SLOVENSKI STANDARD
SIST-TP CEN/TR 81-12:2015

01-januar-2015

Varnostna pravila za konstruiranje in vgradnjo dvigal (liftov) - Osnove in razlaga - 12. del: Uporaba EN 81-20 in EN 81-50 na posebnih trgih

Safety rules for the construction and installation of lifts - Basics and interpretations - Part 12: Use of EN 81-20 and EN 81-50 in specific markets

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Grundlagen und Auslegungen - Teil 12: Use of EN 81-20 and EN 81-50 in specific markets

Règles de sécurité pour la construction et l'installation des élévateurs - Fondamentaux et interprétations - Partie 12: Utilisation des normes EN 81-20 et EN 81-50 dans les marchés spécifiques

Ta slovenski standard je istoveten z: **CEN/TR 81-12:2014**

ICS:

91.140.90 Dvigala. Tekoče stopnice Lifts. Escalators

SIST-TP CEN/TR 81-12:2015 **en**

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/TR 81-12

October 2014

ICS 91.140.90

English Version

Safety rules for the construction and installation of lifts - Basics and interpretations - Part 12: Use of EN 81-20 and EN 81-50 in specific markets

Règles de sécurité pour la construction et l'installation des élévateurs - Fondamentaux et interprétations - Partie 12: Utilisation des normes EN 81-20 et EN 81-50 dans les marchés spécifiques

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Grundlagen und Auslegungen - Teil 12: Anwendung der EN 81-20 und EN 81-50 in bestimmten Märkten

This Technical Report was approved by CEN on 9 September 2014. It has been drawn up by the Technical Committee CEN/TC 10.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. CEN/TR 81-12:2014 E

Contents

Page

Foreword

This document (CEN/TR 81-12:2014) has been prepared by Technical Committee CEN/TC 10 “Lifts, escalators and moving walks”, the secretariat of which is held by AFNOR.

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.

Introduction

EN 81-20 and EN 81-50 or their technical requirements are widely used not only in Europe [1)] and neighbouring countries but also in many regions and countries around the world. It is recognized that each region or country has its own legislative framework and practices that may influence the implementation of those standards or requirements.

This document has been developed in order to facilitate and encourage continued widespread use of EN 81-20 and EN 81-50 as a whole or their technical requirements. This document also provides guidance for use and implementation of those standards in the countries outside Europe while pointing out main issues in a specific region or a country.

1) For the purpose of this document, Europe is considered as CEN member countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, The Former Yugoslav Republic of Macedonia, Turkey and United Kingdom

1 Scope

This Technical Report gives guidance to users, primarily those outside Europe, in order to enable them to apply EN 81-20 and EN 81-50 so far as is reasonably practical, while recognizing specific socio-economic needs or national legislation in their country.

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 81-20:2014, *Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts*

EN 81-50:2014, *Safety rules for the construction and installation of lifts - Examinations and tests - Part 50: Design rules, calculations, examinations and tests of lift components*

3 Terms and definitions

For the purposes of this document, the terms and definitions found in EN 81-20 and EN 81-50 apply.

4 List of significant hazards

For the purposes of this document, the list of significant hazards found in EN 81-20 and EN 81-50 are applicable.

5 Guidance for the use of EN 81-20 and EN 81-50

5.1 Use of the words “shall”, “should”, “may” and “can”

“shall” is used to express a requirement of a standard. If compliance with the standard is claimed, compliance with all the expressions with “shall” is required.

EXAMPLE 1 “All assignments shall be documented.”

“should” is used to express recommendations.

EXAMPLE 2 “Care should be taken after preparation to prevent contamination. If contamination occurs […]”

“may” in a standard indicates that the standard is giving permission.

EXAMPLE 3 “One connection may have many channels.”

“can” describes a possibility.

EXAMPLE 4 “This product can be subjected to external climatic conditions.”

5.2 Importance of notes and annexes

A “note” within a CEN standard is not a technical requirement but advice given by the committee responsible for producing the standard with the intention of making the point clearer to understand.

“Informative annexes” are also considered as guidance and while they may contain specific measurable values such as dimensions, light and noise levels, these are still only advisory and therefore cannot be demanded to be respected for compliance to the standard.

Where an annex is stated to be “Normative”, its content is part of the relevant requirements stated in the core of the standard. If compliance with the standard is claimed, compliance with the annex is required.

Notes and informative annexes are often connected to either National Regulations with regard to how the standard is adopted or to the negotiations which should be carried out between the lift supplier and the person placing the order for the equipment.

5.3 Importance of assumptions

EN 81-20 is intended for use by technical professionals that have a general knowledge of lift technology. As it is not possible to describe all possible aspects and circumstances of how the standard may be used, the assumptions define the environment and the boundaries for application of the standard.

