

BID NUMBER: \_\_\_\_\_

Maintenance and Repairs of Boilers, Steam & Condensate Reticulation,  
Water Treatment on Boilers and Autoclaves, Calorifiers And Mechanical  
Equipment at Various Health Facilities in the North West Province  
Department of Health for a Period of 48 Months.  
(POTCHEFSTROOM, JOB SHIMANKANA TABANE, WITRAND)



**health**  
Department of  
**Health**  
North West Province  
REPUBLIC OF SOUTH AFRICA

**Part C2.2 BILL OF QUANTITIES**

- 1 The Bill of Quantities is split into the sections shown in the Bid Value Table below.:
- 2 Each of the four bills must be completed. Then a total for each bill must be calculated to get to bill total. The four totals must then be filled in the Bid Value Table below. A final bid value inclusive of VAT must then be calculated.

BID VALUE TABLE		
Part	Bill of Quantities	Price
<b>C7.2</b>	Priced rates for maintenance and repairs of the Coal Fired Steam Boilers	
<b>C9.2</b>	Priced rates for maintenance and repairs of the Steam and Condensate Reticulation and Mechanical Equipment Installations	
<b>C15.2</b>	Priced rates for maintenance and repairs of the Autoclave Installations	
<b>C17.2</b>	Priced rates for the Supply and control of Chemical Water Treatment on Steam Boilers, which shall include the regular Maintenance, Repairs and Servicing of the Boiler house related water softening plants and cooling towers Installations	
	Sub-Total	
	VAT	
	<b>TOTAL BID VALUE</b>	

- 3 The **Total Bid Value** from the table above must be transferred to **C1.1 Form of Offer and Acceptance** as well as on this bid cover page.

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**Maintenance and Repairs of Boilers, Steam & Condensate Reticulation, Water Treatment on Boilers and Autoclaves, Calorifiers And Mechanical Equipment at Various Health Facilities in the North West Province Department of Health for a Period of 48 Months.  
(POTCHEFSTROOM, JOB SHIMANKANA TABANE, WITRAND)**



**health**

Department of  
**Health**  
North West Province  
REPUBLIC OF SOUTH AFRICA

**Part C3.2 TECHNICAL SPECIFICATION**

3.1.1 The Technical Specification is split into two sections, as shown in the Technical Specification Table below:

<b>Part</b>	<b>Technical Specification</b>
<b>C8.2</b>	Technical Specification for maintenance and repairs on Coal Fired Steam Boilers
<b>C10.2</b>	Technical Specification for maintenance and repairs on the Steam and Condensate Reticulation and Mechanical Equipment Installations
<b>C16.2</b>	Technical Specification for maintenance and repairs of the Autoclave Installations
<b>C18.2</b>	Technical Specification for the Supply and control of Chemical Water Treatment on Steam Boilers, which shall include the regular maintenance and repairs of Boiler house related water softening plants and cooling towers Installations

**BID NUMBER:** \_\_\_\_\_ **Maintenance and Repairs of Boilers, Steam & Condensate Reticulation, Water Treatment on Boilers and Autoclaves, Calorifiers And Mechanical Equipment at Various Health Facilities in the North West Province Department of Health for a Period of 48 Months.**  
**(POTCHEFSTROOM, JOB SHIMANKANA TABANE, WITRAND)**



**Part C7.2 BILL OF QUANTITIES - COIL FIRED BOILERS**

<b>C7.2 PRICED RATES FOR MAINTENANCE, REPAIRS AND SERVICING OF THE COAL FIRED STEAM BOILERS</b>						
<b>ITEM NO:</b>	<b>SCHEDULED MAINTENANCE</b>	<b>UNIT</b>	<b>Number of Services in 4 years</b>	<b>Nr of Boilers</b>	<b>RATE</b>	<b>TOTAL</b>
1	Boiler Maintenance Routine - Monthly (Job Shimankana Tabane Hospital)	No	32	2		R
2	Boiler Maintenance Routine - Monthly (Potchefstroom Hospital)	No	32	2		R
3	Boiler Maintenance Routine - Monthly (Witrand Hospital)	No	32	2		R
4	Boiler Maintenance Routine - Quarterly (Job Shimankana Tabane Hospital)	No	12	2		R
5	Boiler Maintenance Routine - Quarterly (Potchefstroom Hospital)	No	12	2		R
6	Boiler Maintenance Routine - Quarterly (Witrand Hospital)	No	12	2		R
7	Boiler Maintenance Routine - Annual (Job Shimankana Tabane Hospital)	No	3	2		R
8	Boiler Maintenance Routine - Annual (Potchefstroom Hospital)	No	3	2		R
9	Boiler Maintenance Routine - Annual (Witrand Hospital)	No	3	2		R
10	Boiler Statutory 36 monthly Service (Job Shimankana Tabane Hospital)	No	1	2		R
11	Boiler Statutory 36 monthly Service (Potchefstroom Hospital)	No	1	2		R
12	Boiler Statutory 36 monthly Service (Witrand Hospital)	No	1	2		R
<b>ITEM NO:</b>	<b>SCHEDULED PARTS</b>	<b>UNIT</b>	<b>PROVISIONAL QUANTITIES</b>		<b>RATE</b>	<b>PRICE [EXT VAT]</b>
1	15mm copper tubing; class 2; 6,1m length	M	1			R
2	20mm copper tubing; class 2; 6,1m length	M	1			R
3	25mm copper tubing; class 2; 6,1m length	M	1			R
4	76mm copper tubing, class 2 6,1m length	M	1			R
5	50mm copper tubing, class 2 6,1m length	M	1			R
6	40mm copper tubing, class 2 6,1m length	M	1			R
7	15mm heavy duty steam pipe 6,1m length	M	1			R
8	20mm heavy duty steam pipe 6,1m length	M	1			R
9	25mm heavy duty steam pipe 6,1m length	M	1			R
10	Valve gland packing 12,5mm roll	Roll	1			R
11	Valve gland packing 10mm roll	Roll	1			R
12	Valve gland packing 6mm roll	Roll	1			R
13	Graphite pipe jointing compound 5kg container	Nr	1			R
14	PTFE thread sealing tape roll	Roll	1			R
15	Rope packing; non asbestos; 40mm x 30m roll	Roll	1			R
16	Rope packing; non asbestos; 25mm x 30m roll	Roll	1			R
17	Rope packing; non asbestos; 15mm x 30m roll	Roll	1			R
18	Manhole gaskets, spirally wound; 460mm x 340mm x 5mm thick x 32mm winding with	No	1			R
19	Side wall header gaskets, spirally wound; 125mm x 82mm x 5mm thick x 10mm winding width	No	1			R
20	Gland packing for Sulzer HCP 15-6½ boiler feed water pump; 6 packing per set	No	1			R
21	Lined webbing; non asbestos; rolls of 50mm x 6mm x 30m	Rolls	1			R
22	Packing material: graphite impregnated wire reinforced sheets, 1,2m x 2,4m x 1,5m	No	1			R
23	Packing material: graphite impregnated, wire reinforced sheets 1,2m x 2,4m x 3,0m	Sheet	1			R
24	Acetylene 8,kg cylinder	Cylinder	1			R
25	Industrial quality Oxygen 11,5kg cylinder	Cylinder	1			R
26	Welding electrodes 2,5mm x 5kg	kg	1			R
27	Welding electrodes 3,2mm x 5kg	kg	1			R
28	Brazing rods 1,5mm x 5kg	kg	1			R
29	Brazing rods 2,5mm x 5kg	kg	1			R
30	Brazing flux 500g container	g	1			R
31	Silver solder 100g	g	1			R
32	Copper to copper gas welding rods	kg	1			R
33	Gear box oil SAE 90 5 litre container	Litre	1			R
34	Motor oil SAE 30 5 litre container	Litre	1			R

35	Hydraulic oil CONDOR 310 20 litre containers	Litre	1		R
36	Paraffin 20 litre containers	Litre	1		R
37	General purpose grease 5kg containers	kg	1		R
38	High temperature soot blower grease 15kg	kg	1		R
39	Bolts, 6mm dia x 25mm long & nuts (HTS)	S	1		R
40	Bolts, 8mm dia x 25mm long & nuts (HTS)	S	1		R
41	Bolts, 8mm dia x 40mm long & nuts (HTS)	S	1		R
42	Bolts, 10mm dia x 25mm long & nuts (HTS)	S	1		R
43	Bolts, 10mm dia x 40mm long & nuts (HTS)	S	1		R
44	Bolts, 10mm dia x 50mm long & nuts (HTS)	S	1		R
45	Bolts, 12mm dia x 40mm long & nuts (HTS)	S	1		R
46	Bolts, 12mm dia x 50mm long & nuts (HTS)	S	1		R
47	Bolts, 16mm dia x 40mm long & nuts (HTS)	S	1		R
48	Bolts, 16mm dia x 50mm dia x 50mm long & nuts (HTS)	S	1		R
49	Bolts, 16mm dia x 65mm long & nuts (HTS)	S	1		R
50	Bolts, 16mm dia x 80mm long & nuts (HTS)	S	1		R
51	Bolts, 16mm dia x 100mm long & nuts (HTS)	S	1		R
52	Bolts, 20mm dia x 50mm long & nuts (HTS)	S	1		R
53	Bolts, 20mm dia x 80mm long & nuts (HTS)	S	1		R
54	Bolts, 20mm dia x 100mm long & nuts (HTS)	S	1		R
55	Paint: PWT TPA no 1; 5 litre containers	litre	1		R
56	Refractory Mortar; 25kg bags (Refcast 50)	Kg	1		R
57	Fibre glass wool sheeting: 50mm x 1,2mm x 6m roll	Roll	1		R
58	Pressure recorder charts for Negretti and Zambra P/N 9D192X	S	1		R
59	Conveyor belting for ach conveyor 400mm wide x 12mm thick 3 ply	M	1		R
60	Troughing rollers for ash conveyor 177mm width x 100mm dia x 25mm shaft dia	S	1		R
61	Return rollers for ash conveyor 485mm width x 100mm dia x 25mm shaft dia	S	1		R
62	Idler rollers for ash conveyor 485mm width x 150mm dia x 25mm shaft dia	S	1		R
63	Compensating rollers for ash conveyor 485mm width x 150mm dia x 25mm shaft dia	S	1		R
64	Conveyor belting for coal conveyor 550mm wide x 12mm thick, 3 ply	M	1		R
65	Troughing rollers for coal conveyor 100mm width x 190mm dia x 20mm shaft dia	S	1		R
66	Return rollers for coal conveyor 100mm width x 535mm dia x 20mm shaft dia	S	1		R
67	Roller bearings: SKF 6311 ZZ	S	1		R
68	Roller bearings: SKF 6310 ZZ	S	1		R
69	Roller bearings: SKF 6306 ZZ	S	1		R
70	Roller bearings: SKF 6308 ZZ	S	1		R
71	Roller bearings: MJR 38mm shaft dia	S	1		R
72	Roller bearings: RM 11	S	1		R
73	Roller bearings: NTN 22211 W 33 K	S	1		R
74	Roller bearings: KOYO 22209 RWK 33	S	1		R
75	Roller bearings: KOYO 30215J	S	1		R
76	Roller bearings: SKF 6003	S	1		R
77	40mm steam Barrel nipples	S	1		R
78	50mm steam barrel nipples	S	1		R
79	15mm gate valves	S	1		R
80	20mm gate valves	S	1		R
81	25mm gate valves	S	1		R
82	40mm gate valves	S	1		R
83	50mm gate valves	S	1		R
84	15 stainless steel ball valves	S	1		R
85	20 stainless steel ball valves	S	1		R
86	25 stainless steel ball valves	S	1		R
87	15mm long radius 90° steam bend	S	1		R
88	20mm long radius 90° steam bend	S	1		R
89	25mm long radius 90° steam bend	S	1		R
90	40mm long radius 90° steam bend	S	1		R
91	50mm long radius 90° steam bend	S	1		R
92	15mm C/C weldon Elbows	S	1		R
93	20mm C/C Weldon Elbows	S	1		R
94	25mm C/C Weldon Elbows	S	1		R
95	40mm C/C Weldon Elbows	S	1		R
96	50mm C/C Weldon Elbows	S	1		R

