



SLOVENSKI STANDARD
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Nastavljive aluminijaste teleskopske podpore - Specifikacije izdelka, oblikovanje in ocena z izračunom in preskusi

Adjustable telescopic aluminium props - Product specifications, design and assessment by calculation and tests

Baustützen aus Aluminium mit Ausziehvorrichtung - Produktfestlegungen, Bemessung und Nachweis durch Berechnung und Versuche

Etais télescopiques réglables en aluminium - Spécifications du produit, conception et évaluation par calculs et essais

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EUROPEAN STANDARD
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ICS

English Version

Adjustable telescopic aluminium props - Product specifications, design and assessment by calculation and tests

Etats télescopiques réglables en aluminium - Spécifications
du produit, conception et évaluation par calculs et essais

Baustützen aus Aluminium mit Ausziehvorrichtung -
Produktfestlegungen, Bemessung und Nachweis durch
Berechnung und Versuche

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 53.

If this draft becomes a European Standard, 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.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN 16031:2009) has been prepared by Technical Committee CEN/TC 53 “Temporary works equipment”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

Introduction

Whilst this European Standard deals with the more common types of adjustable telescopic aluminium props in use, it is not intended to prevent development of other types of props. For example, props may have hinged ends or other length adjustment devices or be made of other materials. Whilst such props cannot comply with this European Standard it is recommended that the principals of this European Standard should be considered in the design and assessment of such props.

This European Standard is a product standard primarily for use in the field of falsework and formwork standardized in EN 12812.

The specified values for load bearing capacity listed in this European Standard are figures for classification. For site use γ_F and γ_m can be found in EN 12812

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1 Scope

This European Standard specifies materials, design requirements, designation, corrosion protection alternatives, together with assessment methods using both calculations and testing for adjustable telescopic aluminium props which are intended for use on construction sites. Inner and outer tube of props are made in aluminium or aluminium and steel

It specifies eleven classes of nominal specified values for strengths for adjustable telescopic aluminium props each having a series of maximum extended lengths.

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 39, *Loose steel tubes for tube and coupler scaffolds. Technical delivery conditions.*

EN 74-1, *Couplers, spigot pins and baseplates for use in falsework and scaffolds – Part 1: Couplers for tubes – Requirements and test procedures.*

EN 74-2, *Couplers, spigot pins and baseplates for use in falsework and scaffolds – Part 2: Special couplers – Requirements and test procedures.*

EN 1999-1:1998, *Eurocode 9: Design of aluminium structures - Part 1-1: General rules; general rules and rules for buildings*

EN 1065:1998, *Adjustable telescopic steel props- Product specifications, design and assessment by calculation and tests.*

EN 1090-2, *Execution of steel structures and aluminium structures - Part 2: Technical requirements for the execution of steel structures*

EN 1090-3, *Execution of steel structures and aluminium structures - Part 3: Technical requirements for aluminium structures*

EN 10204, *Metallic materials. Types of inspection documents.*

EN 10210-1, *Hot finished structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery conditions*

EN 10210-2, *Hot finished structural hollow sections of non-alloy and fine grain steels - Part 2: Tolerances, dimensions and sectional properties*

EN 10219-1, *Cold formed welded structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery conditions*

EN 10219-2, *Cold formed welded structural hollow sections of non-alloy and fine grain steels - Part 2: Tolerances, dimensions and sectional properties*

EN 12811-1, *Temporary works equipment – Part 1: Scaffolds – Performance requirements and general design.*

EN 12811-2:2004, *Temporary works equipment – Part 2: Information on materials.*

EN 12811-3:2003, *Temporary works equipment – Part 3: Load testing.*

EN 12812, *Falsework — Performance requirements and general design.*

ISO 2937, *Plain and seamless steel tubes for mechanical application*

ISO 418, *Iron ores. Determination of aluminium content. EDTA titrimetric method*

