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

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

1. Manufactured and certified by **Mersen USA-Salem Branch, 540 Branch Drive, Salem, Virginia, 24153, USA**
(Name and address of Manufacturer)

2. Manufactured for **ARCH CHEMICALS, INC., 1400 BLUEGRASS LAKE PKWY, SUITE F, ALPHARETTA, Georgia, 30004, USA**
(Name and address of Purchaser)

3. Location of installation **ARCH CHEMICALS, ROCHESTER PLANT, 100 MCKEE ROAD, ROCHESTER, New York, 14611, USA**
(Name and address)

4. Type **VERTICAL** (Horizontal, vertical, or sphere) | **POLYTUBE HEAT EXCHANGER** (Tank, separator, jkt. vessel, heat exch., etc.) | **S600226** (Manufacturer's serial number)

N/A (CRN) | **T-875-1-D REV. C** (Drawing number) | **4331** (National Board number) | **2018** (Year built)

5. ASME Code, Section VIII, Div. 1 **2017/ N/A** [Edition and Addenda, if applicable (date)] | **2547 , 2908** (Code Case Number) | **N/A** [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) Number of course(s) **3** (b) Overall length **6' 7.125"**

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	34.000" ID	6' 7.125"	SA-516 GR.70	0.375"	0.0625"	1	NONE	70%	**	NONE	70%	N/A	N/A
1	34.000" ID	6' 7.125"	SA-516 GR.70	0.375"	0.0625"	1	NONE	70%	**	NONE	70%	N/A	N/A
1	34.000" ID	6' 7.125"	SA-516 GR.70	0.375"	0.0625"	1	NONE	70%	**	NONE	70%	N/A	N/A

Body Flanges on Shells												
									Bolting			
No.	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Location	Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material
1	APP. II	34.000"	43.500"	2.375"	N/A	SA-105	FIG. 2-4(11)	FXD END	24 - 3/4-10NC	SA-193 GR.B7 (XYLAN 1424 CTD)	2". 0.8125", 0.15"	C.S. (XYLAN 1424 CTD)
1	APP. II	34.000"	43.500"	2.750"	N/A	SA-105	FIG. 2-4(11)	FLT END	28 - 3/4-10NC	SA-193 GR.B7 (XYLAN 1424 CTD)	2". 0.8125", 0.15"	C.S. (XYLAN 1424 CTD)

7. Heads: (a) **N/A** (Material spec. number, grade or type) (H.T. - time and temp.) (b) **N/A** (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)	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

Body Flanges on Heads												
									Bolting			
No.	Location	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material
(a)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A

8. Type of jacket **N/A** Jacket closure **N/A** (Describe as ogee & weld, bar, etc.)

If bar, give dimensions; if bolted, describe or sketch **N/A**

9. MAWP **75 psi** (Internal) **N/A** (External) at max. temp. **340 °F** (Internal) **N/A** (External) Min. design metal temp. **-20 °F** at **75 psi**

10. Impact test **NONE- EXEMPT FROM CHARPY IMPACT TESTING PER UG-20(f) & UCS-66** at test temperature of **NONE**
[Indicate yes or no and the component(s) impact tested]

11. Hydro., pneu., or comb. test pressure **HYDRO at 100 psi** Proof test **NONE**

Items 12 and 13 to be completed for tube sections.

12. Tubesheet

BS-PGW [Stationary (material spec. no.)]	**36.000"** [Diameter (subject to press.)]	**15.250"** (Nominal thickness)	**N/A** (Corr. allow.)	**CEMENTED** Attachment (welded or bolted)
BS-HLM [Floating (material spec. no.)]	**32.625"** (Diameter)	**14.250"** (Nominal thickness)	**N/A** (Corr. allow.)	**CEMENTED** (Attachment)

13. Tubes

GRAHPILOR 3 XBS T1 (Material spec. no., grade or type)	**1.25"** (O. D.)	**0.1968"** (Nominal thickness)	**349** (Number)	**STRAIGHT** [Type (Straight or U)]

FORM U1

Manufactured by **Mersen USA-Salem Branch, 540 Branch Drive, Salem, Virginia, 24153, USA**

Manufacturer's Serial No. **S600226** CRN **N/A** National Board No. **4331**

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) **N/A** (b) Overall length **SEE REMARKS**

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
	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