97	15mm C/C Weldon T pieces	S	1		R
98	20mm C/C Weldon T pieces	S	1		R
99	25mm C/C Weldon T pieces	S	1		R
100	40mm C/C Weldon T pieces	S	1		R
101	50mm C/C Weldon T pieces	S	1		R
102	15mm C/C Weldon straight connectors	S	1		R
103	20mm C/C Weldon straight connectors	S	1		R
104	25mm C/C Weldon straight connectors	S	1		R
105	45mm C/C Weldon straight connectors	S	1		R
106	50mm C/C Weldon straight connectors	S	1		R
107	25 to 15mm C/C Weldon reducing sockets	S	1		R
108	25 to 20mm C/C Weldon reducing sockets	S	1		R
109	15mm Spirax ft 14 ball float trap	S	1		R
110	20mm Spirax ft 14 ball float trap	S	1		R
111	25mm Spirax ft 14 ball float trap	S	1		R
112	15mm Armstrong 800 Inverted Bucket Trap	S	1		R
113	20mm Armstrong 800 Inverted Bucket Trap	S	1		R
114	20mm Armstrong 812 Inverted Bucket Trap	S	1		R
115	25mm Armstrong 812 Inverted Bucket Trap	S	1		R
116	15mm Steam strainer brass body	S	1		R
117	20mm Steam strainer brass body	S	1		R
118	25mm Steam strainer brass body	S	1		R
119	15mm Steam flap type Non return valve	S	1		R
120	20mm Steam flap type non return valve	S	1		R
121	25mm Steam flap type non return valve	S	1		R
122	40mm Steam flap type non return valve	S	1		R
123	50mm Steam flap type non return valve	S	1		R
124	15mm Sight glass 50mm single window brass body	S	1		R
125	20mm Sight glass 50mm single window brass body	S	1		R
126	25mm Sight glass 50mm single window brass body	S	1		R
127	15 – 20mm sight glass window repair kit	S	1		R
128	15mm cone face steam unions	S	1		R
129	20mm cone face steam unions	S	1		R
130	25mm cone face steam unions	S	1		R
131	40mm cone face steam unions	S	1		R
132	50mm cone face steam unions	S	1		R
133	15mm S/S trim steam globe valve 1000 kPa	S	1		R
134	20mm S/S trim steam globe valve 1000 kPa	S	1		R
135	25mm S/S trim steam globe valve 1000 kPa	S	1		R
136	40mm S/S trim steam globe valve 1000 kPa	S	1		R
137	50mm S/S trim steam globe valve 1000 kPa	S	1		R
138	15mm steam barrel nipples	S	1		R
139	20mm steam barrel nipples	S	1		R
140	25mm steam barrel nipples	S	1		R
141	50 to 40mm C/C reducing sockets	S	1		R
142	40 to 25mm C/C reducing sockets	S	1		R
143	40mm Mobrey modulating control valves	S	1		R
144	40mm Mobrey modulating control valve overall kit	S	1		R
145	20mm Hornes valves	S	1		R
146	25mm Hornes valves	S	1		R
147	40mm Hornes valves	S	1		R
148	0-100°C 75mm face dial thermometer	S	1		R
149	0-100°C Angle poise thermometer	S	1		R
150	10mm BSP gauge cock	S	1		R
151	10mm Syphon tube	S	1		R
152	15mm Quarter turn valves (Boiler)	S	1		R
153	20mm Quarter turn valves (Boiler)	S	1		R
154	15mm Parallel slide valve (Boiler)	S	1		R
155	20mm Parallel slide valves (Boiler)	S	1		R
156	25mm Mobrey sequencing valves (Boiler)	S	1		R
157	Pressure gauge 100mm dia bottom entry x 10mm BSP thread range 0 to 2000 kPa	S	1		R

158	Nylatron Elevator Buckets Outside length 320mm width 180mm depth 130mm projection 165mm wall thickness 8mm approx weight 1,13kg approx capacity 4,50 litre	S	1		R
159	Coal screws flight pitch 150mm x 14m	S	1		R
160	Gear box make ISQ 206118, Type VF130AP13285 Ratio 30MTGB3	S	1		R
161	Motor 5.5kw 380 Volt 3PH	S	1		R
162	Cross feed flight pitch 200mm x 17m	S	1		R
163	Gear box make ISQ 206118, Type VF130AP13285 Ratio 30MTGB3	S	1		R
164	Motor 5.5kw 380 Volt 3PH	S	1		R
165	Feed water pumps Grundfos Model no. A96501222P31233	S	1		R
166	Feed water pumps stork MCH 14A-7	S	1		R
167	Elevator belt buckets 150 x 115 x 85mm	S	1		R
168	Guillotine door cables 6mm x 450mm	S	1		R
169	Bearings FJU210 flanges	S	1		R
170	V belts SPZ1600	S	1		R
171	V belts 16 N x 3170	S	1		R
172	20mm gauge column glass tubes	S	1		R
173	20mm gauge column glass tube cone rubbers	S	1		R
174	Horns valves ¼"	S	1		R
175	Complete John Thompson boiler control panel	S	1		R
176	Complete Premier metal boiler control panel	S	1		R
177	Blower motor	S	1		R
178	Blower motor gasket	S	1		R
179	Fuel nozzle	S	1		R
180	Burner head	S	1		R
181	Burner cone	S	1		R
182	Burner head gasket	S	1		R
183	Burner blower housing	S	1		R
184	Front end gasket	S	1		R
185	Rear end gasket	S	1		R
186	50mm cast steel straight globe valve	S	1		R
187	40MM blow down valve	S	1		R
188	Grit trolley	S	1		R
189	Fuel trim 73/6000	S	1		R
190	Water Mert Kent WP4000 2"	S	1		R
191	Condensate meter Meinecke WPD 50 2"	S	1		R
192	Ware Control valve Bernad 0276000	S	1		R
193	Level switch Mobrey	S	1		R
194	Rope packing; non asbestos; 15mm x 30mm	S	1		R
195	Manhole gaskets, spirally wound; 405mm x 305mm x 5mm thick x 32mm winding width	S	1		R
196	Lined webbing, non asbestos; 50mm x 6mm x 30mm	S	1		R
197	Packing material: 1,5mm Graphite impregnated, wire reinforced sheet 1,2m x 2,4m x 1,5m	S	1		R
198	Packing material: 3mm Graphite impregnated, wire reinforced sheet	S	1		R
199	Paint: PWT TPA no 1 container	S	1		R
200	Refractory mortar; (Refcast 50)	S	1		R
201	Fibre glass wool sheeting rolls 50mm x 1,2m	S	1		R
202	Conveyor belting for ash elevator 200mm wide x 10mm thick-3py	S	1		R
203	Parts for: Mark 4 Stoker for the boilers	S	1		R
204	Stoker mat common links	S	1		R
205	Stoker mat drive links	S	1		R
206	Stoker mat drive sprockets	S	1		R
207	Stoker roller	S	1		R
208	Stoker links rods	S	1		R
209	Carbo-frax blocks	S	1		R
210	Carbo-frax blocks supports	S	1		R
211	Carbo-frax end blocks	S	1		R
212	Carbo-frax distant pieces	S	1		R
213	Washers 14mm	S	1		R
214	3mm split pins	S	1		R
215	Guillotine door 1050 x 300 x 90	S	1		R
216	Feed water pump Calpido CP3KW 5.8 amp 380 Volt	S	1		R
217	Ash extractor frame complete	S	1		R
218	5 groove pulleys	S	1		R

219	Mobrey control valve PC board Type 86436	S	1		R
220	Level switch Mobrey	S	1		R
221	Sauter electric motor IP 55 ID	S	1		R
222	FD electrical motor (SMM) Squirrel cage 3 phase TEFC D1325 5,5KW	S	1		R
223	Stoker electrical motor R47 DT 80K4 0,55 KW	S	1		R
224	ID fan electrical motor AFMAC model 6312 30KW	S	1		R
225	Feed pump electrical motor hawker sidely DF 160 MP 15KW 80C rise 3 phase	S	1		R
226	Feed Pump electrical motor WEG 160M 15KW 3 phase	S	1		R
227	Feed pump electrical motor Siemens K4 95503 15KW 3 phase	S	1		R
228	Electrical motor 0,75 KW 3 phase RPM 2850 230-240 volts	S	1		R
229	Electrical motor Moway CMC075T 0,55KW 0,75HP RPM2800	S	1		R
230	Electrical motor Ebara CMAR-00T 0,75KW RPM2850 1,0HP	S	1		R
231	Bearings SKF 6208	S	1		R
232	Bearings 630903/2	S	1		R
233	Steam Separator 6"	S	1		R
234	Expansion Bellows 5"	S	1		R
235	Grit trolley	S	1		R
236	Fuel trim 73/6000	S	1		R
237	Water Mert Kent WP4000 2"	S	1		R
238	Condensate meter Meinecke WPD 50 2"	S	1		R
239	Ware Control valve Bernad 0276000	S	1		R
240	Preparation for statutory 36 monthly inspection as per item 2 – 1 Ton up to 9,9 ton	S	1		R
241	Preparation for statutory 36 monthly inspection as per item 2 – 10 Ton up to 20 ton	S	1		R
242	AIA Certificate of Continuance (36 Monthly)	S	1		R
243	AIA Pressure Test (12 Monthly)	S	1		R
	<b>LABOUR RATES</b>				-
244	Fitters paragraph 17.1	S	1		R
245	Electricians/Certified Millwright paragraph 17.2	S	1		R
246	Artisan per hour	S	1		R
247	Artisan Assistant per hour	S	1		R
248	Labour Technician per hour	S	1		R
249	Labour Technician per hour overtime	S	1		R
250	Labour Technician per hour Sunday and Public Holidays	S	1		R
251	Labour Technician Assistant per hour	S	1		R
252	Labour Technician Assistant per hour over timer	S	1		R
253	Labour Technician Assistant per hour Sunday and Public Holidays	S	1		R
254	Boiler Operator Training on site rate per hour	S	1		R
<b>SUB-TOTAL BOILERS</b>					<b>R</b>

All unit prices that are not included or missed shall be determined through quotation process with agreed amounts standardised and revised as part of the baseline costs

All prices shall be priced to RSA currency excluding VAT

All travelling rates will be calculated according to the AA rates for the specific month

TENDERER'S SIGNATURE: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_

NAME OF FIRM: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CODE \_\_\_\_\_

TELEPHONE NO: \_\_\_\_\_ CELL NO: \_\_\_\_\_

FAX NO: \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_ DATE: \_\_\_\_\_

**Part C8.2 Technical Specification**

**1 SERVICE REQUIRED:**

- 1,1 Replace existing cladding and lagging at various points and sizes, will be indicated on a site inspection
- 1,2 Replace existing steam traps at various points and sizes, will be indicated on a site inspection
- 1,3 Replace existing leaking steam piping and condensate piping will be indicated on a Site Inspection
- 1,4 Prepare surfaces for painting these areas, will be indicated on the site inspection
- 1,5 Preparation of boiler for Statutory Inspections
- 1,6 Repairs to Steam Generating plants and auxiliaries inside the boiler house as required
- 1,7 Hiring of Fitters, Electricians/millwrights and artisans

NOTE: All above shall be done only after an inspection was conducted by the Representative of the Department: Infrastructure Unit

**2 36 MONTHS STATUTORY PREPARATION AND INSPECTION:**

**DESCRIPTION OF WORK TO BE PERFORMEND**

- 2,01 Isolate and lock intermediate valve on steam mains of the specified boiler in collaboration with the local workshop foreman on site. The Contractor shall comply with General Safety Regulation 5(2)(a) and (b)
- 2,02 Drain boiler through blow down valve. Remove chain grate. Remove manholes, head holes and mud holes. Remove all the fittings on the boiler. Expose all welded or riveted seams and short stay bars. Remove feed water dispersion pipes and anti-priming device all brickwork and arches will have to be removed.
- 2,03 The boiler is to be cleaned to a state in which it is free of all scale, both internally and externally.
- 2,04 All boiler fittings are to be cleaned, overhauled, tested and certified to be suitable for the application intended.
- 2,05 All removed parts and components pertaining to the boiler are to be reassembled and fitted to the boiler, the boiler filled with water for hydraulic test.
- 2,06 Removed sections of lagging are to be remounted, brickwork and arches having been broke down, are to be rebuilt, and the stoker, is to be re-installed.

**3 FITTINGS**

- 3,01 All the fittings are to be stripped and cleaned and shall be free of all scale and rust (internally and externally). All old packing, glands packing are to be removed and areas shall be cleaned.
- 3,02 All valves shall be visually checked for possible damage and defects that will cause valves to be unsafe for further use.
- 3,03 Check and clean all studs/threaded holes/bolts and nuts for possible damage or defects.
- 3,04 All the valve seats are to be resealed by lapping ensuring proper and drop tight seating under pressure.
- 3,05 All the fittings are to be dismantled, the parts being displayed on the bench for inspection purposes on the day specified for the fittings inspection.
- 3,06 After all the fittings have been assembled and before being mounted on the boiler, these shall be hydraulically tested to 1.25 x the authorized working pressure, using a hand pump.
- 3,07 Any major repairs/replacement may only be carried out after written instruction by the Department Health: Infrastructure Unit has been issued.
- 3,08 Overhauling of soot blowers must be done by authorized agents, the two shut off steam valves in front of the soot blowers does form part of this contract, including steam traps.

**4 WATERSIDE OF BOILER**

- 4,01 All scale deposits inside /or on the outside surface of the tubes are to be removed from accessible areas by means of wire brushing.
- 4,02 If a rattler type descaler is to be used it shall be done under full time supervision of the successful contractor to prevent any damage through improper use of such equipment.
- 4,03 Should any damage occur through the incorrect use or the failure of such equipment the successful tenderer/contractor shall be responsible to effect the necessary repair to the satisfaction of the Department: Infrastructure Unit at his own cost in the most suitable way, which is to be determined by Control Boiler Inspector.

**5 EXTERNAL AND FIRESIDE**

**5,01 SHELL, FURNACE, REVERSAL CHAMBER, MUDHOLES AND MANHOLES**

- 5.01.1 All accessible areas are to be cleaned and shall be free of all scale and rust by means of wire brushing and scraping without damaging or removal of any of the underlying material
- 5.01.2 All seating surfaces of all mud holes and manholes are to be cleaned and shall be free of old packing/gasket material. Care shall be taken not to damage the underlying surfaces.
- 5.01.3 Threaded section of draw bolts on all mud holes and Manholes are to be properly cleaned without causing damage to the threads.

