

APPLICATION INSTRUCTIONS

1. Product Description

- 1.1 TUFF-N-DRI® XTS is a fluid-applied, single component, polymer-modified asphalt emulsion. This material was specifically designed for spray application on below grade retaining walls. TUFF-N-DRI XTS can be applied to block, parged block, and poured concrete retaining walls. Proper installation is critical to ensuring the quality of membrane performance. TUFF-N-DRI XTS's application instructions for retaining walls are outlined in the following text and should be strictly adhered to during all phases of application.

2. Storage

- 2.1 TUFF-N-DRI XTS, like all asphalt emulsions, must be kept from freezing. It is best to store TUFF-N-DRI XTS off the floor at an ambient temperature above 50° Degrees Fahrenheit (F). Opened drums should be tightly sealed before storage to avoid a skin developing on top of the liquid.
- 2.2 When shipping emulsion-based products during winter months, there is always a risk of the material freezing while in transport. The risk is much higher on shipments of less than 40 drums because these shipments go as "less than truckload" and therefore do not go directly from our warehouse to yours. If you suspect that a shipment has been exposed to temperatures below freezing, you can easily inspect the material yourself. Insert a pole or stick through the bung opening and check for "chunks" or debris. If none is detected, the material should be fine to spray. If you are still uncertain, contact your Tremco Technical Representative.

3. Safety

- 3.1 Use the following safety instructions when handling TUFF-N-DRI XTS. Also review the Material Safety Data Sheet (MSDS), as well as the safety precautions provided by the spray equipment manufacturer.
1. Avoid direct contact with the material. Prolonged or repeated contact can cause skin irritation. If prolonged contact is anticipated, impervious gloves should be worn.
 2. In a confined space at temperatures less than 212° F, sufficient vapors can accumulate and flash if a source of ignition is present. The product will not support sustained combustion and will not burn under normal circumstances.
 3. Mist from spray application in a confined area can cause a headache, nausea, and irritation of the nose, throat and lungs. To prevent this, a NIOSH approved respirator for ammonia must be worn per the MSDS.
 4. To protect eyes from contact with high-pressure spray, wear chemical safety glasses with side shields. If contact with eyes, occurs, flush with large amounts of cool water while holding eyelids open. Get medical attention if irritation persists.

4. Application Instructions for Retaining Walls Preparation

1. Surfaces to be coated must be clean, smooth, firm, free of dust, mud, loose mortar, wires, fins, metal projections or any other substances which might prevent placement and bonding of a continuous film. Take particular care to ensure that the footing and cove are clean.

2. On poured concrete retaining walls, remove wall ties on outside and inside of wall.
3. Tie holes and other small voids can be patched with an asphalt-based mastic.
4. Repair and/or patch any cracks, honeycombs, or large voids in the wall or footing with grout (non-shrinking grout is preferred, i.e. Thorseal Waterproofing or 50/50 mix Waterplug and cement).
5. When waterproofing retaining walls with structural cants (ledge created by transition from 12" block to 8" block), proper preparation is critical to ensure a smooth transition. Contact your Tremco Technical Sales Representative at 1-800-876-5624 for detailed instructions.
6. TUFF-N-DRI XTS may be applied to damp or green concrete. However, the product must not be applied over standing water, water film, ice or snow.
7. The retaining wall must be of such strength and design to ensure structural integrity. Retaining walls must be properly cured according to the local building code regulations. If these are not available, consult the Concrete Foundation Association for specifications.

