GE/MAT/24/088: Duvha Power Station Corrosion Protection Specification for Acid Proofing of Sulphuric Acid Bund

Where conflict/contradiction exists between any of the referenced standards, this specification, Contractor Procedures or Product Manufacturer requirements then the more stringent requirement shall apply.	
This specification shall be read in conjunction with "GE/MAT/24/089: Duvha P/S Corrosion Protection Specification for Acid Bund Structural Steel" and 240-101712128: Standard for the internal corrosion protection of water systems, Chemical Tanks and Vessels and Associated Piping with Coatings [3] and 240-106365693: Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings [4].	
Acid Proof Brick/Tile System for Acid Bund Floors, Walls and Plinths	
Environment	Bund Concrete and Plinth surfaces exposed to splash and spill by: Sulphuric Acid: Concentration (1.5 – 3.2% and 96%), pH 0.6.
Existing (Material/Substrate)	Concrete either new (concrete rehabilitation) or existing. In the case of existing concrete these surfaces may still be coated/lined/tiled etc.
Bund (Dimensions)	As per Scope of Work document [2].
Generic System Required	Chemically Resistant (Acid and Base) Brick/Tiling.
Surface Preparation: (Pre-Cleaning)	Removal of all existing linings, coatings, mortar and adhesives shall be by mechanical means i.e., chopping, chisels, scrapers etc.
Surface Preparation: (Post-Cleaning of existing concrete or after concrete repair/rehabilitation)	Any remaining remnants, after the step above, i.e., shall be removed by Low Pressure (LP) Water Cleaning: > 300 Bar. • In cases where concrete repair/rehabilitation is required, refer to Section 4.1 of [5]. These repairs shall be performed before proceeding with the following steps: • Lime washing of the substrate. • Repeated Low Pressure Water Cleaning: > 300 Bar. • Abrasive grit blasting may be considered as a last option, should the above not be able to produce the Manufacturer's surface profile requirements. For abrasive grit blasting requirements refer to GE/MAT/24/089.
(Vacuuming)	On completion of steps above and a suitable drying period the surface shall be thoroughly vacuumed until no loose dust is evident.

All primers, organic lining systems shall be solvent free or as a minimum > 80% solids content.	
Concrete Primer	Two component low viscosity moisture tolerant concrete penetrant primer applied by brush and roller. The primer shall be specifically designed for concrete with additional moisture tolerant properties. (Coating thickness as per the Manufacturer's Product Datasheet)
Intermediate Coating/Lining and Membrane Materials.	Several options are available to establish the membrane part of the system before tiling. These include: 1) One or more coats of a Fibreglass/Fibre Reinforced Plastic (FRP) either by a glass flake filled, shopped strand or glass fibre bandage/tissue, with a chemical resistant Vinyl-Ester, Poly-Ester, Phenolic, Bisphenol Epoxy or Epoxy Novalac coating/lining system. 2) Rubber sheeting or Polyisoisobutilene sheeting. The bond between the chosen system (1) above will require a chemical bond to the primer and a chemical/mechanical bond to the next layer of brick/tiling mortar. (2) above will require a mechanical bond by adhesives to the primer as well as a mechanical bond before application of mortar. The preceding coating/lining or adhesive prior to mortar application, shall be applied and finished off by the addition of a Broad Cast aggregate to ensure a mechanical bond with the mortar.
Lining All surfaces of the bund and plinths. (Fibre Reinforced Plastic – FRP Coating/Lining System)	After allowing sufficient time for the primer coat to cure (the Manufacturer's recommendations shall be adhered to in this regard both for minimum and maximum over-coating times), apply on all floor/wall surfaces two coats of a chemical resistant Vinyl-Ester, Poly-Ester, Phenolic, Bisphenol Epoxy or Epoxy Novalac coating/lining system, containing either glass flake, chopped strand or a glass fibre bandage/tissue of no less than 300 g/m^2 of reinforcing, per coat. The glass fibre bandage/tissue system shall be completely saturated with the chosen chemically resistant coating/lining system. The total dry film thickness (DFT) of all coats above shall be > 3mm and shall be determined by calculation of the particular coating spread rate.

