ACCEPTANCE TEST PROCEDURE FOR

CLEAN AIR SUPPLIES

FOR

LIGO VACUUM EQUIPMENT

Hanford, Washington
and
Livingston, Louisiana

PROJECT ENGINEER: Thomas M. Stun

INSTR/ELEC ENGINEER: N A

QUALITY ASSURANCE: Allan R Bradbrook

TECHNICAL DIRECTOR: D. A. McW Alexis

PROJECT MANAGER: Richard Bay Jr

REV LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE
1	D.M(W 12-18-96	R B 12/20/96	REV PER DEO # 0390
0	TMS 5-3-96		INITIAL RELEASE PER DEO # 0165 FOR FDR

PROCESS SYSTEMS INTERNATIONAL, INC. — **SPECIFICATION**

INITIAL APPROVALS	PREPARED	DATE	APPROVED	DATE	Number A V049-2-109	Rev.
	TMS	5-3-96	REB	5/4/96	LIGO-E960011-01-V	1

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1.0 PURPOSE

The purpose of this Acceptance Test Procedure (ATP)is to define the overall plan for acceptance testing of this component in order to demonstrate that it meets the requirements of the LIGO Vacuum Equipment Specification, LIGO-E940002-02-V, Revision 2, dated August 31, 1995.

2.0 GENERAL

2.1 The procedure applies to all of the stations. Differences between the stations will be due to different vacuum equiipment, size of the isolatable sections, surfaces, volumes and quantities of instrumentation and equipment.

2.2 Tests will be performed by PSI personnel, and will be witnessed by an agent (with sign-off authority) designated by LIGO.

3.0 REFERENCE DOCUMENTS

The following documents shall be used in conjunction with this one for performing the ATP:

PSI Specification V049-2-011, Clean Air Supply Systems

4.0 RESPONSIBILITY

It shall be the responsibility of the project engineer assigned to this component or subsystem to ensure that all of the procedures required by this ATP are performed and that the LIGO witness signs the data sheet/test certification (attached to this procedure) verifying that the procedures have been performed. The data sheet shall also be signed by the project engineer, or other PSI person designated by the project manager. Any test listed in the data sheet which is not applicable to this component or subsystem shall be noted by writing "NA" in the appropriate space. Any deviations from the test procedures or parameters shall be noted on the data sheet.

5.0 TEST

5.1 Each compressor system shall be functionally tested. A comprehensive operational test plan shall be developed and used to demonstrate proper operation of the compressors. Tests shall include normal operation plus simulation of unusual events (component failure, etc.) to ensure that individual skid controls bring the system to a safe condition.

5.2 For one of each size system, the delivered flowrate shall be shown to be at least 50 CFM or 200 CFM, the dewpoint shown to be no higher than -60 C (at atmospheric pressure), and hydrocarbon content shown to be no higher than the ambient air. In addition, a particle count of the delivered air shall be taken to confirm that it conforms to Class 100(at 0.5micrometers).

5.3 Final acceptance will occur in the field. The hydrocarbon content, dewpoint, and particle count will be repeated as part of the check for cleanliness of the installed piping system in each station. Measurements shall be made at each outlet connection using the sampling fixture connected to the branch outlet.

5.4 The following instruments, or equal, shall be used for testing:

Dewpoint:	Kahn Ceramic Portable Hygrometer Range: -80Cto +20C
Hydrocarbon Content:	MSA Passport PID2 Organic Vapor Monitor
Particle Count:	MET One Model HPS227B Portable Airborne Particle Counter

LIGO VACUUM EQUIPMENT ACCEPTANCE TEST DATA/TEST VERIFICATION **Equip. Tag_____ S/N_____**

Type of Test	ATP Para.	ATP Req'ment/ Actual Data	Comments	LIGO Witness Sign./date	PSI Sign./date
Visual Inspection					
Labelling Verification					
Bakeout	NA				
Leak rate	NA				
Factory Endurance Test	NA				
Factory Speed Test	NA				
Functional Test	5.1				
DEWPOINT	5.2				
Particle Count	5.2				
HYDROCARBON CONTENT	5.2				

ACCEPTANCE TEST PROCEDURE FOR

CLEAN AIR SUPPLIES

FOR

LIGO VACUUM EQUIPMENT

Hanford, Washington
and
Livingston, Louisiana

PROJECT ENGINEER: Thomas M. Stein

INSTR/ELEC ENGINEER: N A

QUALITY ASSURANCE: Allan R Bradbrook

TECHNICAL DIRECTOR: D. A. McWilliams

PROJECT MANAGER: Richard Bay Jr

REV LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE
1	D McWilliams 12-8-97	RBS 12/31/97	REV PER DEO #0390
0	JMS 5-3-96		INITIAL RELEASE PER DEO #0165 FOR FDR