**5.02 WELDED SEAMS**

All accessible areas of welded seams are to be cleaned and shall be free of scale. This shall be accomplished by means of wire brushing and scraping without deforming the surface or the removal of any of the underlying metal.



## 6 HYDRAULIC TEST AND EXTERNAL INSPECTION

- 6,01 All cleaning material and foreign matter shall be removed from inside the boiler.
- 6,02 Feed water dispersion pipe and anti-priming device shall be reinstalled.
- 6,03 Remount all boiler fittings with suitable new gaskets and packing where required. All mud holes and manholes shall be fitted using new gaskets as specified.
- 6,04 The boiler shall be filled with cold raw water by means of a hosepipe until all air is removed from the highest point or air purge valve where provided.
- 6,05 The pressure in the boiler must be raised slowly by means of a hand pump to the authorized working pressure to check for possible leaks on fittings and joints, and repairing of such faults, when they occur. Under no circumstances will it be allowed to exceed the working pressure at this stage.
- 6,06 Under no circumstances must the boiler be left under pressure for any extended period of time.
- 6,07 All safety valves springs must be removed. The seat on the valve must be gag during hydraulic pressure after word these gag must be removed and showed to the Control Boiler Inspector
- 6,08 On the day of the specified inspection the pressure in the Boiler is to be raised slowly to the authorized working pressure for  $\pm 15$  min before the time of the scheduled inspection. The final test pressure will be determined by the Boiler Inspector.

## 7 PAINTING

After the successful completion of the hydraulic test and external inspection all the welded seams and areas normally covered by brickwork and arches (if removed) must be treated with 3 coats of PWT no 1 paint, which will be supplied by the Contractor.

All grit arrestors, cyclone, ducting, FD and ID fans ducting must be painted with a heat resistant aluminum paint.

## 8 LAGGING

Lagging removed from all welded seams and attachment welds are to be reinstalled in workman like manner, leaving a neat well finished installation.

## 9 CHAINGRATE / STOKER

The following are to be done on overhauling of chain grate stoker.

- 9,01 Remove and strip all worn and broken stoker drive and common links. Strip out all old stoker chain rods and re-install new rods. Remove and inspect the condition of drive shafts, bearing blocks and drive gears. Supply and install new stainless steel sliding strips. Remove, inspect and re-install broken or damaged side seals, carbofrax blocks and brackets.

NB: The following must be replaced and will be supplied by the Contractor: Rods, Washers, Stainless Steel Split Pins, Rear Roller, Drive Gears, New Stainless Steel Sliding Strips and Carbofrax Blocks, drive links and side links.

Common links will only be replaced if required and approved by the Control Boiler Inspector in writing.

- 9,02 Replace and re-install end roller. Check and straighten air guide veins where necessary. Check and set under grate dampers for correct operation. Check chain tensioner bolts. All parts needed to overhaul stoker that does not form part of the price schedule will be supplied by the successful contractor and paid out of the Maintenance cost adjustment
- 9,03 Check and repair guide plate under stoker where necessary. (Contractor to supply material and labour). Replace thrust bearing on worm gear of stoker drive. Inspect and report on condition of main worm wheel and worm gear. Reassemble complete stoker.
- 9,04 The stoker is to be re-installed after the brickwork and further required preparation has been completed. The site must be left clean and tidy after the completion of the contract.

## 9.05 SCOPE OF WORK ON SOOTBLOWERS

- 1. Collect, strip, degrease and chemically clean blowers.
- 2. Re-sleeve steam chest.
- 3. Replace neck rings.
- 4. Replace steam spindle assemblies.
- 5. Replace bronze bushes.
- 6. Replace caps and operating nuts.
- 7. Replace piston rings.
- 8. Replace hammer drive screws.
- 9. Replace split pins and gland packing.
- 10. Present pre-assemble for inspection by Reg. inspector.
- 11. Assemble
- 12. Paint with suitable etching primer.
- 13. Commission on Boiler with correct nozzle setting.
- 14. If beyond repairs replace with new

## 10.00 OVERHAUL CATER GEAR BOX / GEAR BOX

Gear box must be overhaul as per manufacture specification, should it not be economical to repair, the gear box must be replaced with a variable speed drive motor gear box and all additional modification to make this a working installation to the boiler panel.

## 11 GRIT ARRESTOR / CYCLONES

Where possible parts of the inlet and outlet of the ducting to and from grit arrestor must be removed for cleaning and inspection purposes. Where this is not possible and there is now other means of access into grit arrestor, a new inspection door must be supplied and installed, Insuring airtight to grit arrestor. The size of these inspection doors must be 450 x 450 x 6mm mild steel. All stubs and swills must be removed and clean by means of sandblasting.

## 12 DETAILED TECHNICAL REQUIREMENTS

- 12.01 Any repairs to the boiler that may become necessary during this contract will only be carried out on written instruction of the Department: Infrastructure Unit. After receipt of such an instruction, a written repair procedure shall be obtained from an approved inspection authority. Proof of the required and appropriate SABS Accreditation shall accompany such submissions. Any such repair work carried out will be at extra cost to the Department: Infrastructure Unit.
- 12.02 Should scale build up on the water side be excessive, chemical cleaning may be considered. Only an approved water treatment contractor on written instruction of the Department: Infrastructure Unit may affect this type of cleaning.
- 12.03 Sand blasting and needle descaling to remove excessive fire scale on the outer shell will only be carried out on written approval by the Department: Infrastructure Unit. Care shall be taken not to damage the underlying metal base or to remove as little of the underlying metal as possible.
- 12.04 Chipping to remove any scale on any area of the Boiler is not permitted and will not be tolerated.
- 12.05 Any welding on any part of the boiler will only be allowed on written approval of an approved inspection authority accredited to SABS 0227/ Part 2. Only an approved coded welder with a valid certificate may do such welds and an approved repair and welding procedure, which is to be submitted prior to any welding shall be submitted in any way.
- 12.06 Should the removal of all external lagging become necessary after adjudication of this contract, and no prices were allowed for in the price schedule, this will be at extra cost to the Department: Infrastructure Unit.
- 12.07 Any re-lagging of the boiler will only be permitted after thorough cleaning and painting has been completed.
- 12.08 Any re-lagging of the boiler shall be carried out by a reputable lagging company approved by the Department: Infrastructure Unit.
- 12.09 Filling of the boiler must be with cold raw water and utmost care must be taken to prevent over filling and any spillage.
- Any damage occurring in this respect, necessitating i.e. removal and replacing of lagging will be for the account of the successful tenderer/ contractor.
- 12.10 Pressurizing the boiler shall be done by using a suitable hand pump, any other method is not permitted. Should the boiler be over pressurized through any means whatsoever and any damage sustained through this occurrence, the successful tenderer/contractor shall be responsible for payment for such repairs.

The painting of areas specified and rebuilding of brickwork and arches are part of this contract.

- 12.11 Wire brushing of threads on brass fittings is prohibited.
- 12.12 Time is of the essence for this contract and the contractor is to ensure that all work is completed on the scheduled dates.
- 12.13 Equipment, tools and material necessary to carry out the work as specified herein must be supplied by the contractor.
- 12.14 Portable lights used are to be in compliance with Electrical Machinery Regulations, R10, promulgated under the Machinery and Occupational Safety Act, 1983.
- 12.15 The successful tenderer/contractor must at all times ensure that Access to operate and maintain any of the other boiler/s in the Boiler House is not obstructed or impeded in any way.
- 12.16 Storage of equipment and material shall solely and fully be the responsibility of the contractor, and no liability for any damage or loss of equipment of the successful tenderer /contractors stored on site will be accepted by the Department: Infrastructure Unit.
- 12.17 All work carried out within this contract will only be permitted during normal working hours, unless prior arrangement was made.

## 13 LAGGING

The entire surface of the Boiler shall be thoroughly cleaned of all scale, oil, grease, rust, etc., by means of sandblasting, (see section 6.00 paragraph 3) without damaging the underlying surface or the excessive or unnecessary removal of underlying metal.

The entire outer surface of the boiler shall then be painted with three coats of PWT no 1 paint. The quality of the paint supplied by the contractor will be approved by the Control Boiler Inspector before any paint can be put to the surfaces before any rust or dirt can form on or adhere to the surface.

A 50mm thick 120-140kg/m<sup>3</sup> density mattress of glass wool or slag wool shall be secured to the boiler shell with sufficient galvanized steel strapping Thermal conductivity of insulation to be approximately 0,045W/m<sup>2</sup> C. The shell must then be enclosed by means of 0,9mm thick grade 430B stainless steel sheet metal.

All other surface such as the fire box must be lagged with a 40mm thick non asbestos composition layer troweled to a smooth finish and after allowing sufficient time for drying be painted with two coats of heat resistant aluminum paint.

Installation of lagging must be done in such a manner that all main welding seams as identified areas by Control Boiler Inspector are permanently exposed. These open areas will be approximately 100mm wide and must be rounded off neatly.

Openings between lagging and fittings must be sealed off by means of a non asbestos rope and a non-hardening silicone sealer.

To enable the competent person to examine welded joints, cover strips, secured by means of stainless steel self-tapping screws, shall be installed over joints.

Name plate, boiler inspector plate etc., shall be left un-lagged and must NOT BE SANDBLASTED.

## 14 TESTING / INSPECTION AUTHORITY

All MPI, ultrasonic and thickness testing must be done by a reputable level 3 SANAS registered company. An approved inspection authority with a registered pressure vessels certificate and register with SANAS must inspect the boiler with the Control Boiler Inspector and complete all relevant documents.

## 15 GENERAL NOTES TO TENDERER

- a) All work executed under this contract shall comply fully with the Regulations of the Occupational Health and Safety Act, Act 85 of 1993 and all amendments thereof, as well as any Regulations and Standards, promulgated under said Act and which, are in force during the time between handing over of the site to the successful tenderer/ contractor and the handing over of the completed contract to the Department: Infrastructure Unit.
- b) The materials and fittings of the boiler are to the relevant current British Standard specification and to the requirements of approved Inspection Authorities. All threads on pipes, studs, etc., are to British Standards. This shall be maintained by the Contractor.
- c) The contractor shall further more work in close collaboration with the Control Boiler Inspector of the Department: Infrastructure Unit to ensure satisfactory progress of the work.
- d) No second hand equipment of any description may be offered for the use in this contract.
- e) All schedules which accompany the tender notice are an integral part of the tender and shall be duly completed in every detail, failing which, the tender in question may be rendered ineligible for consideration.
- f) Alarms, cutouts and pump controls to be checked for Correct operation under cold conditions directly after completion of the hydraulic test.
- g) Valves on boilers will be opened at random to check for correct assembly after hydraulic inspection.
- h) Boiler internal to be inspected before filling for hydraulic test by the Infrastructure Unit to ensure correct assembly of the dispersion pipe assembly and that no foreign matter is left inside the boiler.
- i) All work must be done according to the standard quality specification for boiler installations.

## 16 TENDER DEVIATIONS

16.01 This specification has preference over any additional documentation submitted by a tenderer. Deviations from this specification will only be considered if indicated as such in this document and has been proven to be suitable for this particular application.

16.02 If the Tenderer wishes to clarify certain aspects of his offer, this may be done in an additional document which, will be subject to the aforementioned preference.

16.03 These items will be subject to the written approval of the Department: Infrastructure Unit.

## 17 BUILDER'S WORK (FIRE BRICK WORK)

All builders work required under this tender is part of this contract and Tenderers must make provision therefore under the tender price.

## 18 ELECTRICAL / BOILER PANELS

Contractor must clean all relevant boiler control panels and as set out in prices schedule to repair / replace as required. He must test and submit a full report on the condition of the boiler control panel. Should it be uneconomically to repair the boiler control panel it must be replaced with a new panel as required by the manufacture

All electrical work required under this contract shall be in accordance with the latest issue of the "Standard Quality Specification for General Electrical Installations GP/ESI Latest addition".

## 19 ROOF FLASHING

Roof flashing around safety valves vent pipe must be made good after securing vent pipe subsequent to a successful inspection/test.

## 20:00 COMMISSIONING AND TRAINING

After completion the contractor must execute a cold commissioning on the relevant boiler insuring that all safety devises are in place and in working order. After these tests have been executed the boiler will be fired up by the facility boiler operator under which the relevant boiler operators on site will be trained as specified in the following for a period as refer to in the price schedule.

### TRAINING SCHEDULE

- 20.01 Train boiler operators on all safety devises and safety aspects (high level alarm, low level alarm, cut out, mobrey testing, gauge glass testing and safety valves)
- 20.02 Train boiler operators to steam boiler to a economically standards as set out by the manufactures (coal supply, coal bed thickness, draft control, cleanings of boilers, cleaning of fly ash in smoke box on a regular basis).
- 20.03 Testing of boiler TDS and mixing of chemicals for water treatment.
- 20.04 Ensure that blow down intervals comply with the water treatment
- 20.05 To carry out proper soot blowing on boilers
- 20.06 Fill in all relevant log books as required by the OSH act and proper shift hand over.

