

INSTALLATION GUIDELINE: Bridge Header and Joint Repair

OVERVIEW:

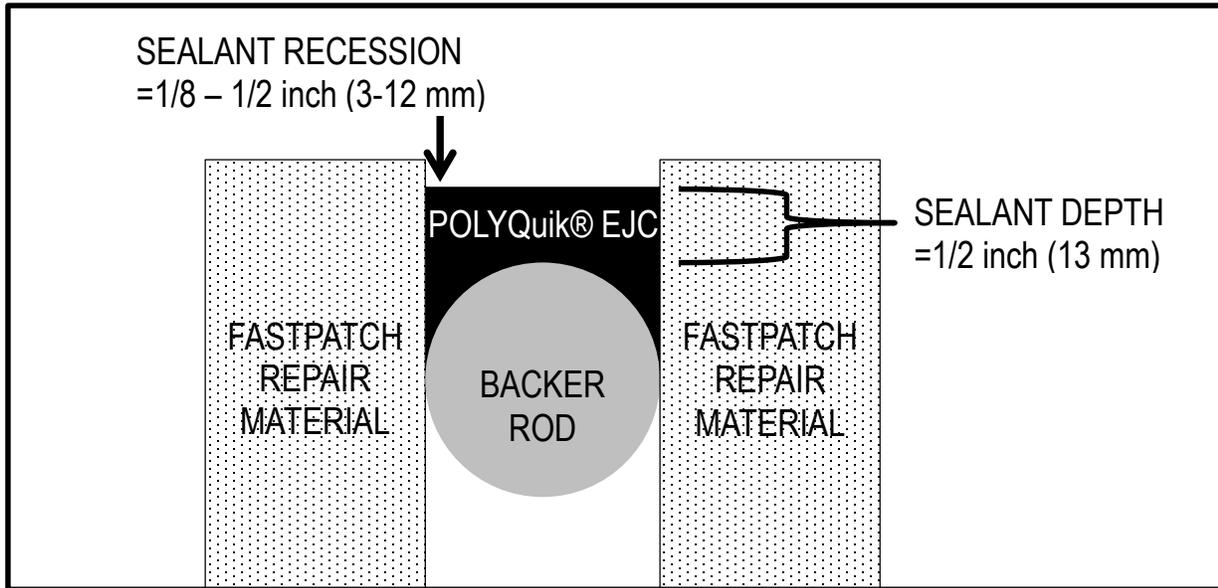
- Description
- Typical Header and Joint Design
- Material and equipment requirements
- Surface preparation
- Header Repair Application Instructions
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DESCRIPTION:

Several FASTPATCH products have been designed with the excellent toughness and rigidity for the demanding requirements of bridge headers. When standard cementitious material fails to provide the resilience required of bridge headers and transitions, FASTPATCH repairs damaged areas and provides the toughness needed for a long lasting repair. When combined with one of several POLYQuik® expansion joint compounds (EJC), FASTPATCH materials proved an outstanding and durable system. The header will be protected from failure due to impact, compression and abrasion. The joint will be sealed 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, great adhesion, and excellent durability.

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.

TYPICAL HEADER AND JOINT DESIGN:



FASTPATCH repair materials may be used to repair one or both sides of the bridge header. When POLYQuik® sealants are used for the expansion joint adjacent to FASTPATCH headers as part of the same header repair project, priming is generally not required because POLYQuik® sealants have excellent adhesion to FASTPATCH repair products. Headers typically have an expansion joint at the center of the header for the entire length. Be sure to provide some forming, typically via foam form board, to honor the joint during FASTPATCH application. Wrap the form board with plastic to allow for easy removal. Some foam form boards are difficult to remove if not wrapped. Do not use release agents on the form board as residual release agents will prevent adhesion of the FASTPATCH to joint sealant.

POLYQuik® EJs should be installed slightly recessed, 1/8 to 1/2 inch (3-13 mm) below grade. They do not require tooling, but can be shaved if desired. Sealant depth at the center point should be 1/2" (13 mm) for the entire length of the joint. Various backer rod tools, usually constructed of expanded polystyrene (EPS), are used to ensure proper depth. Backer rod should be closed cell and 25% larger than the joint width as a general rule. Backer rod should be installed at a consistent depth, and should fit snugly in the joint to prevent sealant from leaking. POLYQuik® EJs are not recommended for joints wider than 2 inches.

