Thermaseal® Geothermal Grout

1. PRODUCT NAME
Tenon™ Thermaseal® Geothermal Grout (MN Mix, and HF Mix)

2. MANUFACTURER
Bluestone Products™, a TCC TCC Materials® company
2025 Centre Pointe Blvd.
Mendota Heights, MN 55120 USA

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3. PRODUCT DESCRIPTION
Tenon™ Thermaseal® Geothermal Grout is a thermally–conductive cementitious grout engineered for application of vertical ground source heat pumps and geothermal well fields. Non–toxic, with a high solids content and a low–permeability factor making it ideal for ground source heat loops and safe for contact with potable ground water. Thermaseal® is a blend of thermally–conductive sand with Portland cement. Thermaseal® also offers low–absorption with a rigid seal to prevent integration of aquifers and is made in three versions, a MN Mix and two HF Mix (high–flow) mixes.

Features and Benefits
- Efficient heat transfer
- Furthers development of a low–permeability, rigid seal to prevent integration of aquifers
- Preblended material
- Increases efficiency, productivity, and consistency
- MN Mix (BOM #121016) conforms to Chapter 4725 of the Minnesota Department of Health Administrative Rules (Section 4725.01; Subp. 226)

Uses
- A high–solids, thermally–conductive grout with low absorption ideal for ground source heat loops
- Functional grout and sealing material for water well applications

SAFETY
READ THE SAFETY DATA SHEET (SDS) BEFORE USING THIS PRODUCT. SDS information is available on our website: tccmaterials.com or contact TCC Materials® at 651–688–9116 (7:30 AM to 4:00 PM Central US Time).

CAUTION
Read complete cautionary information printed on product container prior to use. This Product Data Sheet has been prepared in good faith on the basis of information available at the time of publication.

It is intended to provide users with information about and guidelines for the proper use and application of the covered Tenon™ brand product (s) under normal environmental and working conditions. Because each project is different, neither Tenon™ nor TCC Materials® can be responsible for the consequences of variations in such conditions, or for unforeseen conditions.

4. TECHNICAL DATA

LEED® Eligibility[1]
- Regional Materials (MR–c4, MR–c5)

Mix Table Quantities based on 50 lbs. (22.7 kg) of blended material				
Typical Values • MN Mix (BOM #121016)				
Target Thermal Conductivity (BTU/hr–ft–°F)	Fresh Water	Yield	Acceptable Range	Permeability
1.0	1.55 gal (5.86 L)	3.77 gal (14.27 L)	16.2–17.2 lb/gal (1.94–2.06 kg/L)	N/A
Typical Values • HF 1.1 Mix (BOM #113254)				
Target Thermal Conductivity (BTU/hr–ft–°F)	Fresh Water	Yield	Acceptable Range	Permeability ASTM D5084
1.1	2.40 gal (9.10 L)	4.69 gal (17.8 L)	14.4–15.4 lb/gal (1.73–1.85 kg/L)	6.74×10^{-10} cm/sec
Typical Values • HF 0.75 Low Perm Mix (BOM #129711)				
Target Thermal Conductivity (BTU/hr–ft–°F)	Fresh Water	Yield	Acceptable Range	Permeability ASTM D5084
0.75	2.40 gal (9.10 L)	4.9 gal (18.50 L)	13.8–14.8 lb/gal (1.65–1.77 kg/L)	7.1×10^{-9} cm/sec
Typical Values • HF 0.75 Mix (BOP 129569)				
Target Thermal Conductivity (BTU/hr–ft–°F)	Fresh Water	Yield	Acceptable Range	Permeability
0.75	2.40 gal (9.10 L)	4.53 gal (17.2 L)	15.0–16.0 lb/gal (1.80–1.92 kg/L)	N/A

Packaging

- MN Mix 50 lb. (22.7 kg.) bag (BOM #121016)
- 1.1 HF Mix 50 lb. (22.7 kg.) bag (BOM #113254)
- 0.75 HF Mix 50 lb. (22.7 kg) bag (BOM #129711)
- 0.75 HF Mix 50 lb. (22.7 kg) bag (BOM #129569)

Shelf Life

12 months from the date of manufacture when stored in the original, unopened container, away from moisture, under cool, dry conditions and out of direct sunlight. Product should be stored dry at 40°F–95°F (4°C–35°C).

5. INSTALLATION

Preparation

Proper preparation is crucial to achieving a successful application. This grout is pumped into contained or confined areas starting from the bottom of the casing or loop until it appears at the surface of the ground.

