

SECTION 071700 BENTONITE 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 Bentonite 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 This guide specification was issued in December 2012 and may be superseded without notice at any time.

HYDRO-ULTRA MAT-B SERIES BENTONITE SHEET WATERPROOFING ALONG WITH GARD-DRAIN DRAINAGE COMPOSITE IS DESIGNED FOR THE FOLLOWING APPLICATIONS

- Foundation Walls
- Matt Foundation Slabs
- Property Line Applications
- Earth-covered Structures including Subways and Tunnels
- Free Standing Wall applications
- Elevator Pits

System Description

The HYDRO-ULTRA MAT-B SERIES Waterproofing System is a complete membrane waterproofing system designed to protect below grade structures from the effects of water infiltration leading to structural deterioration and interior water damage.

All HYDRO-GARD waterproofing systems integrate various system 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, and most importantly the HYDRO-GARD waterproofing membranes, to produce an engineered waterproofing solution for a specific waterproofing problem.

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

HYDRO-ULTRA MAT-B SERIES BENTONITE SHEET WATERPROOFING FOR (FREE STANDING FOUNDATION WALLS) (SHORED OR BLIND SIDE FOUNDATION WALLS) AND UNDER SLAB ON GRADE OR MATT FOUNDATION SLABS

The HYDRO-GARD Hydro-Ultra Mat-B Series waterproofing membranes are specially manufactured of needle punched; non-woven, polypropylene matt filled with sodium bentonite granules encapsulated with in the non-woven polypropylene. The mat contains over 1lb per square foot of high swelling sodium bentonite. The Hydro-Ultra Mat comes in a saltwater version, or chemical resistant version, and can be manufactured with an HDPE layer laminated to one side of the Hydro-Ultra Mat.

System Advantages

1. A proven track record of in place performance.
2. All components are factory fabricated - no mixing, kettles, or contamination problem's 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. Complete waterproofing system inclusive of membrane, flashing, thermal insulation, drainage panels, geotextiles, protection layers, and fasteners.
9. Highest degree of quality control and system quality assurance.
10. Third-party full-time inspection is available. Contact the manufacturer for approved inspection firms.
11. Trained and authorized approved applicators.
12. Various Warranties available.
13. Competitive installation costs.
14. Certification: Hydro-Ultra Mat-B Series Waterproofing system has successfully gone through a rigorous testing process.

Substrate Preparation

Concrete Waste Slabs:

The substrate must be smooth, clean, and preferably dry. All irregularities must be removed and repaired. Concrete must be cured and dry and clean prior to application of Hydro-Ultra Mat-B series waterproofing membrane. 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. Substrates may have moisture or be damp with the exception of ponding water. Sweep off all ponding water and let surfaces dry.

Wood Lagging:

Ensure that all lagging is clean and dry. If moisture or water is present, ensure that Hydro-Ultra Mat-B series does not pre-hydrate. Gaps over 1" in lagging shall be filled with concrete, grout or other approved means as defined by HYDRO-GARD. Nails at pile flange shall be removed or hammered down to avoid the possibility of damaging or puncturing the membrane. (*Back lagging conditions should be avoided*) (*Contact HYDRO-GARD for back lagging conditions*)

If steel piles are scheduled to be removed later, ensure the removal will not damage the Hydro-Ultra Mat-B series membrane. This can be accomplished by covering the steel flange at the top of pile with a cement board or other suitable means.

When Hydro-Ultra Mat-B series is installed over wood lagging and is scheduled to terminate at footing, carry membrane down into footing a minimum of 12". Ensure the membrane is fully supported with backing material such as lagging. When the tops of steel piles are scheduled to be cut down, install a cement board for protection. Cement protection board shall be installed beyond the flange of the pile to ensure that removal of the pile will not damage the Hydro-Ultra Mat-B series membrane. Contact the manufacturer for additional information.