Lining All surfaces of the bund but excluding the horizontal/top surfaces of plinths and bases. (Rubber sheeting or Polyisoisobutilene sheeting)	Where a rubber lining is selected by the Contractor then the rubber shall be pre-cured Butyl Rubber Lining (Grade B): 50 - 70 IRHD as per SANS 1198. The adhesion of the rubber lining to substrate shall be ≥ 1.5 kN/m. The rubber lining thickness shall be a minimum of 3 mm. Over and above the Broad Cast aggregate the Contractor shall be responsible for the selection of all suitable adhesives for sheeting systems/rubber lining, as per the Manufacturer's product datasheet, and shall produce evidence that the adhesive system will produce the required bond.
Mortar (Tiling/Brick Installation)	After allowing sufficient time for the intermediate above to cure (the Manufacturer's recommendations shall be adhered to in this regard both for minimum and maximum over-coating times), apply a chemical resistant Vinyl-Ester, Poly-Ester, Phenolic, Bisphenol Epoxy or Epoxy Novalac mortar and install the chemical resistant tiles/bricks, which shall conform to ASTM Specification C-279-88, Type III. The thickness of the shall be between 15 mm and 40 mm. The Contractor shall propose (with relevant case studies) a procedure for filling of defects in the concrete substrate, sealing of joints and cracks and construction joint systems with a detailed description of bond breaker system/laminate/fibreglass systems etc. for these areas. This shall be a requirement in terms of the method statement as required in the "Tender Returnables" section below.
Grouting and pointing	Grouting and pointing shall be based on chemically resistant Vinyl-Ester, Poly-Ester, Phenolic, Bisphenol Epoxy, Epoxy Novalac or Elastomeric Polyurethane/Polyurea coating/lining systems.

General Requirements

1. In the applications mentioned above (for concentrated and dilute sulphuric acid environments) only chemical resistant brick/tiling systems shall be used after intermediate coat/s, etc. as detailed above.
2. This specification considers the steps/aspects to be followed on a sound concrete substrate i.e., surface preparation for corrosion protection. It does not consider or include any civil concrete repair, reinstatement or rehabilitation and assumes a sound existing or new concrete substrate after repair/rehabilitation. For all concrete and civils aspects refer to References [5] below.
3. Cleaning of any concrete surfaces/substrates by acid etching methods are strictly prohibited.
4. With respect to aspects not mentioned in the above specification table (e.g., mixing ratios, pot life, straining, thinning, induction times, over-coating and curing times), the Manufacturer's recommendations shall be strictly adhered to.
5. The supply and cost of all testing, inspection and specialized testing equipment shall be the Contractor's responsibility. QC shall be performed by the Contractor and/or system Manufacturer and the Quality Assurance inspection shall be conducted by Eskom.
6. The Contractor shall make provision for a third-party inspector with NACE Level 1 or SAQCC Level 2 qualifications.
7. The Contractor shall be responsible for any tiling/brick and lining system damage caused during the execution and completion activities and will be required to perform the required repairs.
8. The Contractor shall be responsible for all site clearing activities such as removal of rubble, debris, empty product tins, used and un-used grit.
9. A detailed visual inspection shall be carried out by the Contractor to inspect the concrete surfaces to ensure that they are suitable for receiving the proposed corrosion protection system. Any area found to be unacceptable shall be immediately brought to the attention of the Eskom Engineer.
10. The Contractor shall ensure that the systems proposed shall be suitable for use in the expected environments.
11. The Contractor shall compile a detailed application procedure/method statement in respect of concrete surface preparation, membrane laying, tile bedding/brick laying, joint formation and pointing application. The procedure/method statement shall include a repair procedure in the event of system damage during application.
12. These recommendations shall be strictly adhered to during the application of all systems and will form the basis of quality control steps, testing and interventions.
13. The detailed application procedure/method statement shall prescribe the filling of defects in the concrete substrate, sealing of joints and cracks and construction joint systems with a detailed description of bond breaker/laminate/fibreglass systems etc. for these areas.

14. For unavoidable concrete/steel interfaces such as piping/laterals penetrations in the bund area the Contractor shall propose suitable jointing systems/sealants. Viscous-elastic, poly-isobutene mastic pastes or tape with an outer wrap of polyester or Vinyl-Ester is recommended. The joint configuration shall be described by a drawing and shall be compatible with the environment and the lining system.

