	MATLA POWER STATION SCOPE OF WORK	Document Identifier	14593	Rev	6	
		Effective Date	March 2023			
		Review Date	March 2026			

PLANT AREA: Matla Power Station Water Treatment Plant Condensate Regeneration Plant					
TITLE: Refurbishment of Condensate Polisher Regeneration Plant Vessels (Train 1,2 and 3)					
REF MEP - 051333		Reference Rev No:1		MULTIDISCIPLINARY: Yes	
				Plant Level: All	
COMPILED BY	Name: Yatish Ramkalawan Systems Engineer/End User	Signature	Date 11/12/2023		
COMPILED BY	Name: Isaack Maredi Systems Engineer/End User	Signature	Date 12/12/2023		
APPROVED	Name: Brenda Moeng Line Manager Process Engineering	Signature	Date 03-01-2024		
APPROVED	Name: Gavin Phelelo Line Manager Auxiliary Engineering	Signature	Date 02/01/2024		
APPROVED	Name: Lindokuhle Ngobese Group Manager	Signature	Date 08/01/2024		
REVIEWED	Name: Dora Mchonto Quality Department	Signature	Date 2024/01/10		
REVIEWED	Name: Isert Mokoena Occupational Health and Safety	Signature	Date 10/01/2024		
REVIEWED	Name: Bethuel Moeng Environmental Department	Signature	Date 10/01/2024		

Reference No	MEP - 051333	Reference Rev No	1	Date	2023/12/11	Page	1 of 29
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MATLA POWER STATION

SCOPE OF WORK

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PLANT AREA: Matla Power Station Water Treatment Plant Condensate Regeneration Plant

TITLE: *Refurbishment of Condensate Polisher Regeneration Plant Vessels (Train 1,2 and 3)*

REF:MEP - 051333	Reference Rev No:1	MULTIDISCIPLINARY: Yes	Plant Level: All
ACCEPTED	Name: Project Manager	Signature:	Date:
ACCEPTED	Name:	Signature:	Date:

Reference No: **MEP - 051333**


Reference Rev No: 1

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NB: Do not tamper with the template.

GENERAL


- Data books, reviews, reports, and diagrams/drawings shall be submitted to Engineering after the completion of the work. Engineering to forward the data books to Quality Department (Document Control)
- All QCP's to be submitted to Engineering and Quality for approval prior to outage/project or maintenance work commencement.

	SCOPE OF WORK DESCRIPTION / ACTIVITY	PROCEDURE, SPECIFICATION, ENG. REQUIREMENTS / DOCUMENTATION	HOLD POINTS, WITNESS, REPORTS	RESPONSIBLE PARTY
1.1	Occupational Health and Safety	<ul style="list-style-type: none"> • Health and safety file should be approved by Safety risk management department prior to any work commences on site • All work is to be done in accordance with OHS Act 85 of 1993, Matla plant procedures and Plant Safety Regulations. (240-150642762). • Matla power station SHEQ induction must be done before access to site can be granted • The contractor should ensure that all employees have acquired the required competency for the task they are performing. • The contractor to ensure compliance to updated legal requirements and other requirements 	Eskom to witness.	Contractor

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1.2	Environmental Management.	<ul style="list-style-type: none"> All activities listed in the National Environmental Act 107 of 1998, EIA Regulations as amended, must have environmental AUTHORISATION before commencement of work. The contractor shall comply with all applicable legal and other requirements. The polluter pays principle will be applied. The contractor manager shall ensure compliance with Eskom Matla Environmental procedures to ensure the prevention of pollution (refer: OMOP 4090 and 4402). The last payment will be processed based on the status of the last housekeeping check sheet (Annexure C: OMOP 4402) of designated area. EMS file based on ISO14001 will be required. 	Eskom to witness.	Contractor
1.3	Quality Management	<ul style="list-style-type: none"> The contractor/executioner of work will be responsible for drawing up all QCP documentation and this must be approved by engineering and authorised by the Quality Department before commencing with the work. Contractors/executioner to adhere to QM 58 and OMOP4497 requirements Number of NCR issued can affect your next tendering process. The QCP shall be signed progressively by the Engineer/Supervisor, Eskom QC Inspector, Contractor QC Inspector and/or AIA. No procuring of outage items without the approval of scopes by quality 	Hold point	Contractor

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		<ul style="list-style-type: none"> All outage scopes creep and scopes addition should be approved by quality No contractor should be in the possession of scopes for execution without the scopes approved by quality The contractor is subjected to quality auditing at any point in time during execution of scope 		
1.4	Inputs from other departments			
1.5	Commissioning reference			

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1	Ensure that the cation, anion, and storage vessels are empty of the resin	1 train will be refurbished at a time of the 3 available trains		WTP
2	Ensure the train to be worked is offline and on PTW	As per PSR Requirements		Projects
3	Bottom and top manholes to be opened for ventilation	All three vessels		Contractor
4	Conduct gas test	This must be done before personnel get inside the vessel to ensure they are not inhaling toxic fumes		Projects
5	Build scaffolding outside the vessels			Project
6	Remove the sight glasses and all pipework connected to the vessel		Hold point	Contractor
7	Remove the retaining ring and associated nuts and bolts	Retaining ring surface must be smooth of Araldite (sealant). Should any deviation be observed a new one must be fabricated For the cation and anion vessels	Hold point	Contractor
8	Remove the Neva Clog filter underdrain floor in the cation and anion vessels	In sequence of appearance 1. Neva clog 2. Por-o-septa underdrain backing screen 3. Support grid	Witness point	Contractor

