

SECTION 07 55 56.13
HOT APPLIED RUBBERIZED ASPHALT PROTECTED MEMBRANE ROOFING

This guide specification has been prepared according to the principles established in the Project Resource Manual published by the Construction Specification Institute. It is intended to assist the design professional in the preparation of a specification for the installation of hot fluid applied rubberized asphalt waterproofing. This guide specification may be modified by the design professional with the consent of Hydro-Gard to be tailored to a specific project. This guide specification was issued on December 2012 and may be superseded without notice at anytime.

Hydro-Tuff® HOT FLUID APPLIED (PMR) ROOFING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. All of the Contract Documents, including General and Supplementary Conditions, and Division 1 General requirements will apply to the work of this section.

1.02 RELATED SECTIONS (Modify to individual project)

- A. DIVISION 2 - Sitework: (Section 02500/02870) Paving/Site
- B. DIVISION 3 - Concrete: (Section 03300) Surface / Substrate Requirements
The requirements noted below are the minimum requirements for the installation of the Hydro-Tuff® HFA Roofing and Waterproofing system. The proper coordination of this section is critical for a successful installation of the Roofing and Waterproofing system.

Cast-In-Place Concrete/Composite Deck:

1. Strength/Density: Minimum 2,500 psi compressive strength
Minimum 115 pcf density
2. Finish Requirement: Wood Float: Medium
Steel Trowel: Steel trowel finish followed by a light to medium finish. (Slick or Steel trowel finish is not acceptable)

3. Concrete Hydration/Cure:

- a. Curing Method: Water cure is the preferred method. Curing blankets, wet coverings, plastic or paper sheets or approved curing compound pre-approved by **Hydro-Gard**. (Preferred curing compound is Sodium Silicate)
- b. Duration of Cure: Structural Weight Concrete is recommended to cure for 28 days. Minimum cure time for structural weight concrete is 14 days.

Light Weight Structural Concrete is recommended to cure for 60 days or a minimum of 28 days.
(When concrete is placed in metal deck then vented metal decking is required)

Note: The above minimum requirements for cure/drying times are recommendations based on basic concrete fundamentals and past experience. Conditions may change depending on conditions during application such as (ambient temperature, humidity and weather). In no case should these recommendations be modified or changed without consulting **Hydro-Gard**.

3. Form Release Agents: **Contact Hydro-Gard**

D. DIVISION (04) - Masonry

1. Concrete Masonry Units: When CMU walls are used and specified to receive **Hydro-Tuff® HFA** all CMU joints shall be struck flush and provide a smooth surface for the application of the waterproofing membrane. Tooled joints are unacceptable.
2. Expansion Joints: When expansion joints (ie: CMU separation) are present they shall be filled with an acceptable sealant.
3. Grouting Cells: When concrete is used to fill/grout CMU cells the recommended cure time is 7 days depending on thickness of wall.

- E. DIVISION () - Metals
F. DIVISION () - Wood, Plastics, and Composites
G. DIVISION () - Plumbing (Roof drains, area drains)
H. DIVISION () - Electrical (Conduits, Mounting)

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM)
Canadian Government Specification Board CGSB-37.50-M89, Standard for
“Asphalt, Rubberized, Hot Applied, for Roofing and Waterproofing”

1.04 SYSTEM DESCRIPTION

- A. Furnish and install a (215 mil) fully reinforced (if specified) or a non-reinforced (180 mil) (if specified) complete Roofing and Waterproofing system including all components of assembly such as primers, hot fluid applied rubberized asphalt membrane, flashings, protection layers, heavy duty protection layer (if specified), extruded polystyrene insulation (if specified), drainage composites (if specified), root barriers (if specified) garden roof components (if specified). To ensure total system compatibility of all products and purchased from a single source manufacturer or approved by specified manufacturer.

1.05 SUBMITTALS

- A. General: Submit in accordance with Section 013300
- B. Product Data: Submit for Architect’s action. Submit manufacturer’s literature, specifications and installation instructions describing the general properties of each material, product and accessory to be used in the work.
- C. Shop drawings: Submit for Architect’s action. (Insert all shop drawing requirements)
- D. Product Samples: Submit for Architect’s action (Insert all samples requirements)
- E. Certification: Submit material certification(s) signed by manufacturer certifying materials comply with the specific performance characteristics and physical requirements. Submit certification from manufacturer that proposed installer is certified and trained to install manufacturer’s products and when installed in accordance with manufacturers guidelines manufacturer will issue warranty.
- F. Warranty: Submit sample copy of manufacturer’s warranty identifying the terms and conditions

