SURFACE PREPARATION AND APPLICATION GUIDE

EPOXY POLYMER CONCRETE SERIES 470

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1.0 INTRODUCTION

The purpose of this guide is to acquaint applicators with the basic information necessary for properly ordering, storing and installing Tnemec's Series 470 LavaCrete.

Prior to starting work, please read this entire guide carefully. If you have questions, contact your Tnemec representative. It is important that you obtain answers to any questions before work begins. Please reference the project specifications and compare them with this guide and the product data sheet. Resolve any inconsistencies prior to starting work.

This application guide cannot cover every issue that may be encountered in the field. If issues arise that are not addressed in this guide or the product data sheet, please contact your Tnemec representative or call +1-816-483-3400 or e-mail techsvcs@tnemec.com for technical assistance.

2.0 PRODUCT OVERVIEW

Series 470 LavaCrete is a non-shrinking, abrasion and impact resistant epoxy polymer concretes used for the rehabilitation of severely eroded concrete or the corrosion proofing of new concrete where chemical resistance is required throughout the complete topping system. Extremely fast setting, allowing for fast rebuilds of process floors and secondary containment structures. A grouting mix may be made by adjusting the kit for a more fluid application.

3.0 JOB SET-UP

Prior to starting installation, please note the following:

- Itemize all materials ordered from Tnemec.
- Establish surface preparation requirements.
- Ensure all equipment is readily available and in working order.
- Set-up a mixing area clearly designated at least 50 feet (15.2 meters) away from heat, sparks, open flame, welding, or other sources of ignition.
- Communicate the installation, safety procedures, and requirements with all persons involved.

Note: Polymer concretes should never be poured, placed or grouted in direct sunlight. Further temperature conditions and protection from rain and other elements must be assured prior to beginning any preparation or application of these materials. If necessary, tenting and introduction of conditioned air may be required. Many times, a pop-up awning is sufficient to protect the area from over-heating and/or from the direct sunlight.

4.0 EQUIPMENT OVERVIEW

- Wheel barrows and other conveyance equipment should be lined with heavy plastic to aid in cleanup.
- Equipment and unmixed components should be placed as close to the application site as possible.
- Large projects should have a back-up mortar mixer on site.
- Before mixing, all screed guides, membranes and forms should be in place and checked prior to pouring the material.
- A horizontal, ribbon or ribbon style mortar or grout mixers must have rubber tip edges with no more than a 0.25-inch gap between the blades and drum sides.

5.0 SURFACE PREPARATION

5.1 PREPARATION OF CONCRETE

All foundations, new or existing, shall be constructed or confirmed to be of, or in, structurally sound condition to support the engineering design and loads. Prepare concrete surfaces in accordance with SSPC-SP13/NACE No. 6 Joint Surface Preparation Standards and ICRI Technical Guidelines. Abrasive Blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide at the very minimum ICRI CSP 7 or greater surface profile. **Note:** For grouting polymer concrete and tying multiple lifts over cured material a minimum CSP 8 may be required.

Damaged or chemically degraded concrete may provide adequate surface profile, however, all loose and semi-loose old toppings and aggregates must be removed to a solid stable surface and all chemical contaminations removed prior to application. Use of a primer is highly encouraged in these applications.

5.2 STEEL & MISC METALS

Series 470 is not typically applied over steel; however incidental contact or overcoating of some ferrous metals may be encountered during applications.

5.4 REINFORCEMENT

Polymer concretes typically exhibit greater compressive, flexural, and tensile strengths than standard commercial grade concrete. Competent and responsible professionals should consider and determine if the embedding of reinforcement is appropriate for the project. When casting walls, foundations, large sumps/trenches or similar structures or placing Lavacrete® (+2-inches (5.1 cm)), to floors, this element of design should be considered.

