

# TENDER

(NIT NO. TA/TCL/**01**/23-24)

**FOR**

**STRUCTURAL REPAIRS/RETROFITTING OF  
OVERHEAD TANKS NEAR KASTURBA  
HOSPITAL, HABIBGANJ AND TRT  
GOVINDPURA IN BHEL TOWNSHIP, BHOPAL.**

## PRICE BID

**SECTION - VI**



**TOWNSHIP CIVIL MAINTENANCE  
BHARAT HEAVY ELECTRICALS LIMITED**

**(A Government of India Undertaking)  
BHOPAL - 462 022 (M.P)**

## **PREAMBLE OF PRICE BID**

1.0. This Price Bid consists of three Schedules:

### **1.1 Schedule A**

Schedule A consists of single Annexure:

1) Annexure-I includes items based on GST Compliant DSR-2012, Rate Analysis, Budgetary offer.

**Bidders are requested to quote their rate in Percentage above/below/at Par for Annexure-I.**

2) Annexure-II – List of Approved Make.

### **1.2 Schedule B**

Schedule B gives the details of free issue materials given by BHEL.

### **1.3 Schedule C**

Schedule C gives the details of Tools & Tackles provided by BHEL on Chargeable Basis.

2.0 The work to be carried out under the contract shall, except as otherwise provided in tender conditions, include all labour, materials, tools, plant, equipment, and transport which may be required in preparation of and for full & entire execution and completion of the Works. The descriptions given in the Schedule of Quantities shall, unless otherwise stated, be held to include waste on materials, carriage and cartage, carrying in return of empties, hoisting, setting, fitting and fixing in position and all other labours necessary in and for the full and entire execution and completion as aforesaid in accordance with good practice and recognized principles as laid down in Technical Specification & elsewhere in Tender Specification.

3.0 The price bid should not contain any condition. Conditional price Bids shall be summarily rejected.

4.0 The bidder should not leave any column blank in Price Schedules.

5.0 Price Quoted shall include all taxes, & duties except GST.

6.0 **Unless otherwise specified in the items involving cement or reinforcement steel, these items shall be issued free of cost by BHEL.**

**TOWNSHIP CIVIL MAINT. & CONST. DIVISION****SCHEDULE 'A'****Annexure: I**

**Name of work : Structural Repairs/ Retrofitting of Overhead Tanks near Kasturba Hospital, Habibganj and TRT Govindpura in BHEL Township, Bhopal**

| S.No | It. Code          | Description of items   | Qty.   | Unit | Rate    | Amount           |
|------|-------------------|--|--------|------|---------|------------------|
| 1    |                   | Carriage of material by mechanical transport including loading, unloading, stacking etc. complete  |        |      |         |                  |
| (a)  | 1.1.1             | Lime, moorum, bldg. rubbish (upto 1 km.)   | 40.00  | Cum  | 66.23   | <b>2,649.20</b>  |
| (b)  | 1.1.1             | Lime, moorum, bldg. rubbish (upto 2 km.)   | 11.77  | Cum  | 75.15   | <b>884.52</b>    |
| 2    |                   | Providing and laying in position specified grade of reinforced cement concrete excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level :  |        |      |         |                  |
|      | RA 5.1.1          | 1:1:2 (1 cement : 1 coarse sand : 2 graded stone aggregate 20 mm nominal size).  | 10.00  | Cum  | 2715.15 | <b>27,151.50</b> |
| 3    |                   | Centring and shuttering including strutting, propping, etc. and removal of form for:   |        |      |         |                  |
| (a)  | RA 5.9.6          | Columns, pillars, piers, abutments, posts and struts.  | 154.28 | Sqm  | 349.52  | <b>53,923.95</b> |
| (b)  | RA 5.9.14         | Extra for shuttering in circular work (20% of respective centering and shuttering items). (i.e. 349.52 x 0.20 = 69.90)   | 31.00  | Sqm  | 69.90   | <b>2,167.02</b>  |
| 4    |                   | Extra for additional height in centering, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentering at all levels, over a height of 3.5 m, for every additional height of 1 metre or part thereof (Plan area to be measured). |        |      |         |                  |
|      | RA 5.11.1         | Suspended floors, roofs, landing, beams and balconies (Plan area to be measured)   | 31.00  | Sqm  | 119.53  | <b>3,705.43</b>  |
| 5    | RA 5.22.6/5.22.6A | Steel Reinforcement for RCC work i/c straightening, cutting, bending, placing in position and binding all complete upto/above plinth level :TMT bars (excluding cost of steel bars)  | 957.70 | Kg   | 7.40    | <b>7,086.98</b>  |

|    |          |  |        |        |        |                  |
|----|----------|--|--------|--------|--------|------------------|
| 6  | RA 14.72 | Providing and fixing double scaffolding system (cup lock type) on the exterior side, up to seven story height made with 40mm dia. M.S. tube 1.5m centre to centre horizontal & vertical tubes joining with cup & lock system with M.S. tubes, M.S. tube chollies, M.S. clamps and M.S. staircase system in the scaffolding for working platform etc. and maintaining it in a serviceable condition for the required duration as approved and removing it there after .The scaffolding system shall be stiffened with bracings, runners, connection with the building etc wherever required for inspection of work at required locations with essential safety features for the workmen etc. complete as per directions and approval of Engineer-in-charge .The elevational area of the scaffolding shall be measured for payment purpose .The payment will be made once irrespective of duration of scaffolding. | 706.50 | Sqm    | 120.20 | <b>84,921.30</b> |
|    |          | <b>Note:</b> - This item to be used for maintenance work judiciously, necessary deduction for scaffolding in the existing item to be done.   |        |        |        |                  |
| 7  |          | Demolishing cement concrete manually/by mechanical means including disposal of material within 50 metres lead as per direction of Engineer Incharge.:  |        |        |        |                  |
|    | 15.2.2   | Nominal concrete 1:4:8 or leaner mix (i/c equivalent design mix).  | 10.00  | Cum    | 413.65 | <b>4,136.50</b>  |
| 8  | 15.3     | Demolishing RCC work manually/by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 metres lead as per direction of Engineer Incharge.   | 10.00  | Cum    | 978.95 | <b>9,789.50</b>  |
| 9  | NONDSR   | DEWATERING Dewatering the excavated trenches and pools of water in the building area by using 5 to 9 H.P. pump and other devices, including disposing off the water to a safe distance as directed.  | 40.00  | Hour   | 92.00  | <b>3,680.00</b>  |
| 10 | NONDSR   | Providing and erecting steel props (about 13' height, braced at centre and supporting a continuous 4" x 4" wooden runner, resting on wedge and block minimum capacity 4 Ton) to support the structure provisionally during repair and jacketing etc. and maintaining them in position till required as directed by the consultant. (Counting shall be on the basis of total no. of steel props mobilized at the site during the entire period of contract.)  | 35.00  | Number | 169.60 | <b>5,936.00</b>  |
| 11 | NONDSR   | Carefully tapping with light hammer the hollowness / De-bonded plaster and chipping the same with chisel after demarking and cutting the boundary grooves by electric cutting machine including removal of debris.   | 308.56 | Sqm    | 97.60  | <b>30,115.46</b> |