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		Neva Clog filters to be inspected to determine if they need replacement. Contractor to cost for new Neva Clog Filters including provision of the relevant datasheets, drawings and specifications		
9	Build scaffolding inside the vessels	All three vessels		Projects
10	Remove all internal manifolds and laterals the inlet distributor manifolds and regenerant distributor with the associated laterals	All three vessels. Inspect the removed laterals for any damage and correct if any damages are found on the laterals	Hold point	Contractor
11	Remove the existing rubber lining from the vessel walls, nozzles, man holes and covers by initial removal techniques such as cutting out, stripping and flapper disc grinding	<p>All vessels.</p> <p>Total area of vessels = 30m² per vessel Total area of beams = 3m² per vessel (storage vessels has no beams)</p> <p>Material of construction: Shell: BS 150-150-15-28A Heads: BS 1501-151-28A Forgings: BS 1503 -161</p>		Contractor

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12	<p>Inspection and NDTs</p> <p>Conduct NDT (PT and MPI) on areas found with damage to quantify and correct the whole damage.</p> <p>Conduct MPI's on all Vessel welds (including welds on patches, Vessel Piping Welds) across the 9 Condensate Regeneration Plant vessels and submit the NDT reports to Engineering.</p> <p>Conduct MPI's on vessel stubs/nozzles and flanges (including their mating surfaces). Damaged stubs will need to be refurbished/replaced based on their damage.</p> <p>Conduct Wall thickness on shell body to ensure the wall thickness as still at an allowable thickness. Cut out damaged sections of the vessel shell and replace with new sound plate shell inserts.</p> <p>Conduct MPI's on all Vessel Legs including the welds on the Legs and vessels</p>	<p>Metal surface must be free from any remaining rubber / contamination.</p> <p>Identify damaged areas on the vessel.</p> <p>The NDT's should be conducted by an entity which is an Eskom approved supplier and independent from the welding contractor in order to ensure unbiased inspections. All NDT work must be conform to the following Eskom standard:</p> <ol style="list-style-type: none"> (1) 240-106628253, "Standard for Welding Requirements on Eskom Plant" (2) 240-83539994, "Eskom NDT personnel approval for quality related special processes on Eskom plant standard" (3) 240-83540088, "Requirements for non-destructive testing on Eskom plant standard" <p>All indications from the NDT reports will need to be addressed through repair or possible replacements of the affected components.</p>	Hold point	Contractor

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		The extent of repairs that are required will be finalised after inspection of the vessel		
13	<p>Conduct vessel repairs</p> <p>Correct any defects by means of weld repairs, replacement or repair of damaged nozzles, stubs, flanges and support brackets, and cutting of areas with reduced wall thickness on the vessel shell and dome and welding of new window patches, in order to eliminate the chance of experiencing leaks at a later stage while the vessel is in operation. The option of bottom dome replacement on cation vessel (drawing 0.47/3822) may be required dependent on the extend of damage found. Conduct NDT (PT and MPI) on all new or repaired welds.</p>	<p>All welding to be done by ISO 3834 Part 2 accredited suppliers since this is classified as level 1 plant</p> <p>The extent of repairs that are required will be finalised after inspection of the vessel</p> <p>240-106628253 Standard for Welding Requirements on Eskom Plant</p> <p>Vessel repair and insertion welding to comply to the requirements of the applicable design code.</p>	Hold point	Contractor
14	<p>Grit Blasting the inside of all the 9 CPR vessels using silica free sand blasting grit in order to remove any contaminants on the interior vessel internal of vessel</p>	<p>As per GAM/MAT/22/145: Matla Power Station Condensate Polisher Regeneration (CPR) Corrosion Protection Specification</p> <p>Silica free grit. Grade Sa 3; Dust rating 1; Surface profile as per coating manufacturers product requirements (or 25-50 microns where none is specified)</p> <p>Ensure that there is an installed system which will be able to remove the dust created during sandblasting which must be exhausted outside the building in a designated area. Cleanliness</p>		
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		during Sandblasting is of utmost importance in order to eliminate contamination as this is a demineralisation plant.		
15	Primer application	<p>As per GAM/MAT/22/145: Matla Power Station Condensate Polisher Regeneration (CPR) Corrosion Protection Specification</p> <p>The rubber material manufacturer will advise on the adhesive/primer system for the operating conditions on the vessels</p> <p>Max temperature: 60°C Max Pressure: 973 kpa Fluid: demineralised water Chemicals: 6% H₂SO₄ for the cation vessel 5% NaOH for the anion vessel Demineralised water for the storage tank</p> <p>MSDS shall be provided for the chemicals to be used</p>	QCP required	Contractor