An assumption defines, up to a certain degree, the foundation of the standard and how assumptions shall be considered when applying the standard. However, they are not requirements of the standard and as such the compliance with those assumptions is not required.

5.4 Negotiations

5.4.1 General

EN 81-20 assumes the party supplying the lift and the party responsible for the end use of the lift take part in negotiations to ensure that the supplied product is fit for purpose and used in the intended manner.

These negotiations would normally include such items as the use of the lift as a passenger or goods/passenger lift, the means of loading, the goods to be carried, etc.

5.4.2 Car use and loading conditions

EN 81-20 gives three basic usage conditions to be reflected when designing the car frame, sill and guides;

- Passenger use = 40 % of the rated load applied to the car door sill;
- Goods/Passenger use = 60 % of the rated load applied to the car door sill;
- Heavy Goods use = 85 % of the rated load applied to the car door sill.

In some countries outside Europe it is more common for the lift owner to specify the intended use according to predetermined loading classifications, e.g. those given in the ASME A17.1/CSA B44 standard.

However in some regions outside Europe these are more commonly known by other descriptions such as:

- Class 1 - Passenger and general goods loading: applies when the load is distributed, the mass of any single piece of goods or any single hand truck and its load is not greater than 25 % of the rated load of the lift and the load is handled on and off the car platform manually or by means of hand trucks;

— Class 2 - Heavy goods loading: applies to heavy goods loading exceeding class 1, power or hand trucks are used for carrying the load in transit or for loading/unloading or for concentrated loads;

However, great care should be taken when using such classifications as they can be specific to the region such as those previously used in Europe for the design of guide rails etc. Examples are as follows:

— Class A – Passenger and general goods loading;

— Class B – Motor vehicle loading;

— Class C – Heavy goods loading.

The purpose of these designations is to ensure the designer and manufacturer are fully aware of the conditions under which the lift will be used and adapt their designs appropriately to ensure a satisfactory robustness and service life.

Therefore regardless of the actual descriptors of these usage conditions is it vital that adequate negotiations take place between the supplier and purchaser to ensure that the delivered product is suitable for its intended use.

5.5 Environmental Considerations

Some countries have specific requirements with regard to machinery space and lift well heating and ventilation due to their climate.

At present the normal operating temperature limits are specified in the assumptions EN 81-20 as +5° C to +40° C (degrees Celsius) as part of normal operational conditions. This is both as a means of equipment protection and as a limit to the working environment for lift personnel (see IEC 60364-5-51, Code AA5). EN 81-50 requires specific environmental conditions to be considered (e.g. exposure to UV and humidity for polyurethane buffers).

Some countries may have higher or lower ambient temperatures, altitude and other environmental considerations which may or may not affect the equipment, or to which the lift personnel have become acclimatised, or parameters which are specified by National Regulation.

Such situations should form part of the negotiations between supplier of the lift and purchaser.

5.6 Rationales for different loading conditions

EN 81-20 refers to several loading conditions:

100 % of the rated load: indicating fully loaded car under normal running conditions

110 % of the rated load: maximum loading before the overload sensor is activated, the lift being kept stationary at the floor level. This is to prevent that lift from moving under the overload conditions.

125 % of the rated loading: maximum overloading that may occur and causing lift movement under overload conditions. Relevant lift components such as machine brakes and safety gear to be capable of stopping the moving lift with specified deceleration rate or keeping the speed of the lift within a specified margin.

For hydraulic and positive drive, safety gear may be tested with 100 % of rated load.

As the design of the lift is based on the worst case scenario, i.e. 125 % overload, there is no need to consider lower overload situations in the calculations. The lift is then subjected to various tests on site at rated speed with loads of up to 125 % in order to verify the design and installation. See EN 81-20:2014, 6.3.

5.7 Good engineering practice

Good engineering practice is essential to ensure the safety of lift equipment. It should take into account all service conditions and failure modes. It should embrace the expectations and considerations to be taken into account for design of a lift component. Below are some relevant factors:

a) for every calculation of a design all probable load cases need to be defined and several assumptions should be made specific to the issue under consideration;

b) these assumptions should be based on commonly understood technical and engineering theory and practice and on the experience of the experts responsible for the design. For example, the dynamic factor in the case of counterweight jump when the empty car is stopped by the safety gear, the frictional forces imparted on the guide brackets in case of safety gear application through guide clips or the support of driving machines on structural steel members according to deflection criteria, etc.;

c) the load spectrum and frequencies of different loads should be defined. From this it should be decided which lead to endurance/fatigue stresses and which are occasionally applied loads which lead to corresponding stresses;

d) tolerances of parts, friction factors and possible variations during assembly need to be considered, e.g. tightening torque of fasteners to be defined;