1.06 QUALITY ASSURANCE

- A. Membrane manufacturer shall provide certification letter that the primary membrane has been manufactured in the same location for not less than (5) years.
- B. Membrane manufacturer shall have available in house staff that can assist the contractor or Architect when necessary in the application of it's products.
- C. Installation contractor must provide documentation that it has a minimum of (5) years experience in the work of this type and that they can comply with all the manufacturers installation requirements.
- D. Contractor shall arrange for a pre-installation conference prior to the commencement of any work. In this conference the following shall be observed. Review all submittals, shop drawings, substrate requirements and conditions, penetration requirements, drain types, curing compounds (if used), termination details, tie-in details, interfacing details with dissimilar materials and penetrations. The attendee's shall include a representative of the owner, Architect, manufacturer, inspection firm, general contractor, waterproofing or Roofing contractor and other contractors that may interface with the work of this section.
- E. The owner or Architect shall make arrangements to retain an approved inspection company. The inspection company shall provide full time inspection while all waterproofing work is underway. The inspector shall be provided all contract documents, waterproofing/roofing shop drawings, manufacturers details and specifications. The inspection company must be approved by the manufacturer and had previously completed the manufacturer's inspection training. Inspection service shall provide reports, photo's, documenting the installation of all waterproofing/roofing work. These reports shall be made available to the owner, general contractor, installing contractor and manufacturer.
- F. Installation contractor shall maintain copy of manufacturers installation instructions and MSDS sheets on the project at all times. Installation contractor shall provide access for manufacturer and inspection company to all areas where waterproofing is underway.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original unopened packing, clearly labeled with manufacturers labels indicating name of manufacturer, product and all identifying product numbers.
- B. Storage of materials must be in a secured location and stored in a manner to ensure products are protected from damage. Damage may be caused by inclement

weather, trade damage, prolonged exposure to sunlight or excessive heat. When Rubberized asphalt is exposed to prolonged heat cover with insulation or other suitable means.

- C. Store all adhesives at temperatures between 60°F (15.5°C) and 80°F (26.6°C). When exposed to lower temperatures, restore to 60°F before use.
- D. Follow all material manufacturer instructions on storage and handling of materials. Melting equipment shall consist of double jacketed melters. Either oil jacketed or air jacketed melters are acceptable. Melters shall be equipped with mechanical agitator's or for small units hand agitator's are acceptable.

1.08 PROJECT CONDITIONS

- A. All substrate conditions must be sound and dry. Do not apply waterproofing system during inclement weather or during ambient temperatures at or less than 0°F (18°C).
- B. Ensure that substrate conditions meet all manufacturers requirements. Ensure that work area is well ventilated and that odor's are a well distance from fresh air intakes.
- C. Advise personnel against breathing or inhaling of vapors from heated materials. Advise personnel on all personal protective equipment, ie gloves, eye protection and proper foot wear. Limit access to required personnel during installation of waterproofing system. Secure all propane tanks and provide a safe distance from any open flame.
- D. During adhesive application ensure area is well ventilated. Adhesive's are highly flammable, do not breath in adhesive vapors and ensure no open flame comes in contact with adhesive or adhesive vapors. Review Material Safety Data Sheets on all products prior to their use.
- E. Protect adjoining surfaces not scheduled to be waterproofed. Protect against damage or soiling, including vegetation, plants and any type of finished surface.
- F. Do not allow waste products such as grease, oil, solvents, vegetable or mineral oil, petroleum or animal fat to come in contact with waterproofing products. Contact manufacturer if any of these conditions exist.
- G. Contractor shall provide protection to waterproofing system after installation and water testing. Do allow foot traffic directly on membrane or membrane protection layers. Contractor shall ensure that suitable protection is provided to waterproofing system until over burden materials are in place.

1.09 WARRANTY

- A. Upon completion of work, contractor shall provide to owner a single source warranty.
- B. Warranty must be provided by manufacturer and signed by an authorized agent of manufacturer. Manufacturers warranty application process must be completed by approved and licensed contractor prior to manufacturers submission of warranty.
- C. Warranties vary, in duration, terms and conditions:
 - 1. Material Warranties: (Labor excluded)
 Durations: From 3 years to 10 years (No warranty fees)
 - 2. System Warranty:
 Durations: 5 year, 10 year, 15 year & 20 year
 Fee's: System warranties are at additional cost.
 (Consult Hydro-gard for fees)

Coverage: System warranties cover all products and components supplied by Hydro-Gard. This includes the Hot Fluid Applied Membrane, protection materials, Drainage products, insulation, flashings and pedestal set pavers (when pavers are purchased through Hydro-Gard)

Manufacturers warranties shall be independent from any other warranties made by the contractor under the requirements of the contract documents and may run concurrent with other warranties. Contract Hydro-gard for additional warranty terms and conditions.

PART II - PRODUCTS

2.01 GENERAL

- A. All products and components shall be obtained from membrane manufacturer to ensure system compatibility.

Manufacturer: Hydro-Gard, LLC
 18340 Yorba Linda Blvd, Suite 107, Box 304
 Yorba Linda, CA 92886
 Ph: 562-944-7030
 Fx: 562-944-6402
www.hydro-gard.com

2.02 MATERIALS

- A. Membrane shall be **Hydro-Tuff® HFA**, a hot applied rubberized asphalt membrane meeting the following physical properties.