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	SCOPE OF WORK DESCRIPTION / ACTIVITY	PROCEDURE, SPECIFICATION, ENG. REQUIREMENTS / DOCUMENTATION	HOLD POINTS, WITNESS, REPORTS	RESPONSIBLE PARTY
		Note: C₂S will not be allowed in Eskom's premises		
16	Adhesive system application	<p>As per GAM/MAT/22/145: Matla Power Station Condensate Polisher Regeneration (CPR) Corrosion Protection Specification</p> <p>The rubber material manufacturer will advise on the adhesive/primer system for the operating conditions on the vessels MSDS shall be provided for all the chemicals to be used</p>		Contractor
17	Rubber application to vessel, manholes, manhole covers and nozzles	<p>As per GAM/MAT/22/145: Matla Power Station Condensate Polisher Regeneration (CPR) Corrosion Protection Specification</p> <p>Pre-cured Butyl Rubber Lining (Grade B): 40 - 70 Shore A (IRHD) (I) (III) (V) (VI)</p> <p>Thickness of rubber to be applied on the walls = 6mm (30 m²) per vessel Thickness of rubber to be applied on the beams = 3mm (3 m²) per vessel</p>	Surveillance point	Contractor

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		Rubber lining to comply with SANS 1198 and SANS 1201 requirements Rubber material to be inspected for defects and tested for hardness before application		
18	Rubber inspection	<p>The Rubber should undergo the below testing:</p> <ul style="list-style-type: none"> - Spark testing after application before strapping joints. - Hardness testing pre and post application. - Visual examination for application defects. - Hammer Tap testing for any non-adherent rubber lining. <p>Rubber material batch and testing equipment Calibration certificates to be provided. Specify the voltage to be used for testing</p>	Hold point	Contractor and Chemical Engineering
19	Re-install the removed laterals	The lateral distribution holes to face the correct direction.	Surveillance point	Contractor
20	Re-install the vessel Neva Clog filter underdrain floor	<p>In the correct sequence</p> <ol style="list-style-type: none"> 1. Support grid 2. Por-o-septa underdrain backing screen 3. Neva Clog Filter 4. Retaining ring 	Surveillance point	Contractor

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21	Apply Araldite 2014 or flowcrete 319 TAQ epoxy adhesive and activator combination, or Araldite® AV 138M-1 / Hardener HV 998 or any equivalent product to seal the gaps/clearances between the rubber lined wall and underside of the retaining ring, between retaining ring and neva clog filter as well as winding the sealant into and around the bolts and bolt hole.	Remove all surface dirt and contamination from the neva clog filter and rubber lined wall before sealing or else the adhesion of the sealant will be impaired The Sealant shall be evenly applied to form a smooth, continuous, unbroken layer free from misses, sags, runs, tears and other defects that could affect the seal integrity.	Surveillance point	Contractor
22	Allow sealant to cure	Sufficient curing time shall be provided as per the product data sheet. Accelerated curing will not be permitted. All sealed off surfaces shall be adequately ventilated until full cure has been achieved.	Hold point	Contractor
23	Clean and Re-install the sight glasses. Any defective sight glasses to be replaced.	The use of Stanley knife is prohibited. Buffer rubber to the required smoothness during this activity Supply new side glass if required based on the damage found on the current sight glass.	Hold point	Contractor
24	Close the bottom and top manholes and reconnect all pipework to the vessel	All three vessels		Contractor
25	Acceptance test for the Neva clog filter floor	Load small amount of resin and initiate rinse or flush step. Install clean Y strainer or catch any resin leakage at vessel outlet using appropriate bag. If no resins are present then floor installation was a success.	Hold point	WTP Ops & Process Engineering

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26	Soak and flush the vessels and repeat till TOC's are within specification	TOC's to be between 250 and 400ppb	Hold point	WTP Ops & Chemical Engineering
27	Hand grind and recoat the exterior of the vessels in the same colour as their current colour (which resembles colour hex #FFFF89 (RGB – 252 252 137) (exact colour to be confirmed onsite). Label vessels using black paint.	<p>As per GAM/MAT/22/145: Matla Power Station Condensate Polisher Regeneration (CPR) Corrosion Protection Specification.</p> <p>Coating to be applied on all the 9 CPR Vessels using the same exterior coating as the current coating found on the vessels.</p> <p>Surface preparation: Mechanical clean (by rotary bristle tool) to Grade Sa 2.5 (ISO 8501-1) Primer and Intermediate coats = Twin Pack Polyamide Cured Epoxy. Finishing coat = High Build Re-coatable Polyurethane Acrylic</p>	Hold point	Contractor
28	Bolt Replacement	<p>Replace bolts as follows:</p> <p>Replace all the Internal bolts with Stainless Steel 316 bolts of the same size as the old bolts. Replace all the external bolts with BS 4190 bolts off the same size as the old ones.</p>		Contractor

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		<p>Replace all forgings with BS 1503-161 forgings off the same size as the replaced ones.</p> <p>Replace all bolts, nuts, washers and rubber gaskets on the CPR vessel exterior with components of the same dimension and properties as the ones which will be removed.</p> <p>Replace all rubber grommets inside the Cation and Anion vessels.</p>		
29	Drawings	Take measurements of the Cation Vessels And Internals and all 9 vessel internal manifolds, distributors and laterals during stripping and produce drawings of the vessel and its Internal components. These drawings should be issued to the employer in an electronic format as a PDF/TIF and native CAD (DWG) format and must not be "write protected" or encrypted. These drawings should be part of the work pack which should be submitted upon completion of the work.		Contractor

