

EQUIPMENT DATASHEET 175-C



PLANTAS DE AMONIACO Y UREA

CARRASCO

N° del DOC. PAU-DPC-A-DAS-10812

Rev. B Página 1 de 6

EQUIPMENT DATASHEET

175-C LTS START-UP HEATER

N° del Contrato : DLG 0304

N° del Proy. de SECL : SC2566

В	04-SEP 2013	IFR	Issued for Review	J.Y.SHIN	T.Y.KIM	S.H.KIM
Α	19 JUL 2013	IFR	Issued for Review	H.J.J00	T.Y.KIM	S.H.KIM
Rev.	Fecha	Estado	Descripción del Estado	Preparado por	Verificado por	Aprobado por
	Revisión de	el Docume	Página: To	tal de 6 hojas (Inc	l. Carátula)	



CARRASCO

EQUIPMENT DATASHEET 175-C



N° del DOC. PAU-DPC-A-DAS-10812

Rev. B Página 2 de 6

RESUMEN DE REVISION DEL DOCUMENTO

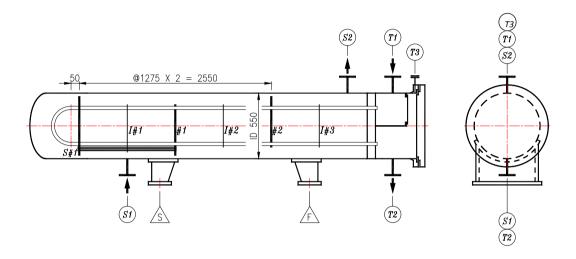
Rev.	Fecha de Revisión	Sección Revisada	Descripción de Revisión
A(BPC)	08 FEB 2013	ALL	Issued for Review
B(BPC)	19 FEB 2013	1	Data Sheet Cover is revised
C(BPC)	12 APR 2013	ALL	Data sheet format, Baffle Spacing, Heat Duty, Pressure Drop, Overall Coefficient
A(DPC)	19 JUL 2013	4,5	Channel side ID is revised. T3 is added on the drawing
B(DPC)	04 SEP 2013	3,4,5,6	Title block is revised.

