Method Statement

Ref. #: DCP00/04-0074-A-2022

Quickmast 1K Flex

(One component, flexible, polyurethane foaming injection resin for watertight sealing of cracks)

Table of Content

Section A: General Comments

General Notes:

The information below is a detailed overview of the application of DCP's **Quickmast 1K Flex** injection system and should be read in conjunction with the relevant technical data sheet prior to application. All DCP Products should be applied by experienced specialist contractors.

All the points below assume correct preparation of the relevant surface.

High-Temperature Working:

It is suggested that, for temperatures above 35°C, the following guidelines are adopted as good working practice:

i. Unmixed materials and equipment should be stored in a shaded area and away from direct sunlight.
ii. Avoid application during the peak temperature of the day.
iii. Plan for enough materials, tools and labour to ensure continuous applicant process.

Low-Temperature Working:

It is suggested that, for temperatures below 10°C, the following guidelines are adopted as good working practice:

i. Unmixed materials should be stored at room temperature.
ii. Cold temperature will affect the properties of the material.
iii. Avoid applying the product if the temperature is around 5°C and falling.

System Products:

Injection resin: **Quickmast 1K Flex.**

Epoxy mortar for patching the packers' area: **Quickmast 341C.**

Tools and Equipment:

It is suggested that the following list of equipment are adopted as a minimum requirement

Personal protection	:	*Protective overalls*
	:	*Goggles or a face mask*
	:	*Good quality gloves*
	:	*Safety shoes*
	:	*Safety helmet*
Equipment	:	*Slow speed heavy duty mixing drill and mixing paddle (Fig.1)*
	:	*Rotary hammer drill with suitable bits (Fig.2)*
	:	*Mechanical injection packers (Fig.3)*
	:	*Injection pump (Fig.4)*
	:	*Stiff wire brush (Fig.5)*
	:	*Chisel and hammer (Fig.6)*
	:	*Wrench spanner (Fig.7)*

Fig.1: Slow speed heavy duty mixing drill and Mixing paddle

Fig.2: Rotary hammer drill with suitable bits

Fig.3: Injection pump

Fig.4: Mechanical Injection Packers

Fig.5: Stiff wire brush

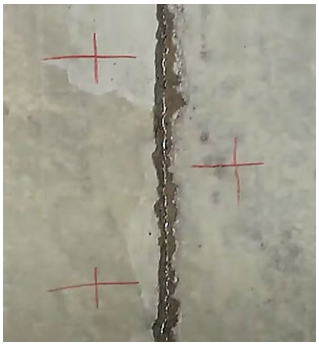
Fig.6: Chisel and hammer

Fig.7: Wrench spanner

Section B: Application

1.0 Substrate Preparation

- The surface of the cracks should be cleaned from dust, oil, plaster, grease, curing compound, corrosion deposits, or any other contaminants that could impair the adhesion of the injection ports.
- Cleaning will help allocate the exact crack location and the width, this is usually done with water and brush.

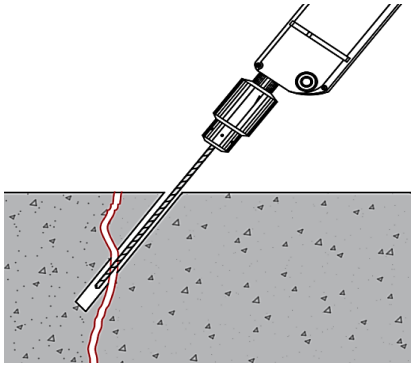


- Check the coherence of the concrete substrate in advance to confirm its ability to withstand the injection pressure.
- Remove all items that can conceal the crack so the crack can be clearly seen and the drilling patterns for the injection holes can be determined.
- Break out the crack area to remove all segregated concrete. Continue breaking out until a sound homogeneous substrate has been reached.
- Use a wire brush to physically remove mineral deposits and dirt and clean with water.

2.0 Injection Holes Drilling and Fixing

- Using a high quality rotary hammer drill, holes should be drilled to install the mechanical injection packers.
- Depending on the packer diameter, a suitable drill pit shall be used; generally, 13 - 16 mm diameter and 70 - 115 mm long packers are used for this purpose.
- As a general rule:

  Diameter of the drill hole = Diameter of the packer + 1 - 2 mm
- Try to allocate steel reinforcement bars and conduits before drilling.
- The angle of drilling should be 45^{o} or less to the surface and toward the crack, and the depth of the drill holes should be close to the middle of structures as much as possible.



- Make sure that you really “cut” the crack.
- Holes should always be staggered from one side of the cracks to the other.
- Spacing between drilled holes usually varies according to the width of the cracks and the cross section thickness of the element (typically equals the width of the section). In general, the wider the cracks, the further apart are drill holes.
- After drilling the injection holes, all cracks should be cleaned with compressed air.

- Determine the type and dimensions of the packers according to the pump type, substrate thickness, and injection type. For more information, consult DCP Technical Department.

- Fix and tighten the mechanical packers so that they can withstand the maximum injection pressure.
- Remove the nipples in order to check the flow of water and injection resin later on.
- Place the packers in the drilled holes so that top of the rubber sleeve is below the concrete surface, then tighten them with the wrench as much as you can.

3.0 Application

3.1 Prior to usage, shake the **Quickmast 1K Flex** resin thoroughly to obtain a homogeneous material.

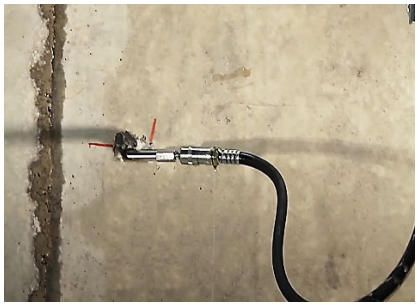
3.2 Load **Quickmast 1K Flex** resin and charge the pump, hose and gun.

