

Proposal

Repairing major leaks in concrete, to initially stop the water flow and then make good the substrate.

Solution of this problem is a 3 or 4 stage process, and is appropriate for situations where water flow is continuous. For minor leaks or seepage through cracks, please refer to Method Statement for minor cracks.

Renderoc Plug, used in Part A, will provide an immediate, temporary plug, at the surface, by stemming the flow of water. This then allows further repair works to be completed in dry conditions.

Nitofill WS60 and Nitofill UR63, used in Parts B and C, are used to complete the sealing operation by filling voids beneath the surface, and thereby effect a permanent repair.

Reprofiling works, as per Part D, may finally be required to coordinate with the adjacent substrate and thus complete the repair.

Part A - Temporary plug

Fill using Renderoc Plug rapid setting repair mortar

1 Preparation

- 1.1 Where water is seeping through a concrete wall, cut back the areas to be repaired to a minimum depth of 15 mm. Where water is seen seeping through a crack, cut a chase 20 mm deep and 20 mm wide along the entire length of the crack.
- 1.2 Remove all surface deposits by mechanical wire brushing to leave the substrate free from any deleterious substances or contaminated water.
- 1.3 Flush area to be repaired with clean water.

2 Mixing

- 2.1 Since Renderoc Plug sets in less than a minute, mix only that quantity of material which can be placed within the setting time.
- 2.2 Take a quantity of Renderoc Plug and place on a suitable mixing board. Create a reservoir in the centre of the material.

- 2.3 Add clean water to the reservoir at a volume ratio of 1:3. Using gloved hands, mix the Renderoc Plug and water together until a ball has been produced.

3 Application

- 3.1 **Immediately** after the ball has been formed press the material into the prepared location.
- 3.2 Continue applying pressure until the material has hardened (approximately 30 seconds).
- 3.3 Continue with the above process until the concrete or crack has been completely sealed.

Part B - Temporary seal

Injection using Nitofill WS60 rapid foaming and setting resin.

1 Preparation

- 1.1 Wire brush the surface of the substrate immediately adjacent to the perimeter of the initial application of Renderoc Plug. Remove all loose deposits, debris and other deleterious substances.
- 1.2 Holes need to be drilled diagonally into the repair area, from the adjacent substrate, to receive the injection packers.
- 1.3 Mark out drill points at 150 to 200 mm centres around the perimeter of the repair area. Where the repair is being applied to a crack, drill points should be staggered either side of the crack.
- 1.4 Drill into the substrate, being sure to penetrate at least 15 mm beneath the initial application of Renderoc Plug, using a drill bit appropriate to the size of the injection packers.

Note

The resin systems featured in this method statement may also be injected directly (without the use of packers or nipples) via a long nozzle, injection probe. This has been omitted purely in the interests of clarity. All other parts of the method statement remain the same.

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2 Fixing injection packers

- 2.1 Insert the injection packers into the pre-drilled holes.
- 2.2 The perimeter of the repair area or crack between the injection packers should be sealed using Nitomortar FC. This should be applied as a band 30 to 40 mm wide and 2 to 3 mm thick, either around the perimeter of the repair or along the length of the crack.
- 2.3 Leave the sealer coat of Nitomortar FC to cure properly - 8 hours at 35°C.

3 Mixing

- 3.1 Mix the two components of Nitofill WS60 rapid foaming polyurethane resin together until homogeneous.
- 3.2 Insert the mixed material into the injection gun and close all seals.
- 3.3 The repair should be filled in a single, continuous operation. Sufficient material and manpower should therefore be available prior to commencement of work.

4 Application

- 4.1 Attach the injection hose to the lowest packer on vertical cracks, or to either end of horizontal cracks.

Where applying around the perimeter of a horizontal repair; attach the hose on opposite sides, then progress around the perimeter in a clockwise direction from both points.

Where applying around the perimeter of a vertical repair; attach the hose to the lowest packer, then progress around the perimeter on alternate sides.

- 4.2 Attach injection gun hose to the packer and slowly apply pressure by gently squeezing the gun trigger.
- 4.3 Continue applying pressure until resin appears at the next packer location.
- 4.4 Remove pressure from the injection gun,

close valve and crimp. Move on to the next location.

- 4.5 Continue as above at all injection points until water no longer seeps from the crack or repair area.
- 4.6 Allow the resin to cure for 6 hours.
- 4.7 When the Engineer is satisfied that water no longer seeps from the repair, proceed to Part C to create a permanent seal to the repair.

Part C - Permanent seal

Injection using Nitofill UR63 flexible polyurethane resin

1 Preparation

- 1.1 Wire brush the surface of the substrate immediately adjacent to the perimeter of the repaired area or crack. Remove all loose deposits, debris and other deleterious substances.
- 1.2 Using a marker pen, locate new drill positions midway between the points used in Part B.
- 1.3 Drill into the substrate, being sure to penetrate at least 15 mm beneath the initial application of Renderoc Plug, using a drill bit appropriate to the size of the injection packers.

2 Fixing injection packers

- 2.1 Insert the injection packers into the pre-drilled holes.
- 2.2 The perimeter of the repair area or crack between the packers shall remain sealed with a band of Nitomortar FC. Re-apply as required to maintain a band 30 to 40 mm wide and 2 to 3 mm thick.
- 2.3 If re-applied, leave the Nitomortar FC to cure properly - 8 hours at 35°C.

Note

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section for high temperature working.

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Mixing

- 3.1 Mix the two components of Nitofill UR63 together until the liquid becomes clear.
- 3.2 Insert the mixed material into the injection gun and close all seals.
- 3.3 The repair should be filled in a single, continuous operation. Sufficient material and manpower should therefore be available prior to commencement of work.

4 Application

- 4.1 Attach the injection hose to the lowest packer on vertical cracks, or to either end of horizontal cracks.

Where applying around the perimeter of a horizontal repair; attach the hose on opposite sides, then progress around the perimeter in a clockwise direction from both points.

Where applying around the perimeter of a vertical repair; attach the hose to the lowest packer, then progress around the perimeter on alternate sides.

- 4.2 Attach injection gun hose to the packer and slowly apply pressure by gently squeezing the gun trigger.
- 4.3 Continue applying pressure until resin appears at the next packer location.
- 4.4 Remove pressure from the injection gun, close valve and crimp injection packer. Move on to the next location.
- 4.5 Continue as above at all injection points until all packer locations have been sealed.
- 4.6 When the engineer is satisfied that the crack has been sealed sufficiently, finish operation and allow to cure for 6 hours.
- 4.7 Remove all Nitomortar FC and packers from the concrete and make good by suitable means.

Note

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section for high temperature working.

Part D - Reprofiling

Where repairs have been effected over a large area, it may be necessary to reprofile the repaired area in order to coincide with the adjacent substrate.

Refer to the most appropriate method statement depending upon the required configuration and depth of the repair.