An acceptable guidance is *ACI 440.1R-15 Concrete Reinforcing With FRP Bars*. In general placing FRP bars is similar to placing steel bars and common practices apply. There are some exceptions, as referenced in *ACI 440.1R-15 6.2 Placement and assembly of materials*. The specification prepared by the engineer should be followed. A good practice with polymer concrete is FRP rebar should be set no higher than 1/2 inch (1.27 cm) below the finish surface and no lower than 1 inch (2.5 cm) below the top of the pour or as directed by the specifying engineer or architect. Most often using maximum spacing recommendations and a #3 (0.375-inch/0.11 mm) FRP and other ancillary products like chairs and non-corrosive ties are used. A preference for fiberglass rebar made from vinyl ester resin and E-CR glass is recommended for maximum corrosion performance of the polymer concrete[1]. Steel rebar, whether galvanized, fusion bonded or epoxy coated is not considered an acceptable selection for use in polymer concretes.

Additionally, large monolithic pours of polymer concrete exterior and/or interior and on to existing slabs, with no working moisture vapor barrier on the base side, and/or expected or known shifting (vertical) of existing horizontal slabs, may require affixing FRP anchors to the existing substrate. Vertical pinning is not generally recommended for polymer concretes.

When making large and/or deep horizontal pours, with polymer concrete, placing the material in a "checkerboard" pattern will help to avoid heat build-up and potential cracking from shrinkage

[1] Owens Corning/Mateenbar™ Fiberglass Rebar

stresses. When making heavy pours (8 inches (20 cm)) in depth it is recommended to consult with Tnemec Technical Services.

5.5 TERMINATIONS & JOINTS

Monolithic pours of polymer concrete, minimizing cold joints is always preferred. Before beginning application of polymer concrete all terminations and joints should be planned. If applying over an existing slab all present control joints and/or isolation/expansion joints should be honored unless directed otherwise by the specifier. Mark these locations prior to polymer concrete placement for addressing at appropriate point of the installation or for cutting after cure.

Expansion or Isolation Joints Using Polypropylene Planks[2] (PP) or Sheets: Example: 1/2-inch (1.27 cm) wide by 2-inch (5.08 cm) deep[3]

- Before installation, score[4] a tear strip no less than 5/8-inch (1.59 cm) deep at the top of the PP and leave attached.
- Place the PP in position where polymer concrete is to terminate and affix to horizontal slab using appropriate temporary support mechanisms like wood framing, stakes or backing anchors to hold PP in place and at an upright and 90° angle during polymer concrete pour.
- After setting of polymer concrete, remove temporary support mechanisms from the next side to be poured. Leave PP plank in place and again pour polymer concrete up to and flush with the top of the scored PP and allow to cure.
- Remove scored tear off strip to reveal concaved annular space.
- Push a 5/8-inch (1.59 cm) bi-cellular or open-cell backer rod[5] into the void allowing for a surface gap of 1/4-inch (0.64 cm) and immediately fill with Tnemec Tank Armor 351 sealant.

Cold Joint Continuation Using Polypropylene Planks (PP) or Sheets (>48-hours) (For select chemical exposures)

- Place a 1/2-inch (1.27 cm) wide and appropriate depth PP or other appropriate damming device to halt and terminate the polymer concrete flow at the stopping point, to the horizontal slab using appropriate support mechanisms like wood framing, stakes or backing anchors to hold PP in place at an upright and 90° angle during polymer concrete pour[2].
- Pour polymer concrete up to and flush with the top of the PP and allow to cure.
- After setting of polymer concrete, remove temporary support mechanisms from the next side to be poured. Leave PP plank in place and again pour polymer concrete up to and flush with the top of the scored PP and allow to cure.