		SUNG ENG SEO	JL, KOI		., L.D.	10.	D		R HEA				
a .	VACUATEN	TOO DETROI IE		100AL FO DO	I IVII ANIGO	DEV		. DE DV	OTE OTED I	A A PART	Sheet OVED BY	3 of	(
Customer		TOS PETROLIF			LIVIANOS	REV		ADE BY	CHECKED I				42
Plant Job No	SC2566	ICED FEKTILL	LEK PU	JEUI		A B		J.JOO Y.SHIN	T.Y.KIM T.Y.KIM		I.KIM I.KIM	Jul. 19, 20 Sep. 04, 20	
Location		CO, BOLIVIA				B	J.	1.SHIN	1.T.KIIVI	3.1	I.KIIVI	Sep. 04, 20	,,,
Service			1			1							
		S START-UP HEATER											
	em No. 175-C												
Total ONE(1) Shells, Connected in 1 Parallel, 1 Series Code ASME Sec.VIII Div.1 TEMA Type NEU						Install TEMA C		lorizonta R		550 ID	44.9 (4,000 L	-11
Code	ASIVIE	Sec.viii Div.i	11		NEU (*5) FORMANC				Effective .	Area	44.9 (*4) m ² /Sh	еп
Case:				TER	OHUIII	201 011							
Fluid Alloc	cation				SHEL	L SIDE				TUBI	E SIDE		
				INL		_	UTL		INL			OUTLET	
Fluid Name				RE	DUCTION		R LT	S	SUI	PERHEAT			
Fluid Quan	ntity, Total	kg/hr			28,057					1,850	X 1.05	5	
Vapor		kg/hr		28,0	57 X 1.05	28	3,05	7 X 1.05					
Liquid		kg/hr								FO W 1 1 1			
Steam		kg/hr							1,8	50 X 1.05)	4.050. 9.1	٠.
Water	1 1	kg/hr										1,850 X 1	.US
Noncond	ensable Temperature	kg/hr °C		81.	27		205.	0	388	2.5		259.43	
Operating Departing 1		kg/cm² [a]		5.0		<u> </u>	٤υ٥.	·	47.	~~		203.40	
Operating I Density	1 ressure	kg/cm² [a]	Vap Liq		55	3,233	6		16.36	70		784.	40
Viscosity		cP	Vap Liq			0.025	-		0.0239			0.10	
Specific He	eat	kcal / kg °C	Vap Liq			0.023			0.5864			1.18	
	onductivity	kcal / hr m °C	Vap Liq			0.034			0.0498			0.52	
Latent Hea	-		por MW		MW 27.31	Lat	_	ıw 27.31		MW	Lat	MW	
	d Dew Point	°C		Dew		Bubble			Dew		Bubble		
Critical Pro		kg/cm² [a] °C	1	Press.		Temp.			Press.		Temp.		
Velocity	_	m/sec			9).7					1.0		
Pressure D		kg/cm²		Allow.	0.25	Calc.		0.22	Allow.	0.02	Calc.	0.01	
Fouling Re		hr m² °C / kcal				O (*2)					0 (*2)		
Film Coeff	ficient	kcal / hr m² °C				5.6				18	25.4		
Overall Co	efficient	kcal / hr m² °C		Design	171.	-	Clear		192.4	Calcul		192.4	
Heat Duty		Gcal / hr				0.90			MTD, correc	cted	12	22.4	°C
					TRUCTIO		E SH	IELL	T				
Design Pre	essure		cm² [g]	Internal	11.0	External			Internal	51.6	Externa		
				Internal	275	External			Internal	420	Externa		
	mperature	°C				12					12	ai 420	
Min. Desig	gn Metal Tem					12 F(1)				-	12 (O(2)	ai 420	
Min. Desig	gn Metal Tem ses	perature °C	1		ON	IE(1)				- TW	/O(2)	ai 420	
Min. Desig No. of Pass Corrosion	gn Metal Tem ses	nperature °C			ON 3					TW	/O(2) 3.0	ai 420	
Min. Desig No. of Pass Corrosion A Insulation	gn Metal Tem ses Allowance	mn mn	1	.05 mm OD	ON 3	E(1) 3.0 IC	8 m	nm (B'	WG 14	TW	/O(2) 3.0 HC		m
Min. Desig No. of Pass Corrosion Insulation Tubes N	gn Metal Tem ses Allowance	nperature °C	19	.05 mm OD	ON 3	IE(1) 3.0 IC n.) 2.10			WG 14 yout angle 6	TW (;	/O(2) 3.0	4,000 m 3,827 m	
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell	gn Metal Temses Ses Allowance To. 98 U's	mn mn	19 5	50 mm ID	ON 3 F , Thk . (Mi	IE(1) 3.0 IC n.) 2.10	4 n	nm , La	yout angle 60 23.4 %	TW () , Le () . Le () . Le () . Le () . Le	HC ngth ffective acing c/c	4,000 m 3,827 m 2 1,275 m	m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles (gn Metal Temses Allowance No. 98 U's Cross Baffle Inlet Noz.	mn mn / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr	19 5 ea / She ance S	50 mm ID ell, Type Shell 9	ON 3 F, Thk . (Mi Tube Pite N.T.I.W 63 , Bund	E(1) 3.0 HC n.) 2.10 ch 25. , (dile	4 m Cut 124	hm , Lag	yout angle 60 23.4 % Impingement	TW	O(2) 3.0 HC ngth ffective acing c/c Rods	4,000 m 3,827 m 2 1,275 m 3 Rows m	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles (gn Metal Terr ses Allowance No. 98 U's Cross Baffle Inlet Noz. Outlet Noz.	mm / Shell, Size 2 + 1(S) + 3(I)	19 5 ea / She ance S	50 mm ID ell, Type shell 9 shell 1,3	ON 3 F Thk . (Mi Tube Pite N.T.I.W 63 , Bunc 67 , Bunc	E(1) 3.0 HC n.) 2.10 ch 25. , (C) the 4	4 m Cut 124 500	hm , Lay	yout angle 60 23.4 % Impingement Tube to Baff	TW	O(2) 3.0 HC ngth ffective acing c/c Rods 2	4,000 m 3,827 m c 1,275 m x 3 Rows m ance 0.8 m	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles (gn Metal Terrses Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube	mn mn / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit	19 5 ea / She ance S	50 mm ID ell, Type shell 9 shell 1,3	ON	E(1) 3.0 HC n.) 2.10 ch 25. , (C) the 4	4 m Cut 124 500	kg/m-s ² kg/m-s ² int:	yout angle 60 23.4 % Impingement Tube to Baft Strength V	TW	MO(2) 3.0 HC Ingth Ingt	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles (gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove	mn mn / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit	19 5 ea / She ance S	50 mm ID ell, Type thell 9 thell 1,3	ON 3 H Thk (Mi Tube Pitt N.T.I.W 63 , Bund 67 , Bund CS Tube to	E(1) 3.0 HC n.) 2.10 ch 25. , (ille 4) Ille (ille (ill	4 m Cut 124 600 et Jo	kg/m-s² kg/m-s² int:	yout angle 60 23.4 % Impingement Tube to Baff Strength V SIDE	TW O C Le Dia., Sp at 19.05 fle Diametr Veld with	MO(2) 3.0 HC ngth ffective acing c/c Rods y al Cleara Light E TUBE	4,000 m 3,827 m 2 1,275 m x 3 Rows m ance 0.8 m xpanding	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles (gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C	mn mn / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit	19 5 ea / She ance S	50 mm ID ill, Type ihell 9 ihell 1,3	ON 3 H , Thk (Mi Tube Pite N.T.I.W 63 , Bund 67 , Bund CS Tube to	E(1) 3.0 4C n.) 2.10 ch 25. , C file 4 file 6 Tube Shee	4 m Cut 124 500 et Jo	kg/m-s² kg/m-s² int: SHELL S	yout angle 6 23.4 % Impingement Tube to Baft Strength V SIDE Remarks	TW O O Le Dia., Sp at 19.05 fle Diametr Veld with Tag No	NO(2) 3.0 HC ngth ffective acing c/c Rods y al Cleara Light E TUBE	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding 2 SIDE Remarks	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles (pv ²)	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet	mn mn / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit	19 5 ea / She ance S	50 mm ID ill, Type thell 9 thell 1,3	ON 3 H , Thk (Mi Tube Pite N.T.I.W 63 , Bund 67 , Bund CS Tube to CS NOZZ CS Inlet	E(1) 3.0 4C n.) 2.10 ch 25. , C file 4 file 6 Tube Shee XLE Tag S1	4 m Cut 124 500 et Jos No.	kg/m-s² kg/m-s² int: SHELL S	yout angle 6 23.4 % Impingement Tube to Baft Strength V SIDE Remarks 60# RF	TW O Le Dia.	