Free Standing Concrete or CMU wall:

Cast in place concrete walls must be clean and dry. Mild irregular surfaces are acceptable when Hydro-Ultra Mat-B series is used. Voids, spalled concrete, and rock pockets must be repaired to provide a smooth surface. All snap tie holes must be filled with grout or other suitable means as determined by the manufacturer. Penetrations shall be in place prior to installation of Hydro-Ultra Mat-B series membrane. Penetrations not in place prior to waterproofing installation shall have sleeves in the wall. Sleeved penetrations shall have link seals installed and waterstops prior to detailing penetrations. Hydro-Ultra Mat-B series membrane can be installed over green structural concrete. As soon as the forms are removed and the wall is prepared, the installation can proceed.

Metal Sheet Piling:

When sheet piling is used as shoring it shall have a minimum of ½" plywood (12 mm) fastened to create a level and flush substrate for the Hydro-Ultra Mat-B series membrane system to be installed against. Plywood shall be installed with all seams of the plywood tightly butted together. Fastening of the plywood to the sheet piling shall be sufficient to hold the weight of the waterproofing system. Fasteners shall be installed so they are flush with the plywood and do not create a puncture concern. If water seepage exists at the sheet piling interlock seams, install waterstop or weld seams solid or other suitable means to maintain the substrate in a dry state. All void spaces behind the plywood and between the sheet piling must be filled with compacted earth, sand, slurry, or concrete. An alternate method is to shotcrete the interior surfaces of the sheet piling to flush out with the face of the piling. This method may require adding items like nelson studs, welded wire mesh or other means to securely keep the shotcrete fill stable.

Cut Rock Face or Auger Cast Caisson Shoring:

The substrate surface of a cut rock and concrete auger pile retention wall should be planar and smooth. Irregular surface conditions, such as voids and sharp transitions that result in an irregular surface profile must be corrected. The substrate that will receive the Hydro-Ultra Mat-B series waterproofing system must be consistently smooth and provide a surface that can receive the membrane. This may require smooth substrate between the concrete caisson's shotcrete. The shotcrete substrate should provide a minimum thickness of 3". Contact the manufacturer for additional information.

Shoring Wall Bracing:

Interior bracing such as rakers and whalers shall be circular pipe type and not H-Pile beams or other irregular types. If interior bracing is not removed prior to waterproofing installation, ensure that block outs are sufficient in size to provide access for detailing waterproofing once bracing is removed. When using circular pipe as wall bracing, ensure that pipe ends are closed off and have a welded plate at the end of pipe before welding to the face of vertical steel piles. H-Pile beams used as rakers, or whalers are not acceptable.

Tie Backs:

Non detentioned tiebacks: For tie backs that will not be detentioned or removed, no block out is required. For this application install Hydro-Ultra Mat-B series field membrane tightly around head of tie-back. Secure by fasteners or install a fastening bar and install manufacturers' tie -back boot. Ensure that no voids exist around tie-back. If voids exist, fill void with concrete, grout, or other approved method.

Post detentioned tie-back block outs: For tie-backs that will be removed post waterproofing application, a block out will need to be provided. Form block outs from wood or other suitable means such as a sonotube. If tie-back rods are angled, then block out form shall follow same angle and degree. A screen type block out material like sta-form is not acceptable. Block out shall be a minimum 24" x 24" square or equal if round, and free of reinforcing steel. Reinforcing steel shall not be inside block out. Rebar collars can substitute rebar inside block out. Consult with structural engineer for additional information. Once tie-back is detentioned or removed, ensure that the removal created no cavity or voids. If void exists, fill void with grout or concrete up to the surface of the steel flange to ensure a flat surface. During installation, block out to ensure that a fireproof protection board is installed inside block out. Cement board or other non-combustible protection can be used to cover and protect the Hydro-Ultra Mat-B series membrane. (See execution portion of this specification for additional information)

Technical Assistance

At HYDRO-GARD we offer the technical assistance needed for the complex waterproofing project. Waterproofing, whether subterranean, below matt slabs, or buried under landscape zones, can cause problems within any building. For these reasons, product selection, design, quality installations and quality control are 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. Therefore 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 an approved, and a 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. HYDRO-GARD recommends third party inspection and acceptance of the installed waterproofing system prior to installation of protective layers.
8. HYDRO-GARD recommends third party monitoring of back fill operation and shotcrete applications.

