PROCESS SPECIFICATION ADDITION

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CHANGE LOG

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CHANGE RECORD

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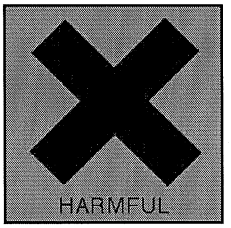
Warnings, Cautions and Notes

Information contained within this specification that is especially important to note is identified by one of the following labels:

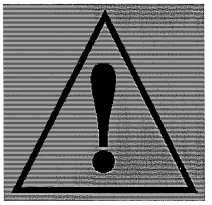
Warnings

The paragraphs listed within this specification having descriptions or practices that could cause harm to personnel and/or hardware are identified with the following symbol:



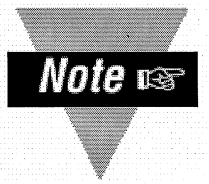
Cautions

The paragraphs listed within this specification having descriptions or practices that could result in an adverse result or compromise personnel safety are identified with the following symbol:



Notes

The paragraphs listed within this specification having descriptions or practices that are important to the successful completion of that operation, without compromising personnel safety, are identified with the following symbol:



1. SCOPE

This document establishes the contamination control requirements for the assembly and packaging of Ultra High Vacuum (UHV) cleaned hardware designated for the Ad-LIGO Seismic Isolation System In-Vacuum Mechanical components.

1.1. Purpose

This specification is intended to provide the necessary environmental controls to preserve the cleanliness of components that have undergone stringent UHV cleaning. The requirements specified herein are intended to support the Vacuum Compatibility requirements of the Ad-LIGO Seismic Isolation System In-Vacuum Mechanical components contract. This specification does not cover requirements for sterile or biologically controlled facilities.

1.2. Classification

1.2.1. Level

The contamination control process shall be one of the following levels (Section 6.xxx), as specified:

Level 1	Not more than 700 particles per cubic foot that are 5 micrometers (μm) or larger and less than 15 parts per million concentration of volatile organic compounds (VOC's).
Level 2	Having no particle count or VOC requirement.

2. APPLICABLE DOCUMENTS

The following documents, of the issue as specified in the contractual instrument (or as specified for use at ASI) form a part of this specification to the extent specified herein:

Document #	Document Title
Specifications	
ASI	
20005656	
ASID-3-1	Quality Systems Procedures
20006638	General Packaging Requirements
20008227	UHV Packaging, Ad-LIGO Seismic Isolation System In-Vacuum Mechanical Elements
Standards	
Non-ASI	
ANSI Z540-1	Calibration Laboratories and Measuring and Test Equipment, General Requirements for
FED-STD-209E	Airborne Particulate Cleanliness Classes for Clean Rooms
ASTM F51	Test Method for Sizing and Counting Particulate Contaminant in and on Clean Room Garments

3. REQUIREMENTS

3.1. Environment

3.1.1. Airborne Particulate Cleanliness

The airborne particulate cleanliness of the contamination controlled workspace shall be as specified in Table I.

Particle Count /1	Specification	Specification Class Name
700	FED-STD-209	100,000

/1: *The numerical designation is derived from the maximum allowable number of particles, 5.0 μm and larger, per cubic foot of air.*

Table I. Airborne Particulate Cleanliness Requirements

3.1.2. Chemical Filtration

The contamination controlled workspace shall use chemical filtration to minimize airborne molecular contamination (e.g., volatile organic compounds). The filter element should posses a minimum 60% of carbon tetrachloride activity of activated carbon.

3.1.3. Temperature

The temperature of the contamination controlled workspace shall be 75 ±5 **Temperature (°F)**

3.1.4. Humidity

The humidity of the contamination controlled workspace shall be 30 to 70 **Relative Humidity (%)**

3.1.5. Air Flow

The air flow within the contamination controlled workspace shall be as specified in Table II.

Flow Classification	Air Flow
Non-Laminar Flow	15 to 30 air changes per hour
Laminar Flow	Air velocity of 100 feet per minute (fpm) at filter face and shall not vary more than 20 fpm throughout the workspace.

