Building Chemistry Industry , Dammam, Kingdom of Saudi Arabia

Method statement for repair and rehabilitation with BC 237 Poly urea water proofing and Anti carbonation coating systems

System Guide

BC Repair 100 , Concrete repair mortar
BC Poxy Putty 2000 **, Concrete repair mortar / Surfacer**
BC Epoxy primer 349 , High performance epoxy primer
BC 237 Polyurea , Pure elastomeric polyurea membrane
BC Anti carbo primer
BC Anti carbo Finish

BUILDING CHEMISTRY INDUSTRY

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Scope of works: Supply and application of BC237 polyurea system along with BCI Anti carbonation system

Given below are the steps followed in this repair project n

1.Condition assessment of existing water proofing system and draining out water from tank and allow it to dry

3.Enclose the work site with suitable protective fencing , in order to isolate the place and prevent adjoining areas getting affected

4.Check and inspect concrete surface for cracks , damages and any other defects and repair them with proper concrete repair materials like BC Repair 100[

5. Treat all expansion joints with high performance sealants line BC Tec 30S

Open wide groves at the joints and clean them thoroughly to have excellent bonding of Sealants and other accessories , fix backing rods where ever required

6.Primer application

The surface is given a complete coat of BCI ,BC Poxy primer 349 @ 200-250 µ

7.Polyurea membrane application

8. BC 237 polyurea system is applied as per guidelines from product data sheet@2000 µ

9. Next step is to apply BCI Anti carbonation primer , BC Anti carbo primer . It subsquesntly top coated with Building Chemistry Industry Anti carbonation finish coat for long life and durability

Equipment Introduction

Reactor 2 E-XP2 proportioner is an advanced technology in applying fast-curing polyurea coatings. The Reactor 2 E-XP2 is engineered to process and spray polyurea and other coatings that require high pressures. The hybrid heater and heated hose condition the materials to the right viscosity prior to mixing. Quick knockdown lower pump for easy maintenance, easy-to-use controls, and rugged design make the Reactor the preferred choice for coatings applications.

After application of BC 237 polyurea water proofing ,

BC 237 Polyurea system shall be then covered with BC Anti carbonation primer and BC Aniti carbonation top coat for long service life

1. Scope of Work

This method of statement is for Plural component spray application of BC 237 polyurea describes the procedures intended to adopt for all associated works with this contract package.

2. Access/Egress

The Access/Egress to the site for the easy movement of workmen, material and equipment will be carried out in a safe manner. Any obstacle shall be properly cleared either manually or employing suitable mechanical equipment. The access to the trenches should be as per project safety procedures.

3. Lighting

3.1 Safety Lighting

Customer will provide Safety lighting at the entry point/s of the project as such adequate to the basic security of the site premises or in accordance with the project requirements.

3.2 Task Lighting

Tower light or portable light is use in the dark or in reduced visibility, lights will befitted and used to enable the work area to be adequately illuminated. In addition, amber flashing beacons that give warning of the presence of the vehicle will be fittedand used if necessary.

3.3 General

Generally, if otherwise required custom will provide adequate lighting facility wherever there is a necessity for the lighting for the safety of its employees, material,equipment or any other asset of Client.

4. Plant & Equipment

4.1 Plant & Equipment Schedule

Plant and Equipment

Sn	Description	Qty	Model	Utilization
2.	Graco Reactor, Polyurea Machine	12	2 E-XP2	**1 year**
3.	Heater Hose (240 bar), 15cm with Scuff Guard	22	E-XP2, 240	**3 years**
4.	Whip Hose (240 bar), 3m with Scuff Guard	8	E-XP2, 240	**9 months**
5.	Fusion Gun AP	16	Fusion	**7 months**
6.	Transfer Pump	24	T2 Pump	**2 years**
7.	**Air Supply and Fusion Gun**	**24**	**Kit for Pumps**	**4 years**

4.2 Personnel Protective Equipment(PPE)

- Safety Helmet
- Clear Goggles
- Black Goggles
- Coverall
- Safety vest
- Safety Shoe
- Hand Gloves
- Face Shield (Where required)

4.3 Manpower

- Foreman/Supervisor
- Site Engineer
- QC
- Plumbers
- Labors (As Required)
- Flagman's (As Required)
- Operators (As Required)
- Masons (As Required)

5. Materials

Surface preparation tools like grinding wheels, cleaning tools

BC Repair 100
BC Epoxy primer 349
BC 237 Polyurea
BC Anti carbo primer
BC Anti carbo Finish