## 21 SIX MONTHLY WASHOUT INSPECTION:

- 1 Shut down boiler for annual maintenance and cool it
- 2 Clean fire tube plates front and back
- 3 Clean tubes of boiler 1st pass, 2nd pass and 3rd pass to a state in which it is free of all scale, both internally and externally
- 4 Remove and check stocker grate mark and stoker gearbox
- 5 Check and rebuilt building work and arches having broken down i.e ignition arch, ring arches and guillotine door and secondary arches
- 6 Check and clean all welded or riveted seams and short stays shall be free of scale
- 7 Open and clean grit arrestors and cyclones
- 8 Open, clean and balance FD fan. Re-grease bearings
- 9 Open, clean and balance ID fan. Re-grease bearings
- 10 Check boiler feed pumps and re-grease bearings
- 11 Calibration boiler pressure gauge
- 12 Electrical control panel to be serviced and cleaned
- 13 Check, clean and reset of mobreys and safety valves
- 14 Check and clean of sootblowers
- 15 Check and clean all fittings of free scale and rust i.e valves, gauge columns, including auxiliary valves, non return valve and modulating valve
- 16 Removal of all fly ash in boiler

## HEALTH AND SAFETY SPECIFICATION

- 1 All piping and ducting which can allow steam, water, condensate, boiler feed water or flue gasses entering the boiler on which work is to be performed, shall be isolated by the Contractor, and remain isolated in such a manner that persons performing work on the boiler, shall be safe. Any valve or damper used for isolation shall be chained and locked in the closed position.
- 2 Lead lights shall operate at a voltage less than 50V and all hand held electrical tools and the ventilation fan shall be protected by earth leakage or be double
- 3 The electrical supply to the boiler shall be isolated, locked and tagged or physically isolated. This shall be done by the contractor Electrician. The contractor shall arrange for this and file a written signed statement by the Electrician that the boiler is isolated with a COC certificate.
- 4 The steam and waterside of the boiler shall be ventilated by providing a 125mm diameter centrifugal fan temporarily mounted to extract air from a mud hole. The fan shall deliver 0,1m³/s at 50Pa. It shall be similar or equal to Donkin type CDC 125/1.0
- 5 In the event of scaffolding being used, it shall be carried out under the supervision of a competent person.
- 6 Rigging equipment shall be used for items where more than 1 person is required to man-handle the item.
- 7 Fall arrest equipment shall be provided and worn where there is a danger of falling.
- 8 Head, foot, eye, ear and nasal dust protection equipment is to be provided and worn as indicated by a hazard identification process.
- 9 The Contractor is to perform the duties as imposed by the Construction Regulations, R1010, of 2003.
- 10 The contractor shall supply all cleaning machines, sandblasting equipment, lapping equipment, lead lights, scaffolding and safe step ladders to complete this

### 1 DESCRIPTION

#### REMOVE / STRIP FROM BOILER AS REQUIRED

- 1,1 All fittings i.e. valves, gauge columns, etc., including auxiliary valves and non-return valves where applicable
- 1,2 Remove coal hopper(s)
- 1,3 Automatic stoker(s)(only remove)
- 1,4 Sheet metal covering and lagging over welded or riveted joints as well as covering over stay bars on rear of semi wetback boilers.
- 1,5 Cover plates over tubes / bars
- 1,6 Building work, fire brickwork i.e. ignition Arch ash retaining walls brickwork, ring Arches and Guillotine door and secondary arches.
- 1,7 Sheet metal and lagging around blow done valve (s)
- 1,8 Sheet metal and lagging around ash port (s)
- 1,9 Sheet metal and lagging for outer shell

### 2 CLEANING OF BOILER

- 2,1 Tube plates on water side
- 2,3 Water side of boiler shell
- 2,4 Tubes ordinary and stay tubes or stay bars (water side)
- 2,5 Tube plates on fire side
- 2,6 Furnace flue (s)
- 2,7 1st pass  
2nd pass  
3rd pass  
Chambers
- 2,8 Tubes ordinary and stay tubes or stay bars (fire side)
- 2,9 Weep holes (Tell tale holes)
- 2,1 Ash port (s)

### 3 MACHINE BOILER PADS

- 3,1 Safety valve pad(s)
- 3,2 Crown valve
- 3,3 Mobrey pads
- 3,4 Water feed pads
- 3,5 Blow down pad(s)
- 3,6 Other pad(s)
- 3,7 Stub flanges

### 4 STUDS IN BOILER PADS AS REQUIRED

- 4,1 Safety valve pad
- 4,2 Crown valve
- 4,3 Mobrey pads
- 4,4 Water feed pads
- 4,5 Blow down pads
- 4,6 Head hole pads

- 4 STUDS IN BOILER PADS AS REQUIRED
- 4.1 Safety valve pad
- 4.2 Crown valve
- 4.3 Mobrey pads
- 4.4 Water feed pads
- 4.5 Blow down pads
- 4.6 Head hole pads
- 5 SAND BLASTING
- 5,1 Sandblast Boiler flue
- 5,2 Front tube plate
- 5,3 Rear tube plate
- 5,4 Endplate
- 5,5 Outer shell
- 5,6 All cast steel valves
- 5,7 Stoker frame
- 5,8 Ash extractor frame(if required)
- 5,9 FD fan
- 5,1 ID fan
- 5,11 Grit arrestor tubes
- 5,12 Grit arrestor swills
- 6 STRIP AND CLEAN BOILER VALVES
- 6.1 Strip clean and reassemble boiler valves mounted onto boiler including auxiliary valves, non return valves and modulating valve (See pages DRT 2 point 3.00).

#### DESCRIPTION

- 7 ACID WASH
- 7.1 Acid wash boiler in water side
- 8 STRIP AND CLEAN TWO SOOT BLOWERS – SEE PAGE DTR 5 POINT (9.05) CONTRACTOR MUST PRICE ACCORDINGLY
- 8.1 No 1
- 8.2 No 2
- 8.3 Replace complete soot blowers
- 8 STRIP AND CLEAN TWO SOOT BLOWERS – SEE PAGE DTR 5 POINT (9.05) CONTRACTOR MUST PRICE ACCORDINGLY
- 8.1 No 1
- 8.2 No 2
- 8.3 Replace complete soot blowers
- 9 STRIP AND CLEAN SAFETY VALVES
- 9.1 1 x \_\_\_\_\_ double spring safety valve
- 9.2 Replace safety valve springs
- 10 STRIP AND CLEAN REASSEMBLE STOKER GRATE MARK
- 10.1 Strip clean and reassemble stoker grate
- 10,2 Replace stoker rods
- 10,3 Replace washers
- 10,4 Replace split pins stainless steel
- 10,5 Replace rear roller
- 10,6 Replace drive sprockets
- 10,7 Replace drive shaft
- 10,8 Replace stainless steel wear strips
- 10,9 Replace carbofrax blocks
- 10.10 Replace drive links
- 10.11 Replace common links
- 10.12 Replace left hand side links

#### DESCRIPTION

- 10.13 Replace right hand side links
- 10.14 Replace spur gear / worm wheel
- 10.15 Replace bearings / bushes on gearbox
- 10.16 Replace oil in worm wheel box

- 11 STRIP AND CLEAN (ONE) STOKER GEARBOX
  - 11.1 Strip and clean Stoker gearbox
  - 11.2 Replace oil
  - 11.3 Replace bearings
  - 11.4 Replace bushes
  - 11.5 Replace inspect worm wheel
  - 11.6 Replace shaft
  - 11.7 Replace oil seals
  - 11.8 Replace bearings on motor
  - 11.9 Replace drive coupling between motor and gearbox
  - 11.10 Replace drive sprockets
  - 11.11 Replace drive chain
  - 11.12 Replace motor fan
- 12 REPLACE CATER GEARBOX CONTRACTOR MUST PRICE ACCORDINGLY
  - 12.1 Replace variable speed drive motor gear box and inverter
- 13 FANS
  - SUPPLY AND INSTALL NEW BEARINGS
  - 13.1 ID fan motor
  - 13.2 FD fan motor
  - 13.3 ID fan
  - 13.4 FD fan
  - 13.5 ID fan plumber blocks
  - 13.6 FD flanges bearing
  - 13.7 New groove pulley for motor / fans
  - 13.8 New taper locks for motor / fans
  - 13.9 New keys for motor / fans
  - 13.10 New drive couplings
  - 13.11 New match set V-belts
  - 13.12 Balance ID fan in position on site
  - 13.13 Balance FD fan in position on site
- 14 STRIP AND CLEAN REASSEMBLE GRIT ARRESTOR
  - 14.1 Open and clean grit arrestor
  - 14.2 Cut and manufacture 600 x 600 manual
  - 14.3 Remove tubes
  - 14.4 Remove swills
  - 14.5 Install new vibrating eliminators
  - 14.6 Cyclones
  - 14.7 Ducting
- 15 COAL SCREW
  - 15.1 Remove coal from coal bunker
  - 15.2 Remove coal screw casing
  - 15.3 Remove coal screw
  - 15.4 Supply and install a new coal screw casing
  - 15.5 Supply and install coal screw
  - 15.6 Supply and install a new coal screw motor and gear box
- 16 TRAPPING ARRANGEMENT (SEE ATTACHED DRAWING)
  - 16.1 Supply and install new trapping arrangement(s) T4
- 17 REPLACE BUILDING WORK
  - 17.1 Ignition Arch(s)
  - 17.2 Ash retaining wall(s)
  - 17.3 Secondary arch(s)
  - 17.4 Ring Arch(s)
  - 17.5 Replacing air seal inside furnace flue(s)
  - 17.6 Around automatic stoker
  - 17.7 Side seals
  - 17.8 Webbing (tube plate covers)

- 18 TESTING
- 18.1 MPI Testing
- 18.2 Ultrasonic Testing
- 19 Thickness Testing
- 20 Supply Magnetically Spray
  - a) White back ground x 6
  - b) Penetrating x 3
- 19 Calibration boiler pressure gauge
- 19.1 Approved inspection authority(3 x visit)
- 20 CLEAN REPAIRS BOILER PANEL
- 20.1 Clean boiler panel
- 20.2 Secure all electrical connections
- 20.3 Clean all contactors
- 20.4 Replace all variable pretension meter
- 20.5 Replace all stop start buttons
- 20.6 Replace all panel indication lamps and holder
- 20.7 Replace photo and magnahelix meter(s)
- 20.8 Clean and reset over loads switches
- 20.9 Replace sauter box motors
- 20.10 Clean Mobrey panel
- 20.11 Replace all magnet switches
- 20.12 Replace solenoid coils
- 20.13 Replace boiler alarm
- 20.14 Test for faults and report
- 20.15 Replace level control diaphragm in coal shut
- 20.16 Replace electric wiring on coal hopper
- 21 Comply with responsibilities as imposed by Construction Regulations R1010
- 22 Replacement of any parts is subject to approval from the Department or the Department's acting agent.
- 23 COMMISSIONING OF BOILER - CONTRACTOR MUST PRICE ACCORDINGLY
- 24 Contractors must submit a price to fire up the boiler and reset all controls and safety devices to working order on completion of boiler. The contractor must steam the boiler with own boiler personnel and train boiler attendants for a period of 7 (seven) days on a 8 (eight) hour day shift (08:00 until 16:00).
- 25 Comply with responsibilities as imposed by Construction Regulations R1010
- 26 Handover of the Boilers for the 36 Month Statutory Servicing is subject to Department of Labour approval and certificate of compliance. All certifications to be submitted to the Department and copies kept for records.

BID NUMBER: \_\_\_\_\_

Maintenance and Repairs of Boilers, Steam & Condensate Reticulation, Water Treatment on Boilers and Autoclaves, Calorifiers And Mechanical Equipment at Various Health Facilities in the North West Province Department of Health for a Period of 48 Months.  
(POTCHEFSTROOM, JOB SHIMANKANA TABANE, WITRAND)



Part C9.2 BILL OF QUANTITIES - STEAM AND CONDENSATE RETICULATION

C9.2 Priced rates for servicing, repairs maintenance of the Steam and Condensate Reticulation and Various Mechanical Equipment						
ITEM NO:	SCHEDULED MAINTENANCE	UNIT	Number of Services in 4 years	Nr of Calorifiers	RATE	PRICE [EXT VAT]
1	Calorifier Maintenance Routine - Quarterly (Job Shimankana Tabane Hospital)	No	12	14		R
2	Calorifier Maintenance Routine - Quarterly (Potchefstroom Hospital)	No	12	9		R
3	Calorifier Maintenance Routine - Quarterly (Witrand Hospital)	No	12	24		R
4	Calorifier Maintenance Routine - Annual (Job Shimankana Tabane Hospital)	No	4	14		R
5	Calorifier Maintenance Routine - Annual (Potchefstroom Hospital)	No	4	9		R
6	Calorifier Maintenance Routine - Annual (Witrand Hospital)	No	4	24		R
ITEM NO:	SCHEDULED PARTS	UNIT	QUANTITIES	RATE		PRICE [EXT VAT]
1	15mm ball float valve	S	1			R
2	20mm ball float valve	S	1			R
3	25mm ball float valve	S	1			R
4	15mm Steam barrel nipples	S	1			R
5	20mm Steam barrel nipples	S	1			R
6	25mm Steam barrel nipples	S	1			R
7	40mm Steam barrel nipples	S	1			R
8	50mm Steam barrel nipples	S	1			R
9	Armstrong 800 Steam trap repair kit: 4.27mm orifice	S	1			R
10	Armstrong 800 Steam trap gasket sets	S	1			R
11	15mm Spirax FT14 Steam traps	S	1			R
12	20mm FT14 Spirax Steam traps	S	1			R
13	25mm FT14 Spirax Steam traps	S	1			R
14	15 to 20mm Spirax Sarco sight glass window repair kits	S	1			R
15	15mm brass horns valves	S	1			R
16	20mm brass horns valves	S	1			R
17	25mm brass horns valves	S	1			R
18	32mm brass horns valves	S	1			R
19	15mm S'S trim globe valve 10 bar	S	1			R
20	20mm S'S trim globe valve 10 bar	S	1			R
21	25mm S'S trim globe valve 10 bar	S	1			R
22	15mm cone face steam unions	S	1			R
23	20mm cone face steam unions	S	1			R
24	25mm cone face steam unions	S	1			R
25	15mm copper tubing, class 2 6,1m length	S	1			R
26	20mm copper tubing, class 2 6,1m length	S	1			R
27	25mm copper tubing, class 2 6,1m length	S	1			R
28	40mm copper tubing, class 2 6,1m length	S	1			R
29	50mm copper tubing, class 2 6,1m length	S	1			R
30	80mm copper tubing, class 2 6,1m length	S	1			R
31	15mm heavy duty steam pipe 6,1m length	S	1			R