PROCESS SYSTEMS INTERNATIONAL, INC. | SPECIFICATION

INITIAL APPROVALS	PREPARED	DATE	APPROVED	DATE	Number A V049-2-109	Rev.
	JMS	5-3-96	REB	5/4/96	LIGO-E960011-01-V	1

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SPECIFICATION

Number A V049-2-109 Rev. /

1.0 PURPOSE

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2.0 GENERAL

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3.0 REFERENCE DOCUMENTS

The following documents shall be used in conjunction with this one for performing the ATP:

PSI Specification V049-2-011, Clean Air Supply Systems

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5.4 The following instruments, or equal, shall be used for testing:

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Hydrocarbon Content:	MSA Passport PID2 Organic Vapor Monitor
Particle Count:	MET One Model HPS227B Portable Airborne Particle Counter

LIGO VACUUM EQUIPMENT ACCEPTANCE TEST DATA/TEST VERIFICATION Equip. Tag_____ S/N_____

Type of Test	ATP Para.	ATP Req'ment/ Actual Data	Comments	LIGO Witness Sign./date	PSI Sign./date
Visual Inspection					
Labelling Verification					
Bakeout	NA				
Leak rate	NA				
Factory Endurance Test	NA				
Factory Speed Test	NA				
Functional Test	5.1				
[illegible]	5.2				
Particle Count	5.2				
[illegible] Content	5.2				

ACCEPTANCE TEST PROCEDURE FOR

PORTABLE SOFT-WALL CLEANROOMS

FOR

LIGO VACUUM EQUIPMENT

Hanford, Washington
and
Livingston, Louisiana

PROJECT ENGINEER: Thomas M. Stan

INSTR/ELEC ENGINEER: FADI BARK (RCB

QUALITY ASSURANCE: Alan L Bradbrook

TECHNICAL DIRECTOR: D. A. McWilliams

PROJECT MANAGER: Rachel Bagby

REV LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE
1	D.M.W 12-18-96	RCB 12/20/96	REV PER DEO 341
0	TMS 5-3-96	RCB 5/4/96	INITIAL RELEASE PER DEO # 0165 FOR FOR

PROCESS SYSTEMS INTERNATIONAL, INC.			SPECIFICATION	
INITIAL APPROVALS	PREPARED DATE	APPROVED DATE	Number A V049-2-110	Rev.
	TMS 5-3-96	RCB 5/4/96		1

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1.0 PURPOSE

The purpose of this Acceptance Test Procedure (ATP)is to define the overall plan for acceptance testing of this component in order to demonstrate that it meets the requirements of the LIGO Vacuum Equipment Specification, LIGO-E940002-02-V, Revision 2, dated August 31, 1995.

2.0 GENERAL

2.1 The procedure applies to all of the stations. Differences between the stations will be due to different vacuum equiipment, size of the isolatable sections, surfaces, volumes and quantities of instrumentation and equipment.

2.2 Tests will be performed by PSI personnel, and will be witnessed by an agent (with sign-off authority) designated by LIGO.

3.0 REFERENCE DOCUMENTS

The following documents shall be used in conjunction with this one for performing the ATP:

PSI Specification V049-2-010

FED-STD 209E, 1992

4.0 RESPONSIBILITY

It shall be the responsibility of the project engineer assigned to this component or subsystem to ensure that all of the procedures required by this ATP are performed and that the LIGO witness signs the data sheet/test certification (attached to this procedure) verifying that the procedures have been performed. The data sheet shall also be signed by the project engineer, or other PSI person designated by the project manager. Any test listed in the data sheet which is not applicable to this component or subsystem shall be noted by writing "NA" in the appropriate space. Any deviations from the test procedures or parameters shall be noted on the data sheet.

5.0 TEST

5.1 One of each size portable cleanroom shall be fully assembled at the manufacturer's shop. It shall be inspected for dimensional specifications and the presence and proper operation of the windows to seal to the beam tube or nozzles, and to the BSC dome. Rigidity of both the frame and of the removable ceiling unit shall be verified. The operation of the sealing system used to mate two cleanrooms together shall be checked. The cleanroom will be operated and certified to produce a Class 100 (at 0.5 micrometers)environment at rest for nonunidimensional flow after balancing, sealing and cleaning.

