



SLOVENSKI STANDARD

SIST EN 2491:2001

01-januar-2001

Aerospace series - Molybdenum disulphide dry lubricants - Coating methods

Aerospace series - Molybdenum disulphide dry lubricants - Coating methods

Luft- und Raumfahrt - Trockenschmierstoffe auf Molybdändisulfid-Basis - Beschichtungsverfahren

Série aérospatiale - Lubrifiants solides à base de bisulfure de molybdène - Méthodes d'application

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Ta slovenski standard je istoveten z: **EN 2491:1997**

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ICS:

49.040	Preveleke in z njimi povezani postopki, ki se uporabljajo v letalski in vesoljski industriji	Coatings and related processes used in aerospace industry
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EUROPEAN STANDARD

EN 2491

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 1997

ICS 49.040.40

Descriptors: aircraft industry, lubricants, solids, molybdenum disulphide, films, titanium, titanium alloys, steels, corrosion resistant steels, surface treatment, characteristics, tests, specifications, acceptance

English version

Aerospace series - Molybdenum disulphide dry lubricants - Coating methods

Série aérospatiale - Lubrifiants solides à base
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d'application

Luft- und Raumfahrt - Trockenschmierstoffe auf
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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 1997, and conflicting national standards shall be withdrawn at the latest by September 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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WORLDWIDE ONLINE BROWSEABLE STANDARD
 DEVELOPMENT OF OPPOSITE SIDE OF THE LEAF
 AVAILABLE

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1 Scope

This standard defines the coating methods and characteristics of molybdenum disulphide dry film lubricants to EN 3021 which may be applied to parts in titanium, titanium alloys, steel and corrosion resisting steel.

2 Purpose of process

To reduce wear, risk of seizing and, in some cases, fretting corrosion

3 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 1463	Metallic and oxide coatings - Measurement of coating thickness - Microscopical method
ISO 2431	Paints and varnishes - Determination of flow time by use of flow cups
ISO 2859-1	Sampling procedures for inspection by attributes - Part 1 : Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection
ISO 2884	Paints and varnishes - Determination of viscosity at a high rate of shear
ISO 8080	Aerospace - Anodic treatment of titanium and titanium alloys - Sulphuric acid process
EN 2000	Aerospace series - Quality assurance - EN Aerospace products - Approval of the quality system of manufacturers
EN 2133	Aerospace series - Cadmium plating of steels with specified tensile strength $\leq 1\ 450$ MPa, copper, copper alloys and nickel alloys
EN 2497	Aerospace series - Dry abrasive blasting of titanium and titanium alloys
EN 2516	Aerospace series - Passivating of corrosion resistant steels and decontamination of nickel base alloys
EN 3021	Aerospace series - Molybdenum disulphide dry lubricants to be applied as a film - Technical specification 1)
ASTM D 2510 : 1983	Standard test method for adhesion of solid film lubricants 2)

1) In preparation at the date of publication of this standard

2) Published by : American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19103

4 Definitions

For the purposes of this standard, the following definitions apply :

4.1 Batch

Parts subjected to the same dry lubricant application at the same time under the same condition

4.2 Pre-production parts

Parts representing future production

5 Apparatus

5.1 For application by dipping

Container with a lid, stirring device and temperature control

The apparatus shall be capable of applying the specified thickness, for example by controlling the speed of immersion and removal and by draining or centrifuging the parts.

5.2 For application by spraying

A dry, oil free air fed gun, with settings adapted to the characteristics of the dry lubricant used and to the shape of the parts to be coated.

Preferably a mechanical stirring device in the reservoir.

NOTE 1 : A device allowing for rotation of the parts to be coated and the automatic displacement of the gun give a more uniform application.

NOTE 2 : Use of an aerosol spray does not always ensure acceptable reproducibility. Moreover, the propellant shall not have any adverse effect on the substrate.

5.3 For curing

An oven capable of temperatures prescribed by the lubricant manufacturer.

6 Information for the processor

- Designation of the dry lubricant to EN 3021 ;
- number of the material standard and metallurgical condition of the latter ;
- areas to be processed ;
- thickness of the dry lubricant, if necessary, (see table 1) ;
- duration and temperature of curing.

