



NSAI
Standards

Irish Standard
I.S. EN 13001-3-6:2018+A1:2021

Cranes - General design - Part 3-6: Limit states and proof of competence of machinery - Hydraulic cylinders

I.S. EN 13001-3-6:2018+A1:2021

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National Foreword

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EUROPEAN STANDARD

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Krane - Konstruktion allgemein - Teil 3-6: Grenzzustände und Sicherheitsnachweis von Maschinenbauteilen - Hydraulikzylinder

This European Standard was approved by CEN on 13 November 2017 and includes Amendment 1 approved by CEN on 9 May 2021.

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| Contents | | Page |
|------------------------|--|-------------|
| European foreword..... | | 4 |
| Introduction | | 5 |
| 1 | Scope..... | 6 |
| 2 | Normative references..... | 6 |
| 3 | Terms, definitions and symbols..... | 7 |
| 3.1 | Terms and definitions | 7 |
| 3.2 | Symbols and abbreviations..... | 7 |
| 3.3 | Terminology..... | 10 |
| 4 | General..... | 12 |
| 4.1 | Documentation..... | 12 |
| 4.2 | Materials for hydraulic cylinders..... | 13 |
| 4.2.1 | General requirements | 13 |
| 4.2.2 | Grades and qualities | 14 |
| 5 | Proof of static strength..... | 14 |
| 5.1 | General..... | 14 |
| 5.2 | Limit design stresses..... | 16 |
| 5.2.1 | General..... | 16 |
| 5.2.2 | Limit design stress in structural members..... | 16 |
| 5.2.3 | Limit design stresses in welded connections..... | 17 |
| 5.3 | Linear stress analysis | 17 |
| 5.3.1 | General..... | 17 |
| 5.3.2 | Typical load cases and boundary conditions | 17 |
| 5.3.3 | Cylinder tube | 19 |
| 5.3.4 | Cylinder bottom..... | 20 |
| 5.3.5 | Piston rod welds..... | 21 |
| 5.3.6 | Cylinder head..... | 22 |
| 5.3.7 | Cylinder tube and piston rod threads..... | 22 |
| 5.3.8 | Thread undercuts and locking wire grooves | 22 |
| 5.3.9 | Oil connector welds..... | 23 |
| 5.3.10 | Connecting interfaces to crane structure..... | 23 |
| 5.4 | Nonlinear stress analysis | 24 |
| 5.4.1 | General..... | 24 |
| 5.4.2 | Standard cylinder with end moments | 24 |
| 5.4.3 | Support leg..... | 24 |
| 5.5 | Execution of the proof | 25 |
| 5.5.1 | Proof for load bearing components..... | 25 |
| 5.5.2 | Proof for bolted connections..... | 25 |
| 5.5.3 | Proof for welded connections..... | 26 |
| 6 | Proof of fatigue strength..... | 26 |
| 6.1 | Ⓐ General | 26 |
| 6.2 | Stress histories..... | 26 |
| 6.3 | Execution of the proof | 28 |
| 6.4 | Limit design stress range | 28 |
| 6.5 | Details for consideration..... | 28 |

| | | |
|--------------|---|----|
| 6.5.1 | General | 28 |
| 6.5.2 | Bottom weld..... | 29 |
| 6.5.3 | Notch stress at oil connectors | 31 |
| 6.5.4 | Cylinder head | 32 |
| 6.5.5 | Piston rod | 34 |
| 6.5.6 | Cylinder head bolts | 36 |
| 6.5.7 | Cylinder head flange weld | 36 |
| 6.5.8 | Mechanical interfaces | 39 |
| 7 | Proof of elastic stability..... | 39 |
| 7.1 | General | 39 |
| 7.2 | Critical buckling load | 39 |
| 7.3 | Limit compressive design force..... | 41 |
| 7.4 | Execution of the proof..... | 42 |
| Annex A | (informative) Critical buckling load for common buckling cases..... | 43 |
| A.1 | General | 43 |
| A.2 | Buckling case A | 44 |
| A.3 | Buckling case B | 44 |
| A.4 | Buckling case C | 45 |
| A.5 | Buckling case D..... | 45 |
| A.6 | Buckling case E | 45 |
| A.7 | Buckling case F | 46 |
| A.8 | Buckling case G | 46 |
| Annex B | (informative) Second order analysis of two important cases | 47 |
| B.1 | Compressed cylinder with end moments and angular misalignment..... | 47 |
| B.2 | Compressed cylinder with lateral end force and angular misalignment | 48 |
| B.3 | Axial stresses for cases in B.1 and B.2 | 49 |
| Annex C | (informative) Shell section forces and moments for cylinder bottom | 50 |
| Annex D | (informative) Fatigue analysis of bottom weld for more complex cases | 53 |
| Annex E | (informative) Selection of a suitable set of crane standards for a given application..... | 56 |
| Annex F | (informative) List of hazards | 58 |
| Annex ZA | (informative) Relationship between this European Standard and the essential requirements of Directive 2006/42/EC aimed to be covered..... | 59 |
| Bibliography | | 60 |

