MIL-STD-1523A
1 FEBRUARY 1984

SUPERSEDING
MIL-STD-1523
11 SEPTEMBER 1973
(SEE SECTION 6)

# MILITARY STANDARD

## AGE CONTROLS OF

## AGE-SENSITIVE ELASTOMERIC MATERIEL

## (FOR AEROSPACE APPLICATIONS)


FSC 4720

FSC 5330

DEPRTMENT OF DEFENSE
WASHINGTON, D.C. 20360

Age Controls of Age-Sensitive Elastomeric Materiel

MIL-STD-1523A

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Ordnance Station, Standardization/ Documentation Division (Code 524), Indian Head, MD 20640 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

1. This standard has been prepared to allow the timely flow of certain elastomeric components through the acquisition cycle from manufacture of the items to installation in subassemblies, assemblies and systems such as military aircraft and missiles and space vehicles. This standard is intended to be cited in acquisition documents by Government acquiring activities so that the elastomeric items of a system will have a satisfactory service life.

2. This document was revised to allow more flexibility in life, planning, development and acquisition cycles. This increased flexibility is made possible by the development of improved synthetic elastomers and the experience of governmental and industrial users of elastomeric items.

3. An elastomer maintains its structural integrity under mechanical stress and rapidly and forcibly resumes its original shape upon removal of the stress. This recovery is made possible by its threee dimensional molecular network structure. The chemical and physical properities are temperature dependant and are determined by: (a) the spacing of network crosslinks, (b) the chemical compositions of the organic long chains of monomer units between crosslinks and (c) the presence or absence of significant volume precentages of reinforcing and other types of fillers and other mixture components. An elastomeric item is useful within a limited range of physical property values. The physical property values will drift out of the usable range at varying rates upon exposure to deleterious influences and will change more rapidly after the antioxidant component of the elastomeric mixture has been depleted. The change in physical properities with time makes it necessary to control the age of elastomeric items at the time of entry into the Government supply system.

4. This document does not apply to elastomeric items after acceptance by a Government supply center or Government user.

5. Guidance for age control of elastomeric material is presented in a table giving the miximum age at acceptance by a Government acquiring agency.

CONTENTS

## 1. SCOPE

1.1 Scope. This document establishes requirements for the maximum ages of age sensitive elastomeric items for use in military aircraft and missiles and for space vehicles at the time of acceptance by a Government acquiring activity. The provisions of this document apply to hoses and O-rings from specific classes of elastomers which are resistant to lubricants, hydraulic fluids, and petroleum base fuels and which conform to the specifications cited herein.

## 2. REFERENCED DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on the date of invitions for bids or request for proposal form a part of this standard to the extent specified herein.

MILITARY SPECIFICATIONS

| | |
|---|---|
| MIL-P-5315 | Packing, Preformed, Hydrocarbon Fuel Resistant |
| MIL-P-5510 | Packing, Preformed, Straight Thread Tube Fitting Boss Type 1 Hydraulic (Minus 65 Deg to 160 Deg F) |
| MIL-H-5593 | Hose, Aircraft, Low-Pressure, Flexible |
| MIL-H-6000 | Hose, Rubber Fuel, Oil, Coolant, Water and Alcohol |
| MIL-R-6855 | Rubber, Synthetic, Sheets, Strips, Molded or Extruded Shapes (Class 1 only) |
| MIL-H-7061 | Hose, Rubber, Aircraft, Self-Sealing, Aromatic Fuel |
| MIL-R-7362 | Rubber, Synthetic, Solid, Sheet, Strip and Fabricated Parts, Synthetic Oil Resistant |
| MIL-H-7938 | Hose, Rubber, Flame-resistant |
| MIL-H-8788 | Hose, Hydraulic, High Pressure |
| MIL-H-8790 | Hose Assembly, Rubber, Hydraulic, High Pressure (3,000 psi) |
| MIL-H-8794 | Hose, Rubber, Hydraulic, Fuel and Oil Resistant |
| MIL-H-8795 | Hose Assembly, Rubber, Hydraulic, Fuel and Oil Resistant |
| MIL-P-25732 | Packing, Preformed, Petroleum Hydraulic Fluid Resistant, Limited Service at 275 Deg F (135 Deg C) |
| MIL-H-26521 | Hose and Hose Assembly, Nonmetallic, Fuel, Collapsible, Low Temperature With Reattachable Couplings |
| MIL-H-27516 | Hose and Hose Assembly, Nonmetallic, Suction and Discharge |
| MIL-P-83461 | Packing Preformed, Petroleum Hydraulic Fluid Resistant Improved Performance at 275 Deg F (135 Deg C) Sizes and Tolerances |
| MIL-H-83796 | Hose Assembly, Rubber, Lightweight, Medium Pressure, General Specification For |

STANDARDS

MILITARY

| | |
|---|---|
| MIL-STD-129 | Marking for Shipment and Storage |

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific acquisition functions should be obtained from the acquiring activity or as directed by the contracting officer.)