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-Ultra Mat-B series system can be installed to Shoring Systems, Free Standing Walls, Under Foundation Slabs, Tunnels (cut and cover) and below grade pits:

- Hydro-Ultra Mat-B Series: Hydro-Ultra Mat-B Series is a needle punched non-woven and woven polypropylene matt filled with over 1 pound per square foot of high swelling sodium bentonite granules encapsulated within the non-woven and woven polypropylene. The following versions are available:

Hydro-Ultra Mat-B	(Fresh water non-contaminated)
Hydro-Ultra Mat-B-PE	(Fresh water non-contaminated with HDPE facer)
Hydro-Ultra Mat-B-SW	(Saltwater version without HDPE facer)
Hydro-Ultra Mat-B-PE-S	(Saltwater version with HDPE facer)
- Hydro-Ultra Mat-G: Hydro-Ultra Mat-G is a geotextile buffer layer. It is designed to overlay a substrate; may it be shoring or another approved blindside substrate. It can also be used as a protection layer over the Hydro-Ultra Mat-B series membrane in free standing wall applications when Gard-Drain drainage composite is not used, or under the Hydro-Ultra Mat-B series membrane in foundation slab applications. In vertical applications it is secured in place with fasteners. In horizontal applications it is loose laid under the Hydro-Ultra Mat-B series membrane. Hydro-Ultra Mat comes in weights from 8 oz per square yard to 24 oz per square yard. Contact Hydro-Gard for additional information.
- Gard-Flex: Gard-Flex is a fiber reinforced polymer modified bitumen liquid flashing compound in a one-part single component. The flashing compound comes in a thick paste form so it can be used in vertical and horizontal applications. Gard-Flex is also solvent free. It is used with Hydro-Ultra Mat B series as a typical mastic compound. Once applied in its paste form it will cure to a flexible rubber type of membrane.
- Gard-Stop SK Tape: Gard-Stop SK tape is a self-adhesive bentonite swelling sealant tape. It has a release liner on one side. It is used as a conventional sealing tape for items such as pipe penetrations, Rebar anchors, form ties and other types of penetrations
- 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 meets water it will expand and seal the construction joint. Waterstop-B comes in multiple sizes. (See data sheet for additional information)
- 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 and Hydro-Ultra Mat-B series. 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.

7. HP 9112 Primer: HP 9112 primer is the primer used in conjunction with the HP Liquid Flashing resin. It is a methyl methacrylate resin used to prepare and prime surfaces such as concrete, metal, plastics in which the HP 9800 Liquid Flashing is to be applied.
8. 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 and Hydro-Ultra Mat-B series. 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.)
9. 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 metal, plywood, masonry, concrete, and Dens Deck Gypsum board. It is used to adhere the Hydro-Prufe® PVC membrane and Hydro-Prufe® PVC flashings.
10. 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.
11. 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 in construction joints. It can also be used for termination points for the Hydro-Prufe® PVC membrane and Hydro-Ultra Mat-B series, and as a detail sealant. (Contact Hydro-Gard for additional applications)
12. Alko-Injection 19: Alko-Injection 19 is a double-jacketed PVC core hose with offset openings and/or slots for the disbursement of compressed injection materials. The openings in the inner hose are offset from the compressible sponge type strips. During injection pressure these sponge strips open and let out the grouting material through the outer nylon netting and prevent concrete, silt and other debris from entering the disbursement slots. The primary use of the Alko-Injection 19 hose is inside construction joints, block outs such as tie-backs and other conditions where water may possibly enter a structure.

Drainage Components

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, and Gard-Drain BCS.

INSTALLATION MANUAL FOR HYDRO-ULTRA MAT-B SERIES BENTONITE SHEET MEMBRANE

Part 1 - General Conditions

1.1 Description

A. Summary:

This installation manual is specific for the installation of Hydro-Ultra Mat-B series waterproofing system for subterranean structures, non-hydrostatic.