|    |        |  |          |     |        |              |
|----|--------|--|----------|-----|--------|--------------|
| 12 | NONDSR | Carefully tapping with light hammer the hollowness of concrete and chipping of loose/ disintegrated concrete upto main rebars with chisel and light weight hammer including removal of debris all complete as directed by Engineer-in-Charge.  | 120.68   | Sqm | 92.00  | 11,102.56    |
| 13 | NONDSR | Providing & applying alkaline chemical rust remover ( <b>Feo Vert rust remover of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II</b> ) with paint brush and removing loose particles after 24 hours of its application with wire brush and thoroughly washing with water jet and allowing it to dry.   | 92.56    | Sqm | 212.00 | 19,622.72    |
| 14 | NONDSR | Providing and applying the one component Anti-corrosive coating ( <b>IPNet RB/ CORROSEAL Rust Converter of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II</b> ) formulated to provide dual protection of a polymeric barrier and an integral corrosion-inhibiting system, to the existing steel and additional steel provided before patching of damaged areas, using suitable tools and equipment inclusive of Material, Manpower and Equipment.                | 92.56    | Sqm | 272.00 | 25,176.32    |
| 15 | NONDSR | Providing and Applying two coats of Migrating Corrosion Inhibitor ( <b>EPCO KP-100/ EPCO KP-200 of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II</b> ) with proven track record, and excellent depth of penetration reacting with the concrete substrate to form a permanent chemical bond on the prepared concrete surface using brush at a consumption rate of maximum 600ml per sq.m. inclusive of Manpower, Material and Equipment.                         | 216.00   | Sqm | 478.40 | 1,03,334.40  |
| 16 | NONDSR | Providing and Pouring into the fixed leak proof formwork to repair the damaged concrete portion with high flow, single component, dual shrinkage - ompensated, cementitious microconcrete ( <b>MOLITH MC / POLYGROUT-M of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II</b> ) that achieves a compressive strength minimum of 25 MPa at 3 day and 40 MPa at 28 days. before the bonding agent becomes tack free, inclusive of Manpower, material and Equipment. | 32682.48 | Kg  | 54.40  | 17,77,926.91 |

|    |        |  |        |        |         |                    |
|----|--------|--|--------|--------|---------|--------------------|
| 17 | NONDSR | Providing and Repairing the damaged concrete portion with single component, fibre reinforced, dual shrinkage - compensated, thixotropic, cementitious patch repair mortar ( <b>MOLITH PMM of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II</b> ) that achieves compressive strength of 35 MPa at 7 day and 45 MPa at 28 days and capable of applying 50mm thick in single layer initially by hand and finishing with trowel carefully compacting the same around the rebars and finishing to bring it in line with existing concrete surface with an average thickness of 25mm inclusive of Manpower, Material and Equipment. | 263.45 | Sqm    | 2740.00 | <b>7,21,853.00</b> |
| 18 | NONDSR | Providing and Fixing Shear connectors of 8mm dia. HYSD steel with two component, <b>styrene &amp; cement free, epoxy-acrylate fixing and anchoring compound</b> of approved make as per Annexure II supplied in self mixing Cylinder-in-cartridge form that avoids site mixing using standard sealant applicator gun after drilling holes of 12mm diameter to a minimum depth of 100mm at required locations, inclusive of all material, manpower and equipment.   | 892.00 | Number | 162.40  | <b>1,44,860.80</b> |
| 19 | NONDSR | Providing and Applying a single coat of two component solvent free epoxy resin based bonding coat ( <b>EPIBOND-21 of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II</b> ) complying to ASTM C881 Type 2, Grade 2, and Class B & C having a open time of 6 hours and shall exceed the tensile strength of concrete in terms of its adhesive bond strength using brush or roller before the application of repairing material inclusive of material, manpower and equipment.   | 290.51 | Sqm    | 328.00  | <b>95,287.28</b>   |
| 20 | NONDSR | Providing and applying Polymer Bond Coat ( <b>MONOBOND SBR of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II</b> ) by using acrylic polymer, cement of approved make as per Annexure II in 1:1 proportion or in recommended proportion as per manufacturer's specification including cleaning the surface, wetting etc. before applying cement plaster wherever required.  | 263.45 | Sqm    | 224.00  | <b>59,012.80</b>   |

|    |        |  |        |        |        |                    |
|----|--------|--|--------|--------|--------|--------------------|
| 21 | NONDSR | Providing and Fixing standard injection packers of 10mm diameter after drilling holes of required diameter along the crack, sealing the packer with epoxy putty ( <b>GOLDBOND 1893-Putty of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II</b> ) of approved make as per Annexure II, removal of packer after grouting inclusive of all Material, manpower and equipment.  | 618.00 | Number | 80.00  | <b>49,440.00</b>   |
| 22 | NONDSR | <b>Grouting Nipples:</b> Providing & Fixing PVC perforated nozzle of 10-12 mm dia. By drilling the holes in concrete to a depth of 100 mm and plugging the holes by cement & polymer and injecting cement slurry mixed with <u>polymer grout</u> through the nozzles using grout pump.   | 309.00 | Number | 56.00  | <b>17,304.00</b>   |
| 23 | NONDSR | Providing and Injecting the fixed packer with two-component low viscosity (<350 cps) epoxy resin system ( <b>EPCO - KP - 250 (SLV) / EPCO - HP - 250 (SLV) of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II</b> ) that achieves compressive strength in excess of 55 MPa at 1 day & 65 MPa at 7 days. and shall exceed 15 MPa in slant shear bond strength with minimum pot life of 30 minutes at ambient temperatures complying with ASTM C881, Type 1 & 4, Grade 1, Class B & C using any of the standard pressure grouting methods at a maximum pressure of 2kgs/sq.cm. till refusal and allowing the epoxy grout to cure before removal of packers inclusive of cost of Material, Manpower and Equipment. | 309.00 | Number | 265.60 | <b>82,070.40</b>   |
| 24 | NONDSR | Providing and Filling the blow holes, crevices and depressions in the Concrete surface of the elements to be wrapped or strengthened with non-sag epoxy compound ( <b>GOLD BOND 1893-Putty of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II</b> ) with ASTM C881 Type I, Grade 3, Class B & C that achieves adhesive bond strength with concrete substrate greater than inherent tensile strength of concrete substrate and compressive strength in excess of 60 MPa at 7 days. at an average thickness of 1mm to make the surface flat and even and make it fit for fibre wrapping inclusive of Manpower, material and Equipment   | 272.92 | sqm    | 456.00 | <b>1,24,451.52</b> |

|    |        |   |        |        |         |                     |
|----|--------|---|--------|--------|---------|---------------------|
| 25 | NONDSR | Providing and Applying Single Ply Unidirectional Glass fibre of 940GSM after necessary surface preparation including rounding off edges to a radius of 10mm, priming and saturation of fibre as per the dry lay up process and sprinkling of sand after the final saturant application for giving protection screed on the top as per the procedure mentioned including of Material, Manpower and Equipment. <b>(GOLDBOND 1893 WRAP for glass fiber and GOLDBOND 1893 - PRIMER &amp; GOLDBOND 1893 SATURANT of M/s Krishna Conchem Products Pvt. Ltd. or any other equivalent product of approved make as per Annexure II)</b>                    | 313.86 | Sqm    | 3200.00 | <b>10,04,352.00</b> |
| 26 | NONDSR | Providing shear anchor of 10mm dia and 150mm long of high strength hybrid woven fiber glass fabric mesh with filling of hole with <b>suitable EPOXY of M/s Krishna Conchem Products Pvt. Ltd. or equivalent product of approved make as per Annexure II</b> & removing/drawing out of the entrapped air etc. from the drilled hole all complete as per manufacturer's specifications and directions of the Engineer in Charge. It shall include labour for mixing EPOXY resin, saturating the anchor with EPOXY, drilling the RCC members and inserting the saturated anchor inside the drilled hole and merging the bushes with the RCC members. | 315.00 | Number | 168.00  | <b>52,920.00</b>    |
| 27 | NONDSR | <b>Providing and Fixing Glass Laminate (50mm x 2.5mm) (GOLDBOND SUPERPLATE of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II)</b> on the structural members to take additional bending moment and shear to RCC slab, beams etc. with of high grade epoxy. The work should be carried out with all the safety measures like Helmet, safety belt and adequated labour insurance under the supervision of qualified supervisor etc. complete.  | 116.00 | Sqm    | 1160.00 | <b>1,34,560.00</b>  |
| 28 | NONDSR | Providing and applying protective coating to inside surfaces of water tanks with food grade epoxy stearate coating <b>(WATERSEAL of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II)</b> . Application of food grade epoxy stearate coating confirming to CFTRI & Haffkins certifications in two coats etc complete as per direction of Engineer in charge.  | 326.81 | Sqm    | 280.00  | <b>91,506.80</b>    |