ITEM NO:	SCHEDULED PARTS	UNIT	QUANTITIES	RATE	PRICE [EXT VAT]
32	20mm heavy duty steam pipe 6,1m length	S	1		R
33	25mm heavy duty steam pipe 6,1m length	S	1		R
34	40mm heavy duty steam pipe 6,1m length	S	1		R
35	50mm heavy duty steam pipe 6,1m length	S	1		R
36	80mm heavy duty steam pipe 6,1m length	S	1		R
37	Valve gland packing 12,5mm	S	1		R
38	Valve gland packing 10mm	S	1		R
39	Valve gland packing 6mm	S	1		R
40	Graphite pipe jointing compound; 5kg container	S	1		R
41	Rope packing; non asbestos; 40mm x 30mm	S	1		R
42	Rope packing; non asbestos; 25mm x 30mm	S	1		R
43	15mm flap type brass body non return valves	S	1		R
44	20mm flap type brass body non return valves	S	1		R
45	25mm flap type brass body non return valves	S	1		R
46	40mm flap type brass body non return valves	S	1		R
47	50mm flap type brass body non return valves	S	1		R
48	15mm steam strainers, brass body	S	1		R
49	20mm steam strainers, brass body	S	1		R
50	25mm steam strainers, brass body	S	1		R
51	40mm steam strainers, brass body	S	1		R
52	50mm steam strainers, brass body	S	1		R
53	Rope packing; non asbestos; 15mm x 30mm	S	1		R
54	Packing material: 1,5mm Graphite impregnated, wire reinforced sheet 1,2m x 2,4m x 1,5m	S	1		R
55	Packing material: 3mm Graphite impregnated, wire reinforced sheet	S	1		R
56	Valve gland packing 8mm	S	1		R
57	Paint: PWT TPA no 1 container	litre	1		R
58	Fibre glass wool sheeting rolls 50mm x 1,2m	S	1		R
59	Pressure Gauge, 100mm dia, bottom entry x 10mm BSP thread, range 0 to 2000 KPA	S	1		R
60	10mm siphon tube	S	1		R
61	10mm cock valves	S	1		R
62	15mm TLV steam traps	S	1		R
63	20mm TLV steam traps	S	1		R
64	25mm TLV steam traps	S	1		R
65	Steam Separator 6"	S	1		R
66	Expansion Bellows 5"	S	1		R
67	Lagging preformed pipe section fiber glass ½"	S	1		R
68	Lagging preformed pipe section fiber glass ¾"	S	1		R
69	Lagging preformed pipe section fiber glass 1"	S	1		R
70	Lagging preformed pipe section fiber glass 1½"	S	1		R
71	½ " brass globe valves	S	1		R
72	¾" brass globe valves	S	1		R
73	1" brass globe valves	S	1		R
74	1 ½" brass globe valves	S	1		R
75	Lagging preformed pipe section fiber glass 1 ¼"	S	1		R
76	Lagging preformed pipe section fiber glass 2"	S	1		R
77	Lagging preformed pipe section fiber glass 2½"	S	1		R
78	Lagging preformed pipe section fiber glass 2 ¾"	S	1		R
79	Lagging preformed pipe section fiber glass 3"	S	1		R
80	Lagging preformed pipe section fiber glass 4"	S	1		R

ITEM NO:	SCHEDULED PARTS	UNIT	QUANTITIES	RATE	PRICE [EXT VAT]
81	Lagging preformed pipe section fiber glass 5"	S	1		R
82	Lagging preformed pipe section fiber glass 6"	S	1		R
83	Galvanized muffs ½"	S	1		R
84	Galvanized muffs ¾"	S	1		R
85	Galvanized muffs 1"	S	1		R
86	Galvanized muffs 1½"	S	1		R
87	Galvanized muffs 1¾"	S	1		R
88	Galvanized muffs 2"	S	1		R
89	Galvanized muffs 2½"	S	1		R
90	Galvanized muffs 2¾"	S	1		R
91	Galvanized muffs 3"	S	1		R
92	Galvanized muffs 4"	S	1		R
93	Galvanized muffs 5"	S	1		R
94	Galvanized muffs 6"	S	1		R
95	40mm conex straight connector	S	1		R
96	50mm conex straight connector	S	1		R
97	Gate valves ½"	S	1		R
98	Gate valves ¾"	S	1		R
99	Gate valves 1"	S	1		R
100	Gate valves 1 ½"	S	1		R
101	Gate valves 1 ¾"	S	1		R
102	Gate valve 2"	S	1		R
103	Gate valve 3"	S	1		R
104	Gate valve 4"	S	1		R
105	15mm cast steel body strainer	S	1		R
106	- 20mm cast steel body strainer	S	1		R
107	25mm cast steel body strainer	S	1		R
108	40mm cast steel body strainer	S	1		R
109	1/2 " brass angle globe valve	S	1		R
110	1½" brass globe valve	S	1		R
111	Temperature Thermometer Ispesl 0-120°C	S	1		R
112	Pressure relieve Bailey 323 2"	S	1		R
113	15mm pressure reducing valve 100-700 Kpa	S	1		R
114	Pressure reducing valves ¾" 100-700KPA	S	1		R
115	Circulating pump Moway	S	1		R
116	Condensate pump Mand B 40M0/75	S	1		R
117	Level switch Mobrey	S	1		R
118	Safety valve pull up type ¾"	S	1		R
119	Safety valve pull up type 1"	S	1		R
120	Central Heating radiators	S	1		R
121	Central Heating Peach Cocks	S	1		R
122	15mm conex male adaptor	S	1		R
123	20mm conex male adaptor	S	1		R
124	25mm conex male adaptor	S	1		R
125	15mm conex straight connector	S	1		R
126	20mm conex straight connector	S	1		R
127	25mm conex straight connector	S	1		R
128	50mm cast steel globe valves	S	1		R
129	65mm cast steel globe valves	S	1		R

ITEM NO:	SCHEDULED PARTS	UNIT	QUANTITIES	RATE	PRICE [EXT VAT]
130	75mm cast steel globe valves	S	1		R
131	15mm cast steel pressure reducing valves	S	1		R
132	20mm cast steel pressure reducing valves	S	1		R
133	25mm cast steel pressure reducing valves	S	1		R
134	32mm cast steel pressure reducing valves	S	1		R
135	40mm cast steel pressure reducing valves	S	1		R
136	50mm cast steel pressure reducing valves	S	1		R
137	65mm cast steel pressure reducing valves	S	1		R
138	75mm cast steel pressure reducing valves	S	1		R
139	300 litre vertical calorifiers	S	1		R
140	500 litre vertical calorifiers	S	1		R
141	1000 litre vertical calorifiers	S	1		R
142	2000 litre vertical calorifiers	S	1		R
143	3000 litre vertical calorifiers	S	1		R
144	300 litre horizontal calorifiers	S	1		R
145	500 litre horizontal calorifiers	S	1		R
146	1000 litre horizontal calorifiers	S	1		R
147	2000 litre horizontal calorifiers	S	1		R
148	3000 litre horizontal calorifiers	S	1		R
149	Condensate pump Ebara CMA.075 T	S	1		R
150	Condensate pump Ebara CMA.100 T	S	1		R
151	Condensate pump Ebara CMA.200 T	S	1		R
152	15mm brass angle globe valves	S	1		R
153	20mm brass angle globe valves	S	1		R
154	25mm brass angle globe valves	S	1		R
155	15mm 90° BSP thread steam elbows	S	1		R
156	20mm 90° BSP thread steam elbows	S	1		R
157	25mm 90° BSP thread steam elbows	S	1		R
158	15mm 90° BSP thread steam bends	S	1		R
159	20mm 90° BSP thread steam bends	S	1		R
160	25mm 90° BSP thread steam bends	S	1		R
161	15mm 90° weld on black elbows	S	1		R
162	20mm 90° weld on black elbows	S	1		R
163	25mm 90° weld on black elbows	S	1		R
164	15mm 90° weld on black bends	S	1		R
165	20mm 90° weld on black bends	S	1		R
166	25mm 90° weld on black bends	S	1		R
167	Key Steel 6mm	S	1		R
168	Key steel 8 mm	S	1		R
169	Key steel 10mm	S	1		R
170	Key steel 12 mm	S	1		R
171	2.5mm mild steel welding rods	S	1		R
172	PTFE thread tape	p/roll	1		R
173	M6 x 50mm mild bolts and nuts	S	1		R
174	M8 x 50mm mild bolts and nuts	S	1		R
175	M10 x 50mm mild bolts and nuts	S	1		R
176	M12 x 50mm mild bolts and nuts	S	1		R
177	M14 x 50mm mild bolts and nuts	S	1		R
178	M16 x 50mm mild bolts and nuts	S	1		R

ITEM NO:	SCHEDULED PARTS	UNIT	QUANTITIES	RATE	PRICE [EXT VAT]
179	M20 x 50mm mild bolts and nuts	S	1		R
180	M6 x 100mm mild bolts and nuts	S	1		R
181	M8 x 100mm mild bolts and nuts	S	1		R
182	M10 x 100mm mild bolts and nuts	S	1		R
183	M12 x 100mm mild bolts and nuts	S	1		R
184	M14 x 100mm mild bolts and nuts	S	1		R
185	M16 x 100mm mild bolts and nuts	S	1		R
186	M20 x 100mm mild bolts and nuts	S	1		R
187	BSP thread reducing bushes 15-10mm	S	1		R
188	BSP thread reducing bushes 20-15mm	S	1		R
189	BSP thread reducing bushes 20-10mm	S	1		R
190	BSP thread reducing bushes 25-10mm	S	1		R
191	BSP thread reducing bushes 25-15mm	S	1		R
192	BSP thread reducing bushes 25-20mm	S	1		R
193	Square condensate tanks 300 litre	S	1		R
194	Square condensate tanks 500 litre	S	1		R
195	Square condensate tanks 1000 litre	S	1		R
196	Condensate tank level switches float type	S	1		R
197	Condensate tank level switches liquid level 3 probes	S	1		R
198	Labour Technician per hour	S	1		R
199	Labour Technician per hour over time	S	1		R
200	Labour Technician per hour Sunday and Public Holidays	S	1		R
201	Labour Technician Assistant per hour	S	1		R
202	Labour Technician Assistant per hour over time	S	1		R
203	Labour Technician Assistant per hour Sunday and Public Holidays	S	1		R
204	Coded Welder per hour	S	1		R
205	Coded Welder per hour over time	S	1		R
206	Coded Welder per hour Sunday and Public Holidays	S			R
	<b>SUB-TOTAL RETICULATION</b>				R

All unit prices that are not included or missed shall be determined through quotation process with agreed amounts standardised and revised as part of this baseline costs

All prices shall be priced to RSA currency excluding VAT

All travelling rates will be calculated according to the AA rates for the specific month

TENDERER'S SIGNATURE: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_

NAME OF FIRM: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CODE \_\_\_\_\_

TELEPHONE NO: \_\_\_\_\_ CELL NO: \_\_\_\_\_

FAX NO: \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_ DATE: \_\_\_\_\_

BID NUMBER: \_\_\_\_\_

**Maintenance and Repairs of Boilers, Steam & Condensate Reticulation, Water Treatment on Boilers and Autoclaves, Calorifiers And Mechanical Equipment at Various Health Facilities in the North West Province Department of Health for a Period of 48 Months.  
(POTCHEFSTROOM, JOB SHIMANKANA TABANE, WITRAND)**



<b>Part C10.2 Technical Specification - Steam and Condensate Reticulation</b>
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1 SERVICE REQUIRED

- 1,2 Replace existing cladding and lagging at various points and sizes, will be indicated on a site inspection
- 1,3 Replace existing steam traps at various points and sizes, will be indicated on a site Inspection
- 1,4 Replace existing leaking steam piping and condensate piping will be indicated on a site inspection
- 1,5 Replace existing condensate pumps at various points and sizes, will be indicated on a site inspection
- 1,6 Replace cladding and lagging on central heating calorifiers, will be indicated during a site inspection
- 1,7 Prepare surfaces for painting these areas, will be indicated on the site inspection
- 1,8 Replace existing calorifiers at various points and plant rooms.
- 1,9 Replace condensate tanks at various points and plant rooms
- 1,10 Replace central heating calorifiers at various points and plant rooms
- 1,14 Replace central heating pumps at various points and plant rooms

