

109051

FORM U-1 MANUFACTURER'S CERTIFICATE OF COMPLIANCE
COVERING PRESSURE VESSELS TO BE STAMPED WITH THE U.S. SYMBOL. SEE U-1(i)
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by Alfa Laval Inc., 5400 International Trade Dr., Richmond VA 23231
(Name and address of Manufacturer)

2. Manufactured for DDCE, 500 Park Blvd Ste 545, Itasca, IL, 601431267 USA
(Name and address of Purchaser)

3. Location of Installation DDCE, 200 Industrial Drive, Vonore, TN, 37885, USA
(Name and address)

4. Type Vertical Plate Heat Exchanger 0.15 Cu. ft 30111-98811
(Horiz., vert., or sphere) (Tank, separator, etc.) (Capacity, all chambers) (Mfg's serial No.)
30111-98811.0 2009
(CRN) (Drawing No.) (Year Built)

5. ASME Code, Section VIII, Div. 1 2007 A08 Code Case No. _____
Edition Addenda (date)

6. Shell (a) No. of course(s): _____ (b) Overall length (ft + in.): _____

Course(s)	Material	Thickness	Long Joint (Cat. A)			Circum. Joint (Cat. A, B + C)			Heat Treatment				
			No.	Diameter, in.	Length, ft. + in.	Spec./Grade or Type	Nom.	Corr.	Type	Full, Spot, None	Eff.	Temp.	Time

7. Heads: (a) SA-516-70 (b) SA-516-70
(Mat'l Spec. No., Grade or Type) H.T. - Time + Temp

Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Radius Side to Pressure		Category A			
	Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.	
(a) Fixed	1 3/16"	0"						26" X 16"						
(b) Movable	1"	0"						26" X 16"						

If removable, bolts used (describe other fastening) SA193-B7 (6) 0.787" (M20 actual) BOLTS
(Mat'l Spec. No., Grade, Size, No.)

8. Type of Jacket _____ Jacket Closure _____
(Describe as ogee + weld, bar, etc.)
If bar, give dimensions, if bolted describe or sketch _____

9. MAWP 145 psi at max. temp. 356 ° F Min. design metal temp. -20 ° F at 145 psi
(internal) (external) (internal) (external)

10. Impact Test NO (Impact Exemption UCS-66(a), (b), UHA-51, UNF-65, as applicable)
(Indicate yes or no and the component(s) impact tested)

11. Hydro., pneu., or comb. test press. 189 Hydro Proof test _____

12. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp. Open)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
Inlet	2	3"	STUDS	SA193-B7		5/8"					
Outlet	2	3"	STUDS	SA193-B7		5/8"					

13. Supports: Skirt _____ Lugs _____ Legs _____ Others FEET Attached BOLTED
(Yes or no) (No.) (No.) (Describe) (Where and how)

14. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items: (part name, part no., mfg's. name and id no.) _____

15. Remarks (13) SA-240-316 .024" Plates Maximum Distance between Heads = 1.85"
Customer PO #: DDCE11-0068 Tag #: E3100 Owner to supply Safety Valve/Noncorrosive Service Only

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

UM Certificate of Authorization No. 25,018 Expires July 5, 2010
Date 9/1/09 Name Alfa Laval, Inc. (Manufacturer)
Signed Harold Melvin (Representative)
Signed Harold Melvin (Certified Individual)

**Alfa Laval, Plate Heat Exchanger
Channel Plate Installation Description**

2009-07-06

Customer: Dupont Danisco Cellulosic Eth SU Order No: 25670-30
 Model : TS6-MFG Serial No: 30111-98811
 Customer PO: DDCE11-0068 Tag: E3100

Plate material and Thickness: ALLOY 316 0.60 mm

A Dimension: 47 mm

	Hot side	Cold side
Grouping:	1*4H	1*5H
Sealing material:	EPDMP CLIP-ON	EPDMP CLIP-ON
Port Locations:	S4 -> S3	S2 -> S1

Connection material: Stainless steel Stainless steel

Port hole with flow on the gasketed side: U

Port hole sealed with O-ring: O

Plates are assembled with the gasket side facing the frame plate.

