

Method Statement for of BC 237 Polyurea System for Underground Shaft

1. Project Description

This method statement covers the surface preparation, repair, waterproofing, and application of hot spray polyurea lining to underground concrete shafts using the following Building Chemistry Industry (BCI) products:

Layer	Product	Thickness
Cementitious Repair Mortar	BC Repair 100	As per requirement
Micro Concrete Grout	BC Cemtec Grout Xtra	As per requirement
Bonding Agent	BC PVA Bond	As per requirement
Epoxy Putty	BC Poxy Putty 2000	As per requirement
Epoxy Primer	BC Poxy Primer 349	200-300μ
Polyurea Membrane	BC 237 Polyurea	1.5 mm-2 mm

2. Scope of Work

The work includes:

Inspection of concrete shaft surfaces.
Repair of honeycombs, voids, cracks, and damaged concrete.
Surface leveling and preparation.
Application of epoxy primer.
Application of hot spray polyurea membrane.
Final inspection and testing.

3. Materials

Repair Materials

BC Repair 100



High-strength polymer modified repair mortar for patch repairs and surface rectification.

BC Cemtec Grout Xtra

Non-shrink micro concrete for large voids and deep repairs.

BC PVA Bond

Polymer bonding agent for enhancing adhesion between old and new concrete.

BC Poxy Putty 2000

Two-component epoxy putty for pinhole filling and surface profiling.

Waterproofing Materials

BC Poxy Primer 349

Two-component epoxy primer for concrete substrate preparation.

BC 237 Polyurea

Fast curing, 100% solids hot spray elastomeric waterproof membrane.

4. Equipment Required

Surface Preparation

Chipping hammer
Grinder
Needle scaler
Wire brush
Industrial vacuum cleaner
Air compressor

Polyurea Application

Plural component spray machine
Heated hoses
Transfer pumps
Spray gun
Generator
Wet film thickness gauge
DFT meter



Safety Equipment

Full body harness
Gas detector
Forced ventilation system
Respirator
Safety helmet
Safety goggles
Safety gloves
Safety boots

5. Surface Preparation

5.1 Initial Inspection

Inspect the shaft for:

Honeycombs
Segregation
Blowholes
Voids
Cracks
Water seepage
Unsound concrete

All defective concrete shall be marked.

5.2 Removal of Unsound Concrete

Remove all loose and damaged concrete by mechanical means.

The substrate shall be:

Structurally sound
Clean
Dry
Free from laitance
Free from oil, grease and contaminants



5.3 Crack Treatment

Static Cracks

Open cracks into V-groove profile.

Apply:

1. BC PVA Bond
2. Fill using BC Repair 100

Wider Cracks and Voids

For repairs exceeding 25 mm depth:

1. Apply BC PVA Bond slurry.
2. Place BC Cemtec Grout Xtra.
3. Compact properly.
4. Cure as per manufacturer recommendations.

6. Repair of Honeycombs and Surface Defects

Shallow Defects (up to 25 mm)

Apply:

- BC PVA Bond
- BC Repair 100

Finish flush with surrounding concrete.

Deep Defects (>25 mm)

Apply:

- BC PVA Bond
- BC Cemtec Grout Xtra

Allow curing before proceeding.

7. Surface Levelling

After repairs have cured:

- Grind all projections.



- Remove sharp edges.
- Produce smooth and continuous surface.

Maximum surface irregularity:

≤ 2 mm under 2 m straight edge.

8. Surface Moisture Requirement

Before priming:

Concrete moisture content shall be:

≤ 5%

No standing water shall be present.

9. Epoxy Putty Application

Apply BC Poxy Putty 2000 to:

- Blowholes
- Pinholes
- Surface imperfections
- Construction joints

Finish smooth.

Allow curing.

10. Epoxy Primer Application

Product

BC Poxy Primer 349

Mixing

Mix Component A and Component B using low-speed mixer.

Mixing time:

3–5 minutes

Application



Apply by:

- Roller
- Brush
- Airless spray

Coverage:

Approximately 0.25 – 0.40 kg/m²

Primer shall fully wet the substrate.

Inspection

Check for:

- Uniform film
- No pinholes
- No missed areas

Allow primer to become tack-free before polyurea application.

11. Hot Spray Polyurea Application

Product

BC 237 Polyurea

Equipment Settings

Parameter	Requirement
Material Temperature	65–75°C
Hose Temperature	65–75°C
Spray Pressure	180–220 bar
Mixing Ratio	1:1 Volume
Spray Distance	500–800 mm

Actual settings shall be adjusted according to site conditions.

Application Procedure

Apply BC 237 Polyurea using plural component hot spray equipment.



Spray shall be performed in multiple passes.

Ensure:

- Continuous membrane formation
- No pinholes
- No overspray defects
- Uniform thickness

Minimum Dry Film Thickness

Underground Shaft Waterproofing

Area	Thickness
Vertical Surfaces	2.0 mm minimum
Critical Areas	2.5 mm minimum
Water Pressure Zones	3.0 mm recommended

Overlap Treatment

Overlap adjacent spray areas by minimum:

100 mm

Ensure seamless integration.

12. Detailing Works

Special attention shall be given to:

- Pipe penetrations
- Construction joints
- Wall-floor junctions
- Lift hooks
- Tie rod holes
- Penetrations

Detail these areas before full membrane application.

13. Quality Control



Before Application

Check:

- Concrete strength ≥ 25 MPa
- Surface soundness
- Moisture content
- Repair completion

During Application

Check:

- Temperature
- Pressure
- Material ratio
- Spray pattern
- Thickness

After Application

Inspect for:

- Pinholes
- Blisters
- Holidays
- Delamination
- Mechanical damage

14. Testing

15. Repair of Defects

Defective areas shall be:

1. Abraded.
2. Cleaned.
3. Re-primed if required.
4. Re-sprayed with BC 237 Polyurea.



16. Safety Requirements

Confined Space Entry

Underground shaft shall be treated as confined space.

Mandatory:

- Entry permit
- Gas monitoring
- Continuous ventilation
- Rescue plan
- Trained standby personnel
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PPE

- Respiratory protection
- Chemical resistant gloves
- Safety goggles
- Coveralls
- Full body harness

17. Completion Criteria

The system shall be accepted when:

- All repairs are completed.
- Surface is fully waterproofed.
- Required thickness is achieved.
- Adhesion requirements are met.
- Holiday testing is passed.
- No visible defects exist.