15. At all times care shall be taken to ensure adequate protection of any surfaces and parts of plant components or systems not requiring washing, blast cleaning and/or corrosion protection.

16. The Contractor and coating Manufacturer shall include in the Tender Returnables, individual Product Data Sheets for all products, comprising the systems i.e., concrete primer, adhesives, membrane, mortar, grout pointing material and brick/tile and construction joint systems which shall contain the following as a minimum:

- A description of the generic type of product for component in the system.
- Recommended and non-recommended uses.
- Service temperatures and chemical resistance limits.
- Confirmation that the intended products are suitable for the method of application, as specified in the table above.
- Confirmation that the product is suitable for the areas/environments, as specified in the table above.
- Shelf life at 25°C.
- Volume Solids.
- Flash Point °C for solvent borne products.
- Maximum % of Solvent Addition permitted.
- Surface preparation requirements; namely blast cleanliness, profile and dust and debris.
- Mixing instructions.
- Recommended method of coating application.
- Requirements with respect to roller and brush application.
- Minimum Dust Dry Time at 15°C & 25°C.
- Minimum Overcoating Time at 15°C & 25°C.
- Maximum Overcoating Time at 15°C & 25°C (without special surface preparation between coats).
- Minimum and maximum recommended DFT per coat.
- If applicable, induction time.

- Pot life at 15°C & 25°C.
- Recommended minimum and maximum ambient and surface temperatures during application.
- Recommended maximum Relative Humidity (RH)%.
- Recommended Dew point maximum (°C) above substrate temperature.
- Maximum and Minimum DFTs for each of the different products in the system.
- All relevant information the Manufacturer deems relevant for the product.
- Specifically for tile and brick provide confirmation that the mechanical/chemical resistance properties are in accordance with ASTM C 279-79 type 111 as follows:
  - Chemical Composition analysis
  - Water Absorption max 1.5 %
  - Acid Solubility Test max 8 %
  - Modulus of Rupture > 6.9 MPa.
  - Adhesive Strength to Concrete > 1 MPa.

17. The Manufacturer Product Datasheets for all corrosion protection systems and products for coating, lining materials, adhesives, mortars, grouting and pointing sealants and fillers, shall be submitted as a Tender Returnable. The Product Data Sheet/s shall be signed by the Manufacturer and Contractor, clearly indicating the signatory's name and date of signature. This is to ensure that the Manufacturer is aware of this specification, the conditions under which it will be applied and to allow for technical back-up where required.

18. The signed Product Data Sheet/s shall be deemed to be a binding reference document (as part of the QCP). It shall be specific to this project, any further/other subsequent revisions of the Product Data Sheet/s shall be submitted to Eskom for reacceptance clearly stating the variations/deviations. No further use/application of the related product, for this project, is permitted until acceptance is granted by the Eskom Engineer.

19. The Contractor/Manufacturer shall indicate the surface condition required before chemical resistant lining application i.e., surface finish by wooden float/steel float and % slope of concrete substrate.

20. Prior to project execution, batch certificates, expiry dates, dates of manufacture, of each product shall be provided to the Eskom Engineer.

21. All coating materials shall be delivered in the Manufacturer's original containers, clearly marked with the following:
    - Manufacturer's name.
    - Product brand and reference number.
    - Batch number which shall incorporate the date of manufacture.

- Abbreviated instructions for storage and use of material, which shall include mixing ratios of the components of multi-component materials, minimum and maximum temperature of application and the method of application.
- The South African Bureau of Standards (SABS) mark or a SANS 9001 certificate where applicable.

22. All Coating materials shall be supplied in sealed, robust containers of a size large enough to allow mixing in the containers and labelled with all the information necessary to ensure coating storage, application, and traceability.

23. The containers shall be kept in approved stores which are dry, enclosed, covered, and kept at a temperature compatible with the required preservation of their contents.

24. If any container shows traces of leakage before use on site, the contents of that container shall not be used.

25. All painting materials on site shall be stored in designated areas in storage facilities that meet the storage requirements of the paint Manufacturer and the safety requirements of the specific site. The Contractor shall be responsible for the provision of appropriate storage/shipping containers as required. These containers shall include the appropriate refrigeration/conditioning systems for temperature control. This requirement shall be dependent on where the container will be located (indoors/outdoors), typical ambient temperature for the season of the year and the maximum storage temperature limits as per the Manufacturer's recommendations.