NOTE: All above shall be done only after an inspection was conducted by the Representative of the Department: Infrastructure Unit

BID NUMBER: \_\_\_\_\_

Maintenance and Repairs of Boilers, Steam & Condensate Reticulation, Water Treatment on Boilers and Autoclaves, Calorifiers And Mechanical Equipment at Various Health Facilities in the North West Province Department of Health for a Period of 48 Months.  
(POTCHEFSTROOM, JOB SHIMANKANA TABANE, WITRAND)



Part C15.2 BILL OF QUANTITIES - AUTOCLAVE INSTALLATIONS

C15.2 Priced rates for servicing, repairs, maintenance of the Autoclave Installations						
ITEM NO:	SCHEDULED MAINTENANCE	UNIT	Numebr of Services in 4 years	Nr of Autoclaves	RATE	PRICE [EXT VAT]
1	Autoclaves Maintenance Routine - Quarterly (Job Shimankana Tabane Hospital)	No	12	5		R
2	Autoclaves Maintenance Routine - Quarterly (Potchefstroom Hospital)	No	12	3		R
3	Autoclaves Maintenance Routine - Annual (Job Shimankana Tabane Hospital)	No	4	5		R
4	Autoclaves Maintenance Routine - Annual (Potchefstroom Hospital)	No	4	3		R
ITEM NO:	SCHEDULED PARTS	UNIT	PROVISIONAL QUANTITIES	RATE		PRICE [EXT VAT]
1	BPT7 Steam Trap Kit	Kit	1			R
2	BP10 Steam Trap Kit	Kit	1			R
3	BP13A Steam Trap Kit	Kit	1			R
4	15mm Steam Globe Valve	S	1			R
5	20mm Steam Globe Valve	S	1			R
6	15mm Steam Solenoid Valve (A47)	S	1			R
7	20mm Steam Solenoid Valve (A49)	S	1			R
8	Asco Solenoid Valve Kit (302-841)	Kit	1			R
9	Asco Solenoid Valve Kit (158-959D)	Kit	1			R
10	Asco Solenoid Valve Kit (304-032)	Kit	1			R
11	Asco Solenoid Valve Kit (304-030)	Kit	1			R
12	Asco Solenoid Valve Kit (304-394)	Kit	1			R
13	Asco Solenoid Valve Kit (302-273)	Kit	1			R
14	Asco Solenoid Valve Voil (400426/117)	S	1			R
15	Asco Transducer (RV24A21)	S	1			R
16	Temperature Sensor Probe PT100	S	1			R
17	Asco Non-Return Valve Kit (216-286)	Kit	1			R
18	Asco Non-Return Valve Kit (216-287)	Kit	1			R
19	ASco Non-Return Valve (15mm)	S	1			R
20	B13 Normally Open Valve	Kit	1			R
21	Check Valve 15mm – Mushroom	S	1			R
22	Check Valve 20mm – Mushroom	S	1			R
23	15mm BRV2 Steam Reducing Valve (700-240kPa)	S	1			R
24	20mm BRV2 Steam Reducing Valve (700-240kPa)	S	1			R
25	15mm Steam Pop-up Type Safety Valve (240kPa)	S	1			R
26	20mm Steam Pop-up Type Safety Valve (240kPa)	S	1			R
27	D2 Water Valve	S	1			R
28	Burkett Air Plunger	S	1			R
29	Butterworth Diaphragm	S	1			
30	Door Piston Seal (Butterworth)	S	1			R
31	15mm Silicone Valve Seal Butterworth	S	1			R
32	20mm Silicone Valve Seal Butterworth	S	1			R
33	Whistle Valve Copper Bellows	S	1			R
34	Door Bellows	Kit	1			R
35	Sekonic Disposable Pens	S	1			R
36	Sekonic Disposable Charts	S	1			R
37	Negretti Zambra Disposable Pen Sets	Sets	1			R
38	ZGPB.01V-1 Dornick Hunter Bacteria Filter	S	1			R

ITEM NO:	SCHEDULED PARTS	UNIT	PROVISIONAL QUANTITIES	RATE	PRICE [EXT VAT]
39	ZGPB.01V-1 Dornick Hunter Filter Sock	S	1		R
40	10mm Hollow Round Door Gasket	Meter	1		R
41	10mm Square Door Gasket	Meter	1		R
42	13mm U-shaped Door Gasket	Meter	1		R
43	15mm U-Shaped Door Gasket	Meter	1		R
44	Silicone Spray	Can	1		R
45	-100 to 300kPa Compound Gauge 100mm dial	S	1		R
46	0 – 400kPa 100mm Dial Steam Pressure Gauge	S	1		R
47	Sauter Pressure Switch (B59)	S	1		R
48	Sauter Pressure Switch (DSA40)	S	1		R
49	Pressure Switch Bellows	S	1		R
50	OMRON unit switch (Z-15GK335)	S	1		R
51	Indicator lamps	S	1		R
52	Shinco contract thermometer	S	1		R
53	NT70 water pump	S	1		R
54	SIHI vacuum pump (LOHE 25007)	S	1		R
55	SIHI Vacuum pump (LEMA 50)	S	1		R
56	Hi-Vac Vacuum pumps	S	1		R
57	OMRON Time (3 min)	S	1		R
58	Delay Timer	S	1		R
59	Limit Switch (D4D/1121)	S	1		R
60	Vacuum Pump Motor (WEG90S/292)	S	1		R
61	Circuit Breaker (SP5 Amp)	S	1		R
62	Circuit Breaker (TP15 amp)	S	1		R
63	Overload (1.6 – 2.5 amp)	S	1		R
64	Overload (0.40 – 0.63 amp)	S	1		R
65	PTFE tape	Rolls	1		R
66	Hydraulic test	S	1		R
67	Steam inlet valve 15mm	S	1		R
68	Steam inlet valve 20mm	S	1		R
69	Steam inlet valve air diaphragm 15mm	S	1		R
70	Steam inlet valve air diaphragm 20mm	S	1		R
71	Water inlet valve 15mm	S	1		R
72	Water inlet valve 20mm	S	1		R
73	Water inlet valve air diaphragm 15mm	S	1		R
74	Water inlet valve air diaphragm 20mm	S	1		R
75	Exhaust valve 15mm	S	1		R
76	Exhaust valve 20mm	S	1		R
77	Air inlet valve 15mm	S	1		R
78	Air inlet valve 20mm	S	1		R
79	Air inlet valve diaphragm 15mm	S	1		R
80	Air inlet valve diaphragm 20mm	S	1		R
81	Safety valve 15mm	S	1		R
82	Safety valve 20mm	S	1		R
83	Vacuum pump coupling	S	1		R
84	Water tank ball valve 20mm	S	1		R
85	Water tank ball valve 25mm	S	1		R
86	Compressor oil	S	1		R
87	Oil lubrication	S	1		R
88	Electrical relays	S	1		R
89	Door cylinder	S	1		R
90	Door interlocks	S	1		R
91	Door slides/fingers	S	1		R
92	Door gearbox (open and close)	S	1		R

ITEM NO:	SCHEDULED PARTS	UNIT	PROVISIONAL QUANTITIES	RATE	PRICE [EXT VAT]
93	Water strainer	S	1		R
94	Steam strainer	S	1		R
95	Vacuum gauge maximum (kPa)	S	1		R
96	Level switches (boiler)	S	1		R
97	Elements 32mm 3 x 2 kw	S	1		R
98	Float less switch	S	1		R
99	P.L.C. Toshiba	S	1		R
100	P.L.C. Mitchibusi	S	1		R
101	P.L.C. Omron	S	1		R
102	P.L.C. Delta	S	1		R
103	Printers	S	1		R
	<b>PRICE RATES</b>				
104	Major service Schedule A item 2.1 to 2.1.6.6	S	1		R
105	Minor service Schedule B item 2.2 to 2.4.8	S	1		R
106	Labour Technician per hour	S	1		R
107	Labour Technician per hour over time	S	1		R
108	Labour Technician per hour Sunday and Public Holidays	S	1		R
109	Labour Technician Assistant per hour	S	1		R
110	Labour Technician Assistant per hour over time	S	1		R
111	Labour Technician Assistant per hour Sunday and Public Holidays	S	1		R
	<b>SUB-TOTAL 5(e)</b>				R

All prices shall be priced to RSA currency excluding VAT

All travelling rates will be calculated according to the AA rates for the specific month

TENDERER'S SIGNATURE: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_

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FAX NO: \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_ DATE: \_\_\_\_\_



BID NUMBER: \_\_\_\_\_

**Maintenance and Repairs of Boilers, Steam & Condensate Reticulation, Water Treatment on Boilers and Autoclaves, Calorifiers And Mechanical Equipment at Various Health Facilities in the North West Province Department of Health for a Period of 48 Months.  
(POTCHEFSTROOM, JOB SHIMANKANA TABANE, WITRAND)**



**health**  
Department of  
Health  
North West Province  
REPUBLIC OF SOUTH AFRICA

## Part C16.2 Technical Specification - Autoclave Installations

- 1,1 The successful Tenderer shall be required to maintain the complete installation and equipment in a proper and safe operating condition, to clean, adjust and lubricate the equipment as required in terms of the Contract, repair or replace all electrical and mechanical part as necessary due to wear and tear.
- 1,2 This includes, but is not limited to the following:
  - 1.2.1 Examine the system in accordance with any applicable regulation framed under the Occupational Health and Safety Act 85 of 1993.
  - 1.2.2 Properly maintain, adjust and keep the installation and equipment in a safe and proper operating condition at all times.
  - 1.2.3 Repair/replace all parts of the installation which may become necessary for the proper use and/or operation of the installation.
  - 1.2.4 Examine, adjust and lubricate the complete installation, supply of all lubricants, replacement parts and the cleaning of material as required for proper maintenance of the equipment.
  - 1.2.5 Any malfunction or defect occurring within a period of 1 month after any service or repair being executed will be for the account of the Contractor.
  - 1.2.6 Examine, periodically and when necessary, all devices and perform any statutory safety tests at or before the expiring of the required intervals.
  - 1.2.7 Complete the services, maintenance or repair action report, which shall be submitted with invoice(s)
  - 1.2.8 Proof of an effective sterilization process by the equipment.

### 2 SCHEDULES OF SERVICE OPERATIONS

#### 2,1 SCHEDULE A - SERVICING TASKS TO BE CARRIED OUT ON MAJOR SERVICE

The following list of spares must be replaced and form part of the price to service each autoclave.

- a) Bacterial filter
- b) Air in solenoids kits
- c) All non return kits
- d) Steam to chamber valve kits
- e) Gasket exhaust valve kit
- f) Exhaust valve kit
- g) Steam to gasket valve kit
- h) All steam trap kits
- i) Door gasket
- j) Recorder ink pens
- k) Jacket control steam solenoid valve kits (all)
- l) Reducing valve diaphragm, ball and seat
- m) Oil in compressors where applicable

## 2.1.1 MECHANICAL COMPONENTS

2.1.1.1 Open all mechanical control valves, check seats and replace discs. Repack and replace spindles and springs if necessary

2.1.1.2 Examine all unions, pipes, connections and fittings for leaks and tightness, repair where necessary

2.1.1.3 Open and clean out all strainers

2.1.1.4 Open all steam traps and replace elements and seats

2.1.1.5 Open glands on vacuum pump, repack

2.1.1.6 Check all reducing valves for accuracy, adjust and replace diaphragms, ball and seat

2.1.1.7 Examine water tank and condensers for corrosion, replace if necessary

2.1.1.8 Change oil in compressor, check oil level

2.1.1.9 Check conditions of all V-belts and pulleys, adjust or replace if necessary

2.1.1.10 Clean and lubricate all mechanical moving parts on machine

2.1.1.11 Replace bacteria air filters

2.1.1.12 Open all non-return valves and replace seats if necessary

2.1.1.13 Check all safety valves for correct operation, adjust or replace if necessary

2.1.1.14 Blow out all pipes to gauges, pressure and vacuum switches

2.1.1.15 Visually check chamber for cracks

## 2.1.2 DOOR

2.1.2.1 Replace chamber door seal

2.1.2.2 Test door locking mechanism (Examine ratchet set, replace diaphragm)

2.1.2.3 Lubricate nose-piece and spindle, report to this Department if threads are worn and not safe

2.1.2.4 Check wearing strips and fingers, report to this Department if replacement needed

2.1.2.5 Test clutch on sliding door, adjust or repair if necessary

2.1.2.6 Check chains and hinges if fitted, repair or replace if necessary

2.1.2.7 Visually check door for cracks

2.1.2.8 Visually check safety flap operation where fitted

## 2.1.3 ELECTRICAL

2.1.3.1 Check all limit switches, adjust where necessary

2.1.3.2 Test pressure and vacuum switches for correct functioning, adjust or replace if necessary

2.1.3.3 Check all timer and overload units for correct setting, adjust if necessary

2.1.3.4 Check all indication lights, replace if necessary

2.1.3.5 Check fixing screws on all electrical components, repair if necessary

2.1.3.6 Examine all electrical connections, contacts in control box where possible

2.1.3.7 Open solenoid valves, clean and examine seats

## 2.1.4 INSTRUMENTS

2.1.4.1 Check all pressure and vacuum gauges and contact thermometers, adjust or replace if necessary

2.1.4.2 Check temperature recorded, if faulty obtain an order number from this Department for repairs or replacement

2.1.4.3 Replace pen and ink

## 2.1.5 ELECTRODE BOILER, STEAM GENERATOR AND WATER CONSERVATION DEVICE

2.1.5.1 Check float level device, repair or replace if necessary

2.1.5.2 Blow down sequence

2.1.5.3 Remove and examine elements and replace if necessary, clean when necessary

## 2.1.6 TESTING

2.1.6.1 Test machine through manual cycle as applicable to each machine

2.1.6.2 Test machine through automatic cycle as applicable to each machine

2.1.6.3 Do "A TEST" test with a Bowie Dick tape or sheet under the supervision of hospital authority

2.1.6.4 Check temperature recorder charts for correct operation of autoclave

2.1.6.5 All parts removed or replaced from any autoclaves must be handed over to the Representative of the Department of Health: Infrastructure Unit on site when the service report is presented for signature. This must be noted on the reports.