5.2 Final acceptance of each cleanroom will occur at the point of first use: in the PSI shop or at the sites. Each cleanroom will be operated and certified to produce a Class 100 (at 0.5 micrometers)environment at rest using a discrete particle counter(DPC) in accordance with Section 5 of FED-STD 209E, 1992. Sample locations and number shall be in accordance with Section 5.1.3.2 for nonunidirectional flow. For the BSC cleanroom it is permissible to block out the non filtered center core with clean room curtains to simulate the presence of the BSC.

5.3 The following instruments, or equal, shall be used for testing:

Particle Count: MET One, Model HPS227B Portable Airborne Particle Counter

Thermal Anemometer: Datametrics, Model ADM-870

Pressure Gauge: Dwyer, Model 2000-00
Range: 0-.25"WC

6.0 DOCUMENTATION

A system assembly and operating manual shall be provided.

LIGO VACUUM EQUIPMENT ACCEPTANCE TEST DATA/TEST VERIFICATION Equip. Tag____ S/N_____

Type of Test	ATP Para.	ATP Req'ment/ Actual Data	Comments	LIGO Witness Sign./date	PSI Sign./date
Visual Inspection					
Labelling Verification					
Bakeout	NA				
Leak rate	NA				
Factory Endurance Test	NA				
Factory Speed Test	NA				
Functional Test	5.1				
RGA Test	NA				
Particle Count	5.2	Class 100			
Pumpdown	NA				

SPECIFICATION FOR

CLEANING PROCEDURE

FOR

LIGO VACUUM EQUIPMENT

Hanford, Washington
and
Livingston, Louisiana

PREPARED BY: Thomas M. Stan

QUALITY ASSURANCE: Alan L Budlong

TECHNICAL DIRECTOR: D A. McWilliams

PROJECT MANAGER: Burbank Bagley

REV LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE
2	TMS 1-16-97	REB DLCW 1-16-97	ADDED DETERGENT DETAILS PER DEO 0414
1	GS 10-10-96	REB	Release for Fab Per DEO #0302
1	TMS 8-6-96	DLCW 8-6	ADDED ACETONE PRECLEAN AND UPDATED PROCEDURE PER DEO 0240
0	TMS 4-30-96	REB	GENERAL REVISION PER DEO # 0151

PROCESS SYSTEMS INTERNATIONAL, INC.				SPECIFICATION	
INITIAL APPROVALS	PREPARED	DATE	APPROVED	DATE	Number A V049-2-015 Rev. 2
	T. Stan	4-30-96	REB	5/1/96	

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SPECIFICATION

Number		Rev.
A	V049-2-015	2

1.0 PURPOSE

The purpose of this procedure is to define the necessary steps for the cleaning of the LIGO vacuum equipment components such that all vacuum exposed surfaces are compatible with ultra high vacuum service.

2.0 GENERAL

This procedure is applicable to any fabricated stainless or aluminum component that is exposed to UHV service. It applies to the cleaning of these components subsequent to completion of all machining and welding operations.

3.0 RESPONSIBILITY

3.1 PSI Engineering is responsible for identifying all components and portions of components that are subject to this procedure. All cleaning will be as specified on the drawings.

3.2 PSI manufacturing is responsible for the execution of this procedure in the PSI shop.

3.3 The installation contractor is responsible for maintaining this procedure at the sites.

3.4 Quality Assurance is responsible for monitoring compliance with this procedure in the PSI shop. Engineering will be responsible for compliance at the sites.

3.5 This procedure shall be maintained and modified as required by the cognizant engineer.

4.0 EQUIPMENT AND SYSTEMS

4.1 The cleaning equipment consists of the following:

4.1.1 Washing Cabinet
- Enclosure
- Spray header system
- Drain collection system and pump
- Vent system
- Controls

4.1.2 Cleaning Solution and Rinse System

Wash water storage tank
Rinse water storage tank
DI Water system and storrage tank
Waste water hold-up tank
Wash/Rinse water heater
DI Water heater
Pumps, filters, piping, valves

4.2 Clean Manufacturing Area

An isolated section of the PSI shop will be provided with an outside air purge to form a clean manufacturing space. Class 100 cleanrooms will be operated in this area. Because the air is recirculated through the cleanroom filters, it will also be cleaner than the shop atmosphere. It is expected that it may reach a level as low as Class 50,000 to 100,000. The components cleaned in the washing cabinet will be moved into the Class 100 cleanrooms for packaging (or closure of the vessel ports) without going back into the shop atmosphere.