MATERIAL AND EQUIPMENT REQUIREMENTS:

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

Materials:	FASTPATCH cartridge, kit or bulk material
	POLYQuik [®] primer (for concrete repair applications requiring priming)
	POLYQuik [®] Expansion Joint Compound (various products available)
	Specified Aggregate (i.e. gravel), contact WVCO for more information. Aggregate may be provided with kit.
	Dry topping sand (optional, to provide sanded finish)
	Backer rod, closed cell, 25% larger diameter than joint width
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)
	Painter’s tape
	Form board to honor the expansion joint at the center of the header repair (see design figure). Boards are typically wrapped with plastic to allow for easy removal.

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.

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 header repair 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/cm² is detected.
4. If priming is required, prime steel according to WVCO guidelines.
5. Refer to primer technical data sheet for application and cure time information.

HEADER REPAIR APPLICATION INSTRUCTIONS:

MATERIAL SELECTION

1. Choose the correct FASTPATCH product for your situation. Various products and packaging are available to meet the specific needs of your application.
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. 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.
4. 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 around the header repair 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. Priming is typically not required if the header joint is sealed with POLYQuik® sealants adjacent to FASTPATCH repair materials. Provided the FASTPATCH surface is clean and has not been cured for longer than 12 hours, unprimed adhesion to FASTPATCH with POLYQuik® sealants is excellent.
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.

FASTPATCH 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. Be sure to provide some forming to honor the joint. Headers typically have an expansion joint at the center of the header for the entire length. Wrap the form board with plastic to allow for easy removal. Some foam form boards are difficult to remove if not wrapped. Do not use release agents on the form board, since residual release agents will prevent adhesion of the joint sealant.

METER DISPENSED

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.
5. Dispense FASTPATCH into the repair area using a pressure that allows sufficient production speed and does not produce splashing when material hits the aggregate.
6. 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.
7. 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.
8. Topping sand can be applied until refusal while the surface is still tacky.
9. 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.
10. 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.
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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.
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.
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. Topping sand can be applied until refusal while the surface is still tacky.

JOINT SEALANT APPLICATION INSTRUCTIONS:

JOINT DESIGN

1. Choose the correct EJC product for your situation. For instance use EJC-25 only in joints where shrinkage and movement will be less than or equal to +/-25%. If an expansion joint was expected to move +100% / -50%, POLYQuik® EJC-100 would be the appropriate sealant.
2. EJC is not recommended for joints wider than 2" (50 mm). Wider joint installations may be possible in some circumstances. Contact WVCO for more information.
3. Joints filled with EJC should be designed and prepared according to ACI and industry standards. To ensure joint compound performs as expected, sealant depth should be ½ the width as a general rule. WVCO recommends a sealant depth of 1/2" (13mm) for all expansion joint repairs.
4. Self-leveling EJC should not be used on slopes greater than 9%. Slope grade products are available.
5. Backer rods should be used according to ACI guidelines in all expansion joints.

PRIMING

1. Priming is not required for header repair scenarios where FASTPATCH products have been used to repair the header surfaces adjacent to the joint.
2. If more than 12 hours have passed since the FASTPATCH header repair was placed, abrade the surface and wipe with acetone. Apply EJC within one hour of cleaning.

METER DISPENSED

PROCESSING

1. Use WVCO meter or equivalent at a 1 to 1 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 production material. Use a 13-mm diameter mix tube with 32 elements or recommended equivalent (contact WVCO for more information). Verify mixed EJC product is uniform in appearance, and the material sets into a homogeneous finished product.

APPLICATION

1. Dispense EJC into the jointing area using a pressure that allows sufficient production speed and does not produce splashing when material hits the backer rod.
2. Application pressures and dispensing rates will vary with joint configuration. Pressures should not fall below 40 psi on WVCO meters. Shallow joints will require lower application pressures compared to deep joints.
3. Fill the joint from the bottom up in one pass and avoid overfilling (typically expansion joints are recessed). Avoid triggering the applicator on and off. In cases where slab elevations are different, fill according to the lower slab height.
4. Topping sand can be applied until refusal while the surface is still tacky.
5. 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.
6. Periodically inspect applied jointing material for uniformity and proper set. If inspected areas are non-uniform, change mix tube and perform another test dispense before resuming.

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PROCESSING

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APPLICATION

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