SECTION 071354
THERMOPLASTIC SHEET WATERPROOFING

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 Thermoplastic Sheet 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 This guide specification was issued on December 2012 and may be superseded without notice at anytime.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-GARD systems are engineered to waterproof various types of conditions including:

- Plaza Decks
- Foundation Walls
- Split Slabs
- Matt Foundation Slabs
- Property Line Applications
- Earth Covered Structures including Subways and Tunnels
- Free Standing Wall applications
- Paver Ballasted Roofs
- Elevator Pits
- Tanks and Reservoirs
- Fountains

System Description

The HYDRO-GARD Waterproofing System Hydro-Prufe® is a complete membrane waterproofing system designed to protect the building contents from damage caused by water infiltration. The Hydro-Prufe® PVC waterproofing system is intended to protect an array of applications. Some of these applications include between slab membranes such as plaza decks, balcony decks, parking decks when under concrete topping, planter boxes, landscape zones, Green Roofs, tunnels, fountains, water features and Protected Membrane Roofing applications.

All HYDRO-GARD waterproofing systems integrate various systems components into specific engineered waterproofing assemblies that address the individual needs of building design, budget, substrate conditions, climate and environment.

Each assembly integrates various components including geotextiles, thermal insulation, drainage layers, protection layers, expansion joints, and most importantly the HYDRO-GARD waterproofing membranes produce an engineered waterproofing solution for a specific waterproofing problem.

This instruction manual covers the specific installation requirements for the following systems.

HYDRO-PRUFE® WATERPROOFING SYSTEMS UNDER CONCRETE TOPPINGS, UNDER LANDSCAPE CONDITIONS AND VEGETATED DECKS

Hydro-Prufe® Waterproofing Membranes

The HYDRO-GARD Hydro-Prufe® waterproofing membranes are specially formulated thermoplastic sheets manufactured by a unique calendering and laminating process. The PVC membrane is specially compounded to remain watertight in a sub-grade environment of constant dampness, high alkalinity, exposure to plant roots, fungi, and bacterial organisms, as well as varying levels of hydrostatic pressure. The membrane's resistance to ponding water along with its dimensional stability and elongation characteristics make it an excellent sub-grade membrane.

The Hydro-Prufe® waterproofing membrane is an 80 Mil unreinforced PVC Sheet Membrane. The membrane is white/grey.

Welding of Seams and Flashings

As a thermoplastic membrane Hydro-Prufe® seams and flashings are welded together with automatic and hand held welding equipment. No sealants, adhesives, or tapes are used to complete the Hydro-Prufe® seams. When completed, the welded seam becomes one monolithic layer of material impervious to moisture infiltration and as strong as the membrane itself. The welded seam is the most secure seaming method available in the thermoplastic market.

Intricate flashings such as pipes, multiple corner intersections, and transitions can be installed with confidence in performance. Ambient temperature, humidity, and other climatic conditions will not negatively influence the installation or performance of Hydro-Prufe® membrane flashing. Due to the dimensional stability and elongation characteristics of the membrane reflective substrate cracking or minor settlement of the structure can be accompanied by the waterproofing system. Flashing thickness remains constant at wall transitions and penetrations.

Welding can be monitored, inspected, and tested for continuity and quality. Seam samples are frequently taken and tested on-site for quality. The problems of adhesive seaming, reliance on liquids or dissimilar membrane materials or different coefficients of expansion and contraction - a major cause of waterproofing system failure - is eliminated. The welding process provides the best method of joining seams and flashings.

Typically, flashing membranes are of the same mil thickness as the primary waterproofing. However, intricate flashings may require a more pliable thickness (60 mil) when heavy thicknesses are used as the field membranes such as the Hydro-Prufe® 80 mil system is used. Contact the manufacturer for recommended flashing thickness when using the 80 mil membrane

System Advantages

1. Proven track record of in place performance. (PVC membranes have over 30 years of in place performance)
2. All components are factory fabricated - no mixing, kettles, or contamination problems on-site insuring product consistence and quality.
3. Ideal for new construction and renovation projects.
4. No variations in thickness. Thickness is controlled by the manufacture process and not the expertise of the installer.
5. Surface preparation is limited.

6. Easily installed over irregular surfaces.
7. Can be installed over damp surfaces in any temperature increasing contractor productivity and lowering installed costs.
8. Welded seams and flashings provide superior performance.
9. Loose-laid membrane can accommodate movement and minor settlement without affecting the performance of the waterproofing system.
10. Hydro-Prufe® membranes and flashings are unreinforced as a standard, but can be reinforced. See the manufacturer for additional information on reinforced.
11. Seams can be monitored, tested, and inspected for continuity and quality.
12. Complete waterproofing system inclusive of membrane, flashings, expansion joints, thermal insulation, drainage panels, geotextiles, protection layers, and fasteners.
13. Highest degree of quality control and system quality assurance.
14. Third party full time inspection is available. Contact the manufacturer for approved inspection firms.
15. Trained and authorized certified applicators.
16. Various Warranties available
17. Competitive installation costs.
18. Certification: Hydro-Prufe® PVC Thermoplastic Waterproofing system has successfully gone through a rigorous testing process through ICC Evaluation Service. ICC has issued to Hydro-Gard report number ESR-3465

Substrate Preparation

Concrete Slabs:

The substrate must be smooth, clean and dry. All irregularities must be removed and repaired. Concrete must be cured and dry. Substrate requirements vary depending on which Hydro-Prufe® system is used. Contact manufacturer for special conditions concerning substrates.

Concrete slab finishes shall be at a minimum smooth float finish. Surface profile shall not have excessive roughness or unevenness. Substrates shall be sound and even. The substrate may have moisture or be damp with the exception of ponding water. Sweep off all ponding water and let the surface dry.

Plywood Substrates:

Plywood substrates must be sound and fully supported. Fastening of the plywood shall follow the American Plywood Association requirements. All fasteners must be sound and flush or countersunk with the surface of the plywood decking. Follow the project specifications for additional requirements.

Precast Concrete Substrates:

Precast concrete decks similar to double tees, span-crete decks or other pre-manufactured concrete decking it is recommended that an additional concrete topping slab is placed over the precast units. Contact the manufacturer for any additional information.

Metal Decking:

When metal decking is used for the substrate it must be of the appropriate gauge and structural supported. Metal decking will require the installation of a substrate board prior to the installation of the Hydro-Prufe® PVC Thermoplastic Waterproofing system. Substrate board shall be a minimum of 5/8" thick but it is recommended that ½" substrate board is used. Fastening shall follow the guideline of the local code or other governing authority having jurisdiction. Fasteners shall be flush with the substrate board and shall not protrude above the substrate board. Approved substrate boards include plywood, OSB,Gypsum type like Dens-Deck or other cement type board. Consultant with the manufacturer for additional information.

