



Product System: KOSTER Negative side Waterproofing

DIVISION 07 – THERMAL AND MOISTURE PROTECTION
Crystalline Waterproofing and Curtain Wall Injection for Negative side Waterproofing
Section 07 16 16.0

PART 1 GENERAL

1.1 DESCRIPTION

- .1 Provide all labour, equipment and material to perform crystalline waterproofing and curtain wall injection at localized area of the LOCATION, as per the drawings and as directed by the consultant.

1.2 SUBMITTAL

- .1 For water-based low viscosity acrylic gel (curtain wall injection grouting):
 - .1 Submit two copies of manufacturer's literature for products furnished, including application instructions, appropriate Safety Data Sheets (SDS), and other safety requirements.
 - .2 Submit a letter attesting to the following:
 - .1 Workers that will perform work for this section have a minimum of 5 years' experience, successfully applying the materials specified in this section, or that workers have been properly trained, and will be supervised by someone who is properly trained and has necessary experience.
 - .2 Workers and supervisors have read and understand requirements described in the manufacturer's literature, and application instructions.
 - .3 Workers will have proper and adequate equipment, including a plural component pump, so as to be able to complete the work according to provisions of this section, and the manufacturer's instructions.
- .2 For cementitious crystalline waterproofing:
 - .1 Submit manufacturer's data sheets on each product to be used, including:
 - .1 Preparation instructions and recommendations
 - .2 Storage and handling requirements and recommendations.
 - .3 Installation methods.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 For water-based low viscosity acrylic gel (curtain wall injection grouting):



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- .1 Deliver materials to job site in sealed undamaged containers with labels intact and legible, indicating material name, date of manufacture and lot number.
- .2 Store material indoors or covered outdoors, at temperatures not below 40 F (>5°C).
- .2 For cementitious crystalline waterproofing:
 - .1 Deliver products to the job site in their original unopened containers, clearly labeled with the manufacturer's name and brand designation.
 - .2 Store products in an approved ventilated dry area; protect from contact with soil, dampness, freezing and direct sunlight.
 - .3 Handle products in a manner that will prevent breakage of containers and damage to products.
 - .4 Liquid should not be stored in areas with temperatures over than 90 F or below 40 F (+ 30 °C or below + 5 °C).

1.4 SITE CONDITIONS

- .1 Install material in accordance with safety and weather conditions required by the manufacturer.
- .2 For water-based low viscosity acrylic gel (curtain wall injection grouting):
 - .1 Curing conditions:
 - .1 Do not apply if the air temperature is lower than 40 F (5°C) or if temperatures are expected to drop below 40 F (5°C) within 24 hours of application; or higher than 120 F (49°C).
 - .2 Cure times are affected by water temperature. Lower temperatures and/or excess water can extend or prevent curing.
 - .3 For cementitious crystalline waterproofing:
 - .1 Curing conditions:
 - .1 Do not apply to unprotected surfaces in wet weather or to surfaces on which ice, frost or water is visible.
 - .2 Do not apply when the temperature is lower than 40 F (5 °C) or expected to fall below this temperature within 24 hours from time of application.
 - .3 Do not apply in rain, snow, fog or mist.
 - .2 Protect to prevent damage from active rain for a minimum period of 24 hours from time of application.

1.5 WARRANTY

- .1 The warranty shall cover the repair of any water leak through the injected areas as a result of faulty materials and/or workmanship for a period of five years from the date of substantial performance of the work. The Warranty does not include leakage



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from any change in the project conditions or new migration of water after work is complete. This is considered as part of the conditions that may occur and the application methods may need to be adjusted to adapt to the present conditions.

- .2 Extended warranties must be qualified by the manufacturer after reviewing the project details and conditions. The extended warranty application and project information must be submitted and approved by the manufacturer prior to the start of the work.
- .3 Warranty is a joint warranty together with the installation contractor. Whereas the manufacturer will supply material needed and the installation contractor will supply the labor for the repair

1.6 QUALIFICATIONS

- .1 For cementitious crystalline waterproofing:
 - .1 Manufacturer qualifications:
 - .1 Manufacturer shall have no less than five years experience in manufacturing crystallizing cementitious waterproofing systems. The system shall be specifically formulated and marketed for waterproofing. System design shall not have changed for a minimum of five consecutive years prior to start of the work.
 - .2 Installer qualifications:
 - .1 Applicator shall be approved by the manufacturer, experienced in surface preparation and application of the material and shall be subject to inspection and control by the manufacturer.
 - .2 Installer shall have no less than three years experience installing the specified waterproofing systems, or have been factory certified and trained in the KOSTER Training Program.

