

METRIC/INCH-POUND

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June 2, 1969
KSC-SPEC-Z-0011A
June 15, 1982

**HEAT AND BLAST PROTECTION COATING
MATERIALS AND APPLICATION METHODS,
SPECIFICATION FOR**

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ENGINEERING DIRECTORATE

National Aeronautics and
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John F. Kennedy Space Center

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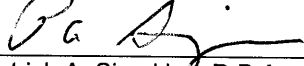
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MATERIALS AND APPLICATION METHODS,
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Approved by:



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Director, Engineering Directorate

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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

Units of measure and some terms commonly understood within the subject disciplines have been abbreviated in the body of this document without callout but are included among the following.

Btu	British thermal unit
°C	degree Celsius
CIP	NACE International Coating Inspector Program
cm	centimeter
cm ²	square centimeter
°F	degree Fahrenheit
ft	foot
GSE	ground support equipment
h	hour
ICC	Interstate Commerce Commission
in	inch
kg	kilogram
km/h	kilometer per hour
KSC	John F. Kennedy Space Center
lb	pound
lb/in	pound per linear inch
LOX	liquid oxygen
MIL	military
mm	millimeter
mph	mile per hour
MMH	monomethylhydrazine
MSDS	Material Safety Data Sheet
NACE	National Association of Corrosion Engineers
NASA	National Aeronautics and Space Administration
N ₂ O ₄	nitrogen tetroxide
PPE	personal protective equipment
RH	relative humidity

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s	second
SPEC	specification
ft ²	square foot
STD	standard
UDMH	unsymmetrical dimethylhydrazine

HEAT AND BLAST PROTECTION COATING MATERIALS AND APPLICATION METHODS, SPECIFICATION FOR

1. SCOPE

This specification is mandatory for use by KSC and associated contractors. This specification covers general requirements for heat and blast protection coating materials for launch structures and ground support equipment (GSE).

1.1 Classification

Materials furnished under this specification shall be of the following types as specified.

- a. Type A – For trowel application to bare or painted steel and for refurbishment of silicone rubber surfaces by trowel application.
- b. Type B – For spray application to bare or painted steel and for refurbishment of surfaces coated with silicone rubber materials.

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/Statement of Work/Contract.

2.1 Governmental

2.1.1 Specifications

John F. Kennedy Space Center (KSC), NASA

KSC-SPEC-E-0012	Heat and Blast Protection Coating for Electrical Cables, Specification for
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Military

MIL-PRF-5606	Hydraulic Fluid, Petroleum Base; Aircraft, Missile, and Ordnance
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MIL-PRF-83282	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Metric, NATO Code Number H-537
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2.1.2 Standards

John F. Kennedy Space Center (KSC), NASA

NASA-STD-5008 Protective Coating of Carbon Steel, Stainless Steel and Aluminum on Launch Structures, Facilities, and Ground Support Equipment

NASA-STD-(I)-6001 Flammability, Offgassing, and Compatibility Requirements and Test Procedures

2.1.3 Publications

National Aeronautics and Space Administration (NASA)

NPR 6000.1 Requirements for Packaging, Handling and Transportation for Aeronautical and Space Systems Equipment and Associated Components

2.2 Nongovernmental

SSPC-PA 2 Measurement of Dry Coating Thickness With Magnetic Gages

The Society for Protective Coatings, SSPC Publication Sales, 40 24th Street, 6th Floor, Pittsburgh PA 15222-4656, 877-281-7772

ASTM D1876 Standard Test Method for Peel Resistance of Adhesives (T-Peel Test)

ASTM D6862 Standard Test Method for 90 Degree Peel Resistance of Adhesives

ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959

(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 Qualifications Tests

Material supplied in accordance with this specification shall have been tested and have passed the qualification tests described in 5.4 for the class specified. Certification that material furnished in accordance with this specification is identical in composition and characteristics, within commercial tolerances, to the material which passed the qualification tests shall be furnished with each batch of material supplied.

3.2 Multicomponent Systems

A coating system composed of different formations (primer, basic coating, and topcoat) or forms (liquid, sheet, and tape) shall satisfy the requirements of this specification as a complete system.

3.3 Shelf Life

Material shall be capable of meeting the requirements of this specification when stored in accordance with the conditions stated in 5.2.4.2, 5.2.5.1, and 5.3.4.

