FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by ALFA LAVAL VICARB, 1 rue du Rif Tronchard , 38120 Le Fontanil Cornillon , FRANCE
(Name and address of Manufacturer)
2. Manufactured for TATE&LYLE SINGAPORE, PTE, 168, Sakra Place, Jurong Island 627811, Singapore
(Name and address of Purchaser)
3. Location of installation TATE&LYLE SINGAPORE, PTE, 168, Sakra Place, Jurong Island 627811, Singapore
(Name and address)
4. type: VERTICAL (Horiz., vert., or sphere) | Welded plate type heat exchanger (Tank, separator, jkt. Vessel, heat exh., etc.) | CP30 – 6325 (Mfg's. serial No.)
N.A. (CRN) | DWG-CP13-12485-01 Rev 00 (Drawing No.) | 1180 (Nat'l. Bd. No.) | 2013 (Year built)
5. ASME Code, Section VIII, Div. 1 2010 Add 2011.a [Edition and Addenda (date)] | N.A. (Code Case No.) | No [Special Service per UG-120(d)]

Items 6-11 incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multichamber vessels.

6. Shell (a) No. of course(s): One (b) Overall length (ft & in): 32.992 in See form U4

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.	Type	Full, spot, None	Eff.	Temp.	Time
1	15.472x15.472	32.992"	SA516 gr 60	See	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
				Form									
				U4									

7. Heads: (a) SA516 gr 60 (Mat'l Spec. No., Grade or Type) (H.T. – Time & Temp.) (b) SA516 gr 60 (Mat'l Spec. No., Grade or Type) (H.T. – Time & Temp.)
See Form U4

	Location (top, Bottom, Ends)	Thickness Min..	Thickness Corr.	Radius Crown	Radius Knuckle	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure Convex	Side to Pressure Concave	Category A Type	Category A Full, Spot, None	Category A Eff.
(a)	TOP	1.890"	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	15.811x 15.811"	N.A.	N.A.	N.A	N.A.	N.A.
(b)	BOTTOM	1.890"	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	15.811x 15.811"	N.A.	N.A.	N.A.	N.A.	N.A.

If removable, bolts used (describe other fastening) N.A. (Mat'l Spec. No., Grade, size, No.)

8. Type of jacket N.A. Jacket closure N.A. (Describe as ogee & weld, bar, etc.)
If bar, give dimensions N.A. If bolted, describe or sketch.
9. MAWP 150 (Internal) 15 (external) psi at max. temp. 350.6 (internal) 350.6 (external) °F Min.design metal temp. -20.2 °F at 150 psi.
10. Impact test No (exemption according to UCS 66 and UHA 51) (Indicate yes or no and the component(s) impact tested) at test temperature of See Form U4 °F.
11. Hydro., ~~pneu., or comb.~~ test pressure 195 psi Proof test See Form U4

Items 12 and 13 to be completed for tube sections. See Form U4

12. Tubesheet: N.A. [Stationary (Mat'l Spec. No.)] | N.A. [Dia., in. (subject to pressure)] | N.A. (Nom. Thk., in.) | N.A. (corr. Allow., in.) | N.A. [Attachment (welded or bolted)]
N.A. [Floating (Mat'l Spec. No.)] | N.A. (Dia., in.) | N.A. (Nom. Thk., in.) | N.A. (corr. Allow., in.) | N.A. (Attachment)
13. Tubes: N.A. (Mat'l Spec. No., Grade or Type) | N.A. (O.D., in.) | N.A. (Nom. Thk., in. or gauge) | N.A. (Number) | N.A. [Type (Straight or U)]

Items 14-18 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers. See Form U4

14. Shell (a) No. of course(s) N.A .(b) Overall length (ft & in): N.A.

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.	Type	Full, spot, None	Eff.	Temp.	Time
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

15. Heads: (a) N.A. (Mat'l Spec. No., Grade or Type) (H.T. – Time & Temp.) (b) N.A. (Mat'l Spec. No., Grade or Type) (H.T. – Time & Temp.)