Note: It is the responsibility of the installer/applicator to ensure the suitability of the product for its intended use.

Job Mockups

The manufacturer requires that when its Tenon™ products are used in any application or as part of any system that includes other manufacturers' products, the contractor and/or design professional shall test all the system components collectively for compatibility, performance and long–term intended use in accordance with pertinent and accepted industry standards prior to any construction. Written documentation of the tests performed shall be satisfactory to the design professional and contractor. Test results must include the means and methods of application, products used, project–specific conditions being addressed, and standardized tests performed for each proposed system or variation.

Mixing

Thermaseal® Geothermal Grout should not be used when ambient air temperatures are below 50°F (10°C) or above 90°F (32°C). When using Thermaseal® Geothermal Grout in cold weather applications, the grout should be mixed with warm water (85°–95°F) to improve set time. In warm weather applications of 85°F (29°C) or higher, Thermaseal® Geothermal Grout may be mixed with cold water (40°–50°F) to increase set times.

1. For best results, condition material to 65°F–75°F (18°C–24° C) 24 hours prior to use.
2. Only mix with clean potable water.
3. For best results, use a mechanical paddle mixer. Always mix full bags at a time to maintain uniform consistency among batches of material. Do not use partial bags.
4. See table for required mix water. Add approximately ¾ of the full amount of mix water into the mixer. Add grout mix to the water.
5. Additional water should be added in small increments until the desired flow and consistency is achieved.
5. Mix a minimum of 3 minutes to ensure a uniform lump free consistency and place immediately.
6. Do not mix more material than can be placed in a 30 minute time frame.

Application

Geothermal Systems

Thermaseal® Geothermal grout is typically pumped into the bore holes or the area to be grouted through a pressurized pipe system in a continuous operation through a tremie pipe at a rate of 5–15 gallons (19–57 liters) per minute. Thermaseal® Geothermal Grout is flowable, making it ideal for pumping into tight, hard–to–reach areas. The use of a positive displacement piston pump may be helpful when pumping.

Well–drilling

A well hole as been drilled, bored, or dug into the ground the well which is held open by a pipe called a "casing". The casing extends from the groundwater aquifer up to the pump and carries the water up to the user. Part of the well–drilling process includes filling the space between the hole and the casing, called the "annular space", with a grout material such as Thermaseal® Geothermal Grout to help prevent surface contaminants and bacteria from entering the well and the aquifer through the annular space. Many states will require the use of a grout seal during well construction for the protection of public health and ground water quality. Thermaseal® Geothermal Grout is non–toxic and safe for contact with potable ground water. Thermaseal® Geothermal Grouts are non–shrink and create a permanent seal. Well–grouting will also provide structural support when PVC casing is used.

Limitations

- Do not use when ambient air temperatures are below 50°F (10°C) or above 90°F (32°C) .
- Do not overwater, retemper, or mix with other additives.
- Do not mix more grout than can be placed in 30 minutes.
- Only a licensed well contractor can "seal" an unused well or geothermal system. Check with your state health department to see if the filing of "A Well and Boring Sealing Record" is required. Any well that is disclosed as "capped", "plugged", "filled", or "abandoned" is not legally the same as a well that is "sealed".

Curing

No special curing is required.

Cleaning

Use clean potable water to clean all tools immediately after use. Dried material must be mechanically removed. Use a waste water hardener (e.g. Conglez™ or similar product) for cementitious waste disposal

6. AVAILABILITY

To locate Tenon™ products in your area, please contact:

Phone: 1.651.688.9116
Email: info@tccmaterials.com

7. WARRANTY

Seller warrants that its product will conform to and perform in accordance with the product specifications. The foregoing warranty is in lieu of all other warranties, expressed or implied, including, but not limited to those concerning merchantability and fitness for a particular purpose. Because of the difficulty in ascertaining and measuring damages hereunder, it is agreed that Seller's liability to the Buyer shall not exceed the total amount billed and billable to the Buyer for the product hereunder.

8. MAINTENANCE

Not applicable.

9. TECHNICAL SERVICES

Technical Assistance:
Information is available by calling TCC Materials®
(hours 7:30 AM to 4:00 PM CST):

Phone: 1.651.688.9116
Email: info@tccmaterials.com
Web: tccmaterials.com

Technical and Safety Literature:
To acquire technical and safety literature, please visit our website at: tccmaterials.com.

10. FILING SYSTEM

Division 23

[1] Tenon™ products can contribute to LEED® credits within the Material Resource, (Recycled Content & Regional Materials) and Indoor Environmental Quality (Low Emitting Materials).

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