PART 2 PRODUCTS

2.1 REPAIR MATERIALS

- .1 Acceptable products for Curtain Wall Injection:
 - .1 Koster Gel G4 as manufactured by KOSTER American Corp.
 - .2 Koster Gel S4 as manufactured by KOSTER American Corp.
 - .3 Material selection per manufacturer recommendations for site conditions.
- .2 Acceptable products for Crystalline Waterproofing:
 - .1 Koster NB1 Grey as manufactured by KOSTER American Corp.
 - .2 Koster KD 2 System as manufactured by KOSTER American Corp.
 - .3 KOSTER Repair Mortar Plus as manufactured by KOSTER American Corp.



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- .4 Material selection per manufacturer recommendations for site conditions.
- .3 Acceptable products for penetrations, pipe, and recessed voids:
 - .1 KOSTER KB Flex as manufactured by KOSTER American Corp.
 - .2 Material selection per manufacturer recommendations for site conditions.

2.2 EQUIPMENT

- .1 For water-based low viscosity acrylic gel (curtain wall injection grouting):
 - .1 2-component injection pumps are required with a fixed mix ratio from 1:1 with an integral flush such as KOSTER Acrylic Gel Pump (supplied by KOSTER American Corp)
 - .2 Solvent and moisture resistant hose.
 - .3 Distributor Lances and Injection Superpackers (for curtain and area injection) usually 18mm x 300, 18mm x 550mm, 13 x 85 or 13 x 130 supplied by KOSTER American Corp.
 - .4 Hammer Drill, air powered or electric.
 - .5 Concrete drill bits various lengths and proper diameter to match injectors.
 - .6 Air compressor with compressor rating of 18 CFM @ 150 psi.

PART 3 EXECUTION

3.1 GENERAL

- .1 Waterproofing is to be placed and cured in accordance with the manufacturer's recommendations.

3.2 REVIEW OF WORK AREAS

- .1 For water-based low viscosity acrylic gel (curtain wall injection grouting):
 - .1 The Installation Contractor shall thoroughly review the entire surface of area to be acrylic gel injected to determine the applicability of gel materials in respect to thickness of wall or floor, existence of any foreign materials harmful to the application of the chemical gel used, inspection of soil grade, deterioration of concrete surface and existing cracks which shall be repaired and sealed prior to the application.
 - .2 If Installation Contractor finds any cracks/joints being too wide to receive an application of the gel material to be used, he shall submit to the Engineer a complete report regarding the locations, existing minimum and maximum thickness and length of cracks/joints. The Engineer and Manufacturer or Supplier shall verify the suitability of the material to be used in the cracks/joints and plan with the contractor for any adjustments with the repair methods required for the existing conditions of the cracks/joints prior to the application of the gel material.



- .2 For cementitious crystalline waterproofing:
 - .1 Do not begin installation until substrates have been properly prepared.
 - .2 If substrate preparation is the responsibility of another installer, notify consultant of unsatisfactory preparation before proceeding.