6. Sequence/Method of work:

Delivery of Material using Dyna Truck

- Before any delivery of materials to site, the supervisor with his crew will prepare the area of storage to receive the material at the lay down area. Number of containers, packing size and total quantity, drum condition, labelling and documents etc. shall be verified.
- The supplier shall inform the site at least two (2) days before the delivery date to have sufficient time on securing relevant work permit and gate passes required.
- If the delivery vehicle is from the supplier, it must be checked to ensure that it is conforming to the requirement of the project using the approved vehicle/equipment checklist. Driver of the delivery vehicle must be of complete PPE while he is in the jobsite.
- The delivery vehicle shall be escorted by SUBCONTRACTOR representative from gate to

laydown area and vice versa.

- Upon arrival of the material, the driver will hand over the delivery receipt to the warehouse supervisor who will check the document that includes the following:
- .After completion of unloading and material inspection, the materials shall be covered with tarpaulin or blue sheets to protect from exposure to weather.
- The materials delivered have been checked and they are correct as per the approvedmaterial submittal

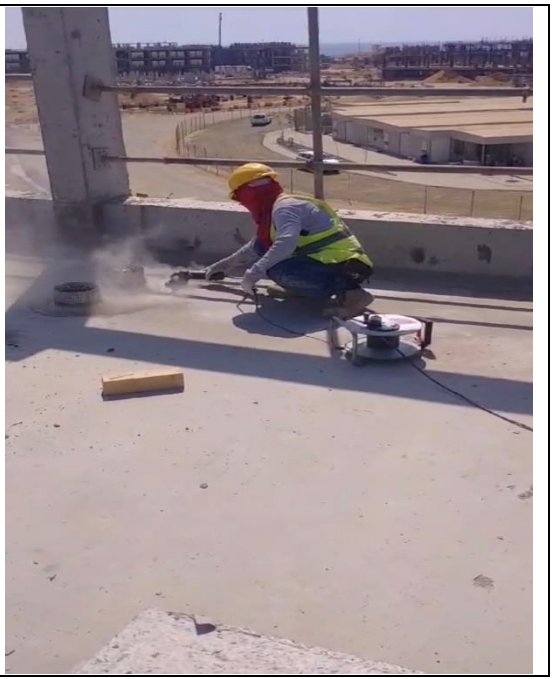
Material Receiving by Manual Handling

- The delivery materials will receive by workforce manually as all of materials are not too heavy.
- Each shipment should be inventoried and inspected upon arrival.
- It is the carrier's responsibility to deliver the shipment in good condition, and it is the receiver's responsibility to ensure that there has been no loss or damage.

7. Program

- Approved schedule will be followed for the duration of project
- Permits from concerned Client authority.
- Wear all necessary protective equipment like safety helmet , hand gloves , cover all and masks etc. before starting any activity including surface preparation Start surface preparation as approved by site in charge
- Degree of surface preparation shall be verified and approved by customer ‘s representative for the project
- Start the compressor and heat the reactor 70 Dec temperature while developing required application pressure

Surface preparation



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Expansion joints treatment

BC Epoxy primer 349

8. Risks and Controls

8.1 Hazards/risks

Risk Assessment (See appendix)

8.2 Control measures/permits

Permit to work shall in place prior to any work issued by Permitauthorizer and must be communicated to workers, operators & staff.