Cold Joint Continuation Using Adhesive Primer (<48-hours) (Use ProBond 108 or 109 with Series 470)

- Place a 1/2-inch (1.27 cm) wide and appropriate depth PP in position where polymer concrete is to terminate and affix to horizontal slab using appropriate support mechanisms like wood framing, stakes or backing anchors to hold PP in place at an upright and 90° angle during polymer concrete pour[2].
- Pour polymer concrete up to and flush with the top of the PP and allow to cure.
- Remove all support mechanisms on the new pour side of the PP. Remove PP from cured polymer concrete.
- Grind or sand glossy contact edge of polymer concrete and remove detritus from the prepared edge prior to prime coating.
- Series 470 polymer concrete cured edge and floor continuation should receive a bonding primer coat of ProBond 108 or 109 at 2-3 mils on vertical edge and 4-8 mils on horizontal surfaces. Allow primer to become semi-cured (tacky but not transferring to finger touch) or not exceed 24-hours before resuming pour. Continue installation of polymer concrete with a resin rich grout mix, as noted on product data sheet, and apply along the cured and primed edge.

Control Joints (At option of specifier. Are used to direct cracking should excessive movement occurs)

- Control joints are to be placed on 14' centerlines or column to column and around fixed objects. Depth is generally no more than 1/2-inch (1.27 cm) deep.
- Due to the rapid setting of polymer concrete control joints are normally saw-cut in place after cure.

5.6 FRAMING

If walls, curbs or other vertical structures are to be poured and cast from Series 470, formwork will need to be built to retain the polymer concrete. Prior to assembly or erection of the formwork the pieces shall be covered with heavy plastic and or other suitable release agents to assist in preventing attachment of the polymer concrete to these surfaces. When casting into forms it is imperative that all joints and mating surfaces are completely sealed to prevent Series 470 from flowing out. All seals and joints must be tight enough to hold water. Where forms meet irregular surfaces such as concrete, it is a good idea to place a heavy caulk bead or putty at this interface for additional "weep" resistance.

6.0 PRIMER INSTALLATION

6.1 SERIES 108 OR 109 PROBOND

Series 108 and 109 ProBond are 100% solids, low surface energy, moisture tolerant, self-leveling primers for use on concrete and porous surfaces to help slow outgassing and improve adhesion to most substrates.

The use of this primer should be discussed at the specification phase to determine applicability. This primer may not be required on all LavaCrete pours. Contact Tnemec for specific details. Series 108 and 109 ProBond are ideally formulated for use on concrete and cementitious substrates.

6.2 SERIES 108 AND 109 PROBOND CURING TIMES

	TEMPERATURE	MIN. RECOAT	MAX. RECOAT
Series 108	90°F (32°C)	1-2 Hours	24 Hours
	70°F (21°C)	2 Hours	36 Hours
	50°F (10°C)	6 Hours	48 Hours
Series 109	70°F (21°C)	1-2 Hours	36 Hours
	50°F (10°C)	2 Hours	48 Hours
	40°F (4°C)	4 Hours	72 Hours

Curing time varies with surface temperature, air movement, humidity and film thickness. A wet-on-wet pour is acceptable provided ProBond 108 is allowed to cure for a minimum of 2 hours at 70°F (21°C) or ProBond 109 is allowed to cure for 6 hours at 50°F (10°C).

Note: Primer should be checked for "amine blush." If primer is sticky or amine blush is present, wash with mild soap and water

[2]Other termination stops such asphalt impregnated fiber board or wood may be substituted for polypropylene closed cell joint planks, but they must be heavy density plastic wrapped or copiously greased to release cured polymer concrete. Removal of grease and oil contaminant must be done prior to continuation of polymer concrete priming and pour.

[3]Nomaco / Nomaflex® Polypropylene Joint Filler Planks & Sheets
[4] Nomaco / Nomaflex Cutter
[5] Nomaco / SOF®ROD Bi-Cellular Polyethylene Backer Rod or OCFOAM™ Open Cell Polyurethan Backer Rod

solution and dry before proceeding. If recoat window is exceeded, primer should be abraded and/or a fresh coat of ProBond 108 or 109 should be applied.

