

PROJECT MANUAL

PROJECT:

HILLSDALE COMMUNITY SCHOOLS
ROOF PROJECTS 2022
DAVIS MIDDLE SCHOOL & BAILEY EARLY CHILDHOOD CENTER

OWNER:

Hillsdale Community Schools
30 S Norwood St
Hillsdale, MI 49242

DATE: March 28th, 2022.

ISSUED FOR: BIDS / CONSTRUCTION DOCUMENTS

OWNERS REPRESENTATIVE

THE GARLAND COMPANY
Ian Mattoon
PH 517-243-6375

SITE MEETING

April, 5th @ 9am

Davis Middle School
30 N West St
Hillsdale, MI 49242

BIDS DUE

April, 12th @ Noon

Hillsdale Community School
Administration Office
ATTN: JEREMY LAFOLLETTE
30 S NORWOOD ST
HILLSDALE, MI 49242

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Contractor's Bid
Hillsdale Community Schools
2022 Roofing Projects

To: Jeremy LaFollette
Hillsdale Community Schools
Administration Office
30 S Norwood St
Hillsdale, MI 49242

Bid Due Date: April 12th @ Noon

Bids are to be submitted to the above address by the time and date listed above. Bids shall be sealed and marked "Bid for 2022 Roof Projects". Bids received after the Due Date and Time will not be considered.

BASE PROPOSAL (Davis Middle School):

SUM FOR SCOPE:

All labor, materials, services and equipment necessary for completion of the work shown on the drawings and in the specifications.

_____ DOLLARS (\$_____)

ALTERNATE #1 (UV Protection):

All labor, materials, services and equipment necessary to add an aluminized coating to the field of the roof at a rate of 1 gal/sq.

ADD: _____ DOLLARS (\$_____)

BASE PROPOSAL (Bailey Early Childhood Center):

SUM FOR SCOPE (Sloped Shingle Roof F-Wave):

All labor, materials, services and equipment necessary for completion of the work shown on the drawings and in the specifications.

_____ DOLLARS (\$_____)

ALTERNATE #1 (Dimensional Shingle):

All labor, materials, services and equipment necessary for completion of base bid subbing out a slate style dimensional shingle for the F-Wave synthetic shingle.

DEDUCT: _____ DOLLARS (\$_____)

ALTERNATE #2 (Standing Seam Metal Roof):

All labor, materials, services and equipment necessary for completion of base bid subbing out a concealed fastener standing seam metal panel for the F-Wave synthetic shingle.

DEDUCT: _____ **DOLLARS (\$ _____)**

SUM FOR SCOPE (Flat Fluid Applied Roof):

All labor, materials, services and equipment necessary for completion of the work shown on the drawings and in the specifications.

_____ **DOLLARS (\$ _____)**

UNIT PRICING:

Extra work may be necessary other than required by the plans and specifications, extra work will be completed according to the written instructions of the Owner for the following unit prices:

Unit Cost Items:	Repair of decking -	_____	per sq. ft.
Unit Cost Items:	Replace of wet insulation -	_____	per sq. ft.
Unit Cost Items:	Remove of abandoned curb -	_____	per sq. ft.
Unit Cost Items:	Replacement of drain -	_____	per sq. ft.

Respectfully Submitted,

SIGNATURE: _____

TITLE: _____

BUSINESS NAME: _____

CONTRACTOR ADDRESS: _____

DATE: _____

AFFIDAVIT OF BIDDER

The undersigned, the owner or authorized officer of _____ (the "Bidder"), pursuant to the familial disclosure requirement provided in the _____ (the "School District") advertisement for construction bids, hereby represent and warrant, except as provided below, that no familial relationships exist between the owner(s) or any employee of _____ and any member of the Board of Education of the School District or the Superintendent of the School District.

List any Familial Relationships:

BIDDER:

By: _____

Its: _____

STATE OF MICHIGAN)

) ss.

COUNTY OF _____)

This instrument was acknowledged before me on the _____ day of _____, 2021,
by _____.

, Notary Public

_____ County, Michigan

My Commission Expires: _____

Acting in the County of: _____

AFFIDAVIT OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT

Michigan Public Act No. 517 of 2012

The undersigned, the owner or authorized officer of _____ (the “Bidder”), pursuant to the compliance certification requirement provided in the _____ (the “School District”) Request For Proposals For _____ (the project) hereby certifies, represents and warrants that the Bidder (including its officers, directors and employees) is not an “Iran linked business” within the meaning of the Iran Economic Sanctions Act, Michigan Public Act No. 517 of 2012 (the “Act”), and that in the event Bidder is awarded a contract / purchase order as a result of the aforementioned Request For Proposal, the Bidder will not become an “Iran linked business” at any time during the course of performing the Work or any services under the contract.

The Bidder further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than \$250,000.00 or 2 times the amount of the contract/purchase order or proposed contract for which the false certification was made, whichever is greater, the cost of the School District’s investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on a request for proposal for three (3) years from the date it is determined that the person has submitted the false certification.

BIDDER:

By: _____

Its: _____

Date: _____

STATE OF _____)

)ss.

COUNTY OF _____)

This instrument was acknowledged before me on the _____ day of _____, 2021,
by _____.

, Notary Public

_____ County, Michigan

My Commission Expires: _____

Acting in the County of: _____

PROJECT QUANTITIES

For this project, material take-off is the responsibility of the bidding contractor. The bidding contractor will have coverage rates of each product to formulate the material quantities needed:

2-Ply SBS/Fluid Applied Membrane Retrofit

Davis Middle School

Product #	Product Name	Unit / Size	Coverage Rate	Minimum	Extra
4144-80	FlexBase Plus 80	Roll	100 SF	350	
4125	StressPly SA FR Mineral	Roll	75 SF	450	
4840-6	GarMesh 6"	Roll	150'	10	
7425-5	Silver Flash	5 gal	1 gal / 7 LNFT	20	
7110-5	Flashing Bond	5 gal	1 gal / 7 LNFT	20	
7411-3	Garla-Brite	5 gal	1 gal/sq	60	

Shingle Replacement and Flat Roof Restoration

Bailey Early Childhood Center

Product #	Product Name	Unit / Size	Coverage Rate	Minimum	Extra
7844-KIT	LiquiTec Base – White	4.5 Gal	3 Gal / Sq	60	
7846-KIT	LiquiTec Top – Gray	4.5 Gal	2 Gal / Sq	40	
4879	Grip Polyester Soft	Roll	1000 SF	9	
4133	R-Mer Seal	Roll	200 SQFT	45	

PLEASE NOTE:

1. It is the responsibility of the bidder to obtain any product-related information from the Garland representative prior to bid submission.
2. Contractor is responsible for completely their own take-offs. Any quantities above, the school has agreed to purchase directly from The Garland Company. If additional material is needed, it falls solely on the contractor's responsibility

END OF SECTION

**SECTION 00 72 00
GENERAL CONDITIONS**

PART 1 GENERAL

1.1. DEFINITIONS

- A. The contract document consists of the AGREEMENT, the GENERAL CONDITIONS of the contract, the DRAWINGS and the SPECIFICATIONS, including all revisions hereto.
- B. The Owner, the Contractor and the Owner's Representative shall be indicated as such throughout these documents. The term Contractor as used herein shall designate the successful bidder to whom the roof contract is awarded.
- C. The term Owner shall be understood to be Hillsdale Community Schools.
- D. The term Owner's Representative shall be understood to mean the representative of the primary material manufacturer.

1.2. OWNER'S REPRESENTATIVE STATUS

- A. The Owner's Representative shall have general Rights of Inspection of the work and is the agent of the Owner in all matters pertaining to the work as provided in the Contract Documents. The Owner's Representative has the authority to stop work whenever such stoppage may be necessary to ensure the proper execution of the contract and shall have authority to reject any and all materials, whether worked or unworked, if such materials are not in accordance with the plans and specifications.

1.3. CONDITION OF SITE

- A. The bidders shall visit the site before submitting their bids and determine the field conditions affecting their work. In considering the bids, the Owner will assume that the bidders are aware of all items, pertinent to their work and have made allowance for same in their bids.

1.4. VERIFICATION OF DIMENSIONS AND ELEVATIONS

- A. Dimensions and elevations indicated on the drawings in reference to existing structures or utilities are the best available data but are not guaranteed by the Owner's Representative and the Owner's Representative will not be responsible for their accuracy. Before bidding on any paperwork dependent upon the data involved, the Contractor shall field check and verify all dimensions, grades, lines, levels or other conditions of limitations at the site to avoid construction errors. If any work is performed by the Contractor or any of his/her subcontractors prior to adequate verification or applicable data, any resultant extra cost for adjustment of work as required to conform to existing limitations, shall be assumed by the Contractor without reimbursement or compensation by the Owner.

1.5. PROTECTION OF OWNER'S OPERATIONS

- A. The Contractor shall erect such barriers, tarpaulins, doors, etc., as may be necessary to protect the Owner's operations while work is in progress. Any such openings that are essential to carrying on the work shall be securely closed by the Contractor when not in use to protect the Owner's operations.

1.6. PROTECTION OF WORK AND PROPERTY

- A. The Contractor shall maintain adequate protection of all his/her work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. He/she shall provide and maintain at all times any danger signs, guards and/or obstructions necessary to protect the public and his/her workmen from any dangers inherent with or created by the work in progress. He/she shall hold the Owner harmless from any loss arising due to injury or accident to the public or his/her workmen, or from theft of materials stored at the job site. All materials will be stored in locations other than on roof surfaces except as necessary and shall then be placed on plywood or other type of material to protect the roof surface at all times.
- B. Before starting any work, the Contractor shall protect all grounds, copings, paving and exterior of all buildings where work will be performed.
- C. In those areas where materials and/or hot asphalt will be raised to the roof area, a protective covering shall be placed from the base of the wall extending up and over the top edge of the roof. This coverage shall be wide enough to assure that the exterior walls do not become stained or soiled during roofing operations.
- D. Any areas of the building or grounds which have become stained or damaged in any way shall be repaired or replaced by the Contractor prior to the final inspections. The method of repair used must be acceptable to both the Owner and the Owner's Representative.

1.7. MATERIAL STORAGE AND CLEAN-UP

- A. The Contractor shall keep the premises free from rubbish at all times and shall arrange his/her material storage so as not to interfere with the Owner's operations. At the completion of the job, all the unused material and rubbish shall be removed from the site. The ground shall be raked clean and the building shall be broom cleaned. If the Contractor refuses at any time to remove his/her debris from the premises, or to keep the working area clean, such cleaning will be completed by the Owner and deducted from the balance due the Contractor.
- B. The Contractor shall also remove drippage of bitumen or adhesive from all walls, windows, floors, ladders and finished surfaces. Failure to do so will result in the work being done by others and the cost shall be deducted from the balance due the Contractor.
- C. Materials must be delivered with manufacturer's label intact and legible. Labels must be affixed to the outside of the package stating the type of product, name and address of the manufacturer. All materials shall be stored and protected

against weather, vandalism, and theft. Any materials found to be damaged or missing shall be replaced by the Contractor at no cost to the Owner.

1.8. INSPECTION OF WORK

- A. Where the drawings or specifications require the inspection and approval of any work in progress by the Owner's Representative, the Contractor shall give that Representative ample notice to allow for scheduling the inspection, which shall be made promptly to avoid delay of work. If work has progressed without the required inspections or approval by the Representative, it shall be uncovered for inspection at the Contractor's expense.
- B. Uncovering of work not originally inspected, or uncovering questioned work may be ordered by the Owner's Representative and it shall be done by the Contractor. If examination proves such work to be incorrectly done or not done in accordance with the plans and specifications, the Contractor shall bear all cost of the reexamination. If the work is proven correctly installed, all such expense shall be borne by the Owner.

1.9. INSPECTION OF WORK IN PROGRESS AND UPON COMPLETION

- A. If directed by the Owner's Representative, the Contractor shall cut not more than four (4) cores, of approximately 200 square inches each, from every newly constructed roof area, in order to establish the amount of materials used per square foot, and shall restore all such areas to sound and watertight conditions as prior to the core testing.
- B. In the event that such core cuts disclose any deficiency in materials, or soundness of construction, the Contractor shall, at his/her own expense, apply additional materials or otherwise correct the deficiencies to the satisfaction of the Owner's Representative.
- C. Noncompliance with the terms of this specification 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 undertaken in a defective manner
- D. Damages caused by water infiltration 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.
- E. The Owner will require the Owner's Representative 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 instructions of the Manufacturer.
- F. The authorized Owner's Representative shall be responsible for:

- G. Keeping the Owner informed on a periodic basis as to the progress and quality of the work;
- H. Calling to the attention of the Contractor those matters he/she considers to be in violation of the contract requirements;
- I. Reporting to the Owner any failure or refusal of the Contractor to correct unacceptable practices;
- J. Conducting preliminary and subsequent job-site meetings with the Contractor's official job representative;
- K. Supervising the taking of test cuts, and the restoration of such areas;
- L. Rendering any other inspection services which the Owner may designate; and
- M. 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 Manufacturing Company.
- N. The presence and activities of the Owner's Representative shall in no way relieve the Contractor of his/her contractual responsibilities.

1.10. MISCELLANEOUS UTILITIES

- A. Electrical power will be furnished by the Owner for small tools only. All connections to the electrical system will be furnished by the Contractor.
- B. Water for concrete, mortar, washing and drinking purposes will be furnished by the Owner. Any connections to the water system shall be completed by the Contractor.
- C. 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/her work.
- D. Toilet facilities will be provided by the Contractor. The Contractor will be responsible for supplying a portable toilet on the job-site. The Contractor's personnel are not permitted to enter the building without proper authorization from the Owner or Owner's Representative.

1.11. CHANGES OR EXTRA WORK

- A. The Owner may, without invalidating the original contract, order such changes or additions as may from time to time be deemed desirable. In so doing, the contract price shall be adjusted, as stated below, with all work being done under

the conditions of the original contract except for such adjustments in extension of time as may be acceptable to the Owner. The value of such extra work shall be determined in one of the following ways:

1. By firm adjustment;
 2. By cost plus with a guaranteed maximum;
 3. By cost with a fixed fee; or
 4. By unit cost.
- B. If agreement is reached that the extra cost shall be handled as per methods 2, 3, or 4, the Contractor shall keep and compile a correct amount of the cost together with such vouchers, etc., as may be necessary to substantiate same for presentation to the Owner. The Owner's Representative shall have authority to make minor job changes or additions as may be necessary to expedite the job providing such changes do not involve additional material cost. No major change or addition shall be made except upon receipt by the Contractor of a signed order from the Owner authorizing such a change. No claims for an extra to the contract price shall be valid unless so authorized.
- C. All work covered by unit prices submitted by the Contractor in his/her proposal must be covered by a written work order. The Owner's Representative will prepare the work order in triplicate covering the quantity of work and the total cost of the work. The work order which will be written at the end of each day, will be signed by the Owner's Representative and the Contractor's foreman and/or superintendent.

1.12. CORRECTION OF WORK PRIOR TO FINAL PAYMENT

- A. The Contractor shall promptly remove any work that does not meet the requirements of the plans and specifications or is incorrectly installed or otherwise disapproved by the Owner or the Owner's Representative as failing to meet the intent of the plans and specifications. The Contractor shall promptly replace any such work without expense to the Owner and shall bear the cost of making good all work of other contractors, or the Owner, destroyed or damaged by such removal or replacement.

1.13. CORRECTION OF WORK AFTER FINAL PAYMENT

- A. The Contractor shall guarantee all materials and workmanship for two (2) years from date of final payment of the contract by the Owner. Any defects which may arise during this period shall be promptly repaired by the Contractor including any damage done to the Owner's property due to such defects.

1.14. DEDUCTION FOR UNCORRECTED WORK

- A. If the Owner deems it unacceptable to have the Contractor correct work which has been incorrectly done, a deduction from the contract price shall be agreed upon therefore. Such a deduction from the contract price shall in no way affect

the Contractor's responsibility for defects which may occur nor his/her ability for correcting them, and damage caused by them.

1.15. LIENS

- A. The Contractor shall, if required by the Owner, furnish him/her with a release in full of all liens arising out of this contract or in lieu thereof, and receipts in full for all materials and labor on the job. In either case, the Contractor shall furnish an affidavit that the liens or receipts include all the labor and material for which a lien could be filed. In lieu of the above, the Contractor may at his/her option furnish a bond to indemnify the Owner against all hazard of liens. Neither part nor final payment shall in any way release the Contractor from the above obligation and in the event that part or full payment has been made and any lien remains undischarged, the Contractor shall refund to the Owner the necessary funds to discharge such a lien including all cost and attorney's fees.

1.16. JOB CONDITIONS

- A. All surfaces to be covered shall be smooth, dry, and free from dirt, debris, and foreign material before any of this work is installed. Pumping equipment shall be located on the ground at a safe distance from building; the location being subject to the approval of the Owner. The Contractor shall be responsible for guarding against fires, and shall provide suitable fire extinguishers conveniently located at the site. Competent operators shall be in attendance at all times equipment is in use. Materials shall be stored neatly in areas designated by the Owner and dispersed so as to present a minimum fire hazard. Loads placed on the roof at any point shall not exceed the safe load for which the roof is designed.
- B. There is NO SMOKING allowed inside any buildings and the Contractor shall be responsible for enforcement of this job rule at all times with his/her personnel.
- C. The Contractor should be aware of Owner's property when tearing off the existing roof. This is required for removal of dirt, silt, debris, roof membrane and insulation from the roof surface in order to preserve the ecology, eliminate unsightly conditions and protect building faces. Specific locations will be discussed at the pre bid conference.
- D. Rolled Roofing Materials: All rolled roofing materials must be stored standing on end on a pallet or otherwise raised off of the roof. The materials are to be covered in a proper manner to assure that they will not become wet prior to application. Any materials that become wet or damaged must be removed from the job-site and replaced at the Contractor's expense.
- E. Ladders: Any ladders used on this project must be in good condition. The ladder must also be secured at the roof line at all times while in use. All ladders must be O.S.H.A. approved.

