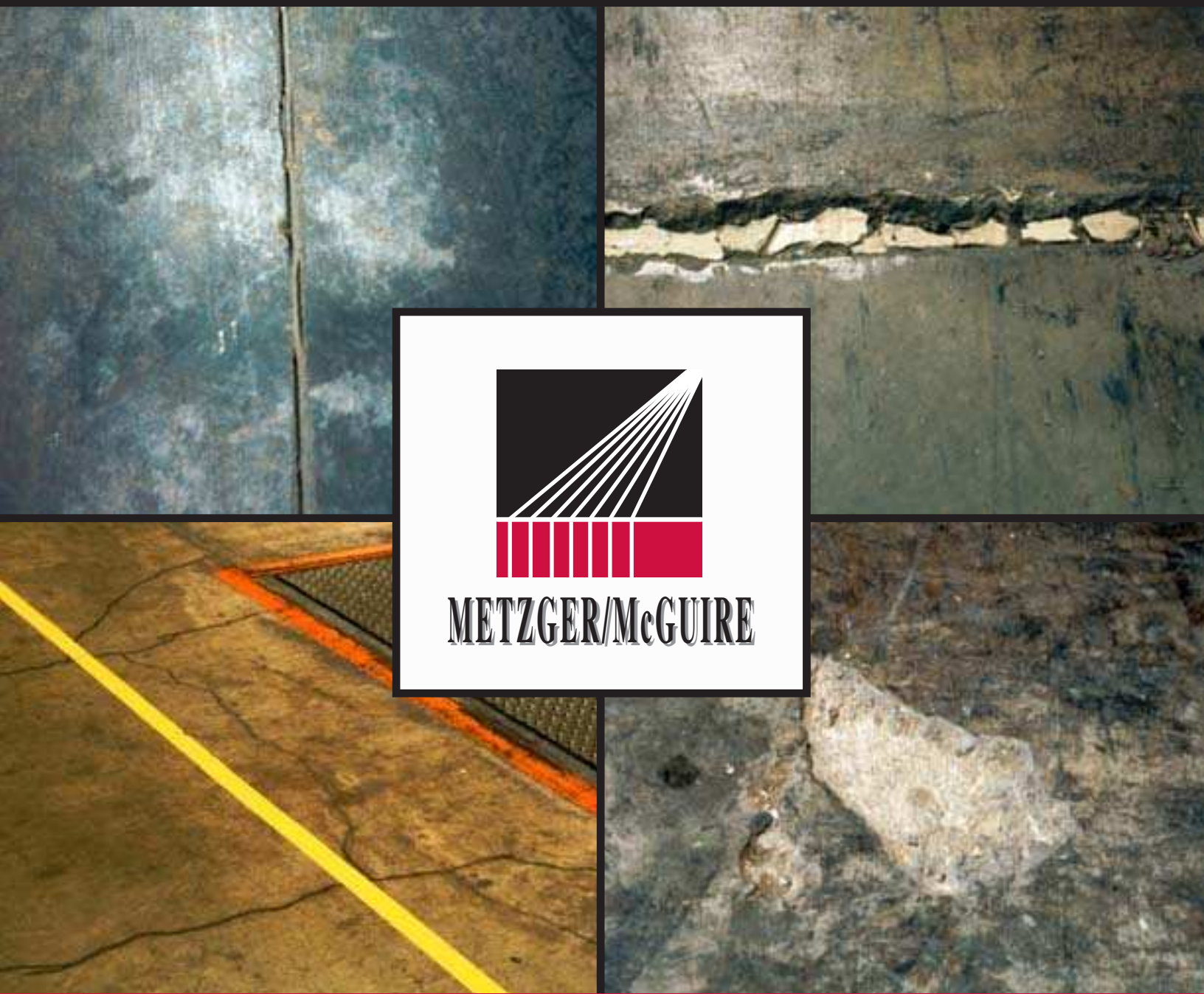


RECOMMENDED FLOOR REPAIR PROCEDURES



Basic Repair Guidelines for Common Floor Defects Including
**RANDOM CRACKS, SPALLED JOINTS, GOUGES,
JOINT FILLER SEPARATION AND MORE...**

4 CRITICAL STEPS TOWARDS ACHIEVING PERMANENT, DURABLE FLOOR REPAIRS

1

Determine Cause(s) of Floor Deterioration

Before you begin repairing floor defects, it's important to identify their underlying causes in order to determine the best long-term repair strategy.