EN 13001-3-6:2018+A1:2021 (E)

European foreword

This document (EN 13001-3-6:2018+2021) has been prepared by Technical Committee CEN/TC 147 “Cranes — Safety”, 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 December 2021, and conflicting national standards shall be withdrawn at the latest by December 2021.

This document includes Amendment 1 approved by CEN on 21 May 2021.

This document supersedes EN 13001-3-6:2018.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**.

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

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard has been prepared to be a harmonized standard to provide one means for the mechanical design and theoretical verification of cranes to conform with the essential health and safety requirements of the Machinery Directive, as amended. This standard also establishes interfaces between the user (purchaser) and the designer, as well as between the designer and the component manufacturer, in order to form a basis for selecting cranes and components.

This European Standard is a type C standard as stated in EN ISO 12100:2010.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this standard.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

EN 13001-3-6:2018+A1:2021 (E)

1 Scope

A1 This document is to be used together with the other generic parts of EN 13001 series of standards, see Annex E, as well as pertinent crane type product EN standards, and as such they specify general conditions, requirements and methods to, by design and theoretical verification, prevent mechanical hazards of hydraulic cylinders that are part of the load carrying structures of cranes. Hydraulic piping, hoses and connectors used with the cylinders are not within the scope of this document, as well as cylinders made from other material than carbon steel.

NOTE 1 Specific requirements for particular crane types are given in the appropriate European product standards, see Annex E.

The significant hazardous situations and hazardous events that could result in risks to persons during intended use are identified in Annex F. Clauses 4 to 7 of this document provide requirements and methods to reduce or eliminate these risks: **A1**

- a) exceeding the limits of strength (yield, ultimate, fatigue);
- b) elastic instability (column buckling).

A1 NOTE 2 **A1** EN 13001-3-6 deals only with the limit state method in accordance with EN 13001-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

A1 *deleted text* **A1**

EN 10277-2:2008, *Bright steel products — Technical delivery conditions — Part 2: Steels for general engineering purposes*

A1 EN 10297-1:2003, *Seamless circular steel tubes for mechanical and general engineering purposes — Technical delivery conditions — Part 1: Non-alloy and alloy steel tubes* **A1**

EN 10305-1:2016, *Steel tubes for precision applications — Technical delivery conditions — Part 1: Seamless cold drawn tubes*

EN 10305-2:2016, *Steel tubes for precision applications — Technical delivery conditions — Part 2: Welded cold drawn tubes*

A1 EN 13001-1:2015, *Cranes — General design — Part 1: General principles and requirements*

EN 13001-2:2014, *Crane safety — General design — Part 2: Load actions*

EN 13001-3-1:2012+A2:2018, *Cranes — General design — Part 3-1: Limit States and proof competence of steel structure* **A1**

EN ISO 148-1:2016, *Metallic materials — Charpy pendulum impact test — Part 1: Test method (ISO 148-1:2016)*

A1 EN ISO 683-1:2018, *Heat-treatable steels, alloy steels and free-cutting steels — Part 1: Non-alloy steels for quenching and tempering (ISO 683-1:2016)*

EN ISO 683-2:2018, *Heat-treatable steels, alloy steels and free-cutting steels — Part 2: Alloy steels for quenching and tempering (ISO 683-2:2016)* **A1**

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