7 Surface roughness of parts prior to application

It shall be specified on the drawing or in the definition documents.

NOTE : The surface roughness is an important factor affecting adhesion and behaviour of the film in service.

8 Surface preparation

8.1 Parts in titanium and titanium alloys

Anodising : ISO 8080, or dry abrasive blasting in accordance with EN 2497, unless otherwise specified.

8.2 Parts in corrosion resisting steel

Passivation : EN 2516, unless otherwise specified.

8.3 Parts in steel

Cadmium plating EN 2133, without chromating. If necessary, the cadmium layer may be phosphated in an accelerated zinc phosphate bath to obtain a uniform and insoluble phosphate coating of a mass per unit area between 1 g/m² and 1,5 g/m² (i.e. a thickness of about 0,002 mm).

NOTE : If the part has been de-embrittled, prior activation of the cadmium plating is necessary (e.g. in a potassium cyanide bath 30 g/l to 45 g/l for 15 s to 30 s at ambient temperature).

9 Coating

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It shall be performed :

- within 24 h, after surface preparation ; all precautions shall be taken to prevent contamination or corrosion of the parts awaiting treatment ;
- in a clean and dry environment, relative humidity between 40 % and 75 %, temperature (20 ± 5) °C avoiding any operations liable to contaminate the surfaces to be treated.

9.1 Application by dipping

Adjust the viscosity of the bath (see ISO 2431 or ISO 2884) to the value given by the manufacturer of the product to be deposited.

If necessary, pre-heat the parts to a temperature preliminarily agreed between purchaser and processor.

Immerse the parts at a speed determined by tests on pre-production parts.

Keep the parts immersed for 2 s to 10 s.

Remove the parts at a speed determined by tests on pre-production parts.

Drain parts.

Dry parts avoiding handling them.

If necessary, cure the coating in an oven. The temperature and duration shall comply with the values given by the manufacturer of the product to be deposited.

9.2 Application by spraying

Adjust the viscosity (see ISO 2431 or ISO 2884) to the value given by the manufacturer.

If necessary, pre-heat the parts to a temperature preliminarily agreed between purchaser and processor.

Produce the coating by applying successive passes, the gun setting and its distance being determined by tests on pre-production parts.

Dry parts avoiding handling them.

If necessary, cure the coating in an oven. The temperature and duration shall comply with the values given by the manufacturer of the product to be deposited.

9.3 Other applications

Other application methods producing the same quality of deposit may be used (for example : barrel deposition).

10 Post-treatment

If the tolerances of the parts necessitate mechanical finishing, it shall be performed by honing, burnishing, barrel finishing or manual brushing according to the size of parts or the batch size.

11 Removal of the film

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The following processes are generally used separately or as a combination :

- removal by dry or wet abrasive blasting with fine grain; <https://standards.iteh.ai/catalog/standards/sist/d692e8c8-857d-41ba-8b0b-7981eab296/sist-en-2491-2001>
- chemical removal (by pickling or solvents).

Following removal of the film, the parts shall be subjected to a visual and dimensional inspection.

12 Characteristics, requirements and test methods

See table 1.

Table 1

Characteristic	Requirement 1)	Test method
Appearance	Uniform colour. A variation of this indicates incorrect distribution of the fillers in the film. Absence of defects such as : scratches, pits, blisters, runs, indentations, foreign bodies, accumulation of particles, lack of uniformity or any other surface imperfection	Visual inspection
Thickness	Unless otherwise specified (0,01 ± 0,003) mm After mechanical finishing (0,005 ± 0,002) mm	Suitable method or ISO 1463 or with the purchaser's agreement, a method based on measurement of the mass of the dry lubricant deposited In the case of dispute, ISO 1463 shall be applied.
Adhesion	No flaking, blisters, cracks	ASTM D 2510 Procedure A for type A 2) ASTM D 2510 Procedure B for type B 2)
Heat curing class 2 2)	The film shall not be damaged by a brief contact with a solvent.	Rub with a pad of cotton-wool impre- gnated with a solvent (for example methy-ethyl-ketone).
1) On parts, if not possible, on accompanying test pieces 2) See EN 3021.		