Example: Joint spalling may be the result of an improper joint filler installation (i.e. low filler profile or poor joint cleaning prior to filling), the wrong joint filler (i.e. urethane that is too soft to support traffic) or no joint filler at all. These are material problems. Joint spalling could also result from differing slab elevations (slab curl) or rocking slab conditions (subgrade deficiencies or voids). These are structural problems that need to be corrected prior to performing standard joint repair.

2

Select Appropriate Floor Repair Material(s)

It's important to choose the repair material(s) best suited to meet the requirements of the facility's operations. Considerations may include frequency of traffic, vehicle loading and types, building temperature, time allowed to perform repairs, defect width, etc.

Example: The repair material best suited for repairing a spalled joint may be heavy duty semi-rigid epoxy or polyurea or a structural epoxy mortar...depending upon the width of the spalled joint (wider exposures require more rigid products), the access time required (will an epoxy take too long to cure?), structural condition of the floor (are the joints still opening?), is the defect in a freezer/cooler (polyurea is likely best)...

3

Prepare Defect for Repair Material

The key to achieving long-lasting repairs is making sure the edges of the defect are defined and the defect is cleaned properly prior to filling with repair material.

Failure to properly clean and prepare a floor defect is probably the #1 cause of ultimate failure. Even the best possible repair material will not function properly if it's placed into a poorly cleaned joint or crack or if the repair material is "feather-edged" along the outside of the defect. The edges of joints, crack, and surface spalls all should be at least 1/2" deep vertically and clean and dry prior to filling to ensure the long term durability and structural stability of any repair.

4

Finished Repair Should Be Flush with Floor

The goal in any floor defect repair is to restore a smooth, continuous transition across the floor surface. To achieve a flush profile, repair materials should be placed slightly higher than the floor, then shaved or ground flush with the surface.

The finished profile of any repair should be "flush" with the floor's surface. Simply filling a defect "even" with material generally results in a finished profile that is concave or dished, as repair materials typically settle a bit during cure. Repair materials should always be placed slightly higher than the floor surface and be allowed to cure. Once cured, excess material can be shaved or ground flush with the surface.

RANDOM CRACKS (1/16" Wide or Greater)



REPAIR MATERIAL

Semi-Rigid Epoxy or Polyurea Joint Filler

MM-80
Spal-Pro 2000
Spal-Pro RS-88

Freezer/Cooler

Spal-Pro 2000 or RSF

TOOLS & EQUIPMENT NEEDED

Preferred:

Right angle grinder w/dustless shroud
Crack chasing saw
Diamond blades-"U" or "V" shaped
Vacuum system
Razor scraper / torch

Minimal:

Right angle grinder
Diamond blades-"U" or "V" shaped
Shop vac
Razor scraper / torch

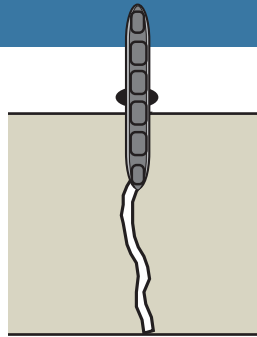
DIFFICULTY



STEP 1

Use a right angle grinder with a diamond square cut or "V" blade to rout out crack to a nominal depth of 1/2" minimum, 3/4" preferred.

Be sure that remaining concrete along edge is structurally sound.

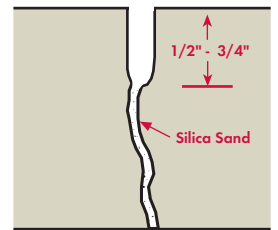


STEP 2

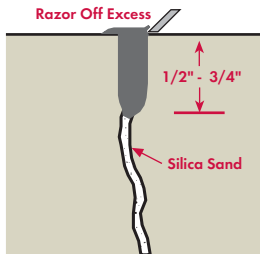
Clean out any remaining debris or loose elements.

Vacuum or blow clear with compressed air.

Choke off base with silica sand. (If necessary due to excessive material seepage).

