

GENERAL DATA

Section A1, sheet 1 of 1

Name and address of manufacturer	: Wuxi Chemical Equipment Co.,Ltd. Huayi road,Hua Zhuang Town,Wuxi, Jiangsu. China.		
Principal's purchase order No.	: 4505729451	Item No.:	18-X-1811
Equip. tag No. and name	: T-2002 Recirculating Exchanger		
Manufacturer's production order No.	: WHA22-122-1		
Applicable design code	: ASME SECTION VIII DIV.1 2021 ED TEMA Tenth Edition Class R API660-2020		
Year of manufacture	: 2023	Manufacturer's serial No. :	WHA22-122-1
Name of design org.	: Wuxi Chemical Equipment Co.,Ltd.		
Name of inspection org.	: Wuxi Chemical Equipment Co.,Ltd.		
Type of vessel	: Heat Exchange		
Design pres. int/ext	psi(g) Bar(g)	: SHELL SIDE:180/15[12.41/1.03] TUBE SIDE:232/15[16/1.03]	
Design temperature	deg F EXT.) °C	: SHELL SIDE:430[221.1]/300[148.89] TUBE SIDE:430[221.1]/400[204.44]	
ID	inch mm	: 202.7 show shell and tube side	
Wall thickness,	inch actual mm	: 12 show shell and tube side	
Corrosion allowance,	inch mm	: SHELL SIDE:1/16"[1.588] TUBE SIDE:1/8"[3.175]	
Overall length of vessel	inch mm	: 2867.5	
Weight of vessel (empty	lbs. Kg	: 1485[675]	
Weight of vessel incl. internals (empty)	: /		
Heat treatment	: YES	When yes, type of heat treatment:	Solution(Elliptical head/Tube bends)
Pressure test date	: SHELL SIDE:2023-05-08 TUBE SIDE:2023-03-29/2023-05-12		
Position	: Horizontal		
Test pressure	show psig values Bar(g)	: SHELL SIDE:54 TUBE SIDE: 67	
Test medium	: Water		
Temperature of medium	T[°C] show deg F values	: SHELL SIDE:23.3 TUBE SIDE: 21/24	
NDE:	- radiography (X-ray/Gamma-ray) : YES;100%		
	- ultrasonic : /		
	- magnetic/particle : YES;100%		
	- dye penetrant : YES;100%		
Joint efficiency	: SHELL SIDE:1.0 TUBE SIDE: 1.0		
Type of equipment support	: Skirt Saddle		
Number(s) of approved drawing(s)	: WXCE6884-00 Rev. No.: 05		
	: WXCE6884-01 Rev. No.: 03		
	: WXCE6884-02 Rev. No.: 03		
	: WXCE6884-03 Rev. No.: 03		
	: WXCE6884-04 Rev. No.: 03		
	: WXCE6884-05 Rev. No.: 03		
	: WXCE6884-06 Rev. No.: 03/02		
	: WXCE6884-07 Rev. No.: 02		
* Delete what does not apply			
For manufacturer:	WCE		For inspection organization:
Name:	Xuyao		Name:
Position:	QC Engineer		Position:
Place and date:	Huayi road,Hua Zhuang Town,Wuxi,Jiangsu,China		Name of company:
	Signature and stamp		Place and date:
			Signature and stamp

Mfr. Representative:

Date:

Sep. 22, 2023

Authorized Inspector:

Date:

Sep. 22, 2023

FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS

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As Required by the Provisions of the ASME Boiler and Pressure Vessel Code Rules, Section VIII, Division 1

1. Manufactured and certified by Wuxi Chemical Equipment Co., Ltd.
36 Huayi Road, Binhu District, Wuxi, Jiangsu Province 214131, P. R. China.
(Name and address of Manufacturer)

2. Manufactured for Air Products Manufacturing LLC., 1940 Air Products Blvd., Allentown PA 18106-5500, USA.
(Name and address of Purchaser)

3. Location of installation Not Known
(Name and address)

4. Type Horizontal Heat exch. WHA22-122-1
(Horizontal, vertical, or sphere) (Tank, separator, jkt. vessel, heat exch., etc.) (Manufacturer's serial number)

NA WXCE6884-00 Rev. 05 547 2023
(CRN) (Drawing number) (National Board number) (Year built)

5. ASME Code Section VIII, Div. 1 2021 NA NA
(Edition and Addenda, if applicable (date)) (Code Case number) (Special Service per UG-120(d))