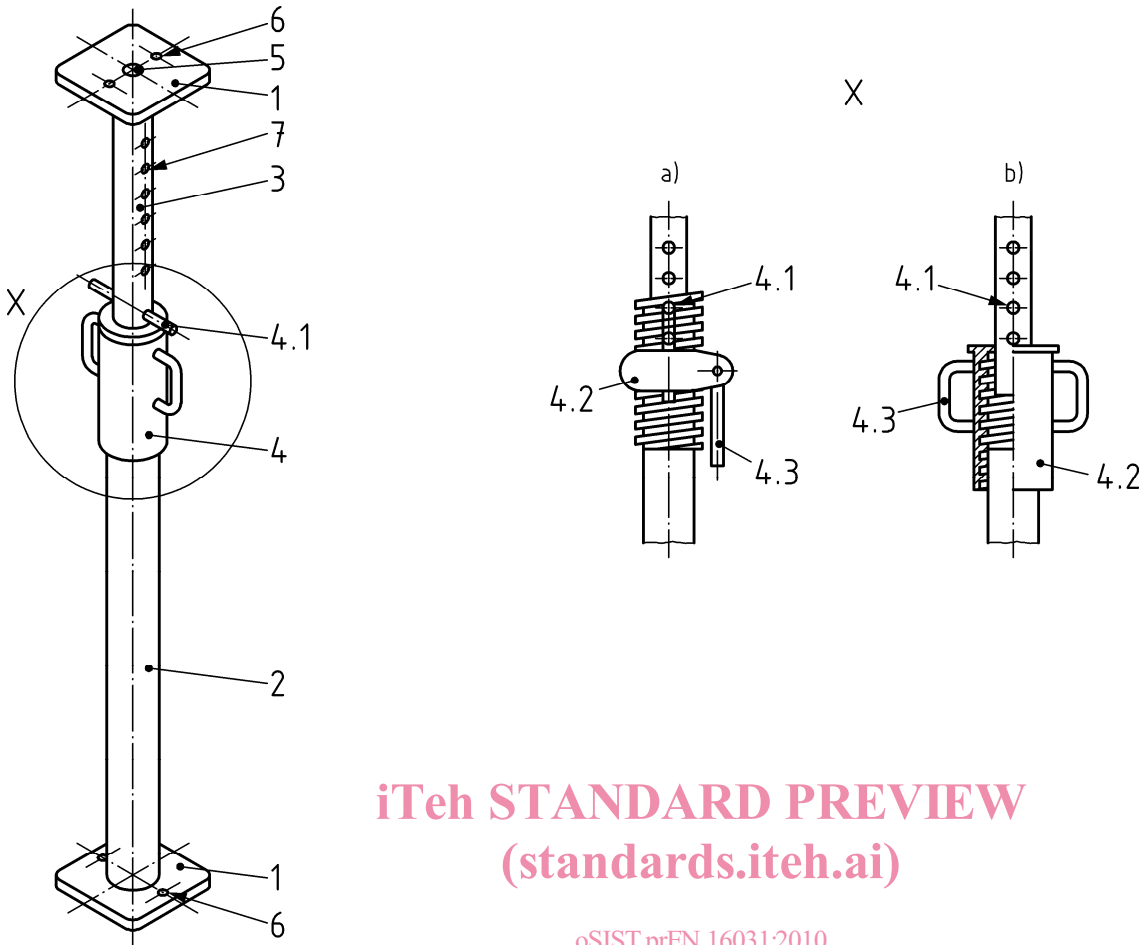
ISO 424, *Iron ores. Determination of titanium content. Diantipyrylmethane spectrophotometric method*

ISO 3629, *Specification for photographic grade potassium metabisulphite*

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Key

a) open thread =DO

b) covered thread =DO

- 1 Endplate
- 2 Outer tube
- 3 Inner tube
- 4 Length adjustment device
- 4.1 attached pin
- 4.2 Collar nut
- 4.3 Handle
- 5 entral hole
- 6 Connection holes
- 7 Pin hole

Figure 1 — Example of adjustable telescopic aluminium prop (type 1)

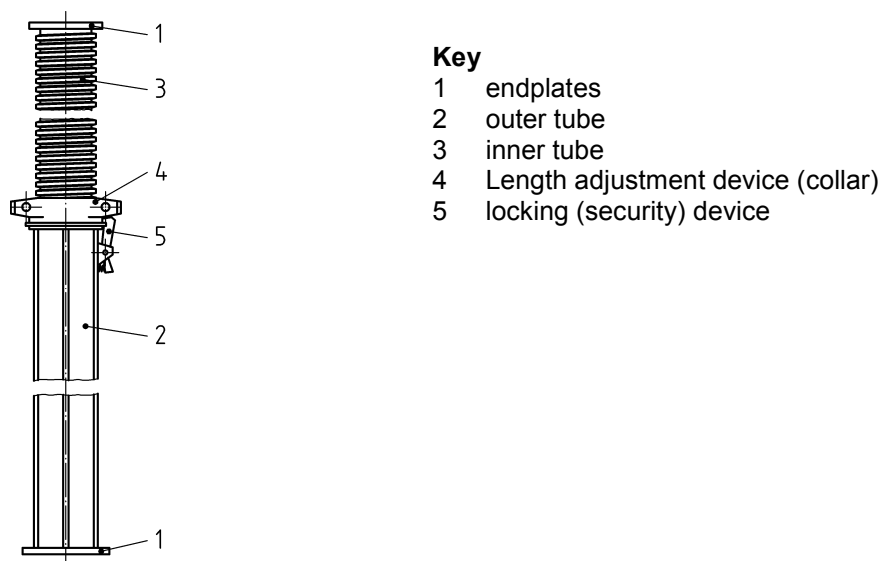


Figure 2 — Example of Adjustable telescopic aluminium prop (type 2)

3 Definitions

For the purposes of this European Standard the following definitions apply.