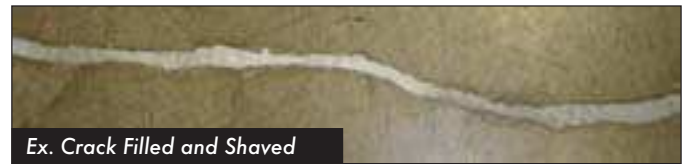
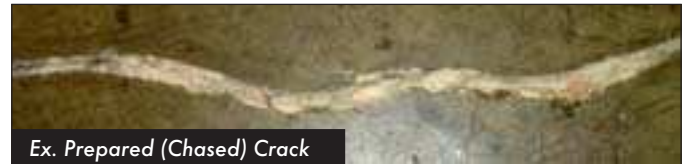


STEP 3



Apply joint filler and allow it to seep into the crack. Reapply until seepage stops, if necessary, and seal off crack with silica sand if seepage continues. Allow to cure. Razor off excess.

(If using **MM-80**, apply heat prior to shaving).



RANDOM CRACKS (Less than 1/16" Width)



REPAIR MATERIAL

Liquid Structural Epoxy

Armor-Hard

Freezer/Cooler

Low Viscosity Structural Polyurea

TOOLS & EQUIPMENT NEEDED

Preferred:

Right angle grinder w/wire wheel
Vacuum/compressed air
Paint Brush

Minimal:

Wire Brush
Vacuum/compressed air
Paint Brush

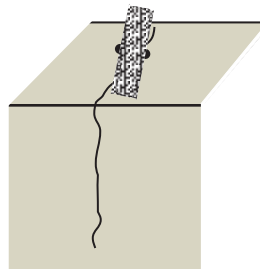
DIFFICULTY



STEP 1

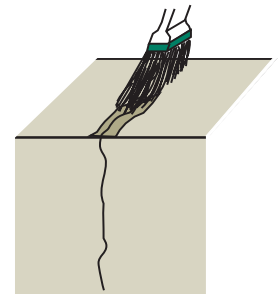
If a crack has no "islands," no chipping, and is less than credit card thickness, we recommend that it *not* be saw cut open.

Clean crack out using right angle grinder with wire brush then vacuum/blow out with air.



STEP 2

After crack is clean, brush-apply a protective coating of our **ARMOR-HARD** liquid structural epoxy on top of the crack to provide a protective structural surface over material and prevent further chipping.



JOINT FILLER SEPARATION - Minor to Severe



REPAIR MATERIAL

Semi-Rigid Epoxy or Polyurea Joint Filler

MM-80 LV

Rapid Access

Spal-Pro RS-88

Freezer/Cooler

Spal-Pro RSF

TOOLS & EQUIPMENT NEEDED

Preferred:

Joint clean-out saw w/ dustless shroud
Braided wire wheel
Diamond blade
Vacuum system
Compressed air
Razor scraper / torch

Minimal:

Right angle grinder
Braided wire wheel
Shop vac
Compressed air
Razor scraper / torch

DIFFICULTY



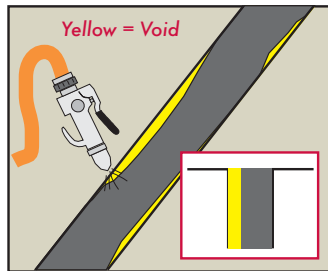
Option 1 - Refilling Voids Without Removal of Existing Filler

Before choosing this option, ensure that existing filler is well bonded structurally to one or both sides of the joint and exhibits signs of being properly installed originally (i.e. flush with floor, proper depth, etc). If filler is not well bonded or original installation appears deficient, remove filler and treat as you would a normal joint repair.

STEP 1

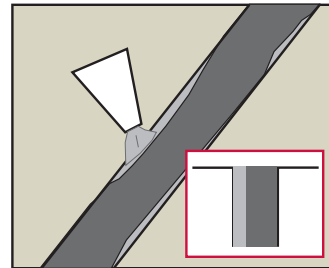
Use knife or narrow tool to loosen debris in voids. Wire brush or wire wheel on a grinder may also be used.

Blow out debris with compressed air and vacuum voids clean.