Deck Drains / Roof Drains:

Roof and Deck drains are to be approved by HYDRO-GARD. Drains are required to be supplied with clamping rings so the Hydro-Prufe® PVC membrane can be clamped down onto the bowl of the drain. Drains are to be of cast iron type unless substitutions are approved by HYDRO-GARD. Drains are to be in place cast in deck and secured with under deck clamps and plumbed and operational. Drains must be operational and functional in order for the Hydro-Prufe® PVC membrane to be water tested. Side outlet drains (Type that is cast into deck wall intersections) and trench drain types are discouraged. These drains are difficult to obtain a positive seal with waterproofing membranes. (Contact the manufacturer for additional information)

Technical Assistance

At HYDRO-GARD we offer the technical assistance needed for the complex waterproofing project. Waterproofing whether it is subterranean, between slabs, or buried under landscape zones can cause problems within any building. For these reasons product selection, design, quality installations and quality control is essential for any successful waterproofing installation. Damage to in place waterproofing systems are common and result in the greatest number of waterproofing failures. Even the best waterproofing installation can be damaged. This is why HYDRO-GARD has designed their systems with this in mind. We offer an array of protection products that decrease the possibility of damage. HYDRO-GARD also recommends that the owner or general contractor retain a certified and trained third-party inspection company. Contact HYDRO-GARD for more information regarding certified third-party inspection requirements.

HYDRO-GARD offers the following assistance:

1. Architectural detail and drawing review. When HYDRO-GARD is the specified product, we take care to ensure the design complies with our standards and warranty requirements.
2 Approved Contractors. HYDRO-GARD provides training to all its approved contractors to ensure they are well trained in all the HYDRO-GARD products they install.
3. HYDRO-GARD supports and encourages the use of shop drawings from its approved contractors. HYDRO-GARD will review these shop drawings prior to submission and approval.
4. HYDRO-GARD review and inspect substrates prior to installation of any of its products.
5. HYDRO-GARD will make on site periodic inspections.
6. HYDRO-GARD or its approved contractor will make photographic documentation of the installation.
7. Water Testing will be reviewed by the approved third-party inspection company.
8. HYDRO-GARD recommends third party Inspection and acceptance of waterproofing system prior to installation of protective layers.
9. HYDRO-GARD recommends third party Monitoring of back fill operation.

The HYDRO-GARD quality assurance program is designed to ensure that the waterproofing installation is installed in full compliance with HYDRO-GARD specifications and requirements. HYDRO-GARD is fully committed to provide the owner with a proven waterproofing system installed by a HYDRO-GARD approved contractor.

System Components

The Hydro-Prufe® systems can be installed to, horizontal split slab applications, free standing wall applications whether cast in place or concrete blocks, vegetated green roof applications, under precast concrete paving on pedestals and lining systems for tanks, reservoirs, tunnels, ponds and fountains:

1. Induction Fastening Plates: These plates are used in vertical applications. They are used in shoring applications, vertical concrete or CMU wall applications or any application where they are fastened through an approved substrate to secure a leveling layer such as Hydro-Ultra Mat or Hydro-Ultra Mat B.

2. Hydro-Ultra Mat: Hydro-Ultra Mat is a geotextile buffer layer. It is designed to overlay a substrate may it be concrete, CMU, plywood or other approved substrate. It can also be used as a protection layer over the Hydro-Prufe® PVC membrane. In vertical applications it is secured in place with induction plates. In horizontal applications it is loose laid over the substrate. Hydro-Ultra Mat comes in weights from 8 oz per square yard to 24 oz per square yard. Hydro-Ultra Mat B is a non woven polypropylene matt filled with sodium bentonite granules encapsulated within the non woven polypropylene. Hydro-Ultra Mat B is used as an additional waterproofing layer when hydrostatic conditions exist. Contact Hydro-Gard for additional information.

3. Hydro-Prufe® PVC Membrane: Hydro-Prufe® is a non reinforced PVC membrane. It is the primary waterproofing product in the Hydro-Prufe® systems. It comes in 80 mil thickness. The roll standard width is 6.75 feet by 65' feet long.

4. HDPE protection layer: Hydro-Prufe® HDPE protection layer is the primary protection layer used in horizontal applications. It can also be used in vertical applications over the PVC membrane. Hydro-Ultra Mat can also be substituted for the HDPE protection layer. The HDPE protection layer comes in thicknesses of 30 mil, 40 mil, 60 mil and 80 mil. When Gard-Drain is used over the Hydro-Prufe® membrane either the HDPE protection layer can be used or the Hydro-Ultra Mat can be used in its place. Contact the manufacturer for appropriate thicknesses for specific applications.

5. Hydro-Prufe® PVC Waterstop: Hydro-Prufe® PVC waterstop is an extruded PVC waterstop designed specifically by HYDRO-GARD to compartmentalize specific areas within blind side vertical applications. It has a swelling sealant tape along three sides of the PVC waterstop. When the waterstop comes into contact with water it swells and creates a segregated compartment. Hydro-Prufe® PVC waterstop can also be used for termination details. It can be cast in the substrate and provide a solid point of termination for the Hydro-Prufe® PVC membrane to terminate against.

6. Hydro-Prufe® Flashing Membrane: Hydro-Prufe® PVC flashing membrane is made from the same membrane as the field membrane but comes in different roll sizes and is 60 mils thick. It is used to flash penetrations, drains, curbs, walls, corners and anywhere else detailing is needed.

7. Gard-Stop SK Tape: Gard-Stop SK tape is a self adhesive swelling sealant tape. It has a release liner on one side. Simply adhere the tape to the Hydro-Prufe® PVC waterstop per Hydro-Gard details for compartmentalization. It is also used as a conventional sealing tape such as around penetrations, behind the PVC membrane where a termination bar can be placed and fastened through the PVC membrane and the tape. (See the manufacturer for additional information)

8. Hydro-Gard Swell Tape: Hydro-Gard Swell Tape is a Hydrophilic Rubber waterstop. When the Hydro-Gard Swell Tape comes in contact with water it expands and creates a gasket type of seal. Like the Gard-Stop SK Tape it can also be used in conjunction with the Hydro-Prufe® PVC waterstop. It is adhered to the PVC waterstop utilizing the SAF-30 adhesive. Hydro-Gard Swell tape may also be used in conventional applications such as between construction joints from one concrete pour to another. It comes in a variety of sizes. See data sheet for additional information.

9. Waterstop B: Waterstop B is a traditional bentonite joint sealing waterstop. It consists of bentonite embedded in a matrix of polyisobutylene and special fillers. Its primary use is for sealing concrete construction joints. It can be mechanically fastened or adhered in place. When Waterstop-B comes in contact with water it will expand and seal the construction joint. Waterstop-B comes in multiple sizes. (See data sheet for additional information)

10. HP Liquid Flashing 9800: HP Liquid Flashing is a flexible methyl methacrylate polyurethane resin. It is 100% reactive and is used with the Hydro-Prufe® PVC membrane. HP Liquid Flashing 9800 is used as a detail membrane for those difficult conditions where conventional flashings just can't conform to a particular shape. It can also be used as an embedment sealant to embed the Hydro-Prufe® Membrane into. (See manufacturers' details for additional applications.)