3.1 adjustable telescopic aluminium prop

compression member normally used as temporary vertical support in construction works. A prop consists of two tubes which are telescopically displaceable within each other with a length adjustment device with threaded inner tube (see Figure 2) or with a pin inserted into hole in the inner tube and a mean of fine adjustment using a threaded collar (see Figure 1). Tubes could be profiled. Inner and outer tubes are made in aluminium or aluminium and steel.

3.2 endplate

plate which is fixed at right angles to one end of inner and outer tube

3.3 collar nut

nut internally threaded to provide fine length adjustment to the prop to transfer the force from the inner to the outer tube

3.4 inner tube

smaller profiled tube provided with thread or holes for the coarse adjustment of the prop

3.5 outer tube

larger profiled tube one end of which could be threaded externally (see Figure.1)

3.6 length at maximum extension

nominal distance measured between the outside faces of the endplates when the prop is in the fully extended position (fully opened)

3.7 length at minimum extension

nominal distance between the outside faces of endplates when the prop is in the fully closed position

3.8 safety devices

devices to prevent unintentional disengage of the inner and outer tube and/or devices to guarantee the minimum overlapping length

3.9 pin

part of the length adjustment device which is inserted through the inner tube holes and is secured to the prop

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3.10 working load

nominal characteristic strength of the prop divided by at least the safety factors given for different classes in EN 12812

NOTE Safety factors can be greater in national regulations.

4 Symbols

Number	Symbol	Denomination	Unit
1	D	Outer diameter of the inner tube	mm
2	D_m	Collar nut major thread diameter	mm
3	D_p	Diameter of the pin	mm
4	$e_{b,core}$	Eccentricity at the base at which the spring becomes effective	mm
5	$e_{b,limit}$	Unit eccentricity at the base	mm
6	$e_{b,0}$	Initial eccentricity at the base	mm
7	e	Eccentricity at the top	mm
8	y	Yield strength	N/mm^2
9	y_{act}	Actual yield strength	N/mm^2
10	y_{nom}	Nominal yield strength	N/mm^2
11	l	Actual extension length of the prop	m
12	l_{max}	Length of a prop at maximum extension	m
13	l_0	Overlapping length	mm
14	M_{p1}	Plastic moment resistance of the cross section	kN · m
15	$M_{p1,N}$	Reduced plastic moment resistance of the cross section	kN · m
16	N	Normal (axial) force	kN
17	$N_{C,i}$	Ideal buckling force	kN
18	N_{p1}	Plastic compression resistance of the cross section	kN
19	N_{pl}	Nominal plastic compression resistance of the cross section	kN
20	N_t	Normal (axial) force of the tube	kN
21	R	Strength of a prop	kN
22	$R_{b,t}$	Bearing resistance of the tube	kN
23	R_p	Shear resistance of the pin	kN
24	R_u	Failure load of a test	kN
25	$R_{y,act}$	Actual characteristic strength of the prop class y where y corresponds to classes from A. to W	kN
26	$R_{y,k}$	Nominal characteristic strength of the prop class y where y corresponds to classes from A. to W	kN
27	V	Vertical load	kN
28	α	Angle of inclination between the inner and outer tube	rad
29	γ_M	Partial safety factor for the resistance	1
30	γ_{M1}, γ_{M2}	Splitted partial safety factors for the material	1
31	γ_F	Partial safety factor for the action	1

5 Classification

Adjustable telescopic aluminium props shall be classified according to its specified value for nominal characteristic strength $R_{y,k}$, given in Table 1 (load classes) and its maximal extension length l_{max} given in table 2 (length classes).

