# Fire Barrier Mortar

## Product Data

### 1. Product Description

3M Fire Barrier Mortar is a lightweight cementitious firestop product. It is available in poly/paper bags and ready for mixing with potable water. 3M Fire Barrier Mortar does not contain MMMF (man-made-mineral-fibers) or asbestos and does not require fibrous damming materials. 3M Fire Barrier Mortar contains binders free of portland cement and therefore has greater resistance to common concrete poisons than PC bound products. For use in mechanical and electrical penetration firestopping.

**Product Features:**

- Variable Mix Ratio: permits self-leveling as well as no sag (no forming) application consistencies, resulting in labor savings
- Excellent Adhesion: will bond to concrete, metals, wood, plastic and cable jacketing
- Re-enterable without use of power tools: results in lower maintenance costs due to ease of making cable changes
- Bonds to Itself: proven prior and during fire testing, resulting in proven and tested repair procedures
- MMMF and Asbestos Free
- Polypropylene-Fiber Reinforced: reduces cracking during cure and firing
- Pumpability: allows faster installations, resulting in labor savings on larger projects and reduced installation time
- Tested with a large variety and thickness range (up to 6"/15 cm) of pipe coverings and jackets
- Excellent Heatsink: resulting in absorption of heat from penetrants, reducing the likelihood of ignition of combustible matter on the unexposed side of the assembly
- Compression Strengths: are between 186 and 790 PSI (1.3 to 5.45 N/mm$^2$), depending on the water/cement ratio (1 part water to 2.5 parts powder to 1:4)
- Tested with 3' x 6" (91 cm x 15 cm) Cable Trays, with 1C1000MCM Power Cables and Other Cables up to 45% Actual (100% Visual) Tray Fill
- Tested with 3' x 6" (91 cm x 15 cm) Aluminum and Galvanized Steel Ladder Trays
- Tested with a 4500A bus duct with Copper or Aluminum Bars
- Tested and Certified for Use with "Slip-Covers": resulting in the ability to isolate and permit movement of penetrates without rupture of the seal

### 2. Limitations

3M Fire Barriers Mortar cannot be installed in below freezing temperatures. Common precautions in use for work with other cementitious substances apply. See Installation Instructions.

### 3. Applications

3M Fire Barrier Mortar is used to seal mechanical and electrical service penetrations in fire-resistance rated wall and floor assemblies of ratings up to 3h in Canada, 2h in the United States of America.

### 4. Physical Properties

| | 3M Fire Barrier Mortar |
|---|---|
| Color: | blue/gray |
| Appearance: | solid powder with white particles and plastic fibers |
| Bulk Powder Density: | 37-57 lb/ft$^3$ or 600-910 kg/m$^3$ range between loose and compacted powders |
| Wet Densities: | 68-119 lb/ft$^3$ or 1,100-1,900 kg/m$^3$ depending on water/powder ratio and placement methods |
| Cured Densities: | 43-87 lb/ft$^3$ 700-1,400 kg/m$^3$ depending on water to powder ratio and placement methods |
| Compression Strengths: | 187-790 PSI or 1.3-5.45 N/mm$^2$ depending on water to powder ratio and placement methods |

## 5. Specifications

Sample specifications are provided under separate cover. CAUTION: firestopping is ideally specified under Section 07270, as a separate workscope tendered by specialty, 3M trained, applicators to the general contractors. Specifiers are advised to instruct the chief designer to provide clear identification of wall ratings in the form of overlays on separate drawings.

**Related Sections of Work are:**

| | |
|---|---|
| 03300 | Concrete Formwork |
| 04200 | Unit Masonry |
| 07900 | Joint Sealers |
| 05300 | Metal Decking |
| 07250 | Spray Applied Fireproofing |
| 08900 | Glazed Curtain Wall |
| 09100 | Metal Support Systems |
| 09250 | Gypsum Board |
| 15250 | Basic Mech. Mat'ls. & Methods |
| 15250 | Mechanical Insulation |
| 15300 | Fire Protection |
| 15400 | Plumbing |
| 15500 | HVAC |
| 15550 | Heat Generation |
| 15650 | Refrigeration |
| 16050 | Basic Elec. Mat'ls & Methods |

Specifiers are advised to search these sections for overlaps, in order to avoid problems that will otherwise appear at tender time and during execution.

