TECHNICAL REPORT

ISO/TR 16764

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Lifts, escalators and passenger conveyors — Comparison of worldwide standards on electromagnetic interference/electromagnetic compatibility

Ascenseurs, escaliers mécaniques et trottoirs roulants — Comparaison des normes mondiales relatives à l'interférence électromagnétique/la compatibilité électromagnétique

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 16764 was prepared by Technical Committee ISO/TC 178, *Lifts, escalators, passenger conveyors*.

0 Introduction

0.1 Background

International standardizing bodies such as IEC, ISO, CISPR, CENELEC, have been involved in drawing up common normative and technical documents to bring international markets closer together.

At the 1996 plenary meeting of ISO/TC 178, it was decided to carry out a comparison between various national and international electrical requirements applicable to lifts (elevators) and escalators. The first objective was to identify and compare the major EMC requirements applicable in the countries of the Working Group members (Resolution 1996/134).

The content of this Technical Report is based on the information provided by ISO/TC 178/WG 8 members.

0.2 Understanding electromagnetic interference/electromagnetic compatibility (EMI/EMC)

An electromagnetic disturbance (noise that is not sinusoidal or unwanted signal) is any electromagnetic phenomenon which may degrade the performance of a device, equipment or system. Electromagnetic interference (EMI) is the degradation in the performance of a device, equipment or system caused by an electromagnetic disturbance. The cause of EMI is unplanned coupling between a source and a receptor by means of a transmission path. Transmission paths may be conducted or radiated. See, for example, Figure 1.

The ability of the device, equipment or system to function satisfactorily in an electromagnetic environment, without introducing intolerable disturbances to that environment is called electromagnetic compatibility (EMC).

EMC has three elements:

a) a source of energy

b) a receptor that is disrupted by this energy

c) a coupling path between the source of energy and receptor.

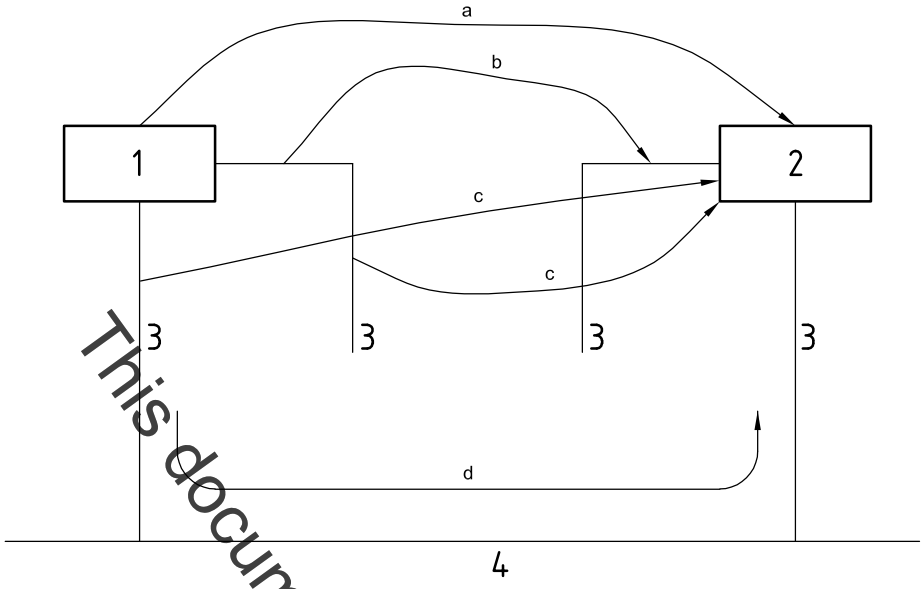
Methods of coupling electromagnetic energy from a source to a receptor fall into one of four categories:

a) conducted (electric current)

b) inductively coupled (magnetic field)

c) capacitively coupled (electric field)

d) radiated (electromagnetic field).



Key

1 source

2 receptor

3 cable

4 power line

a Path 1: direct radiation from source to receptor.

b Path 2: direct radiation from source, picked up by cables (power, signal and control) connected to the receptor, which reaches the receptor via conduction path.

c Path 3: EMI radiated by cables (power, signal or control) of the source.

d Path 4: EMI conducted from source to receptor via cables (common power supply, signal/control).

NOTE 1 Source: Engineering EMC-IEEE Press.

NOTE 2 EMI carried by power/signal/control cables that are connected to the source can be coupled to the power/signal/control cables of the receptor, especially when cable harnesses are bundled, even when common power/signal/control cables do not exist.

Figure 1 — Mechanisms of electromagnetic interference

Lifts, escalators and passenger conveyors — Comparison of worldwide standards on electromagnetic interference/electromagnetic compatibility

1 Scope

This Technical Report consists of a comparison of electromagnetic interference/electromagnetic compatibility (EMI/EMC) worldwide standards of interest to the lift industry.

2 Electromagnetic interference/electromagnetic compatibility standards

2.1 Background

With the advent of radio broadcast transmission in the 1920s, the interference from radio noise (i.e. electromagnetic noise) became a concern of engineers in Europe and North America and many technical papers were beginning to be published dealing with electromagnetic interference (EMI). Early studies showed that motor driven appliances, switches, automobile ignitions, electric traction and electrical power lines, among other sources, caused radio interference.

2.2 CISPR/IEC

In 1933 the International Special Committee on Radio Interference (CISPR, Comité International Spécial de Perturbations Radioélectriques) was formed as a result of a joint effort of the International Electrotechnical Commission (IEC) and the International Union of Broadcasting. The first meeting of CISPR was held in 1934 to address limits of EMI and methods of measurement. Following World War II, the United States, Canada and Australia started to participate in CISPR. Subsequently countries from Asia and other parts of the world also started participating in CISPR. The emphasis initially was on getting agreement on measurement procedures and instrumentation for the protection of radio services with particular emphasis on radio broadcasting. The subject of acceptable performance limits was left to a later date. IEC/TC 65 was formed in the early 1960s and was also concerned with EMC requirements. In 1974, the IEC established a new technical committee (IEC/TC 77) to cover EMC subjects not generally dealt with by the CISPR, in particular, immunity characteristics of all kinds of equipment and emission phenomena below 9 kHz, the lower end of the radio frequency spectrum. The organization of these committees in the IEC is shown in Figure 2. In formal structure, the CISPR is a separate organization from the IEC. However it should be noted that the plenary is constituted of representation from various international organizations, as well as by the National Committees of the IEC. In the IEC council, only the National Committees are represented. Also, the publications of the CISPR are issued by the IEC, and the operational procedures are identical in most respects.