Property	Test Method	Typical Result
Flash Point	ASTM D-92 CGSB-37.50-M89	503° F / (260° C)
Cone Penetration	CGSB 37.50-M89	@ 25°C / 66 / 110 max @ 50°C / 141 / 200 max
Toughness	CGSB 37.50-M89	17.6 joules
Ratio of Toughness to Peak Load	CGSB 37.50-M89	0.051
Water Vapor Permeance	ASTM E-96 CGSB 37.50-M89	1.4 ng/Pa(s)M ²
Low Temperature Flexibility (-25°C)	CGSB 37.50-M89	No delamination, adhesion loss or cracking
Low Temperature Crack Bridging Capacity (-25°C)	CGSB 37.50-M89	No delamination, adhesion loss or cracking
Heat Stability (5 hrs)	CGSB 37.50-M89	Pass, No Change
Viscosity @ application Temperature	CGSB 37.50-M89	2-15 seconds
Solid Content		100 %
Softening Point	ASTM D-36	185°F
Shelf Life		10 years / in container

B. Primer: Primer shall be a surface conditioner for concrete surfaces

Product Name: Hydro-Primer Asphaltic Base primer
Packaging: 5 gal pails / 55 gal drums
Use: Hydro-Primer is used to condition the concrete surface in preparation for the application of the Hydro-Tuff® HFA rubberized asphalt membrane.

C. Membrane Reinforcement:

Product Name: HG Polyester Fabric - 1.35 oz/yd² non woven, spunbonded polyester fabric
Packaging: Rolls
Size: 36", 48", 72", 120" wide; 50', 100', 300' length
Use: HG Polyester Fabric is used to reinforce the Hydro-Tuff® HRA membrane.

D. Flashing Reinforcement:

Product Name: Hydro-Tuff® Neoprene Flashing
Packaging: Rolls
Size: 6", 12", 18", 24", 36", 48" wide
100' lengths
Use: Hydro-Tuff® Neoprene is used as a flexible reinforcement flashing used to flash corners, penetrations, drain bodies and reinforcement at deck to wall conditions.

Product Name: Hydro-Tuff® MB Flashing Sheet
Packaging: Rolls
Size: 39" wide
90' length
Use: Hydro-Tuff® MB is used as reinforcement sheet for deck to wall transitions as a substitute for the Neoprene Flashing. Neoprene Flashing is required at all penetrations, drain bodies and expansion joints.

Product Name: HP Liquid Flashing 9800
Packaging: Box (1gal)
Use: HP Liquid Flashing is a flexible methyl methacrylate polyurethane resin. It is 100% reactive and is used with Hydro-Tuff HFA membrane and can also be used with the Hydro-Prufe PVC membrane. It is used as a detail flashing for difficult shapes and conditions.

Product Name: HP 9112 Primer

Packaging: Supplied inside box with HP Liquid Flashing 9800
Use: HP 9112 primer is the primer used in conjunction with the HP 9800 liquid flashing. It is a methyl methacrylate resin used to prime any surface prior to the HP 9800 application.

Product Name: HP 9900 Liquid Flashing
Packaging: 3 ½ gallon pail
Use: HP 9900 Liquid Flashing is High Viscous trowel or butter grade polyurea-urethane formula single component flashing membrane. HP 9900 can also be used as a detail membrane for difficult shapes and conditions where conventional flashing can't conform to a particular shape. HP 9900 must be used with Gard-Deck 9113 Primer.

Product Name: Gard-Deck 9113 Primer
Packaging: 5 gallon pail
Use: Gard-Deck 9113 Primer is a waterborne modified acrylic primer specifically designed for use with HP 9900 Liquid Flashing membrane. Priming all surfaces such as concrete, PVC, asphalt based product such as Hydro-Tuff HFA applied and other asphalt products.

E. Adhesives:

Product Name: Adhesive U 148-A
Packaging: 5 Gal pails
Use: Adhesive U 148-A is a solvent based contact adhesive used to adhere Neoprene flashing to approved substrates when Neoprene is not set in a hot fluid applied membrane.

Product Name: Adhesive U 155-SC
Packaging: 1 Gal pails
Use: Adhesive U 155-SC is a solvent based adhesive used to adhere Neoprene to Neoprene. It is used to fuse the seams together when the Neoprene is overlapped.

F. Protection Materials: *(Edit to project specifications)*

Product Name: Hydro-Tuff® PB-25
Packaging: Rolls
Size: 39" wide
50' length
Use: Hydro-Tuff® PB-25 is medium to light duty protection material. It is made from SBS rubber and fiberglass reinforced. It is set into the Hydro-Tuff® HFA membrane while the membrane is still hot.

Product Name: Hydro-Tuff® CS-100
Packaging: Rolls
Size: 39" wide
34' length
Use: Hydro-Tuff® CS-100 is a heavy duty Granulated Cap sheet protection material. It is made from SBS rubber and fiberglass reinforced. It is set into the Hydro-Tuff® HFA membrane while the membrane is still hot.

