European standards for lifts

Technical Conference – Lifts
Esfandiar Gharibaan, CEN/TC10
July 5th, 2016, Porto, Portugal
European Committee for Standardization (CEN)
European Committee for Standardization (CEN)
Current status (2016)

- 33 members
- 17 affiliates
- 3 Partner Standardization Bodies
  - Australia, Kazakhstan, Mongolia
  - Open to all ISO members
- Cooperation agreement with
  - China, Russia, Japan, Korea and Canada
- CEN standards are used in many countries around the world
- Nearly 16,000 publications
CEN/TC 10
Technical Committee for lifts and escalators

- Established in 1971
- CEN/TC 10 priorities
  - Safety
  - Accessibility
  - Environment
  - Contribute to the harmonization technical requirements
- Publications: 40
- Standards under development: 4

- Many of TC 10 standards used outside Europe, e.g.
  - EN 81-1/-2 for lifts
  - EN 115-1 for escalators
CEN/TC 10 work program
CEN/TC 10 work program
EN standards for lifts, main structure

Modular Structure
Basic safety standard, supplanted by standards for specific topics

Accessibility

Basic Safety

Fire safety

External influence

Energy efficiency

Segurança básica

Segurança contra o fogo

Estrutura modular

Influência externa

Eficiência energética
**CEN/TC 10 work program**

Application of EN standards for design and construction of a lift

CEN TC 10 (Lifts, escalators and moving walks)

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**Supporting documents**
- EN 13015
- CEN/TR 81-10
- CEN/TS 81-11
- CEN/TR 81-12
- EN ISO 14798

**Basic safety**
- EN 81-20
- EN 81-50 (EN 81-1)
- (EN 81-2)

**External influence**
- EN 81-71
- EN 81-77
- EN 12015
- EN 12016

**Apply other EN standards based on the intended use or the relevant risks**
- EN 81-21
- EN ISO 25745-1
- EN ISO 25745-2
- EN 81-80
- EN 81-82
- CEN/TS 81-83

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**Documentação de suporte**
- Acessibilidade
- EN 81-28
- EN 81-70
- prEN 81-76

**Segurança contra o fogo**
- Fire safety
- EN 81-58
- EN 81-72
- EN 81-73

**Influência exterior**
- External influence
- EN 81-20
- EN 81-50

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**Segurança básica**
- Edifícios existentes com limitações

**Eficiência energética**
- Energy efficiency
- EN 81-80
- EN 81-82

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**Ascensores existentes**
- Existing lifts
- CEN/TS 81-83
CEN/TC 10 work program
Complete overview

Total of 44 standards, 40 published and 4 under development
**EN 81-20/-50**

Evolution of EN 81-1/-2

- **1978**: First publication of EN 81-1
- **1985**: First revision of EN 81-1
- **1987**: First publication of EN 81-2
- **1988**: Inclusion of Machine Room Less (MRL) lifts
- **1998**: Alignment of EN 81-1/-2 with the EU Lifts Directive
- **2004**: Inclusion of Programmable Electronic System in Safety Related Applications for Lifts (PESSRAL)
- **2005**: Inclusion of the Unintended Car Movement (UCM) Protection
- **2009**: Full review and revision Published as EN 81-20/-50
- **2014**: New and improved safety requirements
EN 81-20/-50

Background

• Result of revision of EN 81-1 and EN 81-2

• **EN 81-20**: Requirements for complete passenger or goods passenger lift installations independent of the driving system

• **EN 81-50**: Description of the examinations, calculations and tests of lift components used in any type of lift (passenger, goods passenger, goods only lift, etc.)

