



**SLOVENSKI STANDARD**  
**SIST EN 3899:2005**

**01-junij-2005**

**BUXca Yý U**  
**SIST EN 3899:2004**

---

**Aerospace series - Inserts, thickwall, self-locking, MJ threads, in heat resisting steel FE-PM3801 (17-4PH) - Technical specification**

Aerospace series - Inserts, thickwall, self-locking, MJ threads, in heat resisting steel FE-PM3801 (17-4PH) - Technical specification

**iteh STANDARD PREVIEW**

**(standards.iteh.ai)**

Luft- und Raumfahrt - Gewindeeinsätze, dickwandig, selbstsichernd, MJ-Gewinde, aus hochwarmfestem Stahl FE-PM3801 (17-4PH) - Technische Lieferbedingungen

[SIST EN 3899:2005](#)

<https://standards.iteh.ai/catalog/standards/sist/0b97d0f4-d431-439d-abf3-4060-4060-4060-4060>

Série aérospatiale - Douilles filetées, a paroi renforcée, a freinage interne, a filetage MJ, en acier résistant a chaud FE-PM3801 (17-4PH) - Spécification technique

**Ta slovenski standard je istoveten z: EN 3899:2004**

---

**ICS:**

49.030.30

Matices

Nuts

**SIST EN 3899:2005**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 3899:2005](#)

<https://standards.iteh.ai/catalog/standards/sist/0b97d0f4-d431-439d-ab3-362cc4f0cafa/sist-en-3899-2005>

EUROPEAN STANDARD

EN 3899

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2004

ICS 49.030.30

Supersedes EN 3899:2003

English version

## Aerospace series - Inserts, thickwall, self-locking, MJ threads, in heat resisting steel FE-PM3801 (17-4PH) - Technical specification

Série aéronautique - Douilles filetées, à paroi renforcée, à freinage interne, à filetage MJ, en acier résistant à chaud FE-PM3801 (17-4PH) - Spécification technique

Luft- und Raumfahrt - Gewindeeinsätze, dickwandig, selbstsichernd, MJ-Gewinde, aus hochwarmfestem Stahl FE-PM3801 (17-4PH) - Technische Lieferbedingungen

This European Standard was approved by CEN on 11 September 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. 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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/0b97d0f4-d431-439d-abf3-362cc4f0cafa/sist-en-3899-2005>



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

<b>Contents</b>	<b>Page</b>
Foreword.....	3
1 Scope .....	4
2 Normative references .....	4
3 Terms and definitions .....	4
4 Quality assurance .....	6
4.1 Qualification .....	6
4.2 Acceptance.....	7
4.2.1 Purpose.....	7
4.2.2 Conditions .....	7
4.2.3 Responsibility .....	7
4.2.4 Inspection and test report.....	7
5 Requirements .....	7
Annex A (normative) Definition of test block .....	16
Annex B (normative) Assembly for rotational resistance test .....	18
Annex C (normative) Axial tensile strength test .....	20
Annex D (normative) Assembly for reusability test.....	22

SIST EN 3899:2005

<https://standards.iteh.ai/catalog/standards/sist/0b97d0f4-d431-439d-abf3-362cc4f0cafa/sist-en-3899-2005>

## Foreword

This document (EN 3899:2004) has been prepared by the European Association of Aerospace Manufacturers - Standardization (AECMA-STAN).

After enquiries 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 May 2005, and conflicting national standards shall be withdrawn at the latest by May 2005.

This document supersedes EN 3899:2003.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 3899:2005](https://standards.iteh.ai/catalog/standards/sist/0b97d0f4-d431-439d-abf3-362cc4f0cafa/sist-en-3899-2005)

<https://standards.iteh.ai/catalog/standards/sist/0b97d0f4-d431-439d-abf3-362cc4f0cafa/sist-en-3899-2005>

## 1 Scope

This standard specifies the characteristics, qualification and acceptance requirements for self-locking thickwall inserts with MJ threads, in FE-PM3801, for aerospace applications.