Product Name: Hydro-Tuff® HDPL
Packaging: Rolls
Size: 61" wide
100' length
Use: Hydro-Tuff® HDPL is our heaviest protection sheet. It is a 45 mil CSPE sheet reinforced with a polyester reinforcing scrim. It is set into the Hydro-Tuff® HFA membrane while the membrane is still hot. Once set and in place the seams of the Hydro-Tuff® HDPL can be heat welded together adding not only ultimate protection but an additional layer of waterproofing protection.

G. XPS Insulation Materials: *(Edit to project specifications)*

Approved XPS Insulation manufacturers;

1. Dow Chemical Company

Products: Belowgrade walls, Styrofoam® Brand 25 psi, 40 psi, 60 psi Under Toppings, Styrofoam® Brand 60 psi & 100 psi Under Pedestals, Styrofoam® Brand 60 psi & 100 psi Under Ballast Rock, Styrofoam Brand 40 psi & 60 psi

2. Owens Corning

Products: Belowgrade walls, Foamular® 25 psi, 40 psi, 60 psi
Under Toppings, Foamular® 60 psi, & 100 psi
Under Pedestals, Foamular® 60 psi & 100 psi
Under Ballast Rock, Foamular® 40 psi & 60 psi

H. Prefabricated Drainage Composites: (*Edit to project specifications*)

1. Gard-Drain 200: Gard-Drain 200 is a prefabricated drainage medium intended for belowgrade vertical wall applications. It is a moderate duty drainage medium utilizing a dimple core. It has a single layer of non-woven filter fabric on one side. It has a compressive strength of 11,000 psf, Core flow rate of 12.5 gpm and is .25 inches thick.
2. Gard-Drain 220: Gard-Drain 220 is a prefabricated drainage medium intended for belowgrade vertical wall applications. It is a moderate duty drainage medium utilizing a dimple core. It has a single layer of non-woven filter fabric on one side and a thin film protection sheet on the other side. It has a compressive strength of 11,000 psf, Core flow rate of 12.5 gpm and is .25 inches thick.
3. Gard-Drain 400: Gard-Drain 400 is a prefabricated drainage medium designed to manage water around foundations by collecting surface and ground water and discharging it into the designed collection system. Its primary use is for below grade foundation walls. It has a spunbonded non woven filter fabric on one side. It has a compressive strength of 15,000 psf, Core flow rate of 17 gpm and is .44 inches thick.
4. Gard-Drain 400 RB-T: Gard-Drain 400 RB-T is a prefabricated drainage medium intended for both vertical and horizontal applications. Its primary use is for landscape zones or other areas where a root resistant drainage medium is desirable. It has a spunbonded non woven filter fabric on one side. It has a compressive strength of 15,000 psf, Core flow rate of 21 gpm and is .44 inches thick.
5. Gard-Drain 400 RB-W: Gard-Drain 400 RB-W is a prefabricated drainage medium intended for both vertical and horizontal applications. Its primary use is for landscape zones or other areas where a root resistant drainage medium is desirable. It is a high flow rate drainage medium. It has a root resistant woven monofilament filter fabric on one side. It has a compressive strength of 15,000 psf, Core flow rate of 21 gpm and is .44 inches thick.
6. Gard-Drain 420: Gard-Drain 420 is a prefabricated drainage medium intended for both vertical and horizontal applications. It is used for belowgrade vertical applications such as foundation walls (blind side or free standing) and can be used in landscape zones like the other Gard-Drain 400 series products. It is a high flow rate drainage medium. It has a non woven filter fabric on one side and a thin film protection sheet on the other side. It has a compressive strength of 15,000 psf, Core flow rate of

17 gpm and is .44 inches thick.

7. Gard-Drain 700: Gard-Drain 700 is a prefabricated drainage medium intended for horizontal applications. It is primarily used under concrete toppings, plaza decks, and can also be used in landscape zones. Gard-Drain 700 has a woven monofilament filter fabric on one side. It has a compressive strength of 18,000 psf, Core flow rate of 21 gpm and is .44 inches thick.
8. Gard-Drain 990: Gard-Drain 990 is a prefabricated drainage medium intended for horizontal applications when a high compressive strength drainage medium is needed. It's intended applications are under heavy concrete toppings, vehicle traffic areas and other high compressive strength applications. It has a single layer of woven monofilament filter fabric adhered to the chemically resistant core. It has a compressive strength of 30,000 psf, Core flow rate of 13 gpm and is .25 inches thick.
9. Gard-Drain 1000: Gard-Drain 1000 is prefabricated drainage medium intended for horizontal applications. It can be used under concrete toppings, plaza decks and other horizontal applications where a thin drainage medium is needed. It has a non woven filter fabric on one side. It has a compressive strength of 45,000 psf, a flow rate of 13 gpm and is only .25 inches thick.
10. Gard-Drain GRS: Gard-Drain GRS (Green Roof System) is high flow rate core type prefabricated drainage medium used in Garden Roofing applications. The core is perforated and has a root resistant filter fabric bonded to the top side and protection fabric bonded to the bottom side for installation over the waterproofing membrane. The physical properties are, compressive strength 9,000 psf, core flow rate of 21 gpm, fabric flow rate of 70 gpm, water storage capacity 0.11 gal / per sf and is 1.0 inches thick.

