

Title: **FABRICATION PLAN FOR BEAM SPLITTER CHAMBERS (BSC)**

**FABRICATION PLAN  
FOR  
BEAM SPLITTER CHAMBERS (BSC)  
LIGO VACUUM EQUIPMENT**

**Hanford, Washington  
and  
Livingston, Louisiana**

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**TECHNICAL DIRECTOR:** D. O. Williams

**PROJECT MANAGER:** Robert Bayl

Information contained in this specification and its attachments is proprietary in nature and shall be kept confidential. It shall be used only as required to respond to the specification requirements, and shall not be disclosed to any other party.


0	PEF 5/1/96	DMW	ISSUE FOR DED 0161 FOR FDR
REV LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE

<b>PROCESS SYSTEMS INTERNATIONAL, INC.</b>				<b>SPECIFICATION</b>	
INITIAL APPROVALS	PREPARED	DATE	APPROVED	DATE	NumberA V049-2-080   Rev. $\emptyset$
	PEF	5/1/96	PEB	5/2/96	LIGO-E960131-00-V

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**FABRICATION PLAN FOR BEAM SPLITTER CHAMBERS (BSC)**

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**1.0 PURPOSE**

The purpose of this procedure is to define design guidelines, specifications, and procedures to enable PSI to specify, purchase, inspect, fabricate, test and ship the BSC chambers per LIGO requirements.

**2.0 GENERAL**

All Beam Splitter Chambers (BSC) shall be fabricated per this fabrication plan. Each fabrication process shall be controlled via a written procedure. A "first article" approach will be used to validate all fabrication processes prior to release of the full vessel lot.

All vessels will be fabricated in accordance with the Quality Plan. Key points in the fabrication process shall be verified to ensure consistent results.

All vacuum equipment shall be fabricated in accordance with LIGO Project Contract PC175730 dated September 12, 1995, and subsequent change orders.

**3.0 RESPONSIBILITY**

The Manufacturing Department is responsible for the execution of this procedure, with input and monitoring by the Project Engineer, the Quality Assurance Department, and the Project Manager.

**4.0 FABRICATION PLAN**

4.1 A first article approach (i.e. BSC prototype) will be used to start the BSC manufacturing cycle to validate the manufacturing procedures and technique prior to the full production release.

4.2 The BSC chambers will be fabricated using an outside manufacturing shop. PSI will perform vessel cleaning, leak checking, bakeout and preparation for shipment.

4.3 All BSC will be fabricated and tested per documents listed in Attachment I "Fabrication Documents".

4.4 The BSC will be fabricated and tested per Attachment 2 BSC Fabrication Flow Chart.

4.5 The BSC Chambers will be fabricated according to the Fabrication Priority List Attachment 3.

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## 4.6 Procurement

PSI will procure all S.S. plate and flange material and supply it with the selected fabrication vendor.

PSI will purchase vessel heads and supply them to the selected fabrication vendor.

## 4.7 Quality Assurance

The BSC Fabrication Process shall be monitored and control via the Quality Plan.

Outside fabrication vendors will perform the quality plan inspections for their portion of the work. PSI will witness critical process inspections as detailed in the Quality Plan.

PSI will audit each major fabrication vendor's Q.A. Program after P.O. awards.

PSI and fabrication vendors will inspect all incoming materials to purchase documents.

## 4.8 Shop Conditioning/Testing

The Beam Splitter Chambers will be shop conditioned (cleaned, bakeout, etc.) per PSI Procedure V049-2-047.

## 4.9 Preparation For Shipment

The Beam Splitter Chambers will be prepared and shipped per PSI Procedure V049-2-123.

