



**WorleyParsons**  
resources & energy

PROJECT	PROJ SUB CODE	UNIT/AREA CODE	DISC CODE	DOC TYPE	SEQ NO	REV
180480	HCU	010	38	551	0003	03



**TAMOIL RAFFINAZIONE S.p.A**  
Raffinaria di Cremona

COMPANY: TAMOIL RAFFINAZIONE S.p.A.	DOCUMENT No. <b>7003-62-DG-0022</b>					
PLANT: CREMONA REFINERY	REV.					
PROJECT: CUP TAMOIL	02	03				
PAGE 1 OF 6						

## MECHANICAL DATA SHEET STORAGE TANK

DOCUMENT TITLE : VACUUM RESIDUE STORAGE TANKS

ITEM NOs : B-19 and B-20

PROJECT DESCRIPTION : CREMONA UPGRADING PROJECT (CUP)


ORIGINATOR : BOB CASEY

DATE : 18/12/07

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### REVISION AND APPROVALS

REV	DATE	DESCRIPTION	BY	CHK	LDE	PROJ	CLIENT
01		NOT ISSUED					
02	18/12/07	FOR CLIENT REVIEW	RAC	MJP	ZC	NT	
03	22/02/08	APPROVED FOR DESIGN	RAC	MJP	ZC	NT	

 <b>WorleyParsons</b> resources & energy	<b>MECHANICAL DATA SHEET  STORAGE TANK</b>	<b>PAGE 2 OF 6</b>
	<b>VACUUM RESIDUE STORAGE TANKS</b>  <b>B-19 and B-20</b>	<b>DOCUMENT No</b>  <b>180480-HCU-010-38-551-0003</b> <b>REV 03</b>

**REVISION DESCRIPTION SHEET**

REV	PAGE	REVISION DESCRIPTION
02		FOR CLIENT REVIEW
03		APPROVED FOR DESIGN
	All Pages	Item No's of the Tanks were 99-TK-303 and 99-TK-305, are now B19 and B20
	3	Steam Coil Design Conditions added )line 25).
	6	Fluid Hazard Group, Vesse Hazard Category, Construction Material Group and NDT Test Group for Steam Coil added (lines 15, 24, 26, 28).
HOLD No	PAGE	DESCRIPTION OF HOLD



