BS EN 12016:2013

BSI Standards Publication

Electromagnetic compatibility — Product family standard for lifts, escalators and moving walks — Immunity

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 12016:2013. It supersedes BS EN 12016:2004+A1:2008 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MHE/4, Lifts, hoists and escalators Lifts, hoists and escalators.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 76684 8

ICS 33.100.20; 91.140.90

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2013.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12016

August 2013

ICS 33.100.20; 91.140.90

Supersedes EN 12016:2004+A1:2008

English Version

Electromagnetic compatibility - Product family standard for lifts, escalators and moving walks - Immunity

Compatibilité électromagnétique - Norme de la famille de produits ascenseurs, escaliers mécaniques et trottoirs roulants - Immunité

Elektromagnetische Verträglichkeit - Produktfamilien-Norm für Aufzüge, Fahrtreppen und Fahrsteige - Störfestigkeit

This European Standard was approved by CEN on 22 June 2013.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 12016:2013: E

Contents

Page

Foreword

This document (EN 12016:2013) has been prepared by Technical Committee CEN/TC 10 “Lifts, escalators and moving walks”, the secretariat of which is held by AFNOR.

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 February 2014, and conflicting national standards shall be withdrawn at the latest by February 2014.

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.

This document supersedes EN 12016:2004+A1:2008.

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 Annexes ZA, ZB and ZC, which are an integral part of this document.

The test levels and the performance criteria which are given in this European Standard reflect the fact that lifts, escalators and moving walks when in use, consist generally of self-contained apparatus (e.g. machine room, car, etc.).

The related EMC product family standard for emission is:

— EN 12015, *Electromagnetic compatibility — Product family standard for lifts, escalators and moving walks — Emission*

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, 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 the United Kingdom.

Introduction

This European Standard is a Type C standard as stated in EN ISO 12100.

This European Standard has been prepared to provide one means of conforming to the requirements of the Electromagnetic Compatibility (EMC) Directive, the Lifts Directive and the Machinery Directive. The requirements of this European Standard have been specified so as to ensure an adequate level of electromagnetic immunity for most cases.

The apparatus concerned and the extent to which hazardous situations and events are covered are indicated in the scope of this document.

Where the 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 apparatus that have been designed and built according to the provisions of this type C standard.

Test levels and immunity performance criteria are defined for:

— apparatus which are safety components or are used in conjunction with safety components, (safety circuits);

— apparatus used in general function circuits.

The test levels and requirements are given on the basis that the apparatus, generally, is connected to a low voltage system.

The requirements for safety circuits provide one means of demonstrating conformity with the essential health and safety requirements of the Lifts Directive and the Machinery Directive with regard to immunity against electromagnetic phenomena.

Due to the size of an installed lift, it becomes impracticable to test the total assembly either in a test laboratory or *in situ* where the uncontrolled environment may also influence the test procedures and results. This applies also to measurements within the car. Similar considerations regarding dimensions apply equally to the testing of escalators and moving walks.

Rational to the revision of the standard EN 12016:1998

a) Important changes

The Scope excludes severe electromagnetic environments and apparatus already proven to be in conformity with the Electromagnetic Compatibility Directive.

The term “installation” has been changed to “system”. This is due to the fact that official interpretation defines that fixed installations are not covered by the conformity assessment procedures for CE marking and declaration of conformity according to the EMC Directive. The scope of the standard is applicable to the apparatus and assembly of apparatus of lifts and escalators and assembly into systems.

New requirements on radio frequency electromagnetic field above 500 MHz, these are extended to cover the digital mobile telephone services up to 1960 MHz.

New requirements for surge testing on safety circuits.

New requirements on radio frequency electromagnetic field regarding safety devices as defined by the Lifts Directive and mobile telephones or radio-transmitters as a result of a risk assessment. It is assumed that

mobile telephones and radio-transmitters are not used at frequencies up to 166 MHz near safety circuits of equipment covered by the scope of this standard.

Higher requirements on several environmental phenomena considering the progress on EMC technology and the results of the risk assessment.

