STRUCTURAL TECHNOLOGIES
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Specification Manual For

North Palos Fire Protection District

10629 South Roberts Road - Palos Hills, IL 60465

2022 Roof Replacement Project

Date: March 16, 2022
Specification 100-0921-2022

Prepared By:

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STRUCTURAL TECHNOLOGIES INCORPORATED

1. DIVISION 1 -- GENERAL PROVISIONS

1.1. PREPARATION OF PROPOSAL

1.1.1. Proposals must be submitted upon the prescribed Bid Form. All blank spaces on the form must be filled in approximately, in ink or typewritten. Each bidder shall submit as his bid, the bid form, and shall retain a copy for his records. No bid may be withdrawn within thirty (30) days of date bids are due without consent of the Owner (or designated representative).

1.1.2. Erasures or other changes on the Bid Form must be explained or noted over the signature of the bidder. Bids containing any conditions, omissions, unexplained erasures, alterations, irregularities of any kind, or items not called for in the Bid Form, will be rejected as being an informal and incomplete bid.

All bids shall be submitted to North Palos Fire Protection District, c/o Paul Mackin, 10629 South Roberts Road, Palos Hills, IL 60465 in sealed envelopes with the name of the bidder clearly marked. The Contractor Bid Form and all other required information to be submitted shall be placed in a sealed envelope correctly addressed on the outside. The project title Fire Station 1 - Roof Replacement Project shall also appear on the outside of the envelope in the lower left hand corner.

1.2. EXPLANATION TO BIDDERS

1.2.1. No oral explanation in regard to the meaning of the Drawings and Specifications will be made and no oral instructions will be given except at the bid meeting.

1.2.2. Bidders shall act promptly to allow sufficient time for a reply to reach them before the submission of their bids. Any interpretation made will be in the form of an Addendum to the Specifications and/or Drawings which will be forwarded to all bidders.

1.3. AWARD OF CONTRACT

1.3.1. Contracts will be awarded to the lowest responsible bidder. New bids may be requested by the Owner (or designated representative). The Owner (or designated representative) may call upon the Bidders to explain their bid after being submitted and before the contract is awarded. The Owner (or designated representative) reserves the right to accept or reject any and all bids and will award to the Contractor whom in his opinion, will best fulfill the terms of the contract and specification.

1.3.2. Disqualification of Bidders

- Any one or more of the following causes may be considered sufficient for the disqualification of a Bidder and the rejection of their bids.
- Failure to attend the pre-bid meeting.
- Lack of responsibility as revealed by either financial, technical experience or equipment statements requested.
- Lack of expertise as shown by past work, and judged from the standpoint of workmanship and performance history.
- Uncompleted work under other contracts which, in the judgment of the Owner (or designated representative), might hinder or prevent the prompt and/or proper completion of additional work if awarded.
- Being in arrears on existing contracts, in litigation with an Owner (or designated representative) or having defaulted on a previous contract.
- Inability or refusal of the Contractor to post necessary Bonds, Certificates of Insurance and/or documents required by the Owner (or designated representative) as set forth in this Specification.

1.4. OBLIGATION OF BIDDERS

1.4.1. Each Bidder will be required to attend a pre-bid meeting. This is for the purpose of examining the site and conditions under which the Bidder will be expected to execute the specification and contract. Interpretation of specification and drawings will be done at this time.

1.4.2. Each Bidder shall, by careful examination of site or examination of the supplied details and drawings, satisfy himself as to the location of the work, the scope, nature, and character, the quality and quantity of the work to be executed, and the materials to be furnished. Bidders shall also determine what barriers, signs, etc. shall be required to protect property from damage as a result of the project.

1.4.3. After the contract has been entered into, no consideration will be given for any misunderstanding as to the work and materials set forth herein and shown on any of the accompanying Drawings, Details, and Schedules; it being mutually understood that the tender of a bid carries with it an agreement to this and other obligations set forth in the Contract and Specifications, and further implies a full understanding of the Specifications, Drawings and Details, Notes, Scope of Work, Indications and Requirements.

1.4.4. The Bidder is assumed to be familiar with all federal, state and local laws, ordinances, and rules and regulations that may in any manner affect the work. The failure to familiarize himself with applicable laws will in no way relieve the Bidder from responsibility. The Bidder shall post all necessary Performance and Labor Payment Bonds as deemed necessary by the Owner and as required by the State and local authorities. The cost of such Bond shall be itemized and submitted as an extra cost to the Owner (or designated representative).

1.4.5. All enclosed and attached documents, required by North Palos Fire Protection District, in conjunction with this project shall be completed and returned with the Contractor's sealed bid. Verification and compliance with Equal Employment Opportunity laws, Prevailing Wage statutes, etc. may be attached and/or required by the Owner (or designated representative).

1.5. PERFORMANCE BONDS/PAYMENT BONDS

1.5.1. The Owner (or designated representative) will require a Performance Bond on this project. In the event a Performance Bond is required, the bidder shall deliver Performance Bond and Labor and Material Payment Bond to the Owner (or designated representative) not later than the date of execution of the Contract or if the Work is to be commenced prior thereto in response to a Letter of Intent, the Bidder shall, prior to commencement of Work, submit evidence satisfactory to the Owner and the Consultant that such bonds will be furnished. Bonding company/surety shall be rated A-/6 or better in current Key Rating Guide as issued by A.M. Best Company, Oldwick, NJ.

1.5.2. Unless otherwise required as stipulated on the Contractor the Bid Form, the Bonds shall be written on the form of Payment and Performance Bonds, conforming to AIA Document 312™ - 2010 or as applicable FHA No. 2452.

1.5.3. In the event a Bid Bond is required by the Owner (or designated representative), the Contractor must submit a Bond in the amount of five (5%) percent of their total bid in the form of a Cashier's Check, Certified Check or Surety Bond. Upon award of the contract to the Bidder / Contractor, the Contractor shall replace the Bid Bond with a Performance Bond. The cost of the Bid Bond and Performance Bond, when required, must be itemized by the Contractor at the time of the bid (submittal of their bid) and the cost of all such bonds shall be billed "In Addition" to the Base Contract for this project.

1.6. BUILDING PERMITS

The Contractor shall furnish all Building permits, licenses and other governmental or city approvals as required by all agencies or authorized entities in connection with the performance of this project. The cost of Building Permits the portion of work to be completed by the Contractor. Contractor shall submit the cost of the Building Permit which shall be itemized by the Contractor and shall be submitted as a separate cost in addition to the Base Bid for Permit as "Change Order No. 1" upon acceptance of the contract.

1.7. TIME FOR COMPLETION

1.7.1. The Bidder that is awarded the contract will be required to stipulate the number of calendar days required to complete the work and the estimated starting date. If upon the sole judgment of the Owner (or designated representative), the Contractor has failed to initiate the project or is failing to complete the project in a reasonable and timely manner, the remainder of the contract may be withdrawn and awarded to an alternate approved Bidder. Failure on the part of the successful Bidder to execute a contract and deposit an acceptable Performance Bond when required within ten (10) days from the date of notice of the "Award of Contract" will be considered just cause for the annulment of the Award and forfeiture of the Proposed Guarantee to the Owner (or designated representative).

1.7.2. The Owner (or designated representative) shall notify the Bidder (Contractor) by written notice three (3) days prior to withdrawing the balance of the contract. Allowances for weather, strikes, material shortages and events beyond the control of the Contractor and in the estimation of the Owner (or designated representative) and Consultant as just cause to extend the period of time allowed the Contractor prior to initiating work in conjunction with this contract shall be reviewed and agreed to in writing and shall amend the terms set forth herein. Substantial completion of all work set forth in these documents or phase of the project as contracted by the Owner (or designated representative) shall be within one-hundred twenty (120) calendar days from the initiation of the project and not greater than one-hundred eighty (180) days after Award of Contract. Failure to complete work within this stipulated time period may result in cancellation of all or the remaining portion of the contract and re-award to an alternative contractor without penalty to the Owner (or designated representative) in the event it is demonstrated that the Contractor has failed to properly staff the project or has insufficient personnel or equipment at the project site to complete work in a timely and professional manner. Time for completion may be extended at the option of the Owner (or designated representative) based on the total scope of work to be completed when weather conditions permit proper application of the specified materials.

1.8. EVIDENCE OF INSURANCE

1.8.1. The Contractor shall file with the Owner (or designated representative), before commencing work under his Contract, Certificates of Insurance, concerning the insurance coverage herein above provided. If a Bidder fails to comply with the Insurance Provisions set forth in this document, that Bidder may be disqualified from award of the Contract. The Contractor shall include all parties to the Contract as "Additional Insured" and shall be required to include the Consultant – Structural Technologies, Inc. as an additional insured party.

1.8.2. Deductibles and Self-Insured Retentions: Any deductibles or self-insured retentions must be declared to and approved by the Owner (or designated representative). At the option of the Owner (or designated representative), either; the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner (or designated representative), its officers, officials, employees, volunteers and agents; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

1.8.3. Insurance is to be placed with insurers with a Best's rating of no less than A:VII and licensed to do business in the State of Illinois.

1.8.4. Verification of Coverage: Contractor shall furnish the Owner (or designated representative) with certificates of insurance and with original endorsements if applicable effecting coverage required by this clause. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements are to be received and approved by the Owner (or designated representative) before work commences. The Owner (or designated representative) reserves the right to require complete, certified copies of all required insurance policies, at any time.

1.8.5. Sub-Contractors: The Contractor shall include all Sub-Contractors as insureds under its policies or shall furnish separate certificates and endorsements for each Sub-Contractor. All coverage for Sub-Contractors shall be subject to all of the requirements stated herein.

1.8.6. Names and addresses of insureds.

1.8.7. Titles and locations of the operations to which the insurance applies.

1.8.8. The number of the policy and the type of insurance in force thereunder and the date of the certificate.

1.8.9. The expiration date of the policy and the limit or limits of the liability thereunder.

1.8.10. A statement that the insurance of the types afforded by the policy applies to all of the operations and activities on and at the site of the project or incidental thereto, which are undertaken by the Contractor during the performance of his Contract.

1.8.11. A statement as to the exclusions of the policy, if any.

1.8.12. A statement showing the method of cancellation prescribed by the policy. All coverages afforded by the policy shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the Owner (or designated representative).

1.8.13. Refer to Appendix A for Specific Coverage Limitations and Liability.

1.9. PRE-WORK CONFERENCE

1.9.1. Upon award of the contract to the qualified bidder, a pre-work conference will be arranged prior to the scheduled start of the installation. This meeting will be attended by the Contractor or his representative, the Job-Site Supervisor or Foreman, the Specifying Consultant, the Material Manufacturer's Representative and the Owner (or designated representative). This meeting will provide precise time and location of set-up, dumpster placement, safety precautions, access requirements, facility electrical power location and Customer and Contractor contact personnel and emergency numbers for the Owner (or designated representative) and Contractor.

1.10. SUPERINTENDENT

1.10.1. The Contractor shall keep a competent Superintendent, satisfactory to the Owner (or designated representative), on the job site at all times when work is in progress. The Superintendent shall not be changed without notifying the Owner (or designated representative) unless the Superintendent ceases to be in the employ of the Contractor.

1.10.2. The Superintendent shall represent the Contractor in his absence and all instructions given to the Superintendent shall be as binding as if given directly to the Contractor.

1.10.3. The Superintendent shall be responsible for the conduct of all the Contractor's employees on the premises and shall promptly take necessary measures to correct any abuses called to his attention by the Owner (or designated representative).

1.10.4. The Superintendent shall keep a copy of the specification and detail drawings at the job site at all times. The specification may be called on by the Owner (or designated representative), or the specifying Consultant at any time. If the specification is found not to be at the job site, the Superintendent will immediately send a man to the Contractor's office to get a copy.

1.11. EMPLOYEES/SUB-CONTRACTORS -- JOBSITE REQUIREMENTS

1.11.1. All Contractor personnel must comply with all safety and hygiene measures enforced in the areas where work is to be performed. All workmen shall be thoroughly experienced in the particular class of work in which they are employed. All workmen on the jobsite shall adhere to the following behavioral procedures at all times;

- Absolutely no alcoholic beverages or drugs of any nature (except as prescribed by a doctor) will be allowed on the job site.
- Any workmen using abusive language or presenting an offensive appearance shall be removed from the job site.
- Radios and/or other sound devices will not be allowed at the job site unless approved by the Owner (or designated representative) and only in the event these devices do not interfere with building operations or prevent a safety hazard.
- Failure to comply with these provisions may be cause for termination of the contract.

1.12. INSPECTION AND QUALITY CONTROL

1.12.1. The Owner (or designated representative) will authorize and require a representative of Structural Technologies, Inc. to examine the work in progress, as well as upon completion; in order to ascertain the extent to which the materials and procedures conform to the requirements of these specifications and to the published instruction of the primary material manufacturer.

1.12.2. The project will be inspected periodically by a qualified representative of Structural Technologies, Inc... Inspection by a representative of the Material Manufacturer may be required as stipulated in this specification. Periodic inspections by the appropriate Manufacturers during the preparation and installation phases of the roof project will be required. Suppliers, jobbers, distributors, Contractors, or other agents who might represent the Manufacturers are excluded. The material manufacturer's inspector must have at least three (3) years of field experience in all phases of roofing and roof construction including at least two (2) years of continuous employment with the manufacturer of the primary waterproofing membrane.

The representative of Structural Technologies, Inc. shall be responsible for:

1.12.2.1. Keeping the Owner (or designated representative) informed on a periodic basis as to the progress and quality of work. The inspector shall keep a written log of all visits to the job site, all weather conditions during application and definition of the scope of work undertaken on that day.

1.12.2.2. Calling to the attention of the Contractor those matters which he considers to be in violation of the contract requirements.

1.12.2.3. Reporting to the Owner (or designated representative) any failure or refusal by the Contractor to correct unacceptable practices.

1.12.2.4. Conducting preliminary and subsequent job site meetings with the Contractor's official job representative. (See Superintendent).

1.12.2.5. Rendering any other inspection services which the Owner (or designated representative) may request during the project. These services and/or inspections being subject to additional Project Management fees.

1.12.2.6. Certifying, after completion of the work, the extent to which the Contractor has complied with these specifications as well as to the published instructions of the Material Manufacturer's company. Non-conforming work shall be itemized in a Punchlist / Final Punchlist and corrected by the Contractor. Liability for and correction of any non-conforming work or materials shall be solely the responsibility of the Contractor.

1.13. FINAL INSPECTION

1.13.1. As/if contracted with the Owner (or designated representative), a final inspection shall be made by the specifying Consultant and Project Inspector for Structural Technologies, Inc. when all work is one-hundred percent (100%) completed. If more than one final inspection is required because of unfinished or unsatisfactory items, the Contractor must make repairs to obtain final approval.

1.13.2. If all the requirements of the contract have been met and all work has been accepted, the Contractor may invoice for one-hundred percent (100%) of all monies owed. If the final inspection is not passed, a punch list will be issued to the Contractor by the Consultant - Structural Technologies, Inc... All "Punch List" items must be corrected before another final inspection takes place. Any monies retained by the Owner (or designated representative) shall be held not longer than sixty (60) days or until the Owner (or designated representative) has satisfied himself that all work was completed satisfactorily and that all material Waivers of Lien have been received, whichever accounts for less delay in the release of the monies retained.

1.13.3. The final inspection, acceptance date, and payment of all invoices will mark the commencement of the guaranty period. Any guaranty / warranty period will be contingent upon the full payment of all material and labor for completed work. The term of the guaranty or warranty shall be stipulated, in writing by the Contractor and/or Material Manufacturer including all limitations, required maintenance and any pro-rated reduction of coverage during the period of the Warranty / Guaranty.

1.14. NON-COMPLIANCE

1.14.1. Noncompliance with the terms of the Specifications and ensuing contract can result in either the cancellation of the contract or complete replacement of the defective areas at the Contractor's expense. In the event of cancellation, the Owner will not be obligated to compensate the Contractor for any work that has not been completed in strict accordance with the specification, details and contract agreement. Furthermore, damages caused by water infiltration into the building or other areas resulting from the failure of the Contractor to secure each day's work in a weather tight manner, will be corrected at the Contractor's expense. Included as damages will be all labor costs incurred by the Owner as a result of such water infiltration.

1.15. MATERIAL SUBMITTALS/ALTERNATES

1.15.1. Whenever a particular make of material or trade name is shown or specified herein, it shall be regarded as being indicative of the standard required. Material trade names and Manufacturer code designations will be strictly adhered to. Any variation from these material designations will be considered in violation of this specification and may be cause for cancellation of the contract unless prior submittals and approvals were issued by the Owner (or designated representative).

1.15.2. A Bidder proposing to quote on the basis of an alternate material shall submit the following information at least one (1) week prior to the bid due date.

- A quart sample of any adhesive, coating, mastic or sealant.
- A complete roll of each material as shipped from the factory, plus a one (1.0) square foot sample showing the manufacturer's label.
- A certificate from any independent accredited testing laboratory comparing the physical and performance attributes of the proposed material with those of the specified material.
- A written application for approval of the proposed material along with an explanation of where it is to be substituted, in what quantities and all application criteria.
- A list of at least five (5.0) jobs where the proposed alternate material is installed under similar conditions and in a similar application. Each job must be at least three (3.0) years old and each must be available for inspection by the Owner (or designated representative), or the specifying Consultant. Include copies of the manufacturer's warranty for each application.
- A printed copy of the Manufacturer's standard guarantee for the term specified herein. Said guarantee must clearly state the dollar amount of coverage for the installed roof system and shall be issued and serviced by the primary waterproofing membrane manufacturer. Any fees, maintenance programs, etc. required by the manufacturer to supply the guarantee will be included with these submittals.
- A copy of the manufacturer's published specifications detailing the installation of the proposed material under similar conditions.
- A certificate from the manufacturer of the primary waterproofing membrane identifying the installer and certifying that the installer has been approved by the manufacturer for at least two (2.0) years prior to the date of the bid opening.
- A list of at least three (3.0) projects applied by the installer during the past two (2.0) years incorporating the proposed alternate material as the primary waterproofing membrane under similar conditions and in similar applications. Include copies of the manufacturer's warranty for each application.

1.15.3. Any Bidder proposing an alternate material to the specified primary waterproofing membrane shall submit a notarized statement signed by a corporate officer of the manufacturer of the alternate material confirming that they have reviewed the project for consideration and have approved the methods and materials for this installation as set forth herein and will subsequently provide a written guarantee for the installation. The manufacturer shall perform all necessary on site inspections and analysis, at his cost, to ascertain the existing conditions and the method(s) of installation required to comply with this specification.

1.15.4. Consideration shall be given only to those materials that have approval prior to the scheduled bid opening date.

1.15.5. The Owner (or designated representative) reserves the right to be the final authority on the acceptance or rejection of any proposed alternate material.

1.15.6. During the course of the work, the Owner (or designated representative) may secure samples of the materials being used from the containers as cured samples prepared by the Contractor at the job site and submit such samples to an independent testing laboratory for comparison. If the results of the testing laboratory prove the materials are not comparable and equal to the specified materials, the Contractor shall pay for the testing, and the Owner (or designated representative) reserves the right to reject any and all of the work previously completed. Substitution of materials during the course of the project is strictly forbidden and may be cause for cancellation of the remainder of the contract.

1.16. OWNER'S OBLIGATIONS

The Owner (or designated representative) shall supply the Contractor with the following services or information:

1.16.1. Electricity for power tools, etc. -- 110 V ONLY -- 20 Amp fusing. Electric power must be pre-arranged with the Owner (or designated representative) prior to attachment. Any extension cords, plugs, etc. will be supplied by the Contractor.

1.16.2. Name and title of person to report directly to on daily and/or emergency basis (Association / Association Board or designated representative).

1.16.3. Parking and storage on grounds for equipment and materials in areas designated. The Contractor shall assume all liability and responsibility for his equipment and any materials stored at the job site. All equipment shall be secured with chains or cable and a padlock to prevent tampering or theft.

1.16.4. All procedures and equipment used by the Contractor shall conform with most recent O.S.H.A. requirements. The Contractor shall comply with any safety and security procedures additionally stipulated by the Owner (or designated representative).

1.16.5. It shall be the responsibility of the Owner (or designated representative) to isolate the designated areas of and to publish notice to employees, staff, etc. of site work. The Contractor shall be responsible for the protection of structure adjacent to areas where roof work is performed. It being understood that the Contractor may be directed by the Owner (or designated representative) to act on his/their behalf in the application/installation of protective plastic sheeting, structures, etc. and that the Contractor may submit billing for this work unless otherwise included herein.

1.16.6. The Owner (or designated representative) shall notify occupants/employees work has begun. Dust, dirt and debris and chemical fumes generated during the project may be present during the preparation and application of the specified materials. The Owner (or designated representative) shall advise all affected building occupants and personnel and shall instruct them as to the extent of work being undertaken and the exposure to any hazardous materials or dangers associated with the job site. Only qualified personnel will be allowed on the job site.

1.17. PAYMENT TO CONTRACTOR

1.17.1. All payment terms shall be set forth, in writing, prior to the initiation of the project. Both parties shall agree to all terms set forth in this specification and all performance penalties stipulated herein. Payment in the amount of ninety percent (90%) of the total contract amount shall be made upon completion of the work or portion thereof. The balance of ten (10%) percent shall be paid after receipt of final Waivers of Lien for all materials used, sub-contract amounts, etc. and within sixty (60) days of work completion and acceptance of the work by the Owner / Owner (or designated representative). In the event Owner fails to pay any periodic or installment payment(s) due for work completed, Contractor may cease work without breach of contract, pending payment or resolution of any dispute.

1.17.2. The following payment provisions may apply as directed by the Owner (or designated representative);

1.17.2.1. Upon delivery of materials to the job site, the Contractor may submit an invoice for the amount of the materials to the Owner (or designated representative).

1.17.2.2. When the job is in progress, the Owner agrees to pay upon request to the Contractor, a portion of the total contract price equivalent to the percentage of the completed work. The Contractor may submit Pay Requests for completed work not greater than two times per month.

1.17.2.3. Partial payments may be issued to the Contractor by the Owner (or designated representative). Such payments shall be viewed by both parties as progress payments and will not in any way relieve the Contractor of performance obligations under this contract, nor shall such payments be viewed as approval or acceptance of work performed under this contract.

1.17.2.4. All pay requests shall be submitted in duplicate to the Consultant - Structural Technologies, Inc. for review and approval. The Consultant shall inform the Owner (or designated representative) as to the extent of work completed and the accuracy of the billing. Failure of the Contractor to comply with the above will result in holding up the pay request. Partial Waivers of Lien must be submitted with all partial billings. Compliance with this prerequisite will be mandatory.

1.17.2.5. Final payment shall be withheld until all provisions of the specifications and contract are met, including all necessary clean up, and the Owner (or designated representative) receives written verification of completion. The Owner (or designated representative) may retain an amount equal to ten percent (10%) of the monies owed for a period of sixty (60) days after the date of completion of the project or until such point he has assured himself that all Sub-Contractors, manufacturers and suppliers have been paid in full by the Contractor including all accrued charges.

1.17.2.6. Waivers of Lien shall be submitted in duplicate with all invoices. All major material suppliers and Sub-Contractors involved in the job will be identified by the Contractor within their Schedule of Values and Waivers of Lien must be submitted from each of these parties. The Contractor must list all Sub-Contractors and the type of work they performed.

1.17.2.7. Pre-arranged payouts may be negotiated by the Contractor and Owner (or designated representative) prior to the award of the contract. All such payouts will be agreed to in writing prior to the commencement of the project. Any variances or "extras" must be agreed to, in writing, prior to proceeding with the work.

1.17.2.8. All change orders, additions to, or deletions from these documents and specification shall be by written order only. The Owner (or designated representative) is the sole authority regarding change orders and the Contractor shall not change, alter or delete, in any manner, from these specifications without prior written approval. Failure to properly submit the request for any change will void any responsibility on the part of the Owner (or designated representative) to compensate the Contractor or Sub-Contractor for any additional work.

1.17.2.9. In the event of any dispute between the Owner and the Contractor, each party shall agree to submit the dispute to a licensed arbiter or independent party to represent claims of breach or failure to complete work in accordance with the contract documents, specifications, details and all applicable addenda. During the resolution of any dispute the Contractor will be required to secure all materials, construction site, equipment and shall maintain the structure and site in a safe, watertight / weathertight and functional condition. The prevailing party in all disputes shall be reimbursed all costs including but not limited to property damages, material damages, labor, legal fees, court fees and arbitration fees.

1.18. EMPLOYEES AND SUB-CONTRACTORS -- WAGES, ASSIGNMENT, ETC.

1.18.1. This contract may not be assigned or encumbered, nor may the Contractor subcontract the work in whole or part, unless written authorization is first obtained from the Owner (or designated representative). The competence and ability of the Sub-Contractor(s) may be taken into consideration prior to the award of this contract. This and all other writings not withstanding, there shall be no contractual relationship between the Owner (or designated representative) and any Sub-Contractor.

1.18.2. When deemed necessary, the Contractor shall be prepared to submit in writing a list of all Sub-Contractors; their names and business addresses. Sub-Contractors shall be subject to all work related prerequisites set forth in this specification and shall be bound by the contract to perform all work in accordance with this specification to the same extent as the Contractor. Waivers of Lien may be required from all Sub-Contractors prior to release of payment.

1.19. HAZARDOUS MATERIALS

1.19.1. In the event the Contractor encounters on the site material reasonably believed to contain Hazardous Materials (ACM, PIB, etc.), as defined by current E.P.A. or O.S.H.A. regulations, the Contractor shall immediately notify the Owner (or designated representative) and Consultant of the condition and shall suspend all work at the job site until verification of the materials has been performed by a certified professional.

1.19.2. The Contractor may rescind or modify his bid/contract with the Owner (or designated representative) upon the identification of Hazardous Materials at the job site where exposure of his personnel during the performance of the work specified herein involves the removal, containment, isolation or protection from said materials. This provision only applies in the event that these materials were not previously identified and specifically addressed in this Specification and subsequent documents, addenda, etc.

1.19.3. All necessary precautions in accordance with current E.P.A., AHERA and NESHAPS Rules and Regulations shall be implemented by the Contractor upon discovery and/or announcement of such suspicion. Any additional costs associated with monitoring and/or removal of any hazardous materials shall be paid for by the Owner (or designated representative).

1.19.4. The Owner (or designated representative), upon notification by the Contractor or Consultant, agrees to exonerate, indemnify and hold harmless the Contractor and Consultant from and against all demands and lawsuits and all damages, expenses and losses incurred as a result of the removal of Hazardous Materials from the job site by the Contractor.

1.20. UNFORESEEN CONDITIONS

1.20.1. As is the nature of restoration and reconstructive work, not all conditions may be readily apparent and / or indicated in these specifications, bid documents, drawing or details. The Contractor must use reasonable care during all demolition operations to preserve structure which is to remain. Upon the discovery of conditions which may be interpreted to present a structural hazard, Life Safety Hazard or condition which prevents the completion of the work as specified and detailed, the Contractor shall be required to notify the Owner (or designated representative) and the Consultant. Any required modification to the base scope of work, including the performance of work indicated as "Unit Cost" items on the Contractor's Bid Form will be itemized by the Contractor prior to performing these repairs. The Owner / Owner (or designated representative) and the Contractor may agree to a stipulated sum or "not to exceed" value for work performed in conjunction with Unit Cost items. This agreement shall be in written form and shall be signed and authorized by both the Contractor and Owner / Owner (or designated representative).

1.20.2. The Owner / Owner (or designated representative) acknowledge and accept that work performed beyond the Base Bid value and any stipulated unit quantities and pricing is possible and that increases to the Base Bid price will occur when unforeseen conditions arise. The Owner (or designated representative) may, at their (the Association's) expense, retain the services of a Structural Engineer, Consultant or licensed professional to provide a peer review regarding any required additional work or repairs necessitated by unforeseen conditions. Conditions which exist that present a "Life Safety Hazard" will be immediately reported to the Owner / Owner (or designated representative) and may require temporary barricades, shoring, stabilization or removal / demolition. Costs associated with this work shall be set forth by the Contractor, in writing and delivered to the Owner (or designated representative) or their Legal Representative. The Owner (or designated representative) / Owner take full responsibility for conditions which were pre-existing at the property which represent a Life Safety Hazard or structural defect.

1.20.3. The Contractor, the Consultant – Structural Technologies, Inc. and any contracted Structural Engineer, Architect, Sub-Contractor or Sub-Consultant shall be indemnified and held harmless by the Owner (or designated representative)/ Owner for conditions existing at the property / facility which existed prior to the initiation of the specified work. The aforementioned Contractor, Consultant – Structural Technologies, Inc. and any contracted Structural Engineer, Architect, Sub-Contractor or Sub-Consultant shall be indemnified by the Owner (or designated representative) and shall have no liability for the identification of deterioration, including structural damage and Life Safety Hazards which were not readily apparent through visual analysis and could not be identified without invasive demolition or materials testing.

1.21. FORCE MAJEURE

1.21.1. Neither party shall be responsible for any failure to perform or initiate its obligations under this contract, if these services are prevented, obligations or duties are prevented by means of force majeure. Force majeure shall be considered under this contractual agreement any circumstance outside of the control of the Contractor, subcontractor (or) their constituent's control, notwithstanding allowances for acts of god including weather, strikes, material shortages, labor shortages etc. Where there is an event of force majeure, the party prevented from or delayed in performing its obligations under this contract must immediately notify the other party giving full particulars of the event of force majeure and the reasons for the event of force majeure preventing that party from, or delaying that party in performing its obligations under this contract and that party must use its reasonable efforts to mitigate the effect of the event of force majeure upon its or their performance of the contract and to fulfill its or their obligations under the contract. Upon completion of the event of force majeure the party affected must as soon as reasonably practicable recommence the performance of its obligations under this contract. Where the party affected is the contractor, the contractor must provide a revised scheduling of the works to be completed to minimize the effects (both finical and otherwise) on the alternative party and whereas to prevent delay of projects and scope caused by the event of force majeure. An event of force majeure does not relieve a party from liability for an obligation which arose before the occurrence of that event, nor does that event affect the obligation to pay money in a timely manner which matured during the course of negotiations or prior to the occurrence of that event. Examples and definitions of event that may enact force majeure clause included but are not limited to; riots, acts of war, invasion, act of foreign enemies, hostilities (whether war be declared or not) acts of terrorism, civil war, rebellion, revolution, insurrection of military or usurped power, requisition or compulsory acquisition by any governmental or competent authority; (b) mass contagion events including pandemics, ionising radiation or contamination, radio activity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive assembly or nuclear component; (c) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds; (d) earthquakes, flood, fire or other physical natural disaster, (e) strikes at national level or industrial disputes at a national level, or strike or industrial disputes by labor not employed by the affected party, its subcontractors or its suppliers and which affect an essential portion of the works as to be completed under the proposed scope of services which are beyond the control of the Contractor and in the estimation of the Owner (or designated representative) and Consultant as just cause to extend the period of time allowed the Contractor prior to initiating work in conjunction with this contract shall be reviewed and agreed to in writing and shall amend the terms set forth herein.

1.22. INDEMNITY

1.22.1. By submission of these documents the Contractor assumes full responsibility and risk for and agrees to indemnify and hold the Owner (or designated representative) and Consultant – Structural Technologies, Inc., their respective officers, officials, employees, volunteers, and agents harmless against any claims, costs, causes, actions and expenses, including but not limited to attorney's fees incurred by reason of a lawsuit or claim for compensation arising in favor of any person, including the employees or officers or independent Contractors or Sub-Contractors of the Contractor or Owner, on account of personal injuries or death, or damages to property occurring, growing out of, incident to, or resulting directly or indirectly from the performance by the Contractor or Sub-Contractor, whether such loss, damage, injury or liability is contributed to by the negligence of the Owner or by premises themselves or any equipment thereon whether latent or patent, or from other causes whatsoever, except that the Contractor shall have no liability for damages or the costs incident thereto caused by the sole negligence of the Owner.

1.23. CONTRACTOR QUESTIONS

1.23.1. All questions regarding these documents should be directed to the Consultant - Structural Technologies, Inc., 103 Fessler Drive, Bloomingdale, IL 60108. The office of the Structural Technologies, Inc. may be contacted at (630) 351-8200 or E-Mail: structecinc@gmail.com. Requests for additional specification booklets, Construction Drawings, diagrams, etc. will be at the discretion of the Owner (or designated representative) and may require an additional deposit/fee.

1.24. OWNER / CONSULTANT – PROPRIETARY RIGHTS TO DOCUMENTS

1.24.1. These documents have been prepared for the purpose of obtaining competitive bids for the designated project or combination of projects set forth herein. All format, document design, details, drawings and content as prepared by Structural Technologies, Inc., 103 Fessler Drive, Bloomingdale, IL 60108 an independent building restoration consultant firm shall be considered the intellectual property of Structural Technologies, Inc. and shall not be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise except as permitted by the United States Copyright Act without the express prior written permission of Structural Technologies, Inc.. These documents and all attached drawings contain information and specifications which have been prepared for the express purpose of satisfying the contractual agreement between Structural Technologies, Inc. and the client set forth and designated herein. These documents may be copyrighted by Structural Technologies, Inc. and are the intellectual property of Structural Technologies, Inc... Any use of these documents by the client or any other party employed by the client (including their agent) including copying the entirety of this document or any supplied electronic media (CD, floppy disk, etc.) or any part thereof shall be construed as a violation of this agreement. Structural Technologies, Inc. shall take all necessary legal action against any and all parties who shall violate this agreement including the cost of all legal fees, loss of revenue either real or potential that result from the reproduction of these documents, media, drawings, etc...

Structural Technologies, Inc. retains the right to amend or modify the information contained herein and any supplied electronic documents or drawings attached herewith and shall retain the right of usage and reproduction. Only to the extent agreed and authorized in writing by Structural Technologies, Inc. shall the client / end user of this written document, drawings and any supplied electronic media reproduce or otherwise alter or modify these documents. Reproduction of these documents shall be for the sole purpose of preparing a bid package(s) for the purpose of soliciting competitive bids for the designated project set forth herein and/or as required for purpose of review by contracted parties to this agreement.

Structural Technologies, Inc. shall not be held liable for any work performed and based on these documents, drawings or supplied electronic media unless a contractual obligation exists between the client (Building Owner, Architect, Association, etc.) and Structural Technologies, Inc. for the specific project referenced and set forth herein. Any contractual limit of liability imposed by State statute for services provided by Structural Technologies, Inc. shall begin on the date of substantial completion of the project or any phase of the project completed in the same calendar year.

1.25. LIMIT OF LIABILITY & CONTRACTUAL OBLIGATIONS

Structural Technologies, whether contracted for inspection, analysis, project design / development and/or periodic or full time on-site inspection of work being performed in conjunction with contracted services set forth in this agreement shall neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the work performed by any Contractor awarded work as a result of services provided in this agreement between the Consultant – Structural Technologies, Inc. and the Owner (or designated representative), since these are solely the Contractor's rights and responsibilities under their Contractual Agreement and Contract Documents. The Owner (or designated representative) shall be liable for the selection of the contractor and any negotiated terms not specifically set forth in the specifications and bid documents. Project Management and Project Administration services provided by Structural Technologies, Inc. shall be provided on an advisory capacity and do not supplant the Owner's obligations. Structural Technologies, Inc. shall not be held liable for Contractor related project delays, performance or non-compliance with the specifications and drawings or material failure. The Owner's / Association's release of payment to the Contractor does not represent acceptance of completed work by Structural Technologies, Inc... Structural Technologies, Inc. makes no warranties for workmanship or materials, express or implied, under this Agreement or otherwise, in connection with their (Structural Technologies, Inc.'s) contracted services. Structural Technologies, Inc.'s limitation of liability shall be not greater than the total aggregate cost of either design or inspection services provided by Structural Technologies, Inc. in conjunction with this project.

1.26. BID DUE DATE - SUBMITTAL

1.26.1. All bids are due at the offices of the Owner (or designated representative) at the aforementioned location (Section 1.1.2) no later than the time shown below. The Contractor is to include in his pricing all changes, addendum, etc. established by these documents, the Pre-Bid Meeting, and subsequent revisions. Failure to include pricing for revisions prior to the bid opening may be grounds for disqualification of the bidder.

BID DUE DATE: _____

Original Contractor bids may be delivered by Mail or in person to the Attention of Mr. Paul Mackin, North Palos Fire Protection District, 10629 South Roberts Road, Palos Hills, IL 60465.

Phone Number: 708-974-4474
Email: pmackin@northpalosfire.org

Please submit and E-mailed copy of the Contractor Bid Form, in its entirety, at the end of the day on the Bid Due Date to Structural Technologies, Inc...

Phone Number: 630-351-8200
Email: structecinc@gmail.com

1.26.2. Any bids and/or changes which are submitted after the times shown above shall be considered invalid, thus rejected by the Owner (or designated representative) and the Contractor disqualified. The Owner (or designated representative) reserves the right to reject any or all bids and/or to accept any bid which, in his opinion, best satisfies the requirements of the project.

1.27. JOB COMPLETION/INSTALLATION REQUIREMENTS

1.27.1. The Contractor, upon award of a written contract issued by the Owner (or designated representative), shall be required to immediately apply for all necessary permits, shall order all products and provide all equipment as necessary to complete the work in the designated time period indicated for completion It is understood by the Contractor and mutually agreed by and between the Contractor and the Owner (or designated representative) that the date of initiation of the project and the date of completion as specified in the Contract is a reasonable time for the completion of the work, taking into consideration delays for issuance of permits which are beyond the control and/or not the responsibility of the Contractor, the average weather and conditions prevailing at this location. If the Contractor shall neglect, fail, or refuse to complete the work within the time specified in the contract or any proper extension thereof granted by the Owner, it in no way relieves the Contractor of his responsibility to complete the work at no additional cost to the Owner. Should it be necessary to extend the completion date in order for the Contractor to complete the work, the Owner and the Contractor shall prepare a written agreement to extend the completion date provided the Contractor shall not be responsible for failure to meet the completion date when the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the Owner. The Contractor shall not be charged with any excess cost when the delay in completion of work is due to the following:

1.27.1.1. Any order duly issued by the government (city, county, state or federal).

1.27.1.2. Any unforeseeable cause beyond the control and without fault or negligence of the Contractor including, but not restricted to, Acts of God, severe weather, strikes, acts of the Owner (or designated representative), acts of another Contractor in the performance of a Contract with the Owner (or designated representative).

1.27.1.3. Any delays of Sub-Contractors or suppliers occasioned by any of the causes specified in the above subsections. The Contractor shall notify the Owner (or designated representative) within five (5) days prior to any such delay, when reasonably possible.

END OF DIVISION 1 -- GENERAL PROVISIONS

2. DIVISION 2 -- TECHNICAL PROVISIONS

2.1. PROJECT REQUIREMENTS

2.1.1. General -- Scope of Work to be Performed

Furnish all labor, materials, equipment, etc. to complete the project requirements as specified and as reasonably required for the general administration and construction of the specified work as detailed herein. The work involved under this section shall include, but not necessarily be limited to, the following items;

2.1.1.1. Demolition / Preparation

- Erect necessary barricades, temporary closures, ladders, heated storage areas, scaffolding, mechanical lifts, etc. to access the designated areas and to perform all specified roof replacement. Place protective plywood, tarps, etc. adjacent to building, over roof areas, over walkways and landscaping to protect and preserve existing construction and landscaping.
- Erect tarps, plastic sheet or plywood to protect all windows and doors during all phases of demolition and restoration performed in conjunction with this project.
- Contractor to provide rolling canopy protection for sidewalk areas as well as sidewalk barricades and signage to divert people around the areas of construction. As necessary, additional "ground personnel will be employed to monitor walkway and access areas in order to prevent exposure to any falling debris.
- The Contractor shall be required to coordinate the temporary removal and relocation of existing communication towers / antenna and support cables, trays, etc.. In the event the Contractor must contract for the removal and relocation of the antenna or towers, the cost to perform this work shall be itemized and submitted as a Change Order.
- Visually examine and document conditions and deficiencies of the roof mounted equipment, vent units or AC units. Any abandoned units or inoperable units shall be identified and scheduled for removal from the roof during the roof replacement project. Any cost associated with the disconnection or removal of abandoned or inoperable units will be itemized by the Contractor and will be billed "In Addition" to the Base Contract for this project.
- The Contractor shall be require to erect perimeter safety railing, perimeter wall protection, scaffold protection, construction fencing, plywood protection, etc. as required by OSHA and as stipulated by the Owner to protect all public walkways and entries to the structure throughout the duration of the roofing project. Tarps and other means of protection shall be required to prevent any damage to the structure as a result of the roof removal and replacement project. Dumpsters shall be placed in designated areas adjacent to the building using care to not obstruct doorways or public drive areas. Equipment utilized to remove debris and to transport materials to the roof must be located in designated areas and, when in operation, or when lifting / transporting materials to and from the roof area, coordinated with the Owner's representative to prevent any hazard to occupants of the structure or general public.
- The Contractor shall coordinate with the Owner any required installation of HEPA filters on air intake systems as well as the operation of roof mounted HVAC units exposed to dust, debris or chemical fumes. Prior to the initiation of the project, the Contractor shall review all procedures for roof removal and containment of debris with the Owner's representative.

- **Roof Section 1:** Disconnect heat trace cable and brackets. Dis-assemble and remove the gutters and perimeter edge metal in all areas. Cut-away, remove and properly dispose of all existing roof membranes, flashing membranes, insulation and sheet metal to expose the existing wood roof deck, vent curb bases, wood nailers, perimeter walls and flashing substrates.

- **Roof Section 2:** Dis-assemble internal roof drains and set aside drain clamp rings and cast iron or aluminum drain strainers. Plastic drain strainers must be replaced with new cast iron of aluminum drain strainers. Existing drain bolts and nuts utilized to secure clamp rings must be replaced with new hardware. Cut-away and remove the existing roof field membrane, flashings, perimeter sheet metal, lead flashings, etc. to expose the underlying wood *or* metal decking throughout the entire roof area.

- **Roof Sections 3 & 4:** Dis-assemble internal roof drains and set aside drain clamp rings and cast iron or aluminum drain strainers. Plastic drain strainers must be replaced with new cast iron of aluminum drain strainers. Existing drain bolts and nuts utilized to secure clamp rings must be replaced with new hardware. Remove perimeter edge metal and flashings, disconnect and lift vents from curbs using care to prevent damage to any connected ductwork. Remove furnace stack collars and stack bases in all areas. Tear-off to include removal of the roof membrane, insulation, underlying lightweight concrete / gypsum to expose the structural concrete deck surface. Remove damaged / deteriorated perimeter wood nailers and document conditions and linear feet of wood replacement.

- **Alternate 1: Metal Soffit & Vertical Wall Panel Replacement:** As contracted by the Owner upon accepting the contract for removal and replacement of the vertical metal wall panels and metal soffit, including J-channels, corner trim, etc., the Contractor will dis-assemble the wall panel system and soffit system at the perimeter of each roof section. If possible, all sheet metal will be recycled by the Contractor. Upon removing the exterior metal components, the exposed framing and backup sheathing (where present) will be examined for deterioration, decay, corrosion or loss of structural integrity. Any required removal and replacement of deteriorated framing or sheathing shall be performed on a "Unit Cost" basis to be itemized by the Contractor and billed "In Addition" to the Base Contract for the project.

- **Metal Deck Areas:** Replace structurally damaged metal decking with new galvanized metal decking matching existing deck profile. New decking must be minimum twenty (20) gauge thickness and must be installed to "nest" and overlap surrounding structurally sound metal decking by a minimum of twelve (12.0) inches. All new decking must be secured to structural joists at each end with self-drilling No. 10 or larger stainless steel screw fasteners installed at the base of each deck flute and not greater than six (6.0) inches on-center. Sidelaps in the decking must be secured every twelve (12.0) inches on-center with similar No. 10 or larger stainless steel screw fasteners. The Contractor must document, itemize the total square footage and submit a written Change Order for the exact square footage of deck replacement performed in conjunction with this project.

- **Metal Deck Areas:** Mechanically clean the metal deck surface in all areas where the existing decking exhibits non-structural surface corrosion prior to application of rust inhibitive coating. Remove / sweep debris from all deck flutes. Report any improperly supported or attached deck sections and perform all necessary repairs to secure the decking prior to installation of the vapor barrier membrane. At any deck openings adjacent to skylights, vents or curbs, the metal decking must be properly supported by structural steel angle secured to load bearing joists. Installation of steel angle supports shall be itemized by the Contractor and submitted in writing for authorization by the Owner. Installation of steel angles around all deck openings of greater than twelve inches in diameter or cross-section shall be itemized by the Contractor and submitted "In Addition" to the Base Bid for this project. Mechanical cleaning and coating of corroded metal deck surfaces will be measured by the Contractor, itemized and submitted as a written Change Order billed "In Addition" to the Base Bid for this project.

- **Concrete Deck Areas:** (Roof Sections 3 & 4) Upon completing the removal of the existing roof system and underlying insulation, the Contractor will be required to scrape or peel any vapor barrier membrane or self-adhered membrane from the deck surface. Visually examine the concrete deck and document any deck damage or irregularities requiring corrective action. Repairs to the concrete deck will be completed with high strength polymer mortar or self-leveling mortar. Repairs to the concrete deck shall be completed on a Unit Cost Basis to be itemized and submitted as a Change Order.

- **Wood Deck Areas:** Upon completing the removal of the existing roof system and underlying insulation, the Contractor will perform visual inspection of the wood decking to identify any required replacement due to decay, diminished structural capacity or inadequate capacity to span areas and support roof loads as per Building Code. Replacement decking will be Exterior Grade Plywood Sheathing with a minimum thickness of three-quarters (0.75) inch. Decking must be installed to approximate the existing decking in total thickness. Maximum span between supports shall not be greater than twenty-four inches. Any required installation of additional interim support trusses or framing must be documented by the Contractor, itemized and submitted on a Unit Cost Basis to be billed "In Addition" to the Base Contract for this project. All decking must be properly secured to underlying framing with corrosion resistant No. 10 or larger wood screw fasteners sized to penetrate the underlying frame member by not less than one and one-half (1.50) inch. Secure decking at intervals of six (6.0) inches on-center. Install "H" clips at edges of replacement sheathing.

- Inspect existing perimeter and projection wood nailers and curbs and replace all rotted or structurally damaged wood nailers with new pressure treated wood nailers of the same dimension. Installation of replacement wood nailers and curbs shall be itemized by the Contractor and submitted "In Addition" to the Base Bid for this project.
- Install new pressure treated wood nailers at all unit curbs and perimeter roof edges as required to provide proper height of finished flashings and installed perimeter edge metal. Installation of new pressure treated wood nailers and curbs to compensate for the height / thickness of the installed new tapered insulation, tapered insulation drainage saddles or crickets shall be included in the Contractor's Base Bid for this project. All new wood nailers to be secured with appropriate corrosion resistant screw fasteners. Any required replacement of deteriorated / rotted or damaged wood nailers will be performed on a "Unit Cost" basis in addition to the Base Contract. All wood nailers must be secured in accordance with ASCE-7 Wind Uplift requirements, current International Building Code requirements and SMACNA requirements for existing exposure.
- Remove sanitary stack lead flashings to expose piping. Remove furnace stack base cone and weather collars and discard. Remove all "pitch" pans and temporarily disconnect the multi-port utility rubber boot flashings and boot base. Boot flashings may be re-used and incorporated into the new roof system provided the flashing and base are in good condition and can be re-installed in a manner which provides long term waterproofing integrity.
- Install new PVC stack extensions as required to extend sanitary stacks / soil stacks to minimum clearances above the finished roof system as require by Plumbing Code. Typical height of stacks must not be less than twelve (12.0) inches above the roof surface.
- Remove all existing static vent hoods which were fabricated with "plastic" vent caps (exhibiting damage) and discard. Replacement hoods will be required at all nine (9) locations. Contractor is to verify size and location of all replacement vent caps and shall include the cost for replacement in their Base Bid for this project.

2.1.1.2. Construction / Installation

- **Roof Sections 1 & 2 – Wood Deck:** Sweep and clean the roof deck surface to remove debris. Re-set or remove and replace any nails or projections from the roof deck. Inspect the roof decking for evidence of damage or deterioration requiring removal and replacement. Install new three-quarters (0.75) inch thickness Exterior Grade C-D Exposure 1 Plywood secured to framing with corrosion resistant No. 10 or larger screw fasteners in accordance with ASCE-7 Wind Uplift requirements. All deck replacement shall be itemized and billed "In Addition" to the Contractor's Base Bid for this project.
- **Roof Section 2 – Metal Deck:** Replace structurally damaged metal decking in all areas with new decking configured to match the existing decking. Removal of deteriorated decking and installation of new twenty (20) gauge galvanized metal decking shall be itemized and submitted "In Addition" to the Base Bid for this project. All new decking to be secured with self-drilling corrosion resistant screw fasteners installed at intervals of not greater than twelve (12.0) inches on-center at bar joist connections and not greater than six (6.0) inches on-center at deck overlap / tie-in conditions. All required metal deck replacement shall be itemized and submitted "In Addition" to the Base Bid.
- **Roof Section 2 – Metal Deck:** Sweep and clean all deck flutes to remove debris prior to application of paint coating. Apply rust inhibitive paint coating over all structurally sound rusted metal deck surfaces to completely encapsulate / coat the exposed metal deck surface. All required rust inhibitive coating of the metal deck shall be itemized and submitted "In Addition" to the Base Bid.
- **Roof Sections 3 & 4 – Concrete Deck:** Examine the concrete deck surface for evidence of structural damage, structural cracking or deflection. The Contractor shall be required to document any observed damage and shall perform necessary repairs, as directed by the Consultant, to restore areas to a condition which is both structurally sound and suitable as a substrate of the new roof system. Any required concrete deck repairs shall be itemized by the Contractor and billed "In Addition" to the Base Contract for this project.
- The Contractor shall be required to install new wood blocking nailers at the perimeter of the roof to compensate for the tapered insulation (total thickness of insulation). The new wood blocking shall be "structural" grade, free of defects, warp and splits and shall be installed and secured to the existing nailers or substrate (i.e. concrete wall panel or steel framing) with appropriate screw fasteners as per ASCE 7-10 Wind Uplift requirements. Screws must sufficiently penetrate the substrate to a depth of not less than one and one-half (1-1/2) inch and have a pull-out resistance tested to equal or exceed requirements set forth in ASCE 7-10. Fastener spacing must not exceed eight (8.0) inches on-center.
- Wrap the top of the perimeter wood nailer(s) with self-adhered waterproofing membrane (Grace Ice & Water Shield or equivalent self-adhered waterproofing membrane) extending the membrane down the outside and inside face of the wall to one (1.0) inch below the base of the bottom wood nailer.

- **Roof Sections 1 & 2 – Wood Deck:** After completing the necessary repairs to the wood decking, the Contractor shall be required to install a single ply self-adhered vapor barrier membrane over the entire wood deck surface. As required by the vapor barrier manufacturer, the wood deck surface may be prime coated with proprietary primer to enhance adhesion of the vapor barrier membrane. Align the vapor barrier membrane perpendicular to the slope-to-drain / slope-to-gutter using care to sidelap the membrane a minimum of three (3.0) inches in downslope manner. Endlaps must be staggered by not less than three (3.0) feet and shall be a minimum of six (6.0) inches of overlap. Hand press and roll seams to ensure adhesion. Wrap the vapor barrier membrane over all perimeter edges of the roof and extend the membrane up curb and vertical wall surfaces a minimum of six (6.0) inches.
- **Roof Section 2 – Metal Deck:** In areas where the existing roof decking is metal, the Contractor will be required to install a single ply of non-reinforced 40 mil. Fire Rated EPDM Membrane. The EPDM rubber membrane will be aligned perpendicular to the slope-to-drain. Using the Material Manufacturer's approved splice wash, primer and butyl seam tape, the Contractor shall adhere the sidelaps and endlaps in the EPDM rubber membrane to achieve a watertight vapor barrier system over the metal deck area. Tie-in the EPDM membrane to the self-adhered vapor barrier membrane using butyl seam tape or liquid resin membrane. Extend the EPDM membrane over all perimeter edges of the roof and up all vertical wall or curb surfaces a minimum of six (6.0) inches. Apply a continuous bead of one-part polyurethane caulking at the termination of the EPDM membrane at vertical wall and curb surfaces.
- **Roof Sections 3 & 4 – Concrete Deck:** After completing any necessary repairs to the concrete deck, as required by the vapor barrier membrane manufacturer, the Contractor shall apply the Material Manufacturer's approved primer prior to the installation of the continuous self-adhered vapor barrier membrane. When residual air temperatures are less than forty (40°) Fahrenheit, the Contractor shall be required to install a fully heat welded vapor barrier membrane in lieu of the self-adhered membrane. The vapor barrier membrane will be installed perpendicular to the slope to internal drains. Wrap the vapor barrier membrane up all vertical curb and wall surfaces to the top of the intended insulation height.
- **Roof Sections 1 – Wood Deck:** Upon completing the installation of the vapor barrier membrane, the Contractor will install new polyisocyanurate insulation throughout all areas using care to stagger rows of insulation perpendicular to the slope to gutter edge. The base course of insulation shall be a minimum three and one-half (3-1/2) inch thickness. A second course of one-eighth (0.125) inch tapered insulation with minimum thickness at the gutter edge of one and one-half (1-1/2) inch shall be installed on the "flat" roof areas along the north and south perimeters of this roof section. On the sloped "barrel" portions of the roof, a second course of two (2.0) inch thickness polyisocyanurate insulation shall be installed. The base course of insulation must be mechanically secured to the underling decking with No. 12 screw fasteners fitted with three (3.0) inch galvanized plate washers. Attachment of the insulation boards shall comply with ASCE-7 Wind Uplift Code and shall conform to Factory Mutual FM-1-60 anchoring requirements. A minimum of eight (8) fasteners shall be installed in the roof field, twelve fasteners in Zone 2 – exposed roof edges and sixteen (16) fasteners in Zone 3 exposed outside corners. Install a second course of tapered or flat stock polyisocyanurate insulation will be fully adhered with low rise foam insulation adhesive applied in ribbons at six (6.0) inches on-center spacing. Install a final course of high density glass faced gypsum board over the polyisocyanurate insulation using care to stagger the seams over the base course(s) of insulation. Align the glass faced gypsum board perpendicular to the roof slope-to-gutter edge and secure the overlayment board with low rise foam adhesive applied in ribbons at not greater than six (6.0) inches on-center spacing. Ballast areas of insulation during cure of the insulation adhesive. Fill all gaps of greater than one-half (0.50) inch with rigid insulation or expansion foam.

- **Roof Section 2 – Wood & Metal Deck Areas:** The Contractor shall install a base course of three and one-half (3-1/2) inch thickness flat stock polyisocyanurate insulation over the installed vapor barrier membrane aligning the longest dimension of the insulation board perpendicular to the slope-to-drain. Secure the insulation to the underlying decking with No. 12 self-drilling screws fitted with three (3.0) inch galvanized plate washers. Attachment of the insulation boards shall comply with ASCE-7 Wind Uplift Code and shall conform to Factory Mutual FM-1-60 anchoring requirements. A minimum of eight (8) fasteners shall be installed in the roof field, twelve fasteners in Zone 2 – exposed roof edges and sixteen (16) fasteners in Zone 3 exposed outside corners. Install a second course of eighth (0.125) inch per foot tapered polyisocyanurate insulation fully adhered with low rise foam insulation adhesive applied in ribbons at six (6.0) inches on-center spacing. Minimum average "R-value" of the installed insulation system shall not be less than thirty (30.0). Install a final course of high density glass faced gypsum board over the polyisocyanurate insulation using care to stagger the seams over the base course(s) of insulation. Align the glass faced gypsum board perpendicular to the roof slope-to-gutter edge and secure the overlayment board with low rise foam adhesive applied in ribbons at not greater than six (6.0) inches on-center spacing. Ballast areas of insulation during cure of the insulation adhesive. Fill all gaps of greater than one-half (0.50) inch with rigid insulation or expansion foam. Insulation at internal drain locations shall be reduced by two and one-half (2.5") inches and a "flat sump" area of not less than thirty-six (36.0") inches must be formed to promote drainage. Contractor shall include in their Base Bid any additional insulation required to divert water and correct ponding conditions which remain greater than forty-eight (48) hours after a heavy rain. Final configuration of the insulation shall provide positive drainage from all roof areas based on this requirement.
- **Roof Section 3 & 4 – Concrete Deck Areas:** The Contractor shall install a base course of three and one-half (3-1/2) inch thickness flat stock polyisocyanurate insulation over the installed vapor barrier membrane aligning the longest dimension of the insulation board perpendicular to the slope-to-drain. Fully adhere the insulation to the installed vapor barrier membrane with low rise foam insulation adhesive. Adhesion of the insulation boards shall comply with ASCE-7 Wind Uplift Code and shall conform to Factory Mutual FM-1-60 wind uplift requirements. Install a second course of eighth (0.125) inch per foot tapered polyisocyanurate insulation fully adhered with low rise foam insulation adhesive applied in ribbons at six (6.0) inches on-center spacing. Minimum average "R-value" of the installed insulation system shall not be less than thirty (30.0). Install a final course of high density glass faced gypsum board over the polyisocyanurate insulation using care to stagger the seams over the base course(s) of insulation. Align the glass faced gypsum board perpendicular to the roof slope-to-gutter edge and secure the overlayment board with low rise foam adhesive applied in ribbons at not greater than six (6.0) inches on-center spacing. Ballast areas of insulation during cure of the insulation adhesive. Fill all gaps of greater than one-half (0.50) inch with rigid insulation or expansion foam. Insulation at internal drain locations shall be reduced by two (2.0") inches and a "flat sump" area of not less than thirty-six (36.0") inches must be formed to promote drainage. Contractor shall include in their Base Bid any additional insulation required to divert water and correct ponding conditions which remain greater than forty-eight (48) hours after a heavy rain. Final configuration of the insulation shall provide positive drainage from all roof areas based on this requirement.
- **All Roof Sections:** Install new fire resistant perlite cant strips, loose laid or set in asphalt mastic / adhesive, as per membrane manufacturer's published recommendations.
- **Roof Sections 1 & 2:** Install the base ply of self-adhered Modified Membrane using care to prevent improper alignment. Position the membrane perpendicular to slope beginning at the roof perimeter gutter edge or internal drain location(s). Unroll the membrane and allow the membrane to "relax" as per the Manufacturer requirements based on temperature. Wrap the base ply of self-adhered membrane over perimeter wood nailers to encapsulate the roof edge. Remove the release film from the underside of the membrane and adhere the membrane directly to the perimeter wood nailer(s) and glass-faced gypsum board surface. Use a weighted roller and broom to press and adhere the membrane to the substrate. In the event the base ply of self-adhered membrane is not completed with installation of the cap ply of membrane during the same day, the Contractor will be required to utilize a hot air gun to hand-weld all seams. Install the final ply of granule surfaced SBS Modified Membrane – Class A Fire Rated roof system heat welded over the base ply as per the specifications. Installation of the roof membrane must comply with the specifications and published installation requirements stipulated by the Material Manufacturer for a fully warranted roof assembly. Install a new two (2) ply SBS Modified Membrane flashing assembly. The base ply flashing membrane will be a smooth surfaced self-adhered modified membrane and the granule surfaced cap ply flashing membrane shall be fully adhered by heat welding. Secure vertical flashings with a continuous aluminum metal termination bar. Install fasteners every 8 – 10 inches on-center and apply a continuous bead of one-part polyurethane caulking sealant or asphalt mastic along the upper edge of the flashing membrane where it contacts the wall or curb surface.

- **Roof Section 3 & 4 – Concrete Deck Areas:** Install a two (2) ply SBS Modified Membrane – Class A Fire Rated roof system (both the base ply and the cap ply will be heat welded) per specifications. Installation of the roof membrane must comply with the specifications and published installation requirements stipulated by the Material Manufacturer for a fully warranted roof assembly. Install a new two (2) ply SBS Modified Membrane flashing assembly. The base ply flashing membrane will be a smooth surfaced torch weldable modified membrane and the granule surfaced cap ply flashing membrane shall be fully adhered by heat welding. Secure vertical flashings with a continuous aluminum metal termination bar. Install fasteners every 8 – 10 inches on-center and apply a continuous bead of one-part polyurethane caulking sealant or asphalt mastic along the upper edge of the flashing membrane where it contacts the wall or curb surface.
- Install new galvanized furnace stack jacks and flashings at all locations to replace existing stack jacks. Contractor shall include the replacement of existing stack jacks and weather collars in their Base Bid.
- Install new three and one-half (3.5) pound lead soil vent sleeve flashing placing the flashing into a continuous bed of asphalt mastic and wrapping the lead into the stack a minimum of one (1.0) inch. Prime coat and strip-in the horizontal portion of the lead flashing flange with two plies of modified bitumen membrane. Finished height of all sanitary stacks *must not be less than* twelve (12.0) inches.
- Secure the upper edge of vertical flashings with a surface mounted aluminum metal termination bar secured at intervals of not greater than twelve (12.0) inches on-center spacing. Position the termination bar to allow for application of a continuous bead of one-part polyurethane caulking sealant along the upper edge of the bar to achieve a watertight condition at the interface with the wall or curb.
- Install new pre-finished surface mounted metal counterflashing or slip-metal flashing (inserted beneath equipment curb cap flanges) at all vertical flashing locations. Secure the counterflashing above the termination bar using appropriate wood, sheet metal or masonry / concrete screw fasteners installed not greater than twelve (12.0) inches on-center. Apply a continuous bead of one-part polyurethane caulking along the upper edge of the metal counterflashing and tool finish to achieve a watertight condition.
- Where vertical flashing height is less than six (6.0) inches as measured from the surface of the field membrane, the Contractor will be required to apply a base coat of resin coating, embed fleece fabric reinforcement and apply a final coating of resin to encapsulate the fabric. All resin flashing systems to be manufactured by or approved by the primary Roof Membrane Manufacturer.
- Apply fibrated aluminum paint coating to all vertical and horizontal field and flashing laps and to all de-granulated, surface abraded or surface damaged membrane. Aluminum coating must also be applied to all resin flashing installed at designated locations.
- Install new pre-finished twenty-four (24) gauge galvanized, .032 aluminum, approved polymer or No. 304 stainless steel metal pitch pans as required in designated locations at pipe penetrations. Fill based of pitch pans with non-shrink polymer concrete and complete all pitch pans with self-leveling polyurethane or silyl-terminated polyether sealant. Install new pre-finished galvanized, aluminum or No. 304 stainless steel metal weather crowns over all pitch pans secured to the penetration or conduit and sealed with a continuous bead of one-part polyurethane caulking sealant. As an alternative to using pourable sealant, the Contractor may substitute polyester fleece mesh reinforced resin flashings where existing conditions prevent effective long-term waterproofing at pipe or conduit penetrations.
- Install new internal drain flashings and minimum three and one-half (3.5) pound lead flashings at existing internal drain locations. Prime coat and install modified membrane target and field ply flashings over installed lead drain flashings.
- Install pre-fabricated polymer pipe supports and EPDM walkway pads to support the existing gas lines or electrical conduit where they pass over the new roof. Supports shall be spaced at intervals which prevent overloading any individual support and in strict compliance with the pipe support manufacturer's recommendations. Pipe supports shall be included in the Contractor's Base Bid for this project.
- Coordinate the re-installation / placement of antenna support frames and rubber pads placed over the new roof membrane. Install / apply concrete block (CMU) ballast to frame to prevent wind uplift as per the antenna frame manufacturer's requirement to ballast the frame per ASCE 7-10 wind load specifications. The Owner shall be responsible for any wiring disconnect / reconnect and adjustment of the antenna.

- **Roof Section 1 – Gutter Installation:** Install new .032 (20 gauge) aluminum flange mounted metal gutters and downspouts at all perimeter edges of the roof. Secure the flange mounted commercial six (6.0) inch commercial box gutters to the perimeter wood nailer using stainless steel countersunk screw fasteners installed not greater than six (6.0) inches on-center in two staggered rows. Secure gutter brackets, splice plates, supports, etc. as required by the gutter manufacturer (pre-fabricated Metal-Era ICG-2) or as stipulate per ASCE 7-10 requirements for wind uplift and attachment to the perimeter wood nailers. Install new 4.0 inch x 6.0 inch pre-finished .032 (20 gauge) aluminum metal downspouts secured to the gutter with stainless steel screw fasteners. Downspouts to be located at current "pre-existing" locations.
- Prime coat the gutter flange surface and heat weld a single ply of smooth surfaced Modified Membrane over the flange extending not less than eight (8.0) inches beyond the flange over adjacent smooth surfaced (Base Ply) of field membrane. The final ply of granule surfaced Modified Membrane will be installed and terminated approximately one-quarter inch (0.25") from the inside face of the gutter. Where possible, the field membrane will be the final ply of membrane installed to strip-in the gutter flange. Prior to bonding the flashing to the field membrane, the Contractor will heat the field ply at the lap condition and embed the granules to achieve optimal bond between the flashing ply and field ply. At the termination of the granule surfaced flashing ply on the inside face of the gutter, the Contractor must apply and tool finish a continuous bead of one-part polyurethane caulking.
- **All Roof Sections – Perimeter Edge Metal Installation:** Fabricate and install G-90 twenty-two (22) gauge galvanized metal cleats and new pre-finished twenty-four (24) gauge galvanized metal edge flashing (gravel stop) at designated / existing locations. Sheet metal shall be configured and installed to comply with current SMACNA and Factory Mutual wind uplift, design and attachment requirements. Secure all metal cleat sections with corrosion resistant screw fasteners installed at not greater than twelve (12.0) inches on-center. The new perimeter edge metal / gravel stop must be attached to the continuous metal cleat and the horizontal flange secured with corrosion resistant countersunk No. 12 screw fasteners installed not greater than twelve (12.0) inches on-center in two staggered rows. Alternative attachment with 8D double dipped galvanized corrosion resistant ring shank nails installed every six (6.0) inches on-center will be accepted. Perimeter edge metal must be configured to provide a vertical face with reinforced "break" to prevent oil canning when face dimension is greater than eight (8.0) inches. Pre-fabricated or shop fabricated perimeter edge metal must comply with ASCE 7-16 Wind Uplift / Wind Load requirements. Note: In the event the Owner contracts for the replacement of the vertical metal wall panels, the installation of the metal cleat and perimeter edge metal must be coordinated with the installation of the new metal wall panels to achieve a weathertight condition and overlap of the metal edge extending down the outside face of the metal wall panel(s).
- The Contractor is to include, in their Base Bid, the replacement of the existing "plastic" curb mounted vent caps (nine locations) with new galvanized metal vent caps sized to match the existing curb base and vent capacity. Submit Material Manufacturer information and Shop Drawings for review and approval prior to ordering and installing the new vent caps.
- Clean-up and remove all debris, containers, waste, etc. from the roof surface and grounds surrounding the job site and staging areas daily as specified and upon completion of the project.
- Project Base Bid will include all items in the Specification Documents, Construction Drawings, Addendum's (if applicable), Pre-Bid Meeting and any other correspondence during the bidding process. Any discrepancies in any of the aforementioned documents will be brought to the attention of Structural Technologies, Inc. prior to submitting the project bid. Any questions / concerns regarding the scope of work, materials, etc. to be included in the Base Bid, will be brought to the attention of Structural Technologies, Inc. prior to the submittal of the project bid and approval of the project contract documents.

- **Alternate 1 – Sheathing Installation:** Replacement of the existing vertical metal wall panels and soffit system *in all areas* shall include the installation of three-quarters (3/4) inch thickness Exterior Grade CDX plywood secured to the underlying framing where existing sheathing is deteriorated or missing. Installation of plywood sheathing shall be itemized by the Contractor and submitted as a Change Order to be billed "In Addition" to the Contractor's Base Bid for this project.
- **Alternate 1 – Air Barrier Membrane Installation:** The Contractor shall be required to install a single ply of water resistive air barrier membrane (Typar MetroWrap or equivalent) directly over the sheathing or metal stud framing components. Tape all seams with the Material Manufacturer's material. Wrap membrane beneath soffit areas and terminate the vertical upper edge of the membrane on the outside face of the wood nailers installed at the roof perimeter edges. Secure the membrane with plastic cap ring shank nails.

- **Alternate 1 – Metal Wall Panel & Soffit Installation:** Install new pre-finished aluminum metal J-channel secured to the existing framing or new plywood panels with stainless steel No. 10 countersunk screw fasteners installed every twelve (12.0) inches on-center. Secure J-channel at the outside "exposed" edge of the soffit and along the inside of the soffit where the soffit terminates against the masonry wall of the structure.
- Install pre-finished twenty-four (24) gauge aluminum metal drip edge flashing at the base of the vertical wall. Secure the drip edge flashing over the installed waterproofing membrane using No. 10 countersunk stainless steel screw fasteners installed every 12 – 16 inches on-center. Fasteners heads shall be set flush to slightly indenting the surface of the drip metal vertical flange.
- Install new pre-finished "weeping" / perforated J-channel at the base of the vertical wall panel over the metal drip edge. Secure the weeping J-channel over the drip edge with stainless steel No. 10 screw fasteners sized to penetrate the plywood substrate. Install fasteners every 12 – 16 inches on-center.
- Base Bid to include installation of new low profile twelve (12.0) or sixteen (16.0) inch width pre-finished twenty-four gauge vertical aluminum metal wall panels with a one (1.0) inch width "reveal" in the vertical panel face. Prior to the installation of the vertical wall panels, the Contractor must install a pre-finished weeping J-channel and drip edge flashing at the base of the wall where the vertical panel will terminate. The upper edge of the panel will terminate approximately flush with the top wood nailer installed at the perimeter of the low slope roof section(s). Secure the upper edge of the wall panel with neoprene gasketed self-drilling No. 10 stainless steel screw fasteners installed every twelve (12.0) inches on-center.
- The Base Bid will include the installation of horizontal soffit panels installed beneath the existing soffit. New soffit "eave" panels will be fabricated from twenty-four (24) gauge pre-finished "flush" aluminum metal with matching the panel configuration (12.0 inch or 16.0 inch) and Manufacturer of the vertical soffit wall panels. Soffit panels will be inserted into the J-channel and secured to the underlying framing or plywood / new plywood sheathing with stainless steel No. 10 corrosion resistant screw fasteners installed not greater than twelve (12.0) inches on-center.
- Apply a continuous bead of color matched one-part polyurethane caulking sealant where the drip edge and soffit J-channel interface to form a watertight / airtight condition.
- Apply a continuous bead of color matched one-part polyurethane caulking sealant where the soffit J-channel abuts the vertical masonry wall surface. Tool finish the caulking sealant to achieve a uniform appearance and watertight condition.
- Remove all protective film from metal wall panels and clean surfaces to remove any excess caulking sealant(s), dirt, oils, etc.. Contractor must use the Material Manufacturer's touch-up paint to repair any scratches in the metal panels.

2.2. REQUIREMENTS/JOB SITE CONDITIONS

2.2.1. Existing Site & Building Conditions

The plans do not entirely show the existing building and site in total detail. The Contractor must visit the existing building and site of construction and ascertain for himself the exact conditions existing and the extent of the work required. It is to be understood that his failure to do so will be no excuse for claims resulting from his lack of knowledge of the existing conditions, and he is to base his bid on the conditions of the site and existing building "AS IS". He is to provide a fully completed project in accordance with the plans. It is the Contractor's responsibility to make any investigations he feels necessary to determine the exact existing conditions. Conditions existing that were undetermined at the time of inspection and could not be anticipated with reasonable inspection procedures will be reviewed with the Owner (or designated representative) and any "extra" charge determined to be necessary to amend the deficiencies to ensure a quality installation will be agreed to in writing prior to proceeding with any work.

2.2.2. Measurements

Before ordering any material or doing any work, each Contractor shall verify all measurements or scope of work indicated at the site and shall be responsible for contacting the Consultant and Owner regarding any discrepancy. The Base Scope of work shall be as indicated in the written specifications and as indicated on the Drawings and Details. No extra charge or compensation will be allowed on account of error in obtaining actual dimensions or failure to include the designated scope of work and restoration indicated in the specifications, details and drawings provided for the project. If unforeseen conditions are discovered, or additional work is required beyond the Base Bid, this information and scope of work shall be submitted to the Consultant - Structural Technologies, Inc. for consideration before proceeding with the work. Additional area or work negotiated with the Contractor while on-site shall be "bid" and accepted by the Owner (or designated representative) and will be agreed to in writing prior to proceeding with the work. All measurements for these additional areas will be verified by the Owner (or designated representative) as well as the Consultant - Structural Technologies, Inc...

2.2.3. Interpretation

Reference must be made to the drawings for all measurements. The measurements given on the plans shall be checked by the Contractor before proceeding with his work and any discrepancy reported to the Owner and the Consultant.

2.2.4. Cleaning

The Contractor is responsible for and shall keep the premises clean at all times and shall remove all rubbish regularly without fail and immediately upon direction, insofar as applicable to his work. Upon completion of the work, the Contractor or each Sub-Contractor shall clean up around the new work and leave the structure and grounds in a neat, clean and uncluttered condition. Debris will not be stored on the roof deck except during the process of removing the material. Debris boxes shall be covered at the end of each day with a protective tarp secured to the box with ropes. Debris boxes shall be immediately removed from the job site when filled.

2.2.5. Miscellaneous Utilities

2.2.5.1. The Contractor shall be responsible for providing portable generators for all electrical power necessary to power air compressors, lights, etc.. All connections to the electrical generators will be furnished by the Contractor. Any temporary lights necessary to perform the work will be furnished by the Contractor. Where extension cords may come in contact with water or other conductive surfaces, the Contractor shall supply necessary GFI (Ground Fault Interrupted) plugs and connections to avoid any potential hazard or electrical shock to personnel. All electrical cords shall be in good condition and shall be sized sufficiently to accommodate electrical load without overheating.

2.2.5.2. Water for washing and drinking purposes will be furnished by the Owner. Any connections to the water system shall be completed by the Contractor. The quality of the water supplied for the mixing of mortars shall be reviewed prior to proceeding with the mixing process.

2.2.5.3. At the completion of the work, or when the above connections are no longer required, the Contractor shall remove all connections and leave the facilities in a condition at least as satisfactory as prior to the commencement of his work.

2.2.5.4. Temporary toilet facilities will be provided by the Contractor upon request by the Owner (or designated representative). Temporary toilets will be delivered to the job site and shall be located in a manner so as not to create a sanitary or environmental hazard. The Owner's facilities shall only be used by the Contractor personnel if the Owner (or designated representative) has granted prior permission to access the building for use of their facilities. Any debris, cleaning chemicals, coatings, etc. which are "tracked" over the floor surfaces in the interior of the building and directly attributable to the Contractor's personnel will be cleaned or removed to the satisfaction of the Owner (or designated representative) at the Contractor's expense.

2.3. SCOPE OF WORK, STORAGE AND SITE CONDITIONS

2.3.1. General -- Scope of Work to be Performed

Furnish all materials, equipment, perform all labor and operations to remove the existing roof membrane(s), insulation, light weight concrete, perimeter edge sheet metal, flashings, etc. and inspect the wood, metal or concrete decking. Remove damaged or deteriorated wood or metal decking and replace sections, as required. Apply corrosion resistant coating to structurally sound metal decking exhibiting surface rust. Repair concrete deck areas exhibiting spalling or surface damage with appropriate polymer concrete mortar. Install new pressure treated wood nailers at perimeter edges of each roof section to compensate for the new insulation thickness. Install a vapor barrier membrane in all areas prior to the installation of new polyisocyanurate insulation and glass faced gypsum board. All insulation must be mechanically secured or adhered per ASCE-7 Wind Uplift requirements and must conform to published criteria for Factory Mutual 1-60 requirements. Install a two-ply Modified Membrane roof system and flashings throughout all areas as per the specifications. Install new pre-finished perimeter edge commercial gutters and downspouts and continuous cleat mounted pre-finished raised metal edge adjacent to the low slope roof sections. Install metal termination bars, surface mounted metal counterflashing and caulking sealants to terminate vertical flashings. Install new soil stack and internal drain lead flashings, new galvanized or aluminum static vent hoods, new pitch pans and any required drain strainers, clamp rings and hardware. Apply fiber reinforced aluminum coating to all lap seams and degranulated areas of the roof system upon completion.

Alternate 1: Metal Wall Panels & Soffit System: The Contractor shall remove and replace the existing "red" metal wall panels and soffit system in all areas. The new system shall consist of Factory Manufactured pre-finished galvanized metal wall panels and soffits installed over existing framing and sheathing to comply with ASCE-7 Wind Uplift requirements and conforming to the Material Manufacturer's published installation criteria for a warranted installation.

2.3.2. Storage of Materials

Storage: In order to promptly execute the work, the Contractor must Order, Receive and Store certain materials "on-site" during the project preparation and installation phases. The storage of these materials will be in designated areas as agreed upon by the Owner (or designated representative) prior to commencement of the project.

The materials stored on-site shall be secured in such a manner as to prevent tampering by personnel, employees, etc... All materials shall be stored on pallets, where possible, to provide for ease of transport to and from the job site. Damaged material containers shall be removed from the job site and replaced with new materials. Materials shall be distributed over the roof area(s) in a manner so as not to exceed deck load or deflection limitations for concentrated loads. The Contractor shall be responsible for verifying the capacity of the deck and structure to prevent "point" loading or overloading of any deck areas.

2.3.3. Protection of Structure & Grounds

At all times Contractor personnel shall use care to prevent tracking asphalt, caulking, coatings, etc. over adjacent surfaces. All necessary barricades, signs, etc. required to prevent personnel, employees, tenants, general public, etc. from accessing the work areas will be immediately erected by the Contractor insofar as is applicable to his work. At all times, and on a daily basis, the Contractor shall make certain all Emergency Drives are cleared of debris, nails, metal scrap, etc. as this is a critical use facility. Coordination with the Owner regarding work over sensitive equipment, drive areas, ingress/egress, etc. shall be required and included within the Contractors' base scope of work.

2.3.4. Material Safety Requirements

All cleaning chemicals, coatings, insulation, roofing materials, asphalt and caulking products shall be stored in areas designated by the Owner (or designated representative). Flammable products shall be clearly designated on the outside of each container. Material Safety Data Sheets (MSDS) shall be supplied to the Owner (or designated representative) prior to admittance of any products into the facility.

2.3.5. Equipment

Equipment necessary for the removal of the roof, preparation of the roof deck surface and perimeter walls will be located at the job site immediately adjacent to the designated areas. During the removal of the existing roof and preparation and installation of the roof system, the Contractor will be required to protect the building and adjacent structures from damage.

As necessary, the Contractor shall supply any portable generator equipment, supplemental heating equipment, mixing equipment, wet vacuums, tarps, etc. as deemed necessary to complete the job in accordance with this specification. All power hand tools, hand tools, and power equipment stored on-site shall be secured at the end of each day's operation. The Contractor shall be responsible for his equipment and shall insure that no equipment can be used or tampered with by personnel, employees, etc... Secured equipment storage areas may be arranged with the Owner (or designated representative) prior to the commencement of the project.

2.3.6. Protective Clothing, Etc.

During the course of the project, personnel on the job site will be required to wear protective clothing including safety goggles, protective ear plugs, etc... Workmen shall wear protective clothing including high top shoes laced to the top, gloves (extending over the wrist area), long pants -- without cuffs.

2.3.7. Daily Clean-Up of Job Site

The Contractor shall be responsible for the daily clean-up of the job site and the removal or containment of all debris. The Contractor shall cover all materials and equipment with tarps or plastic sheeting to prevent tampering or damage. Tarps and plastic sheet will be perimeter weighted and secured with rope to prevent wind uplift.

2.4. START & COMPLETION DATES

2.4.1. The following regulations shall be applicable to all projects upon award of the contract by the Owner (or designated representative):

2.4.1.1. Contractor shall order materials and be prepared to commence work within thirty (30) calendar days after the award of contract, or as soon as weather conditions permit, unless otherwise noted on the Bid Form or stated within the Bid Proposal submitted by the Contractor. Failure to begin this project in an expeditious manner may result in cancellation of this contract.

2.4.1.2. Contractor shall advise the Owner (or designated representative) and designated representative of the Consultant - Structural Technologies, Inc. a minimum of three (3) working days prior to the start date. Should the Contractor be unable to meet the scheduled start date(s) the Owner (or designated representative) reserves the right to cancel all pending contracts with said Contractor.

2.4.1.3. All judgments associated to weather, material availability, etc. will be reviewed by the Owner (or designated representative) and the Consultant - Structural Technologies, Inc. to determine cause of delay and appropriate action. Delays determined to be the direct responsibility of the Contractor due to insufficient staffing of the job, insufficient material supplied to the job site, etc. may be cause for cancellation of the remaining balance of the contract.