• Introduces many changes and improvements (>700 items)
EN 81-20/-50

Examples of safety improvement for passengers

- **Requirements for strength of landing and car doors**
  - Addition of door retainers
  - To withstand an impact force of 1000N at any point
  - To be tested with a soft pendulum shock device

- **Preventing car doors striking the passengers when entering or leaving the lift car**
  - Non-contact detection device to open the door before striking the passenger

- **Requisitos para a resistencia de portas**
  - Adição de elementos de retenção
  - Preparadas para 1000N em qualquer ponto
  - Submetidas a teste de pendulo (todas)

- **Prevenção contra entalamento**
  - Dispositivo de detecao sem contacto fisico (barreira)
EN 81-20/-50
Examples of safety improvement for passengers

- **Requirements for strength of car walls**
  - **Withstand 1000N, without permanent deformation**
  - Requisitos para a resistencia de painéis de cabina
    - 1000N sem deformação permanente

- **Level for car lighting**
  - **100 lux (instead of 50 lux)**
  - Nível de iluminação da cabina : 100 lux (em vez de 50 lux)

- **Prevision against possible fall into the lift well due to self-rescue**
  - **Adding car door opening restrictor**
  - **Not to be able to open the car door from inside the car when the car is outside the unlocking zone**
  - Proteção à queda na caixa (auto resgate)
    - Restrição à abertura de porta (adicionado)
    - C/ cabina fora da zona de desencravamento a porta de cabina não abre.
EN 81-20/-50
Examples of safety improvement for passengers

- **Requirements for over-connecting the car or landing door contacts during the maintenance operation**
  - Audible signal on the car during the operation
  - Lift may put into normal service only when the over-connecting is disabled

- **Requirements for rescue of trapped persons**
  - Rescue crew to be able to move the car in all conditions

- Requisitos para “shuntar” os contactos da porta de piso ou cabina, em manutenção
  - Sinal audível durante a operação
  - O ascensor só reentra em normal uma vez removido o “Shunt”

- Requisitos para resgate de pessoas encarceradas
  - Equipamento de resgate capaz de mover a cabina em todas as condições
Examples of safety improvement for workers

• Requirements for refuge spaces on the car roof and in the pit
  • Larger safety refuge volumes
  • Safety refuge volume per person present on the car roof and in the pit
  • Emergency light on the car roof

• Requisitos para espaços de refúgio no tecto da cabina e no poço
  • Maiores volumes de refugio (1 por cada pessoa no teto ou poço)
  • Iluminação de emergência no tecto da cabina

• Requirements for balustrades on the car roof
  • For balustrade of 1100 mm, distance between the lift and the well reduced from 850mm to 500mm
  • Strength of the balustrade is defined

• Balaustreadas
  • 1100 mm (＞500mm em vez de 850 mm)
  • Definida a resistência da balaustrada
EN 81-20/-50
Examples of safety improvement for workers

• Requirements to prevent risk of trapping on the car roof and in the pit
  • To open the landing door from the pit
  • To leave the car roof when the car is blocked for maintenance

• Specific requirements for the size and location of landing door unlocking device
  • No need to stand on the toes or stool to open the landing door

• Requisitos para prevenção do risco de encarceramento no teto da cabina ou poço
  • Abertura da porta de piso a partir do poço
  • Poder sair do teto da cabina se esta está bloqueada para manutenção

• Requisitos específicos para o tipo e localização do dispositivo de desencravamento da porta de piso
  • Não é necessário colocar-se em bicos de pés ou de um banco para abrir a porta de piso
• Requirements for access to pit and machine rooms, e.g. ladders
  • Dimensions, strength and location have been defined

• Requisitos para acesso ao poço e casa de máquinas (p.e. escadas)
  • As dimensões, resistência e localização foram definidas

• Control station in the pit to avoid using ladders and stools to reach car components
  • Moving the car under the control of the person in the pit
  • Reset the lift from outside the well

• Estação de controlo no poço (evitar o uso de escadas para chegara a componentes na cabina)
  • Mover a cabina sob controlo da pessoa no poço
  • Reset do ascensor no exterior da caixa
Examples of safety improvement for workers

- **Accurate definitions for lighting in the well**
  - *Addition of the emergency lighting (5Lux)*