4.3 Class 100 Cleanroom

4.3.1 Two Class 100 soft-wall portable cleanrooms are joined together to make a large working area. The cleanrooms circulate air through HEPA filters at the tops of the rooms downward. The air exits under the soft-walls (plastic curtains) at the bottom and recirculates through the room to the blower inlets at the top.

4.3.2 Cleanroom activities shall be performed in accordance with Cleanroom Procedure V049-2-118. Specific cleanroom training is required for anyone entering the cleanroom. This training, given by Manufacturing Engineering, covers principles, gowning and necessary behavior.

5.0 PROCEDURE

5.1 Starting Condition

a.. All welding completed to the degree possible.

b. Remove gross contamination from all interior and exterior surfaces (including flange faces) by steam cleaning with a portable steam system. Remove ink markings, such as material designations, with acetone.

5.2 Equipment Set-Up

a. Establish the proper level of DI water in the storage tank by running city water through the DI water system and into the tank

b. If any water remains in the waste water hold-up tank, drain it to the waste storage tank. (Note: If the waste water is to be drained to the town sanitary sewer, testing and treatment may be needed before discharge.)

c. Establish the proper level in the wash water tank, adding detergent and water pumped from the primary rinse tank as required. (The entire contents of the wash water tank should be drained every 2 months, or longer if the system is not used continuously. Also, see Section 5.7, below.)

d. Establish the proper water level in the rinse water tank, adding DI water as required.

e. Activate the wash/rinse water heater and circulate the wash water in a closed loop to heat the contents of the tank to approximately 150 F as read on the thermometer at the pump inlet. Repeat for the rinse water. Repeat for the DI water using its dedicated pump and heater.

f. Confirm proper piping connections and valve lineup for the system.

g. Confirm proper operation of the vent fan.

h. Confirm proper operation of the cleanroom.

5.3 Cleaning Precautions

5.3.1 There shall be a minimum of two operators present (in the area) for all cleaning operations.

5.3.2 The operator doing the washing shall wear a lab coat, shoe covers and clean room gloves. (This applies to anyone handling the cleaned pieces.)

5.3.3 The operators should be familiar with the washing system and its components before operating the equipment.

5.3.4 Do not let any surface dry between start of washing and end of final rinse.

5.3.5 Handle each piece or component with appropriate care and clean gloves.

5.4 Cleaning

5.4.1 *General*

a. The heater controls should be set to provide approximately 150 F water.

b. When making DI water, periodically monitor the quality light at the DI system.

5.4.2 *Component Loading*

a. Mount the component to be cleaned on a cart, and position in the washing cabinet.

b. Assemble and position the spray headers as appropriate for the piece being washed.

c. Install the turning machine. Run the turning machine and visually confirm proper rotation of the component and positioning of the spray headers.

d. Close and secure the cabinet doors.

5.4.3 *Wash*

a. Start the cleaning cycle (the vent fan will automatically start during drying). Note: The cycle should not be interrupted between steps.

b. As the controller steps through the washing and rinsing steps of the cycle, periodically monitor the status of the pumps, valves, filters and tanks.

5.4.4 *Drying*

a. Drying will be accomplished by blowing clean air over the component before allowing it to cool.

b. Inspect and bag the component (or close up the vessel) as soon after drying as possible. Avoid contamination from unfiltered shop air through open doorways.

5.5 Inspection

a. Inspection shall be done (before removing the piece from the washing cabinet) using a black light on all interior surfaces or flange faces. No visible contaminant of any form shall be detected when viewed with the naked eye under both natural and ultraviolet light.

b. The presence of any hydrocarbon or fingerprints on any interior surface or flange face shall be cause for rejection. This will require CO_2 cleaning to rectify.

c. A visual inspection shall be made of exterior surfaces. Visible particulates or actual contamination shall be removed.

5.6 Bagging/Wrapping

a. Immediately after drying and inspection, double bag the component using clean, oil-free polyethylene bags or wrap and seal using the same material.

b. Remove the component to the clean area.