6.3 SERIES 108 AND 109 PROBOND PACKAGING

KIT SIZE	PART A	PART B	YIELD (Mixed)
Medium	1-2 gallon pail (partially filled)	1-1 gallon can	1.5 gallons (5.68 L)
Small	1-1 gallon can (partially filled)	1 quart can	0.75 gallons (2.83 L)

6.4 SERIES 108 AND 109 PROBOND THEORETICAL COVERAGE RATES

DRY MILS (MICRONS)	SQ. FT./GAL COVERAGE RATE (M^2/GAL)
4.0 - 8.0 (102 - 203)	401 - 201 (37.3 - 18.6)

6.5 SERIES 108 AND 109 PROBOND MIXING

Slowly mix Part A and Part B to resuspend any settled solids. Use a power mixer with a 3/8-inch (0.95 cm) shaft and double helix blade or similar equipment at low speed. Do not whip or entrain air into material. **Note:** Do not thin.

6.6 SERIES 108 AND 109 PROBOND POT LIFE

Series 108 pot life is approximately 60 minutes at 75°F (24°C). Series 109 pot life is approximately 30 minutes at 75°F (24°C). Material should be poured out onto surface and used immediately after mixing.

6.7 SERIES 108 AND 109 PROBOND MATERIAL & STORAGE HANDLING

Minimum storage temperature is 40°F (4°C) and maximum is 80°F (27°C). Prior to application, the material temperature should be above 60°F (16°C). It is suggested the material be stored at this temperature at least 48 hours prior to use.

Temperatures will affect workability. Cool temperatures increase viscosity and decrease workability. Warm temperatures will decrease viscosity and shorten pot life.

6.8 SERIES 108 AND 109 PROBOND APPLICATION EQUIPMENT

Roller: Use high-grade, solvent-resistant phenolic rollers,

Other: Pin-rakes, flat or notched squeegee, trowels or other appropriate application tools.

6.9 SERIES 108 AND 109 PROBOND APPLICATION CONDITIONS

CONDITION	MATERIAL	SUBSTRATE	AMBIENT
Preferred	60°F (16°C)	70°F (21°C)	70°F (21°C)
Minimum	50°F (10°C)	40°F (4°C)	40°F (4°C)
Maximum	90°F (32°C)	90°F (32°C)	90°F (32°C)

Note: The surface should be dry and at least 5°F (3°C) above the dew point. Coating will not cure below the minimum surface temperature.

6.10 SERIES 108 AND 109 PROBOND CLEANUP

Flush and clean all equipment immediately after use with the recommended thinner or MEK.

7.0 LAVACRETE INSTALLATION OVERVIEW

7.1 SERIES 470 LAVACRETE INTRODUCTION

Series 470 LavaCrete is an abrasion and impact resistant epoxy polymer concretes used for the rehabilitation of severely eroded concrete or the corrosion proofing of new concrete where chemical resistance is required throughout the complete topping system.

7.2 SERIES 470 LAVACRETE CURING TIMES

TEMPERATURE	TO HANDLE	RETURN TO SERVICE
90°F (32°C)	4 Hours	8 Hours
77°F (25°C)	6 Hours	24 Hours
50°F (10°C)	8 Hours	72 Hours

Note: Curing times are based upon 1/2-inch (1.27 cm) of material, thicker castings and pours may result in faster set times.

7.3 SERIES 470 LAVACRETE PACKAGING

KIT	PART A	PART B	PART C	YIELD (Mixed)
Extra Large	2-6 gallon pail	1-5 gallon pail (partially filled)	1400 lb super sack	78.4 gallons (296.3L)
Large	1-5 gallon pail	1-1 gallon can	7-50 lb (22.68 kg) bags	20.4 gallons (77.2 L)

Note: To create a grouting material refer to the mixing section for additional information.

7.4 SERIES 470 LAVACRETE COVERAGE RATES

Refer to the charts below for coverage rates based on kit size and application. **IMPORTANT:** LavaCrete products must be placed at a minimum thickness of 1/2 inch (1.27 cm) to minimize aggregate exposure.

Series 470 Casting/Topping Application:

KIT	CUBIC FEET (CUBIC METERS)
Extra Large	12.96 (0.37)
Large	3.24 (0.09)

7.5 SERIES 470 LAVACRETE MIXING

Power mix the contents of Series 470 Part A and Part B separately in their original containers prior to combining. Add the Series 470 Part B into the pre-mixed Part A and power mix the material approximately one to two minutes before placing material in a drum mixer or adding aggregate.