New requirements have been introduced for immunity to mains power supply voltage interruptions and voltage dips.

b) Environmental issues

Lifts, escalators and moving walks are systems whose component apparatus/assembly of apparatus are distributed (and some of which move) throughout the building. The definition in EMC terms of the use of the building (residential or industrial) cannot be predetermined or assumed to be fixed. Therefore, to cover requirements in all cases, no differentiation between environments has been made and a single set of limits has been maintained.

Severe electromagnetic environments have not been considered. Examples of these are: radio-transmitter stations, railways and metros, heavy industrial plant, electricity power stations. Additional tests and immunity measures may need to be taken on apparatus to be used in these environments.

It is assumed that no ports connected to safety circuit only are rated at currents greater than 100 A.

Rational to the revision of the standard EN 12016:2004+A1:2008

New requirements on radio frequency electromagnetic field to cover the digital mobile telephone services and wireless communication systems up to 2 655 MHz.

Performance criteria requirements for radio equipment and telecommunications terminal equipment as defined by Directive 1999/5/EC used in combined apparatus/assembly of apparatus.

1 Scope

1.1 This European Standard specifies the immunity performance criteria and test levels for apparatus used in lifts, escalators and moving walks which are intended to be permanently installed in buildings including the basic safety requirements in regard to their electromagnetic environment. These levels represent essential EMC requirements.

The standard refers to EM conditions as existing in residential, office and industrial buildings.

This standard addresses commonly known EMC related hazards and hazardous situations relevant to lifts, escalators and moving walks when they are used as intended and under the conditions foreseen by the lift installer or escalator and/or moving walk manufacturer.

However:

— performance criteria and test levels for apparatus/assembly of apparatus used in general function circuits do not cover situations with an extremely low probability of occurrence;

— this standard does not apply to other apparatus already proven to be in conformity to the EMC Directive, and not related to the safety of the lift, escalator or moving walk, such as lighting apparatus, communication apparatus, etc.

1.2 This European Standard does not apply to electromagnetic environments such as:

— radio-transmitter stations,

— railways and metros,

— heavy industrial plant,

— electricity power station,

which need additional investigations.

1.3 This standard is not applicable to apparatus which were manufactured before the date of its publication as EN 12016.

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 55022:2010, *Information technology equipment — Radio disturbance characteristics — Limits and methods of measurement (CISPR 22:2008, modified)*

EN 55024:2010, *Information technology equipment — Immunity characteristics — Limits and methods of measurement (CISPR 24:2010+corrigendum Jun. 2011)*

EN 61000-4-2:2009, *Electromagnetic Compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test (IEC 61000-4-2:2008)*

EN 61000-4-3:2006, *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2006)*[1)]

EN 61000-4-4:2012, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test (IEC 61000-4-4:2012)*

EN 61000-4-5:2006, *Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test (IEC 61000-4-5:2005)*

EN 61000-4-6:2009, *Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques — Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:2008)*

EN 61000-4-11:2004, *Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:2004)*

EN 61000-6-1:2007, *Electromagnetic compatibility (EMC) — Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1:2005)*

EN 61000-6-2:2005, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2:2005)*

IEC 60050-161:1990, *International Electrotechnical Vocabulary — Chapter 161: Electromagnetic compatibility*[2)]

3 Terms and definitions

For the purpose of this document, the terms and definitions given in EN 61000-6-1:2007, EN 61000-6-2:2005, IEC 60050-161:1990 and the following apply.

3.1
assembly of apparatus
arrangement of interconnected apparatus, which can be tested together

Note 1 to entry: See Figure 1 and Figure 2 as examples.