- **Protection against electrical shock**
  - *Additional 30mA RCD for socket outlets, control circuits for landing controls and indicators (voltage > 50 V AC) and circuits on the lift car (voltage > 50 V AC)*

- **Melhor definição da iluminação da caixa**
  - Adicionada a iluminação de emergência no tecto da cabina (5 lux)

- **Proteção contra choques eléctricos**
  - Proteção diferencial adicional de 30 mA para tomadas, circuitos de controlo de piso e indicadores de posição (V>50 V AC) e circuitos na cabina (V>50 V AC)
EN 81-20/-50
Examples of changes to the building interfaces

• Well Ventilation
  • *It is the responsibility of the building designer, based on the information provided by the lift designer*

• Ventilação da caixa
  • Responsabilidade do projetista/construtor com informação fornecida pelo instalador

• Accessible space under the pit
  • *Safety gear in the counterweight must be provided*

• Acesso sob o poço
  • Pára-quedas no contrapeso (não pilar)
**Examples of changes to the building interfaces**

- **Well design**
  - *It is no longer allowed to use ladders to access pits with depth >2500mm*
  - *If glass is used, it must be laminated glass*
  - *Ledges with depth ≥0.15m to be chamfered of protected from person standing*
**Date of publication:** 6th August 2014
- Made available by CEN on 6th Aug. 2014
- EN 81-1/-2 remain harmonised until their date of withdrawal (DOW)

**Date of withdrawal:** 31st August 2017
- EN 81-1/-2 will no longer be harmonised
- Only EN 81-20/-50 will remain harmonised
## CEN/TC 10 work program
Alignment of other standards to EN 81-20/-50

### Normas revistas ou em revisão

**Standards revised or under revision**

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<tr>
<th>Nr.</th>
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<tr>
<td>1</td>
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<tr>
<td>2</td>
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<td>TS 81-11</td>
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### Data comum de retirada (DOW) : 31 Agosto 2018