Plate no.	Plate code no.	Plate Pattern		Punched corner of the plate				Flow direction on the gasket side of the plate
				upper left	lower left	lower right	upper right	
				S1	S2	S3	S4	
				==<=	==>=	=>=	=<=	
		FRAME PLATE		O	O	O	O	
1	39505285 83	TS6 M2	A	O	O	O	O	
2	39505285 03	TS6 M2	B	U --<---	U	O	O	Up
3	39505285 03	TS6 M2	A	O	O	U --<---	U	Down
4	39505285 03	TS6 M2	B	U --<---	U	O	O	Up
5	39505285 03	TS6 M2	A	O	O	U --<---	U	Down
6	39505285 03	TS6 M2	B	U --<---	U	O	O	Up
7	39505285 03	TS6 M2	A	O	O	U --<---	U	Down
8	39505285 03	TS6 M2	B	U --<---	U	O	O	Up
9	39505285 03	TS6 M2	A	O	O	U --<---	U	Down
10	39505285 76	TS6 M2	B	--<---				Up
		PRESSURE PLATE		T1	T2	T3	T4	

Article No:	Quantity:
1640917 01	1
39505285 83	1
39505285 03	8
39505285 76	1

HEAT EXCHANGER DATA SHEET

Date/ Author/ Revision

March 28, 2009 KL

Rev. 0

Vendor shall provide information for cells marked with yellow color

Application:	Media preparation tank jacket heater		
Tag:	3101-W02		
PID	W300		
Heat transfer duties:	Heating water loop, which is circulating in a tank jacket. This tank is used to prepare nutrient solutions for ethanol fermentations. Design case for process tank:		
	Batch total volume	5,7 m ³	1 513 gallons
	Initial fluid temperature	33,0 °C	91 °F
	Target temperature	70,0 °C	158 °F
	Target max. heating time	1,0 hrs/ batch	
Equipment type	Plate heat exchanger		
Manufacturer, model:			
Vendors documentation (spec):			
Fluid	Stream 1	Stream 2	
Fluid	Tempered water (cooling tower water)		3 bar(g) steam
Main components	water		steam
Density, inlet	999 kg/m ³	2,17 kg/m ³	(steam)
Density, outlet	999 kg/m ³	2,17 kg/m ³	(steam)
Specific Heat Capacity, inlet	4,19 kJ/(kg K)	2,26 kJ/(kg K)	
Specific Heat Capacity, outlet	4,19 kJ/(kg K)	2,26 kJ/(kg K)	
Thermal Conductivity, Inlet	0,58 W/(m K)	0,03 W/(m K)	
Thermal Conductivity, Outlet	0,58 W/(m K)	0,03 W/(m K)	
Inlet viscosity	1 cP	0,0138 cP	
Outlet viscosity	1 cP	0,0138 cP	
Rheology	Newtonian		
Total solids	NA		
Suspended solids	NA		
Remarks			
1.			
2.			
Flow, design	15 m ³ /h	66 GPM	
			m ³ /h GPM
			kg/h lbs/h
Flow, calculated, average			196 m ³ /h 865 GPM
			426 kg/h 940 lbs/h
Heat load per batch	909,1 MJ		
Heating time per batch	1,0 hours		
Inlet Temperature, design	°C	32 °F	144,0 °C 291 °F
Outlet Temperature, design (=max)	90,0 °C	194 °F	°C °F
Max Pressure drop allowed	50,0 kPa	7,3 psi	50,0 kPa 7,3 psi
Pressure drop calculated	kPa	psi	kPa psi
Load, calculated (average)	253 kW	239 BTU/s	
Load, calculated (peak)	kW	BTU/s	
Heat transfer area	m ²	ft ²	
Number of plates			
Design (Duty) HTC	W/°C m ²		W/°C m ²
Clean HTC	W/°C m ²		W/°C m ²
% Difference in HTC	10 %		
Fouling factor, specified	°C m ² / kW		°C m ² / kW
Fluid volume	liters		liters
Remarks:			
1.	Heating water flow is determined by loop pump sizing. It's assumed to give max. 15 m ³ /h flow (negotiable)		
2.			
General design	Industrial design		
Materials:			
- Frame:	Industrial, painted carbon steel		
- Connections	Stainless steel		
- Plate:	AISI 316 Stainless Steel		
- Gaskets	EPDM, clip type or welded design		
Plate thickness, minimum	0,5 mm		
Extension capability (additional plates), required	30 %		
Overall dimensions (L x W x H):			
Net weight, empty			
Connections, hot side:	ANSI Flange, AISI 316L material		
Connections, cold side:	ANSI Flange, AISI 316L material		
Design temperature, max	180 °C	356 °F	
Max. operating temperature	150 °C	302 °F	
Design pressure, bar(g)	10 bar(g)	145 psig	
Test pressure, bar(g)	14,9 bar(g)	216 psig	