3.4 Ease of Application

Material shall be capable of being applied by skilled labor following detailed application procedures furnished by the material supplier. Trowelable materials shall be capable of being applied to a vertical surface to a thickness of 6.35 mm (0.25 in) without sagging. Pot life shall be a minimum of 1 hour. Sprayable materials shall be capable of application with commercially available equipment to the film thicknesses specified.

3.5 Adhesion

Material shall adhere to uncoated steel and to steel coated with zinc-rich coating. Adhesion shall be a minimum of 0.89 kg/cm (5 lb/in) when tested as described in 5.7.6.

3.5.1 Adhesion to Surfaces Coated With Materials in Accordance With KSC-SPEC-E-0012 (Type A Only)

Type A material shall exhibit a minimum peel strength of 0.89kg/cm (5 lb/in) when applied over the materials currently approved for use under type A of this specification and tested as described in 5.7.6.1.

3.5.2 Adhesion to Surfaces Coated With Material in Accordance With KSC-SPEC-E-0012 (Type B Only)

Type B material shall exhibit a minimum peel strength of 0.89kg/cm (5 lb/in) when applied over material in accordance with KSC-SPEC-E-0012 and using the materials currently approved for use under type B of this specification. Testing shall be as described in 5.7.6.2.

3.6 Cure

The required cure for the material shall be complete within 7 days at 10 °C to 37.8 °C (50 °F to 100 °F) and 50 to 100 percent relative humidity (RH).

3.7 Resistance to Penetration by Hydraulic Fluids

The surface of the cured material shall be smooth and nonporous. The material shall retain its thermal protection characteristics after exposure to hydraulic fluids conforming to MIL-PRF-5606 and MIL-PRF-83282.

3.8 Rocket Engine Exhaust Resistance

Material applied to a thickness of 3.175 mm (.125 in) to designated areas of the launch facility that will be subjected to launch vehicle exhaust shall not erode or burn through to the underlying surface. The remaining material shall adhere to the underlying surface. Backface temperature shall be measured on the underlying surface. Backface temperature shall not exceed 121 °C (250 °F).

3.9 Refurbishment

Any char resulting from surface thermal decomposition shall be easily removed; for example, by wiping with a cloth, low-pressure washing, using a scrub brush, etc. Material that must be entirely removed before refurbishment is not acceptable. Resurfacing material shall bond to the residual coating after the char has been removed. The bond shall be homogeneous and show no tendency to delaminate under stress of vehicle exhaust.

3.10 Liquid Oxygen Compatibility

Material is not required to satisfy the liquid oxygen (LOX) impact sensitivity requirements of NASA-STD-(I)-6001. However, it must not react spontaneously with LOX. LOX tests, when required, shall be performed as incidental exposure. This test will be conducted by the NASA-KSC Material Science Division.

3.11 Flammability

Materials shall comply with NASA-STD-(I)-6001, Test 1.

3.12 Resistance to Hypergolic Propellants

Material shall not ignite or produce an excessive temperature rise with 50:50 unsymmetrical dimethylhydrazine (UDMH) -hydrazine blend, hydrazine, monomethylhydrazine (MMH), and nitrogen tetroxide (N₂O₄) when tested in accordance with NASA-STD-(I)-6001, Supplemental Test Procedure A.7.

3.13 Flexibility

The coating shall be sufficiently flexible to permit wrapping a 3.175-mm (0.125-inch)-thick sample around a 76.2-mm (3-inch) -diameter mandrel without cracking when tested in accordance with 5.7.5.

3.14 Weathering

The thermal protection characteristics of the material shall not degrade due to seacoast atmospheric exposure. Material installed outside at KSC shall maintain its ability to meet the requirements of this specification for periods up to 6 months.

4. APPLICATION

4.1 Type A

4.1.1 Surface Preparation

Surfaces to receive an ablative coating shall be cleaned of all contaminants. Smooth surfaces shall be roughened with abrasive paper, by abrasive blasting, or other appropriate methods. Surfaces shall be rinsed twice. The first rinse shall be with isopropyl alcohol. After the initial rinsing, the surfaces shall be rinsed again with cloths dampened with acetone, methyl isobutyl ketone, or methyl ethyl ketone (MEK). Because isopropyl alcohol evaporates very rapidly, special care shall be taken to ensure surfaces are cleaned adequately.