3.3 PREPARATORY WORK

- .1 Prior to proceeding with the repair work and in accordance with the work schedule, carry out the following:
 - .1 For water-based low viscosity acrylic gel (curtain wall injection grouting):
 - .1 Where any detrimental foreign materials exist, the Contractor shall follow the recommendations of the chemical gel material manufacturer in respect to the material and methods of cleaning or removing the foreign materials.
 - .2 Drill holes through the construction member to be sealed in a diamond grid pattern of maximum 24 inches (300mm) horizontally and vertically, every second row centrally offset, or in a consistent grid pattern where the second row is directly below first packer placed. The diameter of the boreholes shall be based on the packers chosen.
 - .3 Clean existing joints and seal using suitable means prior to injection. Drill holes along crack on alternating sides of the crack at a 45-degree angle to the surface at a maximum distance of 5 -7 inches (127mm - 177mm) from each other on each side.
 - .2 For cementitious crystalline waterproofing:
 - .1 Clean surfaces thoroughly prior to installation. All concrete surfaces must be solid, sound, and free of all laitance, oils, grease, curing agents, or other foreign materials.
 - .2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - .3 Clean surfaces to receive cementitious waterproofing, chip or abrasive blast to a CSP-3 (ICRI Guideline 3102R13) profile to remove defective materials and foreign matter such as paint, dirt, grease, curing agents, form release agents, and mineral salts.
 - .4 If concrete surface has been previously treated with other agents, notify manufacturer before proceeding.'
 - .5 Repair cracks, expansion joints, control joints, and open surface honeycombs.
 - .1 Use KOSTER SB Bonding Emulsion with manufacturer approved concrete repair materials. Comply with



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requirements listed in manufacturer's technical data information. No exceptions.

- .2 Moving joints and cracks are treated and detailed as expansion joints. Install all elastic sealant and corresponding primer in accordance with sealant manufacturer's instructions.
- .6 Honeycombed areas, cavities, recesses and chipped out areas where form ties have been cut or removed must be routed/bush hammered to sound base and repaired according to manufacturer's instructions and patched flush with KOSTER Repair Mortar Plus.
- .7 Construction joints: Construction joints should be thoroughly cleaned and dampened. Apply one slurry coat of KOSTER NB 1 Grey at the rate 220 sqft (.5lb/sqft for most application) After it has reached an initial set, dampen if dry and apply a second coat of the KOSTER NB 1 Grey at the same rate. Pour concrete while the second coat is still less than 6 hours old to assist in bonding and to form an uninterrupted membrane.
- .8 Piping preparation: Cut back around pipes at least 2.5 cm to give sufficient depth and clean thoroughly. Apply KOSTER KB Flex 200. Flush up the cavity with KOSTER KB-Fix 5.
- .9 Fillets and coves between horizontal and vertical areas: where fillets or coves are specified it is desirable that the cementitious waterproofing be applied behind the cove strip. Repair mortar should be used.

3.4 APPLICATION

- .1 Waterproofing is to be installed in accordance with manufacturer's instructions.
- .2 For water-based low viscosity acrylic gel (curtain wall injection grouting):
 - .1 Chemical gel shall be pumped and pressure injected in the lance or packers that have been inserted into pre-drilled holes. Use packers compatible with the gel material to be installed such as the KOSTER Injection Lance or KOSTER Superpacker depending on application.
 - .2 Allow the gel material sufficient time to flow into all lances or packers.
 - .3 Clean surfaces of excess chemical gel used by means recommended by the manufacturer. Lances or packers shall not extend beyond the plane of the surface of the existing concrete.
 - .4 The Contractor shall be responsible for performing test injections at a minimum of 3 selected locations to finalize material selections, injection procedures, and testing procedures prior to the start of work.
- .3 For cementitious crystalline waterproofing:



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.1 Mixing:

- .1 Based on different application conditions below, prepare a mixing liquid and mix the liquid with the KOSTER NB 1 Grey to a thick slurry consistency.
- .2 Mix using a slow speed mixer, adding the powder to the liquid in portions. Mix one 55 lb bag of KOSTER NB 1 Grey with one of the following: - 6.5 qt of water plus 2 qt of KOSTER SB Bonding Emulsion or, - 8.5 qt of water. The addition of KOSTER SB Bonding Emulsion to the mixing liquid increases the ability of the material to retain water and prevents premature drying of the coating in cases of unfavorable weather conditions. When used in contact with drinking water, do not add KOSTER SB Bonding Emulsion to the mix. This will negate the Drinking Water Certification.
- .3 Use KOSTER SB Bonding Emulsion in both coats of KOSTER NB 1 Grey when installing over CMU, masonry, brick, stone, or other porous cementitious substrates.

