



HYDRO-PRUFE

GUIDE SPECIFICATION (TANK LINING SYSTEM)

PART 1 GENERAL

1.1 SUMMARY

- A. Provide labor, materials, equipment, safety compliance and supervision necessary to install a Thermoplastic Lining system to new or existing concrete, masonry or other approved substrates. Applications include but are not limited to Fire Protection Tanks, Ponds, Fountains, Pools and other submerged applications.
- B. The manufacturer's application instructions for each product used are considered part of these specifications.
- C. Related Sections:
 - 1. Section 03 30 00 - Cast-in-Place Concrete
 - 2. Section 03 40 00 - Precast Concrete
 - 3. Section 03 11 13 - Concrete Forming
 - 4. Section 03 15 13 - Waterstops
 - 5. Section 03 37 13 - Shotcrete
 - 6. Section 03 39 13 - Water Concrete Curing

1.2 SYSTEM DESCRIPTION

- A. Hydro-Prufe® is a un-reinforced 80 mil PVC Thermoplastic Sheet Membrane:

The Hydro-Prufe® system is designed to provide the ultimate protection when used in compliance with the manufacturer's specifications. The PVC membrane comes in 80 mil thickness. Hydro-Prufe® uses the induction method of welding the liner to the substrates they are protecting. This Electro-Bonding system adheres the PVC liner to the substrate by heating the fastening plates behind the PVC liner which results in a permanent bond from the PVC Thermoplastic liner to the plates.

These components include:

1. Hydro-Ultra Mat G (Geotextile / Buffer Mat)
2. Hydro-Prufe® 80 mil PVC membrane
3. PVC Flashing membranes
4. Induction Welding Disc
5. Adhesive U-410 D and U-148 A
6. SAF 30 PMMA Sealant (tube Form)
7. Insulation (if required)
8. Gard-Stop Tape SK or Gard-Stop Sealant Tape
9. Sealants, adhesives, metal bars, fasteners, liquid flashing (if required)
10. Extrusion Welding Rod and HG Tee Circles
11. HP-Liquid Flashing 9800 (kits)

1.3 SUBMITTALS

- A. General: Prepare and submit specified submittals in accordance with the contract documents and division 1 Submittals. Include all manufacturers specifications, Product Data, and Code Compliance documentation.
- B. Product Data: Submit manufacturer's product literature and installation guidelines along with the manufacturer's standard details.
- C. Product Samples: Submit representative samples of the following.
 1. Hydro-Prufe® in thickness as specified.

<u>Parameters</u>	<u>Test Method</u>	<u>Typical Physical Properties</u>
Tensile Strength	ASTM D638	1500 psi
Elongation	ASTM D638	400 %
Tear Resistance	ASTM D1004	10
Laminated Bond ST.	ASTM D413	24
Low Temp Bend	ASTM D2136	-40
Heat Aging	ASTM D4434	90
Water Absorption	ASTM D570	3.0
Flammability	ASTM D568	SE
Seam Strength	ASTM D751	75% of tensile strength
Dimensional Stability	ASTM D1204	0.01
Accelerated Weathering	ASTM D4434	No cracking
Hydrostatic Pressure Resistance	ASTM D751	241 psi
Thickness	ASTM D751	.080" / 2.0 mm

Accessory Products: All accessory products shall be provided by Hydro-Gard or shall have Hydro-Gard approval if supplied by any other manufacturer.

1. Induction fastening plates: Induction plates are standard metal plates treated with and adhesive. This adhesive when activated by the electro bonding microwave fuse the plates to the PVC membrane.