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-G Series)
3. Drainage layer (Gard-Drain Series)
4. Drainage Collection System (Gard-Drain BCS)
5. Liquid Flashing (HP Liquid Flashing 9800, SAF-30 Adhesive)
6. Swellable Sealant Tape (Gard-Stop SK, Hydro-Gard Swell Tape, Waterstop-B and Leakmaster swellable sealant)
7. Injection hoses (19 Injection hoses)
8. Fastening bars and fasteners as supplied or approved by Hydro-Gard.

B. Related Work under other sections:

1. Site work: Excavation, backfill operations, subsurface and geotechnical investigations.
2. Concrete: Forming and placement. Method of securing forms in blind side construction.
3. Shotcrete: Shotcrete placement
4. Plumbing: Piping and drainage system

1.2 Quality Assurance

- A. **Applicator Qualifications:** Applicator shall be approved to install the specified system and authorized by manufacturer. Applicator shall have a minimum of (3) years' experience in the work of the type required by this manual. Applicator shall have completed and passed the manufacturer's training and guidelines.
- B. **Product Manufacturer:** Waterproofing system shall have approval by local code authority or other nationally recognized approval agency.
- C. **Installation of waterproofing membrane, flashing, membrane protection layers, drainage layer and insulation shall be the responsibility of the membrane applicator to ensure undivided responsibility. Applicator shall ensure that all manufacturer's guidelines are always followed.**
- D. **Materials:** Obtain waterproofing products and accessories from a single manufacturer to assure material compatibility or as approved by manufacturer.

- E. Independent Inspection: The owner or Architect may decide 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, manufacturer's 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. For applications that are under hydrostatic conditions this full-time inspection requirement continues while the concrete foundations are being placed. The inspector shall review, document, and photograph all work. A report shall be provided to the Architect, owner, contractor, installing contractor and manufacturer. (*Contact Hydro-Gard when hydrostatic water conditions are anticipated. Special detail conditions may apply*)
- F. 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, waterstop installation, Alko-Injection hose locations, and all termination conditions. The attendees shall include a representative of the owner, architect, inspection firm, general contractor, waterproofing contractor, concrete or shotcrete contractor, excavation and shoring contractor, rebar contractor, and any other contractor's whose work will penetrate the waterproofing or may interface with the waterproofing.
- G. 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.
- H. Water sampling: Waterproofing contractor or General contractor shall supply a minimum of one gallon of site water for the review by manufacturer when water is encounter at site. Manufacturer shall perform test on site water for analysis on swelling capability of Hydro-Ultra Mat-B series. Manufacturer shall confirm after water sample analysis is completed if the specified Hydro-Ultra Mat-B is suitable for application or if specified product needs to be substituted to other Hydro-Gard systems.

1.3 Submittals:

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

- A. Prepare and submit specified submittals in accordance with the contract documents and Division 1 submittals.
- B. Submit manufacturers product literature, governmental approval report when applicable, and installation guidelines along with the manufacturer's standard details.
- C. Submit representative samples of all products listed in this installation manual if applicable.
- D. Submit sample warranty certificate from manufacturer.

- E. Installers certification from manufacturer as an approved manufacturer installer.

1.4 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 materials which are determined damaged by the owner's representative are to be removed from the job site and replaced at no cost to the owner.

1.5 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 surfaces before proceeding with membrane installation. Waterproofing contractor is responsible to ensure 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 manufacturer's 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 blind side substrate is sound and dry. If water is seeping for blind side substrate, report this to owner's representative for correction before proceeding.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner, always, 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 membranes. Contact 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.

1.6 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.
- B. Complete sections of the waterproofing membrane shall be accepted by the inspection firm and manufacturer before proceeding with protection layers and/or backfill operations.