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BILL OF MATERIAL

	Full description of Material/Spares/Equipment	Specifications of Material/Spares/Equipment	Stock No	Part Number	Required Quantity
1	Rubber lining system	Pre-cured Butyl Rubber Lining (Grade B): 40 - 70 Shore A (IRHD) (I) (III) (V) (VI) 6mm 30m ² per vessel 3mm 3m ² per vessel			270m ² 18m ²
2	Sight glasses	As per drawing in appendix below			39
3	Vessel Shell Plate	BS 1501 – 151 -28 Plate (2000 x 2000 mm x 10 mm)			4
4	Bolts and nuts	Refer to drawings in Appendix below			
5	Nevaclog filter cation	To ensure the following type of resins does not pass through: - Ambersep 900 OH ⁻ (Harmonic mean diameter of 0,5 – 0,70mm) - Amberjet 1600 H ⁺ (Bead size range = Min: 300 – 1,200µm and Max: <300µm) SS316, 140 µm, 1424mm OD. With holes as per drawing 0.47/6196 section BB, and detail VII, VIII, IX and X and detail of supporting (on detail VI, VII & VIII). (Dimension to be verified onsite by contractor prior to order placement)			3
6	Nevaclog filter anion	To ensure the following type of resins does not pass through:			3
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		<ul style="list-style-type: none"> - Ambersep 900 OH⁻ (Harmonic mean diameter of 0,5 – 0,70mm) - Amberjet 1600 H+ (Bead size range = Min: 300 – 1,200µm and Max: <300µm) <p>SS316, 140 µm, 1154mm OD. With holes as per drawing 0.47/6198 section BB, and detail VII, VIII, IX and X and detail of supporting (on detail VI, VII & VIII)</p> <p>(Dimension to be verified onsite by contractor prior to order placement)</p>			
7	Retention ring Cation	AISI 316. As per item no. 11 on drawings 0.47/6196 sheets 1-3. Dimensions to be confirmed on site prior to manufacture			1
8	Retention Ring Anion	AISI 316. As per item no. 11 on drawing 0.47/6198 sheets 1-3. Dimensions to be confirmed on site prior to manufacture			1
9	External coating of vessels	Primer and Intermediate coats = Twin Pack Polyamide Cured Epoxy. Finishing coat = High Build Re-coatable Polyurethane Acrylic Final coat colour similar to hex #FFFF89 (RGB – 252 252 137) (exact colour to be confirmed onsite)			To cover approximately 210m ²
10	Mechanical clean/grind vessel exterior to Sa 2.5	Silica free grit			Approximately 210m ²

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11	Grit blast vessel interior to Sa 3	Silica free grit			Approximately 228m ²
12	Cation vessel bottom dome	As per cation drawings below. Material BS 1501 – 151 - 28. Verify dimensions onsite. BS 1515 Pt 1 1965			1

SCOPE COMPILATION REFERENCES				
SOURCE & Ref No.	Yes	No	N/A	Comments
Previous outage service reports				
Return to service data packages				
Maintenance Strategy with Rev number				
SAP defects (attach list as appendix)				
GHRMS (STEP) reports (Generation Heat Rate Management System)				
Online Condition Monitoring				
Pre-outage performance test results				
Post outage performance test results				
GPSS/ Plant Performance data on UCLF incurred				
OMS / IIRMS recommendations (Audits Reports)				

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Risk controls (IRM system)				
Previous audits and reviews (e.g. ERAP)				
Engineering Change Requests (Projects)				
LOPP strategy reports	X			
URS				
Philosophy (Outage)				
Condition Monitoring Report				
VA/PHD Viewer trends				
Corrective Actions				
CARAB reports				
Statutory Requirements				
Grid code requirements				
Waivers and Exemptions				
Calibration requirements				
Previous Outage SOW variations				
Post Mortems Actions from previous outages				
Pre-Outage plant walks				
Risk based inspection (RBI) report				

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Simulation, TOIs, OON, SI				
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COMMENTS

ATTACHMENTS: DRAWINGS, SKETCHES, DIAGRAMS, INSTRUCTIONS, etc	
1	See drawings attached below
2	
3	
4	
5	
6	
7	
8	
9	
10	