26. Store containers in cool well-ventilated areas away from the sun, heat, sparks, and open flames. The ideal storage temperature is between 10 to 30ºC.

27. Store containers away from oxidising agents and other incompatible substances.

28. The individual coats/membrane and final DFT of the applied system shall comply with the limits as recommended in the latest Product System Data Sheet and this specification.

29. Where excessive film thicknesses can be detrimental to the integrity of the coating, the Manufacturer's recommended maximum shall apply. In this situation the Contractor continues to assume complete responsibility for the application and performance of the coating system.

30. The coating shall be applied evenly to form a smooth, continuous, unbroken layer free from misses, sags, runs, tears, and other defects that could affect the integrity of the coating.

31. All materials, i.e., paint, solvents and cleaning agents for a specific paint system shall be supplied by the same Manufacturer. The solvents used shall be those recommended and manufactured by the paint Manufacturer. Where the recommended 'solvent' and 'clean-up thinners' for a material differs, the 'clean-up' solvent must not be added to the paint for dilution purposes.

32. All corrosion protection materials shall be manufactured in accordance with ISO 9001 and all relevant South African National Standards (SANS) standards.

33. All coating materials shall be kept in an approved dry and enclosed store. The temperature shall not drop below 10 °C or exceed 30 °C.

34. Usage of materials shall be on a first in, first out basis and no materials shall be used that have exceeded the shelf life recommended by the Manufacturer.

35. For two pack materials, the use of part of the contents (split packs) is strictly forbidden unless written authorisation by the Eskom Engineer is obtained.

36. All coating components, particularly two or multi-component materials, shall be thoroughly mixed until a homogeneous mixture is achieved.

37. In the case of two-pack materials, each component containing pigments shall be thoroughly mixed. The two components shall then be mixed in the proportions supplied by the Manufacturer until the mixture is completely homogeneous.

38. In the case of solvent based epoxy materials, it is recommended that the mixed material be allowed to stand for an induction period, as recommended by the Manufacturer, before use.

39. The Contractor shall ensure that all paints are mixed in accordance with the Manufacturer's technical data sheets.

40. During application, coating materials shall be agitated regularly to keep the solids in suspension. The preparation time, induction time and pot life of these materials shall be closely adhered to.

41. Only power mixing is permitted for all coating materials. Only low speed power mixers, which do not introduce air into the coating material being mixed, shall be permitted.

42. Further surface preparation procedures, such as surface cleaning and profile requirements of the concrete substrate shall be the responsibility of the Contractor. The surface preparation methods shall be provided in the method statement.

43. Application conditions and details of each of the components of the system shall be provided in the method statement, as follows:

    - Spreading rate of primers, adhesives, and where applicable membrane systems.
    - The thicknesses of the primer, intermediate lining, membrane and brick or tile.
    - Length, width and thickness of tile/brick.
    - Width of tile/brick joints.
    - Primer, adhesive and membrane over-coating times, compatibility, application temperatures, dilutions, application techniques and curing times.
    - Curing time of complete system.
    - Repair procedure for all application steps.

44. The solvents used shall be supplied by the same product Manufacturer. Where the recommended 'solvent' and 'clean-up thinners' for a material differs, the 'clean-up' solvent must not be added to the product for dilution purposes.