	Location (top, Bottom, Ends)	Thickness Min..	Thickness Corr.	Radius Crown	Radius Knuckle	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure Convex	Side to Pressure Concave	Category A Type	Category A Full, Spot, None	Category A Eff.
(a)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A	N.A.	N.A.
(b)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

If removable, bolts used (describe other fastening) N.A. (Mat'l Spec. No., Grade, size, No.)

FORM U-1 (Back)

16. MAWP N.A. (internal) N.A. (external) psi at max. temp. N.A. (internal) N.A. (external) °F Min.design metal temp. N.A. °F at N.A. psi

17. Impact test N.A. [Indicate yes or no and the component(s) impact tested] at test temperature of N.A. °F.

18. Hydro., pneu., or comb. Test press. N.A. Proof test N.A.

19. 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 "A1"	**1**	**2"**	**Cl150-WN**	**SA312**	**SA182**	**SCH40S**	**No**	**N.A.**	**Uw 16.1 (j)**	**C (*)**	**N.A.**
Outlet "A2"	**1**	**2"**	**Cl150-WN**	**TP316L**	**F316L**	**SCH40S**	**No**	**N.A.**	**Uw 16.1 (j)**	**C (*)**	**N.A.**
Inlet "B1"	**1**	**2"**	**Cl150-WN**	**SA312**	**SA182**	**SCH40S**	**No**	**N.A.**	**Uw 16.1 (j)**	**C (*)**	**N.A.**
Outlet "B2"	**1**	**2"**	**Cl150-WN**	**TP316L**	**F316L**	**SCH40S**	**No**	**N.A.**	**Uw 16.1 (j)**	**C (*)**	**N.A.**

20. Support: Skirt No (Yes or no) Lugs No (No.) Legs No (No.) Others 1 angle pads frame (Describe) Attached bolted to heads (a) (Where and how)

21. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: (List the name of part, item number, mfg's. name and identifying number)

N.A.

22. Remarks: SEE FORM U4 (*) Category C butt weld none radiographied, joint efficiency 0.7

Inspection openings provided by removable side panels.

Safety devices per UG 125 not supplied by ALFA LAVAL VICARB

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements 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.

U Certificate of Authorization No. 22,112 Expires August 27 , 2014

Date Oct 11, 2013 Name ALFA LAVAL VICARB LE FONTANIL CORNILLON (Manufacturer) Signed **Q.C.M. René CONSONNI** (Representative)

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of / and employed by **OneCIS Insurance Company** of **LYNN MA** have inspected the pressure vessel described in this Manufacturer's Data Report on Oct 11, 2013 , and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date Oct 11 2013 Signed Benoit ELDRIDGE (Authorized Inspector) Commissions National board 14540 A (Nat'l Board incl. endorsements, State, Province, and No.)

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms with the requirements of ASME Code, section VIII, division 1. U Certificate of Authorization No. _____ Expires _____

Date _____ Name _____ (Assembler) Signed _____ (Representative)

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of _____ and employed by _____ of _____ , have compared the statements in this Manufacturer's Data Report with the described pressure vessel and state that parts referred to as data items _____ , not included in the certificate of shop inspection, have been inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel in accordance with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of _____ psi. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date _____ Signed _____ (Authorized Inspector) Commissions _____ (Nat'l Board incl. endorsements, State, Province, and No.)

2/3

FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by ALFA LAVAL VICARB, 1 rue du Rif Tronchard , 38120 Le Fontanil Cornillon , FRANCE
(Name and address of Manufacturer)

2. Manufactured for TATE&LYLE SINGAPORE, PTE, 168, Sakra Place, Jurong Island 627811, Singapore
(Name and address of Purchaser)

3. Location of installation TATE&LYLE SINGAPORE, PTE, 168, Sakra Place, Jurong Island 627811, Singapore
(Name and address)

4. type: VERTICAL (Horiz., vert., or sphere) | Welded plate type heat exchanger (Tank, separator, heat exch., etc.) | CP30 – 6325 (Mfg's. serial No.)