Refer to CSC TEK-AID Section 07270 Firestopping, Master Specification for comprehensive firestop specification.

## 6. Performance

- Tested per ASTM E814 and CAN/ULC-S115 for up to 2 hour fire resistance, F and T (F, FT, FH and FTH)

**Listed for use in openings as follows:**

**Electrical:**
- 3' x 6" (91 cm x 15 cm) cable trays, aluminum or steel
- 1C1000MCM full cabling of 3' (91 cm) trays
- 45% actual (100% visual) cabling (power, instrumentation, communication)
- Bus Duct: up to 111.3 $in^2$ or 21" x 5.3" (0.07$m^2$ or 53.3 cm x 13.5 cm), 4500A copper, 3400A aluminum bars

**Mechanical:**
- 3" (76 mm) copper DWV/L or sched. 10S or heavier steel piping
- 1" to 6" (2.5 cm to 15 cm) pipe covering made of rockwool, calcium silicate or perlite
- ASJ, 0.01" (0.25 mm) stainless steel or 0.016" (0.41 mm) aluminum jacketing
- Tested with 8" (20 cm) steel piping + 6" (15 cm) pipe covering $\pm$ 20" (51 cm) diameter penetrants

**General:**
- 22.7 $ft^2$ (2.11 $m^2$) openings
- 280 lb (127 kg) concrete block loading test – passed
- re-enterability (re-entry and resealing performed on specimen prior to fire testing)
- "soft spots" made of Temperlite™ (by Knauf Fiber Glas GmbH) insulation sized 4" x 4" x 5" (10 cm x 10 cm x 12.5 cm)
- "slip-covers" consisting of 1/8" (3.2 mm) ceramic paper held on with ordinary duct tape and embedded in 3M Fire Barrier Mortar

## 7. Placement Instructions

1. Obtain and observe current local industrial hygiene and safety regulations, including governmental and plant safety manuals.

2. Clean opening and penetrating items from any dirt, rust, debris, grease, loose items and other substances which may impair proper bonding and remove cable ties within 2' (60 cm) from either sides of cable penetrations, such that mortar can be worked into cable bundles to reduce smoke migration and meet certification listings.

3. Install damming if required (i.e., floor openings larger than 8" x 8" [20 cm x 20cm]). Use polystyrene board such as Styrofoam SM™ (by DOW Chemical) or Thermax® (by Celotex Corporation), both min. 1.5" (38 mm) thick. With the exception of Thermax in the United States, all foamed plastic forms must be removed after cure. Foam boards may be friction fitted in place without anchoring. When a consistency above 1:3 is used, forms can have larger holes in them without mortar leakage.

4. Mask sides (not bonding surfaces) and the edge and end of penetrating items with 2" (5 cm) wide masking tape. When this is omitted, the small quantities of mortar that are applied outside the opening, on the concrete or concrete block, are quickly starved of water and will shrink, leaving what may appear to be a hairline crack at the periphery of the opening. This may cause rejection of the seal by authorities having jurisdiction, as they may be lead to believe that the entire seal shrank and there may be no bond between mortar and the wall or floor. This is typically a wrong conclusion. Problems can be avoided by masking. Masking the penetrants also greatly improves the appearance of the finished job.

5. Mix the mortar as per mixing instructions below.

6. Wet down the opening with water, using a spray bottle or hand brush. Concrete or block wall sides of the opening should be damp to avoid premature or excessive absorption of water from the freshly placed mortar.

7. Immediately place the mortar by filling the most difficult to reach areas first (i.e., inside of cable bundles, *after* removal of cable ties). NOTE: Mix a smaller quantity of mortar for this part of the work to avoid remoistening or premature cure of the rest of the material. If, after the filling of cable bundles etc., the sides of the opening are no longer damp: remoisten as above outlined.

8. Squeeze mortar against the sides of the opening. Always work towards the bonding surface.

   ***Slumping Corrections**:*

   When nearing the top of a wall opening, if the mortar wall being built becomes unstable, either wait until mortar has set more or sprinkle a minute quantity of unmixed mortar powder on top. It will stiffen more quickly!

   Then finish filling the opening.

