BASF

The Chemical Company

PRODUCT DATA

3 03 62 16 **Metallic Non-Shrink Grouting**

EMBECO® 885

High-precision, nonshrink metallic-aggregate grout with extended working time

Description

Embeco® 885 is a cement-based metallic-aggregate grout with an extended working time. It is ideally suited for grouting machines or plates requiring optimum toughness and precision load-bearing support, including machine bases subject to thermal movement. Embeco® 885 grout meets the requirements of ASTM C 1107 and the U.S. Army Corp of Engineers CRD C 621, Grades B and C.

Yield

One 55 lb (25 kg) bag of Embeco® 885 grout mixed with approximately 10 lbs (4.5 kg) or 1.2 gallons (4.5 L) of water yields approximately 0.43 ft^3 (0.012 m^3) of grout.

One 3,300 lb super sack yields approximately 1 cubic yard (0.72 m^3).

Packaging

55 lb (25 kg) multi-wall paper bags

3,300 lb (1,500 kg) bulk bags

Shelf Life

1 year when properly stored

Storage

Store in unopened bags in clean, dry conditions.

Features	Benefits
• High fluidity	Ease of placement; self-consolidating
• Extended 30 minute working time	Ensures proper placement under a variety of conditions
• High tolerance for wetting and drying cycles	Tolerates wet environments
• Hardens free of bleeding, segregation, or settlement shrinkage	Provides maximum effective bearing area for optimum load transfer
• High tolerance to thermal movement, effects of heating and cooling	Ideal for harsh manufacturing environments
• High-quality well-graded blend of metallic-and-quartz aggregate	Provides high strength, impact resistance; handles dynamic and repetitive loads
• Sulfate resistant	For use in marine, wastewater, and sulfate-containing soil environments

Where to Use

APPLICATION

- Where high strength and impact resistance are required
- Where a nonshrink grout is needed to achieve maximum bearing for optimum load transfer
- Applications requiring a pumpable metallic grout with extended working time
- For grouting anchor bolts, reinforcing bars, and dowel rods

LOCATION

- Interior or exterior

SUBSTRATE

- Machinery and equipment base plates:
  - Paper machine soleplates, including hooded dryer sections
  - Turbines, generators, and centrifugal compressors
  - Rolling, stamping, drawing, and finishing mills for the steel and aluminum industries

How to Apply

Surface Preparation

1. Steel must be free of dirt, oil, grease, or other contaminants. Substrate must be fully cured (28 days).

2. The surface to be grouted must be clean, SSD, strong, and roughened to a CSP of 5 – 9 following ICRI Guideline 03732 to permit proper bond. For freshly placed concrete, consider using Liquid Surface Etchant (see Form No. 1020198) to achieve the required surface profile.

3. When dynamic, shear, or tensile forces are anticipated, concrete surfaces should be chipped with a “chisel-point” hammer to a roughness of (plus or minus) 3/8" (10 mm). Verify the absence of bruising according to ICRI Guideline 03732.

4. Concrete surfaces should be rough and saturated (ponded) with clean water for 24 hours just before grouting.

5. All freestanding water must be removed from the foundation and bolt holes immediately before grouting.

6. Anchor bolt holes must be grouted and sufficiently set before the major portion of the grout is placed.

Protection and Repair

Technical Data

Composition

Embeco® 885 is a hydraulic cement-based metallic-aggregate grout.

Compliances

- CRD C 621, Grades B and C
- ASTM C 1107, Grades B and C
- City of Los Angeles Research Report Number RR 23137

Test Data

PROPERTY	RESULTS			TEST METHODS
Compressive strengths, psi (MPa)				ASTM C 942, according to ASTM C 1107
		Consistency		
	Plastic[1]	**Flowable**[2]	**Fluid**[3]	
1 day	5,000 (34)	5,000 (34)	4,000 (28)	
3 days	7,000 (48)	6,000 (41)	5,000 (34)	
7 days	9,000 (62)	8,000 (55)	7,000 (48)	
28 days	11,000 (76)	10,000 (69)	9,000 (62)	
Volume change				ASTM C 1090
	% **Change**	**% Requirement of ASTM C 1107**		
1 day	> 0	0.0 – 0.30		
3 days	0.05	0.0 – 0.30		
14 days	0.07	0.0 – 0.30		
28 days	0.08	0.0 – 0.30		
Setting time, hr:min				ASTM C 191
		Consistency		
	Plastic[1]	**Flowable**[2]	**Fluid**[3]	
Initial set	3:30	5:00	5:30	
Final set	4:30	6:00	7:00	
Flexural strength,* psi (MPa)				ASTM C 78
3 days	880 (6.1)			
7 days	1,050 (7.2)			
28 days	1,150 (7.9)			
Modulus of elasticity,* psi (MPa)				ASTM C 469, modified
3 days	3.16×10^6 (2.18×10^4)			
7 days	3.50×10^6 (2.41×10^4)			
28 days	3.69×10^6 (2.54×10^4)			
Coefficient of thermal expansion,* in/in/° F (cm/cm/° C)	6.5×10^{-6} (11.7×10^{-6})			ASTM C 531
Punching shear strength,* psi (MPa), 3 by 3 by 11" (76 by 76 by 279 mm) beam				BASF Method
3 days	1,600 (11.0)			
7 days	1,800 (12.4)			
28 days	2,600 (17.9)			
Splitting tensile and tensile strength,* psi (MPa)				ASTM C 496 (splitting tensile) ASTM C 190 (tensile)
	Splitting Tensile	**Tensile**		
3 days	350 (2.4)	300 (2.1)		
7 days	490 (3.4)	400 (2.8)		
28 days	520 (3.6)	500 (3.4)		

