



CLIENT: TAMOIL Raffinazione S.p.A.
PROJECT: MINIMUM INVESTMENT PROJECT
UNIT: UNIT 5 - CDW

CONTRACT: 1-BD-0381A

Equipment List

Drawing no.: BD0381A-01-5-101

Revision: C01

Date: 27-11-2007

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FWI job N°: 1-BD-0381A
Client : TAMOIL Raffinazione S.p.A.
Project : Minimum Investment Project
Unit : 5 CDW

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EQUIPMENT LIST

General Notes

(A): P&ID Number 5-1-50-xxx
(B): Requisition BD0381A-xxx

(C): Insulation Type

HC = Heat Conservation
NI = Not Insulated
PP = Personnel Protection
ST = Steam Tracing
ET = Electrical Tracing
WW = Winterized
AI = Acoustic Insulation

(D): PED Category

Category from SEP to IV (to be defined by Vendors)

N.B. LVGO is supposed available at sufficient pressure at battery limit to reach 5-V-1 without need of booster pumps (Basis of Design to be confirmed)

Type Of Service field is indicating the service: continous, stand-by, intermittend, spare...

(E): Insulation type Fire resistant insulation up to 8000 mm above ground
(F): Fluid design temperature
(G): Installed in a common bay

EQUIPMENT LIST

Equipment Number	Equipment Name	Equipment Type	P&ID N° (A)	Requisition (B)	Weight kg	Size		Electrical Power kW	Voltage V	Material	Duty MW	Design		Insulation		PED Cat (D)	TOS	Type of Service	Remarks	Revision
						DIAMETER mm	LENGTH mm					Press Barg	Temp (C) °C	Type	Thick					
5-C-1	DIESEL STRIPPER	VERTICAL	8	HOLD	N.A.	1200	13500	N.A.	N.A.	CS	N.A.	11	360	N.A.	-	HOLD	N.A.	CONTINUOS	15 VALVE TRAYS - 12 CR EXISTING TRAYS TO BE CHECKED AT TURNDOWN CONDITIONS	C00
5-C-9	PURGE GAS ABSORBER																			C00
5-C-51	FRACTIONATOR	VERTICAL	54	BD0381A-1112D_01	28000	1800	30250	N.A.	N.A.	CS + 3 mm SS410 CS + 3 mm	1	5 barg + FV	400 330/250	HC	-	1	N.A.	CONTINUOS	37 new trays ID 1800 mm CS	C01
