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Project: Ferrier Central Process Facility  
 Location: LSD: 11-02-039-06WM5  
 TDE Reference: DFR-12-118  
 Client: Devon Canada c/o Worley Parsons  
 Tag: 003-E-05-3010 / 003-E-05-3011

TDE / DEVON

Ferrier Central Process Facility

Data Sheet for Brazed Aluminum Heat Exchanger

Purchase Order No. : 047631

R4													
R3													
R2													
R1	As-Built	11/19	K.Nishie	11/19	<i>[Signature]</i>	-	-	11/19	<i>[Signature]</i>	-	-		
R0	Issued	2013 4/16	K.Nishie	4/17	<i>[Signature]</i>	-	-	4/17	<i>[Signature]</i>	-	-		
REV NO.	REVISION NOTE	PREPARED	CHECKED	APPROVED	APPROVED	ENGINEERING				QA			
PDM LINK		CAREER			O.NO.	12-64171-C							
CAD					S.NO. (DOC.NO.)	49S8484							
ISSUED BY	Engineering Section 技術室	 			T.NO.	B258247	REV.	R1					
SECT. COD	73C												

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A0 :                      A1 :                      A2 :                      A3 :                      A4 : 4                      TOTAL : 4                      SHEET

## HEAT EXCHANGER SPECIFICATION

PROJECT : Devon Canada/ Ferrier Central Processing      LOCATION : Rocky Mountain      DATE:      BY:  
 SERVICE : Inlet/Residue Gas Exchanger      ITEM.NO. : 003-E-05-3010      CASE: Recovery

PASS		A		B		C				
FLUID NAME	-	202/203		218/219		224/225				
FLOW RATE TOTAL	kg/h	56,946.0		24424.3		69,109.6				
VAP./LIQ. IN	kg/h	56,946.0	-	24,410.7	13.6	69,109.6	-			
VAP./LIQ. OUT	kg/h	55,301.2	1,644.8	-	24,424.3	69,109.6	-			
FLUID VAPORIZED(+)/CONDENSED(-)	kg/h	-1,644.8		-24,410.7		-				
MOL. WEIGHT VAP. IN / OUT	—	-	-	-	-	-	-			
LIQ. IN / OUT	—	-	-	-	-	-	-			
DENSITY VAP. IN / OUT	kg/m3	54.6	85.7	86.8	-	21.4	34.5			
LIQ. IN / OUT	kg/m3	-	426.3	420.7	392.0	-	-			
VISCOSITY VAP. IN / OUT	cP	0.0135	0.0127	0.0127	-	0.0074	0.0119			
LIQ. IN / OUT	cP	-	0.0770	0.0746	0.0601	-	-			
SPECIFIC HEAT VAP. IN / OUT	kJ/kg° C	2.571	3.437	3.517	-	2.464	2.277			
LIQ. IN / OUT	kJ/kg° C	-	3.040	3.090	3.560	-	-			
THERMAL COND. VAP. IN / OUT	W/mK	0.0390	0.0348	0.0348	-	0.0190	0.0356			
LIQ. IN / OUT	W/mK	-	0.0920	0.0921	0.1050	-	-			
TEMPERATURE IN / OUT	°C	42.54	-18.89	-21.61	-96.40	-98.06	34.46			
OPERATING PRESSURE (INLET)	barA	61.77		61.54		15.17				
PRESS. DROP. CAL. / ALLOW	bar	0.07	0.2068	0.01	0.2068	0.12	0.2068			
HEAT TRANSFERRED	kW	2826		2933		5759				
M.T.D. CORRECTED										
FOULING RESISTANCE	°Cm <sup>2</sup> /W	0.0001		0.0001		0.0001				
DESIGN TEMPERATURE MAX./MIN.	°C	65.0	-128.0	65.0	-128.0	65.0	-128.0			
DESIGN PRESSURE	MPaG	7.55		7.55		3.275				
TEST PRESS. HYDRO./PNEUM.	MPaG	9.815	/ -	9.815	/ -	4.258	/ -			

### ALEX<sup>®</sup> SPECIFICATION

NO. CORES: 1    IN PARALLEL: 1    IN SERIES: 1      NO. ASSEMBLIES: 1      NO. CORES/ASSEMBLY: 1      TYPE: VERTICAL  
 CORE SPECS:    WIDTH: 1200 mm    HEIGHT: 1232.1 mm    LENGTH: 4550 mm      NO. PASSAGES: 135    NO. DUMMY LAYERS: 2  
 PARTING SHEET THICKNESS: 1.8 mm    OUTSIDE SHEET THICKNESS: 5 mm      APPROX. CORE WEIGHT: 10,200 kg

NO. PASSAGES	—	67		67		68				
FIN TYPE	—	47PF14050A		47SR12040		95PF14030A	95SR13030			
EFFECTIVE PASSAGE WIDTH	mm	1127		1127		1127				
EFFECTIVE PASSAGE LENGTH	mm	2100		1260		3820				
HEAT TRANSFER AREA/CORE	m <sup>2</sup>	1107.7		808.7		3984.1				
FREE FLOW AREA/CORE	m <sup>2</sup>	0.2039		0.2165		0.5540	0.5423			
HEADER SIZE IN / OUT	mm I.D.	450	450	300	200	450	450			
NOZZLE SIZE IN / OUT	NPS	14"	14"	8"	6"	16"	16"			
FLANGE RATING		600LB WNRF		600LB WNRF		300LB WNRF				

**STACKING ARRANGEMENT:**

REMARKS:    1. The Exchanger was designed for 100% flow and duty with 10% excess surface.  
 2. For outlet physical properties, the values at 1st pressure are indicated.