Table 1 — Load classes of adjustable telescopic aluminium props

load class	Specified value for nominal characteristic strength $R_{y,k}$
A	see clause 10
B	see clause 10
C	see clause 10
D	34,0 kN
E	51,0 kN
R	68,0 kN
S	85,0 kN
T	102,0 kN
U	119,0 kN
V	136,0 kN
W	153,00 kN

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Table 2 — Length classes of adjustable telescopic aluminium props

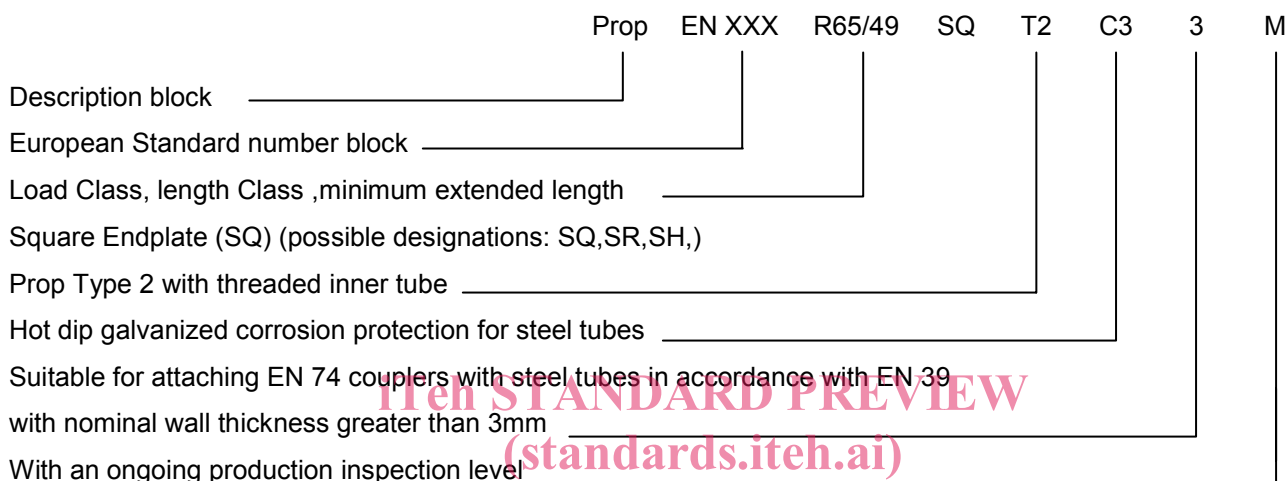
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length class	length at maximum extension l_{max}
10	$1,00 \text{ m} \leq l_{max} \leq 1,49 \text{ m}$
15	$1,50 \text{ m} \leq l_{max} \leq 1,99 \text{ m}$
20	$2,00 \text{ m} \leq l_{max} \leq 2,49 \text{ m}$
25	$2,50 \text{ m} \leq l_{max} \leq 2,99 \text{ m}$
30	$3,00 \text{ m} \leq l_{max} \leq 3,49 \text{ m}$
35	$3,50 \text{ m} \leq l_{max} \leq 3,99 \text{ m}$
40	$4,00 \text{ m} \leq l_{max} \leq 4,49 \text{ m}$
45	$4,50 \text{ m} \leq l_{max} \leq 4,99 \text{ m}$
50	$5,00 \text{ m} \leq l_{max} \leq 5,49 \text{ m}$
55	$5,50 \text{ m} \leq l_{max} \leq 5,99 \text{ m}$
60	$6,00 \text{ m} \leq l_{max} \leq 6,49 \text{ m}$
65	$6,50 \text{ m} \leq l_{max} \leq 6,99 \text{ m}$
70	$7,00 \text{ m} \leq l_{max} \leq 7,49 \text{ m}$

6 Designations

Example: EN xxx R65/49 SQ T2 C3 3 M

Designation of a prop in accordance with EN XXX, class: "R 65", with a minimum extended length: "49" dm, "SQ" with square endplates, "T2" type 2 with threaded inner tube, "C3" hot-dip galvanized corrosion protection for steel, "3" suitable for attaching couplers in accordance with EN 74-1 and EN 74-2 couplers with steel tubes in accordance with EN 39 with nominal wall thickness greater than 3mm, "M" with an ongoing production inspection level M.



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7 Materials

7.1 General

Materials shall have a good resistance to, and/or be protected against atmospheric corrosion and shall be free of any impurities and defects which might affect their satisfactory use. Steels of deoxidation type FU (rimming steels) are not permitted.

Materials should be selected from the relevant existing European and International Standards and, whenever applicable, should be in accordance with the following standards:

EN 12811:1 for steel and EN 12811:2 (in particular clause 6) and EN 1999-1:1998 for aluminium

7.2 Corrosion protection for steel

Steel elements shall be protected against atmospheric corrosion in general in accordance with EN 12811-2. Electrolytical zinc coating C₂ with an average thickness of 15 μ conforms to 8.1 of EN 12811-2:2004.

For pin and attachment it shall be shown that they achieve at least equivalent protection.