5-C-52 A/B	KEROSENE/GASOIL SIDE STRIPPER	VERTICAL	55	BD0381A-1112A_01	10500	900	11800	N.A.	N.A.	CS + 3 mm CA	N.A.	5 + FV	360/250	HC	-	HOLD	N.A.	CONTINUOS	6 + 6 new trays ID 900 mm CS	C01
5-C-53	RECYCLE GAS WASH TOWER	VERTICAL	14(2/2)	BD0381A-1112A_02	N.A.	900	16200	N.A.	N.A.	Shell: KCS + 6 mm CA Internals: 304L SS	N.A.	68 + FV	130	Note E	-	1	N.A.	CONTINUOS		C01
5-DS-51	LP STEAM DESUPERHEATER	HORIZONTAL	52	HOLD	HOLD	HOLD	HOLD	N.A.	N.A.	HOLD	N.A.	5 + FV	370	HC	-	HOLD	N.A.	CONTINUOS	20 trays ID 900 mm CS	C01
5-E-5	MAKE-UP GAS COOLER	S&T	7(2/2)	HOLD	HOLD	387	4880	N.A.	N.A.	Shell: Fine Grain CS Tube: Seamless Fine Grain CS	HOLD	Shell: 34 Tube: 5	Shell: 150 Tube: 66	PP	-	NA	N.A.	CONTINUOS	REUSED FOR 5-K-51 A/B	C01
5-E-13 A/B	STRIPPER BOTTOMS/VISBROKEN GAS OIL EXCH.																			C00
5-E-14 A/B	GASOIL PRODECT/HAGO FEED EXCHANGER	S&T	8	HOLD	HOLD	530	6100	N.A.	N.A.	Shell: CS Tube: CS	HOLD	Shell: 28 Tube: 15	Shell: 220 Tube: 360	HC	-	NA	N.A.	CONTINUOS		C01
5-E-53	KERO PRODUCT TRIM COOLER	S&T	57	HOLD	HOLD	shell i/d 254mm tube length 4880 mm		N.A.	N.A.	Shell: CS Tube: CS	0.03	Shell: 17,5 Tube: 13.5	Shell: 190 Tube: 66	NI	-	HOLD	N.A.	CONTINUOS		C01
5-E-55	DEWAXATE RESIDUE/FRACT.FEED EXCHANGER	S&T	51	HOLD	HOLD	AREA: 85 m ²		N.A.	N.A.	Shell: CS Tube: CS	0.875	Shell: 18 Tube: 17	Shell: 360 Tube: 390	HC	-	HOLD	N.A.	CONTINUOS		C01
5-E-56	GASOIL PRODUCT/FRACT. FEED EXCHANGER	S&T	51	HOLD	HOLD	AREA: 70 m ²		N.A.	N.A.	Shell: CS Tube: CS	1.20	Shell: 22 Tube: 18	Shell: 345 Tube: 315	HC	-	HOLD	N.A.	CONTINUOS		C01
5-E-59	GASOIL PA/FRACT. FEED EXCHANGER	S&T	51	HOLD	HOLD	AREA: 80 m ²		N.A.	N.A.	Shell: CS Tube: CS	1.17	Shell: 18 Tube: 14	Shell: 330 Tube: 370	HC	-	HOLD	N.A.	CONTINUOS		C01
5-E-60	HHP LEAN DEA HEATER	S&T	14(2/2)	HOLD	HOLD	AREA: 3 m ²		N.A.	N.A.	Shell: CS Tube: KCS + 3 mm CA	0.07	Shell: 62 Tube: 80	Shell: 170 Tube: 130	HC	-	HOLD	N.A.	CONTINUOS		C01

