COMMISSION OF THE EUROPEAN COMMUNITIES

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Brussels, 7 July 1975

Proposal for a

COUNCIL DIRECTIVE (EEC)

on the approximation of the laws of the Member States relating to common provisions for lifting and mechanical handling appliances

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Proposal for a

COUNCIL DIRECTIVE (EEC)

on the approximation of the laws of the Member States relating to electrically operated lifts

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(submitted by the Commission to the Council)

EXPLANATORY MEMORANDUM

I. GENERAL

1. A comparative examination of the laws, regulations and administrative provisions in force in the Member States in the sector of lifting and mechanical handling appliances shows important differences not only between the technical requirements concerning the manufacture, examination and testing of these appliances but also between the administrative procedures to be followed in order to place them on the market.

2. This situation compels manufacturers of lifting and mechanical handling appliances to adapt their production and stocks of spares to the varying technical requirements laid down by the laws of the Member States for which these appliances are intended. This applies on a market which, for many of these appliances, is already very international; subcontractors are faced with the same problems.

3. What is more, in cases where administrative procedures for the placing of these appliances on the market exist in one or more Member States, manufacturers are obliged to comply with the approval procedures in force in those States and methods of examination and testing often differ greatly.

4. National laws are, however, justified in that Member States are responsible for protecting users of lifting and mechanical handling appliances - in particular workers - and third parties. Consequently the approximation of these laws, especially as regards the general principles and procedures, appears the most suitable means of eliminating the harmful effects resulting from the differences noted; the various categories of lifting and mechanical handling appliances will then later be covered insofar as is necessary by separate Directives fitting into the framework already defined.

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5. The sector of lifting and mechanical handling appliances is included in the third stage of the "General Programme for the elimination of technical barriers to trade which result from disparities between the provisions laid down by law, regulation or administrative action in Member States". This programme was approved by the Council on 28 May 1969. In its resolution on industrial policy of 17 December 1973, the Council requested the Commission to forward it by 1 January 1975 a proposal for a directive on the sector covered by this Directive with a view to its adoption before 1 January 1976. The technical complexity of the first separate Directive, which is of very great importance, obliged the Commission to delay slightly the forwarding of its proposal to allow it to complete its work.

6. The purpose of this Directive is therefore to eliminate the technical barriers to trade by the approximation of the relevant laws. The legal basis is Article 100 of the Treaty.

7. The Commission has set up a Working Party of national experts, industrial associations and representatives of European standards and inspection bodies in order to obtain technical advice. It has also made the necessary contacts with consumer representatives.

II. HARMONIZATION METHOD

The harmonization method proposed in the Directive is the "optional" method. However, this does not mean that some of the separate Directives cannot be based on the complete harmonization method, involving replacement of the national provisions in force by Community provisions. This should only be done if particularly important safety problems arise and insofar as the definition of a minimum safety level is essential.

III. COMMENTS ON THE PROPOSAL FOR A DIRECTIVE

The proposal for a Directive on lifting and mechanical handling appliances, together with the proposal for a separate Directive on electrically operated lifts, is the outcome of consultations at several meetings of the Commission's Working Party; most of the experts are in agreement with it in principle.

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Although Commission staff have been unable to iron out some differences of opinion that emerged during the discussions, the Commission has endeavoured to submit a Community solution meeting with the assent of most of the experts consulted and in a form as close as possible to the other outline Directives already forwarded to the Council.

The outline Directive is divided into several Chapters and contains general provisions on lifting and mechanical handling appliances such as the principle of the free movement of these appliances and their components if they conform to Community requirements, the adjustment of the Directives to technical progress and a safeguard clause.

It also lays down a number of Community procedures which lifting and mechanical handling appliances and their components can undergo if so stipulated by the separate Directives.

This Directive draws a clear distinction between :

a) EEC type-approval : the procedure certifying that a type of appliance conforms to the requirements of the relevant Directive;

b) EEC component type-approval : the procedure certifying that a type of component satisfies the requirements of the relevant Directive;

c) EEC inspection, the purpose of which is to check that appliances or their components conform to the model or type for which approval was granted.

The first two procedures are virtually identical, they only differ in their field of application.

The Annexes show the Community symbols for EEC type-approval and EEC component type-approval that have to be affixed by the manufacturer to each appliance or component in conformity with the relevant directives. Lifting and mechanical handling appliances or their components that have been granted EEC type-approval or EEC component type-approval and bear the required symbol can be placed on the market, installed and used without restriction.

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In the case of approved components incorporated in an appliance or installation, it is understood that acceptance checks carried out by the relevant national departments - on the spot, before entry into service - should essentially be limited to a visual check on the approval symbols, without need for the component to undergo further examination or testing. However, this does not prejudice the right of these departments to carry out tests, for example, or to request replacement of the components in question if there are dimensional discrepancies.

The Directive also specifies that it is up to the competent authorities in the Member States to grant an applicant EEC type-approval or EEC component type-approval. However, this does not in any way restrict the practices adopted by the Member States of instructing duly authorized bodies of their choice to carry out the examinations and tests prior to a decision to grant type-approval or component type-approval.

Because of the special features of the lifting and mechanical handling appliance sector, the EEC inspection procedure is entirely dependent on prior EEC type-approval or EEC component type-approval. Unlike other outline directives, this proposal for a Directive makes no provision for independent EEC inspection carried out on the sole responsability of the manufacturers.

Some experts, however, considered EEC inspection to be superfluous in the proposal for an outline directive, as it will probably be applied in only very few cases. Consequently these experts felt it preferable to provide for this procedure only when it was found necessary, by incorporating it in the separate directives.

On the other hand the Commission and most of the experts consulted felt it advisable to retain the EEC inspection procedure in this Directive as an available administrative and technical instrument. This does not in any way prejudice practical application of this principle, which will be laid down in each case in the separate directives.

In order to ensure that Member States are kept informed of the competent authorities and inspection bodies responsible for the examinations, tests and inspections, each Member State must forward to the other States and the Commission a list of the authorities and bodies competent to engage in those activities on its territory. It must also give notification of any subsequent amendments made.

The Commission, with the support of most of the experts, thought it useful,

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following the practice adopted in other directives, to establish a number of criteria that the Member States had to take into consideration when appointing the various inspection bodies. This list can obviously only give a limited number of basic criteria and does not limit the rights of the authorities and administrations in Member States to select and supervise such inspection bodies in accordance with existing national structures, especially as regards accurate and faithful implementation of the provisions resulting from Community directives.

In order to ensure that the Annexes to this outline Directive and to the separate directives on lifting and mechanical handling appliances can be adjusted flexibly and rapidly to technical progress, it is proposed to adopt the Committee procedure for amendments. The Committee has already been set up in the "Lifting Equipment" sector by Council Directive on the approximation of the laws, regulations and administrative provisions of the Member States relating to the certification and marking of wire-ropes, chains and hooks.

IV. COMMENTS ON THE PROPOSAL FOR A SEPARATE DIRECTIVE ON ELECTRICALLY OPERATED LIFTS

Electrically operated lifts were selected as the first sector for implementation of the outline directive because of their economic and social impact and because genuine obstacles to their free movement had been noted.

They are used by the whole population and several hundreds of thousands of lifts are installed annually in the Community.

Apart from medium-sized firms with a mainly local market, lifts are produced mainly by a few very large decentralized firms which generally manufacture or have manufactured, in a number of factories throughout the Community countries, each of the components required for the appliances, which are later assembled in another factory.

The differing design and safety specifications required by national authorities are therefore the cause of a substantial increase in production costs, which is obviously reflected in the final cost. The increase is around 8 - 10 %.

Because of this situation, which has long existed, the International Commission for Lift Regulations (CIRA) drew up, in 1969, a recommendation in the form of safety directives for the construction and installation of electrical lifts and goods hoists.

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The European Mechanical Handling Confederation (FEM) in its turn drew up in 1971, on the basis of the CIRA document, draft safety directives taking account of the situations prevailing in the Member States of the Community at that time.

These directives were then taken over, supplemented and amended by the European Committee for Standardization (CEN) in order to prepare a European standard for electrical lifts and goods hoists.

The work on lifts has now reached its final stage. In view of the progress already made in harmonization and standardization for lifts, the Commission felt it advisable to base the technical Annexes of this Directive on the CEN draft standard. If the draft is adopted by CEN before the proposal for an EEC Directive is examined by the Council, the Commission is prepared to replace the technical Annexes and to refer in full or in part to the European standard, so as to cut down the technical content of this Directive.

It should be noted that some experts would like the complete CEN draft standard to be incorporated as an Annex to the Directive, while others have made a number of requests for amendments to the Annexes or have expressed reservations. The CEN, which has been closely associated in the work on the finalization of the proposal for a Directive, will endeavour to take these into account in the final version of the draft standard.

Of the various procedures provided for in the outline Directive, the separate Directive on lifts adopts only EEC component type-approval for certain components and does not incorporate EEC type-approval and EEC inspection as the Commission, with the support of the experts, did not consider these suitable for this type of appliance.

Only five major structural components of vital importance for the safety of the equipment and its installation have to undergo EEC component type-approval. These are :

- locking devices for landing doors;
- fire resistance of landing doors;
- safety gears;
- speed governors;
- hydraulic buffers.

The harmonization method adopted is the "optional" one.

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The Commission staff felt it advisable to abide by the opinion of the majority of the experts consulted. However, it should be noted that some of them, together with the representatives of the industrial circles consulted, are in favour of complete harmonization either by direct application or with transitional periods of five years, for example, in order to eliminate possible distortion of competition as a result of the implementation of the optional harmonization method.

The technical specifications in Annex I to this Directive cover the complete installation of lifts and are based solely on the CEN draft standard. These specifications cover only lifts and their installation, functioning and inspection. These provisions do not in any way prejudice requirements concerning the construction of the building or the fire prevention measures to be taken which exist in the Member States or are the subject of Community provisions.

V. CONSULTATION OF THE EUROPEAN PARLIAMENT AND THE ECONOMIC AND SOCIAL COMMITTEE

Pursuant to the second paragraph of Article 100 of the Treaty, the opinions of these two bodies are required because the implementation of the provisions in the two Directives will, in all Member States, involve the amendment of legislation.

PROPOSAL FOR A COUNCIL DIRECTIVE
ON THE APPROXIMATION OF THE LAWS OF THE MEMBER STATES RELATING
TO COMMON PROVISIONS FOR LIFTING AND MECHANICAL HANDLING APPLIANCES

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 100 thereof,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Parliament,

Having regard to the Opinion of the Economic and Social Committee,

Whereas in each Member State mandatory provisions determine the technical design, inspection and/or operating characteristics of lifting applicances; whereas these requirements differ from one Member State to another; whereas these differences hinder trade and may create unequal conditions of competition within the Community;

Whereas these hindrances to the establishment and functioning of the Common Market can be reduced and eliminated if the same requirements apply in Member States either in addition to or in place of their existing laws;

Whereas compliance with these technical requirements must be checked in order to provide effective protection for users and third parties; whereas existing inspection procedures differ from one Member State to another; whereas in order to achieve free movement of lifting and mechanical handling appliances within the Common Market and obviate multiple inspection procedures which hinder free movement of these appliances it is necessary to provide for mutual recognition of inspection operations among Member States;

Whereas in order to facilitate this mutual recognition it is also necessary to establish appropriate procedures for EEC type-approval, EEC component

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type-approval and EEC inspection for lifting and mechanical handling appliances and to harmonize the criteria to be considered when appointing the inspection bodies responsible for the checks;

Whereas in each Member State the responsability of the bodies carrying out the checks is defined differently, making harmonization necessary;

Whereas the presence, on a lifting or mechanical handling appliance or component, of EEC symbols or marks showing that it has undergone checks indicates that it satisfies the relevant technical requirements and therefore when the appliance is imported it is unnecessary to repeat the checks that have already been carried out;

Whereas national rules concerning lifting and mechanical handling appliances cover numerous categories of lifting and mechanical handling appliances of very different uses, capacities and loads; whereas this Directive should lay down the general provisions dealing, in particular, with EEC type-approval, EEC component type-approval and EEC inspection; whereas separate directives for each category of lifting or mechanical handling appliance will lay down the technical requirements as to design, inspection procedures for the appliances and their components and where appropriate, the conditions under which Community technical requirements are to replace the national provisions in force;

Whereas technical progress requires prompt adjustment of the requirements specified in the directives relating to lifting and mechanical handling appliances; whereas in order to facilitate the implementation of the measures necessary to this end to ensure close cooperation between the Member States and the Commission within the Committee on the Adjustment to Technical Progress of the Directives on the Removal of Technical Barriers to Trade in the Lifting Appliance and Equipment Sector; established by the Council Directive of 19 November 1973 on the approximation of the laws, regulations and administrative provisions of the Member States relating to the certification and marking of wise-ropes, chains and hooks (1);

Whereas lifting or mechanical handling appliances placed on the market, although conforming to the requirements of the separate Directive relating to them, might nevertheless constitute a safety hazard; whereas it is therefore advisable to provide an appropriate procedure to mitigate such danger;

HAS ADOPTED THIS DIRECTIVE : ./.

(1) O.J. E.C., N° L 335, 5 December 1973.

PROPOSAL FOR A COUNCIL DIRECTIVE

on the approximation of the laws of Member States relating to common provisions for lifting and mechanical handling appliances

CHAPTER I

Definition and scope

Article 1

1. For the purposes of this Directive, lifting and mechanical handling appliances mean all lifting and mechanical handling appliances which are electrically, hydraulically or mechanically operated, such as lifts, civil engineering hoists, goods lifts, cranes, conveyor belts and fork-lift trucks.

2. For the purposes of this Directive, a component means any component or part of a lifting or mechanical handling appliance as defined in the separate directives.

3. This Directive does not cover lifting or mechanical handling appliances especially designed for military or research purposes nor those used on ships prospecting for offshore oil, in mines or for the handling of radioactive materials.

Article 2

1. The separate directives on the various categories of lifting or mechanical handling appliances and/or their components shall lay down technical design requirements and inspection, control and testing procedures.

2. In particular, they may lay down rules for design and assembly to be satisfied by lifting or mechanical handling appliances and their components.

3. They may also specify :

   - for categories of lifting or mechanical handling appliances concerned : whether they must undergo EEC type-approval or EEC type-approval and EEC inspection;

   - for the components concerned : whether they must undergo EEC component type-approval or EEC component type-approval and EEC inspection.

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4. In addition they may specify the date on which national provisions conforming to the separate directive for a specific category of lifting or mechanical handling appliance are to replace completely the national regulations hitherto in force.