|             |   |  |         |        |               |                   |
|-------------|---|--|---------|--------|---------------|-------------------|
| 29          | NONDSR  | Drilling and fixing 8mm, 10mm, 12mm, 16mm, 20mm, 25mm, re-bars with 'Fischer/Hilti' system and chemical <b>(HY 200 of HILTI or any equivalent product of approved make as per Annexure II)</b> , etc. (Steel bars to be issued free of cost by BHEL).            |         |        |               |                   |
| a           |   | 25mm dia bars  | 13.00   | Number | 1760.00       | 22,880.00         |
| b           |   | 20mm dia bars  | 13.00   | Number | 1160.00       | 15,080.00         |
| c           |   | 16mm dia bars  | 20.00   | Number | 704.00        | 14,080.00         |
| d           |   | 12mm dia bars  | 13.00   | Number | 504.00        | 6,552.00          |
| e           |   | 10mm dia bars  | 13.00   | Number | 312.00        | 4,056.00          |
| f           |   | 8mm dia bars   | 20.00   | Number | 232.00        | 4,640.00          |
| 30          | NONDSR  | Providing & Applying aliphatic acrylate Concrete coating system for Anti-corrosive and anti-carbonatoin <b>(MONOPOL-456-W of M/s Krishna Conchem Products Pvt. Ltd. or any equivalent product of approved make as per Annexure II)</b> application etc complete. | 1053.67 | Sqm    | 340.00        | 3,58,247.80       |
|             |   |  |         |        | <b>Total=</b> | <b>5176464.67</b> |
|             |   | Percentage quoted by the Contractor  | %       | Above  | Below         | At Par            |
|             |   | Percentage quoted by the Contractor in words   |         |        |               |                   |
|             |   |  |         |        |               |                   |
| <b>Note</b> |   |  |         |        |               |                   |
| 1           | Contractor shall erect temporary protective barricading/screens of 1.8 m in height made in panels with each panel having minimum 40x40x6 mm size MS angle frame with minimum 24 gauge thick G.I. corrugated sheet or suitably stiffened plain G.I. sheet fixed on one side of the frame. Such panels shall be interconnected to each other with nuts and bolts, fixed to ground firmly, at about 2 m spacing for the work duration as required by the Engineer in charge.   |  |         |        |               |                   |
| 2           | The rates shall include the removal of honey bee hives from Over Head tanks in an environment friendly way including all tools and tackles or through other conventional way with all safety precautions against fire breakout/ damage etc followed by detaching the hives.   |  |         |        |               |                   |
| 3           | The contractor shall use safety appliances such as safety nets for the safety of his labourers while working at height. Safety net must be of standard & approved quality. The safety net is to be fixed at top, bottom and at intermediate levels by tying ropes to MS hooks on wall surface or on existing tubular scaffolding system not exceeding 4m C/C along periphery and to make proper arrangement to arrest falling debris, CC lumps & tiles etc., all complete as per direction of Engineer- in- Charge.         |  |         |        |               |                   |
| 4           | Contractor shall erect temporary protective screens made out of specified fabric upto 30m height with all necessary fixing arrangement( or same as Nylon safety net as above) including necessary beading of thread & including G.I. rings to ensure that it remains in good serviceable condition & position for the work duration as required by Engineer in charge. The cloth will be the property of agency and after completion of work same must be removed from the premises as per direction of Engineer-in-charge. |  |         |        |               |                   |
| 5           | The rates shall also include all necessary tools and tackles to complete the above complete job.  |  |         |        |               |                   |
| 6           | The Contractor shall provide insurance coverage to all his workmen & supervisor deployed, at his own cost.  |  |         |        |               |                   |
| 7           | The contractor shall provide all safety appliances such as safety belts, helmets, walkways, safety ladders etc. for use by his labourers while working at height. Safety appliances must be of standard & approved quality.   |  |         |        |               |                   |
| 8           | All the workmen engaged must be medically fit for working at height. Certificate to this effect obtained from a registered medical practitioner having a minimum of MBBS degree shall be submitted by the contractor to the department.   |  |         |        |               |                   |

[illegible]



| ANNEXURE-II   |                        |  |   |
|---|------------------------|--|---|
| Name of work : Structural Repairs/ Retrofitting of Overhead Tanks near Kasturba Hospital, Habibganj and TRT Govindpura in BHEL Township, Bhopal   |                        |  |   |
| List of approved make   |                        |  |   |
| Sr. No.   | Ref                    | Type of material   | Make  |
| 1   | Item at Sr No -13      | Rust remover   | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 2   | Item at Sr No -14      | Anti corrosive coat (paint)  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 3   | Item at Sr No -15      | Corrosion inhibitor  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 5   | Item at Sr No -16      | Micro concrete   | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 14  | Item at Sr No -17      | Patch repair mortar  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 15  | Item at Sr No -18      | Epoxy acrylate anchoring compound  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 4   | Item at Sr No -19      | Epoxy Bond Coat  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 16  | Item at Sr No -20      | Polymer Bond Coat  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 10  | Item at Sr No -21 & 24 | Epoxy Putty  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 17  | Item at Sr No -22      | Polymer grout  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 9   | Item at Sr No -23      | Low viscosity Epoxy Grout  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 18  | Item at Sr No -24      | Non-sag epoxy compound for fibre wrapping                                    | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 6   | Item at Sr No -25      | Glass Fibre (940 GSM)  | FOSROC, BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.  |
| 7   | Item at Sr No -25      | Saturant for glass fibre   | FOSROC, BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.  |
| 8   | Item at Sr No -25      | Primer for glass fibre   | FOSROC, BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.  |
| 20  | Item at Sr No -26      | Shear connector  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 11  | Item at Sr No -27      | Glass laminate (50mm X 2.5mm)  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 12  | Item at Sr No -28      | Food Grade Epoxy Stearate Coating  | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| 19  | Item at Sr No -29      | Grouting chemical for re-bar   | HILTI, FISCHER, Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd. |
| 13  | Item at Sr No -30      | Aliphatic Acrylate Coating for anti-corrosive and anti-carbonation treatment | Pidilite, FOSROC, Chembond Chemicals Limited , BASF, SIKA India Pvt. Ltd., Krishna Conchem Products Pvt. Ltd.                 |
| <b>Note:</b> For refering detail literature of the above mentioned make(s) of various material(s) for the work of "Structural Repairs/ Retrofitting of Overhead Tanks near Kasturba Hospital, Habibganj and TRT Govindpura in BHEL Township, Bhopal" prospectus tenderer(s) / bidder(s) are requested to go through the pages 13 to 32. |                        |  |   |
| Signature of Contractor   |                        |  |   |

| SCHEDULE – “B”  |  |  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|--|
|   |  |  |  |  |  |  |  |  |
| <b>Name of work : Structural Repairs/ Retrofitting of Overhead Tanks near Kasturba Hospital, Habibganj and TRT Govindpura in BHEL Township,</b>   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
| 1. Cement against Item No. 2 of Annexure-I  |  |  |  |  |  |  |  |  |
| 2. Reinforcement Steel against Item No. 5 & 29 of Annexure-I  |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
| Note: If the contractor fails to return to the department unconsumed portion of total quantities of respective free issue material after completion of work or as and when instructed by Engineer-incharge, recovery at twice the respective material cost of the item as procured/decided by BHEL shall be made from the contractor's bill(s). |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
| SCHEDULE – “C”  |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
| -----NIL-----   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
| Signature of Contractor   |  |  |  |  |  |  |  |  |



**STRUCTURAL AUDIT OF OVERHEAD WATER RESERVOIRS AND SUMPS IN BHEL TOWNSHIP AREA AND WATER RESERVOIRS IN JAIL HILL FILTRATION PLANT**

**S.P. BAGWE**  
**CHARTERED ENGINEER**



## **WATERSEAL®**

**Food Grade Epoxy – Stearate Protective Coating**

**Waterseal®** is a unique formulation that provides positive waterproofing to the structure. **Waterseal®** is a chemically cured epoxy stearate compound of base and curing agent to be mixed in equal proportion by volume prior to the application.

