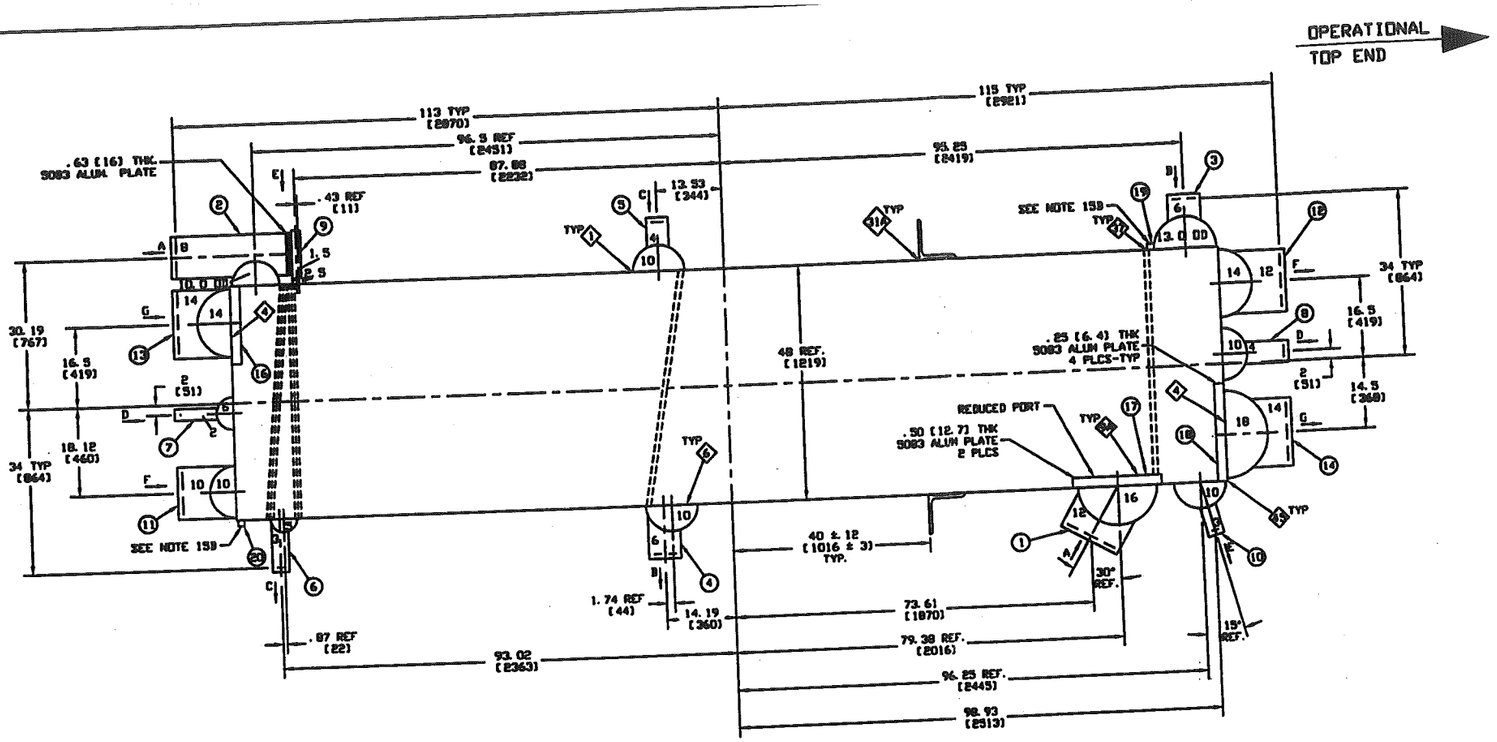

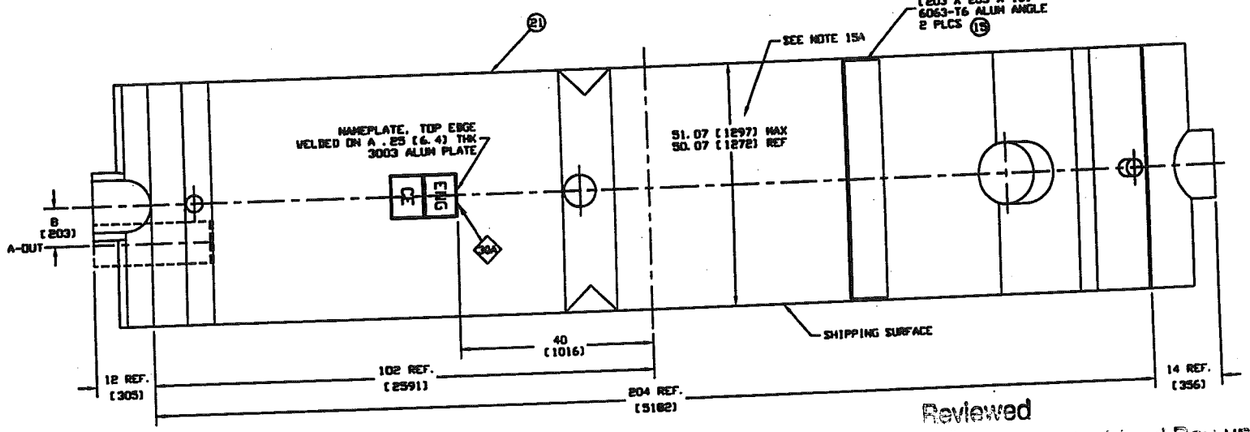

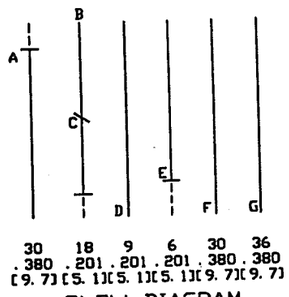

FLOW DIAGRAM

STREAM	INLET		OUTLET	
	HEADER O.D. X WALL	NOZZLE O.D. X WALL	HEADER O.D. X WALL	NOZZLE O.D. X WALL
A (HP-AIR)	16.000 X .375 (406 X 9.5)	12.750 X .375 (324 X 9.5)	10.000 X .250 (254 X 6.4)	8.625 X .322 (219 X 8.2)
B (HP-AIR)	13.000 X 1.000 (330 X 25.4)	6.625 X .432 (168 X 11.0)	10.750 X .750 (273 X 19.1)	6.625 X .432 (168 X 11.0)
C (HPC-AIR)	10.750 X .750 (273 X 19.1)	4.500 X .237 (114 X 6.0)	5.563 X .375 (141 X 9.5)	3.500 X .216 (89 X 5.5)
D (HP-GOX)	6.625 X .375 (168 X 9.5)	2.375 X .154 (60 X 3.9)	10.750 X .500 (273 X 12.7)	4.500 X .237 (114 X 6.0)
E (HP-GAN)	2.875 X .203 (73 X 5.2)	1.900 X .145 (48 X 3.7)	10.750 X .375 (273 X 9.5)	3.500 X .216 (89 X 5.5)
F (LP-GAN)	10.750 X .250 (273 X 6.4)	10.750 X .365 (273 X 9.3)	14.000 X .250 (356 X 6.4)	12.750 X .375 (324 X 9.5)
G (VN)	14.000 X .250 (356 X 6.4)	14.000 X .250 (356 X 6.4)	18.000 X .250 (457 X 6.4)	14.000 X .250 (356 X 6.4)

ALL MATERIAL IN TABLE ABOVE IS 5083 ALUMINUM

Reviewed
TÜV Süddeutschland Bau und Betrieb GmbH
... to Pressure
Equipment Directive 97/23/EC
Testing Laboratory
MAR 29 2005

NOTES:

1. REFER TO BRAZE-ION FOR INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS. ASSURE COMPLIANCE WITH RECOMMENDATIONS PARTICULARLY OPERATING CONDITIONS TO PREVENT ERROR PRESSURIZATION, THERMAL SHOCK AND EXCURSION OUTSIDE DESIGN TEMPERATURE RANGE. REFER TO DRAWING 918-6047 FOR VERTICALLY HEAT EXCHANGER LIFTING INSTRUCTIONS AND DRAWING 918-6671 FOR INSTRUCTIONS ON ROLLING HEAT EXCHANGER TO SIDE OTHER THAN SHIPPING SURFACE.
2. CUSTOMER TO DRILL APPROPRIATE HOLES OR SLOTS IN SUPPORT ANGLES FOR MOUNTING HEAT EXCHANGER AS DESCRIBED IN BRAZE-ION.
3. HEAT EXCHANGER DESIGNED, CONSTRUCTED, AND STAMPED PER THE LATEST MANDATORY EDITION AND ADDENDA OF THE ASME PRESSURE VESSEL CODE, SECTION VIII, DIV. 1 AND REGISTERED WITH THE NATIONAL BOARD.
4. CORROSION ALLOWANCE: ALUMINUM = 0.0000 INCHES
5. SEE DRAWING 15770C FOR MAXIMUM ALLOWABLE PIPE LOADS.
6. THE HEADERS AND NOZZLES ARE LABELED ON THE DRAWING WITH THEIR NOMINAL PIPE SIZE (NPS). IF A STANDARD SIZE IS NOT USED THE PIPING IS LISTED AT ITS ACTUAL OUTSIDE DIAMETER AND LABELED "OD". UNLESS SHOWN OTHERWISE ALL NOZZLES ARE ON THE HEAT EXCHANGER CENTERLINE.
7. TOLERANCE ON ALL DIMENSIONS IS +/- .25 INCH [6] UNLESS OTHERWISE NOTED. ANGULAR TOLERANCE ON NOZZLES IS CONTROLLED BY THE TOLERANCE ON THE CARTESIAN COORDINATE DIMENSIONS (X, Y, Z). IN NO CASE SHALL THE ANGULAR TOLERANCE EXCEED 3 DEGREES.
8. STREAM: A B C D E F G
   MAWP (PSIG) [BARG]: 109 [7.5] 914 [63.0] 914 [63.0] 580 [40.0] 435 [30.0] 29 [2.0] 29 [2.0]
   DESIGN TEMP DEG. F [C]: + 150 MAX. - 320 MIN. [+65 MAX. -196 MIN.]
9. TESTING INFORMATION:

		A	B	C	D	E	F	G
INACTIVE AREAS - 15 PSIG (1.03 BARG)								
STREAM FIRST AIR	(PSIG)	35	50	50	50	50	10	10
	(BARG)	(2.5)	(3.4)	(3.4)	(3.4)	(3.4)	(.7)	(.7)
PRETEST W/ WATER	(PSIG)	---	1371	1371	870	653	---	---
	(BARG)	---	(94.5)	(94.5)	(60.0)	(45.0)	---	---
MPNEU	(PSIG)	164	1009	1005	638	479	44	44
	(BARG)	(11.3)	(69.5)	(69.3)	(44.0)	(33.0)	(3.0)	(3.0)
LEAK	(PSIG)	109	914	914	580	435	SEE NOTES	
	(BARG)	(7.5)	(63.0)	(63.0)	(40.0)	(30.0)	18A	18B

   = A.I. WITNESS REQUIRED.
   MAXIMUM DRYING TEMP 250 DEG F. (121 DEG C.)

HELIUM VACUUM LEAK TEST STREAMS	MAX. ALLOW. LEAKAGE
A	1.0 E-3 STD CC/SEC. (1.0 E-3 MBAR - L/SEC)
B	1.0 E-3 STD CC/SEC. (1.0 E-3 MBAR - L/SEC)
C	1.0 E-3 STD CC/SEC. (1.0 E-3 MBAR - L/SEC)
D	1.0 E-3 STD CC/SEC. (1.0 E-3 MBAR - L/SEC)
E	1.0 E-3 STD CC/SEC. (1.0 E-3 MBAR - L/SEC)
F	1.0 E-3 STD CC/SEC. (1.0 E-3 MBAR - L/SEC)
G	1.0 E-3 STD CC/SEC. (1.0 E-3 MBAR - L/SEC)

10. THE "B" STREAM TO BE CLEANED FOR OXYGEN SERVICE.
11. CONNECTIONS TO BE SUITABLY MARKED FOR FIELD TRIM.
12. UNIT TO SHIP WITH DRY AIR AT 5 PSIG (.34 BARG) IN ALL STREAMS. GAUGES ARE REQUIRED.
13. ESTIMATED WEIGHT = 17400 LBS. (DRY) [7900 KG]
    30300 LBS. (FILLED WITH WATER) [13836 KG]
    (WARNING: DO NOT HYDRO TEST IN FIELD WITH WATER)
14. STREAM VOLUME:

STREAM	A	B	C	D	E	F	G
CU FT. (CU M.)	51.1 (1.45)	9.6 (.27)	6.3 (1.8)	7.9 (.82)	5.2 (.15)	56.4 (1.59)	69.5 (1.97)

15. CUSTOMER NOTE:
    A. ESTIMATED BRAZE HEIGHT. ACTUAL BRAZE HEIGHT MAY VARY +/- .12 INCH/FEET (+/- 10 MM/M) OF BRAZE HEIGHT. MAX DIMENSION INCLUDES TOLERANCE ON BRAZE HEIGHT PLUS HEADER ATTACHMENT PLATES.
    B. CUSTOMER TO REMOVE PLASTIC PLUG(S) FOLLOWING INSTALLATION AND JUST PRIOR TO INSULATING UNIT.
16. CUSTOMER REQUIREMENT:
    A. ONE MITERED END PIECE JOINT TO BE SPOT RADIOGRAPH INSPECTED PER ASME PRESSURE VESSEL CODE; SECT. VIII, DIV. 1, PAR. UW-52.
    B. ALL LONGITUDINAL NOZZLE JOINTS TO BE 100% RADIOGRAPH INSPECTED PER ASME PRESSURE VESSEL CODE; SECT. VIII, DIV. 1, PAR UW-51.
    C. ALL WELDS TO BE 100% DYE PENETRANT EXAMINED PER ASME CODE, SECTION VIII, DIVISION 1.
    D. UNIT TO BE SHRINK WRAPPED IN PLASTIC W/DESICCANT.
17. PED NOTE:
    A. HEAT EXCHANGER TO COMPLY WITH EU PED 97/23/EC; ASSESSMENT MODULE "B
    B. PED NOTIFIED BODY IS TUV INDUSTRIE SERVICE GMBH, SUD GRUPPE.
    C. ASSESSMENT CATEGORY IS "IV". ALL WORKING FLUIDS ARE GROUP 1.
18. PRODUCTION NOTES:
    A. INSTALL TWO RELIEF VALVES NOT EXCEEDING 74 PSIG (5.1 BARG) ON F STREAM. PERFORM LEAK TEST AT 29 PSIG (2.0 BARG). REMOVE RELIEF VALVES AFTER TEST. PRIOR TO SHIPMENT.
    B. INSTALL TWO RELIEF VALVES NOT EXCEEDING 74 PSIG (5.1 BARG) ON G STREAM. PERFORM LEAK TEST AT 29 PSIG (2.0 BARG). REMOVE RELIEF VALVES AFTER TEST. PRIOR TO SHIPMENT.

REVISION RECORD			
	A	B	
ADDED PRODUCTION SYMBOLS. 4" IN FLOW WAS 2.75" ADDED ESTIMATED WEIGHT AND A-STREAM VOLUME. ANGLED A-IN & E-OUT NOZZLES A-OUT HDR WAS 8.0 O.D. STRAIGHT DUT. WAS 8.625 O.D.	1-17-05	ROYAL	
REVISED NOTE 17B AND C. ECN 3983	2-18-05	SMITH	

DR	SMITH	11-3-04
CHKD	EBERT	11-15-04
PROD ENG	GOETHEL	11-17-04
MFG ENG		
WELD ENG		

STD ENGR SPEC 11-6.80
NOTE 9: SEE 9-8.01 PARA 1.2.1, 1.2.2, 1.2.3 & 4.1
NOTE 10: SEE 9-14.00
THIRD ANGLE PROJECTION

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LEGEND
- ○ PART NUMBER (PRODUCTION USE ONLY)
- ◇ JOINT DETAIL-REF./PRODUCTION USE ONLY)
- □ FIN DATA INFORMATION
- △ DIMENSIONAL REVISION
- ⬭ SPECIAL NOTATION

DIMENSIONS: PRIMARY IN INCHES, SECONDARY IN [MM] IN SHEET

Chart

BRAZED ALUM HEAT EXCHA 7 STREAM PLA
ITEM NO. W20

SIZE: D | DWG NO.: 15770

509.8 (4) 11/04