Requirements for Surface Preparation for Concrete

1. pH testing of the finished substrate shall be performed to establish pH levels. pH levels shall be between 9 and 10.
2. The concrete substrate shall have a minimum compressive strength of 30 MPa.
3. All new concrete shall be suitably cured for 28 days prior to the commencement of any surface preparation or lining procedures. This is essential to allow for completion of the hydration reaction in the concrete.
4. Sufficient testing shall be conducted to measure residual concrete moisture which shall be < 5% as measured with a digital hygrometer.
5. All concrete surfaces shall be thoroughly cleaned of all dust, laitance, loose particles, oils, greases, curing compounds and any other deleterious matter.
6. After surface preparation, all dust, grit blasting media, or any other deleterious matter shall be removed from the surfaces only by vacuuming and not blown off by compressed air. The process shall be repeated until the required level of dust and debris removal is achieved. Only industrial vacuum machines are acceptable. Domestic machines shall not be permitted.
7. Power and hand tool cleaning is only applicable to localised touch ups or patch repairs. Specific requirements for patch repairing a coating system are defined in section 4.8.6 of 240-101712128.
8. Hand-tool cleaning for isolated/localised areas may be utilised provided the required standard of finish is achieved. Cleaning by means of hand or power-tools, includes wire brushes, chipping hammers, scrapers, grinders, sanders, needle descalers and bristle blasters. Any other methods shall only be used where accepted by the Eskom engineer.
9. Prior to full-scale cleaning, test patches shall be prepared, and the level of cleanliness, roughness and dust and debris shall be agreed by the Eskom Engineer and the Contractor.
10. Voids, air pockets, omegas, cracks etc., shall be filled with a suitable filler or mortar.

Requirements for Application of Membrane and Tiling/Bricks

1. The Contractor shall ensure that during lining activities the relative humidity (RH) in open, undercover environments is less than 80% RH and a Dewpoint > 5ºC above the substrate or preceding coat/lining surface temperature. Ambient temperatures shall be between 15°C and 30°C or as per the Manufacturer recommendations, whichever is the more stringent. The maximum/minimum substrate temperature at the time of coating application shall be strictly in accordance with the product data sheet. During stable weather conditions environmental parameters shall be measured and recorded at least 4 times per shift.
2. During periods of inclement or cold weather conditions the environmental parameters shall be measured and recorded hourly. If the latest two readings of any of the parameters indicate a deteriorating trend which would likely exceed parameter/s limit, then no final surface preparation or system application shall be permitted. All measurements shall be recorded at the surface.
3. When coating the concrete, the primer used must be a low viscosity penetrative primer and it shall totally soak into the concrete substrate. The primer must be applied by brush in a stippling motion to ensure total absorption.
4. The joints across corners and pipe connections and expansion/construction joints shall be suitably overlapped by the membrane to provide a continuous impermeable joint. The liner system shall overlap the wall/floor interface and shall be applied to the complete height on the vertical wall surfaces and then around onto the top wall surface or as otherwise instructed by the Eskom engineer.
5. Likewise, for corners and pipe connections the membrane section shall either be prefabricated or correctly cut and shaped to suite the geometry such that the joints are suitably overlapped to provide a continuous impermeable membrane after jointing.
6. The complete liner/membrane shall be visually inspected prior to tile/brick installation to ensure that there are no perforations, imperfections or joints that are not continuous or not correctly stitched. Any perforations or damage shall be repaired before tile/brick laying as per the repair procedure.
7. The mortar shall be mixed in the exact proportions and manner indicated by the product data sheets and mixing instructions. Unless directed otherwise by the product Manufacturer, no water, aggregate, cement, or any other mortar shall be added to the mix.
8. Under no circumstances shall any attempt be made to reuse primer, mortar, grout or pointing material which has passed its useful application period, as per datasheet.
9. Tiles/bricks shall be buttered by trowel with the mortar on all contact faces while ensuring there are no air pockets or voids.
10. Tiling/bricks shall be staggered. The tiles/bricks shall be straight and flush, the slope of which to follow that of the concrete substrate to ensure no ponding of liquids.

11. Tiles/bricks shall be placed in a manner to remove air bubbles. This may be achieved by sliding or by light tapping.
12. The finished mortar joint shall be between 5 and 8 mm on all contact sides.
13. Completed and finished pointing shall not exhibit any shrinkage damage, porosity, bubbling or voids.

Requirements for Inspections

1. For all inspections of all surface preparation and coating activities the surfaces shall be clean allowing unhindered visual access to the surface. The Contractor shall provide sufficient and adequate lighting (Cool White) to enable inspections. Cell phone lighting is not acceptable.
2. The frequency and method of testing shall be pre-agreed in the master quality control documentation.
3. The Contractor shall have the following measuring instruments, at all times:

a) Climatic condition testing and measuring instruments:

- Ambient air temperature gauge.
- Steel surface temperature.
- Relative humidity gauge.
- Dew point measurement gauge.

b) Surface preparation:

- Blast surface profile gauge.
- Dust and debris test tape.

c) Application & Inspection:

- Wet film thickness gauge.
- Curing test Methyl Ethel Ketone (MEK)

Requirements for Corrosion Protection Supervisors & Inspectors

1. Supervisors shall have a minimum SAQCC examined Paint Supervisors Certification, ICORR (UK) or equivalent formal qualification and at least 3 years relevant involvement and documented experience.
2. The Contractor shall make provision for a third-party inspector with NACE Level 1 or SAQCC Level 2 qualifications or equivalent formal qualification at the discretion of the Eskom Engineer.