- F. No drugs or alcoholic beverages are permitted on the grounds.
- G. The Contractor shall place necessary barriers and/or protection around or under all work areas where his/her operations involve risk of injury to plant.
- H. The Contractor will also protect the building structure from damage in the process of the job. In the event that damage does occur to any property or equipment, or the Owner's work in process, notification must be made within two (2) working days of the incidents to the Owner and Owner's Representative.
- I. During the progress of the job, if waste material and rubbish are found or damage resulting from the Contractor's operations is found, or the Contractor does not comply with the requirement by keeping the premises free of accumulations and correct the damage, it shall be the Owner's prerogative to hire personnel to do so; and the cost of this work will be deducted from the balance due the Contractor.
- J. Existing roof top equipment walls, windows, etc. shall be completely protected by masking or other effective methods. Any mastics or asphalt must be cleaned off metal surfaces.
- K. The Contractor is responsible for protecting all materials from the elements. If any material, such as insulation, becomes wet, it cannot be installed and must be replaced at the Contractor's expense. NOTE: Insulation and rolled roofing materials must be covered with waterproof tarps at the end of each work day. Plastic wrappers supplied by the insulation manufacturer are not acceptable substitutes for tarps. The Owner's Representative will reject any covering method material which does not adequately protect roofing materials.
- L. Anyone guilty of willful destruction or unlawful removal of company property will be dismissed from the job and is subject to prosecution by law.
- M. Any lawns damaged by Contractor vehicles will be restored with a stand of grass at the Contractor's expense. Any damaged pavements will likewise be restored at the Contractor's expense.
- N. The Contractor must verify that all materials can be installed to accommodate the building design, pertinent codes and regulations, and the manufacturer's current recommendations.
- O. The Contractor will ensure that all substances are clean, dry, sound, smooth, and free of dirt, debris, and other contamination before any materials are supplied.
- P. Any isolated areas that must be torn off and replaced will be built-up to the height of the existing roof prior to the installation of the new roofing membrane system.

1.17. WORKMANSHIP

- A. All materials will be securely fastened and placed in a watertight, neat and workmanlike manner. All workmen shall be thoroughly experienced in the particular class or work upon which they are employed. All work shall be done in accordance with these specifications and shall meet the approval of the Owner or Owner's Representative. The Contractor's representative or job supervisor shall have a complete copy of specifications and drawings on the job-site at all times.
- B. Contractor shall plan and conduct the operations of the work so that each section started on one day is complete and thoroughly protected before the close of work for that day.

1.18. INSULATION

- A. Insulation shall have accurate dimensional stability so as to properly conform to the surfaces of the roof, cants, curbs, pipes, etc. Joints between boards shall be tight and insulation shall be held back 1/2" from vertical surfaces and sumps. Insulation shall be protected from the weather at all times. No more insulation shall be laid than can be completely covered with roof materials on the same day. A base sheet shall not be considered as a proper weather barrier.
- B. Insulation that becomes wet during or after installation shall be removed and replaced with dry insulation. If roofing is in place, the roofing shall be also replaced. All replacing work shall be done at no added cost to the Owner.

1.19. ROOF DECK

- A. Contractor shall notify the Owner or Owner's Representative of any unforeseen areas of wet insulation. Where the damage is serious and extensive, it will be the Owner's prerogative to authorize removal and replacement of deteriorated roofing, insulation and repair of the vapor barrier, if present. Where damage to the roof deck is found, the Contractor shall furnish the Owner with a unit price for removal and replacement of the damaged deck.

1.20. SAFETY

- A. Contractor shall conform to requirements as designated by the United States Federal Government (O.S.H.A.). Contractor shall abide by all regulations as outlined in the O.S.H.A. handbook and shall have a handbook on location at all times.
- B. Contractors hereby acknowledged that they and their workers have undergone Safety Training and shall at all times act in compliance with all NRCA recommended safety compliance rules and regulations.

1.21. INSURANCE

- A. The following standard indemnity agreement and minimum insurance requirements are incorporated in the Specifications for all work performed by Contractors for the Owner, its affiliated and associated organizations or subsidiaries, hereinafter referred to as Owner.

- B. THE CONTRACTOR AGREES TO INDEMNIFY AND SAVE THE OWNER AND OWNER'S REPRESENTATIVE HARMLESS FROM AND AGAINST ANY AND ALL COSTS, LOSS AND EXPENSE, LIABILITY DAMAGES, OR CLAIMS FOR DAMAGES, INCLUDING COST FOR DEFENDING ANY ACTION, ON ACCOUNT OF ANY INJURY TO PERSONS (INCLUDING DEATH) OR DAMAGE TO OR DESTRUCTION OF PROPERTY OF THE OWNER, ARISING OR RESULTING FROM THE WORK PROVIDED FOR OR PERFORMED, OR FROM ANY ACT, OMISSION, OR NEGLIGENCE OF THE CONTRACTOR, SUBCONTRACTOR AND THEIR AGENTS OR EMPLOYEES. THE FOREGOING PROVISIONS SHALL IN NO WAY BE DEEMED RELEASED, WAIVED OR MODIFIED IN ANY RESPECT BY REASON OF ANY INSURANCE OR SURETY PROVIDED BY THE CONTRACTOR.
- C. All sub-contractors are required to file Certificated of Insurance properly completed and signed by an authorized insurance company representative before their work commences on the job or job site. No monies will be paid until the acceptable certificates are on file with the Contractor. Such certificates shall provide that there will be no cancellation, reduction or modification of coverage without thirty (30) days prior written notice to the Contractor. In the event such certificates are not provided to the Contractor prior commencement of work, Contractor's failure to demand such certificates shall not be deemed a waiver of Subcontractor's requirement to obtain the subject insurance.
- D. The Contractor shall provide and maintain standard fire, extended coverage perils, vandalism and malicious mischief insurance to protect the interest of both the Contractor and the Owner for materials brought into the job or stored on the premises. Such insurance shall be for 100% of the insurable value of the work to be performed including all items of labor and materials incorporated therein, materials stored at the job-site to be used in completing the work, and such other supplies and equipment incidental to the work as are not owned or rented by the Contractor, the cost of which are included in the direct cost of the work. This insurance shall not cover any tools, derricks, machinery, tar buckets, ladders, engines, workmen's quarters, boilers, pumps, wagons, scaffolds, forms, compressors, shanties, or other items owned or rented by the Contractor, the cost of which is not included in the direct cost of the work.
- E. In accordance with Section (1.21), the Contractor and subcontractor(s) shall maintain the following insurance:
- F. Workmen's Compensation and Employer's Liability Insurance affording:
- G. Protection under the Workmen's Compensation Law of the States in which the work is performed; and
- H. Employer's Liability protection subject to a minimum limit of \$100,000.
- I. Comprehensive General Liability Insurance in amounts not less than:
- J. Personal Injury: \$1,000,000 per person
- (including bodily injury) \$1,000,000 per occurrence

- K. Property Damage: \$1,000,000 per occurrence
- L. Comprehensive Automobile Liability Insurance in the following minimum amounts:
 - 1. Bodily Injury \$1,000,000 per person
 - a. \$1,000,000 per occurrence
 - 2. Property Damage \$1,000,000 per occurrence
- M. This insurance shall:
 - 1. Include coverage for the liability assumed by the Contractor under this section (section 1.21.A.1) (Indemnity);
 - 2. Includes coverage for:
 - 3. Premises, operations and mobile equipment liability
 - 4. Completed operations and products liability
 - 5. Contractual liability insuring the obligation assumed by the subcontractor in this agreement.
 - 6. Liability which subcontractor may incur as a result of the operations, acts or omissions of subcontractors, suppliers or material men and their agents or employees; and
 - 7. Automobile liability including owned, non-owned and hired automobile.
 - 8. All coverage will be on an occurrence basis and on a form acceptable to the Contractor.
 - 9. Include completed operation coverage which is to be kept in force by the Contractor for a period of not less than one year after completion of the work provided for or performed under these specifications;
 - 10. Not be subject to any of the special property damage liability exclusions commonly referred to as the exclusions pertaining to blasting or explosion, collapse or structural damage and underground property;
 - 11. Not be subject to any exclusion of property used by the insured or property in the case, custody or control of the insured or property as to which the insured for any purpose is exercising physical control; and
 - 12. The Certificate of Insurance furnished by the Contractor shall show specific reference that each of the foregoing items have been provided for.
 - 13. The Certificates of Insurance furnished by the Contractor as evidence of the Insurance maintained by him shall include a clause obligating the Insurer to give the Owner thirty (30) days prior written notice or cancellation of any material change in the insurance.

1.22. WORK HOURS AND DAYS

- A. When the Contract is awarded, the Contractor will contact the Owner's Representative to arrange the work schedule and the hours of the day that the workmen may be on the building. The job is to be bid under the assumption that all work will be performed on a straight time basis.
- B. All work shall be completed within 60 days of project approval.

1.23. COMPLIANCE WITH LAWS

- A. The Contractor shall give notices, pay all fees, permits and comply with all laws, ordinances, rules and regulations bearing on the conduct of work.

1.24. OWNER'S RULES

- A. The Contractor and all his/her personnel/agent(s) shall abide by all rules created by the Owner. The Contractor must contact the Owner's Representative for specific information regarding the rules governing all operations of the project.
- B. The Contractor shall properly notify all employees of conditions relating to roof areas with very poor condition and which will be worked on. After such notification, the Contractor must take all necessary precautions to ensure the safety of his/her employees as well as the building personnel.
- C. THE CONTRACTOR SHALL "HOLD HARMLESS" THE MATERIAL MANUFACTURER, AGAINST ANY LITIGATION ARISING FROM ANY ACCIDENTS DURING THE COURSE OF THE CONTRACT.

1.25. SAFETY AND ECOLOGY

- A. The Contractor(s) shall conform to the requirements as designated by the United States Federal Governments (e.g., O.S.H.A).

1.26. ANTI-DISCRIMINATION IN EMPLOYMENT

- A. Contractors and subcontractors shall not discriminate against any employees or applicant for employment, to be employed in performance of his/her contract, with respect to his/her hire, tenure, terms, conditions or privileges of employment because of his/her race, color, gender, sexual preference, religion, national origin, or ancestry.

2 PART 2 INSTRUCTIONS TO BIDDERS

2.1. WITHDRAWAL OR MODIFICATION OF BID

- A. Any Bidder may withdraw his/her bid at any time before the scheduled closing date of the bid by appearing in person or by sending an authorized representative of the Bidder. An appointment should first be scheduled by calling the Owner's Representative. The Bidder or his/her representative shall be asked to sign, in writing that the bid was returned to him/her/ after the withdrawal from the contract, the Bidding Contractor may not resubmit them.

2.2. BID OPENINGS

- A. Bids will be opened privately and notifications will be sent out at a later date. No later than 45 days after bid due date.

2.3. QUESTIONS

- A. Technical questions regarding this bid can be directed to: TJ Morris and/ or Ian Mattoon
- B. If the Contractor feels a conflict exists between what is considered good roofing practice and these specifications, he/she shall state in writing all objections prior to submitting quotations.

- C. It is the Contractor's responsibility, during the course of the work, to bring to the attention of the Owner's Representative any defective membrane, insulation or deck discovered which has not been previously identified.

2.4. RESPONSIBILITY FOR MEASUREMENTS AND QUANTITIES

- A. The Bidding Contractors shall be solely responsible for all accuracy of all measurements and for estimating the material required to satisfy these specifications.

2.5. DISCREPANCIES AND ADDENDA

- A. Should a Bidder find any discrepancies in the Drawings and Specifications, or should he be in doubt as to their meaning, he/she shall notify the Owner's Representative at once, who will send a written Addendum to all Bidders concerned. Oral instructions or decisions, unless confirmed by Addenda, will not be considered valid, legal or binding.
- B. No extras will be authorized because of the Contractor's failure to include work called for in the Addenda in his/her bid.
- C. It shall be the responsibility of all Bidders to call to the Owner's Representative's attention at the pre bid meeting, any discrepancies which may exist between or with any of the contract documents, or any questions which may arise as to their true meaning.
- D. Modifications to the specifications (if necessary) will be followed by an addendum; no verbal discussions or agreements shall be recognized.

2.6. COMPETENCY OF THE BIDDERS

- A. To enable the Owner to evaluate the competency and financial responsibility of a Contractor, the low Bidder shall, when requested by the Owner, furnish the information indicated in Section 5.0 below, entitled Contractor's Qualification Statement, which shall be sworn to under oath by him/her or by a properly authorized representative of the Bidder.

2.7. DISQUALIFICATION OF BIDDERS

- A. Any one or more of the following causes may be considered sufficient for the disqualification of a Bidder and the rejection of his/her bid(s):
 1. Failure to attend the pre bid meeting;
 2. Evidence of collusion among Bidders;
 3. Lack of responsibility as revealed by either financial, experience or equipment statements, as submitted;
 4. Lack of expertise as shown by past work, and judged from the standpoint of workmanship and performance history;
 5. Uncompleted work under other contracts which, in the judgment of the Owner, might hinder or prevent the prompt completion of additional work if awarded;or

6. Being in arrears on existing contracts, in litigation with an Owner, or having defaulted on a previous contract.

2.8. NOTICE OF AWARD

- A. The award of this contract for the work is contingent upon receipt of an acceptable bid. Any part of or all bids may be rejected. All bids shall be good for a period of ninety (90) days following the date the bids are due. The contract shall be deemed as having been awarded when the formal notice of acceptance of his/her proposal has been duly served upon the intended awardee by an authorized officer or agent of the Owner.
- B. All work shall be completed with 60 days of formal notice of acceptance. If work isn't completed on time, \$300 per day in liquidated damages will be charged to the contractor.

2.9. WARRANTY

- A. A written warranty which will commence from date of acceptance by Manufacturer must be supplied with the roof installation. This warranty will cover all defects in workmanship and materials. Damages caused by storm, vandalism and other trades are not included in the warranty. This warranty shall be from the manufacturer (See further, Statement of Policy).
- B. A two (s) year workmanship warranty is required from the Contractor for all remedial maintenance done under the terms of this contract.

2.10. START AND COMPLETION DATE

- A. Work shall begin within thirty (30) days from the award of this contract, or as agreed upon by all parties.
- B. All work as required in these specifications and drawings shall be completed within sixty (60) days of the start date, or as agreed upon by the parties.
- C. Unless work is hampered by long period of inclement weather, by due proof of material unavailability, or by strike, the Owner will assess a penalty in the amount of \$300.00 a day for each day beyond the agreed completion date.
- D. The Contractor is responsible for supplying trained workmen in proper numbers and for scheduling and laying out his/her work, so that it will be started and completed in a professional manner within the time period indicated on his/her Proposal form.
- E. If the Contractor sets equipment onto the job-site without commencing work immediately, the action will be considered "Spiking the job" which is unacceptable and will be considered a breach of contract by the Contractor; thereby, the contract will be terminated and the Contractor at no cost to the Owner, must remove his/her equipment and possessions from the job-site upon notification by the Owner.
- F. All work must be completed no later than Labor Day – 2022.

2.11. PAYMENT

- A. Payment for materials shall only be made after the material has been delivered to the job-site. An invoice for the material must be presented to the Owner for payment. Materials are not to be delivered to the job-site until the project is ready to begin. The Contractor must provide a release of lien from the Material Manufacturer. Subsequent requests for payment can made monthly. Final payment for the project will be made following completion, after final inspection has been made and an invoice presented to the Owner. A 10% retainer shall be held until delivery of the warranty.
- B. When the job in progress is interrupted for two (2) weeks or longer by causes beyond the Contractor's control such as a strike, weather, acts of God, etc., the Owner agrees to pay, upon request of the Contractor, a price equivalent to the percentage of work completed at that time. Regular progress payments shall be made for labor and/or materials.
- C. Each invoice shall be accompanied by a detailed estimate of the amounts and values of labor expended and materials purchased up to the last day of the preceding month. The amount of the invoice shall not exceed ninety percent (90%) of the labor and material values estimated for the preceding month.
- D. Such payments shall be viewed by both parties as progress payments and shall 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.
- E. Final payment shall be withheld until all provisions of the specifications are met, including all necessary clean-up, and the Owner receives written verification of completion.
- F. Upon completion of the job, the Owner, the Owner's Representative, and the Contractor will make final inspection of the work done, and the Owner's Representative if requested by Owner's Representative.
- G. All payments for material used in the execution of this contract can be made by a check issued jointly, payable to the Contractor and Owner's Representative will sign a completion slip authorizing final payment.
- H. If requested by the Owner and/or Owner's Representative, the Contractor shall provide a Letter of Credit from the bank to secure payment to material supplier.
- I. If requested by the Owner and/or Owner's Representative, a certified check shall be paid by the Contractor to material supplied prior to release of order.
- J. If requested by the Owner and/or Owner's Representative, a certified check shall be paid by the Contractor to material supplier via common carrier upon receipt of delivery.

- K. Contractor shall have a pre-approved line of credit from the material supplier.
- L. Final payment shall be made to the Contractor no later than thirty (30) days after job approval, providing the Contractor submits waivers of lien with his/her final invoice indicating that all suppliers have been paid.

2.12. PERFORMANCE AND PAYMENT BOND

- A. The successful Contractor will be responsible for securing a performance and payment bond from an acceptable bonding company. The cost of the bond will be paid directly by the Contractor. Contractor has to identify his/her bonding company and agent, submitting this documentation with his/her proposal. Note: See "Instruction to Bidders."
 - 1. Performance Bond – 100%
 - 2. Bid Bond – 5%
- B. Financial documentation prescribed by the Owner to ensure that the Contractor is financially sound and capable of supporting the project to its conclusion.
- C. If the successful Bidder is incorporated, an affidavit authorizing persons to sign for the Corporation. This should be in the form of minutes of the meeting of the Board of Directors, authorizing person or persons to sign for this contract work and indicating a quorum being present.

2.13. TERMINATION BY THE OWNER FOR CAUSE

- A. The Owner may terminate the contract and finish the work by whatever reasonable method he/she deems expedient if the Contractor:
 - 1. Persistently or repeatedly refuses to supply specified materials or to provide enough skilled workers to ensure the project will be completed within the time period indicated on his/her Proposal form;
 - 2. Fails to make payment to sub-contractors and/or suppliers for labor and materials as stipulated in the contract documents; and
 - 3. Is guilty of substantial breach of a provision of the contract documents.
- B. When the Owner terminates the contract for any of the above reasons, the Contractor shall not be entitled to receive further payment until the work is finished. If the unpaid balance of the contract sum exceeds the cost of finishing the work, it will be paid to the Contractor. If the cost to finish the work exceeds the unpaid balance, the Contractor shall pay the difference to the Owner.

2.14. COMPLIANCE WITH LAWS

- A. The Contractor shall give notices, pay all fees, permits and comply with all laws, ordinances, rules and regulations bearing on the conduct of work.

3 PART 3 --- CONTRACTOR'S INSTRUCTIONS

3.1. TAXES

- A. Contractor must comply with all state, federal and local taxes. The Contractor shall accept sole and exclusive responsibility for any and all state federal taxes with

respect to Social Security, old age benefits, unemployment benefits, withholding taxes and sales taxes.