Table II. Air Flow Requirements

3.1.6. Pressure Differential

The pressure differential within the contamination controlled workspace shall be as specified in Table V.

Classification	Pressure Differential
Level 1	Positive Pressure of 0.05 in. water minimum inside of clean room relative to semi-contaminated adjacent areas, with 0.01 in. water in semi contaminated areas relative to outside. (Ref: ASHRE 1982, Application HDBK; Ch 16)
Level 2	No specified pressure differential. Positive pressure at all times to minimize the infiltration of uncontrolled or contaminated air.

Table III. Pressure Differential Requirements

3.2. Area Requirements

3.2.1. Area Identification

An identification sign (see Figure 1) shall be permanently affixed, in a obvious manner, outside each entrance of the contamination controlled workspace identifying specific environmental controls are in use.

CONTAMINATION CONTROLLED AREA
REQUIREMENTS PER 20008228

RESTRICTED ACCESS

Figure 1. Example of an Area Identification Sign

3.2.2. Access Control

Only associated personnel that have been properly indoctrinated as identified in 3.3.1.1 shall have access to contamination controlled facilities. A list of the indoctrinated personnel shall be posted outside the entrance of each workspace. When program specific operations require additional access control, a program-specific list shall be implemented. In addition to the authorized personnel lists, facilities with critical hardware operations shall also provide door locks at all entrances to further control access to contamination controlled facilities.

3.2.3. Monitoring

3.2.3.1. Environmental Parameters

The environmental parameters identified in Section 3.1 shall be monitored at specific intervals and their results recorded in the permanent log book for each contamination controlled workspace.

3.2.3.2. Calibration

All equipment required to control, monitor or record the environmental parameters identified in Section 3.1 shall be calibrated and maintained in accordance with ANSI/NCSL Z540-1.

3.2.4. Records

3.2.4.1. Environmental Log

A permanent log (area log book) for recording the environments in Section 3.1 shall be located within each contamination controlled workspace.

3.2.4.2. Indoctrination Log

A log shall be maintained identifying the names and dates of indoctrinated personnel.

3.2.4.3. Maintenance Check-off List

A list identifying the appropriate maintenance for the applicable classification shall be clearly posted within each contamination controlled workspace.

3.2.5. Anteroom

Contamination controlled facilities shall be equipped with anterooms. Anterooms shall be sufficiently large to allow for adequate storage of outer street garments (e.g. coats and sweaters) and to allow for separation of street clothing and clean protective garments. Level 1 controlled areas do not require anterooms unless that workspace opens directly to outside the building. If an anteroom is not provided, an area shall be designated immediately within the entrance to the level 1 controlled area as a garments change area and for adequate storage and separation of street clothes and protective garments

3.2.6. Entrance Mats

Entrance mats with tacky surfaces shall be used to catch and hold loose particles from the soles of shoes of personnel entering an contamination controlled workspace. Mats may have multi-layers to facilitate maintenance.

3.2.7. Shoe Cleaners

Shoe cleaners shall be used to clean the uppers and soles of shoes of personnel prior to entering an contamination controlled workspace.

3.2.8. Waste Containers

Only closed top waste containers are permitted in contamination controlled facilities. Such containers shall be made of plastic or non-corroding metal, and shall be lined with a disposable non-linting bag, which can be securely closed prior to dumping. The dumping of waste from one container into another shall not be permitted.

3.2.9. Protective Garments

Special protective garments are to be worn by all personnel entering contamination controlled workspaces. All garments shall meet the particle generation requirements of ASTM-F51. Garments shall be laundered and bagged in a Class 100 (minimum) clean room in accordance with FED-STD-209.

3.2.9.1. Reusable Garments

Reusable garments shall be made from 100% DACRON polyester fabrics with bound or serged seams. Wrist and ankle openings shall be elasticized.