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FABRICATION PLAN FOR BEAM SPLITTER CHAMBERS (BSC)

ATTACHMENT 1

BSC FABRICATION DOCUMENTS

1.	Spec. For Beam Splitter Chamber (BSC)	V049-2-117
2.	Spec. For Beam Splitter Chamber Quality Plan	V049-2-048
3.	Bill of Material	V049-4-001
4.	Flanges	V049-2-040 & V049-2-042
5.	Heads	V049-2-039
6.	Raw Material Handling Procedure	V049-2-120
7.	Weld Data Sheet Spec.	V049-2-084
8.	Weld Procedures	V049-2-070, V049-2-071, V049-2-072, V049-2-073
9.	Weld Repair Procedure	V049-2-074
10.	Cleaning Procedures	V049-2-015
11.	Painting Procedures	V049-2-077
12.	Stress Relief Procedures	V049-2-046
13.	Bakeout Procedure	V049-2-019
14.	Leak Test Procedure	V049-2-014
15.	Components Shop Conditioning/Test Plan	V049-2-047
16.	Dimensional Verification Procedure	V049-2-121
17.	Component Packing, Handling, and Shipping Procedure	V049-2-123
18.	PSI Drawings	
	BSC Assembly	V049-4-001
	Chamber Supports	V049-4-023
	60" Port Cover	V049-4-014
	60 1/2" ID Flange (Grooved)	V049-4-019
	104.5" ID Flange	V049-4-022
	Floor Assembly	V049-4-036

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**LEGEND**

NUMBERS=PSI MANUFACTURING ACTIVITY  
LETTERS=MACHINE SHOP ACTIVITY (VENDOR)

**BSC FABRICATION PROCESS**

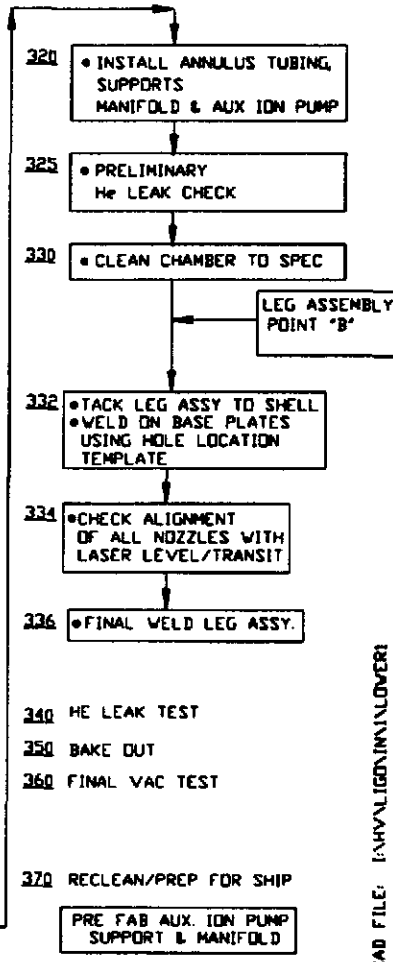
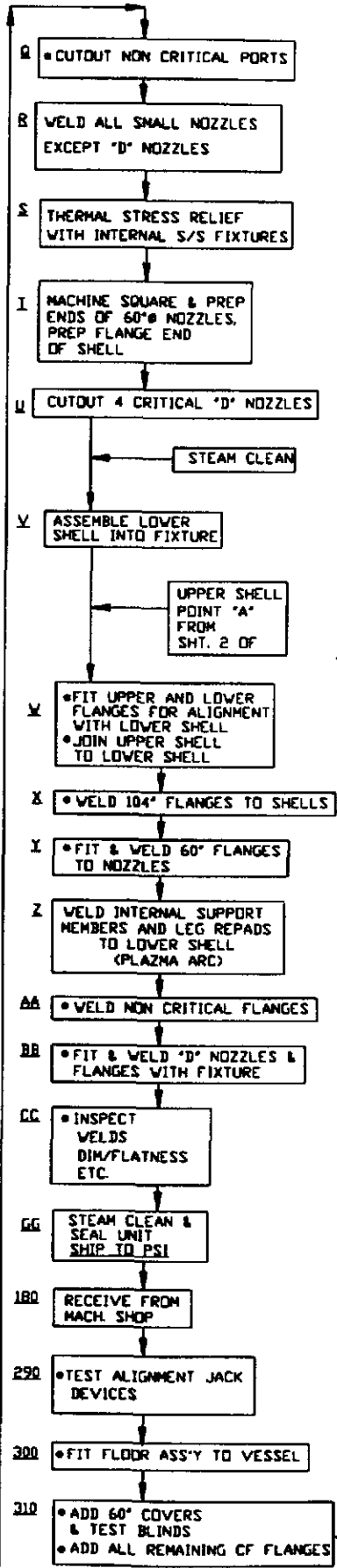
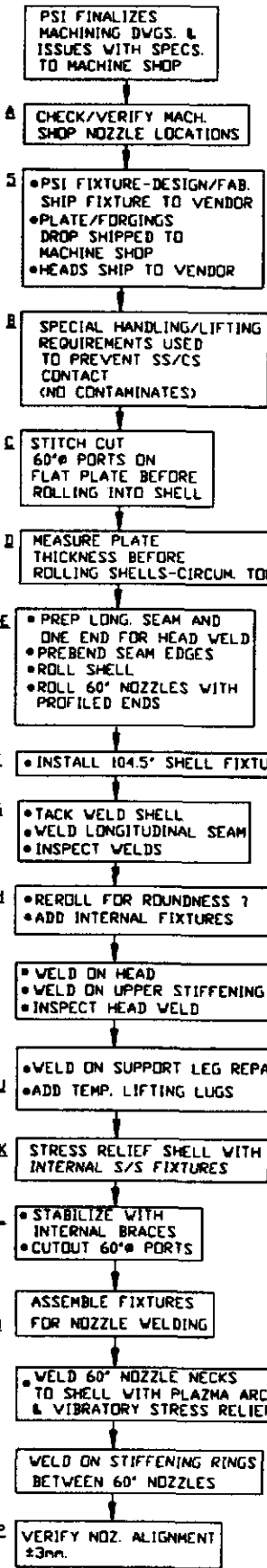
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**LOWER SHELL**