3.2. CONTRACTOR'S LICENSE

A. All pertinent state and local licenses will be required.

3.3. QUALIFICATION OF BIDDERS

A. Provide proof of certification to do work in the State of Michigan.

3.4. BUILDING PERMITS

A. The acquisition of the applicable permits and associated costs to obtain said permits will be the responsibility of the successful Contractor.

3.5. JOB COORDINATION

A. Contractor is responsible for daily communication with the Owner or Owner's Representative relating to areas of roof work in order that the Owner may adequately protect tenant's personal belongings, and the people themselves against possible damage or injury. Contractor is also responsible for policing and protecting areas involving removal and replacement of roof projections, defective decking or other work involving deck penetration.

B. Twenty-four hours prior to starting of the project and/or delivery of materials, the Contractor shall notify Edward Aikman & TJ Morris / Ian Mattoon.

3.6. CLEAN-UP

A. Accumulated debris shall be removed periodically to assure maximum safety and sanitation at all times. At completion of work, the Contractor shall remove all excess material and debris from the site and leave all roof surfaces free from accumulations of dirt, debris and other extraneous materials. The Contractor shall also remove any and all drippage of bituminous materials from the face of the buildings, floor, window, ladders and other finished surfaces.

3.7. SUPERINTENDENT

A. The Contractor shall keep a competent superintendent, satisfactory to the Owner and Owner's Representative, on the job at all times when work is in progress. The superintendent shall not be changed without notifying the Owner and the Owner's Representative unless the superintendent ceases to be in the employ of the Contractor.

B. The superintendent shall represent the Contractor in his/her absence and all directions and instructions given to the superintendent shall be as binding as if given directly to the Contractor.

- C. 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/her attention by the Owner.

3.8. INSPECTIONS

- A. Before any material applications are made, the Owner or his/her representative and the material supplier representative shall be available to ensure a complete understanding of the specification.
- B. The accepted Material Manufacturer will have a representative on site a minimum of three (3) times a week to verify compliance with the specifications, answer questions that may arise and provide on-going inspection services.
- C. A final inspection shall be conducted by Owner, Contractor, and the Owner's Representative upon being notified of completion of specified work and clean-up.

4 PART 4 – STATEMENT OF POLICY

4.1. ENGINEERING

- A. In addition to high-quality products, the Material Manufacturer provides recommendations and/or specifications for the proper installation of its material. However, the Material Manufacturer does not, nor does its representative, practice engineering or architecture. The Material Manufacturer makes no judgments on, and hereby disclaim any responsibility for the soundness of any roof deck or other structural component of buildings upon which the Material Manufacturer products are applied, and further recommend a structural engineer to examine the deck conditions. Re-roofing or Ballasted Roofing Systems will require certification from a structural engineer that the structure will support the proposed additional weight.

4.2. GUARANTEES

- A. A roofing guarantee is available for review from the Material manufacturer for the roofing systems published in these specifications. The guarantee will be issued only upon completion of all the guarantee requirements by an approved Contractor. Such guarantees cannot be altered or amended, nor may any other warranties, guarantees or representations be made by an agent or employee of the Material Manufacturer unless such alteration, amendment or additional representation is issued in writing and is signed by a duly authorized officer of the Material Manufacturer, and sealed with the Material Manufacturer seal. This guarantee does not cover cosmetic deficiencies. THE MATERIAL MANUFACTURER WILL NOT BE RESPONSIBLE FOR ANY DAMAGES TO THE BUILDING OR ITS CONTENTS OR ANY OTHER CONSEQUENTIAL DAMAGES, AND ITS RESPONSIBILITY IS LIMITED TO REPAIRING LEAKS. The Contractor will warranty the roof to the Material Manufacturer for a period of two (2) years. The Contractor will inspect the roof with the Owner's Representative 18 months after completion, and, at the Contractor's expense, correct any workmanship defects before the 24th month following completion of the project.

4.3. APPROVED CONTRACTORS

- A. The roof systems must be applied only by those contractors who have received approval from the Material Manufacturer for such installations. No guarantees will be issued when installation has been performed by a non-approved contractor.

4.4. ROOFING SEQUENCE

- A. Phase roofing is not acceptable. Any insulation or base layers laid in any one day must be covered with the properly installed roof system that same day. Failure to do so will void any warranties and no guarantee will be issued for the roofing system.

4.5. ACCEPTABILITY OF COMPLETED WORK

- A. The acceptability of completed roofing work will be based on its conformance to the contract requirement. The Material Manufacturer 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 Material Manufacturer at the Contractor's expense. The Material Manufacturer will instruct the Contractor's foreman and work crew on the proper methods of installation of the roofing system, and will follow-up on a regular basis to inspect the work being done. Any deficiencies from the specified work noted by the Material Manufacturer will be immediately reported to the Owner, along with recommended corrective actions necessary. The Material Manufacturer will not act in a supervisory capacity, and will not be responsible for the Contractor's errors or omissions.

4.6. ENGINEERING AND ROOF DECK

- A. The Material Manufacturer nor its representatives, practice engineering nor architecture. It makes no judgments on, and hereby disclaim any responsibility for the soundness of any roof deck or other structural component of buildings upon which its products are applied. Re-roofing and general building structuring require certification from a structural engineer that the structure will support the proposed additional weight. In addition, the Contractor must notify the Owner or his/her representative on the job-site of any unforeseen areas of wet insulation. Where the damage is serious and extensive, it will be the Owner's prerogative to authorize removal and replacement of deteriorated roofing, insulation and repair of the vapor barrier if present. Where damage to the roof deck is found, the Contractor shall furnish the Owner with a unit price for removal and replacement of the damaged deck.

4.7. ASBESTOS IDENTIFICATION

- A. The Material Manufacturer routinely conducts roof surveys and inspections in order to provide recommendations and/or specifications for the use of its products. However, the MATERIALS MANUFACTURER IS NOT, NOR ARE ITS REPRESENTATIVES, CERTIFIED TO IDENTIFY, HANDLE OR MONITOR ASBESTOS IN ROOFING, DECKING OR INSULATION. THEREFORE, IT MAKES NO JUDGMENTS ON AND HEREBY DISCLAIMS ANY RESPONSIBILITY FOR IDENTIFYING, HANDLING OR MONITORING ASBESTOS. If a building owner suspects that an asbestos condition exists on or under the roof area

in question, Material Manufacturer can recommend licensed laboratories and technicians that can identify, remove, dispose of, and monitor the project.

4.8. ASBESTOS LIMITATIONS

- A. The Owner has been informed, acknowledges and agrees that Material Manufacturer is not engaged in the business of identifying, abating, encapsulating or removing asbestos or asbestos containing materials from the work site and has not agreed to do so herein.

- B. IN CONSIDERATION OF THE PROVISION HEREOF, THE OWNER HEREBY AGREES TO INDEMNIFY, DEFEND AND HOLD HARMLESS THE MATERIAL MANUFACTURER, ITS OWNERS, OFFICERS, DIRECTORS, EMPLOYEES AND AGENTS, INCLUDING THE ENGINEER FROM AND AGAINST ANY AND ALL LIABILITIES, DAMAGES, LOSSES AND EXPENSES (INCLUDING BUT NOT LIMITED TO ATTORNEY'S FEES) ARISING OUT OF, OR RELATING TO, ANY CLAIMS, DEMANDS, OR CAUSES OF ACTION OF ANY KIND,, ATTRIBUTABLE TO, ARISING OUT OF, OR RELATING TO THE PRESENCE OF ASBESTOS OR ASBESTOS-CONTAINING MATERIALS ON OR AT THE WORK SITE AND/OR THE ABATEMENT, ENCAPSULATION AND/OR THE REMOVAL THEREOF.

4.9. MOLD LIMITATIONS

- A. The Garland Company makes no representation or warranty, express, implied, or otherwise, regarding mold, fungi, rust, corrosion or other bacteria or organism. Neither shall Garland have any duty to identify, nor accept any responsibility or liability for any claims associated with mold, fungi, rust, corrosion or other bacteria or organism related claims.

END OF SECTION

SECTION 00 10 00

SUMMARY OF WORK

PART 1 – SUMMARY OF WORK

- 1 Attached SUMMARY OF WORK, INTENT OF THE SPECIFICATIONS, PROTECTION, HOUSEKEEPING, forms a component part of this section.

1.1. SUMMARY OF WORK: **Roof Replacement – Davis Middle School**

A. **Full Tear Off and Replacement:**

1. Remove the existing roof system and flashings down to the concrete deck.
2. Repair the concrete as necessary.
3. Install 2 layers of 2.6" Poly Iso set in hot asphalt.
4. Install tapered insulation as necessary to achieve a minimum of ¼" per foot slope to the drains.
5. Install a ½" gypsum recovery board set in hot asphalt.
6. Sump all drains 4'x4' with a minimum slope of ½" per foot.
7. Install sbs modified base sheet set in hot asphalt
8. Install sbs mineral modified cap sheet set in hot asphalt
9. 7. Terminate all vertical flashing and install new counter flashing
10. 8. Install new coping metal to meet ANSI-SPRI ES-1 standards.

B. **Partial Replacement:**

1. Removing existing ballasted EPDM, coverboard, and EPDM membrane to exposed underlying Poly Iso Insulation.
2. Remove and replace all damaged or saturated poly iso.
3. Install a ½" gypsum recovery board set in hot asphalt.
4. Sump all drains 4'x4' with a minimum slope of ½" per foot.
5. Install sbs modified base sheet set in hot asphalt
6. Install sbs mineral modified cap sheet set in hot asphalt
7. Terminate all vertical flashing and install new counter flashing
8. Install new coping metal to meet ANSI-SPRI ES-1 standards

1.2. SUMMARY OF WORK: **Roof Replacement – Bailey Early Childhood Center**

A. **Sloped Shingle Section**

1. Remove any loose or damaged shingles from existing structure ensuring substrate is as smooth as possible.
2. Install ½" plywood to ensure new roofing shingles have a smooth and even substrate.
3. Install new self-adhering high temperature synthetic ice and water shield over new plywood substrate.
4. Install new F-Wave High Performance Shingle. Shingle style is to be Estate Series and color will be chosen at a later date by client. F-Wave shingle is to be installed using stainless steel rink shank nails.
5. Install new W-style aluminum valleys and drip edge perimeter metal.

B. **Flat Roof Restoration**

1. Make any necessary repairs, including removal of any wet insulation and roofing materials and replace with like materials.
2. Allow repairs to cure completely.
3. Remove and replace all edge metal. Re-strip in all perimeter details.
4. Carefully power wash all roof surfaces with greater than 2,000 psi pressure to remove debris, rust, scale, dirt, dust, chalking, peeling or flaking coatings, etc. Do not force water into the roof system or damage roof surfaces.
5. Wearing personal protective clothing and equipment, treat areas of algae, mildew or fungus with a solution of three quarts of warm water and TSP or Simple Green Solution.
6. Rinse at least twice to be sure all cleaning agents or contaminants are completely removed to prevent adhesion issues.
7. If the roof surface becomes contaminated with dirt, dust or other particles at any time during the application of the LiquiTec system, cleaning measures must be taken to restore the surface to a suitable condition.
8. Apply LiquiTec Base Coat at 3 gal./ sq. and embed Grip Polyester Soft Scrim in base coat. Scrim should be fully embedded.

9. Allow to cure thoroughly. (24 hours)
10. Prior to field coating application, the local Garland Representative needs to complete an inspection of all treated seams and details.
11. After base coat and scrim are installed, apply a top coating of LiquiTec Top Coat in a uniform manner at minimum application rate of 2 gal./ 100 SF over the entire roof surface, including all flashings.

1.3. INTENT OF THE SPECIFICATIONS

- A. The intent of these specifications is to describe the material and methods of construction required for the performance of the work. In general, it is intended that the drawings shall delineate the detailed extent of the work. When there is a discrepancy between drawings, referenced specifications, and standards and this specification, this specification shall govern.

1.4. PROTECTION

- A. The contractor shall use every available precaution to provide for the safety of the property owner, visitors to the site, and all connected with the work under the Contract.
- B. All existing facilities both above and below ground shall be protected and maintained free of damage. Existing facilities shall remain operating during the period of construction unless otherwise permitted. All access roadways must remain open to traffic unless otherwise permitted.
- C. Barricades shall be erected to fence off all construction areas from operations personnel.
- D. Safety Requirements:
 1. All application, material handling, and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.
- E. 2. Comply with federal, state, and local and owner fire and safety requirements.
- F. 3. Advise owner whenever work is expected to be hazardous to owner employees and/or operations.
- G. 4. Maintain a crewman as a floor guard whenever roof decking is being repaired or replaced and whenever any roofing is being removed.
- H. 5. Maintain proper fire extinguisher within easy access whenever power tools, roofing kettles, and torches are being used. A MINIMUM OF A 2 HOUR FIRE WATER SHALL BE STRICTLY ADHERED TO WHENEVER PROPANE TORCHES ARE IN USE.
- I. 6. ALL SAFETY REQUIREMENTS OF THE BUILDING OWNER MUST BE FOLLOWED. NO EXCEPTIONS WILL BE PERMITTED. SAFETY ORIENTATION MEETING REQUIRED PRIOR TO PERFORMING ANY WORK.

1.5. HOUSEKEEPING

- A. Keep materials neat and orderly.
- B. Remove scrap, waste and debris from the project area.
- C. Maintenance of clean conditions while work is in progress and cleanup when work is completed shall be in strict accordance with the "General Conditions" of this contract.
- D. Fire protection during construction.
- E. Follow all requirements established by the building owner.

END OF SECTION

SECTION 01 43 33
ROOFING MANUFACTURER'S FIELD SERVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 07 Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section includes Manufacturer's field services for roofing assemblies.
- B. Related Sections:
 - 1. Section 07 05 00 – Common Work Results for Thermal and Moisture Protection.
- C. Related Work Specified Elsewhere:
 - 1. Roofing Material: Section 07 56 00 – Fluid Applied Roofing Restoration

1.3 REFERENCES

- A. International building Code (current edition) or local authority building code.
- B. American Society of Civil Engineers (ASCE): ASCE 7, Minimum Design Loads for Buildings and Other Structures.
- C. Factory Mutual Global (FMG): Roof Assembly Classifications.
- D. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- E. American National Standards Institute and Single Ply Roofing Institute (ANSI/SPRI): ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal.

1.4 SUBMITTALS FOR REVIEW

- A. Product Data: Provide manufacturer's technical product data for each type of roofing product specified. Include data substantiating that materials comply with specified requirements.
- B. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.

- C. Roofing System Manufacturer's Evaluation: Provide a comprehensive written assessment comparing available roofing solutions with validation of why the roofing system selection for the specific project is suitable and appropriate.
- D. Roofing System Manufacturer's Report Form: Provide a copy of the report form utilized by the roofing system manufacturer for progress inspections to monitor installation and quality.
- E. Online Reporting Capabilities: Provide a sample of the roofing system manufacturer's online roof inspection report as well as information about how long inspection reports are available to owner.

1.5 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Submit installation instructions and recommendations indicating special precautions required for installing the membrane.
- B. Manufacturer's Certificate: Certify that roof system furnished is approved by Factory Mutual Global, Underwriters Laboratories, Warnock Hersey or approved third party testing facility in accordance with ASTM E108, Class [A or B or C] for external fire and meets local or nationally recognized building codes.
- C. Manufacturer's Certificate: Certify that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- D. Manufacturer's Certificate: Submit a certified copy of the roofing manufacturer's ISO 9001 compliance certificate.
- E. Written certification from the roofing system manufacturer certifying the applicator is currently authorized for the installation of the specified roof system.
- F. Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7, Method 2 for Components and Cladding. In no case shall the design loads be taken to be less than those detailed in Design and Performance Criteria article of this specification.
- G. Qualification data for firms and individuals identified in Quality Assurance Article below.
- H. Test Reports: Submit ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal Products.

- I. Substitutions: Products proposed as equal to the products specified for this project shall meet all of the requirements in the appropriate Division 7 specifications and shall be submitted for consideration at least 7 days prior to the date that bids must be submitted.
 1. Proposals shall be accompanied by a copy of the manufacturer's standard specification Section. That specification Section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.
 2. Manufacturer's checklist will be accompanied with any substitution to verify equal performance characteristics to those specified in Division 7 specification.
 3. The Owner's decision regarding substitutions will be considered final.

1.6 CONTRACT CLOSEOUT SUBMITTALS

- A. Project Warranty: Provide specified warranty for the Project, executed by the authorized agent of the Manufacturer.
- B. Roofing Maintenance Instructions: Provide a roof care and maintenance manual of manufacturer's recommendations for maintenance of installed roofing systems.
- C. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.
- D. Inspection Logs: Copy of inspection reports as performed by the manufacturer shall be submitted at project closeout and include photographic documentation of installation progress, weather conditions, and personnel on the project at the time of every inspection.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with not less than [12] years documented experience [and have ISO 9001 certification].
- B. Installer Qualifications: Company specializing in specified roofing installation with not less than [5] years' experience and authorized by roofing system manufacturer as qualified to install manufacturer's roofing materials.
- C. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress. Maintain proper supervision of workmen.
- D. Maintain a copy of the roof plans, details, and specifications in the possession of the Supervisor/Foreman and on the roof at all times.

- E. Source Limitations: Obtain all primary components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer.
 - 1. The manufacturer providing the roofing system warranty must verify that they manufacture a minimum of 75% of the products utilized in the roofing system of this project. Products that are private labeled shall not be considered as manufactured by the roofing system supplier.
 - 2. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

- F. Source Quality Control: Manufacturer shall have in place a documented, standardized quality control program such as ISO-9001.

1.8 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Roofing Conference: Convene a pre-roofing conference approximately two (2) weeks before scheduled commencement of roofing system installation and associated work.

- B. Require attendance of installer of each component of associated work: installers of deck or substrate construction to receive roofing work: installers of rooftop units and other work in and around roofing that must precede or follow roofing work (including mechanical work if any): architect and/or engineer: owner: roofing system manufacturer's full time employee: and other representatives directly concerned with performance of the Work, including (where applicable) owner's insurers, testing agencies and governing authorities. Objectives of conference include:
 - 1. Review foreseeable methods and procedures related to roofing work, including set up and mobilization areas for stored material and work area.
 - 2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by others.
 - 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
 - 4. Review roofing system requirements (drawings, specifications and other contract documents).
 - 5. Review required submittals both completed and yet to be completed.
 - 6. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
 - 7. Review required inspection, testing, certifying and material usage accounting procedures.
 - 8. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
 - 9. Record discussion of conference including decisions and agreements (or disagreements) reached and furnish a copy of record to each party attending. If substantial disagreements exist at conclusion of conference,

determine how disagreements will be resolved and set date for reconvening conference.