**MECHANICAL DATA SHEET  
STORAGE TANKS**  
VACUUM RESIDUE STORAGE TANKS  
B-19 and B-20

**PAGE 3 OF 6**  
**DOCUMENT NO.**  
**180480-HCU-010-38-551-0003**  
**REV 03**

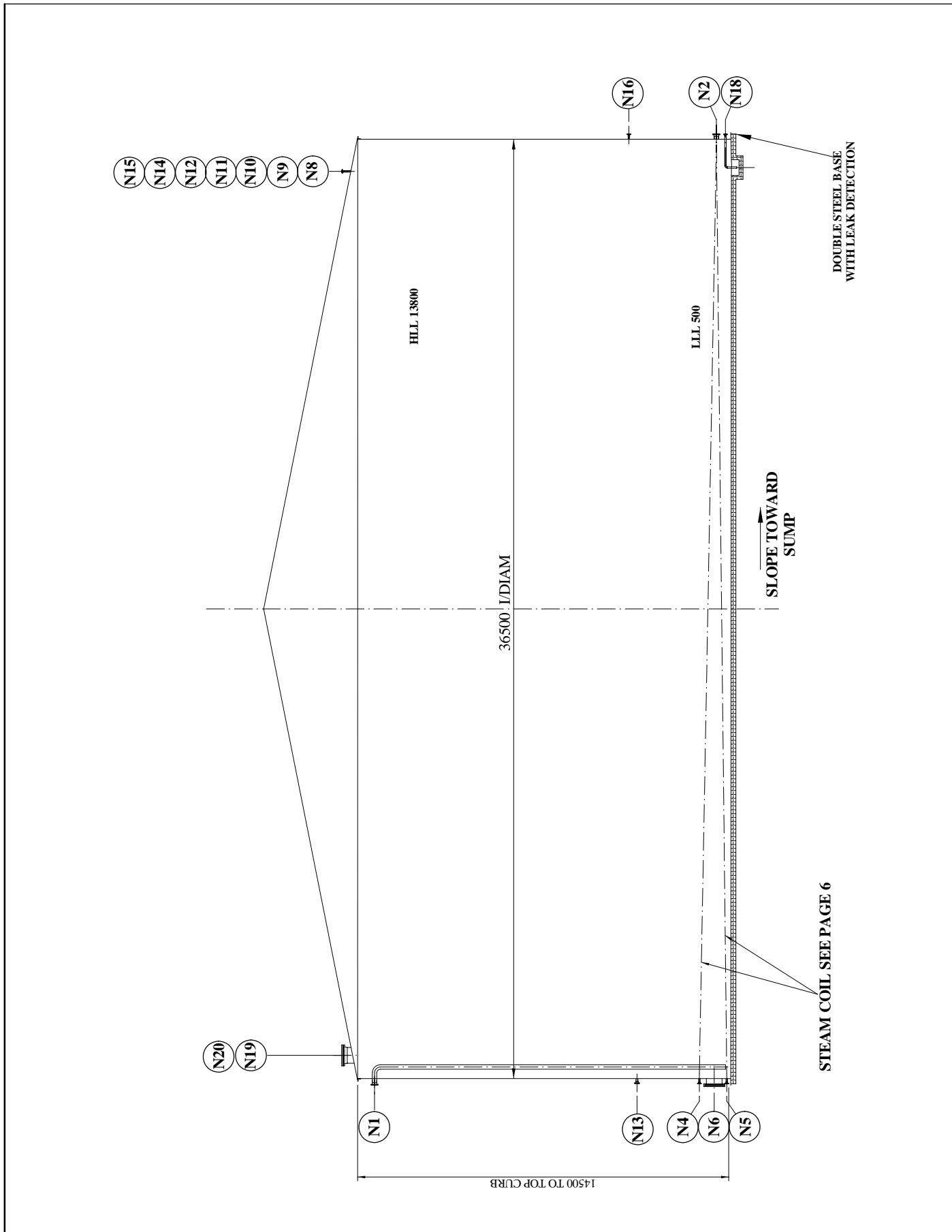
1	Client:	Tamoi S.p.A.	Supplier:		Applicable to:		R E V			
2	Project:		Mfr:		Ref. P&ID:	180480-HCU-999-31-152-0014				
3	Site:	Tamoi Refinery Cremona Italy								
4	Service:	Hydrocarbon				No. Required:		TWO		
5	Type:	Vertical Storage Tank	Case:		Governing Case:					
6	Design Code:	API 650 (ISO 13706)			ASME Stamp	No				
7	Compliance with P.E.D. 97/23/EC	Yes			CE Stamp	No				
8	Fluid Hazard Group (P.E.D. 97/23/EC)	Group IV								
9	Applicable Project Specs:	180480-HCU-000-38-552-0001	180480-HCU-000-32-552-0003	180480-HCU-000-51-552-0001						
10		180480-HCU-000-51-552-0002								
11	<b>DESIGN</b>									
12	Tank Inside Dia	36500	mm	Height	14500	mm	Boot Inside Diameter mm	DDC	Sump Depth	DDC
13	Operating Pressure (Min/Max)	ATMOS	-	mbar.g	Operating Temperature (Min/Max)	-15	155	°C		
14	Design Pressure at Top (Int/Ext)	20.0	-7.0	mbar.g	Design Temperature (Min/Max)	-15	170	°C		
15	Corrosion Allowance		3.0	mm	Weld Joint Coefficient (Long/ Circum):		0.85	-		
16										
17					Field Hydro-Test:	Full of Water				
18	Pneumatic Test Pressure: (Reinforcing Pads):		DDC	bar.g	Specific Gravity of Fluid:		0.945	-		
19	Wind Loading:	See Project Specification			Earthquake Loading:	Lateral: ±	0.07	Vertical: ±		g
20	Cyclic Operation:		No							
21	Temperature Range: (Min/Max):		-	°C						
22	PWHT / Post Forming Heat Treatment:									
23	Design Stress:	Shell/ Roof /Bottom :	DDC	N/mm <sup>2</sup>	Pipe / Forgings:	DDC	DDC	N/mm <sup>2</sup>		
24	Project Design Stress:	Anchor Bolts:	DDC	N/mm <sup>2</sup>	Concrete Bearing:		10.00	N/mm <sup>2</sup>		
25	Steam Out Design Case:	No			Steam Coil Design:		5.0 bar g @ 180 °C			
26	<b>MATERIAL SPECIFICATIONS (&amp; Supplementary Requirements)</b>									
27	Component	Specification	Group	Component	Specification	Group				
28	Shell/Bottom/Roof:	A 516 Gr 70N	DDC	Insulation Supports:	A 283 Gr c (S5)	DDC				
29				Welded Attachments:	A 283 Gr C (S5)	DDC				
30	Nozzle Reinforcement:	A 516 Gr 70N	DDC	Loose Internal Pipe(s):	A 333 Gr 6	DDC				
31				Loose Internal Plate(s):	A 283 Gr c (S5)	DDC				
32				Stud Bolts: (Ext)	A 320 L7M (S2)	DDC				
33				Nuts: (Ext)	A 194 7M (S2 & S40)	DDC				
34	Nozzle Neck Pipe:	A 336 Gr 6	DDC	Bolts: (Int)	A-320-8M (S2)	DDC				
35	Nozzle Neck Plate:	A 516 Gr 70N	DDC	Nuts: (Int)	A -320-8M (S2 & S4)	DDC				
36	Forged Nozzles:	-		Gaskets: (Ext)	SWGf					
37	Forged Nozzle Necks:	-		Gaskets: (Int)	DDC					
38	Forged Flanges & Blinds:	A 350 LF2	DDC	Stairways & Platforms	DDC					
39	Welding Fittings:	DDC	DDC							
40	Wind Girders	DDC	DDC							
41										
42										
43	Welded Internals:	DDC	DDC	Internal Steam Coils	Type 316L St St	DDC				
44										
45										
46				Charpy Impact Tests:	Carbon Steel 27J @ -20°C					
47	Special material requirements:	None								
48	The maximum carbon content of Carbon Steel shall be 0.23%. Max C.E. (IIW) = 0.43%.									
49	<b>INSPECTION DATA</b>									
50										
51	Radiography / Ultrasonics:	10%			Mill Test Certs EN 10204-3.1	Required				
52	Material Testing & Inspection:	By DDC			Production Control Test Plates	Per Code				
53	<b>PAINTING &amp; INSULATION</b>									
54	Finish Externally:	See Project Specification			Finish Internally:	See Project Specification				
55	Supports (Int/Ext):	See Project Specification			Painting - Supports:	See Project Specification				
56	Painting - Shell/Roof:	See Project Specification			Fireproofing:	DDC				
57	Insulation:	(Hot) By Others			Platforms / Ladders:	See Project Specification				
58	<b>ESTIMATED WEIGHTS (* Supplier to Confirm)</b>									
59	Fabrication: *	By DDC	kg	Shipping *	By DDC	kg	Insulation: *	By DDC	kg	
60	Erection - Dressed *	By DDC	kg	Field Hydro-Test: *	By DDC	kg	Fireproofing: *	By DDC	kg	
61	Empty - Operating: *	By DDC	kg							
62	Operating: *	By DDC	kg	Platforms / Ladders:	By DDC	kg	Capacity:*Nominal	15000.00	m <sup>3</sup>	
63	Operating Liquid *	By DDC	kg							
64										
65	<b>FOUNDATION LOADING (* Supplier to Confirm)</b>									
66	Shear/Tensile Force: * Lateral	N	Vertical	N	Overturning Moment *	kNm				