1.7 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 manufacturer's standard (5) year warranty upon request of a properly executed warranty application form. The warranty shall be issued upon confirmation that the installation of the Hydro-Ultra Mat-B series 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. The manufacturer's warranty shall be conditioned upon the following. (1) a properly completed notice of award has been completed by the waterproofing applicator and received by the manufacturer; (2) all products and accessories have been supplied by Hydro-Gard; (3) all products supplied by Hydro-Gard have been installed in accordance with Hydro-Gard installation guidelines and details; (4) Waterstop B has been installed in all construction joints and shotcrete lift joints; (5) Alko-Injection hoses have been installed in all construction joints and shotcrete lift joints when these areas are within the water table; (6) all third party inspection reports have been submitted to Hydro-Gard.

Part 2 - Products

2.1 Hydro-Ultra Mat-B series Bentonite Waterproofing Membrane

- A. Hydro-Ultra Mat-B Series: Hydro-Ultra Mat-B Series is a needle punched non-woven and woven polypropylene matt filled with over 1 pound per square foot of high swelling sodium bentonite granules encapsulated within the non-woven and woven polypropylene. The following versions are available:

Hydro-Ultra Mat-B	(Fresh water non-contaminated)
Hydro-Ultra Mat-B-PE	(Fresh water non-contaminated with HDPE facer)
Hydro-Ultra Mat-B-SW	(Saltwater version without HDPE facer)
Hydro-Ultra Mat-B-PE-S	(Saltwater version with HDPE facer)

Parameters	ASTM Test Method	Typical Physical Properties
Color		Grey
Tensile strength psi, min.	ASTM D6768	68.5 lbs / in
Bentonite Mass	ASTM D5993	1.102 lbs / sf
Swell Index	ASTM D5890	2 gal / 24ml
Hydrostatic Head Pressure	ASTM D751	228 ft
Fluid Loss	ASTM D5891	18 ml / max
Permeability	ASTM D5084	1X10 / m/s

2.2 Manufacturer

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

2.3 Hydro-Ultra Mat-B series Products and Accessories

- A. Accessories:

1. Hydro-Ultra Mat-G: Hydro-Ultra Mat-G is a geotextile buffer layer. It is designed to overlay a substrate may it be concrete, shoring or compacted gravel sub-base. In vertical applications such as shoring it is secured in place with fasteners. 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. Gard-Flex: Gard-Flex is a fiber reinforced polymer modified bitumen liquid flashing compound in a one-part single component. The flashing compound comes in a thick paste form so it can be used in vertical and horizontal applications. Gard-Flex is also solvent free. It is used with Hydro-Ultra Mat B series as a typical mastic compound. Once applied in its paste form it will cure to a flexible rubber type of membrane.
4. Gard-Stop SK Tape: Gard-Stop SK tape is a self-adhesive bentonite swelling sealant tape. It has a release liner on one side. It is used as a conventional sealing tape for items such as pipe penetrations, Rebar anchors, form ties and other types of penetrations
5. 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 metal, plywood, masonry, concrete, steel, and Dens Deck Gypsum board. It is used to adhere the Hydro-Prufe® PVC membrane and Hydro-Prufe® PVC flashings.
6. 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.
6. Alko-Injection 19: Alko-Injection 19 is a double-jacketed PVC core hose with offset openings and/or slots for the disbursement of compressed injection materials. The openings in the inner hose are off set from the compressible sponge type strips. During injection pressure these sponge strips open and let out the grouting material through the outer nylon netting and prevent concrete, silt and other debris from entering the disbursement slots. The primary use of the Alko-Injection 19 hose is inside construction joints, block outs such as tie-backs and other conditions where water may possibly enter a structure.

B. Drainage Components

1. Gard-Drain 200: Gard-Drain 200 is a prefabricated drainage medium intended for below grade 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 below grade 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 420: Gard-Drain 420 is a prefabricated drainage medium intended for both vertical and horizontal applications. It is used for below grade 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.
5. 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.

2.4 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 Tremco.
3. Vulkem 921 by Tremco.
4. Tremseal-S by Tremco

B. Miscellaneous 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 Factory Mutual Standard 4470 for corrosion resistance.

Part 3 - Execution

3.1 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.

