WorleyParsons resources & energy	PROJECT	PROJ SUB CODE	UNIT/AREA CODE	DISC CODE	DOC TYPE	SEQ NO	REV
	180480	HCU	999	38	551	0001	03

TAMOIL RAFFINAZIONE S.p.A Raffinaria di Cremona	COMPANY: TAMOIL RAFFINAZIONE S.p.A.	DOCUMENT No. 07003-62-DG-0023
	PLANT: CREMONA REFINERY	REV.
	PROJECT: CUP TAMOIL	02 | 02A | 03
		PAGE 1 OF 6

MECHANICAL DATA SHEET
STORAGE TANK

DOCUMENT TITLE : CDU PRODUCTS STORAGE TANK

ITEM NOs : B-21

PROJECT DESCRIPTION : CREMONA UPGRADING PROJECT (CUP)

ORIGINATOR : BOB CASEY

DATE : 02/01/08

REVISION AND APPROVALS

REV	DATE	DESCRIPTION	BY	CHK	LDE	PROJ	CLIENT
01		NOT ISSUED					
02	02/01/08	FOR CLIENT REVIEW	RAC	MJP	ZC	NT	
02A	17/01/08	FOR CLIENT REVIEW. TANK SIZE CHANGED	RAC	MJP	ZC	NT	
03	22/02/08	APPROVED FOR DESIGN	RAC	MJP	ZC	NT	

REVISION DESCRIPTION SHEET

REV	PAGE	REVISION DESCRIPTION
02		FOR CLIENT REVIEW
02A		FOR CLIENT REVIEW
	All Pages	Item No of Tank was 99-TK-304, is now B21.
	3	Diameter of Tank was 36500 mm changed to 44500 mm. (line 12)
	3	Height of Tank was 14500 mm changed to 17500 mm (line 12)
	3	Capacity to curb was 15172 cubic metres changed to 27217 cubic metres (line 62)
03		APPROVED FOR DESIGN
	3	Tank was Coned Roof, is now Floating Roof (line 5).
	3	Compliance with PED 97/23/EC is not required for the Tank, but is required for the Steam Coil (line 7).
	3	Fluid Hazard Group for Steam Coil was shown as 2.d, is now 2 (line 8).
	3	Tank Dia was 36500 mm, is now 50000 mm (line 12).
	3	Tank height was 14500 mm, is now 16000 mm (line 12).
	3	Steam Coil Design Conditions added (line 25).
	4	Nozzle Schedule modified to reflect the change from Coned Roof to Floating Roof.
	4	Nozzle N4 was 1", is now 2" NPS (line 4).
	4	Floating Roof Water Drains added, N10, N20, N23 (lines 9, 19, 22).
	4	Roof Manholes were 24", are now 36" (lines 20, 21).
	5	Drawing replaced to reflect the change from a Coned Roof to a Floating Roof.
	6	Vessel Hazard Category, Construction Material Group and NDT Test Group for Steam Coil added (lines 24, 27, 29).

HOLD No	PAGE	DESCRIPTION OF HOLD

WorleyParsons resources & energy	MECHANICAL DATA SHEET STORAGE TANKS	PAGE 3 OF 6
	CDU PRODUCTS STORAGE TANK B-21	DOCUMENT NO. 180480-HCU-999-38-551-0001 REV 03