3. DEFINITIONS

3.1 Age control. Age control is the designation of a specific maximum period of age after cure date that will assure desired performance characteristics of an elastomer. Age control is based on the premise that elastomers are age sensitive.

3.2 Age sensitive. An age sensitive material is one whose physical property values or physical form slowly drift outside the useable range. These changes in elastomeric materials are caused by exposure to harmful influences such as: oxygen and ozone especially in the presence of ultra-violet light, moisture, high temperatures, swelling agents such as fuel and other solvents, corrosive vapors and mechanical stress which modify the network structure of the elastomeric component of the item and may modify the reinforcing action of the fillers. The presence of protective substances and the chemical composition retard these changes. Upon depletion of these protective materials, the rate of degradation increases and the item more rapidly approaches the end of its service life.

3.3 Elastomer. An elastomer is a substance which maintains it structural integrity under mechanical stress and which rapidly and forcibly resumes its original shape upon removal of the stress. The physical and chemical property values of an elastomer are dependent upon its temperature, its three dimensional molecular network structure and the presence or absence of fillers and other additives.

3.4 Rubber. Rubber is a naturally occuring material that can be or already has been vulcanized into a state in which it has high extensibility and forcible rapid retraction. By common useage it has come to mean any elastomer. The term "elastomer" includes natural rubber.

3.5 Cure date The date (see 5.3) when the mixture containing the high molecular weight polymer, the crosslinking agent and additives is chemically reacted usually at an elevated temperature to produce a cured bulk elastomeric product or is cured and molded simultaneously to produce an elastomeric end item.

3.6 Bulk elastomeric product. This product is a cured bulk elastomeric substance that, by itself, has no useful purpose until shaped or formed to create a useful end item.

3.7 Elastomeric end item. An elastomeric end item is a piece so formed and shaped as to perform a designed function and includes hoses and O-rings.

3.8 Part. A part is one piece, or two or more pieces joined together which are not normally subject to disassembly without destruction of the designed use.

3.9 Bulk hose. Bulk hose is a flexible conduit of circular cross section without couplings or fittings installed, usually consisting of an inner tube, reinforcement and an outer cover. The inner tube and outer cover are often elastomers.

3.10 Hose assembly. A hose assembly is a bulk hose cut to a specific length with a coupling or fitting attached to one or each end.

3.11 Assembly. An assembly is a number of items or parts or any combination thereof joined together to perform a specific function and capable of disassembly.

3.12 Uninstalled. Uninstalled designates end items that are not yet introduced into the site where they will perform their designed functions.

3.13 Installed. Installed designates end items joined to other parts to form assemblies or components offered for acceptance on a contract for such assemblies, components or complete systems.

3.14 Acceptance. Acceptance is the act of an authorized representative of the Government by which the Government assumes for itself, or as the agent of another, owership of existing and identified supplies.

3.15 Acceptance date. The acceptance date is the specific date (day, month, year) that the acceptance as defined in 3.14 occurs. The date of acceptance is to be clearly defined by contract or negoitated agreement.

3.16 Service life. The service life of an elastomeric hose assembly or O-ring is the time elapsed between its acceptance date and its date of failure or replacement.

3.17 System life. The system life is the time elapsed from the starting date of the development phase for development equipment or the production phase for production equipment to the date of obsolescence of the system.

## 4. GENERAL REQUIREMENTS

4.1 Usage. This standard shall apply to contractors supplying: military aircraft and missiles, military aircraft and missile engines and their components, and space vehicles to the Government. Government acquiring activities shall use the maximum age limitations and working requirements specified herein when initiating acquisition documents. This standard does not apply to contracts between prime and subcontractors or between subcontractors. The ages of elastomeric items acquired by subcontractors shall be controlled by the contracts between the prime and subcontractors or between subcontractors. Ages of items in acquisitions for system maintenance shall be determined by: failure rates in service use, remaining system life, availability of products and other management contraints. This document shall not be invoked after acceptance of items by a Government acquiring activity.

## 5. DETAILED REQUIREMENTS

5.1 Conditions. The maximum age of elastomeric items at the time of acceptance by the Government acquiring activity as given in Table I shall apply only when the following conditions are met:

(a) The hose or O-ring meets the performance, packaging and marking requirements of one of the specifications cited in 2.1.

(b) The elastomeric item was not subjected to any of the deleterious influences given in 3.2. Packaging in accordance with the specification should provide this protection. Storage temperatures shall not have exceeded 125°F.

(c) The cure date of the item is known and is available to the acceptor. Items with unkown cure dates shall not be accepted.

5.2 Maximum age limitations. The maximum age of elastomeric items at the time of acceptance by the Government acquiring activity shall be as given in Table I.

Table I

| | | |
|---|---|---|
| Elastomeric hoses | - quarters from cure date | - 32 |
| Elastomeric O-rings | - quarters from cure date | - 40 |

Maximum Age At Acceptance by a Government Acquiring Activity

5.3 Cure date marking. In accordance with MIL-STD-129, the cure date shall be marked by quarter and year. The year shall be divided into quarters as follows:

1st quarter - January, February, March
2nd quarter - April, May, June
3rd quarter - July, August, September
4th quarter - October, November, December

5.3.1 Age. Elastomeric items and products manufactured during any given quarter shall not be considered one quarter old until the end of the succeeding quarter.