EQUIPMENT LIST

Equipment Number	Equipment Name	Equipment Type	P&ID N° (A)	Requisition (B)	Weight kg	Size		Electrical Power kW	Voltage V	Material	Duty MW	Design		Insulation		PED Cat (D)	TOS	Type of Service	Remarks	Revision
						DIAMETER mm	LENGTH mm					Press	Temp (C)	Type	Thick					
												Barg	°C							
5-E-61	DEETHANIZER OVERHEAD CONDENSER	S&T	12	HOLD	HOLD	AREA: 50 m ²		N.A.	N.A.	Shell: - Tube: Seamless Fine Grain CS	0.118	Shell: 30 Tube: 23.1	Shell: 140 Tube: 66	N.A.	-	HOLD	N.A.	CONTINUOS	INSTALLED ON TOP OF 5-C-5 TUBE BUNDLE SHALL BE REPLACED	C01
5-EA-4	DIESEL PRODUCT COOLER	A/C	8	HOLD	HOLD	3500	9800	N.A.	N.A.	HOLD	1.375	17.4	180	N.A.	-	HOLD	N.A.	CONTINUOS	Equipment to be rerated for new design conditions.	C01
5-EA-51 Note G	FRACTIONATOR OVERHEAD CONDENSER	A/C	56	HOLD	HOLD	4500	6000	2 * 18,5	400	HOLD	2.94	8 + FV	200	N.A.	-	HOLD	N.A.	CONTINUOS		C01
5-EA-52 Note G	KERO PRODUCT COOLER	A/C	57	HOLD	HOLD			N.A.	N.A.	CS	0.447	17.5	250	N.A.	-	HOLD	N.A.	CONTINUOS		C01
5-EA-53	REACTOR EFFLUENT COOLER	A/C	04	HOLD	HOLD	2000	6000	3 * 5,5	400	HOLD	2.25	71	400	N.A.	-	HOLD	N.A.	CONTINUOS		C01
5-EA-54	DEWAXATE RESIDUE COOLER	A/C	57	HOLD	HOLD	3000	6000	2 * 11	400	CS	2.264	17	360	N.A.	-	HOLD	N.A.	CONTINUOS		C01
5-F-51	FRACTIONATOR HEATER	VERT. CYLINDRICAL	52/53	BD0381A-1242A_01	N.A.	Absorbed Duty=4.5 Gcal/h		N.A.	N.A.	Tubes: 5 Cr	HOLD	11 + FV	Note F	N.A.	-	HOLD	N.A.	CONTINUOS	Radiant + convective LP superheating coil to be installed in convective section	C01
5-K-01 A/B	RECYCLED GAS COMPRESSOR	VOL.	7(1/2)	HOLD	HOLD	Comp fact: 1,4	7000	400	6000	Liner: Cast Iron Cilinder: Cast Steel Plunger: Cast iron Valve discs: PEEK	N.A.	HOLD	HOLD	N.A.	-	HOLD	N.A.	TWO COMPRESSORS WILL OPERATE IN PARALLEL	ITEM TO BE REVAMPED MU CYLINDERS WILL BE USED IN RECYCLE SERVICE. 2 NEW PULS DAMPERS WILL BE NEEDED	C01
5-K-51 A/B	MAKE-UP GAS COMPRESSOR	VOL.	7(2/2)	BD0381A-1322_01	HOLD	MU: 16000 Nm ³ /h	Comp. Fact. MU: 2.6	400	6000	Liner: Cast Iron Cilinder: CS Plunger: Cast iron Valve discs: PEEK	N.A.	HOLD	HOLD	N.A.	-	HOLD	N.A.	TWO COMPRESSORS WILL OPERATE IN PARALLEL		C01
5-P-2 A/B	FEED CHARGE PUMP	N.A.	1	HOLD	HOLD	Flow: 60 Head: 975		244	6000	Case: ASTM A216WCB Impeller: ASTM A216WCB	N.A.	HOLD	250	N.A.	-	HOLD	N.A.	A CONTINUOS B SPARE	NEW IMPELLERS and 2 new motor	C01
5-P-4 A/B	DEBUTANIZER FEED PUMP	N.A.	9	HOLD	HOLD	Flow: 21,1 Head: 178		22	400	Case: ASTM A216WCB Impeller: ASTM A48 CL35	N.A.	HOLD	455	N.A.	-	HOLD	N.A.	A CONTINUOS B SPARE	NEW IMPELLERS and 2 new motor	C01
5-P-17 A/B	STRIPPER BOTTOM PUMPS	N.A.	8	HOLD	HOLD	Flow: 59,6 Head: 52		HOLD	HOLD	Case: ASTM A216WCB Impeller: A 48 CL 35	N.A.	HOLD	455	N.A.	-	HOLD	N.A.	A CONTINUOS B SPARE	To be verified	C01
5-P-51 A/B	FRACT. NAPHTA/REFLUX PUMP	N.A.	56	HOLD	HOLD	Flow: 38 Head: 174		30,7	400	Case: CS Impeller: CS	N.A.	HOLD	HOLD	N.A.	-	HOLD	N.A.	A CONTINUOS B SPARE	TWO NEW PUMPS one operating + one spare	C01
5-P-52 A/B	KEROSENE PRODUCT PUMPS	N.A.	55	HOLD	HOLD	Flow: 9.2 Head: 126		12,6	400	Case: CS Impeller: 12Cr	N.A.	HOLD	HOLD	N.A.	-	HOLD	N.A.	A CONTINUOS B SPARE	TWO NEW PUMPS one operating + one spare	C01
5-P-53 A/B	GASOIL PRODUCT PUMPS	N.A.	55	HOLD	HOLD	Flow: 41.6 Head: 192		25,4	400	Case: CS Impeller: 12Cr	N.A.	HOLD	HOLD	N.A.	-	HOLD	N.A.	A CONTINUOS B SPARE	TWO NEW PUMPS one operating + one spare	C01