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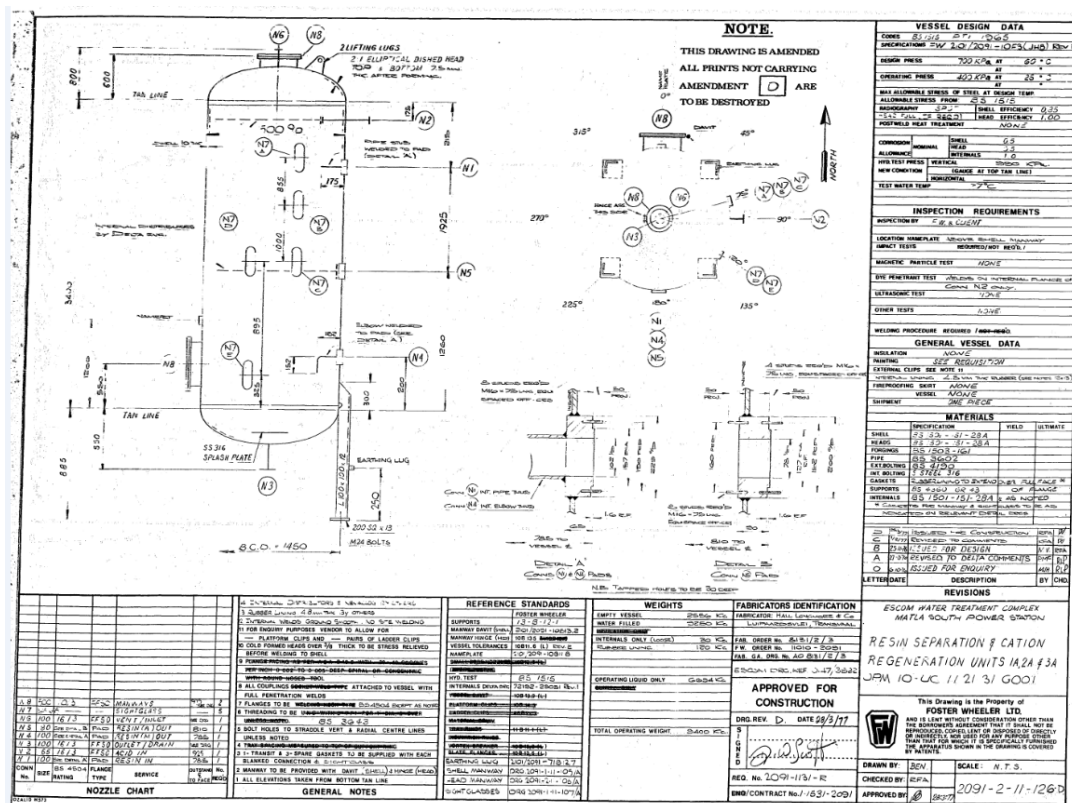
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Appendix A: Cation Regeneration Units and Sight glass



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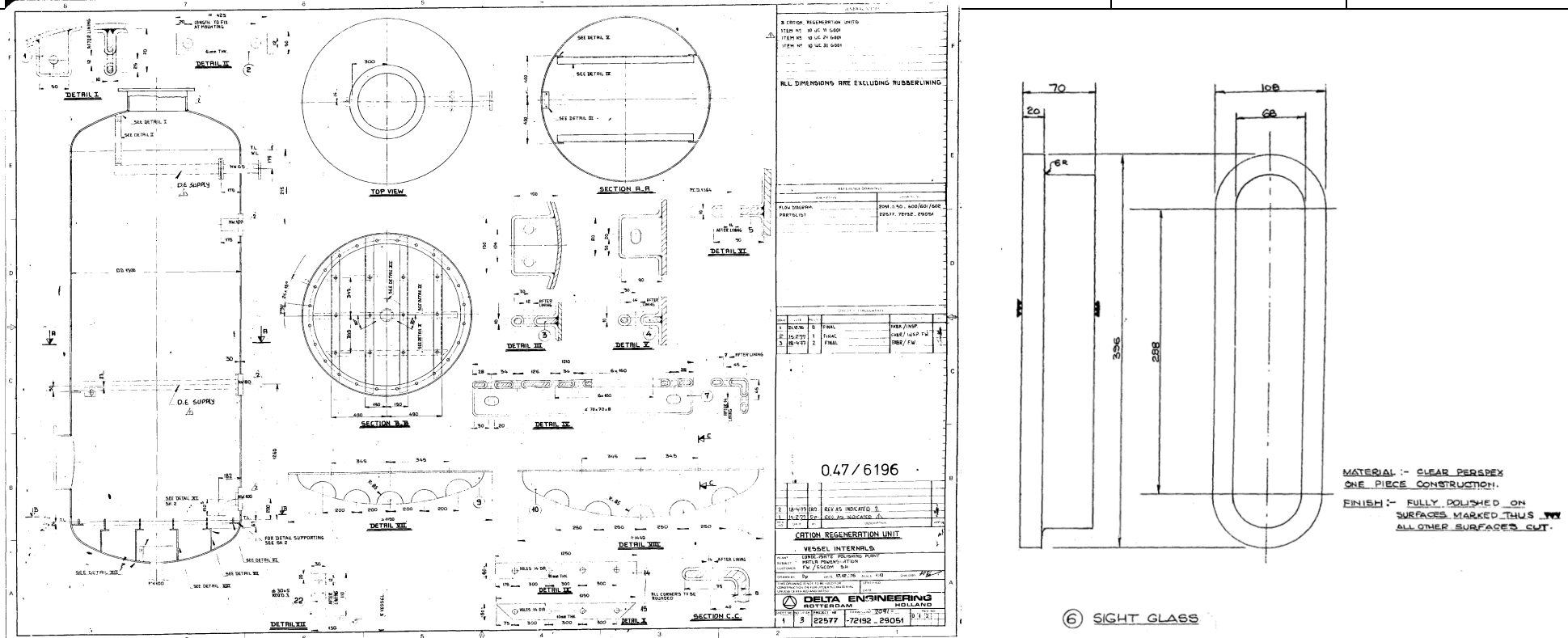
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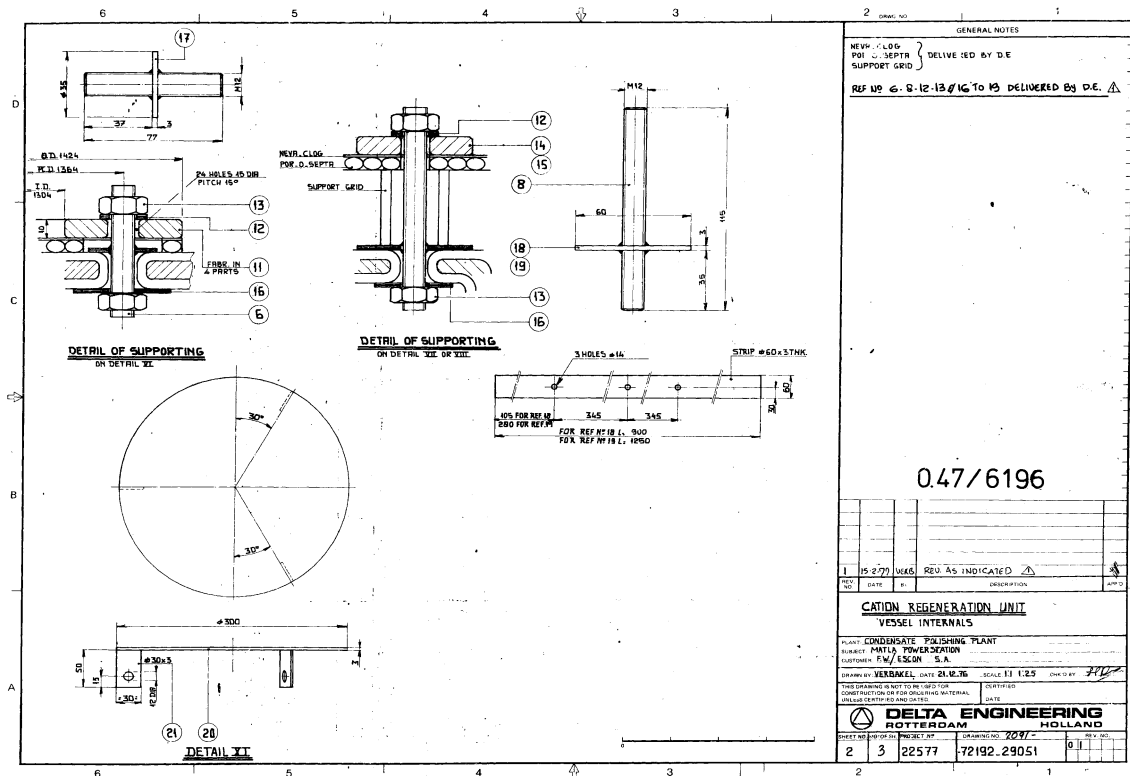
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REF NO 6-8-12-13 & 16 TO 19 DELIVERED BY D.E.