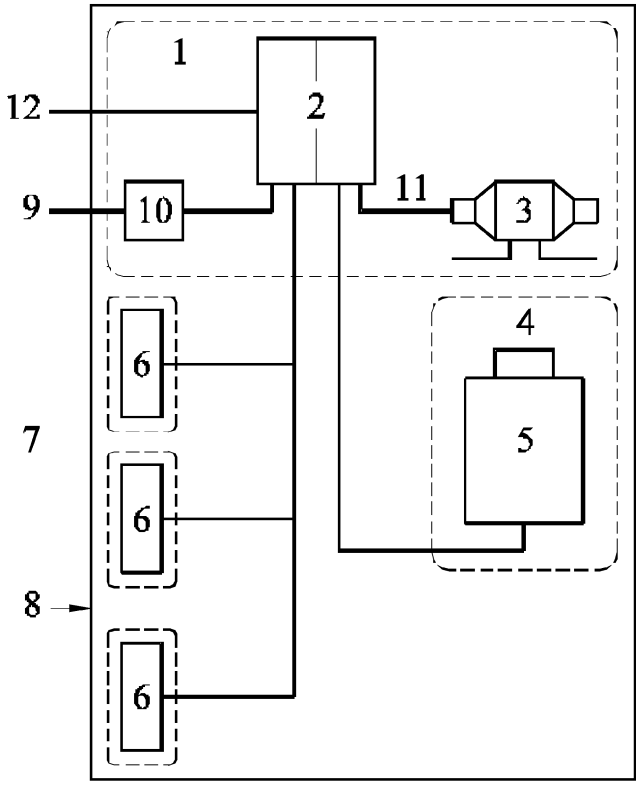
3.2
apparatus
assembly of components with an intrinsic function as defined by its manufacturer

Note 1 to entry: See Figure 1 and Figure 2 as examples.

Note 2 to entry: Safety components listed by Annex IV of the Lifts Directive are considered as apparatus.

1) This document is currently impacted by EN 61000-4-3:2006/A2:2010.

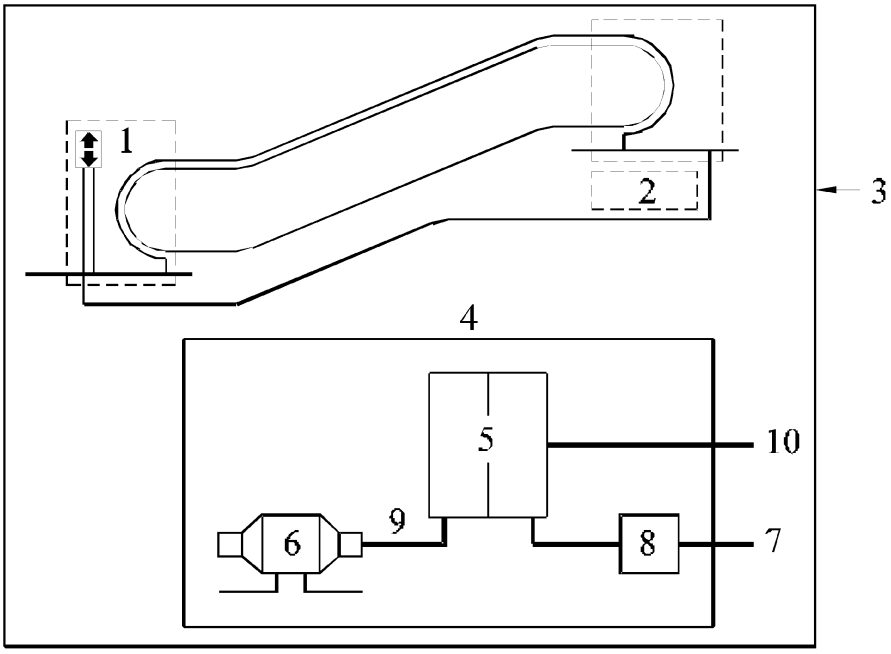
2) This document is currently impacted by IEC 60050-161:1990/A1:1997 and IEC 60050-161:1990/A2:1998.



Key

	assembly of apparatus		
1	machinery space	7	landings
2	main control / control cabinet	8	system boundary
3	machine	9	AC – and/or DC power ports
4	door control	10	main switch
5	lift car	11	output power port
6	apparatus installed at the landing (e.g. push buttons, indicators)	12	ports for monitoring and remote alarm systems

Figure 1 — EMC example (immunity) for lift systems



Key

	assembly of apparatus		
1	control panels	6	machine
2	machinery space (see 4 to 10)	7	AC – and/or DC power ports
3	system boundary	8	main switch
4	machinery space	9	output power port
5	main control/control cabinet	10	ports for monitoring

NOTE The machinery space can also be an external room.