5.7 Wash Solution Maintenance

a. The wash solution should be established and maintained at approximately 4% by volume of Inpro-Clean 1300 (manufactured by Oakite). On the filling of an empty tank, 20 gallons of the cleaner should be used with DI water to fill the tank to 520 gallons (just below the high level switch location).

b. When adding water to the wash solution tank, either from the primary rinse tank or from the DI water system, one gallon of Inpro-Clean 1300 should be added for each 3" increase in tank level. Detergent need not be added for changes less than 3".

c. Initially, and after the first week of frequent wash system usage (and periodically thereafter), a sample from the wash solution tank should be taken and analyzed for detergent concentration by titration using the test kit for Procedure 125. For Procedure 125, the sample volume is 2 ml and the detergent volume percent concentration is T x 3.6 (see instructions in kit). This will assure maintenance of the proper detergent concentration.

d. The entire contents of the wash water tank should be drained every 2 months, or longer if the system is not used continuously. If not changed periodically, the detergent will become ineffective. There is no indication of this condition other than the loss of adequate cleaning (as indicated by the RGA vacuum test).

6.0 REQUIRED DOCUMENTATION

A component cleaning data sheet containing the following data shall be filled out on completion of cleaning. The data sheet will become part of the component QA package.

- Cleaning log describing parts cleaned and procedure used
- Comments and observations
- Record of flow rates, temperatures and durations used
- Record of inspection results

Attachment

LIGO COMPONENT CLEANING DATA SHEET

Project V59049

Component	Serial Number

Wash Cycle: _____

Flowrates: _____ Max. Temp.: _____ Duration: _____

Operator: _____ Date: _____

Comments: _____

_____

_____

Component(s) Inspected By: _____ Date: _____

Quality Assurance: _____ Date: _____

Comments: _____

_____

_____

Oakite®

INPRO-TECH
METAL CLEANING & RUST
PREVENTION MANAGEMENT

Oakite's INPRO-TECH Series is a family of products and programs designed for In-process metal fabrication applications. Product lines utilizing Oakite's In-process metal cleaning, rust protection and process management technology include:

INPRO-CLEAN	-	*Cleaners*
INPRO-TECT	-	*Cleaner/Rust Inhibitors*
INPRO-GUARD	-	*Rust Preventives*

INPRO-CLEAN 1300: Heavy-Duty, Non-Silicated Multi-Metal* Cleaner

DESCRIPTION:
Inpro-Clean 1300 is a low-foaming, mildly alkaline liquid cleaner for in-process metal fabrication and pre-finishing operations. Its exceptional cleaning ability removes difficult soils such as polishing and buffing compounds as well as stencil ink, drawing compounds, oils, greases and metalworking fluids. Inpro-Clean 1300 is a non-silicated, non-caustic cleaner with the versatility of multi-metal* safety and the heavy-duty detergency required for ferrous-metal cleaning.

APPLICATIONS:
Inpro-Clean 1300 is well suited for the In-process cleaning of drawing compounds, oils, greases and metal-working fluids in spray washers. It is also effective in the removal of polishing and buffing compounds.

Inpro-Clean 1300 is ideal for use in pre-finishing processes. It can be used as a pre-phosphate cleaner on multi- metals* where carry-over concerns and rinsing limitations require a non-caustic material. When desired, a slight etch of aluminum and galvanized steel can be obtained through increasing the operating parameters. Inpro-Clean 1300 is recommended for cleaning aluminum prior to phosphate or chromate conversion coatings where a slight etch without smut is desired. It also is ideal for cleaning galvanized steel where the high etch rate of caustic cleaners creates disposal problems due to the volume of zinc dissolved.

Inpro-Clean 1300 can be used in spray washers and agitated tanks. All applications should be followed by a rinse.

FEATURES & BENEFITS:

Non-Silicated	Eliminates silicate drydown which can interfere with subsequent operations.
Non-Emulsifying	Floats oils allowing skimming to extend tank life and facilitate disposal.
Mildly Alkaline, No Heavy Metals	Safer employee handling, facilitates disposal.
Effective in Hard Water	Minimizes scale and sludge formation
Non-Caustic	Eliminates caustic burns and drydown and allows easy rinsing.
Low-Foaming	Suitable for high pressure washers and agitated tanks.
Liquid Form	Allows for easy automatic dispensing and control.
Free Rinsing	Reduces alkaline carry-over into subsequent stages.

CHEMICAL CHARACTERISTICS:
Inpro-Clean 1300 is a solution of phosphates, sequestrants and surfactants.

pH, as used - 9.5 - 10.2
Bulk Density - 10.1 lb/gal

METAL SAFETY:
- Safe on most metals except magnesium. Inpro-Clean 1300 may discolor brass and other cuprous alloys. Slight etching on aluminum and zinc alloys may occur at higher temperatures and/or concentrations. Results on aluminum, zinc and cuprous alloy should be verified prior to use. Note 2024 aluminum alloy may etch at a higher rate.