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Equipment Number	Equipment Name	Equipment Type	P&ID N° (A)	Requisition (B)	Weight	Size		Electrical Power	Voltage	Material	Duty	Design		Insulation		PED Cat (D)	TOS	Type of Service	Remarks	Revision
						DIAMETER	LENGTH					Press	Temp (C)	Type	Thick					
						kg	mm					mm	kW	V	MW					
5-P-54 A/B	GASOIL PA PUMPS	N.A.	54	HOLD	HOLD	Flow: 53.7 Head: 64		10,4	400	Case: CS Impeller: 12Cr	N.A.	HOLD	HOLD	N.A.	-	HOLD	N.A.	A CONTINUOS B SPARE	TWO NEW PUMPS one operating + one spare	C01
5-P-55 A/B	DEWAXATE RESIDUE PUMPS	N.A.	54	HOLD	HOLD	Flow: 39.2 Head: 134		19	400	Case: CS Impeller: 12Cr	N.A.	HOLD	HOLD	N.A.	-	HOLD	N.A.	A CONTINUOS B SPARE	TWO NEW PUMPS one operating + one spare	C01
5-P-56 A/B	HHP LEAN DEA PUMP	N.A.	14(2/2)	HOLD	HOLD	Flow: 11 Head: 622		50	400	Case: CS Impeller: SS 316L	N.A.	HOLD	HOLD	N.A.	-	HOLD	N.A.	A CONTINUOS B SPARE	TWO NEW PUMPS one operating + one spare suction line connected to 5-V-4	C01
5-P-57 A/B	FRACTIONATOR WATER PUMPS	N.A.	56	HOLD	HOLD	Flow: 1.4 Head: 122		2	400	Case: CS Impeller: CS	N.A.	HOLD	HOLD	N.A.	-	HOLD	N.A.	A CONTINUOS B SPARE	TWO NEW PUMPS one operating + one spare	C01
5-V-5	MAKE-UP GAS K.O. DRUM	VERTICAL	7	HOLD	HOLD	600 o.d.	2200	N.A.	N.A.	HOLD	N.A.	HOLD	HOLD	N.A.	-	HOLD	N.A.	CONTINUOS	REUSED FOR 5-K-51 A/B RELOCATED I N THE NEW AREA	C00
5-V-51	FRACT.OVERHEAD ACCUMULATOR	HORIZONTAL	56	HOLD	HOLD	1500 i.d.	6000	N.A.	N.A.	CS + 3 mm CA	N.A.	5.5 + FV	150	N.A.	-	HOLD	N.A.	CONTINUOS	NEW ITEM (WITH WATER BOOT)	C01
5-V-52	FUEL GAS K.O. DRUM	VERTICAL	53	HOLD	HOLD	600 i.d.	2850	N.A.	N.A.	CS + 3 mm CA	N.A.	8,5 + FV	80	N.A.	-	HOLD	N.A.	CONTINUOS		C01
5-V-53	RECYCLE GAS DEOILER	VERTICAL	14(2/2)	HOLD	HOLD	900	3700	N.A.	N.A.	Shell: KCS + 3 mm CA Internals: 304L SS	N.A.	68 + FV	130	Note E	-	HOLD	N.A.	CONTINUOS		C01
5-V-54	SKIM OIL POT	VERTICAL	14(2/2)	HOLD	HOLD	350	1200	N.A.	N.A.	CS + 4 mm CA	N.A.	68 + FV	130	Note E	-	HOLD	N.A.	CONTINUOS		C01
5-V-55	KERO COALESCER	VERTICAL	57	HOLD	HOLD	HOLD	HOLD	N.A.	N.A.	CS + 4 mm CA	N.A.	17,5 + FV	190	NI	-	HOLD	N.A.	CONTINUOS		C01