MO(2) 3.0 HC Ingth Iffective Identification Ingth Iffective Identification Ingth Ing	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding C SIDE Remarks 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles 0 pv2 1 Material 7	gn Metal Terrises Ses Allowance No. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit	19 5 ea / She ance S	50 mm ID ill, Type thell 9 thell 1,3	ON 3 F , Thk (Mi Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS Tube to CS NOZZ CS Inlet CS Outlet	E(1) 3.0 4C n.) 2.10 ch 25. , (Cle 4 lile 6 Tube Sher LLE Tag S1 S2	4 m Cut 124 500 et Jo	kg/m-s² kg/m-s² int: SHELL S	yout angle 6 23.4 % Impingement Tube to Baft Strength V SIDE Remarks	TW O O Le Dia., Sp at 19.05 fle Diametr Veld with Tag No	MO(2) 3.0 HC Ingth Iffective Identification Ingth Iffective Identification Ingth Ing	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding 2 SIDE Remarks	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit	19 5 ea / She ance S	50 mm ID ell, Type Shell 9 Shell 1,3	ON 3 F , Thk (Mi Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS Tube to CS NOZZ CS Inlet CS Outlet Interme	E(1) 3.0 4C n.) 2.10 ch 25. , (Cle 4 lile 6 Tube Sher LLE Tag S1 S2	4 m Cut 124 500 et Jos No.	kg/m-s² kg/m-s² int: SHELL S	yout angle 6 23.4 % Impingement Tube to Baft Strength V SIDE Remarks 60# RF	TW 1	(O(2) 3.0 HC nigth ffective acing c/c Rods al Cleara Light E TUBE NPS 3	4,000 m 3,827 m 2 1,275 m x 3 Rows m ance 0.8 m xpanding C SIDE Remarks 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2 1 Material MEAN M	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo METAL Te	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over	19 5 ea / She ance S	50 mm ID ell, Type chell 9 chell 1,3	ON 3 F , Thk (Mi Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS Tube to CS NOZZ CS Inlet CS Outlet Interme [g] Vent	E(1) 3.0 4C n.) 2.10 ch 25. , (Cle 4 lile 6 Tube Sher LLE Tag S1 S2	4 m Cut 124 500 et Jos No.	kg/m-s² kg/m-s² int: SHELL S	yout angle 6 23.4 % Impingement Tube to Baft Strength V SIDE Remarks 60# RF	TW O Le Dia.	(O(2) 3.0 HC nigth ffective acing c/c Rods al Cleara Light E TUBE NPS 3	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding C SIDE Remarks 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL Te ATURE	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit	19 5 ea / She ance S	50 mm ID ell, Type chell 9 chell 1,3	ON 3 F , Thk (Mi Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS Tube to CS NOZZ CS Inlet CS Outlet Interme [g] Vent	E(1) 3.0 4C n.) 2.10 ch 25. , (Cle 4 lile 6 Tube Sher LLE Tag S1 S2	4 m Cut 124 500 et Jos No.	kg/m-s² kg/m-s² int: SHELL S	yout angle 6 23.4 % Impingement Tube to Baft Strength V SIDE Remarks 60# RF	TW 1	(O(2) 3.0 HC nigth ffective acing c/c Rods al Cleara Light E TUBE NPS 3	4,000 m 3,827 m 2 1,275 m x 3 Rows m ance 0.8 m xpanding C SIDE Remarks 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL Te ATURE	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over	19 5 ea / She ance S	50 mm ID ell, Type chell 9 chell 1,3	ON 3 F , Thk (Mi Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS Tube to CS NOZZ CS Inlet CS Outlet Interme [g] Vent	E(1) 3.0 4C n.) 2.10 ch 25. , (Cle 4 lile 6 Tube Sher LLE Tag S1 S2	4 m Cut 124 500 et Jos No.	kg/m-s² kg/m-s² int: SHELL S	yout angle 6 23.4 % Impingement Tube to Baft Strength V SIDE Remarks 60# RF	TW 1	(O(2) 3.0 HC nigth ffective acing c/c Rods al Cleara Light E TUBE NPS 3	4,000 m 3,827 m 2 1,275 m x 3 Rows m ance 0.8 m xpanding C SIDE Remarks 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL Te ATURE	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over	19 5 ea / She ance S	50 mm ID ell, Type chell 9 chell 1,3	, Thk (Mi Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS Tube to CS NOZZ CS Inlet CS Outlet Interm [g] Vent ide Drain	E(1) 3.0 4 1 1 1 1 1 1 1 1 1	4 m Cut 124 500 et Jos No.	kg/m-s² kg/m-s² int: SHELL S	yout angle 6 23.4 % Impingement Tube to Baft Strength V SIDE Remarks 60# RF	TW 1	(O(2) 3.0 HC nigth ffective acing c/c Rods al Cleara Light E TUBE NPS 3	4,000 m 3,827 m 2 1,275 m x 3 Rows m ance 0.8 m xpanding C SIDE Remarks 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2 1 Material O MEAN M TEMPER Normal Op	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL TeATURE Sperating	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit over oint mperature, °C Shell Tube	19 55 ea / She ance S S	50 mm ID ell, Type shell 9 shell 1,3	Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS NOZZ NOZS Inlet CS Outlet Interme [g] Vent ide Drain RATIN	E(1) 3.0 4 C C C C C C C C	4 m Cut 124 600 No. 1	hm , La H - kg/m-s² kg/m-s² int : SHELL S	yout angle 6 23.4 % Impingemen Tube to Baff Strength V SIDE Remarks 60# RF	TW (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(O(2) 3.0 HC ngth ffective acing c/c Rods >> al Cleara Light E TUBE NPS 3 2	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding 2 SIDE Remarks 600# RF 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL TeATURE Sperating	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over int mperature, °C Shell Tube Il Empty Weigh	19 55 ea / She ance S S	50 mm ID ell, Type chell 9 chell 1,3	Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS NOZZ NOZS Inlet CS Outlet