11. Gard-Tape: Gard-Tape is a double-sided sealant tape with a release liner on each side. It is designed to adhere to most substrates. It is used as an accessory product to the Hydro-Prufe® PVC membrane. Its primary use is for termination points for the Hydro-Prufe® PVC membrane. It is used behind the membrane when the membrane is terminated at grade, around pipe penetrations etc. (See manufacturer details for additional information.)

12. Adhesive U 410-D: Adhesive U 410-D is a urethane elastomeric adhesive which provides a high strength bond to substrates that are dry. It can be used over plywood, masonry, concrete and Dens Deck Gypsum board. It is used to adhere the Hydro-Prufe® PVC membrane and Hydro-Prufe® PVC flashings.

13. Adhesive U 148-A: Adhesive U 148-A is a solvent based contact adhesive. It is used in similar applications as the Adhesive U 410-D but both surfaces the U 148-A is applied. It is applied to the PVC membrane and the mating substrate.

14. SAF-30 Ahesive: SAF-30 is a modified methacrylate liquid paste in tube form. It is primarily used as an adhesive to bond accessory products like the hydrophilic Hydro-Gard Swell tape and the waterstop B to the Hydro-Prufe® PVC waterstop when compartmentalization is designed. (Consult Hydro-Gard for additional applications)

15. Centrix Magnet: The Centrix magnet is used to secure the Hydro-Prufe® PVC membrane to the induction plates behind the membrane once the induction welding is completed. Immediately after the induction weld is performed, the Centrix magnet is placed over the membrane until full adhesion is achieved.

16. HG-Extrusion Welding Rod: HG-Extrusion Welding Rod is a 3 mm PVC welding coil used in extrusion welding. This 3 mm coil is placed in a conventional extrusion welding machine and melted through the machine and installed at the seam of the Hydro-Prufe® PVC membrane after the PVC membrane has been fully hot air welded. (See the installation portion of the specification for additional information.)

17. Hydro-Retention Mat 22: Hydro-Retention Mat 22 is a non woven polypropylene moisture retention mat. This moisture retention mat has non-rotting fibers and promotes good vegetation growth for vegetated green roofs. Hydro-Retention Mat 22 is placed over the insulation and under the Gard-Drain GRS in Green Roofing applications.

18. GRS-Filter Cloth: GRS Filter Cloth is a 100% polypropylene non woven geotextile filter cloth manufactured with staple fibers which are formed into a random network. The GRS-Filter Cloth is resistant to biological degradation and resistant to naturally encountered chemicals. GRS-Filter Cloth is placed over the Gard-Drain GRS in vegetated Green roof applications. The fabric flow rate is 140 gpm per square foot.

19. Gard-Barrier RB: Gard-Barrier RB is a solid sheet of 20 mm post industrial polystyrene re-grind. The Gard-Barrier RB is designed to resist roots in landscape applications. It is used in landscape zones, planting areas and Green roof applications. When used with any of the Hydro-Gard waterproofing systems it will protect the Hydro-Gard waterproofing systems from root infiltration.

Drainage Components

1. Gard-Drain: Hydro-Gard provides an array of different drainage products. Each has different properties, compression strengths and flow rates. Below is a list of the drainage products Hydro-Gard supplies. Contact manufacturer for data sheet and literature on any of the Gard-Drain products.

   Gard-Drain 200, Gard-Drain 220, Gard-Drain 400, Gard-Drain 400 RB-T, Gard-Drain 400 RB-W, Gard-Drain 420, Gard-Drain 700, Gard-Drain 990, Gard-Drain 1000, Gard-Drain GRS, Gard-Drain RB, and Gard-Drain BCS.

INSTALLATION MANUAL FOR HYDRO-PRUFE® (PLAZA DECKS, PLANTERS & GREEN ROOFS)

Part 1 - General Conditions

1.01 Description

A. Summary:

This installation manual is specific for the installation of Hydro-Prufe® PVC waterproofing system for Plaza decks, Planters & Green Roof applications. For other applications refer to specific installation manuals supplied by Hydro-Gard.

The work includes but is not necessarily limited to the following:

1. Substrate preparation (See above for different substrate conditions)
2. Buffer layer (Hydro-Ultra Mat)
3. Hydro-Prufe® PVC membrane 80 mil
4. Protective Layers (HDPE protection layer or Hydro-Ultra Mat)
5. Gard-Drain Drainage Layer (300 series, 700 series, 990 series, 1000 series)
6. Membrane Flashings (Hydro-Prufe® PVC flashings)
7. Extruded Insulation (If required)
8. Liquid Flashing (HP Liquid Flashing 9800)

9. Gard-Drain GRS (If required)
10. Gard-Barrier RB (If required)
11. Hydro-Retention 22 Water Retention Mat (If required)
12. Termination Stops (Hydro-Prufe® PVC extruded waterstop)
13. Sealant Tape (Gard-Stop SK swelling tape)
14. Fastening bars and fasteners as supplied or approved by Hydro-Gard.

B. Related Work under other sections:

1. Site work: Irrigation system, Planting and Landscaping
2. Concrete: Forming and placement, curing compounds
3. Paving: Pedestal Set Pavers, Sand sent Pavers and Mud Set Pavers
4. Plumbing: Drainage, Drains and Scuppers
5. Sheet Metal: Metal counter flashing

1.02 Quality Assurance

A. Applicator Qualifications: The applicator shall be approved to install the specified system if the Thermoplastic system is not installed by manufacturer. The applicator shall have a minimum of (3) years experience in the work of the type required by this manual. The applicator shall have completed and passed the manufacturers training and guidelines.

B. Installation of waterproofing membrane, flashing, membrane protection layers, drainage layer and insulation shall be the responsibility of the membrane applicator to ensure undivided responsibility. The applicator shall ensure that all manufacturers' guidelines are followed at all times.

C. Materials: Obtain waterproofing products and accessories from a single manufacturer to assure material compatibility or as approved by manufacturer.

D. Independent Inspection: The owner or Architect shall make arrangements to retain and 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 subcontractors shop drawings, manufacturers' details and specification. The inspection company must be approved by the manufacturer and had previously completed the manufacturer's inspection training. Inspection service shall provide reports, photos, documenting the installation of all waterproofing work. These reports shall be made available to owner, general contractor, waterproofing contractor and manufacturer. The inspector shall review, document, and photograph all work. A report shall be provided to the Architect, owner, contractor, installing contractor and manufacturer.

E. Pre-Installation Conference: Conduct Conference at the project site to comply with the requirements of division 1 of the specifications. Review requirements of substrate preparation, penetrations, (If applicable) waterstop installation, Hydro-Prufe® PVC waterstop locations (If applicable), and all termination conditions. The attendee's shall include a representative of the owner, Architect, inspection firm, general contractor, waterproofing contractor, plumbing contractor, and any

other contractors whose work will penetrate the waterproofing or may interface with the waterproofing.

F. There shall be no deviation made from the contract specification or the approved shop drawings without prior written approval by the owner, the owner's representative, and membrane manufacturer.