Other requirements

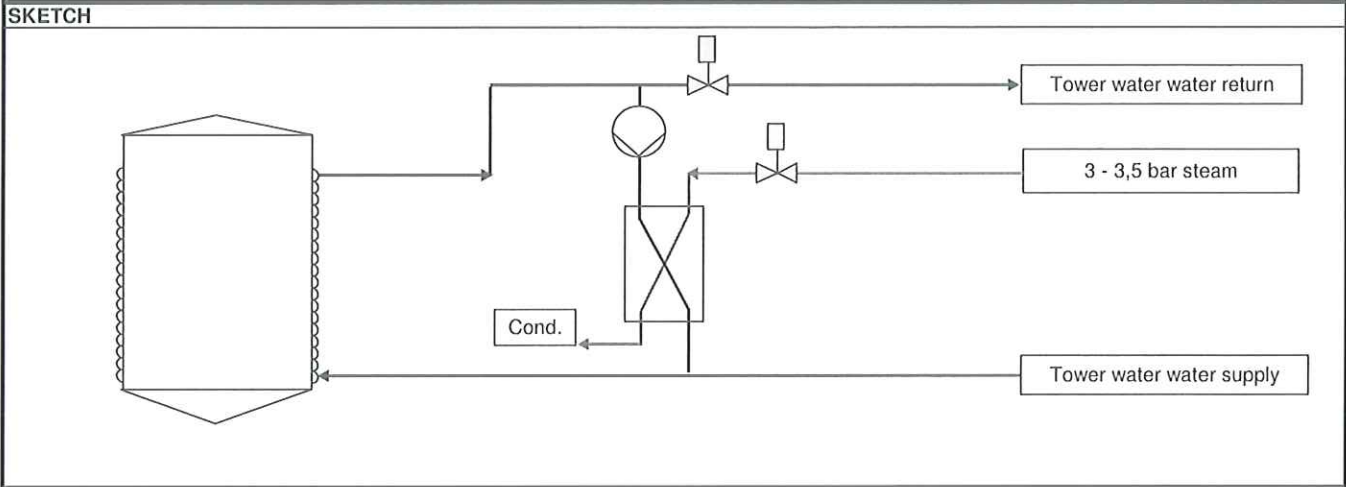
- 1.
- 2.

Remarks:

1. This heat exchanger is to be designed and fabricated according to ASME code and all required code stamps obtained
- 2.

Documentation:

1. There is a separate document defining the documentation requirements



SUPPLIER	REF.	ITEM NO.
AGENT / REF. / 737371	25670-30	E3100
CUSTOMER NAME / REF. NO. Dupont Danisco Cellulosic Ethanol / DDCE11-0068		
SIGN.	CFN	RISK CATEGORY N/A

PLATE HEAT EXCHANGER

TS6-MFG

ASME

DATE	SERIAL NO.
2009-07-06	30111-98811
REV NO.	
0	

REMARKS:

DESIGN PRESSURE	145 psi	SIDE1	145 psi	SIDE2	145 psi
TEST PRESSURE	188.5 psi		188.5 psi		188.5 psi
MAX TEMPERATURE	356 °F		356 °F		356 °F
MIN TEMPERATURE	32 °F		32 °F		32 °F
MAWP	145 psi		145 psi		145 psi
MDMT	-20 °F				