Article 3

No Member State may prevent, prohibit or restrict the placing on the market, use or entry into service, for a purpose for which it is designed, of any lifting or mechanical handling appliance or component thereof, on grounds relating to its construction or to its inspection, examination or testing, as defined and specified in this Directive, if, in accordance with the requirements specified in the relevant separate directive :

1. for a lifting or mechanical handling appliance subject to EEC type-approval or a component subject to EEC component type-approval, the appliance or component conforms to the respective model or type;

2. for a lifting or mechanical handling appliance not subject to EEC type-approval and a component not subject to EEC component type-approval, the appliance or component conforms to the requirements of the relevant separate directives and is accompanied by a certificate of conformity if required by the corresponding directives.

Article 4

The Member States shall attach the same value to EEC type-approval, to EEC component type-approval and to EEC inspection as to the corresponding national measures.

Article 5

The duties of the competent authority in the Member States that grants an EEC type-approval certificate for a lifting or mechanical handling appliance and/or an EEC component type-approval certificate for a component of an appliance or the inspection body that carries out EEC inspection shall be limited to the preper execution of the examinations, verifications and tests specified in the relevant directives.

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CHAPTER II

EEC type-approval

Article 6

1. EEC type-approval means the procedure whereby the competent authority in a Member State confirms and certifies - after inspection and technical tests - that a model of a lifting or mechanical handling appliance satisfies the requirements in the relevant separate directives.

2. Upon application by a manufacturer or his authorized representative, the competent authorities of the Member States shall issue EEC type-approval for any model of a lifting or mechanical handling appliance satisfying the requirements in the relevant separate directive.

3. The Member States shall take the necessary measures to ensure that, for the same type of lifting or mechanical handling appliance, the application for EEC type-approval is submitted in only one Member State.

4. Member States shall keep each other informed of applications for EEC type-approval in accordance with the provisions in item 1.1. of Annex I.

5. The competent authorities of the Member States shall carry out EEC type-approval in accordance with the provisions of this Chapter and items 1 and 2 of Annex I.

6. EEC type-approval constitues a preliminary to EEC inspection referred to in Article 12 and the following articles where EEC inspection is required by the separate directives.

Article 7

1. If the results of the examination described in item 2 of Annex I and laid down in detail in the various separate directives are satisfactory, the competent authority of the Member State which has carried out this examination shall draw up an EEC type-approval certificate and notify the applicant without delay.

   The applicant shall then be required, on his own responsability, to affix the EEC type-approval symbol on each lifting or mechanical handling appliance and if so required by the separate directive relating to a certain category of lifting or mechanical handling appliance, to issue a certificate of conformity for each lifting or mechanical handling appliance concerned.

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2. The provisions relating to the certificate, the approval symbol and the publication of EEC type-approval are set out in items 3, 4 and 5 of Annex I.

3. The separate directives may lay down that EEC type-approval is dependent on certain conditions or limited in time.

4. If the separate directive so requires, the manufacturer shall inform the competent authority when a model of an appliance which has received EEC type-approval is put into mass production.

Article 8

1. The Member State which has granted EEC type-approval may withdraw that approval if it establishes that the lifting or mechanical handling appliances for which the approval was granted do not conform to the approved model or to the provisions of the relevant separate directive.

2. The Member State which has granted EEC type-approval must withdraw it :

   a) for appliances that have to undergo EEC inspection, if it finds that appliances constructed according to an approved model reveal a defect in design or in construction method specified in the EEC type-approval that is liable to endanger safety;

   b) in the cases covered by paragraph 1 of this Article, for appliances that do not have to undergo EEC inspection pursuant to a separate directive, when the manufacturer, after being warned, fails to rectify his production.

3. If that Member State is informed by another Member State of the occurrence of one of the cases covered by paragraphs 1 and 2 of this Article, it shall likewise take the measures provided for in those paragraphs, after consulting with that other State.

4. If the advisability or necessity for withdrawal of EEC type-approval is the cause of a dispute between the competent authority of the Member State which has granted EEC type-approval and that of another Member State, the Commission shall be kept informed.

5. EEC type-approval may only be withdrawn by the competent authority of the Member State which granted the approval. It shall immediately inform the competent authorities of the other Member States and the Commission.

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CHAPTER III

EEC component type-approval

Article 9

1. EEC component type-approval means the procedure whereby the competent authority in a Member State confirms and certifies - after inspection and technical tests - that a type of a component for a lifting or mechanical handling appliance satisfies the requirements in the relevant separate directives.

2. Upon application by a manufacturer or his authorized representative, the competent authorities of the Member States shall issue EEC component type-approval for all types of components of lifting or mechanical handling appliances satisfying the requirements in the relevant separate directive.

3. The Member States shall take the necessary measures to ensure that, for the same type of component for a lifting or mechanical handling appliance, the application for EEC component type-approval is submitted in only one Member State.

4. Member States shall keep each other informed of applications for EEC component type-approval in accordance with the provisions in item 1.1. of Annex II.

5. The competent authorities of the Member States shall carry out EEC component type-approval in accordance with the provisions of this Chapter and items 1 and 2 of Annex II.

6. EEC component type-approval constitutes a preliminary to EEC inspection referred to in Article 12 and the following articles where EEC inspection is required by the separate directives.

Article 10

1. If the results of the examination described in item 2 of Annex II and laid down in detail in the various separate directives are satisfactory, the competent authority of the Member State which carried out that examination shall draw up a certificate of EEC component type-approval and notify the applicant without delay. The applicant shall then be required, on his own responsibility, to affix the symbol of EEC component type-approval on each component of a lifting or mechanical handling appliance and if so required by the separate directive relating to a certain category of lifting or mechanical handling appliance , to issue a certificate of conformity for each component concerned. ./.

2. The provisions relating to the certificate, the approval symbol and the publication of EEC component type-approval are set out in items 3, 4 and 5 of Annex II.

3. The separate directives may lay down that EEC component type-approval is dependent on certain conditions or limited in time.

4. If the separate directive so requires, the manufacturer shall inform the competent authority when a type of a component which has received EEC component type-approval is put into mass production.

Article 11

1. The Member State which has granted EEC component type-approval may withdraw that approval if it establishes that the components of a lifting or mechanical handling appliance for which the approval was granted do not conform to the approved type or to the provisions of the relevant separate directive.

2. The Member State which has granted EEC component type-approval must withdraw it :

   a) for components that have to undergo EEC inspection, if it finds that components constructed according to an approved type reveal a defect in design or in construction method specified in the EEC component type-approval that is liable to endanger safety;

   b) in the cases covered by paragraph 1 of this Article, for components that do not have to undergo EEC inspection pursuant to a separate directive, when the manufacturer, after being warned, fails to rectify his production.

3. If that Member State is informed by another Member State of the occurence of one of the cases covered by paragraphs 1 and 2 of this Article, it shall likewise take the measures provided for in those paragraphs, after consulting with that other State.

4. If the advisability or necessity for withdrawal of EEC component type-approval is the cause of a dispute between the competent authority of the Member State which has granted EEC component type-approval and that of another Member State, the Commission shall be kept informed.

5. EEC component type-approval may only be withdrawn by the competent authority of the Member State which granted the approval. It shall immediately inform the competent authorities of the other Member States and the Commission.

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CHAPTER IV

EEC inspection

Article 12

1. The purpose of EEC inspection is to confirm that mass-produced lifting or mechanical handling appliances and their components conform to the approved model or type.

2. The manufacturer must apply any method considered advantageous to ensure that the mass-produced appliances or components conform to those for which approval was granted and to the requirements of the relevant separate directive.

3. EEC inspection is carried out and certified in accordance with the procedures described in Annex III to this Directive and the requirements of the relevant separate directive.

Article 13

1. The manufacturer shall make available to the inspection body registers, reports or any other information indicating that the lifting or mechanical handling appliances or components have been inspected.

2. The manufacturer may not refuse the inspection body access to his production premises when such access is essential for the proper execution of the tasks entrusted to that body.

Article 14

The separate directives shall specify for each category of lifting or mechanical handling appliance the procedures to be followed by the inspection body for EEC inspection depending on whether EEC type-approval or EEC component type-approval has been granted for a model of appliance or for a type of component.

Article 15

1. The inspection body must, in accordance with Articles 13 and 14, be in a position to execute any inspection considered necessary to ensure that the verifications carried out by the manufacturer are satisfactory.

2. If so required by a separate directive, the inspection body shall issue a certificate recording the checks made and the results.

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Article 16

The separate directives may stipulate that mass-produced lifting or mechanical handling appliances and their components be numbered for identification purposes.

Article 17

Having verified the conformity of each lifting or mechanical handling appliance or its components to the approved model or type when the relevant separate directive does not make provision for EEC inspection, the manufacturer shall, on his own responsability, affix the symbol described in item 5.2. of Annex I or II on each lifting or mechanical handling appliance or its components.

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CHAPTER V

Provisions common to EEC type-approval, EEC component type-approval and EEC inspection

Article 18

1. Conformity of an appliance or component with the approved model or type shall be certified by affixing the corresponding symbols laid down in Articles 7 and 10 and where appropriate in Article 17 of this Directive.

2. The Member States shall take all necessary measures to ensure that lifting or mechanical handling appliances required to undergo EEC type-approval and components required to undergo EEC component type-approval do not bear any mark, sign or inscription liable to be confused with the EEC symbols.

Article 19

Each Member State shall furnish the other Member States and the Commission with :

- a list of the authorities competent to grant EEC type-approval for lifting or mechanical handling appliances;
- a list of the authorities competent to grant EEC component type-approval for lifting or mechanical handling appliances;
- a list of the inspection bodies designated by the competent authorities of the Member States to carry out examinations and tests :
  a) prior to the granting of EEC type-approval or EEC component type-approval;
  b) provided for as part of EEC inspection;
- and any later amendments to these lists.

Article 20

The Member States may designate inspection bodies and entrust them with the tasks specified in this Directive and in the separate directives only if these inspection bodies satisfy the criteria set out in Annex IV.

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CHAPTER VI

Adjustment of the Directives to technical progress

Article 21

1. Amendments to Annexes I, II and III necessary to adjust this Directive to technical progress shall be made pursuant to Article 5 of the Council Directive of 19 November 1973 on the approximation of the laws, regulations and administrative provisions of the Member States relating to the certification and marking of wire-ropes, chains and hooks.

2. The separate directives relating to lifting or mechanical handling appliances, as defined in Article 1 (1) shall specify which of the provisions of their technical annexes may be adapted by this procedure.

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CHAPTER VII

Safeguard clause

Article 22

1. If a Member State establishes, on the basis of a detailed statement of grounds, that a lifting or mechanical handling appliance or a component thereof, although conforming to the requirements of this Directive and of the separate directives, is a safety hazard, it may temporarily prohibit or impose special conditions on the placing on the market, use and entry into service of that appliance or component, on its territory. It shall immediately inform the Commission and the other Member States, giving the reasons for its decision.

2. Within six weeks the Commission shall hold consultations with the Member States concerned and shall then issue its opinion forthwith and take the necessary steps.

3. If the Commission considers that technical adjustments to the Directive are necessary, these adjustments shall be adopted either by the Commission or by the Council in accordance with the procedure set out in Article 5 of the Council Directive of 19 November 1973 on the approximation of the laws, regulations and administrative provisions of the Member States relating to the certification and marking of wire-ropes, chains and hooks. In this case, the Member State which had adopted the safeguard measures may maintain them until the entry into force of the adjustments.

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CHAPTER VIII

Final provisions

Article 23

All decisions taken by a Member State in application of the present Directive and the separate directives, involving a refusal to grant EEC type-approval or EEC component type-approval, the withdrawal of such approval or the prohibition of the sale or entry into service of lifting or mechanical handling appliances, shall state the reasons on which they are based. Such decisions shall be notified without delay to the party concerned, who shall at the same time be informed of the remedies available to him under the laws in force in that Member State and of the time limits allowed for the exercise of such remedies.

Article 24

1. Member States shall put into force the laws, regulations and administrative provisions needed in order to comply with this Directive within eighteen months of its notification and shall forthwith inform the Commission thereof.

2. Member States shall communicate to the Commission the text of provisions of national law which they adopt in the field covered by this Directive.

Article 25

This Directive is addressed to the Member States.

ANNEX I

EEC type-approval

1. Application for EEC type-approval

1.1. The application and the correspondance relating to it shall be drawn up in the official language (or one of the official languages) of the State to which the application is made. This Member State has the right to require that the annexed documents should also be drawn up in the same official language.

The competent authority of the Member State receiving the application shall immediately forward a copy of it to all competent authorities of the other Member States.

1.2. The application shall contain the following information :

- name and address of the manufacturer or the firm, or his or its authorized representative or of the applicant,
- the category of lifting or mechanical handling appliance,
- the intended use,
- the technical characteristics,
- the commercial designation if any.

1.3. The application shall be accompanied by :

1.3.1. the documents necessary for its examination, in triplicate[1], in accordance with the specifications of the separate directives and any other information laid down therein;

1.3.2. a declaration to the effect that no other application for EEC type-approval has been submitted for the same model of appliance;

1.3.3. where appropriate, documents relating to national approvals already granted and components used that have undergone EEC component type-approval and where applicable EEC inspection.

2. Examination for EEC type-approval

2.1. The examination for EEC type-approval shall be carried out on the basis of the manufacturing design and on the model.

This examination shall comprise all the examinations and tests laid down in the separate directives.

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[1] Intended for the competent authority, the body responsible for the examination and testing and the applicant.

ANNEX I

2.2. The separate directives for the various categories of lifting and mechanical handling appliances shall determine, if necessary, the rules of construction and the coefficients to be used for calculation and shall specify the nature and the quality of the materials that may be used in the manufacture of these lifting or mechanical handling appliances.

3. Certificate and symbol of EEC type-approval

3.1. The certificate shall give the results of the examination of the model and shall specify the other requirements to be satisfied. It shall be accompanied by the descriptions, drawings and plans necessary to identify the model and where necessary to explain its functioning. The approval symbol provided for in Article 7 of this Directive shall be a stylized letter E containing :

- in the upper part, the distinguishing capital letter of the State which granted the approval (B for Belgium, D for the Federal Republic of Germany, DK for Denmark, F for France, I for Italy, IR for Ireland, L for Luxembourg, NL for the Netherlands, UK for the United Kingdom) and the last two digits of the year of approval;
- in the lower part, the distinguishing symbol of the competent authority which granted the approval followed by the identification number of the EEC type-approval.

Examples of the approvals symbols are shown in items 5.1 and 5.2 of this Annex.

3.2. The symbols referred to in the previous item, which are affixed by the manufacturer in accordance with the provisions of this Directive, must be easily visible, legible, irremovable and indestructible on each lifting or mechanical handling appliance concerned.

4. Publication of EEC type-approval

4.1. EEC type-approvals shall be published in a special Annex to the Official Journal of the European Communities.

4.2. At the same time as the party concerned is notified, copies of the EEC certificate of approval shall be sent to the Commission and to the other competent authorities appearing in the lists notified in accordance with Article 19; these authorities may also obtain copies of the reports on the examination and tests carried out.