11. Gard-Barrier RB: Gard-Barrier RB is a solid sheet of 20 mm (0.8") post industrial polystyrene. It is used to resist roots in landscape zones, planters, and green roofing applications.
12. Gard-Drain BCS: Gard-Drain BCS (Base drain collector system) is a prefabricated high flow rate collector system used in conjunction with the Gard-Drain drainage mediums. It is designed to collect the water that enters the Gard-Drain drainage composite collect it at the base of the foundation wall and discharge it into the plumbing system. It is used in lieu of a conventional pipe or (French drain). The physical properties are, compressive strength 9000 psf, core flow rate of 80 gpm and is 1.0 inches thick.

I. Filter Fabric:

(Note: To be used over XPS insulation under Ballast or Concrete Topping)

Product Name: Hydro-Tuff® Filter Fabric
 Packaging: Rolls
 Size: 12.5' wide
 360' length

J. Architectural Pedestal Set Pavers: *(Edit to project specifications for size, color, finish and thickness)*

Minimum physical properties:

Compressive Strength	ASTM-C140	=>8,000 psi/ave
Flexural Strength	ASTM-C293	=>800 psi/ave
Water Absorption	ASTM-C140	>6%
Freeze Thaw	ASTM-1260	=>1% loss of dry weight/50cycles
Center Load	WTCL-99	1850 lbs

1. Approved Paver Manufacturers:

- a. Wausau Tile Inc (800-388-8728)
 9001 U.S. 51 Business
 Rothschild, WI 54474
- b. Hanover Architectural Products (800-426-4242)
 5000 Hanover Road
 Hanover, PA 17331
- c. Stepstone Inc (310-327-7474)
 13238 S. Figueroa Street
 Los Angeles, CA

2. Paver Accessories:

- a. Paver accessories such as pedestals, tabs, extenders, levelers, elevators must all be obtained from the paver manufacturer to qualify for the paver manufacturers warranty.

K. Stone Roof Ballast: *(Note: Specifier review Dow Technote #508)*

- 1. Stone ballast shall be rounded stone well screened and washed. The stone ballast shall comply with ASTM-448-80. Gradations shall be #57, 2, 4 or 5.

L. Roof Ballast Pavers: *(Note: Specifier to edit for selection of pedestal set pavers or ballast set pavers. Ballast set pavers used as walkways or perimeter window washing equipment paths should be set on rubber tabs. And when stone ballast is used in conjunction with pedestal set pavers set stone metal edge restraint must be used. See paragraph L. for edge restraint)*

- 1. Roof Ballast pavers used for pure roof ballast or traffic walkways shall meet the following minimum properties;

Compressive Strength	ASTM C39	5000 psi
Flexural Strength	ASTM C78	720 psi / ave
Static Coefficient of friction	ASTM C1028-07	.75/ pass

(Note to specifier, contact paver manufacturer for size, dimensions and finishes available from each paver manufacturer)

M. Stone Metal Edge Restraint:

- 1. Metal edge restraint is required when ballast stone is placed in field of roof and up against raised pedestal paver.

Product:	Stone Metal Edge Restraint
Packaged:	10 pcs per box
Size:	10' long ea
Thickness:	.125 Aluminum / Slotted for drainage

PART III EXECUTION

3.01 Inspection

- A. The installing contractor (*approved by manufacturer*) shall examine all surfaces and conditions under which the work of this section is to be performed and notify the prime contractor, owner and architect if conditions exist that do not meet the project specifications nor the manufacturers requirements. Do not proceed with the work until all conditions are satisfactory and corrected and are in compliance with the specifications and comply with the manufacturers recommendations and warranty requirements.

3.02 Preparation

- A. Cast-in-place concrete or composition decks must be monolithic, smooth, and free of voids, spalls, laitance, honeycombs and protrusions that may puncture the membrane. New concrete should be cured for 28 days. Acceptable finish requirements are smooth wood float, light to medium broom finishes. Smooth trowel or burnt finishes are unacceptable. If concrete surfaces are smooth then mechanically shotblasting may be required. If curing compound are used get prior approval from manufacturer and perform adhesion test as recommended by manufacturer.
- B. Precast concrete decks shall be mechanically secured to minimize movement. All joints must be grouted flush.
- C. Plywood decks shall be a minimum of ½" thick, exterior grade, tongue and groove and mechanically secured to structural support according to all applicable codes. An adequate amount of fasteners shall be used as defined by local code or as specified in the construction documents. If nails are used ring shank nails are preferred.
- D. Metal decks shall be a minimum of 22 gauge. Metal decking shall be supported by adequate structural support. When gypsum board is used it shall be type "X" and have a minimum thickness of 5/8". Installation of substrate board shall follow all local code requirements.
- E. When insulation board is used under the Hydro-Tuff® membrane a cement board is required. The minimum thickness of the cement board is ½" thick. See manufacturer for approved substrate board adhesives.
- F. When insulation board is used under the membrane to provide slope to any roof deck this insulation must be a minimum of 60 psi. Extruded Polystyrene insulation is the preferred product. Contact manufacturer for additional information.