14700 Downey Ave,
Paramount, California, USA
90723.

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) Number of course(s) 1 (b) Overall length 74.134"

Course(s)			Material		Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter	Length	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	ID 7.981"	74.134"	SA-182 F60		0.394"	1/16"	S	NA	1.0	1	Full RT	1.0	None	None
NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Body Flanges on Shells													
No.	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Location	Bolting				
									Num & Size		Bolting Material	Washer (OD, ID,Thk)	Washer Material
1	NA	7.981"	14.961"	2.165"	0.394"	SA-182 F60	Welded	Left	12Nos 7/8"-9UNC-2A, L=12.598" 4Nos 17/8"-9UNC-2A, L=13.583"		SA-193 Gr.B7	1.718", 0.938", 0.219"	ASME PCC-1 Type 4
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA

7. Heads: (a) SA-240 S32205, Remark 1 (b) NA
(Material spec. number, grade or type) (H.T. — time and temp.) (Material spec. number, grade or type) (H.T. — time and temp.)

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)	Right End	0.315"	1/16"	NA	NA	2:1	NA	NA	NA	Yes	Yes	S	NA	1.0
(b)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Body Flanges on Heads												
	Location	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Bolting			
									Num & Size	Bolting Material	Washer (OD, ID, Thk)	Washer Material
(a)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(b)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

8. Type of jacket NA Jacket closure NA
(Describe as ogee and weld, bar, etc.)

If bar, give dimensions; If bolted, describe or sketch

NA

9. MAWP 412.2psig FV at max. temp. 430°F 300°F Min. design metal temp. 32°F at 412.2psig
(Internal) (External) (Internal) (External)

10. Impact test Yes, all parts at test temperature of
(Indicate yes or no and the component(s) impact tested)

11. Hydro., pneu., or comb. test pressure Hydro. at 779.6psig Proof test

Items 12 and 13 to be completed for tube sections.

12. Tubesheet SA-182 F60 7.981" 2.638" 1/16" Bolted
(Stationary (material spec. no.)) (Diameter (subject to press.)) (Nominal thickness) (Corr. allow.) (Attachment (welded or bolted))

NA NA NA NA NA
(Floating (material spec. no.)) (Diameter) (Nominal thickness) (Corr. allow.) (Attachment)

13. Tubes SA-789 S32205 0.75" 0.065"(Avg.) 10 U
(Material spec. no., grade or type) (O.D.) (Nominal thickness) (Number) (Type (straight or U))

confirm thickness.
appears to deduct
only one side of
machining.

Mfr. Representative:

Date: Sep. 22, 2023

Authorized Inspector:

Date: Sep. 22, 2023

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Manufactured by Wuxi Chemical Equipment Co., Ltd.

Manufacturer's Serial No. WHA22-122-1

CRN

NA

National Board No.

547

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

14. Shell: (a) No. of course(s)

1

b) Overall length

17.126"

Course(s)			Material		Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter	Length	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	ID 7.981"	17.126"	SA-266 Gr.2N		0.472"	1/8"	S	NA	1.0	1	Full RT	1.0	None	None
NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Body Flanges on Shells

No.	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Location	Bolting			
									Num & Size	Bolting Material	Washer (OD, ID, Thk)	Washer Material
1	NA	7.981"	14.961"	2.559"	0.472"	SA-266 Gr. 2N	Welded	Left	16Nos 7/8"-9UNC-2A, L=10.236"	SA-193 Gr.B7	1.718", 0.938", 0.219"	ASME PCC-1 Type 4
1	NA	7.981"	14.961"	2.559"	0.472"	SA-266 Gr. 2N	Welded	Right	12Nos 7/8"-9UNC-2A, L=12.598" 4Nos 7/8"-9UNC-2A, L=13.583"	SA-193 Gr.B7	1.718", 0.938", 0.219"	ASME PCC-1 Type 4

15. Heads: (a)

SA-266 Gr.2N, No H.T.

(b)

NA

(Material spec. number, grade or type) (H.T. — time and temp.)

(Material spec. number, grade or type) (H.T. — time and temp.)