It is applicable whenever referenced.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- ISO 2859-1, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*
- ISO 3452, *Non-destructive testing – Penetrant inspection – General principles*
- ISO 4288, *Geometrical Product Specifications (GPS) – Surface texture: Profile method – Rules and procedures for the assessment of surface texture*
- ISO 5855-2, *Aerospace – MJ threads – Part 2: Limit dimensions for bolts and nuts*
- ISO 7481, *Aerospace – Nuts, self-locking, with maximum operating temperature less than or equal to 425 °C – Test methods*
- EN 2638, *Aerospace series – (Aluminium alloy, 2024-T3) extruded bar and section –  $1,2 \leq (a \text{ or } D) \leq 150 \text{ mm}$  with coarse peripheral grain control <sup>1)</sup>*
- EN 3906, *Aerospace series – Martensitic corrosion resisting steel FE-PM3801 – Air melted – Solution treated – Bar –  $D \leq 50 \text{ mm}$  – For the manufacture of fasteners –  $1\ 100 \text{ MPa} \leq R_m \leq 1\ 300 \text{ MPa}$  <sup>1)</sup>*
- EN 4014, *Aerospace series – Inserts, thickwall, self-locking – Design standard*
- EN 4015, *Aerospace series – Inserts, thickwall, self-locking – Installation and removal procedure*
- EN 9133, *Aerospace series – Quality management systems – Qualification procedure for aerospace standard parts <sup>1)</sup>*
- ASTM E112-96, *Standard Test Methods for Determining Average Grain Size <sup>2)</sup>*

## 3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply.

### 3.1

#### batch

quantity of finished parts, of the same type and same diameter, produced from the same material obtained from the same melt, manufactured in the course of the same production cycle, following the same manufacturing route and having undergone all the relevant heat treatments and surface treatments

1) Published as AECMA Prestandard at the date of publication of this standard

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

**3.2****Inspection lot**

quantity of parts from a single production batch with the same part number which completely defines the part

**3.3 Surface discontinuities****3.3.1****crack**

rupture in the material which may extend in any direction and which may be intercrystalline or transcrystalline in character

**3.3.2****seam**

open surface defect

**3.3.3****lap**

surface defect caused by folding over metal fins or sharp corners and then compressing them into the surface

**3.3.4****inclusions**

non-metallic particles originating from the material manufacturing process. These particles may be isolated or arranged in strings.

**3.4****test temperature**

ambient temperature, unless otherwise specified

**3.5****simple random sampling**

the taking of  $n$  items from a population of  $N$  items in such a way that all possible combinations of  $n$  items have the same probability of being chosen

**3.6****critical defect**

defect that, according to judgement and experience, is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the considered product, or that is likely to prevent performance of the function of a major end item

**3.7****major defect**

defect other than critical, that is likely to result in a failure or to reduce materially the usability of the considered product for its intended purpose

**3.8****minor defect**

defect that is not likely to reduce materially the usability of the considered product for its intended purpose, or that is a departure from established specification having little bearing on the effective use or operation of this product

**3.9****sampling plan**

plan according to which one or more samples are taken in order to obtain information and possibly to reach a decision

**3.10****limiting quality (LQ<sub>10</sub>)**

in a sampling plan, the quality limit which corresponds to a specified 10 % probability of acceptance

## EN 3899:2004 (E)

**3.11****acceptance quality limit (AQL)**

a quality limit which in a sampling plan corresponds to a specified but relatively high probability of acceptance

It is the maximum per cent defective (or the maximum number of defects per hundred units) that, for purposes of sampling inspection can be considered satisfactory as a process average.

**3.12****finished thickwall insert**

thickwall insert ready for use, inclusive of any possible treatments and/or surface coatings, as specified in the product standard or definition document

**3.13****definition document**

document specifying all the requirements for finished thick wall inserts

**3.14****self-locking torque**

torque to be applied to the associated bolt to maintain its movement of rotation in relation to the thickwall insert assembly which is under no axial load and the insert locking zone being completely engaged with the bolt (minimum protrusion of two pitches, including the end chamfer)

**3.15****seating torque**

tightening torque to be applied to the thickwall insert and bolt assembly to introduce or to increase the axial load in the assembly

**3.16****unseating torque**

untightening torque to be applied to the thickwall insert and bolt assembly to reduce or remove the axial load in the assembly

**3.17****breakaway torque**

torque required to start unscrewing the associated bolt with respect to the installed thickwall insert, with the insert locking zone still fully engaged on the bolt, but after the axial load in the assembly has been removed by unscrewing half a turn followed by a halt in rotational movement

**4 Quality assurance****4.1 Qualification**

EN 9133

Qualification inspections and tests (requirements, methods, numbers of thickwall inserts) are specified in Table 1. They shall be carried out on:

- each type and diameter of thickwall inserts;
- 44 thick wall inserts selected from a single batch by simple random sampling.

The test programme may possibly be reduced, or the qualification be granted without inspection or testing. Any such decision shall be based on the results obtained on similar types and diameters of thickwall inserts provided that the design and manufacturing conditions are identical.

Table 2 indicates the allocation of thickwall insert samples for the inspections and tests.



## 4.2 Acceptance

### 4.2.1 Purpose

The purpose of acceptance inspections and tests is to check, as simply as possible, by a method representative of actual use conditions, with the uncertainty inherent to statistical sampling, that the thickwall inserts constituting the batch satisfy the requirements of this standard.