Freshly cleaned surfaces that will be exposed to salt-laden winds shall be primed within 2 hours. All other surfaces shall be primed within 8 hours. Suitable precautions shall be taken to ensure that the surfaces remain clean until they are primed.

4.1.2 Application of Primer

Following cleaning, surfaces shall be coated with a thin coat of the appropriate primer in accordance with the manufacturer's instructions by application with clean cheesecloth, spraying, or brushing. Primer shall be applied in a well-ventilated area and kept away from heat, sparks, and open flames.

Application using cheesecloth is the preferred method. For brush application, only good-quality natural-bristle brushes shall be used. A thin coating adheres better than a heavy film. A primer coat is considered too heavy when the surface is flooded, causing the primer to run or appear chalky. The primer shall be permitted to dry in accordance with the manufacturer's recommendations before application of the coating material. If the dry primer is chalk-white in appearance, the surface shall be wiped down with a clean dry cloth until the chalky material has been removed.

No more than 8 hours shall elapse before the coating material is applied to the primed surfaces. If more than 8 hours elapse, the surfaces shall be cleaned and primed again. Primed surfaces shall be protected from dust, other foreign matter, and handprints. The primed surfaces shall be kept dry by any means necessary until the coating material is applied. In cases where the surfaces are exposed to salt-laden winds, the time between primer application and coating material shall be no more than 2 hours.

4.1.3 Application of Ablative Coating by Troweling or Hand Layup

4.1.3.1 Mixing

The base and the catalyst shall be mixed in strict accordance with the manufacturer's written instructions.

4.1.3.2 Application

After mixing, the ablative coating material shall be applied with a trowel or spatula. The material may be reworked to any desired configuration. Uncured excess material shall be removed with xylene or similar aromatic solvents. Trowels or other instruments used to apply the ablative coating material shall be cleaned with these solvents. If hand layup is necessary, protective gloves shall be worn.

CAUTION

No unspecified extraneous materials shall be used as nonsticking agents on hands, gloves, tools, or any implement used in the application of the ablative coating. Only after completion of the job shall suitable cleaners be used to remove coating material compound from hands and tools.

To increase the effectiveness of the ablative coating material, the primed surfaces and coating material being applied shall be kept water-free throughout the entire period of application and final smoothing of the coating. Only specified materials shall be employed in the application of the primer and coating material. Essentially, the ablative coating material shall be applied to the specified thickness and shall be free from contaminants that can reduce adhesion.

4.1.4 Working Time

The ablative coating material shall be applied within the manufacturer's recommended working time and before set begins.

4.1.5 Refurbishment

After exposure to rocket engine exhaust, ablated surfaces shall be prepared to receive additional ablative coating material by the following procedure:

- a. Ablated surfaces shall be roughened with a wire brush or abrasive paper to remove residual char. Ablated surfaces shall be cleaned with a clean cloth dampened with acetone.
- b. If the ablated surface has been eroded to the bare substrate, refurbishment shall be identical to the procedure for coating new surfaces (see 4.1, and 4.2).

4.1.6 Overcoating Silicone-Rubber-Coated Surfaces

Primer shall not be applied to silicone rubber surfaces. Additional coating may be applied directly to recently coated uncontaminated surfaces. Contaminated surfaces shall be cleaned by wiping with acetone before applying additional material. Where the surface is gummy, it shall be wiped with a clean cloth dampened in acetone to remove the gummy portion before refurbishing.

4.1.7 Overcoating Ablative Materials Other Than Silicone Rubber

Where it has been determined that the adhesion between the intended overcoat material and the existing ablative is adequate and that the residual coating is firmly bonded to the subsurface, the overcoating ablative shall be applied over the residual coating.

4.2 Type B

4.2.1 Surface Preparation

The ablative coating material shall be applied over clean, dry substrates. Loose particles of foreign matter shall be blown, brushed, or vacuumed away. Before coating material is applied the surface shall be free of moisture and at least 2 hours of adequate temperature and humidity shall remain before the onset of nightfall or inclement weather.

