

GUIDE TO BASIC FLOOR REPAIRS



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.

JOINT FILLER SEPARATION - Minor to Severe



REPAIR MATERIAL	TOOLS & EQUIPMENT NEEDED		DIFFICULTY
<p style="color: red;">Semi-Rigid Epoxy or Polyurea Joint Filler</p> <p style="text-align: center;">MM-80</p> <div style="background-color: green; color: white; padding: 2px; text-align: center; margin-bottom: 5px;">Rapid Access</div> <p style="text-align: center;">Spal-Pro RS-88</p> <div style="background-color: blue; color: white; padding: 2px; text-align: center; margin-bottom: 5px;">Freezer/Cooler</div> <p style="text-align: center;">Spal-Pro RSF</p>	<p style="color: red;">Preferred:</p> <ul style="list-style-type: none"> Joint clean-out saw w/ dustless shroud Braided wire wheel Diamond blade Vacuum system Compressed air Razor scraper / torch 	<p style="color: red;">Minimal:</p> <ul style="list-style-type: none"> Right angle grinder Braided wire wheel Shop vac Compressed air Razor scraper / torch 	

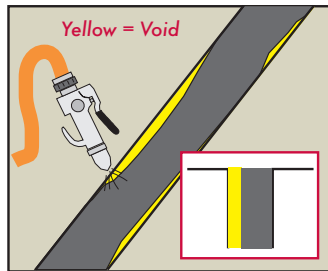
Option 1 - Refilling Voids Without Removal of Existing Filler

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

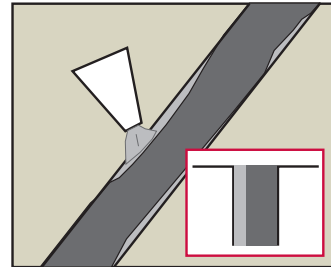
Use knife or narrow tool to loosen debris in voids. Wire brush or wire wheel on a grinder may also be used.

Blow out debris with compressed air and vacuum voids clean.



STEP 2

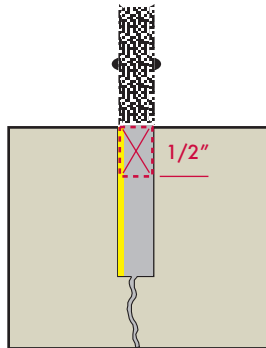
Overfill voids with appropriate semi-rigid filler. Monitor carefully as voids will likely require refilling as filler settles and trapped air is released. Allow filler to cure, then razor flush.



Option 2 - Partial Removal of Existing Filler

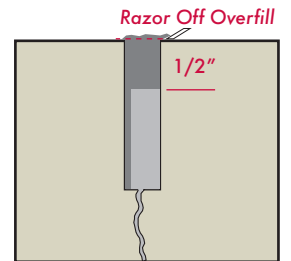
STEP 1

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.

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:

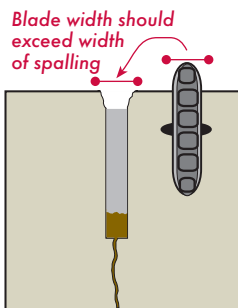
Right angle grinder
Diamond blades
Shop vac
Razor scraper / torch

DIFFICULTY

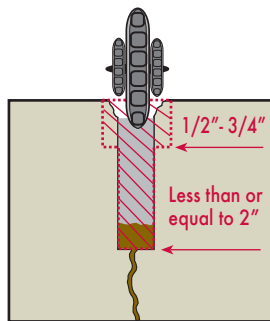


STEP 1

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

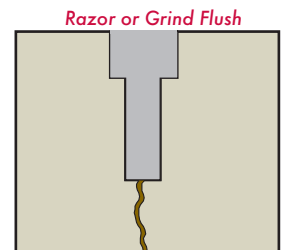
Clean out a debris or lo

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.



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:

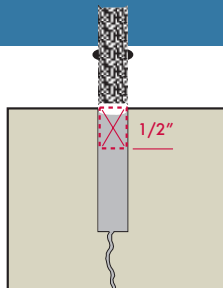
Right angle grinder
Braided wire wheel
Shop vac
Razor scraper / torch

DIFFICULTY



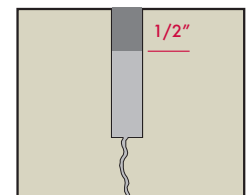
STEP 1

Remove existing filler to a 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).