Requirements for Corrosion Protection QCP

1. The Contractor shall prepare and submit a detailed, project specific Quality Control Plan (QCP), in matrix form, of all the tests to be conducted during the execution of this project. For each test, the schedule shall state at least the following information:
    - Test name/type.
    - Duration.
    - Conditioning parameters.
    - Contractor's in-house procedure reference.
    - Reference standard.
    - Start date and time, planned and actual.
    - Test result.
    - Compliance/Non-compliant.
    - Space for sign off by the Contractor when testing is complete.
    - Space for sign off by an Independent Coating Inspector once testing is complete.
    - Space for sign off by the Eskom Engineer. (Note: this will not signify acceptance by the Engineer of the test result).
    - Remarks.
2. The QCP shall contain all intervention points and relevant criteria as per the information as described in the Product Data Sheet and this specification sheet. Eskom reserves the right to request further revision, clarification or additions in accordance with or as required by this specification sheet.
3. Under no circumstances shall any work be performed until the QCP and Method Statement have been accepted by the Eskom Engineer.
4. The Contractor shall ensure at least one qualified dedicated QC resources independent of production pressures. One inspector for day and the other for night.
5. All inspection interventions during and after completion shall be considered and included.
6. The coating Manufacturer shall provide technical surveys during the execution of the project.
7. The Contractor shall mark up all activities on a drawing of the system at least daily for Eskom to monitor project progress and to suitably ensure sufficient Eskom inspector are available, ahead of time.

8. At the bottom of the QCP the Contractor shall have a specific step for site cleaning of the bund and surrounding areas for grit, dust, empty coating containers. Regular housekeeping and clean up shall take place both during coating operations and at the end of the project before final handover.

Requirements for Tender Returnables

Unless otherwise indicated in the SOW and Enquiry documents, all returnables as detailed below shall be returned as part of the Contractor's Tender document/submission. The SOW and Enquiry document shall be consulted for more detailed and specific requirements.

Mandatory Tender Returnables

At the time of tender the Contractor shall be required to demonstrate competence and to provide verifiable evidence of experience in the installation of chemical resistant tile/brick lining systems for the internals of bunds or sumps, for similar sized projects using the same preparation and application processes and products as per this Specification.

Tender Returnables for Evaluation

1. The coating Manufacturer/Contractor shall supply individual product data sheets and material safety datasheets (MSDS) for all products comprising the systems i.e., internal/external coatings and other products. The specific requirements are detailed in the section "General Requirements", point 16, in this specification.
2. A detailed Method Statement shall be submitted and shall consider and detail all steps in the table above of this specification and section "General Requirements", points 11, 13, 43 and 44.
3. A project specific QCP shall be submitted. The QCP shall be based on the detailed Method Statement as per the point above and shall contain all intervention points and relevant criteria as per the information as described in the Product Data Sheet/s and detailed in this specification namely, all steps in the table above and "Requirements for Corrosion Protection QCP".
4. At the time of tender the Contractor/coating Manufacturer shall provide a definitive statement with respect to exclusions, deviations or qualifications from this specification. If there are none then the statement needs to reflect this. If no exclusions, deviations or qualifications are submitted at the time of tender, the requirements as prescribed in this specification and all other referenced standards shall apply. No further exclusions, deviations or qualifications shall be permitted and will not receive any consideration by Eskom after Contract Award.