The coating material can be applied directly over most other silicone coatings. When older silicone coats are recoated, the surface shall be clean, dry, and structurally sound. The existing coating shall be power-washed with an appropriate surfactant solution and then power-rinsed to remove dirt. It is recommended that a test patch be cleaned and coated with material to verify the effectiveness of the cleaning process and the adhesion of the material to the surface prior to beginning the job.

4.2.2 Application Procedure

The coating material shall be applied by spraying, rolling, or brushing onto clean, dry, structurally sound surfaces. For best results, the ambient temperature should be 10 °C to 26.7 °C (50 °F

to 80 °F). Lower temperatures will lengthen the skin-over, tack-free, and ultimate cure time. Higher temperatures will shorten the cure time and working time. Sudden temperature declines will also result in dew formation on surfaces, which can prevent adhesion. For best results, relative humidity should be above 20 percent. Lower humidity will slow the cure rate significantly.

The coating material shall be sprayed as received, using the equipment recommended by the manufacturer. Additional dilution with solvent is neither necessary nor desirable.

Care shall be taken to avoid overspray. All overspray shall be cleaned up immediately and before it has cured, by wiping alternately with a cloth dampened with mineral spirits and dry cloths. Spraying in high winds (24 km/h or 15 mph) shall not be performed. All surfaces that are not to be coated shall be masked. Cured material shall be scraped off surfaces with a razor blade or scrubbed off with steel wool and mineral spirits.

Equipment containing uncured material shall be cleaned in accordance with the manufacturer's instructions.

5. QUALITY ASSURANCE PROVISIONS

5.1 General Responsibilities

Unless otherwise specified, the manufacturer shall perform all inspection requirements specified herein. Except as otherwise specified, the manufacturer may utilize his own or any other inspection facilities and services acceptable to NASA. Inspection records of the examinations and tests shall be kept complete and available to the Government for a period of 5 years, unless otherwise specified in the contract or order. The Government reserves the right to perform any of the inspections set forth in the specification, where such inspections are deemed necessary, to ensure supplies and services conform to the prescribed requirements.

In addition, the Government and/or the Government's representative shall inspect the surface preparation and coating application processes defined herein as required by the project specifications. The inspector shall perform all of the in-process inspections required by the project specifications. The assigned inspector shall be a NACE-certified coating inspector – Level 3, under the NACE International Coating Inspector program. The inspector shall witness, inspect, and test all protective coating work to verify complete compliance with the specified requirements. For more information regarding NACE coating inspection requirements, refer to NASA-STD-5008.

The Coating Inspector Program is provided by NACE International, Education Department, 1440 South Creek Drive, Houston, Texas, 77218-4906, (281) 228-6200, FAX (281) 228-6300.

5.2 Type A Quality Assurance

5.2.1 Responsibility

The contractor and NACE inspector shall be responsible for performing inspection and tests of materials, equipment, and procedures to ensure conformance to the requirements of this specification. The contractor and NACE inspector shall provide and maintain an inspection and test system acceptable to the Government.

5.2.2 Inspection

5.2.2.1 Cleanliness

Immediately prior to the application of primer, the surface shall be examined to ensure it has been properly cleaned. No visible corrosion products, loose paint, or other foreign matter shall be present. Adhered paint need not be removed.

5.2.2.2 Primed-Surface Inspection

Final inspection of the primed surface shall be performed no sooner than 30 minutes after the primer application. If chalking is noted during this inspection, the primed surface shall be inspected again following the wipedown procedure specified in 4.1.2.

5.2.2.3 Coating Thickness Test

Coating thickness shall be as specified on the engineering drawing. Unless otherwise specified, excessive coating thickness shall not be cause for rejection. Thickness shall be measured by inserting a pin into randomly selected places and measuring penetration or use appropriate dry-film thickness gauges on cured coating material. Evidence of inadequate coating thickness shall be cause for rejection.

5.2.3 Personnel Hazards

The coating material consists of two components, the catalyst and the base. Prior to handling, personnel shall be familiar with Personal Protective Equipment (PPE) recommendations as well as physical and health hazard information contained in the Material Safety Data Sheet (MSDS) of each component.