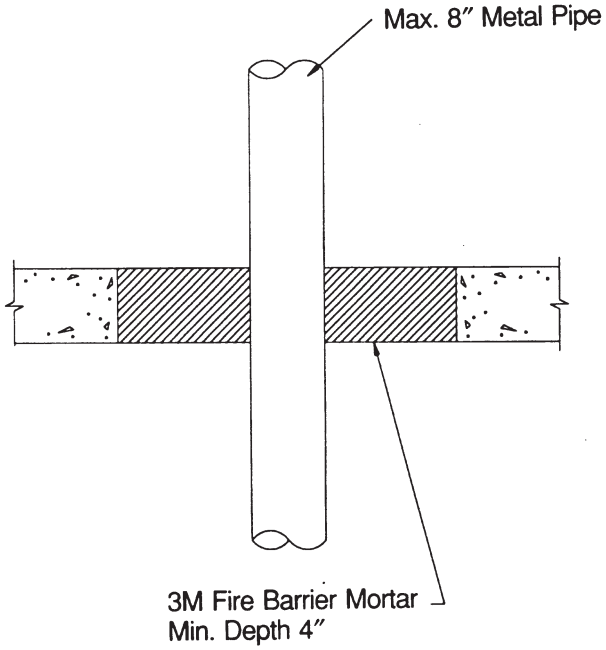
   If the mortar has slumped down and created a small gap at the top of the opening, enlarge this gap by troweling a triangular slot at the top of the gap. Wait until the mortar has set some more (ca. 10-30 min.) and then fill that slot with more freshly mixed mortar.

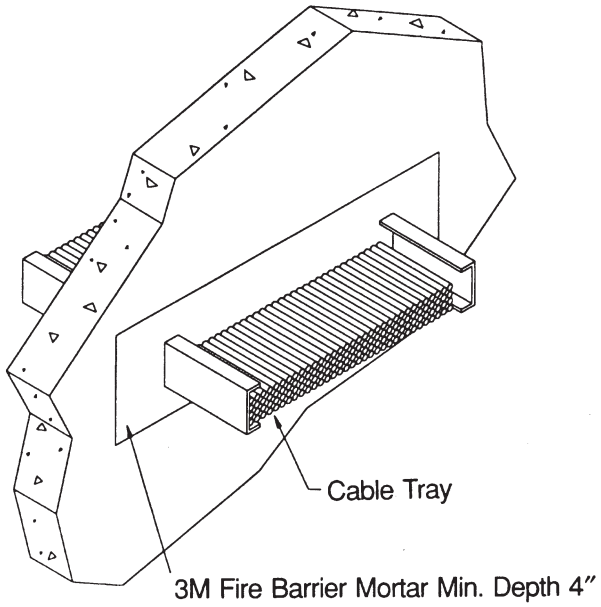
9. Smooth mortar off as quickly as possible, as you fill the opening, flush with the wall or floor. NOTE: Use a variety of trowels, including at least the following: *pointing trowel*, for most of the work and *tuck pointers*, for smoothing between cables and other hard to reach areas. Pointing trowels with straight sides and rounded tips are best. *Cement finishing trowels* or others with a straight front (no tip) are useful in emptying pails and carrying material for making finer corrections with smaller trowels ("cosmetics"). NOTE: 3M Fire

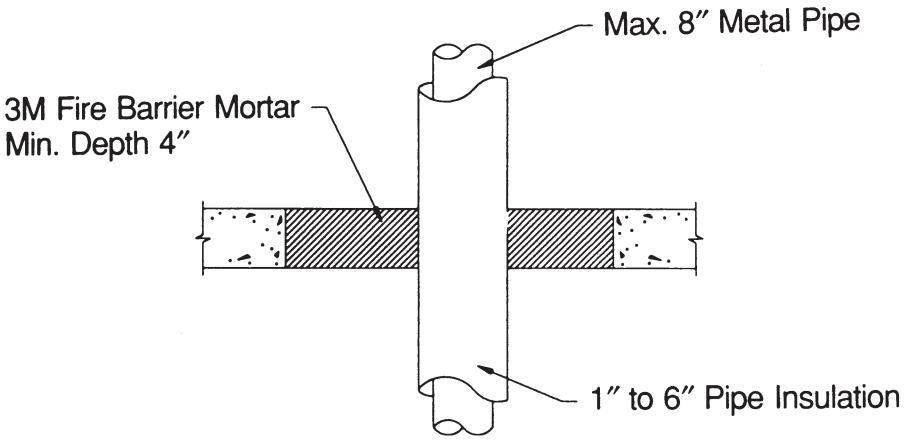
Barrier Mortar sets fast. Set time is influenced by atmospheric conditions, similar to all products containing cement. The hotter and the dryer, the faster the set and the greater the likelihood of shrinkage. Placement should be such as to minimize these environmental effects. To minimize adverse environmental effects (hot, dry, windy), protect seal by covering with plastic sheet or common curing compounds immediately after placement.