Figure 2 — EMC example (immunity) for escalator and moving walk systems

3.3
enclosure port
physical boundary of apparatus/assembly of apparatus through which electromagnetic fields may radiate or impinge

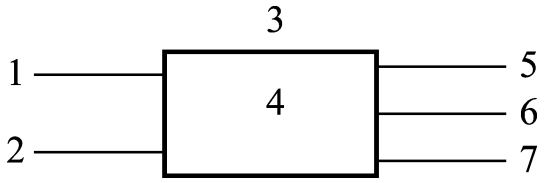
Note 1 to entry: See Figure 3 as an example.

3.4
general function circuit
circuitry used in apparatus which does not incorporate safety circuits

Note 1 to entry: See Figure 1 to Figure 3.

3.5
port
particular interface of specified apparatus/assembly of apparatus with the external electromagnetic environment

Note 1 to entry: See Figure 3 as an example.



Key

1 AC power port

2 DC power port

3 enclosure port

4 apparatus/assembly of apparatus

5 ground port

6 signal/control port

7 machine/motor port

Figure 3 — Examples of ports

3.6
safety circuit
circuit containing electronic components forming an electric safety device as defined in EN 81-1, EN 81-2

Note 1 to entry: Safety components listed by Annex IV of the Lifts Directive are considered to be safety circuits.

3.7
system
lift escalator or moving walk comprising assembly of apparatus with electrical and electronic equipment and interconnections

Note 1 to entry: See Figure 1 and Figure 2 as examples.

4 Test procedure

4.1 The tests shall be carried out as stated in EN 61000-4-2:2009, EN 61000-4-3:2006, EN 61000-4-4:2012, EN 61000-4-5:2006, EN 61000-4-6:2009, EN 61000-4-11:2004, as appropriate (see Table 1 to Table 7).

An attempt shall be made to maximise the susceptibility by varying the position of the test sample in the test facility.

4.2 Travelling cables or any other cables likely to be more than 5 m long shall be represented by a sample of at least 5 m long connected to the relevant port for the purpose of testing for susceptibility.

4.3 It is not always possible to measure the immunity levels for every function of the apparatus/assembly of apparatus. In such cases the most critical period of operation shall be selected.

4.4 The test shall be carried out at a single set of environmental conditions within the specified operating range of temperature, humidity, air pressure and supply voltage, unless otherwise indicated in the standards referred to in 4.1.

4.5 Tests shall be carried out in well-defined and reproducible conditions for each test.

4.6 To facilitate testing, assemblies of apparatus can be tested together. However where apparatus contain safety circuits, the tests shall prove that the safety circuits comply with the immunity requirements for all circuits and specific requirements for safety circuits.

This does not imply that those parts of the whole assembly, which are general function circuits, have to comply with the safety circuit requirements.

4.7 Tests shall be carried out at the following ports of the apparatus or assembly of apparatus where they exist:

— enclosure port (see Table 1);

— ports for signal and control lines not crossing system boundaries (see Table 2);

— ports for monitoring and remote alarm systems crossing the system boundaries (see Table 3);

— input and output DC power ports with current rating ≤ 100 A (see Table 4);

— input and output DC power ports with current rating > 100 A (see Table 5);

— input and output A.C. power ports with current rating at ≤ 100 A per phase (see Table 6);

— input and output A.C. power ports with current rating > 100 A per phase (see Table 7).

4.8 The configuration and mode of operation during measurement shall be recorded.

4.9 Test values shall be applied as specified in Table 1 to Table 7, and the performance criteria in 6.2 shall be met as appropriate. The tests shall be carried out individually as single tests and in sequence.

EN 55024:2010 shall be applied to telecommunication ports as defined in EN 55022:2010.