Immediately pour entire contents of catalyzed liquid into the mortar mixers tub, making sure to scrape as much resin out of the container as possible. Start the mixing unit on low speed (15-20 rpms) and immediately begin adding Series 470 Part C into the mixer. Allow the first bag to be fully mixed before adding additional bags. **Note:** Extra large kits of LavaCrete 470 may be special ordered with 470 Part C aggregates in 1,400-pound "super sack" bags. When using these very large units be sure to consider sizing and power of mixing equipment to accommodate these large volumes of liquids and aggregatges. Only full 1,400-pound bags of 470 Part C are to be added, partial bags are not to be added to the liquid portions.

It is a general practice when mixing polymer concretes, to make a least the first batch "wetter" by leaving out (1) bag of aggregate. This lubricates the mixing drum and folding blades and makes subsequent batches more fluid.

For additional mixing instructions please reference the charts below:

Casting/Topping (Large Kit as supplied):

Part A	Part B	Part C
5 gallon pail (partially filled)	1 gallon can	7 - 50 lb (22.68 kg) bags

Additional LavaCrete Parts A, B or C may be ordered as needed to adjust batching and placement characteristics. Adding Part C will increase the stiffness and the coverage rate. By decreasing the amount of Part C, the flowability or fluidity of the material will increase, however the coverage rate will be reduced. The following adjustments may be made in the field at the installer's discretion to the standard (Casting/Topping) and fluid (Grouting) mix formulas found on the product data sheet and in this guideline to create a mix that is preferred by the applicator.

To make the material heavier, add up to 50 lbs. (22.68 kg) in a large kit (LK) of Part C. To make the material looser, reduce up to 50 lbs. (22.68 kg) in a LK of Part C.

Note: Material and ambient temperature have a great effect on the handling characteristics of polymer concretes. Before making adjustments to the mix, these conditions should be considered.

7.6 SERIES 470 LAVACRETE SLUMP TESTING

When slump testing Series 470, the ideal material mixture should measure 1 in. (2.54 cm) slump when casting or topping.

7.7 SERIES 470 LAVACRETE MATERIAL TEMPERATURE

For optimum application, handling and performance, the material, including the Part C bags of aggregate, temperature during application should be between 60°F and 90°F (15°C and 32°C). Temperature will affect the workability. Cool temperatures increase viscosity and decrease workability. Warm temperatures will decrease viscosity and shorten pot life.

7.8 SERIES 470 LAVACRETE SURFACE TEMPERATURE

Surface temperatures during application should be no less than 50°F (10°C) and below 90°F (32°C). At minimums, temperatures should be anticipated to be on the rise. Do not apply if temperatures are expected to fall below 40°F (5°C) within 24 hours of application.

7.9 SERIES 470 LAVACRETE WORKING TIME

Working time is approximately 50 minutes at 75°F (24°C) & 50% RH. **Note:** Placement and finishing time is dependent on environmental conditions and temperature of components. Material should be transferred to substrate and placed immediately after mixing.

IMPORTANT: Do not attempt to retemper the polymer concrete with additional resin or water. Material should be moved quickly from the mixer to the area of placement.

8.0 LAVACRETE TOPPING INSTALLATION

8.1 SERIES 470 LAVACRETE MATERIAL TRANSFER

When the primer is ready (see Section 6.2), materials should have been appropriately mixed and moved to the placement location and the initial drops can be made onto the substrate.

Placement of the wet polymer concrete shall be from the transfer unit (wheel barrow or tub) and on to the substrate in a staggered drop fashion. If placed between screed guides, allow enough distance between drops so the material will meet the sides, rise up to the top of the rail and once pulled moving forward, each drop of material meets the previous drop. Once a rhythm is established the transfer installer will know the screed applicator's preference for the location of each drop.