2.1.6.6 The Representative of the Department of Health: Infrastructure Unit on site and the Sister in charge must sign the worksheet certifying that the test have been satisfactorily carried out in their presence. Failure to have this certification will result in non-payment of the invoice. Retesting will require a new

## 2.2 SCHEDULE B – SERVICING TASKS TO BE CARRIED OUT BY MINOR SERVICE

The following list of spares must be replaced and form part of the price to service each autoclave.

- a) All non-return kits
- b) Steam to chamber valve kit
- c) Gasket exhaust valve kit
- d) Steam to gasket valve kit
- e) Door gasket
- f) Recorder ink pen kits
- g) Filter sock

## 2.2.1 MECHANICAL COMPONENTS

- 2.2.1.1 Open all mechanical control valves, seats and discs, spindles and springs, replace if necessary
- 2.2.1.2 Examine all unions, pipes, connections and fittings for leaks and tightness. Repair where necessary
- 2.2.1.3 Open and clean out all strainers
- 2.2.1.4 Check all steam traps, clean out
- 2.2.1.5 Check glands on vacuum pumps, repack if necessary
- 2.2.1.6 Check all reducing valves for accuracy, adjust if necessary
- 2.2.1.7 Examine water tank and condensers for corrosion, replace if necessary
- 2.2.1.8 Check oil level in compressor, top up
- 2.2.1.9 Check conditions of v-belts and pulleys, adjust or replace if necessary

all mechanical moving parts on machine

sterilizer air filters and replace sock

replace all non return valve kits

test operation, adjust or replace if necessary

inspect chamber visually for cracks

## 2.2.2 DOOR

- 2.2.2.1 Replace chamber door seal
- 2.2.2.2 Test door locking mechanism
- 2.2.2.3 Check nose piece and spindle, report to Department if threads are worn and not safe
- 2.2.2.4 Check wearing strips and fingers, report to Department if replacement is needed
- 2.2.2.5 Test clutch on sliding door, adjust or repair if necessary
- 2.2.2.6 Check door visually for cracks
- 2.2.2.7 Check operation of safety flaps if fitted

## 2.2.3 ELECTRICAL

- 2.2.3.1 Check all limit switches, adjust where necessary
- 2.2.3.2 Check pressure and vacuum switches for correct functioning, adjust or replace if necessary
- 2.2.3.3 Check all timer and overload units for correct settings, adjust if necessary
- 2.2.3.4 Check all indication lights, replace if necessary
- 2.2.3.5 Check fixing screws on all electrical components, repair if necessary
- 2.2.3.6 Examine all electrical connections, contacts in control box where possible
- 2.2.3.7 Check solenoid valves, for correct functioning

## 2.2.4 INSTRUMENTS

- 2.2.4.1 Check all pressure and vacuum gauges and contact thermometers, adjust or replace if necessary
- 2.2.4.2 Check temperature recorder, if faulty obtain an order number from this Department for repairs or replacement.
- 2.2.4.3 Replace pen and ink

## 2.2.5 ELECTRODE BOILER, STEAM GENERATOR AND WATER CONSERVATION DEVICE

- 2.2.5.1 Check float level device, repair or replace if necessary
- 2.2.5.2 Blow down sequence
- 2.2.5.3 Test and examine elements and replace if necessary, clean when necessary

## 2.3 TESTING

- 2.3.1 Test machine through manual cycle as applicable to each machine
- 2.3.2 Test machine through automatic cycle as applicable to each machine
- 2.3.3 Do "A TEST" test with a Bowie Dick tape or sheet under the supervision of hospitals authority

2.3.4 Check records of each machine on every visit to the Works. Failure by the Institution to provide this information must be reported immediately to the Representative of Department of Health: Infrastructure Unit

## 2.4 COOLING TOWERS

- 2.4.1 Check pumps for operation
- 2.4.2 Clean out all strainers on water lines
- 2.4.3 Clean out sump of cooling towers
- 2.4.4 Clean sump filter of towers
- 2.4.5 Check water float valve for correctness
- 2.4.6 Check fans for operation and condition
- 2.4.7 Check spray nozzles for operation and blockages
- 2.4.8 Check and clean cooling coil fins

BID NUMBER: \_\_\_\_\_  
**Maintenance and Repairs of Boilers, Steam & Condensate Reticulation, Water Treatment on Boilers and Autoclaves, Calorifiers And Mechanical Equipment at Various Health Facilities in the North West Province Department of Health for a Period of 48 Months.**  
**(POTCHEFSTROOM, JOB SHIMANKANA TABANE, WITRAND)**



**Part C17.2 BILL OF QUANTITIES - CHEMICAL WATER TREATMENT**

<b>C17.2 Priced rates for the Supply and control of Chemical Water Treatment on Coal Fired Steam Boilers, which shall include the regular Maintenance and Service of Boiler house related water softening plants and cooling towers</b>						
ITEM NO:	SCHEDULED PARTS	UNIT	Number of Services in 3 Years	Nr of Treatment Plants	RATE	PRICE [EXT VAT]
1	Water Quality Testing Every 6 Months (Job Shimankana Tabane Hospital)	No	8	1		
2	Water Quality Testing Every 6 Months (Potchefstroom Hospital)	No	8	1		
3	Water Quality Testing Every 6 Months (Witransd Hospital)	No	8	1		
ITEM NO:	SCHEDULED PARTS	UNIT	PROVISIONAL QUANTITIES			PRICE [EXT VAT]
1	Replacement exchange resin	Litre	1			R
2	Testing of water softener resin	S	1			R
3	Replacement filtration media	Per m <sup>3</sup>	1			R
4	Internal sand blasting for metal softeners	Per kg	1			R
5	Corrosion protection for metal softeners	Per litre	1			R
6	Replacement nossels 50mm dia PVC pipe	Per m	1			R
7	Iron contamination protection for a sodium on exchange resin bed	Per litre	1			R
8	Test kit	S	1			R
9	Yes/No tablets	Per 100	1			R
10	TDS meter	S	1			R
11	Accuracy test solution for TDS meter	Per litre	1			R
12	Auto duplex head for water softener 300 litre / 120 x 5	S	1			R
13	Auto duplex head for water softener 1500 litre	S	1			R
14	Auto duplex head service pack 300 litre / 150 x 5	S	1			R
15	Auto duplex head service pack	S	1			R
16	Auto duplex head service pack 1500 litre	S	1			R
17	Auto duplex head timer drive motor 300 litre	S	1			R
18	Auto duplex head timer drive motor 400 litre to 600 litre	S	1			R
19	Auto duplex head timer drive motor 800 litre and larger	S	1			R
20	Water softener vessel 300 litre	S	1			R
21	Water softener vessels 400 litre to 600 litre	S	1			R
22	Water softener pre filter 32mm	S	1			R
23	Water softener pre filter cartridge 32mm	S	1			R
24	Water softener pre filter 40mm	S	1			R
25	Water softener pre filter cartridge 40mm	S	1			R
26	Water softener pre filter 50mm	S	1			R
27	Water softener pre filter cartridge 50mm	S	1			R
28	Brine tank for 300 litre 1500 litre	S	1			R
29	Calibration of an existing water meter	S	1			R
30	Water meter 32mm	S	1			R
31	Water meter 40mm	S	1			R
32	Water meter 50mm	S	1			R
33	Water meter 65mm	S	1			R
34	Water meter 80mm	S	1			R
35	Condensate meter 32mm	S	1			R
36	Condensate meter 40mm	S	1			R
37	Condensate meter 50mm	S	1			R
38	Condensate meter 80mm	S	1			R
39	Galvanized piping 15mm	S	1			R
40	Galvanized piping 20mm	S	1			R

ITEM NO:	SCHEDULED PARTS	UNIT	PROVISIONAL QUANTITIES			PRICE [EXT VAT]
41	Galvanized piping 25mm	S	1			R
42	Galvanized piping 32mm	S	1			R
43	Galvanized piping 40mm	S	1			R
44	Galvanized piping 50mm	S	1			R
45	Galvanized piping 65mm	S	1			R
46	Galvanized piping 80mm	S	1			R
47	Galvanized piping 100mm	S	1			R
48	Galvanized elbow 15mm	S	1			R
49	Galvanized elbow 20mm	S	1			R
50	Galvanized elbow 25mm	S	1			R
51	Galvanized elbow 32mm	S	1			R
52	Galvanized elbow 40mm	S	1			R
53	Galvanized elbow 50mm	S	1			R
54	Galvanized elbow 65mm	S	1			R
55	Galvanized elbow 80mm	S	1			R
56	Galvanized elbow 100mm	S	1			R
57	Galvanized socket 15mm	S	1			R
58	Galvanized socket 20mm	S	1			R
59	Galvanized socket 25mm	S	1			R
60	Galvanized socket 32mm	S	1			R
61	Galvanized socket 40mm	S	1			R
62	Galvanized socket 50mm	S	1			R
63	Galvanized socket 65mm	S	1			R
64	Galvanized socket 80mm	S	1			R
65	Galvanized socket 100mm	S	1			R
66	Galvanized nipple 15mm	S	1			R
67	Galvanized nipple 20mm	S	1			R
68	Galvanized nipple 25mm	S	1			R
69	Galvanized nipple 32mm	S	1			R
70	Galvanized nipple 40mm	S	1			R
71	Galvanized nipple 50mm	S	1			R
72	Galvanized nipple 65mm	S	1			R
73	Galvanized nipple 80mm	S	1			R
74	Galvanized nipple 100mm	S	1			R
75	Galvanized union 15mm	S	1			R
76	Galvanized union 20mm	S	1			R
77	Galvanized union 25mm	S	1			R
78	Galvanized union 32mm	S	1			R
79	Galvanized union 40mm	S	1			R
80	Galvanized union 50mm	S	1			R
81	Galvanized union 65mm	S	1			R
82	PTFE tape	S	1			R
83	PVC piping 15mm	S	1			R
84	PVC piping 20mm	S	1			R
85	PVC piping 25mm	S	1			R
86	PVC piping 32mm	S	1			R
87	PVC piping 40mm	S	1			R
88	PVC piping 50mm	S	1			R
89	PVC piping 65mm	S	1			R
90	PVC piping 80mm	S	1			R
91	PVC piping 100mm	S	1			R
92	PVC elbow 15mm	S	1			R
93	PVC elbow 20mm	S	1			R

ITEM NO:	SCHEDULED PARTS	UNIT	PROVISIONAL QUANTITIES			PRICE [EXT VAT]
94	PVC elbow 25mm	S	1			R
95	PVC elbow 32mm	S	1			R
96	PVC elbow 40mm	S	1			R
97	PVC elbow 50mm	S	1			R
98	PVC elbow 65mm	S	1			R
99	PVC elbow 80mm	S	1			R
100	PVC elbow 100mm	S	1			R
101	PVC socket 15mm	S	1			R
102	PVC socket 20mm	S	1			R
103	PVC socket 25mm	S	1			R
104	PVC socket 32mm	S	1			R
105	PVC socket 40mm	S	1			R
106	PVC socket 50mm	S	1			R
107	PVC socket 65mm	S	1			R
108	PVC socket 80mm	S	1			R
109	PVC socket 100mm	S	1			R
110	PVC to steel connector 15mm	S	1			R
111	PVC to steel connector 20mm	S	1			R
112	PVC to steel connector 25mm	S	1			R
113	PVC to steel connector 32mm	S	1			R
114	PVC to steel connector 40mm	S	1			R
115	PVC to steel connector 50mm	S	1			R
116	PVC to steel connector 65mm	S	1			R
117	PVC to steel connector 80mm	S	1			R
118	PVC to steel connector 100mm	S	1			R
119	PVC Glue	S	1			R
120	Chemical dosing pump	S	1			R
121	Chemical containers – 54 litre	S	1			R
122	Chemical containers – 70 litre	S	1			R
123	Chemical containers – 120 litre	S	1			R
124	Chemical containers – 230 litre	S	1			R
125	Boiler PWT No 1 paint	5 litres	1			R
126	Salt	50 kg	1			R
127	Manhole gaskets on boilers	S	1			R
128	Handhold gaskets	S	1			R
129	Rates to treat boiler make up water	Per cub meter	1			R
130	Rates to treat condensate return	Per cub meter	1			R
131	Rates to treat cooling tower water	Per cub meter	1			R
132	Wet storage of boilers evaporation rate 2900 kg/hr as per technical specification item no 2	S	1			R
133	Wet storage of boilers evaporation rate 4000 kg/hr as per technical specification item no 2	S	1			R
134	Wet storage of boilers evaporation rate 4900 kg/hr as per technical specification item 2	S	1			R
135	Wet storage of boilers evaporation rate 5000 kg/hr as per technical specification item 2	S	1			R
136	Wet storage of boilers evaporation rate 6000 kg/hr as per technical specification item 2	S	1			R
137	Wet storage of boilers evaporation rate 7500 kg/hr as per technical specification item 2	S	1			R
138	Wet storage of boilers evaporation rate 13000 kg/hr as per technical specification item 2	S	1			R
139	Wet storage of boilers evaporation rate 15000 kg/hr as per technical specification item 2	S	1			R
140	Wet storage of boilers evaporation rate 20000 kg/hr as per technical specification item 2	S	1			R
141	Six monthly wash out of boiler	S	1			R
142	Six monthly Wash out of cooling towers	S	1			R
143	Wash out of Hotwells 4000 litre as per technical specification item 2	S	1			R
144	Wash out of Hotwells 6000 litre as per technical specification item 2	S	1			R
145	Wash out of Hotwells 8000 litre as per technical specification item 2	S	1			R
146	Wash out of Hotwells 10000 litre as per technical specification item 2	S	1			R