### **TYPICAL APPLICATIONS**

- For protective and watertight coating to E.S.R.'s, G.S.R.'s, M.B.R.'s, Water Treatment Plants and Hatcheries.
- To cure dampness and seepage problems in Basement, Tunnels, Lift wells, Back filled walls or floors and all underground structures.
- As a dust-proof protective coating on floors and walls in sterile areas and labs.

### **UNIQUE ADVANTAGES**

- Impermeable and chemical resistant film on cure.
- Withstands hydrostatic pressure upto 5 kg/cm<sup>2</sup>.
- Non-toxic on cure (Tested at Haffkine Institute, Bombay).
- Conforms to IS-159 and IS-101-64, IS-3085.

### **Storage & Handling:**

Store the material in a cool place away from direct sunlight or any source of ignition and fire. Keep away from the reach of children in a well ventilated place.

### **Health & Safety Precautions:**

Wear protective gloves, goggles, and nose masks while handling and using the material. In case of splashes on the skin and contact with eyes wash thoroughly with plenty of water. In case of ingestion and inhalation remove the personnel to fresh air. Seek medical advice in all the above cases. The disposal of excess or spilled material shall be carried out in accordance with local regulations.

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### **APPLICATION PROCEDURE**

1. The adhesion of **Waterseal®** is greatly impaired if the surface is not prepared thoroughly. Remove dirt, oily residues and existing paint if any by scrubbing with coarse wire brushes or chipping off the top layers.
2. Prior to **Waterseal®** application, seal all the cracks, joints, etc. with EPCO-1010® sealant. Mix **Waterseal®** Base and Curing Agent in equal proportions by volume for 5 minutes. Keep it as it is in the container for 10 minutes before applying.
3. Apply minimum two coats of **Waterseal®** on the surface keeping minimum 24 hours time interval between them.

### **TECHNICAL DATA**

|                               |   |
|-------------------------------|---|
| Base                          | Epoxy Stearate<br>(Two Components)          |
| Mix Proportion<br>(By Volume) | Base : Curing Agent<br>1 : 1                |
| Coverage                      | 3-4 m <sup>2</sup> /lt. (on smooth surface) |
| Colour                        | Transparent / White / Yellow / Grey         |
| Toxicity                      | Non Toxic on cure                           |
| Application                   | By brush after thorough surface preparation |
| Pot Life                      | 30 min. for 1 lt. mix                       |
| Packings                      | 2 lt, 40 lt                                 |
| Cleaning                      | Thinner T-50                                |

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**S.P. BAGI  
CHARTERED ENGINEER**

**K**  
**Krishna Conchem Products Pvt. Ltd.**  
Specialty Construction Chemicals

## **MONOPOL®-456-W**

**High Performance Anti Carbonation, Anti Fungal Acrylic Coating System**

Monopol®-456-W is a 100% acrylic, concrete specific coating system that provides protection against chloride ion penetration, carbonation, UV radiation, fungus, algae and weathering effects.

### **TYPICAL APPLICATIONS**

- Bridge Decks, PSC Box Girders, Cooling Towers, Chimneys
- Multi-storeyed Buildings, Water retaining structures, External surfaces of E.S.R/M.B.R., Structures exposed to thermal stresses, Airline Hangars

### **UNIQUE ADVANTAGES**

- Monopol®-456-W is a single component system.
- Water vapour permeability is unaffected. Allows the substrate to breathe.
- Impermeable to chloride ions & carbonation, fungus and algae.

### **APPLICATION PROCEDURE**

Thoroughly clean the surface by wire brushing and wash with clean water to remove residual dust, oil, depositions & fungus. Seal the cracks, crevices with polymer putty (PC Putty) and honeycombs with Monobond® modified mortar

### **Storage & Handling:**

Store the material in a cool place away from direct sunlight or any source of ignition and fire. Keep away from the reach of children in a well ventilated place.

### **Health & Safety Precautions:**

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### **MIX PROPORTION**

Primer: Add 1.25 ltrs of water to 1 ltr of Monopol®-456-W.

Top Coats: Add 400 ml of water to 1 ltr of Monopol®-456-W.

Stir thoroughly and apply Monopol®-456-W first coat of Primer by brush/spray over the prepared surface and allow it to air cure for minimum 6 hours prior to application of subsequent coats. Apply one Primer plus two top coats.

### **TECHNICAL DATA:**

|                           |   |
|---------------------------|---|
| Base                      | Acrylic-waterbased                                    |
| System                    | Single Component                                      |
| Intercoat interval        | 6 hours minimum                                       |
| Coverage                  | 10 - 12 m <sup>2</sup> /lt. per coat (After dilution) |
| Curing                    | Air curing  |
| pH                        | Min 7.0   |
| Viscosity Ford cup No.B-4 | 25-40 secs at 25°C                                    |
| Specific Gravity          | 1.25 to 1.4   |
| Shades                    | In selected shades                                    |
| Packing                   | 30 lt   |

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**S.P. BAGWE**  
CHARTERED ENGINEER



## **MONOBOND®-SBR**

Polymer Latex Additive for Polymer Modified Concrete/Mortar/Grouts

**Monobond®-SBR** is a polymer latex additive for modifying cement concrete/mortar/plaster/grouts. The addition of **Monobond®-SBR** improves mechanical properties especially flexure and tension. Due to low permeability of polymer-modified systems, remarkable improvement in prevention of carbonation, chloride ion penetration is observed. Also chemical resistance improves significantly.

The addition of **Monobond®-SBR** imparts resilience to the cement matrix. Thereby improving impact resistance. Also the modified cement matrix cures in air, eliminating the necessity of wet curing. It is necessary to mix **Monobond®-SBR** in water first prior to addition in cement mortar/concrete.

### **TYPICAL APPLICATIONS**

- Excellent Repair Mortar, for strengthening dilapidated RCC structures, water retaining structures.
- Due to the excellent chemical resistance properties of PMC it can be used in Chemical plants as Industrial Floor Topping compound.
- Excellent lining material on concrete surface to protect it against carbonation, chloride ion penetration, etc.
- As bond coat.
- As an additive to cement grout.

### **Storage & Handling:**

Store the material in a cool place away from direct sunlight or any source of ignition and fire. Keep away from the reach of children in a well ventilated place.

### **Health & Safety Precautions:**

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### **APPLICATION PROCEDURE**

Mix **Monobond®-SBR** in water first prior to addition in cement mortar/concrete. Dosage 10% to 15% by weight of cement.