- G. Roof substrate boards shall be installed in a manner that all edge and end joints are supported by metal deck ribs. Roof substrate boards shall be staggered as recommended by manufacturer.
- H. Where required, a suitable vapor barrier membrane shall be installed to the metal deck prior to the installation of the substrate board.
- I. Expansion joints should be sealed with expansion joint manufacturers material. Detail expansion joints per manufacturers standard details. Contact **Hydro-Gard** for additional information concerning expansion joints.

3.03 Installation

A. Primer

- 1. Apply primer to all concrete surfaces. Allow primer to dry prior to installation of membrane. Primer can be installed using a hand held sprayer and should be applied at an evenly applied rate of 300 to 600 sf per gallon. Surface profiles can differ so adjust application rate based on surface profile. Do not allow primer to pool or become contaminated with dirt or foreign substances. When applied properly surface should be tan and not blackened. Note: membrane will not adhere properly to wet primer. Ensure all primer is dry to the touch.

B. Hydro-Tuff® HFA Membrane Preparation

- 1. Heat Hydro-Tuff® HFA membrane in double jacketed, oil bath type melter or double walled air jacketed melter. Both type's of melter oil & air jacket shall be equipped with mechanical agitation and be specifically designed for the preparation of a rubberized asphalt membrane. Do not use single wall, direct fire type of equipment. (Asphalt kettles are not acceptable.)
- 2. Heat Hydro-Tuff® HFA membrane until it can be drawn free flowing at a temperature range between 350°F (176°C) and 400°F (204°C). Avoid operating temperatures above 375°F (190°C).

C. Detailing/Flashing

- 1. All detailing and flashing shall be done in accordance with Manufacturers most current installation guidelines and details. Non moving cracks and joints up to 1/16" inch require no special detailing.
- 2. All detailing and flashing shall be completed before installing the Hydro-Tuff® HFA membrane to the field area. Reinforce all non-moving cracks and joints over 1/16" (1.6mm) up to 3/16" (150mm) in width with a minimum 6" (150mm) wide strip of HG Polyester Fabric. Set HG

Polyester Fabric in a 90 mil hot application of Hydro-Tuff® HFA centered over crack. Ensure that the HG Polyester Fabric is fully embedded in the membrane while the membrane is still hot. Overlap ends a minimum of 4" ensuring overlaps are fully embedded in hot membrane.

3. When Roof substrate boards are used as the substrate for the application of the Hydro- Tuff HFA membrane all joint of the board shall be detailed as described in item 2 above. When detailing is complete on roof substrate boards **all** joints shall be covered with 90 mils of membrane and a 6" detail strip of HG Polyester Fabric
4. When plywood is used as the substrate for the application of the Hydro-Tuff® HFA membrane follow items 2 and 3 above.
5. Precast Deck Joints: Reinforce all non-moving, grouted precast deck joints with a 6"(150mm) wide strip of neoprene flashing or Hydro-Tuff® MB flashing can be substituted for neoprene. Ensure that either flashing product is embedded in a 90 mil application of the membrane. (See manufacturer detail)
6. Concrete Curbs: When concrete curbs are cast-in-place on a cast-in-place slab a 6" wide piece of HG Polyester Fabric can be used to reinforce the corner transition. Apply a 90 mil application of Hydro-Tuff® HFA to reinforcement surface and embed HG Polyester Fabric returning a minimum of 3" onto the horizontal concrete deck. Ensure that fabric is fully embedded in the hot membrane. (See manufacturer detail)
7. Sheet Metal Flashing Vertical Curb: When sheet metal flashing is providing the vertical curb the flashing shall be detailed with neoprene. First ensure that metal flashing is properly fastened and secured to deck. Fasteners shall be spaced no greater than 12" oc from each other. Additional fasteners may be required to maintain a consistently flat and smooth surface. Fasteners shall be mushroom head type or other flat head type. Apply a 90 mil coat of Hydro-Tuff® HFA membrane to flashing and embed neoprene flashing ensuring that neoprene is fully embedded in hot membrane. Carry embedded membrane onto concrete slab a minimum of 4". (See manufacturer detail)
8. Deck Drains: Ensure that all Roof drains are provided with clamping rings. Examples of approved drains are Zurn models Z100, Z121 & A125 or JR Smith models 1011 - 1019 all with gravel guards. Drains shall be flashed in with neoprene flashing. Neoprene flashing shall extend 12" beyond clamping rings. Example: if drain diameter is 12" and neoprene is to extend 12" beyond then a single piece of neoprene flashing would be 36"x 36" square and set in 90 mils of Hydro-Tuff® HFA membrane. Once neoprene flashing is set fasten clamping ring and secure in place. (See manufacturer detail)

