



BAROTHERM[®] GOLD

Two-Part Thermally Conductive Grout

Description BAROTHERM[®] GOLD thermally conductive grout is a bentonite material designed for use in grouting boreholes containing ground source heat loops, and related applications. BAROTHERM GOLD thermally conductive grout when combined with silica sand at various concentrations yields a grout with thermal conductivity values ranging between 0.4 and 1.2 BTU/hr-ft.^{°F} (0.69 – 2.1 watts/m.^{°C}).

Applications/Functions

The use of BAROTHERM GOLD thermally conductive grout promotes:

- A thermally conductive grout medium with low permeability for sealing ground source heat loops

Advantages

- Promotes efficient heat transfer
- Produces a uniform slurry for smooth pumping - No need to add extra water
- Creates a low permeability seal
- Develops a permanent, flexible seal to prevent commingling between aquifers
- No heat of hydration
- No Portland or aluminum cement added
- No gypsum added
- NSF/ANSI Standard 60 Certified

Typical Properties

- | | |
|----------------------------------|---|
| • Appearance | Beige to tan powder |
| • Specific gravity | 2.6 |
| • Thermal Conductivity (k) range | 0.4 – 1.2 BTU/hr-ft. ^{°F}
0.69 – 2.1 watts/m. ^{°C} |
| • Yield Volume range | 17.6– 41.8 gal/batch
66.7 – 158.2 liters/batch |
| • Grout Weight range | 10.1 – 15.0 lb/gal
1.21 – 1.80 SG |
| • Typical Permeability* | 3.0 x 10 ⁻⁸ cm/sec |

Recommended Treatment

The recommended treatment is based on the desired thermal conductivity or k value. Please refer to the treatment tables below.

k (Btu/hr-ft. ^{°F})	Silica Sand (lb/50 lb)	Water (gal/50 lb)	Slurry Volume Yield (gallons)	Density (lb/gal)	Total Solids
0.4	0	15.3	17.6	10.1	28.1%
0.69	100	15.3	22.2	12.5	54.0%
0.76	150	16.3	25.5	13.2	59.5%
0.88	200	17.3	28.8	13.7	63.4%
1.0	250	18.3	32.1	14.1	66.3%
1.0**	300	19.5	35.6	14.4	68.3%
1.1	350	20.0	38.5	14.7	70.6%
1.2	400	21.0	41.8	15.0	72.0%

*Permeability test data can be furnished upon request.

**The level of precision shown reflects the accuracy of the employed standard test method (ASTM D-5334) for measurement of thermal conductivity (k).

Because the conditions of use of this product are beyond the seller's control, the product is sold without warranty either express or implied and upon condition that purchaser make its own test to determine the suitability for purchaser's application. Purchaser assumes all risk of use and handling of this product. This product will be replaced if defective in manufacture or packaging or if damaged. Except for such replacement, seller is not liable for any damages caused by this product or its use. The statements and recommendations made herein are believed to be accurate. No guarantee of their accuracy is made, however.

Recommended Treatment (continued)

k (watts/m·°C)	Silica Sand (kg/22.7 kg)	Water (liters/22.7kg)	Slurry Volume Yield (liters)	Density (SG)	Total Solids
0.69	0	57.9	66.7	1.21	28.1%
1.2	45.4	57.9	84.0	1.50	54.0%
1.3	68.1	61.7	96.5	1.58	59.5%
1.5	90.8	65.5	109.0	1.64	63.4%
1.7	113.5	69.3	121.5	1.69	66.3%
1.7**	136.2	73.8	134.7	1.73	68.3%
1.9	158.9	75.7	145.7	1.76	70.6%
2.1	181.6	79.5	158.2	1.80	72.0%

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Recommended Mixing Procedure

- Pre-treat mixing water with Soda Ash (sodium carbonate) to reduce total hardness to less than 100 mg/l and to raise pH to 8.5-9.5.
- Using a mixing device, **do not use a centrifugal pump**, blend one 50-lb (22.7 kg) bag of BAROTHERM® GOLD thermally conductive grout into appropriate volume of water. Rate of addition should be about 10 to 20 seconds per 50-lb (22.7 kg) bag.
- To enhance the thermal conductivity of the resultant grout, dry sand ranging between 50 and 70 mesh and containing greater than 99% silica is recommended.
 - Add sand to grout slurry immediately after mixing at a rate of 5 to 10 seconds per 50 pounds (22.7 kg) and pump. Additional mixing time after the addition of sand is not required and is not recommended.
- Blend, do not over mix. Place through a 1.25 inch (32 mm) minimum I.D. tremie into hole without delay.

Additional Information

- The grouting material and method selected will depend upon the specific subsurface environment including all prevailing geological and hydrological factors and any existing regulatory requirements. The grouting process may not be complete until the grout is static at the desired level.
- The use of bentonite may not be appropriate in environments where the formation water chemistry has a total hardness greater than 500 parts per million and/or a chloride content of greater than 1500 parts per million.
- If questions arise regarding subsurface environments it is always best to consult your local Baroid IDP representative to determine if the Baroid product of choice is appropriate for the given conditions.

Packaging

BAROTHERM GOLD thermally conductive grout is packaged in 50-lb (22.7 kg) multiwall paper bags, containing 0.7 ft³ (0.02 m³). 3000-lb supersacks are available by special order.

Availability

BAROTHERM GOLD thermally conductive grout can be purchased through any Baroid Industrial Drilling Products Retailer. To locate the Baroid IDP retailer nearest you contact the Customer Service Department in Houston or your area IDP Sales Representative.

**Baroid Industrial Drilling Products
Product Service Line, Halliburton**
3000 N. Sam Houston Pkwy E.
Houston, TX 77032

Customer Service	(800) 735-6075 Toll Free	(281) 871-4612
Technical Service	(877) 379-7412 Toll Free	(281) 871-4613