3.2.9.2. Disposable Garments

Disposable garments shall be made from Tyvek® or equivalent with bound or serged seams. Wrist and ankle openings shall be elasticized.

3.2.9.2.1. Gloves

Hand protection shall be used at all times in the contamination controlled workspace. Gloves shall be made from powder free latex that have been approved for use in a Class 100 (minimum) clean room in accordance with FED-STD-209.

Workers exposed to latex gloves and other products containing natural rubber latex may develop allergic reactions such as skin rashes; hives; nasal, eye, or sinus symptoms; asthma; and (rarely) shock.

Ref: National Institute for Occupational Safety and Health (NIOSH) Publication N. 97-135.

3.3. Operational Instructions

3.3.1. Personnel Requirements

3.3.1.1. Indoctrination of Personnel

3.3.1.1.1. Associated Personnel

All personnel associated with the operations within the contamination controlled facilities shall receive indoctrination in the purpose and use of such areas. With the objective of obtaining the cooperation and self-discipline of each individual in the following prescribed stringent operating requirements. Compliance with the requirements for indoctrination shall be the responsibility of the cognizant Manufacturing activity.

3.3.1.1.2. Non-Associated Personnel

Non-Associated personnel (e.g., customers and guests) may enter contamination controlled facilities by escort only. Escorts shall be provided by indoctrinated personnel only, no exceptions. Indoctrinated personnel shall be responsible for selecting the appropriate protective attire and provide briefings on program specific requirements as applicable.

3.3.1.2. Temporary Restrictions

Personnel with colds, asthma or hay fever, which result in temporary periods of excessive coughing and sneezing should be temporarily prohibited from all contamination controlled facilities.

3.3.1.3. Attire

Prior to entering an contamination controlled workspace, personnel shall remove outer garments (e.g. sweaters and jackets) and dress in protective garments as identified in Table IV. Loose jewelry and watches shall also be removed to mitigate damage to protective clothing and hardware.

3.3.1.4. Garment Gowning Sequence

The following gowning sequence shall be used when donning protective garments:

3.3.1.4.1. Shoe Cleaning

When applicable, prior to entering the anteroom or gowning area, clean footwear by inserting the shoe into the cleaner and press the bar. While the cleaner is running move foot in and out to allow cleaning of all surfaces of the shoe. Repeat this operation with the opposite foot.

3.3.1.4.2. Hood

Remove the hood from its package and inspect for damage such as open seams, rips or tears. Discard if damaged. Place the hood over your head and close the apron by using the snaps as required. Adjust the fit with snaps or ties provided and make sure that all hair is covered, especially the forehead. Using a mirror or asking an associate, inspect the hood and its apron for proper fit.

3.3.1.4.3. Face Mask

If mustache / beard covers are required, be sure to all facial hair such as mustache and long sideburns are completely covered.

Garment Type	Required
Coveralls	Yes
Hood	Yes
Shoe Covers **/3**	Yes
Face Mask **/3**	Yes
Gloves **/3 /4**	Yes
Frequency of Change (#/Week)	5

Notes:

/1

/2 When a hood is being used, a cap is not necessary

/3 These items shall be changed daily (minimum).

/4 Gloves shall be changed as necessary during each work period.

Table IV. Personnel Attire Requirements

3.3.1.4.4. Coveralls

Remove the coverall from its package and inspect for damage such as open seams, rips or tears. Discard if damaged. Open the coverall (zipper or snaps) and don the coverall by holding the right cuff, right ankle and right midsection of the body in your right hand, about six (6) inches from the zipper end. Repeat with equivalent parts using your left hand then inserting one (1) first and then the other. Pull the coverall up and insert each arm. As necessary, tuck the apron of the hood inside the coverall and zip completely closed. Snap the collar and cuff buttons shut (as necessary).

When donning coveralls do not allow them to come in contact with the floor. Garments that violate this requirement must be laundered or disposed of as applicable.

3.3.1.4.5. Shoe Covers

Select a shoe cover size that is appropriate for completely covering the shoe. While sitting on a bench or chair, don each cover while transferring from the unprotected side to the protected side.

