KSC-SPEC-P-0014A
Amendment 1
October 6, 1997

Minimum Requirements For Garments Used in Non-Cleanroom Environments
Specification For

This amendment forms a part of KSC-SPEC-P-0014A.

Paragraph 3.3.1.1 third line, Seam Type SSa-2 should be replaced with Seam Type LSc-2 and Stitch Type 516 should be replaced with Stitch Type 401. The paragraph should now read as follows:

> 3.3.1.1 Seams. - The main seams shall be double needle felled to meet the following specification: FED-STD-751A, "Stitches, Seams and Stitching," Seam Type LSc-2, Stitch Type 401, 10mm (3/8") wide."

Safety and Mission Assurance Directorate

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METRIC/U.S. CUSTOMARY

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MINIMUM REQUIREMENTS FOR GARMENTS USED IN NON-CLEANROOM ENVIRONMENTS FOR HAZARDOUS OPERATIONS

SPECIFICATION FOR

SAFETY, RELIABILITY AND QUALITY ASSURANCE DIRECTORATE

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MINIMUM REQUIREMENTS FOR GARMENTS USED IN NON-CLEANROOM ENVIRONMENTS FOR HAZARDOUS OPERATIONS

SPECIFICATION FOR

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MINIMUM REQUIREMENTS FOR GARMENTS USED IN NON-CLEANROOM ENVIRONMENTS FOR HAZARDOUS OPERATIONS

1. SCOPE

This document provides the minimum requirements for garments used during hazardous operations (defined in KMI 1710.13, "Technical Operating Procedures Policy") performed at the John F. Kennedy Space Center (KSC) in KSC related non-cleanroom environments. It details the requirements of the KSC Ground Operations Safety Plan (GP-1098F, Section 2.16).

It is not the intent of this document to specify all nonsafety related requirements but to allow the originator of a purchase specification to add his organization peculiar items to the minimum specifications. In this manner, it is hoped KSC organizations and vendors alike can change designs to meet overall requirements and still satisfy basic safety requirements.

2. APPLICABLE DOCUMENTS

The following documents form a part of this document to the extent specified herein. When this document is used for procurement, including solicitations, or is added to an existing contract, the specific revision levels, amendments, and approval dates of said documents shall be specified in an attachment to the Solicitation/State of Work/Contract.

2.1 Governmental.

2.1.1 Specification.

Military

MIL-C-43122F	Military Specification, Cloth, Sateen Cotton, Flame Retardant Treated

2.1.2 Standards.

Federal

FED-STD-751A Stitches, Seams and Stitching

2.1.3 Publications.

National Aeronautics and Space Administration (NASA)

NHB 8060.1 Flammability, Odor, Offgassing, and Compatibility Requirements and Test Procedures for Materials in Environments that Support Combustion

John F. Kennedy Space Center (KSC), NASA

KMI 1710.13 Technical Operating Procedures Policy

GP-1098 KSC Ground Operations Safety Plan

MMA-1985-79 Standard Test Method for Evaluating Tribo-electric Charge Generations and Decay

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specified procurement functions should be obtained from the procuring activity or as directed by the Contracting Officer.)

3. REQUIREMENTS

3.1 Definition. - Non-cleanroom protective clothing consists of coveralls.

3.2 Characteristics. - Performance and physical characteristics are specified in this section.

3.2.1 Physical Characteristics.

3.2.1.1 Weave. - The weave of the coverall will be either twill or sateen.

3.2.1.2 Weight. - The weight of the material will be 0.20 kg/m^2 (7.5 oz/yd^2) minimum through 0.25 kg/m^2 (8.75 oz/yd^2) maximum weight (after chemical treatment); 0.52 mm thickness minimum.

3.2.1.3 Color. - The material for the coveralls shall be white or natural. The collar on the coveralls shall be navy blue on both sides.

3.2.1.4 Sleeves and Legs. - The garment shall have full-length sleeves and leg coverings. Pant legs should be cuffless and be worn outside and over the "shoe" tops.

