

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 **Corrected Copy** Page 1 of 31. Manufactured and certified by **Louisville Exchanger & Vessel Inc., 3319 Gilmore Industrial Blvd., Louisville, Kentucky, 40213, USA**

(Name and address of Manufacturer)

2. Manufactured for **Daramic, LLC, 5525 Hwy 2830, Owensboro, Kentucky, 42303, USA**

(Name and address of Purchaser)

3. Location of installation **Daramic, LLC, 5525 Hwy 2830, Owensboro, Kentucky, 42303, USA**

(Name and address)

4. Type **Vertical**

(Horizontal, vertical, or sphere)

Heat Exchanger

(Tank, separator, jkt. vessel, heat exch., etc.)

21-062

(Manufacturer's serial number)

N/A

(CRN)

21-062 GA

(Drawing number)

1131

(National Board number)

2022

(Year built)

5. ASME Code, Section VIII, Div. 1

2021/ N/A

[Edition and Addenda, if applicable (date)]

N/A

(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) **1**

(b) Overall length

189.375"

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	16.00" OD	189.375"	SA-312-TP304L	.250	NONE	1	NONE	70%	7	NONE	70%	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

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.
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	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
(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/A9. MAWP **75 psi** at max. temp. **250 °F** Min. design metal temp. **-20 °F**

(Internal)

FV

(External)

(Internal)

(External)

75 psi10. Impact test **No. Material is exempt per UHA-51(d)** at test temperature of **N/A**

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

11. Hydro., pneu., or comb. test pressure **Hydro. at 98 psi**

Proof test

N/A*Items 12 and 13 to be completed for tube sections.*

12. Tubesheet

SA-182-F304LSS

[Stationary (material spec. no.)]

23.5"

[Diameter (subject to press.)]

1.4375

(Nominal thickness)

0.0

(Corr. allow.)

Welded

Attachment (welded or bolted)

N/A

[Floating (material spec. no.)]

N/A

(Diameter)

N/A

(Nominal thickness)

N/A

(Corr. allow.)

N/A

(Attachment)

13. Tubes

SA-249-TP304LSS

(Material spec. no., grade or type)

.75

(O. D.)

.049

(Nominal thickness)

184

(Number)

Straight

[Type (Straight or U)]

Manufactured by **Louisville Exchanger & Vessel Inc., 3319 Gilmore Industrial Blvd., Louisville, Kentucky, 40213, USA**Manufacturer's Serial No. **21-062** CRN **N/A** National Board No. **1131***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) **0** (b) Overall length **N/A**

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	N/A OD	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A OD	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-403-304LSS** (Material spec. number, grade or type) (H.T. - time and temp.) (b) **SA-403-304LSS** (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)	TOP	.250	NONE	N/A	N/A	2:1	N/A	N/A	N/A		X	7	None	70%
(b)	BOTTOM	.250	NONE	N/A	N/A	2:1	N/A	N/A	N/A		X	7	None	70%

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
(a)	TOP	RFSO	18.00"	23.50"	2.50	N/A	SA-182-F304L	WELDED	16 - 1"	B7ZP	N/A	N/A
(b)	BOTTOM	RFSO	18.00"	23.50"	2.50	N/A	SA-182-F304L	WELDED	16 - 1"	B7ZP	N/A	N/A

16. MAWP **75 psi** (Internal) **FV** (External) at max. temp. **250 °F** (Internal) **250 °F** (External) Min. design metal temp. **-20 °F** at **75 psi**17. Impact test **No. Material is exempt per UHA-51(d)** at test temperature of **N/A**
[Indicate yes or no and the component(s) impact tested]18. Hydro., pneu., or comb. test pressure **Hydro. at 98 psi** Proof test **N/A**