3.3.1.4.6. Gloves

Select the appropriate material gloves from the storage cabinet by touching the cuff area only. Don without touching the finger tips with bare hands. Pull cuff of the glove over the arm sleeve of the coverall or frock for maximum particulate protection. Don subsequent gloves, as required, to facilitate easy changes during handling procedures.

3.3.1.5. Entrance Procedure

Enter the contamination controlled workspace by walking on to the tacky mat at the entrance making sure that both feet completely engage the adhesive surface before proceeding into the controlled area.

3.3.1.6. Exiting Procedure

Personnel leaving a contamination controlled workspace, for any reason, shall immediately remove all protective garments and leave them in the anteroom or designated changing area.

3.3.2. Materials

3.3.2.1. General

Only materials required for performing work operations shall be taken into contamination controlled facilities. This includes, but not limiting to, piece parts, sub assemblies, hand tools, fixtures and test equipment.

3.3.2.2. Exceptions

Exceptions to the material requirements specified herein shall be presented, in writing, to the cognizant Quality Assurance activity. The exception request will be reviewed by a Material Review Board (MRB) for conformance to personnel safety and contamination effects.

3.3.2.3. Prohibited Materials

The following materials are strictly prohibited in all contamination controlled facilities to the extent identified below:

a) Tobacco of any kind
b) Food, candy or chewing gum
c) Untreated wood storage containers
d) Pencils, fountain pens, erasers, crayons and chalk
e) Paste Adhesives
f) All Lubricants
g) Pneumatic tools

3.3.2.4. Controlled Materials and Activities

The following items and activities are limited in contamination controlled facilities to the extent identified in Table V.

Material Nomenclature	Material Types
Writing Instruments	Ball-point pen with metal ball
Documentation	Plastic coated paper or bond paper covered with plastic envelope
Task Wipers	Lint free polyester
Storage Containers	Transit Case Polyethylene Tote
Applicators	Polyester Tipped

Table V. Controlled Material Requirements

3.3.2.5. Entry of material

Prior to entry into an contamination controlled workspace, all materials shall be cleaned, packaged and identified in accordance with approved engineering drawings or procedures (e.g., Assembly Instruction Data Sheet). Prepackaged materials such as the controlled materials identified in 3.3.2.4 need only be wiped with a lint free task wipe moistened with Reagent Alcohol – ACS. If the prepackaged materials are double bagged, then the removal of the outer-most bag is preferred.

3.3.2.5.1. Detailing

Tools and equipment that are to be used in the contamination controlled workspace shall be thoroughly cleaned in accordance with ASI 20006034, Class 2.

Cleaning agents must be compatible to prevent excessive material attack or latent degradation

3.3.2.5.2. Packaging

Tools and equipment that have been detailed for entry, shall be immediately packaged per ASI 20006638; Type III, Class 2, Grade B, Style 2 to mitigate re-contamination. Items that are too large for bags or tote boxes may be covered with Bulk bagging material of the same classification.

3.3.2.5.3. Identification

Tools and equipment that have been cleaned and packaged shall be clearly marked with the following information attached package:

1. Nomenclature
2. Project Name
3. Part Number (if applicable)

3.3.2.6. Prohibited Equipment

Mechanical vacuum pumps and compressed (shop) air, which produce aerosol contaminants are strictly prohibited in all contamination controlled facilities

3.3.2.7. Restricted Activities

The following items and activities are restricted in all contamination controlled facilities to the extent identified below:

3.3.2.8. Prohibited Activities

The following activities are strictly prohibited in all contamination controlled facilities to the extent identified below:

a) Soldering, brazing or welding

b) Grinding or filing

c) Drilling

3.3.2.9. Entry Certification

Only after meeting the entry requirements specified herein may material be moved into contamination controlled facilities, with the approval of the cognizant Quality Assurance activity.

