

# INSTALLATION GUIDELINE: Concrete Spall and Crack Repair

## **OVERVIEW:**

- Description
- Material and equipment requirements
- Surface preparation
- Application Instructions

## **DESCRIPTION:**

POLYQuik<sup>®</sup> FASTPATCH products are two-component polyurethane formulas designed to be installed over or alongside broken, spalled or otherwise damaged concrete. The product fills the defect and seals the surface to prevent further damage from water and debris infiltration, freeze-thaw cycles and chemical degradation. Compared to cementitious repair materials FASTPATCH has the advantages of 100% solids formulas (no solvents), wide service temperature range (-30 to 190°F), fast application and cure, excellent physical properties, adhesion, and excellent durability.

POLYQuik<sup>®</sup> FASTPATCH products are supplied in two-part cartridges, kits or bulk containers. The components are labeled "Iso" and "Resin" or "A" side and "B" side, respectively. Materials must be shipped and stored in dry conditions between 60-90°F (15-32°C). All handling recommendations detailed in the respective SDS should be followed.

Depending on the repair type, FASTPATCH and POLYQuik<sup>®</sup> products may be installed neat or filled with aggregate, which improves the rigidity of the repair and allows more economical repairs. The type and loading of aggregate varies depending on the product and the type of repair. The product line includes a large range of viscosities, cure speeds, and physical properties to fit many repair scenarios and contractor capabilities. Contact your WVCO representative for material selection, application and maintenance advice. Proper application is the responsibility of the user.

**MATERIAL AND EQUIPMENT REQUIREMENTS:**

The following materials and equipment are typically used during concrete repairs. Individual requirements will vary depending on the details of your application.

Materials:	FASTPATCH cartridge, kit or bulk material
	POLYQuik® primer (for applications requiring priming)
	Specified Aggregate (i.e. gravel), contact WVCO for more information. Aggregate may be provided with kit.
	Dry topping sand (optional, to provide sanded finish)
Equipment:	Cartridge applicator, 1:1 volume ratio, for 20 oz (600mL) cartridges. Battery-powered electric and pneumatic options available. Manual actuation not recommended.
	Compressor to provide air for blowing out joint at ≥120 psi and to provide 80 psi maximum for pneumatic cartridge applicators if necessary.
	Dry concrete saw
	Angle grinder with wheel suitable for concrete and/or steel
	Chipping hammer/chisel, electric or pneumatic
	“Egg beater” style mix blade
	Drill capable of mixing at ≥400 rpm
	Generator and extension cords
	Plastic containers (for primer mixing and test dispense)
	Putty knives or trowels
	Disposable brushes or rollers (for priming applications)
	Propane torch ‘weed burner’ style (occasionally used to dry repair areas)

**SURFACE PREPARATION:**

*NEW CONCRETE OR CONCRETE WITHOUT PREVIOUS REPAIRS*

1. The concrete should be structurally sound (200 psi or greater according to ASTM D7234), clean (ASTM D4258), and dry (less than 5%, ASTM E1907 or surface dry). FASTPATCH and POLYQuik® products can be applied to concrete newer than 28 days and in some cases as soon as 24 hours from when the concrete was poured. Contact your WVCO representative for more details.
2. Concrete surfaces must be sound, dry, clean, free of dirt, moisture, loose particles, oil, asphalt, tar, paint, wax, rust, waterproofing and curing/parting compounds, membranes and other foreign matter. Laitance and efflorescence must be removed prior to installation.
3. Clean concrete where necessary by grinding, abrasive blasting or hand tooling.
4. For crack repair use an angle grinder to create a V-groove along the entire length of the crack.

*OLD CONCRETE PREVIOUSLY REPAIRED*

1. Remove all previously applied repair material by saw cut. Priming is required if previous material is not completely removed by saw cut (see PRIMING section below).
2. If joint sides have absorbed oils etc., cut away sufficient concrete to ensure a clean, fresh surface.

