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Title: Specification/Materials Road Map

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Intended for: Materials Overview for B61 LEP



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Abstract:

These slides cover materials and parts associated with the Compatibility & Detonator Interface Materials Team Task Team. The purpose of this presentation is to document new and old part numbers; list all associated materials, specifications and standards currently required for each part; insure all current documentation is available and compiled; aid discussions with outside vendors; and guide specification review and identify potential/necessary changes. The parts are made primarily from polysulfone, polypropylene, and silicone RTV elastomer.

Materials/Specification Road Map (W-1-11-0006)

Purpose of the presentation: Materials Overview for B61 LEP Main Charge subPRT and Primary PRT

Cost Codes: 3C070A K61L 1000 0006

Specification/Material Road Map

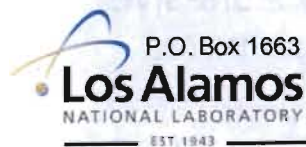
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Overview

■ These slides serve to:

- document new and old part numbers;
- list all associated materials, specifications and standards currently required for each part;
- insure all current documentation is available and compiled;
- aid discussions with outside vendors; and
- guide specification review and identify potential/necessary changes.

■ Part List

- Polysulfone Parts
 - 1K0624 (Formerly 422116 Issue K): Detonator Locator
 - 1K0626 (Formerly 422117 Issue H): Detonator Cover
 - 1K0631 (Formerly 422122 Issue G): Detonator Socket
 - 1K0629 (Formerly 422312 Issue H): Charge Housing
 - 1K0625 Polysulfone Ring (1524863 Ring derived from 1462741 Ring) on 1K0633 (Formerly 422124 Issue J): Detonator Pad Assembly
- Polypropylene Part
 - 1K0632 (Formerly 422123 Issue F): Detonator Sleeve
- Detonator Pad Assembly (Silicone RTV, Polysulfone Rings and Epoxy Adhesive)
 - 1K0633 (Formerly 422124 Issue J): Detonator Pad Assembly [includes 1K0625 PS Ring & 1K0623 Silastic E Pad]

Common/General Specifications

- **Some specifications are common to many parts and materials.**
- **General specifications listed for many of our parts are:**
 - **9900000-07 General Requirements**
 - Scope: This specification covers general product fabrication and inspection requirements. It also provides interpretation of certain requirements specified on product drawings, models and electronic files. Specific requirements on product drawings, models and electronic files always take precedence over these general requirements and interpretations.
 - **1463697-00 General Requirements, Plastic Products**
 - Scope: This specification covers acceptance criteria of molded or machined plastic parts and assemblies. Specific requirements on product drawings always take precedence over these general requirements and interpretations.
 - **9919100-06 Marking, General Methods**
 - Scope: This specification states marking requirements for specified product identification markings. It also:
 - a. Describes the composition of manufacturing identification elements.
 - b. Authorizes certain nonspecified markings that may be applied at the manufacturer's option .
 - c. Authorizes certain actions to correct minor defects found in markings during manufacture.
 - **9906002-02 Wet Blasting**
 - Scope: This standard covers the wet-blasting process. In this process, a water slurry of an abrasive is directed at high speed against the surface to be blasted. A wide variety of materials may be blasted: metals, plastics, or ceramics.

1K0624 (Formerly 422116 Issue K): Detonator Locator

■ Associated Materials/Requirements:

- 9906002-02 Wet Blasting
 - “all outside surfaces of part in accordance with 9906002 condition A”
- 1524499-1 Insert
 - 7340223-01 Corrosion Resistant Steel (303 or 303SE) passivated per 9904301 treatment C.
 - 9919100-07 Marking General Methods and 9900000-09 General Requirements apply.
- 2340027-00 Polysulfone
 - 2340027-2340029 calls out Amoco polysulfone P-1700-natural 11 and P-1700-natural 13.
 - Amoco's polysulfone business was acquired by Solvay Advanced Polymers. The materials are now sold under the Solvay Udel® tradename.
 - 2340027 refers to Amoco polysulfone P-1700-natural 11. This material is now Udel® P-1700 NT 11.
 - 2340027-2340029 (and 2340007-2340017) refer to MIL-P-46120 as a required document. The physical property testing and requirements in the specification are derived from this MIL spec. Unfortunately, this MIL spec has been cancelled without replacement.
 - ASTM D6394 “Standard Specification for Sulfone Plastics (SP)” covers all polysulfone materials and includes the test methods and requirements of historical MIL-P-46120 specification for reference. ASTM D6394 will likely be used in future polysulfone material specifications.
- 9900000-07 General Requirements



Additional Drawing Notes: “Mark Design Agency Part Number per 9919100 class H-1.”