### **TECHNICAL DATA**

|            |                         |
|------------|-------------------------|
| Base       | Styrene butadiene latex |
| Appearance | Milky White             |
| pH         | > 7.0                   |
| Packing    | 30 kg                   |

### **Typical Mix Design For**

| Polymer Modified Mortar |                 |
|-------------------------|-----------------|
| Cement                  | 100 P.B.W.      |
| Sand                    | 300 P.B.W.      |
| Monobond®-SBR           | 10 P.B.W.       |
| Water                   | 30 to 35 P.B.W. |

| Polymer Modified Concrete |                 |
|---------------------------|-----------------|
| Cement                    | 100 P.B.W.      |
| Sand                      | 200 P.B.W.      |
| Aggregate                 |                 |
| M1 (20 mm down)           | 300 P.B.W.      |
| Monobond®-SBR             | 10 P.B.W.       |
| Water                     | 35 to 40 P.B.W. |
| Slump                     | 75 mm           |

| Bonding Coat (Slurry) |            |
|-----------------------|------------|
| Cement                | 150 P.B.W. |
| Monobond®-SBR         | 100 P.B.W. |

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## Molith®PMM

Ready To Use Single Component Polymer Modified Repair Mortar

Molith®PMM is a ready to use single component cementitious polymer modified mortar for repairing concrete structures.

### APPLICATION

In damaged concrete structures Molith®PMM can be used to make up for the lost section of concrete such as concrete cover over reinforcement, portion damaged due to corrosion etc. It can be used to patch up holes in industrial floors. It is also useful in precast concrete elements for repairing damaged patches, corners during demoulding or during erection.

### PROPERTIES

Molith®PMM exhibits excellent bond to concrete. It is so formulated that overhead applications are easy. Mortar does not exhibit sagging while fresh.

Apart from mechanical strength Molith®PMM has excellent resistance against chloride ion diffusion, low permeability to carbon dioxide as well as water vapour. This gives it the unique advantage of repair mortar with excellent barrier against highly corrosive environment such as marine environment.

### METHOD OF USE

- Clean the concrete surface to be repaired thoroughly, remove dirt, dust oil, loose concrete etc. Remove rust from exposed reinforcement and provide corrosion protection with Feovert & IPNet RB where necessary.
- Apply suitable bonding agent of EL-Monobond® where necessary.

- Mix Molith®PMM powder with water in the proportion of 170 to 190 ml water to 1 kg of Molith®PMM powder to get a cohesive mortar. Apply this to the repaired surface and trowel it to restore the surface. On difficult surfaces use latex cement primer and where subsequent mortar finish is required over the repaired area scratch the surface with wire to create a mechanical key.

### TECHNICAL DATA

|                      |   |
|----------------------|---|
| Product              | Molith®PMM  |
| Type                 | Ready to use single component Polymer modified repair mortar.   |
| Form                 | Ready Mix Powder  |
| Colour               | Grey  |
| Compressive Strength | 40 MPa – 28 days  |
| Flexural Strength    | 8 MPa – 28 days   |
| Bulk Density         | 1.5 to 1.6  |
| Curing               | Air curing in extremely hot conditions a little sprinkling of water can be done.  |
| Storage              | Store in cool and dry place. Use within 6 months.   |
| Pot life             | Mix quantity that can be consumed within 40 to 60 minutes. During this period keep the mixed mortar covered with plastic. |

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## **MOLITH<sup>®</sup>MC**

**Free flow, shrinkage compensated, high strength microconcrete**

### **GENERAL**

Molith<sup>®</sup>MC is a free flow, shrinkage compensated, single component microconcrete used in high volume repairs of concrete structures.

### **TYPICAL APPLICATIONS**

- Repairs of slabs, beams, columns of buildings, basement.
- Repairs of foundations, marine structures, bridge decks, piers, cooling towers & chimneys.
- For large pockets in machine base plates, cranes & transporter rails, steel rolling mill beds etc.

### **ADVANTAGES**

- Non-shrink, fills voids and gaps without shrinkage. Reduced cracking.
- Excellent flow characteristics. No need for external aids like rodding, poking, chaining etc.
- Chloride free. Does not cause corrosion of reinforcement.

### **TECHNICAL DATA**

| Compressive strength<br>(Typical value) | Age (days) | Compressive strength N/mm <sup>2</sup><br>min 40 |
|---|------------|--|
| Packing                                 | 28         | 25 kgs bag                                       |
| Shelf life                              | 6 months   |  |

### **APPLICATION METHODOLOGY**

- All areas of application shall be free from oily residues, dust and loose particles.
- Corroded reinforcement shall be cleaned thoroughly and treated with anti corrosive coating Feovert<sup>®</sup> & IPNet<sup>®</sup>-RB.
- The substrate to be treated shall be wetted with clean water (Saturated surface dry condition) prior to placement.

### **MIXING**

Use 25 kgs of Molith<sup>®</sup>MC bags once opened. Pour mixing water gradually into Molith<sup>®</sup>MC in a standard mixer until required consistency is achieved. For 25 kgs mix water requirement will be typically 3.0 to 3.5 ltrs. For larger volumes use concrete mixer.

### **STORAGE**

Keep in dry place.

### **REPAIR PLACEMENT**

Place the Molith<sup>®</sup>MC mix by shuttering and casting technique with suitable compaction.

### **CURING**

Use damp Hessian and polythene sheet.

### **Storage & Handling:**

Store the material in a cool place away from direct sunlight or any source of ignition and fire. Keep away from the reach of children in a well ventilated place.

### **Health & Safety Precautions:**

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## **EPCO<sup>®</sup>-KP-250/HP-250**

**Low Viscosity Epoxy Injection System**

It is a low viscosity epoxy resin system comprising of **RESIN : KP-250** and **HARDENER : HP-250**. This system has an excellent bond with the concrete structures and by virtue of its low viscosity it can penetrate into the finer cracks present in the concrete.

### **TYPICAL APPLICATIONS**

- For repairs of deteriorated concrete structural elements for strength and durability.
- To create proper bond between separate concrete elements.
- Grouting of honeycombs and cavities in concrete structures and grouting baseplates of machine foundations.

### **UNIQUE ADVANTAGES**

- Has an excellent bond with the concrete structures.
- By virtue of its low viscosity, it can penetrate into the finer cracks present in concrete.
- As the system is non-shrinking and has excellent bond with concrete, the original strength of concrete is restored.

### **APPLICATION PROCEDURE**

- The cracks and openings at junctions shall be cleaned for placing injection nipples. Thereafter the injection points placed approx. between 150 mm to 300 mm and shall be drilled to the depth of 75 mm to 125 mm. All the dust and loose particles shall be cleaned from the drilled points.

- Injection nipples be placed and grouted with non-shrinking epoxy putty/grout (HV grade). Even the cracks or openings between the injection points shall be sealed with putty.
- Using specialized injection instrument (ROHIBB INJECTOR) low viscosity grout (KP-250 and HP-250) shall be injected through nipples. The process shall continue till the firm resistance from the surface is received. The pressure of injection may vary from 4 kg/cm<sup>2</sup> to 7 kg/cm<sup>2</sup>.

### **TECHNICAL DATA**

|                               |                                    |
|-------------------------------|------------------------------------|
| Base                          | Epoxide Resin<br>(Two Component)   |
| Mix Proportion<br>(By weight) | KP-250 : HP-250<br>2 : 1           |
| Setting Time                  | 10 hours at ambient temperature    |
| Application                   | Pneumatic pressure grouting        |
| Curing                        | 24 hours in air                    |
| Viscosity                     | 300 – 500 cps                      |
| Pot Life                      | 45 min. for 1 kg mix               |
| Shelf Life                    | 1 year in tightly sealed container |
| Packing                       | 3 kg, 90 kg                        |
| Cleaning                      | Thinner T-50                       |

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## **EPCO®-KP-200**

**Bipolar Concrete Penetrating Corrosion Inhibiting Admixture (CPCIA)®**

EPCO®-KP-200 is a hi-tech corrosion inhibitor system that works on the Bipolar Inhibition Mechanism (B. I. M.)®. B. I. M.® inhibits corrosion of steel in concrete at both the poles, cathodic & anodic simultaneously.

