



TUFF-N-DRI® BASEMENT WATERPROOFING SYSTEM DETAILED APPLICATION INSTRUCTIONS

PRODUCT DESCRIPTION

TUFF-N-DRI Waterproofing Membrane is a fluid-applied, single component, polymer-modified asphalt emulsion. This material is specifically designed for spray application on below grade exterior foundation walls or above grade when covered by other material. **TUFF-N-DRI** can be applied to many different substrates, but is primarily applied to block, parged block or poured concrete foundations.

WARM-N-DRI® Insulation/Drainage Board is a uniformly textured material made from inorganic glass fibers bonded by a thermosetting resin. The product is designed to be applied to the exterior of foundation walls to protect the waterproofing membrane from damage by backfill, to provide a drainage pathway for ground water, and to provide insulation for the reduction of heat loss.

Proper installation of both products is critical to ensuring the quality of their performance. **TUFF-N-DRI**'s application instructions are outlined in the following text and should be strictly adhered to during all phases of application.

STORAGE

TUFF-N-DRI, like all asphalt emulsions, must be kept from freezing. It is best to store **TUFF-N-DRI** 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.

When shipping emulsion-based products during the 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 **TUFF-N-DRI** Technical Representative or Territory Manager.

SAFETY

Use the following safety instructions when handling **TUFF-N-DRI**. 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. If you begin to smell ammonia through the mask, replace the cartridges.

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.

Follow the safety precautions listed below, as well as those found on the MSDS sheet, when handling WARM-N-DRI.

There are three primary areas where the fibers can be introduced into your system:

1. Inhalation: If inhaled, remove person to fresh air. Drink water to clear throat and blow nose to evacuate fibers.
2. Skin Contact: Frequent rinsing of skin surface with cool water to remove accumulated fibers will minimize irritation. If irritation persists, consult a physician. Treat as a mechanical irritant.
3. Eye Contact: Flush eye with flowing water for at least 15 minutes.

APPLICATION INSTRUCTIONS

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 walls, remove wall ties on outside and inside of wall.
3. On poured concrete walls, tie holes and other small voids can be patched with an asphalt-based mastic.
4. For block walls, mortar joints must be struck (made flush) and filled in order to ensure a void free surface. Also make sure that all brick ledges are properly capped or filled.
5. On all block walls, it is recommended that all patching and repair be done with mortar or grout. (A quick-setting and non-shrinking material is preferred.)
6. When waterproofing block walls, be sure to find out whether any or all the cores of the block foundation are to be filled with concrete. If any cores are to be filled, they must be filled with concrete and allowed to dry **BEFORE** the wall is waterproofed with the **TUFF-N-DRI** Waterproofing System.
7. For poured concrete or block walls, repair and/or parge any cracks, honeycombs or large voids in the wall or footing with grout. (Non-shrinking grout is preferred, i.e., Thoroseal Waterproofing or 50/50 mix Waterplug and cement.)
8. **TUFF-N-DRI** may be applied to damp or green concrete. However, the product must not be applied over standing water, or a water film, or ice or snow.
9. Before waterproofing a monolithic slab/footing foundation (where the floor slab and footing are all a single slab), call your **TUFF-N-DRI** Technical Representative at 1-800-876-5624.
10. Consult **TUFF-N-DRI**'s "Builder's Guide to Ensuring a Dry Basement" for the best ways to waterproof lintels (long masonry blocks that provide support over the ditch for attachments to the foundation walls). If the lintel is already attached to the foundation, check around, beneath and between (if 2 lintel blocks are used) to make sure all gaps in the mortar work are filled. Finally, apply **TUFF-N-DRI** Waterproofing to both sides of the lintel and walls on top of the lintel to grade and extend this waterproofing one block beyond the end of the lintel. Do not put any WARM-N-DRI board on this area of waterproofing.

11. The concrete foundation must be of such strength and design to ensure structural integrity. Foundation walls must be properly cured according to local building code regulations. If these are not available, consult the National Concrete Masonry Association for specifications or the Concrete Foundation Association.