1K0626 (Formerly 422117 Issue H): Detonator Cover

■ Associated Materials/Requirements:

- 2340027-00 Polysulfone
 - 2340027-2340029 calls out Amoco polysulfone P-1700-natural 11 and P-1700-natural 13.
 - Amoco's polysulfone business was acquired by Solvay Advanced Polymers. The materials are now sold under the Solvay Udel® tradename.
 - 2340027 refers to Amoco polysulfone P-1700-natural 11. This material is now Udel® P-1700 NT 11.
 - 2340027-2340029 (and 2340007-2340017) refer to MIL-P-46120 as a required document. The physical property testing and requirements in the specification are derived from this MIL spec. Unfortunately, this MIL spec has been cancelled without replacement.
 - ASTM D6394 "Standard Specification for Sulfone Plastics (SP)" covers all polysulfone materials and includes the test methods and requirements of historical MIL-P-46120 specification for reference. ASTM D6394 will likely be used in future polysulfone material specifications.
- 9900000-07 General Requirements

■ Additional Drawing Notes: "Mark Design Agency Part Number per 9919100 class H-1."

1K0631 (Formerly 422122 Issue G): Detonator Socket

■ Drawing Notes:

- 9900000-07 General Requirements
- 2340027-00 Polysulfone
 - 2340027-2340029 calls out Amoco polysulfone P-1700-natural 11 and P-1700-natural 13.
 - Amoco's polysulfone business was acquired by Solvay Advanced Polymers. The materials are now sold under the Solvay Udel® tradename.
 - 2340027 refers to Amoco polysulfone P-1700-natural 11. This material is now Udel® P-1700 NT 11.
 - 2340027-2340029 (and 2340007-2340017) refer to MIL-P-46120 as a required document. The physical property testing and requirements in the specification are derived from this MIL spec. Unfortunately, this MIL spec has been cancelled without replacement.
 - ASTM D6394 "Standard Specification for Sulfone Plastics (SP)" covers all polysulfone materials and includes the test methods and requirements of historical MIL-P-46120 specification for reference. ASTM D6394 will likely be used in future polysulfone material specifications.
- 9906002-02 Wet Blasting
 - "all outside surfaces of part in accordance with 9906002-02 condition A"
- 9919100-06 Marking, General Methods
 - Drawing indicates "Mark Design Agency Part Number per 9919100 class H-1-A."

1K0629 (Formerly 422312 Issue H): Charge Housing

■ Associated Materials/Requirements:

- 2340027-00 Polysulfone
 - 2340027-2340029 calls out Amoco polysulfone P-1700-natural 11 and P-1700-natural 13.
 - Amoco's polysulfone business was acquired by Solvay Advanced Polymers. The materials are now sold under the Solvay Udel® tradename.
 - 2340027 refers to Amoco polysulfone P-1700-natural 11. This material is now Udel® P-1700 NT 11.
 - 2340027-2340029 (and 2340007-2340017) refer to MIL-P-46120 as a required document. The physical property testing and requirements in the specification are derived from this MIL spec. Unfortunately, this MIL spec has been cancelled without replacement.
 - ASTM D6394 "Standard Specification for Sulfone Plastics (SP)" covers all polysulfone materials and includes the test methods and requirements of historical MIL-P-46120 specification for reference. ASTM D6394 will likely be used in future polysulfone material specifications.
- 1463697-00 General Requirements, Plastic Products
- 9919100-06 Marking, General Methods
 - Drawing indicates "Mark Design Agency Part Number per 9919100 class H-1."
- 9906002-02 Wet Blasting

1K0632 (Formerly 422123 Issue F): Detonator Sleeve

■ Drawing Notes:

- 9900000-07 General Requirements
- 2217017 Polypropylene
 - 2217017-2217047 "Plastic Molding Material, Propylene, Injection and Extrusion" identifies several different types/grades of polypropylene.
 - 2217017 is defined as type I with "no additives other than those normally used for stabilization purposes."
 - 2217017-2217047 calls out federal specification L-P-394 as a required document. This is a general specification that defines basic property values for polypropylene.
 - L-P-394 was originally issued in 1964 (issue A), revised in 1968 (issue B) and cancelled in 1988. ASTM D4101 "Standard Specification for Polypropylene Injection and Extrusion Materials" is suggested for use.
 - The task team will review L-P-394 and ASTM D4101 to identify important material properties and address specification revisions.
- 9919100 Marking, General Methods
 - Drawing indicates "Mark Design Agency Part Number per 9919100 class H-1-A."