5 Applicability of tests

5.1 The application of tests for evaluation of immunity depends on the type of apparatus/assembly of apparatus, its configuration, ports, technology and operating conditions.

5.2 It might be determined from consideration of the electrical characteristics and usage of a particular apparatus/assembly of apparatus that some of the tests are inappropriate and therefore unnecessary. In such a case, the decision and justification not to test shall be recorded.

5.3 Where deviations from the test methods specified in 4.1 are applied, such deviations shall be justified and recorded.

6 Evaluation of tests results

6.1 Introduction

The special requirements of the product family make it necessary to define precise criteria for the evaluation of the immunity test results.

The basic safety requirements of the system (lift, escalator or moving walk) are specified in EN 81-1, EN 81-2 and EN 115-1. For this reason, a performance criterion derived from the immunity levels of EN 61000-6-1:2007 is deemed sufficient for most functions. However, for safety circuits, where any malfunction that may produce an unsafe operating mode cannot be tolerated, higher immunity levels derived from EN 61000-6-2:2005 are stipulated.

If radio equipment is used in combined apparatus/assembly of apparatus, uncontrolled operation of a transmitter during testing is not allowed.

6.2 Performance criteria

A functional description of the apparatus or assembly of apparatus and a definition of performance criteria, during or as a consequence of testing shall be recorded.

The definition of performance criteria shall be based on:

Performance criterion A: The apparatus/assembly of apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by its manufacturer, when the apparatus or assembly of apparatus is used as intended. In some cases, the performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus or assembly of apparatus if used as intended.

Performance criterion B: The apparatus/assembly of apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by its manufacturer, when the apparatus or assembly of apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus or assembly of apparatus if used as intended.

Performance criterion C: Temporary loss of function is permitted, provided the function is self-recoverable or can be restored by the operation of the controls.

Performance criterion D: The apparatus/assembly of apparatus and the associated safety component(s) shall continue to operate as intended. No degradation of performance or loss of function is allowed other than a failure into a safe mode.

6.3 Enclosure ports of safety circuits

Where a risk assessment demonstrates that the location of a safety circuit may allow a mobile telephone or emergency services radio-transmitter to be placed directly beside or on the device, then the enclosure port of the device shall be implemented so that the performance criterion D is satisfied in these conditions.

7 Documentation for the installer of the apparatus/assembly of apparatus

The installer shall be provided with documentary information and instructions for installation and use so that compliance with this standard is maintained.

This shall include where applicable:

— instructions for assembly and physical arrangement with other apparatus;

— instructions and precautions for interconnection to other apparatus;

— specifications of interconnection cables and devices;

— instructions for commissioning and testing;

— guidance on avoiding incorrect actions and assembly of apparatus which are known to cause non-compliance with this standard.

Table 1 — Immunity - Enclosure port

Environmental phenomena	Test set-up	Units	Test values		Performance criteria	
			All circuits[a]	Safety circuits[b]	All circuits[a]	Safety circuits[b]
Electrostatic discharge[e]	EN 61000-4-2:2009	kV (charge voltage)	4 Contact 8 Air discharge	6 Contact 15 Air discharge	B	D
Radio frequency electromagnetic field[c]	EN 61000-4-3:2006	MHz V/m (rms, unmodulated) % AM (1 kHz)	80 to 166 10 80	80 to 166 10[d] 80	A[f]	D
Radio frequency electromagnetic field[c]	EN 61000-4-3:2006	MHz V/m (rms, unmodulated) % AM (1 kHz)	166 to 1 000 10 80	166 to 1 000 30[d] 80	A[f]	D
Radio frequency electromagnetic field[c]	EN 61000-4-3:2006	MHz V/m (rms, unmodulated) % AM (1 kHz)	1 429 to 1 516 10 80	1 429 to 1 516 30[d] 80	A[f]	D
Radio frequency electromagnetic field[c]	EN 61000-4-3:2006	MHz V/m (rms, unmodulated) % AM (1 kHz)	1 710 to 1 785 10 80	1 710 to 1 785 30[d] 80	A[f]	D
Radio frequency electromagnetic field[c]	EN 61000-4-3:2006	MHz V/m (rms, unmodulated) % AM (1 kHz)	1 840 to 2 170 3 80	1 840 to 2 170 10[d] 80	A[f]	D
Radio frequency electromagnetic field[c]	EN 61000-4-3:2006	MHz V/m (rms, unmodulated) % AM (1 kHz)	2 300 to 2 655 3 80	2 300 to 2 655 10[d] 80	A[f]	D