5. Application

1. TUFF-N-DRI XTS can be applied to surfaces down to 20° F.
2. To ensure proper temperature at the spray gun, insulate the lines and the pump housing of the spray apparatus. When spraying below 50° F ambient temperature, it is highly recommended to have your equipment and material enclosed in a heated compartment.
3. Spray TUFF-N-DRI XTS in a pressure range between 2300 and 2800 pounds per square inch (psi). For best results, use a 0.35" spray tip. Do not use any tip larger than 0.39".
4. The membrane should be applied to a minimum of 60 mils wet. This will cure to a dry film thickness of 40 mils. Use a wet film mil gauge to ensure proper application thickness. For poured concrete walls, a maximum coverage rate of 25 ft²/per gallon will yield the desired wet mil thickness at application. For block walls, a max coverage rate of 20 ft²/per gallon.
5. Careful attention must be taken during the application process to ensure a consistent, homogenous membrane. Extra coating should be applied to voids or honeycombed areas, changes in plane including joints between footing and wall, tie holes, form joints, cold seams and other rough areas. For best results, apply TUFF-N-DRI XTS using a two-coat technique. Spray the first tack coat horizontally along the entire length of the wall. Spray the second coverage coat vertically to the required wet mil thickness. This technique will help to optimize the coverage rate and ensure a uniform mil thickness.
6. Inspect the sprayed wall thoroughly for pin holes, blisters or other voids in the membrane. If any are detected, lightly re-spray until a monolithic coating is achieved.
7. After application, applicator must verify that:
 - a. Backfill does not exceed the level of the waterproofing system.
 - b. Grade slopes away from the foundation.
8. Applicator must pass the responsibilities in number 7 on to the builder or general contractor. If the applicator does pass these responsibilities on, be sure the builder or general contractor is aware of these responsibilities.

9. To waterproof penetrations, the voids around the penetration must be filled with non-shrinking grout then the penetration area and approximately one foot of pipe must be sealed with an elastomeric membrane.

6. Drainage Requirements

- 6.1 A positive perimeter drainage system for retaining walls is recommended, and sometimes required by local code. Positive perimeter drainage can be effectively achieved by combining DrainStar™ strip drain with TUFF-N-DRI XTS. For information on DrainStar, call your Technical Representative at 1-800-876-5624. Other means of achieving positive drainage include a 3" minimum perforated drainage pipe, and gravel over pipe exiting to a daylight exit, or 2" weep holes at the base of the retaining wall every 4'-6', covered by a minimum of 12" of gravel.

7. DrainStar Drain Board Installation

1. Applying the board at the correct time is essential to ensure good adhesion to the TUFF-N-DRI XTS membrane. The board must be set as the membrane begins to cure. This will vary, depending on ambient temperature and humidity levels. A signal that the membrane is beginning to cure is when it changes from brown to black in color. At 70°F ambient temperature, this should take 2-7 minutes. As the temperature drops, the curing process will take longer. On walls exposed to full sunlight, the curing process will be much faster than on shaded walls.
2. To install the board, place the bottom of the board on the footer at the cove and press firmly. Slowly work your way up to the top of the board carefully pressing the board on to the membrane. Take special care not to slide the boards. The board may appear to be loose, but as the membrane cures, it will draw the board in resulting in excellent adhesion between the board and the membrane. If the board falls off, check the integrity of the membrane and respray to 60 mils wet if needed. It may be necessary to spray a mist of TUFF-N-DRI XTS on the wall to increase adhesion.
3. Place the board along the retaining wall in the same direction as the membrane was applied. All boards should be checked before leaving the job site. When the DrainStar Drain Board is installed, the retaining wall can be backfilled in 16 to 24 hours.
4. When installing the 4' x 4' boards, install the bottom board first then immediately place the top board. Proceed in this fashion of placing the bottom board then top board. This prevents the TUFF-N-DRI XTS membrane from running down and onto the top edge of the bottom board.
5. It may be difficult to achieve the desired adhesion characteristics when applying the thicker boards (i.e., 1 3/16" and 2 3/8"). Adhesives or mechanical fasteners can be considered. Apply the adhesive using a caulking gun to the edges of the back of the board. Consult your Technical Service Representative for availability and detailed application instructions on these products.
6. Mechanical fasteners may be used as needed. They are highly recommended when large areas of DrainStar Board are left exposed. Consult your Technical Service Representative for proper fastener type and installation instructions.

