



SLOVENSKI STANDARD
SIST EN 2348:2002
01-januar-2002

Aerospace series - Control cable assemblies - Technical specification

Aerospace series - Control cable assemblies - Technical specification

Luft- und Raumfahrt - Seilzüge für Flugzeugsteuerungen - Technische Lieferbedingungen

Série aérospatiale - Câbles de commandes équipés - Spécification technique

STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: EN 2348:1988

<https://standards.iteh.ai/catalog/standards/sist/7e10980c-1fe0-4e4f-8a8f-2243990e02f8/sist-en-2348-2002>

ICS:

49.035	Sestavni deli za letalsko in vesoljsko gradnjo	Components for aerospace construction
--------	--	---------------------------------------

SIST EN 2348:2002

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 2348:2002

<https://standards.iteh.ai/catalog/standards/sist/7e10980c-1fe0-4e4f-8a8f-2243990e02f8/sist-en-2348-2002>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 2348

September 1988

UDC : 629.7.05 : 621.854.002.72 : 621.85.053 : 658.56

Key words : Aircraft industry, flight control, flexible cable, cable-ends, specification

English version

Aerospace series
Control cable assemblies
Technical specification

Série aéronautique
Câbles de commandes équipés
Spécification technique

Luft- und Raumfahrt
Seilzüge für Flugzeugsteuerungen
Technische Lieferbedingungen

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was accepted by CEN on 1988-03-17. CEN members are bound to comply with the requirements of CEN 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 CEN 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 CEN Central Secretariat has the same status as the official versions.

CEN members are the national standards organizations of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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

Central Secretariat : Rue Bréderode 2, B—1000 Bruxelles

Brief History

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

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

In accordance with the Common CEN/CENELEC Rules, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

SIST EN 2348:2002

<https://standards.iteh.ai/catalog/standards/sist/7e10980c-1fe0-4e4f-8a8f-2243990e02f8/sist-en-2348-2002>

1 Scope and field of application

This standard specifies the characteristics of control cable assemblies in accordance with EN 2641 for aeronautical applications.

2 References

- ISO 2020, Aerospace series - Mechanical system parts - Preformed flexible steel wire rope for aircraft controls - Technical specification
- EN 2000, Aerospace series - Quality assurance requirements for the manufacture and procurement of EN aerospace standard products
- EN 2357, Aerospace series - Stud-ends, in corrosion resisting steel, swaged on type, control cable - Dimensions and loads
- EN 2358, Aerospace series - Eye-ends, in corrosion resisting steel, swaged on type, control cable - Dimensions and loads
- EN 2359, Aerospace series - Fork-ends, in corrosion resisting steel, swaged on type, control cable - Dimensions and loads
- EN 2360, Aerospace series - Fork-ends, in corrosion resisting steel, swaged on type, control cable, for rolling bearings - Dimensions and loads
- EN 2361, Aerospace series - Ball-ends, in corrosion resisting steel, double shank, swaged on type, control cable - Dimensions and loads
- EN 2362, Aerospace series - Ball-ends, in corrosion resisting steel, swaged on type, control cable - Dimensions and loads
- EN 2641, Aerospace series - Control cable assemblies - Combinations and dimensions

(standards.iteh.ai)

3 Definitions

3.1 Production batch

SIST EN 2348:2002

<https://standards.iteh.ai/catalog/standards/sist/7e10980c-1fe0-4e4f-8a8f-3243999e02f8/sist-en-2348-2002>

A production batch shall consist of control cable assemblies originating from one production run and one composition, i.e. :

- with cables from one reel (i.e. one material and one nominal diameter)
- with the same end definitions

3.2 Sample

The sample shall consist of :

- either a control cable assembly taken out at random from the batch
- or a test specimen consisting of :
 - . a cable of a minimum length of 500 mm, of the same characteristics as the bare cable used in the control cable assembly and originating from the same reel ;
 - . cable ends swaged on the cable under the same swaging conditions as for the control cable assemblies of the batch

The swaging shall be produced during production of the batch in question and under the same conditions of manufacture as this batch.

Note : If a cable assembly comprises two extremity cable ends and one intermediate cable end (EN 2361), each sample will consist of two test specimens on the ends of which the following will be swaged :

- one of the extremity cable ends ;
- one intermediate cable end EN 2361 (see figure 3).

4 Required characteristics and test methods

The required characteristics and test methods are specified in table 1.
The cable shall never be degreased (see ISO 2020).