3.4. Maintenance

3.4.1. Protective Clothing Laundering

Reusable protective garments shall be commercially laundered per current industry standards for clean room garments. The responsible Manufacturing activity shall keep laundering certifications on file. Laundering garments at home is prohibited.

3.4.2. Workspace Cleaning

Contamination controlled facilities shall be subjected to the janitorial cleaning methods and frequencies identified in Table VI. Where possible, cleaning shall be accomplished before or after work shifts. To minimize contamination exposure from the cleaning activity, all exposed hardware shall be appropriately covered with approved packing material as identified in 3.3.2.5.2.

3.4.3. Air Conditioning Equipment

The responsible Manufacturing activity shall be responsible for establishing the maintenance schedule for workspace air-conditioning equipment.

3.4.4. Filters

Pre-filters shall be replaced as necessary to extend the life of the HEPA filters. These filters shall be replaced when monitoring reveals that the air-flow or pressure drop across the filter exceeds the requirements identified herein or when they develop uncorrectable leakage, which cause abnormal particulate counts. The responsible Manufacturing activity shall establish the procedures and frequency for monitoring and replacing filters.

Area	Cleaning Method	Frequency		
		Level 1	Level 2	Level 3
Floor Areas	Vacuum	Weekly	Weekly	Weekly
Floor Areas	Wet Mop	Semi Weekly	Semi Weekly	Semi Weekly
Tacky Mats, Disposable	Top Sheet Removeal	As Required	As Required	As Required
Foot Mats	Vacuum / Wipe / Replace	Daily	Daily	Daily
Work Surfaces / Benches	Vacuum / Wipe	Prior to each shift use	Prior to each shift use	Prior to each shift use
Laminar Flow Work Stations	Wash/Wipe	Prior to each shift use	Prior to each shift use	Prior to each shift use
Cabinet Exteriors	Vacuum or Wipe	Monthly	Monthly	Weekly
Racks	Vacuum or Wipe	Monthly	Monthly	Weekly
Support Areas Beneath Benches	Vacuum or Wipe	Monthly	Monthly	Weekly
Waste Cans	Empty	As Required	As Required	As Required
Walls and Vertical Surfaces Below 8ft	Vacuum or Wipe	Every 6 Months	Every 6 Months	Monthly
Walls and Surfaces Above 8ft	Vacuum or Wipe	Every 6 Months	Every 6 Months	Every 6 Months
Ceiling	Vacuum or Wipe	Annually	Annually	Every 6 Months
Windows	Wash	Annually	Annualy	Monthly
Window Blinds	Wash or Vacuum	Annually	Annualy	Monthly
Sinks and Drinking fountains	Wash	Weekly	Weekly	Weekly
Air Duct Inlets, Exhausts, Plenum Chambers	Vacuum or Wipe	Annually	Annually	Every 6 Months
Other Overhead Surfaces Including Exposed Piping	Vacuum or Wipe	Annually	Annually	Every 6 Months

Table VI. Workspace Cleaning Requirements

4. QUALITY ASSURANCE PROVISIONS

4.1. Quality Conformance Inspection

Quality conformance inspection consists of all the tests and examinations necessary to determine compliance with Section 3 of this specification.

4.1.1. Certification

Prior to the commencement of any activities within any contamination controlled workspace, all requirements shall be audited by the responsible Quality Assurance activity to verify conformance to this specification. Following successful fulfillment of the requirements specified herein, a letter of certification shall be awarded to that particular workspace. The certification shall be posted outside the entrance of that workspace.

4.1.2. Inspection

Inspection performed to determine compliance with the characteristics specified in Table VIII shall be conducted in accordance with the corresponding test and inspection paragraph.