[a] Test values for ports containing general function and/or safety circuits.

[b] Test values for ports containing safety circuits.

[c] For the relationship between test levels, protection distances and radiated powers of mobile telephones, EN 61000–4-3:2006.

[d] Field strength may be limited by distance on site, e.g. 200 mm for mobile phones. Therefore, if no RF shielding barrier is used then a physical barrier shall maintain a distance of 200 mm between the safety circuit and potential sources of perturbation.

[e] If safety circuits are not in a grounded metal box, at least 8 mm of distance between box and circuitry shall be applied to avoid on site damage or other type of insulation shall be used.

[f] If radio equipment as defined by Directive 1999/5/EC is used in apparatus/assembly of apparatus, the exclusion band defined by the harmonised standards applies for that specific radio equipment.

Table 2 — Immunity - Ports for signal and control lines not crossing installation boundary

Environmental phenomena	Test set-up	Units	Test values		Performance criteria	
			All circuits[a]	Safety circuits[b]	All circuits[a]	Safety circuits[b]
Fast transients common mode	EN 61000-4-4:2012	kV (peak) T_r/T_h (ns) Rep. Frequency (kHz)	0,5 5/50 5	2,0 5/50 5	B	D
Surge - Line to ground - Line to line	EN 61000-4-5:2006	T_r/T_h (µs) kV (peak) kV (peak)	Not relevant[f]	1,2/50 +/- 2,0 +/- 1,0	Not relevant[f]	D
Radio frequency common mode	EN 61000-4-6:2009	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 to 80 3 80[c, d]	0,15 to 80 10 80[d]	A[e]	D

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse, shape of the pulse is defined in the relevant test setup standard.

[a] Test values for ports containing general function and/or safety circuits.

[b] Test values for ports containing safety circuits.

[c] Applicable only to ports interfacing with cables whose total length according to the manufacturers functional specification may exceed 3 m.

[d] The test level can also be defined as the equivalent current into a 150 Ω load.

[e] If radio equipment as defined by Directive 1999/5/EC is used in apparatus/assembly of apparatus, the exclusion band defined by the harmonised standards applies for that specific radio equipment.

[f] Not required by EN 61000–6-1:2007 for signal ports.

Table 3 — Immunity - Ports for monitoring and remote alarm systems crossing the system boundaries; not applicable to input ports intended for connection to dedicated non-rechargeable power supplies

Environmental phenomena	Test set-up	Units	Test values		Performance criteria	
			All circuits[a]	Safety circuits[b]	All circuits[a]	Safety circuits[b]
Fast transients common mode	EN 61000-4-4:2012	kV (peak) T_r/T_h (ns) Rep. Frequency (kHz)	+/- 1,0 5/50 5[c]	2,0 5/50 5	B	D
Surge - Line to ground - Line to line	EN 61000-4-5:2006	T_r/T_h (µs) kV (peak) kV (peak)	1,2/50 +/- 1,0 +/- 0,5	1,2/50 +/- 2,0 +/- 1,0	B	D
Radio frequency common mode	EN 61000-4-6:2009	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 to 80 3 80[c, d]	0,15 to 80 10 80[d]	A[e]	D

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse, shape of the pulse is defined in the relevant test setup standard.

[a] Test values for ports containing general function and/or safety circuits.

[b] Test values for ports containing safety circuits.

[c] Applicable only to ports interfacing with cables whose total length according to the manufacturers functional specification may exceed 3 m.