2.4.1.4. Substantial completion of all work set forth in these documents or phase of the project as contracted by the Owner (or designated representative) shall be within one-hundred twenty (120) calendar days from the initiation of the project and not greater than one-hundred eighty (180) days after Award of Contract. Time for completion may be extended at the option of the Owner (or designated representative) based on the total scope of work to be completed when weather conditions permit proper application of the specified materials. Delays beyond the control of the Contractor (strikes, weather, material shortages, etc.) will be reviewed by the Owner (or designated representative) and Consultant - Structural Technologies, Inc. Delays which are determined to be the direct result of availability of personnel, equipment, etc.. specifically supplied by the Contractor will be cause for cancellation of the contract. The provisions set forth in this section may be enforced by the Owner (or designated representative) at his / their discretion. The Contractor shall be compensated only for work completed.

END OF DIVISION 2 -- TECHNICAL PROVISIONS

3. DIVISION 3 -- SPECIFIER/CONSULTANT REQUIREMENTS

3.1. GENERAL SERVICES PROVIDED

Structural Technologies, Incorporated is an independent Consulting Firm and as such is not licensed nor engaged in the practice of Engineering, Architecture, Life Safety Monitoring, Hazardous Material Identification, Air Quality Monitoring or any other regulated or licensed practice. Structural Technologies, Incorporated has made every attempt to research all applicable local Building Code requirements and has prepared these documents, addenda and attached drawings of the existing conditions and construction requirements to complete the specified work in compliance with local Building Code. Any required review or certification by a licensed structural engineer or architect shall be awarded by separate contract either through the Owner (or designated representative) or the Contractor independent of the contractual agreement with Structural Technologies, Inc. unless otherwise stated in the contract documents or through sub-contracted agreement. All professional firms certifying and/or approving these documents shall be licensed in the applicable State where work is to be performed. In the event the Contractor or the Owner (or designated representative) believes or discovers that existing conditions or proposed conditions of construction would not comply with Building Code, they shall immediately suspend all work and shall submit written notification to the Consultant - Structural Technologies, Incorporated.

Structural Technologies, whether contracted for project design / development and/or periodic or full time on-site inspection of work being performed by the Contractor shall neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents. Structural Technologies, Inc. makes no warranties for workmanship or materials, express or implied, under this Agreement or otherwise, in connection with their (Structural Technologies, Inc.'s) contracted services. Structural Technologies, Inc.'s limitation of liability shall be not greater than the total aggregate cost of either design or inspection services provided by Structural Technologies, Inc. in conjunction with this project.

3.2. PRE-CONSTRUCTION MEETING

3.2.1. A Pre-Construction meeting shall be conducted prior to the start of this project. This meeting shall be attended by the Contractor, a representative of the Owner (or designated representative), the Consultant and the Contractor's designated Foreman. At this meeting, the existing conditions of the structure, grounds, etc. will be recorded and procedures for protecting these areas and areas adjacent to the areas of set-up or installation will be reviewed.

3.3. INSPECTIONS & SERVICES

3.3.1. The Consultant - Structural Technologies, Inc. shall examine all work in progress on a periodic basis. This service is provided to assist in ascertaining the extent to which the materials and procedures conform to the requirements of these specifications and to the published instructions of the material manufacturer.

3.3.2. During the course of the work, the Specifying Consultant or Owner (or designated representative) may secure samples of the materials being used from the containers at the job site, and submit them to an independent testing laboratory for comparison. If the results of the independent testing laboratory prove that the materials are not comparable and equal to the specified materials, the Contractor shall pay for the testing and the Owner (or designated representative) reserves the right to reduce the amount of the bid by an amount commensurate with the infraction. If the contract work is not completed when the test results become known, then the Owner (or designated representative) shall impose a penalty commensurate with the infraction and all remaining work shall be completed with the specified materials.

3.3.3. The Consultant - Structural Technologies, Inc. shall be employed by the Owner (or designated representative) to act in his interests to enforce the provisions set forth in this document. It is understood that the Owner (or designated representative) retains the ultimate authority to change, amend, accept or reject any work not performed in strict accordance with this specification and all associated details and documents.

3.3.4. The Consultant shall prepare and provide all Construction Drawings, documents, details, written amendments, etc. as required to define the conditions of the project. Any questions regarding any specific work or requirements stipulated herein will be directed in writing to the Consultant for review.

3.3.5. The acceptability of completed work will be based on its conformance to the contract requirements. The guarantor is not obligated to accept non-conforming work, and such non-conforming work may be rejected. The rejected work shall be promptly replaced or corrected in a manner and by methods approved by the Manufacturer of the repair materials. Any deficiencies or deviations from the specified work as noted by the Consultant will be immediately reported to the Owner (or designated representative) along with recommended corrective actions necessary.

3.3.6. The Consultant – Structural Technologies, Inc., if contracted for Project Management services, shall provide periodic site inspections for the purpose of observing work in progress, documenting conditions at the project site and identifying non-conforming work or installation of materials which do not comply with the specifications, drawings, bid documents and contractual agreement between the Owner and Contractor. The Contractor shall indemnify the Consultant – Structural Technologies, Inc., its personnel, subcontractors, heirs and officers from any liability associated with non-conforming work or substitution of unauthorized materials.

3.4. FINAL INSPECTIONS

3.4.1. A final inspection will be conducted by the Specifying Consultant and the Owner (or designated representative). Such inspection shall be conducted immediately after notification of completion by the Contractor. The acceptability of completed roofing work will be based on its conformance to the contract documents and specifications.

3.4.2. All items noted during the final inspection shall be corrected by the Contractor immediately upon notification by the Consultant. Failure to correct items found to be deficient or improper shall be reason to withhold the Final Payment and to deduct from all payouts the equivalent amount associated with the remaining work to be performed to complete the project in the manner set forth in these documents.

3.4.3. The Owner (or designated representative) reserves the right to withhold final payment until such time as all items related to the final inspection are completed to the satisfaction of the Consultant, Owner (or designated representative), and the Material Manufacturer.

3.4.4. If more than two (2) Final Inspections must be performed, Structural Technologies, Inc. may elect to assess an "Inspection Charge" not to exceed three-hundred fifty dollars ($350.00) per man per hour to re-inspect the work to assure compliance with the Specification and Details and completion of all Punchlist Items. This additional charge will be deducted from retained monies owed the Contractor prior to the Final Payment to the Contractor.

3.5. ROOF SYSTEM WARRANTY/CONTRACTOR GUARANTY

3.5.1. The Contractor shall, upon completion of the project, provide a completed and signed copy of a Contractor's Guaranty and the Material Manufacturer's Warranty. Structural Technologies, Inc. shall have no contractual obligation, liability and makes no warranties for workmanship or materials, express or implied, under this Agreement;

3.5.1.1. The Material Manufacturer shall issue a non-prorated Limited written material and labor Warranty for a period of not less than fifteen (15.0) years from the date of completion and issuance of the Warranty. The Manufacturer shall make written record of their inspections and record any deficiencies which require correction prior to issuance of the Warranty. The manufacturer will not be held liable for non-conforming work which is not corrected by the Contractor. The Contractor shall be required to submit a "Sample" of the Material Manufacturer's Warranty for the selected roof membrane / roof system to be reviewed by the Owner prior to commencement of the project.

3.5.1.2. The Low Slope Roof System / Waterproofing Membrane Warranty shall provide for all labor and replacement materials to correct conditions which have resulted in moisture infiltration into the roof system. The enforcement of the Warranty shall be determined by visual inspection and any objective analysis, tests, etc. as directed by the Consultant, Owner (or designated representative) and Manufacturer. There shall be no limitation or proration of this Warranty coverage for the duration set forth herein other than as specifically stated in written form and supplied by the Material Manufacturer. All Manufacturer Warranties for the installed roofing / waterproofing system shall be duly executed and authorized by a representative of the Material Manufacturer.

3.5.1.3. A Contractor's Guaranty for Workmanship provided in conjunction with this project shall be issued for a period of five (5.0) years from the date of completion and acceptance of the installed roof system and shall be submitted to the Owner (or designated representative) to run concurrent with the Manufacturer's Warranty. This Contractor Guaranty shall indicate that all work completed by the Contractor shall remain free of defects in workmanship or materials for the duration of the guaranty. Upon written notification to the Contractor, the Contractor agrees to repair or replace and materials including all required labor to perform repairs to restore areas without additional cost to the Owner (Village of Glendale Heights). Normal weathering, abuse or neglect / failure to maintain roof areas in accordance with provisions set forth in the Manufacturer Warranty documents shall be accepted. The Contractor's Guaranty shall provide coverage without limitation or proration for all workmanship related to this project for the installation of the roof system for the duration specified herein. The Contractor's Guaranty shall be in the form of a written / certified document prepared on the Contractor's letterhead.

3.5.1.4. The Material Manufacturer (Wall & Soffit Panel inclusive of J-channel and Drip) shall issue a Product Warranty stating that the specified and installed products are free from any manufacturing defects and will conform to the written technical data and performance properties set forth in the Manufacturer's published literature. The period of this warranty shall be one (1.0) year from the date of delivery of the product to the job site. The Manufacturer shall replace, at their expense, any material found to be defective at no additional cost to the Contractor or Owner. In addition to the Product Warranty, the Coating Manufacturer shall provide a one (1) year coating / finish warranty covering fading, chalking and film integrity as per the published product data supplied by the Coating Manufacturer.

3.5.1.5. The issuance and enforcement of all Warranties and Guaranties shall be contingent upon the full payment of all invoices submitted by the Contractor, Sub-Contractors, etc. for all work related to this project.

END OF DIVISION 3 -- SPECIFIER/CONSULTANT REQUIREMENTS

4. DIVISION 4 -- DETAILED SPECIFICATIONS

4.1. PROJECT LOCATION

4.1.1. Building / Site Location

North Palos Fire Protection District – Fire Station 1
10629 South Roberts Road
Palos Hills, IL 60465

4.2. ROOF CONDITIONS & PREPARATION

4.2.1. Existing Conditions

The existing roof system(s) consisting of:

Roof Section 1 – West Roof

Low Slope & Barrel Roof Area:	5,160 square feet (Contractor to Verify)
Structural Roof Deck:	Tongue & Groove Wood Decking – supported by wood timber and steel framing
Vapor Barrier:	None
Barrel Roof Deck:	3/4 inch tongue & groove decking
Roof Insulation:	1/2 inch thickness wood fiber
Roof Drainage:	Barrel Roof 3:12 roof slope to perimeter flat roof areas on north and south edges of the roof.
Roof Termination:	Perimeter gutters (north and south edges of roof), fascia metal and raised metal edge
Roof Projections:	Curb mounted vent units, lightning protection and brick masonry chimney
Installed Roof System:	Modified Membrane with aluminum reflective coating

Roof Section 2 – Northeast Roof

Low Slope Roof Area:	3,486 square feet (Contractor to Verify)
Structural Roof Deck:	Wood Decking & Metal Decking – supported by steel framing
Vapor Barrier:	None
Flat Roof Deck:	3/4 inch tongue & groove decking (approx. 50%) and Type F metal decking
Roof Insulation:	Approx. 3.0 inches lightweight concrete, 1-1/2 inch polyisocyanurate
Roof Drainage:	Nominal 1/16 inch per foot roof slope to internal roof drains
Roof Termination:	Perimeter raised metal edge and masonry wall extending upward to the Apparatus Bay Roof Section (Section 3).
Roof Projections:	Curb mounted vent units, sanitary stacks, satellite dish, HVAC units and furnace stack
Installed Roof System:	Modified Membrane with aluminum reflective coating

Roof Section 3 – Apparatus Bay Roof

Low Slope Roof Area:	9,793 square feet (Contractor to Verify)
Structural Roof Deck:	Structural Reinforced Concrete Decking
Vapor Barrier:	None
Flat Roof Deck:	Structural cast concrete
Roof Insulation:	Approx. 2-1/2 - 3.0 inches lightweight concrete beneath base roof 1/2 inch thickness
Roof Drainage:	Nominal 1/16 inch per foot roof slope to internal roof drains
Roof Termination:	Perimeter raised metal edge and masonry wall extending upward to the Hose Tower Roof Section (Section 4).
Roof Projections:	Curb mounted vent units, sanitary stacks, furnace stacks and exhaust vents
Installed Roof System:	Gravel surfaced – Coal Tar Pitch Built-Up roof system (base roof) Modified Membrane with aluminum reflective coating (second roof)

Roof Section 4 – Hose Tower Roof

Low Slope Roof Area:	163 square feet (Contractor to Verify)
Structural Roof Deck:	Structural Reinforced Concrete Decking
Vapor Barrier:	None
Flat Roof Deck:	Structural cast concrete
Roof Insulation:	No core sample extracted
Roof Drainage:	Nominal 1/16 inch per foot roof slope to internal roof drain
Roof Termination:	Perimeter raised metal edge.
Roof Projections:	Antenna / multi-port penetration
Installed Roof System:	Exposed Roof - Modified Membrane with aluminum reflective coating

4.3. GENERAL REQUIREMENTS

Furnish all materials, equipment, perform all labor and operations to remove the existing roof membrane(s), insulation, light weight concrete, perimeter edge sheet metal, flashings, etc. and inspect the wood, metal or concrete decking. Remove damaged or deteriorated wood or metal decking and replace sections, as required. Apply corrosion resistant coating to structurally sound metal decking exhibiting surface rust. Repair concrete deck areas exhibiting spalling or surface damage with appropriate polymer concrete mortar. Install new pressure treated wood nailers at perimeter edges of each roof section to compensate for the new insulation thickness. Install a vapor barrier membrane in all areas prior to the installation of new polyisocyanurate insulation and glass faced gypsum board. All insulation must be mechanically secured or adhered per ASCE-7 Wind Uplift requirements and must conform to published criteria for Factory Mutual 1-60 requirements. Install a two-ply Modified Membrane roof system and flashings throughout all areas as per the specifications. Install new pre-finished perimeter edge commercial gutters and downspouts and continuous cleat mounted pre-finished raised metal edge adjacent to the low slope roof sections. Install metal termination bars, surface mounted metal counterflashing and caulking sealants to terminate vertical flashings. Install new soil stack and internal drain lead flashings, new galvanized or aluminum static vent hoods, new pitch pans and any required drain strainers, clamp rings and hardware. Apply fiber reinforced aluminum coating to all lap seams and degranulated areas of the roof system upon completion.

Alternate 1: Metal Wall Panels & Soffit System: The Contractor shall remove and replace the existing "red" metal wall panels and soffit system in all areas. The new system shall consist of Factory Manufactured pre-finished aluminum metal wall panels and soffits installed over existing framing and sheathing to comply with ASCE-7 Wind Uplift requirements and conforming to the Material Manufacturer's published installation criteria for a warranted installation.

4.4. LANDSCAPING / GROUNDS / BUILDING - PROTECTION

The Contractor shall be required to include in his base bid necessary protective sheeting, tarps, plywood, etc. to effectively protect the structure and grounds from damage during all roofing operations. This placement of roofing materials and equipment adjacent to the structure shall be reviewed with the Owner (or designated representative) and Consultant and shall be limited to designated areas away from access doors and Emergency Drives. The debris box must be placed on a canvas tarp, plywood or similar protective covering to prevent staining of concrete or asphalt. The exposed wall of the structure immediately adjacent to areas where debris is being lowered to the ground or material lifted to the roof will be covered with canvas or plastic sheeting secured in a manner which shall prevent damage during a wind storm.

At all times the Contractor shall be required to use reasonable care to prevent damage to the sod, shrubbery, trees or exterior of the structure. Any damage to the landscaping, grounds or building shall be the responsibility of the Contractor and shall be repaired, cleaned or replaced at the Contractor's expense.

Prior to mobilization to the job site, the Contractor shall visit the property and shall make digital record by means of photographs or video to document existing site conditions and to record any pre-existing damage to either the structure or grounds surrounding the area(s) of staging, set-up or debris removal.

4.5. DAMAGES / EXEMPT DAMAGES

The Contractor shall be liable for all damages to any of the aforementioned items in the event that it can be proven that the Contractor failed to notify the Owner (or designated representative) and Consultant prior to initiating the work or failed to act responsibly in the execution of the work set forth in this Specification.

Damages which shall be exempt under this section and heading shall be as follows; 1) Nail pops from drywall ceilings as a result of normal roofing tear-off and installation procedures, 2) Dirt and debris, including textured paint or drywall which disbonds from the ceiling or wall surfaces within the structure as a result of normal roofing procedures, 3) damage to artwork including pictures, wall hangings, sculptures, decorative fixtures, etc. resulting from vibration as a result of normal roofing operations, 4) drywall seams or cracks which develop as a result of normal roof removal or roof installation.

The Contractor shall perform a "Pre-Job" inspection of the facility and grounds and shall photograph and document existing / pre-existing conditions of the building, grounds and interior elements prior to initiating work at the project site to prevent disputes arising from alleged or actual damage caused by the Contractor in conjunction with the work completed in conjunction with this project.

4.6. ANTENNA & COMMUNICATION TOWERS

The Contractor shall coordinate the temporary removal and relocation of antenna, communication towers, support "sleds", ballast, etc. to facilitate the removal and replacement of the roof in the designated areas. The Owner shall be responsible for the relocation of the equipment prior to the initiation of the work on the roof area(s). In the event the Contractor must remove and relocate the equipment, the Contractor shall be required to inform the Owner regarding the methods and means necessary to move the equipment and shall provide pricing for this work which shall be itemized and billed "In Addition" to the Contractor's Base Bid for the project.

4.7. ROOF DEMOLITION

Tear-off of the existing roof systems, flashing systems and insulation shall be performed on the designated roof sections as indicated on the Construction and Plan View Drawings. Prior to performing any complete roof removal, the Contractor shall be required to perform an inspection of the interior of the building directly beneath the area of roof removal to locate electrical, plumbing, or mechanical systems beneath the deck and/or any existing conditions which may be impacted by the tear-off operations including damage to suspended ceilings or lighting. Any damage will be immediately brought to the attention of the Owner / Owners (or designated representative) and Consultant. All necessary precautions and temporary protective measures to prevent damage to the interior of the structure shall be included in the "base bid" for tear-off and replacement of the existing roof system.

All tear-off operations shall be carried out in a safe and proper manner, protecting existing construction that is to remain. During any operations of this nature, the Contractor will utilize protective plastic sheeting and any other precautionary means to prevent (or absolutely minimize) the release of debris or water to the interior of any building.

The Contractor will advise the Owner (or designated representative) as well as the Consultant of proposed procedures for such work and obtain his agreement on the methods before proceeding with any operations of this type. It is again pointed out that proper temporary protection and covering (tarps, plastic sheeting, rubber membrane, etc.) shall be available for the open roof area at all times. Any damage that occurs to the interior of the building or to the roof structure during the roof replacement project shall be the responsibility of the Roofing Contractor. The Contractor shall be required to make all necessary repairs to any damaged areas to equal the existing conditions.

Debris must not be allowed to accumulate at the job site but must be regularly removed from the site as the operation progresses. Debris shall be lowered to the ground in a manner which prevents debris from falling to the ground or surrounding areas. A closed "chute" or other device must be used to contain and lower debris to the ground during removal. The side of the building must be protected with a canvas or plastic tarp to prevent damage or staining of the exterior of the structure. Debris boxes / dumpsters shall be placed on protective plywood sheeting to prevent damage to the sod, concrete or asphalt areas. Dumpsters and debris boxes must be secured and covered at the end of each day's work. The Contractor shall inspect the grounds around the project site and shall sweep parking lot areas and remove all related construction debris at the end of each day's work.

Disposal of all tear-off materials shall be in accordance with all local and State regulations for said materials. Hazardous materials including those containing mineral asbestos fibers must be documented and handled in accordance with published E.P.A. and O.S.H.A. regulations. On-site verification by an independent accredited testing firm will be required and insisted upon in the event that hazardous materials will be disturbed or removed from the job site. Verification and receipt of all disposal of such materials as deemed to be hazardous or special waste will be required by the Building Owner / Designated Representative. The Contractor is to maintain all pertinent records and documentation as is required by the State of Illinois and/or any other authority to prove compliance with all published statutes and regulations governing removal and disposal of hazardous or special waste.

Caution shall be used when working adjacent to any existing gas pipe lines, electrical conduit, sanitary stacks or PVC pipes. In all cases the conduit/piping shall remain in place during all roofing procedures and should connection, or disconnection, be necessary it shall be done by the Owner and at the Owner's expense. Unless specifically directed by the Owner (or designated representative), the Contractor is not to disturb, disconnect or alter any piping, conduit, etc. with the exception of increasing the height of the piping to accommodate the new roof system. If work is performed by the Contractor, as directed by the Owner (or designated representative), to alter piping, perform disconnects/reconnects, etc., the Contractor shall submit an itemized separate billing for such work.

4.8. APPROVED PROJECT MATERIALS

Note: To the extent possible, Structural Technologies, Inc. has researched products and manufacturers with similar performance attributes, industry experience and compliance with regulatory agencies. The selection of these material manufacturers is based on industry experience, manufacturer warranties, contractor familiarity, contractor training programs, material availability and material performance. Structural Technologies, Inc. does not warrant the performance of the products or published attributes of any company / manufacturer providing product(s). Structural Technologies, Inc. shall not be liable for material manufacturer defects or material performance. In the event a specified material, as determined by the Material Manufacturer, is inappropriate for the designated application or installation, the Contractor and/or Material Manufacturer shall contract Structural Technologies, Inc. and through written documentation, indicate the reasons the product is inappropriate for the application as well as providing a substitution of an alternate product which shall meet or exceed the performance requirements set forth in this specification.

4.9. APPROVED PROJECT MATERIALS

4.9.1. Approved Manufacturers - Concrete Deck Repair Materials

Approved Manufacturers Polymer Patch Mortar

Manufacturer:	Sika Corporation 201 Polito Avenue Lyndhurst, NJ 07071
Product:	SikaSet Mortar
Manufacturer:	The Euclid Chemical Company 19218 Redwood Road Cleveland, OH 44110
Product(s):	Speed Crete 2028 – Rapid Setting Mortar

Approved Manufacturers Elastomeric Crack Sealant

Manufacturer:	Tremco Incorporated 3735 Green Road Beachwood, Ohio 44122
Product(s):	Vulkem 116
Manufacturer:	Sika Corporation 201 Politio Avenue Lyndhurst, NJ 07071
Product(s):	Sikaflex 1a

4.9.2. Metal Deck Repairs / Replacement - Approved Manufacturer's

Metal Deck Coating:

Manufacturer:	Sherwin Williams Paint Cleveland, Ohio 44101
Product:	Kromik Metal Primer Water Based Catalyzed Epoxy Primer Zinc-Clad IV Primer
Manufacturer:	Rust-Oleum Corporation 11 Hawthorn Parkway Vernon Hills, IL 60061
Product:	9100 System High Performance Epoxy 9400 System Rust-O-Thane Polyurethane

Metal Deck Replacement:

Manufacturer:	National Steel Corporation 4100 Edison Lakes Parkway Mishawaka, IN 46545 (219) 273-7000
Manufacturer:	Joseph T. Ryerson & Son, Inc. 2558 West 16th Street Chicago, IL 60608 (312) 762-8452

4.9.3. Approved Manufacturers & Materials- Wood Deck and Wood Framing

Replacement Wood decking shall not exceed a maximum moisture content of nineteen percent (19%) by weight on a dry weight basis.

Plywood Decking to conform with the following;

Manufacturer:	Georgia-Pacific Building Products 133 Peachtree Street NE Atlanta, GA 30303
Product:	Plytanium 48/24 - 3/4 inch APA (American Plywood Association) Rated Sheathing Exposure 1 Rated PS-1-83 (Dept. of Commerce Standard)
Manufacturer:	Plywood Company of Fort Worth, Inc. 4301 N. Sylvania Avenue Fort Worth, TX 76137
Product:	Rated Sheathing 48/24" APA – 3/4 inch APA (American Plywood Association) Rated Sheathing Exposure 1 Rated PS-1-83 (Dept. of Commerce Standard)

Various Manufacturers to supply the following;

Product	CCA.40 Treated Lumber Pressure Treated Lumber (Wolmanized or equivalent) Select Grade – No. 2 Dimensional Lumber

4.9.4. Approved EPDM Membrane Manufacturer's – Metal Deck – Vapor Barrier

Manufacturer:	Firestone Building Products Company 525 Congressional Blvd. Carmel, IN 46032-5607 Phone: (317) 575-7000
System:	Firestone RubberGard® .045 Non-Reinforced Fire Retardant EPDM Rubber Membrane
Manufacturer:	Johns Manville 717 17th Street Denver, CO 80202
System:	JM EPDM .045 FR Non-Reinforced Fire Retardant EPDM Rubber Membrane
Manufacturer:	Versico / Carlisle Construction Materials P.O. Box 1289 Carlisle, PA 17013 Phone: 1-800-992-7663
System:	VersiGuard® EPDM .045 Non-Reinforced FireRetardant EPDM Rubber Membrane

4.9.5. Approved EPDM Membrane Fasteners

Manufacturer:	ITW Buildex, Inc. 1349 West Bryn Mawr Avenue Itasca, Illinois 60143
Products:	Roofgrip No. 14 Screws 3.0 inch galvanized metal plate washer
Manufacturer	Construction Fasteners, Inc. 4851 West 115th Street Unit E Alsip, Illinois 60658
Products:	Dekfast No. 14 Screws 3.0 inch galvanized metal plate washer
Manufacturer:	Olympic Fasteners P.O. Box 508 153 Bowles Road Agawan, MA 01001
Products:	No. 14 Heavy Steel Deck Fastener 1.0 inch galvanized metal plate washer

4.9.6. EPDM Lap Area Cleaning Approved Materials

Firestone Building Products:	QuickPrime
Johns Manville:	JM Tape / Primer Wash
Versico Roofing Systems:	EPDM Primer

4.9.7. EPDM Lap Area Splicing Approved Materials

Firestone Building Products:	Splice Tape Lap Sealant
Johns Manville:	JM Seam Tape JM Lap Caulk
Versico Roofing Systems:	VersiGard Quick Applied Seam Tape Lap Sealant

4.9.1. Approved Vapor Barrier Membrane – Wood Deck Areas

Manufacturer:	Soprema Roofing and Waterproofing, Inc. 310 Quadral Drive Wadsworth, OH 44281
Products:	SOPRAVAP'R®
Manufacturer:	Johns Manville P.O. Box 5108 Denver, CO 80202
Products:	JM Vapor Barrier SA
Manufacturer:	Firestone Building Products Company 525 Congressional Boulevard Carmel, IN 46032-5607
Products:	V-Force Vapor Barrier Membrane V-Force WB Primer

4.9.2. Approved Manufacturers - Asphalt Primer

Manufacturer:	Johns Manville 717 17th Street Denver, CO 80202
Products:	Concrete Primer
Manufacturer:	Karnak, Inc. 330 Central Avenue Clark, NJ 07066
Products:	100AF Non-Fibered Primer

4.9.3. Approved Manufacturers - Concrete Deck Vapor Barrier

Manufacturer:	Firestone Building Products Company 525 Congressional Boulevard Carmel, IN 46032-5607
Products:	APP 160
Manufacturer:	Soprema Roofing and Waterproofing, Inc. 3200 Gilchrist Road Suite 220 Mogadore, OH 44260
Products:	Elastophene Flam
Manufacturer:	Johns Manville P.O. Box 5108 Denver, CO 80217-5108
Products:	APP Base

4.9.4. Approved Insulation Adhesives – Cold Applied

Manufacturer:	Firestone Building Products 525 Congressional Blvd. Carmel, IN 46032
Products:	I.S.O. Stick Insulation Adhesive
Manufacturer:	Johns Manville P.O. Box 5108 Denver, CO 80217-5108
Products:	Urethane Insulation Adhesive
Manufacturer:	The Dow Chemical Company Polyurethane Systems – North American Headquarters 1881 West Oak Parkway Marietta, Georgia 30062
Products:	Insta-Stik – single component polyurethane adhesive
Manufacturer:	OMG, Inc. 153 Bowles Road Agawam, MA 01001
Products:	OlyBond 500 Adhesive Fastener
Manufacturer:	Soprema Roofing and Waterproofing, Inc. 3200 Gilchrist Road Suite 220 Mogadore, OH 44260
Products:	Duotack polyurethane adhesive DuoTack 365

4.9.5. Approved Insulation Fasteners

Manufacturer:	ITW Buildex, Inc. 1349 West Bryn Mawr Avenue Itasca, Illinois 60143
Products:	Roofgrip No. 12 Screws 3.0 inch galvanized plate washer
Manufacturer	Construction Fasteners, Inc. 4851 West 115th Street Unit E Alsip, Illinois 60658
Products:	Dekfast No. 12 Screws 3.0 inch galvanized plate washer
Manufacturer:	OMG, Inc. 153 Bowles Road Agawam, MA 01001
Products:	No. 12 Heavy Steel Deck Fastener 3.0 inch galvanized metal plate washer

4.9.6. Approved Manufacturers - Insulation

Polyisocyanurate Insulation

Manufacturer:	Johns Manville 717 17th Street Denver, CO 80202
Products:	1/8" Tapered ENRGY 3 & ENRGY Flat Stock Tapered Pre-Cut Crickets
Manufacturer:	Hunter, Inc. 15 Franklin Street Portland, ME 04101
Products:	1/8" Tapered H Shield & H-Shield Flat Stock
Manufacturer:	Firestone Building Products 525 Congressional Blvd. Carmel, IN 46032
Products:	Iso 95+ Polyisocyanurate Insulation 1/8" Tapered Iso 95+ Polyisocyanurate Insulation Polyisocyanurate Insulation -Tapered Pre-Cut Crickets
Manufacturer:	Soprema Roofing and Waterproofing, Inc. 3200 Gilchrist Road Suite 220 Mogadore, OH 44260
Products:	SOPRA-ISO® Polyisocyanurate Insulation SOPRA-ISO® Tapered Polyisocyanurate Insulation

Glass Faced Gypsum Board

Manufacturer:	G-P Gypsum Corporation 133 Peachtree Street N.E. Atlanta, Georgia 30303
Products:	Dens-Deck Prime Roof Board – 1/2 inch thickness
Manufacturer:	Firestone Building Products 525 Congressional Blvd. Carmel, IN 46032
Products:	1/2" Dens-Deck Prime

4.9.7. Approved Manufacturers – Roof and Flashing Membrane – Modified Membrane

Manufacturer:	Johns Manville 717 17th Street Denver, CO 80202 Phone: (800) 922-5922
Products:	JM DynaGrip Base PR SD/SA - base ply roof field & flashing – self-adhered - all wood deck areas JM DynaFast 250 HW - base ply roof field & flashing JM DynaWeld Cap 250 FR - final ply & flashing
Manufacturer:	Firestone Building Products 525 Congressional Blvd. Carmel, IN 46032
Products:	BASEGARD SA – base ply roof field & flashing - self adhered – all wood deck areas SBS Poly Torch Base - base ply roof field & flashing SBS Premium FR Torch - final ply & flashing
Manufacturer:	Soprema Roofing and Waterproofing, Inc. 3200 Gilchrist Road Suite 220 Mogadore, OH 44260
Products:	Sopralene Flam Stick – base ply of field and flashing membrane – self-adhered – all wood deck areas Sopralene Flam 180 – base ply of field and flashing membrane – heat welded Sopralene Flam 250 FR GR – final ply of field and flashing membrane – heat welded

4.9.8. Approved Materials – Liquid Resin Flashing Membrane

Manufacturer:	Johns Manville 717 17th Street Denver, CO 80202 Phone: (800) 922-5922
System:	PermaFlash System
Manufacturer:	Firestone Building Products 525 Congressional Blvd. Carmel, IN 46032
Products:	Ultra Flash Two Part Liquid Flashing
Manufacturer:	Soprema Roofing and Waterproofing, Inc. 3200 Gilchrist Road Suite 220 Mogadore, OH 44260
Products:	Alsan RS 260 LO Field Alsan RS Fleece Alsan RS Detailer

4.9.9. Metal Termination Bar - Approved Materials

Manufacturer:	Tru-Fast Corporation 02105 Williams County Rd. 12-C Bryan, Ohio 43506-9804 Phone: 1-800-443-9602
Products:	Termination Bar - TB-125 Pre-drilled 8.0" on-center
Manufacturer	Firestone Building Products 525 Congressional Blvd. Carmel, IN 46032
Products:	Termination Bar – Aluminum pre-drilled 8.0" on-center

4.9.10. Approved Caulking Sealants

Manufacturer:	Tremco Sealant/Weatherproofing Division 3735 Green Road Beachwood, Ohio 44122
Product(s):	Vulkem 116
Manufacturer:	Sika Corporation 201 Polito Avenue Lyndhurst, NJ 07071
Product(s):	Sikaflex 1a
Manufacturer:	BASF Corporation Construction Systems 889 Valley Park Drive Shakopee, MN 55379
Product:	MasterSeal NP-1

4.9.11. Approved Manufacturers - Pitch Pan Filler - Sealant

Manufacturer:	Sika Corporation 201 Politio Avenue Lyndhurst, NJ 07071
Product(s):	Sika Flex 2C SL Sikaflex 1a
Manufacturer:	Tremco Incorporated 3735 Green Road Beachwood, Ohio 44122
Product(s):	Vulkem 45 Vulkem 116

4.9.12. Approved Manufacturer - Pre-Fabricated Pitch Pan Boot Seal

Manufacturer:	Portals Plus, Incorporated 639 Thomas Drive Bensenville, IL 60106
Product(s):	Model RF-13 Model RF-36

4.9.13. Approved Manufacturers - Roof Membrane Coating

Manufacturer:	Karnak Corporation 330 Central Ave. Clark, NJ 07066
Products:	#97 Fibered Aluminum Coating

4.10. ALTERNATE – METAL WALL PANEL & SOFFIT SYSTEM

4.10.1. Metal Soffit & Wall Panels - Approved Manufacturers

Manufacturer:	Peterson Aluminum Corporation 1005 Tonne Road Elk Grove Village, IL 60007
Product:	Pac-Clad Reveal Wall Panel – 12.0 inch (.032) Pac-Clad Flush Soffit – 12.0 inch (.032)
Manufacturer:	Firestone Building Products Company 525 Congressional Boulevard Carmel, IN 46032-5607
Product:	Una-Clad UC-501 Reveal Panel – 16.0 inch (.032) Una-Clad UC-501 Flush Panel – 16.0 inch (.032)

Note: All soffit, wall panels, J-channel, drip edge and weep edge metal must be pre-finished aluminum.

4.11. SHEET METAL REQUIREMENTS & DETAILS

4.11.1. General Requirements – Sheet Metal Accessories

Sheet Metal: All sheet metal to be supplied in conjunction with this project shall be approved by the primary manufacture of the roofing membrane. All sheet metal shall be a minimum G-90 galvanized or Galvalume metal base with baked enamel finish (Kynar or equivalent). Alternative use of pre-finished aluminum sheet metal, where indicated on the Construction Drawings, shall be permissible. All exposed sheet metal shall be a minimum twenty-four (24) gauge thickness. Sheet metal design configurations and installation procedures shall meet current NRCA, Factory Mutual and SMACNA requirements. All outside edges shall be hemmed to prevent exposure of uncoated metal to weather. All pre-finish colors of sheet metal shall be selected by the Owner (or designated representative).

Counterflashing: Minimum twenty-four (24) gauge thickness, G-90 galvanized metal base (Kynar or Hylar finish – 70% solids), break formed to provide for surface mounting, minimum face dimension of four (4.0) inches. Formed to provide a caulking receiver along the upper edge. Maximum length not to exceed ten (10.0) feet per counterflashing section. Pre-finished Kynar Coating – Color to be selected by Owner.

Continuous Metal Cleat: Minimum twenty-two (22) gauge thickness, G-90 Galvanized Steel, break formed to provide a minimum three (3.0) inch face dimension. Maximum length not to exceed ten (10.0) feet per continuous cleat section.

Perimeter Edge Metal: Minimum twenty-four (24) gauge thickness, G-90 Galvanized Steel, break formed to provide a minimum six (6.0) inch face dimension. Maximum length not to exceed twelve (12.0) feet. Supplied and installed with concealed batten splice plates and configured to attach to the installed metal cleat on the outside vertical face

HVAC & Vent Unit Curb Caps: Supplied in minimum twenty-four (24) gauge thickness, G-90 galvanized metal base, formed to provide a minimum flange return over the curb base of not less than three (3.0) inches. Curb cap to be secured to box curb base with neoprene washered No. 14 screw fasteners inserted every twelve (12.0) inches on center.

Pitch Pan – Material Requirements: Metal pitch pans shall be formed from .032 brushed or mill finish aluminum sheet metal or alternative pre-finished galvanized twenty-four (24) gauge sheet metal formed to provide a metal pitch pan a minimum of four (4.0) inches in height and minimum of two (2.0) inches of clear space between the vertical wall of the pitch pan and the penetration. Metal weather collars shall be formed form .032 aluminum sheet metal / pre-finished galvanized sheet metal and shall be sized to extend a minimum of one (1.0) inch beyond the vertical outside dimension of the pitch pan provided and installed over all pitch pans. Weather collars will be secured to all conduit, pipe, etc. with stainless steel adjustable clamp collars. A continuous bead of one-part polyurethane caulking sealant applied to the upper edge of the banding clamp.

Metal Gutters & Downspouts: New gutters supplied for this project shall be Commercial Grade Box style gutters and shall be a minimum of twenty gauge (.032 inch) pre-finished aluminum metal. Gutters shall be configured to provide a four (4.0) inch flange dimension, a six (6.0) inch trough opening, a minimum six (6.0) inch trough base and an inside vertical wall dimension of not less than five (5.0) inches. All downspout discharges shall be mechanically fastened to the new gutter with a minimum of three (3) stainless steel hex washer headed No. 12 screw fasteners. Downspouts shall be fabricated from twenty (.032 inch) gauge pre-finished aluminum sheet metal. Downspout discharges shall be rivet fastened to the gutter base at designated locations. Downspouts and all elbows must provide a three (3.0) inch by four (4.0) inch cross-section and shall be supplied in ten (10.0) foot maximum lengths. Downspout attachment straps shall be formed from twenty (.032 inch) gauge pre-finished aluminum sheet metal and shall be installed at intervals not exceeding ten (10.0) foot on center (minimum of two straps per downspout section). Gutter sections shall be supplied in maximum of twenty-five (25) foot lengths. The Contractor shall provide a concrete or polymer splash at the base of all gutter downspouts discharging to landscaped areas. Cover caps shall be installed at junctions between adjacent sections of the gutter. All gutters, downspouts and anchor straps to be supplied with pre-finished coating – Color to be selected by Owner.

4.12. CONCRETE DECK INSPECTION, REPAIRS AND REPLACEMENT

4.12.1. Concrete Deck Inspection -- Repair

Roof removal on all designated sections where the underlying structural decking is cast-in-place concrete shall include the removal of all roofing membrane, insulation, flashings, sheet metal. The installed vapor barrier membrane (if applicable), shall be removed to the extent possible and necessitated to evaluate the condition of the underlying concrete decking. Preparation for the application of the new insulation and roof system shall include the inspection and repair/patching of all areas of concrete decking determined to be damaged or deteriorated. The exposed concrete roof deck surface will be swept to remove any residual dirt, aggregate or debris.

Upon the removal of the existing roof assembly, a thorough visual inspection of the exposed concrete deck will be performed. The concrete deck areas identified as being damaged, unlevel, or potentially structurally unsound must be corrected prior to the installation of the new roof system. Cracks in the concrete decking will be sealed with a continuous bead of one-part polyurethane caulking sealant applied directly over the crack. A continuous one-quarter (0.25) to one-half (0.5) inch wide bead of caulking will be applied to the crack and troweled smooth with a clean trowel.

Unlevel sections of concrete decking (greater than 1/2 inch out of level) will be increased in height to equivalent with the surrounding deck surface to prevent bridging or gapping beneath any insulation boards or ponding of water on the completed roof system. These areas will be "raised" by adding rapid setting non-shrink concrete mortar applied directly over the concrete surface. The mortar will be mixed and applied to the concrete deck surface in the affected areas. While the mortar is still wet, the Contractor will trowel the mortar to level, tapering the edge of the patch over the surrounding concrete deck surface.

Any areas of concrete decking exhibiting possible structural damage will be immediately brought to the attention of the Consultant and/or Owner (or designated representative). As necessary, the Contractor will erect barricades around these areas to prevent traffic over these areas during adjacent roofing operations. These sections of decking will be temporarily covered or "roofed" to prevent moisture infiltration prior to replacement or alternative methods of reconstruction. A certified Structural Engineer will be consulted in conjunction with further analysis and preparation of a scope of work for remedies to the structurally damaged concrete areas. A "Deck Replacement/Reconstruction Specification" will be prepared to address these areas in conjunction with the Structural Engineer's recommendations.

In the event abandoned unit curbs are removed and openings in the concrete deck are exposed, the Contractor will be required to install a metal cover plate, minimum twelve (12) gauge thickness, secured over the opening and anchored to the concrete deck with corrosion resistant expansion anchors installed at a minimum of four (4) per metal cover plate and/or one (1) fastener every 8 – 10 inches on-center.

4.13. METAL DECK INSPECTION, REPAIRS AND REPLACEMENT

4.13.1. Metal Deck Inspection -- Repair/Replacement

Upon removal of the existing roof membrane and insulation in designated areas, the Contractor shall perform a visual inspection of the exposed metal decking. Any areas of structurally damaged metal decking will be brought to the attention of the Consultant and Owner (or designated representative). All deck replacement shall be reviewed by a licensed Structural Engineer and all procedures, etc. shall be certified as complying with safe engineering practices.

Sections of structurally damaged metal decking shall be cut-away and removed. New galvanized G-60 metal decking matching the configuration, pan and flute dimensions of the existing deck will be installed. New metal decking will be secured to the surrounding metal decking with corrosion resistant self-drilling screw fasteners inserted every twelve (12.0) inches on-center in the sidelap (pan) and every six (6.0) inches on-center in the endlap (flute). New metal decking shall overlap the surrounding decking a minimum of eight (8.0) inches. All sides of the new metal decking must be supported by the existing decking. Screw fasteners shall penetrate the decking or joist a minimum of one-half (0.5) inch.

Structurally sound metal deck areas which exhibit surface corrosion will be mechanically wire brushed clean to remove all loose rust and scale. All deck flutes will be cleaned to remove debris and insulation. A single coat application of corrosion inhibitive primer / coating shall be applied to the metal deck surface with a brush, roller or airless paint gun at a rate of 75 - 100 square feet per gallon. The Contractor must use care to prevent spilling or splashing the primer / coating over the side of the building or allowing the coating / primer to flow into the structure. Protective measures, including plastic sheeting, tarps, etc. shall be utilized to protect the structure and interior of the building during application of the coating / primer.

4.14. WOOD DECK INSPECTION, REPAIRS AND REPLACEMENT

4.14.1. Existing Structural Wood Deck – General Material Requirements

All plywood decking provided for replacement of existing wood plank decking shall be APA Exposure 1 rated plywood decking, touch sanded and free of defects and sized to match the existing decking. Wood decking shall not exceed a maximum moisture content of three percent (3%) by weight on a dry weight basis. Plywood decking shall be a nominal 3/4 inch thickness with a span rating of 48/24.

All new plywood decking shall be stored on-site beneath protective tarping, on original pallets to allow for air flow beneath the boards. All new plywood decking must be free of mold or surface contaminants and shall be delivered to the job site, as necessary, to minimize any exposure prior to installation.

4.14.2. Existing Structural Wood Deck Inspection -- Repair/Replacement

Upon removal of the existing roof system, the Contractor shall perform a visual inspection of the exposed wood structural decking. Any areas of structurally damaged wood decking will be brought to the attention of the Consultant and Owner (or designated representative). All deck replacement shall be performed as necessary to re-establish the structural integrity of the roof deck. Any structural deterioration of roof trusses and rafters shall be reviewed by a licensed Structural Engineer and all repair or replacement procedures, etc. shall be certified as complying with safe engineering practices in strict compliance with Building Code. During all deck removal and re-installation, the Contractor shall be required to provide for isolation, signage and personal within the structure to prevent passage beneath areas of demolition and construction. All personnel directly involved with the removal and replacement of decking shall be properly secured and tied-off with lanyards and approved O.S.H.A. Fall Arrest equipment.

Sections of structurally damaged, warped or delaminated wood decking shall be cut-away and removed. New pressure treated Wolmanized wood plank decking and/or Exterior Grade 3/4 inch plywood decking matching the existing deck will be installed. New wood decking will be secured to the underlying wood truss rafters with corrosion resistant No. 12 self-drilling screw fasteners inserted every six (6.0) inches on-center along the length of each truss or at each intersection with the underlying truss. New wood decking must be continuously supported at each intersection with the wood truss rafter and must be secured with screw fasteners or nail fasteners at each intersection with the underlying wood truss rafter. All new dimensional wood decking must be secured throughout the field of the decking to comply with Factory Mutual 1-75 Wind Uplift and ASCE 7 Wind Uplift requirements and all applicable Building Code (International Building Code – Current Edition).

Screw fasteners shall penetrate the truss member a minimum of one and one-half (1.5) inch and shall be installed on six (6.0) inch centers at all exposed edges of the sheathing as well as six (6.0) inch centers for all intermediate support attachments. Alternative attachment of the new wood decking with zinc-coated (galvanized) corrosion resistant annular or helically threaded No. 8d nails with a head dimension (crown) of 7/16 inch and shank diameter of .131 sized to penetrate the wood truss rafter a minimum of 1-1/2 inches shall be acceptable. Nail fasteners shall be installed at intervals of three (3.0) inches on center along the exterior edge of all sections of wood sheathing and on six (6.0) inch centers for intermediate support attachment.

All new wood decking must be installed with a minimum of one-eighth (.125) inch clearance and a maximum of one-quarter (.25) inch clearance from adjacent wood deck sections. There shall be no visible evidence of warpage, deterioration or delamination of the new wood decking. Support clips shall be installed at the perimeter of all plywood decking between intermediate supports at a spacing of not less than twelve (12.0) inches on-center at all unsupported sides / junctions of the decking with adjacent decking.

4.15. WOOD NAILERS -- INSTALLATION, INSPECTION AND REPLACEMENT

4.15.1. Wood Nailer - Description

Wood shall be No. 2 or better southern yellow pine, kiln dried, Wolmanized, conforming to Federal Specification TT-550, TT-W-517 and American Wood Preservers Institute Standard LP-2. Wood nailers shall not exceed a maximum moisture content of nineteen percent (19%) by weight on a dry weight basis.

4.15.2. Wood Nailer Replacement

Inspect all existing wood nailers and replace all damaged sections with new pressure treated Wolmanized wood.

Cut-away and remove the damaged sections of the wood nailer and discard. Install new pressure treated wood nailers of the same length, width and height as the existing nailers. Secure the replacement nailer to the underlying deck with the appropriate corrosion resistant screw anchor. Insert fasteners every eight (8.0) to ten (10.0) inches on center in a staggered fashion down the top of the nailer. Fasteners must penetrate the metal deck a minimum of one (1.0) inch. The Contractor shall itemize the total number of linear feet of wood nailer that is replaced and submit a separate invoice that will be in addition to the "base bid".

4.15.3. Perimeter Edge & Projection Curb Elevation

Install new pressure treated Wolmanized wood nailers along the base and top of the existing equipment curbs to elevate the curbs to a height consistent with the Manufacturer's published minimum flashing heights. Secure the new wood nailer to the existing wood nailer, wood deck, concrete or metal deck surface with corrosion resistant No. 14 screw fasteners or expansion masonry anchors inserted every eight (8.0) to ten (10.0) inches on center in two staggered rows through the top of the wood nailer. The screws or anchors must be countersunk flush with the board surface. Fasteners shall be of sufficient length to penetrate the existing wood nailer a minimum of one (1.0) inch. Nominal minimum height of vertical equipment curbs shall be eight (8.0) inches above the finished height of the roof.

** The installation of new wood nailers at the roof perimeter and projections to facilitate the new insulation height shall be included in the base quotation.

4.16. CONCRETE DECK - VAPOR BARRIER INSTALLATION PROCEDURE

4.16.1. Vapor Barrier Installation Procedure – Roof Sections 3 & 4

The entire concrete deck surface will be primed with an ASTM D-1227 Type II water based asphalt primer applied at the rate of one (1.0) to two (2.0) gallons per 100 square feet. The repairs will be made to the concrete deck prior to the application of the primer and the vapor retarder. The primer will be allowed to "flash off' a minimum of one (1.0) hour prior to the torch application of the vapor barrier membrane.

A single ply of a smooth surfaced APP Modified Membrane (approved by the primary waterproofing membrane manufacturer or as specified herein) shall be installed over the entire concrete deck surface (or properly prepared remaining vapor barrier membrane) perpendicular to the deck slope-to-drain beginning at the low point of the roof adjacent to the roof drains or scupper. Sidelaps shall be a minimum of three (3.0) inches and the endlaps / headlaps shall be a minimum of four (4.0) inches. The vapor barrier shall extend a minimum of six (6.0) inches up all vertical surfaces. All exposed edges and termination of the vapor barrier membrane shall have a continuous application of asphalt mastic applied on the same day the sheet is applied to form a watertight condition in all areas. All laps seams on the modified APP membrane must be fully adhered. Poorly bonded sidelaps or endlaps must be hot troweled to insure complete adhesion of the lap seam. All blisters, ridges and fishmouths will be cut and an additional ply of the Modified Membrane will be torch applied over the repair area.

4.17. WOOD DECK - VAPOR BARRIER INSTALLATION PROCEDURE

4.17.1. Self-Adhesive Vapor Barrier Membrane Installation - Roof Sections 1 & 2

Beginning at the low point of the deck adjacent to the perimeter gutter edge (Roof Section 1) or internal drain (Roof Section 2), install a single ply of self-adhesive waterproofing membrane, adhered directly to the wood deck, perpendicular to the deck slope-to-drain / slope-to-gutter. As required by the vapor barrier Material Manufacturer, the Contractor will apply approved primer to the exposed wood deck surface to enhance adhesion of the vapor barrier membrane to the deck surface.

Unroll approximately ten (10.0) feet of self-adhesive waterproofing / vapor barrier membrane and position the sheet. Align adjacent rolls to achieve not less than a three and one-half (3.5) inch sidelap. Using a utility knife (as necessary) lightly score the release film and peel away the face to expose the self-adhesive membrane underside. Continue removing the release paper as the roll is advanced. Lightly broom the membrane to achieve uniform application and adhesion to the deck surface. Maintain all sidelaps at not less than 3.5 inches and all endlaps at not less than 6.0 inches. Roll endlaps and sidelaps with a smooth silicone roller or steel roller to insure complete adhesion at the lap condition.

The vapor barrier membrane shall extend to all perimeter wall surfaces and extend up the vertical surfaces approximately six (6.0) inches. Wrap the vapor barrier membrane over the perimeter wood nailers extending the membrane a minimum of two (2.0) inches below the base of the nailer on all exposed exterior wall surfaces.

4.18. METAL DECK - VAPOR BARRIER INSTALLATION PROCEDURE

4.18.1. Vapor Barrier Installation Procedure – Roof Section 2

A single ply of ASTM D-4637 non-reinforced 45 mil fire rated EPDM rubber membrane shall be installed directly over the metal deck roof areas. The membrane shall be installed parallel to the deck flutes, thus providing support along the lap edge for adhesion. The EPDM membrane shall be laid out over the roof area cutting out all curbs and penetrations. Positioning the sheet at the edge of the roof, secure the corners of the membrane with corrosion resistant No. 14 screw fasteners installed in conjunction with three (3.0) inch galvanized plate washers. The fasteners shall be of sufficient length to penetrate the metal deck a minimum of one-half (0.5) inch at the base of the flute.

The EPDM membrane shall be mechanically fastened to the metal deck utilizing Factory Mutual approved corrosion resistant screw fasteners and three (3.0) inch galvanized plate washers spaced in staggered fashion at a rate of one (1) fastener per twenty-five (25.0) square feet. Attachment of the EPDM rubber roof membrane will be required in the event the Contractor does not / cannot complete the installation of the roof insulation and base ply of Modified Membrane during the same day. In the event all areas can be completed within the same day, the Contractor may "loose lay" the EPDM membrane and mechanically attach the polyisocyanurate insulation board over the membrane to secure both the insulation and membrane simultaneously.

4.18.2. EPDM Membrane -- Lap Area Cleaning Requirements

Position the EPDM Membrane to allow for an overlap of not less than four (4.0) inches. Upon completing the installation of the EPDM membrane over the metal deck surface, fold back the top layer of EPDM membrane along the lap to expose the underside of the membrane for cleaning. Clean the lap splice area with manufacturer's Tape Primer. Utilize a clean white cotton rag or scrubbing pad to remove all dusting agent, dirt or other contaminants from the splice area. Allow all cleaning solvent to completely flash off prior to application of adhesives.

Additional cleaning of the membrane may be required around factory formed splices. The Contractor must not use Splice Wash to clean the membrane surfaces. Excess dusting agent will be wiped or broomed from the surface of the EPDM Membrane prior to application of the Primer. The Primer shall be applied with a scrubber using long strokes along the length of the seam. The rubber surfaces must be observed to be clean and dark gray in color with no streaking or puddling. The Primer must be allowed to completely flash off prior to application of Splice Tape / Seam Tape.

4.18.3. EPDM Membrane -- Lap Area Splicing Requirements

The Contractor shall install a single layer of Splice Tape / Seam Tape along the entire length of the lap area. The Splice Tape / Seam Tape will be installed in a manner which positions the tape to extrude beyond the edge of the top ply of EPDM Membrane approximately 1/8 - 1/2 inch.

Marking and Alignment: Mark the bottom sheet of EPDM Membrane with a lumber crayon or chalk pencil every five feet approximately 1/2 inch from the edge of the top sheet. Tack the top sheet back with Primer as necessary to hold the membrane back after marking and prior to splicing the area.

Primer Application and Cleaning: Apply Primer to the lap seam area utilizing the scrubber to remove excess amounts of dusting agent or contaminants on the membrane surface. Use care to avoid removing the markings on the bottom sheet. During application of the Primer, the Contractor must frequently stir the material. The scrubber pad shall be changed every 200 feet of splice area or when it becomes filled with dusting agent and can no longer hold the proper amount of primer. Additional hand-cleaning of the factory splice areas will be required to insure complete removal of all dusting agent. During periods of cold or high humidity, the Contractor will allow additional time for "flash-off" of the primer prior to application of the tape adhesive.

Splice Tape / Seam Tape Application: Position the Splice Tape / EPDM Seam Tape on the bottom sheet. DO NOT REMOVE THE SEPARATION PAPER ... AT THIS TIME. Align the edge of the Splice Tape / Seam Tape with the markings on the bottom sheet. The Splice Tape / Seam Tape will be positioned to extrude beyond the edge of the closed seam approximately 1/8 - 1/2 inch. Overlap / endlap sections of the Splice Tape / Seam Tape a minimum of one (1.0) inch. After positioning the Splice Tape / Seam Tape, immediately roll the Splice Tape / Seam Tape with a 3 - 4 inch silicone or silicone sleeved steel hand roller. A short nap 3.0 inch paint roller may be substituted for the silicone roller. Loose lay the top layer of EPDM Membrane over the Splice Tape / Seam Tape and trim the top sheet of EPDM Membrane as necessary to allow for proper exposure of the Splice Tape / Seam Tape at the edge of the membrane.

Remove the paper backing from the Splice Tape / Seam Tape along the entire length of the field seam. Pull the paper backing from the top of the Splice Tape / Seam Tape by pulling at an approximate 45 degree angle to the tape and parallel with the roof surface. Allow the top sheet of EPDM Membrane to fall freely onto the exposed Splice Tape / Seam Tape. Broom the entire length of the splice as the release paper is being removed. Use care to avoid creating wrinkles or ridges in the EPDM Membrane while finishing the seam.

Rolling the Splice -- Finishing the Seam: Roll the entire length of the splice using a two (2.0) inch smooth surfaced silicone or silicone sleeved steal roller. The Contractor will roll the seam first across the splice then along the entire length of the splice. Any "air bubbles" within the seam larger than ½ inch diameter will be cut and an additional ply of self-adhesive uncured EPDM membrane applied to the area extending not less than three (3.0) inches from all sides of the cut in the seam.

4.18.4. EPDM Vapor Barrier Membrane -- Perimeter & Projection Details

The EPDM Membrane must be extended to the base of all vertical wall and curb surfaces at which point it shall be wrapped / extended up the curb or wall surface a minimum of six (6.0) inches. The Contractor will be required to apply single component polyurethane caulking sealant to the termination of the vapor barrier membrane on all vertical curb, pitch pan, wall, etc. bases to form a temporary closure of the installed vapor barrier membrane. The caulking sealant will be applied in a continuous one (1.0) inch heavy bead along the edge of the membrane at the termination. At exposed outside edges of the roof where wood nailers are installed or already exist, the EPDM membrane will wrap down the outside vertical face of the nailers to extend not less than one (1.0) inch below the base of the bottom / base nailer.

4.18.5. EPDM Vapor Barrier Cover Strip Installation & Repairs

After completing each section of EPDM vapor barrier installation, the Contractor will be required to perform a visual inspection of the installed membrane. Any damaged or improperly bonded seams will be marked and repaired with an additional ply of self-adhesive EPDM membrane. This additional ply of membrane will be a nominal five (5.0) or six (6.0) inch width of self-adhesive / uncured EPDM membrane as supplied by the manufacturer of the primary waterproofing membrane.

The self-adhesive EPDM membrane patch must be centered over the lap seam or damaged area(s) and shall be fully adhered to the EPDM membrane by using a clean rag to press the membrane into position and then rolling the membrane with a two inch smooth surfaced silicone or silicone sleeved roller. The self-adhesive patch membrane must be fully bonded to the field membrane or lap in all areas without voids, wrinkles or blisters.

In the event the EPDM vapor barrier membrane must function as a temporary roof, the Contractor will be required to install self-adhesive EPDM membrane cover strips over all fastener plates utilized to secure the membrane to the underlying metal deck. These cover strips shall extend a minimum of three (3.0) inches to all sides of the metal plate washer and shall be sealed at the termination of the cover strip on the field membrane with a continuous bead of lap sealant.

Note: The vapor retarder is not to be considered a temporary roof and does not preclude the use of additional waterproofing, tarps, etc. to protect the interior of the building in the event of a sudden rain storm. At all times, the Contractor is to protect the interior of the structure by providing temporary tie-ins to the existing roof membrane, projections, etc...

4.19. INTERNAL DRAIN DETAILS

4.19.1. Internal Drain Repairs

The existing internal roof drains will be inspected and all damaged drain bowls will be brought to the attention of the Owner (or designated representative) and Consultant. All damaged drain bowls must be replaced on a "Line Item" basis. The drain strainer and clamp ring will be removed and the existing drain lead and internal drain flashing must be completely removed. The drain bowl and connection to the internal piping will be inspected. Any deficiencies in the piping, connection or drain bowl will be immediately brought to the attention of the Owner (or designated representative) and/or the Consultant. Damaged drain bowls will be removed and replaced with new cast iron drain bowls sealed to the existing drain pipe with hot-melt plumbers lead or attached via a flexible neoprene boot seal secured to the drain piping with a stainless steel adjustable banding clamp. As necessary, the drain bowl clamp ring bolt sockets will be re-drilled and tapped to allow for installation of new hardware. New corrosion resistant hex bolts will be installed on all internal roof drains to replace existing clamp ring hardware. All internal roof drains must be fully functional and properly installed upon completion. During the removal of the existing roof and flashing, the Contractor will use extreme care to avoid damaging any drains or allowing debris to enter the drain. Drains shall be visually inspected and water tested to insure proper function.

New cast aluminum / cast iron drain strainers will be installed to replace all missing or damaged strainers. All existing plastic drain strainers must be replaced with cast aluminum strainers. Drain strainers must be secured properly to the drain clamp ring per the drain manufacturer's requirements.

If the Contractor is unable to install new clamping hardware to the existing drain head, it will be removed and replaced with a new cast iron drain of the same internal piping dimension as the existing drain. All internal drain hardware, clamp rings, cast aluminum / cast iron drain strainers and attachment hardware will be itemized and billed to the customer on a unit cost basis.

4.20. INSULATION INSTALLATION PROCEDURE

4.20.1. Insulation Adhesive Application – General Requirements

Cold applied insulation adhesives approved for this project must be stored in a heated area prior to use when temperatures are below forty-five (45) degrees Fahrenheit. Application of liquid applied adhesives will be performed only when conditions comply with the Material Manufacturer's published literature. Low rise polyurethane adhesive(s) will be applied in ribbons spaced at six (6.0) inches on-center to achieve approximate one-hundred (100.0) square feet per gallon rate of application. Application of cold applied adhesive shall be suspended when temperatures are below thirty-five (35) degrees Fahrenheit.

4.20.2. Insulation – Mechanical Attachment – Metal Deck Areas

Mechanical attachment of the base course of insulation shall be required in all areas where the insulation is installed over the EPDM rubber membrane vapor barrier and the underlying structural deck system is metal. Secure all new insulation to the underlying metal deck with No. 12 corrosion resistant screw fasteners utilized in conjunction with three (3.0) inch galvanized metal plate washers. Insulation shall be fastened per Factory Mutual FM-1-60 wind uplift requirements. A minimum of two (2) fasteners shall be utilized to secure any section of insulation.

4.20.3. Insulation – Mechanical Attachment – Wood Deck Areas

Mechanical attachment of the base course of insulation shall be required in all areas where the insulation is installed over the self-adhered vapor barrier membrane and the underlying structural wood deck system. Secure all new insulation to the underlying wood deck with No. 12 corrosion resistant screw fasteners utilized in conjunction with three (3.0) inch galvanized metal plate washers. Insulation shall be fastened per Factory Mutual FM-1-60 wind uplift requirements. A minimum of two (2) fasteners shall be utilized to secure any section of insulation.

4.20.4. Insulation – Low Rise Foam Adhesive Attachment – Concrete Deck Areas

Adhesive attachment of the base course of insulation shall be required in all areas where the insulation is installed over the fully adhered vapor barrier membrane vapor barrier and the underlying structural deck system is concrete. Low rise polyurethane adhesive(s) will be applied in ribbons spaced at six (6.0) inches on-center to achieve approximate one-hundred (100.0) square feet per gallon rate of application. Position and place the insulation boards into the foam adhesive and compress the board into the adhesive. Provide temporary ballast placed on the insulation boards to prevent bridging of the board over the adhesive ribbons.

4.20.5. Insulation Installation – General Procedures

Beginning at the internal roof drain locations or perimeter gutter edge, the Contractor will install a base course of three and one-half (3.50) inch thickness polyisocyanurate insulation and additional courses of flat stock and one-eighth (1/8") inch per foot tapered insulation to promote not less than one-eighth inch per foot slope-to-drain. A second course of flat stock two (2.0) inch polyisocyanurate insulation shall be installed over the barrel roof portions of Roof Section 1. Insulation supplied and installed in conjunction with this project insulation must have a C value of .175 and aged R (LTTR) value of 5.7 per 1.0 inch thickness conforming to Federal Specification HH-I-1972/2-1. Tapered insulation configuration throughout all roof areas must achieve uniform drainage / positive drainage from all roof areas. Polyisocyanurate insulation supplied for this project must conform with ASTM C 1289-13e1, Type II, Class 1, Grade 2, ASTM D-1621 Compressive Strength of 20 psi or greater, ASTM D-1622 Density of 2 pcf or greater, ASTM D-2126 Dimensional Stability of 2% maximum and ASTM E-84 Flame Spread of 25 or less, UL Class A – Roof Systems (UL 1256 Standard), Federal Specifications HH-1-1972/2 Class 1, with aged "R" (LTTR) value equal to 5.7 per inch of thickness. All insulation shall be classified by Underwriters Laboratories Inc. for Class A constructions. Insulation must have been tested and accepted for Class IA-60 and IA-90 construction. Insulation shall be reduced to not less than a minimum thickness of two and one half (2.50) inches within the drain sump areas. As per the Energy Code for commercial structures, average R-value for each roof section must be equal to or greater than R-30 for the installed roof assembly.

Install the insulation boards with the end seams arranged in a staggered fashion. All edges of the insulation boards must be butted together to minimize any seam gaps. Position the insulation boards with the longest dimension of the board perpendicular to the slope-to-drain. Additional layers of tapered insulation installed over "flat" stock (non-tapered) will be completed to provide not less than one-eighth (0.125) inch positive slope to drain from all areas of the roof. Tapered drainage saddles and crickets with not less than one-quarter (0.25) inch per foot taper will be installed and fully adhered with insulation adhesive to divert water around roof mounted equipment and to direct water to the internal roof drains.

Metal Deck Areas: Secure the base course of insulation to the metal deck with No. 12 corrosion resistant screw fasteners utilized in conjunction with three (3.0) inch galvanized metal plate washers. Insulation shall be fastened per Factory Mutual FM-1-60 wind uplift requirements. A minimum of two (2) fasteners shall be utilized to secure any section of insulation. Fastening of the insulation at all exposed edges of the roof will be increased by fifty (50%) percent and at all corners by one-hundred (100%) percent. All gaps of greater than 1/4 inch will be filled with additional insulation prior to the installation of the second course of insulation. Tapered insulation saddles shall be fully bonded to the base course of flat stock polyisocyanurate insulation with approved cold adhesive. Where the metal deck system is already tapered to provide positive slope of one-eighth (1/8) inch per foot, the Contractor shall install a second course of two (2.0) inch thickness polyisocyanurate insulation fully adhered to the base course of mechanically fastened polyisocyanurate by means of cold applied insulation adhesive applied in ribbons at not greater than six (6.0) inches on-center spacing. The installed insulation system shall provide positive drainage from all sections and areas of the roof. The Contractor shall install additional layers of tapered insulation or roofing membrane to "elevate" any areas where water is retained on the completed roof membrane surface for a period of greater than forty-eight (48.0) hours.

Tapered insulation crickets and saddles will be installed on the upslope side of all unit curbs or obstructions greater than twenty-four (24.0) inches in width where the flow of water is obstructed. Additional insulation or membrane will be installed at no additional cost to the Building Owner above the Base Contract price for this project to effectively divert and drain water from all roof areas within a forty-eight (48) hour period after a rainfall based on 70 deg. Fahrenheit.

As per the International Energy Code, the average "R" value of the installed insulation over any occupied / conditioned air space must be equal to or greater than R = 30.0 provided said installation of insulation does not require an excessive burden to the Owner for modifications to the structure, perimeter walls or terminations of the roof.

Concrete Deck Areas: Install a base layer of three and one-half (3.50) inch flat stock insulation and additional layers of one-eighth (1/8") tapered polyisocyanurate insulation directly over the installed fully adhered vapor barrier membrane. Cut-away and taper insulation at internal drains to provide a sump extending eighteen (18.0) inches to each side of the drain.

Install the insulation boards with the end seams arranged in a staggered fashion. All edges of the insulation boards must be butted together to minimize any seam gaps. Position the insulation boards with the longest dimension of the board perpendicular to the slope-to-drain. Installation of the tapered insulation shall conform to the insulation manufacturers design. The tapered insulation Manufacturer must review and certify the taper design prior to installation. Apply insulation adhesive in continuous ribbons not greater than six (6.0) inches on-center. Place the insulation boards into the adhesive and "walk-in" or compress the insulation into the adhesive. Insulation must be adhered in accordance with FM-1-60 requirements.

Install additional one-half (0.50) inch tapered insulation saddles and crickets at designated upslope conditions above all unit curbs and penetrations where the flow of water will be impeded. Tapered insulation crickets will be constructed between the internal roof drains installed adjacent to the low point of the roof / perimeter wall to divert water to the internal roof drains and prevent ponding between the drains. Fully adhere all additional tapered insulation with the specified cold applied insulation adhesive. All gaps of greater than 1/4 inch will be filled with additional insulation prior to the installation of the second course of insulation. Tapered insulation saddles shall be fully bonded to the base course of flat stock polyisocyanurate insulation with approved cold adhesive or alternative hot asphalt (if approved).

Wood Deck Areas: Secure the base course of insulation to the underlying wood deck with No. 12 corrosion resistant screw fasteners utilized in conjunction with three (3.0) inch galvanized metal plate washers. Insulation shall be fastened per Factory Mutual FM-1-60 wind uplift requirements. A minimum of two (2) fasteners shall be utilized to secure any section of insulation. Fastening of the insulation at all exposed edges of the roof will be increased by fifty (50%) percent and at all corners by one-hundred (100%) percent. All gaps of greater than 1/4 inch will be filled with additional insulation prior to the installation of the second course of insulation. Tapered insulation saddles shall be fully bonded to the base course of flat stock polyisocyanurate insulation with approved cold adhesive. Where the wood deck system is already tapered (i.e. barrel roof areas) to provide positive slope of one-eighth (1/8) inch per foot, the Contractor shall install a second course of two (2.0) inch thickness polyisocyanurate insulation fully adhered to the base course of mechanically fastened polyisocyanurate by means of cold applied insulation adhesive applied in ribbons at not greater than six (6.0) inches on-center spacing. The installed insulation system shall provide positive drainage from all sections and areas of the roof. The Contractor shall install additional layers of tapered insulation or roofing membrane to "elevate" any areas where water is retained on the completed roof membrane surface for a period of greater than forty-eight (48.0) hours.

Tapered insulation crickets and saddles will be installed on the upslope side of all unit curbs or obstructions greater than twenty-four (24.0) inches in width where the flow of water is obstructed. Additional insulation or membrane will be installed at no additional cost to the Building Owner above the Base Contract price for this project to effectively divert and drain water from all roof areas within a forty-eight (48) hour period after a rainfall based on 70 deg. Fahrenheit.

As per the International Energy Code, the average "R" value of the installed insulation over any occupied / conditioned air space must be equal to or greater than R = 30.0 provided said installation of insulation does not require an excessive burden to the Owner for modifications to the structure, perimeter walls or terminations of the roof.

4.20.6. Tapered Insulation Saddles

Install new ¼:12 tapered polyisocyanurate insulation saddles in designated roof areas to facilitate positive drainage from the completed roof. The tapered insulation saddles (and crickets) will be fully adhered to the base course of polyisocyanurate insulation with approved cold applied insulation adhesive applied in ribbons at not greater than six (6.0) inches on-center spacing. Polyisocyanurate insulation supplied in conjunction with the installation of tapered insulation saddles must conform with ASTM C-1289-05a, Type II, Class 1, Grade 2, ASTM D-1621 Compressive Strength of 20 psi or greater, ASTM D-1622 Density of 2 pcf or greater, ASTM D-2126 Dimensional Stability of 2% maximum and ASTM E-84 Flame Spread of 25 or less, UL Class A – Roof Systems (UL 1256 Standard), Federal Specifications HH-1-1972/2 Class 1. The cost of all drain saddles and crickets shall be included in the Contractor's Base Bid for this project. Crickets will extend eight (8.0) feet from the wall as measured to the greatest distance from the wall between adjacent drains.

4.20.7. Glass Faced Gypsum Recover Board Installation

Install a single course of 1/2 inch glass faced gypsum board directly over the installed polyisocyanurate insulation in all areas. The isolation recovery board supplied for the project shall be delivered to the project with original shrink wrapping and shall be labeled, conforming with UL - Class A Roof Systems, UL 790 and UL 12567, FRMC Class 1 (FM4450), with aged "R" value equal to 0.56 per one-half (0.50) inch. All glass faced gypsum board shall be classified by Factory Mutual as an approved component for FM 1-60, FM-1-75 and FM 1-90 roof assemblies.

Install the single course of glass faced gypsum recovery board with the manufacturer's approved cold applied low rise polyurethane foam adhesive applied directly over the installed polyisocyanurate insulation. Prior to installation of the overlay board, all polyisocyanurate insulation board must be dry with all loose dirt and debris removed. Any gaps between the polyisocyanurate insulation boards must be filled with additional expansion foam insulation or rigid polyisocyanurate insulation. The glass faced gypsum recover board shall be installed with the longest dimension of the isolation board perpendicular to the slope-to-drain. The ends of the glass faced gypsum recover board shall be staggered a minimum of two (2.0) feet. All boards shall be fitted together to prevent gaps of greater than 1/4 inch. Gaps of greater than 1/4 inch must be filled with additional recover board prior to installation of roof system. During installation of the glass faced gypsum board, the Contractor will use care to compress each board into the adhesive to obtain maximum uniform adhesion.

Application of the low rise foam adhesive will be with a wand, spreader or spray equipment. Ribbons of adhesive must be applied at not greater than six (6.0) inches on-center spacing. Spray application of adhesive with foam applicator equipment will be performed to achieve one-hundred (100%) percent coverage of the base insulation surface. Adhesive application must conform with Factory Mutual FM-1-60 Wind Uplift requirements. Additional adhesive ribbons will be applied at the outside corners and exposed edges of the roof to comply with the adhesive manufacture's requirements to comply with FM-1-60 Wind Uplift. As necessary, the Contractor shall provide temporary ballast of the insulation boards during initial set and cure of the insulation adhesive.

4.20.8. Installation - Cant Strips

Install new perlite cant strips at the perimeter of the roof areas along the base of all vertical walls and curb surfaces. This cant strip may be loose laid or fully adhered with cold adhesive or asphalt mastic (as required per the selected roof membrane manufacturer) directly over the insulation surface. Cant strip dimension shall be sized not less than one and one-half (1.5) inch by four (4.0) inches. All cant strips must be Class A Fire Rated and must be approved for construction using torch applied roof systems.

4.21. ROOF INSTALLATION PROCEDURE

4.21.1. Roof Membrane Installation Procedure -- General Guidelines

The work under this section should be in keeping with first class workmanship in the best practice of the trade and shall be accomplished by a qualified Contractor who shall be capable of planning and coordinating the entire work. It is specifically pointed out that the coordination and the cooperation with the Owner (or designated representative) and the Consultant - Structural Technologies, Inc. for the inspection as previously mentioned is required and shall be insisted upon. The Contractor shall be responsible for methods and means employed and utilized to complete work as specified and detailed in these specifications and all attached construction documents. Work shall be carried out in a professional and workmanlike manner using care to prevent damage to adjacent roof areas, portions of the structure, landscaping or equipment including vehicles located adjacent to the structure. It shall be the Contractor's responsibility to maintain the work site including all equipment utilized by employees of the Contractor in a safe and operable condition.

The scope of work set forth herein as detailed in this Section and sub-heading is provided in conjunction with the attached Construction Drawings and Details. These written specifications may not include all components or combination of items to be replaced in conjunction with this project. The Contractor shall reference all written documents, drawings, details, etc. as well as all applicable Addenda and Clarifications provided prior to preparing and submitting their bid. Any questions, discrepancies or conflicts between these referenced documents shall be immediately brought to the attention of the Consultant –Structural Technologies, Inc. for review.

4.21.2. Roof Construction -- Installation Coordination

The Contractor shall plan his work so that he prepares and insulates no more than he can finish roofing during the same day. In the event the Contractor installs the vapor barrier membrane in all areas prior to the installation of the insulation, he shall be required to provide drainage from the roof areas by means of a portable sump pump connected to the drain piping. A continuous bead of asphalt mastic, self-adhesive membrane or one-part polyurethane must be applied at all exposed edges of the vapor barrier tie-in to the existing roof system to form a watertight condition at all times.

Any phased construction of the roof system will be allowed only in the event that the Contractor cannot complete the installation of the final ply of waterproofing membrane during that same day. In these areas, the Contractor must provide a waterproof membrane or temporary "cap" to prevent the absorption of moisture into the underlying insulation or exposed portions of the roof assembly. Installation of the SBS Smooth Surface Modified Membrane over the entire roof area prior to the installation of the granular surfaced "final" ply will be allowed provided all areas of the roof are completed within one (1) week after installation of the smooth surfaced membrane and the roof material manufacturer approves this method of installation for Guaranty purposes. All phased areas completed in this manner shall be reviewed by the Manufacturer's Representative and Project Consultant. Rejected or damaged sections of the roof completed by "phasing" shall be completely removed or prepared in accordance with these specifications and the Manufacturer's direction insofar as is applicable to the areas completed in this manner. The Contractor must have on hand adequate covering and protection to cover all areas of partial tear-off (including flashing areas) should an unexpected rapid weather change occur. If there is an exposed area or if the partial assembly becomes wet as deemed by the Consultant or the Manufacturer's Representative, the area will be torn out and replaced at the Contractor's expense.

4.21.3. Cold Weather Special Precautions

Cold weather application procedures shall apply for installation of the SBS Modified Membrane when residual outside air temperatures are below forty degrees (40°F). All SBS Modified Membrane roofing rolls will be stored in a heated area prior to installation -- minimum of fifty-five degrees (55°F). The roofing rolls will be removed from storage and immediately installed to avoid membrane cooling to below forty-five degrees (45°F). If membrane cracking occurs at any time during cold weather installation, immediately discontinue installation and repair any damaged membrane with asphalt mastic. All other special procedures/precautions stated by the manufacturer will be strictly adhered to with respect to cold weather application.

4.22. SCOPE-OF-WORK -- ROOF MEMBRANE SYSTEM INSTALLATION

4.22.1. Cleaning & Substrate Requirements

Sweep entire insulation or installed base sheet / base ply surface to remove all residual matter, debris, and dirt. All installed insulation must be clean, dry and undamaged with no gaps between adjacent insulation boards prior to the installation of the new modified membrane roof system. All insulation board must be properly adhered to the substrate and/or previous installed layers of insulation. There shall be no gaps or unlevel areas of insulation which will result in retention of water or impaired drainage from the completed roof system.

4.22.2. Modified Membrane - Base Ply Installation – Concrete Deck Areas

Beginning at the low point of the roof adjacent to the internal drain(s), install a single ply of the primary waterproofing membrane manufacturer's specified smooth surfaced Modified Membrane perpendicular to the deck slope-to-drain laying the ply directly over the glass faced gypsum recover board (Dens-Deck Prime or equivalent) and polyisocyanurate insulation by heat welding. The field membrane must be shingle lapped downslope on all crickets and drainage saddles installed through the roof section.

As necessary, the surface of the glass faced gypsum board will be continuously prime coated with an asphalt cut-back primer applied with a bush or roller to achieve uniform coverage and application of one-half (0.50) gallon per one-hundred (100.0) square feet. After allowing the primer to "flash-off" and partially cure, the base ply of smooth surfaced Modified Membrane will be continuously bonded to the surface of the insulation/recover board by use of a hand held propane torch or multi-headed torch cart (the use of the multi-headed torch cart will only be allowed with prior approval from the material manufacturer). The roofing roll will be positioned and a continuous flame will be applied, the asphalt bitumen must be continuously heated to maintain the asphalt at 330°F - 350°F, to completely burn the separation liner away and heat the bitumen until a glossy surface is obtained and the asphalt begins to flow slightly and produce a continuous bond to the surface of the glass faced gypsum board or previous ply of smooth surfaced membrane. Slowly roll the membrane forward using care to prevent overheating the membrane. Care should be taken not to induce stretch into the membrane or to trap air under the membrane.

The smooth surfaced torch weldable Modified Membrane base ply shall be installed directly over the glass faced gypsum board (DensDeck Prime or equivalent) overlay board and polyisocyanurate insulation. Sidelaps shall be a minimum of three (3.0) inches with endlaps of six (6.0) inches. All endlaps between adjacent sheets must be staggered a minimum of thirty-six (36.0) inches. The smooth surfaced torch weldable Modified Membrane base ply shall extend to the top of all cant strips. Fully adhere the base ply of torch weldable Modified Membrane to the glass faced gypsum overlay board surface by continuous heat welding. Extend the base ply beyond the exposed edge of the insulation at all tie-off areas and heat weld or adhere the membrane to the surface of the installed vapor barrier membrane to form a watertight condition at the tie-off. As necessary, to provide a watertight seal at the end of each day's work, the Contractor may utilize a hand held "flameless" hot air welder to weld the sidelaps and endlaps where asphalt adhesive or mastic has been utilized to adhere or repair the membrane. In the event the Contractor utilizes a hot air welder, the Contractor must avoid application of the cold adhesive to the sidelap and endlap areas providing not less than three (3.0) inches of sidelap or endlap to be heat welded.

The Contractor will be required to install the base ply of smooth surfaced torch weldable Modified Membrane in the roof field and the base ply of torch welded smooth surfaced Modified Membrane flashing in the same day. If the Contractor installs only the base ply of Modified Membrane throughout the roof field and cannot complete the installation of the flashings, he will be required to seal the termination of the field membrane at the base of all perimeter walls, curb bases, stacks, internal drains, etc. with asphalt mastic and inorganic mesh reinforcement to keep them watertight until the flashing membrane is installed.

4.22.3. Modified Membrane - Base Ply Installation – Wood & Metal Deck Areas

Beginning at the low point of the roof adjacent to the internal drain(s) or perimeter gutter edge, install a single ply of the primary waterproofing membrane manufacturer's specified smooth surfaced self-adhered Modified Membrane perpendicular to the deck slope-to-drain / slope-to-gutter edge laying the ply directly over the glass faced gypsum recover board (Dens-Deck Prime or equivalent) and polyisocyanurate insulation. The field membrane must be shingle lapped downslope on all crickets and drainage saddles installed throughout the roof section.