3.2.2 Performance Characteristics.

3.2.2.1 Laundering. - Laundering shall not cause discoloration.

3.2.2.2 Garments. - The garment must be comfortable and must not exhibit objectionable odor normally nor when wet; must not irritate, react with, nor be abrasive to the skin.

3.2.3 Reliability.

3.2.3.1 Wear Life. - The garment should be usable after at least 20 industrial washings.

3.2.3.2 Strength. - The contractor shall certify that tear and tensile strength is adequate for the wear life of the garment.

3.2.4 Maintainability.

Laundering. - KSC will be responsible for garment laundering.

3.2.5 Environmental Conditions.

Fire Retardant Treatment. - Treatment must not be carcinogenic nor toxic.

3.3 Design and Construction.

3.3.1 Materials, Processes, and Parts. - The material required shall be permanently treated non-burning 100% cotton, and shall be cured with tetrakis hydroxmethyl phosphonium salt precondensate/ammonia (precondensate/ammonia) (THPOH/NH_3).

3.3.1.1 Seams. - The main seams shall be double needle felled to meet the following specification: FED-STD-751A, "Stitches, Seams and Stitching," Seam Type SSa-2, Stitch Type 516, 10 mm (3/8") wide.

3.3.1.2 Fasteners on Coveralls. - The fasteners shall be nonmetallic, high temperature resistant, 30 ligne or #22 melmane buttons. The collar shall be able to be buttoned around neck.

3.3.1.3 Pockets. - There shall be only one lattice type pocket on the right hip (to hold gloves) and must not trap hazardous fluids. Pocket size shall be 18 cm x 18 cm (7" X 7").

3.3.1.4 Openings. - There shall be fabric covered slit openings at the front on both sides where the pockets normally would be located to permit access to inner garment.

3.3.1.5 Tab. - One tab (for a badge), 2.5 cm x 5.0 cm (1" x 2"), shall be located on the center of the left chest area, 20 cm (8") down from the shoulder seam.

3.3.2 Electromagnetic Interference.

Static Dissipation. - The material must meet the KSC static dissipation requirement. Voltage must drop to 10% or less of the applied voltage within 5 seconds and below 350 volts within 5 seconds at 45 +/- 5% relative humidity (maximum) and 24 °C (75 °F) (maximum). Reference NASA Materials Testing Branch Report, MMA-1985-79, "Standard Test Method for Evaluating Triboelectric Charge Generations and Decay." Testing will be performed at KSC.

3.3.3 Safety.

3.3.3.1 Combustibility: The material must meet the requirements of MIL-C-43112F, "Military Specification, Cloth, Sateen Cotton, Flame Retardant Treated": specifically that the finished cloth shall have an average time of after-flame of not more than 2.0 seconds, and not more than 40% consumed both initially and following 15 launderings. The material must also meet the requirement of NASA Handbook (NHB) 8060.1B, "Flammability, Odor, Offgassing, and Compatibility Requirements and Test Procedures for Materials in Environments that Support Combustion," Test 1: less than 150 mm (6") sample consumed and no sparking, sputtering, or dripping of flaming particles. Testing will be performed at KSC.

3.3.3.2 Propellant Compatibility. - The material shall not react exothermically with fuels, oxidizers, solvents, acids, or other chemicals normally used at KSC. Examples are:

Hydrogen	Hydrogen Peroxide
Oxygen	Alcohol
Nitrogen Textroxide	Nitric Acid
Hydrazine	Sulfuric Acid
Rocket Propellant #1	Ammonia
Methyl Ethyl Keytone	Freon 21

4. QUALITY ASSURANCE PROVISIONS

The Quality Assurance provisions shall meet the provisions required by the procurement document.

5. PREPARATION FOR DELIVERY

Preparation for delivery shall meet the provisions required by the procurement document.

6. NOTES

Intended Use. - This specification is intended to establish the minimum requirements for garments worn by personnel during hazardous operations and/or in non-cleanroom environments at KSC.

NOTICE. When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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