REF. DWG. V049-4-001 (5 SHTS)

**OTHER MACHINE ITEMS:  
(INCLUDES TEST CHAMBER)**

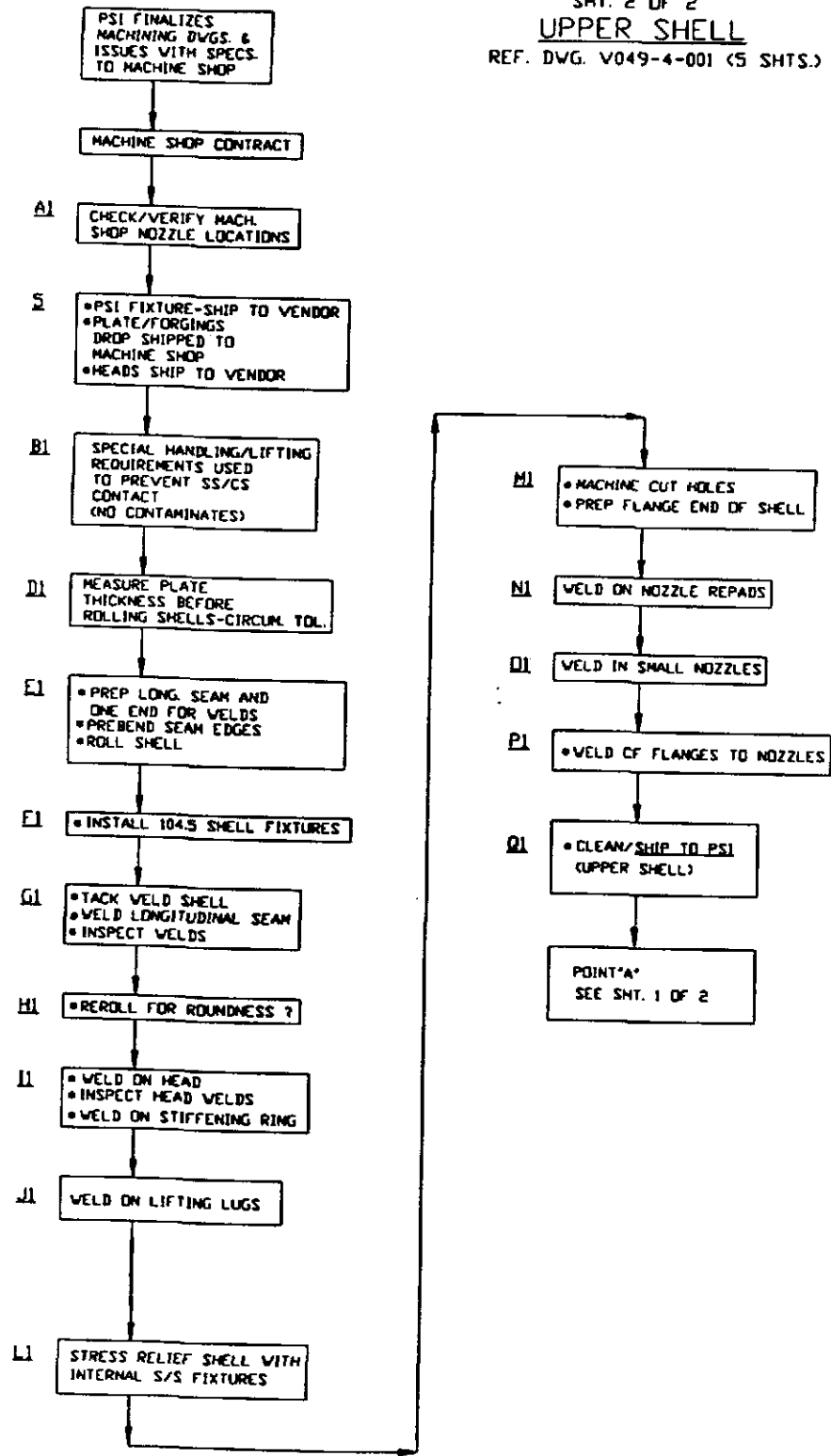
- I •MACHINE 104.5" I.D. FLANGES  
1-GROOVED  
1-FLAT FACED
- II •MACHINE 60.5" I.D. FLANGES  
W/ GROOVES 6 REQ'D.  
•MACHINE HOLES IN (4) 60" HEADS  
•MACHINE 60" FLGS. ON HEADS F.F. 4 REQ'D.  
•MACHINE/DEVELOP 14" CF NOZZLE NECKS  
•MACHINE/PROFILE 8"X10" CF NOZZLES
- III •MACHINE 60" TEST BLINDS-2 REQ'D.  
•MACHINE 60" NOZZLE FIXTURE FOR PSI
- IV •ROLL STIFFENING RINGS
- V •CUTOUT SUPPORT REPADS FROM DROPOUTS  
•CUTOUT LIFTING LUGS FROM DROPOUTS  
•CUTOUT "E" PORTS FROM DROPOUTS
- VI •BASE PLATES-MACHINE HOLES
- VII •PREFAB LEG ASSEMBLY  
•BLAST & PAINT



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**BSC**  
**FABRICATION PROCESS**  
 SHT. 2 OF 2  
**UPPER SHELL**  
 REF. DWG. V049-4-001 (5 SHTS.)



CAD FILE: JAHVALIGN/UPPER

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FABRICATION PLAN FOR BEAM SPLITTER CHAMBERS (BSC)

ATTACHMENT 3

BSC FABRICATION PRIORITY LIST

Prototype (Spare)

WBSC4	(CS)
WBSC7	(CS)
WBSC8	(CS)
WBSC1	(CS)
WBSC3	(CS)
WBSC2	(CS)
WBSC6	(LMS)
WBSC10	(LES)
WBSC5	(RMS)
WBSC9	(RES)
LBSC1	(CS)
LBSC3	(CS)
LBSC2	(CS)
LBSC5	(LES)
LBSC4	(RES)

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