As necessary, the surface of the glass faced gypsum board will be continuously prime coated with an asphalt cut-back primer applied with a bush or roller to achieve uniform coverage and application of one-half (0.50) gallon per one-hundred (100.0) square feet. After allowing the primer to "flash-off" and partially cure, the base ply of smooth surfaced self-adhered Modified Membrane will be continuously bonded to the surface of the insulation/recover board. Care should be taken not to induce stretch into the membrane or to trap air under the membrane during application.

The self-adhered membrane will be carefully aligned with the perimeter edge of the roof prior to removal of the protective release film from the back / underside of the membrane. The Contractor shall use care during removal of the release film to prevent dirt or contaminants from becoming trapped beneath the membrane during application. Install the self-adhered membrane by rolling the membrane forward as the release film is removed. Use a broom or weighted roller to compress the membrane against the surface of the glass faced gypsum board. Fully adhere the base ply of Modified Membrane to the surface of the overlayment glass-faced gypsum board. The field membrane must be shingle lapped downslope in all areas including on all crickets and drainage saddles installed through the roof section.

The smooth surfaced self-adhered Modified Membrane base ply shall be installed directly over the glass faced gypsum board (DensDeck Prime or equivalent) overlay board and polyisocyanurate insulation. Sidelaps shall be a minimum of three (3.0) inches with endlaps of six (6.0) inches. All endlaps between adjacent sheets must be staggered a minimum of thirty-six (36.0) inches. The smooth surfaced self-adhered Modified Membrane base ply shall extend to the top of all cant strips. Fully adhere the base ply of self-adhered Modified Membrane to the glass faced gypsum overlay board surface by removing the release film and continuously compressing and rolling the roll forward avoiding trapping of air beneath the membrane or creating wrinkles or voids. Extend the base ply beyond the exposed edge of the insulation at all tie-off areas and adhere the membrane to the surface of the installed vapor barrier membrane to form a watertight condition at the tie-off. As necessary, to provide a watertight seal at the end of each day's work, the Contractor may utilize a hand held "flameless" hot air welder to weld the sidelaps and endlaps where asphalt adhesive or mastic has been utilized to adhere or repair the membrane. In the event the Contractor utilizes a hot air welder, the Contractor must avoid application of the cold adhesive to the sidelap and endlap areas providing not less than three (3.0) inches of sidelap or endlap to be heat welded.

The Contractor will be required to install the base ply of smooth surfaced self-adhered Modified Membrane in the roof field and the base ply of smooth surfaced self-adhered Modified Membrane flashing in the same day. If the Contractor installs only the base ply of Modified Membrane throughout the roof field and cannot complete the installation of the flashings, he will be required to seal the termination of the field membrane at the base of all perimeter walls, curb bases, stacks or gutter locations, etc. with asphalt mastic and inorganic mesh reinforcement to keep them watertight until the flashing membrane is installed.

4.22.4. Modified Membrane - Final Ply Installation – All Roof Areas

Beginning at the low point of the roof adjacent to the internal drain(s), install the final ply of heat welded granule surfaced Modified Membrane perpendicular to the deck slope-to-drain torch welding the ply directly to the surface of the underlying base ply of smooth surfaced Modified Membrane. The field membrane must be shingle lapped downslope on all crickets and drainage saddles installed through the roof section. Unroll approximately ten (10.0) feet of Modified Membrane and position the sheet. The sidelaps in the final ply of Modified Membrane shall be staggered eighteen (18.0) inches from the laps in the base ply. Under no circumstances are the sidelaps in the final ply to coincide with the sidelaps in the base ply. As necessary, allow the granule surfaced membrane to "relax" for a period of thirty (30.0) minutes prior to heat welding to the base ply. This procedure is especially necessary for cold weather installation. The final ply shall then be solidly bonded to the surface of the base ply by use of a hand held propane torch or multi-headed torch cart (the use of the multi-headed torch cart will only be allowed with prior approval from the Material Manufacturer).

The roofing roll will be positioned and a continuous flame will be applied, the asphalt bitumen must be continuously heated to maintain the asphalt at 330°F - 350°F, to completely burn the separation liner away and heat the bitumen until a glossy surface is obtained and the asphalt begins to flow slightly and produce a continuous bond to the previous ply. Slowly roll the membrane forward using care to prevent overheating the membrane. Care should be taken not to induce stretch into the membrane or to trap air under the membrane.

Sidelap the final ply of granule surfaced Modified Membrane a minimum of three (3.0) inches with endlaps of six (6.0) inches. All endlaps between adjacent sheets must be staggered a minimum of thirty-six (36.0) inches. Prior to lapping any sections of membrane over granular surfaced areas, the Contractor must heat the granulated surface and "embed" the granules. The Contractor will insure that the reinforcement scrim is not visible during the granule embedding process. After the laps are torched they will be rolled with a steel roller or hand troweled smooth with a clean trowel to insure complete adhesion. The Contractor inspect and probe all laps with a blunt trowel or screwdriver blade and must use a hand-held torch and smooth finishing trowel to re-heat and re-bond any poorly bonded sidelaps and endlaps at the end of each day's work. A continuous outflow of 1/8 – 1/4 inch of asphalt should be visible at the edge of all heat welded laps. DO NOT BROADCAST GRANULES INTO THE ASPHALT OUTFLOW.

There shall be no evidence of fishmouths or ridges in the Modified Membrane upon completing the installation. If fishmouths or unadhered laps occur, they shall be cut and an additional ply of the Modified Membrane will be torch applied over the entire area. Prior to torching the patch over the area, the granules must be embedded. The Contractor shall insure that the reinforcement scrim is not visible during the granule embedding process.

4.22.5. Fire Watch and Precautions

Contractor personnel and supervisor shall have successfully completed the NRCA Certified Torch Applicator (CERTA) program for application of roofing materials with heat and/or roofing torch. The Contractor shall provide one (1) fire extinguisher per torch used on the job site. Fire extinguishers shall be 4A60BC rated and shall have been recently inspected and fully functional. Fire extinguishers shall be located at a distance of not greater than thirty (30.0) feet from any torch as stated in BOCA 1993 Fire Prevention Code for open flame conditions. A designated man on each roofing crew shall be required to conduct a "Fire Watch". This man shall be trained in the use of all fire extinguishing equipment and he shall have obtained all information and phone numbers for the local fire department. The location of fire alarms and safety equipment shall be reviewed at the Pre-Job Meeting. A "Fire Watch" shall be implemented on a daily basis with the job foreman or designated personnel walking all areas completed during that day checking for signs of smoldering or burning roof materials for a minimum of one (1.0) hour each day after the last roofing torch is shut off. Inspection of the building interior beneath completed roof areas will also be conducted.

THE FIRE WATCH IS A MANDATORY PROVISION OF THIS PROJECT. INSPECTION OF THE ROOF SHALL BE COMPLETED WITH THERMAL IMAGING CAMERA (FLIR C3, C2, E4 OR EQUIVALENT) WITH PICTURE CAPABILITY AND DOCUMENTATION.

4.22.6. Inspection by Manufacturer

During the installation of the roof system, the Contractor shall contact the Manufacturer to schedule job-site inspections to insure compliance with the manufacturer's recommended procedures for installation. Any exceptions to this specification, required by the manufacturer, shall be submitted in writing and shall be reviewed by the Consultant - Structural Technologies, Inc... The Contractor shall in all instances act to correct any deficiencies identified by the manufacturer to assure guaranty coverage provided by the manufacturer.

4.23. MODIFIED MEMBRANE FLASHING CONSTRUCTION DETAILS

4.23.1. Flashing Installation – Roof Sections 1 & 2

New two (2) ply Modified Membrane flashings, consisting of a base ply of smooth surfaced self-adhered Modified Membrane and a final ply of granular surfaced torch weldable Modified Membrane will be installed on all vertical surfaces (i.e. curb bases, roof hatch, HVAC curbs, etc.). Modified Membrane flashings consisting of one (1.0) ply of smooth surfaced self-adhered Modified Membrane target sheet and the final ply of granule surfaced field membrane will be installed on all flat horizontal surfaces (i.e. gutter edge flashings, furnace stack jack flashings, internal drain flashings, etc.).

The base field ply of smooth surfaced self-adhered Modified Membrane shall be installed to a height of approximately two (2.0) inches above the top of the cant strip. The flashing membrane consisting of a single ply of smooth surfaced self-adhered SBS Modified Membrane and a final ply granular surfaced SBS Modified Membrane will be installed over the cant strip, extending from the horizontal surface of the field membrane up the vertical curb or wall surface. The base ply of flashing shall be fully adhered by priming and applying the self-adhered membrane directly to the substrate surface. The final ply of granular surfaced Modified Membrane flashing will be fully adhered to the base ply of smooth surfaced Modified Membrane using a hand held propane torch or hand-held hot air gun. The base and the final ply will be installed so as to extend over the adjacent field membrane surface a minimum of eight (8.0) inches as measured from the base of the installed cant strip. The granules on the field sheet will be fully embedded prior to the installation of the final ply of granular surface flashing membrane. The base ply and final ply of the flashing membrane shall extend to the top of all vertical curb surfaces and a minimum of eight (8.0) inches above the cant at all vertical wall surfaces. Sidelaps between the base ply and final ply shall be staggered a minimum of twelve (12.0) inches and each ply of flashing shall be sidelapped/endlapped a minimum of four (4.0) inches.

The smooth surfaced Modified Membrane field sheet shall be installed over the roof areas. Prior to installation of the granular surfaced "field ply", the Contractor shall install the "base" ply of smooth surfaced self-adhered Modified Membrane flashing. **INSTALLATION OF THE BASE PLY OF SMOOTH SURFACED MODIFIED MEMBRANE FLASHING MUST PRECEDE THE INSTALLATION OF THE GRANULAR SURFACED FIELD PLY AND FLASHING.**

Upon completing the installation of the base ply of smooth surfaced Modified Membrane flashing and the field ply of granular surfaced Modified Membrane, the final ply of granular surfaced Modified Membrane flashing will be installed. The final ply of the granular surfaced Modified Membrane flashing shall be applied in widths of no greater than thirty-six (36.0) inches on all vertical surfaces. The lap seams of the granular surfaced flashing must not coincide with the lap seams of the base flashing membrane. Stagger all sidelaps / endlaps between the base ply and the final ply a minimum of twelve (12.0) inches. The base ply and final ply of flashing membrane shall be installed in lengths of not greater than six (6.0) feet measured horizontally or in thirty-six (36.0) inch width sections cut from the end of the roll as required by the material manufacturer. All sidelaps / endlaps in the Modified Membrane flashing shall be re-torched and troweled to insure complete and uniform adhesion. Both plies of flashing must be secured to the curb or wall surface with the appropriate tin-cap nail fastener(s) installed every 8 – 10 inches on center, one (1.0) inch from the top / termination of the flashing. The Contractor shall be required to apply a continuous bead of single component polyurethane caulking sealant or trowel applied asphalt mastic to the termination of the vertical flashing membrane on the curb or wall surface to prevent moisture penetration into or behind the installed flashings. Where vertical flashings extend less than six (6.0) inches above the complete roof surface, an aluminum termination bar must be installed and secured along the upper edge of the flashing and a continuous bead of polyurethane caulking applied to the upper edge of the termination bar to form a watertight condition. Metal counterflashing will then be installed over the termination bar in these areas of low clearance. If required as a warranted installation, the Contractor may apply fabric reinforced liquid resin flashings at these locations of low clearance.

A corner "gusset" piece of smooth surfaced Modified Membrane must be installed on all inside and outside corners of the base ply of smooth surfaced Modified Membrane flashing prior to the installation of the final ply of the granular surfaced Modified Membrane.

Note: Contractor must use care during application of heat welded flashing membrane when applying the final ply of granule surfaced membrane to any flammable surfaces including wood nailers, insulation facers or substrate. The Contractor shall only use self-adhered membrane as the base flashing ply where flammable substrate surfaces exist or substitute reinforced liquid resin flashings to prevent any exposure to open flame.

4.23.2. Flashing Installation – Roof Sections 3 & 4

New two (2) ply Modified Membrane flashings, consisting of a base ply of smooth surfaced torch weldable Modified Membrane and a final ply of granular surfaced torch weldable Modified Membrane will be installed on all vertical surfaces. Modified Membrane flashings consisting of one (1.0) ply of smooth surfaced torch weldable Modified Membrane target sheet and the final ply of granule surfaced field membrane will be installed on all flat horizontal surfaces (i.e. gravel stop flashings, furnace stack jack flashings, internal drain flashings, etc.).

The base field ply of smooth surfaced torch weldable Modified Membrane shall be installed to a height of approximately two (2.0) inches above the top of the cant strip. The flashing membrane consisting of a single ply of smooth surfaced torch weldable SBS Modified Membrane and a final ply granular surfaced SBS Modified Membrane will be installed over the cant strip, extending from the horizontal surface of the field membrane up the vertical curb or wall surface. The base ply of flashing shall be fully adhered by heat welding. The final ply of granular surfaced Modified Membrane flashing will be fully adhered to the base ply of smooth surfaced Modified Membrane using a hand held propane torch. The base and the final ply will be installed so as to extend over the adjacent field membrane surface a minimum of eight (8.0) inches as measured from the base of the installed cant strip. The granules on the field sheet will be fully embedded prior to the installation of the final ply of granular surface flashing membrane. The base ply and final ply of the flashing membrane shall extend to the top of all vertical curb surfaces and a minimum of eight (8.0) inches above the cant at all vertical wall surfaces. Sidelaps between the base ply and final ply shall be staggered a minimum of twelve (12.0) inches and each ply of flashing shall be sidelapped/endlapped a minimum of four (4.0) inches.

The smooth surfaced Modified Membrane field sheet shall be installed over the roof areas. Prior to installation of the granular surfaced "field ply", the Contractor shall install the "base" ply of smooth surfaced torch weldable Modified Membrane flashing. **INSTALLATION OF THE BASE PLY OF SMOOTH SURFACED MODIFIED MEMBRANE FLASHING MUST PRECEDE THE INSTALLATION OF THE GRANULAR SURFACED FIELD PLY AND FLASHING.**

Upon completing the installation of the base ply of smooth surfaced Modified Membrane flashing and the field ply of granular surfaced Modified Membrane, the final ply of granular surfaced Modified Membrane flashing will be installed. The final ply of the granular surfaced Modified Membrane flashing shall be applied in widths of no greater than thirty-six (36.0) inches on all vertical surfaces. The lap seams of the granular surfaced flashing must not coincide with the lap seams of the base flashing membrane. Stagger all sidelaps / endlaps between the base ply and the final ply a minimum of twelve (12.0) inches.

The base ply and final ply of flashing membrane shall be installed in lengths of not greater than six (6.0) feet measured horizontally or in thirty-six (36.0) inch width sections cut from the end of the roll as required by the material manufacturer. All sidelaps / endlaps in the Modified Membrane flashing shall be re-torched and troweled to insure complete and uniform adhesion. Both plies of flashing must be secured to the curb or wall surface with the appropriate tin-cap nail fastener(s) installed every 8 – 10 inches on center, one (1.0) inch from the top / termination of the flashing. The Contractor shall be required to apply a continuous bead of single component polyurethane caulking sealant or trowel applied asphalt mastic to the termination of the vertical flashing membrane on the curb or wall surface to prevent moisture penetration into or behind the installed flashings. Where vertical flashings extend less than six (6.0) inches above the complete roof surface, an aluminum termination bar must be installed and secured along the upper edge of the flashing and a continuous bead of polyurethane caulking applied to the upper edge of the termination bar to form a watertight condition. Metal counterflashing or sill flashing will then be installed over the termination bar in these areas of low clearance.

A corner "gusset" piece of smooth surfaced Modified Membrane must be installed on all inside and outside corners of the base ply of smooth surfaced Modified Membrane flashing prior to the installation of the final ply of the granular surfaced Modified Membrane.

4.23.3. Cant Strips

Installation of cant strips at the transition of the horizontal field membrane to a vertical surface will be required for all penetration or projections in excess of twelve (12.0) inches in width. Install new perlite cant strips at the perimeter of the roof areas along the base of all vertical walls and curb surfaces. This cant strip may be loose laid or fully adhered with the manufacturer's cold adhesive (as required per the selected manufacturer) directly over the glass faced gypsum recover board surface. Cant strip dimensions shall be sized not less than one and one-half (1.5) inch by four (4.0) inches. All cant strips must be Class A Fire Rated.

4.23.4. Soil Stack Flashings

Install new three (3.0) pound lead boots over all plumbing vents. Hand form and hammer the lead over the lip of the steel stack taking care to prevent splitting of the lead. Leads shall be of sufficient length to return down the inside of the stack a minimum of one (1.0) inch. Trowel apply a continuous layer of asphalt mastic over the base ply of smooth surfaced Modified Membrane prior to installing the lead flashing. A three (3.0) foot by three (3.0) foot smooth surface modified membrane target / reinforcement ply will be installed over the base of the lead flashing. The lead will be primed with an ASTM D-41 asphalt cutback primer prior to the installation of the reinforcement membrane. Continuously heat weld a single ply of smooth surfaced Modified Membrane base ply over the lead flange extending the membrane a minimum of eight (8.0) inches beyond the termination of the lead flashing in all directions at the tie-in with the field membrane.

The final ply of the granular surfaced Modified Membrane field sheet will be installed after the base ply of flashing has been installed. Fully heat weld the granular surfaced Modified Membrane ply over the installed base ply of membrane extending the final ply a minimum of two (2.0) inches beyond the base ply tie-in to the surrounding field membrane. At the base of the stack where the field membrane terminates against the vertical edge of the lead stack, a continuous bead of one-part polyurethane caulking must be applied. The caulking must be tooled with a smooth finishing trowel to insure complete adhesion to the lead flashing and field membrane surface.

4.23.5. Internal Drain Flashings

The existing internal roof drain strainers, clamp rings and hardware will be removed and set-aside. The insulation will be cut and fitted around the drain bowl to provide a drain sump extending twenty-four (24.0) inches to all sides of the drain bowl. Within the drain sump, the polyisocyanurate insulation may be reduced to one (1.0) inch thickness to allow a flat drain sump. Beginning at the perimeter edge of the drain sump, the installed polyisocyanurate insulation must be a minimum of two (2.0) inch thickness with a single course of 1/2 in. glass faced gypsum board installed over the polyisocyanurate insulation fully adhered with cold adhesive or trowel grade mastic. The base ply of smooth surfaced modified field membrane will then be installed extend through the drain sump and extend over the edge of the internal roof drain bowl a minimum of one (1.0) inch.

Apply a continuous layer of asphalt mastic to the smooth surfaced modified membrane in the drain sump area beginning at the drain bowl and troweling the mastic over the membrane to approximately eighteen (18.0) inches from the center of the drain. Hand press a new three (3.0) pound lead drain flashing into the mastic.

The lead shall be cut-away at the center of the drain and shall be hammered and folded down the vertical side of the drain bowl a minimum of one-half (0.5) inch. Apply a continuous coating of asphalt cut-back primer to the lead flashing surface and allow to dry.

Install and heat weld a single ply of smooth surfaced Modified Flashing Membrane over the drain lead. Cut-away the flashing membrane at the center of the drain to allow approximately one (1.0) inch of overhang at the edge of the bowl. The internal drain flashing "target sheet" shall consist of a three (3.0) foot by three (3.0) foot section of smooth surfaced heat weldable modified membrane. A final ply of granular surfaced Modified Membrane measuring approximately 3.0 ft. x 3.0 ft. shall be cut and heat welded over the smooth surfaced base ply of drain flashing.

The granule surfaced Modified Membrane drain flashing ply shall extend a minimum of eight (8.0) inches over the surrounding smooth surfaced field ply membrane and shall extend through the drain sump and shall terminate at the drain bowl edge. After installing the granule surfaced flashing ply, the final ply of granule surfaced field membrane shall be installed. The granules must be embedded at the overlap of the granule surfaced field membrane where it extends over the granule surfaced drain flashing membrane. The final field ply must overlap the drain flashing a minimum of four (4.0) inches.

Re-install the drain clamp ring and secure with new corrosion resistant hex head bolts. All clamps must be functional with all anchor tabs present. Tighten the clamp ring to provide a minimum of forty (40) pounds of clamping force. Install new aluminum or cast iron metal drain strainer(s) and secure the dome to the clamp ring. All missing, damaged or plastic strainers will be replaced with aluminum or cast iron strainers. Water test all drains to insure proper function upon completion of the roof project.

4.23.6. Metal Termination Bar

Install new "flat" aluminum termination bar above all vertical wall flashings terminated against masonry surfaces and in all areas where the flashing terminates on vertical wall or curb surfaces. The Contractor must install the metal termination bar prior to the installation of the surface mounted metal counterflashing in area where the vertical flashing membrane extends less than six (6.0) inches above the roof surface or the flashing membrane extends up the vertical face of masonry wall surfaces. Metal termination bar shall be secured not less than every eight (8.0) inches on-center with appropriate masonry or self-drilling wood or metal anchors sized to penetrate the substrate not less one and one-half (1.50) inch. All sections of metal termination bar must be secured with a minimum of two (2) fasteners. The termination bar will be positioned along the top edge of the flashing using care to make certain fasteners penetrate the membrane. A gap of one-half inch (0.5) must be provided between adjacent sections of termination bar. The termination bar will be positioned and secured approximately one-half (0.5) inch from the top of the installed vertical flashings and shall be secured with masonry screws or anchoring pins inserted through each of the pre-drilled holes. The termination bar shall extend to within one (1.0) inch of all corners and shall be secured within one (1.0) inch of the end of the termination bar. Do not bend the termination bar around any inside or outside corners. After completing the installation of the termination bar a continuous bead of one-part polyurethane caulking sealant must be applied along the upper edge of the termination bar to form a watertight seal between the wall and the metal termination bar.

4.23.7. Surface Mounted Metal Counterflashing

Install new surface mounted twenty-four (24.0) gauge pre-finished metal counterflashing along the upper edge of all vertical wall flashings. New twenty-four (24) gauge pre-finished surface mounted galvanized metal counterflashing must be installed along the upper edge of installed vertical flashings on any unit curbs where the unit curb cap drip edge is of insufficient length to cover the top of the flashing by a minimum of 3.0 inches. All metal counterflashing shall be formed to provide a face dimension of not less than four (4.0) inches with a reglet receiver formed at the top edge, a reinforcement break in the middle and a drip edge along the bottom. At no point shall a "cut" edge come in contact with the flashing membrane.

Prior to the installation of the metal counterflashing the upper edge of the curb or wall flashing must be secured with an aluminum termination bar or corrosion resistant tin cap masonry or screw fasteners installed every eight (8.0) inches on-center. The counterflashing will then be positioned at the top of the flashing and will be secured to the curb surface with screws used in conjunction with rubber washers. The counterflashing will be installed so that the vertical face of the metal completely laps over the flashing membrane by a minimum of three (3.0) inches. The reglet receiver joint, all exposed fastener heads and all laps between the sections of counterflashing will be caulked with an approved one-part polyurethane caulking sealant.

All surface mounted metal counterflashing shall be formed to provide a face dimension of not less than four (4.0) inches with a reglet receiver formed at the top, a reinforcement break in the middle and a drip edge along the bottom. At no point shall a "cut" edge come in contact with the flashing membrane. The upper edge of the flashing must be secured with corrosion resistant tin-cap nail fasteners installed every eight (8.0) inches on-center prior to the installation of the counterflashing. The counterflashing will then be positioned at the top of the vertical flashing and will be secured with silicone washered Rawl Tap-Con masonry anchors. Secure the counterflashing every eight (8.0) to ten (10.0) inches on center along its entire length.

The surface mounted metal counterflashing will be installed so that the vertical face of the metal completely laps over the flashing membrane by a minimum of three (3.0) inches. The reglet receiver joint, all exposed fastener heads and laps between the sections of metal counterflashing must be sealed with a continuous bead of one-part polyurethane caulking.

4.23.8. Pitch Pan/Conduit Penetration

Existing pitch pans and boots shall be removed and discarded. Install new neoprene rubber boots or galvanized / aluminum metal pitch pockets around all conduit, supports and piping passing directly through the roof membrane and not isolated with a waterproof curb detail. New pitch pans shall be constructed from twenty-four (24) gauge pre-finished galvanized sheet metal or alternative .032 aluminum sheet metal and shall be filled with a rigid mortar and self-leveling polyurethane sealant.

A metal weather crown must be installed over all pitch pans. The weather crown / cap will be secured to the conduit or support with an adjustable metal clamp. A continuous bead of single component polyurethane caulking will be applied to the upper edge of the clamp on the weather crown. The caulking will be "struck" with a smooth finishing trowel to insure contact with both the flashing membrane and the wall or curb surface. A continuous bead of one-part polyurethane caulking sealant must be applied at the junction between the vertical metal surface of the pitch pan base and the horizontal surface of the roof field membrane.

4.23.9. Furnace Stack Flashings

Existing furnace stack flashings shall be removed and discarded. Disconnect and temporarily remove all furnace stack piping. Remove and discard the existing furnace stack "roof jacks". Install the fully adhered Base ply of field membrane extending the membrane to the base of the stack.

Trowel apply a continuous layer of asphalt mastic over the fully adhered Base ply and install new galvanized metal roof jacks over the furnace pipe. Set the base of the stack jack into the asphalt mastic and secure the jack flange to the underlying deck with screw anchors inserted at a rate of one fastener every eight (8.0) inches on center. New roof jacks are to extend a minimum of eight (8.0) inches above the finished roof height. A three (3.0) foot by three (3.0) foot modified membrane reinforcement ply will be installed over the metal stack flange. The surface of the jack flange will be primed with ASTM D-41 asphalt cutback primer prior to the installation of the reinforcement membrane. The final ply of the Granular Surfaced Modified Membrane field sheet will be installed after the Base ply flashing has been installed. At the base of the stack where the field membrane terminates against the vertical edge of the stack, a continuous bead of one-part polyurethane caulking must be applied.

4.23.10. Rooftop Equipment Curbs

Construction of new rooftop equipment curbs will be performed in accordance with N.R.C.A. and B.O.C.A. design recommendations. Pre-manufactured curbs may be used where possible. The Contractor shall submit his design to the Consultant or to the primary waterproofing membrane manufacturer for approval. Existing rail curbs, as identified during the Pre-Bid Meeting will be "closed" and boxed in with new pressure treated wood nailers. Additional support nailers and framing will be installed within the curb and capped with Exterior Grade 3/4 inch plywood sheathing. All new curb caps will be formed from pre-finished twenty-four (24) gauge galvanized sheet metal caps.

Install new surface mounted twenty-four (24.0) gauge pre-finished galvanized metal counterflashing at the top of the installed curb flashings. Secure the counterflashing to the unit curb with corrosion resistant neoprene washered screw fasteners inserted every eight (8.0) inches on center. Apply a continuous bead of one-part polyurethane caulking to the upper edge of the counterflashing and to all exposed fastener heads.

4.23.11. Vent Curb Flashings

All vent units will be temporarily disconnected and lifted (where possible) to gain access to all wood curbs and nailers. All wood curb nailers will be inspected and any deteriorated wood will be replaced with new pressure treated Wolmanized wood. Curbs identified for replacement, reconstruction or framing will be fabricated from new pressure treated Womanized wood in accordance with the enclosed Roof Details and in compliance with the most current issue of the N.R.C.A. manual. All curbs must allow for a minimum clearance of the eight (8.0) inches above the installed roof membrane surface unless otherwise specifically allowed for by the primary waterproofing membrane material manufacturer. Curbs insufficient in height to allow for the installation of the new roof membrane and insulation will be raised by adding additional treated wood nailers to the existing curb. All wood curbs and nailers will be anchored to the deck utilizing fluted masonry nails or Rawl TAPCON® masonry screw anchors inserted every six (6.0) inches on center for concrete deck areas and self-drilling corrosion resistant No. 14 screw fasteners for wood and metal deck areas. Fasteners shall penetrate the deck a minimum of 1-1/2 inch and not more than 3.0 inches.

The "Base" Flashing Ply, consisting of a single ply of Smooth Surface Modified Membrane, will be installed over the vertical curb. The fully adhered smooth surface Base Flashing Ply will be installed by continuous fluid application of hot Type 4 asphalt applied at a rate of 25 – 30 pounds per one hundred (100.0) square feet to the curb base and field membrane. The smooth surfaced Modified Membrane flashing Ply will be installed so as to extend over the adjacent field membrane Base Ply surface a minimum of eight (8.0) inches. The fully adhered Flashing Ply will extend to the top of all vertical curb surfaces and a minimum of eight (8.0) inches above the cant at all vertical curb surfaces. Sidelap all flashings a minimum of four (4.0) inches staggering the laps of the Smooth Surface Flashing Ply and the field ply of Smooth Surface membrane whenever possible.

After completing the installation of the heat welded smooth surfaced Modified Membrane intermediate (second) field ply membrane, the Granular Surface Modified Membrane Flashing Ply will be fully torch adhered over all Smooth Surface Modified Membrane Base Flashing Ply in all areas. The upper edge of the flashing must be secured with corrosion resistant tin-cap nail fasteners installed every eight (8.0) inches on-center prior to the installation of the counterflashing. Apply a continuous bead of one-part polyurethane caulking sealant to the termination of vertical curb flashings at the interface with the substrate. The caulking sealant will be troweled / tooled to provide continuous uniform adhesion to both the granular surfaced modified membrane and the metal sill flashing / counterflashing closure.

In the event the curb cap could not be removed, the Contractor will be required to install new pre-finished twenty-four (24) gauge galvanized metal counterflashing. The counterflashing will be positioned at the top of the vertical flashing and will be secured with silicone washered Rawl Tap-Con masonry anchors or neoprene gasketed No. 14 hew head screw fasteners. Secure the counterflashing every eight (8.0) to ten (10.0) inches on center along its entire length. The metal counterflashing will be installed so that the vertical face of the metal completely laps over the flashing membrane by a minimum of three (3.0) inches.

4.23.12. Blower Vent Curb Construction – Roof section 3

The existing blower vent installed on Roof Section 3 and supported by wood 4 x 4 framing will be temporarily lifted and supported during the roof tear-off and replacement project. The Contractor shall install a new pre-fabricated unit curb base secured to the concrete deck. The curb shall elevate the blower and stack system at the same approximate height as currently exists. The vapor barrier membrane shall be installed prior to the installation of the new equipment curb. Install insulation within the curb to equal insulation installed throughout adjacent roof areas.

Pre-drill the concrete deck to facilitate the attachment of the curb to the concrete decking. Install a base ply of heat welded Modified Membrane flashing and a final ply of granule surfaced heat welded Modified Membrane to waterproof and flash the curb base. Install two (2) layers of new Exterior Grade plywood to cover the top of the curb. Secure the plywood to the curb base with stainless steel countersunk screw fasteners. Install the pre-fabricated metal curb cap over the curb base and secure the vertical flanges of the cap with neoprene gasketed No. 14 screw fasteners, installed every twelve (12.0) inches on-center.

Cut and install an EPDM walkway pad adhesively bonded to the curb cap with one-part polyurethane caulking applied in one (1.0) inch dabs around the perimeter of the pad to adhere the pad to the metal cap while allowing air flow beneath the support pad. Place the blower motor and base directly on the rubber pad. As necessary, install brackets to support the unit base to prevent movement. DO NOT PENETRATE THE TOP OF THE CURB with any fasteners. Any required attachment of brackets to the curb must be in the vertical "sides" of the curb and must be completed with gasketed screw fasteners or fasteners sealed with a continuous bead of one-part polyurethane caulking.

4.23.13. Gutter & Downspout Installation – Roof Section 1

The Contractor will be required to include, in their Base Bid for this project, all additional "new" wood nailers required at the perimeter edge of the roof where the new gutter is to be installed to compensate of the additional thickness of the new insulation and roof membrane. The top horizontal surface of the perimeter wood nailer shall be one-half inch to three-quarters inch "recessed" below the top horizontal surface of the surrounding insulation to provide positive slope to the gutter upon completing the installation of the roof membrane, gutter, stripping ply and final ply of roofing.

The single piece flange mounted gutters shall be secured to the perimeter wood nailer or decking with stainless steel countersunk No. 12 screw fasteners installed at a minimum of one (1) fastener every six (6.0) inches on center in two (2) staggered rows. Downspouts shall be anchored to the structure at intervals of not greater than every six (6.0) foot on center with pre-finished .032 (20 gauge) aluminum metal brackets anchored to the structure with stainless steel screw fasteners. All penetrations into the structure walls will be sealed with a continuous bead of one-part polyurethane caulking sealant. Laps between sections of the pre-finished gutter shall be secured with closed head rivets and sealed with a continuous integral bead of self-leveling gutter sealant or one-part polyurethane caulking sealant or gutter lap sealant applied at the gutter lap conditions.

4.23.14. Gutter Edge Flashings

The wall, roof deck and perimeter nailer surface will be cleaned to remove all mastic residues to provide a smooth surface for installation of the new flange mounted gutter(s) and flashings. Install the self-adhered vapor barrier, insulation and base field ply of smooth surfaced Modified Membrane extending the membrane over the nailer at the roof edge. Install the new pre-finished .032 (20 gauge) aluminum flange mounted commercial "K" style or box metal gutter at the designated locations positioning and securing the metal flange of the gutter over the installed base ply of Modified Membrane and perimeter wood nailer.

Prime the top / exposed surface of the metal flange of the gutter where it extends over the smooth surfaced field membrane with an approved asphalt cut-back primer. Install a single ply of smooth surfaced Modified Membrane over the gutter flange extending the flashing a minimum of twelve (12.0) inches beyond the gutter flange over the field membrane. Install the final ply of granular surfaced Modified Membrane field ply extending the membrane over the base flashing ply and terminating the granular surfaced field ply at the edge of the inside vertical face of the gutter.

At the point where the granule surfaced Modified Membrane terminates on the gutter flange, a continuous bead of one-part polyurethane caulking must be applied. The caulking must be tooled with a smooth finishing trowel to insure complete adhesion to the metal surface and Modified Membrane surface. Apply a continuous bead of color matched one-part polyurethane to all gutter junctions and to any exposed rivets or fasteners. Attach new pre-finished .032 (20 gauge) aluminum metal downspouts to the installed gutters at a minimum of one (1) downspout per gutter section or one (1) downspout per twenty-five (25.0) foot length of gutter. Apply a continuous bead of gutter sealant or one-part polyurethane caulking sealant at each gutter downspout location to form a watertight condition at the connection between the downspout and the interior surface of the gutter trough.

4.23.15. Perimeter Edge Metal / Gravel Stop Installation – All Roof Areas

At the perimeter of the designated roof areas, the Contractor shall be required to install a continuous cleat mounted pre-finished twenty-four (24) gauge galvanized metal gravel stop. Additional pressure treated wood nailers will be installed at the roof edge(s) to compensate for the additional height of the installed tapered insulation. The Contractor will install new pressure treated 2.0 in. x 6.0 in. wood nailers secured to the existing perimeter nailers with appropriate corrosion resistant screw anchors or ring shank nails installed at a rate of not less than one fastener every six (6.0) inches on center in two staggered rows. The installation of all additional wood nailers to compensate for tapered insulation height shall be included in the Contractor's Base Bid for this project. Attachment of perimeter wood nailers must comply with current ASCE 7-16 Minimum Design Loads for Buildings and Other Structures. Pull-out of fasteners utilized to secure the perimeter wood nailers shall be equal to or greater than 350 lb.

Upon completing the installation of the wood nailers, a twenty-two (22) gauge continuous galvanized metal cleat will be secured to the outside vertical face of the wood nailer securing the cleat to the perimeter nailer with corrosion resistant screws installed every twelve (12.0) inches on center. The cleat will be positioned to extend a minimum of one (1.0) inch below the bottom of the perimeter wood nailer and not less than two (2.0) inches over the upper edge of the installed metal fascia. Install a new twenty-four (24) gauge pre-finished metal gravel stop over the roof membrane at the roof perimeter securing the outside face of the gravel stop to the continuous cleat. Fasten the gravel stop flange to the underlying perimeter wood nailer with corrosion resistant countersunk screw fasteners inserted every six (6.0) inches on center in two (2.0) staggered rows.

Alternative securement of the gravel stop flange with ring shank tin cap nails IS ACCEPTABLE provided nail fasteners are installed at three (3.0) inch intervals in two staggered rows. Concealed splice plates will be installed between adjacent sections of the gravel stop. A gap of not less than one-quarter (0.25) inch and not greater than one-half (0.50) will be maintained between the ends of adjacent metal gravel stop sections. A continuous bead of polyurethane caulking sealant will be applied and compressed between the splice plate and the gravel stop to form a watertight seal at the splice prior to the installation of the gravel stop flashing membrane.

Note: The Contractor shall coordinate the installation of the metal cleat and cleat mounted edge metal with the installation of the new metal wall panel system (Alternative 1) if contracted by the Owner.

4.23.16. Perimeter Edge Metal / Gravel Stop Flashing Installation

All areas terminated with a metal edge gravel stop will require the installation of new gravel stop / raised perimeter edge flashings consisting of a single ply of smooth surface modified membrane stripped in over the flange and a single ply of the granular surface modified membrane field ply. The gravel stop flange must be coated with an asphalt cut-back primer applied by brush or roller at a rate of 1/2 gallon per 100 square feet prior to the installation of the flashing ply. Pre-cut sections of the smooth surface flashing ply will be fully adhered to the surface of the metal gravel stop flange by heat welding. Sidelap the smooth surface flashing ply a minimum of four (4.0) inches. All endlaps of the gravel stop flashing shall be formed in a downslope (shingle) lap fashion. After the base flashing ply is installed, fully adhere the final ply of granular surface modified membrane field ply extending the membrane to the perimeter edge of the metal gravel stop. Where the field ply laps are perpendicular to the gravel stop edge, an additional single ply of self-adhesive granule surfaced modified membrane cut into a twelve (12.0) inch width must be stripped-in. All sidelaps in the granule surfaced field / flashing ply must be heat welded with a flameless heat gun or hand-held torch.

At the point where the final ply of granule surfaced modified membrane terminates at the raised edge of the gravel stop, a continuous bead of one-part polyurethane caulking must be applied. The caulking must be tooled with a smooth finishing trowel to insure complete adhesion to the metal surface and Modified Membrane surface.

4.23.17. Liquid Applied Resin Flashing Installation Requirements

At pipe penetrations and at roof projections and penetrations where the installation of the modified membrane flashings is not possible due to the configuration of the penetration or projection or the height of the flashing is equal to or less than six (6.0) inches, the Contractor will be required to install fabric reinforced liquid resin applied membrane flashings.

Prior to the application / installation of the reinforced liquid resin applied flashings, the surface(s) of the projection / penetration must be thoroughly cleaned with a wire brush, angle grinder equipped with wire wheel or hand scraper. Corrosion and contaminants must be removed to expose structurally sound steel surfaces. As required by the liquid flashing membrane material manufacturer, the surfaces will be prime coated with an approved rust inhibitive primer.

Blend / mix the two-component liquid flashing membrane in strict accordance with the Material Manufacturer's requirements. Using a low speed paddle mixer, blend Part A and Part B components. Mixing and application of the material(s) shall be completed within temperature parameters which allow proper curing of the materials. Apply the base coating of the liquid resin directly to the metal surfaces using a brush, roller or trowel applicator. Extend the coating not less than eight (8.0) inches vertically up all pipes or steel tube frame surfaces unless existing construction limits the vertical height to less than eight (8.0) inches. Immediately following the application of the base coating, the polyester fleece fabric will be cut and embedded into the wet resin. Use care to avoid wrinkles in the fabric or trapping air beneath the fabric. Lightly brush the fabric into the base coating with a wetted brush. As required by the Material Manufacturer, allow the base coating to partially cure prior to the application of the final coating. DO NOT BROADCAST GRANULES INTO THE LIQUID FLASHING. After allowing the final coating to fully cure, apply the specified "white" reflective coating to all liquid applied flashing membrane areas.

4.23.18. Antenna Support Frame & Ballast

During tear-off operations, the Contractor will be required to relocate the existing metal frame antenna supports and associated concrete block ballast. Upon completing the installation of the new roof system, the antenna support frames will be relocated to the new roof area using care to prevent any damage to the roof membrane. New one-half (0.50) inch thickness (or greater) rubber walkway pads will be placed directly over the new roof membrane to isolate the metal frame from the roof. As necessary, the walkway pads can be partially adhered to the roof membrane with one (1.0) inch diameter applications of one-part polyurethane caulking sealant compressed between the roof membrane and the walkway pad. Application of caulking shall be minimized to allow for repositioning of the antenna and/or ultimate removal of the antenna. Install / re-install the concrete block "ballast" within the frame. The Owner shall be responsible for re-alignment of the antenna and any other cable connections, etc.

4.24. ROOF MEMBRANE SURFACING/COATING REQUIREMENTS

4.24.1. Inspection and Aluminum Coating of Lap Outflow

Upon completing the installation of the entire roof membrane and all flashings an inspection shall be scheduled with the Consultant - Structural Technologies, Inc. and a representative of the Manufacturer. Upon completing this inspection, the asphalt outflow evident at the sidelap of the Modified membrane in all roof field areas, all flashing lap reinforcement and any other area where asphalt is evident on the roof surface or flashing, shall be coated with an ASTM D-2824 Type I or Type III fibrated aluminum cut-back coating. The aluminum coating shall be applied with a brush or roller at a rate of approximately two (2.0) gallons per one-hundred (100.0) square feet. Coatings shall be applied only when no rain is forecast for a period of forty-eight (48.0) hours. Application of the aluminum coating shall only be performed on "light gray" granule surfaced membranes. White acrylic coating (see Alternative - Energy Star Compliant Coating Application) shall be applied to the laps and degranulated areas of all "white granulated" Energy Star compliant Modified Membrane roof systems.

Note: Coating of the roof shall precede the installation of conduit supports and re-location of the antenna frame supports.

4.25. ALTERNATE 1 – METAL WALL PANEL & SOFFIT REPLACEMENT

4.25.1. Dis-Assembly / Demolition of Existing System

The Contractor shall remove all signage, lighting, etc. secured to the vertical face or soffit areas of the existing metal wall and soffit system using care to prevent damage during the removal process. Removal of the existing metal wall panels and soffit will be coordinated with the removal and replacement of the low slope roof system in the same area. Perimeter edge metal and gutters which terminate above the wall panel system must be isolated or separated by means of synthetic polyester fabric underlayment membrane (air barrier membrane) to prevent direct contract of aluminum metal components with galvanized metal components or framing.

Upon removing the existing metal wall panels and soffit system, the Contractor shall perform a visual inspection of the substrate, sheathing and framing to identify any areas of structural damage, corrosion, decay or compromised capacity. Where plywood sheathing currently exists as substrate for the metal wall panel or soffit system, the Contractor will be required to re-secure any areas where the sheathing has detached. Replacement of plywood sheathing will be completed on a Unit Cost basis to be itemized and billed "In Addition" to the Base Contract for this project. All new plywood sheathing must be Exterior Rated three-quarters (0.75) inch thickness plywood. All plywood must be secured with No. 10 or larger self-drilling wood-to-metal or wood-to-wood screw fasteners.

Installation and attachment of plywood sheathing with No. 10 corrosion resistant screw fasteners shall be in accordance with ASCE 7-16 Wind Uplift criteria for exposed wall panel and soffit areas. In the event the Contractor must repair or replace any wood or metal sub-framing, the Contractor shall notify the Consultant and Owner (or designated representative) regarding the scope and total cost of these repairs. New wood or metal sub-framing must be installed at a maximum of twenty-four (24.0) inches on-center spacing and will be shimmed and secured level to within one-eighth (0.125) inch over a ten (10.0) foot span.

4.25.2. Waterproofing Housewrap Membrane Installation

A continuous single ply of air barrier weatherproof membrane must be applied to the vertical face of the new wall system to completely encapsulate the substrate surface. The membrane will be installed in continuous lengths beginning at the top of the vertical wall surface and extending to the base of the vertical wall sheathing. Sidelap the membrane not less than three (3.0) inches. As necessary, temporarily secure the waterproofing membrane with plastic cap ring shank nails inserted along the upper edge of the weatherproof membrane at six (6.0) inches on-center spacing. Roll and compress all sidelaps to ensure complete adhesion. All sidelap and endlap seams must be sealed with the Material Manufacturer's seam tape.

4.25.3. Metal J-Channel Installation

At the interface with the masonry wall, a continuous twenty-four (24) gauge pre-finished aluminum metal J-channel (receiver) will be installed and secured to the wall. In the event the J-channel must be installed in sections, endlap sections of the J-channel must be notched and spliced together creating a two (2.0) inch lap condition.

J-channel trim must be installed at the perimeter of the soffit (exposed outer edge and inside edge) aligning the metal J-channel with the wall or outer face of the vertical plywood panel installed on the face of the soffit. Secure the J-channel to the plywood sheathing with No. 10 stainless steel screw fasteners installed every twelve (12.0) to sixteen (16.0) inches on-center. Screw heads must be set flush with the J-channel to allow full engagement of the new soffit panels. Install additional J-channel closure at the ends of the soffit. Do not install the final section of J-channel "closure" and metal drip at one end of the soffit until the final panel has been fitted and installed to facilitate closing the soffit and protecting the exposed "cut" edge of the final section of soffit panel.

4.25.4. Metal Soffit Panel Installation

New pre-finished .032 aluminum metal flush interlocking soffit panels will be installed beneath the soffit in all designated areas. The soffit panels must be factory formed and finished. The color of the panels must be selected by the Owner. All panels, trim, J-channel, drip edge and weep flashing, etc. must be manufactured by the same company and all pre-finished color matched. The width of the soffit panel must match the width of the vertical wall panel (12.0 inch or 16.0 inch).

Insert the soffit panel(s) into the J-channel using care to prevent distorting the panel / bending the panel or damaging the interlocking leg of the panel. Secure the panel to the underside of the soffit with stainless steel No. 10 screw fasteners installed every twelve (12.0) inches on-center along the panel leg. Continue installation of the soffit panel beginning at one end of the building and continuing to the opposite end of the soffit. Install the final section of soffit and J-channel closure to finish the soffit.

4.25.5. Metal Wall Panel Installation

After completing the installation of the self-adhered waterproofing membrane applied to the vertical face of the "soffit" beneath the gutter, the Contractor will install the specified pre-finished aluminum metal drip flashing at the base of the vertical metal wall panel locations. Attachment of the metal drip channel with No. 10 stainless steel screw fasteners installed every 12 – 16 inches on-center will be required. After completing the installation of the metal drip flashing, the Contractor will be required to install new pre-finished metal weep flashing installed directly above and "over" the drip flashing vertical leg. Secure the metal weep flashing with No. 10 stainless steel screw fasteners installed every 12 – 16 inches on-center.

Upon completing the installation of the J-channel weep flashing, the Contractor will install the new vertical metal wall panels. The specified panels must provide not less than a one (1.0) inch reveal and not greater than a one and one-half (1.50) inch reveal between panels. Each panel must be installed and secured over the continuous single ply of waterproofing membrane. Attachment of the metal wall panels must be completed with stainless steel No. 10 screw fasteners installed at intervals of twelve (12.0) inches on-center. The top of the wall panel shall terminate not greater than two (2.0) inches and not less than one (1.0) inch below the base of the existing gutter trough to facilitate the installation of new metal "Z" cap flashing.

Install pre-finished .032 aluminum metal outside corners trim to enclose the outside corners of the vertical metal wall panels where the soffit transitions back toward the main structure. Install new pre-finished twenty-four (24) gauge aluminum metal "Z" cap flashing along the upper edge of the vertical soffit wall panels. The metal flashing must be configured to extend not less than three (3.0) inches above the base of the gutter trough and not less than three (3.0) inches down the vertical face of the installed wall panel. Endlap sections of the metal flashing not less than two (2.0) inches and not greater than four (4.0) inches. Apply a continuous concealed bead of one-part polyurethane caulking at all endlap conditions. The break form of the metal flashing shall provide positive forty-five (45°) degree drainage slope from the back of the flashing to the front of the flashing. Secure the metal flashing with neoprene gasketed No. 10 stainless steel screw fasteners installed not greater than twelve (12.0) inches on-center.

4.26. ADDRESS SIGNAGE INSTALLATION

4.26.1. Sign Installation & Caulking

Upon completing the installation of the soffit wall and eave panels, the Contractor must re-install (or install new) signage provided by the Owner or having already existed at the property. Installation of signage shall be completed in a manner using proper hardware to secure the signage in a permanent manner so as to resist wind loads, vibration, snow, rain, etc.. Attachment of the signage to the structure, when possible, will include anchorage through the exterior wall panel / cladding and securement to the underlying sub-framing. All anchorage / attachment must be completed with stainless steel screw fasteners. At the intersection / penetration of screws through the metal wall panel(s), the Contractor must apply a "color-matched" bead of silicone, polymeric or polyurethane caulking to form a watertight condition at the fastener penetration location.

4.27. CAULKING INSTALLATION

4.27.1. Caulking Installation

A continuous bead of one-part polyurethane caulking must be applied at the termination of the J-channel against the masonry wall(s) of the structure beneath the soffit as well as where the vertical wall panel and J-channel receiver interface with the wall(s) of the structure. Application of caulking sealant at these locations will be performed to provide a uniform continuous bead of sealant 1/4 – 1/2 inch. As necessary, the Contractor will mask areas on the metal panel and wall surface to achieve a uniform "straight" termination of the sealant on the wall and panel surface. Immediately following the application and tool finishing of the sealant, the Contractor must remove the masking tape (if used) and clean-up excess caulking from the wall or panel surfaces.

At the J-channel interface with the metal drip at the outside corner beneath the soffit, the Contractor must apply a continuous bead of silyl-terminated polyether or polymeric sealant. Mask areas (as necessary) prior to the application of a one-quarter (0.25) inch width bead of sealant. Inject sealant into the gap / joint between the J-channel and the metal drip installed at the transition from the horizontal soffit surfaces to the vertical wall panels surface and installed metal drip.

4.28. CLEAN-UP / REPARATIONS

The Contractor shall remove all empty / partially empty containers from the job site upon completing the application of the materials, etc... All masking, signage, plastic drop clothes, etc. will be removed from the project site upon completion of the project. Disposal of all materials and containers must be strict compliance with State of Illinois dumping laws. The Contractor shall supply their own dumpsters, trash containment devices, etc. and shall be responsible for placement, protection and removal of all trash / debris containers from the job site in a timely manner and as directed by the Owner (or designated representative).

The Contractor, Consultant and Owner (or designated representative) shall visually inspect the roof areas, adjacent wall surfaces and grounds surrounding the building upon completion of the restoration / replacement project and shall identify any areas of the structure or grounds which require repair or replacement attributed to the Contractor's work.

4.29. REFERENCE DIAGRAMS, SUBMITTALS AND INSTALLATION DRAWINGS

Enclosed are reference diagrams depicting the exact details required for installation of the specified roof system and flashing membrane. All details not herein specified or depicted in the enclosed diagrams will be brought to the attention of Structural Technologies, Inc. and will be detailed in writing prior to commencing work. All details must be performed in accordance with these specifications and the roofing membrane manufacturer's approved method of installation. The Contractor will submit all Shop Drawings and details for the replacement of the curb mounted vents, construction / installation of blower curb base and cap, installation of perimeter edge metal and gutter, installation of the metal wall panel system and soffit system to the Owner (or designated representative), the Consultant and the primary roof Material Manufacturer's representative prior to the installation of the roof system or metal wall panel and soffit system. To avoid any possible re-work of any details, any questions or concerns regarding the specific detail in question will be addressed prior to commencement of work.

Any details not specifically set forth in this specification will be performed in accordance with the most recent edition of The NRCA Roofing and Waterproofing Manual. The Manufacturer's details for installation shall take precedence over the NRCA details and the details set forth herein only in the event that performance of said details may alter or void the guaranty from the manufacturer. Construction must comply with the 2015 International Building Code, 2015 International Mechanical Code and the 2015 International Energy Code (2105 IECC). Sheet metal installed in conjunction with this project shall conform to the standards set forth by NRCA and by SMACNA (Sheet Metal and Air Conditioning Contractors' National Association).

END OF DIVISION 4 -- DETAILED SPECIFICATIONS

STRUCTURAL
TECHNOLOGIES
INCORPORATED

APPENDIX A

INSURANCE REQUIREMENTS

STRUCTURAL TECHNOLOGIES INCORPORATED

INSURANCE REQUIREMENTS

The Contractor awarded the contract shall submit a valid Certificate of Insurance to the Owner (North Palos Fire Protection District and Consultant).

Insurance Requirements for Contractors:

Each Contractor shall furnish a valid Certificate of Insurance to:

North Palos Fire Protection District
10629 South Roberts Road
Palos Hills, IL 60465

c/o Mr. Paul Mackin

Certificates of Insurance shall name as "Additional Insured" the following parties;

Structural Technologies, Inc.
103 Fessler Drive
Bloomingdale, IL 60108
Phone: 630-351-8200
E-Mail: structecinc@gmail.com

No work shall start until this condition is satisfied.

Insurance and Indemnity: The Contractor and each Sub-Contractor shall, until the completion of this Contract (and for at least two years after completion with respect to Products/Completed Operations Liability), procure and maintain at their expense the following insurance in companies acceptable to the Owner (Building Tenant, Architect)

I. Worker's Compensation

Including coverage for Occupational Disease and Employer's Liability.

Limit of Liability

Worker's Compensation	Statutory Benefits:	$1,000,000 per accident
Employer's Liability Limits		$1,000,000 per disease

II. Comprehensive General Liability

Including coverage for contractual liability assumed by the Contractor under Indemnity Agreement set forth below, broad form property damage, product liability, completed operations. The Owner (or designated representative) will be named as an additional insured.

Limit of Liability

$1,000,000 each occurrence combined bodily injury and property damage.
$3,000,000 aggregate where applicable.

III. Comprehensive Automobile Liability

Including coverage for hired and non-owned automobiles and naming the Owner as an additional insured.

Limit of Liability

$1,000,000 each occurrence bodily injury and property damage combined.

STRUCTURAL TECHNOLOGIES INCORPORATED

IV. Indemnity Agreement

Contractor shall defend, indemnify and hold harmless the Owner against all damages, claims, or liabilities and expenses (including attorney's fees) arising out of or resulting in any way from any defect in the goods or services purchased hereunder, or from any act or omission of Contractor, its agents, employees, or Sub-Contractors. This indemnification shall be in addition to the warranty obligations of Contractor.

V. Sub-Contractors

Contractor shall be responsible for requiring its Sub-Contractors to provide and maintain the insurance as stipulated above.

VI. Certificate of Insurance

Before commencing any work under this Contract, the Contractor shall furnish the Owner Certificates of Insurance evidencing (a) types and amounts of insurance as required, (b) insurance company or companies carrying said coverages, (c) effective and expiration dates of policies (d) that the Owner is additional insured on the Contractor's policies of insurance and (e) that thirty (30) days advance written notice will be given to the Owner of any material changes or cancellation of coverage. Certificates of Insurance that contain wording that in any way lessens the Insurance Companies' obligation to provide the thirty (30) day advance notice of cancellation or material changes will not be acceptable.

VII. Loss or Damage to Contractor's Property

All property of any kind owned, hired, or supplied by the Contractor or any Sub-Contractor, their employees, servants, or agents not intended to be incorporated into or made a part of the work to be performed under this Contract shall be at the sole risk of the respective Contractor, Sub-Contractor, or their employees, servants, or agents.

Owner: The Owner as herein referred to is the North Palos Fire Protection District.

STRUCTURAL TECHNOLOGIES INCORPORATED

APPENDIX B

CONSTRUCTION DIAGRAMS AND DETAILS

NORTH PALOS FIRE PROTECTION DISTRICT
FIRE STATION 1 - ROOF REPLACEMENT PROJECT

PROJECT LOCATION:

10629 SOUTH ROBERTS ROAD
PALOS HILLS, ILLINOIS 60465

GENERAL NOTES TO CONTRACTOR:

- CONTRACTOR MUST VERIFY ALL DIMENSIONS AND DETAILS CONTAINED IN THESE BIDDING DOCUMENTS, THE DRAWINGS AND SPECIFICATIONS. FAILURE TO DO SO WILL NOT RELIEVE THE CONTRACTOR OF HIS OBLIGATIONS UNDER ANY CONTRACT.
- THE EXISTING CONDITIONS DEPICTED IN THESE DOCUMENTS ARE AN APPROXIMATION OF THE EXISTING CONSTRUCTION AND CONDITIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL CONSTRUCTION DETAILS AND EXISTING CONDITIONS.
- ENCLOSED DETAILS MUST BE CONSTRUCTED IN ACCORDANCE WITH THE WRITTEN SPECIFICATION. ANY DISCREPANCIES WILL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE CONSULTANT FOR CLARIFICATION AND/OR CORRECTION.
- ANY MODIFICATIONS TO THESE DIAGRAMS OR DETAILS WHICH SHALL BE INTERPRETED TO AFFECT THE FINAL INSTALLATION IN ANY MANNER MUST BE APPROVED BY THE CONSULTANT, THE OWNER / OWNER'S REPRESENTATIVE, OR THE DESIGNATED REPRESENTATIVE.
- THE CONTRACTOR SHALL SUBMIT ANY DETAILS AND CONSTRUCTION DRAWINGS / SHOP DRAWINGS FOR ANY PROPOSED ALTERNATIVE METHOD OF INSTALLATION OR CONSTRUCTION PRIOR TO PERFORMING ANY SUCH WORK. SUBMITTALS SHALL BE REVIEWED BY THE CONSULTANT AND THE OWNER / OWNER'S REPRESENTATIVE PRIOR TO ACCEPTANCE.
- ANY CONDITIONS EXISTING AT THE JOB SITE WHICH MAY BE INTERPRETED TO HAVE DIRECT IMPACT ON PERSONNEL, STAFF, OR VISITORS TO THE PROPERTY, SHALL BE BROUGHT TO THE ATTENTION OF THE CONSULTANT AND OWNER / OWNER'S REPRESENTATIVE BY THE CONTRACTOR. JOB SITE SET-UP, STAGING, DEMOLITION, DEBRIS REMOVAL, INSULATION, ROOF MEMBRANE INSTALLATION, SHEET METAL INSTALLATION, CAULKING, ETC.. WILL BE PERFORMED IN STRICT ACCORDANCE WITH THE PROCEDURES SET FORTH IN THE WRITTEN SPECIFICATION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL NOTES, ATTENDING A PRE-BID MEETING AND PERFORMING ALL SUCH INVESTIGATION AND VERIFICATION AS DETERMINED NECESSARY TO PROVIDE A COMPLETE PRICE FOR ALL WORK SET FORTH IN THE BIDDING DOCUMENTS AND DETAILED IN THESE CONSTRUCTION DIAGRAMS. CONTRACTORS PERFORMING ADDITIONAL INVESTIGATION PRIOR TO BIDDING TO VERIFY THE INTEGRITY OF THE ROOF DECK OR SUBSTRATE, AREAS OF DEMOLITION / REPAIR OR BUILDING CONDITIONS MUST BE APPROVED BY THE OWNER / OWNER'S REPRESENTATIVE AND SHALL BE SCHEDULED PRIOR TO THE BID OPENING.

DEMOLITION / PREPARATION

- ERECT NECESSARY BARRICADES, TEMPORARY CLOSURES, LADDERS, HEATED STORAGE AREAS, SCAFFOLDING, MECHANICAL LIFTS, ETC. TO ACCESS THE DESIGNATED AREAS AND TO PERFORM ALL SPECIFIED ROOF REPLACEMENT. PLACE PROTECTIVE PLYWOOD, TARPS, ETC. ADJACENT TO BUILDING, OVER ROOF AREAS, OVER WALKWAYS AND LANDSCAPING TO PROTECT AND PRESERVE EXISTING CONSTRUCTION AND LANDSCAPING.
- ERECT TARPS, PLASTIC SHEET OR PLYWOOD TO PROTECT ALL WINDOWS AND DOORS DURING ALL PHASES OF DEMOLITION AND RESTORATION PERFORMED IN CONJUNCTION WITH THIS PROJECT.
- CONTRACTOR TO PROVIDE ROLLING CANOPY PROTECTION FOR SIDEWALK AREAS AS WELL AS SIDEWALK BARRICADES AND SIGNAGE TO DIVERT PEOPLE AROUND THE AREAS OF CONSTRUCTION. AS NECESSARY, ADDITIONAL "GROUND PERSONNEL WILL BE EMPLOYED TO MONITOR WALKWAY AND ACCESS AREAS IN ORDER TO PREVENT EXPOSURE TO ANY FALLING DEBRIS.
- THE CONTRACTOR SHALL BE REQUIRED TO COORDINATE THE TEMPORARY REMOVAL AND RELOCATION OF EXISTING COMMUNICATION TOWERS / ANTENNA AND SUPPORT CABLES, TRAYS, ETC.. IN THE EVENT THE CONTRACTOR MUST CONTRACT FOR THE REMOVAL AND RELOCATION OF THE ANTENNA OR TOWERS, THE COST TO PERFORM THIS WORK SHALL BE ITEMIZED AND SUBMITTED AS A CHANGE ORDER.
- VISUALLY EXAMINE AND DOCUMENT CONDITIONS AND DEFICIENCIES OF THE ROOF MOUNTED EQUIPMENT, VENT UNITS OR AC UNITS. ANY ABANDONED UNITS OR INOPERABLE UNITS SHALL BE IDENTIFIED AND SCHEDULED FOR REMOVAL FROM THE ROOF DURING THE ROOF REPLACEMENT PROJECT. ANY COST ASSOCIATED WITH THE DISCONNECTION OR REMOVAL OF ABANDONED OR INOPERABLE UNITS WILL BE ITEMIZED BY THE CONTRACTOR AND WILL BE BILLED "IN ADDITION" TO THE BASE CONTRACT FOR THIS PROJECT.
- THE CONTRACTOR SHALL BE REQUIRE TO ERECT PERIMETER SAFETY RAILING, PERIMETER WALL PROTECTION, SCAFFOLD PROTECTION, CONSTRUCTION FENCING, PLYWOOD PROTECTION, ETC. AS REQUIRED BY OSHA AND AS STIPULATED BY THE OWNER TO PROTECT ALL PUBLIC WALKWAYS AND ENTRIES TO THE STRUCTURE THROUGHOUT THE DURATION OF THE ROOFING PROJECT. TARPS AND OTHER MEANS OF PROTECTION SHALL BE REQUIRED TO PREVENT ANY DAMAGE TO THE STRUCTURE AS A RESULT OF THE ROOF REMOVAL AND REPLACEMENT PROJECT. DUMPSTERS SHALL BE PLACED IN DESIGNATED AREAS ADJACENT TO THE BUILDING USING CARE TO NOT OBSTRUCT DOORWAYS OR PUBLIC DRIVE AREAS. EQUIPMENT UTILIZED TO REMOVE DEBRIS AND TO TRANSPORT MATERIALS TO THE ROOF MUST BE LOCATED IN DESIGNATED AREAS AND, WHEN IN OPERATION, OR WHEN LIFTING / TRANSPORTING MATERIALS TO AND FROM THE ROOF AREA, COORDINATED WITH THE OWNER'S REPRESENTATIVE TO PREVENT ANY HAZARD TO OCCUPANTS OF THE STRUCTURE OR GENERAL PUBLIC.
- THE CONTRACTOR SHALL COORDINATE WITH THE OWNER ANY REQUIRED INSTALLATION OF HEPA FILTERS ON AIR INTAKE SYSTEMS AS WELL AS THE OPERATION OF ROOF MOUNTED HVAC UNITS EXPOSED TO DUST, DEBRIS OR CHEMICAL FUMES. PRIOR TO THE INITIATION OF THE PROJECT, THE CONTRACTOR SHALL REVIEW ALL PROCEDURES FOR ROOF REMOVAL AND CONTAINMENT OF DEBRIS WITH THE OWNER'S REPRESENTATIVE.

AERIAL OVERVIEW

SECTIONS 1 & 2

SECTIONS 3 & 4

DEMOLITION / PREPARATION- CONTINUED

- ROOF SECTION 1: DISCONNECT HEAT TRACE CABLE AND BRACKETS. DIS-ASSEMBLE AND REMOVE THE GUTTERS AND PERIMETER EDGE METAL IN ALL AREAS. CUT-AWAY, REMOVE AND PROPERLY DISPOSE OF ALL EXISTING ROOF MEMBRANES, FLASHING MEMBRANES, INSULATION AND SHEET METAL TO EXPOSE THE EXISTING WOOD ROOF DECK, VENT CURB BASES, WOOD NAILERS, PERIMETER WALLS AND FLASHING SUBSTRATES.

- ROOF SECTION 2: DIS-ASSEMBLE INTERNAL ROOF DRAINS AND SET ASIDE DRAIN CLAMP RINGS AND CAST IRON OR ALUMINUM DRAIN STRAINERS. PLASTIC DRAIN STRAINERS MUST BE REPLACED WITH NEW CAST IRON OF ALUMINUM DRAIN STRAINERS. EXISTING DRAIN BOLTS AND NUTS UTILIZED TO SECURE CLAMP RINGS MUST BE REPLACED WITH NEW HARDWARE. CUT-AWAY AND REMOVE THE EXISTING ROOF FIELD MEMBRANE, FLASHINGS, PERIMETER SHEET METAL, LEAD FLASHINGS, ETC. TO EXPOSE THE UNDERLYING WOOD *OR* METAL DECKING THROUGHOUT THE ENTIRE ROOF AREA.

- ROOF SECTIONS 3 & 4: DIS-ASSEMBLE INTERNAL ROOF DRAINS AND SET ASIDE DRAIN CLAMP RINGS AND CAST IRON OR ALUMINUM DRAIN STRAINERS. PLASTIC DRAIN STRAINERS MUST BE REPLACED WITH NEW CAST IRON OF ALUMINUM DRAIN STRAINERS. EXISTING DRAIN BOLTS AND NUTS UTILIZED TO SECURE CLAMP RINGS MUST BE REPLACED WITH NEW HARDWARE. REMOVE PERIMETER EDGE METAL AND FLASHINGS, DISCONNECT AND LIFT VENTS FROM CURBS USING CARE TO PREVENT DAMAGE TO ANY CONNECTED DUCTWORK. REMOVE FURNACE STACK COLLARS AND STACK BASES IN ALL AREAS. TEAR-OFF TO INCLUDE REMOVAL OF THE ROOF MEMBRANE, INSULATION, UNDERLYING LIGHTWEIGHT CONCRETE / GYPSUM TO EXPOSE THE STRUCTURAL CONCRETE DECK SURFACE. REMOVE DAMAGED / DETERIORATED PERIMETER WOOD NAILERS AND DOCUMENT CONDITIONS AND LINEAR FEET OF WOOD REPLACEMENT.

- ALTERNATE 1: METAL SOFFIT & VERTICAL WALL PANEL REPLACEMENT: AS CONTRACTED BY THE OWNER UPON ACCEPTING THE CONTRACT FOR REMOVAL AND REPLACEMENT OF THE VERTICAL METAL WALL PANELS AND METAL SOFFIT, INCLUDING J-CHANNELS, CORNER TRIM, ETC., THE CONTRACTOR WILL DIS-ASSEMBLE THE WALL PANEL SYSTEM AND SOFFIT SYSTEM AT THE PERIMETER OF EACH ROOF SECTION. IF POSSIBLE, ALL SHEET METAL WILL BE RECYCLED BY THE CONTRACTOR. UPON REMOVING THE EXTERIOR METAL COMPONENTS, THE EXPOSED FRAMING AND BACKUP SHEATHING (WHERE PRESENT) WILL BE EXAMINED FOR DETERIORATION, DECAY, CORROSION OR LOSS OF STRUCTURAL INTEGRITY. ANY REQUIRED REMOVAL AND REPLACEMENT OF DETERIORATED FRAMING OR SHEATHING SHALL BE PERFORMED ON A "UNIT COST" BASIS TO BE ITEMIZED BY THE CONTRACTOR AND BILLED "IN ADDITION" TO THE BASE CONTRACT FOR THE PROJECT.

- METAL DECK AREAS: REPLACE STRUCTURALLY DAMAGED METAL DECKING WITH NEW GALVANIZED METAL DECKING MATCHING EXISTING DECK PROFILE. NEW DECKING MUST BE MINIMUM TWENTY (20) GAUGE THICKNESS AND MUST BE INSTALLED TO "NEST" AND OVERLAP SURROUNDING STRUCTURALLY SOUND METAL DECKING BY A MINIMUM OF TWELVE (12.0) INCHES. ALL NEW DECKING MUST BE SECURED TO STRUCTURAL JOISTS AT EACH END WITH SELF-DRILLING NO. 10 OR LARGER STAINLESS STEEL SCREW FASTENERS INSTALLED AT THE BASE OF EACH DECK FLUTE AND NOT GREATER THAN SIX (6.0) INCHES ON-CENTER. SIDELAPS IN THE DECKING MUST BE SECURED EVERY TWELVE (12.0) INCHES ON-CENTER WITH SIMILAR NO. 10 OR LARGER STAINLESS STEEL SCREW FASTENERS. THE CONTRACTOR MUST DOCUMENT, ITEMIZE THE TOTAL SQUARE FOOTAGE AND SUBMIT A WRITTEN CHANGE ORDER FOR THE EXACT SQUARE FOOTAGE OF DECK REPLACEMENT PERFORMED IN CONJUNCTION WITH THIS PROJECT.

DRAWING INDEX

NORTH PALOS FIRE PROTECTION DISTRICT
FIRE STATION 1 - ROOF REPLACEMENT PROJECT
10629 SOUTH ROBERTS ROAD
PALOS HILLS, ILLINOIS 60465

STRUCTURAL TECHNOLOGIES
THE GOLD STANDARD IN BUILDING RESTORATION
153 FESSLER DRIVE, BLOOMINGDALE, IL 60108
OFFICE: 630.351.6280
E-MAIL: STRUCTECHGROUP@GMAIL.COM
STRUCTURAL TECHNOLOGIES INC.COM

BUILDING SOLUTIONS DELIVERING RESULTS

DATE: 03/21/2022
DRAWN BY: PJM
SCALE: NO SCALE
REVISION NO.
SHEET NO.
C-1

NORTH PALOS FIRE PROTECTION DISTRICT
FIRE STATION 1 - ROOF REPLACEMENT PROJECT

PROJECT LOCATION:

10629 SOUTH ROBERTS ROAD
PALOS HILLS, ILLINOIS 60465

DEMOLITION / PREPARATION- CONTINUED

- METAL DECK AREAS: MECHANICALLY CLEAN THE METAL DECK SURFACE IN ALL AREAS WHERE THE EXISTING DECKING EXHIBITS NON-STRUCTURAL SURFACE CORROSION PRIOR TO APPLICATION OF RUST INHIBITIVE COATING. REMOVE / SWEEP DEBRIS FROM ALL DECK FLUTES. REPORT ANY IMPROPERLY SUPPORTED OR ATTACHED DECK SECTIONS AND PERFORM ALL NECESSARY REPAIRS TO SECURE THE DECKING PRIOR TO INSTALLATION OF THE VAPOR BARRIER MEMBRANE. AT ANY DECK OPENINGS ADJACENT TO SKYLIGHTS, VENTS OR CURBS, THE METAL DECKING MUST BE PROPERLY SUPPORTED BY STRUCTURAL STEEL ANGLE SECURED TO LOAD BEARING JOISTS. INSTALLATION OF STEEL ANGLE SUPPORTS SHALL BE ITEMIZED BY THE CONTRACTOR AND SUBMITTED IN WRITING FOR AUTHORIZATION BY THE OWNER. INSTALLATION OF STEEL ANGLES AROUND ALL DECK OPENINGS OF GREATER THAN TWELVE INCHES IN DIAMETER OR CROSS-SECTION SHALL BE ITEMIZED BY THE CONTRACTOR AND SUBMITTED "IN ADDITION" TO THE BASE BID FOR THIS PROJECT. MECHANICAL CLEANING AND COATING OF CORRODED METAL DECK SURFACES WILL BE MEASURED BY THE CONTRACTOR, ITEMIZED AND SUBMITTED AS A WRITTEN CHANGE ORDER BILLED "IN ADDITION" TO THE BASE BID FOR THIS PROJECT.

- CONCRETE DECK AREAS: (ROOF SECTIONS 3 & 4) UPON COMPLETING THE REMOVAL OF THE EXISTING ROOF SYSTEM AND UNDERLYING INSULATION, THE CONTRACTOR WILL BE REQUIRED TO SCRAPE OR PEEL ANY VAPOR BARRIER MEMBRANE OR SELF-ADHERED MEMBRANE FROM THE DECK SURFACE. VISUALLY EXAMINE THE CONCRETE DECK AND DOCUMENT ANY DECK DAMAGE OR IRREGULARITIES REQUIRING CORRECTIVE ACTION. REPAIRS TO THE CONCRETE DECK WILL BE COMPLETED WITH HIGH STRENGTH POLYMER MORTAR OR SELF-LEVELING MORTAR. REPAIRS TO THE CONCRETE DECK SHALL BE COMPLETED ON A UNIT COST BASIS TO BE ITEMIZED AND SUBMITTED AS A CHANGE ORDER.

- WOOD DECK AREAS: UPON COMPLETING THE REMOVAL OF THE EXISTING ROOF SYSTEM AND UNDERLYING INSULATION, THE CONTRACTOR WILL PERFORM VISUAL INSPECTION OF THE WOOD DECKING TO IDENTIFY ANY REQUIRED REPLACEMENT DUE TO DECAY, DIMINISHED STRUCTURAL CAPACITY OR INADEQUATE CAPACITY TO SPAN AREAS AND SUPPORT ROOF LOADS AS PER BUILDING CODE. REPLACEMENT DECKING WILL BE EXTERIOR GRADE PLYWOOD SHEATHING WITH A MINIMUM THICKNESS OF THREE-QUARTERS (0.75) INCH. DECKING MUST BE INSTALLED TO APPROXIMATE THE EXISTING DECKING IN TOTAL THICKNESS. MAXIMUM SPAN BETWEEN SUPPORTS SHALL NOT BE GREATER THAN TWENTY-FOUR INCHES. ANY REQUIRED INSTALLATION OF ADDITIONAL INTERIM SUPPORT TRUSSES OR FRAMING MUST BE DOCUMENTED BY THE CONTRACTOR, ITEMIZED AND SUBMITTED ON A UNIT COST BASIS TO BE BILLED "IN ADDITION" TO THE BASE CONTRACT FOR THIS PROJECT. ALL DECKING MUST BE PROPERLY SECURED TO UNDERLYING FRAMING WITH CORROSION RESISTANT NO. 10 OR LARGER WOOD SCREW FASTENERS SIZED TO PENETRATE THE UNDERLYING FRAME MEMBER BY NOT LESS THAN ONE AND ONE-HALF (1.50) INCH. SECURE DECKING AT INTERVALS OF SIX (6.0) INCHES ON-CENTER. INSTALL "H" CLIPS AT EDGES OF REPLACEMENT SHEATHING.

- INSPECT EXISTING PERIMETER AND PROJECTION WOOD NAILERS AND CURBS AND REPLACE ALL ROTTED OR STRUCTURALLY DAMAGED WOOD NAILERS WITH NEW PRESSURE TREATED WOOD NAILERS OF THE SAME DIMENSION. INSTALLATION OF REPLACEMENT WOOD NAILERS AND CURBS SHALL BE ITEMIZED BY THE CONTRACTOR AND SUBMITTED "IN ADDITION" TO THE BASE BID FOR THIS PROJECT.
- INSTALL NEW PRESSURE TREATED WOOD NAILERS AT ALL UNIT CURBS AND PERIMETER ROOF EDGES AS REQUIRED TO PROVIDE PROPER HEIGHT OF FINISHED FLASHINGS AND INSTALLED PERIMETER EDGE METAL. INSTALLATION OF NEW PRESSURE TREATED WOOD NAILERS AND CURBS TO COMPENSATE FOR THE HEIGHT / THICKNESS OF THE INSTALLED NEW TAPERED INSULATION, TAPERED INSULATION DRAINAGE SADDLES OR CRICKETS SHALL BE INCLUDED IN THE CONTRACTOR'S BASE BID FOR THIS PROJECT. ALL NEW WOOD NAILERS TO BE SECURED WITH APPROPRIATE CORROSION RESISTANT SCREW FASTENERS. ANY REQUIRED REPLACEMENT OF DETERIORATED / ROTTED OR DAMAGED WOOD NAILERS WILL BE PERFORMED ON A "UNIT COST" BASIS IN ADDITION TO THE BASE CONTRACT. ALL WOOD NAILERS MUST BE SECURED IN ACCORDANCE WITH ASCE-7 WIND UPLIFT REQUIREMENTS, CURRENT INTERNATIONAL BUILDING CODE REQUIREMENTS AND SMACNA REQUIREMENTS FOR EXISTING EXPOSURE.
- REMOVE SANITARY STACK LEAD FLASHINGS TO EXPOSE PIPING. REMOVE FURNACE STACK BASE CONE AND WEATHER COLLARS AND DISCARD. REMOVE ALL "PITCH" PANS AND TEMPORARILY DISCONNECT THE MULTI-PORT UTILITY RUBBER BOOT FLASHINGS AND BOOT BASE. BOOT FLASHINGS MAY BE RE-USED AND INCORPORATED INTO THE NEW ROOF SYSTEM PROVIDED THE FLASHING AND BASE ARE IN GOOD CONDITION AND CAN BE RE-INSTALLED IN A MANNER WHICH PROVIDES LONG TERM WATERPROOFING INTEGRITY.
- INSTALL NEW PVC STACK EXTENSIONS AS REQUIRED TO EXTEND SANITARY STACKS / SOIL STACKS TO MINIMUM CLEARANCES ABOVE THE FINISHED ROOF SYSTEM AS REQUIRE BY PLUMBING CODE. TYPICAL HEIGHT OF STACKS MUST NOT BE LESS THAN TWELVE (12.0) INCHES ABOVE THE ROOF SURFACE.
- REMOVE ALL EXISTING STATIC VENT HOODS WHICH WERE FABRICATED WITH "PLASTIC" VENT CAPS (EXHIBITING DAMAGE) AND DISCARD. REPLACEMENT HOODS WILL BE REQUIRED AT ALL NINE (9) LOCATIONS. CONTRACTOR IS TO VERIFY SIZE AND LOCATION OF ALL REPLACEMENT VENT CAPS AND SHALL INCLUDE THE COST FOR REPLACEMENT IN THEIR BASE BID FOR THIS PROJECT.

CONSTUCTION / INSTALLATION

- ROOF SECTIONS 1 & 2 - WOOD DECK: SWEEP AND CLEAN THE ROOF DECK SURFACE TO REMOVE DEBRIS. RE-SET OR REMOVE AND REPLACE ANY NAILS OR PROJECTIONS FROM THE ROOF DECK. INSPECT THE ROOF DECKING FOR EVIDENCE OF DAMAGE OR DETERIORATION REQUIRING REMOVAL AND REPLACEMENT. INSTALL NEW THREE-QUARTERS (0.75) INCH THICKNESS EXTERIOR GRADE C-D EXPOSURE 1 PLYWOOD SECURED TO FRAMING WITH CORROSION RESISTANT NO. 10 OR LARGER SCREW FASTENERS IN ACCORDANCE WITH ASCE-7 WIND UPLIFT REQUIREMENTS. ALL DECK REPLACEMENT SHALL BE ITEMIZED AND BILLED "IN ADDITION" TO THE CONTRACTOR'S BASE BID FOR THIS PROJECT.
- ROOF SECTION 2 - METAL DECK: REPLACE STRUCTURALLY DAMAGED METAL DECKING IN ALL AREAS WITH NEW DECKING CONFIGURED TO MATCH THE EXISTING DECKING. REMOVAL OF DETERIORATED DECKING AND INSTALLATION OF NEW TWENTY (20) GAUGE GALVANIZED METAL DECKING SHALL BE ITEMIZED AND SUBMITTED "IN ADDITION" TO THE BASE BID FOR THIS PROJECT. ALL NEW DECKING TO BE SECURED WITH SELF-DRILLING CORROSION RESISTANT SCREW FASTENERS INSTALLED AT INTERVALS OF NOT GREATER THAN TWELVE (12.0) INCHES ON-CENTER AT BAR JOIST CONNECTIONS AND NOT GREATER THAN SIX (6.0) INCHES ON-CENTER AT DECK OVERLAP / TIE-IN CONDITIONS. ALL REQUIRED METAL DECK REPLACEMENT SHALL BE ITEMIZED AND SUBMITTED "IN ADDITION" TO THE BASE BID.
- ROOF SECTION 2 - METAL DECK: SWEEP AND CLEAN ALL DECK FLUTES TO REMOVE DEBRIS PRIOR TO APPLICATION OF PAINT COATING. APPLY RUST INHIBITIVE PAINT COATING OVER ALL STRUCTURALLY SOUND RUSTED METAL DECK SURFACES TO COMPLETELY ENCAPSULATE / COAT THE EXPOSED METAL DECK SURFACE. ALL REQUIRED RUST INHIBITIVE COATING OF THE METAL DECK SHALL BE ITEMIZED AND SUBMITTED "IN ADDITION" TO THE BASE BID.
- ROOF SECTIONS 3 & 4 - CONCRETE DECK: EXAMINE THE CONCRETE DECK SURFACE FOR EVIDENCE OF STRUCTURAL DAMAGE, STRUCTURAL CRACKING OR DEFLECTION. THE CONTRACTOR SHALL BE REQUIRED TO DOCUMENT ANY OBSERVED DAMAGE AND SHALL PERFORM NECESSARY REPAIRS, AS DIRECTED BY THE CONSULTANT, TO RESTORE AREAS TO A CONDITION WHICH IS BOTH STRUCTURALLY SOUND AND SUITABLE AS A SUBSTRATE OF THE NEW ROOF SYSTEM. ANY REQUIRED CONCRETE DECK REPAIRS SHALL BE ITEMIZED BY THE CONTRACTOR AND BILLED "IN ADDITION" TO THE BASE CONTRACT FOR THIS PROJECT.
- THE CONTRACTOR SHALL BE REQUIRED TO INSTALL NEW WOOD BLOCKING NAILERS AT THE PERIMETER OF THE ROOF TO COMPENSATE FOR THE TAPERED INSULATION (TOTAL THICKNESS OF INSULATION). THE NEW WOOD BLOCKING SHALL BE "STRUCTURAL" GRADE, FREE OF DEFECTS, WARP AND SPLITS AND SHALL BE INSTALLED AND SECURED TO THE EXISTING NAILERS OR SUBSTRATE (I.E. CONCRETE WALL PANEL OR STEEL FRAMING) WITH APPROPRIATE SCREW FASTENERS AS PER ASCE 7-10 WIND UPLIFT REQUIREMENTS. SCREWS MUST SUFFICIENTLY PENETRATE THE SUBSTRATE TO A DEPTH OF NOT LESS THAN ONE AND ONE-HALF (1-1/2) INCH AND HAVE A PULL-OUT RESISTANCE TESTED TO EQUAL OR EXCEED REQUIREMENTS SET FORTH IN ASCE 7-10. FASTENER SPACING MUST NOT EXCEED EIGHT (8.0) INCHES ON-CENTER.
- WRAP THE TOP OF THE PERIMETER WOOD NAILER(S) WITH SELF-ADHERED WATERPROOFING MEMBRANE (GRACE ICE & WATER SHIELD OR EQUIVALENT SELF-ADHERED WATERPROOFING MEMBRANE) EXTENDING THE MEMBRANE DOWN THE OUTSIDE AND INSIDE FACE OF THE WALL TO ONE (1.0) INCH BELOW THE BASE OF THE BOTTOM WOOD NAILER.