Interme [g] Vent ide Drain RATIN	E(1) 3.0 4 1 1 1 1 1 1 1 1 1	4 m Cut 124 600 No. 1	kg/m-s² kg/m-s² int: SHELL S	yout angle 6 23.4 % Impingemen Tube to Baff Strength V SIDE Remarks 60# RF	TW 1	(O(2) 3.0 HC ngth ffective acing c/c Rods >> al Cleara Light E TUBE NPS 3 2	4,000 m 3,827 m 2 1,275 m x 3 Rows m ance 0.8 m xpanding C SIDE Remarks 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL Te ATURE S Decrating Weight / She	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over int mperature, °C Shell Tube Il Empty Weigh	19 55 ea / She ance S S	50 mm ID ell, Type shell 9 shell 1,3	Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS NOZZ NOZS Inlet CS Outlet Interme [g] Vent ide Drain RATIN	E(1) 3.0 4 C C C C C C C C	4 m Cut 124 600 No. 1	hm , La H - kg/m-s² kg/m-s² int : SHELL S	yout angle 6 23.4 % Impingemen Tube to Baff Strength V SIDE Remarks 60# RF	TW (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(O(2) 3.0 HC ngth ffective acing c/c Rods >> al Cleara Light E TUBE NPS 3 2	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding 2 SIDE Remarks 600# RF 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL Te ATURE S Decrating Weight / She	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over int mperature, °C Shell Tube Il Empty Weigh	19 55 ea / She ance S S	50 mm ID ell, Type shell 9 shell 1,3	Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS NOZZ NOZS Inlet CS Outlet Interme [g] Vent ide Drain RATIN	E(1) 3.0 4 C C C C C C C C	4 m Cut 124 600 No. 1	hm , La H - kg/m-s² kg/m-s² int : SHELL S	yout angle 6 23.4 % Impingemen Tube to Baff Strength V SIDE Remarks 60# RF	TW (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(O(2) 3.0 HC ngth ffective acing c/c Rods >> al Cleara Light E TUBE NPS 3 2	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding 2 SIDE Remarks 600# RF 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL Te ATURE S Decrating Weight / She	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over int mperature, °C Shell Tube Il Empty Weigh	19 55 ea / She ance S S	50 mm ID ell, Type shell 9 shell 1,3	Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS NOZZ NOZS Inlet CS Outlet Interme [g] Vent ide Drain RATIN	E(1) 3.0 4 C C C C C C C C	4 m Cut 124 600 No. 1	hm , La H - kg/m-s² kg/m-s² int : SHELL S	yout angle 6 23.4 % Impingemen Tube to Baff Strength V SIDE Remarks 60# RF	TW (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(O(2) 3.0 HC ngth ffective acing c/c Rods >> al Cleara Light E TUBE NPS 3 2	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding 2 SIDE Remarks 600# RF 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL Te ATURE S Decrating Weight / She	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over int mperature, °C Shell Tube Il Empty Weigh	19 55 ea / She ance S S	50 mm ID ell, Type shell 9 shell 1,3	Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS NOZZ NOZS Inlet CS Outlet Interme [g] Vent ide Drain RATIN	E(1) 3.0 4 C C C C C C C C	4 m Cut 124 600 No. 1	hm , La H - kg/m-s² kg/m-s² int : SHELL S	yout angle 6 23.4 % Impingemen Tube to Baff Strength V SIDE Remarks 60# RF	TW (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(O(2) 3.0 HC ngth ffective acing c/c Rods >> al Cleara Light E TUBE NPS 3 2	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding 2 SIDE Remarks 600# RF 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL Te ATURE S Decrating Weight / She	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over int mperature, °C Shell Tube Il Empty Weigh	19 55 ea / She ance S S	50 mm ID ell, Type shell 9 shell 1,3	Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS NOZZ NOZS Inlet CS Outlet Interme [g] Vent ide Drain RATIN	E(1) 3.0 4 C C C C C C C C	4 m Cut 124 600 No. 1	hm , La H - kg/m-s² kg/m-s² int : SHELL S	yout angle 6 23.4 % Impingemen Tube to Baff Strength V SIDE Remarks 60# RF	TW (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(O(2) 3.0 HC ngth ffective acing c/c Rods >> al Cleara Light E TUBE NPS 3 2	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding 2 SIDE Remarks 600# RF 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL Te ATURE S Decrating Weight / She	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over int mperature, °C Shell Tube Il Empty Weigh	19 55 ea / She ance S S	50 mm ID ell, Type shell 9 shell 1,3	Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS NOZZ NOZS Inlet CS Outlet Interme [g] Vent ide Drain RATIN	E(1) 3.0 4 C C C C C C C C	4 m Cut 124 600 No. 1	hm , La H - kg/m-s² kg/m-s² int : SHELL S	yout angle 6 23.4 % Impingemen Tube to Baff Strength V SIDE Remarks 60# RF	TW (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(O(2) 3.0 HC ngth ffective acing c/c Rods >> al Cleara Light E TUBE NPS 3 2	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding 2 SIDE Remarks 600# RF 600# RF	m m m
Min. Desig No. of Pass Corrosion A Insulation Tubes N Shell Baffles O pv2	gn Metal Terrises Ses Allowance To. 98 U's Cross Baffle Inlet Noz. Outlet Noz. Tube Shell & Cove Channel & C Tube Sheet Baffle Expansion Jo IETAL Te ATURE S Decrating Weight / She	mn mm / Shell, Size 2 + 1(S) + 3(I) 3,394 , Entr 4,819 , Exit er over int mperature, °C Shell Tube Il Empty Weigh	19 55 ea / She ance S S	50 mm ID ell, Type shell 9 shell 1,3	Tube Pite N.T.I.W 63 , Bunc 67 , Bunc CS NOZZ NOZS Inlet CS Outlet Interme [g] Vent ide Drain RATIN	E(1) 3.0 4 C C C C C C C C	4 m Cut 124 600 No. 1	hm , La H - kg/m-s² kg/m-s² int : SHELL S	yout angle 6 23.4 % Impingemen Tube to Baff Strength V SIDE Remarks 60# RF	TW (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(O(2) 3.0 HC ngth ffective acing c/c Rods >> al Cleara Light E TUBE NPS 3 2	4,000 m 3,827 m 2 1,275 m 3 Rows m ance 0.8 m xpanding 2 SIDE Remarks 600# RF 600# RF	m m m

