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Guide to Cementitious Grouting

Surface Preparation

1. Steel and concrete surfaces shall be free of dirt, oil, grease or other contaminants.
2. All surfaces should be roughened to remove laitance and expose sound concrete.
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).
4. Concrete surfaces should be rough and saturated (ponded) with clean water for 24 hours just prior to grouting.
5. All free-standing water must be removed from the foundation and bolt holes prior to grouting.
6. Bolt holes must be grouted before the major portion of grout is placed.
7. Shade the foundation from summer sunlight 24 hours before and 24 hours after grouting.

Forming

1. Forms should be liquid tight and non-absorbent. Seal forms with grout, putty or caulking compound.
2. Moderately sized equipment should utilize a head box sloped at 45° to enhance the grout placement. A moveable head box may be a way to minimize construction costs.
3. Side and end forms should be a minimum 1" (25 mm) horizontally away from the object being grouted to permit expulsion of air and any remaining saturation water as the grout is placed. NOTE: 4–5" (102–127 mm) clearance is recommended at the area where the grout is to be placed. A minimum of 2" (51 mm) is required.
4. Sufficient bracing is required to prevent the grout from leaking.
5. Large non-supporting grout areas should be eliminated wherever possible.
6. Forms should extend a minimum of

1" (25 mm) higher than the bottom of the equipment being grouted.

7. Expansion joints may be necessary for both indoor and outdoor installations. Consult a local BASF representative for suggestions and recommendations.

Temperatures

In order to follow standard grouting procedure, temperatures of the foundation, plates, mixing water and grout should be as follows:

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

If temperature extremes are anticipated, or if special placement procedures are planned, contact a local BASF representative for assistance on hot and cold weather grouting techniques and precautions. When grouting at minimum temperatures, care must be taken to see that foundation, plate and grout temperatures do not fall below 45° F (7° C) until after final set, and that the grout is protected from freezing (32° F or 0° C) until it has reached 4,000 psi (27.6 MPa) compressive strength.

Mixing

Use drinkable (potable) water only.

1. Do not use water in an amount or at a temperature that will produce a flow of less than 20 seconds, or cause the mixed grout to bleed or segregate.
2. Place estimated water into a mortar mixer, then slowly add the dry grout.
3. The water demand will depend on mixing efficiency, material and ambient temperature

conditions. (See product packaging for suggested water amounts.) Mix initially with 80% of the suggested water amount, then adjust the water to achieve the desired flow. Recommended flow for MBT Protection and Repair fluid grouts is 25–30 seconds using the CRD 611 Flow Cone method. (See package for suggested water for SET® Grout at a flowable consistency.)

4. Aggregate extension is dependent upon the grout type, placement, application requirements, and is typically required for replacement depths beyond the limitation of the neat material. The aggregate should be washed, graded, saturated surface-dry (SSD), high density, free from deleterious materials, and comply with the requirements of ASTM C 33. Consult BASF Technical Service for additional guidance.
5. Moderate size batches of grout are best mixed in one or more clean mortar mixers. NOTE: Large batches of grout may be effectively, economically and most efficiently mixed in ready mix trucks utilizing MB Protection and Repair's 3,300 lb (1,500 kg) bulk bags.
6. Mix grout a minimum of 5 minutes after all material and water is in the mixer.
7. When the grout is extended with aggregate add the required amount of aggregate to the grout after adjusting for the placement consistency. Small quantities of water or grout may be required to compensate for the water content of the aggregate.
8. Do not mix more grout than can be placed within the working time of the grout.
9. Transport by wheelbarrow, buckets or pump to the equipment to be grouted. NOTE: Every measure should be taken to minimize the transporting distance.
10. Do not retemper grout by adding water and remixing after it stiffens.

Placing and Curing

1. Grout should always be placed from only one side of the equipment to prevent entrapment of air or water beneath the equipment.
2. After placement, trim the surfaces with a trowel and cover the exposed grout with clean wet rags and maintain this moisture for 5–6 hours.
3. The grout should offer stiff resistance to penetration with a pointed mason's trowel prior to removing the grout forms or cutting back excessive grout.
4. Cure all exposed grout with an approved membrane curing compound immediately after the wet rags are removed to further minimize the potential moisture loss within the grout.

Limitations

1. Do not vibrate grout. Steel straps inserted under the plate may be used to aid in movement of the grout. Do not use chains as air may be entrapped.
2. The mixed temperature of the grout, foundation, baseplate and environment should be in the range of 45–90° F (7–32° C).

Cement Grout Equipment Checklist

- ____ 1. Mortar mixer(s)
- ____ 2. Fuel for mixer(s)
- ____ 3. Drill(s) 1/2" (13 mm), 400 rpm and prop mixers (Jiffy type)
- ____ 4. Extension cords
- ____ 5. Face masks
- ____ 6. Concrete blocks to raise mixers for dumping into wheelbarrows
- ____ 7. Clean 5 gallon (18.9 L) buckets for (a) mixing water (measured off at specified mix water levels) and (b) mixing if Jiffy mixer used
- ____ 8. A clean 55 gallon (208 L) barrel for potable mixing water
- ____ 9. Thermometers, surface and penetration types
- ____ 10. Flow cone and stop watch
- ____ 11. Razor knife
- ____ 12. Required amount of MBT Protection and Repair grout (add 10% material for safety factor)
- ____ 13. One wheelbarrow per paddle mixer
- ____ 14. Metal straps
- ____ 15. Rags for curing
- ____ 16. Polyethylene sheet
- ____ 17. Curing compounds as per product instructions with application tools (e.g., brushes, etc.)
- ____ 18. Sufficient number of laborers to mix, transport, and place grout
- ____ 19. Pallets for elevating material and mixer operator
- ____ 20. Ice for cooling mix water (hot weather)
- ____ 21. Screen (1/2" or 13 mm) to remove any large lumps of grout from mix
- ____ 22. Pails for pouring grout
- ____ 23. Caulk to stop leaks in forms
- ____ 24. Duct tape
- ____ 25. Extra forming material and tools, wood, saws, hammer, nails