Characteristic	Requirement Paragraph	Test/Inspection Paragraph
Airborne Particulates	3.1.1	4.3.1
Temperature	3.1.2	4.3.2
Humidity	3.1.3	4.3.3
Air Flow	3.1.4	4.3.4
Pressure Differential	3.1.5	4.3.5
Area Identification	3.2.1	4.3.7
Access Control	3.2.2	4.3.8
ESD Precautions	3.2.3	4.3.6
Monitoring	3.2.4	4.3.9
Records	3.2.5	4.3.10
Anteroom	3.2.6	4.3.11
Pass Through/Airlock	3.2.7	4.3.12
Area within an Aera	3.2.8	4.3.13
Entrance Mats	3.2.9	4.3.14
Shoe Cleaners	3.2.10	4.3.15
Waste Containers	3.2.11	4.3.16

Protective Garments	3.2.12	4.3.17
Personnel Requirements	3.3.1	4.3.18
Materials	3.3.2	4.3.19
Protective Clothing Laundering	3.4.1	4.3.20
Workspace Cleaning	3.4.2	4.3.21
Air Conditioning Equipment	3.4.3	4.3.22
Filters	3.4.4	4.3.23

Table VIII. Inspection and Test Matrix

4.2. Test Methods and Procedures

4.2.1. Environmental Sampling

4.2.1.1. Particulate

Particulates shall be measured using one of the methods identified in FED-STD-209. The methods and equipment to be employed for measuring airborne particular concentrations shall be selected on the basis of the particle size or sizes specified.

4.2.1.1.1. Clean Room

Particle count samples taken in a clean room shall be averaged. The value of the average shall be used to confirm the classification requirements of the area. If no individual sample exceeds the maximum value specified for the area classification by more than 20 percent and if the average value is less than the maximum value specified for the area classification, the workspace shall be considered within specification. If any one (1) sample exceeds the maximum value specificed for the area classification by more than 20 percent or if the average is greater than the maximum value specified by the area classification, the workspace shall be considered out of specification.

4.2.1.1.2. Flow Bench

Particle count samples taken in flow benches shall be averaged. The value of the average shall be used to confirm the classification requirements of the area. If the average value is less than the maximum value specified for the area classification, the flow bench shall be considered within specification. If the average is equal to or greater than the maximum value specified by the area classification, the flow bench shall be considered out of specification.

4.2.1.2. Temperature

Temperature shall be measured by either by a *thermometer* (total immersion type) accurate to ± 2°F or by an automatic recording device of equivalent accuracy. The thermometer shall be operated in accordance with the manufacturer's instructions.

4.2.1.3. Relative Humidity

Relative humidity shall be measured by either a wet or dry bulb *hygrormeter* accurate to 5 percent or by an automatic recording device of equivalent accuracy. The hygrometer shall be operated in accordance with the manufacturer's instructions.

4.2.1.4. Air Flow

Air flow shall be measured using an *anemometer* offering velocity ranges to meet the requirements of paragraph 3.1.4. The anemometer shall be operated in accordance with the manufacturer's instructions. The air-change rate in *non-laminar* flow facilities shall be calculated per the following:

Air Change = Total air flow (cubic feet /min) **/** Volume of workspace (cubic feet)

Note

The total air-flow is the sum of the air flow through all inlets (including separately supplied clean flow benches) calculated individually. The air flow through any inlet (filter) is the product of the inlet area (square feet) and the air velocity through the inlet (feet per minute).

4.2.1.5. Pressure Differential

Pressure differential shall be measured using a differential gauge or manometer, a pitot tube or by an automatic recording device of equivalent accuracy. The pressure measuring equipment shall be operated in accordance with the manufacturer's instructions.

4.3. Inspection and Tests

4.3.1. Airborne Particulate Cleanliness (Levels 1 Only)

Airborne particulates shall be tested for conformance to the requirements of paragraph 3.1.1.

4.3.2. Temperature

Temperature shall be measured for conformance to the requirements of paragraph 3.1.2.

4.3.3. Humidity

Humidity shall be measured for conformance to the requirements of paragraph 3.1.3.

4.3.4. Airflow

Airflow shall be measured for conformance to the requirements of paragraph 3.1.4.

4.3.5. Pressure Differential

Pressure differential shall be measured for conformance to the requirements of paragraph 3.1.5.

4.3.6. ESD Precautions

ESD precautionary measures shall be inspected for conformance to the requirements of paragraph 3.1.6.

