Mullard Space Science Laboratory

Cleanroom Specifications

Introduction

The MSSL cleanroom is a horizontal laminar flow clean facility. The cleanroom is divided into two at a ratio of 2:1. One side of the cleanroom is referred to as the “white cleanroom” and the other as the “dark cleanroom”. Adjoining the white cleanroom is an anteroom where personnel are provided cleanroom clothing and donning facilities. The dark cleanroom is accessed through the white cleanroom.

White & Dark cleanroom Specification

Internal Dimensions

- White cleanroom - 15 meters long by 5 meters wide by 2.8 meters high
- Dark cleanroom – 15 meters long by 3 meters wide by 2.8 meters high

Laminar flow type

- Horizontal

Cleanroom classification

- Particulates ISO 14644 Class 4 (Fed. Std. 209 D Class 10)
- NVR MIL-STD 1246C Level A
- Particle fallout MIL-STD 1246C Level 150
- Airborne Molecular 0.3 ng/cm²/month (average)

Cleanroom validation

- Independent external contractors, twice yearly

Equipment

- Fully stocked cleanroom compatible tooling
- ISO 14644 Class 10 Laminar flow bench
- Various optical benches
- Work benches
- 2 x vacuum cryostat CCD test and verification stations
- Vacuum bake out station
- Earth bonding points, wrist straps and wrist strap testing station

- Optical alignment surfaces and equipment
- The dark cleanroom is used for optical work and alignment and is fitted with light tight doors. The interior walls, doors and ceiling are coated with Z306 black paint. Projects that have made use of the dark cleanroom for optical alignment and dark optical work include XMM-OM and SWIFT UVOT
- Various microscopes including stereo microscope
- Various grades of surface tables (traditional and granite types)

Clothing regime

- Carbon grid ESD safe hood
- Face mask
- Full body over suit
- Low extract and ESD safe nitrile gloves
- Overshoes

Environmental parameters

- Relative humidity control to 45% ± 5%
- Temperature control to 20°C ± 1°C
- Facility over pressure to 30 Pa
- Laminar flow rate to 100 air changes per hour

Contamination monitoring

The following monitoring takes place in the white cleanroom and is logged to a dedicated cleanroom computer for analysis and archive purposes.

- Airborne particulate concentration
- Relative humidity
- Temperature
- Surface Acoustic Wave device (SAW) real time airborne molecular contamination monitoring
- NVR sampling using external contractors by method Fourier Transform Infrared Spectroscopy (FTIR) and Gas Chromatography/Mass Spectrometry (GC/MS).
- Particle fallout monitoring by tape lift sampling method

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Personnel restrictions

The number of personnel allowed in the white and dark cleanroom at any one time is set at eight people (2 dark cleanroom and 6 white cleanroom). This ensures that the cleanrooms stay within the validated classification and to ensure flight hardware cleanliness.

Network access

The both white and dark cleanrooms have a number of LAN ports available.

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Figure 1. Cleanroom layout