[1]100 – 125% flow on flow table per ASTM C 230

[2]125 – 145% flow on flow table per ASTM C 230

[3]25 to 30 seconds through flow cone per ASTM C 939

*Test conducted at a fluid consistency

This data was developed under controlled laboratory conditions. Expect reasonable variations

Test Data, continued

PROPERTY	RESULTS			TEST METHODS
Ultimate tensile strength and bond stress				ASTM E 488 Tests*
	Diameter, Inches	**Depth, Inches**	**Tensile strength Lbs**	**Bond stress Psi**
	5/8	4	29,200	3,718
	3/4	5	33,200	2,815
	1	7	58,500	2,660

* Average of 5 tests in ≥ 4,000 psi (27.6 MPa) concrete, using 125 ksi threaded rod in 2" diameter, damp, core-drilled holes.

Notes

1. Grout was mixed to a fluid consistency.
2. Recommended design stress: 1,750 psi.
3. Refer to the "Adhesive and Grouted Fastener Capacity Design Guidelines" for more detailed information.
4. Tensile tests with headed fasteners were governed by concrete failure.

Jobsite Testing

If strength tests must be made at the jobsite, use 2" (51 mm) metal cube molds as specified by ASTM C 942 or ASTM C 1107. DO NOT use cylinder molds. Control testing on the basis of the desired placing consistency rather than strictly on the water content.

7. Shade the foundation from sunlight 24 hours before and 24 hours after grouting.

Forming

1. Forms should be liquid tight and nonabsorbent. Seal forms with putty, sealant, caulk, polyurethane foam.

2. Moderately sized equipment should utilize a head form sloped at 45 degrees to enhance the grout placement. A moveable head box may provide additional head at minimum cost.

3. Side and end forms should be a minimum 1" (25 mm) distant horizontally from the object grouted to permit expulsion of air and any remaining saturation water as the grout is placed.

4. Leave a minimum of 2" between the bearing plate and the form to allow for ease of placement.

5. A minimum of 1" (51 mm) clearance is required where the grout will be placed.

6. Use sufficient bracing to prevent the grout from leaking or the form from moving.

7. Eliminate large, nonsupported grout areas wherever possible.

8. Extend forms a minimum of 1" (25 mm) higher than the bottom of the equipment being grouted.

9. Expansion joints may be necessary for both indoor and outdoor installation. Consult your local BASF field representative for suggestions and recommendations.

Temperature

1. For precision grouting, store and mix grout to produce the desired mixed-grout temperature. If bagged material is hot, use cold water. If bagged material is cold, use warm water. This will help achieve a mixed-product temperature as close to 70° F (21° C) as possible.

Recommended Temperature Guidelines for Precision Grouting

	MINIMUM °F (°C)	PREFERRED °F (°C)	MAXIMUM °F (°C)
Foundation and plates	45 (7)	50 – 80 (10 – 27)	90 (32)
Mixing water	45 (7)	50 – 80 (10 – 27)	90 (32)
Grout at mixed and placed temp.	45 (7)	50 – 90 (10 – 32)	90 (32)

2. If temperature extremes are anticipated or if special placement procedures are planned, contact your local BASF representative for assistance.

3. When grouting at minimum temperatures, take care to see that foundation, plate, and grout temperatures do not fall below 45° F (7° C) until after final set. Protect the grout from freezing (32° F or 0° C) until it has attained a compressive strength of 3,000 psi (21 MPa) in accordance with ASTM C 942 or C 1107.

Mixing

1. Place estimated water into the mixer (use potable water only), then slowly add the dry grout while mixing. For a fluid consistency, start with 9.2 lbs (4 kg) or 1.1 gallons (4.2 L) per 55 lb bag.

2. Water demand depends on mixing efficiency and material and ambient temperature conditions. Adjust the water to achieve the desired flow. Recommended flow is 25 – 30 seconds using the ASTM C 939 Flow-Cone Method. Use the minimum amount of water required to achieve the necessary placement consistency. Before placing grout below 45° F (7° C) and above 90° F (32° C), consult your BASF representative.