If the area is small and no screed guides are in place, the material from a mixed kit should still be placed in spaced amounts to make pulling or troweling of the material more manageable.

Unless a pour is more than three (3) inches (7.6 cm) in depth, it is never advised to drop all two cubic feet of material in one location. **IMPORTANT:** Final finishing should be completed within 40-45 minutes.

8.2 SERIES 470 LAVACRETE INITIAL FINISHING

Once material has been delivered and properly placed in the area to be topped, finishing begins. Between the guides, adjust the lay of polymer concrete drop towards the side rails so contact is made and just below the top of the screed guide, using a trowel or other tool.

Begin moving the wet polymer concrete along the guiderail path by dragging a screed board or a heavy straight wood 2x4, long enough to extend one-foot outside or past each guiderail, across the guiderail tops. This length will allow extra movement in the "scissoring" and tamping of the material and allow the installers to be at angles from each other.

After dragging screed board across material several times, gaps, low spots and material deficiencies shall have additional wet polymer concrete placed in these areas and again tamped into place. Continue down the pathway avoiding creation of a cold joint in unplanned locations.

Make sure no dry pockets are created and the material has been firmly pushed and in contact with the primed or prepared substrate. If not using guide rails and screed boards but hand-troweling in smaller footprints or locations, use similar techniques to place and finish the material.

8.3 SERIES 470 LAVACRETE FINAL FINISHING

Once the material has been fully placed at thickness required and in an area that is no larger than what the finishers can easily access, final finishing begins.

Using a high-grade steel trowel final-finish the polymer concrete, adjusting pitches, working "pop-up" aggregates back down and bringing some of the resin to the surface for a better appearance.

The following may also be employed when trowel finishing:

- LavaCrete may have Tnemec Thinner No. 2 used sparingly as a lubricant on the trowel or misted on to the polymer concrete to assist in smoothing.
- Another option, with or without the use of a smoothing agent, is to broadcast 20/40 silica sand onto the wet polymer concrete.

9.0 LAVACRETE CASTING INSTALLATION

9.1 SERIES 470 LAVACRETE CASTING GENERAL INFORMATION

- Forms and framework should always be made from ¾-in thick exterior grade plywood or similar stout materials. Where applicable they should be firmly anchored or pinned.
- All formwork surfaces must be either layered with heavy plastic (+3-mil thickness), waxed or heavily greased with a petroleum based release agent. All guiderails and formwork should be removed immediately after material has set firmly.
- All minor gaps or surface irregularities in the formwork must be filled with caulk or a putty prior to casting. The form must

be made water tight to prevent weeping of resins.
- Vibrating equipment is highly recommended for efficient compacting and removal of air pockets.
- If the exterior of a casting is found not to be of a finish grade desired or a color change is desired, it is imperative that all waxes and greases be removed prior to further application. After release agents are removed a sweep blast is recommended.
- Apply a prime coat of appropriate primer as recommended for the specific polymer concrete.
- For color change, use same polymer based resin in specific color chosen and apply over the polymer concrete.

9.2 SERIES 470 LAVACRETE CASTING

The mixed polymer concrete should be moved to the sturdy framework which has been lined or lubricated for release once cured. If using chains or a pig to help pull material into tighter or longer portions of the casting, they should be in place with the excess lengths of chain or line at the other end of the pull, easily grabbed for quick removal.
It is recommended that some type of funneling or "headbox" be fabricated to assist in filling the annular space from the wheel barrel and that a constant head pressure be kept to assist flow into the space.

Series 470 LavaCrete should be poured from one side of the casting only; this helps to avoid air entrapment. It is important that there is venting available at the opposite end of the pour; this allows air to move out of the form as the polymer concrete is being poured.

While still fluid, LavaCrete should be worked to completely fill the cavity or annular space using vibrating equipment, tamping or rodding devices, chains or other tools to compact the space thereby limiting honeycombs and air pockets.

LavaCrete pours in excess of ten (10) inches (25.4 cm) deep should be made in multiple lifts. Subsequent lifts should be made after the first pour has dissipated heat through the exotherm process and cooled down.

