SLOVENSKI STANDARD
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Aeronavtika - Kabelske spojke za vezalno pasovje - Preskusne metode - 402. del: Življenjski cikel

Aerospace series - Cable ties for harnesses - Test methods - Part 402: Life cycle

Luft- und Raumfahrt - Befestigungsbänder für Leitungsbündel - Prüfverfahren - Teil 402: Gebrauchszyklus

Série aérospatiale - Frettes de câblage pour harnais - Méthodes d'essais - Partie 402: Durée de vie

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EUROPEAN STANDARD

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Aerospace series - Cable ties for harnesses - Test methods - Part 402: Life cycle

Série aérospatiale - Frettes de câblage pour harnais - Méthodes d'essais - Partie 402: Durée de vie

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Foreword

This document (EN 4057-402:2014) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-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 ASD, 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of an identical text or by endorsement, at the latest by October 2014, and conflicting national standards shall be withdrawn at the latest by October 2014.

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This document supersedes EN 4057-402:2006.

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1 Scope

This European Standard specifies the procedure to determine the life cycle of cable ties for harnesses under random vibration conditions for aerospace applications.

It shall be used together with EN 4057-100.

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 2266-007, *Aerospace series - Cables, electrical, for general purpose - Operating temperatures between - 55 °C and 200 °C - Part 007: UV laser printable multicore jacketed cable - Product standard*

EN 2267-009, *Aerospace series - Cables, electrical, for general purpose - Operating temperatures between - 55 °C and 260 °C - Part 009: DRA family, single and multicore assembly - Product standard*

EN 2267-010, *Aerospace series - Cables, electrical, for general purpose - Operating temperatures between - 55 °C and 260 °C - Part 010: DR family, single UV laser printable - Product standard*

EN 2591-403, *Aerospace series - Elements of electrical and optical connection - Test methods - Part 403: Sinusoidal and random vibration*

EN 4056-001, *Aerospace series - Cable ties for harnesses - Part 001: Technical specification*

EN 4057-100, *Aerospace series - Cable ties for harnesses - Test methods - Part 100: General*

EN 4057-401, *Aerospace series - Cable ties for harnesses - Test methods - Part 401: Loop tensile strength*

3 Apparatus

The vibration system consisting of the vibration machine together with its auxiliary equipment shall be capable of generating a random vibration to meet the requirements of EN 2591-403.

A laboratory oven capable of reaching a temperature corresponding to the maximum working temperature of the cable ties as specified in the appropriate product standard plus 30 °C.

A refrigerator capable of reaching a minimum rated temperature of the cable ties.

A tensile tester as required in EN 4057-401.

4 Procedure

4.1 Vibration test

The cable ties be fitted to a cable bundle/harness as shown in Figure 1 and specified in Table 1.

The test bundle shall be mounted onto a vibration table using the clamps as shown in Figure 1.

Set the vibration machine to deliver the required frequencies and intensities conforming to the spectral shape and density test curve of EN 2591-403, method B, Figure 2, Table 2 and level J.

Subject the specimens to the vibration specified for eight hours in each of two mutually perpendicular directions, one of which is parallel to the bundle axis.

The cable harness shall be removed from the vibration table.

4.2 Temperature cycling

Submit the specimen still mounted on the harness to the following temperature cycling test with a transfer time between each condition of not more than two minutes.

Place in an oven at the maximum continuous operating temperature increased by (30 $^{+5}_{0}$) °C for (30 $^{+5}_{0}$) min.

Transfer to a refrigerator within two minutes and maintain the minimum rated temperature for 30 min to 35 min, this is one cycle.

Return the specimen to the hot chamber and repeat for an additional four cycles.

On completing the fifth cycle allow the specimen to return to room temperature and condition as specified in EN 4057-100.

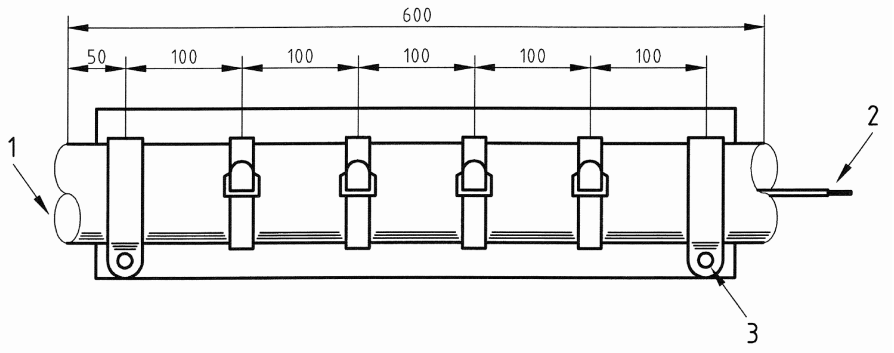
4.3 Final inspection

The specimen shall be inspected using a ×10 magnification aid.

Then remove the centre cable from the bundle permitting the bundle to collapse and the cable tie specimens to be removed.

The cable insulation shall be inspected for damage under each cable tie.

The cable tie specimens shall then be slid onto an appropriate split mandrel and the loop tensile strength test performed as per EN 4057-401.



Key

1 Wire bundle
2 Single cable
3 Clamp or tie and retainer

Figure 1 — Assembly of cable ties, cable harness and fixture

Table 1 — Cable harness construction

Tie minimum length	Cable		Number of cables in bundle
	type	size	
Up to 100 mm	EN 2266-007 or EN 2267-009 or EN 2267-010 or the cable type specified in the product standard	006 (20 AWG)	19
101 mm to 280 mm		020 (14 AWG)	26
> 280 mm		050 (10 AWG)	140

5 Requirements

The performance shall be achieved as required by the technical specification EN 4056-001 and the appropriate product standard.