



SLOVENSKI STANDARD

SIST EN 16031:2012

01-september-2012

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

EN 16031

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2012

ICS 91.220

English Version

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

Etais 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 European Standard was approved by CEN on 28 April 2012.

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

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Contents

	Page
Foreword.....	4
Introduction.....	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Symbols	9
5 Classification	10
6 Designations	11
7 Materials	12
8 Requirements	12
8.1 Tubes	12
8.2 Welding	12
8.3 Length adjustment device	12
8.4 Permanent prevention against unintentional disengagement.....	12
8.5 Anti hand trap	13
8.6 Overlapping length	13
8.7 Endplates	14
9 Verification	14
9.1 General.....	14
9.2 Calculation of prop strength.....	15
9.2.1 General.....	15
9.2.2 Imperfections	15
9.2.3 Behaviours of inner and outer tube	17
9.2.4 Boundary conditions.....	17
9.2.5 Verification of prop strength	21
9.3 Verification of the strength of length adjustment device	22
9.4 Verification of the prevention against unintentional disengagement.....	22
9.5 Confirmation of the calculation results by testing.....	22
10 Tests.....	22
10.1 General.....	22
10.2 Detail tests.....	22
10.2.1 Compression tests on unthreaded tubes.....	22
10.2.2 Compression tests on threaded tube	23
10.2.3 Bending tests on threaded tube.....	25
10.2.4 Tests for the limit eccentricities of prop ends	27
10.2.5 Compression tests on length adjustment device	30
10.3 Test of the prevention against unintentional disengagement	30
10.3.1 Purpose of test.....	30
10.3.2 Test arrangement.....	31
10.3.3 Evaluation of test results	31
10.4 Confirmation test for the prop strength	31
10.4.1 Material properties.....	31
10.4.2 Global test	32
11 Documentation of test results	32

	Page
12 Marking	32
13 Assessment	33
14 User manual	33
Annex A (informative) Ongoing production control	34
Bibliography	36

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[SIST EN 16031:2012](https://standards.iteh.ai/catalog/standards/sist/011ffc26-48f5-4c3c-856d-5dd94961e2e4/sist-en-16031-2012)

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Foreword

This document (EN 16031:2012) has been prepared by Technical Committee CEN/TC 053 “Temporary works equipment”, the secretariat of which is held by DIN.

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 2012, and conflicting national standards shall be withdrawn at the latest by November 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Introduction

This European Standard deals with the more common types of adjustable telescopic aluminium props in current 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 nevertheless recommended that the principals of this European Standard 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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EN 16031:2012 (E)**1 Scope**

This European Standard specifies materials, design requirements and designation together with assessment methods using both calculations and testing for adjustable telescopic aluminium props which are intended for use on construction sites.

It outlines 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 1999-1-1, *Eurocode 9: Design of aluminium structures — Part 1-1: General structural rules*

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

EN 1090-3:2008, *Execution of steel structures and aluminium structures — Part 3: Technical requirements for aluminium structures*

EN 10204:2004, *Metallic materials — Types of inspection documents*

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 12811-3:2002, *Temporary works equipment — Part 3: Load testing*

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

3 Terms and definitions

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

3.1**adjustable telescopic aluminium prop**

compression member consisting of two tubes circular or profiled which are telescopically displaceable within each other with a length adjustment device with threaded inner tube (see Figure 1) or with a pin inserted into holes in the inner tube and a mean of fine adjustment using a threaded collar (see Figure 2)

Note 1 to entry: Such props are normally used as a temporary vertical support in construction works.

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 either to a threaded inner tube or through a pin

3.4**inner tube**

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

3.5**outer tube**

larger tube that may be profiled, one end of which could be threaded externally (see Figure 1 and 2)

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**minimum working length**

nominal distance between the outside faces of the endplates necessary to allow safely the dismounting and removal of prop

3.9**safety devices**

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

3.10**pin**

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

3.11**working load**

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

Note 1 to entry: Safety factors can be greater in national regulations.

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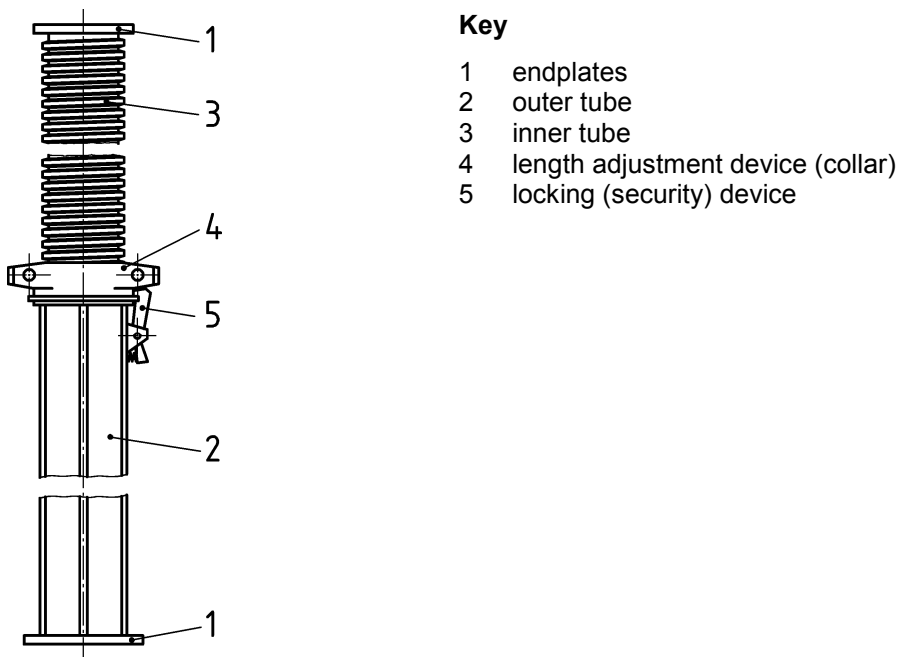