.2 Application - General:

- .1 Surfaces to be waterproofed with KOSTER NB 1 Grey must be sound, solid, and free of bonding inhibiting agents such as grease, oil, laitance, loose particles, dust, form release oil, or curing compounds. The substrate must be absorptive. Open up surface honeycombs to ensure an uninterrupted, even coating application.
- .2 Open static cracks wider than 1/32-in to a minimum of 1/2-in x 1/2-in and repair with KOSTER Repair Mortar at least 24 hours prior to application of KOSTER NB 1 Grey.
- .3 Active leaks must be stopped with necessary methods that applies to the conditions. Active water weeping down a wall can be stopped with KOSTER KD 2 for less severe or manageable application.
- .4 Application for crack, void or curtain wall injection methods may be necessary for severe conditions. All active leaks must be stopped and controlled before the application of KOSTER NB 1 Grey.
- .5 Dampen substrates with clean water making sure that no running or ponding water is present at time of application or prime the substrate with KOSTER Polysil TG 500 (Minimum 340 sqft/gal, in case of strongly absorbant substrates up to 160 sqft/gal.) before the application of KOSTER NB 1 Grey.
- .6 Apply the KOSTER NB 1 Grey with a cement brush in two coats or spray apply in two coats. Work in such a way as to leave no areas void and no pin holes. Back brush the first coat if spray applied. Cross brush the second coat in opposite directions to ensure uniform coverage.

.3 Application - Brush:



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- .1 Apply the KOSTER NB 1 Grey at a coverage rate of minimum .3 lb/sqft per coat (220 sqft per coat). Work in alternating coats from vertical to horizontal if brush applied on rough surfaces.
- .2 Allow the first coat to dry to the touch with no transfer of material or apply the second coat when first coat will not be mechanically damaged through the installation of the second. Wet the first coat with water prior to application of second coat, allowing excess water to run off first.
- .3 The KOSTER NB 1 Grey is self-curing. Do not apply any additional curing methods. Do not cover for 12 hours.
- .4 Application - Spray:
 - .1 Wet surfaces with clean water just prior to spraying or prime with KOSTER Polysil TG 500.
 - .2 Surface should be damp to the touch with no standing or running water.
 - .3 Use conventional spray machine suitable for spraying cementitious material, operating with air pressure between 70-80 psi, a 4-8 mm nozzle and 25 mm delivery hose.
 - .4 If the material is spray applied, two coats at a minimum rate of 220 sqft/ coat (.3 lb/sqft) total is required. The material can be spray applied using a 4 -8 mm nozzle, with total consumption of .5 lb/sqft.
 - .5 Work in alternating coats from vertical to horizontal if brush applied.
 - .6 Allow the first coat to dry to the touch with no transfer of material or apply second coat when first coat will not be mechanically damaged through the installation of the second. Wet the first coat with water prior to application of second coat, allowing excess water to run off first.
 - .7 KOSTER NB 1 Grey is self-curing. The coating must not be exposed to heat, frost, or strong wind during application and for at least 24 hours afterwards. Brush the material both vertically and horizontally to work into the substrate. Mist first coat with water to promote curing. Do not cover for 12 hours.

3.5 PROTECTION

- .1 For installed cementitious crystalline waterproofing:
 - .1 Protect cementitious waterproofing from contact with acid (below pH 7) and sulfates in concentrations exceeding limits for Portland Cement Type I/II.
 - .2 Touch-up, repair or replace damaged products before substantial completion.
 - .3 Do not apply the cementitious waterproofing at temperature below + 5 °C.



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- .4 Do not use curing compounds or water to bring mixture back to brushable consistency.
- .5 The treated area must be kept clear for at least 48 hours before backfilling or applying any concrete screed or other topping.
- .6 Unless broadcast and trowel application is used, the cementitious waterproofing is not designed to be a wearing surface. When waterproofing a horizontal surface that will be subjected to traffic the area must be covered by concrete, cement, tile or other protective screed after 48 hours.
- .7 Cured KOSTER NB 1 coating may be painted. Do not use lime-based paints. Any paint used must be breathable.
- .8 Protect the treated area from temperature below + 5 °C during application and for 24 hours after application.
- .9 Use potable water for mixing and cleaning.
- .10 All salt burdened substrate must be primed with KOSTER Polysil TG 500.

3.6 **CLEANING**

- .1 Upon satisfactory completion of the work, clean excess or waste materials and debris and leave the premises in a condition acceptable to the Consultant.

END OF SECTION 07 16 16.01