JOINT SPALLING, MAJOR (Greater than 1")



REPAIR MATERIAL

Rigid Epoxy Mortar
 Armor-Hard Kit
 Armor-Hard Extreme

Semi-Rigid Epoxy or Polyurea Joint Filler

MM-80, Spal-Pro 2000

Freezer/Cooler

Spal-Pro 2000, AH Extreme

TOOLS & EQUIPMENT NEEDED

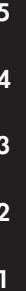
Preferred:

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

Minimal:

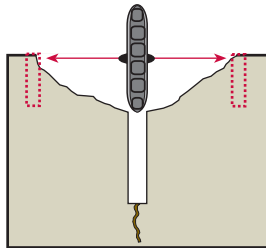
- Right angle grinder
- Diamond blades
- Shop vac
- Razor scraper / torch
- Cold hammer / chisel

DIFFICULTY



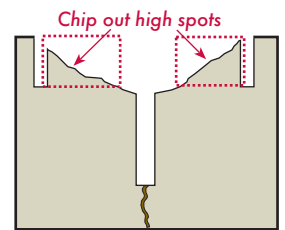
STEP 1

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

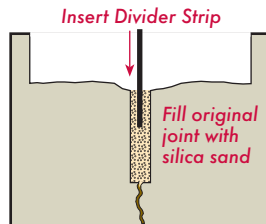
Chip out any concrete which remains above the elevation of the saw cuts using pneumatic chipper or cold hammer and chisel.



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

STEP 3

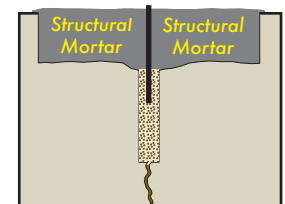
Vacuum new joint channel clean. Backfill original joint opening with silica sand up to the base of the newly formed channel.



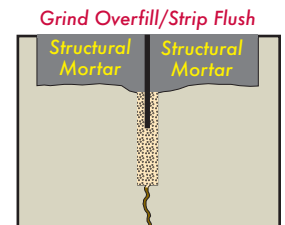
Insert a divider strip into the sand and ensure it is plumb with slab edges. Top of strip should be slightly higher than floor elevation. If strip is to remain after repair, use a material that is rigid and narrow (i.e. PVC or fiberglass strip). If strip is to be later sawn out (see Step 6), use a material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

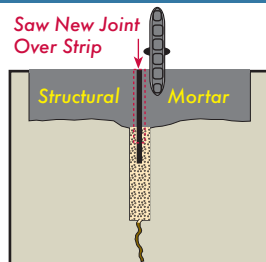


IF PERMANENT STRIP IS USED: Allow mortar to cure and grind off overfill and protruding strip until repair surface and edges are flush with both slab panels.



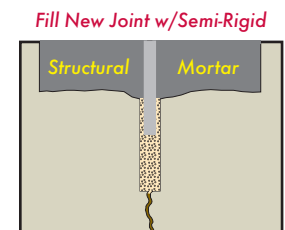
STEP 5 - Only Necessary if Temporary Strip Used

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.

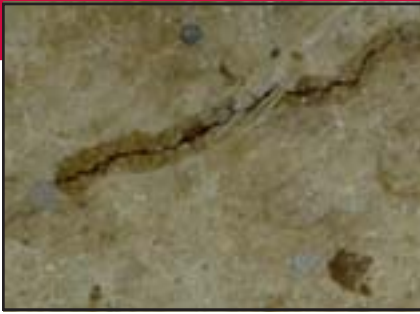


Ex. Rebuild with Permanent Strip



Ex. Rebuild with New Joint (Filled)

RANDOM CRACKS (Less than 1/8" Width)



REPAIR MATERIAL

Structural Repair Polymer
 Rapid Refloor
 Cooler
 Rapid Refloor

TOOLS & EQUIPMENT NEEDED

Preferred:
 Right angle grinder w/soft wire wheel
 Med. grit grinding pad
 Vacuum/compressed air

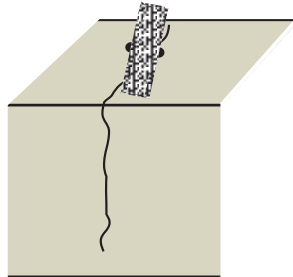
Minimal:
 Wire Brush
 Vacuum/compressed air



STEP 1

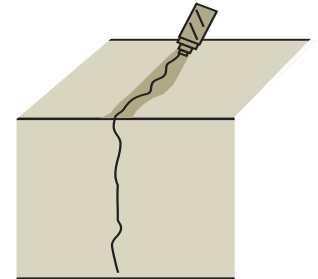
If a crack has no "islands," no chipping, and is less than 1/8" wide, we recommend that it *not* be saw cut open.