Safety Requirements and Considerations:

1. During the applications of all coatings/lining, care shall be taken to ensure adequate ventilation and lighting, to allow for good visibility and proper curing of the coatings and to avoid/minimise health and safety risks.
2. A confined spaces (CS) may be defined as an enclosed, restricted, or limited space in which, because of its construction, location or contents, or any work activity carried on therein, a hazardous substance may accumulate and/or an oxygen-deficient atmosphere may occur, and/or in which a dangerous liquid or dangerous concentration of gas, vapour, dust or fumes may be present. It includes any bund, chamber, tunnel, pipe, pit, sewer, container, valve, pump, sump, chute, bunker, silo, gearbox, tank, receiver, drum or any similar construction, equipment, machinery, or object.
3. Flammable Atmospheres: Gases, vapours and dusts can become trapped in CSs and create flammable or explosive atmospheres, and include combustibles e.g., Hydrogen, Acetylene, Organic Coatings/Linings, and thinning/cleaning solvents, etc.
4. The Flash Point for any solvent borne products such as adhesives, cleaning solvents shall be > 30 ºC.
5. Walking / Working Surfaces and Visibility: Poor lighting may add to hazards caused by an irregular, sloped, or constricted working surface.
6. Special care needs to be taken when working with all organic coatings. Prior to the use of any coating material, the Material Safety Data Sheets shall be obtained from the relevant coating Manufacturer. The Contractor shall be familiar with the contents of these safety data sheets and ensure that the necessary safety precautions are taken to comply with local and national safety and health requirements such as the OHS Act.
7. Any solid waste materials or liquids stripped or generated during the coating operations shall be discarded in accordance with the requirements of the appropriate national and/or local authorities or the requirements of Eskom.
8. The Contractor shall ensure compliance with all statutory regulations, municipal by-laws, etc. concerning pollution and the health and safety of personnel and/or members of the public who may be affected by the work. The Contractor shall provide the personnel with the appropriate required PPE.
9. The Contractor shall provide for all necessary safety precautions and risk assessments.
10. The Contractor shall advise Eskom of all hazardous materials to be brought on site.
11. The Contractor’s Safety File for the area to be worked it shall address all the hazardous activities of surface preparation, membrane application and laying of mortar and brick/tile. The Contractor shall verify that the personnel carrying out these activities are suitably qualified.
12. The Contractor shall ensure that the abrasive materials used conform to all National Health and Safety Standards.

Specifically with respect to CSs and based on the descriptions and definitions of safety risks as per the above points it is <u>imperative</u> that the Contractor's/Product & System Manufacturer's Method Statement shall describe in <u>detail</u>, the measures and mitigation steps for the risks and hazards as identified in this specification sheet.

It is <u>compulsory</u> that these safety risks/mitigation measures and any others as identified by the Contractor/Manufacturer be included in the Method Statement. Prior to the commencement of any work the Method Statement shall be submitted for review, acceptance/rejection by the respective Power Station Risk and Safety office/department.

Reference Documents

The following list of references shall apply in addition to the requirements of 240-101712128. The latest revision of the referenced standards shall apply.

1. GE/MAT/24/089: Duvha P/S Corrosion Protection Specification for Acid Bund Structural Steel.
2. 382-171332: Scope of work for Replacement of the North bulk sulphuric acid tank at Duvha Power Station.
3. 240-101712128: Standard for the internal corrosion protection of water systems, Chemical Tanks and Vessels and Associated Piping with Coatings.
4. 240-106365693 Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings.
5. ISO 9001: Quality Management Systems - "is defined as the international standard that specifies requirements for a quality management system (QMS). Organizations use the standard to demonstrate the ability to consistently provide products and services that meet customer and regulatory requirements."
6. 240-144332407: Standard for Eskom Power Stations Concrete Remedial Work.
7. SANS 1198: The manufacture of rubber sheeting for rubber lining.
8. SANS 1201: The application of rubber linings to pipes, pipe fittings and vessels.
9. 240-99527377: Inspection Manual for Civil Works at Eskom's Power Stations.
10. ASTM C-279-88: Standard Specification for Chemical-Resistant Masonry Units.
11. ASTM 4259: Standard Practice for Preparation of Concrete by Abrasion Prior to Coating.
12. ASTM D4258: Standard Practice for Surface Cleaning Concrete for Coating.
13. ASTM D4263: Standard Test Method for Indicating Moisture in Concrete.
14. ASTM D4414: Standard practice for measurement of wet film DFT by notch gauges.
15. ASTM D4541: Standard Method for Pull-off Strength of Coatings.

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Submitted by:	**Accepted by:**
 ……..	 ……..
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