8.3 Third party protection

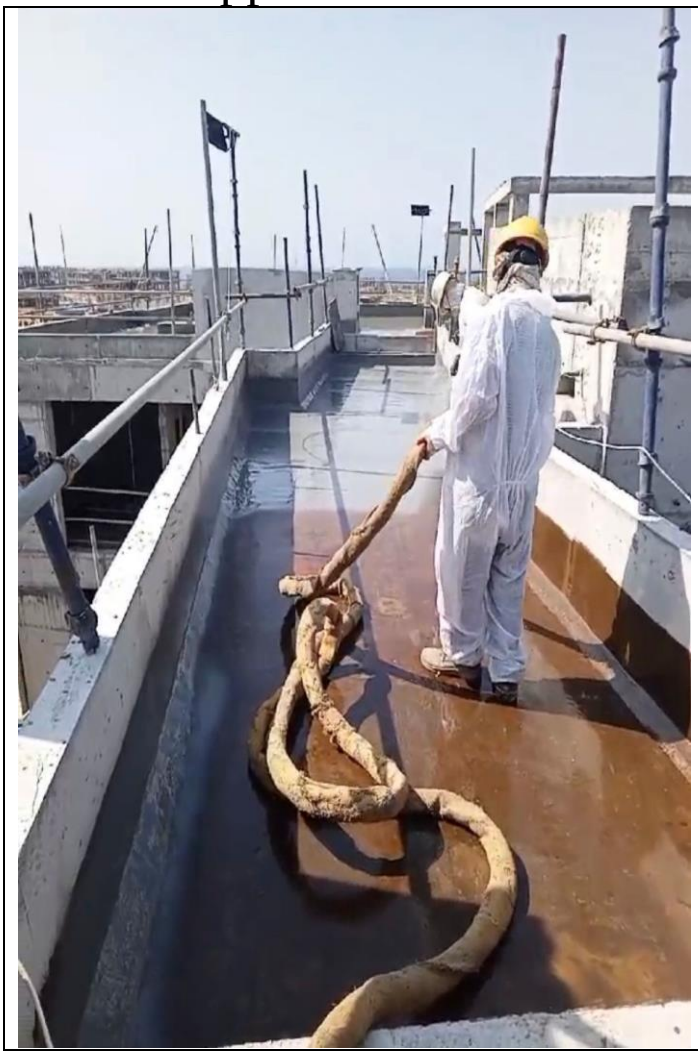
Obtain third party inspection for equipment and operator if necessary as per Guidelines in Table 1. Plant and Equipment - Training, Licensing, and Certification Requirements.

8.4 Environmental considerations and sustainability

A. Waste Management

- Waste shall be controlled and managed at all times
- Waste shall be transferred by appropriately registered carriers and only removed to licensed sites
- Wastes shall be kept in a secure manner, suitably contained and labeled
- Hazardous wastes shall be kept separately and securely labeled containers for the task and disposed of in accordance with the Hazardous Waste Regulations

BC 237 Application



B. Waste minimization

BCI shall endeavor to minimize waste streams in line with the principles of the waste hierarchy

- Avoidance of waste at source
- Reduction of waste volumes
- Re-use of uncontaminated spoil within the works
- Arrange for recycling of the waste
- Disposal as a last option

C. Operations of vehicles and plant

To ensure minimal impact from the operation of vehicles and plant, operators shall give due regard and implement the following

- Minimize route and journey mileage to and from and around site
- Prevent nuisance to the community caused by parking, spoil from vehicle movements, noise and access restrictions
- Ensure prevention of spillage of spoil, fuels, coolants, hydraulic oils and other vehicle fuels
- Maintain vehicles
- Ensure all vehicles and machinery are turned off when not in use
- Ensure suitable control for the means of access and egress to public highway

D. Noise and nuisance

Care shall be taken to ensure good image and relations with the local community by the following

- The use of offensive language, behavior and or discourtesy to the public prohibited
- Excessive noise from plant, equipment, vehicles and employees being monitored
- Strict compliance with noise and working hour restrictions
- Excessive emissions of dust, fumes and odors
- BCI will ensure a high standard of housekeeping and litter control on all sites at all times

F. Air Quality

- Any black smoke / unsightly emissions from vehicles and other equipment must be reported.
- Customer shall ensure that smoking is only permitted in designated areas.
- All material stockpiles to be adequately covered to prevent loss of material through wind erosion as well as dust lift.
- Where possible, avoid simultaneous instances of side-by-side material handling to prevent excessive generation of nuisance dust.

8.5 General

Personal Protective Equipment and selection refer to Employer Requirement (AML-DEV-H&S-GLE-0014 Personal Protective Equipment) for minimum requirements for selection, use and maintenance of PPE.

8.6 Communication and Fire Precautions

- Ensure fire extinguishers, type ABC dry chemical, are provided in all active work areas. Units shall be sized and spaced according to work activity occurring, quantities of combustible and flammable materials in the work area, and level of potential for fires.

- Ensure temporary enclosures are equipped with a minimum of one fire extinguisher suitable for all classes of fires that are expected inside the enclosure

- Ensure all permit requirements for hot work activities are followed. Refer to Employer Requirement (AML-DEV-H&S-GLE-0035 Welding, Cutting & Brazing).

- Maintain that combustible debris, rubbish and waste material are removed from buildings at the end of each shift of work. Refer to the Employer Requirement (AML-DEV-H&S-GLE-0013 Housekeeping).

- Ensure that combustible debris, rubbish and waste material are disposed of properly.

- Ensure that adequate and unimpeded means of egress from all parts of the works, is available at all times in case fire.