5.2.4 Notes

5.2.4.1 Primer

5.2.4.2 Primer Shelf Life

The shelf life of the primer in a sealed container is 6 months when stored at temperatures below 32.2 °C (90 °F). The primer should be used within 6 months of the manufacture date shown on

the label. Containers of outdated primer shall be submitted to the NASA Material Science Division for revalidation at the time of intended use.

5.2.4.3 Primer Maintenance

Opened primer cans shall be resealed as quickly as possible following use. The primer tends to pick up moisture from the atmosphere and its effectiveness deteriorates under these circumstances. To prevent deterioration, it is suggested that only the amount of primer to be used be taken from the container and that the original container be resealed. Unused portions shall not be returned to the original container. The smallest amount of primer necessary to coat the area under consideration shall be removed from the container.

5.2.4.4 Primer Inspection

The primer shall be inspected for clarity prior to use. Cloudiness shall be cause for submission of the primer to the NASA Material Science Division for inspection and revalidation.

5.2.4.5 Primer Storage

All primer shall be stored in areas where the temperature will not exceed 32.2 °C (90 °F) at any time during the primer's shelf-life. Prolonging the shelf-life of the primer is possible by storing it at temperatures as low as -29.4 °C (-20.92 °F).

5.2.5 Ablative Coating Material

5.2.5.1 Coating Material Shelf Life

The coating material should be used before the manufacturer's expiration date printed on the packaging. Containers of outdated coating material shall be submitted to the NASA Material Science Division for revalidation at the time of intended use.

5.2.5.2 Coating Material Storage

The coating material shall be stored in an area where the highest temperature at any time during its storage will not exceed 25.6 °C (78 °F). The material shall be stored in an area where the integrity of the contents of the can will be ensured. The cans shall be stored in a manner to ensure against overheating, water intrusion, and physical damage that might open the can and expose the contents.

5.3 Type B Quality Assurance

5.3.1 Responsibility

The contractor and NACE inspector shall perform inspection and test of materials, equipment, and procedures to ensure conformance to the requirements of this specification. The contractor

and NACE inspector shall provide and maintain an inspection and test system acceptable to the Government.

5.3.2 Inspection

Inspection shall include but not be limited to the following.

5.3.2.1 Cleanliness

Immediately prior to application of the coating material, the surface shall be examined to ensure no visible corrosion products, loose paint, dirt, or other foreign matter are present and the surface has been prepared in accordance with 4.2.1.

5.3.2.2 Coating Application

The coating application process shall be observed for compliance with 4.2.2.

5.3.2.3 Coating Thickness Test

Coating thickness shall be as specified on the engineering drawing. Unless otherwise specified, excessive coating thickness shall not be cause for rejection. Thickness shall be measured by a dry-film-thickness gage suitable for the substrate in accordance with SSPC-PA-2. Evidence of inadequate coating thickness shall be cause for rejection.

5.3.3 Personnel Hazards

Prior to handling, personnel shall be familiar with Personal Protective Equipment (PPE) recommendations and the physical and health hazard information contained in the Material Safety Data Sheet (MSDS).

5.3.4 Shelf Life

The coating material should be used before the manufacturer's expiration date printed on the packaging. Containers of outdated coating material shall be submitted to the NASA Material Science Division for revalidation at the time of intended use.

5.3.5 Storage

The coating material shall be stored in an area where the highest temperature at any time during storage will not exceed 25.6 °C (78 °F). The material shall be stored in an area where the integrity of the contents of the container will be ensured. The container shall be stored in a manner to ensure against overheating, water intrusion, and physical damage that might open the can and expose the contents.

5.4 Qualification Testing

To become a qualified product, material shall meet the requirements of Section 3 and pass the qualification tests of 5.7.

5.5 Acceptance Testing

Production batches of materials shall be tested for LOX compatibility as defined in 3.10 to determine acceptability.

5.6 Standard Test Conditions

Standard conditions during testing shall be $21.1\text{ }^{\circ}\text{C} \pm 2.8\text{ }^{\circ}\text{C}$ ($70\text{ }^{\circ}\text{F} \pm 5\text{ }^{\circ}\text{F}$) and 55 ± 5 percent relative humidity.

5.7 Test Methods

5.7.1 LOX Test

LOX tests, when required, shall be performed as incidental exposure. This test will be conducted by the NASA-KSC Material Science Division.