OPERATING PARAMETERS:
Spray Washer:

Ferrous Metals:

Concentration	-	Up to 5% by volume
Temperature	-	120 - 160°F
Time	-	½ to 3 minutes

Agitated Immersion Application:

Concentration	-	Up to 10% by volume
Temperature	-	100-160°F
Time	-	1 to 5 minutes

For operating parameters on aluminum alloys and cuprous alloys please contact your Oakite Technical Sales Representative.

PROCESS CONTROL:
Concentrations are titrated using either procedures 56 or 125. For Procedure 56 the sample volume is 25 ml. T x 2.9 = % by volume of Oakite Inpro-Clean 1300. For Procedure 125 the sample volume is 2 ml. T x 3.6 = % by volume of Oakite Inpro-Clean 1300.

SAFETY PRECAUTIONS:
See Material Safety Data Sheet

DISPOSAL METHODS:
Dispose in accordance with federal, state and local regulations.

PACKAGING:
Non-returnable 55 gal poly drum, gross wt. 578 lbs., net wt. 555 lbs.
Bulk shipments are available

SHIPPING:
Common carrier, freight classification 1 - "Cleaning Compound, NOIBN Liquid"
Product Code 4401

STORAGE:
Not affected by high or low temperatures. Freezing point is 32°F. If freezing occurs, simply thaw and use.

OAKITE PRODUCTS, INC., 50 VALLEY ROAD, BERKELEY HEIGHTS, NJ 07922
OAKITE CANADA, LIMITED., 115 EAST DRIVE, BRAMALEA, ONT L6T 1B7
Tel: (908) 464-6900 In Canada (416) 791-1628 FAX: (908) 464-6031

PTD IN U.S.A.

F 16242R-5/92

Oakite. MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 4401
OAKITE INPRO-CLEAN 1300
60-KB-21

HMIS 1 0 0 C

SECTION I - PRODUCT IDENTIFICATION

TRADE NAME	OAKITE INPRO-CLEAN 1300	**EMERGENCY TELEPHONE NUMBER:**
CHEMICAL NAME AND SYNONYMS	NA;Mixture	(800) 424-9300 (CHEMTREC)
MANUFACTURER'S NAME AND TELEPHONE NO.	OAKITE PRODUCTS INC. (908) 464-6900 (8am-5pm) A Member of The CHEMETALL Group	
ADDRESS	50 Valley Road Berkeley Heights NJ 07922	
DATE OF PREPARATION	11-01-94	

SECTION II - HAZARDOUS INGREDIENTS

	CAS NO.	% BY WT	ACGIH TLV (TWA)	OSHA PEL (TWA)	UNITS
Diphosphoric acid, tetrapotassium salt	0007320345	10-20	NE	NE	
Trade Secret Registry (735517)	-5022P	<5	NE	NE	
Trade Secret Registry (735517)	-5028P	<5	NE	NE	
Trade Secret Registry (735517)	-5033P	<5	NE	NE	
Non-hazardous ingredients		Bal.			

Unidentified ingredients are considered not hazardous under Federal Hazard Communication Standard (29 CFR 1910.1200).

All components of this material are on the US TSCA Inventory.

CARCINOGENICITY: No substance in this product is listed by IARC, NTP, or regulated by OSHA as a carcinogen.

SECTION III - PHYSICAL DATA

BOILING POINT (F)	NE	SPECIFIC GRAVITY (H20=1)	1.198
VAPOR PRESSURE (mm Hg)	NE	Bulk Density	9.98 lb/gal
VAPOR DENSITY (Air=1)	NE	PERCENT VOLATILE	

NA - Not Applicable **NE - Not Established**

Oakite® MATERIAL SAFETY DATA SHEET

SOLUBILITY IN WATER	Complete	BY WEIGHT(%) Excludes H2O	0
EVAPORATION RATE (BuAc=1)	<1	PH @ 5% by vol.	9.8
APPEARANCE AND ODOR	Amber liquid;mild odor.	PH (concentrate)	9.8

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used): None
FLAMMABLE LIMITS: LEL: NA UEL: NA

EXTINGUISHING MEDIA: Use media suitable for surrounding materials.

SPECIAL FIRE FIGHTING PROCEDURES: No special procedures required.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known.