1K0633 (Formerly 422124 Issue J): Detonator Pad Assembly

- 1K0633 (422124) is a top-level drawing composed of a silicone RTV pad (1K0623) with polysulfone rings (1K0625) bonded using an epoxy adhesive.
 - **Associated Materials/Requirements:**
 - 4551262-01 Filler, Silicon Dioxide
 - Filler, Silicon Dioxide, Medium Surface Area (Cab-O-Sil M-5)
 - 4604145-01 Promoter, Epoxy Resin
 - DMP-Hardener, Epoxy Resin (Curing Agent Ancamine K-54)
 - Required Documents = ASTM D1544 Test for Color of Transparent Liquids
 - Requirements include color, appearance, water content, nitrogen content and distillation.
 - 2201115-01 Curing Agent, Poly Res
 - Versamid 125 (Cognis Corp) or Epikure 3125 (Momentive Performance Materials)
 - Documents =
 - ASTM D445 Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids
 - ASTM D446 Standard Specification and Operating Instructions for Glass Capillary Kinematic Viscometers
 - 9952021 Test, Viscosity of Liquids
- Documents = -ASTM E1-64 Specification for
ASTM Thermometers *64 refers to year, most recent is
07*)

1K0633 (Formerly 422124 Issue J): Detonator Pad Assembly

■ Continued

- 2140285-03 Epoxy Resin
 - Epon 828 (Hexion or Resolution Performance Products)
 - Documents = 4604020 Diethanolamine Curing Agent
 - Documents = -ASTM E 203 Standard Test Method for Water Using Volumetric Karl Fischer Titration
 - 9981054 Water Content Determination of Amines
 - 9981055 Determination of Epoxy Equivalent
 - 9981007 Testing Chloride Content, Low Chloride
 - Documents = -ASTM D4661 Standard Test Method for Polyurethane Raw Materials: Determination of Total Chlorine in Isocyanates
 - ASTM D4327 Standard Test Method for Anions in Water by Chemically Suppressed Ion Chromatography
 - 9981008 Testing, Ash Content
 - 9981053 Testing, Sulfur Content for Organic Material
 - Documents = -ASTM D4661 Standard Test Method for Polyurethane Raw Materials: Determination of Total Chlorine in Isocyanates
 - ASTM D4327 Standard Test Method for Anions in Water by Chemically Suppressed Ion Chromatography

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1K0633 (Formerly 422124 Issue J): Detonator Pad Assembly

■ Continued

- 2140285-03 Epoxy Resin -- continued
 - Epon 828 (Hexion or Resolution Performance Products)
 - Documents = 9952021 Determination of Viscosity of Liquids
 - Documents = -ASTM E1-64 Specification for
ASTM Thermometers *64 refers to year, most recent is
07*)
 - ASTM D1475 Determination of Paint, Varnish, Lacquer and Related Products
 - ASTM D1544 Color of Transparent Liquids (Gardner Color Scale)
 - ASTM E203 Test for Water Using Karl Fischer Reagent
- 1K0623 (formerly 1524864-1) Pad
 - 2070109-00 Elastomer, Silicone RTV
 - Dow Corning® 93-072 Base and Catalyst or Silastic E Base and Catalyst (Dow Corning® Midland, MI)
 - Documents= ASTM D2240 Standard Test Method for Rubber Property—Durometer Hardness
 - 9919100-06 Marking, General Methods
 - Drawing indicates "Mark Manufacturing Agency Part Number per 9919100, class H-1-A. Bag each part separately."
 - 9900000-07 General Requirements

1K0633 (Formerly 422124 Issue J): Detonator Pad Assembly

■ Continued

- 1K0625 (formerly 1524863-2) Ring
 - 1462741-1 Ring
 - Plan to make part 1K0625 (formerly 1524863) directly.
 - 9919100-06 Marking, General Methods
 - Drawing indicates "Mark Manufacturing Agency Part Number per 9919100, class H-1-A.
 - 9900000-07 General Requirements
- 9919103-01 Identification by Ink Marking
 - 9919100-06 Marking, General Methods
- 9919100-06 Marking, General Methods
- 9900000-07 General Requirements