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English version

**Lifting and Load-bearing Equipment for Stages and other
Production Areas within the Entertainment Industry - Part 2:
Specifications for design, manufacture and for use of aluminium
and steel trusses and towers**

This CEN Workshop Agreement has been drafted and approved by a Workshop of representatives of interested parties, the constitution of which is indicated in the foreword of this Workshop Agreement.

The formal process followed by the Workshop in the development of this Workshop Agreement has been endorsed by the National Members of CEN but neither the National Members of CEN nor the CEN Management Centre can be held accountable for the technical content of this CEN Workshop Agreement or possible conflicts with standards or legislation.

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Foreword

The production of this CWA (CEN Workshop Agreement) specifying "Lifting and Load-bearing Equipment for Stages and other Production Areas within the Entertainment Industry" was formally accepted at the CEN Workshop kick-off meeting on 2006-02-08.

The final review/endorsement round for the CWA was successfully closed on 2008-01-23/24. The final text was submitted to CEN for publication on 2008-10-10.

The CWA is published in two parts:

- Part 1: General requirements (excluding aluminium and steel trusses and towers)
- Part 2: Specifications for design, manufacture and for use of aluminium and steel trusses and towers

This document has been developed through the collaboration of a number of contributing partners representing trade associations, manufacturers, installers, consultants, users, public authorities and technical executives engaged within the entertainment industry. The organizations supporting the CWA are:

ABTT, Akumek, Charcoalblue, CISMA, Delstar, DIN/Dthg, Frontline Rigging, Het Muziek Theater, LITEC, Plasa, Pro-lyte Products the Netherlands B.V., Rhino Rigs, Stage Technologies Ltd, Stitching Argh, Sttf, Theatreadvies, OperaEurope, TÜV Österreich, Vlaamse Opera, VPT (Dutch OISTAT Centre), Waagner-Biro Austria Stage Systems.

This CEN Workshop Agreement is publicly available as a reference document from the National Members of CEN: AENOR, AFNOR, ASRO, BDS, BSI, CSNI, CYS, DIN, DS, ELOT, EVS, IBN, IPQ, IST, LVS, LST, MSA, MSZT, NEN, NSAI, ON, PKN, SEE, SIS, SIST, SFS, SN, SNV, SUTN and UNI.

Comments or suggestions from the users of the CEN Workshop Agreement are welcome and should be addressed to the CEN Management Centre.

There are no European Standards that cover the design, manufacture and use of aluminium or steel trusses as used in the entertainment industry.

It should be noted that other European Standards may be relevant depending on the application and intended use.

In the drafting of this CWA the following assumptions have been made:

- a) execution of its design provisions is entrusted to competent persons;
- b) fabrication is carried out by competent persons;
- c) assembly of the structure is carried out by competent persons;
- d) structure is adequately maintained;
- e) structure is used in accordance with the engineering documentation; and
- f) construction materials and products are used as specified in this standard or in the relevant material or product specifications.

This standard specifies a coordinated set of requirements that can also be a guide to government, other regulatory bodies and municipal authorities responsible for design review, inspection and approval, guarding and inspection of the equipment falling within its scope.

The requirements concerning accident prevention are given both as mandatory and advisory provisions; compliance with both types may be required by employers or their employees.

Safety codes, regulations and standards are intended to enhance public safety. Revisions result from committee consideration of factors such as technology advances, new data, and changing environmental and industry needs. Revisions do not imply that previous editions were not adequate.

A European Standard does not purport to include all the necessary provisions of a contract. Users of European Standards are responsible for their correct application.

Compliance with this Standard does not of itself confer immunity from legal obligations.

1 Scope

This standard covers design, manufacture and use of aluminium and steel trusses, towers and associated structural components such as tower head blocks, sleeve blocks, bases and corner blocks used in the entertainment industry.

Entertainment activities are included but not limited to leisure, sports, arts, cultural performances, amusement or presentation of products.

Examples of entertainment activities are:

- a) Product presentations;
- b) theatre shows, musicals, opera and ballet;
- c) classical, pop and rock concerts;
- d) festivals;
- e) exhibitions and trade shows;
- f) celebrations and parties;
- g) fairgrounds;
- h) conventions, demonstration meetings and
- i) production facilities for film, television or radio.

It also applies to trusses present in buildings for public gathering such as discotheques, exhibition centres and sports arenas (excluding those used in the structure of the building).

Constructions made from trusses („truss systems“) are complex structures, built using special elements such as corners (fixed or flexible), arch elements or a combination of different elements of the same truss or different truss systems.

Trusses and truss constructions are used to support predominantly static loads or to serve purely decorative purposes. They can be hung, ground-supported, permanently installed or used as a moving construction

It covers a variety of uses that are confined to the entertainment industry and applies to a range of structures subjected to normal atmospheric conditions.

It does not cover individual, separate rigging hardware such as half couplers, shackles, wire ropes, etc.

It is not intended that it is be used for structures subjected to severe thermal or chemical conditions.

It is not intended to be used for the design of commercial lifting equipment, materials handling equipment, containment vessels, airborne or floating structures or for any application covered by another standard.

Wherever “truss” is referred to in this CWA, it equally applies to “tower” and vice versa.
“Truss” also applies to associated structural components like corners, bases, heads...

Truss systems and ground support systems or towers with flexible or movable elements, as well as systems for moving loads, can be declared machines by the manufacturer in the sense of the Machinery Directive, 98/37/EC. Such machines must bear a CE mark and have an EC declaration of conformity.
Repeated use and assembly of portable truss systems at the same location or at different locations is not considered to mean that the product is placed on the market again.

2 Normative reference

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 287-1, Qualification test of welders - Fusion welding - Part 1: Steels

EN 473, Non destructive testing - Qualification and certification of NDT personnel - General principles

EN 573 (all parts), Aluminium and aluminium alloys - Chemical composition and form of wrought products

EN 754 (all parts), Aluminium and aluminium alloys - Cold drawn rod/bar and tube

EN 755 (all parts), Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles

EN 10056-1, Structural steel equal and unequal leg angles - Part 1: Dimensions

EN 10067, Hot rolled bulb flats - Dimensions and tolerances on shape, dimensions and mass

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

EN 12062, Non-destructive examination of welds - General rules for metallic materials

EN ISO 3834 (all parts), Quality requirements for fusion welding of metallic materials

EN ISO 5817, Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels for imperfections (ISO 5817:2003)

EN ISO 8493, Metallic materials - Tube - Drift-expanding test (ISO 8493:1998)

EN ISO 8495, Metallic materials - Tube - Ring-expanding test (ISO 8495:1998)

EN ISO 9606-2, Qualification test of welders - Fusion welding - Part 2: Aluminium and aluminium alloys (ISO 9606-2:2004)

EN ISO 15613, Specification and qualification of welding procedures for metallic materials - Qualification based on pre-production welding test (ISO 15613:2004)

EN 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 15614-1:2004)

EN 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 15614-2:2005)

EN ISO 10042, Welding - Arc-welded joints in aluminium and its alloys - Quality levels for imperfections (ISO 10042:2005)