[d] The test level can also be defined as the equivalent current into a 150 Ω load.

[e] If radio equipment as defined by Directive 1999/5/EC is used in apparatus/assembly of apparatus, the exclusion band defined by the harmonised standards applies for that specific radio equipment.

Table 4 — Immunity - Input and output DC power ports with current rating ≤ 100 A; not applicable to input ports intended for connection to dedicated non-rechargeable power supplies

Environmental phenomena	Test set-up	Units	Test values		Performance criteria	
			All circuits[a]	Safety circuits[b]	All circuits[a]	Safety circuits[b]
Fast transients common mode	EN 61000-4-4:2012	kV (peak) T_r/T_h (ns) Rep. Frequency (kHz)	0,5 5/50 5[d]	4,0 5/50 2,5	B	D
Surge - Line to ground - Line to line	EN 61000-4-5:2006	T_r/T_h (µs) kV (peak) kV (peak)	1,2/50 +/- 0,5 +/- 0,5[d]	1,2/50 +/- 2,5 +/- 1,0	B	D
Radio frequency common mode	EN 61000-4-6:2009	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 to 80 3 80[c]	0,15 to 80 10 80[c]	A[e]	D

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse, shape of the pulse is defined in the relevant test setup standard.

[a] Test values for ports containing general function and/or safety circuits.

[b] Test values for ports containing safety circuits.

[c] The test level can also be defined as the equivalent current into a 150 Ω load.

[d] Applicable only to input ports crossing the system boundary.

[e] If radio equipment as defined by Directive 1999/5/EC is used in apparatus/assembly of apparatus, the exclusion band defined by the harmonised standards applies for that specific radio equipment.

Table 5 — Immunity - Input and output DC power ports with current rating > 100 A; not applicable to input ports intended for connection to dedicated non-rechargeable power supplies

Environmental phenomena	Test set-up	Units	Test values		Performance criteria	
			All circuits[a]	Safety circuits[b]	All circuits[a]	Safety circuits[b]
Fast transients common mode	EN 61000-4-4:2012	kV (peak) T_r/T_h (ns) Rep. Frequency (kHz)	1,0 5/50 5[d]	Not relevant[f]	B	Not relevant[f]
Surge - Line to ground - Line to line	EN 61000-4-5:2006	T_r/T_h (µs) kV (peak) kV (peak)	1,2/50 +/- 1,0 +/- 0,5[d]	Not relevant[f]	B	Not relevant[f]
Radio frequency common mode	EN 61000-4-6:2009	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 to 80 3 80[c]	Not relevant[f]	A[e]	Not relevant[f]

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse, shape of the pulse is defined in the relevant test setup standard.

[a] Test values for ports containing general function and/or safety circuits.

[b] Test values for ports containing safety circuits.

[c] The test level can also be defined as the equivalent current into a 150 Ω load.

[d] Applicable only to input ports crossing the system boundary.

[e] If radio equipment as defined by Directive 1999/5/EC is used in apparatus/assembly of apparatus, the exclusion band defined by the harmonised standards applies for that specific radio equipment.

[f] Requirement is considered not relevant because safety circuits current rating is less than 100 A.

Table 6 — Immunity - Input and output A.C. power ports rated ≤ 100 A per phase; not applicable to input ports intended for connection to dedicated non-rechargeable power supplies

Environmental phenomena	Test set-up	Units	Test values					Performance criteria				
			All circuits[a]			Safety circuits[b]		All circuits[a]			Safety circuits[b]	
Fast transients common mode	EN 61000-4-4:2012	kV (peak) T_r/T_h (ns) Rep. Frequency (kHz)	1,0 5/50 5			4,0 5/50 2,5		B			D	
Voltage dips[g]	EN 61000-4-11:2004[c]	% residual voltage period	40 10/12 at 50/60Hz	70 25/30 at 50/60Hz	0 1	70 and 40[e] 0,5/0,6 to 5/6 in 0,5/0,6 period steps at 50/60Hz	10/12 to 50/60 in 5/6 period steps at 50/60Hz	40 C	70 C	0 B	D	
Voltage interruptions[g]	EN 61000-4-11:2004[c]	% residual voltage period	0 250/300 at 50/60Hz			0[e] 250/300 at 50/60Hz		C			D	
Surge - Line to ground - Line to line	EN 61000-4-5:2006	T_r/T_h (µs) kV (peak) kV (peak)	1,2/50 +/- 2,0 +/- 1,0[f]			1,2/50 +/- 2,0 +/- 1,0		B			D	

