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सभी पत्राचार मुख्य कार्यपालक (उडन - योग्यता) को सम्बोधित किया जाए और न किसी अन्य अधिकारी के उपनाम से
All Correspondence should be addressed to the Chief Executive (Airworthiness) and not to any officer by name

भारत सरकार, रक्षा मंत्रालय (आर एण्ड डी)
GOVERNMENT OF INDIA
MINISTRY OF DEFENCE (R&D)
सेना उडन - योग्यता और प्रमाणीकरण केन्द्र
CENTRE FOR MILITARY AIRWORTHINESS & CERTIFICATION
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CEMILAC / 5390 / 2 **Date: 18 March 2004**

AIRWORTHINESS DIRECTIVE NO: 5

SUB: SHELF LIFE EXTENSION OF INDIGENOUS RUBBER SEALS

The shelf life of indigenous rubber seals was restricted to 3 years vide D'Aero Letter No. Aero / Rd / 132 / 180/1 dated 03 Oct 1973 and is also mentioned in the AFO No. 60, dated 03 June 1978.

2. HQ Maintenance command vide letter No. MC/7146/1/Eng A4 dated 4th Dec 2003, requested CEMILAC to review the shelf life policy for indigenous rubber seals presently in vogue and consider its extension. The present lifing policy of the Indigenous Rubber Seals has been reviewed by considering views of various RCMAs, HALs, DMSRDE, & 3 BRD and the following modification to D'Aero's letter under reference on shelf life of indigenous rubber seals is hereby approved and issued:-

3. The shelf life of the indigenous rubber seals will be as per the **Annexure-A** and the details are as follows:-

i). Indigenous rubber seals of all categories (categorization as per BS 3F 68, indicated at **Appendix-1**) – The initial storage life is assigned as 3 (Three) years only.

ii). Indigenous rubber seals of category of Group 'A', - NO FURTHER extension of shelf life is permitted.

iii). Indigenous rubber seals of category of Group 'B', -Extension in steps of 1 (one) year can be granted subjected to testing and limiting the total shelf life to maximum of 5 (five) years.

iv). Indigenous rubber seals of category of Group 'X', -One time extension of 2 (two) years can be granted subjected to testing and limiting the total shelf life to maximum of 5 (five) years.

To file. T.E.

Contd...2

TC-4267

v). Storage Conditions of indigenous rubber seals should be as per **Appendix-2.** (Reproduced from AFO No: 60, dated 03 June 1978)

vi). Laboratory tests to be carried out for shelf life extension of indigenous rubber seals should be as per **Appendix-3**. Results of test before and after ageing shall be compared and decision of shelf life extension may be taken in consultation with concerned RCMA.

vii). Tests for life extension to be carried out on or before expiry of shelf life.

4. Efforts to be made to procure Minimum Order Quantity (MOQ) of seals or Quantity required for three years based on Cumulative Annual Requirement to avoid life extension exercise.

5. The above directive supersedes all the earlier instructions on shelf life extension of indigenous rubber seals issued by CEMILAC as well as Directorate of Aeronautics.

(J K SHARMA)
Chief Executive (Airworthiness)

Distribution:

1. SO to AOM
2. SO to SMSO, HQ MC, Nagpur
3. SO to ADG, Army Aviation
4. DNAM
5. Director Aviation, Coast Guard HQrs

→ With a request to accordingly approve & amend this modification to relevant Service orders on this subject.

6. DGAQA, New Delhi
7. Directors ADE, ADA, GTRE, CABS, CVRDE, DMSRDE, DRDL, ADRDE, ARDE, DEBEL, ASIEO & LRDE
8. All MDs, HAL
9. All GMs, HAL
10. All GDs, All RCMAs

Encl-1

Annexure-A

SHELF LIFE OF INDIGENOUS SEALS

CLASS	INITIAL STORAGE LIFE	EXTENSION PERIOD IN STEPS OF	MAXIMUM LIFE
Group A	3 Years	No extension is permitted	3 years
Group B	3 Years	1 Year Blocks – Maximum 2 Blocks	5 years
Group X	3 Years	2 Years	5 years

Note:-

i). Categorisation of rubber compounds as per BS 3F 68 and details indicated in Appendix-1.

ii). Storage conditions should be as per Appendix-2 (Reproduced from AFO No. 60 dated 03 June 1978) and testing as per Appendix-3 and in co-ordination with the concerned RCMA / CEMILAC.

iii). The period of extension can be reviewed after sufficient data is generated on life expired seals by BRD's / DMSRDE / HAL / RCMAs.

