SLOVENSKI STANDARD
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Aeronavtika – Tehniške risbe – Prikaz delov, izdelanih iz kompozitov – 5. del: Šivi

Aerospace series - Technical drawings - Representation of parts made of composite materials - Part 5: Seams

Luft- und Raumfahrt - Technische Zeichnungen - Darstellung von Teilen aus Verbundwerkstoffen - Teil 5: Nähte

Série aérospatiale - Dessins techniques - Représentation des articles en matériaux composites - Partie 5 : Coutures

Ta slovenski standard je istoveten z: **EN 4408-005:2005**

ICS:

01.100.99	Drugi standardi v zvezi s tehniļnim risanjem	Other standards related to technical drawings
49.020	Letala in vesoljska vozila na splošno	Aircraft and space vehicles in general

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 4408-005:2005) 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of an identical text or by endorsement, at the latest by November 2005, and conflicting national standards shall be withdrawn at the latest by November 2005.

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Introduction

This document makes reference to textile standards which quote two types of seams, these being:

— assembly seam;

— reinforcing seam.

The assembly seam undergoes a mechanical effort which is not the case of the holding seam. This distinction may appear necessary in the case of dry fabrics, whereas in aerospace applications there is a systematic curing or densification, therefore it would appear difficult to distinguish them as far as the ready-for-use product is concerned.

The technical definition of seams is required for reinforcing seams.

1 Scope

This standard specifies the representation of seams of composite materials as well as the information to be indicated in technical drawings.

It is applicable to aerospace structures using items linked by seams in dry fabrics, prepregs, film, etc.

It shall be used together with EN 4408-001.

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.

EN 4408-001, *Aerospace series – Technical drawings – Representation of parts made of composite materials – Part 1: General rules.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 4408-001 and the following apply.

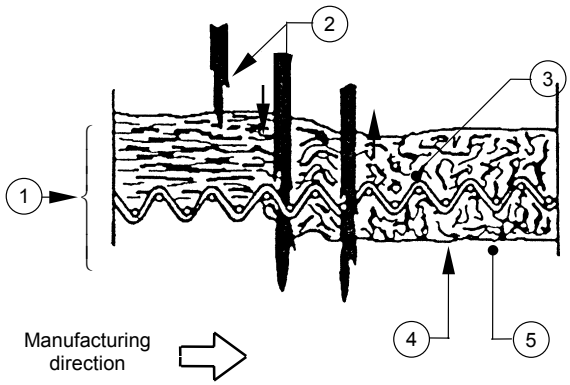
3.1
assembly seam (retention)
it cannot endure any notable effort in using the item

3.2
fibre grafting
action of changing the direction of fibres in an element with or without penetration in another element

3.3
lacing
liaison obtained by a continuous link passed through previously perforated holes

3.4
needling
consolidation of a fibre lap by entanglement using numerous penetrations of spring needles

Needling is a means of fibre grafting (see Figure 1).



Key

1 Superposed fibre lap
2 Spring needles
3 Entangled fibres
4 Support fabric
5 Fibres pulled through when needling

Figure 1

3.5
percentage of grafted fibres
quantity of fibres grafted compared to the total quantity of fibres in a basic element, which implies a homogeneous distribution of grafting points in the area in question

3.6
reinforcing seam
it endures an important part of the effort imposed on the item

3.7
seam
application of a series of stitches or types of stitches to one or several thicknesses of material

3.8
securing the start and end of a seam
the two techniques the most commonly used are the multiple passage with reverse and forward stitches and the stitch secured by knotting

3.9
stitch
structural unity resulting from one or several strands of yarn or yarn loops twisted together, entwined or passed in or through a material

A stitch may be formed:

— without any additional material;
— in the material;
— through the material;
— on the material.

4 Seams made by fibre grafting

4.1 Design parameters

The design parameters to be taken into account in the case of fibre grafting are as follows:

— start of grafting;

— thickness of layers to be linked;

— end of graft;

— percentage of fibres to be grafted (it is difficult to measure the percentage of grafted fibres) or other criteria to provide for a definition of the characteristics to be obtained.

4.2 Representation in the graft table

In as much as the drawing allows, the graft table shall be associated with the lay-up table.

The symbols to be used are defined in Table 1.

Table 1

Design parameters	Drawing symbol
Start of graft	● point
Thickness to be linked	— (line)
Direction and end of graft	► (arrow)
Percentage of fibres to be grafted or other criteria allowing a definition of the characteristics to be obtained	NOTE (see Table 2)

4.3 Representation on the image

See Figure 2 and Figure 3.