INTERNATIONAL STANDARD

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Safety of amusement rides and amusement devices —

Part 1: Design and manufacture

Sécurité des manèges et des dispositifs de divertissement —

Partie 1: Conception et fabrication

Reference number
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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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Foreword

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 254, *Safety of amusement rides and amusement devices*.

ISO 17842 consists of the following parts, under the general title *Safety of amusement rides and amusement devices*:

— *Part 1: Design and manufacture*

— *Part 2: Operation and use*

— *Part 3: Requirements for inspection during design, manufacture, operation and use*

Safety of amusement rides and amusement devices —

Part 1:
Design and manufacture

1 Scope

This part of ISO 17842 specifies the minimum requirements necessary to ensure the safe design, calculation, manufacture, and installation of the following: mobile, temporary or permanently installed machinery and structures, e.g. roundabouts, swings, boats, Ferris wheels, roller coasters, chutes, grandstands, membrane or textile structures, booths, stages, side shows, and structures for artistic aerial displays. The above items, hereafter called *amusement devices* or simply "devices", are intended to be installed both repeatedly without degradation or loss of integrity, and temporarily or permanently in fairgrounds and amusement parks or any other locations. Fixed grandstands, construction site installations, scaffolding, removable agricultural structures and simple coin operated children's amusement devices intended for up to 3 children are not covered by this document.

Nevertheless this document can be used in the design of any similar structural or passenger-carrying device not explicitly mentioned herein.

Existing national rules on workers' safety are not concerned by this document.

This document is applicable to amusement devices and major modifications of amusement devices and rides manufactured after the effective date of its publication.

ISO 17842-3 contains requirements for inspection during design, manufacture, operation and use.

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 288-9, *Specification and approval of welding procedures for metallic materials — Part 9: Welding procedure test for pipeline welding on land and offshore site butt welding of transmission pipelines*

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread*

ISO 1141, *Fibre ropes — Polyester — 3-, 4-, 8- and 12-strand ropes*

ISO 1181, *Fibre ropes — Manila and sisal — 3-, 4- and 8-strand ropes*

ISO 1346, *Fibre ropes — Polypropylene split film, monofilament and multifilament (PP2) and polypropylene high-tenacity multifilament (PP3) — 3-, 4-, 8- and 12-strand ropes*

ISO 2307, *Fibre ropes — Determination of certain physical and mechanical properties*

ISO 3834-1, *Quality requirements for fusion welding of metallic materials — Part 1: Criteria for the selection of the appropriate level of quality requirements*

ISO 3834-3, *Quality requirements for fusion welding of metallic materials — Part 3: Standard quality requirements*

ISO 4014, *Hexagon head bolts — Product grades A and B*

ISO 4016, *Hexagon head bolts — Product grade C*

ISO 4017, *Fasteners — Hexagon head screws — Product grades A and B*

ISO 4018, *Hexagon head screws — Product grade C*

ISO 4032, *Hexagon regular nuts (style 1) — Product grades A and B*

ISO 4034, *Hexagon regular nuts (style 1) — Product grade C*

ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 5817:2014, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections*

ISO 7250 (all parts), *Basic human body measurements for technological design*

ISO 9554, *Fibre ropes — General specifications*

ISO 9606-1, *Qualification testing of welders — Fusion welding — Part 1: Steels*

ISO 9606-2, *Qualification test of welders — Fusion welding — Part 2: Aluminium and aluminium alloys*

ISO 9692-1, *Welding and allied processes — Types of joint preparation — Part 1: Manual metal arc welding, gas-shielded metal arc welding, gas welding, TIG welding and beam welding of steels*

ISO 9692-2, *Welding and allied processes — Joint preparation — Part 2: Submerged arc welding of steels*

ISO 9712:2012, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO 10042:2005, *Welding — Arc-welded joints in aluminium and its alloys — Quality levels for imperfections.* Corrected by ISO 10042:2005/Cor. 1:2006

ISO 10325, *Fibre ropes — High modulus polyethylene — 8-strand braided ropes, 12-strand braided ropes and covered ropes*

ISO 10474:2013, *Steel and steel products — Inspection documents*

ISO 10547, *Polyester fibre ropes — Double braid construction*

ISO 10554, *Polyamide fibre ropes — Double braid construction*

ISO 10556, *Fibre ropes of polyester/polyolefin dual fibres*

ISO 10572, *Mixed polyolefin fibre ropes*

ISO 11666, *Non-destructive testing of welds — Ultrasonic testing — Acceptance levels*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13849-1, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13849-2, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*

ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14118, *Safety of machinery — Prevention of unexpected start-up*

ISO 14119, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

ISO 14120, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

ISO 14122-1, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means of access between two levels*

ISO 14731, *Welding coordination — Tasks and responsibilities*

ISO 14732, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials*

ISO 15607, *Specification and qualification of welding procedures for metallic materials — General rules*

ISO 15609-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding*

ISO 15610, *Specification and qualification of welding procedures for metallic materials — Qualification based on tested welding consumables*

ISO 15611, *Specification and qualification of welding procedures for metallic materials — Qualification based on previous welding experience*

ISO 15612, *Specification and qualification of welding procedures for metallic materials — Qualification by adoption of a standard welding procedure*

ISO 15613, *Specification and qualification of welding procedures for metallic materials — Qualification based on pre-production welding test*

ISO 15614-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys*

ISO 15614-2, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 2: Arc welding of aluminium and its alloys*

ISO/IEC 17020, *Conformity assessment — Requirements for the operation of various types of bodies performing inspection*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 17635, *Non-destructive testing of welds — General rules for metallic materials*

ISO 17636-1:2013, *Non-destructive testing of welds — Radiographic testing — Part 1: X- and gamma-ray techniques with film*

ISO 17637, *Non-destructive testing of welds — Visual testing of fusion-welded joints*

ISO 17638, *Non-destructive testing of welds — Magnetic particle testing*

ISO 17640:2010, *Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels, and assessment*

ISO/TS 17929:2014, *Biomechanical effects on amusement ride passengers*

ISO 23277, *Non-destructive examination of welds — Penetrant testing of welds — Acceptance levels*

ISO 23278, *Non-destructive examination of welds — Magnetic particle testing of welds — Acceptance levels*

ISO 23279, *Non-destructive testing of welds — Ultrasonic testing — Characterization of indications in welds*

IEC 60204-1:2005, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60204-32, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines*

IEC 60364-4-41, *Electrical installations of buildings — Part 4-41: Protection for safety —Protection against electric shock*

IEC 60364-5-54, *Electrical Installation of buildings — Part 5-54: Selection and erection of electrical equipment — Chapter 54: Earthing arrangements, protective conductors and protective bonding conductors*

IEC 60364-7-740, *Electrical Installation of buildings — Part 7-740: Selection and erection of electrical equipment — Chapter 54: Requirements for special installations or locations Temporary electrical installations for structures, amusement devices and booths at fairgrounds, amusement parks and circuses*

IEC 61558-1, *Safety for transformers, power supply units and similar devices*

IEC 61800-5-2, *Adjustable speed electrical power drive systems — Part 5-2: Safety requirements —Functional*

IEC 62061, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems*

IEC 62305 (all parts), *Protection against lightning*

EN 485, *Aluminium and aluminium alloys — Sheet, strip and plate*

EN 755, *Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles*

EN 818 (all parts), *Short link chain for lifting purposes*

EN 1069-1, *Water slides — Part 1: Safety requirements and test methods*

EN 1176 (all parts), *Playground equipment and surfacing*

EN 1261, *Fibre ropes for general service — Hemp*

EN 1677, *Components for slings — Safety*

EN 1991-1-4:2005, *Eurocode 1: Actions on structures — Part 1-4: General actions — Wind actions*

EN 1992-1-1, *Eurocode 2: Design of concrete structures — Part 1-1: General rules and rules for buildings*

EN 1993-1-1, *Eurocode 3: Design of steel structures — Part 1-1: General rules and rules for buildings*

EN 1993-1-8, *Eurocode 3: Design of steel structures — Part 1-8: Design of joints*

EN 1993-1-9:2005, *Eurocode 3: Design of steel structures — Part 1-9: Fatigue*

EN 1995-1-1, *Eurocode 5 — Design of timber structures — Part 1-1: General — Common rules and rules for buildings*

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

EN 10025-1, *Hot rolled products of structural steels — Part 1: General technical delivery conditions*

EN 10025-2, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10025-3, *Hot rolled products of structural steels — Part 3: Technical delivery conditions for normalized/normalized rolled weld able fine grain structural steels*

EN 10160, *Ultrasonic testing of steel flat product of thickness equal or greater than 6 mm (reflection method)*

EN 10164, *Steel products with improved deformation properties perpendicular to the surface of the product — Technical delivery conditions*

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

EN 10210, *Hot finished structural hollow sections of non-alloy and fine grain steels (all parts)*