Nozzle Data ( See Notes Below)										
MARK	No. OFF	NOM SIZE ins	WALL THK * mm	FLANGE TYPE	FLANGE RATING Class	REINFORCEMENT mm *	SERVICE	REMARKS	STAND OUT mm	R E V
1	N1	1	6	DDC	WN R.F.	150#	DDC	Vacuum Residue Inlet	DDC	
2	N2	1	6	DDC	WN R.F.	150#	DDC	Vacuum Residue Outlet	DDC	
4	N4	1	1	DDC	WN R.F.	150#	DDC	LP Steam Supply	DDC	
5	N5	1	2	DDC	WN R.F.	150#	DDC	LP Condensate Return	DDC	
6	N6	1	24	DDC	API 650	API 650	DDC	Manhole	C/W Cover & Davit	DDC
7	N8	1	2	DDC	WN R.F.	300#	DDC	Level Instrument		DDC
8	N9	1	2	DDC	WN R.F.	300#	DDC	Level Instrument		DDC
9	N10	1	HOLD	DDC	WN R.F.	150#	DDC	Pressure Vacuum Relief	Supplier to size	DDC
10	N11	1	2	DDC	WN R.F.	300#	DDC	Level Instrument		DDC
11	N12	1	2	DDC	WN R.F.	300#	DDC	Level Instrument		DDC
12	N13	1	2	DDC	WN R.F.	300#	DDC	Temperature Instrument		DDC
13	N14	1	2	DDC	WN R.F.	300#	DDC	Pressure Instrument		DDC
14	N15	1	HOLD	DDC	WN R.F.	150#	DDC	Vacuum Relief Valve Connection	Supplier to size	DDC
15	N16	1	2	DDC	WN R.F.	300#	DDC	Temperature Instrument		DDC
16	N18	1	2	DDC	WN R.F.	150#	DDC	Tank Drain		DDC
17	N19	1	DDC	DDC	WN R.F.	150#	DDC	Emergency hatch	Supplier to size	DDC
18	N20	1	24	DDC	API 650	API 650	DDC	Roof Manhole	C/W Cover & Davit	DDC
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										