G. Seam sampling: In addition to the waterproofing applicator probing the completed seams the Third party inspection company shall probe all seams. If deemed necessary by the inspection company seam sampling shall be performed. Sample the seam strength by cutting a cross section a minimum of Two inches wide from a completed and probed seam. Test samples shall be tested by inspection company and documented on an inspection report. Inspection company shall consult with the manufacturer on level of acceptability. Shearing of the membrane rather than separation of the weld will constitute an acceptable weld. The applicator shall repair test cut with a round target patch 4" inch minimum in diameter.

H. Water Testing: Test for leaks by installing plugs in all drains and filling deck area with 2" of water and let set for 48 hours.

Install dams where necessary to segment water testing area so 2" minimum of water can be maintained for length of water test.

1.03 Submittals

A. The Contractor shall submit to the owner's representative the following:

B. Prepare and submit specified submittals in accordance with the contract documents and division 1 submittals.

C. Submit manufacturers' product literature and installation guidelines along with the manufacturer's standard details.

D. Submit representative samples of all products listed in this installation manual.

E. Submit Sample warranty certificate from manufacturer.

F. Submit shop drawings when required by project specifications.

1.04 Product Delivery, Storage and Handling

A. Delivery: Materials shall be delivered in their original packaging, clearly marked with manufacturers' name, brand and type of material. Store materials to avoid damage from trade construction, weather damage, or UV over exposure.

B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture with canvas tarpaulins.

C. Membrane rolls shall be stored lying down on pallets, and be fully protected from

moisture with canvas tarpaulins.

D. Adhesives shall be stored at temperatures above 40 degrees F and be covered. Do not store at a temperature greater than 80 degrees.

E. All flammable materials shall be stored in a cool dry area away from sparks and open flames. Follow precautions outlined on the container or supplied by material manufacturer/supplier.

F. Any material which is determined damaged by the owner's representative are to be removed from the job site and replaced at no cost to the owner.

1.05 Job Conditions (SEE SUBSTRATE PREPARATION IN THIS MANUAL)

A. Proceed with waterproofing membrane installation only after substrate preparation is complete. Obtain acceptance from the owner's representative and the membrane manufacturer's representative of substrate surface before proceeding with membrane installation. Waterproofing contractor is responsible for ensuring substrate is adequately prepared to receive waterproofing system.

B. The substrate must be clean and smooth. Do not work in rain or snow. Severe temperatures, moisture and humidity may affect the installation and performance of products during construction. Consult with the manufacturers and comply with applicable recommendations of all materials of workmanship and handling.

C. This specification contemplates the use of a waterproofing system with structures designed to support the system, including the hydrostatic pressure and backfill. The adequacy of the structure support must be verified in writing by the owner, the owner's design professional, architect, or engineer.

D. Ensure that the substrate is sound and dry. If water is present remove prior to proceeding. Ensure all penetrations are in place or proper sleeves have been provided. All Plumbing drains shall be in place and operational.

E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner, at all times, as to preclude wind blow-off or damages.

F. The contractor is cautioned that certain membranes are incompatible with asphalt and oil based and plastic based cements. Avoid contact with asphalt and oil based products with PVC membranes. Contact the manufacturer when this occurs.

G. Arrange work sequence to avoid damage to newly constructed waterproofing. Any damage which occurs to the waterproofing membrane and/or system is to be brought to the attention of the owner's representative, inspection firm and membrane manufacturer. All damage is to be repaired according to the membrane manufacturer's recommendations.

H. Prior to and during application, all dirt, debris, and dust shall be removed from the

surface either by vacuuming, sweeping, blowing with compressed air and/or similar methods.

I. If any unusual or concealed condition is discovered, stop work and notify the owner's representative, inspection firm and membrane manufacturer immediately, in writing.

J. Liquid materials such as solvents and adhesives shall be stored and used away from open flames, sparks and excessive heat.

K. Contaminants, such as grease, fats, oils, and solvents, shall not be allowed to come into direct contact with the waterproofing membrane. Any such contact shall be reported to the manufacturer.

L. The contractor should take necessary precautions when using adhesives around air intakes. The smell of the adhesives could be a disturbance to the building owner and occupants. It is the contractor's responsibility to coordinate equipment to be turned off and on with the owner if necessary.

1.06 Sequencing of the work

A. Work in conjunction with other trades by the timely performance of the work, including installation of protection layer(s), drainage panels, and insulation. Coordinate with other trades to avoid damage to the waterproofing membrane.

1. Complete sections of the waterproofing membrane shall be accepted by the inspection firm and manufacturer before proceeding with protection layers and/or any form of over burden.

1.07 Warranties

A. Special Installer Warranty:

The installer shall provide a 2 year installer warranty. This warranty shall insure against leaks in the waterproofing system caused by defects in the installation of the waterproofing system. The installer warranty shall include defects in materials or workmanship. Upon notification of such defects or leaks with the warranty period the installer shall make all repairs necessary to remedy the leaks in the waterproofing system.

B. Manufacturers' warranty

Hydro-Gard shall offer the manufacturers standard warranty upon request of a property executed warranty application form. The warranty shall be issued upon confirmation that the Hydro-Prufe® system has complied with the manufacturers' requirements. Manufacturers' warranty shall be independent from any other warranty made by Contractor under requirements of the Contract Documents and may run concurrent with the other warranties.

Part 2 - Products

2.01 PVC Waterproofing Membrane

A. Hydro-Prufe® 80 mil Unreinforced Thermoplastic Sheeting

Parameters	**ASTM Test Method**	**Typical Physical Properties**
Color		White / Grey
Overall thickness mm(inches), min.	D-751	2.0 mm / .080
Tensil strength psi, min.	D-638	1500 psi
Elongation at break, min., %	D-638	250
Seam strength, min., % of tensil strength	D-751	75%
Tear resistance	D-1004	10
Low temperature bend (-40 degrees F)	D-2136	-40
Dimensional stability	D-1204	.01
Water absorption	D-570	3.0
Laminated Bond Strength	D-413	24
Flammability	D-568	SE
Accelerated Weather	D-4434	No Cracking

*Failure occurs through membrane rupture not seam failure

2.02 Manufacturer

A. HYDRO-GARD LLC
18340 Yorba Linda Blvd., Suite 107, Box 304
Yorba Linda, CA 92886 Ph: 562-944-7030 Fax: 562-944-6402

2.03 Hydro-Prufe® Products and Accessories

A. Accessories:

1. Induction Fastening Plates: These plates are used in vertical applications. They are used in shoring applications, vertical concrete or CMU wall applications or any application where they are fastened through an approved substrate to secure a leveling layer such as Hydro-Ultra Mat or Hydro-Ultra Mat B.

2. Hydro-Ultra Mat: Hydro-Ultra Mat is a geotextile buffer layer. It is designed to overlay a substrate may it be concrete, CMU, shoring or other approved substrate. In vertical applications it is secured in place with induction plates. In horizontal applications it is loose laid over the substrate. Hydro-Ultra Mat comes in weights from 8 oz per square yard to 24 oz per square yard.