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ANNEX I

4.3. Withdrawal of EEC type-approval shall be notified to the party concerned who shall also receive copies of the reports on the examinations and tests. Withdrawal shall also be notified to the Commission and to the other competent authorities appearing in the lists notified in accordance with Article 19.

4.4. A competent authority which refuses to grant EEC type-approval shall inform the party concerned who may also obtain copies of the reports on the examinations and the tests. The Commission and the other competent authorities appearing in the lists notified in accordance with Article 19 shall also be informed.

5. Symbols relating to EEC type-approval

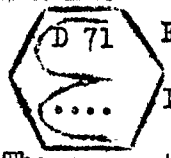
5.1. Symbol of EEC type-approval followed by EEC inspection:

Example : EEC type-approval granted by the competent authority of the Federal Republic of Germany in 1971 (see item 3.1. first indent).

Identification number of the EEC type-approval (see item 3.1. second indent).

5.2. Symbol of EEC type-approval for appliances exempt from EEC inspection:

Example : EEC type-approval granted by the competent authority of the Federal Republic of Germany in 1971.



Identification number of the EEC type-approval.

5.3. The separate directives may establish the dimensions and positions of the symbols relating to EEC type-approval.

Unless otherwise specified in the separate directives, the actual diameter of the circles described about the symbols shall be 6.3 mm or 12.5 mm.

ANNEX II

EEC component type-approval

1. Application for EEC component type-approval

1.1. The application and the correspondence relating to it shall be drawn up in the official language (or one of the official languages) of the State to which the application is made. This Member State has the right to require that the annexed documents should also be drawn up in the same official language.

The competent authority of the Member State receiving the application shall immediately forward a copy of it to the competent authorities of the other Member States.

1.2. The application shall contain the following information :

- the name and address of the manufacturer or the firm, or of his or its authorized representative or of the applicant;
- the category of lifting or mechanical handling appliance for which the component is used;
- the technical characteristics of the components;
- the commercial designation if any.

1.3. The application shall be accompanied by :

1.3.1. the documents necessary for its examination, in triplicate[1], in accordance with the specifications of the separate directives and any other information laid down therein;

1.3.2. a declaration to the effect that no other application for EEC component type-approval has been submitted for the same type of component;

1.3.3. where appropriate, documents relating to national approvals already granted.

2. Examination for EEC component type-approval

2.1. The examination for EEC component type-approval shall be carried out on the basis of the manufacturing design and on the type of component. This examination shall comprise all the examinations and tests laid down in the separate directives.

2.2. The separate directives for the various categories of lifting or mechanical handling appliances shall determine the field of application, the safety factors and the nature and the quality of the materials that may be used in the manufacture of such components. ./.

1 - Intended for the competent authority, the body responsible for the examinations and testing and the applicant..

ANNEX II

3. Certificate and symbol of EEC component type-approval

3.1. The certificate shall give the results of the examination of the type and shall specify the other requirements to be satisfied. It shall be accompanied by the descriptions, drawings and plans necessary to identify the type and where necessary to explain its functioning. The approval symbol provided for in Article 9 of this Directive shall be a stylized letter E containing:

- in the upper part, the distinguishing capital letter of the State which granted the approval (B for Belgium, D for the Federal Republic of Germany, DK for Denmark, F for France, I for Italy, IR for Ireland, L for Luxembourg, NL for the Netherlands, UK for the United Kingdom) and the last two digits of the year of approval;
- in the lower part, the distinguishing symbol of the competent authority which granted approval followed by the identification number of the EEC component type-approval.

Examples of the approval symbols are shown in items 5.1. and 5.2. of this Annex.

3.2. The symbols referred to in the previous item, which are affixed by the manufacturer in accordance with the provisions of this Directive, must be easily visible, legible, irremovable and indestructible on each component.

4. Publication of EEC component type-approval

4.1. EEC component type-approvals shall be published in a special Annex to the Official Journal of the European Communities.

4.2. At the same time as the party concerned is notified, copies of the EEC certificate of component type-approval shall be sent to the Commission and to the other competent authorities appearing in the lists notified in accordance with Article 19; these authorities may also obtain copies of the reports on the examination and tests carried out.

4.3. Withdrawal of EEC component type-approval shall be notified to the party concerned who shall also receive copies of the reports on the examinations and the tests. Withdrawal shall also be notified to the Commission and to the other competent authorities appearing in the lists notified in accordance with Article 19.

4.4. A competent authority which refuses to grant EEC component type-approval shall inform the party concerned who may also obtain copies of the reports on the examinations and the tests. The Commission and the other competent authorities appearing in the lists notified in accordance with Article 19 shall also be informed.

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ANNEX II

5. Symbols relating to EEC component type-approval

5.1. Symbol of EEC component type-approval followed by EEC inspection.

Example : EEC component type-approval granted by the competent authority of the Federal Republic of Germany in 1971 (see item 3.1. first indent).

Identification number of the EEC component type-approval (see item 3.1. second ident).

5.2. Symbol of EEC component type-approval exempt from EEC inspection.

Example : EEC component type-approval granted by the competent authority of the Federal Republic of Germany in 1971.

Identification number of the EEC component type-approval

5.3. The separate directives may establish the dimensions and positions of the symbols relating to EEC component type-approval.

Unless otherwise specified in the separate directives the actual diameter of the circles described about the symbols shall be 6.3 mm or 12.5 mm.

ANNEX III

EEC inspection

1. General

1.1. EEC inspection may be carried out in one or more stages.

1.1.1. Subject to the provisions of the separate directives :

- EEC inspection shall be carried out in one stage on lifting or mechanical handling appliances or components which constitute a whole on leaving the factory, that is to say those which, theoretically, can be transferred to their place of installation without first having to be dismantled and be ready for the use for which they are intended;

- EEC inspection shall be carried out in two or more stages on lifting or mechanical handling appliances or components whose correct functioning depends on the harmonious dovetailing of several elements or devices.

1.1.2. The first stage of the inspection procedure must ensure in particular that the lifting or mechanical handling appliance or component conforms to the approved model or type.

2. Nature of EEC inspection

EEC inspection comprises the examinations and tests laid down in the separate directives. It may possibly include a check to assess the validity of the lifting or mechanical handling appliance or component under normal conditions of service.

3. EEC inspection marks

3.1. Definition of the EEC inspection marks.

3.1.1. Subject to the provisions of separate directives, the EEC inspection marks which are affixed in accordance with item 3.3. of this Annex shall be as follows :

3.1.1.1. The EEC inspection mark shall be composed of two stamps :

a) the first consists of a small letter "e" containing:

- in the upper half, the distinguishing capital letter of the State where the initial inspection is carried out (B for Belgium, D for the Federal Republic of Germany, DK for Denmark, F for France, I for Italy, IR for Ireland, L for Luxembourg, NL for the Netherlands and UK for United Kingdom) together, where necessary, with one or two numbers identifying a territorial subdivision;

- in the lower half, the identification number of the inspection body;

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ANNEX III

b) the second stamp shall consist of the last two digits of the year of inspection in a hexagon.

3.2. Shape and dimensions of the marks

The attached drawings show the shape, dimensions and outline of the letters and numbers for the EEC inspection marks as laid down in item 3.1.; the first two drawings show the various parts of the stamp, the third is an example of a stamp. The dimensions given in the drawing are relative values; they are a function of the diameter of the circle described about the small letter "e" and about the field of the hexagon.

Separate directives may lay down the position and dimensions of the EEC inspection marks.

Unless otherwise specified in separate directives, the actual diameters of the circles described about the marks shall be 6.3 mm or 12.5 mm.

The inspection bodies of Member States shall mutually exchange the original drawings of the EEC inspection marks, conforming to the models in the annexed drawings.

3.3. Affixing the marks

3.3.1. The EEC inspection mark shall be affixed at the appointed location on the lifting or mechanical handling appliance or component when the latter has been completely inspected and is recognized to conform to EEC requirements.

3.3.2. The EEC inspection mark affixed by the inspection body on each lifting or mechanical handling appliance or component must be easily visible, legible, irremovable and indestructible.

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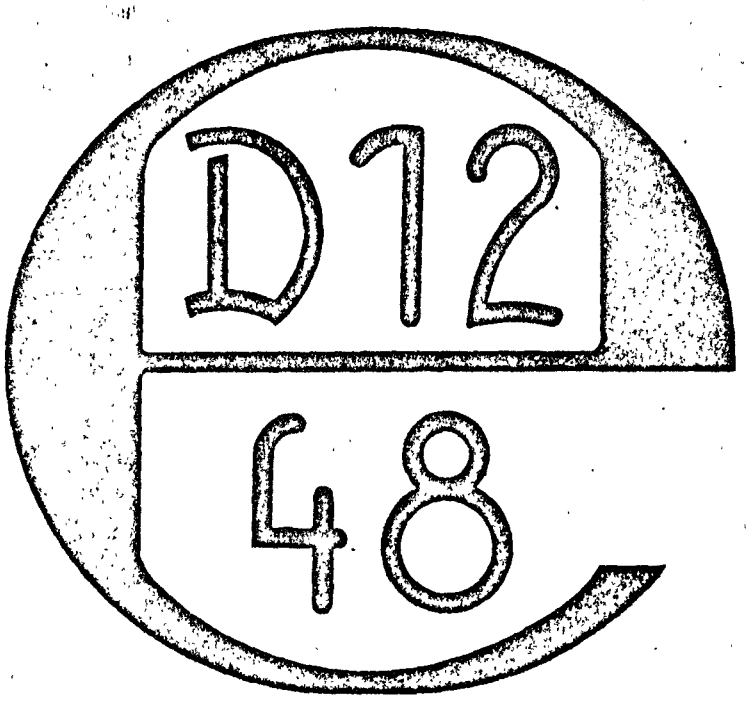
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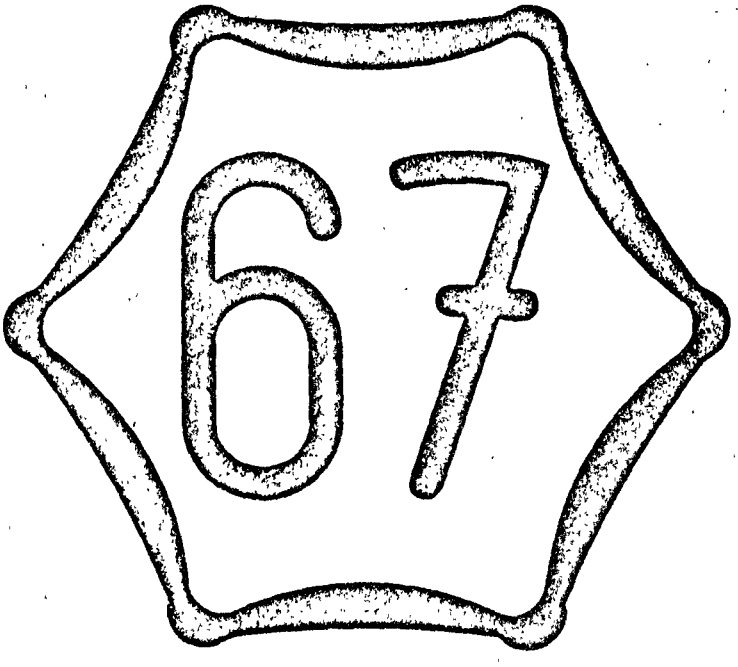
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ANNEX IV

Criteria to be taken into account by Member States when designating inspection bodies responsible for carrying out examinations and tests prior to certification for EEC type-approval, EEC component type-approval and EEC inspection

1. The inspection body, its director and the officials responsible for carrying out the inspection operations may not be the manufacturer, the supplier or the erector of the lifting or mechanical handling appliances which they inspect or the representatives of any of those parties. They may not be engaged in the marketing, representation or maintenance of the lifting or mechanical handling appliances or their components or be the agents of persons engaged in such activities.

2. The inspection body must carry out its inspection operations with the highest level of professional integrity and technical competence, and be free from all commercial pressures which might influence its technical judgment.

3. The inspection body must have access to the equipment necessary for the normal inspection operations for which it is approved.

4. The officials responsible for inspections must have :

   a) satisfactory knowledge of the regulations concerning the checks they have to carry out and sufficient experience in the conduct of such inspections;

   b) the necessary ability to draw up the certificates, records and reports authenticating the inspections carried out.

5. Independence of personnel must be assured by adequate guarantees of employment. Remuneration must not be fixed in relation to the financial results of the organization or the number of inspections carried out.

6. The inspection body shall accept civil liability for the harmful consequences resulting from incomplete or faulty inspection. This civil liability shall be covered by an insurance policy for an adequate amount.

7. The inspection body shall ensure that all designs or documentation forwarded to it by the manufacturer or his representative are kept confidential.

PROPOSAL FOR A COUNCIL DIRECTIVE ON THE APPROXIMATION OF THE LAWS OF THE MEMBER STATES RELATING TO ELECTRICALLY OPERATED LIFTS

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 100 thereof;

Having regard to the proposal from the Commission;

Having regard to the Opinion of the European Parliament;

Having regard to the Opinion of the Economic and Social Committee;

Whereas in the Member States the construction and inspection of electrically operated lifts are subject to mandatory provisions which differ from one Member State to another, and consequently hinder trade in such lifts; whereas it is therefore necessary to approximate these provisions;

Whereas the rules concerning the installation and tests carried out at the time of inspection before entry into service and the performance checks for these appliances effect their manufacture, which differ from one Member State to another must therefore also be harmonised;

Whereas the Council Directive of ....., on the approximation of the laws of the Member States relating to common provisions on lifting and mechanical handling appliances has laid down in particular the procedures for EEC type-approval, EEC component type-approval and EEC inspection for these appliances; whereas in accordance with that Directive, it is necessary to lay down the technical requirements to be satisfied by electrically operated lifts and their essential components (locking devices, landing doors, speed governors, safety gears, hydraulic buffers) in order to be imported, marketed and used without restraint after they have undergone inspection and the marks and symbols laid down have been affixed to them;

HAS ADOPTED THIS DIRECTIVE :

PROPOSAL FOR A COUNCIL DIRECTIVE

on approximation of the laws of the Member States relating to electrically operated lifts

Article 1

1. This Directive applies to fixed hoisting appliances, serving specific levels, having an electrically operated car fitted up for the conveyance of persons and goods, and moving at least partly between vertical guides inclined at an angle of less than 15° to the vertical, hereinafter referred to as "lifts".

2. This Directive does not cover passenger, goods or service lifts not driven by an electric motor, appliances actuated by fluids (such as oil and hydraulic lifts), or hoisting appliances know as : paternosters, rack and pinion elevators, screw-driven elevators, mine lifts, theatre elevators, automatic loading appliances, skips, lifts and goods hoists on building or public work sites, ships'hoists, construction or maintenance equipment, lifts used for offshore oil prospecting and lifts for the disabled.