ITEM NO	QTY	DESCRIPTION	REF NO	MATERIAL	SIZE	REMARKS
3	3	STRIP	22	ST.	Φ 30 x 5 L: 110	
9	3	STRIP	21	AISI 316	Φ 30 x 3 L: 50	
3	1	PLATE	20	AISI 316	PL Φ 300 x 3	
6	2	STRIP	19	AISI 316	Φ 60 x 3 L: 1250	WELDED ON REF NO 8
6	2	STRIP	18	AISI 316	Φ 60 x 3 L: 900	WELDED ON REF NO 8
72	24	RING	17	AISI 316	PL Φ 35 x 3 HOLE Φ 13	WELDED ON REF NO 6
108	36	PLAIN WASHER	16	AISI 316	PL Φ 40 x 3 HOLE Φ 14	
6	2	STRIP	15	AISI 316	Φ 60 x 10 L: 1050	
3	1	STRIP	14	AISI 316	Φ 60 x 10 L: 1250	
23	72	NUT	13	AISI 316	M12	DIN 934
108	36	PLAIN WASHER	12	AISI 316	FOR BOLT M12	A13 DIN 125
12	4	STRIP	11	AISI 316	Φ 60 x 10 L: ≈ 1070	FORMING IN RING
6	2	PLATE	10	ST.	≈ 300 x 8 L: ≈ 1440	
6	2	PLATE	9	ST.	≈ 300 x 8 L: ≈ 1190	
36	12	THREAD END	8	AISI 316	M12 x 115	
6	2	ANGLE	7	ST.	Δ 90 x 70 x 8 L: 1210	
72	24	THREAD END	6	AISI 316	M12 x 77	
3	1	STRIP	5	ST.	Φ 90 x 10 L: 4380	FORMING IN RING
12	4	STRIP	4	ST.	Φ 80 x 10 L: 90	
3	1	STRIP	3	ST.	Φ 100 x 10 L: 150	
3	1	STRIP	2	AISI 304	Φ 50 x 6 L: ≈ 425	
3	1	STRIP	1	ST.	Φ 50 x 10 L: 70	