4.3.7. Area Identification

Area identification shall be inspected for conformance to the requirements of paragraph 3.2.1.

4.3.8. Access Control

Access control shall be inspected for conformance to the requirements of paragraph 3.2.2.

4.3.9. Monitoring

Monitoring of key environmental parameters shall be performed at the intervals identified in Table IX for conformance to the requirements of 3.2.3. All results shall be recorded in the area log and shall be audited by the responsible Quality Assurance activity.

Characteristic	Requirement Paragraph	Sampling Frequency
Airborne Particulates	3.1.1	Every 6 Months
Temperature	3.1.2	Once every work shift
Humidity	3.1.3	Once every work shift
Air Flow	3.1.4	Every 3 Months
Pressure Differential	3.1.5	Every Month

Table IX. Environmental Monitoring Schedule

4.3.10. Records

Records shall be inspected for conformance to the requirements of paragraph 3.2.4.

4.3.11. Anteroom

Anterooms shall be inspected for conformance to the requirements of paragraph 3.2.5.

4.3.12. Pass Through/Air Lock (Level 3 Only)

Pass through and air locks shall be inspected for conformance to the requirements of paragraph 3.2.6.

4.3.13. Area within an Area

Areas within areas shall be inspected for conformance to the requirements of paragraph 3.2.7.

4.3.14. Entrance Mats

Entrance mats shall be inspected for conformance to the requirements of paragraph 3.2.8.

4.3.15. Shoe Cleaners

Shoe cleaners shall be inspected for conformance to the requirements of paragraph 3.2.9.

4.3.16. Waste Containers

Waste containers shall be inspected for conformance to the requirements of paragraph 3.2.10.

4.3.17. Protective Garments

Protective garments shall be inspected for conformance to the requirements of paragraph 3.2.11.

4.3.18. Personnel Requirements

Personnel requirements shall be inspected for conformance to the requirements of paragraph 3.3.1.

4.3.19. Materials

Materials shall be inspected for conformance to the requirements of paragraph 3.3.2.

4.3.20. Protective Clothing Laundering

Laundering of protective clothing shall be inspected for conformance to the requirements of paragraph 3.4.1.

4.3.21. Workspace Cleaning

Workspace cleaning shall be inspected for conformance to the requirements of paragraph 3.4.2.

4.3.22. Air Conditioning Equipment

Air conditioning equipment shall be inspected for conformance to the requirements of paragraph 3.4.3.

4.3.23. Filters

Filters shall be inspected for conformance to the requirements of paragraph 3.4.3.

5. PREPARATION FOR DELIVERY

This Section is not applicable to this specification

6. NOTES

6.1. Intended use

This specification is intended for use in establishing the requirements for a contamination control plan through personnel indoctrination, monitoring, access control and maintenance.

6.2. Definitions

6.2.1. Environmental Filtration

6.2.1.1. Pre-Filter

A filter media installed in the up-stream side of the HEPA and gas phase adsorbers used to remove gross contamination before it enters the specialty filters, thus increasing the useful life of the filter elements.

6.2.1.2. Gas Phase Adsorber

A chemical filter using activated carbon to adsorb airborne molecular contamination (e.g., volatile organic compounds or VOC's).

6.2.1.3. High Efficiency Particulate Air (HEPA) Filter

A pleated media particle filter having a minimum efficiency in removing small particles (approximately equal to 0.3 microns) from air of 99.97%. In other words, only three (3) out of 10,000 particles, 0.3 microns in size can penetrate through the filter. HEPA filters are also used to "straighten" the airflow in unidirection flow clean rooms.

7. APPROVED PRODUCTS

Approved products used in the processes specified herein maybe facilitated by the following companies:

7.1. Equipment

Product Nomenclature	Manufactures Address
AccuTech Ultra-Clean Latex Gloves (# 91-300)	Ansell Protective Products 1300 Walnut St. Coshocton, OH 43812 800-800-0444
Clean Room Wiper	