EPCO®-KP-200 by virtue of its high vapour pressure & affinity for the embedded metal diffuses through densest concrete to reach the corroding steel. The migration of EPCO®-KP-200 takes place over a prolonged period of time and hence this molecular layer shall continue to protect rebar by its constant presence.

### **TYPICAL APPLICATIONS**

Protection of concrete structures, RCC elements/structures exposed to corrosive environment, Marine structures, structures exposed to saline atmosphere, coastal structures, sewerage systems, etc. like bridges, jetties, docks, mooring berths, railway sleepers, chlorinating plants, swimming pools, chimney, cooling towers, power plants, pipelines, etc.

### **UNIQUE ADVANTAGES**

- Penetrates to rebar over a prolonged period and arrests corrosion of rusting steel.
- Non-toxic, eco-friendly.
- Nitrite and chromate free.
- Non-deleterious unlike conventional rust converters.
- Effective even in the presence of high amount of chlorides.
- Does not affect bond strength of new concrete to reinforcement bars.
- Does not entrain air.
- Does not affect mechanical strength characteristics of concrete/mortar.

### **APPLICATION PROCEDURE**

EPCO®-KP-200 be used as an admixture, by adding into wet concrete mix along with batch water during the mixing of cement, sand, aggregate before placement or pouring into transit mixer to impart corrosion protection to the embedded reinforcement.

The batch water shall be calculated accounting for the quantity of EPCO®-KP-200 to be added at 2 kgs per cubic meter.

### **TECHNICAL DATA**

|                               |  |
|-------------------------------|--|
| Base                          | Water based organic corrosion inhibitor.   |
| Colour                        | Brownish   |
| Specific Gravity              | 1.04 – 1.06 at 25°C  |
| Viscosity at 25°C             | 10 -20, sec by Ford Cup B-4  |
| Mixing                        | EPCO®-KP-200 may be added with concrete batch water. It should not be mixed with any other admixtures prior to being introduced into the concrete mixer.   |
| Effect on concrete properties | No change in physical properties in fresh & hardened concrete in the absence of any other admixtures. However it is essential to carry out trial mix with desired admixtures along with EPCO®-KP-200 |
| Tropical Compatibility        | No change in effectiveness at elevated temperatures at 60°C  |
| Storage & Handling            | Store in a cool place away from direct sunlight. In case of spillage wash with water thoroughly  |
| Point of Addition             | Addition into wet concrete. Mix along with batch water or at the time of discharge.  |
| Chlorides, Nitrates, Suphates | Negligible   |
| Properties                    | Conforms to ASTM-G-109. Rate of corrosion with EPCO®-KP-200 after 09 cycles is 0.50 coulombs max compared to control sample without CPCIA® having a standard value of 25 coulombs.                   |
| Dosage                        | 2 kgs per cubic meter of concrete  |
| pH                            | Minimum 9.0  |
| Shelf Life                    | 12 months in closed containers   |
| Packing                       | 30 kg, 225 kg  |

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**STRUCTURAL AUDIT OF OVERHEAD WATER RESERVOIRS AND SUMPS IN BHEL  
TOWNSHIP AREA AND WATER RESERVOIRS IN JAIL HILL FILTRATION PLANT**

**S.P. BAGWE  
CHARTERED ENGINEER**



## **GOLDBOND®-SUPERPLATE**

### **TECHNICAL DATA**

|                           |   |
|---------------------------|---|
| Grade                     | P-2550                                  |
| Material                  | E-Glassfiber reinforced in epoxy matrix |
| Dimensions                | 2.5 mm (Thickness) x 50 mm (width)      |
| Volume fraction of fiber  | 65% minimum                             |
| Modulus of elasticity (E) | 41 GPa                                  |
| Tensile Strength          | 690 MPa                                 |
| Elongation at break       | 2%                                      |
| Shelf life                | Unlimited at room temperature           |

The above properties are for longitudinal direction of fibers.

#### **Storage & Handling:**

Store the material in a cool place away from direct sunlight or any source of ignition and fire. Keep away from the reach of children in a well ventilated place.

#### **Health & Safety Precautions:**

Wear protective gloves, goggles, and nose masks while handling and using the material. In case of splashes on the skin and contact with eyes wash thoroughly with plenty of water. In case of ingestion and inhalation remove the personnel to fresh air. Seek medical advice in all the above cases. The disposal of excess or spilled material shall be carried out in accordance with local regulations.

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## GOLDBOND® 1893-Putty

GOLDBOND®-1893-Putty is a two component thiotropic solvent free, non-shrinking epoxy adhesive with high modulus property.

### TYPICAL APPLICATIONS

- For filling cracks, voids of concrete substrate.
- For bonding precast segments.
- For joint sealing in between the segments.

### UNIQUE ADVANTAGES

- Can be applied to wet and damp surfaces.
- Hardening is not affected by high humidity.
- Hardens without shrinkage.
- High modulus and high compressive strength, non-sag adhesive suitable for vertical and overhead applications.

### SURFACE PREPARATION

Prepare substrate for optimum adhesion by abrading / wire brushing. Surfaces must be clean and free from any bond breaking material such as oil, grease, laitance or loose particles.

### MIXING

Add component B to component A and mix thoroughly for 5 minutes until a uniform grey colour is obtained. Allow it to remain for 5 minutes.

### APPLICATION

GOLDBOND®-1893-Putty can be applied by trowel spatula or with a gloved hand.

### CLEANING

Clean tools with T-50.

### TECHNICAL DATA

|                         |  |
|-------------------------|--|
| Mixing                  | Part A : Part B<br>(Base) : (Curing Agent)<br>1 : 1 (parts by wt.) |
| Colour                  | Grey   |
| Pot Life<br>at 25° C    | 30 min – 35 min for 100 gms mix                                    |
| Compressive<br>Strength | 550 kg / cm <sup>2</sup>   |
| Packing                 | 2 kg   |
| Shelf Life              | 12 months  |

### Storage & Handling:

Store the material in a cool place away from direct sunlight or any source of ignition and fire. Keep away from the reach of children in a well ventilated place.

### Health & Safety Precautions:

Wear protective gloves, goggles, and nose masks while handling and using the material. In case of splashes on the skin and contact with eyes wash thoroughly with plenty of water. In case of ingestion and inhalation remove the personnel to fresh air. Seek medical advice in all the above cases. The disposal of excess or spilled material shall be carried out in accordance with local regulations.

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CHARTERED ENGINEER**



**Storage & Handling:**

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**CHARTERED ENGINEER**



**SURFACE PREPARATION**

Concrete to be treated shall be free from oil residues, demoulding agents, curing compounds, grouting lines and protrusions. The concrete surface to be wrapped shall be structurally repaired prior to treatment for corrosion induced damage / structural damage by epoxy / monomer grouting and epoxy / polymer modified mortar repair systems. Depressions in the concrete shall be filled by Goldbond®1893 Putty. Differences in concrete levels shall not be more than 1 mm. Corners shall be rounded with Goldbond®1893 Putty with a radius of 25 mm minimum.

**MIXING & APPLICATION**

Mix Goldbond®1893 Primer in specified proportion and stir thoroughly for 5-10 minutes with a clean stirrer in preferably a plastic container. Allow the mixed material to remain for 5-10 minutes before taking up for application over the prepared surface. Apply the mixed Goldbond®1893 Primer by roller or by brush and follow it up by mixing and applying Goldbond®1893 Putty adhesive by trowel preferably within 30 to 40 min. Coverage will vary according to substrate profile.