Article 2

1. Without prejudice to Article 3, no Member State may refuse, prohibit or restrict the installation and entry into service of lifts, if such lifts satisfy the requirements in Annex I and their conformity has been established prior to entry into service, at the time of the acceptance inspection, by checks and tests carried out in accordance with the provisions in Annex IV of this Directive.

2. The technical provisions in Annex I shall not preclude Community or national measures concerning the construction of buildings and in particular fire protection.

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3. The examination requested by a Member State as part of prior authorization to installation shall be conducted in accordance with the provisions in Annex III to this Directive.

4. Maintenance and periodic inspection either after extensive modification or after an accident shall be carried out in accordance with the provisions in Annex I, Chapter M and Annex V.

Article 3

No Member State may refuse, prohibit or restrict the placing on the market or the use for construction and installation of the following components for lifts, if they conform to the approved type, bear the EEC symbol of component type-approval and are accompanied by a certificate of conformity made out by the manufacturer.

1. locking devices;
2. landing doors;
3. speed governors;
4. safety gears;
5. hydraulic buffers.

Article 4

The Member States shall take all necessary measures to ensure that EEC component type-approval for the components referred to in Article 3, a specimen of which is given in Annex VI, is granted when they satisfy the technical requirements in Annex I of this Directive and have successfully undergone the tests specified in Annex II.

Article 5

Amendments to the Annexes necessary to adjust this Directive to technical progress shall be made pursuant to Article 5 of the Council Directive of 19 November 1973 on the approximation of the laws, regulations and administrative provisions of the Member States relating to the certification and marking of wire-ropes, chains and hooks.

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Article 6

1. The Member States shall put into force the laws, regulations and administrative provisions needed in order to comply with this Directive within eighteen months of its notification and shall forthwith inform the Commission thereof.

2. Member States shall communicate to the Commission the text of the provisions of national law which they adopt in the field covered by this Directive.

Article 7

This Directive is addressed to the Member States.

A N N E X E S

Summary

ANNEX I

DEFINITIONS

The following definitions are intended to indicate precisely the technical sense in which the terms are used in the Annex to the Directive.

For convenience of reference they are listed in alphabetic order rather than grouped according to use.

Available Area (Surface utile)

The available area of the car is defined as the area measured at a height of 1,0 m above floor level, disregarding handrails, which is available for passenger or goods during operation of the lift.

In the case of a lift car without a door, a strip of 0,1 m in width in front of each car threshold is not reckoned in the available area calculation.

Authorised user and instructed user (Usager autorisé et averti)

A person authorised by those responsible for the lift to use it, and who has received instructions relative to its use.

Buffer (Amortisseur)

A deformable stop at the end of travel, and comprising a means of braking using fluids or springs (or other similar means).

Guides (Guides)

The components which provide guiding for the sling of the car or the counterweight.

Instantaneous Safety gear (Parachute à prise instantanée)

A safety gear in which the full gripping action on the guides is almost immediate.

Instantaneous Safety Gear with buffered effect (Parachute à prise instantanée avec effet amorti)

A safety gear in which the full gripping action on the guides is effected by almost immediate locking, but the reaction on the supported car is limited by the presence of an intermediate elastic system.

Levelling (Nivelage)

An operation which improves the accuracy of stopping at landings.

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Annex I

Lift (Ascenseur)

A permanent lifting equipment serving defined landing levels comprising a car whose dimensions and means of construction clearly permit the access of persons running at least partly between guides which are vertical or whose inclination to the verticle is less than 15°.

Lift Machine (Machine)

The unit comprising motor and gear which drives and stops the lift.

Lift Car (Cabine)

A part of the lift or service lift which carries the persons or other loads.

Machine Room (Machinerie ou local des machines)

Area in which are placed the lift machine and/or control equipment.

Minimum breaking load of a lifting rope (Charge de rupture minimale d'un cable)

This load is the product of the cross section of the nominal diameter of the rope (in square millimetres) and the nominal resistance to force of the wires (in Newtons per square millimetre) and a coefficient appropriate to the type of rope construction (ISO/DIS 2532).

The effective breaking load obtained in a rupture test on a sample of rope following a defined method, shall be at least equal to the minimum breaking load, defined above.

Motor car lift (Monte-voitures)

A lift whose car is suitably dimensioned for carrying private motor cars.

Overspeed Governor (Limiteur de vitesse)

A device, which on the lift attaining a pre-determined speed, causes the machine to stop, and if necessary causes the safety gear to be applied.

Passenger means any person carried on a lift.

Pit (Cuvette)

The part of the well situated below the lowest stop level served by the lift.

Positively coupled drive lift (Ascenseur à treuil attelé)

A lift whose lifting ropes or chains are driven by means other than friction.

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Progressive safety gear (Parachute à prise amortie)

A safety gear in which gripping is effected by a braking action on the guides and for which steps are taken so as to limit the force on the supported car to a permissible value.

Rated Load (Charge nominale)

The load for which the equipment has been built and for which normal operation is guaranteed by the lift maker.

Rated Speed (Vitesse nominale)

The speed of the lift for which the equipment has been built and for which normal operation is guaranteed by the lift maker.

Safety gear (Parachute)

A mechanical device for stopping, and maintaining stationary on the guides, the lift car or counterweight in case of overspeeding in the downward direction, or rupture of the lifting ropes.

Self releveling (Isonivelage)

An operation after the lift stops to permit the stopping position of the car to be corrected during loading or unloading, if necessary by successive movements.

Sling (Etrier)

The metal framework carrying the car or counterweight, connected to the means of suspension.

Toe Guard (Garde Pieds)

An apron having a smooth vertical surface extending downwards from the sill of the landing or car entrance.

Traction Drive lift (Ascenseur à adhérence)

A lift whose lifting ropes are driven by friction in the grooves of the driving sheave of the machine.

Unlocking Zone (Zone de déverouillage)

A zone, extending above and below the stopping level and in which the car floor must be in order for the landing door to be able to be unlocked.

User (Usager)

A person employing the services of a lift or service lift installation.

Well (Gaine)

The space in which the car and/or counterweight travels. This space is bounded by the bottom of the pit, the walls of the enclosure and the roof of the well.

TECHNICAL REQUIREMENTS

A - LIFT WELL

A.1. General

A.1.1. The requirements of this chapter relate to wells containing one or more lift cars.

A.1.2. The counterweight of a lift shall be in the same well as the car.

A.2. Well enclosure

A.2.1. Each well shall be totally enclosed by imperforate walls, as defined in A.3.

The only permissible openings are

- landing doors (see section C)
- inspection and emergency doors of the well, and inspection trap doors of the well from the machine room (A.2.2.)
- vent openings for escape of hot gases and smoke in the event of fire
- ventilation openings (A.2.3.)
- permanent openings between the well and the machine or pulley rooms.

A.2 A.2.1.1. If the requirements of national regulations are not too restrictive it may be permitted :

a) to limit the height of wall enclosure on faces other than the entrance face, to a height of 2.5 m above any points normally accessible to persons.

b) At the entrance face of the well to use mesh or perforated panels from a height of 2.5 m above landing level (the panels are not required if the car door locks mechanically).

The dimensions of the mesh or perforations shall not exceed 75 mm measured either horizontally or vertically.

A.2.2. Inspection or Emergency doors - Inspection trap doors

A.2.2.1. Inspection of emergency doors, and inspection trap doors shall only be authorised on grounds of safety to users or the requirements of servicing.

Inspection doors shall have a minimum height of 1.4 m. Emergency doors shall have a minimum height of 1.8 m and a minimum width of 0.3 m.

A.2.2.1.1. Where there is a long stretch of lift well without a landing door there shall be provided at least at each third floor, at a distance apart not exceeding 11 m, the means of evacuating passengers. This is not required if there is an emergency door on the car (instance of adjoining cars - D.1.2.4.).

A.2.2.2. Inspection or emergency doors and inspection trap doors shall not open towards the interior of the well.

Operation of the lift shall depend on the maintenance in the closed position of these doors and trap doors. For this purpose security contacts shall be employed, following the conditions of use presented in the Table N° I.

These doors and trap doors shall be provided with a key operated lock, but be capable, even when locked, of opening from inside the well without a key.

A.2.2.3. Inspection or emergency doors and inspection trap doors shall be solid and satisfy the same requirements for mechanical strength as the landing doors.

Under the trap doors providing access to the well from the machine room floor a mesh panel shall be maintained capable of taking the weight of a man. This panel shall only be raised while being handled.

Inspection and emergency doors shall have the same fire resistance as the walls in which they are fixed.

A.2.3. Ventilation of the well

The well shall be suitably ventilated. It shall not be used to provide ventilation of machine rooms other than those for the individual lift installation, nor for a machine room if it is not situated over the well.

Even though not specified in national regulations it is recommended making provision for ventilation orifices in the upper part of the well, over a minimum of 1 % of the well surface, either to the outside or to the machine and pulley rooms.

A.3. Walls of the Well

The structure of the well shall be able to support the loads of the machine, the guides at the moment of safety gear operation and buffer operation.

A.3.1. The walls of the well shall :

a) be made of incombustible materials
b) have sufficient mechanical strength

NOTE : In the case of lifts without a car door, the following criteria shall apply for the wall facing the car entrance :

It shall suffer no elastic or permanent deformation exceeding 10 mm, when a horizontal force of 300 N is applied to the wall at any point of either side, this force being evenly distributed over an area of 0.0025 m^2, in a round or square section.

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Annex I

A.4. Construction of the walls of lift wells and landing doors facing a car entrance

A.4.1. The following requirements relating to landing doors walls or parts of walls, facing a car entrance, shall be applicable to the full height of the well.

For clearance between car and lift well enclosure, see Chapter G.

A.4.2. The assembly comprising the landing doors and a wall or part of the wall enclosure facing the car entrance, shall form a continuous surface over the full entrance width of the car.

A.4.3. (I) For lifts with car doors :

a) Below each landing door threshold over a vertical distance of not less than half the unlocking zone plus 50 mm the wall of the lift well shall comply with the requirements of clause A.4.3.(2) a) below.

It shall be :

- either extended to the lintel of the next landing door;
- or lengthened below using a hard smooth chamfer whose angle to the horizontal shall be higher than 60°, preferably 75°, the chamfer need not be carried back to the wall of the well. This chamfer shall be restricted to 50 mm in length if the distance between the toe guard and the back of the well is greater.

b) Outside this zone, the horizontal distance between the well and sill or entrance frame of the car or door (or edge of doors in the case of sliding doors) shall not exceed 0,15 m. This requirement has the aim of preventing :

- danger of falling down the well
- a person introducing himself in normal circumstances into the gap between car door and well (it is with this in mind that the measurement of 0.15 m shall be taken, particularly in the case of interlinked telescopic doors).

Exceptions

1) A horizontal distance of 0.2 m may be permitted :

a) over a vertical distance of 0.75 m (max)

or

b) in the case of lifts with vertical sliding landing doors.

2) The conditions laid down in A.4.3.(1) b) need not be observed if the car is provided with a mechanically locked door which can only be opened in the unlocking zone of a landing door.

The operation of the lift shall depend on the locking of the car door. The lock shall be controlled by an electrically motivated safety device in accordance with conditions for use laid down in the table No I (particular case C.7.2.1.).

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A.4.3. (2) For lifts without car door :

a) The assembly described in A.4.2. shall form a continuous vertical surface composed of elements smooth and hard, such as metal and hard facings or materials equivalent so far as concerns friction. Plaster faced walls are forbidden.

b) Any projections shall be less than 5 mm. Projections exceeding 2 mm shall be chamfered at least 75° to the horizontal.

c) When landing doors are provided with recessed handles the depth of the recesses on the well side shall not exceed 30 mm or be wider than 40 mm. The upper and lower surfaces shall make an angle of at least 60° and if possible 75° with the horizontal. The position of the handles or bars shall reduce the risk of being cought up and shall not allow of fingers either being trapped or squeezed.

A.5. Protection of spaces possibly located underneath the path of the car or counterweight

A.5.1. Preferably lift wells shall not be situated above a space accessible to persons.

A.5.2. If spaces are underneath the path of the car or counterweight the base of the pit shall be designed on the basis of a load of at least 500 kg/m^2, and :

a) there shall be installed below the counterweight buffer a solid pier extending down to solid ground, or

b) alternatively the counterweight shall be equipped with safety gear.

A.6. Well containing cars or counterweights belonging to several lifts or service lifts

A.6.1. In the bottom of the well there shall be a partition between the moving parts (car or counterweight) of different lifts or service lifts.

This screen shall extend at least from the lowest point of travel of the moving parts to a height of 2.5 m above the floor of the pit.

A.6.2. Further, if the horizontal distance between the cage of the car roof and a moving part (car or counterweight) of an adjacent lift or service lift is less than 0,3 m the screening called for in A.6.1. shall be extended through the full height of the well and over the effective width.

This width shall be at least equal to that of the moving part (or part of this) which one wishes to guard, increased by 0,10 m at both sides.

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A.7. Top clearances - lift well

A.7.1. Top clearances for traction drive lifts

A.7.1.1. When the counterweight rests on its fully compressed buffer, the three following conditions shall be satisfied at the same time :

1) The guided movement of the car, still possible in the upward direction, shall be at least 0.035 V2, distance in metres, V (the rated speed) in metres per second.

2) The free height above the car roof shall be at least 1.00 m plus 0.035 V2.

3) The free distance between the lowest parts of the roof of the well and :

a) the highest pieces of equipment fixed on the top of the car shall be at least 0,3 m plus 0.035 V2

b) the highest part of the guide shoes or rollers or as the case may be from the pediment or vertical sliding door equipment shall be at least 0,1 m plus 0.035 V2.

A.7.1.2. When the car rests on its totally compressed buffers the guided movement of the counterweight still possible in the upward direction shall be at least 0.035 V2, distance in metres, V (the rated speed) in metres per second.

A.7.1.3. When the deceleration of the lift is controlled, in accordance with Clause H.8., the value of 0.035 V2 used in A.7.1.1. and A.7.1.2. for calculation of distances may be reduced:

a) by ½ for lifts whose rated speed $\leq$ 4 m/s, with a minimum of 0.25 m

b) by 2/3 for lifts whose rated speed $>$ 4 m/s, with a minimum of 0.25 m.

A.7.1.4. For lifts which are fitted with compensating ropes having a tensioning pulley equipped with a lock-down device in the event of sudden ascent, the value of 0.035 V2 may be replaced in the above formulae by a figure related to the possible travel of that pulley (double for a two rope pulley-block) plus 1/1000e of the travel with a minimum of 0,2 m to take account of the rope elasticity

A.7.2. Top clearance for drum drive lifts

A.7.2.1. When the car is at the top floor, the guided movement of the car, still possible in the upward direction, before the buffers come into action, shall be at least 0.5 m

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A.7.2.2. When the car is in contact with the fully compressed upper buffers the following conditions shall be satisfied at the same time.