0.47/61.96 R.1

DRAWING RECORDS
 TEKENINGLEER

ESCO 28 MAR 1977
 CONTACT 11238
 INDEX REFERENCE 11238
 VERVIS

MADE BY	DATE	CHK'D BY	DATE	APP'D BY	DATE	DESCRIPTION
Dp	20.12.76		22.12.76			CATION REGENERATION UNIT



DELTA ENGINEERING
 ROTTERDAM HOLLAND

PROJECT NO.	DOCUMENT NO.	REV NO.	SH NO.	TIME
22577	72192	29051	1	1

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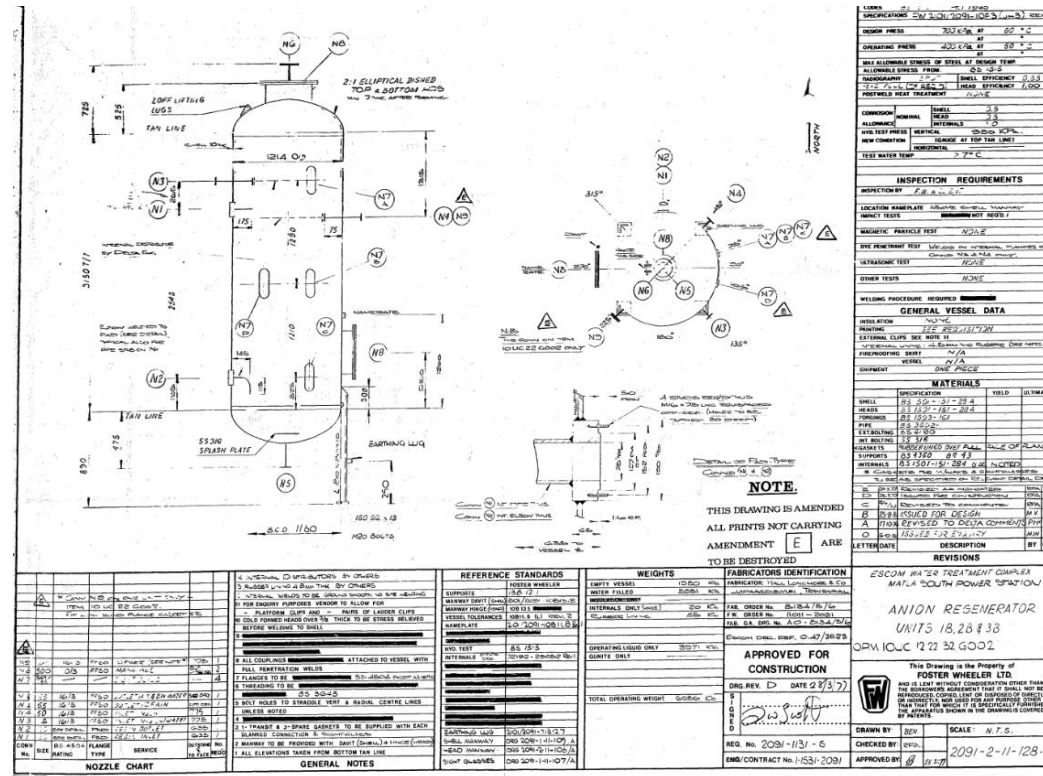


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Appendix B: Anion Regenerator Units



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Reference Rev No: 1

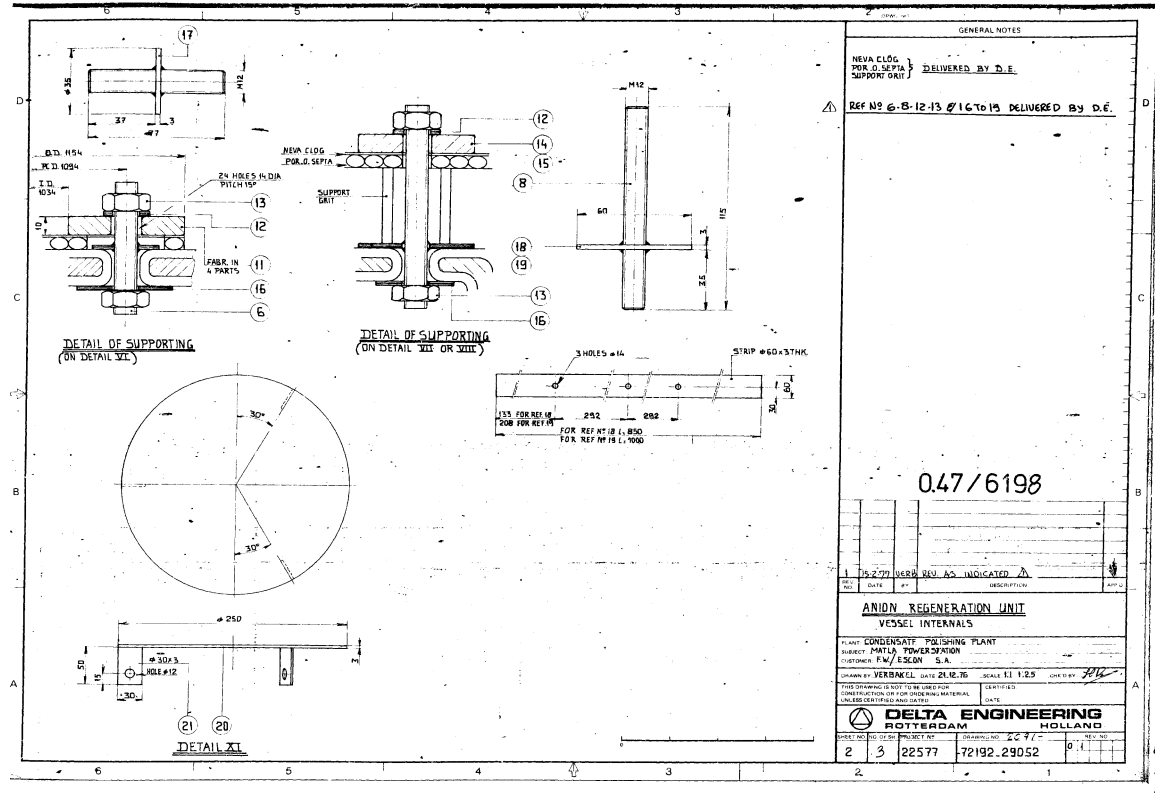
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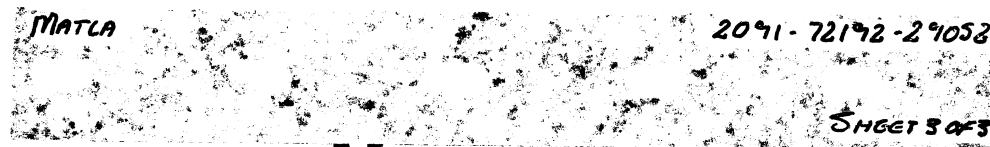