Table 6 *(continued)*

Environmental phenomena	Test set-up	Units	Test values		Performance criteria	
			All circuits[a]	Safety circuits[b]	All circuits[a]	Safety circuits[b]
Radio frequency common mode	EN 61000-4-6:2009	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 to 80 3 80[d]	0,15 to 80 10 80[d]	A[h]	D
NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse, shape of the pulse is defined in the relevant test setup standard.						

[a] Test values for ports containing general function and/or safety circuits.

[b] Test values for ports containing safety circuits.

[c] See also EN 61800-3:2004, 5.2.3.

[d] The test level can also be defined as the equivalent current into a 150 Ω load.

[e] The safety circuit shall go into a safe state if the voltage falls below the designed functional limits.

[f] Only applicable to input ports.

[g] Limited to a maximum of 16 A for testing.

[h] If radio equipment as defined by Directive 1999/5/EC is used in apparatus/assembly of apparatus, the exclusion band defined by the harmonised standards applies for that specific radio equipment.

Table 7 — Immunity - Input and output A.C. power ports rated > 100 A per phase

Environmental phenomena	Test set-up	Units	Test values		Performance criteria	
			General function circuits[a]	Safety circuits[b]	General function circuits[a]	Safety circuits[b]
Fast transients common mode	EN 61000-4-4:2012	kV (peak) T_r/T_h (ns) Rep. Frequency (kHz)	+/- 2,0 5/50 5	Not relevant[f]	B	Not relevant[f]
Surge[c] - Line to ground - Line to line	EN 61000-4-5:2006	T_r/T_h (µs) kV (peak) kV (peak)	1,2/50 +/- 2,0 +/- 1,0	Not relevant[f]	B	Not relevant[f]
Radio frequency common mode	EN 61000-4-6:2009	MHz V (rms, unmodulated) % AM (1 kHz)	0,15 to 80 3 80[d]	Not relevant[f]	A[e]	Not relevant[f]

NOTE T_r is the rise time of the pulse, T_h is the time duration of the pulse, shape of the pulse is defined in the relevant test setup standard.

a Test values for ports containing general function circuits only.

b Test values for ports containing safety circuits.

c Only applicable to input AC ports.

d The test level can also be defined as the equivalent current into a 150 Ω load.

e If radio equipment as defined by Directive 1999/5/EC is used in apparatus/assembly of apparatus, the exclusion band defined by the harmonised standards applies for that specific radio equipment.

f Requirement is considered not relevant, because safety circuits current rating is less than 100 A.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2004/108/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conformity to the protection requirements of Annex I Article 1(b) of the EU Directive 2004/108/EC.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Annex ZB
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC on machinery.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirement 1.5.11 of Annex I of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Annex ZC
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 95/16/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the Directive 95/16/EC for Lifts.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirement 1.5.11 of Annex I of the Directive 98/37/EC for Machinery that is applicable to lifts according to Section 1.1 of Annex I of the Directive 95/16/EC for Lifts and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

[1] EN 81-1, *Safety rules for the construction and installation of lifts — Part 1: Electric lifts*

[2] EN 81-2, *Safety rules for the construction and installation of lifts — Part 2: Hydraulic lifts*

[3] EN 115-1, *Safety of escalators and moving walks — Part 1: Construction and installation*

[4] EN 61800-3:2004, *Adjustable speed electric power drive systems — Part 3: EMC product standard including specific test methods (IEC 61800-3:2004)* [3)]

[5] EN ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100)*

3) This document is currently impacted by EN 61800-3:2004/A1:2012.

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™