5.7.2 Rocket Engine Exhaust Test

Three test panels shall be attached to a location designated by the procuring activity. Test specimens shall consist of carbon steel panels, 152.4 mm by 152.4 mm by 3.175 mm (6.0 in by 6.0 in by 0.125 in), painted with zinc-rich coating, coated with 3.175 mm (0.125 in) $\pm 0.397\text{ mm}$ (0.0156 in) of the material to be tested. Alternatively, an area of the launch facility designated by the procuring activity shall be coated with 3.175 mm (0.125 in) of the material to be tested. The specimens shall be cured at ambient conditions for at least the minimum time recommended by the manufacturer. The samples shall then be subjected to the launch vehicle exhaust or other rocket engine exhaust acceptable to the procuring activity. After exposure, the test samples shall not have eroded or burned through to the underlying surface. Material remaining shall adhere firmly to the underlying surface. Backface temperature shall not exceed $121\text{ }^{\circ}\text{C}$ ($250\text{ }^{\circ}\text{F}$). This test will be conducted by the NASA-KSC Material Science Division.

5.7.3 Flammability Test

Flammability testing shall be conducted in accordance with the method described in NASA-STD-(I)-6001, Test 1. Specimen thickness shall be 3.175 mm (0.125 in).

5.7.4 Hypergolic Propellant Compatibility Test

Compatibility with 50:50 UDMH-hydrazine blend, hydrazine, MMH, and N_2O_4 shall be determined in accordance with NASA-STD-(I)-6001, Supplemental Test Procedure A.7. Exposure

time shall be 10 minutes. Evidence of flame or violent reaction shall be cause for rejection. This test shall be conducted by NASA-KSC Material Science Division.

NOTE

Compatibility with the hypergolic propellants shall be determined with separate specimens.

5.7.5 Flexibility Test

A sample 3.175 mm by 25.4 mm by 127 mm (0.125 in by 1.0 in by 5.0 in) shall be wrapped around a mandrel 76.2 mm (3.0 in) in diameter. Evidence of cracking shall be cause of rejection.

5.7.6 Adhesion Test

One each of 25.4 mm-(1.0-inch)-wide samples of any convenient length and thickness of bare steel and steel coated with zinc-rich primer shall be coated with 3.175 mm (0.125 in) of the material to be tested. Peel-strength shall be a minimum of 0.89kg/cm (5 lb/in) when tested using a crosshead travel speed of 508 mm/min (20 in/min), in accordance with ASTM D6862. Samples that exhibit a peel-strength greater than the material tensile strength shall be considered to have passed the adhesion test.

5.7.6.1 Supplementary Adhesion Test (Type A Only)

One-inch-wide samples of any convenient length and thickness of each of the currently qualified Type A materials shall be overcoated with 3.175 mm (0.125 in) of the material being tested. T-peel strength shall be a minimum of 0.89kg/cm (5 lb/in) when peel-tested using a crosshead travel speed of 508 mm/min (20 in/min), in accordance with ASTM D1876.

5.7.6.2 Supplementary Adhesion Test (Type B Only)

25.4 mm-(1.0 inch)-wide samples of any length and thickness of each of the currently qualified Type B materials and material conforming to KSC-SPEC-E-0012 shall be overcoated with 3.175 mm (0.125 in) of the material being tested. T-peel strength shall be a minimum of 0.89kg/cm (5 lb/in) when peel-tested using a crosshead travel speed of 508 mm/min (20 in/min), in accordance with ASTM D1876.

5.8 Rejection and Retest

Failure of any sample from any production lot to conform to the requirements of this specification shall be cause for rejection of the production lot represented.

5.9 Sampling for Production Lot Inspection

Samples shall be selected from each production lot submitted for acceptance testing as required. Sufficient quantities of material shall be selected at random to permit testing as specified herein.

6. PREPARATION FOR DELIVERY

6.1 Packaging and Packing

Preparation for delivery shall be in accordance with NPR 6000.1. Unless otherwise specified, preservation and packaging shall be Level A and packaging shall be Level C, as defined therein.