SAMSUN	SAMSUNG ENGINEERING CO., LTD.	TU	BULAI	R HEAT	EXCH	IANGE
	SEOUL, KOREA	ı			Sheet	4 of
Customer Plant	YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS BOLIVIA YPFB FERTILIZER POJECT	REV A	MADE BY H.J.JOO	T.Y.KIM	APPROVED BY S.H.KIM	DATE Jul. 19, 2013
Job No	SC2566	В	J.Y.SHIN	T.Y.KIM	S.H.KIM	Sep. 04, 201
Location	CARRASCO, BOLIVIA					
Service	LTS START-UP HEATER					
Item No.	175-C					
	NO	TE				
0 57					NIDING NODIA	
	CHANGER IS USED FOR LTS CATALYST REDUCTION ERATION. WHEN NOT IN SERVICE, BOTH SIDES MUS				JURING NORM	AL
3. PR	OVIDE A PASS PARTITION BOX ON THE TUBE SIDE IN	ILET.				
	CLUDES U-BEND SURFACE.					
	NDLE IS NOT REMOVABLE.					
	OVIDE ONE 1"-600# RF TUBE SIDE VENT NOZZLE (T3) DIE LOCATED AT THE TOP ON OUTLET CHANNEL FL		SEE DETAIL (ON SHEET 3).		
7. U-E	BENDS TO BE IN THE VERTICAL PLANE.					
8. PR	OVIDE ONE INTERMEDIATE SUPPORT PER BAFFLE S	PACE A	ND ONE FUL	L CIRCLE SUP	PORT AT THE	U-BEND.
	% MARGIN ON SURFACE PROVIDED.					
	ELLSIDE HYDROGEN PARTIAL PRESSURE, kg/cm² (a):	INLET	= 0.5 (Max.) / (OUTLET = 0.5 (Max.)	
11. CH	ANNEL SIDE ID IS 570 mm					