e) the probability of a combination of worst cases of all influences should be described, considering that the simple combination of all worst assumptions may lead to unnecessarily heavy designs in some cases;

f) material properties and characteristics shall be considered and safety margins selected accordingly;

g) established analysis and design standards and relevant Codes, including textbooks, handbooks and expert publications may be applicable or may give the necessary design input to validate the design. This would include materials, parameters, safety factors etc.;

h) when using calculation methods, whether traditional or finite element analysis, due consideration should be given to the inclusion of the inherent simplifications and error factors as well as any assumptions e.g. working to design criteria which are based on known acceptable stress limits rather than ultimate tensile strength;

i) it is important that suitable material be selected dependent upon the application and loading conditions. Material properties in the final use condition (i.e. after machining, heat treatment grinding etc., and accounting for use and environmental influences such as wear, corrosion) should be considered. In evaluating stress factors it is important to consider size factors, shape factors, changes in section, geometry and size of radii and fillets at section changes, surface finish, material hardness etc.;

j) it is also important to consider material properties such as ultimate tensile strength, yield strength, elongation before rupture, impact strength, fracture toughness, endurance strength etc. as applicable;

k) the applicable failure criteria need to be established, dependent upon the application, for example Tresca maximal shear stress, von Mises yield criteria, Octahedral shear stress, energy of distortion, low cycle fatigue, high cycle fatigue, Euler and Rankine elastic stability criteria etc.;

l) the designer also has the responsibility to determine whether the analyses and calculations are adequate and whether additional endurance and/or breaking tests are required;

m) good engineering practice also entails a subsequent design review by a peer(s) or expert(s) in the appropriate discipline. The peer(s) or expert(s) may be employees of the same organization responsible for the design or external experts as long as they are suitably qualified. Such practice may also be covered by the quality assurance system, e.g. ISO 9000, of the organization responsible for the design.

5.8 Authorized persons, where these persons require certification

EN 81-20 gives definitions for persons interacting with lifts. The following gives additional explanation of those persons' actions and responsibilities:

— User: person making use of the services of the lift installation which includes passengers, persons waiting at the landings and authorized persons;

— Passenger: a person who is transported in the lift car;

— Competent person: a person who has received training and can demonstrate their understanding in a specific task, such as a competent maintenance person required to return the lift back into service following an interruption in the safety circuit, or a person who has been trained to carry out the specific task of conducting passenger release in the event of a lift breakdown;

— Authorized person: a person who has received the permission of the lift owner or duty holder to be present at the lift site in order to carry out a specific task. It is therefore necessary for any authorized person to also be able to demonstrate competence in the task they undertake, e.g. persons carrying out periodic examination of lifts or insurance inspections.

It may be the case in some countries that the authorization of these persons to work on lifts is also subject to agreement/qualification by the national authorities. In this case, there may be specific certification programmes that need to be respected in order to be considered as authorized in addition to the permissions required from the owner/duty holder. Such programmes are considered as being outside the scope of the EN 81 series of standards and subject to national regulations.

NOTE ISO 22559-1 includes the definition for the non-user as: a person in the vicinity of the lift not intending to access or use the lift.

5.9 Passenger capacity

EN 81-20 is based on an average weight of a person being 75 kg, and capacity tables in 5.4.2.1 reflect this value. This is an accepted value in Europe and many other countries.

However, in some regions or counties other values for the average weight of a person with regard to lift usage may apply.

Examples are given in Table 1.

Table 1 — Passenger capacity - Examples

Country	Average weight of a person (kg) used to calculate load capacity
Australia	75
China	75
India	68
Japan	65
Korea	65
South Africa	75
USA	72,5

These alternative values may be used in order to formulate new passenger capacities according to the rated load in kg, with only the load plate displayed in the lift car according to EN 81-20:2014, 5.4.2.3.2 being affected.

This will however affect the traffic design and handling which will be based on the number of persons being moved within a specified time limit.

It is recommended that all car sizes be based on those found in the ISO 4190 series.

5.10 References to EN standards

In order to unify the requirements at an international level, EN 81-20 and EN 81-50 refer to ISO or IEC versions of documents supporting the standard wherever possible. However, there is a need in some areas of design to quote either specific EN standards, which are harmonized to European legislation, or EN standards for which there are no ISO or IEC equivalents.

Some countries that wish to adopt EN 81-20 and EN 81-50 standards may not have implemented these EN standards for various socio-economic reasons and/or national law. In this case, it may be appropriate for them to use their own National standards as substitutes while still maintaining the same level of safety. The case for using such National standards can only be made by the local authority in the appropriate country. The following table lists all other standards referenced in EN 81-20 and EN 81-50 standards and provides information related to possible alternatives.

Table 2 and Table 3 give the list of equivalent ISO/IEC documents to the standards referenced in EN 81-20 and EN 81-50.