Table 1

Clause	Characteristic	Requirements	Test methods	A 1)	Q 1)
4.1	Composition of the control cable assembly	The control cable assembly shall have a composition in accordance with its codified designation according to EN 2641.	Visual inspection.	X	X
4.2	External appearance	No crack, distorsion or burr is permitted. The presence of a mark made by a blunt ended punch is permissible on the cable end. This punch mark is applied before swaging to keep the cable inserted in the cable end.	Visual inspection.	X	X
4.3	Swaged part				
4.3.1	Dimensions	See figures 1, 2 and 3 and table 2	Usual measuring instruments.	X	X
4.3.2	Penetration length "X" of the cable in the cable end	See figure 1.	The inspection is carried out as follows : - either by an X-ray examination - or by the method shown in figure 5.	X	X
4.3.3	Internal defects	See figure 4. After swaging : - no crack or fold shall be visible to the naked eye - no cracks exceeding 150 µm in depth, - not more than 6 cracks of 40 to 150 µm deep shall be visible	The following shall be carried out on a cross section of the swaged part : - an examination of the cross section with the naked eye - micrographic examination with 100 min. magnification.	X	X

1) A = Acceptance test
Q = Qualification test

Table 1 (Concluded)

Clause	Characteristic	Requirements	Inspection and test methods	A 1)	Q 1)
4.4	Length L_s of the cable ^s assembly	Conforming to EN 2641.	Unless otherwise specified the length L_s of the cable assembly is L_s measured the cable being pulled horizontally by a force of 50 N.	X	X
4.5	Mechanical properties			X	X
4.5.1	Behaviour under a load of 60% of the minimum breaking strength of the cable	Under a load of at least 60% of the minimum breaking strength of the concerned cable specified in ISO 2020 no slippage of the cable shall occur in the cable end be, no broken wires shall be visible or detected by touch.	It is mandatory that the test is carried out with the cable in a straight line. The load shall be applied continuously and progressively (duration : 3 s). The load shall be maintained for 5 s and then reduced gradually to zero. Any sudden change in the load recorded during this test shall be considered indicative of possible slippage in the swaged part and shall result in a very strict inspection of the cable assembly and of its length L_s . After this test the control cable assembly shall be examined carefully.		
4.5.2	Behaviour under minimum breaking strength of the cable	No slippage of the cable in the cable ends is admissible under the minimum breaking strength of the concerned cable specified in ISO 2020. The failure of the control cable assembly shall only take place under a load equal or above the minimum breaking strength. The fracture shall not take place in or close to the cable end.	The load shall be applied continuously and progressively up to 80% of the cable minimum failure load. The remaining load shall be applied slowly at a rate of approximately 10 N/s. The absence of slippage shall be checked by visual inspection.	X	X

Dimensions in millimetres

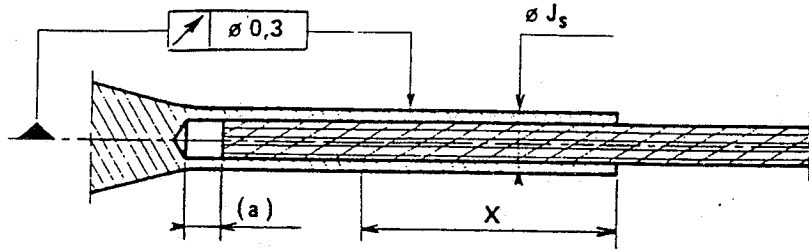


Figure 1 - (for cable ends EN 2357, EN 2358, EN 2359, EN 2360)

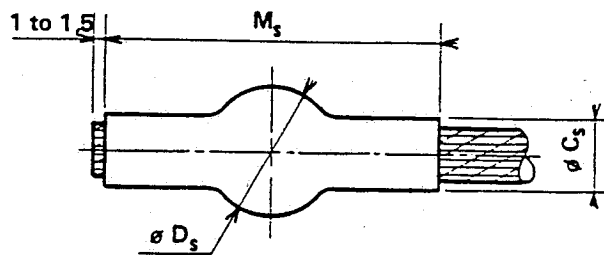
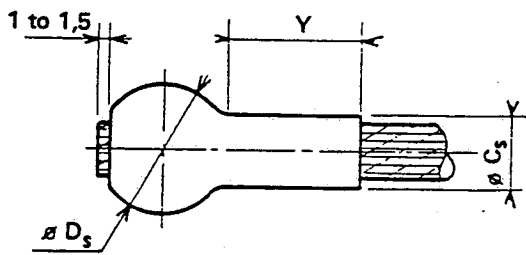