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REF NO 6-8-12-13 & 16 To 19 DELIVERED BY DE.

QTY	UNIT	DESCRIPTION	MATERIAL	SIZE	REMARKS
1	1	STRIP	23	ST	
3	3	STRIP	22	ST	
3	3	STRIP	21	AISI 316	
3	1	PLATE	20	AISI 316	
6	2	STRIP	19	AISI 316	
6	2	STRIP	18	AISI 316	
72	24	RING	17	AISI 316	
108	36	PLAIN WASHER	16	AISI 316	
6	2	STRIP	15	AISI 316	
3	1	STRIP	14	AISI 316	
216	72	NUT	13	AISI 316	
108	36	PLAIN WASHER	12	AISI 316	
12	4	STRIP	11	AISI 316	
6	2	PLATE	10	ST	
6	2	PLATE	9	ST	
36	12	THREAD END	8	AISI 316	
6	2	ANGLE	7	ST	
72	24	THREAD END	6	AISI 316	
3	1	STRIP	5	ST	
12	4	STRIP	4	ST	
2	1	STRIP	3	ST	
3	1	STRIP	2	AISI 304	
3	1	STRIP	1	ST	

ONLY FOR ITEM NO 101X326 002

WELDED ON REF NO 8
WELDED ON REF NO 8
WELDED ON REF NO 6

DIN 934
A13 DIN 125
FORMING IN RING

FORMING IN RING

MADE BY: VERBAKEL DATE: 20.12.76 CHK'D BY: 22.12.76 APP'D BY: DATE: DESCRIPTION: ANION REGENERATION UNIT PROJECT NO: 22577 DOCUMENT NO: 2091-72192-29052 SHEET 3 OF 3

DELTA ROTTERDAM 0.47/6198 HOLLAND

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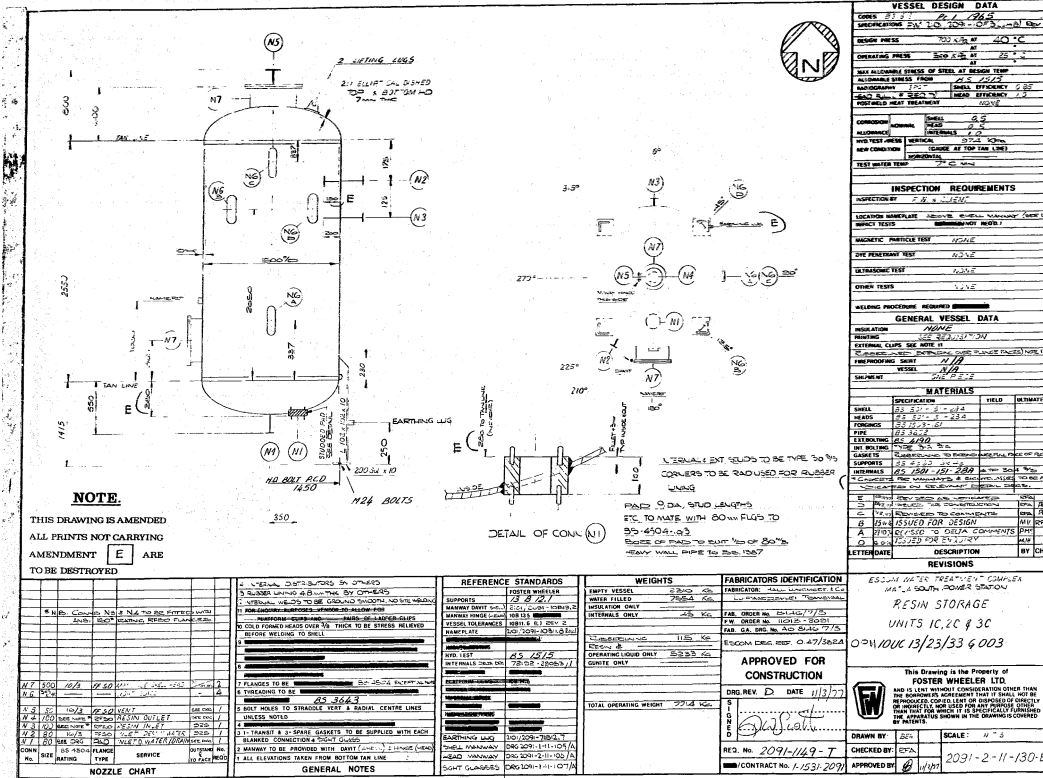
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Appendix C: Resin Storage Units



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