- ROOF SECTIONS 1 & 2 - WOOD DECK: AFTER COMPLETING THE NECESSARY REPAIRS TO THE WOOD DECKING, THE CONTRACTOR SHALL BE REQUIRED TO INSTALL A SINGLE PLY SELF-ADHERED VAPOR BARRIER MEMBRANE OVER THE ENTIRE WOOD DECK SURFACE. AS REQUIRED BY THE VAPOR BARRIER MANUFACTURER, THE WOOD DECK SURFACE MAY BE PRIME COATED WITH PROPRIETARY PRIMER TO ENHANCE ADHESION OF THE VAPOR BARRIER MEMBRANE. ALIGN THE VAPOR BARRIER MEMBRANE PERPENDICULAR TO THE SLOPE-TO-DRAIN / SLOPE-TO-GUTTER USING CARE TO SIDELAP THE MEMBRANE A MINIMUM OF THREE (3.0) INCHES IN DOWNSLOPE MANNER. ENDLAPS MUST BE STAGGERED BY NOT LESS THAN THREE (3.0) FEET AND SHALL BE A MINIMUM OF SIX (6.0) INCHES OF OVERLAP. HAND PRESS AND ROLL SEAMS TO ENSURE ADHESION. WRAP THE VAPOR BARRIER MEMBRANE OVER ALL PERIMETER EDGES OF THE ROOF AND EXTEND THE MEMBRANE UP CURB AND VERTICAL WALL SURFACES A MINIMUM OF SIX (6.0) INCHES.

- ROOF SECTION 2 - METAL DECK: IN AREAS WHERE THE EXISTING ROOF DECKING IS METAL, THE CONTRACTOR WILL BE REQUIRED TO INSTALL A SINGLE PLY OF NON-REINFORCED 40 MIL. FIRE RATED EPDM MEMBRANE. THE EPDM RUBBER MEMBRANE WILL BE ALIGNED PERPENDICULAR TO THE SLOPE-TO-DRAIN. USING THE MATERIAL MANUFACTURER'S APPROVED SPLICE WASH, PRIMER AND BUTYL SEAM TAPE, THE CONTRACTOR SHALL ADHERE THE SIDELAPS AND ENDLAPS IN THE EPDM RUBBER MEMBRANE TO ACHIEVE A WATERTIGHT VAPOR BARRIER SYSTEM OVER THE METAL DECK AREA. TIE-IN THE EPDM MEMBRANE TO THE SELF-ADHERED VAPOR BARRIER MEMBRANE USING BUTYL SEAM TAPE OR LIQUID RESIN MEMBRANE. EXTEND THE EPDM MEMBRANE OVER ALL PERIMETER EDGES OF THE ROOF AND UP ALL VERTICAL WALL OR CURB SURFACES A MINIMUM OF SIX (6.0) INCHES. APPLY A CONTINUOUS BEAD OF ONE-PART POLYURETHANE CAULKING AT THE TERMINATION OF THE EPDM MEMBRANE AT VERTICAL WALL AND CURB SURFACES.

- ROOF SECTIONS 3 & 4 - CONCRETE DECK: AFTER COMPLETING ANY NECESSARY REPAIRS TO THE CONCRETE DECK, AS REQUIRED BY THE VAPOR BARRIER MEMBRANE MANUFACTURER, THE CONTRACTOR SHALL APPLY THE MATERIAL MANUFACTURER'S APPROVED PRIMER PRIOR TO THE INSTALLATION OF THE CONTINUOUS SELF-ADHERED VAPOR BARRIER MEMBRANE. WHEN RESIDUAL AIR TEMPERATURES ARE LESS THAN FORTY (40°) FAHRENHEIT, THE CONTRACTOR SHALL BE REQUIRED TO INSTALL A FULLY HEAT WELDED VAPOR BARRIER MEMBRANE IN LIEU OF THE SELF-ADHERED MEMBRANE. THE VAPOR BARRIER MEMBRANE WILL BE INSTALLED PERPENDICULAR TO THE SLOPE TO INTERNAL DRAINS. WRAP THE VAPOR BARRIER MEMBRANE UP ALL VERTICAL CURB AND WALL SURFACES TO THE TOP OF THE INTENDED INSULATION HEIGHT.

CONSTRUCTION / INSTALLATION - CONTINUED

- ROOF SECTIONS 1 - WOOD DECK: UPON COMPLETING THE INSTALLATION OF THE VAPOR BARRIER MEMBRANE, THE CONTRACTOR WILL INSTALL NEW POLYISOCYANURATE INSULATION THROUGHOUT ALL AREAS USING CARE TO STAGGER ROWS OF INSULATION PERPENDICULAR TO THE SLOPE TO GUTTER EDGE. THE BASE COURSE OF INSULATION SHALL BE A MINIMUM THREE AND ONE-HALF (3-1/2) INCH THICKNESS. A SECOND COURSE OF ONE-EIGHTH (0.125) INCH TAPERED INSULATION WITH MINIMUM THICKNESS AT THE GUTTER EDGE OF ONE AND ONE-HALF (1-1/2) INCH SHALL BE INSTALLED ON THE "FLAT" ROOF AREAS ALONG THE NORTH AND SOUTH PERIMETERS OF THIS ROOF SECTION. ON THE SLOPED "BARREL" PORTIONS OF THE ROOF, A SECOND COURSE OF TWO (2.0) INCH THICKNESS POLYISOCYANURATE INSULATION SHALL BE INSTALLED. THE BASE COURSE OF INSULATION MUST BE MECHANICALLY SECURED TO THE UNDERLING DECKING WITH NO. 12 SCREW FASTENERS FITTED WITH THREE (3.0) INCH GALVANIZED PLATE WASHERS. ATTACHMENT OF THE INSULATION BOARDS SHALL COMPLY WITH ASCE-7 WIND UPLIFT CODE AND SHALL CONFORM TO FACTORY MUTUAL FM-1-60 ANCHORING REQUIREMENTS. A MINIMUM OF EIGHT (8) FASTENERS SHALL BE INSTALLED IN THE ROOF FIELD, TWELVE FASTENERS IN ZONE 2 - EXPOSED ROOF EDGES AND SIXTEEN (16) FASTENERS IN ZONE 3 EXPOSED OUTSIDE CORNERS. INSTALL A SECOND COURSE OF TAPERED OR FLAT STOCK POLYISOCYANURATE INSULATION WILL BE FULLY ADHERED WITH LOW RISE FOAM INSULATION ADHESIVE APPLIED IN RIBBONS AT SIX (6.0) INCHES ON-CENTER SPACING. INSTALL A FINAL COURSE OF HIGH DENSITY GLASS FACED GYPSUM BOARD OVER THE POLYISOCYANURATE INSULATION USING CARE TO STAGGER THE SEAMS OVER THE BASE COURSE(S) OF INSULATION. ALIGN THE GLASS FACED GYPSUM BOARD PERPENDICULAR TO THE ROOF SLOPE-TO-GUTTER EDGE AND SECURE THE OVERLAYMENT BOARD WITH LOW RISE FOAM ADHESIVE APPLIED IN RIBBONS AT NOT GREATER THAN SIX (6.0) INCHES ON-CENTER SPACING. BALLAST AREAS OF INSULATION DURING CURE OF THE INSULATION ADHESIVE. FILL ALL GAPS OF GREATER THAN ONE-HALF (0.50) INCH WITH RIGID INSULATION OR EXPANSION FOAM.
- ROOF SECTION 2 - WOOD & METAL DECK AREAS: THE CONTRACTOR SHALL INSTALL A BASE COURSE OF THREE AND ONE-HALF (3-1/2) INCH THICKNESS FLAT STOCK POLYISOCYANURATE INSULATION OVER THE INSTALLED VAPOR BARRIER MEMBRANE ALIGNING THE LONGEST DIMENSION OF THE INSULATION BOARD PERPENDICULAR TO THE SLOPE-TO-DRAIN. SECURE THE INSULATION TO THE UNDERLYING DECKING WITH NO. 12 SELF-DRILLING SCREWS FITTED WITH THREE (3.0) INCH GALVANIZED PLATE WASHERS. ATTACHMENT OF THE INSULATION BOARDS SHALL COMPLY WITH ASCE-7 WIND UPLIFT CODE AND SHALL CONFORM TO FACTORY MUTUAL FM-1-60 ANCHORING REQUIREMENTS. A MINIMUM OF EIGHT (8) FASTENERS SHALL BE INSTALLED IN THE ROOF FIELD, TWELVE FASTENERS IN ZONE 2 - EXPOSED ROOF EDGES AND SIXTEEN (16) FASTENERS IN ZONE 3 EXPOSED OUTSIDE CORNERS. INSTALL A SECOND COURSE OF EIGHTH (0.125) INCH PER FOOT TAPERED POLYISOCYANURATE INSULATION FULLY ADHERED WITH LOW RISE FOAM INSULATION ADHESIVE APPLIED IN RIBBONS AT SIX (6.0) INCHES ON-CENTER SPACING. MINIMUM AVERAGE "R-VALUE" OF THE INSTALLED INSULATION SYSTEM SHALL NOT BE LESS THAN THIRTY (30.0). INSTALL A FINAL COURSE OF HIGH DENSITY GLASS FACED GYPSUM BOARD OVER THE POLYISOCYANURATE INSULATION USING CARE TO STAGGER THE SEAMS OVER THE BASE COURSE(S) OF INSULATION. ALIGN THE GLASS FACED GYPSUM BOARD PERPENDICULAR TO THE ROOF SLOPE-TO-GUTTER EDGE AND SECURE THE OVERLAYMENT BOARD WITH LOW RISE FOAM ADHESIVE APPLIED IN RIBBONS AT NOT GREATER THAN SIX (6.0) INCHES ON-CENTER SPACING. BALLAST AREAS OF INSULATION DURING CURE OF THE INSULATION ADHESIVE. FILL ALL GAPS OF GREATER THAN ONE-HALF (0.50) INCH WITH RIGID INSULATION OR EXPANSION FOAM. INSULATION AT INTERNAL DRAIN LOCATIONS SHALL BE REDUCED BY TWO AND ONE-HALF (2.5") INCHES AND A "FLAT SUMP" AREA OF NOT LESS THAN THIRTY-SIX (36.0") INCHES MUST BE FORMED TO PROMOTE DRAINAGE. CONTRACTOR SHALL INCLUDE IN THEIR BASE BID ANY ADDITIONAL INSULATION REQUIRED TO DIVERT WATER AND CORRECT PONDING CONDITIONS WHICH REMAIN GREATER THAN FORTY-EIGHT (48) HOURS AFTER A HEAVY RAIN. FINAL CONFIGURATION OF THE INSULATION SHALL PROVIDE POSITIVE DRAINAGE FROM ALL ROOF AREAS BASED ON THIS REQUIREMENT.
- ROOF SECTION 3 & 4 - CONCRETE DECK AREAS: THE CONTRACTOR SHALL INSTALL A BASE COURSE OF THREE AND ONE-HALF (3-1/2) INCH THICKNESS FLAT STOCK POLYISOCYANURATE INSULATION OVER THE INSTALLED VAPOR BARRIER MEMBRANE ALIGNING THE LONGEST DIMENSION OF THE INSULATION BOARD PERPENDICULAR TO THE SLOPE-TO-DRAIN. FULLY ADHERE THE INSULATION TO THE INSTALLED VAPOR BARRIER MEMBRANE WITH LOW RISE FOAM INSULATION ADHESIVE. ADHESION OF THE INSULATION BOARDS SHALL COMPLY WITH ASCE-7 WIND UPLIFT CODE AND SHALL CONFORM TO FACTORY MUTUAL FM-1-60 WIND UPLIFT REQUIREMENTS. INSTALL A SECOND COURSE OF EIGHTH (0.125) INCH PER FOOT TAPERED POLYISOCYANURATE INSULATION FULLY ADHERED WITH LOW RISE FOAM INSULATION ADHESIVE APPLIED IN RIBBONS AT SIX (6.0) INCHES ON-CENTER SPACING. MINIMUM AVERAGE "R-VALUE" OF THE INSTALLED INSULATION SYSTEM SHALL NOT BE LESS THAN THIRTY (30.0). INSTALL A FINAL COURSE OF HIGH DENSITY GLASS FACED GYPSUM BOARD OVER THE POLYISOCYANURATE INSULATION USING CARE TO STAGGER THE SEAMS OVER THE BASE COURSE(S) OF INSULATION. ALIGN THE GLASS FACED GYPSUM BOARD PERPENDICULAR TO THE ROOF SLOPE-TO-GUTTER EDGE AND SECURE THE OVERLAYMENT BOARD WITH LOW RISE FOAM ADHESIVE APPLIED IN RIBBONS AT NOT GREATER THAN SIX (6.0) INCHES ON-CENTER SPACING. BALLAST AREAS OF INSULATION DURING CURE OF THE INSULATION ADHESIVE. FILL ALL GAPS OF GREATER THAN ONE-HALF (0.50) INCH WITH RIGID INSULATION OR EXPANSION FOAM. INSULATION AT INTERNAL DRAIN LOCATIONS SHALL BE REDUCED BY TWO (2.0") INCHES AND A "FLAT SUMP" AREA OF NOT LESS THAN THIRTY-SIX (36.0") INCHES MUST BE FORMED TO PROMOTE DRAINAGE. CONTRACTOR SHALL INCLUDE IN THEIR BASE BID ANY ADDITIONAL INSULATION REQUIRED TO DIVERT WATER AND CORRECT PONDING CONDITIONS WHICH REMAIN GREATER THAN FORTY-EIGHT (48) HOURS AFTER A HEAVY RAIN. FINAL CONFIGURATION OF THE INSULATION SHALL PROVIDE POSITIVE DRAINAGE FROM ALL ROOF AREAS BASED ON THIS REQUIREMENT.
- ALL ROOF SECTIONS: INSTALL NEW FIRE RESISTANT PERLITE CANT STRIPS, LOOSE LAID OR SET IN ASPHALT MASTIC / ADHESIVE, AS PER MEMBRANE MANUFACTURER'S PUBLISHED RECOMMENDATIONS.

NORTH PALOS FIRE PROTECTION DISTRICT
FIRE STATION 1 - ROOF REPLACEMENT PROJECT
10629 SOUTH ROBERTS ROAD
PALOS HILLS, ILLINOIS 60465

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NORTH PALOS FIRE PROTECTION DISTRICT
FIRE STATION 1 - ROOF REPLACEMENT PROJECT

PROJECT LOCATION:

10629 SOUTH ROBERTS ROAD
PALOS HILLS, ILLINOIS 60465

CONSTRUCTION / INSTALLATION - CONTINUED

- ROOF SECTIONS 1 & 2: INSTALL THE BASE PLY OF SELF-ADHERED MODIFIED MEMBRANE USING CARE TO PREVENT IMPROPER ALIGNMENT. POSITION THE MEMBRANE PERPENDICULAR TO SLOPE BEGINNING AT THE ROOF PERIMETER GUTTER EDGE OR INTERNAL DRAIN LOCATION(S). UNROLL THE MEMBRANE AND ALLOW THE MEMBRANE TO "RELAX" AS PER THE MANUFACTURER REQUIREMENTS BASED ON TEMPERATURE. WRAP THE BASE PLY OF SELF-ADHERED MEMBRANE OVER PERIMETER WOOD NAILERS TO ENCAPSULATE THE ROOF EDGE. REMOVE THE RELEASE FILM FROM THE UNDERSIDE OF THE MEMBRANE AND ADHERE THE MEMBRANE DIRECTLY TO THE PERIMETER WOOD NAILER(S) AND GLASS-FACED GYPSUM BOARD SURFACE. USE A WEIGHTED ROLLER AND BROOM TO PRESS AND ADHERE THE MEMBRANE TO THE SUBSTRATE. IN THE EVENT THE BASE PLY OF SELF-ADHERED MEMBRANE IS NOT COMPLETED WITH INSTALLATION OF THE CAP PLY OF MEMBRANE DURING THE SAME DAY, THE CONTRACTOR WILL BE REQUIRED TO UTILIZE A HOT AIR GUN TO HAND-WELD ALL SEAMS. INSTALL THE FINAL PLY OF GRANULE SURFACED SBS MODIFIED MEMBRANE - CLASS A FIRE RATED ROOF SYSTEM HEAT WELDED OVER THE BASE PLY AS PER THE SPECIFICATIONS. INSTALLATION OF THE ROOF MEMBRANE MUST COMPLY WITH THE SPECIFICATIONS AND PUBLISHED INSTALLATION REQUIREMENTS STIPULATED BY THE MATERIAL MANUFACTURER FOR A FULLY WARRANTED ROOF ASSEMBLY. INSTALL A NEW TWO (2) PLY SBS MODIFIED MEMBRANE FLASHING ASSEMBLY. THE BASE PLY FLASHING MEMBRANE WILL BE A SMOOTH SURFACED SELF-ADHERED MODIFIED MEMBRANE AND THE GRANULE SURFACED CAP PLY FLASHING MEMBRANE SHALL BE FULLY ADHERED BY HEAT WELDING. SECURE VERTICAL FLASHINGS WITH A CONTINUOUS ALUMINUM METAL TERMINATION BAR. INSTALL FASTENERS EVERY 8 - 10 INCHES ON-CENTER AND APPLY A CONTINUOUS BEAD OF ONE-PART POLYURETHANE CAULKING SEALANT OR ASPHALT MASTIC ALONG THE UPPER EDGE OF THE FLASHING MEMBRANE WHERE IT CONTACTS THE WALL OR CURB SURFACE.
- ROOF SECTION 3 & 4 - CONCRETE DECK AREAS: INSTALL A TWO (2) PLY SBS MODIFIED MEMBRANE - CLASS A FIRE RATED ROOF SYSTEM (BOTH THE BASE PLY AND THE CAP PLY WILL BE HEAT WELDED) PER SPECIFICATIONS. INSTALLATION OF THE ROOF MEMBRANE MUST COMPLY WITH THE SPECIFICATIONS AND PUBLISHED INSTALLATION REQUIREMENTS STIPULATED BY THE MATERIAL MANUFACTURER FOR A FULLY WARRANTED ROOF ASSEMBLY. INSTALL A NEW TWO (2) PLY SBS MODIFIED MEMBRANE FLASHING ASSEMBLY. THE BASE PLY FLASHING MEMBRANE WILL BE A SMOOTH SURFACED TORCH WELDABLE MODIFIED MEMBRANE AND THE GRANULE SURFACED CAP PLY FLASHING MEMBRANE SHALL BE FULLY ADHERED BY HEAT WELDING. SECURE VERTICAL FLASHINGS WITH A CONTINUOUS ALUMINUM METAL TERMINATION BAR. INSTALL FASTENERS EVERY 8 - 10 INCHES ON-CENTER AND APPLY A CONTINUOUS BEAD OF ONE-PART POLYURETHANE CAULKING SEALANT OR ASPHALT MASTIC ALONG THE UPPER EDGE OF THE FLASHING MEMBRANE WHERE IT CONTACTS THE WALL OR CURB SURFACE.
- INSTALL NEW GALVANIZED FURNACE STACK JACKS AND FLASHINGS AT ALL LOCATIONS TO REPLACE EXISTING STACK JACKS. CONTRACTOR SHALL INCLUDE THE REPLACEMENT OF EXISTING STACK JACKS AND WEATHER COLLARS IN THEIR BASE BID.
- INSTALL NEW THREE AND ONE-HALF (3.5) POUND LEAD SOIL VENT SLEEVE FLASHING PLACING THE FLASHING INTO A CONTINUOUS BED OF ASPHALT MASTIC AND WRAPPING THE LEAD INTO THE STACK A MINIMUM OF ONE (1.0) INCH. PRIME COAT AND STRIP-IN THE HORIZONTAL PORTION OF THE LEAD FLASHING FLANGE WITH TWO PLIES OF MODIFIED BITUMEN MEMBRANE. FINISHED HEIGHT OF ALL SANITARY STACKS ***MUST NOT BE LESS THAN*** TWELVE (12.0) INCHES.
- SECURE THE UPPER EDGE OF VERTICAL FLASHINGS WITH A SURFACE MOUNTED ALUMINUM METAL TERMINATION BAR SECURED AT INTERVALS OF NOT GREATER THAN TWELVE (12.0) INCHES ON-CENTER SPACING. POSITION THE TERMINATION BAR TO ALLOW FOR APPLICATION OF A CONTINUOUS BEAD OF ONE-PART POLYURETHANE CAULKING SEALANT ALONG THE UPPER EDGE OF THE BAR TO ACHIEVE A WATERTIGHT CONDITION AT THE INTERFACE WITH THE WALL OR CURB.
- INSTALL NEW PRE-FINISHED SURFACE MOUNTED METAL COUNTERFLASHING OR SLIP-METAL FLASHING (INSERTED BENEATH EQUIPMENT CURB CAP FLANGES) AT ALL VERTICAL FLASHING LOCATIONS. SECURE THE COUNTERFLASHING ABOVE THE TERMINATION BAR USING APPROPRIATE WOOD, SHEET METAL OR MASONRY / CONCRETE SCREW FASTENERS INSTALLED NOT GREATER THAN TWELVE (12.0) INCHES ON-CENTER. APPLY A CONTINUOUS BEAD OF ONE-PART POLYURETHANE CAULKING ALONG THE UPPER EDGE OF THE METAL COUNTERFLASHING AND TOOL FINISH TO ACHIEVE A WATERTIGHT CONDITION.
- WHERE VERTICAL FLASHING HEIGHT IS LESS THAN SIX (6.0) INCHES AS MEASURED FROM THE SURFACE OF THE FIELD MEMBRANE, THE CONTRACTOR WILL BE REQUIRED TO APPLY A BASE COAT OF RESIN COATING, EMBED FLEECE FABRIC REINFORCEMENT AND APPLY A FINAL COATING OF RESIN TO ENCAPSULATE THE FABRIC. ALL RESIN FLASHING SYSTEMS TO BE MANUFACTURED BY OR APPROVED BY THE PRIMARY ROOF MEMBRANE MANUFACTURER.
- APPLY FIBRATED ALUMINUM PAINT COATING TO ALL VERTICAL AND HORIZONTAL FIELD AND FLASHING LAPS AND TO ALL DE-GRANULATED, SURFACE ABRADED OR SURFACE DAMAGED MEMBRANE. ALUMINUM COATING MUST ALSO BE APPLIED TO ALL RESIN FLASHING INSTALLED AT DESIGNATED LOCATIONS.
- INSTALL NEW PRE-FINISHED TWENTY-FOUR (24) GAUGE GALVANIZED, .032 ALUMINUM, APPROVED POLYMER OR NO. 304 STAINLESS STEEL METAL PITCH PANS AS REQUIRED IN DESIGNATED LOCATIONS AT PIPE PENETRATIONS. FILL BASED OF PITCH PANS WITH NON-SHRINK POLYMER CONCRETE AND COMPLETE ALL PITCH PANS WITH SELF-LEVELING POLYURETHANE OR SILYL-TERMINATED POLYETHER SEALANT. INSTALL NEW PRE-FINISHED GALVANIZED, ALUMINUM OR NO. 304 STAINLESS STEEL METAL WEATHER CROWNS OVER ALL PITCH PANS SECURED TO THE PENETRATION OR CONDUIT AND SEALED WITH A CONTINUOUS BEAD OF ONE-PART POLYURETHANE CAULKING SEALANT. AS AN ALTERNATIVE TO USING POURABLE SEALANT, THE CONTRACTOR MAY SUBSTITUTE POLYESTER FLEECE MESH REINFORCED RESIN FLASHINGS WHERE EXISTING CONDITIONS PREVENT EFFECTIVE LONG-TERM WATERPROOFING AT PIPE OR CONDUIT PENETRATIONS.
- INSTALL NEW INTERNAL DRAIN FLASHINGS AND MINIMUM THREE AND ONE-HALF (3.5) POUND LEAD FLASHINGS AT EXISTING INTERNAL DRAIN LOCATIONS. PRIME COAT AND INSTALL MODIFIED MEMBRANE TARGET AND FIELD PLY FLASHINGS OVER INSTALLED LEAD DRAIN FLASHINGS.

CONSTUCTION / INSTALLATION - CONTINUED

- INSTALL PRE-FABRICATED POLYMER PIPE SUPPORTS AND EPDM WALKWAY PADS TO SUPPORT THE EXISTING GAS LINES OR ELECTRICAL CONDUIT WHERE THEY PASS OVER THE NEW ROOF. SUPPORTS SHALL BE SPACED AT INTERVALS WHICH PREVENT OVERLOADING ANY INDIVIDUAL SUPPORT AND IN STRICT COMPLIANCE WITH THE PIPE SUPPORT MANUFACTURER'S RECOMMENDATIONS. PIPE SUPPORTS SHALL BE INCLUDED IN THE CONTRACTOR'S BASE BID FOR THIS PROJECT.
- COORDINATE THE RE-INSTALLATION / PLACEMENT OF ANTENNA SUPPORT FRAMES AND RUBBER PADS PLACED OVER THE NEW ROOF MEMBRANE. INSTALL / APPLY CONCRETE BLOCK (CMU) BALLAST TO FRAME TO PREVENT WIND UPLIFT AS PER THE ANTENNA FRAME MANUFACTURER'S REQUIREMENT TO BALLAST THE FRAME PER ASCE 7-10 WIND LOAD SPECIFICATIONS. THE OWNER SHALL BE RESPONSIBLE FOR ANY WIRING DISCONNECT / RECONNECT AND ADJUSTMENT OF THE ANTENNA.
- ROOF SECTION 1 - GUTTER INSTALLATION: INSTALL NEW .032 (20 GAUGE) ALUMINUM FLANGE MOUNTED METAL GUTTERS AND DOWNSPOUTS AT ALL PERIMETER EDGES OF THE ROOF. SECURE THE FLANGE MOUNTED COMMERCIAL SIX (6.0) INCH COMMERCIAL BOX GUTTERS TO THE PERIMETER WOOD NAILER USING STAINLESS STEEL COUNTERSUNK SCREW FASTENERS INSTALLED NOT GREATER THAN SIX (6.0) INCHES ON-CENTER IN TWO STAGGERED ROWS. SECURE GUTTER BRACKETS, SPLICE PLATES, SUPPORTS, ETC. AS REQUIRED BY THE GUTTER MANUFACTURER (PRE-FABRICATED METAL-ERA ICG-2) OR AS STIPULATE PER ASCE 7-10 REQUIREMENTS FOR WIND UPLIFT AND ATTACHMENT TO THE PERIMETER WOOD NAILERS. INSTALL NEW 4.0 INCH X 6.0 INCH PRE-FINISHED .032 (20 GAUGE) ALUMINUM METAL DOWNSPOUTS SECURED TO THE GUTTER WITH STAINLESS STEEL SCREW FASTENERS. DOWNSPOUTS TO BE LOCATED AT CURRENT "PRE-EXISTING" LOCATIONS.
- PRIME COAT THE GUTTER FLANGE SURFACE AND HEAT WELD A SINGLE PLY OF SMOOTH SURFACED MODIFIED MEMBRANE OVER THE FLANGE EXTENDING NOT LESS THAN EIGHT (8.0) INCHES BEYOND THE FLANGE OVER ADJACENT SMOOTH SURFACED (BASE PLY) OF FIELD MEMBRANE. THE FINAL PLY OF GRANULE SURFACED MODIFIED MEMBRANE WILL BE INSTALLED AND TERMINATED APPROXIMATELY ONE-QUARTER INCH (0.25") FROM THE INSIDE FACE OF THE GUTTER. WHERE POSSIBLE, THE FIELD MEMBRANE WILL BE THE FINAL PLY OF MEMBRANE INSTALLED TO STRIP-IN THE GUTTER FLANGE. PRIOR TO BONDING THE FLASHING TO THE FIELD MEMBRANE, THE CONTRACTOR WILL HEAT THE FIELD PLY AT THE LAP CONDITION AND EMBED THE GRANULES TO ACHIEVE OPTIMAL BOND BETWEEN THE FLASHING PLY AND FIELD PLY. AT THE TERMINATION OF THE GRANULE SURFACED FLASHING PLY ON THE INSIDE FACE OF THE GUTTER, THE CONTRACTOR MUST APPLY AND TOOL FINISH A CONTINUOUS BEAD OF ONE-PART POLYURETHANE CAULKING.
- ALL ROOF SECTIONS - PERIMETER EDGE METAL INSTALLATION: FABRICATE AND INSTALL G-90 TWENTY-TWO (22) GAUGE GALVANIZED METAL CLEATS AND NEW PRE-FINISHED TWENTY-FOUR (24) GAUGE GALVANIZED METAL EDGE FLASHING (GRAVEL STOP) AT DESIGNATED / EXISTING LOCATIONS. SHEET METAL SHALL BE CONFIGURED AND INSTALLED TO COMPLY WITH CURRENT SMACNA AND FACTORY MUTUAL WIND UPLIFT, DESIGN AND ATTACHMENT REQUIREMENTS. SECURE ALL METAL CLEAT SECTIONS WITH CORROSION RESISTANT SCREW FASTENERS INSTALLED AT NOT GREATER THAN TWELVE (12.0) INCHES ON-CENTER. THE NEW PERIMETER EDGE METAL / GRAVEL STOP MUST BE ATTACHED TO THE CONTINUOUS METAL CLEAT AND THE HORIZONTAL FLANGE SECURED WITH CORROSION RESISTANT COUNTERSUNK NO. 12 SCREW FASTENERS INSTALLED NOT GREATER THAN TWELVE (12.0) INCHES ON-CENTER IN TWO STAGGERED ROWS. ALTERNATIVE ATTACHMENT WITH 8D DOUBLE DIPPED GALVANIZED CORROSION RESISTANT RING SHANK NAILS INSTALLED EVERY SIX (6.0) INCHES ON-CENTER WILL BE ACCEPTED. PERIMETER EDGE METAL MUST BE CONFIGURED TO PROVIDE A VERTICAL FACE WITH REINFORCED "BREAK" TO PREVENT OIL CANNING WHEN FACE DIMENSION IS GREATER THAN EIGHT (8.0) INCHES. PRE-FABRICATED OR SHOP FABRICATED PERIMETER EDGE METAL MUST COMPLY WITH ASCE 7-16 WIND UPLIFT / WIND LOAD REQUIREMENTS. NOTE: IN THE EVENT THE OWNER CONTRACTS FOR THE REPLACEMENT OF THE VERTICAL METAL WALL PANELS, THE INSTALLATION OF THE METAL CLEAT AND PERIMETER EDGE METAL MUST BE COORDINATED WITH THE INSTALLATION OF THE NEW METAL WALL PANELS TO ACHIEVE A WEATHERTIGHT CONDITION AND OVERLAP OF THE METAL EDGE EXTENDING DOWN THE OUTSIDE FACE OF THE METAL WALL PANEL(S).
- THE CONTRACTOR IS TO INCLUDE, IN THEIR BASE BID, THE REPLACEMENT OF THE EXISTING "PLASTIC" CURB MOUNTED VENT CAPS (NINE LOCATIONS) WITH NEW GALVANIZED METAL VENT CAPS SIZED TO MATCH THE EXISTING CURB BASE AND VENT CAPACITY. SUBMIT MATERIAL MANUFACTURER INFORMATION AND SHOP DRAWINGS FOR REVIEW AND APPROVAL PRIOR TO ORDERING AND INSTALLING THE NEW VENT CAPS.
- CLEAN-UP AND REMOVE ALL DEBRIS, CONTAINERS, WASTE, ETC. FROM THE ROOF SURFACE AND GROUNDS SURROUNDING THE JOB SITE AND STAGING AREAS DAILY AS SPECIFIED AND UPON COMPLETION OF THE PROJECT.
- PROJECT BASE BID WILL INCLUDE ALL ITEMS IN THE SPECIFICATION DOCUMENTS, CONSTRUCTION DRAWINGS, ADDENDUM'S (IF APPLICABLE), PRE-BID MEETING AND ANY OTHER CORRESPONDENCE DURING THE BIDDING PROCESS. ANY DISCREPANCIES IN ANY OF THE AFOREMENTIONED DOCUMENTS WILL BE BROUGHT TO THE ATTENTION OF STRUCTURAL TECHNOLOGIES, INC. PRIOR TO SUBMITTING THE PROJECT BID. ANY QUESTIONS / CONCERNS REGARDING THE SCOPE OF WORK, MATERIALS, ETC. TO BE INCLUDED IN THE BASE BID, WILL BE BROUGHT TO THE ATTENTION OF STRUCTURAL TECHNOLOGIES, INC. PRIOR TO THE SUBMITTAL OF THE PROJECT BID AND APPROVAL OF THE PROJECT CONTRACT DOCUMENTS.

CONSTRUCTION / INSTALLATION - CONTINUED

ALTERNATIVE 1 - METAL WALL PANEL & SOFFIT REPLACEMENT

- ALTERNATE 1 - SHEATHING INSTALLATION: REPLACEMENT OF THE EXISTING VERTICAL METAL WALL PANELS AND SOFFIT SYSTEM *IN ALL AREAS* SHALL INCLUDE THE INSTALLATION OF THREE-QUARTERS (3/4) INCH THICKNESS EXTERIOR GRADE CDX PLYWOOD SECURED TO THE UNDERLYING FRAMING WHERE EXISTING SHEATHING IS DETERIORATED OR MISSING. INSTALLATION OF PLYWOOD SHEATHING SHALL BE ITEMIZED BY THE CONTRACTOR AND SUBMITTED AS A CHANGE ORDER TO BE BILLED "IN ADDITION" TO THE CONTRACTOR'S BASE BID FOR THIS PROJECT.
- ALTERNATE 1 - AIR BARRIER MEMBRANE INSTALLATION: THE CONTRACTOR SHALL BE REQUIRED TO INSTALL A SINGLE PLY OF WATER RESISTIVE AIR BARRIER MEMBRANE (TYPAR METROWRAP OR EQUIVALENT) DIRECTLY OVER THE SHEATHING OR METAL STUD FRAMING COMPONENTS. TAPE ALL SEAMS WITH THE MATERIAL MANUFACTURER'S MATERIAL. WRAP MEMBRANE BENEATH SOFFIT AREAS AND TERMINATE THE VERTICAL UPPER EDGE OF THE MEMBRANE ON THE OUTSIDE FACE OF THE WOOD NAILERS INSTALLED AT THE ROOF PERIMETER EDGES. SECURE THE MEMBRANE WITH PLASTIC CAP RING SHANK NAILS.
- ALTERNATE 1 - METAL WALL PANEL & SOFFIT INSTALLATION: INSTALL NEW PRE-FINISHED ALUMINUM METAL J-CHANNEL SECURED TO THE EXISTING FRAMING OR NEW PLYWOOD PANELS WITH STAINLESS STEEL NO. 10 COUNTERSUNK SCREW FASTENERS INSTALLED EVERY TWELVE (12.0) INCHES ON-CENTER. SECURE J-CHANNEL AT THE OUTSIDE "EXPOSED" EDGE OF THE SOFFIT AND ALONG THE INSIDE OF THE SOFFIT WHERE THE SOFFIT TERMINATES AGAINST THE MASONRY WALL OF THE STRUCTURE.
- INSTALL PRE-FINISHED TWENTY-FOUR (24) GAUGE ALUMINUM METAL DRIP EDGE FLASHING AT THE BASE OF THE VERTICAL WALL. SECURE THE DRIP EDGE FLASHING OVER THE INSTALLED WATERPROOFING MEMBRANE USING NO. 10 COUNTERSUNK STAINLESS STEEL SCREW FASTENERS INSTALLED EVERY 12 - 16 INCHES ON-CENTER. FASTENERS HEADS SHALL BE SET FLUSH TO SLIGHTLY INDENTING THE SURFACE OF THE DRIP METAL VERTICAL FLANGE.
- INSTALL NEW PRE-FINISHED "WEEPING" / PERFORATED J-CHANNEL AT THE BASE OF THE VERTICAL WALL PANEL OVER THE METAL DRIP EDGE. SECURE THE WEEPING J-CHANNEL OVER THE DRIP EDGE WITH STAINLESS STEEL NO. 10 SCREW FASTENERS SIZED TO PENETRATE THE PLYWOOD SUBSTRATE. INSTALL FASTENERS EVERY 12 - 16 INCHES ON-CENTER.
- BASE BID TO INCLUDE INSTALLATION OF NEW LOW PROFILE TWELVE (12.0) OR SIXTEEN (16.0) INCH WIDTH PRE-FINISHED TWENTY-FOUR GAUGE VERTICAL ALUMINUM METAL WALL PANELS WITH A ONE (1.0) INCH WIDTH "REVEAL" IN THE VERTICAL PANEL FACE. PRIOR TO THE INSTALLATION OF THE VERTICAL WALL PANELS, THE CONTRACTOR MUST INSTALL A PRE-FINISHED WEEPING J-CHANNEL AND DRIP EDGE FLASHING AT THE BASE OF THE WALL WHERE THE VERTICAL PANEL WILL TERMINATE. THE UPPER EDGE OF THE PANEL WILL TERMINATE APPROXIMATELY FLUSH WITH THE TOP WOOD NAILER INSTALLED AT THE PERIMETER OF THE LOW SLOPE ROOF SECTION(S). SECURE THE UPPER EDGE OF THE WALL PANEL WITH NEOPRENE GASKETED SELF-DRILLING NO. 10 STAINLESS STEEL SCREW FASTENERS INSTALLED EVERY TWELVE (12.0) INCHES ON-CENTER.
- THE BASE BID WILL INCLUDE THE INSTALLATION OF HORIZONTAL SOFFIT PANELS INSTALLED BENEATH THE EXISTING SOFFIT. NEW SOFFIT "EAVE" PANELS WILL BE FABRICATED FROM TWENTY-FOUR (24) GAUGE PRE-FINISHED "FLUSH" ALUMINUM METAL WITH MATCHING THE PANEL CONFIGURATION (12.0 INCH OR 16.0 INCH) AND MANUFACTURER OF THE VERTICAL SOFFIT WALL PANELS. SOFFIT PANELS WILL BE INSERTED INTO THE J-CHANNEL AND SECURED TO THE UNDERLYING FRAMING OR PLYWOOD / NEW PLYWOOD SHEATHING WITH STAINLESS STEEL NO. 10 CORROSION RESISTANT SCREW FASTENERS INSTALLED NOT GREATER THAN TWELVE (12.0) INCHES ON-CENTER.
- APPLY A CONTINUOUS BEAD OF COLOR MATCHED ONE-PART POLYURETHANE CAULKING SEALANT WHERE THE DRIP EDGE AND SOFFIT J-CHANNEL INTERFACE TO FORM A WATERTIGHT / AIRTIGHT CONDITION.
- APPLY A CONTINUOUS BEAD OF COLOR MATCHED ONE-PART POLYURETHANE CAULKING SEALANT WHERE THE SOFFIT J-CHANNEL ABUTS THE VERTICAL MASONRY WALL SURFACE. TOOL FINISH THE CAULKING SEALANT TO ACHIEVE A UNIFORM APPEARANCE AND WATERTIGHT CONDITION.
- REMOVE ALL PROTECTIVE FILM FROM METAL WALL PANELS AND CLEAN SURFACES TO REMOVE ANY EXCESS CAULKING SEALANT(S), DIRT, OILS, ETC.. CONTRACTOR MUST USE THE MATERIAL MANUFACTURER'S TOUCH-UP PAINT TO REPAIR ANY SCRATCHES IN THE METAL PANELS.

NORTH PALOS FIRE PROTECTION DISTRICT
FIRE STATION 1 - ROOF REPLACEMENT PROJECT
10629 SOUTH ROBERTS ROAD
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DRAWN BY: PJM
SCALE: NO SCALE
REVISION NO.
SHEET NO.

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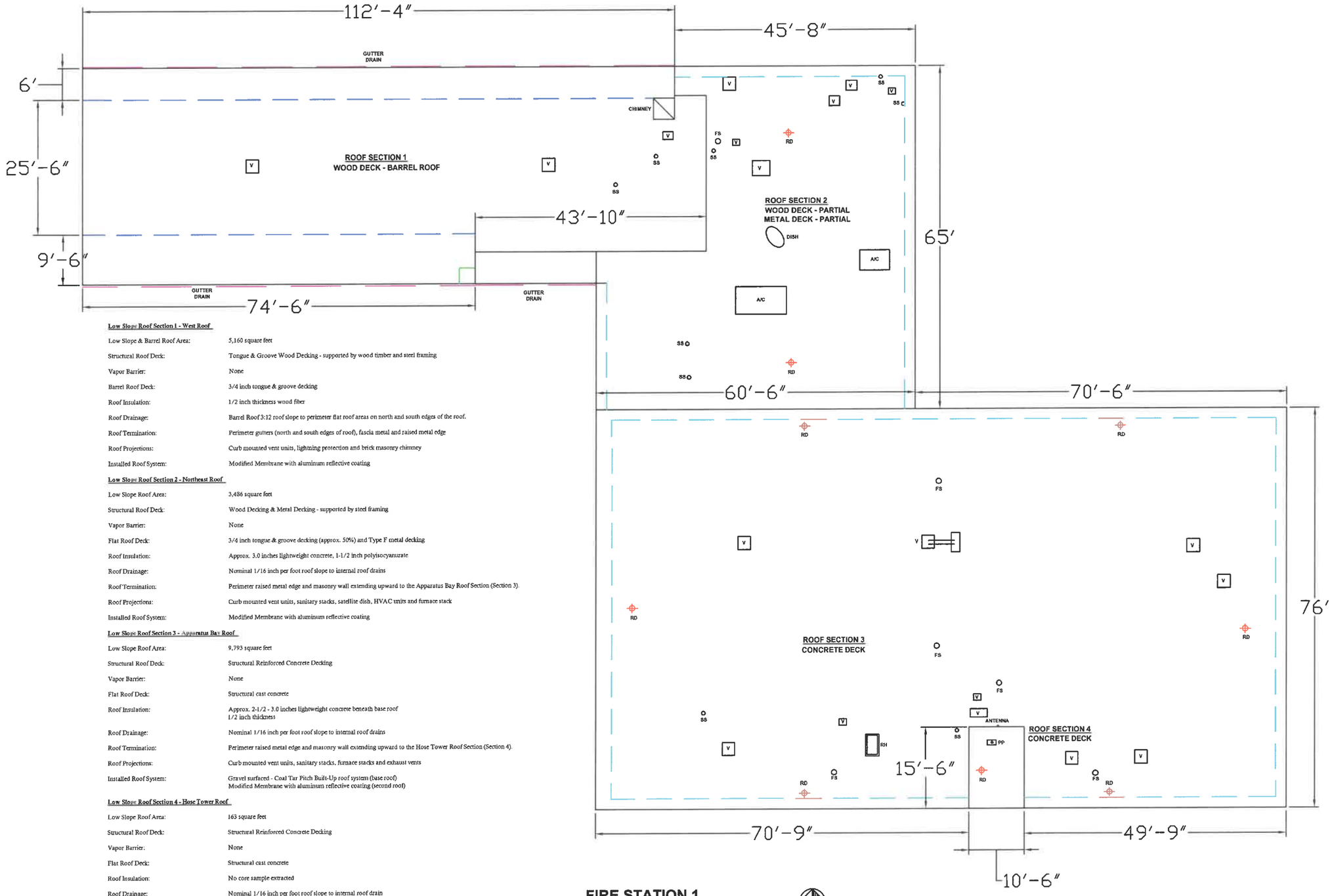
NORTH PALOS FIRE PROTECTION DISTRICT
FIRE STATION 1 - ROOF REPLACEMENT PROJECT



Low Slope Roof Section 1 - West Roof

Low Slope & Barrel Roof Area:	5,160 square feet
Structural Roof Deck:	Tongue & Groove Wood Decking - supported by wood timber and steel framing
Vapor Barrier:	None
Barrel Roof Deck:	3/4 inch tongue & groove decking
Roof Insulation:	1/2 inch thickness wood fiber
Roof Drainage:	Barrel Roof 3:12 roof slope to perimeter flat roof areas on north and south edges of the roof.
Roof Termination:	Perimeter gutters (north and south edges of roof), fascia metal and raised metal edge
Roof Projections:	Curb mounted vent units, lightning protection and brick masonry chimney
Installed Roof System:	Modified Membrane with aluminum reflective coating

Low Slope Roof Section 2 - Northeast Roof

Low Slope Roof Area:	3,486 square feet
Structural Roof Deck:	Wood Decking & Metal Decking - supported by steel framing
Vapor Barrier:	None
Flat Roof Deck:	3/4 inch tongue & groove decking (approx. 50%) and Type F metal decking
Roof Insulation:	Approx. 3.0 inches lightweight concrete, 1-1/2 inch polyisocyanurate
Roof Drainage:	Nominal 1/16 inch per foot roof slope to internal roof drains
Roof Termination:	Perimeter raised metal edge and masonry wall extending upward to the Apparatus Bay Roof Section (Section 3).
Roof Projections:	Curb mounted vent units, sanitary stacks, satellite dish, HVAC units and furnace stack
Installed Roof System:	Modified Membrane with aluminum reflective coating

Low Slope Roof Section 3 - Apparatus Bay Roof

Low Slope Roof Area:	9,793 square feet
Structural Roof Deck:	Structural Reinforced Concrete Decking
Vapor Barrier:	None
Flat Roof Deck:	Structural cast concrete
Roof Insulation:	Approx. 2-1/2 - 3.0 inches lightweight concrete beneath base roof 1/2 inch thickness
Roof Drainage:	Nominal 1/16 inch per foot roof slope to internal roof drains
Roof Termination:	Perimeter raised metal edge and masonry wall extending upward to the Hose Tower Roof Section (Section 4).
Roof Projections:	Curb mounted vent units, sanitary stacks, furnace stacks and exhaust vents
Installed Roof System:	Gravel surfaced - Coal Tar Pitch Built-Up roof system (base roof) Modified Membrane with aluminum reflective coating (second roof)

Low Slope Roof Section 4 - Hose Tower Roof

Low Slope Roof Area:	163 square feet
Structural Roof Deck:	Structural Reinforced Concrete Decking
Vapor Barrier:	None
Flat Roof Deck:	Structural cast concrete
Roof Insulation:	No core sample extracted
Roof Drainage:	Nominal 1/16 inch per foot roof slope to internal roof drain
Roof Termination:	Perimeter raised metal edge.
Roof Projections:	Antenna / multi-port penetration
Installed Roof System:	Exposed Roof - Modified Membrane with aluminum reflective coating

FIRE STATION 1
SCALE: NO SCALE - CONTRACTOR TO FIELD VERIFY

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NORTH PALOS FIRE PROTECTION DISTRICT
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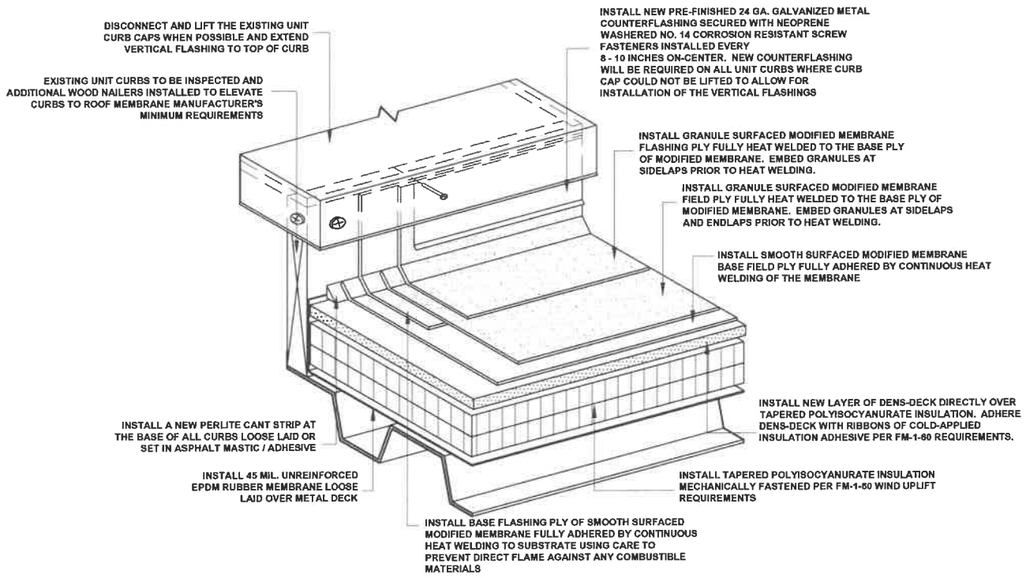
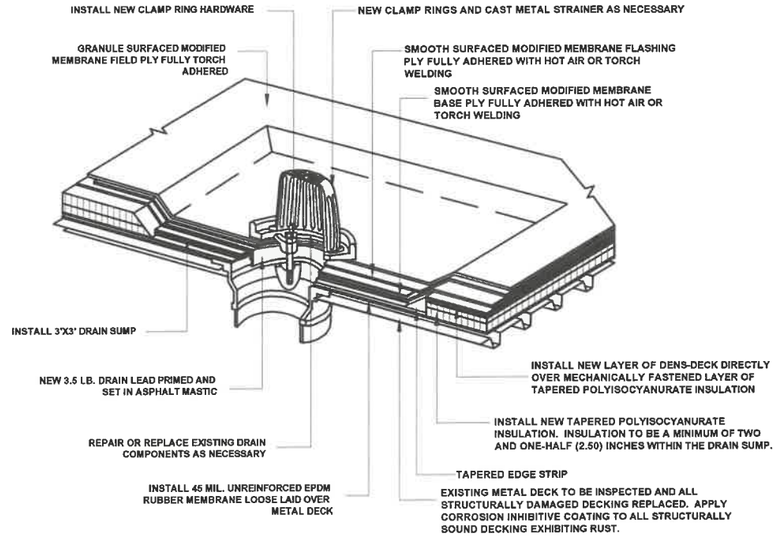
FIRE STATION 1 - ROOF REPLACEMENT PROJECT

METAL DECK DETAILS

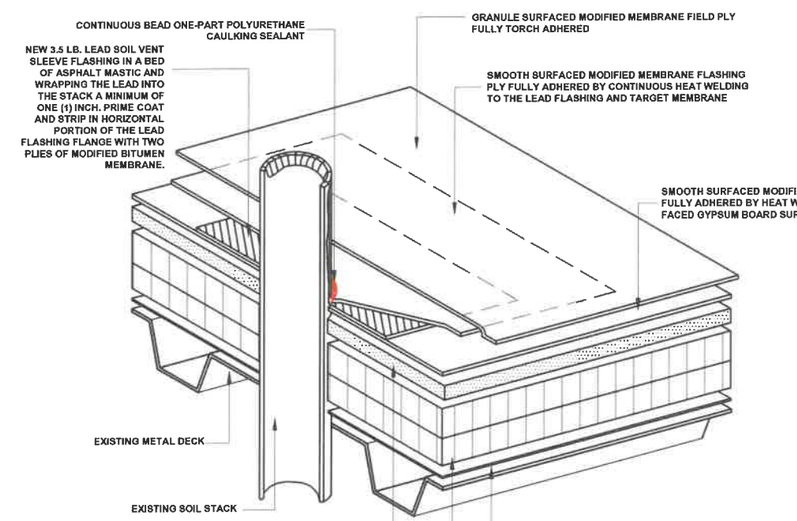
VENT / EQUIPMENT CURB FLASHING DETAIL



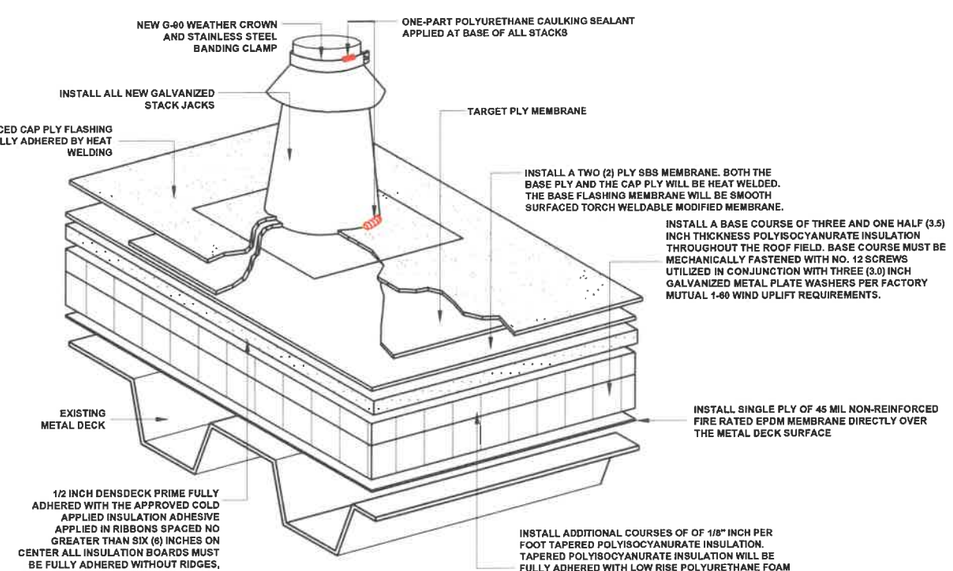
INTERNAL DRAIN DETAIL



SOIL STACK DETAIL



FURNACE STACK DETAIL



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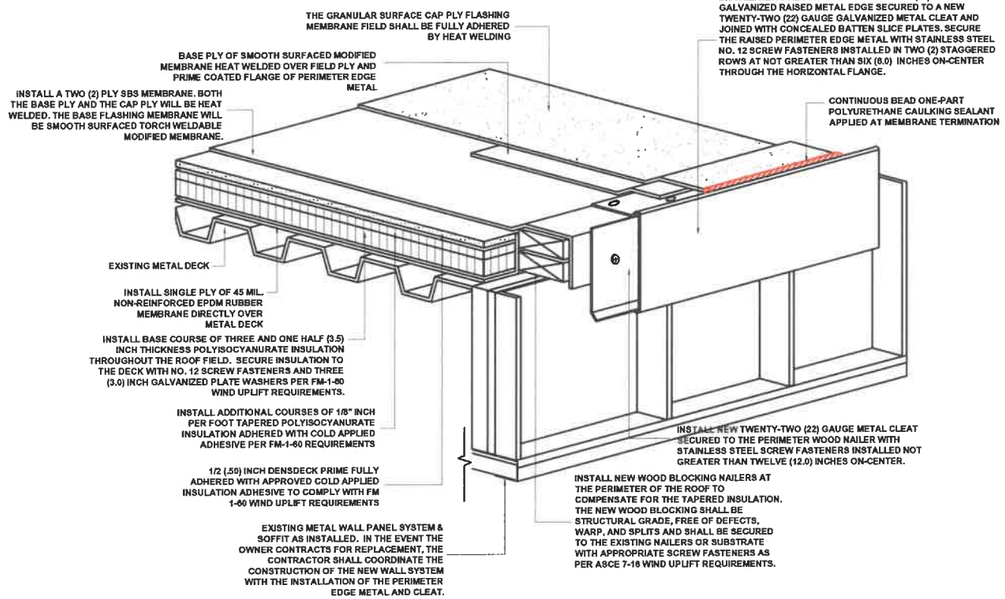
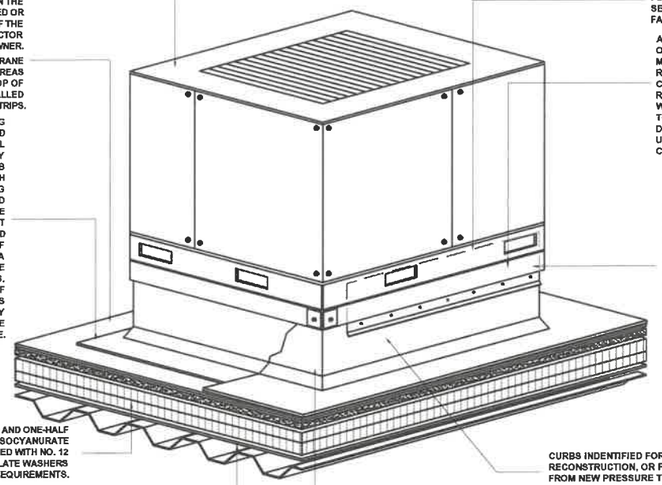
FIRE STATION 1 - ROOF REPLACEMENT PROJECT

METAL DECK DETAILS

GRAVEL STOP FLASHING DETAIL



HVAC CURB DETAIL



CONTRACTOR TO COORDINATE THE REMOVAL OF THE EXISTING METAL WALL PANEL SYSTEM AND METAL EDGE SYSTEM DURING THE ROOF REPLACEMENT PROJECT. IN THE EVENT THE OWNER ELECTS TO RETAIN THE EXISTING SYSTEM, THE CONTRACTOR MUST *ONLY REMOVE* THE METAL EDGE GRAVALE STOP SYSTEM. A NEW METAL CLEAT AND METAL EDGE GRAVEL STOP WILL BE INSTALLED IN ALL AREAS AS SPECIFIED.

INSTALL NEW PRE-FINISHED TWENTY-FOUR (24) GAUGE GALVINIZED RAISED METAL EDGE GRAVEL STOP AND NEW TWENTY-TWO (22) GAUGE GALVANIZED METAL CLEAT SECURED OVER THE NEW *OR EXISTING* METAL WALL PANEL SYSTEM EXTENDING THE METAL EDGE NOT LESS THAN TWO (2.0) INCHES BELOW THE TOP OF THE METAL WALL PANEL.

INSTALL NEW PRESSURE TREATED WOOD BLOCK NAILERS AT ROOF PERIMETER EDGES TO COMPENSATE THE NEW INSULATION THICKNESS AND TAPER. SECURE WOOD BLOCKING WITH SCREW FASTENERS PER ASCE 7-16 WIND UPLIFT REQUIREMENTS AS SPECIFIED. WRAP VAPOR BARRIER MEMBRANE OVER ALL DECK SURFACES *PRIOR TO THE INSTALLATION OF WOOD BLOCKING* OR AFTER BLOCKING IS INSTALLED TO COMPLETELY ENCAPSULATE THE BLOCKING AND PERIMETER EDGE OF THE DECK.

TIE-IN BETWEEN THE METAL EDGE AND INSTALLED WALL PANEL SYSTEM SHALL INCLUDE WRAPPING THE ENTIRE AREA, PRIOR TO INSULATION INSTALLATION, WITH A SINGLE PLY OF SELF-ADHERED WATERPROOFING MEMBRANE. AFTER COMPLETING THE INSTALLATION OF THE NEW INSULATION, A SINGLE PLY OF SELF-ADHERED WATERPROOFING MEMBRANE MUST BE INSTALLED. NEW REINFORCED LIQUID RESIN FLASHINGS WILL BE REQUIRED IN THESE AREAS TO FULLY INTEGRATE AND ENCAPSULATE THE METAL AND SURROUNDING ROOF MEMBRANE.

IN THIS AREA THE METAL WALL PANELS SHALL BE COMPLETELY REMOVED AND DISCARDED (REGARDLESS OF OWNER'S ACCEPTANCE OF ALTERNATE 1 - PANEL REPLACEMENT). THE VERTICAL WALL WILL BE INSPECTED AND UNDERLYING PLYWOOD OR INSTALLED SHEATHING EXAMINED AND REPAIRED / REPLACED. INSTALL A SINGLE PLY OF SELF-ADHERED WATERPROOFING MEMBRANE PRIOR TO THE INSTALLATIOPN OF NEW 3/4 INCH EXTERIOR GRADE PLYWOOD SHEATHING. INSTALL A BASE PLY OF SELF-ADHERED SMOOTH SURFACE MODIFIED MEMBRANE AND FINAL PLY OF HEAT WELDED OR SELF-ADHERED GRANULE SURFACED MODIFIED MEMBRANE. INSTALL A VERTICAL MOUNTED METAL COMPRESSION BAR AND PRE-FINISHED METAL COUNTERFLASHING TO TERMINATE THE MEMBRANE AT THE OUTSIDE CORNER TRANSITION TO THE METAL WALL PANEL SYSTEM.

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SCALE: NO SCALE

REVISION NO.

SHEET NO.

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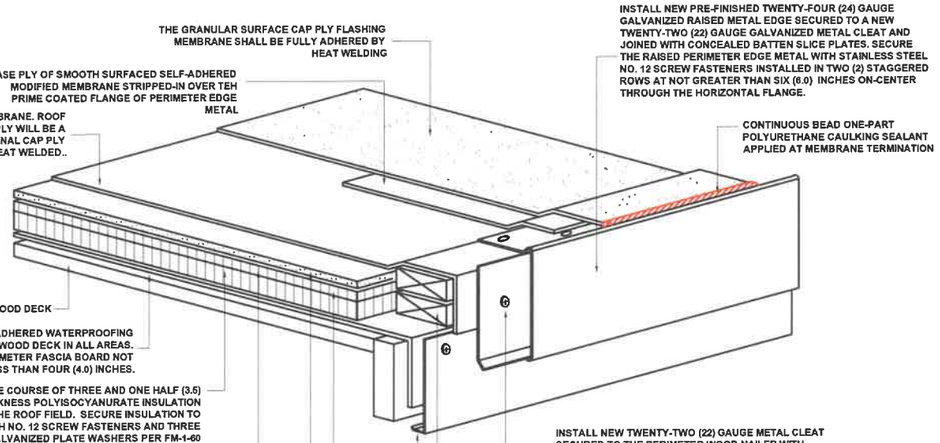
NORTH PALOS FIRE PROTECTION DISTRICT

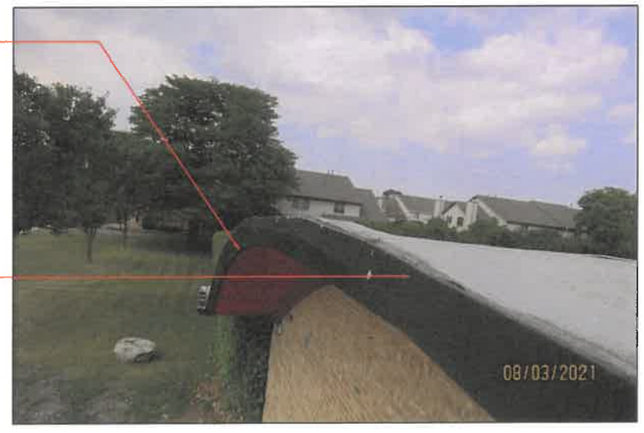
FIRE STATION 1 - ROOF REPLACEMENT PROJECT
WOOD DECK DETAILS

GRAVEL STOP FLASHING DETAIL

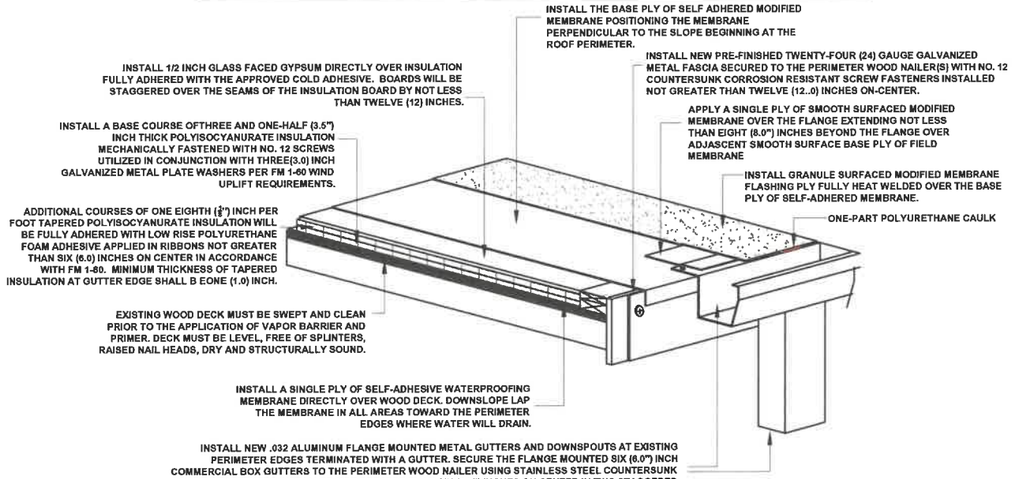


CONTRACTOR TO INSTALL NEW PRE-FINISHED TWENTY-FOUR GAUGE METAL FASCIA TO WRAP / ENCAPSULATE THE WOOD FASCIA BEHIND AT THE END OF THE BARREL ROOF WHERE PERIMETER EDGE METAL IS TO BE INSTALLED. FASCIA MUST *INTEGRATE WITH THE NEW FLUSH MOUNTED SOFFIT PANELS (ALTERNATE 1)*. SECURE FASCIA WITH COUNTERSUNK STAINLESS STEEL NO. 12 SCREW FASTENERS INSTALLED NOT GREATER THAN TWELVE (12.0) INCHES ON-CENTER. LAP SECTIONS OF FASCIA TWO (2.0) INCHES AND COMPRESS A CONTINUOUS BEAD OF ONE-PART POLYURETHANE AT EACH LAP CONDITION.

CONTRACTOR TO INSTALL NEW TWENTY-FOUR (24) PRE-FINISHED RAISED EDGE METAL SECURED TO A CONTINUOUS TWENTY-TWO (22) GAUGE GALVANIZED METAL CLEAT. SECURE THE METAL CLEAT WITH COUNTERSUNK STAINLESS STEEL SCREW FASTENERS INSTALLED AT NOT GREATER THAN TWELVE (12.0) INCHES ON-CENTER SPACING. SECURE THE NEW RAISED METAL EDGE TO THE CLEAT AND ANCHOR THE FLANGE OF THE METAL EDGE AT NOT GREATER THAN SIX (6.0) INCHES ON-CENTER USING SCREWS OR THE SPECIFIED HOT DIPPED GALVANIZED RING SHANK NAILS. STRIP-IN THE GRAVEL STOP FLANGE WITH THE SELF-ADHERED BASE PLY OF MODIFIED MEMBRANE AND FINAL PLY OF HEAT WELDED GRANULE SURFACED MODIFIED MEMBRANE. APPLY CAULKING AT THE TERMINATION OF THE MEMBRANE AT THE RAISED METAL EDGE OF THE GRAVEL STOP FLANGE.



GUTTER EDGE FLASHING DETAIL-WOOD DECK



CONTRACTOR TO INSTALL NEW PRE-FINISHED ALUMINUM COMMERCIAL FLANGE MOUNTED SIX (6.0) INCH GUTTER AND DOWNSPOUTS TO REPLACE EXISTING GUTTERS AND DOWNSPOUTS IN ALL AREAS. SECURE THE GUTTER FLANGE TO THE PERIMETER WOOD NAILERS WITH COUNTERSUNK STAINLESS STEEL SCREW FASTENERS INSTALLED IN TWO (2) STAGGERED ROWS AT NOT GREATER THAN SIX (6.0) INCHES ON-CENTER SPACING. STRIP-IN THE GUTTER FLANGE WITH THE SELF-ADHERED BASE PLY OF MODIFIED MEMBRANE AND FINAL PLY OF HEAT WELDED GRANULE SURFACED MODIFIED MEMBRANE. APPLY CAULKING AT THE TERMINATION OF THE MEMBRANE ON THE GUTTER FLANGE.

CONTRACTOR TO INSTALL NEW PRE-FINISHED TWENTY-FOUR GAUGE METAL FASCIA TO WRAP / ENCAPSULATE THE WOOD FASCIA BEHIND THE GUTTER. FASCIA MUST *INTEGRATE WITH THE NEW FLUSH MOUNTED SOFFIT PANELS (ALTERNATE 1)*. SECURE FASCIA WITH COUNTERSUNK STAINLESS STEEL NO. 12 SCREW FASTENERS INSTALLED NOT GREATER THAN TWELVE (12.0) INCHES ON-CENTER. LAP SECTIONS OF FASCIA TWO (2.0) INCHES AND COMPRESS A CONTINUOUS BEAD OF ONE-PART POLYURETHANE AT EACH LAP CONDITION.

NORTH PALOS FIRE PROTECTION DISTRICT
FIRE STATION 1 - ROOF REPLACEMENT PROJECT
10629 SOUTH ROBERTS ROAD
PALOS HILLS, ILLINOIS 60465

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163 FESSLER DRIVE
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BUILDING SOLUTIONS/DELIVERING RESULTS

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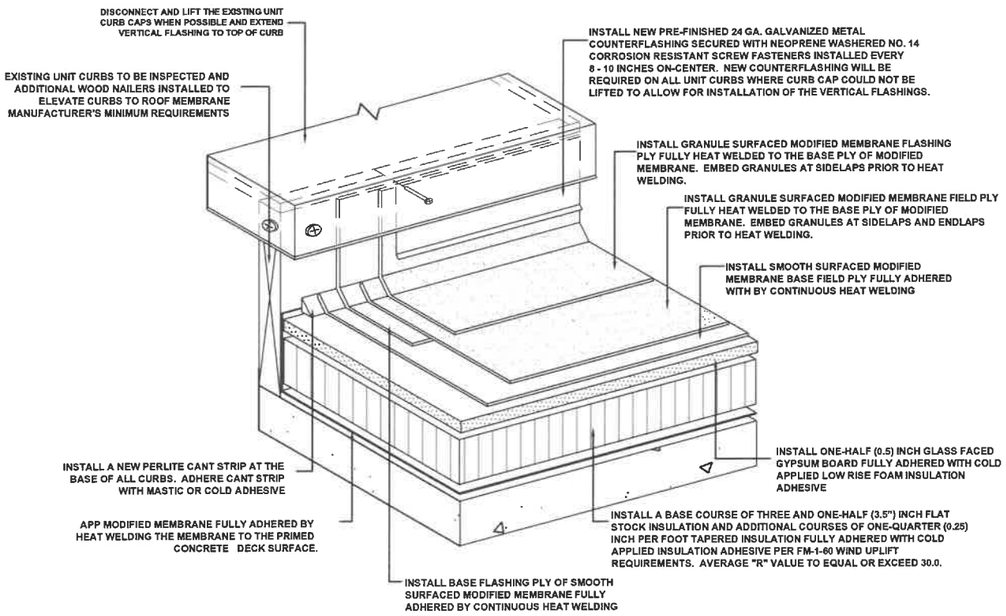
SHEET NO.
A-4

NORTH PALOS FIRE PROTECTION DISTRICT

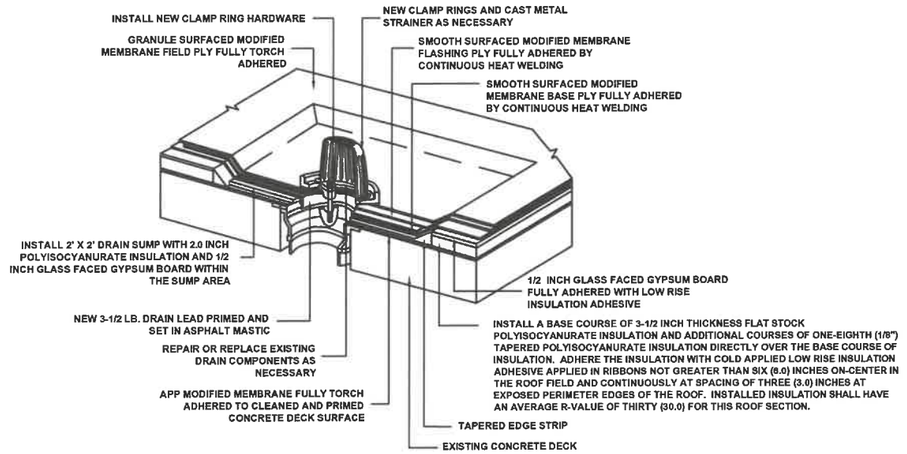
FIRE STATION 1 - ROOF REPLACEMENT PROJECT

CONCRETE DECK DETAILS

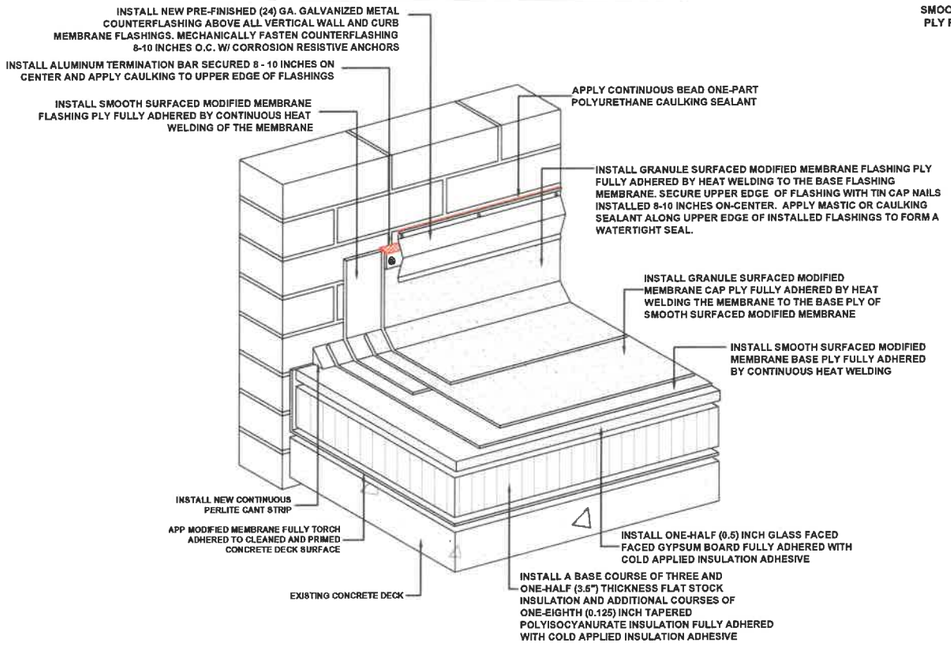
VENT / EQUIPMENT CURB FLASHING DETAIL



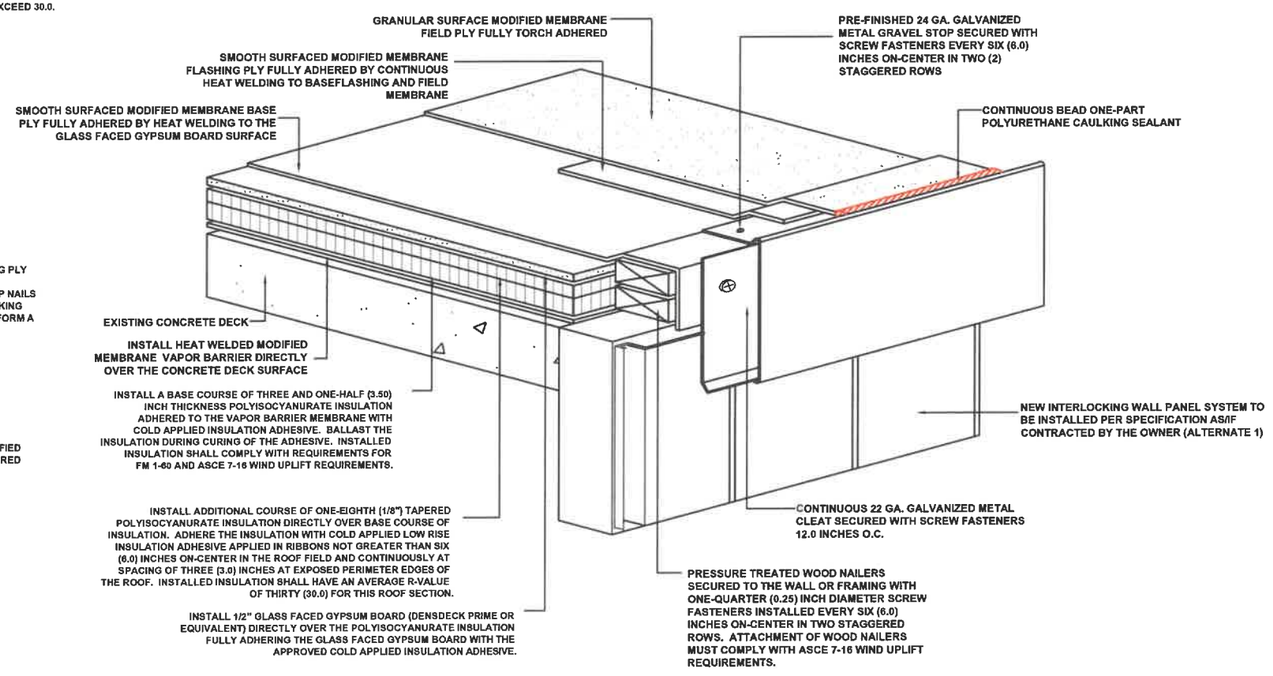
INTERNAL DRAIN DETAIL



FLASHING DETAIL AT MASONRY WALL



GRAVEL STOP / PERIMETER EDGE FLASHING DETAIL



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SHEET NO.
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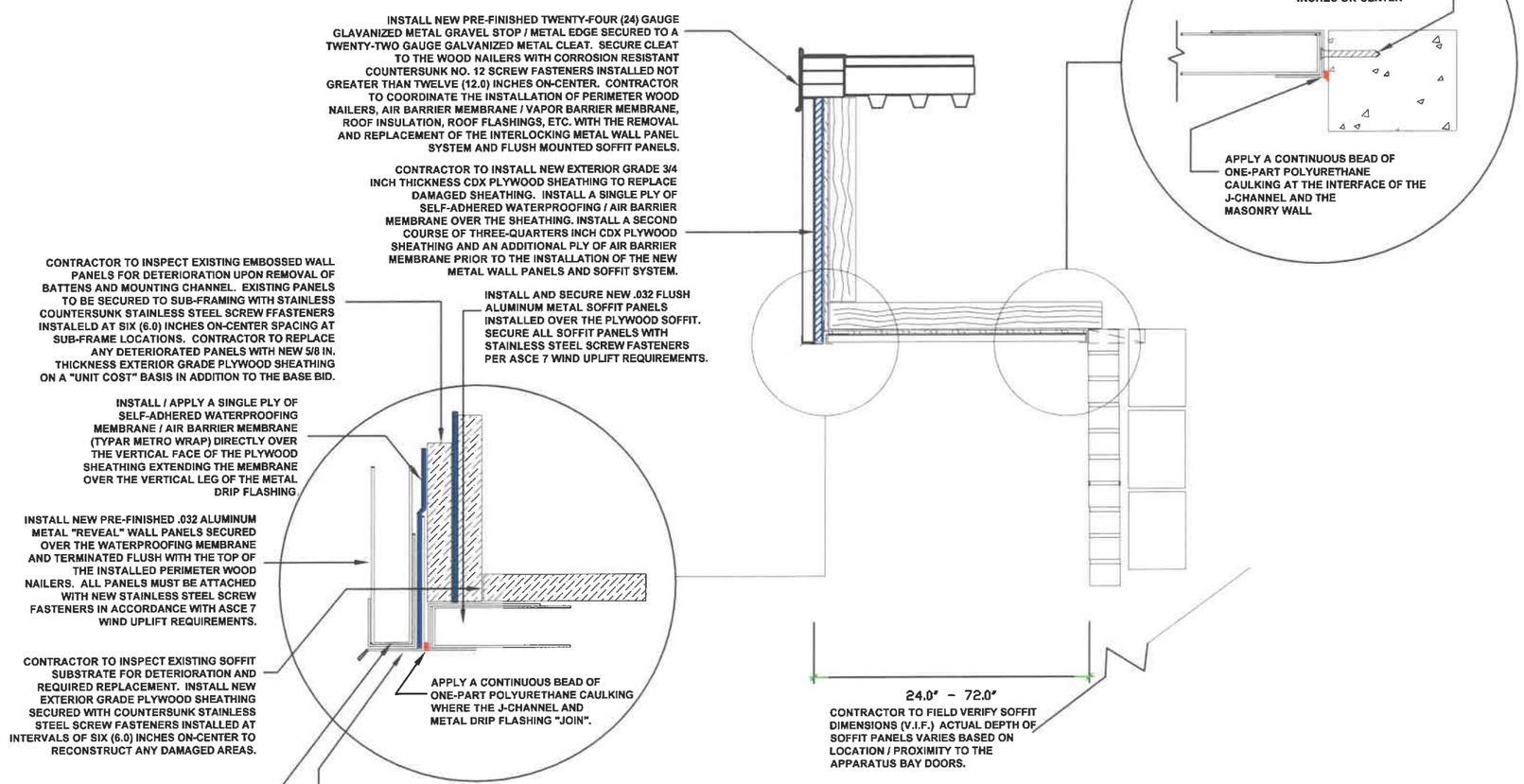
NORTH PALOS FIRE PROTECTION DISTRICT

FIRE STATION 1 - ROOF REPLACEMENT PROJECT
METAL WALL PANEL AND SOFFIT DETAILS



INSTALL NEW PRE-FINISHED TWENTY-FOUR (24) GAUGE GALVINIZED RAISED METAL EDGE GRAVEL STOP AND NEW TWENTY-TWO (22) GAUGE GALVANIZED METAL CLEAT SECURED OVER THE NEW *OR EXISTING* METAL WALL PANEL SYSTEM EXTENDING THE METAL EDGE NOT LESS THAN TWO (2.0) INCHES BELOW THE TOP OF THE METAL WALL PANEL.

