



SURFACE PREPARATION AND APPLICATION GUIDE

SERIES G434
PERMA-SHIELD H₂S

TNEMEC COMPANY INC

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1.0 INTRODUCTION

The procedures outlined in this guide are intended to aid in determining proper surface preparation, mixing, application and inspection methods for Tnemec's Series G434 Perma-Shield H₂S epoxy mortar wastewater system. Prior to starting work, please read this entire guide carefully. Please contact your Tnemec representative or call Tnemec Technical Service at 1-800-TNEMEC1 for specific recommendations.

2.0 PRODUCTS AND PACKAGING

The following contains information on the core components of this product.

2.1 SERIES G434 PERMA-SHIELD H₂S

Series G434 Perma-Shield H₂S is an aggregate-reinforced, 100% solids hybrid epoxy mortar. This product is designed for severe wastewater immersion and fume environments. Specifically formulated to withstand high levels of hydrogen sulfide gas (H₂S), sulfuric acid (H₂SO₄), as well as other gases common to sewer exposures. The aggregate reinforcement provides additional resistance to abrasion and impacts.

2.1.1 SERIES G434 PACKAGING

KIT SIZE	PART A (PARTIALLY FILLED)	PART B (PARTIALLY FILLED)	PART C	YIELD (MIXED)
Large Kit	5 gallon pail	3 gallon pail	36 lb box	3.7 gallons (14 L)

2.1.2 SERIES G434 COVERAGE RATES

DRY FILM THICKNESS	LARGE KIT COVERAGE
At 1/8" (125 mil)	48 sq. ft. (4.4 m ²)
At 1/4" (250 mil)	24 sq. ft. (2.2 m ²)

Note: Application of coating below the minimum recommended dry film thickness of 1/8" may adversely affect coating performance.

2.2 SERIES G434 STORAGE AND MATERIAL TEMPERATURE

The minimum storage temperature is 40°F (4°C) and maximum is 110°F (43°C). For optimum handling and application characteristics, both material components should be stored or conditioned between 70°F (21°C) and 80°F (27°C) 48 hours prior to use.

Temperature will affect the workability. Cool temperatures will increase viscosity and decrease workability. Warm temperatures will decrease viscosity and shorten spray and pot life.

3.0 SURFACE PREPARATION

3.1 PREPARATION OF EMBEDDED MISCELLANEOUS METALS

When encountering miscellaneous metals embedded into concrete, the surface must be prepared in accordance with SSPC-SP5/NACE 1 White Metal Blast Cleaning with a 4.0 mil minimum angular anchor profile.

3.2 PREPARATION OF CONCRETE

Allow new cast-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness in accordance with ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride" (moisture vapor transmission should not exceed three pounds per 1,000 square feet in a 24 hour period), F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes" (relative humidity should not exceed 80%), or D 4263 "Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method" (no moisture present). Prepare concrete surfaces in accordance with NACE No. 6/SSPC-SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 5 surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer.

3.3 REINFORCING STEEL REPAIR

Where corrosion of the reinforcement steel (rebar) exists, continue concrete removal along the corroded steel and any adjacent areas which show evidence of corrosion-induced damage that would inhibit bonding of repair material. When the exposed reinforcing steel has loose rust, corrosion products, or is not well bonded to the surrounding concrete, removal should include undercutting the corroded reinforcing steel by approximately 3/4 in (19 mm) in accordance with ICRI Guideline No. 310.1R. Every precaution should be made to avoid cutting underlying reinforcement. All exposed reinforcement surfaces shall be thoroughly cleaned of all loose concrete, rust, and other contaminants. A protective coating such as Series 1, 61, or N69 can be applied to the reinforcement after surface preparation. Avoid spillage or application onto the parent concrete. The area around the rebar may then be rebuilt using Series N218 MortarClad, or in more extreme cases, Series 217 MortarCrete.

3.4 OUTGASSING

Outgassing must always be considered a possibility with any concrete substrate. A number of means exist to either eliminate or reduce outgassing. First, application should be accomplished in indirect sunlight and during times when the surface temperature of the concrete is stable or in a descending pattern. In addition, use of primers and resurfacing agents can help reduce outgassing. Series N218 MortarClad was specifically designed, and is the preferred method, to minimize this problem. Outgassing can also be minimized by spray applying a "mist coat" and allowing the concrete to outgas for several minutes. This should be followed by another light tack coat. Alternately, rolling a coat of the Series G435 Perma-Glaze with the recommended roller cover can also minimize outgassing prior to spray applying at greater thicknesses.