2. Hydro-Flashing: Hydro-Flashing is a 60 mil PVC flashing unreinforced thermoplastic flashing. It is used to flash penetrations, drains, curbs, walls, Inside and outside corners and circle patches for Tee joints.
3. Fastening Bars: Fastening bars are used to secure and terminate the PVC waterproofing system. The termination bar is min 1/8" thick x 1" wide stainless steel. Aluminum bars are also acceptable. Termination bars are to be pre-punched at 6" on center and fastened with lead anchors or other approved method.
4. Adhesive: Solvent based and water based adhesive supplied by manufacturer. Use to adhere PVC membrane to floors, curbs, walls and other various substrates.
 - a. Adhesive U 148-A for Vertical Applications (contact adhesive)
 - b. Adhesive U 410-D for Horizontal Applications (urethane based)
6. Hydro-Ultra Mat G: Hydro-Ultra Mat G is a non woven geotextile fabric. It comes in weights from 8 oz per square yard to as heavy as 22 oz per square yard. It is used as a substrate buffer between the Hydro-Prufe® PVC membrane and the concrete. This will provide an acceptable surface for the Hydro-Prufe PVC waterproofing system to be installed to.
10. HDPE Protection Layer: This High Density Polyethylene is used as a heavy duty protection layer. It is installed over the Hydro-Prufe® PVC waterproofing system. The HDPE protection layer comes in thicknesses of 30 mil, 40 mil, 60 mil and 80 mil. When placing concrete or shotcrete against the PVC membrane 40 HDPE is required. **(Not required in tank ling applications unless a topping slab is being placed over Hydro-Prufe)**
11. Gard-Stop SK tape: Gard-Stop SK tape is a self adhesive swelling sealant tape. It has a release liner on one side. Remove the release liner and firmly adhere it to the surface you are sealing. It is used around pipes that penetrate the Hydro-Prufe PVC membrane and is adhered to the face and sides of the Hydro-Prufe PVC waterstop. It can be used to back the PVC membrane at terminations such as termination bars at grade, pipe penetrations or other areas where the PVC membrane is terminated.

12. 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.)
 13. HG-Extrusion Welding Rod: HG-Extrusion welding rod coil is a PVC coil used in extrusion welding machines. The welding rod is used over the completed and probed PVC seam to provide additional protection and sealing of the seams.
 14. HG Tee Patch Circles: HG Tee Patch Circles are 6-3/4" in diameter and are made of the same PVC membrane as the Hydro-Prufe® but in a 60 mil thickness. All Tee joints shall receive HG Tee Patches and shall be fully welding to the field membrane.
- D. Licensed Applicator: Submit evidence that the applicator has been licensed by the manufacturer to install the specified system.
- E. Warranty: Submit manufacturer's standard warranty.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Applicator shall be approved to install the specified system if the lining system is not installed by the manufacturer.
- B. Supplier Qualifications: HYDRO-PRUFE®, as supplied by HYDROGARD, is approved for use on this project.
- C. Approvals: The Tank lining system shall comply with NFPA 22, as referenced in the applicable sections of the following code editions:
- 2015 and 2012 International Fire Code (IRC), Section 507.2.2
- D. 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, curing of substrates, waterstop installation and all termination conditions. The attendee's shall include a representative of the owner, Architect, inspection firm, general contractor, waterproofing applicator, concrete or substrate placement contractor, and any other contractor whose work will interface with the Hydro-Prufe® PVC waterproofing system.
- E. Materials: Obtain waterproofing products and accessories from a single

manufacturer to assure material compatibility or as approved by manufacturer.

- F. Independent Inspection: The owner or Architect may 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 subcontractor shop drawings, manufacturer's 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, photos, documenting the installation of all waterproofing work. These reports shall be made available to owner, general contractor, waterproofing contractor and manufacturer.

- G. Electronic Leak Detection: Electronic leak detection testing shall be performed on the completed tank lining installation.

1.5 DELIVERY, STORAGE AND HANDLING

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

- B. Storage and Handling: Recommended storage temperature is 75 degrees. Handle products to avoid damage and do not store products in direct sunlight for long periods of time.

1.6 JOB CONDITIONS

- A. Substrate Conditions: Proceed with work only when substrate conditions comply with manufacturers requirements. Non compliant conditions shall be brought to the attention of the Architect and Manufacturer.

- B. Weather Conditions: Ensure that conditions are dry and clean. Do not apply lining system into standing water. Ensure that surfaces are in a dry condition for installation of Hydro-Prufe® PVC Waterproofing system.