- C. The Owner's Representative will designate one of the conference participants to record the proceedings and promptly distribute them to the participants for record.
- D. The intent of the conference is to resolve issues affecting the installation and performance of roofing work. Do not proceed with roofing work until such issues are resolved to the satisfaction of the owner and [architect and/or engineer] of record. This shall not be construed as interference with the progress of Work on the part of the owner or [architect or engineer] of Record.

1.9 MANUFACTURER'S INSPECTIONS

- A. When the Project is in progress, a full-time employee of the roofing system manufacturer must provide the following:
 - 1. Report progress and quality of the work as observed. Progress reports must be published to an online system as referenced in Section 1.4.
 - 2. Provide periodic (3 days per week) roofing installation inspections: Inspections must include; photographic documentation of work in-progress and written statements of compliance with details/shop drawings.
 - 3. Report to the owner, architect and/or engineer in writing any failure or refusal of the contractor to correct unacceptable practices called to the contractor's attention.
 - 4. Confirm after project completion that the manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.10 WARRANTY

- A. Upon completion of installation, and acceptance by the owner and architect and/or engineer, the manufacturer will supply to the owner the specified warranty.
- B. Installer will submit a two (2)- year workmanship warranty to the membrane manufacturer with a copy directly to the owner.
- C. The roofing system manufacturer must have been in continuous business operation for a period of time at least as long as the length of the roof system warranty provided for this project.

1.11 DESIGN AND PERFORMANCE CRITERIA

- A. Provided at Prebid.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 EXECUTION, GENERAL

- A. Comply with requirements of related Division 07 Section.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.
- B. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.

3.3 FIELD QUALITY CONTROL

- A. Roofing Manufacturer Representative shall perform field inspection as specified in Article titled: MANUFACTURER'S INSPECTIONS above. Inspections must include photographic documentation of installation progress, weather conditions, and personnel on the project at the time of inspection.
- B. Correct defects or irregularities discovered during field inspection. Issues deemed defective must be re-inspected and determined suitable by the roofing manufacturer.
- C. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system. A copy of the specification shall also be on site at all times.
- D. Frequent progress meetings shall be conducted during the performance of roof system installation and must be attended by the owner, architect or engineer, roofing system manufacturer's full time employee, and other representatives directly concerned with performance of the work.

3.4 FINAL INSPECTION

- A. At the completion of the roofing installation and associated work, meet with contractor, architect or engineer, installer, installer of associated work, owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.
- B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.

- C. Notify the [contractor] [architect and/or engineer] [owner] upon completion of corrections.
- D. The roofing system manufacturer reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided by the roofing contractor.
- E. If core cuts verify the presence of damp or wet materials, the roofing contractor shall be required to replace the damaged areas at his own expense.
- F. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.
- G. Immediately correct roof leakage during construction. If the contractor does not respond within twenty-four (24) hours, the owner may exercise right to correct the Work under the terms of the Conditions of the Contract.

END OF SECTION

**SECTION 06 17 00
ENGINEERED FRAMING SYSTEMS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Engineered lumber framing systems for the following applications:
 - 1. Parapet cap engineered framing system.
 - 2. Window and door buck engineered framing system.
 - 3. Top and sill plate engineered framing system.

1.2 REFERENCES

- A. American Wood Protection Association (AWPA):
 - 1. AWPA U1-15, UC2 Interior/Damp Use.
- B. ASTM International (ASTM):
 - 1. ASTM E 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus. (R-Value).
- C. ICC Evaluation Service:
 - 1. ICC-ES Report ESR-1387 -StrandGuard TimberStrand LSL 1.30E treated with zinc borate.
- D. NAHB Research Center:
 - 1. Green Approved Product for National Green Building Certification, Certificate 00008.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 30 00 - Administrative Requirements.
- B. Product Data: Submit manufacturer's current published data including materials, standard details, and installation instructions.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 5 years' experience manufacturing similar products.
- B. AWPA Standards: Materials shall meet AWPA U1-15 for Use Category UC 2. Service conditions for UC2 are interior construction, above ground, damp; protected from weather, but may be subject to sources of moisture.
- C. NAHB Green Approved Product: Materials shall be NAHB Green Approved; StrandGuard TimberStrand LSL is a Green Approved Product for National Green Building Certification, Certificate 00008.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle materials in accordance with manufacturer's recommendations and as required to avoid damage.

1.6 PROJECT CONDITIONS

- A. Maintain temperature and humidity within limits recommended by the manufacturer. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 WARRANTY

- A. Warranty: Provide manufacturer's standard limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: PreBuck, which is located at: 2555 28th St. SW; Wyoming, MI 49519; Tel: 616-309-6256; Email: [request info \(brett@prebuckproducts.com\)](mailto:brett@prebuckproducts.com); Web: <http://www.prebuckproducts.com>
- B. Substitutions: Not permitted.

2.2 PARAPET CAP ENGINEERED FRAMING SYSTEM

- A. Parapet Cap Engineered Framing System: StrandGuard TimberStrand LSL 1.30E Engineered Lumber by PreBuck Engineered Framing Systems.
 1. Meets AWWA U1-15 for Use Category 2 (UC2).
 2. NAHB Research Center Green Approved.
 3. MDI resin, 100 percent waterproof when cured.
 4. Treated with zinc borate through complete cross section.
 5. Typical material 1-1/2 inches (38 mm) thick; built-up as required.
 6. Round 1-1/4 inch counter sunk anchor openings at 24 inches O.C.
 7. Acceptable for direct contact with concrete, non-corrosive to metals, insect and fungi resistive.
 8. Materials: StrandGuard TimberStrand LSL 1.30E Engineered Lumber, ICC ESR-1387.
 - a. Treatment: Zinc borate through complete cross section.
 - b. Bending Strength: 1900 psi.
 - c. Tensile Strength: 1075 psi.
 - d. Shear Strength: 150 psi.
 - e. Compression - Perpendicular to Grain: 670 psi.
 - f. Specific Gravity: 0.50 into the face, 0.42 into the edge.
 - g. R-value of 1-1/2 inch thickness (ASTM E 518): 1.86.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install materials in accordance with manufacturer's recommendations and in proper relationship with adjacent construction. Set members level, plumb, and true to line.
- B. Coordinate construction sequence with installation of flashings and adjacent materials provided by others to prevent exterior moisture from entering or passing through completed assemblies.
- C. Remove excess and waste materials from the job.

END OF SECTION

SECTION 07 22 00
ROOF DECK AND INSULATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.2 SUMMARY

- A. Section includes roof insulation over the properly prepared deck substrate.
- B. Related Sections:
1. Section 07 05 00 – Common Work Procedures for Thermal and Moisture Protection.
 2. Section 07 62 00 – Sheet Metal Flashing and Trim.
 3. Section 06 17 00 – Engineered Framing System

1.3 REFERENCES

- A. American Society for Testing and materials (ASTM):
1. ASTM A167 Standard Specification for Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet and Strip.
 2. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
 3. ASTM B29 Standard Specification for Refined Lead.
 4. ASTM B32 Standard Specification for Solder Metal.
 5. ASTM C165 Standard Test Method for Measuring Compressive Properties of Thermal Insulation.
 6. ASTM C208 Standard Specification for Cellulosic Fiber Insulation Board.
 7. ASTM C209 Standard Test Method for Cellulosic Fiber Insulating Board.
 8. ASTM C272 Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.
 9. ASTM C1396 Standard Specification for Gypsum Wallboard.
 10. ASTM C518 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 11. ASTM C728 Standard Test Methods for Fire Test of Roof Coverings.
 12. ASTM C1289 Standard Specification for Faced Rigid Polyisocyanurate Thermal Insulation.
 13. ASTM D5 Standard Test Method for Penetration of Bituminous Materials.
 14. ASTM D36 Standard Test Method for Softening Point of Bitumen (Ring and Ball Apparatus).
 15. ASTM D312 Standard Specification for Asphalt Used in Roofing.
 16. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
 17. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 18. ASTM D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
 19. ASTM D2126 Standard Test Method for Response off Rigid Cellular Plastics to Thermal Humid Aging.

- 20. ASTM D5147 Standard Sampling and Testing Modified Bituminous Sheet Material.
- B. National Roofing Contractors Association (NRCA):
 - 1. Roofing and Waterproofing Manual.
- C. Underwriters Laboratories, Inc. (UL):
 - 1. Fire Hazard Classifications.
- D. Warnock Hersey (WH):
 - 1. Fire Hazard Classifications.
- E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- F. Steel Deck Institute, St. Louis, Missouri (SDI)
- G. Insulation Board, Polyisocyanurate (FS HH-I-1972)
- H. Insulation Board, Thermal (Fiberboard) (FS LLL-1-535B)

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's specification data sheets for each product in accordance with Division 01 Section Submittal Procedures. 01300.
- B. Provide approval letters from insulation manufacturer for use of their insulation within this particular roofing system type.
- C. Provide a sample of each insulation type.
- D. Shop Drawings
 - 1. Submit manufacturer's shop drawings indicating complete installation details of tapered insulation system, including identification of each insulation block, sequence of installation, layout, drain locations, roof slopes, thicknesses, crickets and saddles.
 - 2. Shop drawing shall include: Outline of roof, location of drains, complete board layout of tapered insulation components, thickness and the average "R" value for the completed insulation system.
- E. Certification
 - 1. Submit roof manufacturer's certification that insulation fasteners furnished are acceptable to roof manufacturer.
 - 2. Submit roof manufacturer's certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.

1.5 QUALITY ASSURANCE

- A. Fire Classification, ASTM E-108.
- B. Manufacturer's Certificate: Certify that roof system furnished is approved by Factory Mutual, Underwriters Laboratories, Warnock Hersey or approved third party testing facility in accordance with ASTM E108, Class [A or B or C] for external fire and meets local or nationally recognized building codes.

- C. Manufacturer's Certificate: Certify that the roof system is adhered properly to meet or exceed the requirements of FM [1-90].
- D. Pre-installation meeting: Refer to Division 07 roofing specifications for pre-installation meeting requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.
- B. Store all insulation materials in a manner to protect them from the wind, sun and moisture damage prior to and during installation. Any insulation that has been exposed to any moisture shall be removed from the project site.
- C. Keep materials enclosed in a watertight, ventilated enclosure (i.e. tarpaulins).
- D. Store materials off the ground. Any warped, broken or wet insulation boards shall be removed from the site.

PART 2 – PRODUCTS

2.1 PRODUCTS, GENERAL

- A. Refer to Division 01 Section "Common Product Requirements."
- B. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.
- C. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.
 - 1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.
 - 2. Include a list of three (3) projects of similar type and extent, located within a one hundred mile radius from the location of the project. In addition, the three projects must be at least five (5) years old and be available for inspection by the Architect, Owner or Owner's Representative.
 - 3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.
 - 4. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2 INSULATION MATERIALS

- A. Thermal Insulation Properties and Approved Insulation Boards.
 - 1. Rigid Polyisocyanurate Roof Insulation; ASTM C1289:
 - a. Qualities: Rigid, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
 - b. Thickness: Minimum 4".
 - c. R-Value: Minimum R-20.

- d. Compliances: UL, WH or FM listed under Roofing Systems Federal Specification HH-I-1972, Class 1.
 - e. Acceptable Products:
 - 1) ENRGY-3; Johns Manville
 - 2) Hytherm; Dow
 - 3) EnergyGuard; GAF
 - 4) Approved Equivalent
2. Tapered Polyisocyanurate Roof Insulation; ASTM C1289:
- a. Qualities: Factory Tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
 - b. Thickness: Minimum 1/2"
 - c. Average R-Value: Minimum R-2.8
 - d. Tapered Slope: 1/8"
 - e. Compliances: UL, WH or FM listed under Roofing Systems Federal Specification HH-I-1972, Class 1
 - f. Acceptable Products:
 - 1) ENRGY 3; Johns Manville
 - 2) EnergyGuard; GAF
 - 3) Approved Equivalent
3. Dens-Deck Prime Roof Board
- a. Qualities: Nonstructural glass mat faced, noncombustible, water-resistant treated gypsum core panel.
 - b. Board Size: Four feet by four feet (4'x4').
 - c. Thickness: One quarter (1/4) inch.
 - d. R-Value: .28
 - e. Compliances: UL, WH or FM listed under Roofing Systems.
4. Securock Roof Board
- a. Qualities: Nonstructural, noncombustible, homogenous composition panel.
 - b. Board Size: Four by eight feet (4'x8').
 - c. Thickness: One quarter (1/4) inch.
 - d. R-Value: .2
 - e. Compliances: UL, WH or FM listed under Roofing Systems.
 - f. Manufacturer: USG

2.3 RELATED MATERIALS

- A. Fiber Cant and Tapered Edge Strips: Performed rigid insulation units of sizes/shapes indicated, matching insulation board or of perlite or organic fiberboard, as per the approved manufacturer.
 - 1. Acceptable Manufacturers:
 - a. The Garland Company, Inc.
 - b. Celotex
 - c. Johns Manville
 - d. GAF
 - e. Approved Equivalent
- B. Protection Board: Pre-molded semi-rigid asphalt composition board one half (1/2) inch.
- C. Roof Board Joint Tape: Six (6) inches wide glass fiber mat with adhesive compatible with insulation board facers.
- D. Asphalt: ASTM D312, Type III Steep Asphalt.

- E. Roof Deck Insulation Adhesive: Insul-Lock HR - Dual-component, high rise foam adhesive as recommended by insulation manufacturer and approved by FM indicated ratings.
 - 1. Tensile Strength (ASTM D412).....250 psi
 - 2. Density (ASTM D1875).....8.5 lbs./gal.
 - 3. Viscosity (ASTM D2556).....22,000 to 60,000 cP.
 - 4. 2` Peel Strength (ASTM D903).....17 lb/in.
 - 5. 3` Flexibility (ASTM D816).....Pass @ -70°F

- F. Roof Deck Insulation Adhesive: Insul-Lock E HR - Dual-component, high rise foam adhesive with 45% rapidly renewable material content as recommended by insulation manufacturer and approved by FM indicated ratings.
 - 1. Tensile Strength (ASTM D412).....250 psi
 - 2. Density (ASTM D1875).....8.5 lbs./gal.
 - 3. Viscosity (ASTM D2556).....22,000 to 60,000 cP.
 - 4. 2` Peel Strength (ASTM D903).....17 lb/in.
 - 5. 3` Flexibility (ASTM D816).....Pass @ -70°F

- G. Fasteners: Corrosion resistant screw fastener as recommended by roof membrane manufacturer.
 - 1. Factory Mutual Tested and Approved with three (3) inches coated disc for I-90 rating, length required to penetrate metal deck one inch.

PART 3 – EXECUTION

3.1 EXECUTION, GENERAL

- A. Comply with requirements of Division 01 Section “Common Execution Requirements.”

3.2 INSPECTOR OF SURFACES

- A. Roofing contractor shall be responsible for preparing an adequate substrate to receive insulation.
 - 1. Verify that work which penetrates roof deck has been completed.
 - 2. Verify that wood nailers are properly and securely installed.
 - 3. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness.
 - 4. Do not proceed until defects are corrected.
 - 5. Do not apply insulation until substrate is sufficiently dry.
 - 6. Broom clean substrate immediately prior to application.
 - 7. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.
 - 8. Verify that temporary roof has been completed.

3.3 INSTALLATION

- A. Attachment with Bitumen on Concrete Deck
 - 1. Over the entire deck surface, prime concrete surfaces with asphalt primer at the rate of 1 (one) gallon per one hundred (100) square feet.
 - 2. Embed one layer of rigid insulation board in solid moppings of hot asphalt at the rate and temperature recommended by insulation manufacturer. Stagger end joints of boards so all open joints will be eliminated. Walk in each piece of insulation and leave boards completely adhered to deck. Each insulation

board shall be butt firmly against adjoining panels. All open joints shall be eliminated.

3. Embed second layer of insulation board in solid moppings of hot asphalt after first layer has been attached as recommended by insulation manufacturer. Stagger end joints of boards so all open joints will be eliminated. Walk in each piece of insulation and leave boards completely adhered to base felt or deck. Each insulation board shall be butt firmly against adjoining panels. All open joints shall be eliminated.
4. Approved insulation shall be tapered around roof drains and scuppers. Tapered insulation sump shall start with a thickness of one-half at drain bowl to the specified dimension of three feet from the center line of the drain. Install tapered insulation sump in such a way to provide proper slope for runoff. Shape insulation with tool as required so completed surface is smooth and flush with ring of drain. Under no circumstances will the membrane be left unsupported in an area greater than one quarter (1/4) inch. Install recovery board over tapered insulation sump as required.
5. Approved recovery board one quarter (1/4) inch thickness shall be installed over base tapered insulation using hot asphalt at the rate of approximately thirty three (33) pounds per square.
6. All boards shall be cut and fitted where the roof deck intersects a vertical surface. The boards shall be cut to fit a minimum of one quarter (1/4) inch away from the vertical surface.
7. Install no more insulation at one time than can be roofed on the same day.
8. Install temporary water cut-offs at completion of each day's work and remove upon resumption of work.
9. Cant Strips/Tapered Edge Strips: Install preformed forty five (45) degree cant strip at junctures of vertical surfaces. Provide preformed, tapered edge strips at perimeter of edges of roof that do not terminate at vertical surfaces and/or indicated on the drawings.
10. Tape joints of insulation as per manufacturer's requirements.

B. Attachment with Mechanical Fasteners

1. Approved insulation board shall be fully attached to the deck with an approved mechanical fastening system. As a minimum, the amount of fasteners shall be in accordance with manufacturer's recommendation for FM I-90 system. Otherwise, a minimum of one fastener per two square feet shall be installed.
2. Filler pieces of insulation require at least two fasteners per piece if size of insulation is less than four square feet.
3. Spacing pattern of fasteners shall be as per manufacturer's recommendations to meet the FM requirements. Placement of any fastener from edge of insulation board shall be a minimum of three inches, and a maximum of six (6) inches.
4. Minimum penetration into deck shall be as recommended by the fastener manufacturer. There is a one (1) inch minimum for metal, wood and structural concrete decks where not specified by the manufacturer. For gypsum and cement-wood fiber decks, penetration shall be determined from pull-out test results with a minimum penetration of one and one-half (1 ½) inches.
5. Gypsum and cementitious wood fiber decks: Where the roof deck is visible from the building interior, the contractor shall ensure no penetration of fasteners through underside of the deck. Any holes or spalling caused by fastener installation shall be repaired by the roofing contractor. Where the new roof system thickness exceeds an amount so that a minimum of 1 ½ of penetration cannot be achieved with an Olympic TB Fastener, or approved equivalent, then (and only then) toggle bolts may be used to secure installation to the deck.