STEP 2

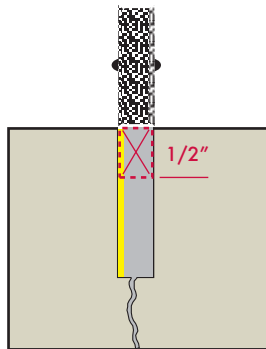
Overfill voids with appropriate semi-rigid filler. Monitor carefully as voids will likely require refilling as filler settles and trapped air is released. Allow filler to cure, then razor flush.



Option 2 - Partial Removal of Existing Filler

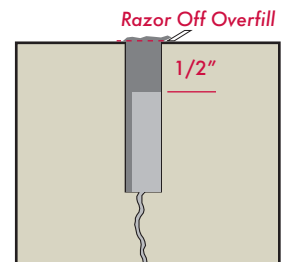
STEP 1

Use joint cleaning saw or right angle grinder equipped with a braided wire wheel to remove existing joint filler to a nominal depth of 1/2" below surface. It's important that all filler residue remaining on joint walls be removed back to clean concrete. A diamond blade may be required to achieve this. Vacuum joint clean.



STEP 2

Overfill joint with appropriate semi-rigid filler. Monitor carefully during initial material cure as filler may run through joint bottom and leave filler profile low when cured. Allow filler to cure, then razor flush with floor surface.



Option 3 - Complete Removal of Existing Filler



If existing joint filler has lost complete adhesive bond on both sides of joint and in examining material there appears to be evidence of inadequate adhesion (i.e. dirt/debris bonded to sides of filler), inadequate filler depth (shallower than joint depth or placed over foam backer rod/debris, etc.) then the filler should be completely removed and replaced in order to provide maximum long-term durability.

If this is the case, filler can be removed using methods described in Option 2 and joint should be treated as a standard joint repair.

CONCAVE / LOW JOINT FILLER PROFILE



REPAIR MATERIAL

Semi-Rigid Epoxy or Polyurea Joint Filler

MM-80

Rapid Access

Spal-Pro 2000
Spal-Pro RS-88

Freezer/Cooler

Spal-Pro 2000 or RSF

TOOLS & EQUIPMENT NEEDED

Preferred:

- Joint clean-out saw w/ dustless shroud
- Braided wire wheel
- Diamond blade
- Vacuum system
- Razor scraper / torch

Minimal:

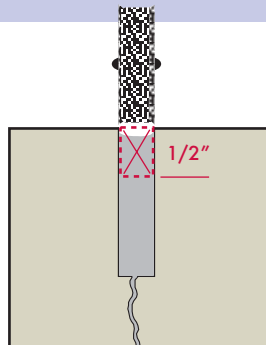
- Right angle grinder
- Braided wire wheel
- Shop vac
- Razor scraper / torch

DIFFICULTY



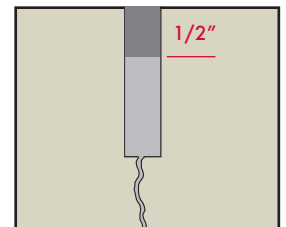
STEP 1

Remove existing filler to a nominal depth of 1/2" (min.) below floor surface using saw or grinder with braided wire wheel or diamond blade. Ensure that joint walls are cleaned back to original concrete and that no filler residue remains. Vacuum out newly created channel.



STEP 2

Overfill newly formed channel with chosen semi-rigid filler and allow to cure. Razor off excess filler flush with floor. (If MM-80 Epoxy Joint Filler was installed, heat overfill lightly with propane torch prior to razoring).



SURFACE SPALLING / POP-OUTS, GOUGES

REPAIR MATERIAL

Structural Epoxy Mortar

Armor-Hard Kit

Semi-Rigid Polyurea

Rapid Access

Spal-Pro 2000

Freezer/Cooler

Spal-Pro 2000

TOOLS & EQUIPMENT NEEDED

Preferred:

- Right angle grinder w/dustless shroud
- Diamond blades
- Zec®/Grinding Pads
- Vacuum system
- Razor scraper

Minimal:

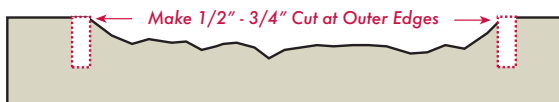
- 3 lb. hammer
- Cold chisel
- Shop vac
- Trowel
- Razor scraper / torch

DIFFICULTY



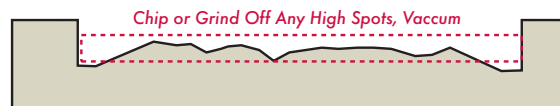
STEP 1

Make cuts with blade or chip out section at outer edges of spalling, 1/2" deep (minimum) to 3/4" deep (preferred).