### 4.2.2 Conditions

Acceptance inspections and tests (requirements, methods, numbers of thick wall inserts) are specified in Table 1. They shall be carried out on each batch. Thickwall inserts from the batch to be tested shall be selected by simple random sampling.

Each thickwall insert may be submitted to several inspections or tests.

If a more stringent inspection is deemed necessary, all or part of the qualification inspections and tests may be performed during the acceptance inspections and tests. In this case, the number of thickwall inserts submitted to these inspections and tests is the same as that submitted for qualification inspection and tests.

### 4.2.3 Responsibility

Acceptance inspections and tests shall be carried out by the manufacturer, or under his responsibility.

### 4.2.4 Inspection and test report

A test report showing actual numerical values shall be provided if specified in the purchase order.

ITeH STANDARD PREVIEW  
(standards.iteh.ai)

## 5 Requirements

See Table 1.

[SIST EN 3899:2005  
https://standards.iteh.ai/catalog/standards/sist/0b97d0f4-d431-439d-abf3-362cc4f0cafa/sist-en-3899-2005](https://standards.iteh.ai/catalog/standards/sist/0b97d0f4-d431-439d-abf3-362cc4f0cafa/sist-en-3899-2005)

Table 1 — Technical requirements and test methods

Clause	Characteristic	Requirement	Inspection and test method	Q/A <sup>a</sup>	Sample size
5.1	Material	In accordance with the product standard or definition document	Chemical analysis or certificate of conformity issued by the manufacturer of the semi-finished product	Q	
				A	
5.2	Dimensions, tolerances and tolerances of form and position	In accordance with the product standard or definition document	Standard gauging	Q	44
				A	Tables 3 and 4
5.3	Manufacturing				
5.3.1	Process	Inserts may be manufactured by machining or forming.	Manufacturing method shall be indicated.	Q	
5.3.2	Heat treatment	<p>The heat treatment medium or atmosphere shall not cause any surface contamination.</p> <p>Any scale which will not be removed by subsequent machining shall be removed by abrasive blasting with an appropriate equipment.</p> <p>The blank shall be solution treated at a temperature of 1 025 °C to 1 055 °C, hold at the selected temperature within ± 15 °C for 4 h ± 15 min and oil quench or equivalent or faster.</p> <p>The solution treated blanks shall be precipitation heat treated at (540 ± 5) °C, held at this temperature for 4 h ± 15 min, and air cooled or faster.</p>	<p>Calibration of the heat treatment equipment shall be confirmed.</p> <p>Visual examination</p> <p>Examination of the heat treatment specification</p>	Q	
5.3.3	Thread deformation	<p>Threads in the locking zone may be deformed in any manner provided that the insert meets the requirements of this standard.</p> <p>The finished inserts shall allow the "GO" thread plug gauge to enter a minimum of one turn, when gauged from the counterbore side before engagement of the locking zone for having overall threaded length ≥ 1,2 times the nominal thread diameter.</p> <p>Inserts having a shorter threaded length shall allow the "GO" thread plug gauge to enter a minimum of three quarters of a turn.</p>	Standard gauging	Q	44
				A	Tables 3 and 4

continued

Table 1 (continued)

Clause	Characteristic	Requirement	Inspection and test method	Q/A <sup>a</sup>	Sample size
5.3.4	Surface roughness	In accordance with the product standard or definition document	ISO 4288	Q	3
			Visual examination	A	Tables 3 and 4
5.3.5	Surface coating	In accordance with the product standard or definition document	See applicable coating standard.	Q	41
				A	Tables 3 and 4
5.4	Mechanical properties				
5.4.1	Swaging resistance	After testing, the inserts shall not display any circular cracks.	Inserts shall be installed into test block (see Annex A, normative).  Use a conical tool specified in accordance with EN 4015  Visual examination at a suitable magnification of $\times 10$ to $\times 20$	Q	34
5.4.2	Rotational resistance				
5.4.2.1	– into test block in aluminium alloy	Inserts shall withstand the torque specified in Table B.1 without rotation.	Inserts shall be installed into test block in aluminium alloy (see Annex A).  The installed inserts shall be tested with a counter clockwise rotational direction of the torque wrench as shown in Annex B (normative).	Q	5
5.4.2.2	– into test block in corrosion resisting steel	See 5.4.2.1.	Inserts shall be installed into test block in corrosion resisting steel (see Annex A).  Test method, see 5.4.2.1.	Q	5
5.4.3	Axial load	Inserts shall withstand axial strength corresponding to the strength class of 1 100 MPa.  After testing, the inserts shall be free from: – any cracks; – any failure.  Permanent distortion or loss of the locking torque is acceptable.	Inserts shall be installed into test block in corrosion resisting steel (see Annex A) by the method given in EN 4015.  The axial strength values specified in Annex C (normative) shall apply.	Q	3

continued