Application of Goldbond®1893-Superwrap / Goldbond®1893-CF sheet shall be done subsequently over 1<sup>st</sup> coat application of saturant. The Goldbond®1893-Superwrap / Goldbond®1893-CF sheet shall be squeezed in the longitudinal direction of the fibers using roller and rubber spatula. Squeeze out the resin through the fiber as much as possible. Apply additional saturant at the overlap interface. Apply second overcoat of Saturant as above and allow it to cure.

Precaution shall be taken to eliminate air gaps underneath the Goldbond®1893-Superwrap / Goldbond®1893-CF. In case where more than 1 layer of Goldbond®1893 Superwrap / Goldbond®1893-CF shall be applied the same method as above shall be repeated.

Finish coat (Goldbond®1893-PU) / Monopol®-456 shall be applied wherever the structures are exposed to sunlight within 2 days of applying the top coat of saturant.

In case of application of multiple plies, the proper procedure is to apply only one ply per day. The previous ply must be dry and be inspected for any air pockets, bubbles or areas of non adhesion and repaired.

**Repair procedure for air pockets, bubbles and areas of non-adhesion.**

**Small areas:** Cut the affected areas on the longitudinal axis and apply saturant generously to the area until properly adhered.

**Large areas:** Cut and remove the affected area and re-apply an overlapping section to cover the exposed area (overlap must exceed 10cm).

**Additional Information:** The epoxy binder in the system does withstand upto 70° C in wrapping application like chimneys.

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**GOLDBOND® 1893-PRIMER & SATURANT**  
Epoxy Primer & Saturant System for E-Glass / Carbon Fibre Applications On Concrete

Goldbond®1893 is a 2 part specialty system comprising of a primer part and a saturant part. Goldbond®1893 Primer is comprised of a base and curing agent. Goldbond®1893 Saturant is also comprised of a base and curing agent.

**TYPICAL APPLICATIONS**

In wrapping of unidirectional e-glass fiber sheets / carbon fiber sheets to concrete structural elements for structural strengthening and seismic retrofitting applications.

**TECHNICAL DATA**

| Properties  | Goldbond®1893-Primer                           | Goldbond®1893-Saturant                         |
|---|--|--|
| Base  | Epoxide Resin                                  | Epoxide Resin                                  |
| % Solids  | 100  | 100  |
| Mix Proportion(By Weight)                                   | Part A (Base) : Part B (Curing Agent)<br>1 : 1 | Part A (Base) : Part B (Curing Agent)<br>1 : 1 |
| Colour  | Pale Yellow / Clear                            | Dark   |
| Theoretical Coverage (on smooth concrete) For E-Glass Fiber | 4-6 sq.mt / kg                                 | 0.75-1.0 sq.mt / kg                            |
| Theoretical Coverage (on smooth concrete) For Carbon Fiber  | 4-6 sq.mt/ kg                                  | 1.5-2.0 sq. mt/ kg                             |
| Pot Life  | 45 min at 30° C                                | 45 min at 30° C                                |
| Shelf Life  | 12 months                                      | 12 months                                      |
| Tack free time  | 1-2 hours                                      | 1-2 hours                                      |
| Recommended No. of Coats                                    | 1  | 2  |
| Overcoat Time   | Putty 30 minutes<br>Saturant : 4 hrs min       | 30 min to 3 hrs between two coats of Saturants |
| Packing   | 10 kg, 60 kg                                   | 10 kg, 60 kg                                   |

| Cast epoxy material Properties |                   |                    |
|--------------------------------|-------------------|--------------------|
| Property                       | Method            | Typical Test Value |
| Compressive Strength           | ASTM-D-695        | 70 MPa             |
| Tensile Strength               | ASTM D-638 Type 1 | 50 MPa             |
| Tensile Modulus                | ASTM D-638 Type 1 | 3.2 GPa            |
| Elongation %                   | ASTM D-638 Type 1 | 5                  |
| Flexural Strength              | ASTM D-790        | > 40 MPa           |
| Flexural Modulus               | ASTM D-790        | 3.12 GPa           |

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**S.P. BAGWE  
CHARTERED ENGINEER**



## **FeoVert®**

**Alkaline Rust Converting Primer**

FeoVert® is a single pack alkaline waterbased rust converting primer which is designed for application on rusted steel surfaces to form a complex iron compound. The unique deoxygenating agent formed during application of FeoVert® converts the rust into corrosion resistant, insoluble and adherent layer by reacting with the oxygen present on the surface.

### **UNIQUE ADVANTAGE**

- FeoVert® is waterbased and free from mineral acids (as in conventional rust convertor) making it safer for application and for the environment.
- Gives off no fumes, ideal for use in enclosed spaces.
- Alkaline in nature and safer to concrete and embedded steel in concrete.
- Converts both haemetite and magnetite forms of rust.

### **APPLICATION PROCEDURE**

- Remove loosely held rust using a hand wire brush gently, but leave behind the layer of rust directly attached to the underlying steel.
- Ensure removal of oil or greasy residues if any with strong detergent and wash with clean water. Allow it to dry.
- Apply the FeoVert® using a brush or spray.
- Apply minimum 1 coat. Preferably two coats when heavy rust is present.
- Curing time for each coat 6 – 8 hours.

### **TECHNICAL DATA**

|             |                       |
|-------------|-----------------------|
| Base        | Organic (Water Based) |
| Appearance  | Dark brown            |
| Coverage    | 8-10 sq.mt./lt.       |
| pH          | Alkaline              |
| Flash Point | Not applicable        |
| Packing     | 500 ml, 5 lt, 30 lt   |
| Cleaning    | Water                 |
| Shelf Life  | 12 months             |

### **Storage & Handling:**

Store the material in a cool place away from direct sunlight or any source of ignition and fire. Keep away from the reach of children in a well ventilated place.

### **Health & Safety Precautions:**

Wear protective gloves, goggles, and nose masks while handling and using the material. In case of splashes on the skin and contact with eyes wash thoroughly with plenty of water. In case of ingestion and inhalation remove the personnel to fresh air. Seek medical advice in all the above cases. The disposal of excess or spilled material shall be carried out in accordance with local regulations.

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**S.P. BAGWE  
CHARTERED ENGINEER**



## **EPIBOND-21**

**Bonding new to old concrete**

**EPIBOND-21** is used to bond fresh concrete to concrete that is fully cured.

**EPIBOND-21** will give monolithic bond capable of transmitting high stresses. In addition, **EPIBOND-21** possesses excellent water and alkali resistance.

### **TYPICAL APPLICATIONS**

- Concrete jointing (cold joints) and for repairs using cement plaster/guniting.
- Reinforcing existing concrete structure or elements and also in jacketing of columns.
- Waterproof joints (Sandwich Layer).

### **UNIQUE ADVANTAGES**

- Excellent bonding agent between New and Old concrete.
- Conforms to ASTM-C-882-91.

### **APPLICATION PROCEDURE**

- To obtain good adhesion it is necessary to have a clean and sound substrate, which can be obtained by grinding, wire brushing, chipping, sandblasting, etc.
- Mix **EPIBOND-21** thoroughly in the prescribed proportion and apply on the clean and sound substrate.

- Apply concrete/cement plaster/guniting on the tacky **EPIBOND-21** layer which would be achieved approximately after 30 minutes of application and under any circumstances within one hour.
- Best results are obtained when w/c ratio of the new concrete is as low as practicable.