(\* Supplier to Confirm Thickness & Size)

Relevant Standard Drawings			
33 Insulation & Fireproofing Supports	180480-HCU-000-38-251-0010	Standard Handrail Details	180480-HCU-000-25-251-0004
34 Vessel Hot Insulation Supports	180480-HCU-000-38-251-0008		
35 Standard Bolt Hole Configuration	180480-HCU-000-38-251-0014		
36 Storage Tank Tolerances	180480-HCU-000-38-251-0027		
37 Details of Earthing Boss	180480-HCU-000-38-251-0020		
38 Manhole Cover Davit	180480-HCU-000-38-251-0021		
39 Nameplate for API 650 Tanks	180480-HCU-000-38-251-0005		
40 Nameplate Bracket	180480-HCU-000-38-251-0007		
41 Nameplate for Vessels (for Steam Coil)	180480-HCU-000-38-251-0006		
42			
43			
44			
45			

- 46 **Page Notes:**
- 47 a. ALL NOZZLE STAND-OUTS MEASURED FROM VESSEL CENTRE LINE OR HEAD TANGENT LINE TO FLANGE GASKET FACE.
  - 48 NOZZLE STANDOUTS TO ACCOUNT FOR DEPTH OF VESSEL BELOW GRADE
  - 49 b. NOZZLE ATTACHMENT SHALL BE SET-THROUGH FULL PENETRATION WELDS OR BUTT WELD ATTACHMENT.
  - 50 c. ALL **PROCESS NOZZLE** REINFORCEMENT SHALL BE SUITABLE TO SUSTAIN PIPING LOADS TABLED IN NOZZLE LOAD SPECIFICATION
  - 51 d. ALL FLANGE DIMENSIONS ARE TO **ASME B16.5** UP TO 24" & **ASME B16.47** TABLE 'A' OVER 24" (UNLESS OTHERWISE NOTED).
  - 52 e. FLANGE GASKET SURFACE SHALL BE FINISHED IN ACCORDANCE WITH PRESSURE VESSEL SPECIFICATION
  - 53 f. FLANGE FACES SHALL BE PROTECTED DURING ALL STAGES OF STORAGE AND MANUFACTURE.
  - 54 g. MANHOLES SHALL BE COMPLETE WITH COVER, DAVIT, GASKET, BOLTS AND NUTS.
  - 55 h. EXTERNAL GASKETS SHALL BE 316 ST. STL. SPIRAL WOUND GRAPHITE FILLED STYLE'CG' TO **ASME B 16.20**. (Low Stress Type)
  - 56 i. 10% SPARE BOLTS (4 MIN.) PLUS 2 ADDITIONAL SPARE GASKETS SHALL BE PROVIDED FOREACH BLANKED NOZZLE.
  - 57 10% SPARE BOLTS PLUS 2 SPARE GASKETS SHALL BE PROVIDED FOR EACH MANHOLE.
  - 58 j. ALL NOZZLES SHALL BE PROVIDED WITH AN INSIDE CORNER RADIUS OF 3mm MINIMUM..
  - 59 k. PIPE FITTINGS SHALL BE THE SAME SIZE AND SCHEDULE AS ATTACHED PIPE. ELBOWS SHALL BE LONG RADIUS.
  - 60
  - 61
  - 62
  - 63
  - 64
  - 65
  - 66