3. Moderate size batches of grout are best mixed in one or more clean mortar mixers. Large batches of grout are effectively, economically, and most efficiently mixed in ready-mix trucks using 3,300 lb (1,500 kg) bulk bags.

4. Mix grout a minimum of 5 minutes after all material and water are in mixer. Use mechanical mixer only.

5. Do not mix more grout than can be placed in approximately 30 minutes.

6. Transport by wheelbarrow or buckets, or pump to the equipment to be grouted. Minimize the transporting distance.

7. Do not retemper grout by adding water.

Application

1. Always place grout from only one side of the equipment to prevent entrapment of air or water beneath the equipment. Place Embeco® 885 grout in a continuous pour. Discard grout that becomes unworkable.

2. Immediately after placement, trim the surfaces with a trowel and cover the exposed grout with clean wet rags (not burlap). Maintain this moisture for 5 – 6 hours.

3. The grout should offer stiff resistance to penetration with a pointed mason's trowel before the grout forms are removed or excessive grout is cut back.

4. To further minimize the potential moisture loss within the grout, cure all exposed grout with an approved membrane curing compound (compliant with ASTM C 309 or preferably ASTM C 1315) immediately after the wet rags are removed.

5. Do not vibrate grout. Steel straps inserted under the plate may be used to aid in movement of the grout.

6. Consult your BASF representative before placing more than 6" (152 mm) in depth per lift.

For Best Performance

- For guidelines on specific anchor-bolt applications, contact BASF Technical Service.
- Do not add plasticizers, accelerators, retarders, or other additives unless advised in writing by BASF Technical Service.
- The water requirement may vary with mixing efficiency, temperature, and other variables.
- Hold a pre-job conference with your local representative to plan the installation. Hold conferences as early as possible before the installation of equipment, sole plates, or rail mounts. Conferences are important for applying the recommendations in this product data sheet to a given project, and they help ensure a placement of highest quality and lowest cost.
- The ambient and initial material temperature of the grout should be in the range of 45 to 90° F (7 to 32° C) for both mixing and placing. Ideally, use the amount of mixing water that is necessary to achieve a 25 – 30 second flow specified by ASTM C 939 (CRD C 611). For placement outside of 45 to 90° F (7 to 32° C), contact your local BASF representative.
- For pours greater than 6" (152 mm) deep, consult your local BASF representative for special precautions and installation procedures.
- When the grout will be in contact with steel stressed over 80,000 psi (550 MPa), use Masterflow® 816 cable grout or Masterflow® 1205, or Masterflow® 1341 post-tensioning cable grouts.
- Embeco® 885 is not intended for use as a floor topping or in large areas with exposed shoulders around baseplates. Where grout is exposed for shoulders, occasional hairline cracks may occur. Cracks may also occur near sharp corners of the baseplate and at anchor bolts. These superficial cracks are usually caused by temperature and moisture changes that affect the grout at exposed shoulders at a faster rate than the grout beneath the baseplate. They do not affect the structural, nonshrink, or vertical support provided by the grout if the foundation-preparation, placing, and curing procedures are properly carried out.
- Minimum placement depth is 1" (25 mm).
- Surfaces may discolor in certain environments; it is not an indication of product performance.
- Make certain the most current versions of product data sheet and MSDS are being used; call Customer Service (1-800-433-9517) to verify the most current version.
- Proper application is the responsibility of the user. Field visits by BASF personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

Health and Safety

EMBECO® 885

WARNING

Embeco® 885 contains silica, crystalline quartz, portland cement; limestone; iron oxide; calcium oxide; gypsum; silica, amorphous; magnesium oxide.

Risks

Eye irritant. Skin irritant. Causes burns. Lung irritant. May cause delayed lung injury.

Precautions

KEEP OUT OF THE REACH OF CHILDREN. Avoid contact with eyes. Wear suitable protective eyewear. Avoid prolonged or repeated contact with skin. Wear suitable gloves. Wear suitable protective clothing. Do not breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. Wash soiled clothing before reuse.

First Aid

Wash exposed skin with soap and water. Flush eyes with large quantities of water. If breathing is difficult, move person to fresh air.

Waste Disposal Method

This product when discarded or disposed of is not listed as a hazardous waste in federal regulations. Dispose of in a landfill in accordance with local regulations.

For additional information on personal protective equipment, first aid, and emergency procedures, refer to the product Material Safety Data Sheet (MSDS) on the job site or contact the company at the address or phone numbers given below.

Proposition 65

This product contains materials listed by the state of California as known to cause cancer, birth defects, or reproductive harm.

VOC Content

0 lbs/gal or 0 g/L

For medical emergencies only, call ChemTrec (1-800-424-9300).

BASF Construction Chemicals, LLC – Building Systems

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Form No. 1019298 7/07
Printed on recycled paper including 10% post-consumer fiber.