3. Hydro-Prufe® PVC Membrane: Hydro-Prufe® is a non reinforced PVC membrane. It is the primary waterproofing product in the Hydro-Prufe® systems. It comes in, 80 mil thickness. The roll standard width is 6.75 feet by 65' feet long.

4. HDPE protection layer: Hydro-Prufe® HDPE protection layer is the primary protection layer used in horizontal applications. It can also be used in vertical applications over the PVC membrane in blind side application in lieu of the Hydro-Ultra Mat (Consult manufacturer for specific applications). It comes in thicknesses of 30 mil, 40 mil, 60 mil and 80 mil. For vertical application it is recommended that 30 mil or 40 mil be utilized. It can be spot welded or fully welded.

5. Hydro-Prufe® PVC Waterstop: Hydro-Prufe® PVC waterstop is an extruded PVC waterstop designed specifically by HYDRO-GARD to compartmentalize specific areas within blind side vertical applications. It has a swelling sealant tape along three sides of the PVC waterstop. When the waterstop comes into contact with water it swells and creates a segregated compartment. Hydro-Prufe® PVC waterstop can also be used for termination details. It can be cast in the substrate and provide a solid point of termination for the Hydro-Prufe® PVC membrane to terminate against.

6. Hydro-Prufe® Flashing Membrane: Hydro-Prufe® PVC flashing membrane is made from the same membrane as the field membrane but

comes in different roll sizes and is 60 mils thick. It is used to flash penetrations, drains, curbs, walls, corners and anywhere else detailing is needed.

7. Gard-Stop SK Tape: Gard-Stop SK tape is a self adhesive swelling sealant tape. It has a release liner on one side. It is used with the Hydro-Prufe® PVC waterstop. Simply adhere the tape to the Hydro-Prufe® PVC waterstop per Hydro-Gard details for compartmentalization. It is also used as a conventional sealing tape such as around penetrations, behind The PVC membrane where a termination bar can be placed and fastened through the PVC membrane and the tape. (See the manufacturer for additional information)

8. HP Liquid Flashing 9800: HP Liquid Flashing is a flexible methyl methacrylate polyurethane resin. It is 100% reactive and is used with the Hydro-Prufe® PVC membrane. HP Liquid Flashing 9800 is used as a detail membrane for those difficult conditions where conventional flashings just can't conform to a particular shape. It can also be used as an embedment sealant to embed the Hydro-Prufe® Membrane into. (See the manufacturers' details for additional applications.)

9. Gard-Tape: Gard-Tape is a double-sided sealant tape with a release liner on each side. It is designed to adhere to most substrates. It is used as an accessory product to the Hydro-Prufe® PVC membrane. Its primary use is for termination points for the Hydro-Prufe® PVC membrane. It is used behind the membrane when the membrane is terminated at grade, around pipe penetrations etc. (See the manufacturers' details for additional information.)

10. Adhesive U 410-D: Adhesive U 410-D is a urethane elastomeric adhesive which provides a high strength bond to substrates that are dry. It can be used over plywood, masonry, concrete and Dens Deck Gypsum board. It is used to adhere the Hydro-Prufe® PVC membrane and Hydro-Prufe® PVC flashings.

11. Adhesive U 148-A: Adhesive U 148-A is a solvent based contact adhesive. It is used in similar applications as the Adhesive U 410-D but both surfaces the U 148-A is applied. It is applied to the PVC membrane and the mating substrate.

12. SAF-30 Adhesive: SAF-30 is a modified methacrylate liquid paste in tube form. It is primarily used as an adhesive to bond accessory products like the hydrophilic Hydro-Gard Swell tape and the waterstop B to the Hydro-Prufe® PVC waterstop when compartmentalization is designed. (Consult Hydro-Gard for additional applications)

13. Centrix Magnet: The Centrix magnet is used to secure the Hydro-Prufe® PVC membrane to the induction plates behind the membrane once the induction welding is completed. Immediately after the induction weld is performed, the Centrix magnet is placed over the membrane until full

adhesion is achieved.

14. Hydro-Ultra Mat B: Hydro-Ultra Mat B is a non woven polypropylene mat filled with sodium bentonite granules encapsulated within the non woven polypropylene. The primary use of Hydro-Ultra Mat B is as a buffer mat used between the Hydro-Prufe® PVC membrane and the substrate the PVC membrane is being installed to. When the Hydro-Prufe® PVC waterproofing system is being used under hydrostatic conditions, Hydro-Ultra Mat B is a requirement. It can be used against shoring, free standing walls, cut and cover tunnels and anywhere a double layer is required.

15. Hydro-Retention-22: Hydro-Retention 22 is a non woven water retention mat. The moisture mat has non-rotting fibers and promotes good vegetation growth for vegetated roofing. It comes in 22 ounces per square yard. It is one of the Garden Roof components.

16. PVC Clad Metal: PVC Clad Metal is approximately.020 (508 mm) thick PVC membrane laminated to 24 gauge stainless or galvanized sheet metal. It is used to custom fabricate scuppers, flashing and other custom made shapes making it possible to weld the Hydro-Prufe® PVC membranes to.

17. GRS-Filter Cloth: GRS Filter Cloth is a 100% polypropylene non woven geotextile filter cloth manufactured with staple fibers which are formed into a random network. The GRS-Filter Cloth is resistant to biological degradation and resistant to naturally encountered chemicals. GRS-Filter Cloth is placed over the Gard-Drain GRS in vegetated Green roof applications. The fabric flow rate is 140 gpm per square foot.

B. Drainage Components

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. It 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. It's 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.

2.04 Related Materials

A. Sealants

The following sealants are accepted based on chemical compatibility with Hydro-Prufe® membrane.

1. Sonneborn NP-1 by Chemrex, Inc.

2. Vulkem 116 by Mameco International

3. Vulkem 921 by Mameco International

4. Tremseal-S by Tremco

B. Miscellaneous Fasteners and Anchors

All fasteners and Anchors

All fasteners shall be of the same type as the metal being secured. In general all fasteners, anchors, nails, straps, shall be of stainless steel. Fasteners are to be compatible with materials in contact with fasteners. All fasteners and anchors shall have a minimum embedment of 1-1/4 inches and shall be approved for such use by the fastener manufacturer. Fasteners for attachment of metal to wood expansion type fasteners. All fasteners shall meet the factory mutual standard 4470 for corrosion resistance.

Part 3 - Execution

3.01 General

The waterproofing contractor shall coordinate the installation so that each area is made watertight at the end of each work period or onset of inclement weather whenever possible. Trapped water under the Hydro-Prufe® PVC waterproofing system must be removed prior to proceeding with the system.

3.02 Examination

A. Examine all surfaces, substrates and conditions to receive the Hydro-Prufe® waterproofing system. Confirm conditions are acceptable for the application of the PVC waterproofing system. Do not proceed with work until all unsatisfactory conditions have been corrected in a manner acceptable to installer and manufacturer. Starting work within a particular area will be construed as applicators acceptance of all substrate conditions.