1		R																								
2	<b>1.0 GENERAL REQUIREMENTS :</b>	E																								
3	In the event of conflict or ambiguity between the code, referenced specifications and the requirements of this Engineer	V																								
4	Data Sheet, the Supplier shall, in all cases, refer to the Purchaser for clarification.																									
5																										
6	1.1 Deleted																									
7																										
8	1.2 The Supplier shall provide all materials unless otherwise noted in this data sheet.																									
9																										
10	1.3 Deleted																									
11																										
12	1.4 Deleted																									
13																										
14																										
15	1.5 <b>CR 13445-7</b> Fluid Hazard Group : Tank = Group 2 Steam Coil = Group 2																									
16																										
17	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="4" style="text-align: center;">FLUID MEDIUM CHARACTERISTICS :</th> </tr> <tr> <td style="width:30%;">- TOXIC</td> <td style="width:15%;">No</td> <td style="width:30%;">- ABRASIVE</td> <td style="width:25%;">No</td> </tr> <tr> <td>- FLAMMABLE</td> <td>No</td> <td>- LETHAL</td> <td>No</td> </tr> <tr> <td>- EXPLOSIVE</td> <td>No</td> <td>- HYDROGEN</td> <td>No</td> </tr> <tr> <td>- CORROSIVE</td> <td>No</td> <td>- SOUR - WET</td> <td>No</td> </tr> <tr> <td>- AMINE SERVICE</td> <td>No</td> <td></td> <td></td> </tr> </table>	FLUID MEDIUM CHARACTERISTICS :				- TOXIC	No	- ABRASIVE	No	- FLAMMABLE	No	- LETHAL	No	- EXPLOSIVE	No	- HYDROGEN	No	- CORROSIVE	No	- SOUR - WET	No	- AMINE SERVICE	No			
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24	1.6 CR 13445-7 Vessel Hazard Category : Steam Coil By DDC																									
25																										
26	1.7 EN-13445-2 Construction Material Group : Steam Coil 8.1																									
27																										
28	1.8 EN-13445-5 NDT Test Group : Steam Coil 3b																									
29																										
30	1.9 Carbon Steel shall have the Carbon Content reatrickted to below 0.23%. Carbon Steel with a tensile strength greater than																									
31	485 Mpa shall have an Equivalent Carbon Content of less than 0.43%.																									
32																										
33	1.10 The following Purchaser Specifications shall apply:																									
34																										
35	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:50%;">Purchaser Specification</th> <th style="width:50%;">Title</th> </tr> </thead> <tbody> <tr> <td>180480-HCU-000-51-552-0001</td> <td>Surface Preparation &amp; Painting</td> </tr> <tr> <td>180480-HCU-000-51-552-0002</td> <td>Materials, Welding, PWHT &amp; NDE of Pressure Containing Vessels</td> </tr> <tr> <td>180480-HCU-000-32-552-0003</td> <td>Allowable Loading on Equipment Nozzles</td> </tr> <tr> <td>180480-HCU-000-38-552-0001</td> <td>Site Built Storage Tanks</td> </tr> </tbody> </table>	Purchaser Specification	Title	180480-HCU-000-51-552-0001	Surface Preparation & Painting	180480-HCU-000-51-552-0002	Materials, Welding, PWHT & NDE of Pressure Containing Vessels	180480-HCU-000-32-552-0003	Allowable Loading on Equipment Nozzles	180480-HCU-000-38-552-0001	Site Built Storage Tanks															
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40																										
41																										
42																										
43	1.11 The Supplier shall provide a Nameplate according to the Purchaser's Standard 180480-HCU-000-38-251-0005																									
44	for the Tanks and Purchaser's Standard 180480-HCU-000-38-251-0006 for the Steam Coils.																									
45																										
46	1.12 Tanks B19 and B20 are required to have a double steel tank bottom in accordance with																									
47	API 650 Appendix I Figure I-5.																									
48																										
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