ITEM NO:	SCHEDULED PARTS	UNIT	PROVISIONAL QUANTITIES			PRICE [EXT VAT]
147	Wash out of Hotwells 15000 litre as per technical specification item 2	S	1			R
148	Wash out of Hotwells 25000 litre as per technical specification item 2	S	1			R
149	Independent testing for condensate water as per part 3	S	1			R
150	Labour Technician per hour	S	1			R
151	Labour Technician per hour over time	S	1			R
152	Labour Technician per hour Sunday and Public Holidays	S	1			R
153	Labour Technician Assistant per hour	S	1			R
154	Labour Technician Assistant per hour over time	S	1			R
155	Labour Technician Assistant per hour Sunday and Public Holidays	S	1			R
	<b>SUB-TOTAL WATER TREATMENT</b>				R	

All prices shall be priced to RSA currency excluding VAT

All travelling rates will be calculated according to the AA rates for the specific month

TENDERER'S SIGNATURE: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_

NAME OF FIRM: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CODE \_\_\_\_\_

TELEPHONE NO: \_\_\_\_\_ CELL NO: \_\_\_\_\_

FAX NO: \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_ DATE: \_\_\_\_\_

## **Part C18.2 Technical Specification**

### **1 CONDITIONING TREATMENT**

The objective of this contract is to supply the boilers with a feed water treatment that will ensure that boilers remain clean and free of corrosion and or scale. Part of the objective is to ensure minimum down time both, during washout and preparation for statutory inspection.

The boiler water treatment must be F.D.A (Federal Drug Administration) approved.

This treatment prescribed at each boiler house must vary according to conditions. These variations must anticipate predictable seasonal variations, which result in an increase or decrease of steam load. Additionally it must anticipate the possible malfunctioning of base-exchange water softeners that can result in hardness or chlorine slippage.

The treatment prescribed must ensure that the TDS levels can be maintained within the National prescribed limits and adhere to the Manufacturers specification.

The treatment must ensure the prevention of scale deposits and or corrosion furthermore it must remove all traces of existing scale and corrosion.

The treatment must protect steam lines, condensate lines and condensate storage tanks against corrosion.

#### **1.1 The treatment is intended to do the following:**

- 1.1.1 Prevent scale formation from small amounts of hardness and other impurities in the feed water.
- 1.1.2 Remove traces of dissolved gasses (particularly oxygen before it enters the boiler)
- 1.1.3 Maintain the correct Chemical balance in the boiler water.
- 1.1.4 Protect the feed water systems between and including the point at which make up water is introduced into the collecting tanks.
- 1.1.5 Condition sludge to ensure the forming of soft sludge that will be carried out at blow down.
- 1.1.6 Adjust alkalinity to prevent corrosion in feed lines and boiler.
- 1.1.7 De-gas water to remove dissolved oxygen and carbon dioxide.
- 1.1.8 Adjust concentrations to inhibit caustic imbrittlement.
- 1.1.9 Assure that steam and condensate is completely harmless and non-toxic and have a pH of between 7.0 and 7.4. A neutraliser may be used, provided every precaution is taken to make it safe for hospital use and the introduction of the amine is done slowly, full application only being reached at about 3 months after commencement. Such a chemical must not carry over into sterilisers or onto foodstuffs where steam is directly applied for this purpose.
- 1.1.10 Contain an effective antifoaming compound.
- 1.1.11 Passivate the after boiler reticulation system by using a volatile oxygen scavenger in the steam supply and to passivate all metallic surfaces in the steam and condensate lines.
- 1.1.12 Prevent the forming of undesired and harmful substances in the steam and condensate lines.

Treatment must be pumped into the Feed water tanks of the boilers by means of fully automated dosing pumps.

TANNIN BASED TREATMENTS ARE PREFERRED BUT ALTERNATIVELY BASED TREATMENTS MAY BE OFFERED, ALTERNATIVE TREATMENTS MUST BE SABS APPROVED.

SHOULD TANNIN BASED TREATMENTS BE INCLUDED IN THE TENDER THE CONTRACTOR MUST SUBMIT A LABORATORY REPORT TO SUBSTANTIATE THE PRODUCT TO BE SUITABLE FOR THE PURPOSE THAT IT WILL BE APPLIED FOR

The Department reserves the right to request verification of the effectiveness of such an alternative treatment.

Phosphate treatments are COMPLETELY UNACCEPTABLE.

Under normal conditions on-line treatment for cleaning and removal of excessive scale will not be considered due to the possible obstruction of water passages and blockage to the blow down valve.

However should this procedure be necessary the cost involved for additional chemicals will be for the contractors account irrespective of the payment for this service being paid on amounts of condensate and raw water

### **2 BOILER WASHOUT**

Boilers will be washed out after six months of operation or the nearest possible time to that. The contractor must arrange with the various responsible persons that the opening of boilers take place at a convenient time to both parties which should preferably be at a time of regularly monthly visit. During winter, it may be necessary to run one or two boilers for shorter periods as required by local conditions. At the same time Hotwell tanks shall be washed out, scale removed by means of shot blasting and painted with boiler paint PWT No. 1 as prescribed. Three layers of paint with intervals, red black red, as prescribed. Mechanical Inspector will inspect condition of the tanks before painting. ALL THE WORK AS ABOVE DESCRIP SHALL BE EXECUTED BY THE SUCESSFULL TENDERER AND MUST ALLOW FOR THIS IN THE PRICE SCHEDULE.

#### **2.1 Method of Treatment**

Depending on scale, chemical decaling agents are to be added to a raw water filled boiler, while the circulating pump in running, until the calculated concentrations are maintained thus to prevent damage to boilers.

### **3 EXISTING WATER SOFTENERS**

The Department has in use a water softening plant per boiler house, supplying softened water to boilers and equipment. The contractor will be responsible for incidental maintenance and servicing of these softeners to ensure no hard water and chloride slippage.

As it is in the best interest of the contractor to check the condition of the make-up water regularly, any malfunctioning must be reported to the Department immediately.

The contractor must always be present on site when repairs are done to water softeners. If the work is sub-contracted, the main contractor will still be accountable.



### 3,1 Replacement resins

Where resins are to be replaced, it must be replaced with a synthetic non-phenolic polystyrene type. During the process of replacement, the contractor must ensure that sufficient chemical dosage is supplied to the boilers to compensate for any hardness slippage.

### 3,2 Metal softeners

Where resin tests on metal vessels reveals rust it must be reported to the Department for a decision on remedial work.

Where metal softener vessels are to be repaired the inside must be sand blasted to SABS Standard Method 771 and painted with two layers of copon

### 3,3 Iron contamination

Where iron contamination is detected, the vessels must be washed out with a chemical that will solubilise the contamination.

## 4 REPLACEMENT WATER SOFTENERS

In the instance where it is required to replace a water softener the following design criteria will be followed:

Fully automatic duplex water softeners are required to supply softened water to the boilers at a hardness not exceed 5 mg/l CaCO<sub>3</sub>.

The maximum and mean water consumption for sizing of the softeners must be ascertained at the relevant boiler house.

The softener must have an exchange capacity, delivering continuous soft water. With a salt usage of 150g NaCl/liter of resin, the exchange capacity must not be less than 60g/litre. The resin must be of the synthetic non-phenolic polystyrene type. Each vessel must be capable of handling the total quantity of water and must be installed in a duty and stand-by relationship.

### 4,1 CONSTRUCTION OF THE PLANT

The softener vessel must be constructed with ABS inner shell and laminated fibre glass/epoxy outer shell and must be designed to withstand a working pressure of up to 690 kPa.

The brine tank shall be of polypropylene construction.

All interconnecting piping and valves must be neatly installed and colour coded. The pressure gauge must be not less than 100 mm in diameter and the siphon bend must be fitted with a valve to allow for replacement of the gauge. The control valve can be mounted on top or on the side but must be of a robust construction. The valve must be complete with staging meters, timers, incorporated injectors and backwash controllers. The operating must be completely mechanically and allow for low operating pressure during service flow.

## 5 WATER AND CONDENSATE METERS

The water and condensate meters must be sized to accommodate maximum flow but must be small enough to register the small flow of water experienced during summer. i.e the meter will be smaller than the raw water supply pipe.

The condensate meters must be able to withstand temperatures of up to 96°C.

When meters are to be re-calibrated it must be done by an Independent testing authority and the supply of a test certificate is necessary.

## 6 WATER FILTER

A Pre-filter in a cartridge type housing, complete with 25 micron cartridge and pressure relief valve, must be installed directly prior to the softener vessel inlet

The supply of replacement cartridges forms part of this contract.

## 7 CHEMICAL DOSING PUMP

A ratio feed chemical dosing pump must be supplied when required. This pump must operate with 220 V supply voltage. The pump must be suitably sized to supply the need for the biggest boiler house under the control of the Department.

A repair kit for this pump must be available.

A polypropylene chemical container must be supplied with the dosing pump.

## 8 TDS METER

TDS meters supplied must be battery operated, simple to use and able to indicate the level of total dissolved solids between 0->5 000 ppm. The units offered must be robust and be able to withstand abnormal working conditions and handling. One litre of accuracy test solution for the TDS meter must be supplied with the meter.

Full operating instructions to be supplied with TDS meters.

## 9 TEST KITS

All the necessary equipment and chemicals required for the tests must be supplied with a kit.

The quantities of chemicals supplied must be such that at the expected rate of consumption it will be depleted before the end of its shelf life.

NB: Dates of expiry must be clearly indicated on each container.

Full operating instructions to be supplied with test kits.

[Additional]

SCHEDULE OF INFORMATION

1,01 SCHEDULE OF INFORMATION

The following questionnaire must be filled in and fully completed by the tenderer, failing of which will invalidate the tender:

1,02 LABORATORY DETAILS

Address/es of laboratories

- (a) .....  
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- (b) .....  
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Capability of laboratory

- (a) .....  
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- (b) .....  
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1,03 DETAILS OF TREATMENT OFFERED

Treatment for raw water (detail fully)

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Treatment for softened water (detail fully)

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Treatment for boiler wet storage (detail fully)

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Treatment for Air Conditioning Cooling Towers (detail fully)

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Treatment for contamination of resin in softeners (detail fully)

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1,04 CHEMICAL FORMULATIONS  
FOR BOILER WATER TREATMENT

DESIGNATION OF COMPOUND AND PURPOSE  
CONSTITUENTS OF COMPOUND CHEMICAL PERCENTAGE BY MASS OR VOLUME

PURPOSE OF COMPOUND  
SOLID OR LIQUID  
BULK OR MINI BULK  
PACKAGING TYPE SIZE

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1,05 WATER SOFTENERS

Make and manufacturer of plant: .....

Model: .....

Country of origin: .....

Does the softener deliver continuous soft water?

Type of ion exchange material: .....

Make of ion exchange material:

Exchange capacity of exchange material: .....

Working pressure (Maximum): .....

Make and size of pressure gauge: .....

Full scale deflection of pressure gauge [kPa]: .....

Make and type of control valves: .....

Make and type of test kit: .....

Is piping colour coded? .....

Will operating instructions be supplied as specified? .....

Will softener be supplied fully charged and ready for operation after installation? .....

Does the plant comply with the Occupational Health and Safety Act, Act 85 of 1993, as amended? .....

Is illustrated pamphlet attached: .....

How and where is salt administered for regeneration? .....

Guarantee period: .....

Delivery period: .....

Remarks: .....

Does the one vessel act as a standby for the other: .....

#### 1,06 WATER AND CONDENSATE METERS

Name .....

Type .....

Country of origin .....

Material of construction .....

Maximum working temperature of condensate meter .....

#### 1,07 WATER FILTER

Name .....

Type .....

Country of origin .....

Material of construction .....

Type of filter cartridge .....

Material of cartridge .....

#### 1,08 CHEMICAL DOSING PUMP

Name .....

Type .....

Country of origin .....

Does repair kit exist? .....

Operating voltage .....

#### 1,09 PRODUCT FOR IRON CONTAMINATION

Name of product .....

Chemical formulation .....

#### 1,1 TEST KIT

Make .....

Give details of each compound .....

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Give full description and working off test kit .....

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#### 1,11 TDS METER

Name .....

Make .....

Model .....

Is the meter readily available Yes/no .....