1.7 WARRANTY

- A. HYDROGARD shall offer the manufacturer's standard warranty upon request of a properly executed warranty application form. The warranty shall be issued upon confirmation that the Hydro-prufe® PVC Waterproofing system has complied with the manufacturer's requirements. Manufacturer's

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.

B. Special Installer Warranty:

The installer shall provide a 2 year installer warranty. This warranty shall ensure against leaks in the Hydro-Prufe® PVC system caused by defects in the installation. The installer warranty shall include defects in materials or workmanship. Upon notification of such defects or leaks within the warranty period the installer shall make all repairs necessary to remedy the leaks in the tank.

1.8 MANUFACTURER

- A. HYDROGARD LLC**
18340 Yorba Linda Blvd, Suite 107, Box 304
Yorba Linda, Ca 92886 Ph: 562-944-7030 Fax: 562-944-6402

1.9 MATERIALS

- A. Hydro-Prufe® 80 mil PVC Thermoplastic Sheeting**
1. Primer as supplied by manufacturer (if required)
 2. Liquid Flashing as supplied by manufacturer
 3. PVC Flashing as supplied by manufacturer
 4. HDPE protection layer (when specified)
 5. Hydro-Ultra Mat G (Geotextile / Buffer Mat)
 6. Fastening bars and fasteners as supplied or approved by manufacturer.
 7. Sealants and any other accessories supplied by manufacturer or approved by manufacturer.

2.0 EXECUTION

- A.** Examine substrate surfaces to receive Hydro-Prufe® PVC waterproofing system and associated work and confirm conditions are acceptable for the application of PVC membrane. 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.** All substrate surfaces shall be clean, dry and smooth and shall be in accordance with manufacturer guidelines. Gaps, voids, or other irregular surfaces shall be repaired to the satisfaction of the manufacturer. Minor moisture content may be acceptable. Contact the Manufacturer if moisture is present.
- C.** Verify that all penetrations are in place and sealed with link seals or other

suitable means approved by manufacturer. All penetrations will be flashed and sealed in accordance with the manufacturers guidelines.

- D. Verify that all substrates meet the conditions required by the manufacturer. Submit data sheets on curing compound or form release agents to manufacturer for approval.

2.1 PREPARATION

- A. Thoroughly clean all surfaces to receive the Hydro-Prufe® PVC waterproofing system per manufacturer's recommendations.
- B. Remove all debris, dirt, cement residue or any other foreign matter which may inhibit the proper performance of the Hydro-Prufe® PVC waterproofing system.
- C. Install Cants or Fillets at inside corners from Cementitious materials, or as approved by manufacturer. Cementitious Cants shall be installed to all inside 90 degree corners prior to installation of Hydro-Prufe® Tank Lining.

2.2 INSTALLATION OF PVC SYSTEM

- A. Install Geotextile levelling layer (Hydro-Ultra Mat G) over properly prepared vertical substrates. Ensure that the surface is clean, smooth and dry. Remove any and all contaminates. For tank installations utilized Hydro-Ultra Mat G 12 oz/sy at walls and ceilings.
- B. Cut and trim (Hydro-Ultra Mat G) levelling layer around penetrations and secure in place.
- C. Over lap (Hydro-Ultra Mat G) levelling layer a minimum of 4" and secure lap with spot adhesive if necessary. Spot adhere overlap when levelling layer is not covered with PVC membrane the same day.
- D. Layout the Hydro-Prufe® PVC waterproofing layer over the levelling layer at walls and ceilings (When Ceiling are specified). Overlap sheets a minimum of 4", let relax according to the manufacturers guidelines.
- E. For Horizontal application (Floor of Tank) clean floor and remove any foreign matter. Apply adhesive U-410 D to floor at a rate of 1.5-2 gallons per 100 square feet. Coverage rates vary depending on surface profile. Let adhesive set 5 to 15 minutes and set PVC Liner in adhesive, and firmly work PVC Liner into adhesive. Adhesive can be installed by roller naps, or notched trowel. Position Sheets so Hydro-Prufe PVC Waterproofing is carried up over cants and fillets, terminate above fillets approximately 3" and secure terminating edge with fastening bar. Fastening bar shall be secured at 12" on center minimum. (See Detail WT-001 for illustration)