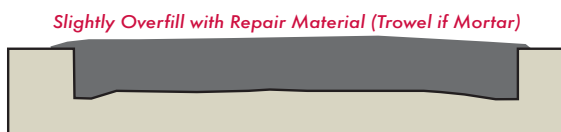
STEP 2

Chip or grind out any high spots above level of cuts. Vacuum/brush area clean. If oils/debris present solvent wipe with rag.



STEP 3

Slightly overfill area with repair material
If Armor-Hard Kit: trowel smooth/slightly high
If Spal-Pro 2000: fill gradually until material flows over edges slightly high



STEP 4

Remove overfill to create smooth, flush surface
If Armor-Hard Kit: grind flush w/Zec® pad
If Spal-Pro 2000: razor flush if small dia. (< 2"), or sand flush at low speed



JOINT SPALLING, MAJOR (Greater than 1")



REPAIR MATERIAL

Rigid Epoxy Mortar
 Armor-Hard Kit

Semi-Rigid Epoxy or Polyurea Joint Filler
 MM-80
 Spal-Pro 2000

Freezer/Cooler
 Spal-Pro 2000

TOOLS & EQUIPMENT NEEDED

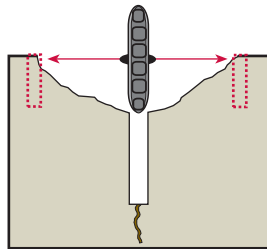
Preferred:
 Right angle grinder w/dustless shroud
 Joint clean-out saw
 Diamond blades
 Vacuum system
 Razor scraper / torch
 Pneumatic chipper

Minimal:
 Right angle grinder
 Diamond blades
 Shop vac
 Razor scraper / torch
 Cold hammer / chisel



STEP 1

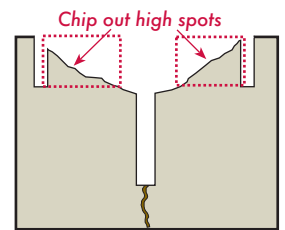
Create a vertical edge behind the spalled edges on both sides using a joint cleanout saw or right angle grinder with diamond blade. The depth of these cuts should be 1/2" minimum (3/4" preferable).



STEP 2

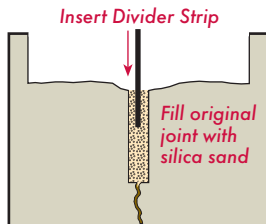
Chip out any concrete which remains above the elevation of the saw cuts using pneumatic chipper or cold hammer and chisel.

This new channel does not have to be completely flat but should be as close as possible.



STEP 3

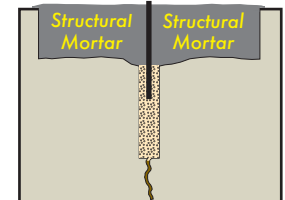
Vacuum new joint channel clean. Backfill original joint opening with silica sand up to the base of the newly formed channel.



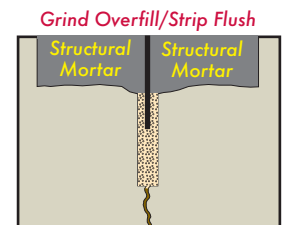
Insert a divider strip into the sand and ensure it is plumb with slab edges. Top of strip should be slightly higher than floor elevation. If strip is to remain after repair, use a material that is rigid and narrow (i.e. PVC or fiberglass strip). If strip is to be later sawn out (see Step 6), use a material which is easy to saw out (i.e. durable cardboard or fiberboard, etc).

STEP 4

Fill both sides of strip with mortar from Armor-Hard Kit. Ensure that divider stays plumb during filling and do not fill over top of strip. Trowel mortar smooth and only slightly higher than edges of the slab panels.