9. Penetrations: Roof penetrations shall be flashed with neoprene. All roof penetrations shall be secured in place. Penetrations shall be ridged pipe, ridged conduit or other metal type penetrations. Plastic type penetrations are not recommended. (See manufacturer details)

D. Membrane Application

1. Apply minimum 90 mil (2.3mm) thick base layer application of Hydro-Tuff® HFA membrane as a continuous monolithic coat over entire area to be waterproofed. This includes over all previous detail work cracks, joints, etc.
2. With the 90 mil base layer still hot and fluid, fully embed a layer of Hydro-Tuff® HG Polyester Fabric reinforcement into the top surface of the base layer membrane. Overlap fabric a minimum of 2" inches (50mm) on side laps and end laps. Immediately work fabric into 90 mil base layer application using flat squeegee, brooms or other acceptable methods.
3. Prior to base membrane layer completely cooling apply a minimum 125 mils (3.2mm) thick top layer of Hydro-Tuff® HFA over the reinforced base layer in one continuous monolithic application. **Total minimum membrane thickness shall be 215 mils (5.5mm) thick.**

E. Separation layer / Protection Course (*Edit to project specifications*)

1. While top layer of Hydro-Tuff® HFA membrane is still hot embed specified protection layer into the membrane; broom protection layer into membrane to ensure a good bond.
2. Overlap adjoining sheet edges a minimum of 2" to 3" for the Hydro-Tuff® PB & CS series and 6" for the Hydro-Tuff® ® HDPL. Laps for the Hydro-Tuff® PB, CS & HDPL series can be sealed with the Hydro-Tuff® Hot membrane or maybe left dry.
3. (*Specifier's option*): Hydro-Tuff® ® HDPL can have the seams heat welded. When contract documents call for heat welding the Hydro-Tuff® HDPL seams, they shall be installed as stated in item 2 above and overlapped by 6". Ensure that the overlap seam is clean and has no membrane inside the seam. Any membrane inside the portion of the seam scheduled to be hot air welded will have to be removed.
 - a. **Welding process:** When hand welding the lap/seam it shall be tack welded every 3 feet to hold the seam in place. The back edge of the lap (Approx: 4") shall be welded with a thin, continuous weld to prevent heat loss during final welding. The hot air nozzle shall be inserted into the lap keeping the welding equipment at a 45 degree angle to the side lap. Once the proper welding temperature has been

reached and HDPL material starts to flow, the hand roller shall be applied at right angles to the welding gun and pressed lightly.
(Contact manufacturer for additional information)

4. Separation/Protection layers are UV sensitive. Hydro-Tuff® PB series should not be left exposed to ultra-violet rays for more than 60 days during normal temperatures. Higher temperatures will reduce this 60 day period. Hydro-Tuff® CS and Hydro-Tuff® HDPL are not as UV sensitive and can be left exposed for extended periods of time. (Consult Manufacturer for any additional information).

F. Water Test

1. The roof area or portions thereof shall be leak tested by means of electronic testing or by ponding water. When using the water testing method maintain a minimum depth of 2" (50.8mm) for a period of 48 hours. Plug all drains and outlets and fill roofing surface with water ensuring structure can withstand the deadload weight of the water test.
 - a. When electronic testing is specified as with a water test all roofing work must be complete and visually inspected. No over burden shall be installed (such as insulation, rock ballast, pavers, etc), Contact electronic testing company for additional information.
 - b. In addition to above and prior to installation of over burdens the roofing system must be inspected by manufacturer or a manufacturer approved third party inspection firm. Inspection shall be documented and approved by manufacturer or inspection firm.

G. Drainage Course *(Edit to project specifications: Note, Gard-drain series 420, 700, 990 & 1000 are all acceptable applications).*

1. Installation of Gard-drain drainage course shall be installed over all horizontal roof areas (when specified). Install per manufacturers installation guidelines.
2. Layout and place in position drainage course and allow to relax so drainage course will lay flat. Cut and fit drainage course to perimeter and trim around all penetrations to within 1".
3. Overlap geotextile laps to ensure that adjacent sheets have seams covered with geotextile fabric. Adhere together if necessary to avoid debris from entering core of Gard-drain. Avoid UV exposure to filter fabric for prolonged periods of time.

H. Insulation

1. Place specified rigid insulation loose laid directly over the Gard-drain drainage composite. Stagger joints of insulation board by 50% of adjacent board or at a minimum of 24".
2. When multiple layers (more than a single layer) are used then the first or bottom layer must be the greater in thickness and shall be no less than 2" (50.8mm) thick. All layers shall be installed loose laid (non-bonded) to each other and all insulation joints staggered from each underlying layer.
3. The maximum acceptable spacing between insulation boards shall not be greater than 3/8" (9.5mm). And insulation boards shall be trimmed around all penetrations, gaps shall not be greater than 3/4" (19mm).