TUBULAR HEAT EXCHANGER SAMSUNG ENGINEERING CO., LTD. SEOUL, KOREA YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS REV CHECKED BY APPROVED BY DATE MADE BY Customer **BOLIVIA YPFB FERTILIZER POJECT** H.J.J00 T.Y.KIM S.H.KIM Jul. 19, 2013 Α Plant Job No В J.Y.SHIN T.Y.KIM S.H.KIM Sep. 04, 2013 CARRASCO, BOLIVIA Location LTS START-UP HEATER Service 175-C Item No.

ARRANGEMENT



Detail of Baffles and Supports									
S#1	I#1	#1	#2	I#2, I#3					
	184.2 146.1	146.1	45. 1.0. 1.0. 1.0. 1.0. 1.0. 1.0. 1.0. 1.	146.1					

56	NOZZLE			SHEL	L SIDE			TUB	E SIDE	Remarks
57	NOZZEE	Tag	No.	NPS	Remarks	Tag	No.	NPS	Remarks	
58	Inlet	S1	1	12	150# RF	T1	1	3	600# RF	
59	Outlet	S2	1	12	150# RF	T2	1	2	600# RF	
60	Intermed.									
61	Vent					T3	1	1	600# RF	
62	Drain									
63	Manway									
64										
65										
66										
67										
68										
69	RATING									