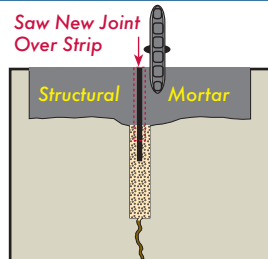


IF PERMANENT STRIP IS USED: Allow mortar to cure and grind off overfill and protruding strip until repair surface and edges are flush with both slab panels.



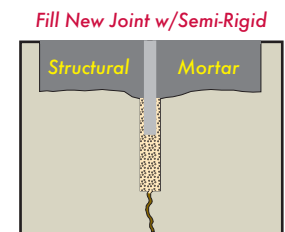
STEP 5 - Only Necessary if Temporary Strip Used

Using joint cleaning saw and diamond blade, cut a new joint through structural repair to the depth of the strip. Remove any debris left from strip and vacuum joint clean.



STEP 6 - Only Necessary if Temporary Strip Used

Overfill newly formed joint with semi-rigid epoxy or polyurea joint filler and allow to cure. If overfill is excessive, razor off as much as possible. Grind excess structural mortar or joint filler flush across repair and along repair edges.



JOINT SPALLING, MINOR (Up to 1" Wide)



REPAIR MATERIAL

Semi-Rigid Epoxy or Polyurea Joint Filler

MM-80
Spal-Pro 2000
Spal-Pro RS-88

Freezer/Cooler

Spal-Pro 2000 or RSF

TOOLS & EQUIPMENT NEEDED

Preferred:

Right angle grinder w/dustless shroud
Joint clean-out saw
Diamond blades
Vacuum system
Razor scraper / torch

Minimal:

Right angle grinder
Diamond blades
Shop vac
Razor scraper / torch

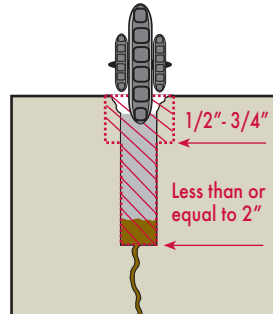
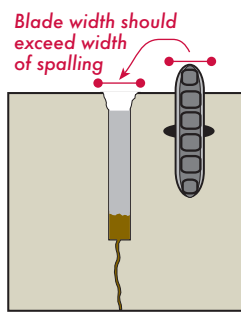
DIFFICULTY



STEP 1

The ultimate width of a spalled joint will determine the best cleaning/resawing method required to recreate a proper joint for filling. If spalled joint is narrow, it may be possible to use a single diamond blade to cut a "new" joint to the same depth as the original joint (or 2" min).

If joint spalling is wider than a single cut can achieve, consider the use of a series of blades to reach the proper width. If using multiple blades, the center blade should reach the depth of the original joint (or 2") and the outer blades should achieve a cut of 1/2" - 3/4", creating a "T" shape after cutting.



STEP 2

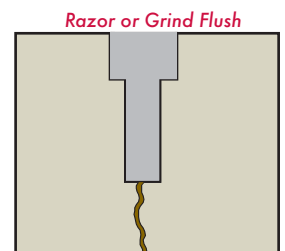
Clean out a debris or lo

Vacuum or blow clear with compressed air.

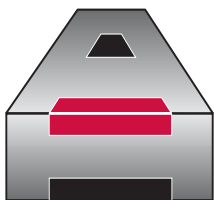
Choke off base with silica sand. (If necessary due to excessive material seepage).

If using MM-80 and joint width exceeds 1/2", it is acceptable to modify the MM-80 with silica sand. (See installation instructions for more information).

Slightly overfill cleaned joint with filler (several passes may be required) and allow to cure. After full cure razor off excess or grind flush if razoring proves difficult.



NEW PRODUCTS from



ARMOR-HARD ARMOR-HARD KIT



EARLY SET, STRUCTURAL EPOXY FOR CONCRETE FLOOR REPAIRS

EARLY SET, STRUCTURAL EPOXY MORTAR KIT FOR CONCRETE FLOOR REPAIRS

Armor-Hard is a new "early set" structural epoxy "binder" for industrial concrete floor repair (slab edge rebuilds, wide joint repairs, etc.) Armor-Hard can be used to create a durable structural repair mortar by blending it with your choice of aggregates or with a pre-ratioed, custom aggregate blend designed for easy troweling as part of the Armor-Hard Kit.