## HEAT EXCHANGER SPECIFICATION

PROJECT : Devon Canada/ Ferrier Central Processing      LOCATION : Rocky Mountain      DATE:      BY:  
 SERVICE : Inlet/Residue Gas Exchanger      ITEM.NO. : 003-E-05-3010      CASE: Rejection

PASS		A		B		C			
FLUID NAME	-	202/203		218/219		224/225			
FLOW RATE TOTAL	kg/h	94,909.8		33,218.4		83,454.0			
VAP./LIQ. IN	kg/h	94,909.8	-	33,218.4	-	83,454.0	-		
VAP./LIQ. OUT	kg/h	94,909.8	-	7,025.6	26,192.9	83,454.0	-		
FLUID VAPORIZED(+)/CONDENSED(-)	kg/h	-		-26,192.9		-			
MOL. WEIGHT VAP. IN / OUT	—	-	-	-	-	-	-		
LIQ. IN / OUT	—	-	-	-	-	-	-		
DENSITY VAP. IN / OUT	kg/m3	54.6	68.9	68.6	132.1	19.1	11.0		
LIQ. IN / OUT	kg/m3	-	-	-	296.1	-	-		
VISCOSITY VAP. IN / OUT	cP	0.0135	0.0129	0.0128	0.0140	0.0083	0.0120		
LIQ. IN / OUT	cP	-	-	-	0.0348	-	-		
SPECIFIC HEAT VAP. IN / OUT	kJ/kg° C	2.571	2.827	2.824	8.490	2.215	2.215		
LIQ. IN / OUT	kJ/kg° C	-	-	-	5.479	-	-		
THERMAL COND. VAP. IN / OUT	W/mK	0.0390	0.0357	0.0357	0.0414	0.0210	0.0349		
LIQ. IN / OUT	W/mK	-	-	-	0.0819	-	-		
TEMPERATURE IN / OUT	°C	42.54	5.88	5.79	-56.80	-71.10	40.07		
OPERATING PRESSURE (INLET)	barA								
PRESS. DROP. CAL. / ALLOW	bar	0.202	0.2068	0.08	0.2068	0.17	0.2068		
HEAT TRANSFERRED	kW	2575		3006		5581			
M.T.D. CORRECTED									
FOULING RESISTANCE	°Cm <sup>2</sup> /W	0.0001		0.0001		0.0001			
DESIGN TEMPERATURE MAX./MIN.	°C	65.0	-128.0	65.0	-128.0	65.0	-128.0		
DESIGN PRESSURE	MPaG	7.55		7.55		3.275			
TEST PRESS. HYDRO./PNEUM.	MPaG	9.815	/ -	9.815	/ -	4.258	/ -		

## ALEX<sup>®</sup> SPECIFICATION

NO. CORES: 1    IN PARALLEL: 1    IN SERIES:1      NO. ASSEMBLIES: 1      NO. CORES/ASSEMBLY: 1      TYPE: VERTICAL  
 CORE SPECS:    WIDTH: 1200 mm    HEIGHT: 1232.1 mm    LENGTH: 4550 mm      NO. PASSAGES: 135    NO. DUMMY LAYERS: 2  
 PARTING SHEET THICKNESS: 1.8 mm    OUTSIDE SHEET THICKNESS: 5 mm      APPROX. CORE WEIGHT:    10,200 kg

NO. PASSAGES	—	67		67		68			
FIN TYPE	—	47PF14050A		47SR12040		95PF14030A	95SR13030		
EFFECTIVE PASSAGE WIDTH	mm	1127		1127		1127			
EFFECTIVE PASSAGE LENGTH	mm	2100		1260		3820			
HEAT TRANSFER AREA/CORE	m <sup>2</sup>	1107.7		808.7		3984.1			
FREE FLOW AREA/CORE	m <sup>2</sup>	0.2039		0.2165		0.5540	0.5423		
HEADER SIZE IN / OUT	mm I.D.	450	450	300	200	450	450		
NOZZLE SIZE IN / OUT	NPS	14"	14"	8"	6"	16"	16"		
FLANGE RATING		600LB WNRF		600LB WNRF		300LB WNRF			

STACKING ARRANGEMENT:  
 REMARKS:    1. The Exchanger was designed for 100% flow and duty with 10% excess surface.  
                   2. For outlet physical properties, the values at 1st pressure are indicated.