CONTRACTOR TO COORDINATE THE REMOVAL OF THE EXISTING METAL WALL PANEL SYSTEM AND METAL EDGE SYSTEM DURING THE ROOF REPLACEMENT PROJECT. IN THE EVENT THE OWNER ELECTS TO RETAIN THE EXISTING SYSTEM, THE CONTRACTOR MUST *ONLY REMOVE* THE METAL EDGE GRAVALE STOP SYSTEM. A NEW METAL CLEAT AND METAL EDGE GRAVEL STOP WILL BE INSTALLED IN ALL AREAS AS SPECIFIED.

ALTERNATIVE 1: AS CONTRACTED WITH THE OWNER, THE CONTRACTOR SHALL REMOVE / DEMOLISH THE EXISTING METAL WALL PANEL SYSTEM AND METAL SOFFIT SYSTEM IN CONJUNCTION WITH THE ROOF REPLACEMENT PROJECT. THE EXPOSED UNDERLYING SHEATHING, FRAMING, ETC. WILL BE EXAMINED FOR DETERIORATION AND ANY NECESSARY RECONSTRUCTION OR REPLACEMENT ITEMIZED BY THE CONTRACTOR AND SUBMITTED ON A "UNIT COST" BASIS TO BE BILLED "IN ADDITION" TO THE BASE CONTRACT FOR THIS PORTION OF THE PROJECT. THE BASE BID SHALL INCLUDE THE APPLICATION / INSTALLATION OF A SINGLE PLY OF SELF-ADHERED WATERPROOFING MEMBRANE OVER THE EXISTING VERTICAL FACE OF THE SHEATHING, INSTALLATION OF A SINGLE LAYER OF THREE-QUARTERS (0.75) INCH THICKNESS EXTERIOR GRADE PLYWOOD SHEATHING SECURED OVER THE WATERPROOFING MEMBRANE AND ANCHORED TO THE SUB-FRAMING, INSTALLATION OF A SINGLE PLY OF AIR BARRIER MEMBRANE (TYPAR METROWRAP) AND INSTALLATION OF THE NEW METAL WALL PANEL SYSTEM, DRIP CLOSURE, METAL J-CHANNEL AND NEW FLUSH MOUNTED METAL SOFFIT PANELS.

BASE BID - ALTERNATE 1: THE CONTRACTOR SHALL BE REQUIRED TO REMOVE EXISTING SIGNAGE AND DIS-ASSEMBLE THE EXISTING VERTICAL METAL WALL PANEL SYSTEM AND SOFFIT SYSTEM TO EXPOSE THE UNDERLYING SHEATHING (CONTRACTOR TO VERIFY) AND SUB-FRAMING. INSTALL SPECIFIED WATERPROOFING MEMBRANE, 3/4 IN. EXTERIOR GRADE PLYWOOD SHEATHING, AIR BARRIER AND NEW METAL WALL PANEL & SOFFIT SYSTEM.

NEW FLUSH MOUNTED INTERLOCKING ALUMINUM METAL SOFFIT PANELS WILL BE INSTALLED AND SECURED TO THE UNDERSIDE OF THE SOFFIT. NEW J-CHANNELS SHALL BE SECURED TO THE MASONRY WALL WITH THE SPECIFIED TAPCON MASONRY SCREW ANCHORS. SOFFIT PANELS MUST BE SECURED TO THE PLYWOOD SOFFIT SYSTEM OR FRAMING IN ACCORDANCE WITH THE MATERIAL MANUFACTURER'S PUBLISHED INSTALLATION CRITERIA TO ACHIEVE WIND UPLIFT RESISTANCE IN ACCORDANCE WITH ASCE 7-16 REQUIREMENTS.
NEW PRE-FINISHED "FLUSH REVEAL WALL PANELS SHALL BE INSTALLED TO REPLACE ALL EXISTING "RED" WALL PANELS. NEW FLUSH MOUNTED INTERLOCKING ALUMINUM METALSOFFIT PANELS WILL BE INSTALLED TO REPLACE ALL "RED" SOFFIT PANELS, J-CHANNELS, METAL DRIP, ETC.. CONTRACTOR TO COORDINATE THE REMOVAL AND REPLACEMENT OF THE WALL AND SOFFIT SYSTEM WITH THE REMOVAL AND REPLACEMENT OF THE ROOF SYSTEM AND INSTALLATION OF NEW PERIMETER EDGE SHEET METAL AND GUTTERS.

NORTH PALOS FIRE PROTECTION DISTRICT
FIRE STATION 1 - ROOF REPLACEMENT PROJECT
10629 SOUTH ROBERTS ROAD
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THE STANDARD IN BUILDING RESTORATION

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REVISION NO.
SHEET NO.
A-6

STRUCTURAL
TECHNOLOGIES
INCORPORATED

SECTION 7

MANUFACTURER LITERATURE

Firestone
BUILDING PRODUCTS COMPANY

HD Seam Plate

Firestone Item Number:
HD Seam Plate: W56TPOPL03

DESCRIPTION:
Firestone HD Seam Plates are specifically designed to be used for the attachment of Firestone UltraPly™ TPO membranes to approved substrates. Firestone HD Seam Plates are to be used with Firestone HD or All-Purpose Fasteners into 22-gauge steel, wood or structural concrete decks (HD's only). The plates are packaged in a clear plastic sleeve for easy handling. The sleeve has an easy-open pull-tab with serrations that runs the length of the sleeve.

METHODS OF APPLICATION:

With A Screw Gun:
1. HD Seam Plates may be installed with a conventional screw gun. Plates are positioned within the seam area with "Firestone" logo up and the Eyehooks™ against the membrane. The stacked plates allow for the installer to carry 56 plates at one time which are all oriented in the same direction to make it easier to layout. Once placed in the correct seam location, the plate is attached with All Purpose or HD Fasteners and a screw gun.

With the AccuSeam™ Tool:
1. Remove the weight from the plate magazine by lifting out. Remove one tube of stacked plates from the pail and tear off the perforated edge. This will expose the stack of plates all oriented in the same direction. Remove and slide the plates into the magazine with the Firestone logo facing up (Eyehooks down). Replace the weight and you are ready to start.
2. Drop a fastener into the feed tube, turn the screw gun on, and push the tool all the way down until the fastener is properly seated in the plate.
3. Pull the screw gun back up, move the tool to the next position, drop in your fastener, and repeat step 2.

PRODUCT DATA

NOTE: AccuSeam Tools can be purchased from ITW Buildex. The AccuSeam "boot" attachment can be purchased by owners of AccuTrac® III tools upon request (must have tools with serial numbers of 12134 or higher). Training on the AccuTrac Tools is recommended prior to use.

PHYSICAL PROPERTIES:

Material:	Galvalume® - Sheet Steel AZ50 or AZ55
Material Thickness:	0.037" (.94 mm)
Hole Diameter:	0.265" ± 0.003" (6.73 mm ± 0.076 mm)
Pull Through Resistance:	700 lb (317.5 kg) from center hole
Corrosion Resistance:	Meets FM Requirement – Less than 15% red rust in 15 cycles of Kesternich Testing (DIN 50018)

PRODUCT DATA:
1. Plates are labeled: "Firestone."
2. Plates are circular shaped, 2-3/8" (60.3 mm) maximum diameter.
3. Plates have four (4) inner and four (4) outer Eyehook™ extensions for additional holding power.

PACKAGING:
Plates are packaged 18 sleeves /plastic pail (1,000 pieces). There are 40 pails/pallet.

Note: Galvalume® is a registered trademark of BIEC International Inc. Eyehook™, AccuSeam™ and AccuTrac® III are trademarks of ITW Buildex.

LEED INFORMATION:

Post Consumer Recycled Content:	0%
Post Industrial Recycled Content:	21%
Manufacturing Location:	West Chicago, IL

Subject to the conditions of Approval when installed as described in the current edition of the FM Approval Guide

Firestone Building Products Company
A Division of BFS Diversified Products, LLC
310 E. 96th Street, Indianapolis, IN 46240
Sales: (800) 428-4442 • Technical (800) 428-4511
www.firestonebpco.com

OMG

Standard RoofGrip® Drill Point Fastener

PRODUCT DATA SPECIFICATIONS

PRODUCT DESCRIPTION

The OMG Standard RoofGrip Drill Point Fastener (#12) is designed to secure insulation to steel (18 Ga.–24 Ga. [1.25–0.65 mm]) and wood. It is available in lengths from 1⅝-in. to 8-in. (40 to 200 mm). The OMG Standard RoofGrip Drill Point Fastener is Factory Mutual and Miami-Dade County approved.

FEATURES & BENEFITS

- Heavier shank and thread diameters than most "standard" roofing fasteners.
- Deep buttress thread for high pullout resistance.
- Extra sharp drill point for quick installation in new or reroof applications.
- Available with #3 Phillips truss head.

COATING

OMG CR-10 corrosion resistant coating passes the corrosion requirements of FM Approval Standard 4470 and EAD030351-00-0402.

APPLICATION

For steel decks, ¾-in. (20 mm) penetration is the minimum allowable. Factory Mutual requires that fasteners penetrate the top flute.

For OSB and plywood*, ¾-in. (20 mm) penetration through the underside of the board is the minimum allowable. For wood deck (wood beams, wood plank, tongue & groove), 1-in. (25 mm) penetration is the minimum allowable.

Using a screw gun, drive the fastener until a slight depression is seen in the insulation and the plate. On rigid cover boards, care must be taken not to strip the deck.

The strength of different roof decks can vary widely and can be adversely affected by moisture and other conditions. Therefore, it is recommended that a fastener pull test be conducted to help evaluate deck condition and fastener suitability. Call OMG to schedule testing.

Note: Care must be taken not to overdrive the fastener. Fastener must be tight enough so that the plate doesn't turn. For best results, use a variable speed 0–2500 RPM screw gun.

To speed installation, this fastener can be used with the AccuTrac® System and is also available pre-assembled.

PLATES & ACCESSORIES

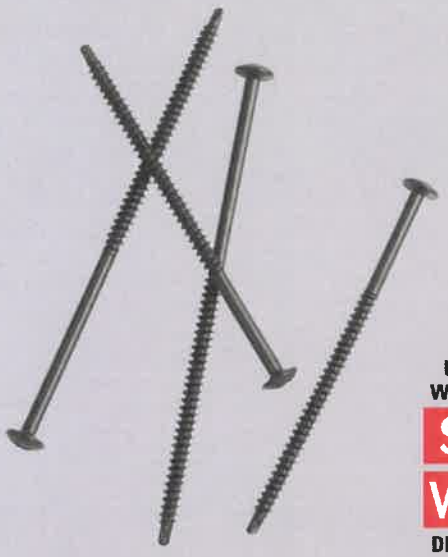
Use appropriate steel or plastic plates, depending upon the application.

APPROVALS

FM APPROVED

MIAMI-DADE COUNTY APPROVED

Factory Mutual listings refer to this product as #12 RoofGrip, #12 Standard RoofGrip, and OMG #12 Standard.



USE WITH

S

W

DECK TYPES

PHYSICAL DATA†

The data below is constant for each OMG Standard RoofGrip Drill Point Fastener.

HEAD	THREAD
#3 Phillips Truss Head**	.220" (5.58 mm) Diameter
	SHANK
.435" (11.04 mm) Diameter	.160" (4.06 mm) Diameter
	COATING
	CR-10

**#3 Phillips bit included in each carton.

ORDERING INFORMATION

CAT. NO.	LENGTH IN (MM)	THREAD IN (MM)	PKG QTY	WEIGHT LBS (KG)
RGDP158B	1⅝ (40)	Full	1000	12 (5.45)
RGDP214B	2¼ (55)	Full	1000	16 (7.26)
RGDP003B	3 (75)	Full	1000	24 (10.89)
RGDP004B	4 (100)	3 (75)	1000	28 (12.71)
RGDP005B	5 (125)	3 (75)	1000	35 (15.89)
RGDP006B	6 (150)	4 (100)	1000	40 (18.16)
RGDP007B	7 (175)	4 (100)	1000	48 (21.79)
RGDP008B	8 (200)	4 (100)	1000	50 (22.70)

†All sizes are nominal.

KEY:

- S Steel
- W Wood
- G Gypsum
- P Purlins
- SC Structural Concrete
- LC Lightweight Concrete
- LWIC Lightweight Insulating Concrete
- CWF Cementitious Wood Fiber

Standard RoofGrip® Drill Point Fastener

PRODUCT DATA SPECIFICATIONS

SPECIFICATION

The fastener will be an OMG Standard RoofGrip Drill Point Fastener (#12) with a thread diameter of .220-in. (5.58 mm). The fastener must have 12.5 buttress threads per inch. Also, the fastener must be heat-treated per specification OMG-1. The OMG Standard RoofGrip Drill Point Fastener will be used with a Factory Mutual approved, OMG pressure plate or pressure bar. The fastener must be Factory Mutual approved.

COATING REQUIREMENT

The fastener will be coated with the OMG CR-10 corrosion resistant coating which passes the corrosion requirements of FM Approval Standard 4470 and EAD030351-00-0402.

APPLICATION

The OMG Standard RoofGrip Drill Point Fastener must penetrate steel decks a minimum of ¾-in. (20 mm). Factory Mutual requires that fasteners penetrate the top flute.

For OSB and plywood*, ¾-in. (20 mm) penetration through the underside of the board is the minimum allowable. For wood deck (wood beams, wood plank, tongue & groove), 1-in. (25 mm) penetration is the minimum allowable.

Using a screw gun, drive the fastener until a slight depression is seen in the insulation and the plate. On rigid cover boards, care must be taken not to strip the deck.

The strength of different roof decks can vary widely and can be adversely affected by moisture and other conditions. Therefore, it is recommended that a fastener pull test be conducted to help evaluate deck condition and fastener suitability. Call OMG to schedule testing.

Note: Care must be taken not to overdrive the fastener. Fastener must be tight enough so that the plate doesn't turn. For best results, use a variable speed 0–2500 RPM screw gun.

*FM does not approve OSB or plywood deck types.

STANDARD ROOFGRIP DRILL POINT FASTENER LENGTH SELECTION PROCEDURE

1. If applicable, determine the thickness of the existing roofing material.
2. Add thickness of new insulation.
3. **For steel:** Add ¾ to 1-in. (20 to 25 mm) fastener penetration depending on deck type (see Application Section for details).
4. If odd size requirement, always size up in length, not down. See example:

	Example:	Your Project:
Existing Roofing	1¾" (45 mm)	
Cover Board	½" (13 mm)	
Min. Penetration	¾" (20 mm)	¾" (20 mm)
Total Fastening	3" (75 mm)	
Correct Length	3" (75 mm)	

The proper #12 Standard RoofGrip Drill Point Fastener for this steel deck example is 3 in. (75 mm)

OMG
ROOFING PRODUCTS
153 BOWLES ROAD, AGAWAM, MA 01001 USA
800·633·3800 413·789·0252 OMGROOFING.COM

Superior productivity.
Superior performance.

FA1015 Rev. 04122021

Self-Drilling Screws Cont.

ITW Buildex TEKS® Pancake Head Clip Screws For Metal Roofs Cont.

Applications:
Low profile architectural metal roof clips to steel purlin.
Low profile architectural metal roof clips to wood supports.

Diameter - #10 Thread Size - 12		
		Phillips
Length	Point	Part No.
1"	Type A	0123040

Diameter - #10 Thread Size - 16		
		Phillips
Length	Point	Part No.
1"	Teks 3	0123038

Diameter - #12 Thread Size - 11		
		Phillips, Square
Length	Point	Part No.
1"	Type A	0123041

Diameter - #12 Thread Size - 14		
		Phillips
Length	Point	Part No.
1"	Teks 3	0123039

ITW Buildex

Clip Screws for Metal Roofs

Part No.
0131191

Roofgrips

ITW Buildex

Roofing Fasteners #3 Phillips Truss Head - CR 10 Coated

Standard Roofing Fastener is designed to secure insulation and single-ply to standard steel (18 ga. - 24 ga.) and wood.

	Phillips
Length	Part No.
1-5/8"	51601
2-1/4"	51602
2-7/8"	51603
3-1/4"	51614
3-3/4"	51604
4-3/8"	51605
5"	51606
6"	51607
7"	51615
8"	51613
10"	51610
12"	51611

Deck Screws

Tapping Screw Sealers - Metal To Metal - Steel Zinc Plated & Stainless Steel

An EPDM rubber washer bonded to a steel washer compresses to form a weather tight seal as you drive these unslotted screws. Our screws, also known as tap screws, are ideal for metal-to-metal fastening. Head Dia. (across flats) .375" . Head Ht. .190" . These screws, also known as pole barn screws, are ideal for metal-to-wood fastening. Head Dia. (across flats) .250" . Head Ht. .150" .

Length is measured from under head.
Package quantity is 100.

Diameter - #14		
	Stainless Steel	Steel
Length	Part No.	Part No.
3/4"	31919	31902
1"	31920	31903
1-1/4"	-	31904
1-1/2"	31922	31905
1-3/4"	-	31906
2"	-	31907
2-1/2"	-	31908
3"	31926	31909
3-1/2"	-	31910
4"	-	31911
5"	-	31913
6"	-	31915

Diameter - #17	
	Steel
Length	Part No.
3/4"	31917
1"	31916
1-1/2"	31918

ITW Buildex

Painted Hex Wood grip Screws With Bonded Sealing Washer.

Non-walking sharp gimlet point for fast material engagement Dual sealing bonded washer prevents leaks Vulcanized bonding of washer eliminates separation of EPDM from the metal backing High Hat Hex Washer Head for driving stability.

Finish - Barn Red Diameter - #9	
Part No.	Length
11100253	1"
11100262	1-1/2"
11100271	2"
11100280	2-1/2"
11100290	3"

Finish - Bright White Diameter - #9	
Part No.	Length
11100288	3"

Finish - Brown Diameter - #9	
Part No.	Length
11100257	1"
11100266	1-1/2"
11100275	2"
11100284	2-1/2"
11100294	3"

Finish - Charcoal Gray Diameter - #9	
Part No.	Length
11100260	1"
11100269	1-1/2"
11100278	2"
11100287	2-1/2"
11100297	3"

Finish - Clay Diameter - #9	
Part No.	Length
11100256	1"
11100265	1-1/2"
11100274	2"
11100283	2-1/2"
11100293	3"

Finish - Cocoa Diameter - #9	
Part No.	Length
11100258	1"
11100267	1-1/2"
11100276	2"
11100285	2-1/2"
11100295	3"

Finish - Evergeen Diameter - #9	
Part No.	Length
11100254	1"
11100263	1-1/2"
11100272	2"
11100281	2-1/2"
11100291	3"

Finish - Light Gray Diameter - #9	
Part No.	Length
11100259	1"
11100268	1-1/2"
11100277	2"
11100286	2-1/2"
11100296	3"

Finish - Light Stone Diameter - #9	
Part No.	Length
11100255	1"
11100264	1-1/2"
11100273	2"
11100282	2-1/2"
11100292	3"

Finish - Polar White Diameter - #9	
Part No.	Length
11100252	1"
11100261	1-1/2"
11100270	2"
11100279	2-1/2"
11100289	3"

Finish - White Diameter - #9	
Part No.	Length
31932	1"
31934	1-1/2"
31936	2"
31938	2-1/2"

Finish - Zinc Diameter - #9	
Part No.	Length
31931	1"
31933	1-1/2"
31935	2"
31937	2-1/2"
31939	3"

RUST-OLEUM® HIGH PERFORMANCE

9100 SYSTEM DTM EPOXY MASTIC

DESCRIPTION AND USES

A two-component, high solids epoxy coating for use in moderate to severe environments. It is specifically designed for application directly on sound rusted steel with minimum surface preparation. It can also be used on clean steel, galvanized metal, concrete (including concrete floors), previously coated and slightly damp surfaces. It may also be used for water immersion service, using High Performance Industrial DTM Epoxy Mastic standard premix bases only with 9102402 Immersion Activator. (Note: Do not use for immersion service in potable water tanks). High Performance Industrial DTM Epoxy Mastic can be used indoors or out. While exposure to sunlight and certain interior lighting conditions causes fading and chalking of all epoxy type coatings, these changes are cosmetic in nature only and film integrity and performance will not be adversely affected.

Epoxy coatings will yellow with age. This is most noticeable with interior applications of white or light colors which are not subjected to bleaching from Sunlight. Note: 9102402 Immersion Activator and 9104402 Fast-Cure Activator produce a semi-gloss finish. Also,using the 9104402 Fast-Cure Activator may result with a slight colorshift when compared with products using the 9101402 Standard Activator.

PRODUCTS

COATINGS

1-Gallon	5-Gallon	Description
9115402	—	Aluminum
9122402	—	Marlin Blue
9125402	—	Safety Blue
9133402	—	Safety Green
9145402	—	Equipment Yellow
9165402	—	Regal Red
9168402	—	Tile Red
9171402	9171300	Dunes Tan
9179402	—	Black
9182402	9182300	Silver Gray
9186402	9186300	Navy Gray
9192402	—	White
9144402	9144300[a]	Safety Yellow

[a]Made-to-Order only. Contact Rust-Oleum Customer Service for details.

PRODUCTS (cont.)

ACTIVATOR

1-Gallon	5-Gallon	Description
9101402	9101300	Standard Activator
9102402*	9102300	Immersion Activator
9103402	9103300	Low Temp Activator
9104402*	A910008300	Fast Cure Activator

* Not for use with tint bases.

TINT BASES**

1-Gallon	5-Gallon	Description
9105405	—	Red
9106405	—	Yellow
9107405	9107375	Masstone
9108421	9108381	Deep
9109408	9109388	Light

**Tint bases use the Rust-Oleum 2020 Colorants

All standard colors, tint bases and activators are USDA acceptable under FSIS Directive 11000.4 (Rev.1), November 24,1995.

Color subject to approval of USDA Inspector. Agriculture Canada accepted: 9115, 9145, 9165, 9171, 9179, 9186, 9192 and 9101.

COMPANION PRODUCTS

RECOMMENDED PRIMERS

System is self-priming

COMPATIBLE PRIMERS

Extended Recoat Epoxy Primers (9300 System)

COMPATIBLE TOPCOATS

Industrial High Performance Acrylic Finishes (3700 & 3100 Systems)

Industrial High Gloss Urethane Finishes (9400 System)***

Industrial Low VOC Urethane Finishes (9700 System)***

Industrial DTM Urethane Mastic Finishes (9800 System)***

***Do not use over 9115402 Aluminum

PRODUCT APPLICATION

SURFACE PREPARATION

ALL SURFACES: Remove all dirt, grease, oil, salt and chemical contaminants by washing the surface with Pure Strength® Cleaner/Degreaser item #3599402 or other suitable cleaner. Rinse with fresh water and allow to dry.

STEEL: Hand tool (SSPC-SP-2) or power tool (SSPC-SP-3) clean to remove loose rust, scale, and deteriorated previous coatings to obtain a sound rusted surface. For optimum corrosion resistance, abrasive blast to commercial grade SSPC-SP-6, with a blast profile of 1-2 mils (25-50 µ).

STEEL (IMMERSION): Abrasive blast clean to a minimum SSPC-SP-10 Near White Grade (NACE 2) and achieve a surface profile of 1.5-3 mils. All weld spatter must be removed along wield seams, rough welds should be ground smooth, and all sharp edges should be ground to a smooth radius.

PREVIOUSLY COATED: Previously coated surfaces must be sound and in good condition. Smooth, hard, or glossy finishes should be scarified by sanding or sweep blasting to create a surface profile. The High Performance Industrial DTM Epoxy Mastic is compatible with most coatings, but a test patch is suggested. WARNING! If you scrape, sand or remove old paint from any surface, you may release lead paint dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH-approved respirator to control lead exposure. Carefully clean up with a wet mop or HEPA vacuum. Before you start, find out how to protect yourself and your family by contacting the U.S.EPA/Lead Information Hotline at 1-800-424-LEAD or log onto www.epa.gov/lead.

GALVANIZED METAL: Remove oil, dirt, grease and other chemical deposits with Pure Strength® Cleaner/Degreaser item #3599402 or other suitable cleaner. Remove loose rust, white rust or deteriorated old coatings by hand or power tool cleaning or brush off blasting. Rinse throughly with fresh water and allow to fully dry.

CONCRETE OR MASONRY: New concrete or masonry must cure 30 days before coating. Any concrete surface must be protected from moisture transmission from uncoated areas. Remove all loose, unsound concrete. Remove laitance and create a surface profile by either acid etching with Rust-Oleum 108402 Cleaning and Etch Solution, or by grinding. Surface sealers and curing agents must be removed by grinding.

APPLICATION

Airless spray is the preferred method of application.However, brush, roller, or air-atomized spray may also be used. Refer to table for thinning recommendations. For proper performance, a dry film thickness of 5-8 mils per coat is required. Excessive brushing or rolling may reduce film thickness. Apply a second coat if necessary to achieve the recommended film thickness.

PRODUCT APPLICATION (cont.)

Use Industrial DTM Epoxy Mastic with 9101402 Standard Activator or 9104402 Fast Cure Activator at air and surface temperatures between 50-100°F (10-38°C) and when the surface temperature is at least 5°F (3°C) above the dew point. Low curing temperatures and/or condensation on the film while curing can affect appearance in the form of an amine blush. This can generally be removed with soap and water, however, in a case of extreme blushing, the performance of the coating may be slightly affected.

When application temperatures are between 40-60°F (5-15°C) and when the surface temperature is at least 5°F (3°C) above the dewpoint, use Industrial DTM Epoxy Mastic with the 9103402 Low Temperature Activator. Do not apply the material if the temperature is expected to fall below 40°F in the first 24 hours of cure. At 40°F, full cure will be achieved in 7 days.

For water immersion service, use Industrial DTM Epoxy Mastic with the 9102402 Immersion Activator. Do not use the 9102402 Immersion Activator with tint bases. This system may be used for both salt and fresh water; do not use for the inside of potable water tanks. Apply at air and surface temperatures between 60-100°F (15-38°C), when the surface temperature is at least 5°F (3°C) above the dew point, and when relative humidity is below 85%. Apply two coats alternating color between coats to ensure complete hide. Allow 7 days cure after application of the second coat before immersion.

NOTE: The 9104402 Fast Cure Activator may also be used in water immersion. Allow 7 days for full cure prior to beginning immersion service. Do not use tinted colors in water immersion.

NOTE: If curing time exceeds 72 hours, the surface must be scarified by sanding, or other method, prior to application of an additional coat or other finish coating.

Pools

When used with 9102402 Immersion Activator, the Industrial DTM Epoxy Mastic premix bases can be used as a pool coating over existing epoxy pool coatings, new bare concrete, plaster, gunite, and fiberglass. The pool must be completely empty and dry before coating. After pool is emptied, this typically requires 7-10 days depending on temperature and humidity. To test the dryness of concrete, gunite or plaster pool surfaces, securely tape a 2 ft. by 2 ft. piece of clear plastic onto a horizontal and vertical surface at the deep end of the pool. Check after 24 hours. If water condensation is visible under the plastic, this is an indication that the surface is not completely dry, and NOT suitable for coating. Allow additional dry time and retest. Follow surface preparation, mixing and application instructions. Avoid painting in midday sun. Application is recommended early in the day or late in the afternoon when at least 2 hours of sunlight remain after completion of the job. Allow minimum of 5-7 sunny days cure before filling pool. Early contact with water can cause premature fading, chalking and blistering. Super chlorinated water can cause a bleached out look. Sunlight and UV will cause chalking and fading. **Do not** use over: 1) chlorinated rubber, 2) synthetic rubber, 3) vinyl, 4) acrylic. See Note in Performance Characteristics Section on Page 3.

9100 SYSTEM DTM EPOXY MASTIC

PRODUCT APPLICATION (cont.)

EQUIPMENT RECOMMENDATIONS

(Comparable equipment also suitable.)

BRUSH: Use a good quality natural or synthetic bristle brush.

ROLLER: Use a good quality lamb's wool or synthetic fiber (3/8-1/2"nap).

AIR-ATOMIZED SPRAY:

Method	Fluid Tip	Fluid Delivery	Atom. Pressure
Pressure	0.055-0.070	10-16 oz./min.	25-60 psi
Siphon	0.055-0.070	—	25-60 psi
HVLP	0.043-0.070	8-10 oz./min.	10 psi (at tip)

AIRLESS SPRAY:

Fluid Pressure	Fluid Tip	Filter Mesh
1800-3000 psi	0.013-0.017	100

THINNING

Thinning is normally not required, except for air-atomized spray. For air-atomized spray application, thin only up to 10% by volume with 160402 Thinner after the components have been mixed. If the coating is going to be used in immersion service, 9102 or 9104 activator, then, use up to 10% 165402 Thinner for air-atomized spray and up to 5% of 165402 Thinner for airless spray.

NOTE: Addition of more than 10% of 160402 or 165402 Thinner will cause VOC to exceed 340 g/l. In this case, 333402 VOC exempt thinner can be used if needed.

MIXING

Both the base and activator components are highly pigmented. Mix each component thoroughly to ensure any settled pigment is re-dispersed before combining the components together. Combine at a 1:1 ratio by volume in a container large enough to hold the total volume. Mix thoroughly for 2-3 minutes. Power mixing is preferred. Do not mix more material than you plan to use within the listed pot life.

CLEAN-UP

Use 160402 or 165402 Thinner.

SHELF LIFE

Base components	3 years†
Activators	2 years†

†Unopened containers. Some settling may occur requiring mechanical mixing to redisperse pigment.

PERFORMANCE CHARACTERISTICS

System Tested

Topcoat: DTM Epoxy Mastic with 9101 Activator

PENCIL HARDNESS

METHOD: ASTM D3363

RESULT: B (7 days), 4H (30 days)

CONICAL FLEXIBILITY

METHOD: ASTM D522

RESULT: >32%

CYCLIC PROHESION

Rating 1-10, 10=best

METHOD: ASTM D5894, 2300 hours

RESULT: 10 per ASTM D714 for blistering

RESULT: 10 per ASTM D1654 for corrosion

IMPACT RESISTANCE (direct)

METHOD: ASTM D2794

RESULT: 160 in.–lbs.

TABER ABRASION

METHOD: ASTM D4060 CS-17 wheel, 500 g. load, 1000 cycles

RESULT: 125 mg loss

GLOSS

METHOD: ASTM D4587

RESULT: 80%

For chemical and corrosion resistance, see the Rust-Oleum Industrial Brands Catalog Form # 206275.

NOTE: In swimming pool service, early chalking may occur if the water pH is outside the range of 7.2-7.6 and/or if the water temperature exceeds 100°F (38°C).

CAUTION: Exposure of the 9100 System during the curing stage of the coating to the by products of propane combustion may cause discoloration to occur. During application and curing, propane fueled fork lifts and other vehicles or propane fueled heaters should not be used in the area until the coating is fully cured. At least 72 hours.

RUST-OLEUM® HIGH PERFORMANCE

TECHNICAL DATA

9100 SYSTEM DTM EPOXY MASTIC

PHYSICAL PROPERTIES

		9101 Activator	9102 Immersion Act.	9103 Low Temp. Act.	9104 Fast-Cure Act.
Resin Type		Aliphatic Amine converted Epoxy	Polyamide converted Epoxy	Aliphatic Amine converted Epoxy	Polyamide/modified Amine converted Epoxy
Inhibitive Pigment		Calcium Borosilicate	Calcium Borosilicate	Calcium Borosilicate	Calcium Borosilicate
Solvents		Xylene, Methyl Isobutyl Ketone, 1-Methoxy-2-propranol	Xylene, Methyl Isobutyl Ketone, 1-Methoxy-2-propranol	Xylene, Methyl Isobutyl Ketone, 1-Methoxy-2-propranol	Xylene, Methyl Isobutyl Ketone, 1-Methoxy-2-propranol
Weight††	**Per Gallon**	11.4-12.6 lbs.	11.4-12.6 lbs.	9.3-10.4 lbs.	12.0-13.0 lbs.
	Per Liter	1.4-1.5 kg	1.4-1.5 kg	1.1-1.2 kg	1.4-1.6 kg
Solids††	**By Weight**	86-89%	79-82%	78-81%	81-83%
	By Volume	78-81%	65-68%	72-75%	67-69%
Volatile Organic Compounds††		<340 g/l (2.84 lbs./gal.)	<340 g/l (2.84 lbs./gal.)	<340 g/l (2.84 lbs./gal.)	<340 g/l (2.84 lbs./gal.)
Mixing Ratio		1:1 Act.:Base (by vol.)	1:1 Act.:Base (by vol.)	1:1 Act.:Base (by vol.)	1:1 Act.:Base (by vol.)
Recommended Dry Film Thickness (DFT) Per Coat		5-8 mils (125-200µ)	5-8 mils (125-200µ)	5-8 mils (125-200µ)	5-8 mils (125-200µ)
Wet Film to Achieve DFT (unthinned material)		6.5-10.5 mils (162.5-262.5µ)	7.5-12.0 mils (187.5-300µ)	7-11 mils (175-275µ)	7.5-12.0 mils (187.5-300.0µ)
Theoretical Coverage at 1 mil DFT (25µ)		1250-1300 sq. ft./gal. (30.8-32.0 m^2/l)	1045-1090 sq. ft./gal. (25.7-26.8 m^2/l)	1155-1200 sq. ft./gal. (28.4-29.5 m^2/l)	1075-1100 sq. ft./gal. (26.4-27.3 m^2/l)
Practical Coverage at Recommended DFT (assumes 15% material loss)		125-225 sq. ft./gal. (3.1-5.5 m^2/l)	100-175 sq. ft./gal. (2.5-4.3 m^2/l)	125-200 sq. ft./gal. (3.1-5.0 m^2/l)	115-190 sq. ft./gal. (2.8-4.7 m^2/l)
Induction Period		None required	30 min. (60 min. at 60-70°F)	None required	15 minutes
Pot Life†††	**2 gallons**	2-4 hours at 70°F (21°C), / 1-2 hours at 90°F (32°C)	2-4 hours at 70°F (21°C) / 3-5 hours at 60°F (15°C)	2-4 hours at 60°F (15°C)	2-4 hours at 70°F (21°C) / 1-2 hours at 90°F (32°C)
	10 gallons	2 hours at 70°F (21°C) / <1 hour at 90°F (32°C)	2 hours at 70°F (21°C) / 3 hours at 60°F (15°C)	2 hours at 60°F (15°C)	2 hours at 70°F (21°C) / <1 hour at 90°F (32°C)
Dry Times at 50% Relative Humdity	**Tack-free**	6-8 hours at 70°F (21°C) / 12-24 hours at 50°F (10°C)	6-8 hours at 70°F (21°C)	16-20 hours at 40°F (5°C)	4 hours at 70°F (21°C) / 8 hours at 50°F (10°C)
	Handle	6-12 hours at 70°F (21°C) / 48-72 hours at 50°F (10°C)	8-14 hours at 70°F (21°C)	22-26 hours at 40°F (5°C)	5 hours at 70°F (21°C) / 10 hours at 50°F (10°C)
	Recoat	16 hours to 30 days at 70°F (21°C) / 72 hours to 30 days at 50°F (10°C)	16-72 hours at 70°F (21°C)	24-72 hours at 40°F (5°C)	4 hours at 70°F (21°C) / 8 hours at 50°F (10°C)
Dry Heat Resistance		300°F (149°C), Color may shift above 150°F (66°C)	300°F (149°C), 125°F (52°C): for immersion service Color may shift above 150°F (66°C)	300°F (149°C), Color may shift above 150°F (66°C)	300°F (149°C), Color may shift above 150°F (66°C)
Safety Information	**Flash Point**	110°F (43°C)	110°F (43°C)	110°F (43°C)	68°F (20°C)
	Contains	Lead-free	Lead-free	Lead-free	Lead-free
	Warning!	**FLAMMABLE LIQUID AND VAPOR. HARMFUL IF INHALED. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY AFFECT THE BRAIN OR NERVOUS SYSTEM CAUSING DIZZINESS, HEADACHE OR NAUSEA. MAY CAUSE ALLERGIC SKIN REACTION. FOR INDUSTRIAL OR COMMERCIAL USE ONLY. REFER TO MATERIAL SAFETY DATA SHEET (MSDS) FOR ADDITIONAL INFORMATION.**			

††Activated material. †††Pot life is affected by air temperature, amount of material activated and quantity of thinner used. Avoid activating large quantities at temperatures above 80°F (27°C). At temperatures above 90°F (32°C), the pot life of unthinned material in 5 gallon pails may be very short (less than one hour). In hot weather, thin activated material with 10% 160 Thinner or 165 Thinner for 9102 activated material. Final gloss maybe slightly higher for coating applied near the end of the potlife.

RUST-OLEUM® INDUSTRIAL BRANDS

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Form: 2032990
Rev.: 071811

RUST-OLEUM® HIGH PERFORMANCE

9400 SYSTEM
HIGH GLOSS POLYESTER URETHANE

DESCRIPTION AND USES

A two component, polyester polyurethane with a super high-gloss finish. This coating system has two different activators to meet the specific requirements set by national air quality regulations. The 9401 Activator is used to meet the VOC requirements of the automotive refinishing rule. The 9401 Activator does not meet the VOC requirements for industrial maintenance painting. For industrial maintenance painting, use only the HS9401 Activator which has been formulated to meet the reduced VOC levels established for this market.

When using the 9401 Activator, this highly durable, high gloss enamel is designed for coating mobile equipment used in an aggressive environment. The coating has excellent chemical resistance and excellent color and gloss retention making it ideal for outdoor equipment such as ready-mix concrete trucks, bulk haulers, tank wagons, cranes, and other mobile equipment.

When using the HS9401 Activator, this high performance polyurethane has excellent chemical resistance and excellent color and gloss retention. It is suitable for use in severe coastal, offshore, or chemical environments where both corrosion protection and aesthetics are very important. Ideal for exposed structural steel, tanks, conveyors, and other tough maintenance applications.

PRODUCTS

FINISHES

1-Gallon	5-Gallon	Description
9410402	—	Clear
9425402	—	Blue
9479402	—	Black
9483402	—	Gray
9492402	9492300	White
9465402	—	Red
9401402	9401300	Activator
HS9401402	HS9401300	High Solids Activator
9402730*	—	Dry Time Accelerator
9404730*	—	Leveling Additive

TINT BASES

1-Gallon	5-Gallon	Description
9405405	—	Red Base
9406405	—	Yellow Base
9407405	—	High Gloss Masstone
9408421	—	High Gloss Deep
9409408	—	High Gloss Light

PRODUCTS (cont.)

*Use with 9401 Activator only. All standard colors, tint bases and activators are USDA acceptable under FSIS Directive 11000.4 (Rev.1), November 24,1995. Color subject to approval of USDA Inspector. Agriculture Canada accepted: 9425, 9492, 9479, 9410, 9483, and 9465 cured with HS9401 Activator.

PACKAGING

Standard premix colors are packaged in one gallon containers to be mixed with one full gallon of activator. The combined base and activator components will yield two full gallons.

Tint bases are packaged in short filled gallon containers to allow for the addition of colorant. The following tint bases are available. **Red Base** – A red tint base that can accept up to 16 ounces of colorant per gallon. **Yellow Base** – A yellow tint base that can accept up to 16 ounces of colorant per gallon. **Masstone Base** – A clear tint base that can accept up to 16 ounces of colorant per gallon. **Deep Base** – A white tint base that contains 0.8 pounds of titanium dioxide per gallon. It can accept up to 12 ounces of colorant per gallon. **Light Base** – A white tint base that contains 1.8 pounds of titanium dioxide per gallon. It can accept up to 8 ounces of colorant per gallon. Activated tinted colors which do not use the maximum amount of colorant will yield less than two full gallons of activated material.

COMPANION PRODUCTS

RECOMMENDED PRIMERS

HS9369	Red
HS9381	Gray Epoxy Primer.

COMPATIBLE PRIMERS

With 9401 activator:

2083	Gray Transportation Primer

With HS9401 activator:

9100	High Performance Epoxy (do not use 9115 aluminum), 9360 or 9370 High Solids Epoxy Primer

PRODUCT APPLICATION

SURFACE PREPARATION

ALL SURFACES: If excessive time has elapsed since the primer was applied, remove all dirt, grease, oil, salt and chemical contaminants by washing the surface with Pure Strength® Cleaner/Degreaser item #3599402, commercial detergent or other suitable cleaner.

Form: 1051990
Rev.: 120310

9400 SYSTEM HIGH GLOSS POLYESTER URETHANE

PRODUCT APPLICATION (cont.)

Two-component epoxy primers may require light scuff sanding or sweep blasting. Mold and mildew areas must be cleaned with a chlorinated cleaner or bleach solution. Rinse thoroughly with freshwater and allow to fully dry. All surfaces must be dry at time of application.

STEEL: Intended for clean steel only. Sand or scarify the surface to optimize adhesion. For optimum corrosion resistance, use HS9369 Red or HS9381 Gray Epoxy Primer as a prime coat. See primer labels and technical data sheet for correct surface preparation and application procedures.

PREVIOUSLY COATED: Previously coated surfaces must be sound and in good condition. Smooth, hard, or glossy finishes should be scarified by sanding or sweep blasting to create a surface profile. The Rust-Oluem® Industrial High Gloss Urethane Finish is compatible with most coatings, but a test patch is suggested.

WARNING! If you scrape, sand or remove old paint from any surface, you may release lead paint dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH-approved respirator to control lead exposure. Carefully clean up with a wet mop or HEPA vacuum. Before you start, find out how to protect yourself and your family by contacting the U.S.EPA/Lead Information Hotline at 1-800-424-LEAD or log onto www.epa.gov/lead.

GALVANIZED METAL: New galvanized steel must be free of grease, oil, or wax surface treatments prior to coating. Solvent wiping may be required.

APPLICATION

Apply only when air and surface temperatures are between 32-100°F (0- 38°C) and surface temperature is at least 5°F above dew point. For best result, air atomized spray is the recommended method of application. Airless spray will produce an acceptable industrial finish. Brush and roller applications generally do not produce an acceptable finish and should be limited to touch up only. The 9404 Leveling Additive is suggested for use with the 9401 Activator. The 9402 Accelerator and 9404 Leveling Additive can not be used with HS9401 Activator.

EQUIPMENT RECOMMENDATIONS

BRUSH: For touch-up only. Good quality natural or synthetic bristle recommended.

ROLLER: For touch-up only. Good quality lamb's wool or synthetic fiber recommended.

AIR-ATOMIZED SPRAY:

Method	Fluid Tip	Fluid Delivery	Atom. Pressure
Pressure	0.055-0.070	10-16 oz./min.	25-60 psi
Siphon	0.055-0.070	—	25-60 psi
HVLP	0.043-0.070	8-10 oz./min.	10 psi at the tip

PRODUCT APPLICATION (cont.)

AIRLESS SPRAY:

Fluid Pressure	Fluid Tip	Filter Mesh
1600-2400 psi	0.013-0.017	100

THINNING

With 9401 activator:

Use the following levels of 190 Thinner to remain within VOC limits: Without additives, do not exceed 15% by volume (19 oz. per activated gallon). With 9402 Accelerator, do not exceed 14% by volume (18 oz. per activated gallon). With 9404 Leveling Additive, do not exceed 15% by volume (19 oz. per activated gallon).

With HS9401 activator:

Use the following levels of 195 Reducer to remain within VOC limits: for airless spray do not exceed 15% by volume (19 oz. per activated gallon); for air atomized spray do not exceed 20% by volume (25 oz. per activated gallon). In order to maintain VOC <420 g/l do not thin more than 25% by volume with 195 Reducer only.

MIXING

Premix base component before adding activator, then combine at a 1:1 ratio by volume and mix together. Short-filled tinted base components are to be mixed with one full gallon of activator.

CLEAN-UP

190 Thinner or Methyl Ethyl Ketone (MEK)

PERFORMANCE CHARACTERISTICS

System Tested

Primer: Rust-Oluem Industrial DTM Mastic (9100 System)

Topcoat: Rust-Oluem Industrial High Gloss Urethane (9400 System)

CYCLIC PROHESION

Rating 1-10, 10=best

METHOD: ASTM D5894, 5 cycles, 1,680 hours

RESULT: 10 per ASTM D714 for blistering

RESULT: 10 per ASTM D610 for rusting

GLOSS (60°)

METHOD: ASTM D523

RESULT: 94% (color–white)

ACCELERATED WEATHERING (% gloss retention)

METHOD: ASTM D4587, QUV Type A bulb, 1,500 hours

RESULT: 99% gloss retention (color–white)

For chemical and corrosion resistance,see the Rust-Oleum Industrial Brands Catalog (Form #206275).

9400 SYSTEM HIGH GLOSS POLYESTER URETHANE

PHYSICAL PROPERTIES

		FINISH COLORS†	TINT BASES†	FINISH COLORS‡	TINT BASES‡
		†With 9401 Activator		‡With HS9401 Activator	
Resin Type		Aliphatic isocyanate, converted polyester urethane		Aliphatic isocyanate, converted polyester urethane	
Solvents		Xylene, esters and ketones		Xylene, esters and ketones	
Weight*	**Per Gallon**	8.3-10.3 lbs.	8.3-9.8 lbs.	8.7-10.5 lbs.	8.6-10.2 lbs.
	Per Liter	1.0-1.2 kg	1.0-1.2 kg	1.0-1.2 kg	1.0-1.2 kg
Solids*	**By Weight**	44-45%, 43% 9410 Clear	46-54%	61-71%, 60% 9410 Clear	62-70%
	By Volume	37-41%, 35% 9410 Clear	39-42%	54-58%, 43% 9410 Clear	55-58%
Volatile Organic Compounds*		<600 g/l (5.0 lbs./gal.)		<420 g/l (3.50 lbs./gal.)	
Recommended Dry Film (DFT) Per Coat		1-2 mils (25-50µ) 0.5-1.0 mils (12.5-25.0µ) 9410 Clear	1-2 mils (25-50µ)	1-2 mils (25-50µ)	1-2 mils (25-50µ)
Wet Film to Achieve DFT (unthinned material)		3-5 mils (75-125µ) 1.5-2.5 mils (37.5-62.5µ) 9410 Clear	2.5-5.0 mils (62.5-125µ)	2.0-4.0 mils (50-100µ)	2.0-3.5 mils (50-87.5µ)
Theoretical Coverage at 1 mil DFT (25µ)		595-660 sq. ft./gal. (14.6-16.2 m^2/l) 560 sq. ft./gal. (13.8 m^2/l) Clear	560 sq. ft./gal. (13.8 m^2/l)	866-930 sq. ft./gal. (21.3-22.9 m^2/l)	885-930 sq. ft./gal. (21.8-19.4 m^2/l)
Practical Coverage at Recommended DFT (assumes 15% material loss)		260-560 sq. ft./gal. (6.4-13.8 m^2/l) 480-950 sq. ft./gal. (11.8-23.4 m^2/l) 9410 Clear	265-570 sq. ft./gal. (6.5-14.0 m^2/l)	370-790 sq. ft./gal. (9.1-19.4 m^2/l)	375-790 sq. ft./gal. (9.2-19.4 m^2/l)
Mixing Ratio		1:1 Activator to base (by volume)	One full gallon of 9401 Activator per unit of tinted base component	1:1 Activator to base (by volume)	One full gallon of HS9401 Activator per unit of tinted base component
Induction Period		None required	None required	None required	None required
Pot Life @ 70-80°F (21-27°C) & 50% Relative Humidity		8-16 hours	8-16 hours	2-4 hours	2-4 hours
Dry Times at 77°F (25°C) and 50% Relative Humidity	**Tack-free**	2-4 hours	2-4 hours	2-4 hours	2-4 hours
	Handle	4-6 hours	4-6 hours	6-8 hours	6-8 hours
	Recoat	9400 Finishes after 16 hours; Over HS9360 or HS9381, ½-72 hours; Over 2083, ½ hour		9400 Finishes after 16 hours; Over HS9360 or HS9381, ½-72 hours; Over 9100 Finishes, 16-72 hours. Over HS Epoxy Primers, 16 hours - 14 days. Over 2068 o 2082 after 1 hour.	
Force Cure		15-20 minutes at 150-225°F (66-105°C) Dry to handle after cooling.		15-20 minutes at 150-225°F (66-105°C) Dry to handle after cooling.	
Dry Heat Resistance		300°F (149°C). A color shift may occur at temperatures above 150°F (66°C)		300°F (149°C). A color shift may occur at temperatures above 150°F (66°C)	
Shelf Life		2 years. Opened 9401 Activator must be used within 2-4 weeks. Do not use opened activator if it has become cloudy.		2 years. Opened HS9401 Activator must be used within 2-4 weeks. Do not use opened activator if it has become cloudy.	
Safety Information	**Flash Point**	Base: 50°F (10°C); 9401 Activator: 84°F (29°C)		Base: 50°F (10°C); HS9401 Activator: 90°F (32°C)	
	Contains	No lead has been deliberately added.			
	Warning!	**FLAMMABLE. VAPOR HARMFUL IF INHALED MAY AFFECT BRAIN OR NERVOUSSYSTEM CAUSING DIZZINESS, HEADACHE OR NAUSEA. CAUSES NOSE, THROAT, EYE AND SKINIRRITATION. FOR INDUSTRIAL OR COMMERCIAL USE ONLY. KEEP OUT OF REACH OF CHILDREN.SEE THE PRODUCT MATERIAL SAFETY DATA SHEET (MSDS) AND LABEL WARNINGS FORADDITIONAL SAFETY INFORMATION.**			

*Activated material. Calculated values are shown and may vary slightly from the actual manufactured material.

The technical data and suggestions for use contained herein are correct to the best of our knowledge, and offered in good faith. The statements of this literature do not constitute a warranty, express, or implied, as to the performance of these products. As conditions and use of our materials are beyond our control, we can guarantee these products only to conform to our standards of quality, and our liability, if any, will be limited to replacement of defective materials. All technical information is subject to change without notice.

RUST-OLEUM®
INDUSTRIAL BRANDS

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Vernon Hills, Illinois 60061
An RPM Company

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Form: 1051990
Rev.: 120310

TREMCO

Vulkem® 116

Weatherproofing Sealant
One-Part, High-Performance Elastomer

Product Description:
Vulkem 116 is a one-part moisture-curing, gun-grade polyurethane sealant. Vulkem 116 is durable, flexible and offers excellent performance in moving joints. Vulkem 116 does not require a primer on most construction materials.

Basic Uses:
Vulkem 116 is an excellent general purpose sealant designed for use in precast, masonry, window frame perimeters and similar types of construction joints. Vulkem 116 is suitable for continual immersion in water. Vulkem 116 is designed for exterior and interior use.

Limitations:
- Do not apply over damp or contaminated surfaces.
- Use with adequate ventilation.

Packaging:
1/12 gallon (300mL) cartridges, 20 oz. (600mL) sausages, 2 (7.6 L), and 5 (18.9 L) gallon pails and 55 gallon (208 L) drums.

Colors:
Aluminum Stone, Anodized Aluminum, Grey, Limestone, White, Off White, Buff, Precast White, Ivory, Beige, Almond, Hartford Green, Redwood Tan, Stone, Naural Clay, Dark Bronze, Bronze, Light Bronze, Black,

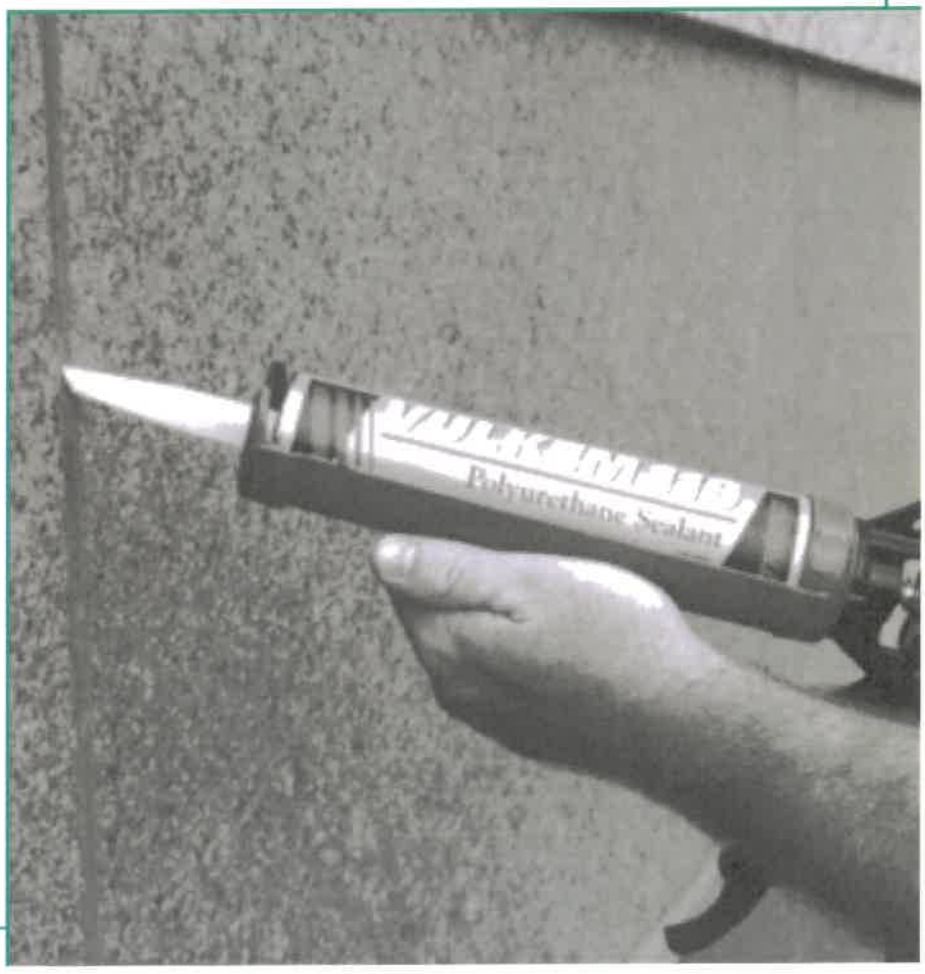
APPLICABLE STANDARDS:
Conforms to U.S. Federal Specification TT-S-00230C, Type II, Class A and ASTM C920, Type S, Grade NS, Class 25, Use NT, M, T, A, I, O, and CAN/CGSD-19.13, MCG-2-25-B-N. Conforms to USDA approval standards.

INSTALLATION
Joint Design:
May be used in any vertical or horizontal joint designed in accordance with accepted architectural/engineering practice. Joint width should be 4 times anticipated movement, but not less than 1/4 inch (6.4mm) wide. Movement should not exceed 25% of the minimum joint width.

Joint Dimensions:
For joints 1/4 inch (6.4mm) to 1/2 inch (12.7mm) wide, the width to depth ratio should be equal. Joints 1/2 inch (12.7mm) wide or greater should have a sealant depth of 1/2 inch (12.7mm). Minimum joint size is 1/4 inch by 1/4 inch (6.4mm by 6.4mm).

Surface Preparation:
For good adhesion, the joint interface must be sound, clean and dry. Depending on the substrates, or presence of form release agents, masonry waterproofings, dust, loose mortar or laitance, architectural paints or finishes, the joint surface may require a thorough wire bushing, grinding, sandblasting, solvent washing and/or primer.

Tooling & Cleaning:
Tooling is recommended immediately after application to insure firm, intimate contact with the joint interface. Dry tooling is preferred. Excess sealant and smears adjacent to the joint can be carefully removed with Xylol or Toluol before sealant cures.



Joint Backing Bond Breaking Tape:

Closed cell polyethylene backer rods are preferred as joint backing to control depth of sealant bead. Where depth of joint will prevent use of joint backing, an adhesive backed polyethylene tape must be installed to prevent three-sided adhesion. Joint backing must be dry at time of sealant application.

Application:

Vulkem 116 is easy to apply with conventional caulking equipment. Fill joint completely and tool. At 75°F (23.9°C), 50% R.H. a durable skin forms within 24 hours. Curing continues at the rate of 1/16 inch (1.6mm) depth per day. The cure rate is reduced at lower temperatures and less humidity.

Maintenance:

Damaged sealant can be repaired. Consult your Tremco Distributor or Representative for repair procedures.

Availability:

Immediately available from Distributors located throughout the United States, Canada, and overseas.

Warranty:

Tremco warrants its Vulkem Sealants to be free of defects in materials, but makes no warranty as to appearance or color. Since methods of application and on-site conditions are beyond our control and can affect performance, Tremco makes no other warranty, expressed or implied, including warranties of MERCHANTABILITY and FITNESS FOR A PARTICULAR PURPOSE, with respect to Vulkem Sealants. Tremco's sole obligation shall be, at its option, to replace, or to refund the purchase price of the quantity of Vulkem Sealant proved to be defective and Tremco shall not be liable for any loss or damage.

TYPICAL PHYSICAL PROPERTIES

ASTM C920 TT-S-00230C	Requirement	Vulkem 116 Results
Rheological Properties at 40 and 122°F. (4.4 and 50°C.)	3/16" (4.8mm) Maximum Flow No Deformation	0 None
Extrusion Rate	45 Seconds Maximum	7
Hardness Properties	15-50 (Shore A)	40
Weight Loss	Less than 10%	9.0
Tack Free Time	Tack Free 72 Hours Maximum	30
Stain & Color Change	No Visible Change No Stain	None None
Durability-Cyclic Movement Adhesion & Cohesion	1-1/2 sq. in. (9.7 cm^2) Max Total Bond Loss	Passes
Adhesion-in-Peel	Not less than 5 pli (22N)	Aluminum-18-22 pli (80-98N) Concrete-20-25 pli (89-111N) Brick-19-23 pli (85-102N)
	Less than 25% Bond Loss	No Adhesion Loss
Effects of Accelerated Weathering	No cracks greater than #2 on U.V. and Cold Temperature Bond Test	Passes

For MSDS and Spec Data Sheets, visit our website:
www.tremcosealants.com

TREMCO
Sealant/Weatherproofing Division
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Revision: August 4, 2009
Supersedes: April 14, 2009
Ref: 957584 / 957156

TECHNICAL DATA SHEET

OSI
Professional Grade Adhesives & Sealants

QUAD® VOC
Advanced Formula Sealant

Henkel Corporation
Professional and Consumer Adhesives
Avon, OH 44011
Phone 1-800-624-7767
Fax (440) 937-7067
www.henkel.com www.osipro.com

Color	Size	Packaging	Item #
Various Colors	10.2 Fl. Oz. (301 mL)	Paper Cartridge	Various

DESCRIPTION

OSI® QUAD® VOC Advanced Formula Sealant is composed of elastomeric polymers and high quality synthetic resins. This product offers the superior adhesion characteristics and unmatched elasticity found in high performance sealants. It yields a tough, rubbery seal which resists outdoor weather-related elements like water, oxygen, ozone, heat and UV light. The formula skins over in a short time to resist dirt and dust pickup. It goes on smoothly and has easy cut-off without stringing. When cured, the surface displays a slight sheen similar to some silicone sealants. QUAD® VOC is paintable with either latex or oil-based paints. This Low VOC formulation meets stringent State and Federal regulatory requirements.

RECOMMENDED FOR

Sealing around windows, doors, fiber-cement siding, vinyl siding, roofing and gutters. It bonds without a primer to most common substrates like cedar, fiberglass, aluminum, masonry and concrete.

NOT RECOMMENDED FOR

- Sealing expansion joints, including butt joints
- Bonding polystyrene foams and polypropylene or polyethylene plastics
- Continuous water immersion
- Use as a traffic bearing sealant
- Use on log homes
- Use inside occupied structures
- Joints deeper than 3/8" (9.5 mm) without the use of backing material or for applications less than ¼" in thickness
- Not to be used to fill nail holes

FEATURES & BENEFITS

Feature	Benefits
Low VOC formulation	Meets stringent State & Federal regulations
Withstands moderate expansion-contraction cycles	Permanently flexible; Will not crack or split even over temperature extremes
Water-resistant	Great for outdoor applications
Paintable and durable	Long-lasting, professional finish
Available in a variety of colors	Manufactured to match most siding colors

COVERAGE

A 10.2 fl. oz. (301 mL) cartridge will extrude approx. 31.3 ft. (9.5 m) of a ¼" (6 mm) bead.
A 10.2 fl. oz. (301 mL) cartridge will extrude approx. 13.9 ft. (4.2 m) of a 3/8" (9.5 mm) bead.

DIRECTIONS

Tools Typically Required:
Utility knife and caulking gun.

Safety Precautions:
Not recommended for use inside occupied structures. Wear gloves. Wash hands after use.

Preparation:
Apply sealant between 20°F (-7°C) and 100°F (38°C). For easier extrusion of sealant at lower temperatures the material should be kept at room temperature 24 hours prior to use. All surfaces must be clean, dry and free of old caulk, grease, dust and other contaminants. Insert cartridge into caulking gun, apply moderate pressure in order to break the "Break Away" seal inside the nozzle. Cut the tip off the cartridge at a 45° angle to desired bead size (3/8" is recommended).

Application:
Using a caulking gun, apply sealant with steady pressure, forcing the sealant into the joint. If the depth of the joint exceeds 3/8" (9.5 mm) the use of a backer rod is recommended. Tooling of the sealant is not necessary or recommended. Sealant is paintable with a latex or oil-based paint after full cure.

Clean-up:
Clean tools and uncured sealant residue immediately with mineral spirits or paint thinner. Cured sealant must be carefully cut away with a sharp-edged tool.

STORAGE AND DISPOSAL

NOT DAMAGED BY FREEZING. Store in a cool, dry place. Take unwanted product to an approved household hazardous waste transfer facility. Hardened material may be disposed of with trash.

PRECAUTIONS

WARNING! Contains petroleum distillates and toluene. FLAMMABLE. Vapors may ignite explosively. Do not use or store near heat, sparks or open flame. Do not smoke when using this product. Extinguish all flames and pilot lights and turn off all sources of ignition, including stoves, heaters and electric motors, during use and until all vapors are gone. Prevent build-up of vapors by opening all windows and doors to achieve cross-ventilation. Use in a well-ventilated area. Avoid breathing vapors. Avoid contact with eyes and skin. Prolonged or repeated exposure may affect the nervous system causing dizziness, headache or nausea. If you experience eye watering, headache or dizziness, leave the area to obtain fresh air. Do not swallow. **FIRST AID:** If swallowed do not induce vomiting, call a physician or Poison Control Center immediately. For eye contact flush with water for 15 minutes, call a physician. For skin contact, wash thoroughly with soap and water. If overcome by vapors, get fresh air. **KEEP OUT OF THE REACH OF CHILDREN.** If this product is used in an OSHA regulated workplace consult the MSDS before use. **WARNING:** This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Refer to Material Safety Data Sheet (MSDS) for further information.

DISCLAIMER

The information and recommendations contained herein are based on our research and are believed to be accurate, but no warranty, express or implied, is made or should be inferred. Purchasers should test the products to determine acceptable quality and suitability for their own intended use. Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute a permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

TECHNICAL DATA

Typical Uncured Physical Properties

Color:	Various colors
Appearance:	Lump-free paste
Base:	Elastomeric polymers and synthetic resins
Odor:	Solvent
Specific Gravity:	1.28
Flash Point:	112°F (44°C) Uncured product is flammable.
% Solids by Weight:	70%
VOC Content:	<50 g/L (<4% by weight)
Shelf Life:	24 months from date of manufacture (unopened)
Lot Code Explanation: (Lot code stamped on bottom plunger of cartridge)	YYDDD YY = Last two digits of year of manufacture DDD = Day of manufacture based on 365 days in a year For example: 09061 = 61st day of 2009 = March 2, 2009

Typical Application Properties

Application Temperature:	Apply between 20°F (-7°C) and 100°F (38°C) (For easier extrusion of sealant at lower temperatures, store cartridge at room temperature at least 24 hours prior to use.)
Skin Formation Time: (At 72°F and 70% relative humidity)	40 min.
Tack-Free Time:	8 hours
Cure Time:	7 days (Cure time is dependent on temperature, humidity and depth of sealant applied.)
Extrusion:	
Room Temperature:	56 lbs
43°F (6°C):	88 lbs
Boeing Sag (15 minutes):	
Room Temperature:	0.03 inches
Extrudability:	4.1 sec / mL

Typical Cured Performance Properties

Color:	Various colors
Shrinkage:	36%
Hardness, Shore A:	40
21 days at 140°F:	65
21 days under R1 lamp:	55
Movement Capability:	± 25%
Elongation:	600%
Paintable:	Yes
Water Resistant:	Yes
Service Temperature:	-20°F (-29°C) to 200°F (93°C)
Tensile Strength:	182 psi
180° Peel Adhesion: (ASTM C794)	
Painted Aluminum Flashing:	25.2 pli
Vinyl Siding:	27.5 pli
Specifications:	Meets the performance characteristics of: ▪ ASTM C 920: Type S, Grade NS, Use NT

BASF

The Chemical Company

Technical Data Guide

7 | 07 92 00 **Joint Sealants**

MasterSeal® NP 1™

One-component, elastomeric, gun-grade polyurethane sealant

FORMERLY SONOLASTIC® NP 1™

PACKAGING

– 300 ml (10.1 fl oz) cartridges, 30 cartridges per carton and 12 cartridges per carton

– 590 ml (20 fl oz) ProPaks, 20 per carton

COLORS

White, Off-White, Limestone, Stone, Tan, Aluminum Gray, Medium Bronze, Special Bronze, Redwood Tan, Black And Gray

For color availability in bulk packaging, call Customer Service.

YIELD

See page 3 for charts

STORAGE

Store in original, unopened containers away from heat and direct sunlight. Storing at elevated temperatures will reduce the shelf life.

SHELF LIFE

Cartridges and ProPaks:
1 year when properly stored.

VOC CONTENT

35g/L less water and exempt solvents

DESCRIPTION

MasterSeal NP 1 is a one-component, high-performance, non-priming, gun-grade, elastomeric polyurethane sealant. It requires no mixing and typically requires no priming to bond to many materials, including concrete and masonry.

PRODUCT HIGHLIGHTS

- One-component formula requires no mixing, helping to reduce labor costs
- Joint movement capability ±35% provides excellent flexibility for keeping moving joints weathertight
- Easy to gun and tool, speeding up application and making neater joints
- Available in ProPaks, reducing jobsite waste, lowering disposal costs
- 12 standard colors to match a wide variety of common substrates
- No primer required for most construction materials lowering installation costs
- Weather resistant for long-lasting weathertight seals
- Wide temperature application range makes MasterSeal NP 1 suitable for all climates
- Compatible with non-rigid coatings and can be painted
- Superior holding power for long-lasting roof tile installation
- UL listed; Passes 4–hour, 4–inch, fire and hose stream test when used with Ultra Block or mineral wool
- Suitable for water immersion with documented performance in wet areas
- Meets VOC requirements in all 50 states

APPLICATIONS

- Interior and exterior
- Above and below grade
- Immersed in water
- Expansion joints
- Panel walls
- Precast units
- Aluminum and wood window frames
- Roofing
- Fascia
- Parapets
- Vinyl siding
- Store front assemblies

SUBSTRATES

- Concrete
- Masonry
- Aluminum
- Wood
- Clay & concrete roof tiles
- Stucco
- Natural stone

Technical Data

Composition

MasterSeal NP 1 is a one-component moisture-curing polyurethane.

Compliances

- ASTM C 920, Type S, Grade NS, Class 35, Use NT, M, A, T, O* and I
- Federal Specification TT-S- 00230C, Type II, Class A
- Corps of Engineers CRD-C- 541, Type II, Class A
- Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N, No. 81026
- CFI accepted
- USDA compliant for use in meat and poultry areas
- Underwriters Laboratories Inc.® classified (fire resistance only)
- ISO 11600-F-25LM

* Refer to substrates in Where to Use.

Typical Properties

PROPERTY	VALUE
Service temperature range, ° F (° C)	-40 to 180 (-40 to 82)
Shrinkage	None

Test Data

PROPERTY	RESULTS	TEST METHOD
Movement capability, %	±35	ASTM C 719
Tensile strength, psi (MPa)	350 (2.4)	ASTM D 412
Tear strength, pli	50	ASTM D 1004
Ultimate elongation at break, %	800	ASTM D 412
Rheological, (sag in vertical displacement) at 120° F (49° C)	No sag	ASTM C 639
Extrudability, 3 seconds	Passes	ASTM C 603
Hardness, Shore A		ASTM C 661
At standard conditions	25 – 30	
After heat aging (max Shore A: 50)	25	
Weight loss, after heat aging, %	3	ASTM C 792
Cracking and chalking, after heat aging	None	ASTM C 792
Tack-free time, hrs, (maximum 72 hrs)	Passes	ASTM C 679
Stain and color change	Passes	ASTM C 510
Adhesion* in peel, pli (min. 5 pli)	30	ASTM C 794
Adhesion* in peel after UV radiation through glass (min. 5 pli)	Passes	ASTM C 794
Artificial weathering, Xenon arc, 250 hours	Passes	ASTM C 793
Artificial weathering, Xenon arc, 3,000 hours	No surface cracking	ASTM G 26
Water immersion, 122° F (50° C)	Passes 10 weeks with movement cycling	ASTM C 1247

*Primed for water immersion dictated by ASTM C 920. Concrete and aluminum primed with P 173.
Test results are typical values obtained under laboratory conditions. Reasonable variations can be expected.

TABLE 1
Joint Width and Sealant Depth

JOINT WIDTH, IN (MM)	SEALANT DEPTH AT MIDPOINT, IN (MM)
¼–½ (6–13)	¼ (6)
½–¾ (13–19)	¼–⅜ (6–10)
¾–1 (19–25)	⅜–½ (10–13)
1–1½ (25–38)	½ (13)

Yield

LINEAR FEET PER GALLON*

JOINT DEPTH, (INCHES)	JOINT WIDTH (INCHES)									
	¼	⅜	½	⅝	¾	⅞	1	1½	2	3
¼	308	205	154	122	–	–	–	–	–	–
⅜	–	–	–	82	68	58	51	–	–	–
½	–	–	–	–	51	44	38	26	19	12

METERS PER LITER

JOINT DEPTH, (MM)	JOINT WIDTH (MM)									
	6	10	13	16	19	22	25	38	50	75
6	24.8	16.5	12.4	9.8	–	–	–	–	–	–
10	–	–	–	6.6	5.5	4.7	4.1	–	–	–
13	–	–	–	–	4.1	3.5	3.0	2.2	1.5	0.7

HOW TO APPLY

JOINT PREPARATION

1. The product may be used in sealant joints designed in accordance with SWR Institute's Sealants - The Professional's Guide.
2. In optimal conditions, the depth of the sealant should be ½ the width of the joint. The sealant joint depth (measured at the center) should always fall between the maximum depth of ½" and the minimum depth of ¼". Refer to Table 1.
3. In deep joints, the sealant depth must be controlled by closed cell backer rod or soft backer rod. Where the joint depth does not permit the use of backer rod, a bond breaker (polyethylene strip) must be used to prevent three-point bonding.
4. To maintain the recommended sealant depth, install backer rod by compressing and rolling it into the joint channel without stretching it lengthwise. Closed cell backer rod should be about ⅛" (3 mm) larger in diameter than the width of the joint to allow for compression. Soft backer rod should be approximately 25% larger in diameter than the joint width. The sealant does not adhere to it, and no separate bond breaker is required. Do not prime or puncture the backer-rod.

SURFACE PREPARATION

Substrates must be structurally sound, fully cured, dry, and clean. Substrates should always be free of the following: dirt, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing or curing and parting compounds, membrane materials and sealant residue.

CONCRETE, STONE AND OTHER MASONRY

Clean by grinding, sandblasting or wire brushing to expose a sound surface free of contamination and laitance.

WOOD

New and weathered wood must be clean, dry and sound. Scrape away loose paint to bare wood. Any coatings on wood must be tested to verify adhesion of sealant or to determine an appropriate primer.

METAL

Remove scale, rust and loose coatings from metal to expose a bright white surface. Any coatings on metal must be tested to verify adhesion of sealant or to determine an appropriate primer.

PRIMING

1. MasterSeal NP 1 is considered a non-priming sealant, but special circumstances or substrates may require a primer. It is the user's responsibility to check the adhesion of the cured sealant on typical test joints at the project site before and during application. Refer to product data sheet on MasterSeal P 173 or MasterSeal P 176, and consult Technical Service for additional information.
2. For immersion applications, MasterSeal P 173 must be used.
3. Apply primer full strength with a brush or clean cloth. A light, uniform coating is sufficient for most surfaces. Porous surfaces require more primer; however, do not over-apply.
4. Allow primer to dry before applying MasterSeal NP 1. Depending on temperature and humidity, primer will be tack-free in 15–120 minutes. Priming and sealing must be done on the same day.

APPLICATION

1. MasterSeal NP 1 comes ready to use. Apply using professional grade caulking gun. Do not open cartridges, ProPaks or pails until preparatory work has been completed.
2. Fill joints from the deepest point to the surface by holding an appropriately sized nozzle against the back of the joint.

3. Dry tooling is recommended. Proper tooling results in the correct bead shape, neat joints, and optimal adhesion.
4. For roof tile applications apply a bead of MasterSeal NP 1 sufficient in size to make a bond between two tiles on the upper surface of the down slope tile. Install the upslope tile and press into the sealant bead to ensure good contact between the sealant and both tiles.

CURING TIME

The cure of MasterSeal NP 1 varies with temperature and humidity. The following times assume 75° F (24° C), 50% relative humidity, and a joint ½" width by ¼" depth (13 by 6 mm).
– Skins: overnight or within 24 hours
– Full cure: approximately 1 week
– Immersion service: 21 days

CLEAN UP

1. Immediately after use, clean equipment with MasterSeal 990 or xylene. Use proper precautions when handling solvents.
2. Remove cured sealant by cutting with a sharp-edged tool.
3. Remove thin films by abrading.

FOR BEST PERFORMANCE

- Do not allow uncured MasterSeal NP 1 to come into contact with alcohol-based materials or solvents.
- Do not apply polyurethane sealants in the vicinity of uncured silicone sealants or uncured MasterSeal NP 150™.
- MasterSeal NP 1 should not come in contact with oil-based caulking, uncured silicone sealants, polysulfides, or fillers impregnated with oil, asphalt or tar.
- Protect unopened containers from heat and direct sunlight.
- In cool or cold weather, store container at room temperature for at least 24 hours before using.
- When MasterSealNP 1 is to be used in areas subject to continuous water immersion, cure for 21 days at 70° F (23° C) and 50% relative humidity. Allow longer cure times at lower temperatures and humidities. Always use MasterSeal P 173.
- Do not apply over freshly treated wood; treated wood must have weathered for at least 6 months.
- Do not use in swimming pools or other submerged conditions where the sealant will be exposed to strong oxidizers. Avoid submerged conditions where water temperatures will exceed 120° F (50° C).
- Substrates such as copper, stainless steel and galvanized steel typically require the use of a primer; MasterSeal P 173 or MasterSeal P 176 is acceptable. For Kynar 500 based coatings, use P 173 only. An adhesion test is recommended for any other questionable substrate.
- MasterSeal NP 1 is an aromatic urethane, as such it may discolor over time with UV exposure. Where maintaining a true white appearance is critical, use MasterSeal NP 150 or MasterSeal CR 195 sealants.
- MasterSeal NP 1 can be applied below freezing temperatures only if substrates are completely dry, free of moisture and clean. Contact Technical Service for more information.
- Lower temperatures and humidities will extend curing times.
- Pursuant to accepted industry standards and practices, using rigid paints and/or coatings over flexible sealants can result in a loss of adhesion of the applied paint and/or coating, due to the potential movement of the sealant. However, should painting and/or coating be desired it is required that the applicator of the paint and/or coating conduct on-site testing to determine compatibility and adhesion.
- Proper application is the responsibility of the user. Field visits by BASF personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.
- Not for use in glazing applications. Do not apply on glass and plastic glazing panels.

HEALTH, SAFETY AND ENVIRONMENTAL

Read, understand and follow all Safety Data Sheets and product label information for this product prior to use. The SDS can be obtained by visiting www.master-builders-solutions.basf.us, e-mailing your request to basfbscst@basf.com or calling 1(800)433-9517. Use only as directed. **For medical emergencies only, call ChemTrec® 1(800)424-9300.**

LIMITED WARRANTY NOTICE

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is the replacement of product or refund of the purchase price, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

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www.master-builders-solutions.basf.us
Customer Service 1(800)433.9517
Technical Service 1(800)243.6739

VERSIGARD

EPDM Roofing Systems

VERSICO
ROOFING SYSTEMS

BUILDING INTEGRITY

VERSIGARD

EPDM ROOFING SYSTEMS

Why Choose EPDM?

Versico EPDM membranes have been field tested for decades with long-term exposure to UV and ozone resulting in little property change. EPDM Systems are economical to install, offer easy maintenance for owners and achieve Factory Mutual (FM) approvals and (UL) Underwriter's Laboratories fire ratings.

VersiGard EPDM non-reinforced membranes are available in standard 45-mil and 60-mil thicknesses. Membrane widths up to 50' and lengths to 200' afford less rooftop seaming for large projects. Custom sizes may be requested.

WHY CHOOSE **VERSIGARD EPDM**?

The VersiGard Roofing Systems incorporate either 45-mil or 60-mil reinforced or non-reinforced EPDM membrane.

VersiGard (black) reinforced membranes, in 45-, 60- and 75-mil thicknesses, are manufactured with a polyester reinforcement completely encapsulated between two plies of EPDM. Specially developed for Versico's mechanically attached, purlin attached and fully adhered systems, the membrane offers superior fatigue and puncture resistance.

Versico's narrow-width EPDM membranes are pre-cleaned to provide a dust-free surface and enhance splice performance. Additionally, set marks for sheet overlaps and fastener patterns are manufactured right onto the sheet, reducing installation time.

VersiGard EPDM With Quick-Applied Tape

One of the most critical portions of a VersiGard EPDM installation can be made faster and easier with Quick-Applied Tape (QAT) Seam Technology, which factory-applies the Seam Tape to the membrane, greatly reducing the time required for completing seams and minimizing your labor costs.

VersiGard EPDM with QAT:

- Improves seaming productivity by nearly 75% and saves labor costs
- Improves the ability to get buildings "in the dry" in less time
- Factory-controlled consistency provides professional finish for any roofing system

90-Mil Non-Reinforced Membrane

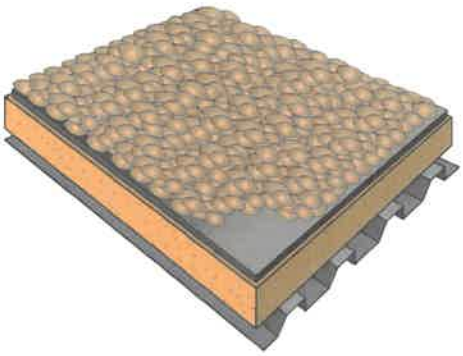
- Provides extra durability and resistance to extreme weather due to its added thickness
- Double the thickness of typical membranes
- Added longevity with the thickest weathering layer available
- More resistant to punctures and hail
- Able to withstand the rigors of foot traffic

VersiGard's 90-mil non-reinforced EPDM membrane combined with an adhered roofing system can be utilized in our 30-year Total Systems Warranty (contractors must be pre-approved to install 30-year systems).