																	REV
1	Client:	Tamoil S.pA.			Supplier:					Applicable to:							
2	Project:				Mfr:					Ref. P&ID:	180480-HCU-999-31-152-0016						
3	Site:	Tamoil Refinery Cremona Italy															
4	Service:	Hydrocarbon Liquids												No. Required:	ONE		
5	Type:	Vertical Storage Tank with Floating Roof				Case:				Governing Case:							03
6	Design Code:	API 650 (ISO 13706)								ASME Stamp	No						
7	Compliance with P.E.D. 97/23/EC			Tank: No	Steam Coil: Yes					CE Stamp	Tank: No	Steam Coil: Yes					03
8	Fluid Hazard Group (P.E.D. 97/23/EC)					Tank: Group 1	Steam Coil: 2										03
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		180480-HCU-000-51-552-0004														
11	DESIGN																
12	Tank Inside Dia	50000 mm	Height	16000	mm	Boot Inside Diameter mm			DDC	Sump Depth	DDC						03
13	Operating Pressure	(Min/Max)	ATMOS	-	mbar.g	Operating Temperature			(Min/Max)	-15	40	°C					
14	Design Pressure at Top	(Int/Ext)	20.0	-7.0	mbar.g	Design Temperature			(Min/Max)	-15	68	°C					
15	Corrosion Allowance			3.0	mm							-					
16												-					
17					-	Field Hydro-Test:					Fill with Water						
18	Pneumatic Test Pressure:	(Reinforcing Pads):	DDC	bar.g		Specific Gravity of Fluid:					0.770	-					
19	Wind Loading:	See Project Specification				Earthquake Loading:	Lateral: ±	0.07		Vertical: ±		g					
20										-	-						
21											-						
22	PWHT / Post Forming Heat Treatment:	Required for Sub Assemblies only															
23	Design Stress:	Shell/ Roof /Bottom :	DDC	N/mm²		Pipe / Forgings:	DDC	DDC	N/mm²								
24	Project Design Stress:	Anchor Bolts:	DDC	N/mm²		Concrete Bearing:	10.00	N/mm²									
25	Steam Out Design Case:	No				Steam Coil Design:	5.0 bar g @ 180 °C										03
26	MATERIAL SPECIFICATIONS (& Supplementary Requirements)																
27	Component	Specification	API			Component			Specification			API					
28			Group									Group					
29	Shell/Roof:	A 516 Gr 70N	V			Insulation Supports:			DDC								
30	Inner Bottom Plates	A 516 Gr 70N	V			Welded Attachments:			DDC								
31	Outer Bottom Plates	A 516 Gr 70N	V			Loose Internal Pipe(s):			DDC								
32	Nozzle Reinforcement:	A 516 Gr 70N	V			Loose Internal Plate(s):			DDC								
33						Stud Bolts:		(Ext)	A 320 L7M (S2)								
34						Nuts:		(Ext)	SA 194 7M (S2 & S4)								
35	Nozzle Neck Pipe:	A 336 Gr 6				Bolts:		(Int)									
36	Nozzle Neck Plate:	A 516 Gr 70N				Nuts:		(Int)									
37	Forged Nozzles:	-				Gaskets:		(Ext)	SWGF								
38	Forged Nozzle Necks:	-				Gaskets:		(Int)	DDC								
39	Forged Flanges & Blinds:	A 350 LF2				Stairways & Platforms			DDC								
40	Welding Fittings:	DDC							-								
41	Wind Girders	A 516 Gr 70N	V						-								
42									-								
43	Welded Internals:	A516 Gr 70N	V			Internal Steam Coils			A312 316L								
44																	
45						Charpy Impact Tests:			Required 27J @ -20°C								
46	Special material requirements:																
47																	
48	The maximum carbon content of Carbon Steel shall be 0.23%. Max C.E. (IIW) = 0.43%.																03
49	INSPECTION DATA																
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	PAINTING & INSULATION																
54	Finish Externally:	See Project Specification				Finish Internally:			See Project Specification								
55	Supports (Int/Ext):	See Project Specification				Painting:			See Project Specification								
56	Painting - Shell/Roof:	See Project Specification				Fireproofing:			DDC								
57	Insulation:	(Hot) By Others				Platforms / Stairways:			See Project Specification								
58	ESTIMATED WEIGHTS (* Supplier to Confirm)																
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: To Curb		27217	m^3						
63	Operting Liquid *	By DDC	kg														
64																	
65	FOUNDATION LOADING (* Supplier to Confirm)																
65	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	REV
1	N1	1	6	DDC	WN R.F.	150#	DDC	Product Inlet		DDC	
2	N2	1	6	DDC	WN R.F.	150#	DDC	Product Outlet		DDC	
4	N4	1	2	DDC	WN R.F.	150#	DDC	LP Steam Supply		DDC	03
5	N5	1	2	DDC	WN R.F.	150#	DDC	LP Condensate Return		DDC	
6	N6	1	24	DDC	API 650	API 650	DDC	Shell Manhole	C/W Cover	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	DDC	DDC	WN R.F.	150#	DDC	Roof Water Drain	Supplier to size	DDC	03
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	
16	N16	1	2	DDC	WN R.F.	300#	DDC	Temperature Instrument		DDC	
17	N18	1	2	DDC	WN R.F.	150#	DDC	Tank Drain		DDC	
18	N19	1	DDC	DDC	DDC	DDC	DDC	Emergency Hatch	Supplier to size	DDC	
19	N20	1	DDC	DDC	WNRF	150#	DDC	Roof Water Drain	Supplier to size	DDC	03
20	N21	1	36	DDC	API 650	API 650	DDC	Roof Manhole	C/W Cover	DDC	03
21	N22	1	36	DDC	API 650	API 650	DDC	Roof Manhole	C/W Cover	DDC	03
22	N23	1	DDC	DDC	WNRF	150#	DDC	Roof Water Drain	Supplier to size	DDC	
23											
24											
25											
26											
27											
28											
29											
30											

