



NOTES:

- 1) ALL PARTS ARE TO BE FREE OF GREASE, OIL OR ANY OTHER CONTAMINANTS PRIOR TO ASSEMBLY AND WELDING.
- 2) DIMENSIONS AT TUBE/PIPE ENDS ARE FOR REFERENCE ONLY AND DO NOT ACCOUNT FOR SIZE VARIATIONS OF CONNECTING PARTS/FITTINGS. ADJUST LENGTHS ACCORDINGLY TO MAINTAIN OVERALL AND ON CENTER DIMENSIONS.
- 3) SEAL-OFF VALVE (ITEM NO. 10) MUST BE DISASSEMBLED AND DEVOID OF O-RING PRIOR TO WELDING.
- 4) ITEM 15 MAY BE SPLIT ALONG ITS VERTICAL AXIS AS AN ASSEMBLY REQUIREMENT.
- 5) SUPERINSULATION - TAPER MLI ON VERTICAL LEGS BEGINNING WITH ONE LAYER AT TOP OF ITEM 8, INCREASING TO 15 LAYERS 32.5" FROM START. REMAINING INTERNAL PIPING IS SPIRAL WRAPPED WITH 60 LAYERS OF MLI.
- 6) SUPERINSULATION ADJACENT TO WELD JOINTS IS TO BE PROTECTED FROM EXCESS HEAT WITH 2 LAYERS OF GLASS CLOTH FABRIC, (MAURITZON INC. STYLE 200 WELDGARD, ORANGE, .055" THICK OR EQUAL). SECURE WITH SILVER METALIZED TAPE, (3M PART NO. 850-1-SILVER, 1" WIDE X 2 MILS THICK).
- 7) UNLESS NOTED OTHERWISE ALL WELDS ARE PROCESS GTAW LEAK TIGHT.
- 8) WELD INDICATED MUST NOT PROTRUDE BEYOND OD OF TUBE AND IS TO BE CHECKED WITH A "GO" GAGE $\varnothing 3.009/3.005$.
- 9) CONNECTION INDICATED REQUIRES SCREW THREADS TO BE COATED W/ EPOXY ADHESIVE PRIOR TO BEING MADE UP. EPOXY TYPE IS 3M SCOTCH WELD 2 PART STRUCTURAL ADHESIVE NO. 1838 B/A GREEN, FERMI STK# 1930-060000.
- 10) POLISH OUTER SURFACE OF TUBES (ITEM NO. 3) W/ A POLYESTER CLEANSING PAD (3M SCOTCH-BRITE NO. 7747, FERMI STK# 1202-202000, OR EQUIVALENT). SURFACE MUST BE FREE OF IRREGULARITIES, PITTING, DENTS AND DEBRIS AND CHECKED WITH A "GO" GAGE SPECIFIED IN NOTE 8.
- 11) VACUUM TEST- NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A He MASS SPEC. LEAK DETECTOR, MINIMUM SENSITIVITY OF 1×10^{-4} atm. cc/sec.
- 12) AFFIX ARROW LABELS TO EACH SIDE OF OUTER PIPE, CENTERED HORIZONTALLY AND VERTICALLY, POINTING IN FLOW DIRECTION.

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|----|--|-----------|---|---|
| 18 | | FC0071353 | TUBE, 2.25" OD x .065" W, 304 SST | 2 |
| 17 | | FC0071352 | PIPE, 3.00" NPS SCH 5S, 304 SST | 3 |
| 16 | | FC0028338 | ELBOW, PIPE-90, LONG, 3"x5S, 304 SS | 2 |
| 15 | | FC0022491 | HDSS, 0.3750x4.5Lx5/16-18, SS18-8 | 6 |
| 14 | | F10130959 | SLEEVE, DN65 U-TUBE VAC JKT | 1 |
| 13 | | F10121323 | WELDMENT, 6" VACUUM BELLOW, 3" U-TUBE | 2 |
| 12 | | F10119608 | FLANGE, V-BAND COUPLING, 3" MALE BAYONET | 2 |
| 11 | | F10119396 | LUG, LIFTING, 3" U-TUBE | 2 |
| 10 | | F10119376 | FLANGE, BELLOW RESTRAINT | 2 |
| 9 | | F10119375 | TUBE, SPACER, .625" OD X .120" W, 304 SST | 6 |
| 8 | | F10119348 | APAPTER, 2.25" OD X 3.00" NPS SCH 5S | 2 |
| 7 | | F10119346 | TUBE, 6" OD VACUUM JACKET, VAR VERT MITER | 1 |
| 6 | | F10117410 | TUBE, 6" OD VACUUM JACKET, FIXED VERT MITER | 2 |
| 5 | | F10117409 | TUBE, 6" OD VACUUM JACKET, DOUBLE MITER | 2 |
| 4 | | F10117408 | TUBE, 6" OD VACUUM JACKET, HORIZ MITER | 1 |
| 3 | | F10117406 | TUBE, OUTER BAYONET, 3.00" OD | 2 |
| 2 | | F10094364 | END, MALE, 3" SUBATM BAYONET | 2 |
| 1 | | F09000378 | VALVE - 1 IN VAC SEAL-OFF - CV1 V-1046-31 INCL TC | 1 |

| ITEM | VENDOR \ NO | FERMI NO | PART NAME | QTY |
|--|-------------|----------|--------------------------|-------------------|
| UNLESS OTHERWISE SPECIFIED | | | | |
| 1-X | 1-XX | 1-XXX | 1-X/X | 1-X" |
| 1 | .02 | .005 | 1/16 | 1" |
| DRAWN: G.S. JOHNSON | | | CHECKED: R. WANG | DATE: 07-Feb-2020 |
| APPROVED: R. WANG | | | DATE: 14-Feb-2020 | |
| DO NOT SCALE DRAWING DIMENSIONS BASED ON: ASME Y14.5-2009 MAX MACHINE ALL SURFACES: .125/ DRAWING UNITS: INCHES | | | | |
| THIRD ANGLE PROJECTION | | | MATERIAL: SEE PARTS LIST | |
| GROUP: Technical Division - Organic Support CASE CODE: 0496 | | | | |

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|---|-------------------------|---------------|--------|
| FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY | | | |
| NAME: ASSEMBLY, U-TUBE, HWR DN65 2K RETURN | | | |
| SCALE: 1:12 | SIZE: DRAWING NUMBER: E | SHEET: 1 of 1 | REV: - |
| F10117405 | | | |