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
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) **SA-516 GR.70 (FIXED COMPRESSION PLATE)** (b) **SA-516 GR.70 (FLOATING COMPRESSION PLATE**

(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)	FIXED	1.85"	0.000"	N/A	N/A	N/A	N/A	N/A	43.5"			N/A	N/A	N/A
(b)	FLOATING	1.424"	0.000"	N/A	N/A	N/A	N/A	N/A	43.5"			N/A	N/A	N/A

Body Flanges on Heads

No.	Location	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Bolting			
									Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material
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

16. MAWP **75 psi** (Internal) **N/A** (External) at max. temp. **340 °F** (Internal) **N/A** (External) Min. design metal temp. **-20 °F** at **75 psi**.

17. Impact test **NONE- EXEMPT FROM CHARPY IMPACT TESTING PER UG-20(f) & UCS-66** at test temperature of **NONE**.

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

18. Hydro., pneu., or comb. test pressure **Hydro. at 100 psi** Proof test **NONE**

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	
SERVICE INLET	1	10" x 6"	150# RFSO	SA-234 WPB/SA-53 B/E	SA-105	0.280"	0.0625"	INHERENT	FIG. UW-16.1(c)	FIG. UW-21(1)	SHELL
SERVICE OUTLET	1	10" x 6"	150# RFSO	SA-234 WPB/SA-53 B/E	SA-105	0.280"	0.0625"	INHERENT	FIG. UW-16.1(c)	FIG. UW-21(1)	SHELL
SERVICE DRAIN	1	1"	FULL COUPLING	SA-105		3000#		INHERENT	FIG. UW-16.1(z-1)		SHELL

Additional Nozzles - See Attached U-4...

20. Supports: Skirt **NO** (Yes or no) Lugs **0** (Number) Legs **0** (Number) Others **(1)NAMEPLATE BRACKET (2)SUPPORTS (4)LIFTING TRUNNIONS** (Describe) Attached **WELDED TO THE SHELL PER FILLET WELD** (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):

N/A

22. Remarks

Length of tubes: 20'
~GRAPHITE "CODE" PER UIG
~U-2(g) USED IN DESIGN
~VESSEL USED FOR EXCHANGER SHELL
~INSPECTION OPENINGS OMITTED PER UG-46(a)(2)
~SAFETY VALVE NOT PROVIDED PER UG-125(a)
****FLANGE TO SHELL TYPE 1, SHELL TO SHELL TYPE 7**

-FIXED END COMPRESSION PLATE/SKIRT: (SA-516 GR.70) 43.500" O.D. w/ (24)7/8" THRU HOLES ON A 40-1/2" B.C. HOLES STRADDLE CENTER LINE x (2)12.625" I.D. OPENINGS w/ (12)7/8-9NC X 1" DEEP TAPPED HOLES ON A 14-1/4" B.C. HOLES STRADDLE CENTER LINE x 2.500" THK. --SKIRT: (SA-516 GR.70) 38.625"

Additional Remarks - See Attached U-4... *Form U-1B Attached....*

FORM U1

Manufactured by **Mersen USA-Salem Branch, 540 Branch Drive, Salem, Virginia, 24153, USA**

Manufacturer's Serial No. **S600226** CRN **N/A** National Board No. **4331**

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 **25867** Expires **September 17, 2018**

Date 06/05/2018 Name **Mersen USA-Salem Branch** (Manufacturer) Signed (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

OneCIS Insurance Company, of Lynn, MA

have inspected the pressure vessel described in this Manufacturer's Data Report on **June 2, 2018**, 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 06/05/2018 Signed (Authorized Inspector) Commissions **12048, VA921** (National Board Authorized Inspector Commission number)

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the statements made 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 _____ 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 employed by

_____,

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 pressure test of _____. 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 _____ Signed _____ (Authorized Inspector) Commissions _____ (National Board Authorized Inspector Commission number)

FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET

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

1. Manufactured and certified by **Mersen USA-Salem Branch, 540 Branch Drive, Salem, Virginia, 24153, USA**
(Name and address of Manufacturer)

2. Manufactured for **ARCH CHEMICALS, INC., 1400 BLUEGRASS LAKE PKWY, SUITE F, ALPHARETTA, Georgia, 30004, USA**
(Name and address of Purchaser)

3. Location of installation **ARCH CHEMICALS, ROCHESTER PLANT, 100 MCKEE ROAD, ROCHESTER, New York, 14611, USA**
(Name and address)

4. Type **VERTICAL** (Horizontal, vertical, or sphere) | **POLYTUBE HEAT EXCHANGER** (Tank, separator, heat exch., etc.) | **S600226** (Manufacturer's serial number)

N/A (CRN)	**T-875-1-D REV. C** (Drawing number)	**4331** (National Board number)	**2018** (Year built)

Data Report Item Number | Remarks

Additional Remarks:

I.D x 0.250" THK. x 15.375" LG.

