

# Materials / Contamination Control

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March 1, 1994

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## Materials & Processes Evaluation

### • Materials & Processes Requirements

- MSFC-STD-506      Materials and Processes Selection and Control Standards
- MSFC-SPEC-522    Design Criteria for Controlling Stress Corrosion
- JSC-SP-R-0022    Vacuum Stability Requirements
- MSFC-SPEC-1443   Outgassing Test for Nonmetallic Materials Associated with Sensitive Optics
- NHB 8060.1        Flammability Requirements and Test Procedures for Materials in Environments that Support Combustion
- MSFC-HDBK-527    Materials Selection List for Space Systems Hardware

### • Materials & Processes Evaluation Status

- NASA GSFC / MSFC Materials and Processes Intercenter Agreement for Space Shuttle and ELV Payloads
- MSFC design evaluations are in work
- Kaiser Electro-Optics Sensor Assembly Material Evaluation Complete
  - » Sensor Assembly MIUL has been evaluated
  - » All subsequent MUAs evaluated and approved
- Lockheed Palo Alto Research Laboratory (LPARL) CCD material evaluations are in work

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## Contractors Engineering Design Evaluation

- **Materials Identification and Usage List**
  - Identifies proposed materials and processes selections, manufactures, and using assemblies
  - Identifies proposed subject materials and processes specifications
  - Defines environmental parameters relative to applicable material selections (temperatures, pressure & atmospheric media)
  - Shows result of the materials evaluation relative to the specified environmental parameters (includes materials ratings data per Maptis or MSFC-HDBK-527)
  - Identifies materials which require Material Usage Agreements (MUAs) consideration
- **MUAs**
  - Materials and processes which do not meet the TRMM/LIS requirements are evaluated and dispositioned by the MSFC MAEB subsequent to testing or further data analysis
  - Contractors are responsible for submitting MUAs to MSFC M&P Laboratory for evaluation

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## MSFC "In House" LIS Engineering Design Evaluation

- **Concurrent preliminary design and materials and processes selection approach implemented during Engineering Model development**
- **Materials and processes discipline approval required prior to MSFC design release for fabrication**
  - Alternate materials and processes are proposed
  - Proposed materials and processes which do not meet the TRMM/LIS M&P requirements are evaluated by MUA
- **No MIUL Document**
  - Approved as built design package verifies MSFC hardware materials and processes selections

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## TRMM / LIS Assembly Flow

- **Lens Holder Assembly**
  - Kaiser Electro Optics Assembly
  - Deliver to MSFC for sensor structure integration
- **Sensor Structure/ Lens Holder Assembly**
  - MSFC receive lens holder assembly
  - MSFC install ring and straps to lens holder assembly
  - Ship integrated sensor structure/lens holder assembly to LPARL
- **Sensor Structure/Lens Holder Assembly/ Charge Coupled Device (CCD)**
  - LPARL receive sensor structure/lens holder assembly
  - LPARL install CCD assembly
  - Ship integrated sensor structure/lens holder assembly/CCD assembly to MSFC

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## TRMM / LIS Assembly Flow (Continued)

- **Sensor Assembly**
  - MSFC receive integrated sensor structure/lens holder assembly/CCD assembly
  - Complete sensor assembly (housing, etc.)
- **Electronics & Associated Hardware**
  - MSFC fabrication and assembly
- **Flight Associated Hardware**
  - MSFC fabrication and assembly

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## Contamination Control

- **Objective**
  - Implement processes and procedures to prohibit instrument/platform performance degradation due to contamination
- **Outline of Contamination Control Plan**
  - Strict materials and processes selection and control
    - » Selection of thermal vacuum stable and optically compatible materials
    - » Thermal vacuum baking where applicable to control outgassing
  - Control environmental cleanliness
    - » Perform assembly in class 10,000 clean room
    - » Perform test in class 100,000 clean room
    - » Transportation of hardware in approved container
    - » Maintain external surface cleanliness to JSC-SN-C-0005A VC/standard

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