- Customer shall ensure that smoking is only permitted in designatedareas.

9. Training

- All on site must complete site safety induction.

- Toolbox meeting must be conducted prior to commence the activity.
- Provide awareness training for the new employee for (tools, equipment and etc.) and discuss a wide variety of hazards that new workers can encounter while performing different types of tasks, and explains what they need to do to avoid those hazards.
- Working at height training.

10. Supervision

- Works to be supervised by BCI site management.
- The Site Supervisor manages and assesses any potential safety hazards on site and looks at eliminating them. Conduct a regular site inspection and provide a safety program.
- Ensure that a project is seen through and completed safely.

11. Supervisor

- To ensure that the approved reparation methodology is well executed by all of the team.
- Safety of the Manpower should always be promoted in all the duration of work daily to avoid any kind of accidents.

A. Foreman

- To ensure the high level of workmanship. To ensure that the preparation methodology adopted by the Supervisor involved is well executed.
- To ensure the availability and the quality of the tools and product use by the team.
- The provision to his responsible Supervisor in charge the adequate information for works performance.
- The provision to his responsible Supervisor the daily report illustrating work progress / reparation methodology applied / resources / manpower / completed work.
- Manage the equipment's in the working zone in a safe way.

B. QC Inspector

- Inspect and conform the quality and test report of the required backfilling materials.
- Witness placement, compaction and compaction test.
- Responsible for random inspection required during the execution
- Responsible for the witness testing approval and records.
- Responsible for arranging third parties required for testing at site whenever needed.

C. Safety Officer

- Ensure that work is performed according to the safety instruction and precautions specified in the work permit.
- Ensure that barricades and warning tapes are erected where required and safety equipment is readily available at the site.

D. Work Permit Receiver

- Submit the activity permit request.
- Must abide by the instructions provided in the activity permit.
- Responsible for obtaining work permits required for the daily job and maintain the record as per project requirements.

12. Working Hours

BCI generally have an 8 hour working schedule. However, working hours maybe extended by the Project In charge which is paid in accordance with the Saudi labor laws. Usually breaks are considered as per project requirements and Saudi labor laws.

13. Housekeeping

- All rubbish and debris must be cleared from the work site on a daily basis in progress with the work.
- No excess rubbish or debris will be permitted to be left onsite at the end of the working shift.
- Sufficient bins must be available for the Contractor at each work face to cope with debris generated.
- Bins must be emptied/changed immediately when full.

14. Other Information

- Safety induction to be conducted to all new workers that involved to this activity.
- Safety tool box meeting shall be conducted to remind the workers about concerning the safety.
- Make sure that material will be stored at temp storage area and should be barricaded properly.

15. Technical notes:

Anti-carbonation coatings are specialized coatings designed to protect concrete structures from the effects of carbonation, which can weaken the structure and reduce its lifespan. Carbonation occurs when carbon dioxide (CO_2) from the atmosphere reacts with calcium hydroxide in the concrete, forming calcium carbonate. This process reduces the alkalinity of the concrete, which can lead to the corrosion of steel reinforcement within the structure.

Key Features of Anti-Carbonation Coatings

Low CO_2 Diffusion: These coatings act as a barrier to carbon dioxide penetration, slowing or preventing the carbonation process.
Water Resistance: They prevent water ingress, which is another factor that accelerates carbonation and corrosion.
Permeability to Water Vapor: While they block CO_2 and liquid water, anti-carbonation coatings allow water vapor to escape, preventing moisture build-up within the concrete.
UV Resistance: High resistance to UV radiation ensures durability under prolonged exposure to sunlight.
Crack Bridging: Some formulations can bridge minor cracks in the concrete, maintaining their

protective capabilities.
Aesthetic Appeal: Available in various colors and finishes, these coatings can also improve the appearance of concrete surfaces.

Applications

Bridges and highways
Parking structures
Industrial and residential buildings
Marine structures (piers, docks)
Retaining walls and water tanks

Types of Anti-Carbonation Coatings
Application Process
Surface Preparation: The concrete surface must be clean, dry, and free from loose material or contaminants.
Priming: Depending on the product, a primer may be applied to enhance adhesion.
Coating Application: Typically done in multiple layers using a brush, roller, or spray.
Curing: Allow sufficient time for the coating to cure before exposing it to environmental stresses.

Advantages

Long-term protection against carbonation and corrosion
Reduces maintenance costs over time
Enhances the lifespan of concrete structures
Improves surface aesthetics