Armor Hard Advantages

- Early set allows for:
 - Foot traffic and grinding in 3-4 hours
 - Hard-wheeled traffic in 8 hrs. or less (at 70° F)
- USDA/FDA acceptable
- Excellent impact, wear and chemical resistance

For More Information Call Us at 800-223-MM80 or Visit www.metzgermcguire.com

NOT SO BASIC REPAIRS...



SLAB CORNER BREAKS



ROCKING SLABS



SLAB EDGE CURL



SURFACE DUSTING

Please Contact Metzger/McGuire's Technical Service Department for Assistance on Repairs Not Referenced in this Basic Guide or to Discuss Specific Repair Settings and Circumstances

APPROXIMATE MATERIAL COVERAGE RATES

BASED ON ONE U.S. GALLON CARTRIDGE COVERSION: 450ML 1/8 Gal. 900 ML 1/4 Gal. 1500 2/5 Gal.

NARROW JOINTS AND CRACKS

1/8 x 3/4" = 200 lf/gal.	3/16 x 3/4" = 135 lf/gal.	1/4 x 3/4" = 100 lf/gal.	3/8 x 3/8" = 135 lf/gal.	1 x 1" = 20 lf/gal.
1/8 x 1" = 150 lf/gal.	3/16 x 1" = 100 lf/gal.	1/4 x 1" = 80 lf/gal.	3/8 x 1/2" = 100 lf/gal.	1 x 1/2" = 40 lf/gal.
1/8 x 1-1/4" = 125 lf/gal.	3/16 x 1-1/4" = 85 lf/gal.	1/4 x 1-1/4" = 60 lf/gal.	1/2 x 1/2" = 80 lf/gal.	1 x 2" = 10 lf/gal.
1/8 x 1-1/2" = 100 lf/gal.	3/16 x 1-1/2" = 70 lf/gal.	1/4 x 1-1/2" = 50 lf/gal.	3/4 x 1/2" = 50 lf/gal.	2 x 2" = 5 lf/gal.
1/8 x 1-3/4" = 85 lf/gal.	3/16 x 1-3/4" = 60 lf/gal.	1/4 x 1-3/4" = 45 lf/gal.	3/4 x 3/4" = 35 lf/gal.	
1/8 x 2" = 75 lf/gal.	3/16 x 2" = 50 lf/gal.	1/4 x 2" = 40 lf/gal.	1 x 3/4" = 25 lf/gal.	

WIDER JOINTS AND CRACKS

SAND-MODIFICATION NET YIELDS

LIQUID EPOXY + SILICA SAND = MORTAR YIELD

GAL. EPOXY + GALS. SAND = GALS. MORTAR

1	1	1.6
1	1.5	1.9
1	2	2.2
1	2.5	2.5
1	3	2.8

GOUGES, HOLES, ETC.

450 ML UNIT = 28.75 cubic inches

900 ML UNIT = 57.5 cubic inches

GALLON UNIT = 230 cubic inches

PLEASE CALL AND LET US ASSIST YOU WITH COVERAGE RATES ON OTHER DIMENSIONS

ADDITIONAL SERVICES AND RESOURCES

FIRMS® Program - Floor Inspection and Maintenance Services

Metzger/McGuire offers a host of floor construction and repair services through our FIRMS® program including:

- **Corporate-Wide Floor Improvement Planning Services**
- **Facility-Specific Repair Specifications and Assistance**
- **In-House Repair Training for Maintenance Personnel**
- **Real Estate Due Diligence/Pre-Acquisition Assessments**
- **Advocacy/Start-Up Services on New Construction Projects**

EQUIPMENT RESOURCES

Metzger/McGuire inventories many of the necessary repair tools referenced in this guide and/or can provide appropriate supplier referrals where necessary.

CONTRACTOR REFERRALS

Through our nationwide network of quality repair contractors and approved installers, we can assist you in securing quality bidders for all of your floor repair contracting and joint filler installation needs.



800-223-MM80

P.O. BOX 2217 CONCORD, NEW HAMPSHIRE 03302
FAX: 603.224.6020 • E-MAIL: SPECMM80@AOL.COM