Examples: A product cured during January, Feburary, or March of any year will not be considered one quarter old until July 1 of that same year. A product cured during October, November, or December of any year will not be considered one quarter old until April 1 of the folowing year.

5.3.2 Uninstalled item age control. Age control of uninstalled elastomeric items shall be based on the cure date. Cure date shall be marked on containers in accordance with MIL-STD-129.

5.3.3 Assembly age control. Age control of an assembly shall be based on the cure date of its oldest elastomeric component. The cure date shall be physically marked on the assembly in accordance with MIL-STD-129.

5.3.4 Shipping container markings. Shipping containers shall be marked in accordance with MIL-STD-129.

5.3.4.1 Hose assemblies. Unit, intermediate, and shipping containers containing hose assemblies or components that include hose or hose assemblies shall be marked with the cure date of the oldest hose assembly contained therein for each hose or hose assembly specification listed on the container.

5.3.4.2 Mixed categories of elastomeric material. Unit, intermediate, and shipping containers containing components that include mixed categories of elastomeric material and hose and hose assemblies shall be marked with the cure date of the oldest item contained therein for each specification listed on the container.

5.4 Storage conditions. Elastomeric items, products, and assemblies shall be protected from circulating air, sunlight, fuel, oil, water, dust, and ozone (which is generated by electric arc, fluorescent lamps, and similar electrical equipment.) The storage temperature shall not exceed 125°F.

6. NOTES

6.1 Additional tables. Request for generation of additional tables may be made by using the self-addressed DD Form 1426 appearing at the end of this document or by letter.

6.2 Supersession information. MIL-STD-1523A includes the requirements of and supersedes MIL-STD-1523 and ANA Bulleting No 438c, dated 15 February 1965; Naval Sea Systems Command (Code Ident 10001) weapons requirements WR-64, dated 11 December 1964; and Naval Sea Systems Command (Code Ident 10001) purchase description WS 8040C, dated 14 November 1969.

6.3 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:
Navy - OS
Air Force - 99
Army - ME

Preparing Activity:
Navy - OS

Project No. 5330-0498

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

*(See Instructions – Reverse Side)*

| 1. DOCUMENT NUMBER | 2. DOCUMENT TITLE |
|---|---|
| MIL-STD-1523A | (For Aerospace Applications) Age Controls of Age-Sensitive Elastomeric Materiel |

| 3a. NAME OF SUBMITTING ORGANIZATION | 4. TYPE OF ORGANIZATION *(Mark one)* |
|---|---|
| | ☐ VENDOR<br>☐ USER<br>☐ MANUFACTURER<br>☐ OTHER *(Specify)*: |
| b. ADDRESS *(Street, City, State, ZIP Code)* | |

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

| 7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional | b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional |
|---|---|
| c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional | 8. DATE OF SUBMISSION *(YYMMDD)* |

*(TO DETACH THIS FORM, CUT ALONG THIS LINE.)*

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE.

NOTICE OF CANCELLATION

INCH-POUND

MIL-STD-1523A
NOTICE 1
30 January 1995

MILITARY SPECIFICATION

# AGE CONTROLS OF AGE-SENSITIVE ELASTOMERIC MATERIEL

(FOR AEROSPACE APPLICATIONS)

MIL-STD-1523A, dated 1 February 1984, is hereby cancelled. Future acquisitions should refer to SAE AS 1933, Age Controls for Hose Containing Age-Sensitive Elastomeric Material.

(Application for copies of SAE publications should be addressed to the Society of Automotive Engineers, Inc., (SAE), 400 Commonwealth Drive, Warrendale, PA 15096.)

Preparing activity:
Navy - AS

(Project 5330-0939)

AMSC N/A

FSC 5330

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

NOTICE OF CANCELLATION

INCH-POUND

MIL-STD-1523A
NOTICE 2
16 November 1999
SUPERSEDING
MIL-STD-1523A
NOTICE 1
30 January 1995

MILITARY STANDARD

# AGE CONTROLS OF AGE-SENSITIVE ELASTOMERIC MATERIAL (FOR AEROSPACE APPLICATIONS)

MIL-STD-1523A, dated 1 February 1984, is hereby canceled. Future acquisition for this product should refer to SAE-AS1933, "Age Control for Hose Containing Age-Sensitive Elastomeric Material" for hose application and SAE-ARP5316, "Storage of Aerospace Elastomeric Seals and Seal Assemblies which include an Elastomer Element prior to Hardware Assembly" for seal application.

(Application for copies of SAE publications should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

Custodians:
Army - AV
Navy - AS
Air Force - 99

Preparing activity:
Navy - AS

(Project 5330-1170)

Review activities:
Army - MI
Navy - MC, SA, CG
Air Force - 11, 71, 82

AMSC N/A

FSC 5330