1) The free distance above the car roof shall be at least equal to 1 m.

2) The free distance between the lowest part of the roof of the well and :

a) the highest pieces of equipment fixed on the car top, with the exception of those referred to in b) shall be at least 0.3 m

b) the highest part of the guide shoes or rollers shall be at least 0.1 m.

A.7.2.3. When the car rests on the fully compressed buffers the guided movement of the counterweight, still possible in the upward direction, shall be at least 0.3 m.

A.7.3. Pit

A.7.3.1. A lift pit shall be provided at the bottom of the lift well which is approximately level and with a smooth finish, with the exception of possible buffer base plates and water outlets.

After the building - in of guide fixings, buffers, meshes etc. the pit shall be imprevious to infiltration of water.

A.7.3.2. (1) If there is an access door to the pit, other than the landing door, it shall comply with the requirements of Clauses A.2.2.2. and A.2.2.3.

Such a door must be provided if the pit depth exceeds 2.5 m.

(2) If no other access is provided or if the pit depth exceeds 1.30 m a fixed ladder shall be provided in the well easily accessible from the landing door to permit competent personnel to descend safely into the pit. This shall not project into the clear running space of the lift equipment.

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A.7.3.3. Protection under the car

When the car rests on its fully compressed buffers the following conditions shall be simultaneously fulfilled.

1) There must be in the pit free space sufficient to accomodate a rectangular block 0.5 x 0.6 x 0.8 reposing on any one of its faces.

2) The clear distance between the bottom of the pit and :

   a) the lowest portions of the car except for items detailed in b) should be at least 0.3 m.

   b) the lowest parts of the guide shoes or rollers, of safety gear blocks, toe guards or parts of vertical sliding doors, shall be at least 0.1 m.

A.7.3.4. Pit stop current switch

Servicing personnel having to work in the pit must have the facility in the pit :

1. of a stop switch, making it possible to stop the lift and hold it in the stop position, eliminating the risk of error for that relative position. This switch must comply with the conditions laid down in the table I.

   Restoring the lift to service shall only be possible by a deliberate act by such personnel.

2. of lighting current.

A.8. Exclusive use of the lift well

A.8.1. The well shall be exclusively for the lift. It shall not contain electric cables, trunking equipment etc. other than for the lift. (The well may contain heating equipment for the lift well, however, the required equipment for control and adjustment of the machine shall be located on the outside).

A.9. Lighting of the well

The well shall be provided with permanent artificial lighting installation sufficient for emergency winding or servicing, even when all landing doors are closed. This illumination shall comprise one lamp, 0.50 m maximum from the highest and lowest points in the well with intermediate lamps at 7 m, maximum spacing.

If use is made of the exception given in A.2.1.1. this artificial lighting could be that existing around the lift well.

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B - MACHINE AND PULLEY ROOMS

B.1. General

B.1.1. Machines, their control gear and pulleys shall normally be accessible only to personnel concerned with servicing the lift (maintenance, inspection and emergency).

B.1.2. The machines, their control gear and pulleys shall be in areas specially assigned to them, consisting of a door, walls, floor and ceiling.

B.1.2.1. If there is nothing to the contrary in national requirements machines, their control gear and pulleys may be in areas serving other purposes (e.g. special passages for access to balconies) if they are separated by an enclosure at least 1.8 m high, the access door having a key operated lock.

B.1.3. In no case shall machine or pulley rooms, or enclosures referred to in B.1.2.1., be used for purposes other than lifts. They shall contain no tubing or other equipment other than for the lift. (They may however contain heating equipment for the machine room or equipment for associated service lifts and escalators. However the required equipment for control and adjustment of the heating appliance shall be located on the outside).

B.1.4. Machine rooms shall, preferably, be placed above the well.

B.1.4.1. When the machine rooms are above the well, exceptionally a deflection pulley for diverting ropes passing to the counterweights may be installed in the well on condition that its shaft can be attended to in complete safety from the car top.

B.2. Access

B.2.1. Access from the public way to the interior of the machine and pulley rooms shall be easy and safe throughout in all circumstances, well illuminated and without the need for passing through private accommodation.

B.2.1.1. The access path to the machine rooms and the entrance itself must be of a minimum height of 1.8 m. Threshold and flanges which do not project beyond 0.4 m are not taken into consideration.

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B.2.2. Access for personnel to machine rooms should, for preference, be effected entirely by way of stairs. likewise for pulley rooms.

B.2.2.1. If stairs are not possible, ladders may be used which satisfy the following conditions :

a) - they shall not be liable to slip or to turn over,

b) - they shall when in position form an angle of no more than 70° with the horizontal, unless they are fixed and their height is less than 1.50 m,

c) - they shall be exclusively used for this purpose and be kept at all times at disposal in close proximity, the necessary provisions shall be made in this regard,

d) - on arrival at the upper part of the ladder persons shall have one or two hand holds available.

B.2.3. Means of access must be provided for handling of heavy materials for installation, or for repairs, so that this can be done in optimum safety conditions, especially avoiding handling on staircases.

B.3. Design and Construction of Machine Rooms

B.3.1. Mechanical strength, floor surface, sound insulation.

B.3.1.1. Machine rooms shall be so constructed to withstand the loads and the forces to which they will normally be subjected.

They shall be in durable material not favouring the creation of dust.

B.3.1.2. Machine room floors shall not be slippery.

B.3.1.3. When the function of the building requires it (e.g. dwellings, hotels, hospitals, schools, libraries, etc.) the walls floors and ceilings of machine rooms must be constructed or treated to absorb substantially the sounds associated with the equipment, in compliance with national regulations.

B.3.2. Dimensions

B.3.2.1. The dimensions of machine room shall be sufficient to permit easy and safe access for servicing personnel to all the equipment, especially the controller.

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In particular there shall be provided :

a) - a free space over the width of each of the panels or cubicles (of at least 0.5 m) and 0.7 m in depth to give access to the components;

b) - a free space of at least 0.5 m x 0.6 m for servicing and inspection of moving parts at points where this attention is necessary;

c) - access ways to these free space which must have a width of at least 0.5 m.

Exception : The width of 0.5 m may be reduced to 0.4 m in areas where there are no moving parts.

B.3.2.2. In no case shall the free height for access or working be less than 1.8 m if national regulations do not specify a higher figure.

B.3.2.2.1. This height is taken to exclude roof beams and measured from :

a) the floor of the access area

b) the floor of the working area

B.3.2.3. There shall be a free vertical distance of at least 0.3 m above the rotating parts of the machine.

B.3.2.4. When the machine room comprises a number of service levels, the height of which differs by more than 0.5 m, stairways or steps shall be provided.

B.3.2.5. When the machine room includes conduits of which the depth is greater than 0.5 m and the width less than 0.5 m, they must be covered.

B.3.3. Access Doors and Trap Doors

B.3.3.1. Entrance doors shall have a minimum width of 0.6 m unless National Regulations impose higher values. They shall not open towards the interior of the room.

B.3.3.2. Access traps shall give a clear passage at least 0.80 m x 0.80 m.

When they are closed they must be capable of supporting the weight of persons likely to be there.

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The traps must be counterpoised and open upwards, unless they are associated with collapsible ladders. When a trap is in the open position measures shall be taken to prevent the fall of persons or materials (e.g. a guard rail).

B.3.3.3. The access and trap doors shall be provided with a key operated lock making it possible to open them from the inside of the room without a key.

B.3.3.3.1. Trap doors which only give access to equipment shall be locked from the inside.

B.3.4. Other Openings

The dimensions of holes in the supports and machine room floor shall be reduced to a minimum, with the aim of removing the danger of objects falling through.

To this end, for openings situated above the well and for electric cables ferrules shall be used, which project at least 0.05 m above the floor level.

B.3.5. Ventilation and Temperature

B.3.5.1. Machine rooms shall be ventilated. They shall be such that the motors, control equipment as well as electric conduits are protected so far as possible from dust, fumes and humidity.

Stale air from other parts of the building shall not be extracted into the machine room.

B.3.5.2. The ambient temperature in the machine room shall be maintained between + 5 °C and + 40 °C.

B.3.6. Lighting

The electric lighting of the machine room shall be provided on the basis of at least 200 lux at floor level.

This lighting should be independent of the power supply to the machine, and may be fed from a separate source or from a point on the line supplying the machine, but before the main switch.

A light switch, placed inside, or in proximity to an access and at normal height shall enable the light to be put on before entering. One or more socket outlets shall be provided.

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B.3.7. Handling of Material

One or more metal supports or hooks as appropriate, shall be provided in the machine room ceiling, or beams, conveniently disposed to permit the hoisting of heavy equipment during erection or its replacement. The maximum permissible load shall be indicated on these supports or hooks.

B.4. Design and Construction of pulley rooms

B.4.1. Mechanical strength, floor surface

B.4.1.1. The pulley rooms shall be constructed in a manner to support the loads and forces to which they will normally be subjected.

They shall be in durable material, not favouring the creation of dust.

B.4.1.2. Their floors shall not be slippery.

B.4.2. Dimensions

B.4.2.1. Pulley room dimensions shall be sufficient to provide easy and safe access for servicing personnel to all the equipment.

In particular there shall be a free space at least 0.5 m x 0.7 m (0.7 measured perpendicular to the access face of the pannel or cubicle) in front of electrical control panels to give access to the components.

B.4.2.2. The height under the roof shall be at least 1.5 m. If there are electrical contact panels in the pulley room, the requirements of B.3.2.2. will apply.

There shall be a free vertical distance of 0.3 m above the pulleys, except in the case of double wrap or deflection pulleys.

B.4.3. Access Doors and Trap Doors

B.4.3.1. Access doors shall have a minimum height of 1.40 m and a minimum width of 0.6 m, unless National Regulations impose higher values.

B.4.3.2. Access traps shall give a clear passage of at least 0.80 m x 0.80 m.

When they are closed they must be capable of supporting the weight of persons likely to be there.

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The traps shall be counterpoised and open upwards, unless they are associated with collapsible ladders.

When a trap is in the open position, measures shall be taken to prevent the fall of persons or materials (e.g. a guard rail).

B.4.3.3. Access doors and trap doors shall be provided with a key operated lock making it possible to open them from the inside of the room without a key.

B.4.4. Other openings

The dimensions of holes in the supports and pulley room floor shall be reduced to a minimum with the aim of removing the danger of objects falling through.

To this end, for openings situated over the well and for electric cables, ferrules shall be used which project at least 0.05 m above the floor level.

B.4.5. Stop Switch

There shall be installed in the pulley room a stop switch, marked with the "stop" position, the switch shall conform to the conditions given in the table I, making it possible to stop the lift and hold it in the stop position, eliminating the risk of error for that position.

B.4.6. Temperature

The ambient temperature in the pulley room shall be maintained between + 5 °C and + 40 °C.

B.4.7. Lighting

All necessary measures shall be taken to provide sufficient electric lighting in the pulley room. A light switch, placed inside or in close proximity to an access, shall enable the light to be put on before entering.

One or more socket outlets shall be provided.

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Annex I

C - LANDING DOORS

C.1. General

C.1.1. The openings in the well giving access to the lift car shall be provided with solid doors.

When closed, the clearance between panels, or between panels and uprights, lintels or sills shall be as small as possible.

This condition is adequately fulfilled if the clearance does not exceed 10 mm. The clearance shall be measured from the bottom of the groove, if there is one.

To avoid the risk of shearing during operation, the exterior face of automatic sliding doors shall not have recesses or projections exceeding 3 mm. Edges shall be chamfered.

C.1.2. For details of internal faces of landing doors see A.4.

C.2. Strength of doors and their frames

C.2.1. Doors and their frames shall be constructed in such a way that they will not become deformed in the course of time. To this end, it is recommended that they are made of metal.

The use of glass, even armoured or of plastic materials for a wall or part of a wall is only permitted for vision panels (see C.6.2.2.).

C.2.2. Resistance to fire

Landing doors shall satisfy at least the criteria laid down in Annex II, Chapter B. (doors), based on fire tests in accordance with ISO Standard 3008.

C.2.3. Mechanical Strength

Doors and their locks shall possess mechanical strength and rigidity such that under a horizontal force of 300N applied at any point on either face, being mainly perpendicular evenly distributed over an area of 0.0005 m^2 in round or square section, the locked door shall

- resist permanent deformation
- deform elastically no more than 15 mm
- operate satisfactorily after such a test.

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C.2.3.1. Under the application of the forces defined above, in the case of door-less cars the elastic deformation of the landing doors towards the well interior shall not exceed 5 mm.

C.2.3.2. Under the application of manual force (without a tool) of 300N, in the direction of opening of the door, the clearances defined in C.1.1. may be greater than 10 mm, but must not exceed 30 mm.

C.3. Height and Width of doors

C.3.1. Height

Landing doors shall have a minimum clear height of 2.00 m.

C.3.2. Width

The free width of the landing entrances shall not be greater or less than the car entrance by 0.1 m unless appropriate precautions are taken.

C.4. Sills guides, door suspension

C.4.1. Sills

Every landing entrance shall incorporate a sill of sufficient strength to withstand the passage of loads being introduced into the car. It is recommanded to provide for a slight reverse slope in front of each landing sill.

C.4.2. Guides

C.4.2.1. Landing doors shall be designed to avoid derailment, jamming or displacement at the extremities of their travel.

C.4.2.2. Horizontal sliding landing doors shall be guided top and bottom.

C.4.2.3. Vertical sliding landing doors shall be guided at both sides.

C.4.3. Suspension of vertical sliding doors

C.4.3.1. Panels of vertical sliding landing doors shall be fixed to two independent suspension points.

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C.4.3.2. Suspension elements shall be calculated with a safety factor of at least 8.

C.4.3.3. Cable pulley diameters shall be at least 25 times the cable diameter.

C.4.3.4. Cables shall be guarded against leaving the pulley grooves.

C.5. Protection in relation to door closure

C.5.1. The doors and their surroundings shall be designed in such a way as to minimise risk of damage or injury due to a jamming of a part of the body, clothing or an object.

C.5.2. Doors with automatic closing must be designed to reduce to a minimum the undesirable consequences of a person being struck by a door panel. To this end the following criteria shall apply :

C.5.2.1. Horizontal Sliding Doors

C.5.2.1.1. Doors with automate movement.

1) No matter what its position the force necessary to prevent the closing of the doors shall not exceed 150 N.

2) The kinetic energy of the landing door and the mechanical elements to which it is rigidly connected, calculated at the average closing speed (x) shall not exceed 10 J.