8. Equipment Recommendations

- 8.1 Emulsion-based products require some special handling in order to optimize their application. Below are listed some equipment recommendations and a "trouble shooting" section should any spray problems arise.

9. Equipment Set-Up

1. A pump capable of spraying 3000 psi is required. The GRACO #733 or GRACO #533 pumps work well with this material.
2. The diameter and length of all the interlinking lines is critical to ensuring a good flow of material to and from the pump. The larger the diameter and shorter the length of all interlinking lines decreases the flow resistance and optimizes product transfer.

The siphon line from the drum to the heat exchanger should not be longer than 4 feet if possible, and a 2" diameter is recommended. The line from the heat exchanger to the pump should have a minimum inside diameter of 1 1/4" and be no longer than 3 feet. All connections should be as tight as possible so as to not introduce air into the lines.

3. Make sure the lower piston ball check is on the high setting. Consult your equipment manual for adjustment procedures.
4. A single-pass heat exchanger connected to truck engine's coolant system is the best way to heat TUFF-N-DRI XTS to the proper application temperature of 110° F to 160° F. Many different sizes of heat exchangers have been used with good success. One in particular that produces good heat transfer is Young's Radiator Company's Model #F-605-EY-1P. Consult your TUFF-N-DRI XTS Technical Representative for availability.
5. The spray hose must be a "high pressure" type, capable of taking 4000 psi. A maximum of 1/2" diameter line is accepted for the first 100 feet of hose. It should then be reduced to 3/8" for the next 50 feet. No more than 150 feet of hose is recommended.
6. Many different spray guns can be used. Best results have been achieved with GRACO's Hydra-Mastic Airless Spray Gun, Model #206-716. In colder weather (40° F and below), switching to an extrusion flow type gun such as GRACO's Silver Airless Gun, Model #208-663 is recommended. This will eliminate the concern of material building up in the spring assembly of the Hydra-Mastic Gun.

10. Troubleshooting

- 10.1 If you lose pressure while spraying:

1. Check all line connections for air leaks.
2. Reduce the amount of engine coolant going through the heat exchanger, but watch to be sure that the TUFF-N-DRI XTS material temperature does not drop below 110° F.
3. Flush system with Toluene, diesel fuel, or mineral spirits.
4. Spray product to test pressure.
5. If pressure cannot be maintained, take apart the lower foot valve and inspect the piston ball check. If the piston ball check moves freely and is seating correctly, take out the piston rod and inspect the packings. Replace the packings if they are damaged or worn excessively.
6. Reassemble the equipment and spray product to see if a constant pressure can be maintained.
7. If pressure still cannot be maintained, open up the heat exchanger and check for blockage. If blocked, clean thoroughly and reassemble.
8. If these procedures do not work, consult your GRACO Service Representative or TUFF-N-DRI XTS Technical Representative.

11. Operational Maintenance

- 11.1 Consult your GRACO Service Manual for maintenance scheduling or replacement of vital parts (i.e. piston packings, ball check, etc.).

TUFF-N-DRI® XTS

Polymer-modified asphalt emulsion

1. Many different solvents can be used to flush the system, but mineral spirits are recommended because they act as a lubricant for the leather packings in the pump.
2. **DO NOT** use water to flush TUFF-N-DRI XTS out of the lines. This will shock the emulsion and cause it to “break” in the lines.
3. Mineral spirits, toluene and most other solvents are flammable and/or hazardous. Be sure to check with the suppliers of these solvents for the correct safety and handling procedures and follow the suppliers’ recommendations when using clean up solvents.

12. Transportation

12.1 TUFF-N-DRI XTS is classified as a non-hazardous emulsion and does not require placarding.

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Please refer to our website at www.tremcosealants.com for the most up-to-date Application Instructions.

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