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	
WATER INLET A	1	3"	150# RFSO	SA-312-TP304LSS	SA-182-F304LSS	.216	None		UW-16.1(c)	UW-21.1(1a)	Bottom Channel
WATER OUTLET B	1	3"	150# RFSO	SA-312-TP304LSS	SA-182-F304LSS	.216	None		UW-16.1(c)	UW-21.1(1a)	Bottom Channel
VAPOR INLET C	1	3"	150# RFSO	SA-312-TP304LSS	SA-182-F304LSS	.216	None		UW-16.1(c)	UW-21.1(1a)	Shell
COND. OUTLET D	1	3"	150# RFSO	SA-312-TP304LSS	SA-182-F304LSS	.216	None		UW-16.1(c)	UW-21.1(1a)	Shell
TUBE VENT E	1	3/4"	HCOUP	SA-182-F304LSS		3000#	None		UW-16.1(c)		Top Channel
TUBE VENT F	1	3/4"	HCOUP	SA-182-F304LSS		3000#	None		UW-16.1(c)		Top Channel
TUBE DRAIN H	1	3/4"	HCOUP	SA-182-F304LSS		3000#	None		UW-16.1(c)		Bottom Channel
TUBE DRAIN J	1	3/4"	HCOUP	SA-182-F304LSS		3000#	None		UW-16.1(c)		Bottom Channel

20. Supports: Skirt **No** (Yes or no) Lugs **Four** (Number) Legs **None** (Number) Others **N/A** (Describe) Attached **Welded to Shell** (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: 192.0"
Pressure relief devices by others.**Daramic PO: 140148**

Form U-5 Attached....

Manufactured by	Louisville Exchanger & Vessel Inc., 3319 Gilmore Industrial Blvd., Louisville, Kentucky, 40213, USA		
Manufacturer's Serial No. 21-062	CRN N/A	National Board No. 1131	

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 **33385** Expires **July 2, 2023**

Date 06/07/2023 Name Louisville Exchanger & Vessel Inc. Signed 
(Manufacturer) (Representative)

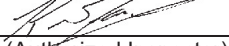
CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and employed by

Bureau Veritas Inspection and Insurance Company, of Lynn, MA

have inspected the pressure vessel described in this Manufacturer's Data Report on June 12, 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 06/12/2023 Signed  Commissions: 15726, IN2018, KY1142, IL023291C
(Authorized Inspector) (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 _____ Signed _____
(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 _____,

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 _____ Commission _____
(Authorized Inspector) (National Board Authorized Inspector Commission number)

FORM U-5 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET

SHELL-AND-TUBE HEAT EXCHANGERS

Corrected Copy

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

1. Manufactured and certified by Louisville Exchanger & Vessel Inc., 3319 Gilmore Industrial Blvd., Louisville, Kentucky, 40213, USA
(Name and address of Manufacturer)

2. Manufactured for Daramic, LLC, 5525 Hwy 2830, Owensboro, Kentucky, 42303, USA
(Name and address of Purchaser)

3. Location of Installation Daramic, LLC, 5525 Hwy 2830, Owensboro, Kentucky, 42303, USA
(Name and address)

4. Type Vertical 21-062 N/A
(Horizontal, vertical, or sphere) (Manufacturer's serial number) (CRN)

21-062 GA 1131 2022
(drawing no.) (National Board number) (Year built)

FIXED TUBESHEET HEAT EXCHANGERS

Name of Condition	Design/Operating Pressure Ranges				Design/Operating Metal Temperature				Allowable Axial Differential Thermal Expansion Range	
	Shell Side		Tube Side		Shell	Channel	Tubes	Tubesheet		
	Min.	Max.	Min.	Max.					Min.	Max.
	units:	units:	units:	units:					units:	units:
Design	FV	75	FV	75	250	250	250	250	0	41
	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	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	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	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	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
	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	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	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Data Report Item Number N/A Remarks

Certificate of Authorization: Type "U" No. 33385 Expires July 2, 2023

Date 06/07/2023 Name Louisville Exchanger & Vessel Inc. Signed [Signature]
(Manufacturer) (Representative)

Date 06/12/2023 Signed [Signature] Commissions: 15726, IN2018, KY1142, IL023291C
(Authorized Inspector) (National Board Authorized Inspector Commission number)