- F. Adjacent sheets shall be welded in accordance with manufacturer's instructions. All side, and end lap joints shall be hot-air welded. Lap area shall be a minimum of 4 inches wide. Probe all seams during installation. All seams shall be probed each day before leaving that days installation.
- G. On vertical surfaces install Geotextile Buffer Mat (Hydro-Ultra Mat G) on wall prior to Hydro-Prufe® PVC waterproofing installation. Spot adhere Geotextile Buffer Mat (Hydro-Ultra Mat G) until induction disc are set and fastened to wall through Hydro-Ultra Mat G. Disc shall be approximately set at 14" to 15" spacing horizontally and 46" to 48" vertically. Spacing of disc shall be determined by manufacturer. Sheet size may vary and effect spacing. If over head applications are required, disc spacing shall be greatly reduced. Consult manufacturer for overhead applications. (See Detail WT-004 for illustration)
- H. Secure top terminating edge of liner with metal fastening bar as approved by manufacturer. Apply sealant approved by manufacturer over termination bar, and terminating edge of PVC membrane. Contact manufacturer for approved sealants. (See Detail WT-004 for illustration)
- I. When welding a three way joints install HG Tee patch circles center over T joint and fully weld in place.
- J. All seams shall be checked by the installer after cooling using a blunt object like a round screw driver. Two inch cross section samples shall be taken daily. A correct weld will fail from shearing of the membrane. Maintain cross section cuts for record example. Provide to manufacturer upon request.
- K. Welding equipment shall be approved by manufacturer.

2.3 MEMBRANE FLASHINGS

- A. All flashings shall be installed at this time. All inside and outside corners shall be field fabricated out of the 60 mil PVC flashing membrane. Corners shall extend 10" minimum in all directions. This includes 10" vertically up the wall, and 10" horizontally onto the slab, and 10" out from all corners. See manufacturer's corner details for additional information.
- B. After all seams are welded check seams with a blunt seam probe to ensure all seams are tight and fused. Field fabricated corners need special attention. Check seams carefully.
- C. After seam probing is complete install HG-Extrusion welding rod to all seams in the following locations;
 - All fully welded seams at floor of tank
 - All fully welded seams from floor elevation up wall min 24"
 - All fully welded seams at all inside and outside corners
 - All fully welded PVC boots at all penetrations in floors and walls

2.4 PENETRATIONS

- A. Detail all penetrations in accordance with manufacturer's guidelines. Penetrations shall have link seals installed whenever possible. All penetrations shall be in place and secured to deck or wall prior to liner installation. See manufacturer penetration details.
- B. Cut field membrane tightly around penetrations. All penetrations shall have a minimum height of 8" above field membrane. Install PVC boots pre-fabricated or field fabricated over penetrations insert Gard-Stop SK tape or Gard-Stop sealant tape and clamp top with a stainless steel hose clamp and seal with sealant or other approved compound. Weld base of boot to field membrane. Probe all seams. See manufacturer details for additional information.

2.5 ELECTRONIC LEAK DETECTION TESTING

- A. Installer shall retain a qualified third party leak detection testing firm. The testing firm shall perform electronic leak detection at all seams and field areas once all hot air welding, seam probing and extrusion welding is complete. The testing agency shall document all testing by written reports and photographic documentation and supply reports to manufacturer. Installer shall be present during all testing. If testing results show any defects in installation installer shall repair in the presence of testing agency and agency shall confirm defects has been repaired and successfully retested.

2.6 CLEAN UP

- A. Remove all residual debris from area created by this work. Insure that Hydro-Prufe® PVC membrane and other products of this system are in place and not damaged by subsequent trades. Report all damage to prime contractor, inspection company and manufacturer. Provide digital photos to document damage.

END OF SECTION