A sensitive protection device shall cause the automatic reopening of the door in the event of a passenger being struck in crossing the entrance during the closing movement.

a) the protective device can be part of the car door;

b) the effect of the device can be neutralized during the last 50 mm of movement of each door panel.

(x) The average closing speed of a sliding door is calculated on the total travel reduced by :

- 25 mm at each end of travel in the case of centre closing doors,
- 50 mm at each end of travel in the case of side closing doors.

C.5.2.1.2. Doors of which the closing movement takes place under the permanent control of the users (e.g. by continuous pressure on a button).

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When the kinetic energy, calculated as stated in C.5.2.1.1.2. exceeds 10 J, the closing speed of the door panels shall be restricted to 0,3 m/s.

C.5.2.2. Vertical sliding doors

Automatic closing of this type of door is authorized if all the following conditions are fulfilled :

1) The lift is specifically for the conveyance of accompanied loads.

2) The closing movement is carried out under the permanent controle of the users.

3) The closing speed of the door panels is restricted to 0.3 m/s.

4) The car door is equipped with a mesh panel as provided for in the exception in D.6.1.

5) The car door is atleast two-third closed before the sliding door begins to close.

C.5.2.3. Other types of doors

Where use is made of other types of doors (e.g. swivel doors), with the risk on opening or closing of striking the users precautions similar to those specified above shall be taken.

C.6. Local lighting and parking signal lights

C.6.1. Natural or artificial lighting of the landings in the vicinity of landing doors shall be at least 50 lux, such that a user can see what is ahead of him when he is opening the landing door to enter the lift, even if the car light has failed.

C.6.2. Car present indication

C.6.2.1. In the case of landing doors with manual opening, the user must be able to know, before opening the door, whether the car is there or not.

C.6.2.2. To this effect, there shall be installed :

1) preferably one or more vision panels conforming to the mechanical strength requirements of Clause C.2.3., and whose thickness is at least 0.006 m.

a - The minimum area of vision panel shall be at least 0.01 m^2. Each landing door shall have vision panel area of at least 0.015 m^2.

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b - The width of vision panels shall not be less than 0.06 m, nor greater than 0.15 m.

c - The lower edge of vision panels which are wider than 0,08 m, shall be at least 1 m above floor level.

2) Alternatively an illuminated 'car present' signal which can only light up when the car is about to stop or has stopped at the particular landing. The signal shall remain illuminated all the time the car remains there.

C.7. Locking and closed landing door proving devices

C.7.1. Protection against the risk of falling down the well

It must not be possible in normal functioning to open a landing door (or any of the panels in the case of multi-panel door) unless the car has stopped, or is on the point of stopping, in the unlocking zone of that door.

C.7.1.1. The unlocking zone shall not exceed 0,2 m above or below the landing level.

However, in the case of power operated car and landing doors (coupled) the unlocking zone may not exceed 0,35 m, above or below the landing level.

C.7.2. Protection against shearing

It shall not be possible to make the lift start or to continue in motion if a landing door is open, (or any of the panels in the case of multi-panel door). However operations preparatory to car movement may take place.

C.7.2.1. Particular cases

Operation with the car landing doors open is permitted in the following zones :

1) In the unlocking zone to permit levelling or self re-levelling at the corresponding floor level, provided the requirements of clause K.2.1.2. are met.

2) Above the serving level in a zone extending to a maximum height above landing level of 1.65 m to permit the loading or unloading of lifts reserved for the use of authorised and instructed users, providing the requirements of clauses D.4.1.2. and K.2.1.5. are met :

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a)- In such cases the free height between the landing door header and the floor of the car must not be less than 2,00 m.

b)- Whatever the position of the car inside this zone, it must be possible, without special manoeuvre, to ensure the complete closure of the landing door.

C.7.3. Locking and emergency unlocking

Each landing door shall be provided with a locking device satisfying the requirement of clause C.7.1. This device shall be protected against deliberate misuse.

C.7.3.1. The effective locking of the landing door shall precede the movement of the car. The locking must be proved by an electric security device, satisfying the requirements in the table I.

1) The car cannot start until the mechanical locking elements are engaged by at least 7 mm (see Annex II, Chapter A).

2) The connection between one of the contact elements which breaks the circuit, and the device which proves the mechanical locking shall be direct and normally 'non-adjustable'.

C.7.3.2.

1) Mechanical locking of hinged doors shall be effected as near as possible to the closing edge(s) of the doors, and maintained properly even if panels are deflected.

2) The locking elements and their fixings shall be resistant to shock, and be made or reinforced with metal.

3) The engagement of the locking elements shall be achieved in such a way that a force in the opening direction of the door does not diminish the effectiveness of engagement.

4) The lock shall resist at least a force in the opening direction of :

- 1000 N in the case of sliding doors,
- 3000 N on the locking pin, in the case of hinged doors.

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5) The locking action shall be effected and maintained by the action of gravity, permanent magnets, or springs. The springs shall act in compression be guided and of such dimensions that at the moment of unlocking, the coils are not compressed solid.

   a) In event of failure or removal of the permanent magnet or spring, gravity shall not cause unlocking.

   b) If the locking element is maintained in position by the action of a permanent magnet, it shall not be possible to neutralise its effect by simple means (e.g. heat or shock ...).

6) The locking device shall be protected against the risk of an accumulation of dust which could hinder its proper functioning

7) Inspection of the working parts must be easy, as for example by use of a vision panel.

8) In the case where the lock contacts are in a box the fixing screws for the cover shall be of the captive type.

C.7.3.3. Emergency unlocking

Each of the landing doors must be capable of being opened from the outside with the aid of a special key, in the form of a triangle shown in Figure I (page 84).

A specimen of this key must not be given to responsible persons unless accompanied by a written instruction detailing the indispensible precautions to take in order to avoid accidents which could result from an unlocking which was not followed by effective re-locking.

1) After an emergency unlocking with this key, the locking device shall not remain in the unlocked position with the landing door closed, when the key has been removed from its unlocking position.

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2) In the case of coupled car and landing doors, a device (either weight or springs) shall ensure the automatic closing of the landing door if this door becomes open, for whatever reason, when the car is outside the unlocking zone.

C.7.4. Door closed proving device

Each landing door shall be provided with an electric device for proving the closed position, which satisfies the conditions imposed by Clause C.7.2. and conforms to the requirements for electric security devices in accordance with the table I.

C.7.4.1. In the case of horizontal sliding landing doors, coupled with car doors, the device referred to in C.7.4. may be in common with the device for proving the locked condition, provided that this device ensures positive closing of the panel.

C.7.4.2. In the case of hinged landing doors, the device referred to in C.7.4. shall be placed beside the lock or on the mechanical device proving the closed condition.

C.7.5. Requirements common to devices for proving the locked condition and the closed condition of the door

C.7.5.1. The devices for proving the locked condition and the closed condition of doors shall conform to the requirements of Clause K.1.2. "Electric security devices", and shall be chosen to satisfy the requirements for use according to Table I.

C.7.5.2. It shall not be possible from positions normally accessible to users, to operate the lift with a door open or unlocked, after one action not forming part of the normal operating sequence.

C.7.5.3. If a mechanical means is used for proving the position of a locking element, its functioning shall be positive.

C.7.6. The case of horizontal or vertical sliding doors with multiple panels, mechanically interlinked

C.7.6.1. When a horizontal or vertical sliding door comprises several panels which are directly mechanically linked, it is permitted to satisfy the requirement of C.7. to :

1) To lock only one panel, on condition that this single locking will prevent the opening of the other panels.

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2) To place the device for proving the closed condition, as provided for in C.7.4. or C.7.4.1. on a single panel.

C.7.6.2. When the panels are indirectly linked (e.g. by cable, chain or wire) such linkage shall be designed to resist any normally anticipated forces, be constructed with special care, and checked periodically.

1) It is permitted to lock only one panel on condition that this single locking will prevent the opening of other panels, which shall not be provided with a handle.

2) The closed condition of the unlocked panels must be proved electrically.

C.8. Locking by key of landing doors

All landing doors on lifts available to all users shall be capable of opening from within the car without a key, the car being in the stopped position, at least within the unclocking zone.

D - CAR AND COUNTERWEIGHT

D.1. Height of Car

D.1.1. The interior height of the car shall be at least 2 m.

D.1.2. The clear height of the car entrance(s) serving normal users must be at least 2 m.

D.2. Internal Area of car

D.2.1. To prevent the number of passengers exceeding that corresponding to the rated load of the lift, the available area of the car must be limited. To this end the relationships between nominal load and maximum available area is determined from the Table following :

Rated Load (kg)	Maximum (+) Car available Area. m2	Maximum number of Persons
100	0,40	1
180	0,50	2
225	0,70	3
300	0,90	4
375	1,10	5
400	1,17	5
450	1,30	6
525	1,45	7
600	1,60	8
630	1,66	8
675	1,75	9
750	1,90	10
825	2,05	11
900	2,20	12
975	2,35	13
1.000	2,40	13
1.050	2,50	14
1.125	2,65	15
1.200	2,80	16
1.275	2,95	17
1.350	3,10	18
1.425	3,25	19
1.500	3,40	20

(+) Recesses and extensions, even of height less than 1 m, whether protected or not by separating doors, are only permitted if their area is taken into account in the calculation of maximum available car area.

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Beyond 1500 Kg, add 0.16 m^2 for each 100 Kg extra
For intermediate loads - The area is determined by linear interpolation. - Max. No. of persons is obtained from the formula $\frac{\text{Rated Load}}{75}$ rounded down to the nearest whole number. If the rated load exceeds by more than 15 % that indicated in the table for the appropriate area, the maximum number of persons shall be that corresponding to the area.

D.2.2. Particular Cases

(1) Lifts other than for motor-cars, and for which the use is reserved for authorised and instructed users.

The requirements of Clause D.2.1. shall be applied and one must furthermore take into account in design calculations not merely the load carried but also the weight of trucks etc. entering the car for loading purposes.

(2) Motor-car lifts reserved for authorised and instructed users.

The rated load shall be calculated on the basis of at least 200 kg per square metre, of the usable car area.

D.3. Sides, floor and roof of the car

D.3.1. The car shall be completely enclosed by solid sides, floor and roof, the only authorised openings being as follows :

a) Entrances for the normal use of users
b) Trap doors and Emergency doors
c) Ventilation holes

D.3.2. The sides, floor and roof :

a) shall have sufficient mechanical strength (D.3.2.1.)

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b) shall preserve, in the case of fire and for the necessary time period, their mechanical strength, and they shall not be made of materials likely to become dangerous through too great inflammability or through the nature and volume of gas and fumes they may generate.

D.3.2.1. (1) The assembly comprising the support, guide-blocks, sides, the floor and the roof shall have sufficient mechanical strength to resist the forces which will be applied to them in normal lift useage, in safety gear or buffer operation.

(2) The sides of the car shall have a mechanical strength and rigidity such that they suffer no permanent deformation at any point, this force mainly upright being distributed over an area of 0.0005 m^2 round or square. The elasticity deformation shall not exceed 15 mm.

D.4. Toe guards

D.4.1. Each car sill shall be fitted with a toe guard of which the vertical part extends over the full width of the landing entrance which it faces. This vertical section shall be extended towards the lower edge by a chamfer whose angle with the horizontal shall be greater than 60°, and if possible 75°. This chamfer must be at least 50 mm in length.

D.4.1.1. The height of the vertical position shall be at least 0.75 m.

D.4.1.2. In the case of lifts with docking manoeuvre (K.2.1.5.) the height of the vertical portion shall be such that with the car in the highest loading position, it extends at least 0.10 m below the landing sill.

D.5. Closing of car entrance

D.5.1. Car entrances shall be provided with a door.

D.5.1.1. While the presence of a door is preferable in all cases, it may however be permitted for lifts, specialising in the transport of accompanied loads that one or two separate car entrances need not have doors if, in addition to the provisions of D.2.1., the following conditions are simultaneously fulfilled :

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1) The lift is restricted to the transport of authorised and instructed users.

2) The rated speed of the lift does not exceed 0.63 m/s.

3) The depth of the car measured from the sill, having no door, is greater than 1.5 m.

4) The maximum number of passengers admissible in the car must be calculated as stated in D.2.1., for this purpose the maximum usable area being reduced by a zone having the width of the doorless entrance and a depth of 0,1 m.

D.6. Car Doors

D.6.1. The car doors must be imperforate.

Particular cases : For lifts intended for transport of accompanied loads, one may use vertically sliding car doors, in mesh or performated panel form in which the dimensions of the mesh shall not exceed 60 mm horizontally or 60 mm vertically.

D.6.1.1. In the closed position the clearance between panels or between panels and uprights, lintels or sills shall be as small as possible, such that there is no risk of shearing. This condition is considered to be adequately fulfilled when the clearances do not exceed 10 mm. The clearances are measured to the bottom of crevices if these exist.

D.6.1.2. In the case of hinged doors they shall strike stops to prevent them swinging outside the car.

D.6.1.3. All vision panels incorporated in car doors shall satisfy the requirements of clause C.6.2.2. (1).

D.6.1.4. Car doors, when closed shall, but for the required clearances, have the same dimensions as the corresponding car entrance.

Particular case : In the case of a lift the use of which is restricted to authorised and instructed users having a car entrance height greater than 2.5 m, the height of the car door may be limited to 2 m if the following conditions are simultaneously fulfilled :

a) the door closes vertically,
b) the rated speed does not exceed 0,63 m.

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D.6.2. Sills, guides, door suspension

The requirements of C.4. must be adhered to.

D.6.3. Mechanical strength

The car doors in the closed position shall possess mechanical strength and rigidity such that under a mainly upright horizontal force of 300 N from the inside to the outside of the car, this force being distributed over an area of 0,0005 m^2 round or square :

- the doors shall withstand permanent deformation;
- the doors shall withstand elasticity deformation greater than 15 mm;
- they shall subsequently meet their operational requirements.

D.7. Protection through door operation

D.7.1. The doors and their surrounds shall be designed such that users cannot be nipped in a dangerous manner.

To avoid the risk of shearing during mechanical operation of sliding doors, the faces of the doors near the car, shall not have recesses or projections of more than 3 mm. Edges shall be chamfered.

D.7.2. Power operated doors shall be designed to minimise the consequences of a person being struck by a door panel. To this effect the following requirements shall be met.

D.7.2.1. Horizontal sliding doors

D.7.2.1.1. Automatic moving doors

1) Whatever the position, the force to prevent the door closing shall not exceed 150 N.

2) The kinetic energy of the car door and of the mechanical elements which are rigidly connected to it and calculated at the average speed of closing (+) shall not exceed 10 J.

(+) The average closing speed of sliding doors is calculated as stated in C.5.2.1.1.

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A protection device shall be required which causes automatic re-opening of the door in the event of a passenger being struck by the door in crossing the entrance during the closing movement.