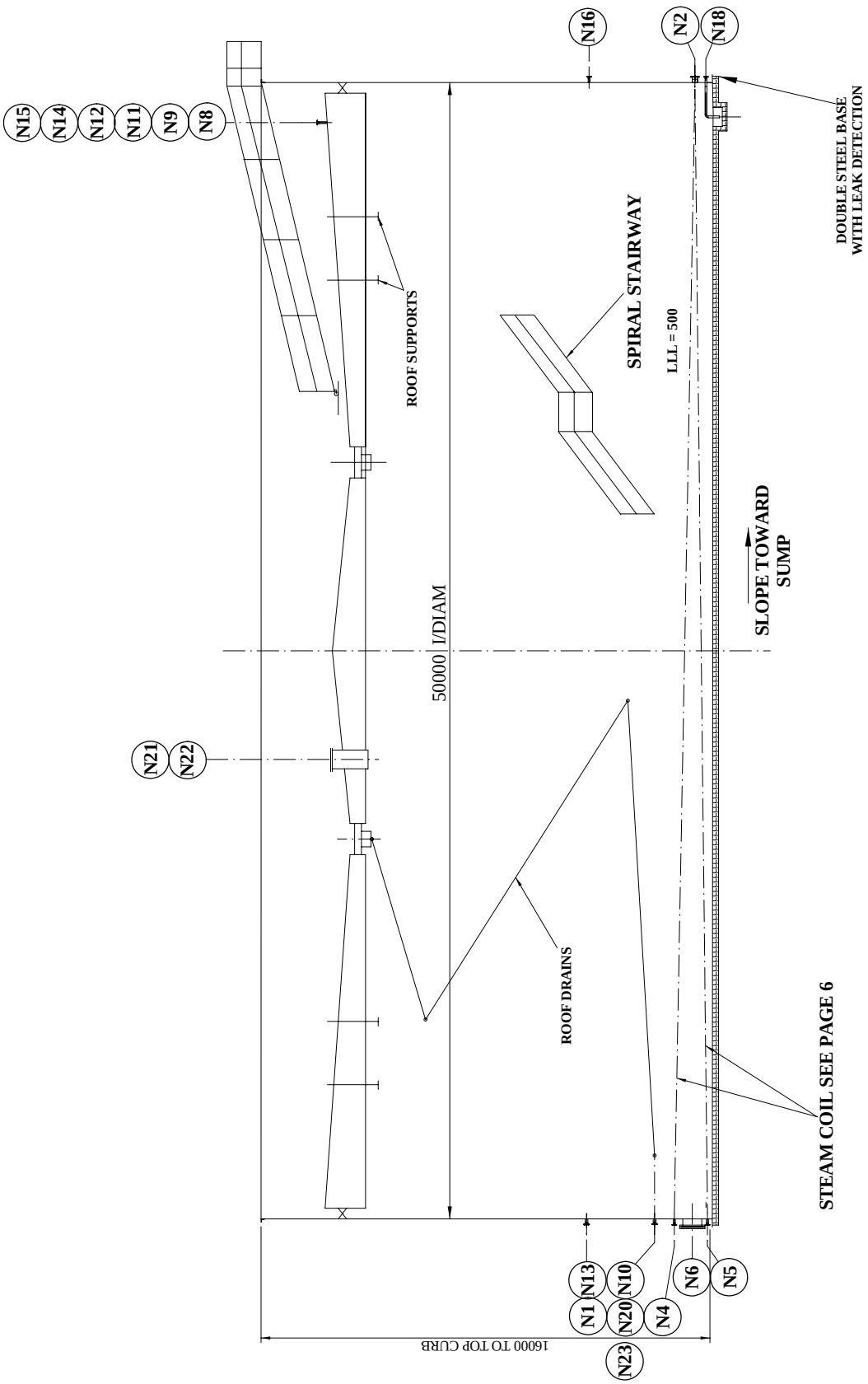
(* Supplier to Confirm Thickness & Size)

Relevant Standard Drawings

34						
35	Vessel Hot Insulation Supports		180480-HCU-000-38-251-0008	Typical Handrail Details		180480-HCU-000-25-251-0004
36	Standard Bolt Hole Configuration		180480-HCU-000-38-251-0014			
37	Storage Tank Tolerances		180480-HCU-000-38-251-0027			
38	Vessel Pipe Support Brackets		180480-HCU-000-38-251-0025			
39	Details of Earthing Boss		180480-HCU-000-38-251-0020			
40	Nameplate for API 650 Tanks		180480-HCU-000-38-251-0005			
41	Nameplate Bracket		180480-HCU-000-38-251-0007			
42	Nameplate for Vessels (for Steam Coil)		180480-HCU-000-38-251-0006			
43						
44						
45						
46						
47						
48						
49						
50						
51						