6. Tape joints of insulation as per manufacturer's requirements.
- C. Attachment with Insulation Adhesive.
1. Ensure all surfaces are clean, dry, free of dirt, debris, oils, loose ore embedded gravel, unadhered coatings, deteriorated membrane and other contaminants that may inhibit adhesion.
 2. Apply insulation adhesive directly to the substrate using a ribbon pattern with one quarter to one half (1/4-1/2) inch wide beads 12 inches o.c., using either the manual applicator or an automatic applicator, at a rate of one (1) gallon per one hundred (150) square feet per cartridge.
 3. Immediately place insulation boards into wet adhesive. Do not slide boards into place. Do not allow the adhesive to skin over before installing insulation boards.
 4. Briefly step each board into place to ensure contact with the adhesive. Substrates with irregular surfaces may prevent the insulation board from making positive contact with the adhesive. Relief cuts or temporary weights may be required to ensure proper contact.
 5. All boards shall be cut and fitted where the roof deck intersects a vertical surface. The boards shall be cut to fit a minimum of one quarter (1/4) inch away from the vertical surface.
 6. Tape joints of insulation as per manufacturer's requirements.
- 3.4 CLEANING
- A. Remove debris and cartons from roof deck. Leave insulation clean and dry, ready to receive roofing membrane.

3.5 CONSTRUCTION WASTE MANAGEMENT

- A. Remove and properly dispose of waste products generated during installation. Comply with requirements of authorities having jurisdiction.

END OF SECTION

SECTION 07 31 13
PREMIUM SYNTHETIC ROOFING SHINGLES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Roof shingles and accessories including the following:
 - 1. Synthetic roofing shingles.
 - 2. Hip and ridge shingles.
 - 3. Starter shingles.
 - 4. Self-adhering ice and water barrier.
 - 5. Attic ventilation.
 - 6. Fasteners.

1.2 RELATED SECTIONS

- A. Section 07 62 00 – Sheet Metal Flashing and Trim

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D228 - Standard Test Method for Sampling, Testing, and Analysis of Asphalt Roll Roofing, Cap Sheets, and Shingles Used in Roofing and Waterproofing.
 - 2. ASTM D3018 - Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules.
 - 3. ASTM D3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).
 - 4. ASTM D3462 - Standard Specification for Asphalt Shingles Made from Glass felt and Surfaced with Mineral Granules
 - 5. ASTM D7158 - Standard Test Method for Wind Resistance of Sealed Asphalt Shingles (Uplift Force/Uplift Resistance Method).
 - 6. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings.
 - 7. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- B. Canadian Standards Association (CSA): CSA A123.5 - Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules. Note: Applicable only to products sold for use in Canada.
- C. International Code Council (ICC):
 - 1. International Residential Code (IRC).
 - 2. International Building Code (IBC).
- D. International Code Council Evaluation Service (ICC-ES)
 - 1. ICC-ES Evaluation Reports.
 - 2. ICC-ES Acceptance Criteria.
- E. Underwriters Laboratories (UL):
 - 1. UL 790 - Standard Test Methods for Fire Test of Roof Coverings.

1.4 SUBMITTALS

- A. Submit printed copies of product data sheets indicating product characteristics, product information, installation instructions (including required preparation and installation procedures) and product limitations and color samples.
- B. Verification Samples: For each product and finish specified, two samples representing actual products and colors.

1.5 PRE-INSTALLATION MEETING

- A. Conduct a pre-installation meeting at the site prior to commencing work in this section. Require attendance of entities directly concerned with roof installation. Topics to be discussed:
 - 1. Safety procedures.
 - 2. Installation procedures/method (including substrate preparation), sequencing of materials, and coordination with installation of other/adjacent work.
 - 3. Roofing material availability, storage and handling.
 - 4. Additional roof covering and roof accessory materials.
 - 5. Through roof penetrations and other roof details.
 - 6. All other items related to successful execution/completion of work.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Installer shall be licensed or otherwise authorized by all federal, state and local authorities to install all products specified in this section. Installer shall follow manufacturer published installation instructions.
 - 1. Installer shall be a Preferred Contractor as defined and certified by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's unopened bundles with labels intact and legible.
- B. Store all products in manufacturer's unopened, labeled packaging until they are ready for installation.
- C. Store all products in accordance with manufacturer recommendations.
- D. Do not install underlayment or shingles on wet surfaces.
- E. Store and dispose of solvent-based materials in accordance with all federal, state and local regulations.
- F. For rooftop loading, lay shingle bundles flat. Do not bend over the ridge.

1.8 PROJECT CONDITIONS

- A. Do not install systems under environmental conditions outside manufacturer recommended limits. Proceed with work only when existing and forecasted weather

conditions will permit work to be performed within manufacturer recommended limits.

1.9 WARRANTY

- A. Standard Limited Warranty: Provide to the Owner information required for standard prorated warranty coverage for materials in the event of a material defect. Refer to actual warranty for complete details, limitations and requirements.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. F-Wave or Owner Approved Equal

2.2 ASPHALT SHINGLES

- A. F-Wave Revia Estate Series

2.3 HIP AND RIDGE SHINGLES

- A. F-Wave Revia Estate Series

2.4 STARTER SHINGLES

- A. F-Wave Revia Estate Series

2.5 SELF-ADHERING UNDERLAYMENTS

- A. Roof Deck Protection & Leak Barrier:
 - 1. Self-adhering high temperature underlayment with non-slip, cross-laminated polymer film laminated to a rubberized asphalt adhesive. Each roll contains approximately 200 sf, 36 inches by 67 feet, 45 mils. R-Mer Seal by The Garland Company, Inc.

2.6 ROOF VENTILATION

- A. VentSure® Rigid Roll Ridge Vent with Weather PROtector® Moisture Barrier.
 - 1. Shingle-over, low profile ridge vents with Weather PROtector® Moisture Barrier allows the passage of hot and/or moisture-laden air from attics, while prohibiting snow infiltration.
 - 2. Provides 12.5 sq in (8200 sq mm) NFVA per lineal foot.
 - 3. Available in 20 ft (6.1 m) rolls in three different widths (regional availability): 7 in (178 mm), 9 in (229 mm), and 11-1/4 in (286 mm).
 - 4. Suitable on roofs with a pitch from 2:12 to 20:12.
 - 5. Standards/Qualifications: ICC-ESR 2664, Passes Wind-Driven Rain with 8.8 in (224 mm) of rain/hr at 110 mph (177 km/h), and Snow Infiltration at 35 mph (56 km/h) and 70 mph (112 km/h) Tests, UL ER21292-01, Florida Product Approval, and Miami-Dade County Product Approval.
- B. VentSure® InFlow® Vent

1. Shingle-over, polypropylene intake vent solution for soffit-less and open-rafter homes, and homes with inadequate intake. Designed to work with exhaust ventilation to help achieve a balanced air ventilation system.
2. Patent-pending bottom intake design helps protect against wind-driven rain.
3. 4 ft (2.4 m) strip provides 10 sq in (6500 sq mm) NFVA per lineal foot, or 40 sq in (25800 sq mm) NFVA per vent
4. Weather PROtector® Moisture Barrier provides added protection against wind-driven rain and snow infiltration.
5. Roof Mount Unit dimensions: 48 in (1219 mm) length, 15 in (381 mm) width and 1 in (25 mm) height.
6. Suitable for use on roofs with a pitch from 4:12 to 16:12.
7. Standards/Qualifications: Passes Wind-Driven Rain with 8.8 in (224 mm) of rain/hr at 110 mph (177 km/h); ICC-ES AC132; TDI listed for usage in Texas Coastal Regions (RV-82) and Florida Product Approval.

2.7 FASTENERS

- A. Fasteners: Galvanized steel, stainless steel, or aluminum nails complying with ASTM F1667, minimum 12-gauge, 0.0808 in (2.05 mm) shank with 3/8 in (9.5 mm) diameter head. Check local building code requirements.

2.8 METAL FLASHING

- A. Flashing: Provide flashing as specified by Section 07 62 00 – Sheet Metal Flashing and Trim.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Prior to starting work, examine all roof decks on which work will be applied for defects in materials and workmanship.
- B. Do not begin installation until the roof deck has been properly prepared.
- C. If another installer is responsible for roof deck preparation, notify the architect, designer-of-record on the project, or building owner of unsatisfactory preparation prior to proceeding with installation. Commencement of installation constitutes acceptance of conditions.
- D. Underlayment and shingles installed directly over roof insulation or similar type decks is not approved.
 1. Roof deck must be dry, minimum 3/4 in (19 mm) thick, minimum 6 in (152 mm) wide boards with maximum 1/4 in (6.4 mm) spaces, or APA rated sheathing (exposure 1); minimum 3/8 in (9.5 mm) plywood, minimum 7/16 in (11.1 mm) oriented strand board. Consult your manufacturer for other approved constructions.
 2. Ventilation under the roof deck must meet local code requirements.

3.2 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- B. Remove all existing roofing down to the roof deck.
- C. Verify that the deck is dry, structurally sound, clean and smooth. It shall be free of any depressions, waves, and projections. Cover ALL holes 1 in (25 mm) or less in diameter, cracks over 1/2 in (13 mm) in width, loose knots and excessively resinous areas with minimum 28 gauge; 0.0187 in (0.475 mm) galvanized steel, 0.0156 in (0.396 mm) stainless steel, or 0.0126 in (0.320 mm) aluminum sheet metal. Decking or deck boards with holes greater than 1 in (25 mm) in diameter shall be replaced.
- D. Replace damaged deck with new materials.
- E. Verify installed roof deck is acceptable to receive shingles. Acceptable roof decks include the following:
 - 1. Wood boards: 6 in (152 mm) minimum width, 3/4 in (19 mm) minimum thickness.
 - 2. Plywood sheathing: 1/2 in (9.5 mm) minimum thickness Exposure 1 grade plywood sheathing as recommended by APA and in compliance with local building code requirements.
 - 3. OSB panels: 7/16 in (11.1 mm) minimum thickness non-veneer structural panels as recommended by APA and in compliance with local building code requirements.
 - 4. Spacing between boards or panels shall not exceed 1/4 in (6.4 mm) between roof boards or 1/8 in (3.2 mm) between plywood or OSB sheathing panels.

3.3 UNDERLAYMENT INSTALLATION

- A. Install underlayments using manufacturer installation instructions and in accordance with local building code requirements. When local codes and installation instructions are in conflict, the local building code requirements shall take precedence.
 - 1. Install self-adhering ice and water barrier over the entire roof surface. Lap ends 6 in (152 mm) on roof decks sloped 5:12 and greater.
- B. Drip Edge
 - 1. Drip edge shall be installed on all roof edges.
 - 2. Install drip edge on eaves first with underlayment installed over the drip edge, or install per local code requirements.
 - 3. Install drip edge on rakes after underlayment is installed, with the drip edge fastened over the underlayment.
 - 4. Joints in drip edge shall be lapped minimum 2 in (51 mm) with the upslope piece lapped over the down slope piece, or per local building code requirements
 - 5. Install fasteners 8 in to 10 in (203 mm to 254 mm) on center, approximately 1-3/4 in (44 mm) to 3 in (76 mm) from the outside edge of the drip edge, or per local building code requirements.
- C. Valleys
 - 1. Where valleys are indicated to be "open valleys", install metal flashing over self-adhering ice and water barrier before roof deck underlayment is installed;

DO NOT nail through the flashing. Secure the flashing by nailing at 18 in (457 mm) on center just beyond edge of flashing so that nail heads hold down the edge, or use valley metal with a formed edge and secure with clips.

- D. Penetrations
 - 1. Vent pipes: Install a 24 in (610 mm) square piece of self-adhering ice and water barrier lapping over roof deck underlayment; seal tightly to pipe.
 - 2. Vertical walls: Install self-adhering ice and water barrier extending at least 3 in to 4 in (76 mm to 102 mm) up the wall and 12 in (305 mm) onto the roof surface. Lap the membrane over the roof deck underlayment.
 - 3. Chimneys: Install self-adhering ice and water barrier around entire chimney extending at least 6 in (152 mm) up the wall and 12 in (305 mm) on to the roof surface. Lap the membrane over the roof deck underlayment.

3.4 SHINGLE INSTALLATION

- A. Install shingles (including started shingles as well as hip and ridge shingles) in accordance with manufacturer installation instructions and in accordance with local building code requirements.
- B. Install starter course at lowest roof edge and along rake with edge of shingles extending 1/4 in (6.4 mm) over edge of roof. Sealant strip should be closest to roof edge.
- C. Install first and successive courses of shingles stepping diagonally up and across roof deck with manufacturer recommended offset at each succeeding course. Maintain uniform exposure of shingles at each succeeding course. Use of a chalk line every other course is recommended.
- D. Fasten shingles to deck with number of roofing nails per shingle and type of nails specified, or in accordance specified by local Authority Having Jurisdiction.
- E. All fasteners must be driven flush with the shingle surface and penetrate at least 3/4 in (19.1 mm) into the wood deck. Where the deck is less than 3/4 in (19.1 mm) thick, the fastener should be long enough to penetrate fully and extend through the roof sheathing.

3.5 VENT INSTALLATION

- A. Install vents in accordance with manufacturer installation instructions and local building code requirements.
- B. Ventilation at minimum must meet or exceed local building code requirements. Manufacturer recommends:
 - 1. Net Free Ventilating Area (NFVA) of 1:150 as a minimum.
 - 2. Balanced approach for most effective ventilation (balance between the lower and upper parts of the roof by providing 50% of NFVA at the soffit and 50% at the ridge).
 - 3. NFVA at the upper part of the roof should not exceed 50%.
 - 4. Where length of the roof ridge is sufficient provide continuous ridge vents for most effective ventilation approach.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

**SECTION 07 52 00
MODIFIED BITUMINOUS MEMBRANE ROOFING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hot Applied 2-Ply Asphalt Roofing (StressPly, OptiMax, or Versiply). (2.9) (3.5)
- B. Accessories. (2.19)
- C. Edge Treatment and Roof Penetration Flashings. (2.20)(3.9)

1.2 REFERENCES

- A. ASTM D 2178 Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
- B. ASTM D 2824 Standard Specification for Aluminum-Pigmented Asphalt Roof Coating.
- C. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- D. ASTM D 4601 Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.
- E. ASTM D 5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.
- F. ASTM D 6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
- G. ASTM D 6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
- H. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- I. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings
- J. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- K. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- L. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.
- M. ASCE 7, Minimum Design Loads for Buildings and Other Structures
- N. UL - Fire Resistance Directory.
- O. FM Approvals - Roof Coverings and/or RoofNav assembly database.

1.3 DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform work in accordance with all federal, state and local codes.

- B. Exterior Fire Test Exposure: Roof system shall achieve a UL, FM or WH Class rating for roof slopes indicated on the Drawings as follows:
 - 1. Factory Mutual Class A Rating.
 - 2. Underwriters Laboratory Class A Rating.
- C. Roof System membranes containing recycled or bio-based materials shall be third party certified through UL Environment.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.
- C. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor barrier, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane, prior to job start.
- D. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins.
- E. Recycled or Bio-Based Materials: Provide third party certification through UL Environment of roof System membranes containing recycled or bio based materials.
- F. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- G. Manufacturer's Certificates: Provide to certify products meet or exceed specified requirements.
- H. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147. Testing must be performed at 77 deg. F. Tests at 0 deg. F will not be considered.
- I. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.

- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.6 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to commencing Work of this section.
- B. Review installation procedures and coordination required with related Work.
- C. Inspect and make notes of job conditions prior to installation:
 - 1. Record minutes of the conference and provide copies to all parties present.
 - 2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
 - 3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.8 COORDINATION

- A. Coordinate Work with installing associated metal flashings as work of this section proceeds.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. ASD. Toll Free: 800-321-9336. Phone: 216-641-7500. Fax: 216-641-0633. Web Site: www.garlandco.com.
- B. The Products specified are intended and the Standard of Quality for the products required for this project. If other products are proposed the bidder must disclose in the bid the manufacturer and the products that they intend to use on the Project. If no manufacturer and products are listed, the bid may be accepted only with the use of products specified.
 - 1. Bidder will not be allowed to change materials after the bid opening date.
 - 2. If alternate products are included in the bid, the products must be equal to or exceed the products specified. Supporting technical data shall be submitted to the Architect/ Owner for approval prior to acceptance.
 - 3. In making a request for substitution, the Bidder/Roofing Contractor represents that it has:
 - a. Personally investigated the proposed product or method, and determined that it is equal or superior in all respects to that specified.
 - b. Will provide the same guarantee for substitution as for the product and method specified.
 - c. Will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
 - d. Will waive all claims for additional cost related to substitution, which consequently become apparent.
 - e. Cost data is complete and includes all related cost under his/her contract or other contracts, which may be affected by the substitution.
 - f. Will reimburse the Owner for all redesign cost by the Architect for accommodation of the substitution.
 - 4. Architect/ Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed alternate roofing systems or materials that has met ALL specified requirement criteria.
 - 5. Failure to submit substitution package, or any portion thereof requested, will result in immediate disqualification and consideration for that particular contractors request for manufacturer substitution.

2.2 HOT APPLIED 2-PLY ASPHALT ROOFING - STRESSPLY, OPTIMAX, OR VERSIPLY

- A. Base (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
 - 1. FlexBase 80:
- B. Modified Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive.
 - 1. VersiPly Mineral:
- C. Interply Adhesive: (1 and 2)
 - 1. Generic Type III Asphalt:
- D. Flashing Base Ply: One ply bonded to the prepared substrate with Interply Adhesive: except torch sheet.
 - 1. FlexBase 80:
- E. Flashing Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:

except torch sheet.

1. VersiPly Mineral:

F. Surfacing:

1. Surface Coatings
 - a. Garla-Brite:

2.3 ACCESSORIES:

- A. Roof Insulation: In accordance with Section 07 22 16 - Roof Board Insulation.
- B. Roof Insulation: Provide G-P Gypsum DenDeck Prime, G-P Gypsum DenDeck DuraGuard, USG Securock for proper adhesion of the self-adhered base sheet in accordance with Section 07 22 16 - Roof Board Insulation.

