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| TITLE FITTING/PURGE PROCEDURE FOR CIRCUMFERENTIAL BUTT WELDS | | IDENTIFICATION FPCIRCUMFERENTIAL LIGO-8960050-06-B | | | | |
| | | REFERENCE NO. 930212 | | SHT 1 OF 3 | | |
| PRODUCT LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY | | OFFICE COH | | REVISION 6 | | |
| | | MADE BY RWP | CHKD BY BGG | MADE BY RAJ | CHKD BY KSD | |
| | | DATE 1/24/94 | DATE 1/31/94 | DATE 2/17/97 | DATE 2/18/97 | |
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1.0 PURPOSE:

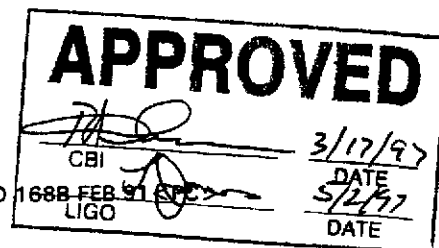
This procedure is to be used in conjunction with WPS-ER308L /CIRC. It is to be used for the welding of butt joints between expansion joints-to-tube and for tube-to-tube.

2.0 LIST OF EQUIPMENT:

- 2.1 Inflatable purge ring (Site).
- 2.2 Purge dams (Shop).
- 2.3 Fitting device.
- 2.4 Segmental Plexiglas Gloves Box.
- 2.5 100 feet 1½" OD vacuum hose.
- 2.6 Clean Room Ultra Low Particulate Air (ULPA) Vacuum.
- 2.7 Portable Drill or Grinder (Cordless preferred) with milling cutters.

3.0 PURGING:

- 3.1 Place fitting device on one end of tube, in the case of tube-to-expansion joint, the device shall be placed on the tube end.
- 3.2 Round out tube end by turning the adjusting screws.
- 3.3 Place other tube, or expansion joint, into clamp and tighten using adjusting screws.
- 3.4 Adjust screws to rough align the weld joint and tape the outside of the weld joint when necessary to retain purge gas. When used, the tape shall have a central liner to keep adhesive off of the weld area. Use ¾ inch wide masking tape as the central liner should center lined tape be unavailable.





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| TITLE FITTING/PURGE PROCEDURE FOR CIRCUMFERENTIAL BUTT WELDS | | IDENTIFICATION FPCIRCUMFERENTIAL | | | |
| | | REFERENCE NO. 930212 | | SHT 2 OF 3 | |
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3.5 Purge Apparatus

3.5.1 Shop - Install purge dam on each side of the weld joint.

3.5.2 Site - Install inflatable purge ring on inside of tube centered over the weld joint.

3.6 Purging at Shop

3.6.1 Purge dams shall be placed in position.

3.6.2 Purge with 100% argon until oxygen level is less than 1.0%.

3.6.3 Maintain oxygen level of less than 1.0% during welding. Do not allow pressure to build up in annular space. Periodically monitor oxygen level during welding.

3.7 Purging at Site

3.7.1 Inflate purge ring outer seals with nitrogen. Regulator should be set at approximately 20-25 psig.

3.7.2 Open evacuation line valve and annular space pressure line valve allowing 100% argon purge gas to purge annular space. Purge until oxygen level is less than 1.0%.

3.7.3 Reduce flow rate into purge area to a minimum level to maintain adequate purge, less than 1.0% oxygen.

3.7.4 During welding, vent purge gas into the tube to prevent a buildup of pressure in the purge area.

Note: excessive pressure in the purge area will cause the inside root of the weld to be pushed toward the outside. This can result in a repair.



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| IDENTIFICATION | | | |
| FPCIRCUMFERENTIAL | | | |
| REFERENCE NO. | | SHT 3 OF 3 | |
| 930212 | | | |
| OFFICE | | REVISION | |
| COH | | 6 | |
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4.0 FITTING:

- 4.1 Adjust screws for flush outside fit with a maximum allowable offset of 1/4 of the thickness of the thinner member.
- 4.2 The gap shall not exceed 0.010".
- 4.3 Tacking of joint
 - 4.3.1 Shop-When offset and gap are acceptable, tack in accordance with WPS-ER 308L/Manual on the outside of the joint using small autogenous tacks approximately 1/8" wide x 1/2" long. Tacks shall be spaced as needed for alignment and fit up. Back purge with hand held purge.
 - 4.3.2 Site-When the offset and gap are acceptable, replace the tape if needed to help keep an adequate purge. Keep tape adhesive off of the weld area. Tack weld using WPS-ER 308L/Manual on the outside of the joint using small autogenous tack welds approximately 1/8" wide x 1/2" long. Tacks shall be spaced as needed for alignment and fit up.

5.0 WELDING:

- 5.1 Mount 56" diameter welding track as accurately as possible approximately 10" from the weld joint. Take extra care to assure the track is parallel to the weld joint.
- 5.2 Place the welding unit on the track and check to see that all cables are in place. (See the Operators Manual for instructions)
- 5.3 Welding of joint
 - 5.3.1 Shop - Weld joint in accordance with WPS-ER308L/CIRC while rotating tube at same speed as weld head is traveling on track. The weld torch is kept at the 2:00 to 3:00 clock position during welding.



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| | | REFERENCE NO. 930212 | | SHT 4 OF 3 | |
| | | OFFICE COH | | REVISION 6 | |
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5.3.2 Site - Weld the joint using WPS-ER308L/CIRC removing the tape (when used) ahead of the welding arc.

5.4 When welding is complete, remove the purge dams or purge ring.

6.0 VISUAL INSPECTION:

6.1 Perform an outside visual inspection of the circumferential joint. If there are to be any welded repairs, use WPS-ER308L/REPAIR.

6.2 Repeat step 6.1 above until no welded repairs are required.

6.3 Release purge gas.

6.4 Perform an inside visual inspection of the circumferential joint. If there are to be any welded repairs, use WPS-ER308L/REPAIR. Purging of the outside of the joint is required when welding from the inside. If there are to be any repairs not requiring welding use GR 8X.

Note: If grinding on the inside of the tube is required at site, grinding dust must be contained so as to prevent contamination of the inside of tube.