*STEEL*

1. Steel surfaces must be cleaned before blasting according to SSPC-SP1. Remove any sharp edges and other surface imperfections.
2. Dry abrasive blast surface according to SSPC SP-6/NACE No. 3 Commercial Blast minimum.
3. Test the surface for non-visible soluble salt contamination according to NACE 6G186. If necessary treat with CHLOR\*RID or equivalent salt remover until less than 3ug/cm<sup>2</sup> is detected.
4. Priming is recommended. Prime steel according to WVCO guidelines.
5. Refer to primer technical data sheet for application and cure time information.

**APPLICATION INSTRUCTIONS:**

*MATERIAL SELECTION*

1. Choose the correct FASTPATCH product for your situation. Small to medium repairs can be addressed with cartridge or kit packaging. Large areas should use meter dispensed bulk materials.
2. Aggregate selection is just as important as repair material selection. Always use specified aggregates. Many FASTPATCH products are supplied with aggregate, or customers may opt to use their own supplier of approved aggregate. Contact WVCO for more information about aggregate qualification.
3. Crack repairs have special considerations, so select a product carefully. Not all FASTPATCH products are suitable for small crack filling. Contact WVCO for more information.
4. Installations on slopes greater than 9% require damming repair edges or using extra aggregate to give a slope-grade flow behavior. Contact WVCO for advice on handling slopes.
5. Repairs up to 3 inches (7.5 cm) depth can be done in a single stage. Deeper repairs require multiple lifts typically not more than 3-4 inches at a time.

*PRIMING*

1. Concrete priming is usually recommended for optimum adhesion and durability. Prime with POLYQUik® POLYPRIME or other WVCO primer. Contact WVCO for proper selection.
2. Before using FASTPATCH on a non-standard substrate or using non-WVCO primer, testing is recommended to verify performance. Contact WVCO for assistance in adhesion analysis.
3. For some applications with little dynamic movement, priming may not be required. While priming is typically recommended by manufacturers and industry associations, it is not always a requirement for low movement areas. The decision of where and when to use primer is the responsibility of the engineer and/or contractor.
4. Masking tape may be applied to adjacent surfaces before priming and removed after FASTPATCH placement to ensure a clean application.
5. Apply primer in a thin, uniform film (typically 1– 10 mils). Refer to the primer technical data sheet for application guidelines. Avoid excess film thickness and application of primer beyond joint faces.
6. Allow primer to cure according to guidelines in the technical data sheet before applying FASTPATCH. Overcoat application times will vary with primer selection and ambient temperature.

**METER DISPENSED**

*PROCESSING*

1. Use WVCO meter or equivalent at the correct ratio by volume. For metering applications contact WVCO Precision Technologies division for equipment recommendations.
2. Condition resin and iso to approximately 70°F (21°C) for 24 hours before using.
3. Mechanically mix resin for 30-60 minutes before use. Do not overmix as this could introduce excessive air. Use mix blades that are 1/3 the diameter of the container.
4. Test the meter operation by dispensing material for 15-30 seconds into a waste container before dispensing material. Use a 13-mm diameter mix tube with 32 elements or recommended equivalent

(contact WVCO for more information). Verify mixed product is uniform in appearance, and the material sets into a homogeneous finished product with no soft or tacky spots.

**APPLICATION**

1. When the repair area is primed and ready for repair, add the desired aggregate to the area. Fill the area within ¼ inch of grade. Repairs less than 2 inches deep may not require aggregate.
2. Dispense FASTPATCH into the repair area using a pressure that allows sufficient production speed and does not produce splashing when material hits the aggregate.
3. Application pressures and dispensing rates will vary with configuration. Pressures should not fall below 40 psi on WVCO meters. Shallow areas will require lower application pressures compared to deep areas.
4. Fill the repair from the bottom up by inserting the mixer tip into the aggregate to the bottom of the area, then flooding the aggregate until FASTPATCH rises just above the aggregate surface. Shift the mixer up and down, and back and forth in the aggregate, to work air out of the spaces between the aggregate. If necessary apply the next lift once the first pour has set to the point that aggregate no longer sinks into it. Fill the repair until it is flush with the surrounding grade. Avoid triggering the applicator on and off. In cases where slab elevations are different, fill to the lower slab height.
5. Topping sand can be applied until refusal while the surface is still tacky.
6. Stopping more than 30 seconds can clog mix tubes. Change mix tubes if dispensing stops for more than 30 seconds at 70°F (21°C). Elevated temperatures decrease mix tube life.
7. Periodically inspect applied material for uniformity and proper set. If inspected areas are non-uniform, change mix tube and perform another test dispense before resuming.