3.5 TERMINATIONS

When the coating system is not scheduled to provide a monolithic surface, terminations must be built into the system. For example, when the system is scheduled to terminate, 1/4" sawcuts must be installed. Apply Series N218 up to sawcuts then install the Perma-Shield lining system into the sawcut. Please refer to the Perma-Shield Details Guide which can be found online at www.tnemec.com.

4.0 RESURFACING/PATCHING

For information regarding the resurfacing or patching of deteriorated concrete surfaces, please refer to the Series 215, 217, Tor N218 product data sheets or application guides.

5.0 MIXING

Mix entire contents of Part A and Part B separately. Add the contents of the can marked Part B to Part A and blend both components using a minimum of 10 amp, 3/4" heavy duty drill with an "H" paddle drywall mixing blade (e.g. M713 mixing paddle) or eggbeater mixing paddle (e.g. Kraft Tool DC716) for one minute. Gradually add all the Part C aggregate to the liquid mix while under agitation and blend for another one to two minutes or until a uniform consistency is achieved. During the mixing process, scrape the sides and bottom of the container to ensure all of the Parts A, B, and C are blended together. **Caution: Do not split kit, mix the entire kit as supplied. Do not reseal mixed material. An explosion hazard may be created.**

6.0 CURING

Temperature	75°F (24°C)	55°F (13°C)
To Topcoat	8 hours	12 hours
To Place in Service	2 days	3 days
Maximum Recoat	7 days	7 days

Curing time will vary with surface temperature, air movement, humidity and film thickness. **Note:** If more than 7 days have elapsed between coats, the Series G434 coated surface must be mechanically abraded before topcoating.

7.0 APPLICATION & EQUIPMENT

The following contains information on the recommended application methods and equipment.

7.1 WORKING TIME

The recommended working time for Series G434 is 30 minutes at 77°F (25°C).

7.2 TROWEL APPLICATION

Once the surface has been properly prepared, Series G434 Perma-Shield H₂S may then be applied using hand trowels and mortar hawks. Material is applied by trowel and worked to cover the surface in an even, minimum 1/8" (125 mils) thickness. Skilled technicians are required for the application of Series G434.

Once the material is placed and roughly smoothed out, it should be allowed to set for 20 minutes at 75°F (24°C). This will vary with ambient and substrate temperatures, so attention must be paid to the cure process. Once the material assumes a dough-like consistency, the Series G434 Perma-Shield H₂S epoxy mortar may be closed using a 1/4" roller cover lightly dampened with Tnemec No. 2 or No. 42 Thinner. Lightly roll the trowelled surface to remove trowel marks and surface irregularities.

Note: Hand trowel application can present difficulties when applying material to ceilings and other overhead structures, and two lifts may be required.

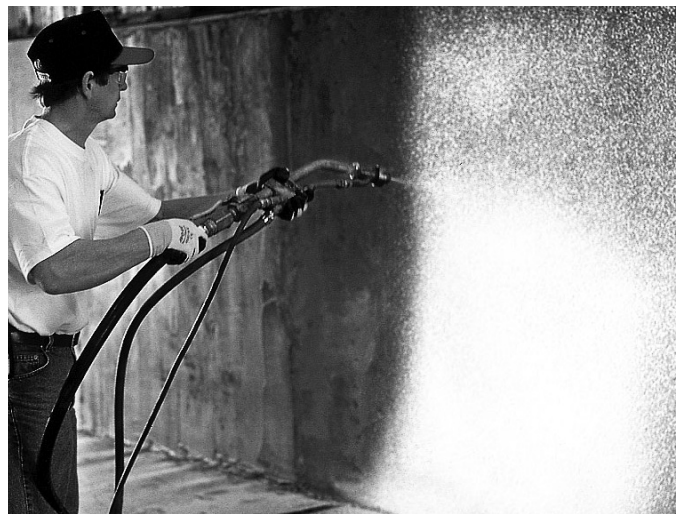


7.3 SPRAY APPLICATION

Application of Series G434 Perma-Shield H₂S can proceed more rapidly when applying material by spray. However spray applying should only be considered a means of transfer; trowelling is required to close the surface in order to attain the maximum performance characteristics.