2.4 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

- A. Flashing Boot - Rubbertite Flashing Boot: Neoprene pipe boot for sealing single or multiple pipe penetrations adhered in approved adhesives as recommended and furnished by the membrane manufacturer.
- B. Vents and Breathers: Heavy gauge aluminum and fully insulated vent that allows moisture and air to escape but not enter the roof system as recommended and furnished by the membrane manufacturer.
- C. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design.
- D. Drain Flashings should be 4lb (1.8kg) sheet lead formed and rolled.
- E. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled.
- F. Liquid Flashing - Tuff-Flash: An asphaltic-polyurethane, low odor, liquid flashing material designed for specialized details unable to be waterproofed with typical modified membrane flashings.
 1. Tensile Strength, ASTM D 412: 400 psi
 2. Elongation, ASTM D 412: 300%
 3. Density @77 deg. F 8.5 lb/gal typical
- G. Fabricated Flashings: Fabricated flashings and trim are specified in Section 07 62 00 - Sheet Metal Flashing and Trim.
 1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the CDA Copper Development Association "Copper in Architecture - Handbook" as applicable.
- H. Manufactured Roof Specialties: Shop fabricated copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are specified in Section 07 71 23 - Manufactured Gutters and Downspouts.
 1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the NRCA "Roofing and Waterproofing Manual" as applicable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.

- B. Inspect and approve the deck condition, slopes and fastener backing if applicable, parapet walls, expansion joints, roof drains, stack vents, vent outlets, nailers and surfaces and elements.
- C. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- D. If substrate preparation and other conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. General: Clean surfaces thoroughly prior to installation.
 - 1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - 2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.
 - 3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.
 - 4. Wherever necessary, all surfaces to receive roofing materials shall be power broom and vacuumed to remove debris and loose matter prior to starting work.
 - 5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
 - 6. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.
- B. Precast concrete:
 - 1. Decks shall be clean, dry, fully cured and free of flaws and attached securely to the supporting structure as recommended by the deck manufacturer.
 - 2. All joints shall be caulked or grouted.
 - 3. Concrete surfaces to receive roofing shall be fully primed at the rate of 1 gallon per 100 sq. ft.
 - 4. When applying roofing or insulation directly to the deck with asphalt, prime with asphalt/concrete primer, ASTM D41, at a rate of 1 gal/square (.4 L/m²) and allow the primer to dry prior to the application of the roofing system. Hold back bitumen at the joints approximately 4 inches (102 mm) to prevent bitumen drippage.
 - 5. Deck joints shall be stripped in with a 12 inch (305 mm) wide strip of modified membrane unadhered a minimum of 2 inches (51 mm) immediately on either side of the joint.

3.3 INSTALLATION - GENERAL

- A. Install modified bitumen membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual, the Asphalt Roofing Manufacturers Association, and applicable codes.
- B. General: Avoid installation of modified bitumen membranes at temperatures lower than 40-45 degrees F. When work at such temperatures unavoidable use the following precautions:
 - 1. Take extra care during cold weather installation and when ambient temperatures are affected by wind or humidity, to ensure adequate bonding is achieved between the surfaces to be joined. Use extra care at material seam welds and where adhesion of the applied product to the appropriately prepared substrate as the substrate can be affected by such temperature constraints as well.
 - 2. Unrolling of cold materials, under low ambient conditions must be avoided to prevent the likelihood of unnecessary stress cracking. Rolls must be at least 40 degrees F at the time of application. If the membrane roll becomes stiff or difficult to install, it must

be replaced with roll from a heated storage area.

- C. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water
- D. All slopes greater than 2:12 require back-nailing to prevent slippage of the ply sheets. Use ring or spiral-shank 1 inch cap nails, or screws and plates at a rate of 1 fastener per ply (including the membrane) at each insulation stop. Place insulation stops at 16 ft o.c. for slopes less than 3:12 and 4 feet o.c. for slopes greater than 3:12. On non-insulated systems, nail each ply directly into the deck at the rate specified above. When slope exceeds 2:12, install all plies parallel to the slope (strapping) to facilitate backnailing. Install 4 additional fasteners at the upper edge of the membrane when strapping the plies.

3.4 INSTALLATION HOT APPLIED ROOF SYSTEM

- A. Base/Felt Ply(s): Install base sheet or felt plies in twenty five (25) lbs (11.3kg) per square of bitumen shingled uniformly to achieve one or more plies over the entire prepared substrate. Shingle in direction of slope of roof to shed water on each area of roof. Do not step on base rolls until asphalt has cooled, fish mouths should be cut and patched.
 - 1. Lap ply sheet ends 8 inches (203 mm). Stagger end laps 2 inches (304mm) minimum.
 - 2. Install base flashing ply to all perimeter and projection details after membrane application.
 - 3. Extend plies 2 inches beyond top edges of cants at wall and projection bases.
 - 4. Install base flashing ply to all perimeter and projection details.
 - 5. Allow the one ply of base sheet to cure at least 30 minutes before installing the modified membrane. However, the modified membrane must be installed the same day as the base plies.
- B. Modified Cap Ply(s): Solidly bond the modified membrane to the base layers with specified material at the rate of 25 to thirty 30 lbs. (11-13kg) per 100 square feet.
 - 1. Roll must push a puddle of hot material in front of it with material slightly visible at all side laps. Use care to eliminate air entrapment under the membrane. Exercise care during application to eliminate air entrapment under the membrane.
 - 2. Apply pressure to all seams to ensure that the laps are solidly bonded to substrate.
 - 3. Install subsequent rolls of modified membrane as above with a minimum of 4 inch (101 mm) side laps and 8 inch (203 mm) end laps. Stagger end laps. Apply membrane in the same direction as the previous layers but stagger the laps so they do not coincide with the laps of the base layers.
 - 4. Apply hot material no more than 5 feet (1.5 m) ahead of each roll being embedded.
 - 5. Extend membrane 2 inches (50 mm) beyond top edge of all cants in full moppings of the specified hot material.
- C. Fibrous Cant Strips: Provide non-combustible perlite or glass fiber cant strips at all wall/curb detail treatments where angle changes are greater than 45 degrees. Cant may be set in approved cold adhesives, hot asphalt or mechanically attached with approved plates and fasteners.
- D. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips as specified in Section 06 11 00 - Wood Framing.
 - 1. Provide nailers at all roof perimeters and penetrations for fastening membrane flashings and sheet metal components.
 - 2. Wood nailers should match the height of any insulation, providing a smooth and even transition between flashing and insulation areas.
 - 3. Nailer lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
 - 4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss

Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.

- E. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings as specified in Section 07 62 00 - Sheet Metal Flashing and Trim or Section 07 71 23 - Manufactured Gutters and Downspouts. Install in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.
- F. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches (203 mm) o/c to achieve constant compression. Provide suitable, sealant at the top edge if required.
- G. Flashing Base Ply: Install flashing sheets by the same application method used for the base ply.
 - 1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 - 2. Prepare all walls, penetrations, expansion joints and surfaces to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 - 3. Adhere to the underlying base flashing ply with specified hot material unless otherwise noted in these specifications. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
 - 4. Solidly adhere the entire sheet of flashing membrane to the substrate.
 - 5. Seal all vertical laps of flashing membrane with a three-course application of trowel-grade mastic and mesh.
 - 6. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work as specified.
 - 7. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.
- H. Flashing Cap Ply: Install flashing cap sheets by the same application method used for the cap ply.
 - 1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 - 2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 - 3. Adhere to the underlying base flashing ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
 - 4. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
 - 5. Coordinate roof accessories, miscellaneous sheet metal accessory items with the roofing system work.
 - 6. All stripping shall be installed prior to flashing cap sheet installation.
 - 7. Heat and scrape granules when welding or adhering at cut areas and seams to granular surfaces at all flashings.
 - 8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.
- I. Surface Coatings: Apply roof coatings in strict conformance with the manufacturer's recommended procedures.
- J. Roof Walkways: Provide walkways in areas indicated on the Drawings.

3.5 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

- A. Surface Mounted Counterflashing/Coping Cap:
1. Minimum flashing height is 8 inches (203 mm) above finished roof height. Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 3. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to field of roof.
 4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all seams and allow to cure and aluminize.
 5. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall. Alternatively use caulk to replace the butyl tape.
 6. Secure counterflashing set on butyl tape above flashing. Fasten 8 inches (203 mm) o.c. and caulk top of counterflashing.
 7. Attach tapered board to top of wall (minimum slope 1/4 -12). Do not use organic fiberboard or perlite.
 8. Cover tapered board and all exposed wood with base flashing ply. Fasten inside and out at 8 inches (203 mm) o.c.
 9. Install continuous cleat and fasten at 6 inches (152 mm) o.c. to outside wall.
 10. Install new metal coping cap hooked to continuous cleat.
 11. Fasten inside of cap 24 inch (609 mm) o.c. with approved fasteners and neoprene washers.
- B. Surface Mounted Counterflashing:
1. Minimum flashing height is 8 inches (203 mm) above finished roof height. Maximum flashing height is 24 inches (609 mm). Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 3. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to field of the roof.
 4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
 5. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall. Alternatively use caulk to replace the butyl tape.
 6. Secure counterflashing set on butyl tape above flashing at 8 inches (203 mm) o.c. and caulk top of counterflashing.
- C. Expansion Joint:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Chamfer top of curb. Prime vertical curb at a rate of 100 square feet per gallon and allow to dry.
 2. Mechanically attach wood cant to expansion joint nailers. Run all field plies over cant a minimum of 2 inches (50 mm).
 3. Install compressible insulation in neoprene cradle.
 4. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
 5. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Attach top of membrane to top of curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
 6. Install pre-manufactured expansion joint cover. Fasten sides at 12 inches (609 mm) o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.
- D. Curb Detail/Air Handling Station:

1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 3. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
 4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
 5. Install pre-manufactured counterflashing with fasteners and neoprene washers or per manufacturer's recommendations.
 6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
- E. Skylight:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 3. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
 4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Attach top of membrane to top of wood nailer and apply a three-course application of mastic and mesh. Allow to cure and aluminize.
 5. Install pre-manufactured lens and fasten flashing sides at 8 inches (203 mm) o.c. with fasteners and neoprene washers.
- F. Exhaust Fan:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all plies over cant a minimum of 2 inches (50 mm).
 3. Install base flashing ply covering curb with 6 inches (152 mm) on to field of the roof.
 4. Install a second ply of modified flashing ply installed over the base flashing ply, 9 inches (228 mm) on to field of the roof. Attach top of membrane to top of wood curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
 5. Install metal exhaust fan over the wood nailers and flashing to act as counterflashing. Fasten per manufacturer's recommendation.
- G. Roof Drain:
1. Plug drain to prevent debris from entering plumbing.
 2. Taper insulation to drain minimum of 24 inches (609 mm) from center of drain.
 3. Run roof system plies over drain. Cut out plies inside drain bowl.
 4. Set lead/copper flashing (30 inch square minimum) in 1/4 inch bed of mastic. Run lead/copper into drain a minimum of 2 inches (50 mm). Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.
 5. Install base flashing ply (40 inch square minimum) in bitumen.
 6. Install modified membrane (48 inch square minimum) in bitumen.
 7. Install clamping ring and assure that all plies are under the clamping ring.
 8. Remove drain plug and install strainer.
- H. Plumbing Stack:
1. Minimum stack height is 12 inches (609 mm).
 2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
 3. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch (6 mm) bed of roof cement.
 4. Install base flashing ply in bitumen.

5. Install membrane in bitumen.
6. Caulk the intersection of the membrane with elastomeric sealant.
7. Turn sleeve a minimum of 1 inch (25 mm) down inside of stack.

I. Pitch Pocket:

1. Run all plies up to the penetration.
2. Place the pitch pocket over the penetration and prime all flanges.
3. Strip in flange of pitch pocket with one ply of base flashing ply. Extend 6 inches (152 mm) onto field of roof.
4. Install second layer of modified membrane extending 9 inches (228 mm) onto field of the roof.
5. Fill pitch pocket half full with non-shrink grout. Let this cure and top off with pourable sealant.
6. Caulk joint between roof system and pitch pocket with roof cement.

3.6 CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Remove asphalt markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.7 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.
- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.
- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

3.8 FIELD QUALITY CONTROL

- A. Inspection: Provide manufacturer's field observations at start-up and at intervals of approximately 30 percent, 60 percent and 90 percent completion. Provide a final inspection upon completion of the Work.
 1. Warranty shall be issued upon manufacturer's acceptance of the installation.
 2. Field observations shall be performed by a Sales Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
 3. Provide observation reports from the Sales Representative indicating procedures followed, weather conditions and any discrepancies found during inspection.
 4. Provide a final report from the Sales Representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.

3.9 SCHEDULES

- A. Base (Ply) Sheet:

1. FlexBase 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a dual fiberglass reinforced scrim, performance requirements according to ASTM D 5147.
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 225 lbf/in XD 225 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 39.0 kN/m XD 39 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 300 lbf XD 300 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 1335 N XD 1335 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 7% XD 7%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 7% XD 7%
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34.4 deg. C)
- B. Thermoplastic/Modified Cap (Ply) Sheet:
 1. VersiPly Mineral: 145 mil SBS (Styrene-Butadiene-Styrene) mineral surfaced, rubber modified roofing membrane with dual fiberglass reinforced scrim. ASTM D6163, Type III Grade S
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 220 lbf/in XD 220 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 38.5 kN/m XD 38.5 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 300 lbf XD 300 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 1335 N XD 1335 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 4.5% XD 4.5%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 4.5% XD 4.5%
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34 deg. C)
- C. Interply Adhesive:
 1. Generic Type III Asphalt: Hot Bitumen, ASTM D 312, Type III steep asphalt having the following characteristics:
 - a. Softening Point 185 deg. F - 205 deg. F
 - b. Flash Point 500 deg. F
 - c. Penetration @ 77 deg. F 15-35 units
 - d. Ductility @ 77 deg. F 2.5 cm
- D. Flashing Base Ply:
 1. FlexBase 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a dual fiberglass reinforced scrim, performance requirements according to ASTM D 5147.
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 225 lbf/in XD 225 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 39.0 kN/m XD 39 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 300 lbf XD 300 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 1335 N XD 1335 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 7% XD 7%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 7% XD 7%
 - d. Low Temperature Flexibility, ASTM D 5147:
 - 1) Passes -30 deg. F (-34.4 deg. C)
- E. Flashing Ply Adhesive:
 1. Generic Type III Asphalt: Hot Bitumen, ASTM D 312, Type III steep asphalt having the following characteristics:

- a. Softening Point 185 deg. F - 205 deg. F
- b. Flash Point 500 deg. F
- c. Penetration @ 77 deg. F 15-35 units
- d. Ductility @ 77 deg. F 2.5 cm

F. Surfacing:

1. Flashing Cap (Ply) Sheet:

- a. VersiPly Mineral: 145 mil SBS (Styrene-Butadiene-Styrene) mineral surfaced, rubber modified roofing membrane with dual fiberglass reinforced scrim. ASTM D6163, Type III Grade S
 - 1) Tensile Strength, ASTM D 5147
 - a) 2 in./min. @ 73.4 +/- 3.6 deg. F MD 220 lbf/in XD 220 lbf/in
 - b) 50 mm/min. @ 23 +/- 2 deg. C MD 38.5 kN/m XD 38.5 kN/m
 - 2) Tear Strength, ASTM D 5147
 - a) 2 in./min. @ 73.4 +/- 3.6 deg. F MD 300 lbf XD 300 lbf
 - b) 50 mm/min. @ 23 +/- 2 deg. C MD 1335 N XD 1335 N
 - 3) Elongation at Maximum Tensile, ASTM D 5147
 - a) 2 in./min. @ 73.4 +/- 3.6 deg. F MD 4.5% XD 4.5%
 - b) 50 mm/min. @ 23 +/- 2 deg. C MD 4.5% XD 4.5%
 - 4) Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34 deg. C)

2. Surface Coatings:

a. Surfacing:

- 1) Garla-Brite: ASTM D 2824 aluminum coating non-fibered aluminum roof coating non-fibered aluminum roof coating having the following characteristics:
 - a) Flash Point 103 deg. F (39 deg. C) min.
 - b) Weight/Gallon 7.9 lbs./gal. (1.0 g/cm³)

END OF SECTION

SECTION 07 56 30
FLUID APPLIED ROOFING RESTORATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mineral Modified Bitumen Surface Roof Restoration
- B. Accessories
- C. Edge Treatment and Roof Penetration Flashings

1.2 RELATED SECTIONS

1.3 REFERENCES

- A. ASTM C 78 - Standard Test Method for Flexural Strength of Concrete.
- B. ASTM C 92 - Standard Test Methods for Sieve Analysis and Water Content of Refractory Materials.
- C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
- D. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- E. ASTM D 2240 - Standard Test Method for Rubber Property-Durometer Hardness.
- F. SRI - Solar Reflectance Index calculated according to ASTM E 1980.
- G. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual.

1.4 SYSTEM DESCRIPTION

- A. Mineral Modified Bitumen Surface Roof Restoration: Renovation work includes:
 - 1. Surface preparation: Remove dirt, and debris.
 - 2. Fascia Edges: Cut back edges. Prime, coat with mastic, cover with fabric.
 - 3. Parapets and Vertical Surfaces: Cut back and replace fabric base flashings. Prime, coat with mastic, cover with fabric.
 - 4. Metal Flashings: Repair/Replace metal flashings, pitch pockets, etc.
 - 5. Roof Repairs: Repair blisters, stressed or cracked membrane. Cut back, patch with primer/mastic/membrane.
 - 6. Primer: Prime surface of new asphalt only.
 - 7. Full Reinforcement: Apply base coat and Install full fabric reinforcement and topcoat over entire roof surface.
 - 8. Coating: Apply coating over entire roof surface.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
- C. Shop Drawings: Submit shop drawings including installation details of fluid applied roofing and flashing prior to job start.
- D. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, and color.
- E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- F. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with manufacturer's current Application and Installation Guidelines and the NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Manufacturer: Company specializing in manufacturing products specified in this section with documented ISO 9001 certification and minimum twelve years and experience.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.7 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-roofing conference approximately two weeks before scheduled commencement of roofing system installation and associated work.
- B. Require attendance of installers of deck or substrate construction to receive roofing, installers of rooftop units and other work in and around roofing which must precede or follow roofing work including mechanical work, Architect, Owner, roofing system manufacturer's representative.

- C. Objectives include:
1. Review foreseeable methods and procedures related to roofing work, including set up and mobilization areas for stored material and work area.
 2. Tour representative areas of roofing substrates, inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work.
 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
 4. Review roofing system requirements, Drawings, Specifications and other Contract Documents.
 5. Review and finalize schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
 6. Review required inspection, testing, certifying procedures.
 7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
 8. Record conference including decisions and agreements reached. Furnish a copy of records to each party attending.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Storage temperatures should be between 60 degrees F to 80 degrees F (15.6 degrees to 26.7 degrees C). Indoor ventilated storage is recommended. Ensure jobsite storage is in a shaded and ventilated area. Do not store in direct sunlight. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Weather Condition Limitations: Product application must not be done when rain or other conditions such as fog or heavy dew are possible within a 24 hour period. Roof surface must be at least 6 Fahrenheit degrees or 3 Celsius degrees above the dew point and rising.
- C. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.

- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- E. When applying materials with spray equipment, take precautions to prevent over spray and/or solvents from damaging or defacing surrounding walls, building surfaces, vehicles or other property. Care should be taken to do the following:
 - 1. Close air intakes into the building.
 - 2. Have a dry chemical fire extinguisher available at the jobsite.
 - 3. Post and enforce "No Smoking" signs.
- F. Avoid inhaling spray mist; take precautions to ensure adequate ventilation.
- G. Protect completed roof sections from foot traffic for a period of at least 48 hours at 75 degrees F (24 degrees C) and 50 percent relative humidity or until fully cured.
- H. Take precautions to ensure that materials do not freeze.
- I. Minimum temperature for application of White-Knight Plus/ White-Stallion Plus, White-Knight Plus WC and LiquiTec coatings is 50 degrees F (10 degrees C) and rising.

1.10 WARRANTY

- A. Warranty Period: 20 years.
 - 1. Upon completion of the work, provide the Manufacturer's written and signed limited labor and materials Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
 - a. Mineral Modified Bitumen Surface
- B. Warranty Period: Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
 - 1. Warranty Period:
 - a. 2 years from date of acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: The Garland Company
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MINERAL MODIFIED BITUMEN SURFACE ROOF RESTORATION

- A. LiquiTec:
 - 1. Primer: Garla-Block Primer is required only on new asphaltic repair material.
 - 2. Base: LiquiTec Base
 - 3. Coating: LiquiTec.
 - 4. Flashing: LiquiTec.
 - 5. Reinforcement:
 - a. Full Reinforcement: Apply in base coat on the entire roof surface.
 - 1) Reinforcement Materials:

a) Grip Polyester Soft.

2.3 ACCESSORIES:

- A. Roof Insulation: In accordance with Section 07220.
- B. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless steel nails shall be used with aluminum; and stainless steel nails shall be used with stainless steel, Fasteners shall be self-clinching type of penetrating type as recommended by the deck manufacturer. Fasten nails and fasteners flush-driven through flat metal discs not less than 1 inch (25 mm) diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than 1 inch (25 mm) diameter are used.
- C. Urethane Sealant - Tuff-Stuff MS: One part, non-sag sealant as approved and furnished by the membrane manufacturer for moving joints.
 - 1. Tensile Strength, ASTM D 412: 250 psi
 - 2. Elongation, ASTM D 412: 950%
 - 3. Hardness, Shore A ASTM C 920: 35
 - 4. Adhesion-in-Peel, ASTM C 92: 30 pli
- D. Butyl Tape: 100% solids, asbestos free and compressive tape designed to seal as recommended and furnished by the membrane manufacturer.
- E. Pitch Pocket Sealer - Universal Pitch-Pocket Sealer: Two-part, 100% solids, self-leveling, polyurethane sealant.

2.4 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

- A. Flashing Boot - Rubbertite Flashing Boot: Neoprene pipe boot for sealing single or multiple pipe penetrations adhered in approved adhesives as recommended and furnished by the membrane manufacturer.
- B. Vents and Breathers: Heavy gauge aluminum and fully insulated vent that allows moisture and air to escape but not enter the roof system as recommended and furnished by the membrane manufacturer.
- C. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design.
- D. Drain Flashing should be 4lb (1.8kg) sheet lead formed and rolled.
- E. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled.
- F. Fabricated Flashing: Fabricated flashings and trim are specified in Section 07620.
 - 1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the CDA Copper Development Association "Copper in Architecture - Handbook" as applicable.
- G. Manufactured Roof Specialties: Manufactured copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are specified in Section 07710.
 - 1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the NRCA "Roofing and Waterproofing Manual" as applicable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 ROOF PREPARATION AND REPAIR

- A. General: All necessary field and flashing repairs must be done according to good construction practices, including the removal of all wet insulation and defective materials as identified through a moisture detection survey such as an infrared scan and replacement with like-materials.
 - 1. Remove damaged roof flashings from curbs and parapet walls down to the surface of the roof. Remove damaged existing flashings at roof drains and roof penetrations.
 - 2. Remove all wet, deteriorated, blistered or delaminated roofing membrane or insulation and fill in any low spots with like materials occurring as a result of removal work to create a smooth, even surface for application of new roof membranes.
 - 3. Install new wood nailers as necessary to accommodate insulation/recovery board or new nailing patterns.
 - 4. When mechanically attached, the fastening pattern for the insulation/recovery board shall be as recommended by the specific product manufacturer.
 - 5. Existing roof surfaces shall be primed as necessary and allowed to dry prior to installing the roofing system.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Repair all defects such as deteriorated roof decks, saturated materials, loose or brittle membrane or membrane flashings, etc. Verify that existing conditions meet the following requirements :
 - 1. Existing membrane is either fully adhered or that the membranes mechanical fasteners are secured and functional.
 - 2. Application of roofing materials over a brittle, damaged or poor condition roof membrane is not permitted.
- D. Remove all loose dirt and foreign debris from the roof surface. Do not damage roof membrane in cleaning process.
- E. Clean and seal all parapet walls, gutters and coping caps, and repair any damaged metal where necessary. Seal watertight all fasteners, pipes, drains, vents, joints and penetrations where water could enter the building envelope.
- F. Confirm local water run-off ordinances and restrictions prior to cleaning roof. Clean the entire roof surface by removing all dirt, algae, mold, moss, paint, oil, talc, rust or other foreign substance. Use a bio-degradable cleaner like Simple Green Oxy Solve

when necessary and warm water. Scrub heavily soiled areas with a brush. Power wash roof thoroughly with an industrial surface cleaner equipped with one piece balanced spray rotating jets for streak free close contact cleaning. Rinse with fresh water to completely remove all residuals. Allow roof to dry thoroughly before continuing.

- G. Repair existing roof membrane as necessary to provide a sound substrate for the liquid membrane. All surface defects must be repaired/renovated and be made watertight. Any repairs must be with be only with materials compatible with the fluid-applied roofing restoration system.

3.3 INSTALLATION

A. General Installation Requirements:

1. Install in accordance with manufacturer's current Application and Installation Guidelines and the NRCA Roofing and Waterproofing Manual.
2. Adequate coating thickness is essential to performance. If the applicator is unfamiliar in gauging application rates, we suggest that a controllable area be measured and the specified material be applied. In all cases, all minimum specified material must be applied and proper minimum dry film thicknesses must be achieved. Care must be taken to ensure that all areas completed including all flashings, roof penetrations, etc. are coated sufficiently to ensure a watertight seal.
3. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.
4. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.
5. Protect work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore adjacent work damaged by installation of the roofing system.
6. All primers must be top coated within 24 hours of application. Re-prime if more time passes after priming.
7. Keep roofing materials dry during application.
8. Coordinate counter flashing, cap flashings, expansion joints and similar work with work specified in other Sections under Related Work.
9. Coordinate roof accessories and miscellaneous sheet metal accessory items, including piping vents and other devices with work specified in other Sections under Related Work.

B. Mineral Modified Bitumen Surface Roof Restoration: Renovation work includes:

1. Surface preparation: Remove dirt, and debris.
 - a. Previously coated roofs with well-adhered polyurethane or polyurea coating surfacing must be solvent-wiped with acetone after cleaning to reactivate surface for overcoating.
2. Liquid Flashings:
 - a. Fascia Edges: Cut back edges. Prime with Rust-Go Primer, apply Coating, embed fabric reinforcement apply Top Coating.
 - b. Parapets and Vertical Surfaces: Prime, apply Coating, embed fabric reinforcement apply Top Coating
 - c. Metal Flashings: Prime, apply Coating.
3. Primer: Prime roof surfaces at a rate of 0.5 gallons per 100 SF.
4. Full Reinforcement with Base Coat: Install full fabric reinforcement in base coat

on the entire roof surface.

- a. On field surfaces run fabric parallel to the low edge using a shingling method up the slope with minimum 3 inch fabric laps.
 - b. After positioning reinforcement to roll out, apply Coating 40 inches wide to surface where reinforcement ply is to be applied at a rate of 4.0 gallons per 100 SF for mineral modified bitumen
 - c. Do not apply coating too far ahead of fabric so coating does not dry before fabric can be embedded.
 - d. Immediately roll a 40 inch width of reinforcement into wet coating.
 - e. Ensure roller is fully saturated with coating and backroll over the reinforcement surface to fully saturate fabric.
 - f. Use care to lay the fabric tight to the roof surface without air pockets, wrinkles, fishmouths, etc.
 - g. Lap adjacent rolls of reinforcement 3 inches and end laps 3 inches.
 - h. Allow to dry, but no more than 72 hours before applying top coat. If not coated within 72 hours, solvent wipe with acetone, let dry and immediately apply coating.
5. Coating: Apply coating to entire roof surface. Use special attention to coating flashings and other critical areas to build adequate membrane thickness
- a. LiquiTec:
 - 1) Apply Coating at 2.0 gallons per 100 SF over the entire roof surface.

3.4 REPAIR OF EDGE TREATMENT AND ROOF PENETRATION FLASHING

A. General

1. Repair flashing in accordance with the requirements/recommendations of the Membrane manufacturer and as indicated on the manufacturer's standard drawings. Provide system with base flashing, edge flashing, penetration flashing, counter flashing, and all other flashings required for a complete watertight system.
2. Install and repair flashings concurrently with the roofing as the job progresses.
3. Terminate flashings as required by the membrane manufacturer.

B. Manufactured Roof Specialties: Manufactured copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are provided as specified in Section 07710.

1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the National Roofing Contractor's Association "Roofing and Waterproofing Manual" as applicable.

C. Repairs of Existing Roof Penetrations and Flashings

1. Coping Cap:
 - a. Minimum flashing height is 8 inches (203 mm) above finished roof height. Maximum flashing height is 24 inches (609 mm). Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
 - b. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 - c. Install base flashing ply covering entire wall and wrapped over top of wall and down face with 6 inches (152 mm) on to field of the roof and set in cold asphalt. Nail membrane at 8 inches (203 mm) o.c.
 - d. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-

- course application of mastic and mesh at all seams and allow to cure and aluminize.
- e. Install coping cap per manufacturer's recommendations.
2. Surface Mounted Counterflashing/Coping Cap:
- a. Minimum flashing height is 8 inches (203 mm) above finished roof height. Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
- b. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
- c. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to field of roof.
- d. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all seams and allow to cure and aluminize.
- e. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall. Alternatively use caulk to replace the butyl tape.
- f. Secure counterflashing set on butyl tape above flashing. Fasten 8 inches (203 mm) o.c. and caulk top of counterflashing.
- g. Attach tapered board to top of wall (minimum slope 1/4 -12). Do not use organic fiberboard or perlite.
- h. Cover tapered board and all exposed wood with base flashing ply. Fasten inside and out at 8 inches (203 mm) o.c.
- i. Install continuous cleat and fasten at 6 inches (152 mm) o.c. to outside wall.
- j. Install new metal coping cap hooked to continuous cleat.
- k. Fasten inside of cap 24 inch (609 mm) o.c. with approved fasteners and neoprene washers.
3. Surface Mounted Counterflashing:
- a. Minimum flashing height is 8 inches (203 mm) above finished roof height. Maximum flashing height is 24 inches (609 mm). Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
- b. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
- c. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to field of the roof.
- d. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
- e. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall. Alternatively use caulk to replace the butyl tape.
- f. Secure counterflashing set on butyl tape above flashing at 8 inches (203 mm) o.c. and caulk top of counterflashing.
4. Expansion Joint:
- a. Minimum curb height is 8 inches (203 mm) above finished roof height. Chamfer top of curb. Prime vertical curb at a rate of 100 square feet per gallon and allow to dry.
- b. Mechanically attach wood cant to expansion joint nailers. Run all field plies over cant a minimum of 2 inches (50 mm).

- c. Install compressible insulation in neoprene cradle.
 - d. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
 - e. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Attach top of membrane to top of curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
 - f. Install pre-manufactured expansion joint cover. Fasten sides at 12 inches (609 mm) o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.
5. Equipment Support:
- a. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
 - b. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 - c. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
 - d. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Attach top of membrane to top of curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
 - e. Install pre-manufactured cover. Fasten sides at 24 inches (609 mm) o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.
 - f. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
6. Roof Drain:
- a. Plug drain to prevent debris from entering plumbing.
 - b. Taper insulation to drain minimum of 24 inches (609 mm) from center of drain.
 - c. Run roof system plies over drain. Cut out plies inside drain bowl.
 - d. Set lead/copper flashing (30 inch square minimum) in 1/4 inch bed of mastic. Run lead/copper into drain a minimum of 2 inches (50 mm). Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.
 - e. Install base flashing ply (40 inch square minimum) in bitumen.
 - f. Install modified membrane (48 inch square minimum) in bitumen.
 - g. Install clamping ring and assure that all plies are under the clamping ring.
 - h. Remove drain plug and install strainer.
7. Plumbing Stack:
- a. Minimum stack height is 12 inches (609 mm).
 - b. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
 - c. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch (6 mm) bed of roof cement.
 - d. Install base flashing ply in bitumen.
 - e. Install membrane in bitumen.
 - f. Caulk the intersection of the membrane with elastomeric sealant.
 - g. Turn sleeve a minimum of 1 inch (25 mm) down inside of stack.

8. Heat Stack:
 - a. Minimum stack height is 12 inches (609 mm).
 - b. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
 - c. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch (6 mm) bed of roof cement.
 - d. Install base flashing ply in bitumen.
 - e. Install modified membrane in bitumen.
 - f. Caulk the intersection of the membrane with elastomeric sealant.
 - g. Install new collar over cape. Weld collar or install stainless steel draw brand.
 9. Pitch Pocket:
 - a. Run all plies up to the penetration.
 - b. Place the pitch pocket over the penetration and prime all flanges.
 - c. Strip in flange of pitch pocket with one ply of base flashing ply. Extend 6 inches (152 mm) onto field of roof.
 - d. Install second layer of modified membrane extending 9 inches (228 mm) onto field of the roof.
 - e. Fill pitch pocket half full with non-shrink grout. Let this cure and top off with pourable sealant.
 - f. Caulk joint between roof system and pitch pocket with roof cement.
- D. Liquid Flashing:
1. Mask target area on roof membrane with tape.
 2. Clean all non-porous areas with isopropyl alcohol.
 3. Apply 32 wet mil base coat of liquid flashing over masked area.
 4. Embed polyester reinforcement fabric into the base coat of the liquid flashing.
 5. Apply 32 wet mil top coat of the liquid flashing material over the fabric extending 2 inches (51 mm) past the scrim in all directions.

3.5 CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Remove coating markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.6 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.
- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.
- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

3.7 FIELD QUALITY CONTROL

- A. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system.
- B. Perform field inspection and [and testing] as required under provisions of Section 01410.
- C. Correct defects or irregularities discovered during field inspection.

3.8 FINAL INSPECTION

- A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, roofing system manufacturer's representative and others directly concerned with performance of roofing system.
- B. Walk roof surface areas, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. Identify all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. If core cuts verify the presence of damp or wet materials, the installer shall be required to replace the damaged areas at his own expense.
- D. Repair or replace deteriorated or defective work found at time above inspection as required to produce an installation that is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- E. Notify Architect upon completion of corrections.
- F. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

3.9 SCHEDULES

- A. Primers:
 - 1. Garla-Block Primer: copolymer sealant that prevent staining and degradation of surface coatings when installed over smooth or granulated asphalt, coal tar modified bitumen, or smooth asphalt BUR membranes.
 - a. Non-Volatile Solids % by Weight, ASTM 3960: 28-32 %
 - b. Non-Volatile Solids % by Volume, ASTM 3960: 25-28 %
 - c. pH: 8-10
 - d. Wet Film Thickness @ 1 gal./100 sq. ft.: 16 mils (microns 406.4)
 - e. Flash Point PMCC: None
 - f. Drying Time, Touch @ 70 degrees F (21.1 degrees C) /50% R.H.: 1-2 hrs.
 - g. Viscosity @ 77 degrees F (25 degrees C) Brookfield RVT, #4 Spindle; 20 rpm, ASTM 2196: 3000-5000 cPs
 - h. VOC: 30 g/l max
- B. Base:
 - 1. Base Coating: LiquiTec Base: Multi-purpose, 100% solids, two-part, fast-cure, polyurea liquid waterproofing membrane having the following characteristics:
 - a. Elongation, ASTM D 412: 800%
 - b. Tensile Strength, ASTM D 412: 2500 psi

- c. Tear Resistance, ASTM D 624: 449 lbs./in
 - d. Low Temperature Flexibility, ASTM D 522: -60 degrees F (-51.1 degrees C)
 - e. Hardness, ASTM D 2240 (Shore A): 80
 - f. Dynamic Impact Resistance (Fully Reinforced System): ASTM D 5635, 37 joules
 - g. Static Puncture Resistance (Fully Reinforced System): ASTM D 5602, 20 kg
 - h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D 4073, 274 lbf
 - i. Tensile Load Strain (Fully Reinforced System): ASTM D 4073, 193 lbf/in.
 - j. Toughness: (Fully Reinforced System): 46 in.-lbf/in²
 - k. Dry Film Thickness (Fully Reinforced System), 90-100 mils
 - l. Lap Shear Strength (MB Seam with coating): ASTM D 7379, 231 lbf/in.
 - m. Density @ 77 degrees F (25 degrees C, ASTM D 2939) 9.6 lb./gal (1.2 g/m³)
 - n. Flash Point: ASTM D 93, 110 degrees F min. (43 degrees C)
 - o. VOC: 0 g/l
 - p. Microbial Resistance: ASTM G21, No Microbial Growth
 - q. Water Leakage Resistance: ASTM D7281, Pass
- C. Reinforcement:
- 1. Grip Polyester Soft: Soft polyester reinforcing fabric.
 - a. Tensile Strength ASTM D 3766, 57.1 lbs (25.9 kg).
 - b. Tear Strength, 16.1 lbs (7.30 kg).
 - c. Elongation ASTM D 3786, 61.65%
 - d. Weight per Area, 3 oz./sq yd. (102 g/m²)
 - e. Mullen Burst, ASTM D 3786: 176 lbs. (80.2 kg)
- D. Top Coat:
- 1. Coating: LiquiTec: Multi-purpose, 100% solids, two-part, fast-cure, polyurea liquid waterproofing membrane having the following characteristics:
 - a. Elongation, ASTM D 412: 800%
 - b. Tensile Strength, ASTM D 412: 2500 psi
 - c. Tear Resistance, ASTM D 624: 449 lbs./in
 - d. Low Temperature Flexibility, ASTM D 522: -60 degrees F (-51.1 degrees C)
 - e. Hardness, ASTM D2240 (Shore A): 80
 - f. Dynamic Impact Resistance (Fully Reinforced System): ASTM D 5635, 37 joules
 - g. Static Puncture Resistance (Fully Reinforced System): ASTM D 5147, 135 lb/in
 - h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D 4073, 274 lbf
 - i. Tensile Load Strain (Fully Reinforced System): ASTM D 4073, 193 lbf/in.
 - j. Toughness: (Fully Reinforced System): ASTM D 5147 46 in.-lbf/in²
 - k. Dry Film Thickness (Fully Reinforced System), 90-100 mils
 - l. Lap Shear Strength (MB Seam with coating): ASTM D 7379, 231 lbf/in.
 - m. Density @ 77 degrees F (25 degrees C), ASTM D 2939) 9.6 lb./gal (1.2 g/m³)
 - n. VOC: 0 g/l
 - o. Microbial Resistance: ASTM G21, No Microbial Growth
 - p. Water Leakage Resistance: ASTM D7281, Pass
 - q. Initial Reflectance: 0.84
 - r. Initial Emittance: 0.88
 - s. Initial SRI: 105
- E. Liquid Flashings