I. Filter Fabric Placement

1. Hydro-Tuff® Filter Fabric is to be placed over the top layer of insulation. Overlap filter fabric a minimum of 12". Stagger filter fabric joints so they do not align with one another.
2. Carry filter fabric up vertical surfaces of penetrations, curbs and other vertical conditions to approximately 3" above finish surface of stone ballast, paver or other over burden.
3. Ensure that no joints/seams of filter fabric come within 6' feet of the roof perimeter. This will require the initial installation of filter fabric be installed around perimeter and then continue into field of roof.
4. Extend filter fabric to drainage opening and trim as required as to not obstruct natural roof drainage. Trim filter fabric around all penetrations and secure to penetrations. Stone ballast must not be present under the filter fabric, if so remove filter fabric, remove stone ballast and reinstall until all stone ballast is positioned on filter fabric. *Stone ballast must not find its way to the insulation where it can enter the insulation joints.*
5. Temporary Ballast of Stone Filter Fabric: During the installation of the Stone filter fabric it maybe necessary to temporarily place ballast weight over filter fabric until stone ballast can be placed. Provide temporary ballast (ie: pavers, sand bags or other suitable means) at ends of filter fabric, seams of filter fabric to ensure that filter fabric stays in place until final ballast can be installed.

6. Stone filter fabric is not UV stable. Extended exposure to ultra violet rays will damage filter fabric. Cover filter fabric as soon as possible. Exposure to high temperature on filter fabric may cause insulation boards to warp. If construction schedules prohibit final installation of over burdens then delay installation of drainage composite, insulation, filter fabric and stone ballast.
*Note: If over burdens are delayed because of construction traffic either protect roofing membrane with suitable temporary protection or specify one of **Hydro-Gards** heavier protection materials. Either Hydro-Tuff® CS-100 or Hydro-Tuff® HDPL.*
- J. Air Layer (*Edit to project specifications: Note; It is the specifier's option to specify an air layer. Air layer can be used when the final over burden is cast in place concrete, mud set or sand set pavers. when specifying an air layer Gard-drain 302 is acceptable*).
1. Install Gard-drain 302 over the in place stone filter fabric when specified. Layout Gard-drain 302 and let relax and flatten out. Install per manufacturers instructions, abutting all adjacent drainage core edges an overlap geotextile on Gard-drain 302. Ensure that over burden (ie: cast in place concrete) does not enter over lap area.
 2. Cut and trim air layer in and around penetrations and perimeters and secure.
- K. Installation of Concrete Ballast Roof Pavers
(Edit to project specifications: Note; It is the specifier's option to specify if pavers are simple ballast pavers (ie: following the natural roof slope) or if the pavers are to be set on adjustable pedestals and are to provide a consistent flat elevation).
1. Review paver layout on contract documents. Verify that dimensions shown on plans and dimension of specified paver will match walk pads dimensions shown on roof plan. Provide shop drawings showing proposed layout, paths to serviceable equipment, dimensions, detailing around penetrations and support tabs when used.
 2. Pavers shall be by one of the approved manufacturers listed in this specification. Ensure that filter fabric is in place and ready for installation pavers. When air layer is used ensure air layer is lying flat and will provide a suitable surface for installation of tabs and pavers.
 3. Place concrete pavers on tabs were indicated by the project documents and approved layout. Accurately aligned and place pavers on tabs or if specified on adjustable pedestals. *(If adjustable pedestals are used then stone metal edge restraint must be used)* fit pavers snugly around penetrations per paver manufacturer requirements.

4. When pedestal set pavers are used the pedestal must be from the same manufacturer that makes the paver. Or as approved by Hydro-Gard
5. Joints in pavers shall be 3/16" or 1/8". In pedestal set pavers tolerances shall be a maximum of 1/16" height variation between paver to paver. Paved areas shall not vary more than a 1/4" from level in a distance of 10 lf feet in all directions.
6. Cleaning: when specified clean pavers using high pressure water and scrub paver with a non suds detergent. Rinse clean.

L. Stone Ballast

1. Ballast design shall be in accordance with Dow Chemical Company Tech Note508 (Ballast Design Guide for IRMA Roofs), and other applicable codes or wind design criteria.
2. Apply ballast uniformly over filter fabric at a rate required by **Hydro-gard** or the Dow Tech Note 508 design guide.
3. Ballast Stone shall consist of crushed or river bottom stone and/or pressed concrete pavers.
 - a. Stone ballast shall be in accordance with ASTM D448, size 57, 2,4 or 5.
 - b. Paver ballast shall provide a weight no less than 18 lbs/sf.
 - c. When paver ballast covers more than 10% of the insulated roof area an air layer is recommended. Air layer shall be installed between the insulation and the underside of the paver.

3.04 Job Completion

- A. In areas where adjacent finished surfaces have been soiled by this work, consult with manufacturer of surfaces for cleaning measured and cleaning products. Restore adjacent surfaces to their original state.
- B. Remove and dispose of all debris, excess materials, equipment and dispose of waste in conformance with local law or any governmental agency.
- C. Installing contractor, inspection company and manufacturers representative shall walk the final work and notify the owner or architect of any defects. All defects must be corrected by contractor before manufacturer issues warranty.

END OF SECTION 07 55 56.13