Ideally, between 60°F (16°C) and 80°F (27°C), the subsequent lifts should be made within four (4) hours of the previous pour to achieve best bonding.

If in excess of four (4) hours, or when installing in warmer ambient temperatures, pieces of rebar, chicken wire or lath may need to be placed in the previous casting prior to the set of the a new pour and allowed to protrude to accept bonding and tie of subsequent pours. See 5.4 Reinforcement for guidelines on pinning and tie-in of larger pours together using appropriate GFRP. Also acceptable is heavy scarification to no less than a visual standard ICRI/CSP-8. **Note:** It is recommended that the specific primer for the selected polymer concrete be applied to the interface of subsequent pours whenever four (4) hours or more have elapsed between lifts.

10.0 LAVACRETE GROUTING INSTALLATION

10.1 SERIES 470 LAVACRETE GROUTING*

*Not generally used for grouting.

- Work on grouting projects should conform to ACI 351.5-15 "Specification for Installation of Epoxy Grouting Between Foundations and Equipment Bases" published by the American Concrete Institute (ACI). Best practices and allowances are detailed, especially in Part 3-Execution.
- When grouting pump/motor/engine bases or rail settings, always use the "grouting" mix in lieu of the "casting" formula.
- The goal in vibration control and dampening is to have the grout create a solid connection from the equipment, through the baseplate to the foundation and finally into the soil: a tight and air-pocket-free fill is critical.
- Anchor bolts, leveling screws and forms should always be installed by experienced grout personnel.
- Polymer concretes are not used for "grouting" between tiles as the aggregate size is too large.

Typically, an API compliant or other baseplate or bedplate is set on top of a new or in good condition concrete foundation or pad. If the concrete is a new pour it must be adequately cured prior to beginning this work. If an existing foundation is to be used, check for chemical contamination, grease or oils and remove prior to mechanically cleaning the surface to accept Series 470.

To achieve a good bond of the polymer concrete to the concrete foundation, the surface should be chipped using a pneumatic or air driven chipping hammer to expose no less than 50% of the aggregate. This irregular surface should not have pockets or holes any deeper than the aggregate itself as these cavities can potentially hinder the flow of the grout and/or create air pockets. Additionally, the parameter of the concrete pad shall be chamfered down to provide a greater depth of the grout material along the edge of the pad. All chips and dust shall be blown clean with oil-free dry air and with the assistance of heavy bristle brushes.

10.2 LAVACRETE GROUTING FRAMEWORK

Forms should be constructed in accordance with ACI 301 "Specifications for Structural Concrete." In general, a framework form shall be created around the prepared concrete pad and tightly affixed to the outside parameter. This framework should be fabricated out of 3/4-inch (1.9 cm) plywood and/or 2x4 or 2x6 straight studs, and all gaps or cracks caulked or putty-filled to retain grout material. The interior sides shall be heavily waxed or petrolatum-based lubricated with thick paste to facilitate the release of the forms once the grout has set. In general, the top of this containment framework, should have a height level to the baseplate at the following corresponding levels:

- Engine frame plates: a minimum of 1 inch (2.5 cm) below the top of the plate
- Rail or soleplates: a minimum of 1/2 inch (1.27 cm) from the bottom of the plate.
- Skid "I" beams: over the flange and up the web a minimum 1/2 inch (1.27 cm).

Note: In order to fix a more accurate height of the grout containment frame, it is usually placed after the setting and leveling of the baseplates or rails.

10.3 LAVACRETE GROUTING BASEPLATE

The baseplate shall be prepared by abrasive blasting the internal side to SSPC-SP6 Commercial Blast or better. The exterior side of the plate should also be abrasive blasted to remove paint where the grout is specified to meet the metal.

Equipment alignment, leveling of plates including adjustment screws and anchor bolts and expansion joints are the responsibility of the owner's installer. The contractor should be familiar with best-practice procedures and have experience in these disciplines.