Figure 2 - (for cable end EN 2362)

Figure 3 - (for cable end EN 2361)

STANDARD PREVIEW
(standards.iteh.ai)

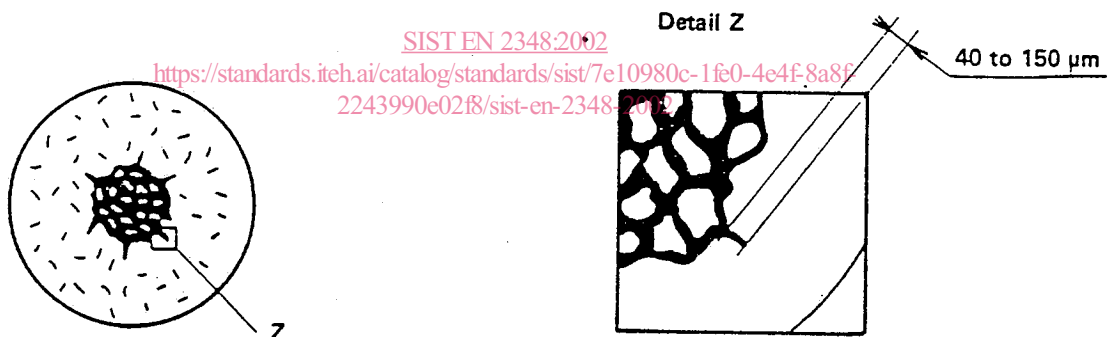
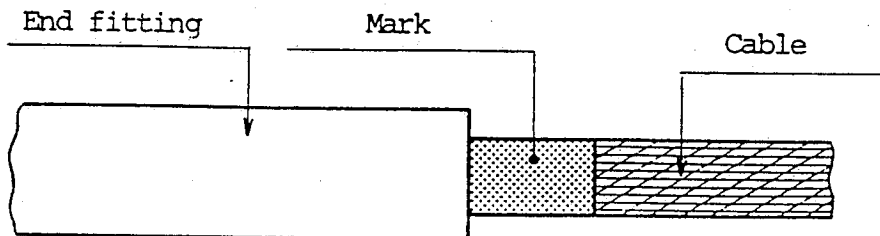


Figure 4



The length X is checked with a mark applied to the cable before swaging. No trace of bare cable shall appear between the mark and the cable end after swaging. The choice of mark (paint, adhesive tape, etc.) is left to be manufacturer's discretion.

Figure 5

Table 2

Dimensions in millimetres

Nominal cable diameter	J_s 1) $\pm 0,12$	X min.	a	D_{0s} $- 0,12$	C_s 2)		Y max.	M_{max} .
					tol.			
1,6	3,50	18	4,5	4,83	2,84	0 -0,12	4	10
2,4	4,83	21	5	6,43	3,63		6	15,5
3,2	5,56	27	6,4	8,00	4,83		8	20
4,0	6,35	33	8	9,63	5,64		10	26
4,8	7,95	34	7,3	11,23	6,48		12	30
5,6	9,52	39	8,4	12,83	7,67	0 -0,17	14	35
6,4	11,12	43	8,4	14,40	8,84		16	41

1) Required over the length X (see figure 1)
2) Required over the length Y (see figure 2)

iTeh STANDARD PREVIEW

5 Quality assurance [\(standards.iteh.ai\)](https://standards.iteh.ai)

5.1 Manufacturer's approval

[SIST EN 2348:2002](https://standards.iteh.ai/catalog/standards/sist/7e10980c-1fe0-4e4f-8a8f-2243990e02f8/sist-en-2348-2002)

See EN 2000

<https://standards.iteh.ai/catalog/standards/sist/7e10980c-1fe0-4e4f-8a8f-2243990e02f8/sist-en-2348-2002>

5.2 Product qualification

The manufacturer shall obtain separate qualification for each control cable diameter in the following 3 combinations of cable ends :

- 1) cable ends EN 2357 or EN 2358 or EN 2359 or EN 2360 at both ends
- 2) cable end EN 2357 or EN 2358 or EN 2359 or EN 2360 at one end and cable end EN 2361 or EN 2362 at the other end.
- 3) cable end EN 2361 at one end and cable end EN 2362 at the other.

Six control cable assemblies (2 in each of the above definitions) for a cable assembly of a given nominal diameter are required for the inspections and tests given in table 3.