3.2 Examination

- A. Examine all surfaces, substrates and conditions to receive the Hydro-Ultra Mat-B series waterproofing system. Confirm conditions are acceptable for the application of the waterproofing system. Do not proceed with work until all unsatisfactory conditions have been corrected in a manner acceptable to manufacturer. Starting work within a particular area will be construed as applicators acceptance of all substrate conditions.
- B. Substrate surface shall comply with manufacturers requirements. See “Substrate Requirements” within this manual.
- C. Verify that all penetrations are in place and sealed with link seals or other suitable means approved by manufacturer. All penetrations installed after (post) Hydro-Ultra Mat-B series waterproofing system shall have waterstops installed. (See penetration details)

3.3 Substrates and Substrate Preparation

- A. Free Standing Foundation Walls:
 - 1. Concrete foundation walls shall be cured and free of fins, voids or sharp projections that could cause damage to the Hydro-Ultra Mat-B series waterproofing system.
 - 2. Form tie holes shall be sacked flush with concrete or grout. Fins or other sharp or raised areas in concrete shall be ground down flush to provide a smooth and consistent surface.
 - 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 manufacturer for any additional detailing on expansion joints.)
- B. Wood Lagged Shored Walls:
 - 1. Ensure that all lagging is clean and dry. If moisture or water is present, ensure that water does not prematurely activate the Hydro-Ultra Mat-B series. Gaps more than 1 inch in lagging shall be filled with concrete,

grout or other approved means as defined by HYDRO-GARD. Nails at a pile flange shall be removed or hammered down to avoid the possibility of damaging or puncturing the membrane.

2. Wood lagging should extend down to the lowest level of the waterproofing installation. When Hydro-Ultra Mat-B series waterproofing system is not specified to be carried under footing and under slab then waterproofing system must be carried down into perimeter footing a minimum of 12". Hydro-Ultra Mat-B series waterproofing must be fully supported by lagging, ensure that lagging is fully supported and carried down into footing a minimum of 12". If lagging needs to extend beyond the minimum, then continue to extend lagging until waterproofing system is fully supported.
3. When Gard-Drain drainage composite is not fully covering the wood lagging and soldier pile then a strip of Hydro-Ultra Mat-B series shall be used over the steel soldier pile extending a minimum of 6" beyond the side of the soldier pile as a double layer at the steel pile. Hydro-Ultra Mat 12 oz geotextile can be substituted for the Hydro-Ultra Mat-B series when the project is not anticipated to be within the expected water table.

C. Working Mud Slab:

Working mud slabs shall be dry and free of any debris. A mud slab should have a smooth wood float finish without sharp angular depressions, voids or sharp raised areas that could cause damage to the Hydro-Ultra Mat-B series waterproofing system.

D. Compacted Soil Substrates:

1. The sub-grade shall provide no less than 85% compaction factor if specified by the engineer. The surface shall provide a smooth and uniform profile free of debris, standing water, ice or rocks. Sharp protrusions shall either be removed or rolled flat. Specific sub-grade preparation shall be designed by a licensed and qualified engineer. When compacted Soil substrates are used in lieu of working mud slabs Hydro-Ultra Mat 12 oz must be used in addition to the Hydro-Ultra Mat- B series as a buffer layer. *Projects within the water table must provide a working mud slab. (See paragraph 3.05, B for additional information)*
2. Aggregate sub-grades shall consist of 3/4" (19 mm) stone or smaller and rolled flat and shall be free from any sharp or protruding edges. Sub-base shall consist of highway type road base that contains sand and other fines that lend themselves to compaction. Hydro-Ultra Mat 12 oz must be used with the Hydro-Ultra Mat- B series as a buffer layer placed under the Hydro-Ultra Mat-B series.

E. Concrete Protection slab:

1. A concrete protection slab placed over the Hydro-Ultra Mat-B series waterproofing system is highly recommended. A concrete protection slab will ensure that the Hydro-Ultra Mat-B series waterproofing system is protected from damage from subsequent construction operations. If a concrete protection slab is not provided and reinforcing steel is erected on top of the Hydro-Ultra Mat-B Series then cement adobe shall be used to support the rebar. No other rebar supports are acceptable.