SECTION V - HEALTH HAZARD INFORMATION

ROUTE(S) OF ENTRY:	INHALATION:	SKIN:	INGESTION:
	X	X	X

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known
SYMPTOMS/EFFECTS OF OVEREXPOSURE:
Prolonged or repeated inhalation of vapors can cause nasal and respiratory irritation. Direct contact with eyes causes irritation. Direct contact causes skin irritation.

FIRST AID

EYES: Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

SKIN: Wash affected area with plenty of water for at least 15 minutes.

INGESTION: Contact local poison control center or physician IMMEDIATELY!

INHALATION: Move victim to fresh air.

SECTION VI - REACTIVITY DATA

STABILITY: NORMALLY STABLE
INCOMPATIBLE MATERIALS: Strong acids.

NA - Not Applicable **NE - Not Established**

Oakite® MATERIAL SAFETY DATA SHEET

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide, Carbon monoxide, Phosphorous oxides.

SECTION VII - SPILL OR LEAK PROCEDURES

PROCEDURES: Wear personal protective equipment (See Section VIII). Clean up with absorbant material. Flush area with plenty of water.

WASTE DISPOSAL METHOD: Dispose of in accordance with Local State and Federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY: Respirator not normally required. For symptoms of overexposure, wear a NIOSH-approved dust/mist respirator.

EYEWEAR: Wear chemical safety goggles.

CLOTHING/GLOVES: Wear neoprene or other chemical-resistant gloves and protective clothing.

VENTILATION: Local exhaust may be necessary for some handling/use conditions. Specific needs should be addressed by supervisory or health/safety personnel.

SECTION IX - SPECIAL PRECAUTIONS

Store in closed container.

APPROVAL: Michael Chang Mgr.Health & Environmental Dept. 11/01/1994

NAME **TITLE** **DATE OF PRINTING**

NA - Not Applicable **NE - Not Established**

CALIFORNIA INSTITUTE OF TECHNOLOGY LIGO PROJECT
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VENDOR MEETING MINUTES

Doc. No. V049-MM-18

Date:	January 14, 1996	
Vendor:	PSI	
Meeting Date:	December 19, 1996	
Location:	Westborough, MA	
Subject:	PSI Status	
Attendees:	**Ligo**	**PSI**
	A. Sibley	R. Bagley (P/T)
		R. Hendry (P/T)
		D. McWilliams

1. Clean Rooms

The status of the clean rooms was discussed. Two HAM clean rooms will be used for final assembly of components at PSI.

- The frames have been received from the vendor.
- Softwall curtains have been received for 2 HAM clean rooms
- Assembly will commence upon receipt of fan/filter units

The clean room frames were inspected in the PSI clean area.

The clean room acceptance procedure was briefly discussed in general terms. A copy of the latest revision of the ATP (VO49-2-110 Rev 1) is attached for information. The ATP has been revised to include reference to specific sections of FED-STD 209 and define test instrumentation.

2. Washing Station

The status of the washing station was discussed and a tour of the facility was held.

- The wash station was inspected.
- The following items were inspected:
  - Enclosure

- Pumping System
- Internal and external wash nozzle assemblies.
- Turning cart.

- Operating procedures were discussed and the station components were reviewed against the system P&ID.
- Qualification of the wash process was discussed. Qualification will be demonstrated by the vacuum performance results.

During qualification testing, the water quality will be monitored regularly to maintain detergent concentration.

- Detergent will be dumped on a time basis.
- Deionized water quality is monitored with a conductivity monitor.
- Deionized water is not recycled.
  - An updated copy of the washing procedure (VO49-2-015 Rev 2) is attached for information. It has been revised to include detergent technical data and water quality maintenance procedures.

3. **Clean Air System**

The first 50 CFM clean air system was visually inspected. This system has been run both at the vendor, and at PSI.

It was not available to demonstrate operation since the power had been disconnected in preparation for moving it to the mezzanine, where it will be used in conjunction with the clean rooms

A copy of the ATP (VO49-2-109 Rev 1) for the clean air system is attached for information . It has been revised to add test and instrumentation details.