## HEAT EXCHANGER SPECIFICATION

PROJECT : Devon Canada/ Ferrier Central Processing      LOCATION : Rocky Mountain      DATE:      BY:  
 SERVICE : Demethanizer Reboiler      ITEM.NO. : 003-E-05-3011      CASE: Recovery

PASS		A		B		C		D	
FLUID NAME	-	205/206		237/238		241/242		251/252	
FLOW RATE TOTAL	kg/h	37,964.0		33,524.9		34,795.9		25,819.6	
VAP./LIQ. IN	kg/h	37,964.0	-	-	33,524.9	-	34,795.9	-	25,819.6
VAP./LIQ. OUT	kg/h	35,021.8	2,942.2	3,013.2	30,511.7	8,740.4	26,055.4	-	25,819.6
FLUID VAPORIZED(+)/CONDENSED(-)	kg/h	-2,942.2		3,013.2		8,740.4		-	
MOL. WEIGHT VAP. IN / OUT	—	-	-	-	-	-	-	-	-
LIQ. IN / OUT	—	-	-	-	-	-	-	-	-
DENSITY VAP. IN / OUT	kg/m <sup>3</sup>	54.7	89.8	-	23.0	-	28.8	-	-
LIQ. IN / OUT	kg/m <sup>3</sup>	-	410.9	533.0	519.6	498.3	490.2	492.9	447.9
VISCOSITY VAP. IN / OUT	cP	0.0135	0.0127	-	0.0093	-	0.0094	-	-
LIQ. IN / OUT	cP	-	0.0707	0.1282	0.1155	0.0977	0.0958	0.095	0.074
SPECIFIC HEAT VAP. IN / OUT	kJ/kg° C	2.572	3.685	-	1.925	-	1.864	-	-
LIQ. IN / OUT	kJ/kg° C	-	3.176	2.477	2.582	2.817	2.865	2.786	3.277
THERMAL COND VAP. IN / OUT	W/mK	0.0390	0.0350	-	0.0215	-	0.0198	-	-
LIQ. IN / OUT	W/mK	-	0.0920	0.1214	0.1147	0.1027	0.0977	0.0962	0.0794
TEMPERATURE IN / OUT	°C	42.60	-25.37	-53.52	-36.09	-12.47	-3.94	-1.77	21.11
OPERATING PRESSURE (INLET)	barA	61.89		16.12		15.74		37.90	
PRESS. DROP. CAL. / ALLOW	bar	0.17	0.2068	0.07	0.2068	0.10	0.1034	0.04	0.3447
HEAT TRANSFERRED	kW	2204		683.7		1027		492.7	
M.T.D. CORRECTED									
FOULING RESISTANCE	°Cm <sup>2</sup> /W	0.0001		0.0001		0.0001		0.0001	
DESIGN TEMPERATURE MAX./MIN.	°C	65.0	-128.0	65.0	-128.0	65.0	-128.0	65.0	-45.0
DESIGN PRESSURE	MPaG	7.55		3.275		3.275		4.138	
TEST PRESS. HYDRO./PNEUM.	MPaG	9.815	/ -	4.258	/ -	4.258	/ -	5.38	/ -

## ALEX<sup>®</sup> SPECIFICATION

NO. CORES: 1	IN PARALLEL: 1	IN SERIES: 1	NO. ASSEMBLIES: 1	NO. CORES/ASSEMBLY: 1	TYPE: VERTICAL
CORE SPECS: WIDTH: 500 mm    HEIGHT: 580.3 mm    LENGTH: 2940 mm			NO. PASSAGES: 75    NO. DUMMY LAYERS: 2		
PARTING SHEET THICKNESS: 1.8 mm			OUTSIDE SHEET THICKNESS: 5 mm		
			APPROX. CORE WEIGHT: 1,800 kg		
NO. PASSAGES	—	37	38	38	38
FIN TYPE	—	47PF14050A	64SR13030	64PF14030A	64SR13030
EFFECTIVE PASSAGE WIDTH	mm	463	463	463	463
EFFECTIVE PASSAGE LENGTH	mm	2480	360	1380	220
HEAT TRANSFER AREA/CORE	m <sup>2</sup>	276.9	69.2	239.2	42.3
FREE FLOW AREA/CORE	m <sup>2</sup>	0.0463	0.0826	0.0843	0.0826
HEADER SIZE IN / OUT	mm I.D.	350    300	200    200	200    300	250    200
NOZZLE SIZE IN / OUT	NPS	10"    8"	6"    6"	6"    8"	6"    6"
FLANGE RATING		600LB WNRF	300LB WNRF	300LB WNRF	300LB WNRF

STACKING ARRANGEMENT:

REMARKS: 1. The Exchanger was designed for 100% flow and duty with 10% excess surface.  
 2. For outlet physical properties, the values at 1st pressure are indicated.