Insulation

- Versico insulation is recommended for use with all of Versico's VersiGard Roofing Systems and is required in a Versico Total Systems Warranty.
- Standard polyisocyanurate board size is 4' x 8' with a thickness range from 1" to 4" and is also available in tapered form
- Versico Polyisocyanurate Insulation is UL and/or FM approved as a system component in certain roofing assemblies

Versico ISO is a polyisocyanurate insulation with foam core insulation boards faced on both sides with a medium-weight fiber-reinforced felt. This dimensionally stable, durable insulation offers maximum thermal efficiency.



VersiGard Ballasted Roofing System
Ballasted designs incorporate a loose-laid insulation and membrane and the use of ballast or pavers as securement.

VersiGard Fully Adhered Roofing System
Fully Adhered Systems require mechanical or adhesive attachment of the insulation and bonding of the membrane to the insulation.

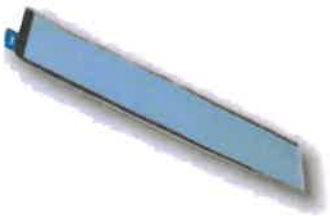
VersiGard Mechanically Attached Roofing System
Mechanically Attached Systems require mechanical attachment of the insulation to the deck and mechanical attachment of the membrane within the seam area.

Versico Roofing System Warranties

- Up to 40-year Premium Membrane Warranties are available. Also, up to 30-year Total Roofing System Warranties are available. Standard wind speed coverage is 55 mph. Additional wind speed warranties are available.
- A warranted system is installed by an authorized Versico Roofing Contractor. A completed warranted system is inspected by a trained Versico Field Service Representative to ensure conformance with Versico specifications.

Accessories

VersiGard Quick-Applied (QA) Accessories greatly reduce the time required for completing seams and installing flashing, resulting in reduced labor costs. Consistent high quality is achieved with VersiGard QA products. The adhesive application is uniform throughout the installation, and ultimate adhesive strength is achieved in a short period of time.



QA Pourable Sealer Pockets

QA RTS

QA Pipe Seals

QA Inside/Outside Corners

QA Seam Tape

QA Uncured Flashing

**Please see VersiGard accessories literature for a more complete listing of accessories.*

VersiGard .045" & .060" Non-Reinforced EPDM Sheet
Typical Properties and Characteristics

Property	Test Method	SPEC. (Pass)	.045	.060
Tolerance on nominal thickness, %	ASTM D412	± 10	± 10	± 10
Weight, lbs/ft² (kg/m²)			0.29 (1.4)	0.39 (1.9)
Tensile Strength, min, psi (Mpa)	ASTM D412	1305 (9)	1600 (11.0)	1600 (11.0)
Elongation, Ultimate, min, %	ASTM D412	300	480	465
Tear Strength, min, lbf/in (kN/m)	ASTM D624 (Die C)	150 (26.3)	200 (35.0)	200 (35.0)
Factory Seam Strength, min	Modified ASTM D816	Membrane Rupture	Membrane Rupture	Membrane Rupture
Resistance to Heat Aging* Properties after 28 days @ 240°F (116°C)	ASTM D573			
Tensile Strength, min, psi (Mpa)	ASTM D412	1205 (8.3)	1500 (10.3)	1450 (10.0)
Elongation, Ultimate, min, %	ASTM D412	200	225	280
Tear Strength, min, lbf/in (kN/m)	ASTM D624	125 (21.9)	215 (37.6)	215 (37.6)
Linear Dimensional Change, max, %	ASTM D1204	± 1.0	-0.4	-0.50
Ozone Resistance* Condition after exposure to 100 pphm Ozone in air for 168 hours @ 104°F (40°C) Specimen is at 50% strain	ASTM D1149	No Cracks	No Cracks	No Cracks
Brittleness Temp., max, °F (°C)*	ASTM D746	-49 (-45)	-49 (-45)	-49 (-45)
Resistance to Water Absorption* After 7 days immersion @ 158°F (70°C) Change in mass, max, %	ASTM D471	+8, -2	+2.0	+2.0
Water vapor Permeance* Max, perms	ASTM E 96 (Proc. B or BW)	0.10	0.05	0.03
Flexibility/Torsion DMA	ASTM D5279-08	N/A	225 MPa @ -40°F	225 MPa @ -40°F
Fungi Resistance	ASTM G21	N/A	0 (No Growth)	0 (No Growth)
Resistance to Outdoor (Ultraviolet) Weathering* Xenon-Arc, total radiant exposure at 0.70 W/m² irradiance, 80°C black panel temp.	ASTM G155	No Cracks No Crazing 7,560 KJ/m² 3,000 hrs	No Cracks No Crazing 41,580 KJ/m² 16,500 hrs	No Cracks No Crazing 41,580 KJ/m² 16,500 hrs
At 0.35 W/m² irradiance, 80°C black panel temperature		6,000 hrs	33,000 hrs	33,000 hrs

*Not a Quality Control test due to the time required for the test or the complexity of the test. However, all tests are run on a statistical basis to ensure overall long-term performance of the sheeting.

Typical properties and characteristics are based on samples tested and are not guaranteed for all samples of this product. This data and information is intended as a guide and does not reflect the specification range for any particular property of this product.

Note: VersiGard non-reinforced EPDM membrane meets or exceeds the minimum requirements set forth by ASTM D 4637 for Type I non-reinforced EPDM single-ply roofing membranes.

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REPRINT REQUEST CODE: 601732 – "VersiGard 4 page Brochure" – 05.05.15

TAPERED H-SHIELD

SLOPED POLYISO INSULATION

NEXGEN CHEMISTRY

PRODUCT DESCRIPTION

Tapered H-Shield is a sloped rigid roof insulation panel composed of a closed cell polyisocyanurate foam core bonded on-line to fiber reinforced facers. Tapered H-Shield is designed to promote positive drainage and prevent ponding water. For best results, use Hunter Panels Tapered Shop Drawings.

FEATURES AND BENEFITS

- Manufactured with NexGen Chemistry™ - Zero ODP, CFC Free, EPA Compliant
- Approved under major roof covering systems – BUR, Modified and Single Ply.

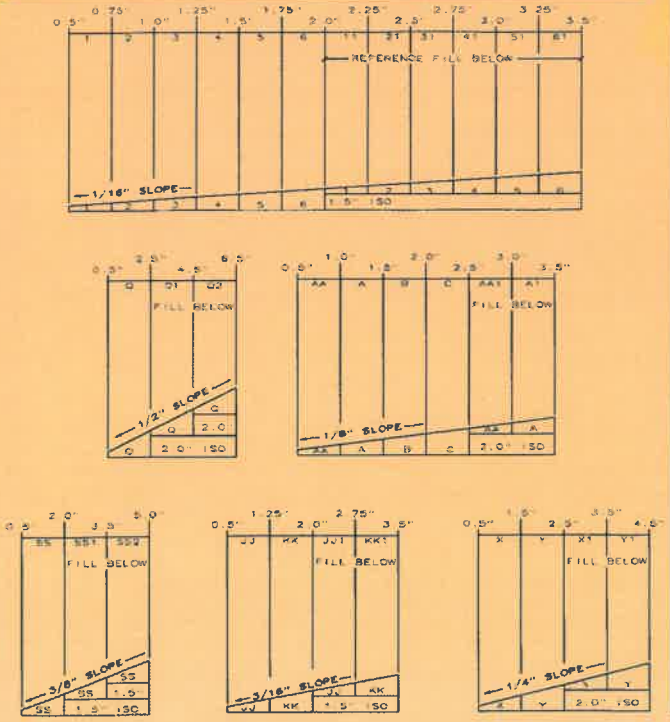
PANEL CHARACTERISTICS

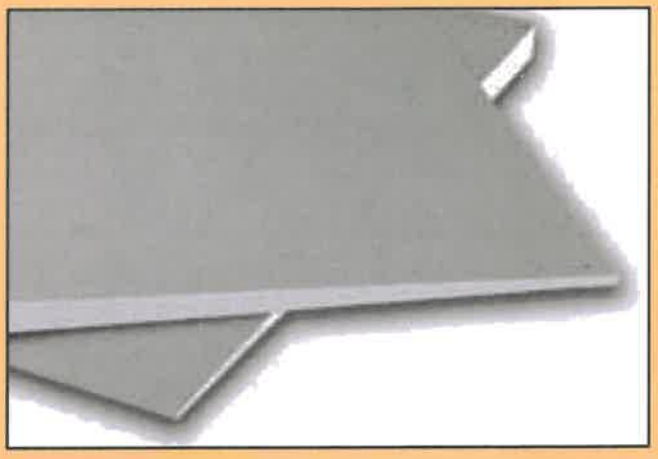
- Available in 4'x4' (1220mm x 1220mm) in thickness of 1/2" (12mm) minimum to 4.0" (102mm) maximum in a single layer.
- Available slopes are 1/16"(2mm), 1/8"(3mm), 3/16"(5mm), 1/4"(6mm), 3/8"(10mm) and 1/2"(12mm) per foot
- Available in two grades of compressive strengths per ASTM C1289-05a, Type II, Class 1, Grade 2 (20 psi), Grade 3 (25 psi).
- Other panel sizes and facers are available upon special request.

APPLICATIONS

- Constructions requiring FM Class 1 and UL Class A ratings
- Single-Ply Roof Systems (Ballasted, Mechanically Attached, Fully Adhered)
- Modified Bitumen Systems
- Built-Up Roofing: Asphalt and Coal Tar

PROFILES





INSTALLATIONS

BUILT UP, COAL TAR AND MODIFIED BITUMEN SYSTEMS

Each Tapered H-Shield panel must be secured to the roof deck with Factory Mutual approved fasteners and plates (appropriate to the deck type). Maximum 4'x4' (1220mm x 1220mm) panels of Tapered H-Shield may be adhered to a prepared concrete deck with a full mopping of hot steep asphalt. Application by cold adhesion also approved. Butt edges and stagger joints of adjacent panels. Install the roof covering according to the manufacturer's specifications.

SINGLE PLY SYSTEMS

BALLASTED SINGLE PLY SYSTEMS

Each Tapered H-Shield panel is loosely laid on the roof deck. Butt edges and stagger joints of adjacent panels. Install the roof covering according to the manufacturer's specifications.

MECHANICALLY ATTACHED SINGLE PLY SYSTEMS

Each Tapered H-Shield panel must be secured to the roof deck with Factory Mutual approved fasteners and plates (appropriate to the deck type). Butt edges and stagger joints of adjacent panels. Install the roof covering according to the manufacturer's specifications.

FULLY ADHERED SINGLE PLY

Each Tapered H-Shield panel must be secured to the roof deck with Factory Mutual approved fasteners and plates (appropriate to the deck type). Maximum 4'x4'(1220mm x 1220mm) panels of Tapered H-Shield may be adhered to a prepared concrete deck with a full mopping of hot steep asphalt. Application by cold adhesion also approved. Butt edges and stagger joints of adjacent panels. Install the roof covering according to the manufacturer's specifications.

HUNTER PANELS

TAPERED H-SHIELD SLOPED POLYISO INSULATION

TAPERED H-SHIELD CODES AND COMPLIANCES

FEDERAL SPECIFICATIONS

- ASTM C1289-05a, Type II Class 1, Grade 2 (20 psi), Grade 3 (25 psi)
- National Building Code (1998) Section 2603 Building Officials and Code Administration International, Inc.

NOTE: Please be aware the Federal Specification HH-I-1972/GEN has been replaced

UNDERWRITERS LABORATORIES, INC.

- Component of Class A Roof Systems (UL 790)
- Hourly Rated P series roof assemblies (UL 263 foam core only) P 225, 230, 232, 259, 508, 510, 514, 519, 701, 713, 717, 718, 719, 720, 722, 723, 724, 727, 728, 729, 730, 732, 734, 735, 739, 801, 814, 815, 818, 819, 823, 824, 826, 827, 828, 832.
- Insulated metal deck assemblies - UL 1256 (nos. 120, 123)
- Tapered H-Shield classified by ULC
- R18846

FACTORY MUTUAL RESEARCH

- FM 4450, FM 4470 (Foam Core Only)
- FM Class 1 approval for steel roof deck constructions, Class 1 Fire and 1-60 and 1-90 windstorm classification (FM 4450).

(Subject to the conditions of approval described in the current Factory Mutual Approval Guide and Supplements)

FLORIDA BUILDING CODE APPROVAL FL#1296
MIAMI-DADE BUILDING CODE COMPLIANCE NOA NO: 04-1018.01

WARNINGS AND LIMITATIONS

Insulation must be protected from open flame and kept dry at all times. Install only as much insulation as can be covered the same day by completed roof covering material. Hunter Panels will not be responsible for specific building and roof design by others, for deficiencies in construction or workmanship, for dangerous conditions on the job site or for improper storage and handling. Technical specifications shown in this literature are intended to be used as general guidelines only and are subject to change without notice. Call Hunter Panels for more specific details, or refer to PIMA Technical Bulletin No. 109: *Storage & Handling Recommendations for Polyiso Roof Insulation.*

TYPICAL PHYSICAL PROPERTY DATA CHART POLYISO FOAM CORE ONLY

PROPERTY	TEST METHOD	VALUE
Compressive Strength	ASTM D 1621 ASTM 1289-05a	20 psi* minimum (138kPa, Grade 2)
Dimensional Stability	ASTM D 2126	2% linear change (7 days)
Moisture Vapor Transmission	ASTM E 96	< 1 perm ((57.5ng/(Pa•s•m²))
Water Absorption	ASTM C 209	< 1% volume
Flame Spread (foam core)	ASTM E 84	< 50
Service Temperature		-100° to 250° F (-73°C to 122°C)

* Also available in 25 psi minimum, Grade 3

OTHER PRODUCTS BY HUNTER:

- **H-Shield** *FLAT POLYISO*
- **H-Shield-NB** *POLYISO BONDED TO ORIENTED STRAND BOARD*
- **H-Shield-WF** *POLYISO BONDED TO WOOD FIBERBOARD*
- **H-Shield-F** *POLYISO BONDED TO FOIL*
- **H-Shield-CG** *POLYISO BONDED TO COATED GLASS FACER*
- **H-Shield-AGF** *POLYISO BONDED TO AGF FACER*
- **H-Shield-DD** *POLYISO BONDED TO DENSDECK*
- **H-Shield-DDP** *POLYISO BONDED TO PRIMED DENSDECK*
- **Tapered H-Shield-WF** *TAPERED POLYISO BONDED TO WOOD FIBERBOARD*
- **Tapered H-Shield-CG** *TAPERED POLYISO BONDED TO COATED GLASS FACER*
- **Cool-Vent** *VENTILATED NAILBASE INSULATION PANEL*
- **Cool-Vent II** *VENTILATED NAILBASE INSULATION PANEL*

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MANUFACTURING FACILITIES:

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FRANKLIN PARK, IL
LAKE CITY, FL
TERRELL, TX
TOOELE, UT
SMITHFIELD, PA

H-Shield

Flat Polyiso

NEXGEN CHEMISTRY

PRODUCT DESCRIPTION

H-Shield is a rigid roof insulation panel composed of a closed cell polyisocyanurate foam core bonded on each side to fiber reinforced facers.

Features and Benefits

- Manufactured with NexGen Chemistry™ - Zero ODP, CFC Free, EPA Compliant.
- Approved for direct application to steel decks.
- Approved under all major roof covering systems – BUR, Modified and Single Ply.

Panel Characteristics

- Available in 4'x4' (1220mm x 1220mm) and 4'x8' (1220mm x 2440mm) panels in thickness of 1"(25mm) to 4.0" (102mm)
- Available in two grades of compressive strengths per ASTM C1289-05a, Type II, Class 1, Grade 2 (20 psi), Grade 3 (25 psi).

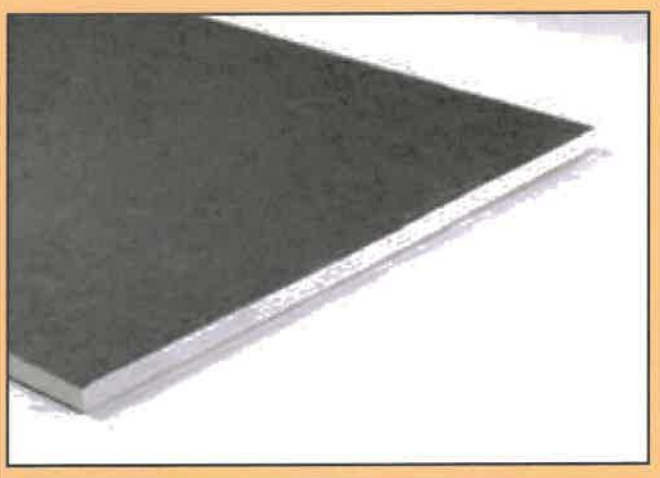
Applications

- Constructions requiring FM Class 1 and UL Class A ratings
- Single-Ply Roof Systems (Ballasted, Mechanically Attached, Fully Adhered)
- Modified Bitumen Systems
- Built-Up Roofing: Asphalt and Coal Tar

H-SHIELD THERMAL VALUES

THICKNESS (INCHES)	(MM)	LTTR R VALUE*	FLUTE SPANABILITY
1.00"	25	6.00	2 5/8"
1.50"	38	9.00	4 3/8"
1.60"	41	9.60	4 3/8"
1.70"	43	10.30	4 3/8"
1.80"	46	10.90	4 3/8"
2.00"	51	12.10	4 3/8"
2.50"	64	15.30	4 3/8"
2.70"	69	16.60	4 3/8"
3.00"	76	18.50	4 3/8"
3.10"	79	19.10	4 3/8"
3.30"	84	20.40	4 3/8"
3.50"	89	21.70	4 3/8"
3.60"	91	22.40	4 3/8"
3.70"	94	23.00	4 3/8"
4.00	102	25.00	4 3/8"

*Long Term Thermal Resistance Foam Core Values are based on ASTM C1289-05a and CAN/ULC S770 which provides for a 15-year time weighted average. All PIMA members have adopted this advanced standard for R-value measurement as of 1/1/03.



INSTALLATION

Built Up, Coal Tar And Modified Bitumen Systems

Each H-Shield panel must be secured to the roof deck with Factory Mutual approved fasteners and plates (appropriate to the deck type). Maximum 4'x4' (1220mm x 1220mm) panels of H-Shield may be adhered to a prepared concrete deck with a full mopping of hot steep asphalt. Application by cold adhesion also approved. Butt edges and stagger joints of adjacent panels. Install the roof covering according to the manufacturer's specifications.

Single Ply Systems

Balasted Single Ply Systems

Each H-Shield panel is loosely laid on the roof deck. Butt edges and stagger joints of adjacent panels. Install the roof covering according to the manufacturer's specifications.

Mechanically Attached Single Ply Systems

Each H-Shield panel must be secured to the roof deck with Factory Mutual approved fasteners and plates (appropriate to the deck type). Butt edges and stagger joints of adjacent panels. Install the roof covering according to the manufacturer's specifications.

Fully Adhered Single Ply

Each H-Shield panel must be secured to the roof deck with Factory Mutual approved fasteners and plates (appropriate to the deck type). Maximum 4'x4'(1220mm x 12 20mm) panels of H-Shield may be adhered to a prepared concrete deck with a full mopping of hot steep asphalt. Application by cold adhesion also approved. Butt edges and stagger joints of adjacent panels. Install the roof covering according to the manufacturer's specifications.

H-SHIELD
CODES AND COMPLIANCES

Federal Specifications

- ASTM C1289-05a, Type II, Class 1, Grade 2 (20 psi), Grade 3 (25 psi)
- National Building Code (1998) Section 2603 Building Officials and Code Administration International, Inc.

NOTE: Please be aware the Federal Specification HH-I-1972/GEN has been replaced

Underwriters Laboratories, Inc.

- Component of Class A Roof Systems (UL 790)
- Hourly Rated P series roof assemblies (UL 263 foam core only) P 225, 230, 232, 259, 508, 510, 514, 519, 701, 713, 717, 718, 719, 720, 722, 723, 724, 727, 728, 729, 730, 732, 734, 735, 739, 801, 814, 815, 818, 819, 823, 824, 826, 827, 828, 832.
- Insulated metal deck assemblies - UL 1256 (nos. 120, 123)
- H-Shield classified by ULC
- R18846

Factory Mutual Research

- FM 4450, FM 4470 (Foam Core Only)
- FM Class 1 approval for steel roof deck constructions, Class 1 Fire and 1-60 and 1-90 windstorm classification (FM 4450).
  (Subject to the conditions of approval described in the current Factory Mutual Approval Guide and Supplements)

FLORIDA BUILDING CODE APPROVAL FL#1296
MIAMI-DADE BUILDING CODE COMPLIANCE NOA NO: 04-1018.01

WARNINGS AND LIMITATIONS

Insulation must be protected from open flame and kept dry at all times. Install only as much insulation as can be covered the same day by completed roof covering material. Hunter Panels will not be responsible for specific building and roof design by others, for deficiencies in construction or workmanship, for dangerous conditions on the job site or for improper storage and handling. Technical specifications shown in this literature are intended to be used as general guidelines only and are subject to change without notice. Call Hunter Panels for more specific details, or refer to PIMA Technical Bulletin No. 109: *Storage & Handling Recommendations for Polyiso Roof Insulation*.

TYPICAL PHYSICAL PROPERTY DATA CHART
POLYISO FOAM CORE ONLY

PROPERTY	TEST METHOD	VALUE
Compressive Strength	ASTM D 1621 ASTM 1289-05a	20 psi* minimum (138kPa, Grade 2)
Dimensional Stability	ASTM D 2126	2% linear change (7 days)
Moisture Vapor Transmission	ASTM E 96	< 1 perm ((57.5ng/(Pa•s•m²))
Water Absorption	ASTM C 209	< 1% volume
Flame Spread (foam core)	ASTM E 84	< 50
Service Temperature		-100° to 250° F (-73°C to 122°C)

* Also available in 25 psi minimum, Grade 3

OTHER PRODUCTS BY HUNTER:

- **H-Shield-NB** *POLYISO BONDED TO ORIENTED STRAND BOARD*
- **H-Shield-WF** *POLYISO BONDED TO WOOD FIBERBOARD*
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H-SHIELD FLAT POLYISO

FM APPROVED

CLASSIFIED UL · PIMA · Energy Star

PIMA QualityMark™ The Certified LTTR-value

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Georgia-Pacific

DensDeck®

Prime Roof Board

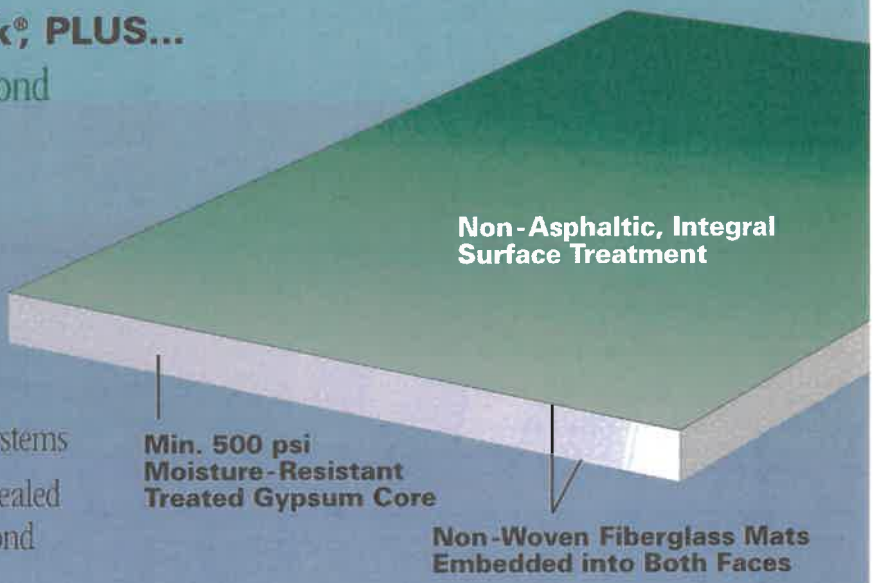
Featuring a non-asphaltic, integral surface treatment for an enhanced bond and reduced fasteners.

All the properties of DensDeck®, PLUS...

- Creates a more consistent, stronger bond
- Reduces adhesive requirements
- Fewer fasteners required
- Allows for uniform drying time

Uses:

- Fully-adhered single-ply systems
- Torch and cold-applied modified bitumen systems
- Other commercial roofing systems where a sealed surface is desirable for a highly consistent bond



Features	Benefits
Reduces adhesive use in single-ply systems by up to 50 percent	Significant cost savings
Fewer fasteners required for higher wind uplift resistance	Lower installation cost
Minimizes blistering during torch application of modified bitumens	Allows for a more consistent bond
Darker color that accelerates drying of surface after moisture exposure	Diminishes risk of trapped moisture
Fiberglass mat is encapsulated with coating	Reduces skin irritation from exposed glass fibers
High-strength bonds with both adhesive and modified bitumen	Improves wind uplift performance and reduces fastener requirements
Allows uniform drying of single-ply adhesives and cold mastics	Facilitates a more consistent bond without blisters
Moisture-resistant core	Superior mold and fire resistance
Fiberglass mats embedded into core on both faces	Results in dimensional stability and prevents warping

Georgia-Pacific
Gypsum

DensDeck® Prime Properties, Standards and Classifications

Georgia-Pacific DensDeck DuraGuard Roof Board

	1/4" DensDeck Prime	1/2" DensDeck Prime	5/8" DensDeck Prime Fireguard®
Thickness, nominal	1/4" ± 1/16"	1/2" ± 1/32"	5/8" ± 1/32"
Width, standard	4' ± 1/8"	4' ± 1/8"	4' ± 1/8"
Length, standard	4' and 8' ± 1/4"	4' and 8' ± 1/4"	4' and 8' ± 1/4"
Weight, lbs./sq. ft., nominal	1.15 - 1.25	1.975	2.55
Surfacing	Fiberglass mat Durable, low-perm coating	Fiberglass mat Durable, low-perm coating	Fiberglass mat Durable, low-perm coating
Flexural Strength[1], parallel, lbs. min.	40	80	100
Flute Spanability[2]	2-5/8"	5"	8"
Permeance[3], Perms	50	35	32
"R" Value[4]	.28	.56	.67
Linear Variation with Change in Temp., in/in °F	8.5×10^{-6}	8.5×10^{-6}	8.5×10^{-6}
Linear Variation with Change in Moisture, in/in %RH	6.25×10^{-6}	6.25×10^{-6}	6.25×10^{-6}
Water Absorption[5], % max	10.0	10.0	10.0
Compressive Strength, psi nominal	500 - 900	500 - 900	500 - 900
Surface Water Absorption, grams, nominal	≤ 2.0	≤ 2.0	≤ 2.0
Flame Spread, Smoke Developed (ASTM E 84)	0/0	0/0	0/0
Fire Classification	FM CLASS 1 (as overlayment)	FM CLASS 1 (FM 4450)	FM CLASS 1 (FM 4450)
	UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107
Mold Resistance per ASTM D 3273[6]	Mold resistant	Mold resistant	Mold resistant
ASTM Standard	C 1177	C 1177	C 1177
Uplift Standards and Testing	ANSI/UL 1897 ASCE 7 FM 4470	ANSI/UL 1897 ASCE 7 FM 4470	ANSI/UL 1897 ASCE 7 FM 4470
Bending Radius	5'	8'	12'

1. Tested in accordance with ASTM C 473.
2. Tested in accordance with ASTM E 661 (400 lb. conc. load only for 1/2" and 5/8").
3. Tested in accordance with ASTM E-96 (dry cup method).
4. Tested in accordance with ASTM C 518 (heat flow meter).
5. ASTM C 1177 minimums.
6. When tested as manufactured in accordance with ASTM D 3273.

Georgia-Pacific Gypsum

SALES INFORMATION AND ORDER PLACEMENT

U.S.A. Midwest: **1-800-876-4746**
West: **1-800-824-7503**
South: **1-800-327-2344**
Northeast: **1-800-947-4497**

CANADA Canada Toll Free: **1-800-387-6823**
Quebec Toll Free: **1-800-361-0486**

TECHNICAL INFORMATION

Georgia-Pacific Gypsum Technical Hotline
U.S.A. and Canada: **1-800-225-6119**
www.gpgypsum.com

FM APPROVED
CLASSIFIED UL US

METRO DADE APPROVED
02.0102.01

TRADEMARKS

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UPDATES AND CURRENT INFORMATION

The information in this document may change without notice. Visit our website at www.gpgypsum.com for updates and current information.

LIMITATION OF REMEDIES AND DAMAGES

Unless otherwise stated in our written warranty for these products, our sole liability for any product claim shall be limited to reimbursement of the cost of repair or replacement of the affected product, up to a maximum amount of two times the original purchase price for the affected product. We shall not be responsible under any circumstances for lost profits, damage to a structure or its contents, or indirect, incidental, special or consequential damages. Claims shall be deemed waived if they are not submitted to us in writing within ten (10) days after discovery of a product defect/circumstance giving rise to a claim.

CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

HANDLING AND USE

CAUTION: This product contains fiberglass facings which may cause skin irritation. Dust and fibers produced during the handling and installation of the product may cause skin, eye and respiratory tract irritation. Avoid breathing dust and minimize contact with skin and eyes. Wear long sleeve shirts, long pants and eye protection. Always maintain adequate ventilation. Use a dust mask or NIOSH/MSHA approved respirator as appropriate in dusty or poorly ventilated areas. For additional product fire, safety and use information go to www.gp.com/safetyinfo or call 1-800-225-6119.

FIRE SAFETY CAUTION

Passing a fire test in a controlled laboratory setting and/or certifying or labeling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance or protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating of any product or assembly/system.

G-P Gypsum

DensDeck Prime®
Roof Board

Technical Service Hotline 1.800.225.6119 or
www.densdeck.com

Manufacturer

G-P Gypsum Corporation
55 Park Place, 19th floor, Atlanta, GA 30303
Technical Service Hotline 1-800-225-6119 or www.densdeck.com

Description

DensDeck Prime® Roof Board is an exceptional fire barrier, thermal barrier and recovery board used in various commercial roofing systems. The product features a pre-primed surface to make the bond even stronger. The patented DensDeck design employs glass mat facings front and back that are embedded into a water resistant and moisture-resistant treated core, providing excellent fire resistance, moisture resistance and wind uplift properties. The unique construction of DensDeck Prime provides superior flute spanning and will help stiffen and stabilize the roof deck. Additionally, DensDeck Prime has been shown to withstand delamination, deterioration, warping and jobsite damage more effectively than roofing membrane substrates such as paper-faced gypsum board, fiberboard and perlite insulation. DensDeck Prime resists the growth of mold and mildew per ASTM D 3273.

Primary Uses

Roof system manufacturers and designers have found DensDeck Prime Roof Board to be compatible with many types of roofing systems, including: modified asphalt, single-ply, metal systems, recover board, as well as an overlayment for polyisocyanurate and polystyrene insulation. DensDeck Prime can also be used as a form board for poured gypsum concrete deck in roof applications as well as a substrate for spray foam roofing systems. 1/2" and 5/8" DensDeck Prime may also be used in vertical applications as a backer board or liner for the roof side of parapet walls.

DensDeck Prime Roof Board allows the bonding of cold mastic modified bitumen and torching directly to the surface. ***Consult with the system manufacturer for recommendations on this application.*** System manufacturers and designers have found DensDeck Prime to be compatible with bonding adhesives for fully adhered single-ply membrane applications and has been shown to extend the adhesive usage.

DensDeck Prime Roof Board's exceptional moisture resistance make it the preferred substrate for vapor retarders. An excellent fire barrier, DensDeck Prime features a noncombustible core and inorganic surface that offers greater fire protection than other conventional commercial roofing products when applied over combustible roof decks and steel decks. DensDeck Prime is FM tested and approved as the only 1/2" gypsum product to meet the calorimeter requirements for conventionally insulated decks. Tested in accordance with ASTM E 84, its surface burning characteristics are Flame Spread-0 and Smoke Developed-0. 5/8" DensDeck Prime can replace any generic Type X gypsum board in any roof assembly in the UL Fire Resistance Directory under the prefix "P".

Limitations

DensDeck Prime Roof Board is designed to act with a properly designed roof system. The actual use of DensDeck Prime as a roofing component is the responsibility of the roofing system's designing authority. Georgia-Pacific does not offer roofing system design services.

Conditions beyond the control of Georgia-Pacific such as weather conditions, dew, application temperatures and techniques may cause adverse effects with adhered roofing systems. Always consult roofing manufacturers for their specific instructions on applying their products to DensDeck Prime Roof Board.

Panels must be kept dry before, during and after installation. Apply only as much DensDeck Prime Roof Board as can be covered by a roof membrane system in the same day.

Accumulation of water due to leaks or condensation in or on DensDeck Prime Roof Board must be avoided during construction and after construction. Avoid over-use of non-vented direct-fired heaters during winter months. Avoid application of DensDeck Prime during rains, heavy fogs and other conditions that may deposit moisture on the surface.

The need for a separator sheet between the DensDeck Prime Roof Board and the roofing membrane shall be determined by the roof membrane manufacturer or roofing systems designer.

When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.

Maximum flute span is 2-5/8" for 1/4" DensDeck Prime; 5" for 1/2" DensDeck Prime; and 8" for 5/8" DensDeck Prime Fireguard® Type X.

Consult membrane manufacturer for specific system installation instructions.

Submittal Approvals

Job Name _____

Contractor _____

Date _____

Stamps / Signatures

G-P Gypsum

DensDeck Prime®

Roof Board

Technical Service Hotline 1.800.225.6119 or
www.densdeck.com

Technical Data

Flame spread 0, smoke developed 0, when tested in accordance with ASTM E 84 or CAN/ULC-S102. Noncombustible when tested in accordance with ASTM E 136.

DensDeck Prime Fireguard: UL Classified when tested in accordance with ASTM E 119.

1/4" DensDeck Prime has been tested in G-P sponsored tests with Factory Mutual for 60 psf and 90 psf wind uplift for BUR, EPDM, thermoplastics and modified bitumen roof systems. Higher wind uplift ratings have been achieved by numerous membrane manufacturers using DensDeck Prime in their FMRC approved construction designs.

Properties	1/4"	1/2"	5/8"
Thickness, nominal	1/4" + 1/16"	1/2" ± 1/32"	5/8" ± 1/32"
Width, standard	4' ± 1/8"	4' ± 1/8"	4' ± 1/8"
Length, standard	4' and 8' ± 1/4"	4' and 8' ± 1/4"	4' and 8' ± 1/4"
Weight, lbs./sq. ft., nominal	1.15	1.975	2.55
Surfacing	Glass mat non-asphaltic coating	Glass mat with non-asphaltic coating	Glass mat with non-asphaltic coating
Flexural Strength[1], parallel, lbs. min.	40	80	100
Flute Spanability[2]	2-5/8"	5"	8"
Permeance[3], Perms	50	35	32
"R" Value[4]	.28	.56	.67
Linear Variation with Change in Temp., in/in °F	$8.5x10^{-6}$	$8.5x10^{-6}$	$8.5x10^{-6}$
Linear Variation with Change in Moisture, in/in %RH	$6.25x10^{-6}$	$6.25x10^{-6}$	$6.25x10^{-6}$
Water Absorption[5], % max	10.0	10.0	10.0
Compression Strength, psi nominal	500 - 900	500 - 900	500 - 900
Surface Water Absorption[5], grams, nominal	<2.0	<2.0	<2.0
Flame Spread, Smoke Developed (ASTM E 84)	0/0	0/0	0/0
Fire Classification	FM CLASS 1 (as overlayment)	FM Class 1 (FM 4450)	FM Class 1 (FM 4450) UL 1256, ULC S-126
	UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	UL Classified "P" assemblies ULC Classified "R" assemblies ULC S-101 Class A (UL 790), ULC S-107
Mold Resistance per ASTM D 3273[6]	Mold resistant	Mold resistant	Mold resistant
FM Approvals[7]	60 and 90 psf uplift/ FM Class 1-90 as an overlayment	FM 1-60, 1-90, 1-135	FM 1-60, 1-90, 1-180
Bending Radius	5'	8'	12'

1. *Tested in accordance with ASTM C 473.*
2. *Tested in accordance with ASTM E 661 (400 lb. conc. load only for 1/2" and 5/8").*
3. *Tested in accordance with ASTM E-96 (dry cup method).*
4. *Tested in accordance with ASTM C 518 (heat flow meter).*
5. *ASTM C 1177 minimums.*
6. *When tested as manufactured in accordance with ASTM D 3273.*
7. *Higher wind uplift ratings have been achieved by numerous membrane manufacturers using DensDeck, DensDeck Prime or DensDeck DuraGuard roof boards in their FM-Approved construction designs.*

G-P Gypsum
a Georgia-Pacific company

SALES INFORMATION AND ORDER PLACEMENT

U.S.A. Midwest: **1-800-876-4746** West: **1-800-824-7503**
South: **1-800-327-2344** Northeast: **1-800-947-4497**

CANADA Canada Toll Free: **1-800-387-6823**
Quebec Toll Free: **1-800-361-0486**

TECHNICAL INFORMATION Complete technical information, application instructions, test data, and specifications can be obtained by visiting our Web site at **www.gpgypsum.com** or by calling the GP Technical Hotline.

G-P Gypsum Technical Hotline
U.S.A. and Canada: **1-800-225-6119**
Mon.-Fri., 8 a.m.-6 p.m. ET

TRADEMARKS DENSDECK PRIME, FIREGUARD and DENS are trademarks of Georgia-Pacific Corporation or one of its subsidiaries.

UPDATES AND CURRENT INFORMATION The information in this document may change without notice. Visit our website at www.gpgypsum.com for updates and current information.

LIMITATION OF REMEDIES AND DAMAGES Our sole liability for any product claim shall be limited to reimbursement of the cost of repair or replacement of the affected product, up to a maximum amount of two times the original purchase price for the affected product. We shall not be responsible under any circumstances for lost profits, damage to a structure or its contents, or indirect, incidental, special or consequential damages. Claims shall be deemed waived if they are not submitted to us in writing within ten days after discovery.

SAFETY CAUTION: This product contains fiberglass. Fibers and dust may be released from this product during normal handling and may result in skin, eye and respiratory irritation. Avoid breathing dust and contact with the skin and eyes.

Follow these standard work practices: Wear a loose-fitting, long-sleeved shirt and long pants, protective gloves and eye protection (goggles or safety glasses with side shields). Wear a dust mask when sanding. Additional protection may be needed when very dusty. Do not use a power saw. For Material Safety Data Sheet or additional information, call 1-800-225-6119 or visit www.gpgypsum.com.

Johns Manville

Single Ply Roofing Systems (EPDM)

JM EPDM Nonreinforced Roofing Membranes:

☐ 45 FR ☐ 60 FR ☐ 90 FR

Description

JM Nonreinforced EPDM Roofing Membranes are 45, 60 or 90 mil (1.14, 1.52 or 2.87 mm) thick, cured EPDM (ethylene propylene diene monomer) sheets. The polymer allows the membrane to become rubber-like, allowing it to respond to stress and recover its original shape. The EPDM formulation offers superior ozone and weather resistance and the sheet remains elastic through wide temperature ranges. The durability and strength of EPDM make it an excellent solution for your roofing needs.

Use

Use as a single ply membrane in certain ballasted and fully adhered roofing systems or as a flashing material as outlined in JM EPDM flashing specifications.

Color

Black

Standard Sizes

Thickness	Widths	Lengths
45 FR	10' (3.05 m)	50', 100' (15.24 m, 30.48 m)
	20' (6.1 m)	50', 100' (15.24 m, 30.48 m)
	30' (9.14 m)	100' (30.48 m)
	40' (12.19 m)	100' (30.48 m)
60 FR	10' (3.05 m)	50', 100' (15.24 m, 30.48 m)
	15' (4.57 m)*	100' (30.48 m)*
	20' (6.1 m)	50', 100' (15.24 m, 30.48 m)
	30' (9.14 m)	100' (30.48 m)
90 FR	10' (3.05 m)	100' (30.48 m)

* Full width, no fold membrane

Approvals

JM EPDM Roof Systems are classified by UL® (Underwriters Laboratories Inc.) and FM Global® (Factory Mutual).

Application

Refer to JM EPDM Applicator Guides or Detail Drawings for instructions.

Storage

Keep clean and dry prior to application.

Precautions

Do not install in direct contact with asphalt or coal tar pitch.

Refer to the Material Safety Data Sheet prior to using JM EPDM Nonreinforced Roofing Membranes. Material Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

JM EPDM membranes meet or exceed all the requirements of ASTM D 4637, Type I.

Typical Physical Properties

Property	Test	Standards Minimum
Thickness, min Sheet - overall	D-751	0.040" (1.02 mm)
Tensile Strength, min, psi (MPa)	D-412	1305 (9.0)
Dynamic Puncture Resistance	D-5635	Pass
Static Puncture Resistance	D-5602	Pass
Elongation, ultimate, min, %	D-751	300
Tensile Set, max, %	D-412	10
Tear Resistance, min, lbf/in. (kN/m)	D-624	150 (26.27)

Property	Test	Standards Minimum
Brittleness Point, max, °C (°F)	D-2137	-45 (-49)
Ozone Resistance, no cracks	D-1149	Pass
Heat Aging:	D-573	
Tensile Strength, min, psi (MPa)	D-412	1205 (8.3)
Elongation, ultimate, min, %	D-412	200
Tear Resistance, min, lbf/in. (kN/m)	D-624	125 (21.9)
Linear Dimension Change, max, %	D-751	± 1
Water Absorption, max, mass %	D-471	+8/-2
Weather Resistance:	G-151,	
Visual Inspection	G-155	Pass
PRFSE, min, %		30
Elongation, ultimate, min, %		200

Flat & Tapered ENRGY 3®

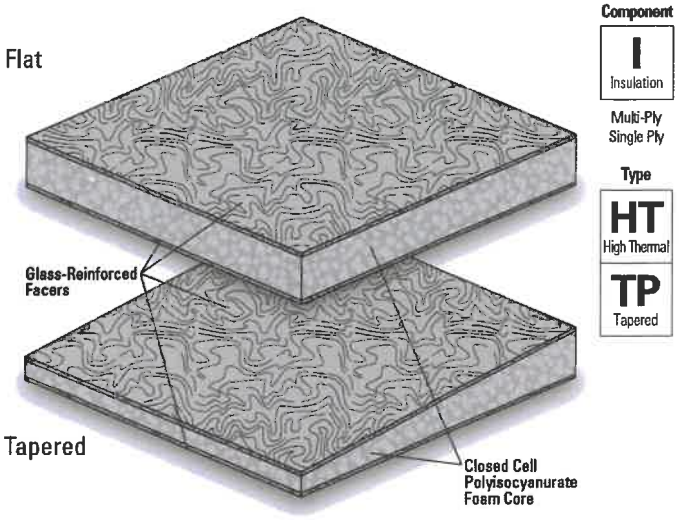
Polyisocyanurate Roof Insulation

Meets the requirements of ASTM C 1289, Type II, Class 1, Grade 2 (20 psi)

- **ENRGY 3 / Tapered ENRGY 3**

Grade 3 (25 psi)

- **ENRGY 3 25 PSI / Tapered ENRGY 3 25 PSI**



Features and Components

Glass-Reinforced Facers: Provides rigidity and resistance to indentation and crushing, and are compatible with BUR, modified bitumen and single ply membrane systems.

Closed Cell Polyisocyanurate Foam Core: Provides high R-value per inch in built-up, modified bitumen, metal roof and single ply roof systems, and approved for direct application to steel decks.

System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR		APP			SBS											
	HA		CA		HW	HA		CA		HW	SA		MF				
	Compatible with the selected Multi-Ply systems above																
Single Ply	TPO					PVC					EPDM						
	MF		AD		SA	IW		MF		AD	IW		MF		AD		BA
	Compatible with all Single Ply systems																

Key: **HA** = Hot Applied **CA** = Cold Applied **HW** = Heat Weldable **SA** = Self Adhered **MF** = Mechanically Fastened **IW** = Induction Weld **BA** = Ballasted **AD** = Adhered

Energy and the Environment

LEED® Recycled Content	Varies with thickness, see *Product Data and Packaging* table on next page.
Produced with a pentane blowing agent with zero ozone depletion and virtually no global warming potential.	

Peak Advantage® Guarantee Information

Systems
For use in approved JM Peak Advantage Roofing Guarantees

Codes and Approvals

- FM® Standards 4450/4470 Approvals (refer to FM RoofNav℠)
- UL® Standard 790, 263 and 1256 (refer to UL Roofing Materials system directory)
- Meets the requirements of CAN/ULC S704, Type 2 & 3, Class 3
- California Code of Regulations, Title 24, Insulation Quality Standard License #TI-1341
- Third-party certification with the PIMA Quality Mark™ for Long-Term Thermal Resistance (LTTR) values

Refer to the Safe for Use instructions and product label prior to using this product. The Safe for Use instructions are available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

Note: Technical information on this data sheet is intended to be used as a general guideline only and is subject to change without notice. Contact your JM Sales Representative for further details.

Installation/Application

Refer to the application instructions guidelines for proper utilization of this product.

Flute Span:

Width of Rib Opening:	Up to 2⅝" (6.67 cm)	Up to 3⅜" (8.57 cm)	Up to 4⅜" (11.11 cm)
Insulation Thickness (min):	1.0" (2.54 cm)	1.2" (3.05 cm)	≥1.3" (3.30 cm)

Packaging and Dimensions

Flat Sizes[1]	4' x 4' (1.22 m x 1.22 m)	4' x 8' (1.22 m x 2.44 m)
Tapered Size[2]	4' x 4' (1.22 m x 1.22 m)	
Producing Locations	Bremen, IN Hazleton, PA	Cornwall, ONT Jacksonville, FL Fernley, NV
Stocking Locations[3]	Grand Prairie, TX	Southgate, CA Tracy, CA

1. For available thicknesses, see *Product Data and Packaging* table on page 2 of this data sheet. Other sizes available by special request, some sizes are not stocked but can be special ordered with minimum order quantities. Contact your JM Sales Representative for details.
2. Tapered ENRGY 3 and Tapered ENRGY 3 25 PSI are available in thicknesses of ½" to 4". Available profiles are shown on page 3 of this data sheet. In some regions extended panels are also available.
3. Not all sizes, thicknesses, and products are stocked at all locations, please call Customer Service at 1-877-766-3295.

Johns Manville

Flat ENRGY 3®

Polyisocyanurate Roof Insulation

Typical Physical Properties

	Test	ASTM	Values
Strength	Tensile Strength	C 209	500 psf (24 kPa) *(min)*, 730 psf (35 kPa) *(nom)*
	Compressive Resistance 10% Consolidation	D 1621	Grade 2: 20 psi (138 kPa), Grade 3: 25 psi (172 kPa) *(min)*
	Dimensional Stability Change, *(length & width)*	D 2126	0.5% *(nom)*, 2% *(max)*
Moisture	Moisture Vapor Permeance	E 96	<1 perm, 57.5 ng/(Pa•s•m²)
	Water Absorption	C 209	1.0% *(max)*
Insulation	Service Temperature	D 1623	-100°F – 250°F (-73°C – 121°C)
	Flame Spread, *(foam core)*	E 84	20 - 30 *(nom)*, 75 *(max)*
	Smoke Developed, *(foam core)*	E 84	55 - 250 *(nom)*, 450 *(max)*

Product Data and Packaging

Thickness		Long-Term Thermal Resistance (LTTR) Values[1]		Recycled Content[2] 20 PSI / 25 PSI			Boards per Pallet	Square Feet per Pallet		Pallets per Truck[3]	
in.	mm	(hr•ft²•°F)/BTU	m²•°C/W	% Pre-Consumer	% Post-Consumer	% Total	4x4 and 4x8	4x4	4x8	4x4	4x8
1.0	25.4	5.7	1.00	5.3 / 5.2	31.8 / 29.9	37.1 / 35.1	48	768	1536		
1.1	27.9	6.3	1.10	5.2 / 5.2	30.0 / 28.1	35.3 / 33.3	41	656	1312		
1.2	30.5	6.8	1.20	5.2 / 5.2	28.4 / 26.6	33.6 / 31.76	38	608	1216		
1.25	31.8	7.1	1.25	5.2 / 5.2	27.7 / 25.8	32.9 / 31.0	35	560	1120		
1.3	33.0	7.4	1.30	5.3 / 5.3	27.0 / 25.2	32.3 / 30.4	35	560	1120		
1.4	35.6	8.0	1.41	5.3 / 5.2	25.7 / 23.9	31.0 / 29.2	32	512	1024		
1.5	38.1	8.6	1.51	5.2 / 5.2	24.5 / 22.8	29.8 /28.0	32	512	1024		
1.6	40.6	9.1	1.61	5.2 / 5.2	23.4 / 21.7	28.7 / 27.0	28	448	896		
1.7	43.2	9.7	1.71	5.2 / 5.2	22.4 / 20.8	27.7 / 26.0	27	432	864		
1.75	44.5	10.0	1.76	5.2 / 5.2	22.0 / 20.4	27.2 / 25.6	27	432	864		
1.8	45.7	10.3	1.81	5.2 / 5.2	21.5 / 19.9	26.7 / 25.1	25	400	800		
1.9	48.3	10.8	1.91	5.2 / 5.2	20.7 / 19.1	25.9 / 24.3	24	384	768		
2.0	50.8	11.4	2.01	5.2 / 5.2	19.9 / 18.4	25.1 / 23.6	24	384	768		
2.1	53.3	12.0	2.11	5.2 / 5.2	19.2 / 17.7	24.4 / 22.9	21	336	672		
2.2	55.9	12.6	2.22	5.2 / 5.2	18.5 / 17.1	23.7 / 22.3	21	336	672		
2.3	58.4	13.2	2.32	5.2 / 5.2	17.9 / 16.5	23.1 / 21.7	20	320	640		
2.4	61.0	13.8	2.43	5.2 / 5.2	17.3 / 16.0	22.5 / 21.1	19	304	608		
2.5	63.5	14.4	2.53	5.2 / 5.2	16.8 / 15.4	22.0 / 20.6	19	304	608		
2.6	66.0	15.0	2.64	5.2 / 5.1	16.3 / 15.0	21.4 / 20.1	18	288	576		
2.7	68.6	15.6	2.74	5.2 / 5.1	15.8 / 14.5	21.0 / 19.7	17	272	544		
2.8	71.1	16.2	2.85	5.2 / 5.1	15.3 /14.1	20.5 / 19.2	16	256	512	48	24
2.9	73.7	16.8	2.96	5.2 / 5.1	14.9 / 13.7	20.1 / 18.8	16	256	512		
3.0	76.2	17.4	3.06	5.2 / 5.1	14.5 / 13.3	19.7 / 18.4	16	256	512		
3.1	78.7	18.0	3.17	5.1 / 5.1	14.1 / 12.9	19.3 / 18.1	14	224	448		
3.2	81.3	18.6	3.28	5.1 / 5.1	13.8 / 12.6	18.9 / 17.7	14	224	448		
3.25	82.6	18.9	3.33	5.1 / 5.1	13.6 / 12.4	18.7 / 17.6	14	224	448		
3.3	83.8	19.2	3.39	5.1 / 5.1	13.4 / 12.3	18.6 / 17.4	14	224	448		
3.4	86.4	19.9	3.50	5.1 / 5.1	13.1 / 12.0	18.2 / 17.1	13	208	416		
3.5	88.9	20.5	3.61	5.1 / 5.1	12.8 / 11.7	17.9 / 16.8	13	208	416		
3.6	91.4	21.1	3.72	5.1 / 5.1	12.5 / 11.4	17.6 / 16.5	12	192	384		
3.7	94.0	21.7	3.82	5.1 / 5.1	12.2 / 11.1	17.3 / 16.3	12	192	384		
3.75	95.3	22.0	3.88	5.1 / 5.1	12.0 / 11.0	17.2 / 16.1	12	192	384		
3.8	96.5	22.3	3.94	5.1 / 5.1	11.9 / 10.9	17.0 / 16.0	12	192	384		
3.9	99.1	23.0	4.05	5.1 / 5.1	11.7 / 10.7	16.8 / 15.8	12	192	384		
4.0	101.6	23.6	4.16	5.1 / 5.1	11.4 / 10.4	16.5 / 15.5	12	192	384		
4.1	104.0	24.2	4.26	5.1 / 5.1	11.2 / 10.2	16.3 / 15.3	11	176	352		
4.2	107.0	24.9	4.39	5.1 / 5.1	10.9 / 10.0	16.0 / 15.1	11	176	352		
4.3	109.0	25.5	4.49	5.1 / 5.1	10.7 / 9.8	15.8 / 14.9	11	176	352		
4.4	112.0	26.1	4.60	5.1 / 5.1	10.5 / 9.6	15.6 / 14.7	10	160	320		
4.5	114.0	26.8	4.72	5.1 / 5.1	10.3 / 9.4	15.4 / 14.5	10	160	320		

1. The Long-Term Thermal Resistance (LTTR) values were determined in accordance with CAN/ULC S770 at 75°F (24°C). The ultimate R-Value of these products will depend on individual installation circumstances.

2. Value represents average results (Grade 2/Grade 3). 3. Assumes 48' flatbed truck.

Refer to the Safe for Use instructions and product label prior to using this product. The Safe for Use instructions are available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

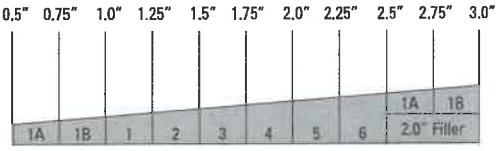
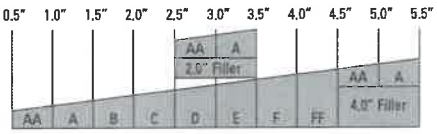
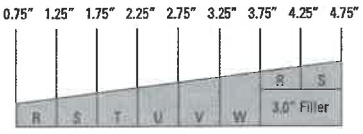
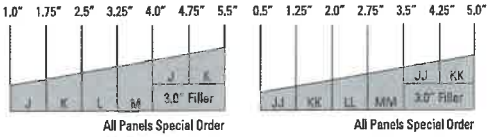
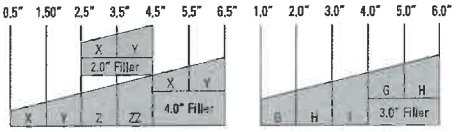
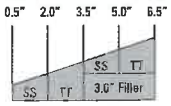
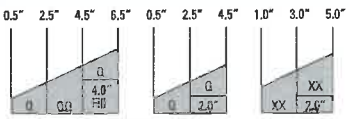
RS-5137 5-20 (Replaces 5-19)

Johns Manville

Tapered ENRGY 3®

Polyisocyanurate Roof Insulation

Johns Manville Tapered Polyiso Offerings *Please refer to the previous page for typical physical properties.*

Panel Desig.	Slope	Dimension		LTTR* Value Nominal	Pieces per Unit	Square Foot per Unit	Brd Ft per Unit	Slope Profiles
		Thin	Thick					
1/16 in/ft (5.2 mm/m)								
1A	1/16	0.5	0.75	3.6	70	1120	700	 All Panels Special Order
1B	1/16	0.75	1	5.0	50	800	700	
1	1/16	1	1.25	6.4	38	608	684	
2	1/16	1.25	1.5	7.8	32	512	704	
3	1/16	1.5	1.75	9.3	28	448	728	
4	1/16	1.75	2	10.7	22	352	660	
5	1/16	2	2.25	12.1	20	320	680	
6	1/16	2.25	2.5	13.6	18	288	684	
1/8 in/ft (10.4 mm/m)								
AA	1/8	0.5	1	4.3	64	1024	768	 Extended and Special Order Panels: D, E, F, FF
A	1/8	1	1.5	7.1	38	608	760	
B	1/8	1.5	2	10.0	26	416	728	
C	1/8	2	2.5	12.9	20	320	720	
D**	1/8	2.5	3	15.9	16	256	704	
E**	1/8	3	3.5	18.9	14	224	728	
F**	1/8	3.5	4	22.1	12	192	720	
FF**	1/8	4	4.5	25.3	10	160	680	
R	1/8	0.75	1.25	5.7	44	704	704	 All Panels Special Order
S	1/8	1.25	1.75	8.6	30	480	720	
T	1/8	1.75	2.25	11.4	22	352	704	
U	1/8	2.25	2.75	14.4	16	256	640	
V	1/8	2.75	3.25	17.4	14	224	672	
W	1/8	3.25	3.75	20.5	12	192	672	
3/16 in/ft (15.6 mm/m)								
J	3/16	1	1.75	7.8	32	512	704	 All Panels Special Order All Panels Special Order
K	3/16	1.75	2.5	12.1	20	320	680	
L**	3/16	2.5	3.25	16.6	16	256	736	
M**	3/16	3.25	4	21.2	12	192	696	
JJ	3/16	0.5	1.25	5.0	52	832	728	
KK	3/16	1.25	2	9.3	28	448	728	
LL**	3/16	2	2.75	13.6	18	288	691	
MM**	3/16	2.75	3.5	18.2	14	224	694	
1/4 in/ft (20.8 mm/m)								
G	1/4	1	2	8.6	30	480	720	 Extended and Special Order Panels: Z, ZZ All Panels Special Order
H	1/4	2	3	14.4	16	256	640	
I**	1/4	3	4	20.5	12	192	672	
X	1/4	0.5	1.5	5.7	48	768	768	
Y	1/4	1.5	2.5	11.4	24	384	768	
Z**	1/4	2.5	3.5	17.4	16	256	768	
ZZ**	1/4	3.5	4.5	23.6	12	192	768	
3/8 in/ft (31.2 mm/m)								
SS	3/8	0.5	2	7.1	36	576	720	 All Panels Special Order
TT**	3/8	2	3.5	15.9	16	256	704	
1/2 in/ft (41.6 mm/m)								
Q	1/2	0.5	2.5	8.6	32	512	768	 Extended and Special Order Panels: QQ Special Order
QQ**	1/2	2.5	4.5	20.5	12	192	672	
XX	1/2	1	3	11.4	22	352	704	

* (hr•ft²•°F/Btu)

** Extended panels require less adhesive and less labor.

Tapered Recycle Content:

Recycled content is dependent upon average thickness. To calculate, match the average thickness of Tapered ENRGY 3 to the thickness of Flat ENRGY 3. Use the number from Flat ENRGY 3 as your recycled content.

Refer to the Safe for Use instructions and product label prior to using this product. The Safe for Use instructions are available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

RS-5137 5-20 (Replaces 5-19)

JM TWO-PART URETHANE INSULATION ADHESIVE

Johns Manville

Features and Components

Use: For bonding insulation board products to approved roofing substrates, and insulation to insulation.

Type: Two-part, cold application insulation adhesive.

Substrates: Compatible with the following insulations, cover boards, and substrates: polyisocyanurate; HD wood fiber; perlite; Invinsa® Roof Board; gypsum; concrete; treated plywood; cementitious wood fiber plank; base sheets; gypsum; and some existing smooth-surfaced asphalt *(per inspection)*.

Color: Pink

Features: No primers or catalysts are required for application. May be used in single ply and bituminous systems.

Component: **AD** Adhesive

Type: **I** Insulation; **B** Cover Board

Multi-Ply
Single Ply

System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR	APP		SBS										
	HA	CA	HW	HA	CA	HW	SA	MF						
	Used to adhere Insulation in all Multi-Ply systems													
Single Ply	TPO				PVC			EPDM		
	MF	AD	SA	IW	MF	AD	IW	MF	AD	BA
	Used to adhere Insulation in all Single Ply systems									

Key: **HA** = Hot Applied **CA** = Cold Applied **HW** = Heat Weldable **SA** = Self Adhered **MF** = Mechanically Fastened **IW** = Induction Weld **BA** = Ballasted **AD** = Adhered

Energy and the Environment

Maximum VOC	11 g/l as applied after mixing (EPA method 24)

Physical Properties

Property			ASTM Test Method	JM Two-Part UIA
Weight	Weight *(liquid components)*	Part 1	–	10.32 lb/gal (1.2 kg/l)
		Part 2	–	8.54 lb/gal (1.0 kg/l)
	Viscosity *(liquid components)*	Part 1	–	300 cps
		Part 2	–	280 cps
Strength	Density - Free Rise		D-1622	3.2 lb/cf (0.05 g/cm)
	Compressive Strength - Parallel		D-1621	38 psi (0.26 MPa) @ 6% deflection
	Tensile Strength		D-1623	35 psi (0.26 MPa)
	Water Absorption		D-2843	5.1%
	Closed Cell Content		D-2856	90% (min)

Codes and Approvals

CLASSIFIED C UL US

FM APPROVED

MIAMI-DADE COUNTY APPROVED
Miami-Dade County Product Control Approved

Installation/Application

Cart Bead

- **Cartridges:** Two grades available, applied at temperatures between:
  Regular grade: 40°F (4°C) and above
  Winter grade: 0°F to 65°F (-18°C to 18.3°C)
- **Boxes:** Two grades available, applied at temperatures of:
  Regular grade: 40°F (4°C) and above
  Winter grade: 25°F to 65°F (-4°C to 18.3°C)
- Adhesive must be 72°F (22°C) before using in a pace cart.
- Refer to the application instructions guidelines for proper utilization of this product.

Packaging and Coverage

Container Type	Case	Box
Items per Case/Box	4 - cartridges/case with 6 mixing tips	2 - boxes (parts)/box 5 gal (18.9 l) each
Shipping Weight *(approx.)*	19 lb (8.6 kg)	Part 1 = 52 lb (23.6 kg) Part 2 = 43 lb (19.5 kg)
Cases/Boxes per Pallet	40	32
Coverage Rate*	400 ft² to 600 ft² (37.16 m² to 55.74 m²) per case	1000 ft² to 2000 ft² (92.9 m² to 185.8 m²) per set

+ 15 gal and 55 gal sizes available as special order items.

* Coverage, open and dry time rates can vary dramatically depending on the particular substrate and environmental conditions. Coverage rates stated herein are approximate only. If FM Global® or UL® approval is required, consult specific RoofNav℠ or the UL Certifications Directory for specific application rates.

Storage

Shelf Life	18 months from manufacture date
Storage Conditions	Clean, dry, well-ventilated indoor environment in an unopened container
Temperature Range	45°F to 95°F (7°C to 35°C) - Protect from freezing

Refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

RS-4504 12-19 (Replaces 7-19)

JM TWO-PART URETHANE INSULATION ADHESIVE

Installation/Application Instructions

JM Two-Part UIA is dispensed in a semi-liquid bead that rises ¾" to 1" (19 mm to 25 mm) above the substrate. Beads are typically 12" (305 mm) on center. Within two minutes, the insulation board is placed into the adhesive and walked into place. The adhesive cures completely in approximately 4 to 8 minutes after application, depending on temperature and weather conditions. Note: Board stock must be placed into the adhesive while it is still wet (before it reaches its tack-free state).

Ensure all insulation boards are 4' x 4' (1.22 m x 1.22 m) or smaller. Ensure all surfaces are dry and free of any debris, dirt, oil and grease before using JM Two-Part UIA.

Typical Application Rates

Insulation to:	sqs/gal pace cart	sqs/box of 4 cartridges
Concrete	1.7 to 2	6
Insulation	1.7 to 2	6
Smooth BUR	1.5 to 1.7	5
Mod Bit	1.5 to 1.7	5
Gypsum	1 to 1.2	4
Lightweight Concrete	1 to 1.7	4
Wood	1.7 to 2	6
Tectum	1 to 1.2	4
Steel	1 to 1.2	4

Clean-Up and Disposal

Disposal

Neutralize and dispose of spilled material, unused contents and empty containers in accordance with local, state and federal regulations.

Environmental Hazard

PMDI in Part 1 component may cause pollution. Do not discharge into lakes, streams, ponds or public waters. For guidance, contact your regional office of the U.S. Environmental Protection Agency.

Precautions

__First Aid__ – In case of contact with eyes, immediately flush eyes with running water for at least 15 minutes. Call a physician immediately. In case of contact with skin, wash affected area with soap and water. Remove all contaminated clothing and shoes. Wash clothing before reuse and discard contaminated shoes. If swallowed, drink large amounts of water to dilute. If vomiting occurs, drink more water and call a physician immediately.
__Environmental Hazard__ – PMDI in Part 1 component may cause pollution. Do not discharge into lakes, streams, ponds or public waters. For guidance, contact your regional office of the U.S. Environmental Protection Agency.
__Disposal__ – Neutralize and dispose of spilled material, unused contents and empty containers in accordance with local, state and federal regulations.
__Safety__ – Wear proper clothing and safety equipment.

Refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

Johns Manville

DynaGrip™ Base SA/SA

Self-Adhering/Both Sides

Description

Johns Manville (JM) DynaGrip Base SA/SA is a self-adhering modified bitumen sheet incorporating the features of a medium weight fiber glass mat with a blend of SBS (Styrene-Butadiene-Styrene) rubber and high-quality asphalt. This elastomeric asphaltic blend has full recovery properties after 100% elongation and lends elasticity and flexibility to the sheet. The modified asphalt is self-adhering and has an easy-to-peel, removable-release plastic film on both sides of the sheet and selvage for ease of application.

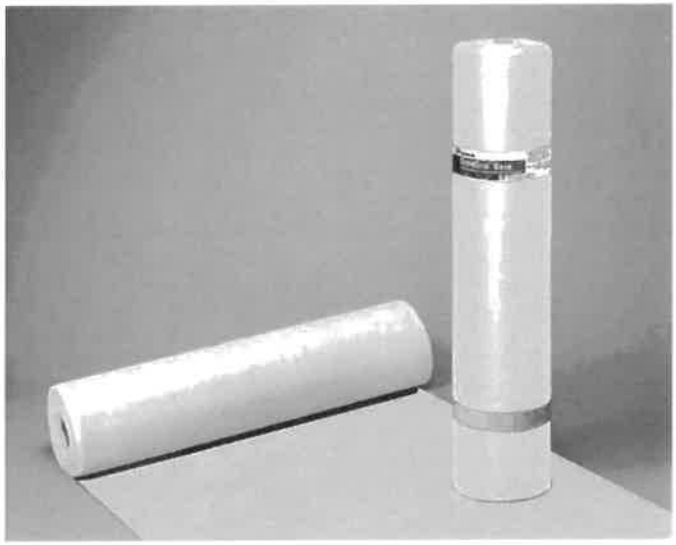
DynaGrip Base SA/SA is designed for use in roofing systems where two or more plies of modified bitumen are desired.

Use

DynaGrip Base SA/SA is used in multiple-ply modified bitumen membranes. It may be used as the base ply when installed over an **approved substrate.**

Note: When self-adhering over mineral surfaces (i.e., at end laps), MBR® Cold Application Adhesive, MBR® Flashing Cement, MBR® Bonding Adhesive or MBR® Utility Cement must be used.

Note: Apply in dry weather and when the roll is at least 60°F (16°C) at the time of application.



Advantages

- The fiber glass mat provides excellent tensile strength and puncture resistance.
- The elongation and recovery properties allow the product to easily accommodate the continual expansion and contraction strains experienced on all roofs.
- The product's self-adhering features allow for installation without the need of hot asphalt or heat welding.

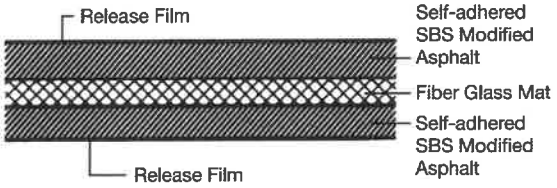
Typical Physical Properties*

Thickness	70 mil (1.78 mm)
Tensile Strength @ 0°F (-18°C)	
Machine Direction	90 lb force/in. width (15.75 kN/m)
Cross Machine Direction	70 lb force/in. width (12.25 kN/m)
Elongation @ 0°F (-18°C)	
Machine Direction	4.0%
Cross Machine Direction	4.0%
Tensile–Tear	
Machine Direction	85 lb/in. (14.88 kN/m)
Cross Machine Direction	70 lb/in. (12.25 kN/m)
Low Temperature Flexibility	-10°F (-23°C)
Dimensional Stability	
Machine Direction	0.20% change
Cross Machine Direction	0.20% change

* Material tested in accordance with ASTM D 5147 Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Materials.

Sizes

Roll size	200 ft² (18.58 m²)
Roll weight	80 lb (36.29 kg)
Roll length	65' 7" (19.99 m)
Roll width	39⅜" (1 m)



JM Recommended Substrates

- OSB/plywood products
- Metal surfaces
- Unsanded asphalt
- Foil-faced polyisocyanurate
- Primed concrete

Refer to the Material Safety Data Sheet and product label prior to using this product.

RS-4700 5-08 (Replaces 7-05 V2)

JM APP™ BASE SHEET

Fiber Glass-Reinforced, APP Base or Ply Sheet

Meets the requirements of ASTM D 6509

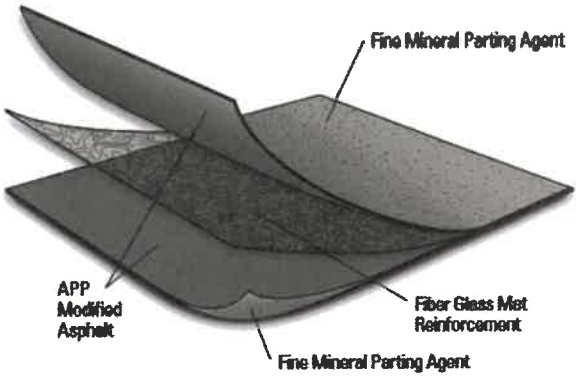
Features and Components

JM APP Base is used as a base or ply sheet in APP multi-ply roofing systems.

APP (Atactic Polypropylene) Polymer and Asphalt Blend: Provides an extremely durable sheet with excellent weathering characteristics, flexibility and dimensional stability for ease of handling and quick installations.

Fiber Glass Reinforcement Mat: Offers excellent dimensional stability and tensile strength and withstands differential movement. Because it has no thermal memory less time is needed to relax the sheet, allowing for ease of installation. The fiber glass mat also has good lay-flat characteristics.

Surfacing: Fine mineral parting agent on both sides of the sheet. Enables the product to be applied using cold adhesive or heat welding techniques.



System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR			APP			SBS					
	HA	CA		CA	HW		HA	CA	HW	SA		
	Compatible with the selected Multi-Ply systems above											

Single Ply	TPO			PVC			EPDM					
	MF	FA		MF	FA		MF	FA	BA			
	Do not use in Single Ply systems											

Key: HA = Hot Applied CA = Cold Applied HW = Heat Weldable SA = Self Adhered MF = Mechanically Fastened FA = Fully Adhered BA = Ballasted

Energy and the Environment

Pre-consumer Recycled Content	0%
Post-consumer Recycled Content	0%

Peak Advantage® Guarantee Information

Systems	Guarantee Term
Dependent on system*	Up to 30 years

*Contact JM Technical Services for specific system requirements or guarantee terms.

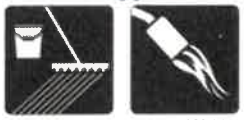
Codes and Approvals

CLASSIFIED C UL US

FM APPROVED

MIAMI-DADE COUNTY APPROVED
Miami-Dade County Product Control Approved

Product Application


Cold Applied

Heat Weld

- Standard base sheet attachment only. No in-lap fastening methods allowed.
- May be used as a backer ply in two-ply flashing systems.
- Approved cap sheets may be applied to the base sheet using cold adhesive application techniques.

Refer to JM APP modified bitumen specifications and detail drawings for application and slope information.

Packaging and Dimensions

Roll Width	39 3/8" (1 m)
Roll Length	49' 3" (15 m)
Roll Coverage*	145.08 ft² (13.5 m²)
Roll Weight	96 lb (43.6 kg)
Rolls per Pallet	20
Pallets per Truck**	24

*Assumes a 4" side lap. **Assumes a 48' flatbed truck

Refer to the Safe Use Instructions and product label prior to using this product. The Safe Use Instructions are available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

RS-4338 3-16 (Replaces 9-14)

Johns Manville

JM APP™ BASE SHEET

Fiber Glass-Reinforced, APP Base or Ply Sheet

Meets the requirements of ASTM D 6509

Tested Physical Properties

	Physical Properties		ASTM Test Method	Standard for ASTM D 6509	JM APP Base Results	
					MD*	XMD**
Strength	Tear Resistance @ 73.4° F		D 4073 /5147	≥ 70 lbf	93 lbf	81 lbf
Strength	Peak Load @ 0° F		D 5147	≥ 70 lbf/in-width	156 lbf/in-width	125 lbf/in-width
Strength	Peak Load @ 73.4° F	Unconditioned	D 5147	≥ 50 lbf/in-width	67 lbf/in-width	59 lbf/in-width
Strength		90 day Heat Conditioned	D 5147/5869	≥ 50 lbf/in-width	81 lbf/in-width	58 lbf/in-width
Performance	Low Temp. Flexibility @ 180° F Mandrel (Pass-Fail)	Unconditioned	D 5147	Pass @ 32° F *"none of the specimens show cracking"*	Pass	Pass
Performance		90 day Heat Conditioned	D 5147/5869		Pass	Pass
Performance	Low Temperature Unrolling (Pass-Fail) Unroll in 4-6s; Visual Inspection in "unrolled" position		D 5636	Pass @ 32° F *"none of the specimens show cracking"*	Pass	Pass
Performance	Compound Stability - 2 hr 15 min @ 230° F (Pass-Fail)		D 5147	Pass *"no failures showing signs of flowing, dripping, or drop formation"*	Pass	
Performance	Thickness		D 5147	≥ 70 mils	90 mils	
Performance	Bottom Coating Thickness		D 5147	≥ 30 mils	45 mils	
Performance	Water Absorption - water by distillation		D 5147/95	≥ 3.2 %	0.8 %	
Performance	Moisture Content - water by distillation		D 5147/95	≥ 1 %	0.4 %	
Performance	Elongation at Peak Load @ 0° F		D 5147	≥ 1 %	5 %	5 %
Performance	Elongation at Peak Load at 73.4°F	Unconditioned	D 5147	≥ 2 %	4 %	4 %
Performance		90 day Heat Conditioned	D 5147/5869	≥ 2 %	4 %	4 %
Installation	Dimensional Stability - 24 hr @ 176° F		D 5147/1204	≥ 0.2 %	0.03 %	0.03 %
Installation	Net Mass per Unit Area		D 146	≥ 40 lb/100 ft²	61 lb/100 ft²	

*MD = Machine Direction
**XMD = Cross-Machine Direction

Note: All data represents tested values.

Refer to the Safe Use Instructions and product label prior to using this product. The Safe Use Instructions are available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

DYNAWELD™ CAP 250 FR

Fire-Retardant, Polyester-Reinforced, SBS Mineral-Surfaced Cap or Flashing Sheet

Meets the requirements of ASTM D 6164, Type II, Grade G

Features and Components

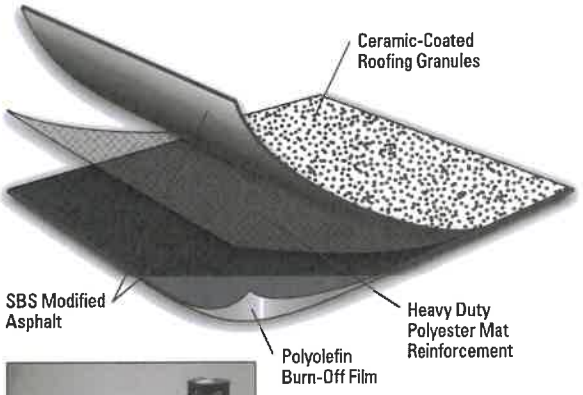
DynaWeld Cap 250 FR is used as a premium polyester-reinforced cap or flashing sheet in a variety of multi-ply roofing systems.

Ceramic-Coated Roofing Granules: Specifically engineered for optimal embedment in the SBS-blend sheet. The ceramic coating promotes excellent long-term adhesion. Granules are available in White, Black and Tan (Black and Tan may require extended lead times).

High-Quality SBS Rubber and Asphalt Blend: Lends elasticity and flexibility to the sheet. The elongation and recovery properties allow the product to easily accommodate the continual expansion and contraction experienced on all roofs. The FR blend contains additional fire-retardant additives.

Heavy Duty Polyester-Reinforcement Mat: Provides excellent tensile strength, toughness and puncture resistance, and it can accommodate stresses created by typical rooftop expansion and contraction forces.

Polyolefin Burn-Off Film: Promotes ease of heat welding.



Component: **M** Membrane — Multi-Ply

Type: **CS** Cap Sheet; **FL** Flashing

Colors: White, Black and Tan
(Black and Tan may require extended lead times).

System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR		APP		SBS			
	HA	CA	CA	HW	HA	CA	HW	SA
	Compatible with the selected Multi-Ply systems above							

Single Ply	TPO		PVC		EPDM		
	MF	FA	MF	FA	MF	FA	BA
	Do not use with Single Ply systems						

Key: **HA** = Hot Applied **CA** = Cold Applied **HW** = Heat Weldable **SA** = Self Adhered **MF** = Mechanically Fastened **FA** = Fully Adhered **BA** = Ballasted

Energy and the Environment

Test	Initial	3-Year Aged
Reflectivity* (ASTM C 1549)	0.26	0.27
Emissivity* (ASTM C 1371)	0.87	0.84
Solar Reflectance Index* (SRI) - E 1980	25	25
Pre-Consumer Recycled Content	0%	
Post-Consumer Recycled Content	0%	

*Standard White Granule only

Peak Advantage® Guarantee Information

Systems	Guarantee Term
When used in most 2-5 ply JM SBS systems.*	Up to 30 years

*Contact JM Technical Services for specific system requirements or guarantee terms.

Codes and Approvals

CLASSIFIED UL C US

FM APPROVED

MIAMI-DADE COUNTY APPROVED
Miami-Dade County Product Control Approved

Product Application

Heat Weld

- Must be installed using heat-welding techniques
- Refer to JM SBS modified bitumen specifications and detail drawings for application and slope information

Packaging and Dimensions

Roll Coverage*	95.8 ft² (8.9 m²)
Roll Length	32' 10" (10 m)
Roll Width	39 3⁄8" (1 m)
Roll Weight	115 lb (52.2 kg)
Rolls per Pallet	20
Pallet Weight	2,430 lb (1,102 kg)
Pallets per Truck**	20

*Assumes a 4" side lap **Assumes 48' flatbed truck.

Refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

Johns Manville

DYNAWELD™ CAP 250 FR

Fire-Retardant, Polyester-Reinforced, SBS Mineral-Surfaced Cap or Flashing Sheet

Meets the requirements of ASTM D 6164, Type II, Grade G

Tested Physical Properties

	Physical Properties		ASTM Test Method	Standard for ASTM D 6164, Type II, Grade G (Min.)	DynaWeld Cap 250 FR	
					MD*	XMD**
Strength	Tensile Tear		D 5147	70 lbf (311 N)	181 lbf (805 N)	124 lbf (552 N)
	Peak Load at 0°F (-18°C)		D 5147	100 lbf/in (17.5 kN/m)	184 lbf/in (32.2 kN/m)	122 lbf/in (21.4 kN/m)
	Peak Load at 77°F (23°C)		D 5147	70 lbf/in (12 kN/m)	106 lbf/in (18.6 kN/m)	84 lbf/in (14.7 kN/m)
Longevity	Low Temp. Flexibility	Unconditioned	D 5147	0°F (-18°C)	-10°F (-23°C)	
		90-Day Heat Conditioned	D 5147	0°F (-18°C)	-10°F (-23°C)	
	Compound Stability		D 5147	215°F (102°C)	250°F (121°C)	
	Granule Loss		D 4977	2 g (0.07 oz)	0.7 g (0.02 oz)	
	Thickness		D 5147	130 mil (3.3 mm)	165 mil (4.2 mm)	
	Selvage Edge Thickness		D 5147	N/A	134 mil (3.4 mm)	
	Elongation at Peak Load at 0°F (-18°C)		D 5147	20%	46%	54%
	Elongation at Peak Load at 73.4°F (23°C)		D 5147	50%	58%	71%
	Ultimate Elongation at 77°F		D 5147	60%	61%	76%
Aged Performance	90-Day Heat-Conditioned Peak Load at 0°F (-18°C)		D 5147	100 lbf/in (17.5 kN/m)	178 lbf/in (31.2 kN/m)	119 lbf/in (20.8 kN/m)
	90-Day Heat-Conditioned Elongation at Peak Load at 0°F (-18°C)		D 5147	20%	49%	60%
	90-Day Heat-Conditioned Peak Load at 73.4°F (23°C)		D 5147	70 lbf/in (12 kN/m)	133 lbf/in (23.3 kN/m)	96 lbf/in (16.8 kN/m)
	90-Day Heat-Conditioned Elongation at Peak Load at 73.4°F (23°C)		D 5147	50%	58%	68%
	90-Day Heat-Conditioned Ultimate Elongation at 73.4°F (23°C)		D 5147	60%	60%	71%
Installation	Dimensional Stability		D 5147	1.0%	0.3%	0.1%
	Net Mass per Unit Area		D 146	90 lb/100 ft² (41 kg/9.29 m²)	110 lb/100 ft² (49.9 kg/9.29 m²)	
	Roll Weight		D 146	N/A	115 lb (52.2 kg)	

*MD = Machine Direction
**XMD = Cross-Machine Direction

Note: Material tested in accordance with ASTM D 5147 Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Materials.