### **TECHNICAL DATA**

|                               |  |
|-------------------------------|--|
| Base                          | Epoxy Resin<br>(Two Component)                               |
| Appearance                    | Dark Yellow to Brownish                                      |
| Coverage                      | 2.5 - 3.5 m <sup>2</sup> /kg. depending upon surface quality |
| Mix proportion<br>(By Weight) | Base : Curing agent<br>2 : 1                                 |
| Pot Life                      | 30 minutes for 3 lt mix at 25 <sup>o</sup> C                 |
| Application                   | By brush after thorough surface preparation                  |
| Shelf Life                    | 1 year in tightly sealed container                           |
| Packing                       | 90 kg  |
| Cleaning                      | Thinner T-50   |

### **Storage & Handling:**

Store the material in a cool place away from direct sunlight or any source of ignition and fire. Keep away from the reach of children in a well ventilated place.

### **Health & Safety Precautions:**

Wear protective gloves, goggles, and nose masks while handling and using the material. In case of splashes on the skin and contact with eyes wash thoroughly with plenty of water. In case of ingestion and inhalation remove the personnel to fresh air. Seek medical advice in all the above cases. The disposal of excess or spilled material shall be carried out in accordance with local regulations.

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**S.P. BAGWE**  
CHARTERED ENGINEER



## CORROSEAL

**CORROSEAL** is a two pack polyamide cured air drying epoxy compound. **CORROSEAL** has excellent resistance to corrosion.

### TYPICAL APPLICATIONS

- Protection of Concrete & Steel structures. Typically Bridge Decks, Piers, Foundations, Marine Structures, Water Retaining Structures, Cooling Towers, Chimneys etc.
- Protective coatings to Metal Pipes, Frames, Grills, Tanks, Manhole covers, Drainage systems, M. S. Pile Liners.

### TYPICAL INDUSTRIES

- Pipelines.
- Fertilizer Plants.
- Refineries & Petrochemical Complexes.
- Power Projects
- Pulp, Paper, Rayon units.
- Sugar Industries.
- Port (off-shore installations)
- Infrastructure Projects

### APPLICATION PROCEDURE

Mix **CORROSEAL** Base & Curing agent in prescribed proportion by volume and allow it to remain for 10 minutes before application. Apply 2-3 coats of Corroseal with a time interval of 24 hours between coats.

### TECHNICAL DATA

|                          |  |
|--------------------------|--|
| Base                     | Epoxide Resin  |
| Mixing Ratio (By Volume) | Base : Curing Agent<br>1 : 1   |
| Pot life                 | 45 minutes at 25° C for 1 lt mix   |
| Appearance               | Grey, Yellow, Red, off white/ Clear  |
| Application              | By brush / spray   |
| Cleaning                 | Thinner T-50   |
| Coverage                 | 5-6 sq.mt./lt/coat on smooth concrete surface<br>6-7 sq.mt./lt/coat on steel |
| Curing                   | Air curing   |
| Adhesion                 | 30 kg/ cm <sup>2</sup>   |

### Storage & Handling:

Store the material in a cool place away from direct sunlight or any source of ignition and fire. Keep away from the reach of children in a well ventilated place.

### Health & Safety Precautions:

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QT/16/APRIL/2015 - 16

Date: 5<sup>th</sup> May, 2015

To,  
S.P Bagwe Consultants Pvt. Ltd.  
B/11, Sahar CHS,  
Andheri Sahar Road, Parsiwada  
Andheri (E)  
Mumbai - 400099  
Email: erspbagwe@gmail.com

Sub: Quote for the supply of Construction Chemicals for BHEL Project

Dear Sir,

With reference to your mail dt. 04.05.2015, regarding the above, we offer our most competitive rates as under :

| Quotation  |   |                 |                          |      |        |        |
|--|---|-----------------|--------------------------|------|--------|--------|
| NAME OF PROJECT :- RETROFITTING / STRUCTURAL REPAIRS TO OVERHEAD WATER RESERVOIRS AND SUMPS IN BHEL TOWNSHIP AREA AND WATER RESERVOIRS AT JAIL HILL FILTRATION PLANT AT BHOPAL, (M.P.) |   |                 |                          |      |        |        |
| Sr.No.   | Description                                 | Make            | Name Of Product          | Unit | Rate   | Remark |
| 1  | Rust Remover                                | Krishna Conchem | Fevovert                 | Lit. | 255.00 |        |
| 2  | Anti-corrosive                              | Krishna Conchem | Corrozeal Rust Converter | Lit. | 315.00 |        |
| 3  | Corrosion Inhibitor                         | Krishna Conchem | EPOC KP-200              | Lit. | 765.00 |        |
| 4  | Micro concrete                              | Krishna Conchem | Molith MC                | Kg.  | 42.00  |        |
| 5  | Thixotropic Mortar                          | Krishna Conchem | Molith PMM               | Kg.  | 33.00  |        |
| 6  | Epoxy Bond Coat                             | Krishna Conchem | Epibond - 21             | Kg.  | 485.00 |        |
| 7  | SBR Polymer Latex                           | Krishna Conchem | Monobond SBR             | Kg.  | 228.00 |        |
| 8  | Low Viscosity Epoxy Grout                   | Krishna Conchem | EPCO KP/HP-250           | Lit. | 650.00 |        |
| 9  | Epoxy Putty                                 | Krishna Conchem | Goldbond 1893 Putty      | Kg.  | 350.00 |        |
| 10   | E Glass 900 GSM                             | Krishna Conchem | GOLDBOND 1893 WRAP       | Sqm. | 475.00 |        |
| 11   | Saturant                                    | Krishna Conchem | GOLDBOND 1893 SATURANT   | Lit. | 750.00 |        |
| 12   | Primer                                      | Krishna Conchem | GOLDBOND 1893 PRIMER     | Lit. | 470.00 |        |
| 13   | Glass Laminate 50x2.5mm                     | Krishna Conchem | Goldbond Superplate      | Rmt. | 750.00 |        |
| 14   | Waterseal Epoxy Stearate Food Grade Coating | Krishna Conchem | Waterseal                | Lit. | 550.00 |        |
| 15   | Aliphatic Acrylate Coating                  | Krishna Conchem | Monopol-456-W            | Lit. | 500.00 |        |

Best Regards

For Krishna Conchem Products Pvt. Ltd.,



B / 11, SAHAR SOCIETY, PARSIWADA, ANDHERI (E), MUMBAI - 400099



**STRUCTURAL AUDIT OF OVERHEAD WATER RESERVOIRS AND SUMPS IN BHEL  
TOWNSHIP AREA AND WATER RESERVOIRS IN JAIL HILL FILTRATION PLANT**

**S.P. BAGWE  
CHARTERED ENGINEER**



05.5.2015

To,  
S.P. BAGWE  
B/11, Sahar CHS,  
Parsiwada,  
Andheri (E),  
Mumbai - 400099

Subject: - RETROFITTING / STRUCTURAL REPAIRS TO OVERHEAD WATER RESERVOIRS AND SUMPS IN BHEL  
TOWNSHIP AREA AND WATER RESERVOIRS AT JAIL HILL FILTRATION PLANT AT BHOPAL, (M.P.)

Dear Sir,

Kindly find attached the rates for the grouting chemical for application in dry area  
and overhead application

| Sr.No | Description                   | Make  | Name<br>of<br>Product | Unit | Rate<br>(INR) | Remark                |
|-------|-------------------------------|-------|-----------------------|------|---------------|-----------------------|
| 1     | HILTI<br>Grouting<br>Chemical | HILTI | HY 200                | 1 ml | 8.3 / -       | Inclusive<br>of Taxes |

Assuring you of our best attention at all times.

Yours faithfully,  
For HILTI India Pvt Limited.



Abhijit Majumdar  
Key Account Consultant

B / 11, SAHAR SOCIETY, PARSIWADA, ANDHERI (E), MUMBAI - 400099