

EXCHANGER INDUSTRIES

Page of

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For Macdonald Engineering Ltd.
Our Job 96-5425
Item No EI
Section Name Alternate Design

Dsg SAN Chk'd
Date Sep 04/96
V 6.08
MACCHECK- 1068

Box Header design per ASME VIII Div 1 A94 13.7 & 13.9

Header		<1>	<2>
Wrapper thk	in	1.5000	1.0000
Tubesheet thk	in	1.7500	1.7500
Stay Plate thk	in	.7500	.8750
End Plate thk	in	1.1250	.8750
t per UG-34 c=.20		1.0670	.7583
Wrapper Span	in	8.0000	4.0000
Tubesheet Span	in	6.9375	6.8750
Box Length	in	156.75	156.25
T.S. Width	in	17.625	16.625
Box Depth	in	11.500	7.5000
Rows in Header		6	6
Rows in Chamber		3	3
Chambers / type		2 WS	2 WS

STRESSES: Allowable -- Sm 16,500 psi Sb & St 24,750 psi

Sm-Wrapper	psi	3644.	4362.
Sm-Tubesheet	psi	5074.	2537.
Sm-Stay Plate	psi	12803.	13286.
Sbn-Wrapper	psi	11644.	2723.
Sbq-Wrapper	psi	19929.	15037.
Sbm-Tubesheet	psi	15185.	22014.
Sbq-Tubesheet	psi	14642.	4910.
Stn-Wrapper	psi	15288.	7085.
Stq-Wrapper	psi	23573.	19400.
Stm-Tubesheet	psi	20259.	24552.
Stq-Tubesheet	psi	19716.	7447.

Pressure 1,480 psi

Temperature 200 F

Corrosion 0.0000 in

Tube O.D. 1.0000 in

Horizontal Pitch 3.0000 in

Ligament Efficiency 0.6667 %

Wall Thickness 0.0650 in

Tube Length 48.0000 ft

Radiography FULL

MAWP Hot 1,492.0 psi (Tubesheet 2)

Box Material SA-240-304L

Stress Hot 16,500 psi

Stress Cold 16,700 psi

Tube Material SA-249TP316L

Stress Hot 14,200 psi

Stress Cold 14,200 psi

No. Passes 2

No. Rows 6

Stress Relieve No

MAWP Cold 1,510.0 psi (Tubesheet 2)