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)	Left End	2.362"	1/8"	NA	NA	NA	NA	NA	14.961"	Yes	Yes	S	NA	1.0
(b)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Body Flanges on Heads

	Location	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Bolting			
									Num & Size	Bolting Material	Washer (OD, ID, Thk)	Washer Material
(a)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(b)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

16. MAWP 532.3psig FV at max. temp. 430°F 400°F Min. design metal temp. 32°F at 532.3psig

(Internal) (External) (Internal) (External)

17. Impact test

No, exempted per UCS-66

at test temperature of

NA

(Indicate yes or no and the component(s) impact tested)

18. Hydro., pneu., or comb. test pressure

Hydro. at 961.6psig

Proof test

NA

19. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Type	Material		Nozzle Thickness		Reinforcement Material	Attachment Details		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
T1, TS Inlet	1	NPS 3	CL600 LWN/RF	SA-105N	SA-105N	0.803"	1/8"	Inherent	Fig. UW-16.1(c)	NA	
T2, TS Outlet	1	NPS 3	CL600 LWN/RF	SA-105N	SA-105N	0.803"	1/8"	Inherent	Fig. UW-16.1(c)	NA	
S1, SS Inlet	1	NPS 3	CL600 LWN/RF	SA-182 F60	SA-182 F60	0.803"	1/16"	Inherent	Fig. UW-16.1(c)	NA	
S2, SS Outlet	1	NPS 3	CL600 LWN/RF	SA-182 F60	SA-182 F60	0.803"	1/16"	Inherent	Fig. UW-16.1(c)	NA	
TV, TS Inlet	1	NPS 1-1/2	CL300 WN/RF	SA-106 Gr.B	SA-105N	0.4"	1/8"	Inherent	Fig. UW-16.1(c)	None RT, eff. 1.0	
Aux 1-2, Auxiliary	2	NPS 2	CL300 WN/RF	SA-106 Gr.B	SA-105N	0.218"	1/8"	Inherent	Fig. UW-16.1(c)	None RT, eff. 1.0	
Aux 3-4, Auxiliary	2	NPS 2	CL300 WN/RF	SA-182 F60	SA-182 F60	0.218"	1/16"	Inherent	Fig. UW-16.1(c)	None RT, eff. 1.0	

20. Supports: Skirt

No

Lugs

NA

Legs

NA

Others

2Nos saddles

Attached

Welded to shell

(Yes or no)

(Number)

(Number)

(Describe)

(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, Manufacturer's name, and identifying number):

None

22. Remarks

See attached Form U-4.

Mfr. Representative: 黄江 Date: Sep 22, 2023

Authorized Inspector: 王 Date: Sep. 22. 2023

FORM U-1

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Manufactured by Wuxi Chemical Equipment Co., Ltd.

Manufacturer's Serial No. WHA22-122-1 CRN NA National Board No. 547

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 BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1.

U Certificate of Authorization Number 30,972 Expires April 16, 2026
Date Sep. 22, 2023 Name Wuxi Chemical Equipment Co., Ltd. Signed 黄江
(Manufacturer) (Representative)

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and employed by APAVE SA of / have inspected the pressure vessel described in this Manufacturer's Data Report on July 06, 2023, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. By signing this certificate neither the Inspector nor his/her employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his/her 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 Sep. 22. 2023 Signed 王 Commissions NB15677
(Authorized Inspector) (National Board Authorized inspector Commission number)

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the statements in this report are correct and that the field assembly construction of all parts of this vessel conforms with the requirements of ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. U Certificate of Authorization Number 30,972 Expires April 16, 2026

Date Sep. 22, 2023 Name Wuxi Chemical Equipment Co., Ltd. Signed 黄江
(Assembler) (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 employed by APAVE SA 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 BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of not included in the certificate of shop inspection. By signing this certificate neither the Inspector nor his/her employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his/her 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 Sep. 22, 2023 Signed 王 Commissions NB15677
(Authorized Inspector) (National Board Authorized Inspector Commission number)

(07/17)

1. Manufactured and certified by Wuxi Chemical Equipment Co., Ltd.
36 Huayi Road, Binhu District, Wuxi, Jiangsu Province 214131, P. R. China.
 (Name and address of Manufacturer)

2. Manufactured for Air Products Manufacturing LLC., 1940 Air Products Blvd., Allentown PA 18106-55
 (Name and address of Purchaser)

3. Location of installation Not Known
 (Name and address)

4. Type Horizontal Heat exch. WHA22
 (Horizontal, vertical, or sphere) (Tank, separator, heat exch., etc.) (Manufacturer's serial number)

NA WXCE6884-00 Rev. 05 547 2023
 (CRN) (Drawing number) (National Board number) (Year built)

14700 Downey Ave, Paramount, California, USA 90723.

**14700 Downey
Ave, Paramount,
California, USA
90723.**

[illegible]

07/19)