Supplemental Testing

Physical Properties		ASTM Test Method	DynaWeld Cap 250 FR Result
Cyclic Joint Displacement	Initial	D 5849	Pass at 500 cycles*
	After 90-Day Heat Conditioning per ASTM D 5147	D 5849	Pass at 200 cycles*
Coefficient of Friction	Static	D 1894	1.32
	Kinetic	D 1894	0.89

*In a min 2-ply system when adhered with any combination of cold applied, hot applied and or heat-weld that is approved by JM for application.

Refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

DYNAFAST® 250 HW

Heavy Duty, Polyester-Reinforced, SBS Base or Ply Sheet

Meets the requirements of ASTM D 6164, Type II, Grade S

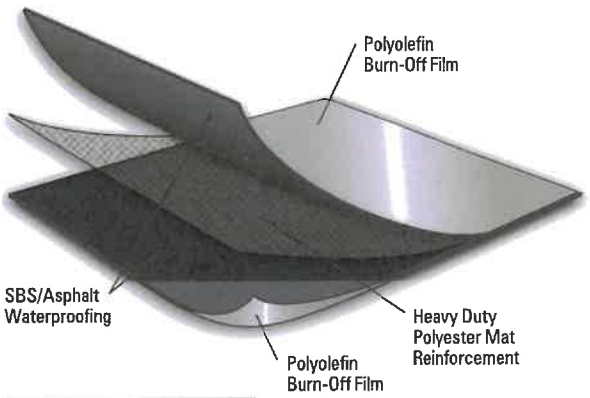
Features and Components

DynaFast 250 HW is a heat weldable base or ply sheet for use in mechanically fastened systems.

High-Quality SBS Rubber and Asphalt Blend: Lends elasticity and flexibility to the sheet. The elongation and recovery properties allow the product to easily accommodate the continual expansion and contraction experienced on all roofs.

Heavy Duty Polyester-Reinforcement Mat: Provides excellent tensile strength, toughness, and puncture resistance and can accommodate stresses created by typical roof top expansion and contraction forces.

Polyolefin Burn-Off Film: Promotes ease of heat welding.



Component: **M** Membrane

Multi-Ply
Single Ply

Type: **BS** Base Sheet; **PS** Ply Sheet

System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR		APP		SBS				
	HA	CA	CA	HW	HA	CA	HW	SA	MF
	Compatible with the selected Multi-Ply systems above								

Single Ply	TPO		PVC		EPDM		
	MF	FA	MF	FA	MF	FA	BA
	Do not use with Single Ply systems						

Key: **HA** = Hot Applied **CA** = Cold Applied **HW** = Heat Weldable **SA** = Self Adhered **MF** = Mechanically Fastened **FA** = Fully Adhered **BA** = Ballasted

Energy and the Environment

Pre-Consumer Recycled Content	0%
Post-Consumer Recycled Content	0%

Peak Advantage® Guarantee Information

Systems	Guarantee Term
When used in most 2-5 ply JM SBS systems.*	Up to 30 years

*Contact JM Technical Services for specific system requirements or guarantee terms.

Codes and Approvals

- FBC Approved

Installation/Application

Heat Weld

Mechanically Fastened

- May be mechanically fastened or installed using heat-welding techniques
- Side laps must be installed using heat welding techniques
- Refer to JM SBS modified bitumen specifications and detail drawings for application and slope information

Packaging and Dimensions

Approximate Roll Coverage*	95.8 ft² (8.9 m²)
Roll Length	32' 10" (10 m)
Roll Width	39 3/8" (1 m)
Roll Weight	105 lb (47.6 kg)
Rolls per Pallet	20
Pallet Weight	2,250 lb (1,020.6 kg)
Pallets per Truck**	20

*Roll net coverage rates are determined by the estimator or designee.
**Assumes 48' flatbed truck.

Refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

Johns Manville

DYNAFAST® 250 HW

Heavy Duty, Polyester-Reinforced, SBS Base or Ply Sheet

Meets the requirements of ASTM D 6164, Type II, Grade S

Tested Physical Properties[1]

Physical Properties			ASTM Test Method	Standard for ASTM D 6164, Type II, Grade S (Min.)	DynaFast 250 HW	
					MD*	XMD**
Strength	Tensile Tear		D 5147	70 lbf (311 N)	181 lbf (805 N)	124 lbf (552 N)
	Peak Load at -18°C (0°F)		D 5147	100 lbf/in (17.5 kN/m)	184 lbf/in (32.2 kN/m)	122 lbf/in (21.4 kN/m)
	Peak Load at 23°C (73.4°F)		D 5147	70 lbf/in (12 kN/m)	106 lbf/in (18.6 kN/m)	84 lbf/in (14.7 kN/m)
Longevity	Low Temp. Flexibility	Unconditioned	D 5147	0°F (-18°C)	-10°F (-23°C)	
		90-Day Heat Conditioned	D 5147	0°F (-18°C)	-10°F (-23°C)	
	Compound Stability		D 5147	215°F (102°C)	250°F (121°C)	
	Thickness		D 5147	115 mil. (2.9 mm)	157 mil. (4.0 mm)	
	Elongation at Peak Load at -18°C (0°F)		D 5147	20%	46%	54%
	Elongation at Peak Load at 23°C (73.4°F)		D 5147	50%	58%	71%
	Ultimate Elongation at 23°C (73.4°F)		D 5147	60%	61%	76%
Aged Performance	90-Day Heat-Conditioned Peak Load at -18°C (0°F)		D 5147	100 lbf/in (17.5 kN/m)	178 lbf/in (31.2 kN/m)	119 lbf/in (20.8 kN/m)
	90-Day Heat-Conditioned Elongation at Peak Load at -18°C (0°F)		D 5147	20%	49%	60%
	90-Day Heat-Conditioned Peak Load at 23°C (73.4°F)		D 5147	70 lbf/in (12 kN/m)	133 lbf/in (23.3 kN/m)	96 lbf/in (16.8 kN/m)
	90-Day Heat-Conditioned Elongation at Peak Load at 23°C (73.4°F)		D 5147	50%	58%	68%
	90-Day Heat-Conditioned Ultimate Elongation at 23°C (73.4°F)		D 5147	60%	60%	71%
Installation	Dimensional Stability		D 5147	1.0%	0.3%	0.1%
	Net Mass per Unit Area		D 146	70 lb/100 ft² (32 kg/9.29 m²)	97.6 lb/100 ft² (44 kg/9.29 m²)	
	Roll Weight		D 146	N/A	105 lb (47.6 kg)	

*MD = Machine Direction
**XMD = Cross-Machine Direction

1. Material tested in accordance with CAN/CGSB 37-GP-56M.

Supplemental Testing

Physical Properties		ASTM Test Method	DynaFast 250 HW Result
Cyclic Joint Displacement	Initial	D 5849	Pass at 500 cycles*
	After 90-Day Heat Conditioning per ASTM D 5147	D 5849	Pass at 200 cycles*

*In a min 2-ply system when adhered with any combination of cold applied, hot applied and or heat-weld that is approved by JM for application.

Refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

RS-4692 2-18 (Replaces 8-14)

TECHNICAL INFORMATION SHEET

I.S.O. Twin Pack™ Adhesive

Item Description
Insulation Adhesive

Item Number
W56RACINTA

Product Information

Description:

I.S.O. Twin Pack Insulation Adhesive is a two-component low-rise polyurethane adhesive designed for anchoring acceptable roof insulation and cover boards to acceptable substrates, as well as for adhering multiple layers of insulation. I.S.O. Twin Pack is a solvent free and VOC free insulation adhesive that contains no harmful HCFC or CFCs.

I.S.O. Twin Pack Insulation Adhesive is suitable for cold weather applications when stored properly. I.S.O. Twin Pack Insulation Adhesive is dispensed using I.S.O. Twin Pack Hand Dispenser (TIS 1519) I.S.O. Twin Pack Four Bead Dispenser (TIS 1520); Multi-Bead Plus Dispenser; Battery Powered Single Bead Applicator or a Pneumatic Single Bead Applicator. The dispensers extrude I.S.O. Twin Pack Part A and B simultaneously to the static mixer, which results in a mixed adhesive in bead form.

Firestone Building Products standard warranties are available up to 30-year warranty period. Please refer to the Firestone Technical Database www.firestonebpco.com for specific warranty requirements.

Method of Application:

1. I.S.O. Twin Pack Insulation Adhesive can be installed at temperatures as low as 20 °F (-7 °C) and rising when the material is stored between 60 °F (16 °C) and 80 °F (27 °C).
2. For best results, use power actuated dispensers (battery; pneumatic) to dispense I.S.O. Twin Pack. Hand powered dispensers may not offer the continuous force necessary to insure uniform mixing of large quantities.
2. The substrate must be clean, smooth, dry, and free of sharp edges, loose and foreign materials, oil, grease, and other contaminants.
3. To mix and dispense I.S.O. Twin Pack Insulation Adhesive from kits, remove plugs and apply the static mixer over plug end of kit by hand tightening static mixer to kit with plug end facing up. Keep plug end facing up until you are ready to dispense I.S.O. Twin Pack Insulation Adhesive to the deck substrate.
4. Properly mixed I.S.O. Twin Pack will be amber, with no marbling. Part A and B will be extruded simultaneously through dispensing equipment.
5. To stop dispensing I.S.O. Twin Pack Insulation Adhesive, stop the dispenser plunger from advancing and point the mixing end up to stop Part A and Part B from entering static mixer. This stopped position of the kit can only be maintained for several minutes, as Part A and Part B already in the static mixer will continue to react, set up, and block the static mixer. If the static mixer becomes blocked during stopped period, replace static mixer in order to mix and dispense the remaining Part A and Part B in kit.
6. Apply I.S.O. Twin Pack Insulation Adhesive in a bead ½" (13 mm) wide to deck substrate in spacing as specified for the project and immediately set the insulation or cover boards, 4' x 4' (1.22 m x 1.22 m) maximum, in fresh I.S.O. Twin Pack insulation adhesive before a skim coat develops. The adhesive will rise to a bead of ¾" – 1" (19.0 mm – 25.4 mm) within minutes after placement. Rise time will depend on the ambient conditions: warmer=faster; cooler=slower.
7. To ensure that the insulation makes continuous contact with the adhesive during the critical set-up period, immediately weight each board after setting in place, using full pails of Bonding Adhesive or other available source of weight that will not damage the roof insulation.

I.S.O. Twin Pack™ Adhesive

Storage:

- Store in original containers at temperatures between 60 °F (16 °C) and 80 °F (27 °C). Do not allow I.S.O. Twin Pack to freeze.
- Store cartons with kits on their side.
- DO NOT store kits with plunger or plugged end down to avoid the possibility of leakage.
- Keep plugs on kits tightly closed during storage. DO NOT expose to moisture.
- For optimum results, rotate your stock to ensure stored material has not exceeded the shelf life of one year.

Shelf Life:

Shelf life of twelve (12) months can be expected when stored in original, unopened containers at temperatures between 60 °F and 80 °F (16 °C and 27 °C) and kept out of sunlight, and protected from rain and moisture.

Precautions:

- Review applicable Safety Data Sheets prior to use.
- Store in original containers at temperatures between 60 °F (16 °C) and 80 °F (27 °C). Do not allow I.S.O. Twin Pack to freeze.
- Personnel who are sensitive/allergic to isocyanate or polyurethane should not work with I.S.O. Twin Pack Insulation Adhesive.
- At the start of each workday, and prior to beginning work, perform a trial application using I.S.O. Twin Pack Insulation Adhesive and a sample piece of insulation or cover board to verify the product's suitability for use that day. Verify that proper mixing, set-up and overall adhesion of insulation to substrate is being achieved before proceeding. Use only when conditions allow, and daily trials indicate successful adhesion.
- Install only as much roof insulation with I.S.O. Twin Pack Insulation Adhesive as can be covered and made watertight during that working day. The performance of I.S.O. Twin Pack should be periodically monitored during the workday to verify that sufficient rise, adhesion, and mating of the insulation using I.S.O. Twin Pack is occurring.
- Review dispensing equipment instructions prior to use. Ensure dispensing equipment is in good working order.
- It is the responsibility of the Roofing Contractor to maintain dispensing equipment in good working order to deliver and thoroughly mix, meter, and dispense this adhesive in a 1:1 (Part A:Part B) ratio.
- Avoid contact with eyes. Wear safety glasses with side shields.
- Avoid breathing of vapors. A Self-Contained Breathing Apparatus (SCBA) or Respirator should be used in areas of limited ventilation.
- Avoid contact with skin. Wear gloves when dispensing. Wash hands thoroughly after handling.
- Set insulation boards immediately into wet I.S.O Twin Pack Insulation Adhesive. Insulation boards shall not exceed 4' x 4' (1.2 m x 1.2 m).
- It is imperative that freshly installed insulation is continuously weighted until I.S.O. Twin Pack Insulation Adhesive sets up and the board is held in place by the adhesive.
- Use caution when removing plugs from kits
- Do not burn empty kit containers. Dispose in accordance with local, federal, and state regulations.

LEED® Information:

Post-Consumer Recycled Content: 0%
Post Industrial Recycled Content: 0%
Manufacturing Location: Chagrin Falls, OH
*NOTE: LEED® is a registered trademark of the U.S. Green Building Council.

I.S.O. Twin Pack™ Adhesive

Packaging

Property	Value
Kit Contents	I.S.O. Twin Pack Insulation Adhesive is packaged as a kit consisting of one 750 ml Part A cartridge fastened together with one 750 ml Part B cartridge.
Each Case Contains	4 Part A – Part B Kits, 4 Static Mixers, Instruction Sheet
Weight of Case	20 lb (9 kg)
Number per Pallet	48
NOTE: Coverage rates of each I.S.O. Twin Pack kit, when properly mixed, dispenses 150' (45.7 m) of mixed adhesive in a bead ½" (13 mm) wide. This bead will rise ¾" - 1" (19.0 mm – 25.4 mm). This equates to a coverage area of 600 ft² (55.74 m²) per carton when installed in beads 12" (304.8 mm) on center (typical spacing). **NOTE:** Coverage rate may be reduced due to irregularities in substrates.	

Beads Dispensed - Coverage per Carton

4" o.c. (102 mm)	200 ft² (27.87 m²)
6" o.c. (152 mm)	300 ft² (18.58 m²)

Typical Set Up Times

At 60 °F (16 °C) to 90 °F (32 °C): 5-8 minutes
At 20 °F (-7 °C) to 60 °F (16 °C): 8-15 minutes

Typical Properties

Property	Minimum Performance
Color: Part A	Amber
Color: Part B	Off-White
Composition Part A	Isocyanate pre-polymer
Composition Part B	Polyol
Mix Ratio of A:B	1:1 by volume
Specific Gravity Part A	1.18 + 0.06
Specific Gravity Part B	1.02 + 0.05
Viscosity Part A/Part B	3,000-24,000 cps, #52 spindle at 5 RPM, 77 °F (25 °C)
V.O.C. Content	0 f/L (0 lb/gal)

I.S.O. Twin Pack™ Adhesive

Acceptable Substrates

Property	NOTE
Structural Concrete (New)	New poured decks must have a minimum 28 day cure time
Structural Concrete (Existing)	Positive adhesion test required
Steel	New steel decks may require cleaning to remove processing oils
Gypsum Decks	Positive adhesion test required
Cementitious Woodfiber	
Modified Bitumen Roofs	
Plywood and OSB	
SBS Base Sheets	
V-Force Membrane	Positive adhesion test required
Lightweight Concrete	Acceptable Lightweight concrete substrates include cellular or air-entrained concrete.
Existing Asphalt and Modified Bitumen Roofs (mineral or Smooth Surfaced)	Existing substrates containing residual asphalt must be cleaned and scraped smooth as possible.
Coal Tar Pitch	Positive adhesion test required. Primer may be required.
Insulation ISO 95+™ GL / ISOGARD™ GL, ISOGARD HD, RESISTA™ / ISOGARD CG, Structodek® HD, DensDeck®, Securock®, Expanded Polystyrene, Extruded Polystyrene	Non-Firestone brand insulations require a positive adhesion test.
	Single Ply membranes, Fiberglass insulation, Perlite

Necessary Equipment:

The following equipment is necessary to dispense I.S.O. Twin Pack Insulation Adhesive:

- **Static Mixer:** Supplied with I.S.O. Twin Packs. Static mixer tubes are bolted onto the plugged end of kit after plugs removed. As Part A and B are simultaneously extruded through the tube, the static mixer properly and thoroughly mixes Part A and Part B. The tip at the end of the static mixer (opposite bolt end) dispenses mixed I.S.O. Twin Pack Insulation Adhesive in a ½" (13 mm) wide bead.

- **I.S.O. Twin Pack 4 Bead (Firestone Item No. W56RACINT4) and 13 Bead MBA+ Multi Bead Dispenser (sold separately):** Cart and wheel mounted, hand maneuverable, with battery driven plungers, these dispensers mix and dispense multiple beads of I.S.O. Twin Pack Insulation Adhesive simultaneously from 12" (305 mm) on center all the way up to full coverage on open, unobstructed roof areas. Pre-marked cartridge slots provide consistent application for desired bead spacing of the I.S.O. Twin Pack.

- **I.S.O. Twin Pack Single Bead Hand Dispenser (Firestone Item No. W56RACINTG); Battery Powered Single Bead Applicator and Pneumatic Single Bead Applicator (sold separately):**
  Mixes and dispenses one bead of I.S.O. Twin Pack Insulation Adhesive and are necessary for dispensing I.S.O. Twin Pack Insulation Adhesive on roof areas where Multi Bead Dispensers cannot be maneuvered.

Please contact Firestone Technical Services at 1-800-428-4511 for further information.

Firestone
BUILDING PRODUCTS
NOBODY COVERS YOU BETTER.®

CE Technical Data Sheet
Firestone RubberGard EPDM LSFR 045

Description:
Firestone RubberGard EPDM LSFR 045 is a non reinforced, black, synthetic roofing membrane made of Ethylene-Propylene-Diene Terpolymer (EPDM) with a nominal thickness of 1.1 mm (MDV).

Use:
The membrane is used as a roof waterproofing membrane in ballasted, fully adhered and mechanically attached systems as defined by EN 13956.

Characteristics:

Property	Standard	Unit	Declaration MLV*
Watertightness	EN 1928 (B)		Pass
External fire performance	EN 13501-5		$B_{ROOF}(t1)$
Reaction to fire	ENV 1187 EN 13501-1 EN ISO 11925-2		E
Joint peel resistance	EN 12316-2	N/50mm	≥50
Joint shear resistance	EN 12317-2	N/50mm	≥200
Tensile strength (L/T)	EN 12311-2 (B)	N/mm²	≥7
Elongation (L/T)	EN 12311-2 (B)	%	≥300
Resistance to impact – soft substrate	EN 12691 (B)	mm	≥1700
Resistance to impact – hard substrate	EN 12691 (A)	mm	≥200
Resistance to static load - soft substrate	EN 12730 (A)	kg	≥15
Resistance to static load - hard substrate	EN 12730 (B)	kg	≥20
Tear resistance (L/T)	EN 12310-2	N	≥40
Resistance to root penetration	EN 13948		Pass
Dimensional stability	EN 1107-2	%	≤0.5
Foldability at low temperature	EN 495-5	°C	≤-45
UV exposure	EN 1297	Visual	Pass

**Manufacturer's limiting values in accordance with EN 13956.*

Issue 7, 1 January 2012

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Firestone Building Products – Ikaroslaan 75 – 1930 Zaventem – Belgium
tel: +32/2/711.44.50 – fax: +32/2/721.27.18 – info@fbpe.be
Please check www.firestonebpe.com for updates.

Firestone
BUILDING PRODUCTS

APP 160

Meets ASTM D 6222, Type I, Grade S
Tested in Accordance with D 5147

Firestone Item Number: W70APP0162

DESCRIPTION:

Firestone APP 160 is a smooth surfaced APP modified bitumen membrane. It consists of select asphalt, modified with atactic polypropylene, and reinforced with a non-woven 190 g/m^2 (5.6 oz/yd^2) polyester mat, enhanced with continuous glass fiber strands in the machine direction. The combination results in a flexible, yet durable roofing membrane that exceeds the performance requirements of ASTM D 6222 Type I, Grade S.

APP 160 is ideal for both new construction and re-roofing applications as a base ply, cap sheet, or as a flashing sheet in single or multi-ply applications. Low slope roofs of any size, even those with numerous penetrations, may accommodate a Firestone APP 160 application.

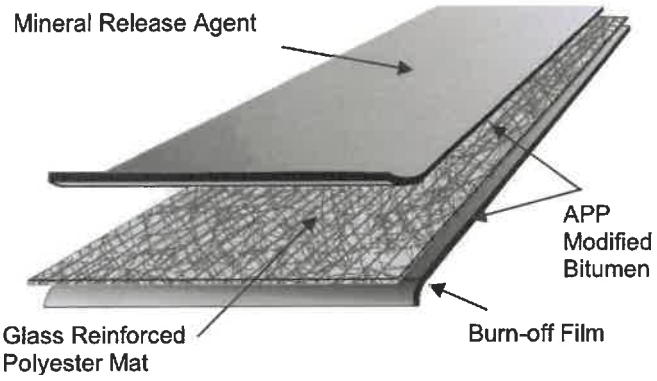
APPLICATION METHOD:

APP 160 shall be fully heat welded to the substrate.

STORAGE:

All material must be stored out of the weather in a clean, dry area in its original unopened packaging at a minimum of 40° F (4° C) and a maximum of 140° F (60° C) so that it will be a minimum of 40° F (4° C) at the time of application.

If material must be stored temporarily on the roof before application, it must be elevated from the roof surface on a pallet, stored on end, and covered from the weather with a light colored opaque tarp in a neat, safe manner not to exceed the allowable live load of the storage area.



Manufactured in an ISO 9000 Registered Facility

Roll Width:	**3.3 ft (1 m)**
Roll Length:	**32' 10" (10 m)**
Net Coverage:	**98 sq. ft (9.1 sq. m)**
Roll Weight:	**98 lb (44.5 kg)**
Pallet Size:	**48" x 39" (1.1 m x 1 m)**
Rolls Per Pallet:	**20**
Weight Per Pallet:	**2,020 lb (918 kg)**
Pallets Per Truckload:	**26**

PRECAUTIONS:

Take care when transporting and handling Firestone Modified Bitumen rolls to avoid punctures and other types of physical damage. Isolate waste products, petroleum products, grease, oil (mineral and vegetable) and animal fats from all Firestone Modified Bitumen membranes. This product is not intended for application in hot applied asphalt. Contact Firestone Roof Solutions Department for specific recommendations.

Stack Firestone APP 160 Squarely In Original Unopened Packaging No More Than Two (2) Pallets High

LEED INFORMATION:

Post Consumer Recycled Content:	8%
Post Industrial Recycled Content:	0%
Manufacturing Location:	Beech Grove, IN

FM APPROVED

CLASSIFIED C UL US

MIAMI-DADE COUNTY APPROVED

Membrane for Roofing Systems
As to an external Fire Exposure Only
61P2
See UL Directory of Products
Certified for Canada
and UL Roofing Materials
R9516

Firestone Building Products Company, LLC
NO ONE COVERS YOU BETTER™
250 W. 96th Street, Indianapolis, IN 46260
Sales: (800) 428-4442 • Technical (800) 428-4511
www.firestonebpco.com

TECHNICAL INFORMATION SHEET

401
07/23/2009

APP 160

Meets ASTM D 6222, Type I, Grade S
Tested in Accordance with D 5147

Firestone
BUILDING PRODUCTS

Dimensions and Mass	English			Metric		
Property	Unit	ASTM Minimum	Firestone Nominal	Unit	ASTM Minimum	Firestone Nominal
Product Thickness	mil	140	160	mm	3.5	3.8
Net Mass	lb/100 ft^2	70	95	g/m^2	3,417	4,003
Bottom Coating	mil	30	50	mm	0.8	1.4

Physical Properties

Peak Load at 0° F (-18° C) (Tensile Strength)	lbf/in	60	MD	169	kN/m	14.0	MD	30
			XMD	137			XMD	24
Elongation at Peak Load at 0° F (-18° C)	%	10	MD	52	%	10	MD	52
			XMD	39			XMD	39
Peak Load at 73.4° F (25° C) (Tensile Strength)	lbf/in	50	MD	90	kN/m	8.8	MD	16
			XMD	62			XMD	14
Elongation at Peak Load at 73.4° F (25° C)	%	23	MD	55	%	23	MD	48
			XMD	60			XMD	52
Ultimate Elongation (at 5% of Peak Load) at 73.4° F (25° C)	%	30	MD	62	%	30	MD	57
			XMD	78			XMD	60
Tear Strength at 73.4° F (25° C)	lbf	70	MD	127	N	311.5	MD	543
			XMD	91			XMD	405
Dimensional Stability	% Change	1	MD	-0.07	% Change	1	MD	-0.07
			XMD	0.3			XMD	0.3
Low Temperature Flexibility	°F	32	14		°C	0	-10	
High Temperature Stability	°F	230	270		°C	110	132	

Physical Properties After Heat Conditioning

Peak Load at 73.4° F (25° C) (Tensile Strength)	lbf/in	50	MD	90	kN/m	8.8	MD	16
			XMD	62			XMD	11
Elongation at Peak Load at 73.4° F (25° C)	%	23	MD	43	%	23	MD	43
			XMD	38			XMD	38
Low Temperature Flexibility	°F	32	10.0		°C	0	-12.2	

Firestone V-Force™ Vapor Barrier Membrane and Temporary Roof

V-Force

Firestone V-Force Vapor Barrier Membrane is a self-adhered membrane that serves as a reliable vapor barrier and temporary roof.

When you need to quickly weatherproof a new construction or re-roof project, V-Force Vapor Barrier Membrane is the ideal solution. Two or three laborers can cover a typical roof in a day or less. Once installed, V-Force membrane's rugged surface can be left exposed to the elements for up to 3 months over an approved substrate. Its high-tensile woven polyethylene surface allows for adhesion of Firestone insulation products above the barrier, and aggressive adhesion to substrates below.

V-Force Vapor Barrier Membrane offers the following benefits:

- V-Force may be used on concrete, plywood, DensDeck® Prime, exterior gypsum and other Firestone-approved substrates
- Self-adhered temporary roof with a quick and easy release film
- Class I vapor retarder (perm rating = .02), as recognized by the International Building Code
- UL and FM approved when used with approved assemblies
- The SBS adhesive in V-Force membrane is suitable for use over a variety of substrates
- Puncture resistant, handles roof traffic
- Non-slip, UV resistant surface
- Provides a temporary roof for work crews to maintain job schedules in dry conditions without interruption
- Ideal smooth surface to adhere or attach Firestone insulation with approved insulation adhesives
- Available in 80 lb/36 kg rolls, providing 500 sq ft/46.5 sq m coverage per roll
- When installed in conjunction with an approved Firestone Roofing System, it qualifies for Red Shield® Warranty coverage

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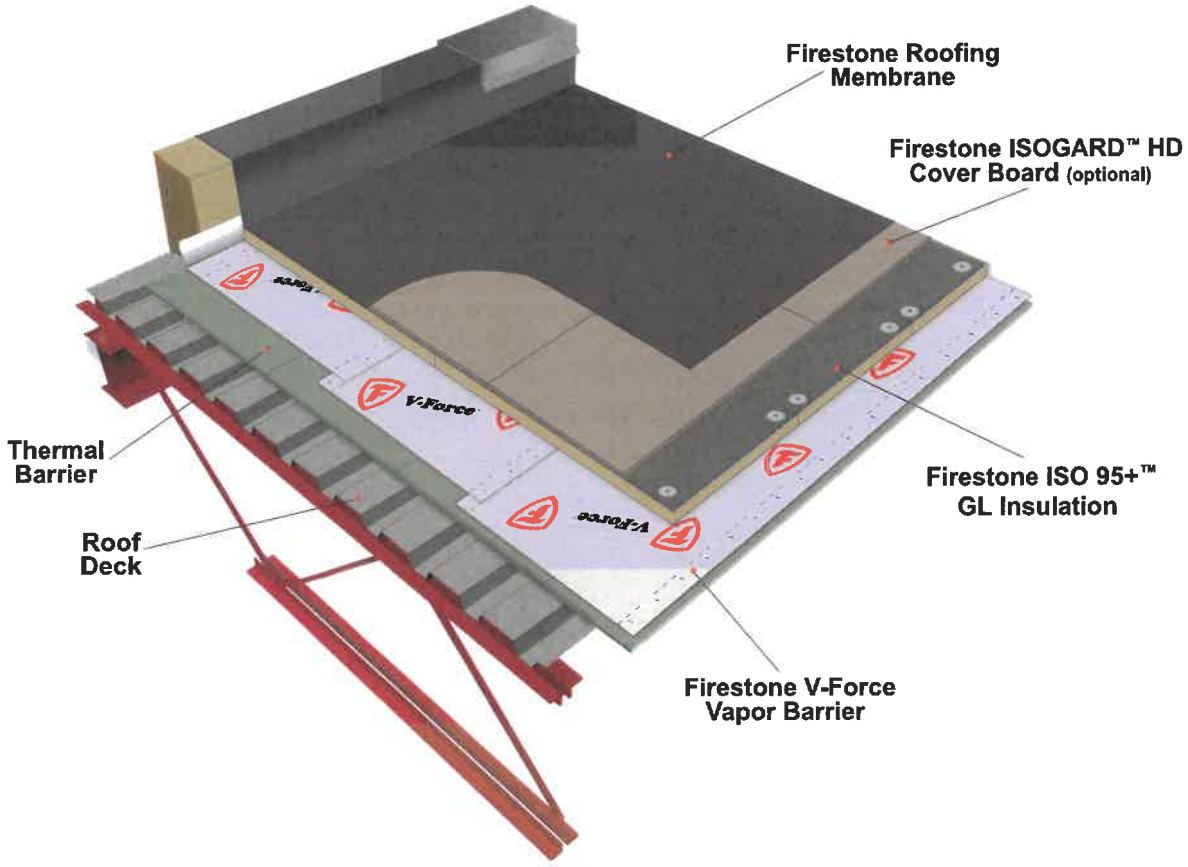
V-Force™ | Firestone V-Force Vapor Barrier Membrane




Installation considerations:

- Approved substrates must be primed with V-Force solvent-based or water-based primer, except steel deck
- Removing the release liner from the back of the membrane at a 45° angle will promote straight seams
- Seams should overlap a minimum of 3" on the side laps and 6" on the end laps for effective coverage
- Self-seals around mechanical fasteners and minimizes any air leakage around open gaps in deck joints and perimeter area



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www.firestonebpco.com

Printed in U.S.A. Item #1322 3/12 (Replaces 6/11) -01

Firestone V-Force™ Vapor Barrier Membrane and Temporary Roof

V-Force

Firestone V-Force Vapor Barrier Membrane is a self-adhered membrane that serves as a reliable vapor barrier and temporary roof.

When you need to quickly weatherproof a new construction or re-roof project, V-Force Vapor Barrier Membrane is the ideal solution. Two or three laborers can cover a typical roof in a day or less. Once installed, V-Force membrane's rugged surface can be left exposed to the elements for up to 3 months over an approved substrate. Its high-tensile woven polyethylene surface allows for adhesion of Firestone insulation products above the barrier, and aggressive adhesion to substrates below.

V-Force Vapor Barrier Membrane offers the following benefits:

- V-Force may be used on concrete, plywood, DensDeck® Prime, exterior gypsum and other Firestone-approved substrates
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- UL and FM approved when used with approved assemblies
- The SBS adhesive in V-Force membrane is suitable for use over a variety of substrates
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- Non-slip, UV resistant surface
- Provides a temporary roof for work crews to maintain job schedules in dry conditions without interruption
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- Available in 80 lb/36 kg rolls, providing 500 sq ft/46.5 sq m coverage per roll
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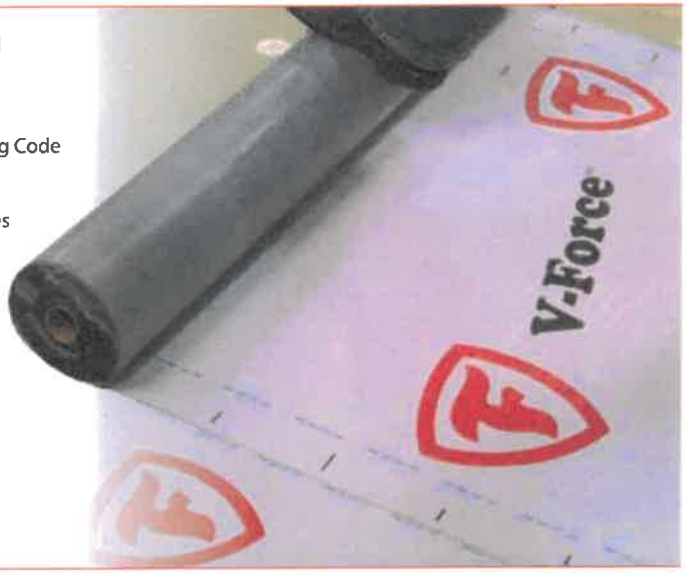

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V-Force™ | Firestone V-Force Vapor Barrier Membrane




Installation considerations:

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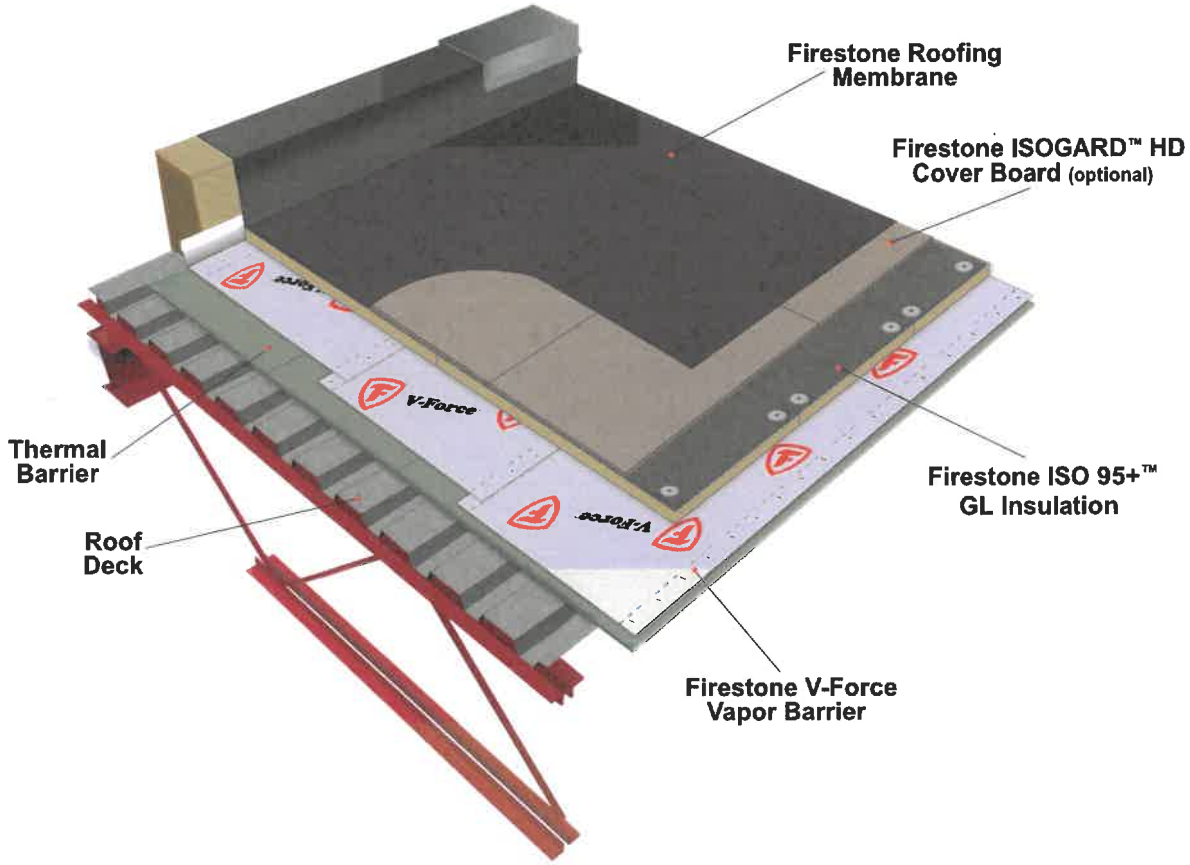
- Seams should overlap a minimum of 3" on the side laps and 6" on the end laps for effective coverage
- Self-seals around mechanical fasteners and minimizes any air leakage around open gaps in deck joints and perimeter area



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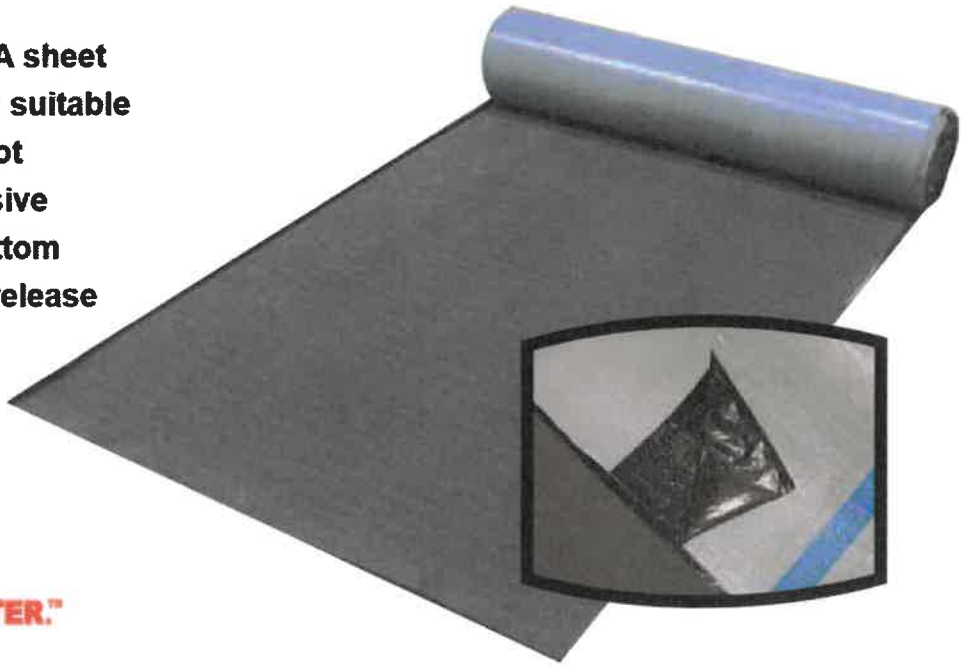
Printed in U.S.A. Item #1322 3/12 (Replaces 6/11) -01

Firestone BASEGARD™ SA

BASEGARD SA is a nominal 70-mil, fiberglass reinforced, self-adhered modified bitumen base sheet that can be used with Firestone's full line of APP and SBS systems. The fiberglass reinforcing mat contributes dimensional stability for ease of application.

The top of the BASEGARD SA sheet is sand surfaced to provide a suitable substrate for heat welding, hot asphalt, and insulation adhesive attachment methods. The bottom surface has an opaque split release film for easy installation.



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Firestone BASEGARD™ SA

BASEGARD SA base sheet continues to demonstrate Firestone's commitment to provide durable, high performance modified bitumen roofing systems, proving again that "NOBODY COVERS YOU BETTER".

BASEGARD SA base sheet, in a two square roll, provides the following features:

- Compatible with Firestone SBS and APP products
- Can be installed over numerous substrates such as ISOGARD™ HD cover board or RESISTA™ insulation
- Acceptable for adhesion to existing non-coated granule surfaced modified bitumen
- Can be used as an effective vapor retarder when installed over an approved substrate
- 70 mil thickness provides durable base sheet for multi-ply systems
- Acceptable for inclusion in Red Shield™ Warranties up to 25 years
- Approved by FM Global and Underwriters Laboratories (UL) in many assemblies
- Split-film release liner allows for easy removal and quick installation
- Qualifies for a flat fee Red Shield Warranty when used in conjunction with a granule surfaced modified bitumen cap sheet

For additional information, please contact your local sales representative.

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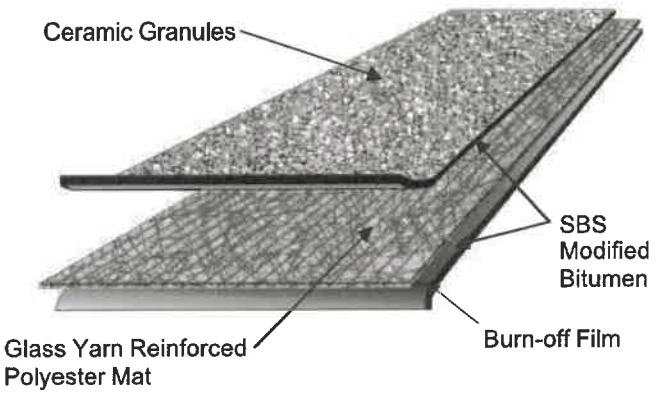
Printed in U.S.A. Item # 1830 3/12-01

Firestone
BUILDING PRODUCTS COMPANY

SBS Premium FR Torch

Meets ASTM D 6164, Type II, Grade G
Tested in Accordance with D 5147

Firestone Item Number:
W71HWS16FT (White)
W71HBS16 FT (Black)



DESCRIPTION:

Firestone SBS Premuim FR Torch is a Styrene-Butadiene-Styrene modified bitumen membrane that is reinforced with a 265 g/m^2 (7.8 oz./yd^2) non-woven polyester mat enhanced with continuous glass fiber strands in the machine direction. The combination results in a flexible, durable membrane. The addition of SBS rubber optimizes asphalts natural waterproofing characteristics and increases system performance. This proprietary Fire Retardant compound provides resistance to thermal and physical forces over a wide range of temperatures. SBS Premium FR Torch is ideal for both new construction and reproofing applications. Low slope roofs of any size, even those with numerous penetrations, may accommodate a Firestone SBS Premium FR Torch application.

Roll Width:	**3.3 ft (1 m)**
Roll Length:	**33.5 ft (10.2 m)**
Net Coverage:	**100 sq. ft (10.2 m^2)**
Roll Weight:	**103 lb (46.8 kg)**

APPLICATION METHOD:

SBS Premium FR Torch shall be installed by fully heat welding the membrane to an appropriate substrate.

STORAGE:

All material must be stored out of the weather in a clean, dry area in its original unopened packaging at a minimum of 40° F (4° C) and a maximum of 140° F (60° C) so that it will be a minimum of 40° F (4° C) at the time of application. If material must be stored temporarily on the roof before application, it must be elevated from the roof surface on a pallet, stored on end, and covered from the weather with a light colored opaque tarp in a neat, safe manner not to exceed the allowable live load of the storage area.

Manufactured in an ISO 9000 Registered Facility

Pallet Size:	**48" x 39" (1.2 m x 1 m)**
Rolls Per Pallet:	**20**
Weight Per Pallet:	**2,120 lb (962.3 kg)**
Pallets Per Truckload:	**22**

Stack Firestone SBS Premium FR Torch Squarely In Original Unopened Packaging No More Than Two (2) Pallets High

PRECAUTIONS:

Take care when transporting and handling Firestone Modified Bitumen rolls to avoid physical damage. Isolate waste products, petroleum products, grease, oil (mineral and vegetable) and animal fats from all Firestone Modified Bitumen membranes. Contact Firestone Roofing Solutions Department for specific recommendations.

LEED INFORMATION:

Post Consumer Recycled Content:	5%
Post Industrial Recycled Content:	0%
Manufacturing Location:	Beech Grove, IN

Subject to the conditions of Approval when installed as described in the current edition of the FM Approval Guide

Certificate Number FM 38812

Membrane for Roofing Systems As to an External Fire Exposure Only 61P2 See UL Directory of Products Certified for Canada And UL Roofing Materials And Systems Directory R9516

Cool Roof Rating Council Product Identification Number: 06080012 (For White Granules)

Firestone Building Products Company
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SBS Premium FR Torch

Firestone BUILDING PRODUCTS COMPANY

Meets ASTM D 6164, Type II, Grade G
Tested in Accordance with D 5147

Dimensions and Mass	English			Metric		
Property	Unit	ASTM Minimum	Firestone Nominal	Unit	ASTM Minimum	Firestone Nominal
Product Thickness	mil	130	160.0	mm	3.3	4.1
Net Mass	lb/100 ft^2	90	97.0	g/m^2	4,394	4,735
Bottom Coating	mil	40	45.0	mm	1.0	1.2

Physical Properties

Peak Load, at 0° F (-18° C) (Tensile Strength)	lbf/in	100	MD	148.0	kN/m	17.5	MD	25.9
			XMD	126.0			XMD	22.0
Elongation at Peak Load, at 0° F (-18° C)	%	20	MD	50.0	%	20	MD	50.0
			XMD	60.0			XMD	60.0
Peak Load, at 73.4° F (25° C) (Tensile Strength)	lbf/in	70	MD	105.0	kN/m	12.3	MD	18.4
			XMD	90.0			XMD	15.8
Elongation at Peak Load, at 73.4° F (25° C)	%	50	MD	55.0	%	50	MD	55.0
			XMD	70.0			XMD	70.0
Ultimate Elongation at 5% of Peak Load, at 73.4° F (25° C)	%	60	MD	70.0	%	60	MD	70.0
			XMD	85.0			XMD	85.0
Tear Strength, at 73.4° F (25° C)	lbf	70	MD	125.0	N	311	MD	556.3
			XMD	120.0			XMD	534.1
Dimensional Stability	% Change	1	MD	-0.1	% Change	1	MD	-0.1
			XMD	0.2			XMD	0.2
Low Temperature Flexibility	°F	0	-30		°C	-18	-34	
High Temperature Stability	°F	215	270		°C	102	132	
Granule Loss					g	2	0.9	

Physical Properties After Heat Conditioning

Peak Load, at 0° F (-18° C) (Tensile Strength)	lbf/in	100	MD	150.0	kN/m	17.5	MD	26.3
			XMD	115.0			XMD	20.1
Elongation at Peak Load, at 0° F (-18° C)	%	20	MD	35.0	%	20	MD	35.0
			XMD	39.0			XMD	39.0
Peak Load, at 73.4° F (25° C) (Tensile Strength)	lbf/in	70	MD	105.0	kN/m	12.3	MD	18.4
			XMD	81.0			XMD	14.2
Elongation at Peak Load, at 73.4° F (25° C)	%	50	MD	54.0	%	50	MD	54.0
			XMD	63.0			XMD	63.0
Ultimate Elongation at 5% of Peak Load, at 73.4° F (25° C)	%	60	MD	64.0	%	60	MD	64.0
			XMD	75.0			XMD	75.0
Low Temperature Flexibility	°F	0	-10.0		°C	-18	-23.3	

Firestone
BUILDING PRODUCTS COMPANY

SBS Premium FR Torch

Meets ASTM D 6164, Type II, Grade G
Tested in Accordance with D 5147

Firestone Item Number:
W71HWS16FT (White)
W71HBS16 FT (Black)

DESCRIPTION:

Firestone SBS Premuim FR Torch is a Styrene-Butadiene-Styrene modified bitumen membrane that is reinforced with a 265 g/m^2 (7.8 oz./yd^2) non-woven polyester mat enhanced with continuous glass fiber strands in the machine direction. The combination results in a flexible, durable membrane. The addition of SBS rubber optimizes asphalts natural waterproofing characteristics and increases system performance. This proprietary Fire Retardant compound provides resistance to thermal and physical forces over a wide range of temperatures. SBS Premium FR Torch is ideal for both new construction and reproofing applications. Low slope roofs of any size, even those with numerous penetrations, may accommodate a Firestone SBS Premium FR Torch application.

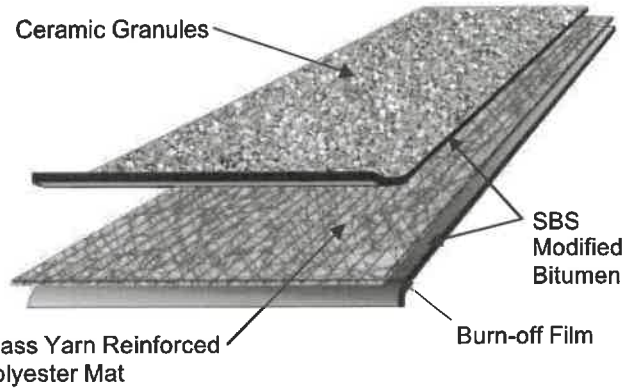
Roll Width:	**3.3 ft (1 m)**
Roll Length:	**33.5 ft (10.2 m)**
Net Coverage:	**100 sq. ft (10.2 m^2)**
Roll Weight:	**103 lb (46.8 kg)**

APPLICATION METHOD:

SBS Premium FR Torch shall be installed by fully heat welding the membrane to an appropriate substrate.

STORAGE:

All material must be stored out of the weather in a clean, dry area in its original unopened packaging at a minimum of 40° F (4° C) and a maximum of 140° F (60° C) so that it will be a minimum of 40° F (4° C) at the time of application. If material must be stored temporarily on the roof before application, it must be elevated from the roof surface on a pallet, stored on end, and covered from the weather with a light colored opaque tarp in a neat, safe manner not to exceed the allowable live load of the storage area.



Manufactured in an ISO 9000 Registered Facility

Pallet Size:	**48" x 39" (1.2 m x 1 m)**
Rolls Per Pallet:	**20**
Weight Per Pallet:	**2,120 lb (962.3 kg)**
Pallets Per Truckload:	**22**

Stack Firestone SBS Premium FR Torch Squarely In Original Unopened Packaging No More Than Two (2) Pallets High

PRECAUTIONS:

Take care when transporting and handling Firestone Modified Bitumen rolls to avoid physical damage. Isolate waste products, petroleum products, grease, oil (mineral and vegetable) and animal fats from all Firestone Modified Bitumen membranes. Contact Firestone Roofing Solutions Department for specific recommendations.

LEED INFORMATION:

Post Consumer Recycled Content:	5%
Post Industrial Recycled Content:	0%
Manufacturing Location:	Beech Grove, IN

Subject to the conditions of Approval when installed as described in the current edition of the FM Approval Guide

Certificate Number FM 38812

Membrane for Roofing Systems As to an External Fire Exposure Only 61P2
See UL Directory of Products Certified for Canada And UL Roofing Materials And Systems Directory R9516

Cool Roof Rating Council Product Identification Number: 0608-0012 (For White Granules)

Firestone Building Products Company
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SBS Premium FR Torch

Firestone BUILDING PRODUCTS COMPANY

Meets ASTM D 6164, Type II, Grade G
Tested in Accordance with D 5147

Dimensions and Mass	English			Metric		
Property	Unit	ASTM Minimum	Firestone Nominal	Unit	ASTM Minimum	Firestone Nominal
Product Thickness	mil	130	160.0	mm	3.3	4.1
Net Mass	lb/100 ft^2	90	97.0	g/m^2	4,394	4,735
Bottom Coating	mil	40	45.0	mm	1.0	1.2

Physical Properties

Peak Load, at 0° F (-18° C) (Tensile Strength)	lbf/in	100	MD	148.0	kN/m	17.5	MD	25.9
			XMD	126.0			XMD	22.0
Elongation at Peak Load, at 0° F (-18° C)	%	20	MD	50.0	%	20	MD	50.0
			XMD	60.0			XMD	60.0
Peak Load, at 73.4° F (25° C) (Tensile Strength)	lbf/in	70	MD	105.0	kN/m	12.3	MD	18.4
			XMD	90.0			XMD	15.8
Elongation at Peak Load, at 73.4° F (25° C)	%	50	MD	55.0	%	50	MD	55.0
			XMD	70.0			XMD	70.0
Ultimate Elongation at 5% of Peak Load, at 73.4° F (25° C)	%	60	MD	70.0	%	60	MD	70.0
			XMD	85.0			XMD	85.0
Tear Strength, at 73.4° F (25° C)	lbf	70	MD	125.0	N	311	MD	556.3
			XMD	120.0			XMD	534.1
Dimensional Stability	% Change	1	MD	-0.1	% Change	1	MD	-0.1
			XMD	0.2			XMD	0.2
Low Temperature Flexibility	°F	0	-30		°C	-18	-34	
High Temperature Stability	°F	215	270		°C	102	132	
Granule Loss					g	2	0.9	

Physical Properties After Heat Conditioning

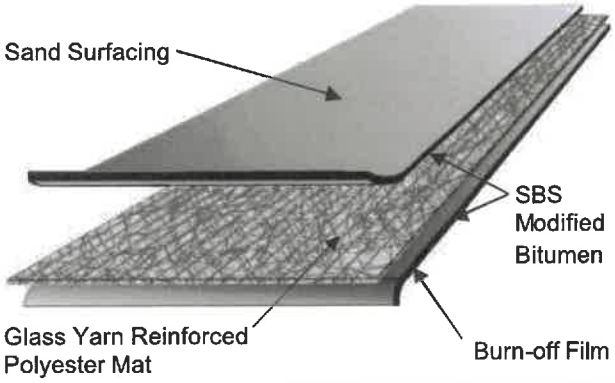
Peak Load, at 0° F (-18° C) (Tensile Strength)	lbf/in	100	MD	150.0	kN/m	17.5	MD	26.3
			XMD	115.0			XMD	20.1
Elongation at Peak Load, at 0° F (-18° C)	%	20	MD	35.0	%	20	MD	35.0
			XMD	39.0			XMD	39.0
Peak Load, at 73.4° F (25° C) (Tensile Strength)	lbf/in	70	MD	105.0	kN/m	12.3	MD	18.4
			XMD	81.0			XMD	14.2
Elongation at Peak Load, at 73.4° F (25° C)	%	50	MD	54.0	%	50	MD	54.0
			XMD	63.0			XMD	63.0
Ultimate Elongation at 5% of Peak Load, at 73.4° F (25° C)	%	60	MD	64.0	%	60	MD	64.0
			XMD	75.0			XMD	75.0
Low Temperature Flexibility	°F	0	-10.0		°C	-18	-23.3	

Firestone
BUILDING PRODUCTS COMPANY

SBS Poly Torch Base

Meets ASTM D 6164-00, Type I, Grade S
Tested in Accordance with ASTM D 5147

Firestone Item Number: W71PSP1625



Manufactured in an ISO 9002 Registered Facility

DESCRIPTION:

Firestone SBS Poly Torch Base is a modified bitumen base sheet consisting of a Styrene-Butadiene-Styrene (SBS) rubber modified asphalt reinforced with a 180 g/sq. m (5.3 oz./sq. yd.) non-woven polyester mat enhanced with continuous glass fiber strands in the machine direction. The glass fiber strand reinforcement contributes to the following:

- Increased machine direction dimensional stability
- Excellent tensile strength and puncture resistance
- High flexibility for ease of installation

Roll Width:	**3.3 ft (1 m)**
Roll Length:	**33.5 ft (10.2 m)**
Net Coverage:	**100 sq. ft (9.3 sq. m)**
Roll Weight:	**85 lb (38.6 kg)**

APPLICATION METHOD:

SBS Poly Torch Base shall be installed using a roofing torch.

STORAGE:

All material should be stored out of the weather in a clean, dry area in its original unopened packaging at a minimum of 40° F (4° C) and a maximum of 140° F (60° C) so that it will be a minimum of 40° F (4° C) at the time of application. If material must be stored temporarily on the roof before application, it must be elevated from the roof surface on a pallet, stored on end, and covered from the weather with a light colored opaque tarp in a neat, safe manner not to exceed the allowable live load of the storage area.

Pallet Size:	**45" x 39" (1.1 m x 1 m)**
Rolls Per Pallet:	**25**
Weight Per Pallet:	**2,125 lb (964.6 kg)**
Pallets Per Truckload:	**21**

Stack Firestone SBS Poly Torch Base Squarely In Original Unopened Packaging No More Than Two (2) Pallets High

PRECAUTIONS:

Take care when transporting and handling Firestone Modified Bitumen rolls to avoid punctures and other types of physical damage. Isolate waste products, petroleum products, grease, oil (mineral and vegetable) and animal fats from all Firestone Modified Bitumen membranes. Contact Firestone Technical Services Department for specific recommendations.

LEED INFORMATION:

Post Consumer Recycled Content:	4%
Post Industrial Recycled Content:	0%
Manufacturing Location:	Beech Grove, IN

Subject to the conditions of Approval when installed as described in the current edition of the FM Approval Guide

Certificate Number FM38812

Type G-2 Coated Base/Ply for Roofing Systems As to an External Fire Exposure Only 61P2 See UL Directory of Products Certified for Canada And UL Roofing Materials And Systems Directory R9516

Firestone Building Products Company
A Division of BFS Diversified Products, LLC
310 E. 96th Street, Indianapolis, IN 46240
Sales: (800) 428-4442 • Technical (800) 428-4511
www.firestonebpco.com

SBS Torch Base

Firestone BUILDING PRODUCTS COMPANY

Meets ASTM D 6164-00, Type I, Grade S
Tested in Accordance with ASTM D 5147- 02

Values shown are an average of actual Quality Assurance values.

Dimensions and Mass	English			Metric		
Property	Unit	ASTM Minimum	Firestone Nominal	Unit	ASTM Minimum	Firestone Nominal
Product Thickness	mil	85.0	120.0	mm	2.2	3.0
Net Mass	lb/100 ft^2	54.0	72.7	g/ sq. m	2,636	3,549
Bottom Coating	mil	39.4	54.0	mm	1.0	1.4

Physical Properties

Maximum Load, 0° F (-18° C) (Tensile Strength)	lbf/in	70	MD	130.0	kN/m	12.3	MD	22.7
			XMD	100.0			XMD	17.5
Elongation at Maximum Load, 0° F (-18° C)	%	20	MD	34.0	%	20	MD	34.0
			XMD	40.0			XMD	40.0
Maximum Load, 73.4° F (25° C) (Tensile Strength)	lbf/in	50	MD	75.0	kN/m	8.0	MD	13.1
			XMD	60.0			XMD	10.5
Elongation at Maximum Load, 73.4° F (25° C)	%	35	MD	62.0	%	35	MD	62.0
			XMD	75.0			XMD	75.0
Elongation at 5% Maximum Load, 73.4° F (25° C)	%	38	MD	115.0	%	38	MD	115.0
			XMD	112.0			XMD	112.0
Tear Strength, 73.4° F (25° C)	lbf	55	MD	110.0	N	244.8	MD	490.0
			XMD	80.0			XMD	356.0
Strain Energy at Maximum Load, 73.4° F (25° C)	in*lbf/in^2	Not Stated	MD	36.6	N*m/m^2	Not Stated	MD	158.6
			XMD	47.0			XMD	203.7
Dimensional Stability	% Change	1	MD	-0.1	% Change	1	MD	-0.1
			XMD	0.1			XMD	0.1
Low Temperature Flexibility	°F	0	-20		°C	-18	-29	
High Temperature Stability	°F	215	270		°C	102	132	
Granule Loss			Not Applicable		g		Not Applicable	

Physical Properties After Conditioning

Maximum Load, 0° F (-18° C) (Tensile Strength)	lbf/in	70	MD	131.0	kN/m	12.3	MD	22.9
			XMD	93.0			XMD	16.3
Elongation at Maximum Load, 0° F (-18° C)	%	20	MD	48.0	%	20	MD	48.0
			XMD	40.0			XMD	40.0
Maximum Load, 73.4° F (25° C) (Tensile Strength)	lbf/in	50	MD	90.0	kN/m	8.8	MD	15.7
			XMD	80.0			XMD	14.1
Elongation at Maximum Load, 73.4° F (25° C)	%	35	MD	53.0	%	35	MD	53.0
			XMD	64.0			XMD	64.0
Elongation at 5% Maximum Load, 73.4° F (25° C)	%	38	MD	68.0	%	38	MD	68.0
			XMD	83.0			XMD	83.0
Low Temperature Flexibility	°F	0	-8.0		°C	-18	-22.2	

UltraFlash Liquid Flashing

3-gal Kit:

Part A – 2.66 gal (3-gal pail):	W70UFLF07A
Part B Activator II – 0.33 gal jug:	W70UFLF07B

1-gal Kit:

Part A – 0.8 gal (1-gal can):	W70UFLF01A
Part B Activator II – 11 fl oz bottle:	W70UFLF11B

Product Information

Description:

Firestone UltraFlash™ Liquid Flashing is a tough liquid-applied urethane elastomer blend of Part A and Part B Activator II that chemically cures to form an impermeable, seamless, UV resistant, monolithic membrane and is tack-free within approximately four (4) hours.

UltraFlash Liquid Flashing Part B Activator II is a brown colored liquid component which initiates the chemical cure when blended with UltraFlash Liquid Flashing Part A. This is not a catalyst and must be mixed in proper ratios.

UltraFlash Liquid Flashing is designed for use with Firestone SBS and BUR roofing systems, even those installed with Firestone MB Cold Adhesive. UltraFlash Liquid Flashing is not recommended for use with APP membranes. Application can be used for vertical surfaces such as flashing walls and curbs, penetrations, roof drains; and penetration pockets with pipe clusters and unusual shaped penetrations.

UltraFlash Liquid Flashing adheres to concrete, steel, glass, wood, and most surfaces. Use UltraFlash LVOC Primer on all nonporous surfaces, including all metal surfaces.

Method of Application:

1. Remove existing flashings (i.e., metal, bituminous, mastic, etc.).
2. Substrates must be clean, dry, relatively smooth, and free of sharp objects, foreign materials, oil, grease, and other contaminants.
3. All equipment and substrates must be ABSOLUTELY DRY.
4. Apply UltraFlash LVOC Primer, if required by substrate type.
5. Apply when ambient and substrate temperatures are 45 °F (7.2 °C) or above.
6. DO NOT THIN. DO NOT MIX BY HAND.
7. Do not mix partial containers.
8. UltraFlash flashing should be at least 60 °F (15 °C) when mixed and applied.
9. Thoroughly blend UltraFlash Liquid Flashing Part B Activator with Part A by mechanical means.
10. Three gallon (11.4 L) pails should be mixed with an eight inch (203.2 mm) mud blade. All products (except cartridges) are to be mixed for **3 minutes** to insure proper and thorough mixing.
11. One gallon (3.8 L) cans should be mixed with a 3" (76.3 mm) spiral blade for **3 minutes**.
12. Apply in strict accordance with printed instructions and specifications available on the Firestone website.
13. All material should be applied within 30 minutes after mixing. Warmer temperatures reduce the working time.
14. Flash details in accordance with the appropriate Firestone Detail Drawings. Apply UltraFlash Liquid Flashing with a paint brush, or trowel.
15. The flashing seal must be made directly to the penetration except for hot stacks.
16. Do not coat UltraFlash Liquid Flashing with Firestone Fibered Aluminum Coating or any aluminum paint.
17. POT LIFE. Pot life is about 45 minutes. Working time depends on temperature and method of application. UltraFlash cure time will be reduced in colder temperatures, and accelerated in warmer temperatures.

UltraFlash Liquid Flashing

Method of Application (Continued):

Working time in minutes as a function of temperature

Temp °F	50	60	70	80	90	100
Minutes	55	50	45	40	35	30

The mixing of UltraFlash Liquid Flashing pails should be timed so that one container of freshly mixed material is ready when the application crew finishes with the preceding pail. DO NOT stockpile mixed material, as it will cure to an unworkable viscosity before the application crew can use it.

18. For additional information including mixing directions, refer to *Firestone UltraFlash Liquid Flashing Application Guide*

Storage:

- Store in original unopened containers, at temperatures between 70 to 90 °F (21 to 32 °C) until ready for use.
- When exposed to lower temperatures, restore to at least 60 °F (15 °C) prior to use.
- For optimum results, rotate stock to ensure stored material has not exceeded the shelf life of one year.

Shelf Life:

Shelf life of one year can be expected when stored in original sealed containers at temperatures between 70 to 90 °F (21 to 32 °C). Do not use Part B if a white residue has formed.

Coverage Rate:

Though coverage varies with surface texture and type of application, one gallon covers approximately 30 square feet.

Clean-Up:

Use mineral spirits for clean-up of uncured material.

Precautions:

- **WARNING- Flammable; vapor harmful**
- UltraFlash Liquid Flashing contains petroleum asphalt, petroleum distillates, amine compounds and other chemical ingredients. Adequate health and safety precautions should be observed during storage, handling, application and curing. Refer to Material Safety Data Sheets for specific details regarding the safe use and handling of UltraFlash Liquid Flashing.
- Keep out of reach of children.
- **Avoid moisture contamination. Contact with water can generate explosive pressure in a closed container!**
- All equipment, air supplies, and application substrates must be ABSOLUTELY DRY.
- Do not use with APP products.
- Do not thin.
- Do not mix partial containers.
- Use an appropriate power mixer when blending Part B with Part A.
- Do not contaminate with foreign materials.
- Avoid contact with skin. Disposable gloves are recommended when mixing and dispensing UltraFlash Liquid Flashing.
- Avoid breathing vapors. Use only in well ventilated areas.
- Cover containers tightly when not in use.

UltraFlash Liquid Flashing

LEED Information:

Post Consumer Recycled Content: 0%
Post Industrial Recycled Content: 0%
Manufacturing Location: Houston, TX

Physical Properties

Property	Test Method	Typical Performance
Base:		Polyurethane
Color:		Mixed: Black
		Part A: Black
		Part B: Brown
Flash Point, °F (°C):	Part A:	101 °F (38 °C)
	Part B:	>250 °F (>121 °C)
Solids by Volume:		89%

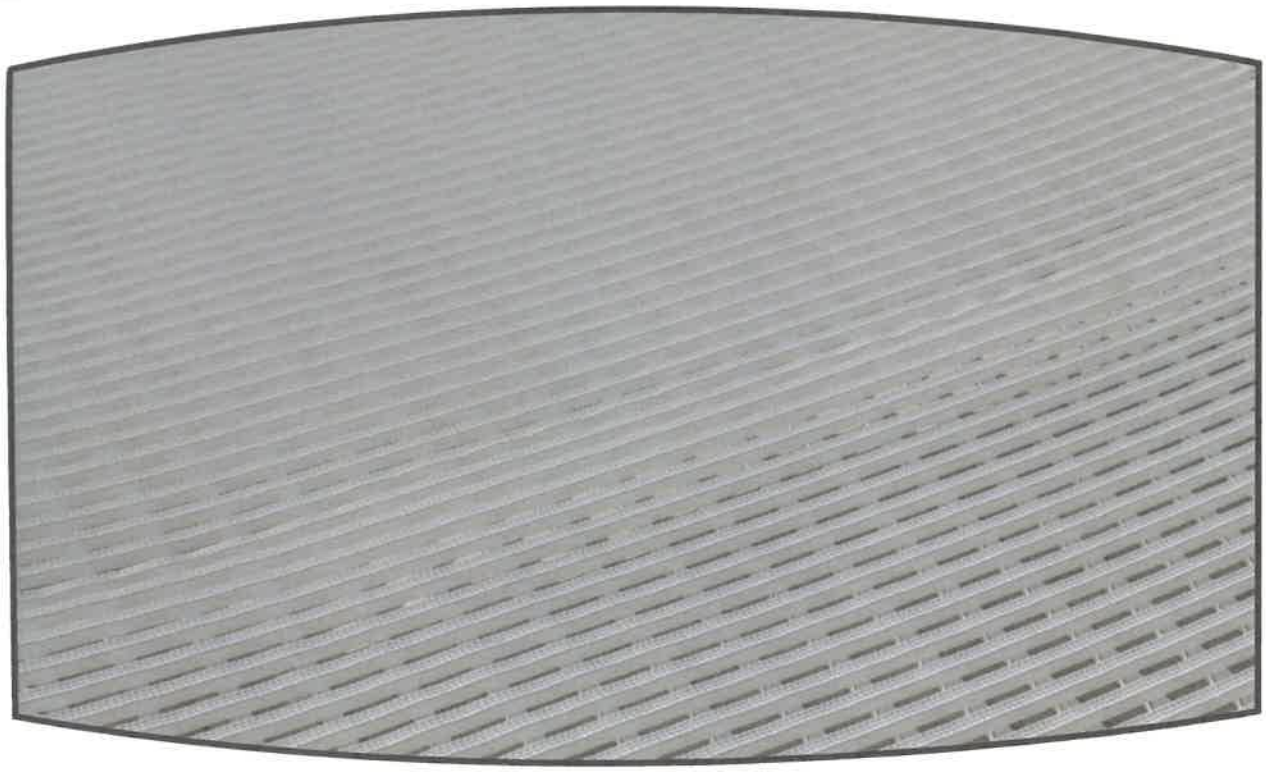
Physical Properties (Continued)

Tensile Strength:	D412	800 psi
Elongation to break:	D412	300%
Specified Gravity:	Part A:	1.00
	Part B:	1.21
Water Vapor Transmission	E96	0.03 perms
Pot Life:		30 minutes (max.) at 72 °F (22 °C)
V.O.C. Content:		88 g/L (0.74 lb/gal)

Please contact your Firestone Roof Systems Advisor at 1-800-428-4511 for further information.

This sheet is meant to highlight Firestone products and specifications and is subject to change without notice. Firestone takes responsibility for furnishing quality materials which meet published Firestone product specifications. Neither Firestone nor its representatives practice architecture. Firestone offers no opinion on and expressly disclaims any responsibility for the soundness of any structure. Firestone accepts no liability for structural failure or resultant damages. Consult a competent structural engineer prior to installation if the structural soundness or structural ability to properly support a planned installation is in question. No Firestone representative is authorized to vary this disclaimer.

TRED™ WALKWAY PAD



With Firestone's premium walkway pad, you're always on firm footing.

X-Tred is a premium Walkway Pad made from 100% TPO for use on TPO, PVC, EPDM and Modified Bitumen roofing systems. Its self-ballasting feature requires no heat welding or attachment to the membrane system and won't buckle or blow away.

100% TPO construction

- Can be removed and recycled* with other products
- X-Tred Walkway Pad does not impede water runoff
- Self-ballasting design eliminates heat welding, increasing ease of installation
- Included in system warranties
- Compatible with single ply and modified bitumen roofing systems

Firestone
BUILDING PRODUCTS

NOBODY COVERS YOU BETTER™

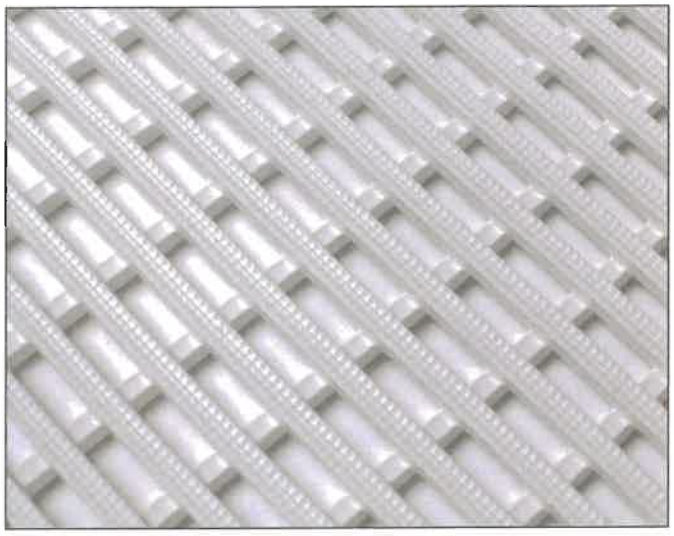
www.firestonebpco.com

*Subject to recyling programs in your area, contact FSBP for more details.

X-Tred™ Walkway Pad

The Firestone X-Tred pad can be loose-laid, which means no heat welding equipment needed for quick and easy installation. X-Tred pads are made of white TPO with a X-Tred design for less thermal expansion and greater impact resistance in the cold.

X-Tred Walkway Pad's open design and weight (1.3lb./ft.) allow the pad to remain in place. The versatile X-Tred pad is easily installed or removed without damage to the underlying membrane, facilitating safe access for rooftop maintenance or roofing system upgrades.



- Design seamlessly integrates with various roofing systems
- Diamond-cut surface provides slip-resistance
- X-Tred Walkway Pad is available in 30 in. x 30 ft. rolls
- X-Tred Pad with open grid enables self-draining and minimizes ponding water
- Can be installed on TPO, PVC, EPDM and modified bitumen roofing systems
- Does not require additional heat welding equipment for installation
- Loose-laid design allows for removal to make repairs and to clean if necessary

PRINTED WITH SOY INK

This green product printed on recycled paper using Soy Inks and manufactured using 100% Wind Power.

Firestone GREEN

Firestone Building Products
250 West 96th St., Indianapolis, IN 46260
Corporate Office: 800-428-4442 • 317-575-7000
www.firestonebpco.com

Printed in U.S.A.

Item #1318

10/11 (Replaces 3/11)-01

PRODUCT DATA SHEET

PDS-390
Rev 02/09

SOPRALENE FLAM 250 FR GR

SOPRALENE FLAM 250 FR GR (54) Order No. 02176*

*Cap sheet order numbers are for WHITE CAP SHEETS ONLY. Contact Customer Service or your Sales Representative for other available cap sheet colors and special order requirements.

CRRC COOL ROOF RATING COUNCIL MEMBER

DESCRIPTION & APPLICATION

Sopralene Flam 250 FR GR cap ply is composed of selected SBS modified bitumen applied onto a non-woven polyester reinforcement with film on the underside and a colored granule topside surface.

The Sopralene Flam 250 FR GR field and flashing cap membrane ply is adhered to a properly prepared, clean, dry and/or primed (where required) base or ply membrane by using the heat welding application method. See published Specifications and Approved Details.

COMPOSITION & PACKAGING

Product/ Property	**SOPRALENE FLAM 250 FR GR**
Reinforcement	polyester
Elastomeric Bitumen	selected blend of bitumen and SBS thermoplastic polymers
Topside	colored granules
Underside	sanded
Approximate Nominal Thickness	160 mils (4.0 mm)
Approximate Roll Coverage	97.5 ft² (9.1 m²)
Side Lap	3" (76 mm)
End Lap	6" (152 mm)
Roll Length	33 ft (10 m)
Roll Width	39" (1 m)
Approximate Roll Weight	110 lbs (50 kg)
Rolls per Pallet*	25
* Rolls stocked upright on pallets	

APPROVALS

See Underwriters Laboratories Inc. File #R11436, FM Approvals, ICC/ES, Miami-Dade County or Florida Building Code Product Approval Listings for current Approved Roof Assembly combinations. Soprema is ISO-9001:2000 Certified.

WARRANTY

Contact your local SOPREMA representative for project warranty offerings.

310 QUADRAL DRIVE • WADSWORTH, OHIO 44281 • TEL.: (330) 334-0066 • TOLL FREE: (800) 356-3521 • FAX: (330) 334-4289

PHYSICAL PROPERTIES

Physical Property per ASTM D 6164, Type II, Grade G	MD	XD
Tensile - Max Load at 0 ± 3.6°F lbf/in	159	111
Elongation at 0 ± 3.6°F %	33	28
Tensile - Max Load at 73.4 ± 3.6°F lbf/in	136	99
Elongation at 73.4 ± 3.6°F %	54	59
Tear Strength at 73.4 ± 3.6°F lbf	164	121
Low Temperature Flex °F max	-15	-15
Dimensional Stability % max	<0.5	<0.5
Compound Stability Temp F	230	230
Granule Embedment g/max	0.8	0.8
Minimum values before and after Heat Conditioning Test results for manufacturing plant in Wadsworth, OH		

GENERAL

SOPREMA is a Certified ISO 9001:2000 worldwide producer of bituminous membranes with factories in Europe and North America. Waterproofing sheets have been produced by SOPREMA since 1908. Today, through a special mixture of components, SOPREMA membranes redefine the qualities indispensable to a high performance roof membrane: elasticity, flexibility, heat & fatigue resistance.

SOPREMA SBS modified bitumen membrane assemblies typically consist of base and top ply membranes that have specific type reinforcements in order to meet specific ASTM Standards. The two ply system provides a resistance to punctures and tears, as well as ensuring an effective distribution of stress points. The two ply system operates in a homogeneous fashion. The bitumen in each layer moves uniformly to offer continuous protection.

CRRC COOL ROOF RATING COUNCIL® MEMBER

	Initial	Weathered
Solar Reflectance	0.27	0.24
Thermal Emittance	0.86	0.90
SRI	Varies by location	
Rated Product ID	0772-0010	
Licensed Manufacturer ID	0772	
Classification	Production Line	

Cool Roof Rating Council ratings are determined for a fixed set of conditions and may not be appropriate for determining seasonal energy performance. The actual effect of solar reflectance and thermal emittance on building construction may vary.

Manufacturer of product stipulates that these ratings were determined in accordance with the applicable Cool Roof Rating normal procedures.

CA Title 24 (CRRC) Compliant	Reflectivity	Emmissivity
Initial	0.27	0.86
Weathered	0.24	0.90
LEED	Recycled Content 0%	
	Production Locations: Wadsworth, OH, Gulfport, MS, & Chilliwack, BC	

PRODUCT DATA SHEET

PDS-400
Rev 02/09

SOPRALENE FLAM STICK

SOPRALENE FLAM STICK (33)

Order No. 06010

DESCRIPTION & APPLICATION

Sopralene Flam Stick base ply is composed of selected SBS modified bitumen applied onto a non-woven polyester reinforcement with self-adhesive bitumen on the underside and a film topside surface.

The Sopralene Flam Stick field and flashing base membrane ply is adhered to a properly prepared, clean, dry and/or primed (where required) substrate by the self-adhered application method. Optional inner ply(s) or the field cap membrane ply is bonded to the properly prepared, clean, dry Sopralene Flam Stick top surface with the heat welding application method.

See published Specifications and Approved Details.

COMPOSITION & PACKAGING

Product/ Property	**SOPRALENE FLAM STICK**
Reinforcement	polyester
Elastomeric Bitumen	selected blend of bitumen and SBS thermoplastic polymers
Topside	film
Underside	self-adhesive with release film
Approximate Nominal Thickness	96 mils (2.4 mm)
Approximate Roll Coverage	147 ft² (13.6 m²)
Side Lap	3" (76 mm)
End Lap	6" (152 mm)
Roll Length	49 ft (15 m)
Roll Width	39" (1 m)
Approximate Roll Weight	87 lbs (39.5 kg)
Rolls per Pallet*	25
* Rolls stocked upright on pallets	

WARRANTY

Contact your local SOPREMA representative for project warranty offerings.

310 QUADRAL DRIVE • WADSWORTH, OHIO 44281 • TEL.: (330) 334-0066 • TOLL FREE: (800) 356-3521 • FAX: (330) 334-4289

PHYSICAL PROPERTIES

Physical Property per ASTM D 5147	MD	XD
Tensile - Max Load at 0 ± 3.6°F lbf/in	117	83
Elongation at 0 ± 3.6°F %	29	22
Tensile - Max Load at 73.4 ± 3.6°F lbf/in	70	70
Elongation at 73.4 ± 3.6°F %	56	61
Tear Strength at 73.4 ± 3.6°F lbf	120	87
Low Temperature Flex °F max	-15	-15
Dimensional Stability % max	<0.5	<0.5
Compound Stability Temp F	230	230
Granule Embedment g/max	NA	NA
Minimum values before and after Heat Conditioning Test results for manufacturing plant in Wadsworth, OH		

APPROVALS

See Underwriters Laboratories Inc. File #R11436, FM Approvals, ICC/ES, Miami-Dade County or Florida Building Code Product Approval Listings for current Approved Roof Assembly combinations. Soprema is ISO-9001:2000 Certified.

GENERAL

SOPREMA is a Certified ISO 9001:2000 worldwide producer of bituminous membranes with factories in Europe and North America. Waterproofing sheets have been produced by SOPREMA since 1908. Today, through a special mixture of components, SOPREMA membranes redefine the qualities indispensable to a high performance roof membrane: elasticity, flexibility, heat & fatigue resistance.

SOPREMA SBS modified bitumen membrane assemblies typically consist of base and top ply membranes that have specific type reinforcements in order to meet specific ASTM Standards. The two ply system provides a resistance to punctures and tears, as well as ensuring an effective distribution of stress points. The two ply system operates in a homogeneous fashion. The bitumen in each layer moves uniformly to offer continuous protection.

PRODUCT DATA SHEET

PDS-357
Rev 04/08

SOPRALENE FLAM 180

SOPRALENE FLAM 180 (32)

Order No. 00410

DESCRIPTION & APPLICATION

Sopralene Flam 180 base ply is composed of selected SBS modified bitumen applied onto a non-woven polyester reinforcement with a film on both the underside and topside surfaces.