GASKET
EPDMP CLIP-ON

PLATE MATERIAL
ALLOY 316

PLATE THICKNESS
0.60 mm

HEATING SURFACE
7.4 ft²

PLATE GROUPING
1*4H/1*5H

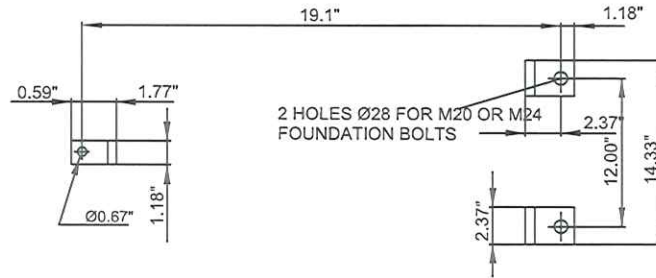
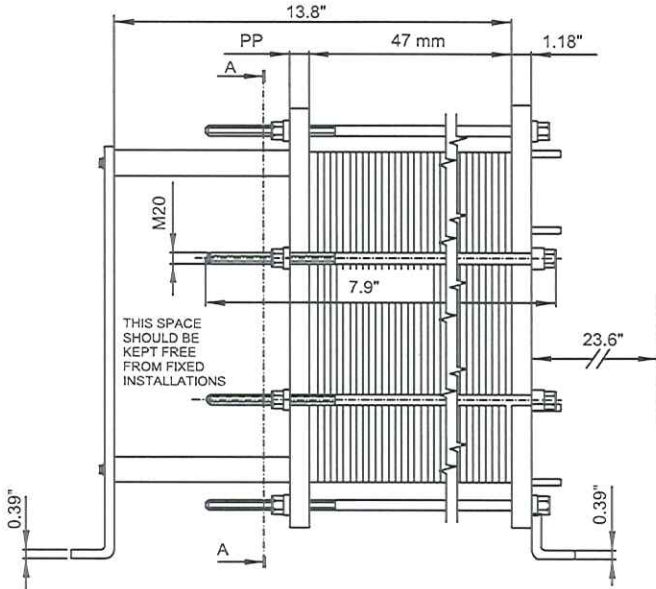
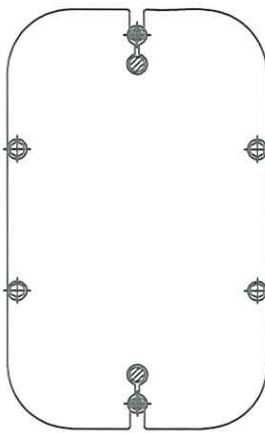
WEIGHT WITH WATER
280 lb

NETWEIGHT
275 lb

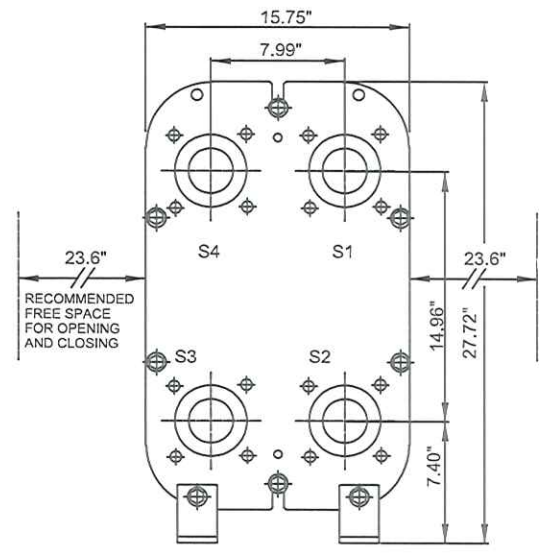
ALL DIMENSIONS IN INCHES

SIDE	MEDIA	INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRESSURE DROP	LIQUID VOL.
1	Steam	S4	290.8 °F	S3	290.8 °F	1346 lb/h	1.480 psi	0.07 ft ³
2	Water	S2	91.0 °F	S1	131.5 °F	30530 lb/h	3.638 psi	0.09 ft ³

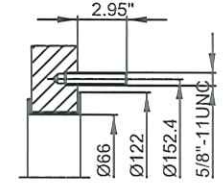
PRESSURE PLATE
(MOVABLE)
SECTION A-A
PP=25



FRAME PLATE
(FIXED)



ASME 150 SHEET LINING
SS



TOTAL LENGTH	20.9"
TOTAL WIDTH	15.8"
TOTAL HEIGHT	27.7"