52 **Page Notes:**

53 a. ALL PROCESS NOZZLE REINFORCEMENT SHALL BE SUITABLE TO SUSTAIN PIPING LOADS TABLED IN NOZZLE LOAD
54 SPECIFICATION.
55 b. NOZZLE ATTACHMENT SHALL BE SET-THROUGH FULL PENETRATION WELDS OR BUTT WELD ATTACHMENT.
56 c. ALL FLANGE DIMENSIONS ARE TO **ASME B16.5** UP TO 24" & **ASME B16.47** TABLE 'A' OVER 24" (UNLESS OTHERWISE NOTED).
57 d. FLANGE GASKET SURFACE SHALL BE FINISHED IN ACCORDANCE WITH PRESSURE VESSEL SPECIFICATION
58 e. FLANGE FACES SHALL BE PROTECTED DURING ALL STAGES OF STORAGE AND MANUFACTURE.
59 f. MANHOLES SHALL BE COMPLETE WITH COVER, DAVIT, GASKET, BOLTS AND NUTS.
60 g. EXTERNAL GASKETS SHALL BE 316 ST. STL. SPIRAL WOUND GRAPHITE FILLED STYLE **CG**' TO **ASME B 16.20**. (Low Stress Type)
61 h. 10% SPARE BOLTS (4 MIN.) PLUS 2 ADDITIONAL SPARE GASKETS SHALL BE PROVIDED FOREACH BLANKED NOZZLE.
62 10% SPARE BOLTS PLUS 2 SPARE GASKETS SHALL BE PROVIDED FOR EACH MANHOLE.
63 i. ALL NOZZLES SHALL BE PROVIDED WITH AN INSIDE CORNER RADIUS OF 3mm MINIMUM..
64 j. NOZZLE STANDOUT IS MEASURED FROM FLANGE GASKET FACE TO OUTSIDE OF TANK SHELL/ROOF
65 k. PIPE FITTINGS SHALL BE THE SAME SIZE AND SCHEDULE AS ATTACHED PIPE. ELBOWS SHALL BE LONG RADIUS.
66
67


N16
N2
N18
N15
N14
N12
N11
N9
N8
DOUBLE STEEL BASE
WITH LEAK DETECTION
ROOF SUPPORTS
SPIRAL STAIRWAY
LLL = 500
SLOPE TOWARD
SUMP
50000 I/DIAM
N21
N22
ROOF DRAINS
STEAM COIL SEE PAGE 6
N13
N10
N6
N5
N1
N20
N4
N23
16000 TO TOP CURB

REV

1.0 GENERAL REQUIREMENTS :

In the event of conflict or ambiguity between the code, referenced specifications and the requirements of this Engineering Data Sheet, the Supplier shall, in all cases, refer to the Purchaser for clarification.

1.1 Steam Coils to be designed for (LP) steam, 5.0 bar g @ 180 ºC.
Coil to be stamped with Design Data, Test Pressure and CE Mark to meet requirements of PED.

1.2 The Supplier shall provide all materials unless otherwise noted in this data sheet.

1.3 Not Used

1.4 Not Used

1.5 **CR 13445-7 Fluid Hazard Group** : Tank = Group 1. Steam Coil Group = 2

FLUID MEDIUM CHARACTERISTICS :			
- TOXIC	No	- ABRASIVE	No
- FLAMMABLE	Yes	- LETHAL	No
- EXPLOSIVE	No	- HYDROGEN	Yes
- CORROSIVE	No	- SOUR - WET	No
- AMINE SERVICE	No		

1.6 **CR 13445-7** Vessel Hazard Category : Steam Coil By DDC. 03

1.7 **EN-13445-2** Construction Material Group : Steam Coil 8.1 03

1.8 **EN-13445-5** NDT Test Group : Steam Coil 3b 03

1.9 Carbon Steel shall have the Carbon Content restricted to below 0.23%. Carbon Steel with a tensile strength greater than 485 Mpa shall have an equivalent Carbon Content of less than 0.43%. 03

1.10 The following Purchaser Specifications shall apply:

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-000-51-552-0004	Materials Requirements for Wet Sour Service
180480-HCU-000-32-552-0003	Allowable Loading on Equipment Nozzles
180480-HCU-000-38-552-0001	Site Built Storage Tanks

1.11 The Supplier shall provide a Nameplate according to the Purchaser's Standard 18
for the Tank and Purchaser's Standard 180480-HCU-000-38-251-0006 for the Steam Coil.

1.12 Tank B21 is required to have a double steel tank bottom in accordance with API 650 Appendix I Figure I-5 with leak detection.