**KIT DISPENSED**

1. Kits supplied by WVCO come complete with premeasured “A” and “B” components, as well as aggregate. The packaging and type of aggregate vary by product. Contact WVCO for more information.
2. Condition kits to 70°F (21°C) for 24 hours before using.
3. Kit mixing may be done in the same pail used to ship the kit. Inspect the contents of the kit to ensure everything is included and nothing was damaged in transit. Use the entire kit at once. Do not try to use partial kits.
4. Add part “A” to the aggregate. Mix with a drill or mortar mixer equipped with a D-shaped (egg beater style) paddle blade at ≥400 rpm for 2 minutes.
5. Depending on the FASTPATCH product being used, ancillary additives may be used at this point. Extra pigment, catalyst “Kicker,” and/or second type of aggregate can be added.
6. Add part “B” and mix an additional 2 minutes. Scrape the sides and bottom of the pail during mixing to ensure good dispersion. Thorough mixing is critical to material performance.
7. Place the completed mix in the repair area immediately. Work the material into corners and level the surface with plastic putty knives. Screed the surface even with grade if necessary.
8. Topping sand can be applied until refusal while the surface is still tacky.

**CARTRIDGE DISPENSED**

**PROCESSING**

1. Condition cartridges to approximately 70°F (21°C) for 24 hours before using. Examine cartridges for signs of separation in storage before use. Shake cartridges if necessary.
2. Use a 13-mm diameter static mix tube with 32 elements or equivalent, with a pneumatic or battery-powered gun. Hand actuated dispensing guns are not recommended due to the increased chances of poor mixing. Contact WVCO for further instructions if hand actuated application is required.

**APPLICATION**

1. Add aggregate to the repair area if desired. Fill the area to within ¼" of grade. Repairs less than 2 inches deep may not require aggregate. For crack repair the crack may be filled with neat repair material, filled with sand and then flooded with material, or premixed with sand and troweled in place.
2. Use a 1-to-1 volume ratio dispenser (normally 30-50 psi ram pressure for pneumatic, not to exceed 80 psi) and ensure that the dispenser is the correct size for the cartridge. Pneumatic and battery-powered dispensers are available through WVCO.
3. Remove the retaining nut and caps from the cartridge.
4. Keep the cartridge upright during assembly.
5. Check alignment of plungers inside cartridge; adjust if necessary.
6. Place mix tube on cartridge nozzle and hand tighten the retaining nut over the mix-tube.
7. Keep cartridge upright and load into applicator gun.
8. Begin dispensing with cartridge upright to remove any trapped air.
9. Dispense initial material (20-40mL) outside the repair area.
10. Change mix tubes if dispensing stops more than 30 seconds. Elevated temperatures decrease mix tube life.
11. Fill the repair from the bottom up by inserting the mixer tip into the aggregate to the bottom of the area, then flooding the aggregate until FASTPATCH rises just above the aggregate surface. Shift the mixer up and down, and back and forth in the aggregate, to work air out of the spaces between the aggregate. If necessary apply the next lift once the first pour has set to the point that aggregate no longer sinks into it. Fill the repair until it is flush with the surrounding grade. Avoid triggering the applicator on and off. In cases where slab elevations are different, fill to the lower slab height.
12. Cracks may develop holes or gaps after application. This indicates that the crack has a wide or deep spot which the repair material could not fill. Use sand topped with added repair material, or premixed material with sand, to fill the gaps.
13. Topping sand can be applied until refusal while the surface is still tacky.