



IDENTIFICATION			
FPCIRCUMFERENTIAL			
LIGO-8960050-05-B			
REFERENCE NO.		SHT 1 OF 3	
930212			
OFFICE		REVISION	
COH		5	
MADE BY	CHKD BY	MADE BY	CHKD BY
RWP	BGG	WLR	RAJ
DATE	DATE	DATE	DATE
1/24/94	1/31/94	8/21/95	8/21/95

TITLE	FITTING/PURGE PROCEDURE FOR CIRCUMFERENTIAL BUTT WELDS
PRODUCT	LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY

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.
- 2.2 Fitting device.
- 2.3 Segmental Plexiglas Gloves Box.
- 2.4 100 feet 1½" OD vacuum hose.
- 2.5 Clean Room Ultra Low Particulate Air (ULPA) Vacuum.
- 2.6 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. 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.
- 3.5 Install inflatable purge ring on inside of tube centered over the weld joint.
- 3.6 Inflate purge ring outer seals with nitrogen. Regulator should be set at 5 psig.

APPROVED

[Signature]
LIGO 11/10/95

[Signature]
11/10/95



IDENTIFICATION			
FPCIRCUMFERENTIAL			
REFERENCE NO.		SHT 2 OF 3	
930212			
OFFICE		REVISION	
COH		5	
MADE BY	CHKD BY	MADE BY	CHKD BY
RWP	BGG	WLR	RAJ
DATE	DATE	DATE	DATE
1/24/94	1/31/94	8/21/95	8/21/95

TITLE	FITTING/PURGE PROCEDURE FOR CIRCUMFERENTIAL BUTT WELDS
PRODUCT	LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY

- 3.7 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%.
- 3.8 Reduce flow rate into purge area to a minimum level to maintain adequate purge, less than 1.0% oxygen.

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". If the gap is greater than the allowable 0.010", the tubes may be pulled together by means of a turnbuckle.
- 4.3 When the offset and gap are acceptable, tack the joint and replace the tape to help keep adequate purge. Keep tape adhesive off of the weld area. All tacking shall be done by the manual GTAW process without the use of filler metal spaced approximately every 4 to 5 inches. Small "button" tacks shall be used with a diameter no larger than 1/8".

5.0 WELDING:

- 5.1 Mount 56" diameter welding track exactly 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 Weld the joint using WPS-ER308L/CIRC removing the tape ahead of the welding arc.



IDENTIFICATION
FPCIRCUMFERENTIAL

TITLE
FITTING/PURGE PROCEDURE FOR CIRCUMFERENTIAL BUTT WELDS

PRODUCT
LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY

REFERENCE NO. 930212		SHT 3 OF 3	
OFFICE COH		REVISION 5	
MADE BY RWP	CHKD BY BGG	MADE BY WLR	CHKD BY RAJ
DATE 1/24/94	DATE 1/31/94	DATE 8/21/95	DATE 8/21/95

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 Shut valve on annular space pressure/purge line to 100% argon purge gas.
- 6.4 Shut nitrogen ring seal gas supply valve.
- 6.5 Open purge ring outer seal vent valve.
- 6.6 Remove inflatable purge ring, welding unit and welding track.
- 6.7 Perform an inside visual inspection of the circumferential joint. If there are to be any welded repairs, use WPS-ER308L/REPAIR. If there are to be any repairs not requiring welding use GR 8X.
- 6.8 If during field installation, repairs are to be made in accordance with the requirements contained in procedure INSTALLSEQ.
- 6.9 If during field installation, perform spot cleaning per procedure CL3N.
- 6.10 If during field installation, install inflatable purge ring and proceed with procedure HMST2N.