N.A. (CRN)	DWG- CP13-12485-01 Rev 00 (Drawing No.)	**1180** (Nat'l. Bd. No.)	2013 (Year built)

Data Report Item Number	Remarks
ITEM 4/6 (TYPE / SHELL	COMPABLOC welded plate type heat exchanger composed of a non Code pack of welded square exchange plates enclosed in a bolted Code symbol stamped rectangular shell with encased carbon steel square flat heads. The rectangular shell is constituted by 4 shell side panels (in carbon steel SA516 gr 60) bolted on 4 longitudinal girders and the 2 square flat heads. Nominal thickness for side panels chanel A : Inlet = 2.3622 inch - Outlet = 2.3622 inch Nominal thickness for side panels chanel B : Inlet = 2.3622 inch - Outlet = 2.3622 inch Minimum thickness for side panels chanel A : Inlet = 1.9685 inch - Outlet = 1.9685 inch Minimum thickness for side panels chanel B : Inlet = 1.9685 inch - Outlet = 1.9685 inch - Side panel bolting : SA 193 gr B7 / SA 194 gr 7 - size 0.7874 in. diameter (metric thread M20) total number : 96.
ITEM 7 (HEADS)	Concern top and bottom carbon steel square flat heads encased and bolted at the end of the shell side panels Minimum thickness = 1.890 inch - Nominal thickness = 1.9685 inch
ITEM 9 (PARAMETERS)	Parameters are same for Chanel A and B .
ITEM 11 (TEST PRESSURE)	Hydro test pressure in the completed assembled condition, in vertical position. Both sides of Code symbol stamped rectangular shell are hydrotest simultaneously: Heat exchange pack being considered as a non code part.

Certificate of Authorization: Type U No. 22,112 Expires August 27 , 2014

Date Oct 11, 2013 Name ALFA LAVAL VICARB LE FONTANIL CORNILLON (Manufacturer) Signed Q.C.M. René CONSONNI (Representative)

Date Oct 11, 2013 Name Benoit ELDRIDGE (Authorized Inspector) Commission National board 14540 A (Nat'l Board incl. endorsement, State, Province and No.)

3/3

FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

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(Name and address of Manufacturer)

2. Manufactured for TATE&LYLE SINGAPORE, PTE, 168, Sakra Place, Jurong Island 627811, Singapore
(Name and address of Purchaser)

3. Location of installation TATE&LYLE SINGAPORE, PTE, 168, Sakra Place, Jurong Island 627811, Singapore
(Name and address)

4. type: VERTICAL (Horiz., vert., or sphere) | Welded plate type heat exchanger (Tank, separator, heat exch., etc.) | CP30 – 6325 (Mfg's. serial No.)

N.A. (CRN) | DWG- CP13-12485-01 Rev 00 (Drawing No.) | **1180** (Nat'l. Bd. No.) | 2013 (Year built)

Data Report Item Number	Remarks
ITEM 22 (REMARKS)	Mechanical design and calculation checked by proof test RGE - CP - 90 322 as per ASME VIII Div.1 UG 101 (o).
	Heat exchanger not designed to withstand pressure in partial assembly condition. Delivered with safety clips preventing removal of 1 side panel without dismantling the adjacent ones.
	Chanels A : Side panels linings made of stainless steel SA240 type 316L materials, thick 0.1181 inch. Linings designed according to UCL 23(a) and attached to side panels by spot welds
	Chanels B : Side panels linings made of stainless steel SA240 type 316L materials, thick 0.1181 inch. Linings designed according to UCL 23(a) and attached to side panels by spot welds
	Non Code pack of welded exchange plates made of stainless steel SA240 type 316L material.

Certificate of Authorization: Type U No. 22,112 Expires August 27 , 2014

Date Oct 11, 2013 Name ALFA LAVAL VICARB LE FONTANIL CORNILLON (Manufacturer) Signed Q.C.M. René CONSONNI (Representative)

Date Oct 11, 2013 Name Benoit ELDRIDGE (Authorized Inspector) Commission National board 14540 A (Nat'l Board incl. endorsement, State, Province and No.)