*With a common Date of Withdrawal (DOW) as 31st August 2018*

- Already published with DOW as 31st August 2017
  - **Already published with DOW as 31st August 2018**
  - Já publicada : DOW 31 Agosto 2017
  - Já publicada : DOW 31 Agosto 2018
Additional Information
Detailed overview of CEN/TC 10 work program
<table>
<thead>
<tr>
<th>Reference</th>
<th>Full Title</th>
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<tr>
<td>EN 81-1:1998</td>
<td>Safety rules for the construction and installation of lifts - Part 1: Electric lifts</td>
<td>To be withdrawn</td>
<td>2014/33/EU (Lifts)</td>
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<td>Safety rules for the construction and installation of lifts - Part 2: Hydraulic lifts</td>
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<td>CEN/TR 81-12:2014</td>
<td>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</td>
<td>Published</td>
<td>Not Applicable</td>
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<tr>
<td>EN 81-20:2014</td>
<td>Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts</td>
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<td>2014/33/EU (Lifts)</td>
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<td>EN 81-31:2010</td>
<td>Safety rules for the construction and installation of lifts - Lifts for the transport of goods only - Part 31: Accessible goods only lifts</td>
<td>Under Revision</td>
<td>2006/42/EC (Machinery)</td>
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<tr>
<td>EN 81-41:2010</td>
<td>Safety rules for the construction and installation of lifts - Special lifts for the transport of persons and goods - Part 41: Vertical lifting platforms intended for use by persons with impaired mobility</td>
<td>Under Revision</td>
<td>2006/42/EC (Machinery)</td>
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<tr>
<td>EN 81-42</td>
<td>Vertical Lifting Appliance with enclosed carrier intended for use by persons, including persons with disability</td>
<td>Under Development</td>
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<td>EN 81-43:2009</td>
<td>Safety rules for the construction and installation of lifts - Special lifts for the transport of persons and goods - Part 43: Lifts for cranes</td>
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<td>EN 81-44</td>
<td>Lifts in wind turbines</td>
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<td>EN 81-50:2014</td>
<td>Safety rules for the construction and installation of lifts - Evaluations - Part 50: Examinations, calculations and tests of lift components</td>
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<td>2014/33/EU (Lifts)</td>
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<td>EN 81-58:2003</td>
<td>Safety rules for the construction and installation of lifts - Examination and tests - Part 58: Landing doors fire resistance test</td>
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<td>EN 81-70:2003 +A1:2003</td>
<td>Safety rules for the construction and installations of lifts - Particular applications for passenger and good passengers lifts - Part 70: Accessibility to lifts for persons including persons with disability</td>
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<td>EN 81-72:2015</td>
<td>Safety rules for the construction and installation of lifts - Particular applications for passenger and goods passenger lifts - Part 72: Firefighters lifts</td>
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### CEN/TC 10 work program
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<td>EN 81-73:2016</td>
<td>Safety rules for the construction and installation of lifts - Particular applications for passenger and goods passenger lifts - Part 73: Behaviour of lifts in the event of fire</td>
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<td>CEN TS 81-76:2011</td>
<td>Safety rules for the construction and installation of lifts - Particular applications for passengers and goods passenger lifts - Part 76: Evacuation of disabled persons using lifts</td>
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<td>EN 81-77:2013</td>
<td>Safety rules for the construction and installation of lifts - Particular applications for passenger and good passengers lifts - Part 77: Lifts subject to seismic conditions</td>
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<td>EN 81-80:2003</td>
<td>Safety rules for the construction and installation of lifts - Existing lifts - Part 80: Rules for the improvement of safety of existing passenger and goods passenger lifts</td>
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<td>EN 81-82:2013</td>
<td>Safety rules for the construction and installation of lifts - Existing lifts - Part 82: Improvement of the accessibility of existing lifts for persons including persons with disability</td>
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<td>CEN TS 81-83:2009</td>
<td>Safety rules for the construction and installation of lifts - Existing lifts - Part 83: Rules for the improvement of the resistance against vandalism</td>
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<td>EN 12159:2000</td>
<td>Builders hoists for persons and materials with vertically guided cages</td>
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<td>EN 16719</td>
<td>Transport platforms</td>
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<td>EN 13015:2001</td>
<td>Maintenance for lifts and escalators - Rules for maintenance instructions</td>
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<td>2006/42/EC (Machinery)</td>
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<td>EN ISO 14798:2013</td>
<td>Lifts (elevators), escalators and moving walks - Risk assessment and reduction methodology</td>
<td>Published</td>
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<td>EN ISO 25745-1:2012</td>
<td>Energy performance of lifts, escalators and moving walks - Part 1: Energy measurement and conformance</td>
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<td>Specification for data logging and monitoring of lifts, escalators and passenger conveyors</td>
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<td>Safety of escalators and moving walks - Part 1: Construction and installation</td>
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<td>Safety of escalators and moving walks - Part 2: Rules for the improvement of safety of existing escalators and moving walks</td>
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<td>CEN/TS 115-4:2015</td>
<td>Safety of escalators and moving walks - Part 4: Interpretations related to EN 115 family of standards</td>
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<td>EN 1570-2</td>
<td>Safety requirements for lifting tables – lifting tables serving more than 2 fixed landings of a building, for lifting goods with vertical travel speed not exceeding 0,15 m/s – Part 2: Complementary elements</td>
<td>Under Development</td>
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<td>EN 12385-3:2008</td>
<td>Steel wire ropes - Safety - Part 3: Information for use and maintenance</td>
<td>Published</td>
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<tr>
<td>EN 12385-5:2002</td>
<td>Steel wire ropes - Safety - Part 5: Stranded ropes for lifts</td>
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<td>EN 13411-7:2008</td>
<td>Terminations for steel wire ropes - Safety – Part 7: Symmetric wedge socket</td>
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