The effect of the device may be cancelled during the last 50 millimetres movement of each door panel.

D.7.2.1.2. Doors of which the closing is carried out under the permanent control of users (e.g. by continuous pressure on a button).

When the kinetic energy calculated as stated in D.7.2.1.2.2) exceeds 10 J, the closing speed of the panels shall be restricted to 0,3 m/s.

D.7.2.2. Vertical sliding doors

Mechanical closing of this type of door is authorised if the following conditions are complied with :

1) The lift is specifically for the conveyance of accompanied loads.

2) The closing is carried out under the permanent control of users.

3) The closing speed of the panels is restricted to 0,6 m/s.

D.8. Requirements for entrance cars of lifts without doors

D.8.1. When a car entrance has no door, it must be used in such a way as to reduce the risks of pincing or crushing between the car sill and the wall of the well, a photo-electric cell or similar device is used, the failure of which shall prevent self-starting of the lift.

D.9. Closed car door proving contacts

D.9.1. It shall not be possible to start the lift nor keep it in motion if a car door (or one panel of a multipanel door) is open. However, all the preliminary operations may be carried out.

D.9.1.1. Particular cases

Movement of the lift with car door open is permitted under the conditions of clauses C.7.2.1.(1) and (2).

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D.9.2. The closed car door proving device shall comply with the requirements of clause K.1.2. "Electric security devices", and be chosen according to operating requirements in table I of this Annex.

D.10. Horizontal or vertical sliding doors comprising several mechanically interlinked panels

D.10.1. If a vertical or horizontal sliding door comprises several directly linked panels, it is permitted :

1) to place the closed door proving device on a single panel (on the high-speed panel for telescopic doors);

2) to place the closed door proving device on the driving equipment of doors if there is direct linkage between that equipment and the panels;

3) having regard, as appropriate to the locking mechanism described in exception (2) a) of paragraph A.4.3.(2) to lock only one panel on condition that this single locking prevents the opening of the other panels (by the engaging of the panels in the closed position in the case of telescopic doors).

D.10.2. If the panels are indirectly linked (e.g. by wire-rope, belts or chains) such means of linkage must be designed to resist any normally anticipated forces, constructed with special care anc checked periodically.

(1) It is permitted to place the electrical closed door proving device on a single manel, provided that :

a) this is not the driven panel,

b) that the driven panel is coupled directly to it.

D.11. Opening the car door

D.11.1. In order to permit passengers to leave the lift if the lift stops for whatever reason with the car near a landing, it shall be possible with the car stopped and the door operator (if there is one) shut off :

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1) to open or partly open the car door by hand from the landing,

2) to open or partly open by hand from within the car, the car door and the linked landing door, in the case of doors operating simultaneously.

D.11.2. (1) The opening of the car door in the circumstances foreseen in D.11.1. shall be effected at least within the unlocking zone.

(2) The force necessary to open the door in this instance shall not exceed 300 N.

D.11.3. The opening of a lift car door, the nominal speed of which exceeds 1 m/s, shall require a force greater than 50 N. This requirement is not obligatory in the levelling zone.

D.12. Trap doors and emergency or inspection doors

D.12.1. Assistance to passengers in the car must always come from outside, being provided in particular by the emergency device mentioned in clause H.5.

D.12.2. If there is an emergency trap in the car top to permit the evacuation of passengers it should measure at least 0.35m x 0.50m.

D.12.3. An emergency trap or door shall be provided in lifts with doorless cars, to permit the possible emergency evacuation of passengers and in lifts referred in A.2.2.1.

D.12.4. Emergency doors may be used in the case covered by clause A.2.2.1.1., on condition that the horizontal distance between cars does not exceed 0.75 m.

Emergency doors if used shall measure at least 1.8 m high and 0.3 m long.

D.12.5. If trap doors emergency or servicing doors are used, they shall conform to the following requirements on grounds of safety :

D.12.5.1. Trap doors and emergency or inspection doors shall be self-locking.

D.12.5.1. (1) Trap doors and emergency doors shall be opened from outside without a key. If there is a special

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requirement for opening from inside the car; this shall necessitate the use of the special key described in Figure I (page 84).

(2) Trap and emergency doors shall not open inwards.

(3) Trap and emergency doors in the open position shall not project beyond the edge of the lift car.

D.12.5.1.2. (1) Emergency doors shall be opened from outside without a key and from inside with a special key of the type described in Figure I (page 84).

(2) Emergency doors shall not open outwards from the car.

(3) Emergency doors shall not be located in front of the path of the counterweight or of fixed obstacles (with the exception of beams separating the cars) preventing passage between one car and another.

D.12.5.2. The locking action called for in clause D.12.5.1., shall be proved by means of an electric security device satisfying the requirements of clause K.1.2. and chosen according to the conditions of use detailed in table I.

(1) This device must cause the lift to stop if the locking ceases to be effective.

(2) Restoring the lift to service must only be possible after the effective relocking by a person entrusted with the care or servicing of the lift.

D.13. Car roof

D.13.1. Further to the requirements of D.3.2.

(1) the car roof must be able to support at any point, without permanent deformation, two men or 200 kg.

(2) the roof of the car must provide at one point a free area for standing of at least 0.12 m^2, in which the lesser dimension is at least 0.25 m.

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D.13.1.1. If there are pulleys on the car top, they must be provided with devices :

a) for worker protection,
b) to prevent the ropes leaving their grooves
c) to prevent the introduction of foreign bodies between ropes and grooves.

These devices must be so constructed as not to prevent the proper inspection of the pulleys.

D.14. Front of the car

D.14.1. If the height of the landing entrance is greater than the car entrance, (e.g. in the case of a lift with docking manoeuvre), the upper part of the car entrance header must be extended upwards, over the width of the landing entrances which it faces, by a rigid vertical panel to exceed the maximum difference in height between car and landing entrances.

D.15. Equipment on car top

(1) Control Station : see K.2.1.3.
(2) Stopping Device : see K.2.2.3.
(3) Socket outlet : see D.17.2.
(4) Data plate : see L.3.

D.16. Ventilation

D.16.1. Cars with imperforate doors shall be adequately ventilated, taking into consideration the time necessary for possible breakdown service.

D.16.1.1. The effective area of ventilation orifices situated in the upper part of the car shall be at least 1 % of the used car floor area, the same for orifices in the lower part of the car.

The gaps round the door panels may be taken into account in the calculation, to the amount of 50 % of the total value.

D.16.1.2. Ventilation holes shall be built or guarded in such a way that it is not possible to pass a rigid rod 10 mm diameter through the car sides into the well.

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D.17. Lighting, Current

D.17.1. Lighting

The car shall be provided with permanent electric light ensuring a light intensity of at least 50 lux at the level of the floor and the control panels.

(1) If incandescent lamps are used, at least two lamps shall be provided connected in parallel.

(2) There shall be an emergency supply automatically charged which, in the event of the cutting off of the normal current supply, is capable of feeding at least one watt lamp for 1 hour. This emergency lighting must come on in the event of failure of the normal lighting.

(3) The supply referred to in (2) above may be used to feed the emergency alarm signal called for in K.2.3.

D.17.2. Socket Outlet

A socket outlet shall be installed on the car roof.

D.18. Counterweights

D.18.1. If the counterweight incorporates filler weights, necessary measures shall be taken to prevent their displacement. To this effect the following measures shall be taken :

(1) there may be a frame in which the fillers are held secure,

(2) if the fillers are metallic, and if the nominal car speed does not exceed 1 m/s, there may be a minimum of two tie-rods, on which the filler weights are held.

D.18.2. If there are pulleys on the counterweight they shall incorporate devices for :

a) preventing wire ropes jumping from the grooves
b) preventing the introduction of foreign bodies between ropes and grooves (or between chains and pinions).

These devices shall be so constructed as not to prevent the proper inspection of the pulleys.

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E - SUSPENSION AND SAFETY GEAR

E.1. Types of suspension, number of ropes and chains

E.1.1. Car and counterweights shall be suspended from steel wire ropes in accordance with the specifications of the draft standard on steel wire ropes for lifts, ISO/TC 105/SC 3.

As an exception the use of steel chains with parallel links (of the Galle type or roller chains) is authorised for lifts in which the speed of the chains does not exceed 0.63 m.p.s.

E.1.2. In the case of traction sheeves the minimum number of ropes shall be two.

The ropes shall be independent.

E.1.3. In the case of drum drive the minimum number of ropes shall be two

1) The ropes shall be independent.
2) There must be no counterweights.

E.1.4. Where reeving is used, the number to take into account is that of the ropes and not the falls.

E.1.5. The minimum number of chains shall be two.

The chains shall be independent.

E.2. Relation between diameter of pulleys and sheaves (or drums) and diameter of ropes. Safety factor of ropes and chains

E.2.1. The ratio between the pitch diameter of pulleys or drums and the nominal diameter of the lifting ropes shall be at least 40, regardless of the number of strands.

E.2.2. The lifting ropes shall be calculated with a safety factor of at least :

- 12 in the case of traction drive with three lifting ropes, or more
- 16 in the case of traction drive with two lifting ropes,
- 12 in the case of drum drive.

E.2.2.1. The safety factor is the ratio between the breaking strength of the suspension system, obtained by multiplying the number of ropes (or the falls in the case of reeving) by the minimum breaking load of rope and the total suspended static load.

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The static suspended load is the sum of the rated load of the lift, the car weight, the weight of ropes over the length of travel and the additional weight due to the travelling cables and possibly compensating ropes.

E.2.3. The safety factor of the rope attachments shall be at least 80 % of that of the ropes.

E.2.4. Suspension chains shall be calculated with a safety factor of at least 10.

E.2.4.1. The safety factor is determined in a similar manner to that specified for ropes in E.2.2.1.

E.2.5. The safety factor of chain attachment shall be at least 80 % of that of the chains.

E.3. Rope traction (for traction drive lifts) - specific pressure

E.3.1. Rope traction (see Annexe III-5.b) shall be such that :

a) It shall not be possible to raise the car by starting the machine, in the up direction when the counterweight is resting on the buffers.

b) It shall not be possible to raise the counterweight by starting the machine, in the down direction when the car is resting on the buffers.

E.3.2. The specific pressure of the suspension ropes in the sheave grooves shall satisfy the requirements of clause 5.c of Annex III.

E.4. Winding up of ropes (for drum drive lifts)

E.4.1. When the car or counterweight rests on its fully compressed buffers, one and a half turns of rope shall remain on the drum.

E.4.2. There shall only be one layer of rope wound on the drum.

E.4.3. The deflection angle of the ropes in relation to the grooves shall not exceed 4°.

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E.5. Equalisation of load between the ropes or the chains

E.5.1. A device shall be provided for automatically equalising the tension of suspension ropes or chains, at least at one of their extremities.

E.5.1.1. For chains engaging with pinions, the ends fixed to the car as well as to the counterweight shall be provided with such an equalisation device.

E.5.1.2. Double return pinions shall be independent.

E.5.2. If for this purpose springs are used they shall work in compression.

E.5.3. In the case of the car having a two rope or two chain suspension an electric security switch shall cause the lift to stop in case of relative abnormal extension of one rope or chain.

E.5.3.1. The switch shall conform to the requirements of clause K.1.2. "Electric security switch", and be chosen according to service requirements in table I of this Annex.

E.5.4. The devices for adjusting the length of ropes or chains shall be made in such a way that they cannot work loose after adjustment.

E.6. Compensating ropes

E.6.1. When compensating ropes are used, they shall be tensioned if the rated speed of the lift exceeds 2.5 m/s.

1) The tension shall be provided by gravity.

2) The tension must be controlled by the safety device referred to in table I of this Annex.

3) The ratio between the original diameter of the pulleys and the rated diameter of the compensating ropes shall be at least 30.

E.6.2. When the rated speed of the lift exceeds 3.5 m/s there shall in addition be an anti-rebound device.

1) The operation of the anti-rebound device shall stop the lift machine, by means of the electric safety device referred to in table I of this Annex.

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E.7. Protection of pinions, return pulleys used for rope deflection, reeving and compensation

E.7.1. Necessary measures shall be taken to avoid :

a) ropes leaving their grooves,
b) the introduction of foreign bodies between ropes and grooves (or between chains and pinions).

The devices used shall be so constructed that they do not prevent inspection of the pulleys or pinions.

E.8. Safety gears

E.8.1. General

E.8.1.1. The car shall be provided with a safety gear capable of stopping solely the downward moving fully laden car even in free fall by gripping the guides, and of holding it there.

E.8.1.2. In the case envisaged in clause A.5.1., exception b, the counterweight shall also be equipped with safety gear, operating only on a downward moving counterweight.

E.8.1.3. It is not permitted to apply a safety gear in upwards motion.

E.8.2. Conditions of use for different types of safety gear

E.8.2.1. Car safety gears shall be of the gradual type if the rated speed of the lift exceeds 1 m/s. They can either be

1) of instantaneous operation with buffered effect if the rated speed does not exceed 1 m/s,

2) Instantaneous operation if the rated speed does not exceed 0.63 m/s.

E.8.2.2. If the car carries several safety gears they shall all be of the progressive type.

E.8.2.3. The safety gears of the counterweight shall be of the progressive type if the rated speed of the lift exceeds 1 m/s. they may be of the instantaneous type otherwise.

E.8.3. Methods of tripping

E.8.3.1. The safety gears of the car and counterweight shall be tripped by a speed governor.

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Particular Case : The safety gear of counterweights may be tripped by the failure of the suspension gear or by a safety rope if the rated speed of the lift does not exceed 1 m.p.s.

E.8.3.2. The tripping of safety gears by devices which operated electrically, hydraulically or pneumatically is forbidden.

E.8.4. Deceleration

For progressive safety gears the average deceleration after tripping the car descending in free fall with rated load in the car shall lie between 0,2 g and g (g being the gravity acceleration).

E.8.5. Release of Safety Gear

E.8.5.1. The release of the safety gear on the car (or the counterweight) shall only be possible by raising the car (or the counterweight).

E.8.5.2. The release of the safety gear must be carried out by a person competent to restore the service.

E.8.5.3. After release the safety gear shall be ready for normal operation again.

E.8.6. Constructional requirement

E.8.6.1. It is forbidden to use the jaws of safety gears as guide shoes.

E.8.6.2. For safety gears of the instantaneous type with buffered effect, the design of the elastic system shall be based on the dissipation of energy, satisfying the requirements of F.4.2.

E.8.6.3. The safety gear operating equipment shall be kept in the bottom part of the car. In the case of multiple safety gears at least one shall meet this requirement.

E.8.7. Deflection of the car platform in the case of safety gear operation

When the safety gear operates (any load being uniformly distributed) the floor of the car must not deflect more than 5 % from its normal position.