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



STEP 2

After crack is clean, apply **Rapid Refloor** into crack, slightly overfilling. Monitor material and refill if seepage occurs. After cure use Med. grit grinding pad to remove excess **Rapid Refloor** flush with surface.



RANDOM CRACKS (1/8" 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

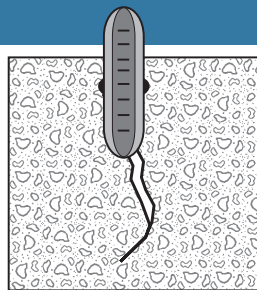
Minimal:
 Right angle grinder
 Diamond blades- "U" or "square" shaped
 Shop vac
 Razor scraper / torch



STEP 1

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

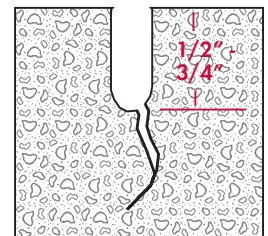
Be sure that remaining concrete along edge is structurally sound.



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).

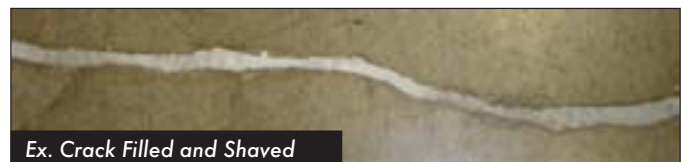
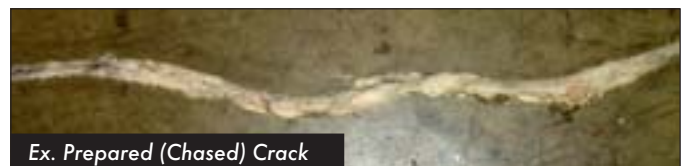


STEP 3



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).



SURFACE SPALLS/DEFECTS - LARGER THAN 6"



REPAIR MATERIAL

- Structural Epoxy Mortar**
- Armor-Hard Kit
 - Rapid Access**
 - Armor-Hard Extreme Kit
 - Freezer/Cooler**
 - Spal-Pro 2000

TOOLS & EQUIPMENT NEEDED

- | | |
|---------------------------------------|-----------------------|
| Preferred: | Minimal: |
| Right angle grinder w/dustless shroud | 3 lb. hammer |
| Diamond blades | Cold chisel |
| Zec®/Grinding Pads | Shop vac |
| Vacuum system | Trowel |
| Razor scraper | Razor scraper / torch |

DIFFICULTY



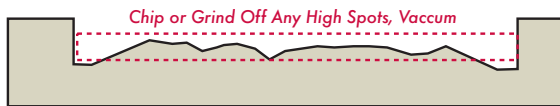
STEP 1

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.



Ex. Prepared Area

STEP 3

Slightly overfill area with repair material and trowel smooth, slightly high.

Slightly Overfill with Repair Material (Trowel if Mortar)



STEP 4

Remove overfill to create smooth, flush surface by grinding flush w/Zec® pad or similar.

Grind/Razor Off Overfill Material After Full Cure



Ex. Finished Area

SURFACE SPALLS/DEFECTS - LESS THAN 6"



REPAIR MATERIAL

- Structural Repair Polymer**
- Rapid Refloor
 - Rapid Access**
 - Rapid Refloor
 - Cooler**
 - Rapid Refloor

TOOLS & EQUIPMENT NEEDED

- | | |
|---------------------------------------|-------------------------|
| Preferred: | Minimal: |
| Right angle grinder w/dustless shroud | Soft Wire Brush |
| Soft steel/brass wire wheel | Right angle grinder |
| Med. grit grinding pads | Med. grit grinding pads |
| Vacuum system | Shop vac |
| Solvent wipe | |

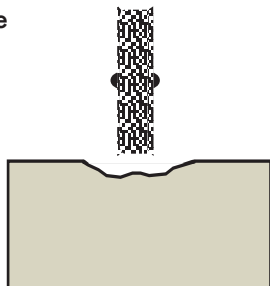
DIFFICULTY



STEP 1

Run grinder with soft wire wheel over defects twice (in opposite directions).

Wipe defect with solvent if oils/residue remain. Vacuum defect clean.



STEP 2

Slightly overfill defect with repair material and allow to cure.

Grind off overfill flush to floor surface.



Ex. Filled Defect



Ex. Finished Area

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. 600 ML-1/6 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