Appendix – 1

CATEGORIES OF RUBBER COMPOUNDS (AS PER BS 3F 68)

GROUP 'A' [Moderate Susceptibility to deterioration by ageing]	**GROUP 'B'** [Low Susceptibility to deterioration by ageing]	**GROUP 'X'** [No periodic inspection required]
Natural Polybutadiene Polyisoprene Polyurethane Styrene – butadiene	Acrylonitrile – butadiene (nitrile) blend of Acrylonitrile – Butadiene and polyvinyl chloride (nitrile / PVC) Epichlorhydrin Polyacrylate Polychloroprene (neoprene) Polyisobutylene – isoprene (butyl)	Chlorosulphonated polyethylene Ethylene – propylene Fluorocarbon Fluorosilicone Silicone

Encl-(2)

Appendix – 2

STORAGE OF RUBBER SEALS AND OTHER COMPONENTS

(Reproduced from AFO No. 60 dated 03 June 1978)

1. Standard conditions of storage of rubber items used on aircraft are to be appended below:-

2. Packaging:- Suitable packaging of rubber items in storage is necessary to minimize deterioration. Normally such items are received suitably packed from the manufactures. Packaging done by the manufacturers should not be removed till items is actually required for use. However, if original packaging has been undone for some reasons the items should be repacked in accordance with following instructions while they are in storage.

a). Small components should be enclosed in sealed envelopes.

b). Components which cannot conveniently be accommodated in envelopes shall be suitably enclosed or wrapped so as to prevent free access of air.

c). Packaging shall be accomplished under conditions which will ensure freedom from contamination by dust, oil grease etc., Attention shall be given to ensuring that the packet is efficiently sealed.

d). Components shall be free from strain (e.g adequately supported) and no part shall be tied or tagged.

e). When it is necessary for components to be packed in assembly sets, such components shall be retained in their original identifying envelopes and the whole shall be inserted to the required quantity in the main package.

f). Dimension of Envelopes:- The preferred size of envelopes are 55, 150, 205 and 255 mm size.

g). Packing Materials:- Preference shall be given to the use of heat sealable opaque materials. Suitable materials are polythene coated kraft paper, aluminium foil / paper / polythene laminate and opaque polythene film. PVC film shall not be used. If for any reason a transparent or translucent

material is used it shall be over wrapped with an opaque material.

3. Identification of Packaging :- Every package / envelope shall be marked with at least the following information shall be visible from outside of the package without breaking the seal.

a). Part Number
b). Material Specification Number
c). Quarter or year of cure
d). Life grouping (if applicable and known)
e). Quantity in package if more than one.
f). Batch Number
g). Manufacturers identity

Note:- If the storage agency finds any of the above information missing on receipt of an item it should ask the provisioning agency to obtain supply the same.

4. **Temperature**:-

The storage temperature shall be between 10^0 C to 21^0 C. At temperature exceeding 25^0 C certain forms of deterioration may be accelerated sufficiently to affect the ultimate service life. The effects of very low temperature are not permanently deleterious to vulcanised rubber articles but they may become stiffer if stored at low temperature and care should be taken to avoid distorting them during handling at that temperature. When articles are taken from low temperature storage for immediate use their temperate should be raised to approximately 30^0 C throughout before they are put in to service.

5. Humidity

Moist conditions should be avoided; storage conditions should be such that condensation does not occur. For seals, incorporating fabric should not be allowed to become damp. The relative humidity should not exceed 65%

6. Light

Rubber articles should be protected form light, in particular direct sunlight or strong artificial light with a high ultraviolet content. Unless the articles are packed in opaque containers it is advisable to cover windows of storage rooms with a red or orange coating screen.

Encl-3

7. Oxygen & Ozone

Where possible rubber articles be protected from circulating air by wrapping storage in air-tight containers or other suitable means. This particularity applies to articles with large surface area to volume ratios, e.g. Rubber sheets etc. As Ozone, is particularly deleterious, storage rooms should not contain any equipment that is capable of generating Ozone, such as mercury lamps, high voltage electrical equipment, electric motors or other equipment which may give rise to electric sparks or silent electrical discharges.

8. Deformation

Vulcanised rubber should, wherever possible, be stored in a relaxed condition free from tension, compression or other deformation. The items should not be tightly strung together. When articles are packaged in strain free condition they shall be stored in their original packaging.

9. Contact with liquid and semi-solid materials

Vulcanised rubber should not be allowed to come into contact with liquid or semi-solid materials, in particular, solvents, oils and greases, at any time during storage, unless so packed by the manufacturers.

10. Contact with metals

Certain metals in particular copper, manganese and iron are known to have deleterious effects on vulcanised rubber. Vulcanised rubber should, therefore, not be stored in contact with metals but should be protected by wrapping or by separation with a layer of suitable material, eg. Paper, polythene etc.

11. Contact between various rubbers

It is desirable that contact between vulcanised rubbers of different composition is avoided. This particularly applies to rubbers of different colours.

12. Articles with Rubber-to-Metal Bonds

The bonded metal should not come in contact with the vulcanised rubber other than at the bond. Any temporary protective coating used on the metal shall be such that it will not adversely effected the rubber or the bonds.

13. Rotation of Stocks

Vulcanised rubber should remain in store for as short a time as possible. There fore, articles should be issued from store in strict rotation, so that articles remaining in store are those of latest manufacture or delivery.

14. Storage of Specific Items

Seals (including door seals) and extrusion:

i). Lip type-seals:- These shall always be stored in such a way as to prevent the sealing edges being damaged. On no account shall identity labels be tied to the actual components.

ii). Extrusions and large components:- Coils of extruded items shall be protected by suitable rigid materials so that each coil is not distorted by its own with or that of other upon it. Large moldings, especially door seals, shall preferably be supported on hard board or thick cardboard.