B. Substrate surfaces shall comply with manufacturers requirements. See “Substrate Requirements” within this manual.

C. Do not allow bitumen or oil in any form to contact the thermoplastic membrane or other system components. Ensure that foreign matter, debris is not in contact with PVC waterproofing membrane.

D. Verify that all penetrations are in place and sealed with link seals or other suitable means approved by manufacturer. All penetrations installed after (post) PVC waterproofing system shall have waterstops installed. (See penetration details)

3.03 Substrates and Substrate Preparation

A. Concrete Decks

1. Concrete substrates shall be cured and free of fins, voids or sharp projections that could cause damage to the PVC waterproofing system. Irregular conditions like spalls, honeycombs or rough surfaces must be filled or bushed to provide an acceptable profile.

2. Concrete finishes shall be medium to light broom finish or smooth float finish.

3. Curing compounds or form release agents shall be the type approved by the manufacturer.

4. CMU walls shall have all joints struck flush. Tooling of joint is unacceptable. Gaps shall be grouted flush. Expansion joints in CMU walls

shall be filled with an acceptable sealant. (Consult with the manufacturer for any additional detailing on expansion joints.)

5. New concrete should be cured for 28 days. If necessary to proceed prior to the 28 day cure period contact manufacturer for additional recommendations.

6. Precast concrete decks shall be mechanically secured to minimize movement. All joint must be grouted flush.

B. Plywood/Metal Decks/Insulation

1. 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.

2. Metal decks shall be a minimum of 22 gauge. Metal decking shall be supported by adequate structural support. When a substrate board is used over metal decking, it shall be a minimum of 5/8" thick and be one of the approved types noted in this installation manual.

3. When insulation board is used under the Hydro-Prufe® PVC waterproofing system it must be a minimum of 25 psi. Acceptable insulations include, Polyisocyanurate, Extruded and Expanded Polystyrene and light weight insulating concrete.

4. Substrate boards and insulation shall be installed in a manner that all edge and end joints are supported by the metal deck ribs. Roof substrate boards shall be staggered as recommended by the manufacturer.

5. When required, a suitable vapor barrier membrane shall be installed to the metal deck prior to the installation of the substrate board.

6. 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.

7. When the project is a tear off project, or remedial waterproofing, it is recommended that all existing Roofing/Waterproofing membrane be removed. If this is not possible (Contact Hydro-Gard for additional recommendations)

3.04 Installation of Hydro-Prufe® PVC Membrane

A. Installation of Buffer Layer over concrete or masonry horizontal and vertical surfaces.

1. Install Hydro-Ultra Mat Geotextile leveling layer over properly prepared substrates. Install loose laid over horizontal decks and when installing to vertical walls install with Induction welding disc or adhere with Adhesive U 410-D or U 148-A. When using Hydro-Ultra Mat overlap seams a minimum of 4" and spot adhere if needed. When installing vertically in the case of planter walls or other high walls layout location of induction disc and set disc utilizing either power actuated fasteners or pre-drill and set with anchors. (*If adhesive is* used *no induction discs are required*.) Ensure that discs are fastened flush, and that the fastener does not indent or warp the disc. Discs must provide a consistent flat and even surface for induction welding. Discs shall be set approximately at 14" to 15" spacing horizontally and vertically as needed to secure Hydro-Prufe® PVC membrane in place. When using the induction method spacing shall be determined by installer and manufacturer.

2. Cut and trim Hydro-Ultra Mat leveling layer around penetrations and secure all terminations in place, spot adhere if necessary. Cut leveling layer around drains and terminate Hydro-Ultra Mat at edge of Hydro-Prufe® PVC Drain flashing.

B. Hydro-Prufe® PVC Drain Flashing

1. Ensure area around the drain is clean and smooth. Shape protrusions and other rough areas shall be ground down smooth. All foreign matter is to be removed.

2. Clean off all grinding dust and residue and prepare a target patch of Hydro-Prufe® PVC membrane flashing 12" square beyond the edge of all drains. *Example: if a drain diameter is 12" then a PVC target patch will be a minimum of 36" square*. Prime surface area under target patch with HP 9112 primer and bring primer beyond PVC target patch 2" inches. Apply HP 9112 primer at a rate of .75 to 1 gal per 100 square or 12 to 16 wet mils. Follow mixing instructions on HP 9112 data sheet. During this time also prime the backside of Hydro-Prufe® PVC flashing target with HP 9112 primer at same rate as was installed around the drain. Allow to dry for 60 minutes.

3. Mix HP 9800 liquid flashing (per data sheet) and apply to the primed surface around the drain at an even and consistent rate of 4 gals per 100 square feet or 60 to 64 wet mils. Set a target patch of Hydro-Prufe® PVC flashing into wet HP 9800 liquid flashing around the drain and ensure PVC

target patch is rolled into wet HP 9800 liquid flashing and that PVC extends beyond clamping ring into drain body a minimum of 1 ½" inches. Roll PVC membrane to ensure to minimize air bubbles under membrane. Caution: review data sheet for HP 9800 throughly. Pot life and hardening additives vary depending on surface temperature and ambient temperatures.

C. Hydro-Prufe® PVC membrane installation

1. Starting at the lowest portion of the deck (Drain area) layout the Hydro-Prufe® PVC membrane over the leveling layer. Over lap the Hydro-Prufe® PVC membrane over the PVC drain flashing 6". Continue laying out Hydro-Prufe® PVC membrane up the slope overlapping all sheets a minimum of 4" inches until it terminates against a curb, walls or other termination point. At all termination points install manufacturers' termination bar or other approved termination bar and fasten through Hydro-Prufe® PVC membrane and leveling layer ever 12" on center.

2. Ensure that all overlaps are shedding water in a shingle fashion.

3. Adjacent sheets shall be welded in accordance with Hydro-Gard instructions and as defined in this instruction manual.

4. Welding equipment shall be approved by manufacturer. Contact Hydro-Gard for approved equipment.

5. When welding a three way joint provide a round target piece of PVC membrane approximately 6" inches in diameter center of T and weld in place.

6. All seams shall be checked by the installer after cooling using a blunt object like a round screw driver.

A. Vertical Wall Installation

1. Hang Hydro-Prufe® PVC membrane vertically over leveling layer. Secure PVC sheets at top of wall or intermittently secure by manufacturer batten bars or other temporary measures. Let sheets relax. Hydro-Prufe® PVC sheets shall drape down wall and over lap Horizontal Hydro-Prufe® PVC membrane and terminate a minimum of 4" inches beyond horizontal termination bar. Weld terminating overlap from wall to horizontal PVC sheet a minimum of 4"inches.

2. Weld Hydro-Prufe® PVC membrane to induction disc utilizing the induction method of welding. Ensure that machine is calibrated for proper welding. Locate induction plates behind PVC sheet and set a flat portion of induction welding handle flush and centered over plate and weld Hydro-

Prufe® sheet to plate. Welding should take 1 to 4 seconds. Set magnets over welds immediately until PVC sheet has cooled down and full adhesion has set. Induction welding time may vary depending on conditions during installation. Contact the manufacturer for additional information.