Figure 1 — Example of adjustable telescopic aluminium prop (type 1)

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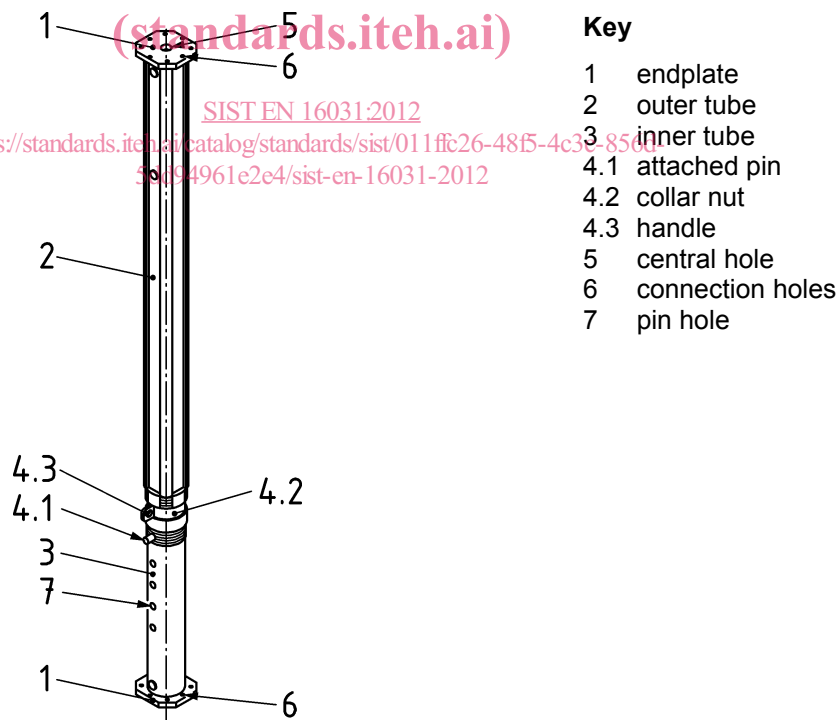


Figure 2 — Example of adjustable telescopic aluminium prop (type 2)

4 Symbols

Symbol	Designation	Unit
D_i	outer diameter of the inner tube	mm
D_m	collar nut major thread diameter	mm
D_p	diameter of the pin	mm
$e_{b,core}$	eccentricity at the base at which the spring becomes effective	mm
$e(N)$	limiting eccentricity of the axial forces	mm
c_b	spring stiffness	N · mm/rad
$e_{b,limit}$	unit eccentricity at the base	mm
$e_{b,0}$	initial eccentricity at the base	mm
e_t	eccentricity at the top	mm
f_y	yield strength	N/mm ²
f_{yact}	actual yield strength	N/mm ²
f_{ynom}	nominal yield strength	N/mm ²
f_0	characteristic value of proof strength at the transitions point between prop and base plate	N/mm ²
$f_{0,HAZ}$	characteristic value of proof strength at the transitions point between prop and base plate determined by taking the heat effected zone into account	N/mm ²
l	actual extension length of the prop	m
l_{max}	length of a prop at maximum extension	m
l_0	overlapping length	mm
M_{pl}	plastic moment resistance of the cross section	kN · m
$M_{pl,N}$	reduced plastic moment resistance of the cross section	kN · m
N	normal (axial) force	kN
$N_{R,k}$	characteristic compression resistance	kN
$N_{C,i}$	ideal buckling force	kN
N_{pl}	nominal plastic compression resistance of the cross section	kN
R	strength of a prop	kN
$R_{b,t}$	bearing resistance of the tube	kN
R_p	shear resistance of the pin	kN
R_u	failure load of a test	kN

Symbol	Designation	Unit
$R_{y,act}$	actual characteristic strength of the prop class y where y corresponds to classes from A to W	kN
$R_{y,k}$	nominal characteristic strength of the prop class y where y corresponds to classes from A to W	kN
$R_{y,t}$	lowest evaluated test result in the global test	kN
$R_{y,a}$	average value test result in the global test	kN
$R_{ad,k}$	characteristic strength in compression	kN
V	vertical load	kN
$\Delta\varphi_0$	angle of inclination between the inner and outer tube	rad
γ_M	partial safety factor for the resistance	1
$\gamma_{M1} \cdot \gamma_{M2}$	splitted partial safety factors for the material	1
γ_F	partial safety factor for the action	1

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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).

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Table 1 — Load classes of adjustable telescopic aluminium props

Load class	Specified value for nominal characteristic strength $R_{y,k}$
A	$51,0 \cdot \frac{l_{max}}{l^2} \leq 44,0 \text{ kN}$
B	$68,0 \cdot \frac{l_{max}}{l^2} \leq 51,0 \text{ kN}$
C	$102,0 \cdot \frac{l_{max}}{l^2} \leq 59,5 \text{ kN}$
D	34,0 kN
E	51,0 kN
R	66,0 kN
S	82,5 kN
T	99,0 kN
U	115,5 kN
V	132,0 kN
W	148,5 kN