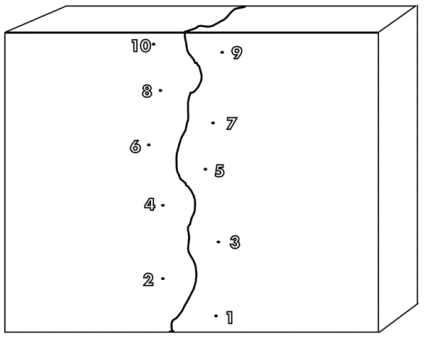
Wet Structure:

- Single component, high pressure pump should be used with PU system injectable materials since PU materials are moisture sensitive and will thicken rapidly.
- Inject **Quickmast 1K Flex** resin continuously into the crack. The resin will react with the water in the structure and will foam.
- Start the injection from the lowest point or furthest point towards the centre checking for resin coming out of the next injection hole along.
- Inject at the point of the highest resistance to ensure a good penetration and minimal loss of materials.

Dry Structure:

- Inject **Quickmast 1K Flex** resin and water continuously into the crack using a 2-component, high pressure injection pump.
- **Quickmast 1K Flex** resin and the water are inserted separately in the pump but are mixed homogeneously in a volume ratio of 1:1 in the mixing head of the pump before being injected through the pump nozzle.
- Alternatively, pre-inject the crack well with clean water, and apply **Quickmast 1K Flex** resin using a one-component injection pump.





3.3 The injection is usually started at the lowest point on the vertical crack or at the narrowest area of the horizontal crack.

3.4 **Quickmast 1K Flex** will react fast enough with water and expand rapidly to close these cracks, and the cured **Quickmast 1K Flex** will heal the crack.

3.5 If a pressure gauge is available, the pressure should be monitored and kept in a range that is just enough to allow a good flow of material.

3.6 Start injection with the lowest possible pressure. The injection pressure varies depending on the structure and size of the crack, Increase the pressure until resin begins to flow.

3.7 The injection process will continue until the injected **Quickmast 1K Flex** foam travels to the next packer(s). This is necessary to achieve an even material distribution.

3.8 Stop pumping, disconnect and move to the next packer as quickly as possible, continue this procedure until the crack is completely filled.

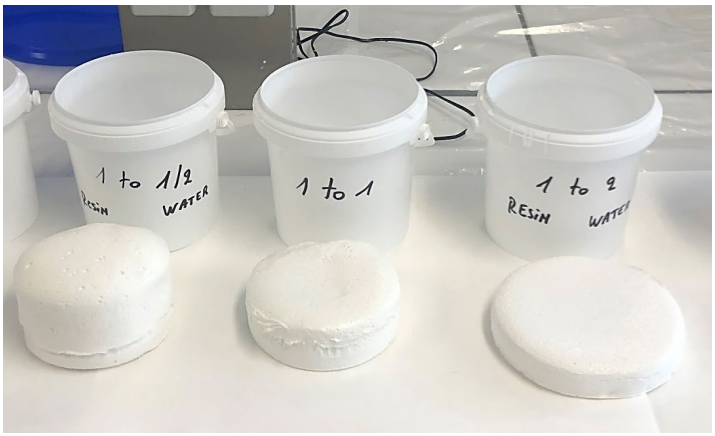
3.9 Packers must be removed after the material is cured, and holes should be patched with appropriate epoxy mortar such as **Quickmast 341C**.

3.10 Resin must be cleaned up immediately before it sets.

3.11 Allow a few days for the injection resin to cure.

Notes:

- *For injection into dry cracks, 1:1 dilution ratio with water is recommended, However, other dilution rates can be used.*
- *The foaming of **Quickmast 1K Flex** is highly dependent on the amount of water available to react with the resin, the higher the volumes of water available, the lower the volume of foam, and the denser the end result.*



Resin : Water	1 : 0.5	1 : 1	1 : 2

4.0 Cleaning

4.1 All tools and pumps should be cleaned immediately.

4.2 Clean and flush the pump equipment with acetone or Methyl Ethyl Ketone solvent (MEK) every time there is a stop of more than 15 minutes.

4.3 At the end of the injection, flush with a sufficient amount of acetone or Methyl Ethyl Ketone solvent (MEK), make sure that the pump is well cleaned.

5.0 Remarks

5.1 **Quickmast 1K Flex** is ideally used for cracks of 0.4 mm minimum width.

5.2 **Quickmast 1K Flex** can only be injected in moisture-containing areas.

5.3 Verify that the pump and equipment are clean and that no residues from previous injection works are left.

5.4 The reaction time depends on the temperature of the material, the substrate, and the amount of water present. Higher temperatures will speed up the reaction time and lower temperatures will slow it down.

5.5 **Quickmast 1K Flex** is ideally used for cases of high volumes of water and low water pressure.

5.6 Where water is gushing out of the crack with high flow rates and pressure, the use of 2 component injection systems is recommended **(Quickmast 110 and Quickmast 120)**.

Section C: Cautions

Health and safety

Quickmast 1K Flex should not come into contact with skin and eyes. However, any accidental splashes to the eyes must be rinsed with clean water and seek medical advice.

Fire:

Quickmast 1K Flex is nonflammable.

Quickmast 341C is nonflammable.

For further information on refer to the Material Safety Data Sheet.

Section D : Approval and Variations

This method statement is offered by DCP as a 'standard proposal' for the application of **Quickmast 1K Flex**. It remains the responsibility of the Engineer to determine the correct method for any given application. Where alternative methods are to be used, these must be submitted to DCP for approval, in writing, prior to commencement of any work. DCP will not accept responsibility or liability for variations to the above method statement under any other condition.