3. Adjacent sheets shall be welded in accordance with manufacturers instructions. All side and end lap joints shall be hot-air welded. Lap area shall be a minimum of 4 inches wide. Standard hot air welding of seams or wedge welding is acceptable. (If wedge welding, increase an overlap seam to 6") all welds shall be continuous and without defects.

3.05 Water Testing ***(Edit to project specifications)***

1. Upon completion of all welding and third party inspection. Inspect all Hydro-Prufe® PVC membrane for damage, scraps or any damage that may cause failure from water testing. Repair all damage as required and repairs shall be documented by applicator and inspection company.

2. Test for leaks by installing plugs in all drains and fill with water with 2' inches of water and let set for 48 hours.

3. Install dams where necessary to segment water testing area so 2" minimum of water can be maintained for length of water test.

4. Water test shall be documented by applicator and inspection company. Photos shall be taken of the tested area just prior to testing, during testing and after water test is completed. Photos and reports shall be submitted to applicator, owner and manufacturer.

3.06 Electronic Leak Detection (*Edit to project specifications)*

1. If electronic testing is specified follow the guidelines below:

2. During the preconstruction meeting create an approved EFVM guideline created by the ELD testing company. This testing procedure shall be submitted to the Owner, Architect, General Contractor, Inspection company and the waterproofing contractor.

3. The waterproofing area to be tested shall be thoroughly wet. Use means and methods determined in the preconstruction meeting.

4. Visually inspect all areas and perform the ELD testing to locate membrane void or breaches, if ELD testing discovered breaches in the waterproofing system document locations and submit to inspection company.

5. Repair all discovered breaches as required by the manufacturer and ensure all repairs are inspected by the third party inspection company.

6. Once all repairs are completed and documented proceed with the overburden systems.

3.07 Protection Layer Installation (*Edit to project specifications)*

(Protection Layer Options)

1. When installing an overburden such as cast in place concrete topping, mud set paving, pedestal set pavers or any other heavy overburden that involves hard overburden material such as these, Hydro-Gard requires that either our PVC protection layer be used or our HDPE protection layers. The PVC protection layers can be either 50 mil, 60 mil, 80 mil or even 100 mils. Our HDPE protection layers can be either 40 mil, 60 mil or 80 mil. If an HDPE protection layer is used then overlap a minimum of 8" if not spot welding and 4" if spot welding. If PVC protection is being used then overlap a minimum of 4" and spot weld seams to avoid debris from entering overlap.

2. When installing overburden such as soil, landscaping, or ballast rock any of the above protection materials noted in item 3.06, item 1 can be used. In addition when the overburden material is soil, landscaping or ballast rock Hydro-Ultra Mat 16 can be used in lieu of PVC/HDPE protection material but the Hydro-Ultra Mat 16 must be covered up with Gard-Drain Drainage board. When installing Hydro-Ultra Mat over Hydro-Prufe® PVC membrane loose lay Hydro-Ultra Mat over membrane and overlap all adjacent sheets by 12". Spot glue seams in place if Gard-Drain is not installed over Hydro-Ultra Mat the same day.

3.08 Drainage Product Installation (*Edit to project specifications)*

1. When installing Gard-Drain products the correct series of Gard-Drain must be selected by the specifier. When the overburden which is directly in contact with the Gard-Drain is soil, aggregate ballast or typical landscaping the following Gard-Drain series is recommended.

   Gard-Drain 400, or 400 RB-T, 420 series, 700 series and 990 series.

   When installing Gard-Drain products under heavy or hard overburdens like cast in place concrete toppings, mud set pavers and Tile the following Gard-Drain series is recommended.

   Gard-Drain 700 series, 990 series and 1000 series.

   (*Optional Gard-Drain GRS for Green Roofs)*

   When installing Green roofing components Gard-Drain GRS is used and is installed over the Hydro-Retention 22 moisture mat and over the insulation

(*when used.)* The Gard-Drain GRS is then covered by the GRS-Filter Cloth. Vegetation and landscaping are then placed.

2. Install Gard-Drain directly over the protection layer starting at the low point of the deck and continue installing up the sloped area. This will result in a shingle fashion installation.

3. Butt adjacent panels together and lap geotextile fabric and use adhesive to bond adjacent filter fabric together.

4. Trim Gard-Drain to fit closely around all penetrations and other vertical projections. Ensure that Gard-Drain is cut neatly around deck drains and that no obstructions exist that may block the flow of water from the Gard-Drain to the deck drains. Ensure that core is protected with filter fabric around a deck drain so no overburden like concrete or mortar will block the flow of water from the core to the drain.

5. When trimming Gard-Drain around penetrations or other terminations where core has been cut and fabric is now removed, install tape over core to close off core and avoid debris from entering core.

6. When installing Gard-Drain inside planters and Gard-Drain is terminating at a finish grade (vertically), ensure that Gard-Drain will not be left exposed to ultra violet light. If Gard-Drain is terminated at the same level as finish grade then a counterflashing should be used to flash over the Gard-Drain. Light weight planting soils have a tendency to settle over time and can leave the Gard-Drain exposed to ultra violet rays. These UV rays will decompose the filter fabric in time and allow debris to enter the core diminishing the performance of the Gard-Drain.

3.09 Insulation Installation (*Optional-Edit to project specifications*)

Note: When heavy or hard overburdens are used and insulation is laid over the Hydro-Prufe® PVC waterproofing system Hydro-Gard requires the use of extruded ploystyrene when insulation is used with its system. Contact Hydro-Gard for type and psi strength.

1. In horizontal applications loose lay insulation in a staggered manner and tightly butt joints of insulation. The maximum recommended opening between insulation board is 3/8" inch. Insulation shall be installed within 3/4" inches of all projections, penetrations, etc.

2. When more than one layer is used the bottom layer shall be the thicker layer. All layers shall be installed loose laid and (not adhered). The end of insulation panels shall be staggered by a minimum of 12" inches from adjacent panels.

3. Insulation shall be neatly cut around all penetrations and projections. See item 1 above for requirements on joint openings.

4. Ensure that installed insulation is covered by overburden the same day. If this is not possible then temporary ballast must be used to ballast insulation in place until permanent overburden is installed. This can be accomplished by placing sand bags or other means as long as temporary ballast does not damage or indent insulation panels.

5. When installing insulation panels over sloped decks ensure that insulation panels are fully supported by the substrate below. Unsupported insulation panels that are not fully supported can crack or break when under weight or foot traffic. To avoid this scoring the insulation panels at ridges and valleys may be necessary.

6. When cutting and trimming insulation panels ensure that debris from this operation does not rest under insulation panels. This debris may cause a blockage to water flow or obstruct drains.

   (When Pedestal set Pavers or Concrete Toppings are placed over the insulation follow the paragraph below:)

7. Prior to overburden installation install Hydro-Tuff® IRMA filter fabric over insulation panels. Overlap filter fabric by 12" and spot adhere if necessary. (Optional): If an air layer is needed over the insulation panels then Gard-Drain 1000 can be substituted for the Hydro-Tuff® filter fabric. Install Gard-Drain 1000 in a similar fashion as the standard Gard-Drain products.