TUFF-N-DRI® APPLICATION

1. **TUFF-N-DRI** can be applied to surfaces down to 20° F. Material temperature at application must be between 110°F and 160°F. Do not exceed 175° 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** in a pressure range between 2300 and 2800 pounds per square inch (psi). For best results, use a .035" spray tip. Do not use any tip larger than .039".
4. The membrane should be applied to a minimum thickness of 60 mils wet. The product 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 square feet per gallon (sf/gal) will yield the desired wet mil thickness at application. The maximum coverage rate on block walls should be 20 sf/gal. Coverage rates may be lower depending on the porosity of the block or poured concrete walls.
5. Careful attention must be taken during the application process to ensure a consistent, homogeneous membrane. Extra coating should be applied to voids or honeycombed areas, changes in plane including joints between footing and wall, joints between blocks, tie holes, form joints, cold seams and other rough areas. For best results, apply **TUFF-N-DRI** 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. Adequate foundation drainage system is installed (See "Drainage Requirements")
 - b. All Penetrations (water, sewer, etc.) have been sealed.
 - c. Backfill does not exceed the level of the waterproofing system.
 - d. Grade slopes away from the foundation.
8. Applicator may 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 first be filled with non-shrinking grout then the penetration area and approximately one foot of pipe must be sealed with an elastomeric membrane.



WARM-N-DRI® INSTALLATION

1. Applying the board at the correct time is essential to ensure good adhesion to the **TUFF-N-DRI**. 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 to 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 onto the membrane. Take special care not to slide the board. 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 re-spray to 60 mils wet if needed. It may be necessary to spray a mist of **TUFF-N-DRI** on the wall to increase adhesion.
3. Place the board around the foundation in the same direction as the membrane was applied. All boards should be checked before leaving the job site. When the **WARM-N-DRI** Board is applied, the foundation can be backfilled in 16 to 24 hours.
4. When installing 4' x 4' boards, install the bottom board first then immediately place the top board. Proceed in this fashion of placing bottom board then top board. This prevents the **TUFF-N-DRI** 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 **TUFF-N-DRI** Technical Representative for availability and detailed application instruction on these products.
6. Mechanical fasteners may be used as needed. They are highly recommended when large areas of **WARM-N-DRI** are left exposed.
7. Another technique to enhance board adhesion is to wet the back side of the **WARM-N-DRI** board with a calcium chloride solution before installing the board to the **TUFF-N-DRI** membrane. The solution is simply prepared by mixing up a ratio of approximately 2-3 pounds of granular calcium chloride per 1 gallon of water. (For example: In a 5 gallon bucket, put in 10-15 pounds of calcium chloride and add 5 gallons of water. Stir or mix solution until granular solid is dissolved. Note: Be aware that dissolving the calcium chloride can heat the water significantly, up to 150°F.)

Wet the board with the solution using a watering can or weed sprayer or similar device. It is not necessary to drench the board; simply dampen it. Install the wet side of the board to the **TUFF-N-DRI** membrane. Contact your **TUFF-N-DRI** Technical Representative, if necessary, for more instruction on this procedure.

DRAINAGE REQUIREMENTS

In order to qualify for the 30-Year Limited Warranty, a proper drainage system must be installed. **TUFF-N-DRI** requires a positive drainage system consistent with local, good construction practices. An exterior drainage system consisting of a 3" minimum, perforated drainage pipe, and gravel over the pipe, on to the footer and at least 10" up the face of the vertical wall is recommended. The drain tile must channel the water to either an operating sump pump or to daylight. If an interior drainage system is used, special measures to ensure proper drainage must be taken. Weep holes in the footing must be created to allow water from the **WARM-N-DRI** on the exterior foundation wall to flow to the interior drain tile. There should be weep holes every 8 feet and gravel installed as detailed previously. PVC pipe through the footer is acceptable in place of weep holes. The grade should always slope away from the structure.

EQUIPMENT RECOMMENDATIONS

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.

EQUIPMENT SET-UP

1. A pump capable of spraying 3000 psi is required. The GRACO #733 or GRACO Hydromax 350 pumps work well with this material. (Contact **TUFF-N-DRI** for assistance with equipment purchases.)
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 an engine's coolant system is the best way to heat the **TUFF-N-DRI** to the preferred application temperature of 110° to 130°F. Many different sizes of heat exchangers have been used with good success. One in particular that produces good heat transfer is the API Basco Model 500. Consult your **TUFF-N-DRI** Territory Manager 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 can then be reduced to 3/8" for the next 100 feet. No more than 200 feet of hose is recommended.
6. Many different airless spray guns can be used to spray **TUFF-N-DRI**. The most widely used brand is Graco. The Graco Silver Plus gun is the most popular for polymer-modified asphalt emulsion type spraying. You may also use the Graco Heavy-Duty Texture Gun or the Graco Flex Plus Gun. The Graco Contractor II line of guns can also be used to spray **TUFF-N-DRI** if the handle filters are removed.

TROUBLE SHOOTING

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 the **TUFF-N-DRI** 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 can not 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 can't 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** Technical Representative.

OPERATIONAL MAINTENANCE

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

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** 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.

TRANSPORTATION

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



If you have any further questions please call us at (800) DRY-BSMT

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