6.1.1 Marking of Packaging and Packing Container

Additional marking requirements for each unit package (kit) and pack shall include the following:

- a. title, number, and date of this specification,
- b. class and type,
- c. name of the product,
- d. batch number,
- e. manufacturer's name and address,
- f. size of container,
- g. date of manufacturer,
- h. toxicity precautions,
- i. supplementary information necessary to ensure safe and proper use of the material, and
- j. ICC flammable label (as required).

6.1.2 Mixing and Application Instructions

Mixing and application instructions shall be included with each kit.

7. NOTES

7.1 Intended Use

The material covered by this specification is intended to be used to protect launch structures and ground support equipment from rocket engine exhaust. Materials are intended for use where LOX exposure is possible and where the conditions necessary for ignition are not expected to be present.

7.2 Ordering Data

Procurement documents for the coating should specify the following:

- a. title, number, and date of this specification,
- b. class and type of compounds required (see 1.2),
- c. whether special preservation, packaging, packing, and marking are required (see 5.1).

7.3 Provisions for Qualification

With respect to products requiring qualification, awards will be made only for such products as have been tested and approved for inclusion into the applicable qualified products list prior to the bid opening date, whether or not such products have actually been listed by that date. The supplier's attention is called to this requirement, and manufacturers are urged to make arrangements for qualification testing of their product so that they may be eligible for contracts to supply the products covered by this specification. Requests for information pertaining to qualification of products covered by this specification should be addressed as follows:

Engineering Directorate, Materials Science Division, NE-L
NASA/Kennedy Space Center
Kennedy Space Center, Florida 32899

NOTICE. The Government drawings, specifications, and/or data are prepared for the official use by, or on behalf of, the United States Government. The Government neither warrants these Government drawings, specifications, or other data, nor assumes any responsibility or obligation, for their use for purposes other than the Government project for which they were prepared and/or provided by the Government, or any activity directly related thereto. 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 licensing in any manner the holder or any other person or corporation nor conveying the right or permission to manufacture, use, or sell any patented invention that may relate thereto.

Custodian:

NASA – John F. Kennedy Space Center
Kennedy Space Center, Florida 32899

Preparing Activity:

John F. Kennedy Space Center
Materials Science Division
Engineering Directorate

APPENDIX A. PRODUCTS APPROVED UNDER KSC-SPEC-F-0006

This list has been derived from a continuing test program. All listed materials have passed specific tests or service requirements of KSC-SPEC-F-0006, "Heat and Blast Protection Coating Materials and Application Methods, Specification for," and have been found to be satisfactory.

Type A (Trowelable)

Product	Manufacturer
Q3-6077	Dow Corning Corporation Midland, Michigan 48640
Chem Seal CS-3808 CS-9903 Primer	Flamemaster Corporation 13576 Desmond St. Pacoima, CA 91331 (818) 890-1401

Type B (Sprayable)

Product	Manufacturer
GE SCM 3404-NASA (gray) GE SCM 3402-NASA (white) (single component)	Momentive Performance Materials 5200 Dallas Hwy. Suite 200, MB 287 Powder Springs, GA 30127 (770) 505-2720
GE SCM 3304 (gray) GE SCM 3302 (white) (2 components)	Momentive Performance Materials 5200 Dallas Hwy. Suite 200, MB 287 Powder Springs, GA 30127 (770) 505-2720
Dow Q3-3516 (2 components)	Dow Corning Corporation Midland, Michigan 48640
Dow Q3-5000 (single component)	Dow Corning Corporation Midland, Michigan 48640

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3 and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6 and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

Note: This form may not be used to request copies of documents, nor to request waivers or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document or to amend contractual requirements.

I RECOMMEND A CHANGE	1. Document Number	2. Document Date
	KSC-SPEC-F-0006B	01-30-2009

3. Document Title
Heat and Blast Protection Coating Materials and Application Methods, Specification For

4. Nature of Change (*Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.*)

5. Reason for Recommendation

6. SUBMITTER

a. Name (<i>Last, First, Middle Initial</i>)	b. Organization	
c. Address (<i>include zip code</i>)	d. Telephone (<i>include area code</i>)	e. Date Submitted

7. PREPARING ACTIVITY

a. Name (<i>Last, First, Middle Initial</i>) Sampson, Jeffrey W.	b. Organization KSC Engineering Directorate
c. Address (<i>include zip code</i>) John F. Kennedy Space Center, FL 32899	