F. Steel Solider Piles:

1. When steel H piles are used it is always the preference to have the lumber lagging front lagged. Hydro-Ultra Mat-B series waterproofing system should be installed over a flush and consistent surface. If front lagging is not possible then consult with manufacturer for additional detail requirements.
2. If steel piles are scheduled for removal, ensure that the removal will not damage the Hydro-Ultra Mat-B series waterproofing system. This can be accomplished by installing a protection layer of cement or other fire rated board at the top of the pile or positioned at the point that the pile will be cut off later.
3. Lagging board nails shall either be removed or pounded down flush until they no longer are considered a possible protrusion that could puncture the waterproofing system.

G. Expansion Joints:

Expansion joints should follow the design of the project documents. Expansion joints shall be installed prior to the installation of the Hydro-Ultra Mat-B series. Expansion joints are responsible for the primary seal at these structural separations. (*Contact Hydro-Gard for specific details concerning expansion joints*)

3.4 Initial Wall Installation

A. Drainage Board Installation:

1. When required by the construction documents install Gard-Drain BCS at base of wall just above footing. Start at the base of the lagged wall and install Gard-Drain BCS horizontally connecting each roll with splice couplers. Install discharge outlets as required by the construction documents. Discharge pipes shall be sealed with Gard-Flex mastic and two rows of Waterstop B or Gard-Stop SK Tape shall be installed around pipe penetration. See manufacturers details for this condition.
2. Blindside Wall Installation: Continue installation of Gard-Drain Prefabricated drainage board vertically up wall with geotextile fabric

facing lagging in blind side installations. Attach Gard-Drain panel using washer head nails, construction adhesive, adhesive tapes or other means approved by manufacturer. Cut and fit Gard-Drain neatly around penetrations and seal off edges of drainage board.

3. Back Fill Wall Installation: When installing Gard-Drain over completed in place Hydro-Ultra Mat-B series membrane fasten Gard-Drain through the Hydro-Ultra Mat-B series membrane. Ensure that non-woven filter fabric side is facing the backfill work. Adhesives or spots of Adhesives can be used to secure the Gard-Drain in place until backfill operations are complete. (Contact Hydro-Gard for adhesive recommendations.)

B. Hydro-Ultra Mat- B Series Installation:

(When hydrostatic conditions exist 2 layers of Hydro-Ultra Mat- B series must be used or change to Hydro-Prufe® 80 mil PVC waterproofing system. Consult manufacturer when hydrostatic conditions exist)

1. Install Hydro-Ultra Mat- B series over properly prepared lagging or Gard-Drain. Install overlapping seams a minimum of 4" and secure laps with washer head nails at 24" on center. Install Hydro-Ultra Mat- B series neatly and tightly around tie-back heads and other penetrations. Use Gard-Flex mastic where appropriate.
2. Install Hydro-Ultra Mat-B series with the dark gray woven geotextile side facing the concrete placement. In blindside application it would be facing the installer, so shotcrete or concrete is placed against this dark grey side. In Back Fill Wall application, the dark grey side is placed against the concrete wall and the white geotextile side or PE side is facing the installer.
3. Overlap the Hydro-Ultra Mat-B series a minimum of 4" and fasten laps every 24" on center with round cap nails. When shotcrete is being placed against the Hydro-Ultra Mat-B series ensure the shotcrete does not open or enter the overlaps of the Hydro-Ultra Mat-B series. Additional nailing maybe required, or seam tape can be placed over the Hydro-Ultra Mat-B series.

3.5 Initial Installation Under Slab and Wall Transition

Under Slab Installation: (When hydrostatic conditions exist, 2 layers of Hydro-Ultra Mat-B series must be used. Or system shall be changed to Hydro-Prufe® 80 Mil PVC waterproofing system)

- A. **Mud / Waste Slab:** When installation is within the water table and under hydrostatic conditions a mud or waste slab must be provided. Mud or waste slab shall be a minimum of 3" thick and can be reinforced or non-reinforced. Slabs shall be finished by smooth wood float or trowel smooth.