Leveling screws for the baseplate should have the bottom of the

screw resting on a leveling pad that underneath has had this small area filled with a quick setting leveling compound. Pad should have a 3-inch (7.6 cm) diameter and be glued to the prepared foundation substrate to offset twisting.

Anchor bolt jackets/sleeves placed in the concrete foundation shall protrude slightly above the foundation and receive expansion joint compound between the jacket and sleeve.

The anchor bolt sleeve to be surrounded by LavaCrete shall be protected from the grout by placing foam pipe insulation pieces (Armaflex or similar) of a matching size, diameter and length around the shaft. Spray-applied urethane foam may also be used.

It should be confirmed that appropriate vent holes have been removed prior to pouring grout.

10.4 LAVACRETE GROUTING APPLICATION

It will be necessary that some type of funneling or "headbox" be fabricated to assist in grouting application. Depending on the location and configuration of the foundation top to be grouted the box for concentrating the pour may need to be fairly large. For small baseplates with fill holes up to three (3) inches (7.6 cm) in diameter, many times a plastic traffic cone with a smooth interior and the tip cut off to allow flow is sufficient.

The head box or cone should always be at an elevation above the highest point of the pour. Material placed in the head box or funnel should never be allowed to fall below the highest point of the grout fill as air or pockets will be introduced when these gaps occur.

Uninterrupted filling of the head box/funnel to maintain hydraulic pressure or head pressure should be maintained for maximum flowability and push of the grout.

- Grout should enter through a singular inlet of the baseplate at one end and flow until it has reached an adjacent inlet. Move headbox or funnel to that inlet and continue grouting until complete.
- If grouting using a lance or hose, it should be inserted under the plate to the point furthest from extraction. The lance/hose shall be withdrawn as grout is pumped, keeping it embedded in the grout at all times.

The outer perimeter edges of the surface pour shall be relieved with a 45° chamfer strip.

LavaCrete should be poured from one side of the casting only; this helps to avoid air entrapment. It is important that there is venting available at the opposite end of the pour; this allows air to move out of the form as the polymer concrete is being poured.

If expansion joints are necessary, the following are guidelines:

- Expansion joints must be situated from the top of the grout to the bottom meeting the concrete base or pad.
- Expansion joints should be placed every 3-7 feet (1-2 m), isolate each grout plate or rail from each other and run the length of the pour.
- Pour grout into adjoining expansion joint areas once the previous expansion joint is at least 50% full of grout.
- They may be made from rigid Styrofoam or hard rubber or other non-oil absorbing material.
- An alternate method is to plastic wrap wood strips and pour the grout around them at the desired expansion joint locations. Once the LavaCrete has firmly set, these strips are removed and filled with an appropriate chemical-resistant flexible joint material.

11.0 CLEAN UP

It is recommended to clean mortar mixers after mixing approx. 15 large kits of LavaCrete to avoid acceleration or work time loss due to fresh materials being added to older catalyzed material. Actual field conditions and temperatures may necessitate more frequent cleaning or extend the number of mixes. Scheduled cleaning limits the inadvertent setting of materials on parts in the mixer that may fall into the polymer concrete, potentially affecting the applicator's work progress or ruining the mixer. Production stops of one (1) hour or more should have the mixing drum thoroughly cleaned before re-starting.

Cleaning is generally accomplished using solvents and scrub brushes on the mixer blade. Sand can also be added to help scour the internals as well as the empty LavaCrete Part C bags can be thrown into the mixing drum. MEK is the preferred cleaning solvent; however, abide by local VOC-regulations and plant site permissions for appropriate solvents.

12.0 HEALTH & SAFETY

LavaCrete is for industrial use only and must be installed by qualified coating and lining application specialists only. Paint products contain chemical ingredients which are considered hazardous. Read container label warning and Material Safety Data Sheet for important health and safety information prior to the use of this product. Keep out of the reach of children.

More detailed health and safety requirements for LavaCrete products are available in the Safety Data Sheet. Contact your local Tnemec representative for more information.