The Sopralene field and flashing base membrane plies is adhered to a properly prepared, clean, dry and/or primed (where required) substrate by using the heat welding application method. Optional inner ply(s) or the field cap membrane ply is bonded to the properly prepared, clean, dry and/or primed (where required) Sopralene Flam 180 top surface with the heat welding application method.

See published Specifications and Approved Details.

COMPOSITION & PACKAGING

Product/ Property	**SOPRALENE FLAM 180**
Reinforcement	polyester
Elastomeric Bitumen	selected blend of bitumen and SBS thermoplastic polymers
Topside	film
Underside	film
Approximate Nominal Thickness	120 mils (3.0 mm)
Approximate Roll Coverage	97.5 ft² (9.1m²)
Side Lap	3" (76 mm)
End Lap	6" (152 mm)
Roll Length	33 ft (10 m)
Roll Width	39" (1 m)
Approximate Roll Weight	81 lbs (37 kg)
Rolls per Pallet*	30
* Rolls stocked upright on pallets	

WARRANTY

Contact your local SOPREMA representative for project warranty offerings.

310 QUADRAL DRIVE • WADSWORTH, OHIO 44281 • TEL.: (330) 334-0066 • TOLL FREE: (800) 356-3521 • FAX: (330) 334-4289

PHYSICAL PROPERTIES

Physical Property per ASTM D 6164, Type I, Grade S	MD	XD
Tensile - Max Load at 0 ± 3.6°F lbf/in	117	83
Elongation at 0 ± 3.6°F %	29	22
Tensile - Max Load at 73.4 ± 3.6°F lbf/in	70	70
Elongation at 73.4 ± 3.6°F %	56	61
Tear Strength at 73.4 ± 3.6°F lbf	120	87
Low Temperature Flex °F max	-15	-15
Dimensional Stability % max	<0.5	<0.5
Compound Stability Temp F	230	230
Granule Embedment g/max	NA	NA
Minimum values before and after Heat Conditioning Test results for manufacturing plant in Wadsworth, OH		

APPROVALS

See Underwriters Laboratories Inc. File #R11436, FM Approvals, ICC/ES, Miami-Dade County or Florida Building Code Product Approval Listings for current Approved Roof Assembly combinations. Soprema is ISO-9001:2000 Certified.

GENERAL

SOPREMA is a Certified ISO 9001:2000 worldwide producer of bituminous membranes with factories in Europe and North America. Waterproofing sheets have been produced by SOPREMA since 1908. Today, through a special mixture of components, SOPREMA membranes redefine the qualities indispensable to a high performance roof membrane: elasticity, flexibility, heat & fatigue resistance.

SOPREMA SBS modified bitumen membrane assemblies typically consist of base and top ply membranes that have specific type reinforcements in order to meet specific ASTM Standards. The two ply system provides a resistance to punctures and tears, as well as ensuring an effective distribution of stress points. The two ply system operates in a homogeneous fashion. The bitumen in each layer moves uniformly to offer continuous protection.

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PRODUCT DATA SHEET

PDS-150
Rev 02/09

SOPRAVAP'R

SOPRAVAP'R (16)

Order No. D14201

DESCRIPTION

Sopravap'r is a self-adhesive vapor barrier membrane for steel decks composed of SBS modified bitumen adhesive on the bottom surface and a tri-laminated woven polyethylene on the top surface. A silicone release film covers the self-adhesive under surface.

APPLICATION

The Sopravap'r membrane can be installed on a steel deck, plywood, gypsum or concrete board, asphalt panel, or concrete. Except for the steel deck, all substrates must be primed with Elastocol 600c primer. All surfaces must be clean and dry prior to application of the primer. The minimum application temperature for Sopravap'r is +14 °F (-10 °C).

Physical Properties:	Standards	Sopravap'r
• Thickness - mils (mm)	-	31.5 (0.8)
• Dimensions - feet (m)	-	133 x 3.75 (40.8 x 1.14)
• Gross/Net coverage/roll - ft² (m²)	-	499 / 466 (46.5 / 43.5)
• Roll Weight - pounds (kg)	-	82 (37)
• Bottom Face	-	Silicone release film
• Top Face	-	Tri-laminate woven polyethyl.
• Tensile Strength, MD/XD lbf/in (kN/m)	ASTM D 5147	64/88 (11.3 / 15.4)
• Ultimate elongation, MD/XD (%)	ASTM D 5147	52 / 24
• Cold Bending °F (°C)	ASTM D 5147	-31 (-35)
• Static Puncture lbf (N)	ASTM D 5602	90 (400)
• Tear Resistance, MD/XD lbf (N)	ASTM D 5601	84/90 (375 / 400)
• Lap Adhesion, lbf (N/m)	ASTM D 1876	138 (2,000)
• Water Absorption (%)	ASTM D 5147	0.1 maximum
• Peel Resistance, lbf/ft (N/m)	ASTM D 903	83 (1,200)
• Water Vapor Permeance perm (ng/Pa· s· m²)	ASTM E 96 (Pro. B)	0.017 (0.92)
• Air Permeability, (L/sec· m²)	ASTM E 283 (75 Pa)	<0.007

Availability:
• Contact Soprema

All values are nominal.

310 QUADRAL DRIVE • WADSWORTH, OHIO 44281 • TEL.: (330) 334-0066 • TOLL FREE: (800) 356-3521 • FAX: (330) 334-4289

ALSAN RS 260 LO FIELD

1.800.356.3521
www.soprema.us

ORDER NO.: L-RS050S (pebble grey)
L-RS053S (traffic white)

TECHNICAL DATA SHEET

WEIGHT (kg)	COVERAGE	AMBIENT TEMP	SUBSTRATE TEMP	POT LIFE	RAIN PROOF	NEXT LAYER	FULLY CURED
25	90	32-95°F	32-122°F	20	45	2	5
(55.1 lb)	ft² per container	(0 to 35°C)	(0 to 50°C)	minutes at 68°F (20°C)	minutes at 68°F (20°C)	hours at 68°F (20°C)	hours at 68°F (20°C)

DESCRIPTION

Alsan RS 260 LO Field is a low odor, rapid-curing, proprietary formulation polymethacrylate (PMA) liquid resin. Alsan RS 260 LO Field is combined with Alsan RS Fleece reinforcing fabric to form a flexible and monolithic, reinforced membrane used in SOPREMA roofing and waterproofing applications.

PREPARATION

Using a slow-speed (200 to 400 rpm) mechanical agitator, stir the entire container of resin for two minutes before each use, and prior to pouring off resin into a second container if batch mixing. Catalyze only the amount of material that can be used within 10-15 minutes. Pre-measure catalyst for the appropriate amount of liquid resin. Add pre-measured catalyst to the resin component, stir for two minutes and apply to substrate.

Refer to catalyst mixing chart for additional information.

APPLICATION

Apply Alsan RS 260 LO Field with a brush, roller or notched squeegee. Notched squeegee is utilized on base layer application only.

Prior to application, refer to published specifications and approved details for complete application instructions. The applicator is responsible for ensuring conditions are appropriate to proceed with application.

PACKAGING

Alsan RS 260 LO Field is available in resealable 25 kg cans.

STORAGE

Always store closed containers in cool, ventilated and dry location away from heat and oxidizing agent. Do not store in direct sunlight or in temperatures below 32°F (0°C) or above 77°F (25°C). Approximate shelf life is twelve months from date of manufacture when properly stored, sealed and unmixed.

HANDLING

Keep away from open fire, flame or any ignition source. Vapors may form explosive mixtures with air. Avoid skin and eye contact with this material. Avoid breathing fumes. Do not eat, drink or smoke in the application area.

Alsan RS 260 LO Field transports as a non-hazardous material per US DOT regulations.

Consult the Material Safety Data Sheet for additional information pertaining to this product.

ALSAN RS 260 LO FIELD

1.800.356.3521
www.soprema.us

TECHNICAL DATA SHEET

COVERAGE RATES

	kg / ft²	kg / m²	wet mil quantity
Minimum total consumption	0.28	3.0	72 - 86
Base coat consumption	0.19	2.0	50 - 60
Top coat consumption	0.09	1.0	22 - 26

- Coverage rates may vary depending on substrate conditions.
- Mil thickness rate does not take into account polyester fleece reinforcement thickness; measurement is for liquid resin only.

CATALYST MIXING CHART

	2% Catalyst • 60°F to 95°F (15°C to 35°C)			4% Catalyst • 32°F to 59°F (0°C to 15°C)		
Resin quantity	kg	TBSP	0.1 kg Packets	kg	TBSP	0.1 kg Packets
1.0 kg	0.02	2	n/a	0.04	4	n/a
25.0 kg	0.5	50	5	1	100	10
1 liter	0.03	3	n/a	0.06	6	n/a

PHYSICAL PROPERTIES

Property	Value [1]	Test Method
Membrane Thickness (min.)	105 mils (2.7 mm)	ASTM D 5147 Section 6
Peak Load @ 73°F (avg.)	71 lbf/in (12.5 kN/m)	ASTM D 5147 Section 7
Elongation @ Peak Load (avg.)	38%	ASTM D 5147 Section 7
Peak Load @ 73°F (avg.)	90 lbf/in (15.8 kN/m)	ASTM D 412 (dumbbell)
Elongation @ Peak Load (avg.)	54%	ASTM D 412 (dumbbell)
Shore A Hardness (avg.)	78	ASTM D 2240
Water Absorption, Method I (24hr @ 73°F)	0.5%	ASTM D 570
Water Absorption, Method II (48hr @ 122°F)	1.4%	ASTM D 570
Low Temperature Flexibility	14°F (-10°C)	ASTM D 5147 Section 12
Dimensional Stability (maximum)	< 0.1%	ASTM D 5147 Section 11
Tear Strength (avg.)	98 lbf (0.4 kN)	ASTM D 5147 Section 8
Tensile Strength (avg.)	795 psi (5.5 MPa)	ASTM 412
UV Resistance (7000 hours)	3.29 g/L	SCAQMD Rule 1113
VOC Content	0.84 (initial)	ASTM C 1549
Reflectance [2]	0.86 (initial)	ASTM C 1371
Emittance [2]	105 (initial)	-
Solar Reflectance Index (SRI) [2]	109 (initial)	-

[1] Values based on reinforced Alsan RS liquid membrane applied at a coverage rate of 3.3 kg/m².
[2] Values based on testing performed on Alsan RS 230 Field Traffic White.

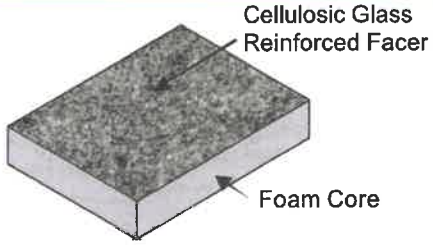
CRRC RATED PRODUCT

Alsan RS 230 Field is a CRRC rated product - product ID 0772-0046; license seller ID is 0772; classification: field applied coating

Cool Roof Rating Council ratings are determined for a fixed set of conditions and may not be appropriate for determining seasonal energy performance. The actual effect of solar reflectance and thermal emittance on building performance may vary. Manufacturer of product stipulates that these ratings were determined in accordance with the applicable Cool Roof Rating Council procedures.

Firestone
BUILDING PRODUCTS COMPANY

ISO 95+ GL
Flat and Tapered



DESCRIPTION:
Firestone ISO 95+ GL flat and tapered roof insulation consists of a closed-cell polyiso foam core laminated to a black glass reinforced mat facer. Flat and tapered ISO 95+ GL provide outstanding thermal performance on commercial roofing applications, while providing positive roof top drainage to eliminate ponding water when tapered ISO 95+ GL is used.

All Firestone polyiso insulations use EPA accepted blowing agents and qualify under the Federal Procurement Regulation for Recycled Material. Flat and tapered ISO 95+ GL with IsoGard Foam Technology incorporates a HCFC-free blowing agent that does not contribute to the depletion of the ozone (ODP-free).

ADVANTAGES:
1. Outstanding thermal performance.
2. Meets FM 4450 and UL 1256 for direct-to-steel-deck applications.
3. Compatible with ballasted, fully adhered and mechanically attached single-ply, modified bitumen and built-up roofing systems.
4. Available in flat boards 4' x 4' (1.22 m x 1.22 m) and 4' x 8' (1.22 m x 2.44 m) in thickness ranging from 1.0" (25.4 mm) to 4.0" (101.6 mm).
5. Available in tapered boards 4' x 4' (1.22 m x 1.22 m) and 4' x 8' (1.22 m X 2.44 m) with slopes ranging from 1/16" per foot (.5%) to ½" per foot (4%).

SPECIFICATION COMPLIANCE:
ASTM C1289, Type II, Class 1
UL Classified
FM Class 1 Approved
Manufactured in an ISO 9002 Registered Facility
CAN/ULC-S704

METHOD OF APPLICATION:
Insulation shall be neatly fitted to all roof penetrations, projections and nailers. No more insulation shall be installed than can be covered with membrane and completed before the end of each day's work or before the onset of inclement weather.

Note: See Firestone Technical Information Sheet 950 for Insulation Attachment Patterns.

ISO 95+ GL FLAT AND TAPERED MUST BE INSTALLED USING:
Fasteners and plates, hot asphalt or Firestone approved insulation adhesives.

For ballasted systems, the top layer of Firestone insulation may not be mechanically attached.

STORAGE AND PRECAUTIONS:
1. Keep insulation dry at all times.
2. Elevate insulation above the deck or ground.
3. Cover insulation with waterproof tarps.
4. Combustible. Refer to MSDS for more information.
5. Do not install over wet, damp or uneven substrates.

ISO 95+ GL Flute Span Over Metal Decks				
Thickness	1.0"	1.25"	1.5"-3.8"	4.0"
Span	2.625"	3.675"	4.375"	4.5"

PRODUCT DATA

Insulation Thickness (Inches)	(mm)	LTTR* R-Value
1.00	25.4	6.0
1.25	31.7	7.5
1.50	38.1	9.0
1.75	44.5	10.5
2.00	50.8	12.1
2.30	58.4	14.0
2.50	63.5	15.3
2.80	71.1	17.2
3.00	76.2	18.5
3.25	82.6	20.1
3.50	88.9	21.7
3.75	95.3	23.4
4.00	101.6	25.0

*Long Term Thermal Resistance (LTTR) values provide a 15-year time-weighted average in accordance with CAN/ULC-S770.

POLYISO PHYSICAL PROPERTIES

Physical Property	ASTM Test	English Values	Metric Values
Compressive Strength*	D 1621	20 psi	138 kPa
Density	D 1622	2 pcf	32 kg/m^3
Dimensional Stability	D 2126	<2%	<2%
Moisture Vapor Transmission	E 96	<1 Perm	<57.5 ng/(Pa•s•m^2)
Water Absorption	C 209	<1% by Volume	<1% by Volume
Service Temperature		-100° to 250° F	-73° to 121° C

*25 psi (172 kPa) available upon request.

LEED INFORMATION:

Post Consumer Recycled Content:	Average 19%	
Post Industrial Recycled Content:	Average 15%	
Manufacturing Locations:	Aurora, CO	DeForest, WI
	Bristol, CT	Jacksonville, FL
	Corsicana, TX	Salt Lake, UT
	Covington, KY	Youngwood, PA

PIMA QualityMark

Firestone Building Products Company
A Division of BFS Diversified Products, LLC
310 E. 96th Street, Indianapolis, IN 46240
Sales: (800) 428-4442 • Technical (800) 428-4511
www.firestonebpco.com

 Read Material Safety Data Sheets before using this product.

97AF Fibered Aluminum Roof Coating

DESCRIPTION:

Karnak #97AF Fibered Aluminum Roof Coating is made of selected asphalts and pigment flakes of pure aluminum blended with refined solvents and reinforcing fibers for heavy duty service. When Karnak #97AF Fibered Aluminum Roof Coating is applied to the roof, the aluminum flakes leaf to the surface providing a reflective metallic shield over the base of the coating.

USES:

Karnak #97AF Fibered Aluminum Roof Coating helps reduce indoor building temperatures. It's ideal for use on modified bitumen membranes, metal corrugated decks, steep asphalt that has aged for 90 days, or any Karnak emulsion coating that has been allowed to cure for 3-5 days.

SPECIFICATIONS:

ASTM D-2824 Type III (Non-Asbestos) TT-C-498C (except Non-Asbestos)
ASTM D-3805 Metro-Dade Approved, UL Class "A" rated FM approved.

ADVANTAGES:

The advantages of this metallic aluminum shield are twofold:

1. The asphaltic oils in the base coating are protected from harmful intense rays of the sun by the reflective properties of the aluminum. Most of the sun's rays are reflected by this aluminum shield, thereby preventing these oils from being "cooked" out of the base coating. The coating, therefore, retains its resilient characteristics and will not prematurely crack or dry out.
2. During the hot summer months, Karnak #97AF Fibered Aluminum Roof Coating may help reduce indoor building temperatures and improve inside living and working conditions, by reflecting the sun's rays and reducing roof surface temperatures.

One coat of Karnak #97AF Fibered Aluminum Roof Coating will extend the life of modified bitumen membrane, not only by limiting fire-spread, (as indicated by the U.L. Class "A" Rating) but its high aluminum content and excellent reflectivity afford solar protection and weather durability.

Modified Bitumen: Karnak #97AF Fibered Aluminum Roof Coating is U.L. Class A rated over specified Modified Bitumen Systems, UL Listing #RI2199(N).

SURFACE PREPARATION:

Prepare all surfaces by sweeping clean of dust, dirt, oil and loose particles. Repair all cracks and blisters by spreading Karnak #19AF Flashing Cement over the dam-

KARNAK
330 CENTRAL AVENUE, CLARK, NJ 07066
732-388-0300 • 800-526-4236 • FAX: 732-388-9422
WEB: http://www.karnakcorp.com

FM APPROVED · CLASSIFIED UL · CLASSIFIED C UL · METRO-DADE APPROVED

97AF Fibered Aluminum Roof Coating

aged area, then embed Karnak Cotton, Glass or Poly-Mat reinforcement and apply another coat of Karnak #19AF Flashing Cement over the entire patch. New asphalt roof surfaces should weather a minimum of 90 days before being coated with Karnak #97AF Fibered Aluminum Roof Coating. However, Karnak #97AF Fibered Aluminum Roof Coating can be coated on roofs 3 to 5 days after Karnak asphalt emulsions have been applied. Badly weathered or alligatored asphalt surfaces should be primed with Karnak 100AF Non-Fibered Emulsion or 220AF Fibered Emulsion prior to coating with 97AF Fibered Aluminum Roof Coating. Allow emulsion primer to cure a minimum of 3-5 days before application of aluminum coating.

NOTE:
Discoloration will occur in areas where Karnak #19AF Flashing Cement is not allowed to dry a minimum of 60 days.

APPLICATION:
Karnak #97AF Fibered Aluminum Roof Coating should be spread uniformly over the roof surface. Care should be taken not to overwork the coating during application. This could have a damaging effect on the leafing of the aluminum. Pour the correct amount of aluminum coating to cover a given area and work it in one direction. Be sure to mechanically mix the aluminum coating thoroughly before using. Karnak #97AF Fibered Aluminum Roof Coating can be applied with a soft roof brush, roller or spray.

COVERAGE:
Apply at the rate of 1 to 1.5 gallons per 100 sq. ft.

CARE OF TOOLS:
Equipment may be thoroughly cleaned after use with mineral spirits, taking the necessary precautions when handling combustible materials.

CAUTION:
Do not use near open flame. Avoid breathing solvent fumes and prolonged contact with skin. Do not take internally. If swallowed, **do not induce vomiting**. Call a physician immediately. Keep out of reach of children. Keep container covered when not in use. **Do not thin**. Dispose of in an environmentally safe manner. Cover air intakes during application and while drying.

PACKAGING:
Available in 1 gallon cans, 5 gallon pails and 55 gallon drums.

KARNAK

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97AF Fibered Aluminum Roof Coating

Note: Coating Modified Bitumen Membranes with Aluminum Coatings:
Karnak recommends coating modified bitumen membranes as soon as possible after the membrane is installed.

Karnak's experience, laboratory and field tests, as well as NRCA, RCMA and ARMA reports, indicate that aluminum coating will reduce the combined effects of ultraviolet rays, heat and moisture, which, especially on APP modified bitumens, enhance exudation that can cause discoloring and delamination of any surface coating

COLD-PROCESS SYSTEMS AND COATINGS, EITHER EMULSION OR SOLVENT BASED, SHOULD ONLY BE INSTALLED ON DECKS WITH POSITIVE DRAINAGE.

PER NRCA, (NATIONAL ROOFING CONTRACTORS ASSOCIATION) "THE CRITERIA FOR JUDGING PROPER SLOPE FOR DRAINAGE IS THAT THERE BE NO EVIDENCE OF STANDING WATER ON THE DECK 48 HOURS AFTER IT STOPS RAINING."

If further information is required, please contact Karnak's Technical Service Department at 1-800-526-4236.

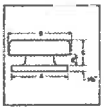
Conventional Curbs

Whether your equipment is a small exhaust fan or the largest custom Air Handling Unit, RCS offers roof curbs for all applications involving conventional roofing materials. Sloped, Flat, or Warped designs are typical depending on the age and design of the building which we help you determine along with structural analysis of the curb construction with the intended equipment to ensure you are properly supported.

Conventional Roof Curb Specifications:

- Material Options: 14 Ga. to 18 Ga. G90 or AZ55 steel along with .063 to .080 Aluminum available upon request
- Insulation: 1-1/2" Commercial Board Fiberglass with R-6.5 thermal rating per inch standard
- CNC Punching and Cutting fabrication processes deliver the most accurate nested metal parts
- Configurator driven fabrication optimizes Forming processes to reduce welds and increase curb strength
- Fully welded mitered corners with zinc coated welds; Splice options available for optimized shipping if needed
- All curbs are available with accessories such as the list below to meet your project specifications:
    - Burglar Bars
    - Liners
    - Louvered (Un-insulated)
    - Wood Nailers
    - Seismic Engineering Construction and Calculations

Just like our Metal Building Curb approach, we have the resources and experience to make your conventional project a



DAYTON

GRAINGERCHOICE

Gravity Ventilator, 22 in x 22 in, 1512/1848 Max. Intake CFM/Throat Velocity, Spun Aluminum

Item #2RB70 Mfr. Model #2RB70

UNSPSC #40101502 Catalog Page #2965

Country of Origin USA. Country of Origin is subject to change.

The DAYTON® low-profile gravity roof ventilator is designed for exhaust or supply applications on natural gra View More

Web Price

$255.66 / each

This item requires special shipping, additional charges may apply.

Qty 1 Add to Cart

Ship Pickup

Expected to arrive **Fri. Mar 11.**

Ship to **60601** | Change

Shipping Weight 15.65 lbs

Ship Availability Terms

Add to List

Technical Specs

Item	Gravity Ventilator
Base Size - Roof Ventilators	22 in x 22 in
Style - Roof Ventilators	Low Profile
Item - Roof Ventilators	Gravity Ventilator
CFM/Throat Velocity @ 0.050-In. SP Gravity Intake	448/546
CFM/Throat Velocity @ 0.050-In. SP Gravity Relief	523/638
CFM/Throat Velocity @ 0.100-In. SP Gravity Intake	633/772
CFM/Throat Velocity @ 0.100-In. SP Gravity Relief	740/903
CFM/Throat Velocity @ 0.125-In. SP Gravity Intake	708/863
CFM/Throat Velocity @ 0.125-In. SP Gravity Relief	828/1009
CFM/Throat Velocity @ 0.200-In. SP Gravity Intake	895/1092
CFM/Throat Velocity @ 0.200-In. SP Gravity Relief	1047/1277
CFM/Throat Velocity @	1001/1221

CFM/Throat Velocity @ 0.250-In. SP Gravity Relief	1171/1428
Overall Height (In.)	11 3/4 in
Depth (In.)	29 in
Width (In.)	29 in
Max. Intake CFM/Throat Velocity	1512/1848
Construction Material	Spun Aluminum

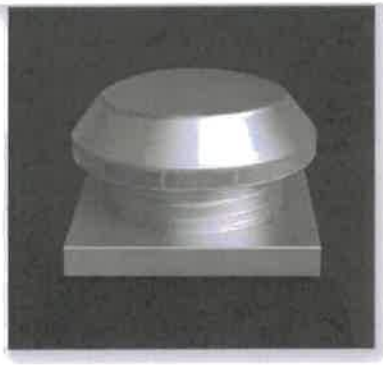
Recommended 8 In. Fixed Curb Item No.	4HX39
Recommended 12 In. Fixed Curb Item No.	2RB76
Dimension A	22 in
Dimension B	29 in
Dimension C	10 in
Dimension D	3 1/2 in

Documentation

Dayton Solutions for Air Resource

Dayton Gravity Ventilators OIPM

Bra
UP(
Moc
Cat

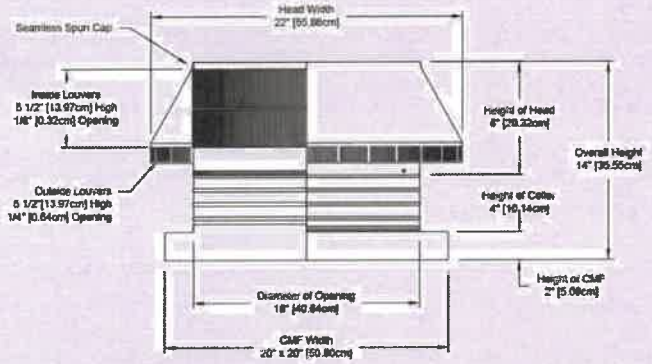


- The Pop Vent Commercial Roof Louver with curb mount flange allows fresh air to enter the attic or plenum
- Inner louver design prevents rain and snow as well as animals and insects from entering inside
- Roof Louver can be used as a hatch to service the attic or plenum
- Roof Louver can also be modified with a tail pipe adapter if duct venting is required
- Can be installed in every climate zone on roof curbs
- Constructed of durable rust-free aluminum
- 5 Year Warranty

(Powder coating available)

Inside Louvers

Dimensions & Specifications *200 Sq. in. NFA*



Net Free Vent Area (sq. inches)	(sq. feet)
200	1.39
Application per Sq. Foot (1/150)	**(1/300)**
416	833
Weight	
13 lbs	

800-Roof-Vent (766-3836) • 845-565-7770
roofvents.com • sales@roofvents.com

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Pop Vent Commercial Roof Louver Air Intake with Curb Mount Flange | 16" Diameter 4" Tall Collar | 200 Sq. In. NFA | Model PV-16-C4-CMF

$163.00

Plus Shipping and Options

Specifications | Image Gallery | Description | Colors | Drawings | Installation

Vent Calculator | Roof Curb | Add To Cart

Click to print or download product brochure

TYPAR® METROWRAP™
THREE-PART SPECIFICATIONS

PART 1. GENERAL

1.1 Summary

A. This Section specifies TYPAR MetroWrap applied as a water-resistive barrier and air barrier assembly on exterior walls.

1.2 Submittals

A. Product Data: Submit manufacturer's product data and installation instructions.
B. Samples: Submit 12" (300mm) square sample for approval.

1.3 Quality Assurance

A. Manufacturer:
1. Obtain primary materials from a single manufacturer regularly engaged in manufacturing building wraps. Obtain secondary materials from a source acceptable to the primary materials manufacturer.

B. Installer:
1. Minimum two years experience with installation of similar building wraps.

PART 2. PRODUCTS

2.1 Manufacturer

A. Berry Global, Inc., 70 Old Hickory Blvd, Old Hickory, TN 37138; +1 615-847-7000; www.TYPAR.com.

2.2 Water-Resistant Barrier

A. Material shall comply with the following:
1. Thickness: 0.121" average.
2. Breaking Strength Test: 94 pounds mean value per ASTM D5034.
3. Water Vapor Transmission: 9-15 perms (grains per hr.in.Hg.sqft) per ASTM E96, dessicant method.
4. Pliability: No signs of cracking per AC38, Sec. 3.3.4.
5. Ultraviolet Exposure: Not less than 10 months prior to exterior cladding coverage.
6. Accelerated Aging Cycling: No signs of failure at 21 days per AC38.
7. Water Resistance Test: Exceeds one hour per ASTM D779.
8. Elongation: 1.9" mean value per ASTM D5034, 4" wide sample.
9. Air Penetration Resistance (Gurley Hill Porosity) [TAPPI T 460] [sec/100cc] >4800.
10. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: Pass. Smoke Spread: Pass. NFPA 285: Pass.

2.2 Manufacturer's Accessory Products – Sealing Tape/Fasteners

A. Tape: TYPAR® Construction Tape.
1. Description:
a. Face Material Composition: Polyethylene barrier.
b. Face Color: Gray.
c. Adhesive Composition: Acrylic.
d. Thickness: 3.6mil.
e. Dimensions: 1-7/8" x 165', 3" x 165.'
2. Performance Characteristics:
a. Temperature Resistance: 0°F (-18°C) – Min. application temperature; 230°F (110°C) – Max. application temperature.
b. Peel Adhesion PSTC-1*
c. Tensile Strength PSTC – 31*
*Pressure-Sensitive Tape Council.
3. Accessories:
a. Primer: Polyken spray adhesive or equal.
b. Flashing Tape: TYPAR® All-Temperature Flashing, TYPAR® Flexible Flashing, and TYPAR® Butyl Flashing.
c. Fastener: Fastener is dependent on substrate construction.
d. Sealant: Must comply with ASTM C920 elastomeric polymer sealant.

B. Flashing: TYPAR Butyl Flashing.
1. Description:
a. Face Material Composition: Polyethylene barrier.
b. Face Color: Gray.
c. Adhesive Composition: Butyl rubber adhesive.
d. Thickness: 18.5mil.
e. Release Liner: Kraft paper.
f. Dimensions: 4" x 25'; 4" x 75'; 6" x 75'; 9" x 75'; 12" x 75'.

TYPAR

2. Performance Characteristics:
    a. Low Temp Pliability ASTM C765 PASS.
    b. Nail Sealability ASTM D1970 PASS.
    c. Tensile Strength ASTM D5034-95 PASS.
    d. Peel Adhesion: ASTM D3330-04 PASS.
3. Accessories:
    a. Primer: Polyken spray adhesive or equal.
    b. Seam Tape: TYPAR® Construction Tape.
    c. Fastener: Fastener is dependent on substrate construction.
    d. Sealant: Must comply with ASTM C920 elastomeric polymer sealant.

C. Recommended Sealants Against TYPAR® Logo-Side Coating:
1. Elastomeric polymer-based, butyl rubber, rubber-based, meeting ASTM C920 evaluation.

D. Recommended Fasteners for Wood, Insulated Sheathing Board, Exterior Gypsum:
1. Plastic cap nails.
2. Plastic cap staples.

E. Recommended Fasteners for Steel Frame Construction:
1. Rust-resistant screws with washers.

F. Recommended Fastening to Masonry:
1. Sealant: Polyurethane-based, meeting ASTM C920 evaluation.
2. Mechanical: Masonry fastener with washer.

PART 3. EXECUTION

3.1 Installation

A. TYPAR MetroWrap.
Install in accordance with manufacturer's instruction over exterior sheathing or open studs. Seal joints and penetrations through weather-resistive barrier with specified tape and fasteners prior to installation of finish material. Air infiltration barrier shall be airtight and free from holes, tears, and punctures. All window and door penetrations are to be flashed and sealed per ASTM 2112, AAMA guidelines and manufacturer instructions. Cover with exterior cladding within six months of installation.

B. TYPAR® Butyl Flashing.
1. Follow the TYPAR® Flashing installation procedures.

C. TYPAR Construction Tape.
1. Follow the TYPAR Construction Tape installation procedures.

3.2 Examination

A. TYPAR MetroWrap.
1. Verify substrate and surface conditions are in accordance with the flashing manufacturer's recommendation.

B. TYPAR Butyl Flashing.
1. Verify substrate and surface conditions are in accordance with the flashing manufacturer's recommendation.

C. TYPAR Construction Tape.
1. Verify substrate and surface conditions are in accordance with the flashing manufacturer's recommendation.

3.3. Protection

A. TYPAR Butyl Flashing.
1. Protect installed self-adhesive and flashing tapes from damage during construction.

B. TYPAR Construction Tape.
1. Protect installed self-adhesive and flashing tapes from damage during construction.

REVEAL WALL PANELS

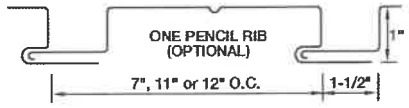
MATERIALS

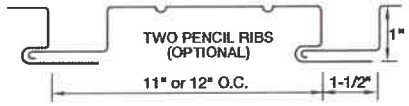
.032 aluminum	24 gauge steel
.040 aluminum*	22 gauge steel*

SPECS

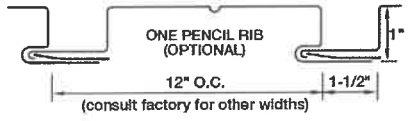
7", 11" or 12" O.C. 1" High

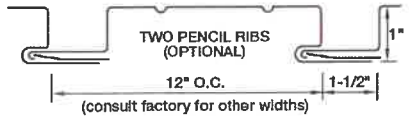
REVEAL PANEL





REVEAL PANEL W/ CLIP (OPTIONAL)





*Limited color availability. 12" O.C. has reduced fastening flange. A complete specification is available online at pac-clad.com.

**Clip is available only on 12" panels

REVEAL PANEL

REVEAL PANEL W / CLIP (OPTIONAL)**

PRODUCT FEATURES

- Leveled for flatness
- Available with up to two pencil ribs
- Rounded interlock leg provides improved flush fit
- 30-year non-prorated finish warranty
- Panel lengths from 4' to 25'

MATERIAL

- 43 stocked colors (24 gauge steel)
- 16 Stocked colors (22 gauge steel)
- 36 stocked colors (.032 aluminum)
- 22 stocked colors (.040 aluminum)
- Galvalume Plus available

ASTM TESTS - FLUSH

- ASTM E330 tested - 12" only
- ASTM 1592
- ASTM E283
- ASTM E331
- AAMA 501.1-05

FLORIDA BUILDING PRODUCT APPROVALS

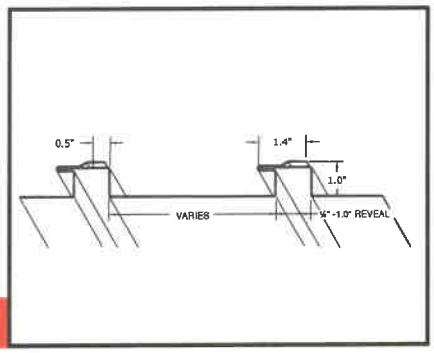
Please refer to pac-clad.com or your local factory for specific product approval numbers for Flush panels.

PAC-CLAD

Firestone Building Products

TECHNICAL INFORMATION SHEET

UNA-CLAD™ UC-501



Item Description
Reveal Flush Panel

Product Information

Description:

Firestone UNA-CLAD UC-501 Reveal Flush Panel is a factory-formed, interlocking, architectural metal panel designed for soffit and fascia applications. The UC-501 Reveal Flush Panel offers the design professional a flat appearance with an aesthetically pleasing reveal by utilizing an interlocking leg and concealed fastening system. The panel is available in a wide variety of materials and finishes including Kynar™ coated G-90 Galvanized Steel, Galvalume (PA) and Aluminum, Copper, and Zinc.

Method of Application:

1. A smooth, solid substrate of plywood or OSB, or a substructure of min. 22 ga (0.79 mm), ⅞" (22 mm) hat channels is recommended for the Firestone UC-501 metal flush panel.
2. The application of a Firestone approved underlayment prior to panel installation is recommended.
3. Firestone UC-501 panels must be installed in a sequential order.

Storage:

- Firestone metal panels should be stored in a well ventilated, dry place where no moisture can contact them. Moisture (from rain, snow, condensation, etc.) trapped between layers of material may cause water stains or white rust, which can affect the service life of the material and will detract from its appearance.
- If outdoor storage cannot be avoided, protect the panels with a ventilated canvas or waterproof paper cover. Do not use plastic, which can cause condensation. Keep the material off the ground in an inclined position with an insulator such as wood. Protective film may degrade or become brittle with long term exposure to direct sunlight.

Precautions:

- Aluminum is recommended for soffit applications.
- Oil canning is not a cause for rejection.
- Heavier gauges, narrower widths, striations, and embossing minimize oil canning.
- Sealant for end laps and lap joints shall be non-drying, non-toxic, and non-shrinking with a serviceable temperature of -60 °F to 212 °F. (-51 to 100 °C)
- Quality, long-life butyl sealants work best as a gasket sandwiched between two pieces of metal. Non-acetic cured silicone color matching sealants are recommended when voids must be filled. Sealants are not a substitute for proper assembly and workmanship.
- Exercise caution when lifting, moving, transporting, storing or handling Firestone metal to avoid possible physical damage.
- Refer to Safety Data Sheets (SDS) for safety information.
- Immediately remove protective film after installation.

TECHNICAL INFORMATION SHEET

UNA-CLAD™ UC-501

Manufacturing Location: Anoka, MN

Typical Information

Property	Value
Panel Type	Flush with Reveal Joint
Panel Interlock	Interlocking Joint
Tapered Panels	No
Minimum Slope	N/A
Radiused	No
Stiffening Ribs	Optional
Striations	Optional as UC-501V
Standard Panel Surface	Smooth
Optional Panel Surface	Stucco Embossed (MN Only)
Substrate	Solid Substrate or Hat Channels
Panel Width	8" - 20" (203.2 mm - 508 mm)
Optimal Face Width w/1"	11" & 19" (279.4 mm & 482.6 mm)
Panel Depth	1" (25.4 mm)
Minimum Panel Length	36" (914.4 mm)
Maximum Panel Length	576"* (14.63 m)

Technical Information

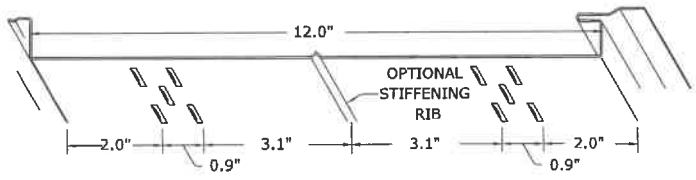
Property	Value
Fire Rating	UL Class A Rated Assemblies, UL 263, UL 790
Hail Impact Rating	Class 4, UL 2218
Structural Performance	ASTM E 1592

*Contact your Firestone Building Systems Advisor for special consideration on panels over 180" (4570 mm).
NOTE: Testing not applicable for all substrates, materials, and dimensions. All systems with test lightings must be installed in accordance with the assembly tested. Refer to Firestone Website for available code listings.

TECHNICAL INFORMATION SHEET

UNA-CLAD™ UC-501

OPTIONAL VENTING PATTERN



MATERIAL & THICKNESS	METAL SPECIFICATION	AVAILABLE FINISHES
ALUMINUM 0.032" (0.81 mm) 0.040" (1.02 mm)	Base Metal: Aluminum Minimum Yield: 21 KSI (145 MPa) Thermal Expansion: 12.6 x 10^{-6} in/in/ °F (22.2 m/m.K x 10^{-6}) Mod. Of Elasticity: 10.0 x 10^{3} x KSI (68.9 MPa)	Anodized Kynar 500®/Hylar 5000®
GALVANIZED STEEL 26 ga.(0.48 mm) 24 ga. (0.64 mm) 22 ga. (0.79 mm)	Base Metal: AISI-G90 Galvanized steel Minimum Yield: 33 to 45 KSI (227 to 310 MPa) Thermal Expansion: 06.7 x 10^{-6} in/in/ °F (13.9 m/m.K x 10^{-6}) Mod. Of Elasticity: 29.0 x 10^{6} x KSI (200 GPa)	Kynar 500®/Hylar 5000® Unpainted G90
GALVALUME® STEEL 26 ga.(0.48 mm) 24 ga. (0.64 mm) 22 ga. (0.79 mm)	Base Metal: AZ-55 Hot Dipped Galvalume Minimum Yield: 50 KSI (345 MPa) Thermal Expansion: 06.7 x 10^{-6} in/in/ °F (13.9 m/m.K x 10^{-6}) Mod. Of Elasticity: 29.0 x 106 x KSI (200 GPa)	Zincalume® Plus – Clear Acrylic Coated Kynar 500®/Hylar 5000®
COPPER 16 oz (0.56 mm) 20 oz (0.69 mm)	AGSC minimum copper content of 99.9% copper, silver counting as copper, cold rolled from ingots of 122 alloy. Thermal Expansion: 9.3 x 10^{-6} in/in/ °F (16.5 m/m.K x 10^{-6}) AGSC copper meets and/ or exceeds ASTM B370 specification.	Natural Patriot Green™ Freedom Gray™
ZINC 0.028" (0.7 mm) 0.032" (0.8 mm) 0.040" (1.0 mm)	RHEINZINK®: Electrolytic high-grade, 99.995% pure, fine zinc (DIN EN 1179) titanium copper alloy. certified according to DIN ISO 9001: 1994 Thermal Expansion: 2.2 mm/m x 100K (16.5" x 10^{-6} in/in/ °F)	Shiny Pre-weathered Blue-Gray Pre-weathered Graphite Gray

NOTE: Consult current UNA-CLAD Color Selection Guide
Custom color services available upon request
Consult current base metal Coil & Flat sheet TIS for additional information on the base metal and coating.
Not all materials and thicknesses are available from all locations. Contact your Firestone Building Systems Advisor for additional information.

Please contact Firestone Technical Services at 1-800-428-4511 for further information.

This sheet is meant to highlight Firestone products and specifications and is subject to change without notice. Firestone takes responsibility for furnishing quality materials which meet published Firestone product specifications or other technical documents, subject to normal roof manufacturing tolerances. Neither Firestone nor its representatives practice architecture. Firestone offers no opinion on and expressly disclaims any responsibility for the soundness of any structure. Firestone accepts no liability for structural failure or resultant damages. Consult a competent structural engineer prior to installation if the structural soundness or structural ability to properly support a planned installation is in question. No Firestone representative is authorized to vary this disclaimer.

STRUCTURAL TECHNOLOGIES INCORPORATED

SECTION 8

CONTRACTOR BID FORMS

STRUCTURAL TECHNOLOGIES INCORPORATED

CONTRACTOR BID FORM

NOTE: The following Bid Form is to be completed exactly by the contractor submitting a bid for the proposed work. All bids must be submitted on these forms. All pages of this Bid Form must be submitted with all blank spaces filled in. Failure to complete this form may be cause for rejection of the entire bid upon discretion of the Owner (or designated representative).

SUBMIT BID PROPOSALS TO

North Palos Fire Protection District
10629 South Roberts Road
Palos Hills, IL 60465-

Attn.: Paul Mackin

PROJECT IDENTIFICATION

Roof Replacement Project

LOCATION OF PROJECT

North Palos Fire Protection District – Fire Station 1
10629 South Roberts Road
Palos Hills, IL 60465

CONTRACTOR INFORMATION

Proposal Submitted By _____
(Name of Installing Contractor's Firm)

Address of Contractor _____
(Street Address)

_____
(City) (State) (Zip Code)

Contractor Contact _____
(Name of Principal or Estimator)

Phone Number (_____)_____

Fax Number (_____)_____

GENERAL INSTRUCTIONS TO BIDDERS

The bidder (herein referred to as the contractor) in response to your invitation to bid, has carefully examined the site, drawings and associated documents depicting the proposed scope of work. We hereby propose to furnish all labor, materials, supplies and services required, in the manner prescribed therein and to the standards of quality and performance established by the Specifications, within the price stated herein for each of the items or combination of items stipulated.

SPECIFIED AREAS AS DESCRIBED

Roof Replacement Project – Fire Station 1
10629 South Roberts Road
Palos Hills, IL 60465

STRUCTURAL TECHNOLOGIES INCORPORATED

GENERAL DESCRIPTION OF WORK TO BE PERFORMED

Furnish all labor, materials, equipment, etc. to complete the project requirements as specified and as reasonably required for the general administration and construction of the specified work as detailed herein. The work involved under this section shall include, but not necessarily be limited to, the following items;

Demolition / Preparation:

- Erect necessary barricades, temporary closures, ladders, heated storage areas, scaffolding, mechanical lifts, etc. to access the designated areas and to perform all specified roof replacement. Place protective plywood, tarps, etc. adjacent to building, over roof areas, over walkways and landscaping to protect and preserve existing construction and landscaping.
- Erect tarps, plastic sheet or plywood to protect all windows and doors during all phases of demolition and restoration performed in conjunction with this project.
- Contractor to provide rolling canopy protection for sidewalk areas as well as sidewalk barricades and signage to divert people around the areas of construction. As necessary, additional "ground personnel will be employed to monitor walkway and access areas in order to prevent exposure to any falling debris.
- The Contractor shall be required to coordinate the temporary removal and relocation of existing communication towers / antenna and support cables, trays, etc.. In the event the Contractor must contract for the removal and relocation of the antenna or towers, the cost to perform this work shall be itemized and submitted as a Change Order.
- Visually examine and document conditions and deficiencies of the roof mounted equipment, vent units or AC units. Any abandoned units or inoperable units shall be identified and scheduled for removal from the roof during the roof replacement project. Any cost associated with the disconnection or removal of abandoned or inoperable units will be itemized by the Contractor and will be billed "In Addition" to the Base Contract for this project.
- The Contractor shall be require to erect perimeter safety railing, perimeter wall protection, scaffold protection, construction fencing, plywood protection, etc. as required by OSHA and as stipulated by the Owner to protect all public walkways and entries to the structure throughout the duration of the roofing project. Tarps and other means of protection shall be required to prevent any damage to the structure as a result of the roof removal and replacement project. Dumpsters shall be placed in designated areas adjacent to the building using care to not obstruct doorways or public drive areas. Equipment utilized to remove debris and to transport materials to the roof must be located in designated areas and, when in operation, or when lifting / transporting materials to and from the roof area, coordinated with the Owner's representative to prevent any hazard to occupants of the structure or general public.
- The Contractor shall coordinate with the Owner any required installation of HEPA filters on air intake systems as well as the operation of roof mounted HVAC units exposed to dust, debris or chemical fumes. Prior to the initiation of the project, the Contractor shall review all procedures for roof removal and containment of debris with the Owner's representative.

- **Roof Section 1:** Disconnect heat trace cable and brackets. Dis-assemble and remove the gutters and perimeter edge metal in all areas. Cut-away, remove and properly dispose of all existing roof membranes, flashing membranes, insulation and sheet metal to expose the existing wood roof deck, vent curb bases, wood nailers, perimeter walls and flashing substrates.

- **Roof Section 2:** Dis-assemble internal roof drains and set aside drain clamp rings and cast iron or aluminum drain strainers. Plastic drain strainers must be replaced with new cast iron of aluminum drain strainers. Existing drain bolts and nuts utilized to secure clamp rings must be replaced with new hardware. Cut-away and remove the existing roof field membrane, flashings, perimeter sheet metal, lead flashings, etc. to expose the underlying wood *or* metal decking throughout the entire roof area.

- **Roof Sections 3 & 4:** Dis-assemble internal roof drains and set aside drain clamp rings and cast iron or aluminum drain strainers. Plastic drain strainers must be replaced with new cast iron of aluminum drain strainers. Existing drain bolts and nuts utilized to secure clamp rings must be replaced with new hardware. Remove perimeter edge metal and flashings, disconnect and lift vents from curbs using care to prevent damage to any connected ductwork. Remove furnace stack collars and stack bases in all areas. Tear-off to include removal of the roof membrane, insulation, underlying lightweight concrete / gypsum to expose the structural concrete deck surface. Remove damaged / deteriorated perimeter wood nailers and document conditions and linear feet of wood replacement.

- **Alternate 1: Metal Soffit & Vertical Wall Panel Replacement:** As contracted by the Owner upon accepting the contract for removal and replacement of the vertical metal wall panels and metal soffit, including J-channels, corner trim, etc., the Contractor will dis-assemble the wall panel system and soffit system at the perimeter of each roof section. If possible, all sheet metal will be recycled by the Contractor. Upon removing the exterior metal components, the exposed framing and backup sheathing (where present) will be examined for deterioration, decay, corrosion or loss of structural integrity. Any required removal and replacement of deteriorated framing or sheathing shall be performed on a "Unit Cost" basis to be itemized by the Contractor and billed "In Addition" to the Base Contract for the project.

- **Metal Deck Areas:** Replace structurally damaged metal decking with new galvanized metal decking matching existing deck profile. New decking must be minimum twenty (20) gauge thickness and must be installed to "nest" and overlap surrounding structurally sound metal decking by a minimum of twelve (12.0) inches. All new decking must be secured to structural joists at each end with self-drilling No. 10 or larger stainless steel screw fasteners installed at the base of each deck flute and not greater than six (6.0) inches on-center. Sidelaps in the decking must be secured every twelve (12.0) inches on-center with similar No. 10 or larger stainless steel screw fasteners. The Contractor must document, itemize the total square footage and submit a written Change Order for the exact square footage of deck replacement performed in conjunction with this project.

- **Metal Deck Areas:** Mechanically clean the metal deck surface in all areas where the existing decking exhibits non-structural surface corrosion prior to application of rust inhibitive coating. Remove / sweep debris from all deck flutes. Report any improperly supported or attached deck sections and perform all necessary repairs to secure the decking prior to installation of the vapor barrier membrane. At any deck openings adjacent to skylights, vents or curbs, the metal decking must be properly supported by structural steel angle secured to load bearing joists. Installation of steel angle supports shall be itemized by the Contractor and submitted in writing for authorization by the Owner. Installation of steel angles around all deck openings of greater than twelve inches in diameter or cross-section shall be itemized by the Contractor and submitted "In Addition" to the Base Bid for this project. Mechanical cleaning and coating of corroded metal deck surfaces will be measured by the Contractor, itemized and submitted as a written Change Order billed "In Addition" to the Base Bid for this project.

- **Concrete Deck Areas:** (Roof Sections 3 & 4) Upon completing the removal of the existing roof system and underlying insulation, the Contractor will be required to scrape or peel any vapor barrier membrane or self-adhered membrane from the deck surface. Visually examine the concrete deck and document any deck damage or irregularities requiring corrective action. Repairs to the concrete deck will be completed with high strength polymer mortar or self-leveling mortar. Repairs to the concrete deck shall be completed on a Unit Cost Basis to be itemized and submitted as a Change Order.

- **Wood Deck Areas:** Upon completing the removal of the existing roof system and underlying insulation, the Contractor will perform visual inspection of the wood decking to identify any required replacement due to decay, diminished structural capacity or inadequate capacity to span areas and support roof loads as per Building Code. Replacement decking will be Exterior Grade Plywood Sheathing with a minimum thickness of three-quarters (0.75) inch. Decking must be installed to approximate the existing decking in total thickness. Maximum span between supports shall not be greater than twenty-four inches. Any required installation of additional interim support trusses or framing must be documented by the Contractor, itemized and submitted on a Unit Cost Basis to be billed "In Addition" to the Base Contract for this project. All decking must be properly secured to underlying framing with corrosion resistant No. 10 or larger wood screw fasteners sized to penetrate the underlying frame member by not less than one and one-half (1.50) inch. Secure decking at intervals of six (6.0) inches on-center. Install "H" clips at edges of replacement sheathing.

- Inspect existing perimeter and projection wood nailers and curbs and replace all rotted or structurally damaged wood nailers with new pressure treated wood nailers of the same dimension. Installation of replacement wood nailers and curbs shall be itemized by the Contractor and submitted "In Addition" to the Base Bid for this project.
- Install new pressure treated wood nailers at all unit curbs and perimeter roof edges as required to provide proper height of finished flashings and installed perimeter edge metal. Installation of new pressure treated wood nailers and curbs to compensate for the height / thickness of the installed new tapered insulation, tapered insulation drainage saddles or crickets shall be included in the Contractor's Base Bid for this project. All new wood nailers to be secured with appropriate corrosion resistant screw fasteners. Any required replacement of deteriorated / rotted or damaged wood nailers will be performed on a "Unit Cost" basis in addition to the Base Contract. All wood nailers must be secured in accordance with ASCE-7 Wind Uplift requirements, current International Building Code requirements and SMACNA requirements for existing exposure.

- Remove sanitary stack lead flashings to expose piping. Remove furnace stack base cone and weather collars and discard. Remove all "pitch" pans and temporarily disconnect the multi-port utility rubber boot flashings and boot base. Boot flashings may be re-used and incorporated into the new roof system provided the flashing and base are in good condition and can be re-installed in a manner which provides long term waterproofing integrity.
- Install new PVC stack extensions as required to extend sanitary stacks / soil stacks to minimum clearances above the finished roof system as require by Plumbing Code. Typical height of stacks must not be less than twelve (12.0) inches above the roof surface.
- Remove all existing static vent hoods which were fabricated with "plastic" vent caps (exhibiting damage) and discard. Replacement hoods will be required at all nine (9) locations. Contractor is to verify size and location of all replacement vent caps and shall include the cost for replacement in their Base Bid for this project.

Construction / Installation:

- **Roof Sections 1 & 2 – Wood Deck:** Sweep and clean the roof deck surface to remove debris. Re-set or remove and replace any nails or projections from the roof deck. Inspect the roof decking for evidence of damage or deterioration requiring removal and replacement. Install new three-quarters (0.75) inch thickness Exterior Grade C-D Exposure 1 Plywood secured to framing with corrosion resistant No. 10 or larger screw fasteners in accordance with ASCE-7 Wind Uplift requirements. All deck replacement shall be itemized and billed "In Addition" to the Contractor's Base Bid for this project.
- **Roof Section 2 – Metal Deck:** Replace structurally damaged metal decking in all areas with new decking configured to match the existing decking. Removal of deteriorated decking and installation of new twenty (20) gauge galvanized metal decking shall be itemized and submitted "In Addition" to the Base Bid for this project. All new decking to be secured with self-drilling corrosion resistant screw fasteners installed at intervals of not greater than twelve (12.0) inches on-center at bar joist connections and not greater than six (6.0) inches on-center at deck overlap / tie-in conditions. All required metal deck replacement shall be itemized and submitted "In Addition" to the Base Bid.
- **Roof Section 2 – Metal Deck:** Sweep and clean all deck flutes to remove debris prior to application of paint coating. Apply rust inhibitive paint coating over all structurally sound rusted metal deck surfaces to completely encapsulate / coat the exposed metal deck surface. All required rust inhibitive coating of the metal deck shall be itemized and submitted "In Addition" to the Base Bid.
- **Roof Sections 3 & 4 – Concrete Deck:** Examine the concrete deck surface for evidence of structural damage, structural cracking or deflection. The Contractor shall be required to document any observed damage and shall perform necessary repairs, as directed by the Consultant, to restore areas to a condition which is both structurally sound and suitable as a substrate of the new roof system. Any required concrete deck repairs shall be itemized by the Contractor and billed "In Addition" to the Base Contract for this project.
- The Contractor shall be required to install new wood blocking nailers at the perimeter of the roof to compensate for the tapered insulation (total thickness of insulation). The new wood blocking shall be "structural" grade, free of defects, warp and splits and shall be installed and secured to the existing nailers or substrate (i.e. concrete wall panel or steel framing) with appropriate screw fasteners as per ASCE 7-10 Wind Uplift requirements. Screws must sufficiently penetrate the substrate to a depth of not less than one and one-half (1-1/2) inch and have a pull-out resistance tested to equal or exceed requirements set forth in ASCE 7-10. Fastener spacing must not exceed eight (8.0) inches on-center.
- Wrap the top of the perimeter wood nailer(s) with self-adhered waterproofing membrane (Grace Ice & Water Shield or equivalent self-adhered waterproofing membrane) extending the membrane down the outside and inside face of the wall to one (1.0) inch below the base of the bottom wood nailer.
- **Roof Sections 1 & 2 – Wood Deck:** After completing the necessary repairs to the wood decking, the Contractor shall be required to install a single ply self-adhered vapor barrier membrane over the entire wood deck surface. As required by the vapor barrier manufacturer, the wood deck surface may be prime coated with proprietary primer to enhance adhesion of the vapor barrier membrane. Align the vapor barrier membrane perpendicular to the slope-to-drain / slope-to-gutter using care to sidelap the membrane a minimum of three (3.0) inches in downslope manner. Endlaps must be staggered by not less than three (3.0) feet and shall be a minimum of six (6.0) inches of overlap. Hand press and roll seams to ensure adhesion. Wrap the vapor barrier membrane over all perimeter edges of the roof and extend the membrane up curb and vertical wall surfaces a minimum of six (6.0) inches.
- **Roof Section 2 – Metal Deck:** In areas where the existing roof decking is metal, the Contractor will be required to install a single ply of non-reinforced 40 mil. Fire Rated EPDM Membrane. The EPDM rubber membrane will be aligned perpendicular to the slope-to-drain. Using the Material Manufacturer's approved splice wash, primer and butyl seam tape, the Contractor shall adhere the sidelaps and endlaps in the EPDM rubber membrane to achieve a watertight vapor barrier system over the metal deck area. Tie-in the EPDM membrane to the self-adhered vapor barrier membrane using butyl seam tape or liquid resin membrane. Extend the EPDM membrane over all perimeter edges of the roof and up all vertical wall or curb surfaces a minimum of six (6.0) inches. Apply a continuous bead of one-part polyurethane caulking at the termination of the EPDM membrane at vertical wall and curb surfaces.

- **Roof Sections 3 & 4 – Concrete Deck:** After completing any necessary repairs to the concrete deck, as required by the vapor barrier membrane manufacturer, the Contractor shall apply the Material Manufacturer's approved primer prior to the installation of the continuous self-adhered vapor barrier membrane. When residual air temperatures are less than forty (40°) Fahrenheit, the Contractor shall be required to install a fully heat welded vapor barrier membrane in lieu of the self-adhered membrane. The vapor barrier membrane will be installed perpendicular to the slope to internal drains. Wrap the vapor barrier membrane up all vertical curb and wall surfaces to the top of the intended insulation height.
- **Roof Sections 1 – Wood Deck:** Upon completing the installation of the vapor barrier membrane, the Contractor will install new polyisocyanurate insulation throughout all areas using care to stagger rows of insulation perpendicular to the slope to gutter edge. The base course of insulation shall be a minimum three and one-half (3-1/2) inch thickness. A second course of one-eighth (0.125) inch tapered insulation with minimum thickness at the gutter edge of one and one-half (1-1/2) inch shall be installed on the "flat" roof areas along the north and south perimeters of this roof section. On the sloped "barrel" portions of the roof, a second course of two (2.0) inch thickness polyisocyanurate insulation shall be installed. The base course of insulation must be mechanically secured to the underling decking with No. 12 screw fasteners fitted with three (3.0) inch galvanized plate washers. Attachment of the insulation boards shall comply with ASCE-7 Wind Uplift Code and shall conform to Factory Mutual FM-1-60 anchoring requirements. A minimum of eight (8) fasteners shall be installed in the roof field, twelve fasteners in Zone 2 – exposed roof edges and sixteen (16) fasteners in Zone 3 exposed outside corners. Install a second course of tapered or flat stock polyisocyanurate insulation will be fully adhered with low rise foam insulation adhesive applied in ribbons at six (6.0) inches on-center spacing. Install a final course of high density glass faced gypsum board over the polyisocyanurate insulation using care to stagger the seams over the base course(s) of insulation. Align the glass faced gypsum board perpendicular to the roof slope-to-gutter edge and secure the overlayment board with low rise foam adhesive applied in ribbons at not greater than six (6.0) inches on-center spacing. Ballast areas of insulation during cure of the insulation adhesive. Fill all gaps of greater than one-half (0.50) inch with rigid insulation or expansion foam.
- **Roof Section 2 – Wood & Metal Deck Areas:** The Contractor shall install a base course of three and one-half (3-1/2) inch thickness flat stock polyisocyanurate insulation over the installed vapor barrier membrane aligning the longest dimension of the insulation board perpendicular to the slope-to-drain. Secure the insulation to the underlying decking with No. 12 self-drilling screws fitted with three (3.0) inch galvanized plate washers. Attachment of the insulation boards shall comply with ASCE-7 Wind Uplift Code and shall conform to Factory Mutual FM-1-60 anchoring requirements. A minimum of eight (8) fasteners shall be installed in the roof field, twelve fasteners in Zone 2 – exposed roof edges and sixteen (16) fasteners in Zone 3 exposed outside corners. Install a second course of eighth (0.125) inch per foot tapered polyisocyanurate insulation fully adhered with low rise foam insulation adhesive applied in ribbons at six (6.0) inches on-center spacing. Minimum average "R-value" of the installed insulation system shall not be less than thirty (30.0). Install a final course of high density glass faced gypsum board over the polyisocyanurate insulation using care to stagger the seams over the base course(s) of insulation. Align the glass faced gypsum board perpendicular to the roof slope-to-gutter edge and secure the overlayment board with low rise foam adhesive applied in ribbons at not greater than six (6.0) inches on-center spacing. Ballast areas of insulation during cure of the insulation adhesive. Fill all gaps of greater than one-half (0.50) inch with rigid insulation or expansion foam. Insulation at internal drain locations shall be reduced by two and one-half (2.5") inches and a "flat sump" area of not less than thirty-six (36.0") inches must be formed to promote drainage. Contractor shall include in their Base Bid any additional insulation required to divert water and correct ponding conditions which remain greater than forty-eight (48) hours after a heavy rain. Final configuration of the insulation shall provide positive drainage from all roof areas based on this requirement.
- **Roof Section 3 & 4 – Concrete Deck Areas:** The Contractor shall install a base course of three and one-half (3-1/2) inch thickness flat stock polyisocyanurate insulation over the installed vapor barrier membrane aligning the longest dimension of the insulation board perpendicular to the slope-to-drain. Fully adhere the insulation to the installed vapor barrier membrane with low rise foam insulation adhesive. Adhesion of the insulation boards shall comply with ASCE-7 Wind Uplift Code and shall conform to Factory Mutual FM-1-60 wind uplift requirements. Install a second course of eighth (0.125) inch per foot tapered polyisocyanurate insulation fully adhered with low rise foam insulation adhesive applied in ribbons at six (6.0) inches on-center spacing. Minimum average "R-value" of the installed insulation system shall not be less than thirty (30.0). Install a final course of high density glass faced gypsum board over the polyisocyanurate insulation using care to stagger the seams over the base course(s) of insulation. Align the glass faced gypsum board perpendicular to the roof slope-to-gutter edge and secure the overlayment board with low rise foam adhesive applied in ribbons at not greater than six (6.0) inches on-center spacing. Ballast areas of insulation during cure of the insulation adhesive. Fill all gaps of greater than one-half (0.50) inch with rigid insulation or expansion foam. Insulation at internal drain locations shall be reduced by two (2.0") inches and a "flat sump" area of not less than thirty-six (36.0") inches must be formed to promote drainage. Contractor shall include in their Base Bid any additional insulation required to divert water and correct ponding conditions which remain greater than forty-eight (48) hours after a heavy rain. Final configuration of the insulation shall provide positive drainage from all roof areas based on this requirement.

- **All Roof Sections:** Install new fire resistant perlite cant strips, loose laid or set in asphalt mastic / adhesive, as per membrane manufacturer's published recommendations.
- **Roof Sections 1 & 2:** Install the base ply of self-adhered Modified Membrane using care to prevent improper alignment. Position the membrane perpendicular to slope beginning at the roof perimeter gutter edge or internal drain location(s). Unroll the membrane and allow the membrane to "relax" as per the Manufacturer requirements based on temperature. Wrap the base ply of self-adhered membrane over perimeter wood nailers to encapsulate the roof edge. Remove the release film from the underside of the membrane and adhere the membrane directly to the perimeter wood nailer(s) and glass-faced gypsum board surface. Use a weighted roller and broom to press and adhere the membrane to the substrate. In the event the base ply of self-adhered membrane is not completed with installation of the cap ply of membrane during the same day, the Contractor will be required to utilize a hot air gun to hand-weld all seams. Install the final ply of granule surfaced SBS Modified Membrane – Class A Fire Rated roof system heat welded over the base ply as per the specifications. Installation of the roof membrane must comply with the specifications and published installation requirements stipulated by the Material Manufacturer for a fully warranted roof assembly. Install a new two (2) ply SBS Modified Membrane flashing assembly. The base ply flashing membrane will be a smooth surfaced self-adhered modified membrane and the granule surfaced cap ply flashing membrane shall be fully adhered by heat welding. Secure vertical flashings with a continuous aluminum metal termination bar. Install fasteners every 8 – 10 inches on-center and apply a continuous bead of one-part polyurethane caulking sealant or asphalt mastic along the upper edge of the flashing membrane where it contacts the wall or curb surface.
- **Roof Section 3 & 4 – Concrete Deck Areas:** Install a two (2) ply SBS Modified Membrane – Class A Fire Rated roof system (both the base ply and the cap ply will be heat welded) per specifications. Installation of the roof membrane must comply with the specifications and published installation requirements stipulated by the Material Manufacturer for a fully warranted roof assembly. Install a new two (2) ply SBS Modified Membrane flashing assembly. The base ply flashing membrane will be a smooth surfaced torch weldable modified membrane and the granule surfaced cap ply flashing membrane shall be fully adhered by heat welding. Secure vertical flashings with a continuous aluminum metal termination bar. Install fasteners every 8 – 10 inches on-center and apply a continuous bead of one-part polyurethane caulking sealant or asphalt mastic along the upper edge of the flashing membrane where it contacts the wall or curb surface.
- Install new galvanized furnace stack jacks and flashings at all locations to replace existing stack jacks. Contractor shall include the replacement of existing stack jacks and weather collars in their Base Bid.
- Install new three and one-half (3.5) pound lead soil vent sleeve flashing placing the flashing into a continuous bed of asphalt mastic and wrapping the lead into the stack a minimum of one (1.0) inch. Prime coat and strip-in the horizontal portion of the lead flashing flange with two plies of modified bitumen membrane. Finished height of all sanitary stacks *must not be less than* twelve (12.0) inches.
- Secure the upper edge of vertical flashings with a surface mounted aluminum metal termination bar secured at intervals of not greater than twelve (12.0) inches on-center spacing. Position the termination bar to allow for application of a continuous bead of one-part polyurethane caulking sealant along the upper edge of the bar to achieve a watertight condition at the interface with the wall or curb.
- Install new pre-finished surface mounted metal counterflashing or slip-metal flashing (inserted beneath equipment curb cap flanges) at all vertical flashing locations. Secure the counterflashing above the termination bar using appropriate wood, sheet metal or masonry / concrete screw fasteners installed not greater than twelve (12.0) inches on-center. Apply a continuous bead of one-part polyurethane caulking along the upper edge of the metal counterflashing and tool finish to achieve a watertight condition.
- Where vertical flashing height is less than six (6.0) inches as measured from the surface of the field membrane, the Contractor will be required to apply a base coat of resin coating, embed fleece fabric reinforcement and apply a final coating of resin to encapsulate the fabric. All resin flashing systems to be manufactured by or approved by the primary Roof Membrane Manufacturer.
- Apply fibrated aluminum paint coating to all vertical and horizontal field and flashing laps and to all de-granulated, surface abraded or surface damaged membrane. Aluminum coating must also be applied to all resin flashing installed at designated locations.
- Install new pre-finished twenty-four (24) gauge galvanized, .032 aluminum, approved polymer or No. 304 stainless steel metal pitch pans as required in designated locations at pipe penetrations. Fill based of pitch pans with non-shrink polymer concrete and complete all pitch pans with self-leveling polyurethane or silyl-terminated polyether sealant. Install new pre-finished galvanized, aluminum or No. 304 stainless steel metal weather crowns over all pitch pans secured to the penetration or conduit and sealed with a continuous bead of one-part polyurethane caulking sealant. As an alternative to using pourable sealant, the Contractor may substitute polyester fleece mesh reinforced resin flashings where existing conditions prevent effective long-term waterproofing at pipe or conduit penetrations.
- Install new internal drain flashings and minimum three and one-half (3.5) pound lead flashings at existing internal drain locations. Prime coat and install modified membrane target and field ply flashings over installed lead drain flashings.
- Install pre-fabricated polymer pipe supports and EPDM walkway pads to support the existing gas lines or electrical conduit where they pass over the new roof. Supports shall be spaced at intervals which prevent overloading any individual support and in strict compliance with the pipe support manufacturer's recommendations. Pipe supports shall be included in the Contractor's Base Bid for this project.

- Coordinate the re-installation / placement of antenna support frames and rubber pads placed over the new roof membrane. Install / apply concrete block (CMU) ballast to frame to prevent wind uplift as per the antenna frame manufacturer's requirement to ballast the frame per ASCE 7-10 wind load specifications. The Owner shall be responsible for any wiring disconnect / reconnect and adjustment of the antenna.
- **Roof Section 1 – Gutter Installation:** Install new .032 (20 gauge) aluminum flange mounted metal gutters and downspouts at all perimeter edges of the roof. Secure the flange mounted commercial six (6.0) inch commercial box gutters to the perimeter wood nailer using stainless steel countersunk screw fasteners installed not greater than six (6.0) inches on-center in two staggered rows. Secure gutter brackets, splice plates, supports, etc. as required by the gutter manufacturer (pre-fabricated Metal-Era ICG-2) or as stipulate per ASCE 7-10 requirements for wind uplift and attachment to the perimeter wood nailers. Install new 4.0 inch x 6.0 inch pre-finished .032 (20 gauge) aluminum metal downspouts secured to the gutter with stainless steel screw fasteners. Downspouts to be located at current "pre-existing" locations.
- Prime coat the gutter flange surface and heat weld a single ply of smooth surfaced Modified Membrane over the flange extending not less than eight (8.0) inches beyond the flange over adjacent smooth surfaced (Base Ply) of field membrane. The final ply of granule surfaced Modified Membrane will be installed and terminated approximately one-quarter inch (0.25") from the inside face of the gutter. Where possible, the field membrane will be the final ply of membrane installed to strip-in the gutter flange. Prior to bonding the flashing to the field membrane, the Contractor will heat the field ply at the lap condition and embed the granules to achieve optimal bond between the flashing ply and field ply. At the termination of the granule surfaced flashing ply on the inside face of the gutter, the Contractor must apply and tool finish a continuous bead of one-part polyurethane caulking.
- **All Roof Sections – Perimeter Edge Metal Installation:** Fabricate and install G-90 twenty-two (22) gauge galvanized metal cleats and new pre-finished twenty-four (24) gauge galvanized metal edge flashing (gravel stop) at designated / existing locations. Sheet metal shall be configured and installed to comply with current SMACNA and Factory Mutual wind uplift, design and attachment requirements. Secure all metal cleat sections with corrosion resistant screw fasteners installed at not greater than twelve (12.0) inches on-center. The new perimeter edge metal / gravel stop must be attached to the continuous metal cleat and the horizontal flange secured with corrosion resistant countersunk No. 12 screw fasteners installed not greater than twelve (12.0) inches on-center in two staggered rows. Alternative attachment with 8D double dipped galvanized corrosion resistant ring shank nails installed every six (6.0) inches on-center will be accepted. Perimeter edge metal must be configured to provide a vertical face with reinforced "break" to prevent oil canning when face dimension is greater than eight (8.0) inches. Pre-fabricated or shop fabricated perimeter edge metal must comply with ASCE 7-16 Wind Uplift / Wind Load requirements. Note: In the event the Owner contracts for the replacement of the vertical metal wall panels, the installation of the metal cleat and perimeter edge metal must be coordinated with the installation of the new metal wall panels to achieve a weathertight condition and overlap of the metal edge extending down the outside face of the metal wall panel(s).
- The Contractor is to include, in their Base Bid, the replacement of the existing "plastic" curb mounted vent caps (nine locations) with new galvanized metal vent caps sized to match the existing curb base and vent capacity. Submit Material Manufacturer information and Shop Drawings for review and approval prior to ordering and installing the new vent caps.
- Clean-up and remove all debris, containers, waste, etc. from the roof surface and grounds surrounding the job site and staging areas daily as specified and upon completion of the project.
- Project Base Bid will include all items in the Specification Documents, Construction Drawings, Addendum's (if applicable), Pre-Bid Meeting and any other correspondence during the bidding process. Any discrepancies in any of the aforementioned documents will be brought to the attention of Structural Technologies, Inc. prior to submitting the project bid. Any questions / concerns regarding the scope of work, materials, etc. to be included in the Base Bid, will be brought to the attention of Structural Technologies, Inc. prior to the submittal of the project bid and approval of the project contract documents.

TOTAL BASE BID – ALL LOW SLOPE ROOF SECTIONS: $_____ (Total Price)

Base Bid:

Roof Section 1 – West Roof $_____ (Total Price)

Roof Section 2 – Northeast Roof $_____ (Total Price)

Roof Section 3 – Apparatus Bay Roof $_____ (Total Price)

Roof Section 4 – Hose Tower Roof $_____ (Total Price)

ALTERNATIVE 1 – METAL WALL PANEL & SOFFIT REPLACEMENT

- **Alternate 1 – Sheathing Installation:** Replacement of the existing vertical metal wall panels and soffit system *in all areas* shall include the installation of three-quarters (3/4) inch thickness Exterior Grade CDX plywood secured to the underlying framing where existing sheathing is deteriorated or missing. Installation of plywood sheathing shall be itemized by the Contractor and submitted as a Change Order to be billed "In Addition" to the Contractor's Base Bid for this project.
- **Alternate 1 – Air Barrier Membrane Installation:** The Contractor shall be required to install a single ply of water resistive air barrier membrane (Typar MetroWrap or equivalent) directly over the sheathing or metal stud framing components. Tape all seams with the Material Manufacturer's material. Wrap membrane beneath soffit areas and terminate the vertical upper edge of the membrane on the outside face of the wood nailers installed at the roof perimeter edges. Secure the membrane with plastic cap ring shank nails.

- **Alternate 1 – Metal Wall Panel & Soffit Installation:** Install new pre-finished aluminum metal J-channel secured to the existing framing or new plywood panels with stainless steel No. 10 countersunk screw fasteners installed every twelve (12.0) inches on-center. Secure J-channel at the outside "exposed" edge of the soffit and along the inside of the soffit where the soffit terminates against the masonry wall of the structure.
- Install pre-finished twenty-four (24) gauge aluminum metal drip edge flashing at the base of the vertical wall. Secure the drip edge flashing over the installed waterproofing membrane using No. 10 countersunk stainless steel screw fasteners installed every 12 – 16 inches on-center. Fasteners heads shall be set flush to slightly indenting the surface of the drip metal vertical flange.
- Install new pre-finished "weeping" / perforated J-channel at the base of the vertical wall panel over the metal drip edge. Secure the weeping J-channel over the drip edge with stainless steel No. 10 screw fasteners sized to penetrate the plywood substrate. Install fasteners every 12 – 16 inches on-center.
- Base Bid to include installation of new low profile twelve (12.0) or sixteen (16.0) inch width pre-finished twenty-four gauge vertical aluminum metal wall panels with a one (1.0) inch width "reveal" in the vertical panel face. Prior to the installation of the vertical wall panels, the Contractor must install a pre-finished weeping J-channel and drip edge flashing at the base of the wall where the vertical panel will terminate. The upper edge of the panel will terminate approximately flush with the top wood nailer installed at the perimeter of the low slope roof section(s). Secure the upper edge of the wall panel with neoprene gasketed self-drilling No. 10 stainless steel screw fasteners installed every twelve (12.0) inches on-center.
- The Base Bid will include the installation of horizontal soffit panels installed beneath the existing soffit. New soffit "eave" panels will be fabricated from twenty-four (24) gauge pre-finished "flush" aluminum metal with matching the panel configuration (12.0 inch or 16.0 inch) and Manufacturer of the vertical soffit wall panels. Soffit panels will be inserted into the J-channel and secured to the underlying framing or plywood / new plywood sheathing with stainless steel No. 10 corrosion resistant screw fasteners installed not greater than twelve (12.0) inches on-center.
- Apply a continuous bead of color matched one-part polyurethane caulking sealant where the drip edge and soffit J-channel interface to form a watertight / airtight condition.
- Apply a continuous bead of color matched one-part polyurethane caulking sealant where the soffit J-channel abuts the vertical masonry wall surface. Tool finish the caulking sealant to achieve a uniform appearance and watertight condition.
- Remove all protective film from metal wall panels and clean surfaces to remove any excess caulking sealant(s), dirt, oils, etc.. Contractor must use the Material Manufacturer's touch-up paint to repair any scratches in the metal panels.

TOTAL BASE BID: ALL AREAS – WALL PANEL & SOFFIT $_____ (Total Price)

Base Bid

Roof Section 1 – West Roof – Red Metal Soffit & Wall Panels $_____ (Total Price)

Roof Section 2 – Northeast Roof – Red Metal Soffit & Wall Panels $_____ (Total Price)

Roof Section 3 – Apparatus Bay Roof – Red Metal Soffit & Wall Panels $_____ (Total Price)

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LINE ITEM - ADDITIONS TO BASE BID

The following items will be performed as detailed during the Pre-Bid Meeting and as required by the Owner. The work performed in conjunction with these items will be billed on a unit basis to include materials and labor to complete the installation.

Note: Work performed in conjunction with the following items is not included in the Contractor's Base Bid and will incur additional costs beyond the Base Contract for this project. The Association / Association Board (or designated representative) will be advised by the Contractor in writing the total estimated quantities associated with each of these components and will submit a written Change Order to the Association / Association Board (or designated representative) for approval prior to performing this work. The work associated with these items cannot / could not be completely and accurately established prior to performing partial or complete demolition of building components included in the base scope of work. The repair or replacement of these items is required to provide a suitable substrate and/or to restore the structural integrity of the building or designated building component prior to the installation of the specified materials.

Item 1: Wood Deck Replacement

$_____ (Price per square foot – installed – 3/4 in. Exterior Grade Plywood)

Item 2: Wood Nailer Replacement

$_____ (Price per linear foot – installed – 2 x 6 pressure treated lumber)

Item 3: Metal Deck Replacement

$_____ (Price per square foot – includes removal of existing metal deck and installation of new G-60 galvanized metal deck matching existing deck configuration)

Item 4: Metal Deck Coating

$_____ (Price per square foot – includes metal deck preparation and coating application)

Item 5: Roof Drain Repair

$_____ (Replacement of drain strainer, clamp ring and hardware)

Item 6: Roof Drain Replacement

$_____ (Installation of new drain head/bowl, pipe connection, clamp ring, strainer, hardware, etc... as required for internal drain)

Item 7: Plywood Sheathing Replacement

$_____ (Price per square foot – installed – 3/4 in. Exterior Grade Plywood)

Item 8: Brick Masonry Restoration

$_____ (Price per square foot – grinding & repointing brick mortar joints with Type N mortar)

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CONTRACT REQUIREMENTS

This document shall be the governing Contractor Bid Document for this project. All items, combination of items, requirements, scope of work, etc. set forth in this document shall be performed in accordance with the written Specifications, Drawings, Details and all pertinent Addenda issued prior to the submittal of this Contractor Bid Document. The Contractor agrees to and shall be required to provide all labor, materials, equipment, machines, goods and services which may be required to complete the work in accordance with the Specification(s). All work is to be performed by skilled workmen in a good and workmanlike manner and shall conform to the Specifications, Drawings and Details prepared for this project and as approved by the Owner. This Contract may not be re-assigned, encumbered or subcontracted to any other party without the Owner's prior written consent. The bid(s) for the work set forth in the Specifications and submitted herewith shall be binding upon the successors and assigns of the parties, except otherwise provided in the Specifications or as set forth herein.

This Contractor Bid Form shall be completed in its entirety and shall be the basis for establishing all prices for the prescribed work including all additional work as directed by the Owner (or designated representative). After submittal and acceptance of this Bid, the prices and values set forth on the Contractor Bid Form may not be amended, added to or superseded except by written agreement signed by the Contractor and the Owner referencing those items or combination of items to the specific provisions hereof which are affected by such amendment.

SCHEDULING AND COMPLETION REQUIREMENTS

Substantial completion of all work set forth in these documents or phase of the project as contracted by the Owner (or designated representative) shall be within one-hundred twenty (120) calendar days from the initiation of the project and not greater than one-hundred eighty (180) days after Award of Contract. Time for completion may be extended at the option of the Owner (or designated representative) based on the total scope of work to be completed when weather conditions permit proper application of the specified materials. Delays beyond the control of the Contractor (strikes, weather, material shortages, etc.) will be reviewed by the Owner (or designated representative) and Consultant - Structural Technologies, Inc. Delays which are determined to be the direct result of availability of personnel, equipment, etc.. specifically supplied by the Contractor will be cause for cancellation of the contract. The provisions set forth in this section may be enforced by the Owner (or designated representative) at his / their discretion. The Contractor shall be compensated only for work completed.

The successful Contractor will be required to submit an estimated schedule of completion to North Palos Fire Protection District.

These Bid Documents are respectfully submitted this _____ (day) of _____ (month), 2022.

BID SUBMITTED BY:

_____
(Contractor / Firm Name)

_____
(Street Address)

_____
(City - State - Zip Code)

_____
(Signature of Authorized Agent or Owner)