The recommended spray-transfer pumps are the 10:1 Graco M680, 9:1 WIWA 410, or 12:1 WIWA 600. Material is transferred to the gun via a 25', 1" hose. The Graco M680 should be configured with a 10' 3/4" diameter fluid line, Flex Hose spray gun applicator with #5 or #6 nozzle, and 550psi atomizing fluid pressure. The WIWA 410 or WIWA 600 should be configured with a 10' 3/4" fluid line, 35' 1/2" airline, atomizing air and control air hose assembly, and spray wand with 1/4" and 3/8" spray tips. The minimum air requirements for all pumps are 80 CFM @ 100psi.

The primary purpose of the pump is to move material, as complete atomization is not required. Once the material leaves the gun, air pressure is used to spatter the material onto the surface.



7.4 PUMP MAINTENANCE

After every four to five kits, the equipment should be flushed with MEK. This is accomplished in two stages. First, MEK (either new or filtered) is run through the pump for five minutes. Then, a second flush is done, again for five minutes, this time using only fresh MEK. (This MEK can be used for the first flush of the next flush cycle). This cycle is repeated every three to five kits.

After the end of a work shift, the pump is flushed as stated above. This time, after the second flush, the lower end of the pump is disassembled and thoroughly cleaned to remove all traces of coating material. Once cleaned, the pump is reassembled and can be placed back into operation.

It should be noted that the amount of flushing needed is dependent on temperatures and extended spray times. Contact Tnemec Technical Services for detailed equipment recommendations.

8.0 SERIES G435 PERMA-GLAZE OPTIONAL TOPCOAT

Series G435 Perma-Glaze is a 100% solids, modified polyamine epoxy designed for outstanding H₂S permeation resistance and is used as a glaze coat to prolong the service life of the Perma-Shield H₂S System. It is applied with a 3/8" - 1/2" high quality, synthetic, woven nap roller or airless spray equipment. Refer to the Tnemec Series G435 Surface Preparation and Application Guide and Product Data Sheet for further instructions.

9.0 HIGH VOLTAGE DISCONTINUITY (SPARK) TESTING

High voltage discontinuity (spark) testing is recommended to determine the presence and number of discontinuities in the nonconductive Series G434 Perma-Shield H₂S applied to a conductive surface.

If required by the project specifications, all high voltage discontinuity (spark) testing shall be performed in accordance with NACE SP0188 and the procedures outlined herein. Contact Tnemec Technical Service for voltage recommendations and curing parameters prior to testing.

Series G434 Perma-Shield H₂S shall be applied and allowed to cure within the parameters of the corresponding Product Data Sheets. Sufficient curing time of the coating system shall be allowed prior to conducting a holiday test, as indicated by the "To Place in Service" duration on the Product Data Sheets. Curing time will vary with surface temperature, air movement, humidity, and film thickness.

If the substrate is incompatible or if thickness constraints are not applicable for a non-destructive dry film thickness gauge, measurements of the coating system thickness are to be performed during application of each system component using a wet film gauge, feeler gauge, or other measurement device that can accurately measure the coating wet film thickness. These coating measurements are to be tabulated to determine the total system thickness.

To perform holiday testing attach a ground wire from the instrument ground output terminal to the conductive substrate and ensure proper electrical contact. Test conductivity by attaching the instrument ground wire to rebar or other metallic ground permanently installed in the concrete and touch the electrode to

the bare concrete. If metallic ground is not visible, the ground wire can be placed directly against a bare concrete surface and weighted with a damp cloth and paper sand-filled bag. Make contact with the exploring electrode on the conductive substrate to verify the instrument is properly grounded. If the test proves negative, determining discontinuities with a high voltage spark test will be ineffective. Under no circumstances shall the voltage be increased above the recommended voltage potential.

10.0 HEALTH & SAFETY

Series G434 is for Industrial use only and must be installed by qualified coating and lining application specialists only. Paint products contain chemical ingredients which are considered hazardous. Read container label warning and Safety Data Sheet for important health and safety information prior to the use of this product. Keep out of the reach of children.

More detailed health and safety requirements for Series G434 are available in the Safety Data Sheet. Contact your local Tnemec representative for more information.