10. Immediately after smoothing, remove masking tape from sides of opening and penetrants by pulling away from (not towards) mortar surfaces.

## Typical Penetration Firestops For Metal Pipe, Cable Tray And Insulated Pipe



## 8. Mixing Instructions

1. Add water to the mixing bucket first. Then add mortar and mix using 5/8" (16 mm) or " (13 mm) drill (the larger and the slower, the better). Avoid mud whips, paint mixing or all purpose mixing paddles. Professional grout mixing paddles are preferable. Mud whips will work but will entrain more air into the mix and require caution. Mix ratio can be varied from 1 part water to 2.5 parts powder (by mass) to 1 part water to 4 parts powder (by mass always). 1:3.5 is a typical consistency used when hand-packing "balls" of the material into wall openings, without the use of forms. Set time influences consistency. A "thin" or more watery mix (i.e., 1:2.8) may be "thick" enough by the time it is placed into an opening.
2. Avoid using extreme ratios. The less water used, the less the forming required. The more water, the more self-leveling the consistency.
3. Mix the mortar until it is homogeneous and smooth, for a total of not less than 5 minutes. Watch for dry spots at the bottom edges of the bucket.
4. Do not remix more than once. For "remoistening", avoid adding too much water. Try first without adding any water.

**CAUTION:** This mortar will conduct electricity when wet. DO NOT install in contact with live exposed conductors of electricity such as bus bars or on old cloth type cable jacketing. Consult electrician or electrical engineer in case of doubt.

**CAUTION:** When sealing an opening in a wall or floor assembly, which contains a definite crack due to movement or vibration, be sure to provide a movement joint at that location as this crack may otherwise carry over into the mortar. Simply strike a " (6.4 mm) deep triangular "key" into the mortar at that location. This pre-determines where the crack goes. To maintain cold smoke integrity, caulk with 3M CP 25WB+ sealant. With some penetrating items, stress cracking can be addressed in the same manner by striking keys from the penetrant to the side of the opening, particularly at distinct edges (i.e., corners of vibrating cable trays). For severe movement, use suitable primer to prevent adhesive failure of sealant.

**CAUTION:** Avoid bonding 3M Fire Barrier Mortar to moving pipes. Wrap such pipes with 1/8" (3 mm) thick ceramic paper. This acts as a bond breaker to prevent cracks as a result of moving pipes. All insulated piping typically moves. The ceramic paper need not extend beyond the firestop on either side. It can be held in place with duct tape or wire.

**CAUTION:** This mortar is not intended to be loadbearing. See "compression strengths" under Physical Properties. There are no standards in existence to qualify firestops as loadbearing.

## 9. Maintenance

3M Fire Barrier Mortar is expected to be stable indefinitely under normal conditions of use. Avoid presence of typical concrete poisons (i.e., sulfates, bleaches, etc.), which may deteriorate the product.

## 10. Availability

3M Fire Barrier Mortar is available in 44 lb (20 kg) poly/paper bags yielding a minimum 2 $ft^2$ (0.19 $m^2$) of opening area at 4" (10 cm) depth, without penetrating items. Bags are shipped 30 per pallet. Full pallets are stretch-wrapped. 3M Fire Barrier Mortar is available from 3M Fire Protection Products Distributors. Shelf life is one year.



3M
**Specified Construction Products Department**
3M Center, Building 225-4S-08
St. Paul, MN 55144-1000
800 328 1687

*Recycled paper*
*40% pre-consumer*
*10% post-consumer*

Litho in USA with 3M films,
Proofing systems and offset plates.