-FLOATING END COMPRESSION PLATE/SKIRT: (SA-516 GR.70) 43.500" O.D. w/ (28)0.875" THRU HOLES ON A 40-1/2" B.C. HOLES STRADDLE CENTER LINE x 2.500" THK. --SKIRT: (SA-516 GR.70) 38.625" I.D x 0.250" THK. x 10.375" LG.

-FLANGED GLAND RING: (SA-105) 38.000" O.D. w/ (14)7/8" THRU HOLES ON A 36" B.C. x 34.625" I.D. x 2.625" THK.

-SPLINT RING HOLDER: (SA-105) 43.500" O.D. w/ (28)0.875" THRU HOLES ON A 40.500" HOLES STRADDLE CENTER LINE x 33.875" I.D. x 2.125" THK.

***FLOATING END TUBESHEET SKIRT: (SA-516 GR.70) 33.750" O.D. x 31.625" x 1.25" THK. x 14.625" LG. WELDED BY TYPE 1 JOINT**

Additional 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	
SERVICE VENT	1	1"	FULL COUPLING	SA-105		3000#		INHERENT	FIG. UW-16.1(z-1)		SHELL

Certificate of Authorization: Type **"U"** No. **25867** Expires **September 17, 2018**

Date **06/05/2018** Name **Mersen USA-Salem Branch** (Manufacturer) Signed (Representative)

Date **06/05/2018** Signed (Authorized Inspector) Commissions 12048, VA921 (National Board Authorized Inspector Commission number)

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

1. Manufactured and certified by **Mersen USA-Salem Branch, 540 Branch Drive, Salem, Virginia, 24153, USA**
(Name and address of Manufacturer)

2. Manufactured for **ARCH CHEMICALS, INC., 1400 BLUEGRASS LAKE PKWY, SUITE F, ALPHARETTA, Georgia, 30004, USA**
(Name and address of Purchaser)

3. Location of installation **ARCH CHEMICALS, ROCHESTER PLANT, 100 MCKEE ROAD, ROCHESTER, New York, 14611, USA**
(Name and address)

4. Type **VERTICAL** (Horizontal, vertical) Use **POLYTUBE HEAT EXCHANGER** (Tank, vessel, heat exch., etc.) Manufacturer's serial no **S600226** (Manufacturer's serial number)

CRN no. **N/A** (CRN) Dwg no. **T-875-1-D REV. C** (Drawing number) National Board no. **4331** (National Board number) Year built **2018**

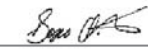
5. ASME Code, Section VIII, Div. 1 edition/addenda **2017/ N/A** [Edition and Addenda (date)] Code Case **N/A** (Code Case Number)

6. Graphite components:

Item	Material Designation	Compressive Strength	Tensile Strength	CMTR No.
TUBESHEET	BS-HLM	16,242.30 PSI (111.99 MPa)	2,277.80 PSI (15.70 MPa)	Q2-18-HLM_222177
TUBESHEET	BS-PGW	20,831.52 PSI (143.63 MPa)	2,318.86 PSI (16.09 MPa)	Q2-18-PGW_222177
HEADS	BS-PGW	20,831.52 PSI (143.63 MPa)	2,318.86 PSI (16.09 MPa)	Q2-18-PGW_222177
NOZZLES	XBS-2890	24,892.00 PSI (171.62 MPa)	3,939.80 PSI (27.16 MPa)	Q2-18-2890_222177
TUBES	GRAPHILOR 3 XBS T1			

Certificate of Authorization: Type **"U"** No. **25867** Expires **September 17, 2018**

Date **06/05/2018** Name **Mersen USA-Salem Branch** Signed

Date **06/05/2018** Signed  Commissions **12048, VA921**
(National Board Authorized Inspector Commission Number)

(07/13)