Slabs shall provide a surface without voids or sharp protrusions so as not to put pressure on the membrane. When de-watering wells are within the mud / waste slab contact manufacturer for additional details. Mud or Waste slab must provide a dry surface for installation of waterproofing system. A network of perforated piping under the mud / waste slab maybe needed to maintain a dry surface for the waterproofing system

- B. Hydro-Ultra Mat- B Series:
Over properly prepared Mud / Waste slab layout Hydro-Ultra Mat- B series over mud / waste slab. Ensure slab is dry and has no ponding water conditions. Dampness is acceptable. Ensure that light color side of sheet is facing down against mud / waste slab. Darker color grey geotextile should be facing up toward sky. Overlap all adjoining sheets a minimum of 4" and secure overlaps with washer head nails or staples. Fastening should be at a minimum of 24" on center or as needed to maintain position of sheet. Ensure sheets are staggered so end laps are a minimum of 12" apart. Continue installation and carry Hydro-Ultra Mat- B Series up forms or lagging to ensure a proper tie-in with wall system. It is recommended that Hydro-Ultra Mat- B series is installed up vertically a minimum of 24" above rebar dowels coming out of the structural slab. When vertical bulkhead forms are used to segment horizontal pours, extend Hydro-Ultra Mat- B series beyond forms a minimum of 24" to ensure enough tie-in and overlap is provided.
- C. Continue installation of Hydro-Ultra Mat-B series up wall overlapping seams a minimum of 4" and secure laps with washer head nails at 24" on center. Install Hydro-Ultra Mat-B series neatly and tight around all other penetrations. Install Gard-Flex mastic where appropriate.
- D. Install Hydro-Ultra Mat-B series waterproofing under all grade beams, column footings and other detail conditions in accordance with manufacturer guidelines.
- E. Waterstop B shall be installed in all construction joints, pour joints of matt slab or slab on grade. Install Waterstop B around all slab penetrations in accordance with manufacturer guidelines. *(When application is within the water table 2 layers of Hydro-Ultra Mat-B series is required and the addition of Alko-Injection hose 19 must be installed in all construction joints. See manufacturer for additional information and details)*

3.6 Tie Back Block outs

- A. Prior to tie back removal, applicators shall inspect block out to ensure no Hydro-Ultra Mat-B series membrane has been damaged. Applicator, contractor, and inspection company shall consult with contractor removing tie-back to ensure removal process proceeds without causing damage to the membrane. Once block out and tie-backs are removed, remove fireproof protection material that was previously installed and inspect the

Hydro-Ultra Mat-B membrane along with inspection company and repair any damaged membrane exposed inside block out. Gard-Flex can be used to repair small breaches in membrane. Install HG tie-back cover over removed or detentioned tie-back. Fasten flange of tie-back cover to Hydro-Ultra Mat-B series inside block out. Install a 6" minimum strip of Hydro-Ultra Mat-B series over flange in a bedding of manufacturer's mastic, Gard-Flex. Install two rows of Hydro-Gard Gard-Stop SK Tape or Waterstop B inside clean block out. Block out surface shall provide a smooth surface for the installation of waterstops. The preferred method to fill block out is cast in place concrete. Hand grouting (packing) is also acceptable. See manufacturer for additional details regarding tie-back. Pneumatically placed concrete, i.e., (Shotcrete) to fill tie-back is not acceptable. (*Alternate Method: When Alko-Injection hoses are installed inside block out only one waterstop is required.*)

- B. Rakers and other block out conditions shall be detailed in accordance with manufacturers guidelines. All block outs shall have waterstops or Alko-Injection hose installed within the block out prior to block out being grouted.

3.7 Termination at Grade

Terminate Hydro-Ultra Mat-B series membrane at grade once pile removal work has been completed. Ensure removal process has not caused any damage to the Hydro-Ultra Mat-B series membrane. If damaged, repair as needed. See manufacturers' details for Grade terminations or interfacing details with above grade membranes and between slab membranes.

3.8 Completion

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