4. Ligo reviewed the master schedule and expressed concern over vendor performance (especially GNB).

5. Bakeout blankets were discussed. PSI pointed out that some smoke will be generated from skin oils and the Ligo building systems must be capable of discharging it outside. ***ACTION:*** LIGO

Prepared By:

Richard Bagley
LIGO Project Manager

REB/lccs

cc: R. Bagley, R. Bento, R. Curtis, D. Evers, P. Ferland, P. Hendry, D. McWilliams, L. Mauriello, R. Sullivan, P. Weeks

LIGO File: VMM-3.5.5.25

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V049-97-002-:VMM:REB

ACCEPTANCE TEST PROCEDURE FOR

CLEAN AIR SUPPLIES

FOR

LIGO VACUUM EQUIPMENT

Hanford, Washington
and
Livingston, Louisiana

PROJECT ENGINEER: Thomas M. Stuver

INSTR/ELEC ENGINEER: N A

QUALITY ASSURANCE: Allen R Bradbrook

TECHNICAL DIRECTOR: D. A. McW Dlearis

PROJECT MANAGER: Richard Bay Jr

REV LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE
1	D.M(W 12-18-96	RBS 12/20/96	REV PER DEO # 0390
0	TMS 5-3-96		INITIAL RELEASE PER DEO # 0165 FOR FDR

PROCESS SYSTEMS INTERNATIONAL, INC. — SPECIFICATION

INITIAL APPROVALS	PREPARED	DATE	APPROVED	DATE	Number A V049-2-109	Rev.
	TMS	5-3-96	REB	5/4/96	LIGO-E960011-01-V	1

TABLE OF CONTENTS

Number

Rev.

SPECIFICATION

Number A V049-2-109 Rev. /

1.0 PURPOSE

The purpose of this Acceptance Test Procedure (ATP)is to define the overall plan for acceptance testing of this component in order to demonstrate that it meets the requirements of the LIGO Vacuum Equipment Specification, LIGO-E940002-02-V, Revision 2, dated August 31, 1995.

2.0 GENERAL

2.1 The procedure applies to all of the stations. Differences between the stations will be due to different vacuum equiipment, size of the isolatable sections, surfaces, volumes and quantities of instrumentation and equipment.

2.2 Tests will be performed by PSI personnel, and will be witnessed by an agent (with sign-off authority) designated by LIGO.

3.0 REFERENCE DOCUMENTS

The following documents shall be used in conjunction with this one for performing the ATP:

PSI Specification V049-2-011, Clean Air Supply Systems

4.0 RESPONSIBILITY

It shall be the responsibility of the project engineer assigned to this component or subsystem to ensure that all of the procedures required by this ATP are performed and that the LIGO witness signs the data sheet/test certification (attached to this procedure) verifying that the procedures have been performed. The data sheet shall also be signed by the project engineer, or other PSI person designated by the project manager. Any test listed in the data sheet which is not applicable to this component or subsystem shall be noted by writing "NA" in the appropriate space. Any deviations from the test procedures or parameters shall be noted on the data sheet.

5.0 TEST

5.1 Each compressor system shall be functionally tested. A comprehensive operational test plan shall be developed and used to demonstrate proper operation of the compressors. Tests shall include normal operation plus simulation of unusual events (component failure, etc.) to ensure that individual skid controls bring the system to a safe condition.

5.2 For one of each size system, the delivered flowrate shall be shown to be at least 50 CFM or 200 CFM, the dewpoint shown to be no higher than -60 C (at atmospheric pressure), and hydrocarbon content shown to be no higher than the ambient air. In addition, a particle count of the delivered air shall be taken to confirm that it conforms to Class 100(at 0.5micrometers).

5.3 Final acceptance will occur in the field. The hydrocarbon content, dewpoint, and particle count will be repeated as part of the check for cleanliness of the installed piping system in each station. Measurements shall be made at each outlet connection using the sampling fixture connected to the branch outlet.

5.4 The following instruments, or equal, shall be used for testing:

Dewpoint:	Kahn Ceramic Portable Hygrometer Range: -80Cto +20C
Hydrocarbon Content:	MSA Passport PID2 Organic Vapor Monitor
Particle Count:	MET One Model HPS227B Portable Airborne Particle Counter

LIGO VACUUM EQUIPMENT ACCEPTANCE TEST DATA/TEST VERIFICATION Equip. Tag_____ S/N_____

Type of Test	ATP Para.	ATP Req'ment/ Actual Data	Comments	LIGO Witness Sign./date	PSI Sign./date
Visual Inspection					
Labelling Verification					
Bakeout	NA				
Leak rate	NA				
Factory Endurance Test	NA				
Factory Speed Test	NA				
Functional Test	5.1				
DEWPOINT	5.2				
Particle Count	5.2				
HYDROCARBON CONTENT	5.2				