1. Coating: LiquiTec: Multi-purpose, 100% solids, two-part, fast-cure, polyurea liquid waterproofing membrane having the following characteristics:
 - a. Elongation, ASTM D 412: 800%
 - b. Tensile Strength, ASTM D 412: 2500 psi
 - c. Tear Resistance, ASTM D 624: 449 lbs./in
 - d. Low Temperature Flexibility, ASTM D 522: -60 degrees F (-51.1 degrees C)
 - e. Hardness, ASTM D 2240 (Shore A): 80
 - f. Dynamic Impact Resistance (Reinforced System): ASTM D 5635, 37 joules
 - g. Static Puncture Resistance (Reinforced System): ASTM D 5602, 20 kg
 - h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D 4073, 274 lbf .
 - i. Tensile Load Strain (Fully Reinforced System): ASTM D 4073, 135 lbf.in .
 - j. Toughness: ASTM D 5147 46 in.-lbf/in² .
 - k. Dry Film Thickness (Fully Reinforced System), 70-80 mils
 - l. Lap Shear Strength (MB Seam with coating): ASTM D7379, 231 lbf/in.
 - m. Density @ 77 degrees F (25 degrees C, ASTM D 2939) 9.6 lb./gal (1.2 g/m³)
 - o. VOC: 0 g/l
 - p. Microbial Resistance: ASTM G 21, No Microbial Growth
 - q. Water Leakage Resistance: ASTM D7281, Pass
 - r. Initial Reflectance: 0.84
 - s. Initial Emittance: 0.88
 - t. Initial SRI: 105
2. Coating: LiquiTec Base:
 - a. Elongation, ASTM D 412: 800%
 - b. Tensile Strength, ASTM D 412: 2500 psi
 - c. Tear Resistance, ASTM D 624: 449 lbs./in
 - d. Low Temperature Flexibility, ASTM D522: -60 degrees F (-51.1 degrees C)
 - e. Hardness, ASTM D2240 (Shore A): 80
 - f. Dynamic Impact Resistance (Fully Reinforced System): ASTM D 5635, 37 joules
 - g. Static Puncture Resistance (Fully Reinforced System): ASTM D 5602, 20 kg
 - h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D 4073,
 - i. Tensile Load Strain (Fully Reinforced System): ASTM D 4073,
 - j. Toughness: ASTM D 5147 , 46 in.-lbf/in²
 - k. Dry Film Thickness (Fully Reinforced System), 70-80 mils
 - l. Lap Shear Strength (MB Seam with coating): ASTM D 7379, 231 lbf/in.
 - m. Density @ 77 degrees F (25 degrees C). ASTM D 2939 9.6 lb./gal (1.2 g/m³)
 - n. VOC: 0 g/l
 - o. Microbial Resistance: ASTM G 21, No Microbial Growth
 - p. Water Leakage Resistance: ASTM D7281, Pass

END OF SECTION

SECTION 07 62 00

EDGE METAL, SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.2 SUMMARY

- A. Provide all labor, equipment, and materials to fabricate and install the following.
 - 1. Edge strip and flashing
 - 2. Fascia, scuppers, and trim
 - 3. Coping cap at parapets
 - 4. Expansion joint and area divider covers
 - 5. Fascia and edge material
 - 6. Gutters, scuppers and down spouts
- B. Related Sections:
 - 1. Division 07 Section Common Work Results for Thermal and Moisture Protection
- C. Related Work Specified Elsewhere:
 - 1. Division 06 Section - Rough Carpentry
 - 2. Division 06 Section – Engineered Framing System
 - 3. Division 07 Section - Modified Bituminous Membrane Roofing
 - 4. Division 07 Section - Roof Accessories
 - 5. Division 07 Section - Joint Sealants

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (galvannealed) by the Hot-Dip Process.
 - 2. ASTM A792 Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process.
 - 3. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 4. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 5. ASTM D692 Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures.
- B. American National Standards Institute and Single Ply Roofing Institute (ANSI/SPRI)
 - 1. ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal
- C. Warnock Hersey International, Inc., Middleton, WI (WH)
- D. Underwriters Laboratories (UL)
- E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

1. 1993 Edition Architectural Sheet Metal Manual
 - F. National Roofing Contractors Association (NRCA)
 1. Roofing and Waterproofing Manual
 - G. American Society of Civil Engineers (ASCE)
 1. ASCE 7 Minimum Design Loads for Buildings and Other Structures
- 1.4 SUBMITTALS FOR REVIEW
- A. Product Data:
 1. Provide manufacturer's specification data sheets for each product.
 2. Metal material characteristics and installation recommendations.
 3. Submit color chart prior to material ordering and/or fabrication so that equivalent colors to those specified can be approved.
 - B. Samples: Submit two (2) samples, illustrating typical metal edge, coping, gutters, fascia extenders for material and finish.
 - C. Shop Drawings
 1. For manufactured and ANSI/SPRI ES-1 compliant shop fabricated gravel stops, fascia, scuppers, and all other sheet metal fabrications.
 2. Indicate material profile, jointing details, fastening methods, flashing, terminations, and installation details.
 3. Indicate type, gauge and finish of metal
 - D. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.
- 1.5 SUBMITTALS FOR INFORMATION
- A. Design Loads: Any material submitted as equal to the specified material must be accompanied by a report signed and sealed by a professional engineer licensed in the state in which the installation is to take place. This report shall show that the submitted equal meets the wind uplift and perimeter attachment requirements according to ASCE 7 and that the submitted equal edge metal system is compliant with the ANSI/SPRI ES-1 standard. Substitution requests submitted without licensed engineer approval will be rejected for non-conformance.
 - B. A letter from the manufacturing company certifying that the materials furnished for this project are the same as represented in tests and supporting data.
 - C. Mill production reports certifying that the steel thicknesses are within allowable tolerances of the nominal or minimum thickness or gauge specified.
 - D. Certification of work progress inspection. Refer to Quality Assurance Article below.
 - E. Certifications.
 1. Submit roof manufacturer's certification that metal fasteners furnished are acceptable to roof manufacturer.
 2. Submit roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
- 1.6 CONTRACT CLOSEOUT SUBMITTALS
- A. General: Comply with Requirements of Section 01 78 00 – Closeout Submittals

- B. Special Project Warranty: Provide specified warranty for the Project, executed by the authorized agent of the Manufacturer.
- C. Roofing Maintenance Instructions. Provide a manual of manufacturer's recommendations for maintenance of installed roofing systems.
- D. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.7 QUALITY ASSURANCE

- A. Engage an experienced roofing contractor specializing in sheet metal flashing work with a minimum of five (5) years' experience.
- B. Maintain a full-time supervisor/foreman who is on the job-site at all times during installation. Foreman must have a minimum of five (5) years' experience with the installation of similar system to that specified.
- C. Source Limitation: Obtain components from a single manufacturer. Secondary products which cannot be supplied by the specified manufacturer shall be approved in writing by the primary manufacturer prior to bidding.
- D. Upon request fabricator/installer shall submit work experience and evidence of financial responsibility. The Owner's representative reserves the right to inspect fabrication facilities in determining qualifications.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials which may cause discoloration or staining.

1.9 PROJECT CONDITIONS

- A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for pre-formed metal edge system.

1.10 DESIGN AND PERFORMANCE CRITERIA

- A. Thermal expansion and contraction:
 - 1. Completed metal edge flashing system, shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.

1.11 WARRANTIES

- A. Owner shall receive one (1) warranty from manufacturer of roofing materials covering all of the following criteria. Multiple warranties are not acceptable.
 - 1. Pre-finished metal material shall require a written thirty (30)- year non-prorated warranty covering fade, chalking and film integrity. The material shall not show a color change greater than 5 NBS color units per ASTM

- D2244 or chalking excess of 8 units per ASTM D659. If either occurs material shall be replaced per warranty, at no cost to the Owner.
2. Changes: Changes or alterations in the edge metal system without prior written consent from the manufacturer shall render the system unacceptable for a warranty.
 3. Warranty shall commence on date of substantial completion or final payment, whichever is agreed by contract.
 4. The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of two years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.
 5. Installing roofing contractor shall be responsible for the installation of the edge metal system in general accordance with the membrane manufacturer's recommendations.
 6. Installing contractor shall certify that the edge metal system has been installed per the manufacturer's printed details and specifications.
 7. One manufacturer shall provide a single warranty for all accessory metal for flashings, metal edges and copings, along with the warranty for metal roof areas, membrane roof areas, and any transitions between two different material types.

PART 2 – PRODUCTS

2.1 PRODUCTS, GENERAL

- A. Refer to Division 01 Section "Common Product Requirements."
- B. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.
- C. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.
 1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section.
 2. Include a list of three (3) projects of similar type and extent, located within a one hundred mile radius from the location of the project. In addition, the three projects must be at least five (5) years old and be available for inspection by the Architect, Owner or Owner's Representative.
 3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.
 4. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2 ACCEPTABLE MANUFACTURERS

- A. The design is based upon roofing systems engineered and manufactured by:
 1. The Garland Company
 2. Or Approved Equal

2.3 MATERIALS

- A. General: Product designations for the materials used in this section shall be based on performance characteristics of the R-Mer_ metal edge system manufactured by The Garland Company, Cleveland, OH, and shall form the basis of the contract documents.
- B. Materials: Minimum gauge of steel or thickness of Aluminum to be specified in accordance with Architectural Sheet Metal Manual, Sheet Metal and Air Conditioning Contractor's National Association, Inc. recommendations.
- C. R-Mer Force Flash-less Snap-On Fascia Cover and Splice Plate
 - a. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 24-gauge, 22 gauge or 20 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality
- D. R-Mer Force Flash-less Snap-On Fascia Extruded Base Anchor
 - a. Base Anchor and Anchor Splice Plates: 6005A-T61 extruded aluminum
 - b. Compression Seal for top of anchor: TPE thermoplastic elastomer.
 - c. Sealant for Flange: Green-Lock Sealant XL: Single-component high performance 100% solids, interior and exterior polyether joint sealant
- E. R-Mer Edge Coping Cap Cover and Splice Plate
 - a. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 24-gauge, 22 gauge or 20 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
- F. Finishes
 - 1. Exposed surfaces for coated panels:
 - a. Steel Finishes: fluorocarbon finish. Epoxy primer baked both sides, .2-.25 mils thickness as approved by finish coat manufacturer. Weathering finish as referred by National Coil Coaters Association (NCCA).

PROPERTY	TEST METHOD	FLUOROCARBON*
Pencil Hardness	ASTM D3363 NCCA II-2	HB-H
Bend	ASTM D-4145 NCCA II-19	O-T
Cross-Hatch Adhesion	ASTM D3359	no loss of adhesion
Gloss (60° angle)	ASTM D523	25+/-5%
Reverse Impact	ASTM D2794	no cracking or loss of adhesion
Nominal Thickness	ASTM D1005	
Primer		0.2 mils
Topcoat		0.7 mils min
Clear Coat (optional, only to be used with 22 gauge steel)		0.3 mils

*Subject to minimum quantity requirements

b. Color shall be as specified

2. Exposed and unexposed surfaces for mill finish flashing, fascia, and coping cap, shall be as shipped from the mill

2.4 RELATED MATERIALS AND ACCESSORIES

- A. Metal Primer: Zinc chromate type.
- B. Plastic Cement: ASTM D 4586
- C. Sealant: Specified in Section 07900 or on drawings.
- D. Underlayment: ASTM D2178, No 15 asphalt saturated roofing felt.
- E. Self-Adhering Underlayment, one of the following:
 - 1. 60 mil minimum transition strip
 - 2. 45 mil high temperature underlayment with cross laminated polymer surface
- F. Slip Sheet: Rosin sized building paper.
- G. Fasteners:
 - 1. Corrosion resistant screw fastener as recommended by metal manufacturer. Finish exposed fasteners same as flashing metal.
 - 2. Fastening shall conform to Factory Mutual requirements or as stated on section details, whichever is more stringent.
- H. Gutter and Downspout Anchorage Devices: Material as specified for system

PART 3 – EXECUTION

3. EXECUTION, GENERAL

- A. Refer to Division 07 Section Common Work Results for Thermal and Moisture Protection.

4. PROTECTION

- A. Isolate metal products from dissimilar metals, masonry or concrete with bituminous paint, tape, or slip sheet. Use gasketed fasteners where required to prevent corrosive reactions.

5. GENERAL

- A. Secure fascia to wood nailers at the bottom edge with a continuous cleat.
- B. Fastening of metal to walls and wood blocking shall comply with building code standards.

- C. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.
 - D. Allow sufficient clearances for expansion and contraction of linear metal components. Secure metal using fasteners as required by the system. Exposed face fastening will be rejected.
6. INSPECTION
- A. Verify that curbs are solidly set and nailing strips located.
 - B. Perform field measurements prior to fabrication.
 - C. Coordinate work with work of other trades.
 - D. Verify that substrate is dry, clean and free of foreign matter.
 - E. Commencement of installation shall be considered acceptance of existing conditions.
7. MANUFACTURED SHEET METAL SYSTEMS
- A. Furnish and install manufactured fascia and coping cap systems in strict accordance with manufacturer's printed instructions.
 - B. Provide factory-fabricated accessories including, but not limited to, fascia extenders, miters, scuppers, joint covers, etc. refer to Source limitation provision in Part 1.
8. SHOP-FABRICATED SHEET METAL
- A. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.
 - B. Hem exposed edges.
 - C. Angle bottom edges of exposed vertical surfaces to form drip.
 - D. Lap corners with adjoining pieces fastened and set in sealant.
 - E. Form joints for gravel stop fascia system, coping cap with a 3/8" opening between sections. Back the opening with an internal drainage plate formed to the profile of fascia piece.
 - F. Install sheet metal to comply with referenced ANSI/SPRI, SMACNA and NRCA standards.
9. FLASHING MEMBRANE INSTALLATION
- A. Scupper Through Roof Edge
 - 1. Install scupper box in a one fourth (1/4) inch bed of mastic. Assure all box seams are soldered and have minimum four (4) inch flange. Make sure all corners are closed and soldered.
 - 2. Prime metal edge at a rate of one hundred (100) square feet per gallon and allow to dry.
 - B. Flash-less Snap-On Fascia Detail with Extruded Aluminum Base Anchor

1. Position base ply of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations. Cap sheet shall stop at the edge of the roof and shall not turn over the edge of the nailer.
2. Prior to installing the base anchor, assure a level plane is present. If not, shim the roof edge surface as required.
3. Extruded base anchor: Apply two 1/4" beads of Green-Lock Sealant XL or equal on the bottom surface of the top flange of the extruded anchor.
4. Set the extruded anchor on the edge and face fasten through pre-punched slots every 18 inches o.c. for 5.75 inch face fascia, and 18 inches o.c. staggered for any fascia size greater than 5.75 inches. Begin fastening 6 inches from ends.
5. Install Green-Lock Sealant XL or equal at the ends of the base frame to prevent water from running between base anchor joints.
6. Install compression seals every 40 inches on center in the slots located at the top of the extruded anchor.
7. Install fascia cover setting the top flange over the top flange and compression seals of the base anchor. Assure compression seals are in place during this process. Beginning on one end and working towards the opposite end, press downward firmly (do not rotate) until "snap" occurs and cover is engaged along entire length of miter.
8. Install splice plate at each end of the base anchor and fascia cover prior to the installation of the next adjacent ten foot piece.

C. Snap-On Coping Cap Detail

1. Install Miters first.
2. Position base flashing of the Built-Up and/or Modified Roofing membrane over the wall edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
3. Install minimum sixteen (16) gauge, sixteen (16) inch long by specified width anchor chair at [Contact Garland Representative] feet on center.
4. Install six (6) inch wide splice plate by centering over sixteen (16) inch long by specified width anchor chair. Apply two beads of sealant to either side of the splice plate's center. Approximately two (2) inches from the coping cap joint. Install Coping Cap by hooking outside hem of coping on outside face of anchor chair. Press downward on inside edge of coping until "snap" occurs and hem is engaged on the entire chair.

10. CLEANING

- A. Clean installed work in accordance with the manufacturer's instructions.
- B. Replace damaged work than cannot be restored by normal cleaning methods.

11. CONSTRUCTION WASTE MANAGEMENT

- A. Remove and properly dispose of waste products generated. Comply with requirements of authorities having jurisdiction.

12. FINAL INSPECTION

- A. At completion of installation and associated work, meet with Contractor, Architect, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.

- B. Inspect work and flashing of roof penetrations, walls, curbs, and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.
 - C. Repair or replace deteriorated or defective work found at time above inspection as required to produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
 - D. Notify the [Contractor] [Architect] [Owner] upon completion of corrections.
 - E. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.
 - F. Immediately correct roof leakage during construction. If the Contractor does not respond within twenty-four (24) hours, the Owner will exercise rights to correct the Work under the terms of the Conditions of the Contract.
13. DEMONSTRATION AND TRAINING
- A. At a time and date agreed to by the Owner, instruct the Owner's facility manager, or other representative designated by the Owner, on the following procedures:
 - 1. Troubleshooting procedures
 - 2. Notification procedures for reporting leaks or other apparent roofing problems
 - 3. Maintenance
 - 4. The Owner's obligations for maintaining the warranty in effect and force
 - 5. The Manufacturer's obligations for maintaining the warranty in effect and force.

END OF SECTION