3.10 Penetrations

1. Detail all penetrations in accordance with manufacturers' details and guidelines. Penetrations shall have link seals installed whenever possible.

2. Cut field membrane tightly around penetrations. Field fabricate a target piece of Hydro-Prufe® PVC flashing membrane and set over penetration in a bedding of HP liquid flashing 9800. Make sure PVC flashing membrane is primed with HP 9112 primer and let dry. Install Gard-Stop SK Tape or Gard-Tape around penetrations and install a compression ring or hose clamp over penetration and secure. Weld target piece to field membrane. (See manufacturers penetration details)

3.11 Welding of Hydro-Prufe®

A. General Welding

1. Welding equipment shall be approved by Hydro-Gard. Welding equipment shall be calibrated at the start of each day and checked throughout the installation day. Test welds should be run at the beginning of each day and after cool down and any re-start up during the installation day. The calibration readings and test welds should be documented by the third party inspection company.

2. Seam sampling: At a minimum of three times per day sample seams. Sample seam strength by cutting a cross section a minimum of Two inches wide from a completed and probed seam. Test samples shall be tested by third party inspection company and documented on an inspection report. Inspection company shall consult with the manufacturer on level of acceptability. Shearing of the membrane rather than separation of the weld will constitute an acceptable weld. Applicator shall repair test cut with a round target patch 6" in diameter.

3. When welding a three way joint provide a round target piece of PVC approximately 6" inches in diameter center of Tee joint and weld in place. Tee joint patches must be probed with the seam testing blunt seam tool and confirmed by the third party inspection company.

4. All surfaces to be welded shall be clean and dry. No adhesives, fluids or debris shall be present within the lap areas.

5. Welding equipment whether hand, or automatic shall be allowed to warm up for at least one minute prior to the start of any welding.

6. In hand welding the lap shall be tack welded in every 3 feet to hold the seam in place. The back edge of the lap shall be welded with a thin, continuous weld to prevent heat loss during final welding.

7. 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 the material starts to flow, the hand roller shall be applied at a right angle to the welding gun and pressed lightly. The recommended nozzles are 1 ½" for straight laps and for corners and detail work a 3/4" nozzle is recommended.

8. Machine welded seams are to be achieved by the use of various automatic welding equipment. When using this equipment, Hydro-Gard's instructions shall be followed. The automatic welding machines require 218 to 230 volts at 30 amps. Check with the manufacturers of the welding equipment

for additional information. The use of portable generators' is highly recommended.

9. T-Joints or (three way overlaps) require increased attention by the installer. Since Hydro-Prufe® PVC membranes are thicker than most PVC membranes the intersection of these three way Tee joints will require some trim work. At the top edge of the second membrane shave down the membrane to create a smooth transition for the top membrane layer to conform to for positive welding. Chamfer the edge of the membrane using a hand-held grinder with a joint planer or shaving tool approved by Hydro-Gard. Target patches for Tee joints must be a minimum of 6" inches.

10. Wedge Welding:

    When using a double wedge welder the following must be adhered to:

    A. Membrane overlaps are increase to 6" inches. Overlaps shall be welded with an approved double wedge welder. Each seam shall be pressure tested in the presence of the third party inspection company.

    B. The weld channel (air space area between the two welds) can be sealed up after the air pressure test by hand welding the ends of the weld. Weld a target patch over the end of weld channel after air testing has passed.

    C. Air testing weld channel can be tested by inserting pressure gauge tip into the weld channel. Test by applying internal air pressure into the weld channel. Test for 30 psi for ten minutes. Loss of pressure greater than 10% constitutes failure. If channel fails weld an 8" minimum PVC coverstrip and weld by hand.

11. Extrusion Welding:

    Extrusion welding is and option of the designer. Extrusion welding does not replace the requirement of hot air welding or the requirement of probing or test cuts. It is only another enhancement offered to the Hydro-Prufe® PVC waterproofing system. When extrusion welding is specified, ensure the completed hot air weld seam is clean and free of any debris. Prior to extrusion welding clean the surface of overlap seam and lightly abrade with light sand paper or other approved method. After abrading wipe surface with a clean cloth and proceed to weld a bead of extruded PVC rod from an approved extrusion welder. Run an extruded bead over the edge of the seam in a continuous smooth and even consistency leaving a clean and smooth bead. It is recommended that the PVC rod be a contrasting color to the Hydro-Prufe® PVC base membrane. There is no testing needed on the extrusion weld. A visual inspection is suitable for this application.

3.12 Overburden Options (*Edit to project specifications)*

Pedestal Set Pavers:

1. When pedestal set pavers are supplying the finish overburden Hydro-Gard recommends that the Gard-Drain air layer is eliminated. The space beneath the pedestal set pavers will supply the free flow of air. See protection board options in section 3.07. (option).

2. When pedestal set pavers are used follow the paver manufacturers' specifications.

Soil / Vegetation Overburden: (*Edit to project specifications)*

1. When landscaping and vegetation is being used as the finish overburden then the following changes to the assembly shall apply.

2. Over the insulation panels install Gard-Drain 300 or 302. Cut and trim around all penetration and ensure core is sealed with filter fabric. (*Note: The use of Gard-Drain 300 or 302 used over the insulation panels is an option of the specifier. It is not a requirement of the manufacturer)*

3. Install Hydro-Retention 22 Geotextile over Gard-Drain 300 or 302 or (*directly over insulation)*. Loose lay Hydro-Retention 22 and overlap all seams a minimum of 12". Carry Hydro-Retention 22 up curbs and vertical surfaces as shown on details or as recommended by manufacturer.

4. Install Gard-Drain GRS over Hydro-Retention 22 Geotextile Moisture Mat. Overlap all seams of Gard-Drain GRS and seal all seams with filter fabric per manufacturers' requirements. Gard-Drain GRS is installed to all horizontal surfaces.

5. Install system filter over Gard-Drain GRS and carry up vertical surfaces to just below finish grade of landscaping.

6. When installing the Hydro-Prufe® PVC membrane system and landscaping or vegetation is being placed over the system. Gard-Barrier RB must be used. Gard-Barrier RB shall be placed over the protection materials and under any Gard-Drain Drainage composite. Install horizontally and vertically. Overlap seams 6" and tape seams to seal all overlaps.

3.13 Termination at Grade

1. Terminate Hydro-Prufe® PVC membrane at grade. If damaged repair as needed. See manufacturers' details for Grade terminations or interfacing details with above grade membranes and between slab membranes. For typical grade terminations see details (GT-001), (GT-002) & (GT-003)

3.14 Completion

1. Prior to demobilization from the site, the work shall be reviewed by the contractor, inspection company and manufacturer representative. All defects noted, noncompliance with the specifications or the recommendations of membrane manufacturer shall be itemized in a punch list. These items must be corrected immediately by the contractor prior to demobilization to the satisfaction of the membrane manufacturer.

END