E.9. Speed Governors

E.9.1. Tripping of the car safety gear by the speed governor shall occur at a speed at least equal to 115 % of the rated

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speed and less than

a) 0.80 m/s for instantaneous safety gears (except on the captive roller type);

b) 1 m/s for safety gears of the captive roller type;

c) 1,50 m/s for instantaneous safety gears with buffered effect;

d) $1.25\ V + \frac{0,25}{V}$ for other types of safety gear (V being rated lift speed).

E.9.1.1. For lifts of which the rated speed exceeds 1 m/s it is recommended that a resetting speed be selected as near as possible to the upper limit specified in E.9.1.

E.9.2. For lifts with very heavy loads and low speeds the speed governor shall be built specially. It is recommended to choose a tripping speed as close as possible to the minimum limit fixed in E.9.1.

E.9.3. The operating speed of a speed governor for a counterweight safety gear shall be higher than that for the car safety gear, by a margin not exceeding 10 %.

E.9.4. The force exerted by the speed governor shall be at least twice that necessary for tripping the safety gear, with a minimum of 300 N.

E.9.5. The direction of rotation shall be marked, corresponding to that for tripping the safety gear.

E.9.6. Speed Governor Ropes

E.9.6.1. The speed governor shall be driven by a very flexible wire rope.

E.9.6.2. The breaking strain of the rope shall be related to the operating force by a safety factor of at least 8.

E.9.6.3. The nominal rope diameter shall be at least 6 mm.

E.9.6.4. The ratio between pulley pitch diameter and nominal rope diameter shall be at least 30.

E.9.6.5. The rope shall be tensioned by a tensioning pulley.

This pulley or its counterweight (if this exists) shall be guided.

E.9.6.6. At the moment of engagement of the safety gear tearing or deformation of the rope shall not be possible even in the case of excessive braking distance.

E.9.6.7. The rope shall be readily detachable from the safety gear.

E.9.7. Idle time

The idle time of the speed governor shall be sufficiently short not to permit the speed reaching a dangerous value before tripping the safety gear.

E.9.8. Accessibility

The speed governor shall be located in the machine room or pulley room.

E.9.9. Operation

It shall be possible to operate the safety gear at a lower speed than that indicated in Clause E.9.1. by tripping the governor in some recognised manner.

E.9.10. The speed governor shall be sealed after setting the speed.

E.9.11. Electrical Interlock

E.9.11.1. When the car safety gear operates, a device mounted on it shall cause the motor and brake circuits to open before or at the moment of safety gear operation.

E.9.11.2. The speed governor or another device shall cause the lift to stop before the car speed either up or down reaches the mechanical tripping speed of the governor.

1) However for rated speeds not exceeding 1 m/s this device may operate at the tripping speed.

2) If after release of the safety gear the speed governor does not automatically re-set itself, an electric security device shall prevent restarting of the lift until the speed governor is re-set.

An exception is made in the case referred to in K.2.1.4.3.

The restoration to service must be carried out by a competent person.

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E.9.11.3. The breakage or slackening of the governor rope shall cause the lift to stop.

E.9.11.4. The electrical control devices required in Clause E.9.11. shall satisfy the requirements of Clause K.1.2. "Electric security device and be chosen accordang to conditions of use in the Table I.

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F - GUIDES, BUFFERS AND STOPPING DEVICES

F.1. General on Guides

F.1.1. The strength of the guides (Annex III - 5.d), their fixings and joints shall be sufficient to withstand the forces imposed due to the operation of the safety gear deflection or due to uneven loading of the car. This deflection shall be limited to a value that will not effect the normal operation of the lift.

F.1.2. The fixing of the guides to their brackets and to the building shall permit compensation, either automatically or by simple adjustment, of effects due to normal settling of the building or shrinkage of concrete. The design of guide clips shall be such that rotation does not release the guide.

F.2. Guiding of the car and counterweight

F.2.1. The car and counterweight shall be guided by at least two rigid steel guides.

F.2.1.1. If the rated speed exceeds 0.4 m/s the guides shall be of drawn steel or shall have their rubbing surfaces machined.

F.2.1.2. The requirement of F.2.1.1. shall apply whatever the speed, when progressive safety gear is used.

F.3. Car and Counterweight Buffers

F.3.1. Buffers shall be placed at the bottom limit of travel of the car and counterweights.

F.3.1.1. If the buffers travel with the car or counterweight they shall strike against a pedestal of at least 0.5 m height, at the end of the terminal.

Particular Case : This requirement is not imposed on counterweight buffers if access under the counterweight is impossible to servicing or inspection personnel in the well (for example : by a wire mesh guard, whose mesh conforms to Clause A.2.1.1.b.).

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F.3.2. Drum drive lifts shall also be provided with buffers on the car top to function at the upper limit of travel.

F.3.2.1. If these lifts are provided with counterweights these upper buffers shall not function until the counterweight buffers are fully compressed.

F.3.3. Lifts whose rated speed exceeds 1 m/s shall be provided with buffers, which function through energy dissipation.

F.3.3.1. Lifts which have a rated speed not exceeding 1.6 m/s shall be provided with buffers functioning through dissipated energy having return movement shock absorption.

F.4. Stroke of Car and counterweight buffers

F.4.1. Buffers other than those functioning through energy dissipation

F.4.1.1. The total stroke of the buffers shall be at least equal to twice the gravity stopping distance corresponding to the governor tripping speed.

In any event the stroke shall not be less than 65 mm.

F.4.1.2. Buffers shall be designed to travel the distance defined in F.4.1.1. under a static load of between 2 to 3 times the weight of the car plus its rated load (or the weight of the counterweights).

F.4.2. Buffers functioning through energy dissipation

F.4.2.1. The total stroke of the buffer shall be at least equal to the gravity stopping distance corresponding to 115 % of the rated speed of the lift ($0.067\ V^2$).

F.4.2.1.1. Exception

In the case of buffers functioning through dissipated energy having return movement shock absorption the total stroke of the buffers shall be at least equal to twice the gravity stopping distance corresponding to 115 % of the rated speed ($0,134\ V^2$).

F.4.2.2. When the retardation of the lift at the terminal floor is controlled by a device, satisfying the requirements of paragraph H.8., the speed with which the car (or counterweights) will come in contact with the buffers, may be used instead of the rated speed when calculating the buffer stroke by use of the formula in F.4.2.1.

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However, the stroke thus reduced, may not be less than :

1) 50 % of the stroke calculated from F.4.2.1. if the contract speed does not exceed 4 m/s.

2) 33 1/3 % of the stroke calculated from F.4.2.1. if the contract speed exceeds 4 m/s.

In any event the reduced stroke shall not be less than 0.42 m.

F.4.2.3. With the rated load in the car, in free fall the average deceleration of the buffers shall not exceed g, nor exceed 2.5 g in any period exceeding 1/25 sec. (g being the gravity acceleration).

F.4.2.4. The operation of the lift shall depend on the return of the buffers to their normal position after operation. The switch used for this shall be chosen according to conditions of use in Table I of this Annex.

F.4.2.5. Buffers, if hydraulic, shall be so constructed that the fluid level may easily be checked.

F.5. Final Limit Switches

Final limit switches shall be provided.

F.5.1. (1) Final limit switches shall come into operation as close as possible to the terminal floors, without risk of accidental operation.

(2) They shall operate as stated in F.5.3. before the car (or counterweight if there is one) comes into contact with the buffer. Limit switch action shall continue until buffer compression is complete.

F.5.2. Control of final limit switches

F.5.2.1. It is forbidden to use control circuits common to terminal stopping and final limit switches.

F.5.2.2. Opening of the final limit switches must be effected

1) In the case of drum drive

either

(a) by a device linked to the movement of the machine,

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(b) or by the car and counterweight at the top of the well,

(c) or if there is not a counterweight by the car at the top and bottom of the well.

2) In the case of traction machines, by the car (or by a device linked directly to the car) at the top and bottom of the well.

F.5.3. Method of operation of final limit switches

F.5.3.1. The final limit switches shall

1) For drum drive machines, open directly by positive break switching the circuit feeding the motor and brake.

Measures shall be taken so that the motor cannot be fed by the brake solenoid.

2) For traction drive machines, single or two speed.

a) break circuits according to (1) above

b) open by positive break switching the circuit feeding directly the coils of two contactors the contacts of which are in series in the circuit feeding the motor and brake.

Each of these contactors shall be capable of breaking the circuit under load.

3) In the case of variable voltage or continuously variable speed lifts, assure the rapid stopping of the lift.

F.5.3.2. After the operation of the final limit switch, the return to service of the lift shall only be effected by the action of a competent person.

If there are several final limit switches at each end of travel, the coming into operation of one of them at least shall prevent movement in both directions, and this one at least shall require the action of a competent person to restore the lift to service.

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F.6. Safety device in case the car or counterweight meets an obstruction when moving downwards

F.6.1. Drum drive lifts

Drum drive lifts shall have a slack rope or chain device to open the control circuit and cause the lift to stop if the car (or counterweight) meets an obstacle when moving downwards.

F.6.1.1. The device used to satisfy Clause F.6.1., shall comply with Clause K.1.1. "Electric security switches", and be chosen according to operating conditions in Table I of this Annex.

F.6.2. Traction drive lifts

1) Traction drive lifts shall incorporate a device to open the control circuit and cause the lift to stop, if when called upon

   a) - the machine does not drive or

   b) - the car (or counterweight) is stopped in downward movement by an obstacle which causes rope slip on the pulley carriage.

2) This device shall function in a time which may not exceed the time for travelling the full length of the well, plus 10 seconds.

   This time may however be 20 seconds, if the full travel time is less than 10 seconds.

   In any case the time may not exceed 45 seconds.

3) This device may be rendered inoperative during inspection operation of the lift.

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G - CLEARANCES BETWEEN CAR AND LIFT WELL ENCLOSURE

G.1. General Provisions

G.1.1. The clearances set out in this Annex shall be complied with no matter what length of time the lift has been in service.

G.2. Lifts with car doors

G.2.1. The horizontal distance between well and sill or framework of the car entrance or door (or entrance edge of doors in the case of sliding doors) shall not exceed 0.15 m.

Particular Cases

(1) The distance given in G.2.1. may be extended to 0.2 metres over a height not exceeding 0.75 metres.

(2) The distance given in G.2.1. may be extended to 0.2 metres throughout the travel on lifts, reserved for authorised and instructed users and in the case of vehicle lifts in which the doors are automatic and vertical sliding.

(3) The distance referred to in G.2.1. is not limited in the instance of the particular case referred to in paragraph A.4.3.1. (b) (2).

G.2.2. The horizontal distance between the sill of the car and sill of the landing doors shall not exceed 35 mm.

G.2.3. The horizontal distance between the car door and the closed landing doors shall not exceed 0.12 metres, unless the access distance between the doors during the whole of their normal operation does not exceed this value.

G.3. Lifts without car doors

G.3.1. The horizontal distance between the well and the sill or uprights of the car entrance frame shall not exceed 20 mm.

G.3.2. If the free height of the car entrance is less than 2.5 m, the horizontal distance between the car entrance header and the well shall be between 0.07 and 0.12 m.

The use of a moving device to close this gap is forbidden.

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H - MACHINES

H.1. General Requirements

Each lift must have at least one winding unit of its own.

H.2. Drive of the car and the counterweight

The following two methods of drive are authorised :

a) by traction (employment of sheaves and ropes)

b) by drum (employment of a drum and of ropes, or of pinions and of chains).

(1) This method of drive is only authorized when the rated speed does not exceed 0.63 m/s.

(2) In the case of drum with counterweight the strength calculations must take account of the condition where the counterweight (or the car) rests on its buffers.

H.2.1. Use may be made of belting for coupling the motor or motors to the mechanism on which the mechanical brake operates.

H.3. Employment of overhung sheaves and pulleys or pinions

In the case of the use of overhung sheaves pulleys or pinions, the following precautions must be taken.

a) To avoid the ropes leaving their grooves, or chains leaving the sprocket teeth.

b) To avoid foreign bodies lodging between the grooves and the ropes (or between pinions and chains) in the case where the machine is not above the well.

H.4. Braking system

H.4.1. General requirements

H.4.1.1. The lift shall be provided with a braking system which operates automatically :

a) in the case of absence of a power supply to the circuit,
b) in the absence of a supply to the control circuits.

H.4.1.2. The braking system shall have a mechanical brake (friction type), but may in addition have other braking means (e.g. electric).

H.4.2. Mechanical Brake

H.4.2.1. This brake shall be capable of :

(1) Decelerating the machine when the car is at its rated speed and with the rated load augmented by 25 %.

(2) Maintaining the machine stationary with the car load equal to rated load augmented by 50 %.

H.4.2.2. The component on which the brake operates shall be coupled to the pulley (or pinion) by a direct mechanical connection.

H.4.2.3. The normal opening of the brake must be effected by the continuous flow of electric current.

(1) The cutting of this current shall be effected with the aid of at least two independent electric devices whether linked or not with those which the cut the current supplying the machine.

(2) When the motor of the lift is likely to function as a generator, it shall be impossible for the electric magnet feeding the brake to be fed by the driving motor.

(3) The brake shall be applied without deliberate delay as soon as the electric circuit feeding it is broken (the use of a diode or direct condenser lead to the brake coil terminal is not to be considered as being a delibèrate delay).

H.4.2.4. The brake of machines for which the manual effort needed to move the car in the upward direction with its rated load does not exceed 400 N, shall be capable of being released by continuous hand pressure.

H.4.2.5. The brake force shall be exerted by guided compression springs or by weights.

H.4.2.6. Braking shall be effected by application to the brake drum or disc at least two shoes, pads or jaws.

H.4.2.7. Band brakes are forbidden.

H.4.2.8. Brake linings shall be incombustible.

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H.5. Emergency Operation

H.5.1. If the effort necessary to move the car in the upward direction with its rated load does not exceed 400 N, the lift shall be provided with a manual means of operation permitting the car to be moved to one of the landings with the aid of a spokeless wheel. If the device is removable it shall be located in an accessible place in the machine room. It shall be suitably marked to avoid any risk of confusion as to the machine for which it is intended.

H.5.1.1. The direction of movement of the car shall be clearly indicated on or near the hand wheel.

H.5.1.2. It shall be possible to check easily from the machine room whether the car is in the unlocking zone. This check may be made, for exemple, by means of marks on the lifting or governor ropes.

H.5.2. If the effort defined in H.5.1. is greater than 400 N, a means of electrical winding must be provided in the machine room, in accordance with Clause K.2.1.4.

H.6. Speed

The speed of the car measured in descent with half load and in the middle of travel, all acceleration and deceleration being excluded, and the voltage and the frequency being within the tolerances of the supply company, shall not exceed at the most 5 % of the rated speed (x).

H.7. Stopping the machine and checking its stopped condition

H.7.1. The stopping of the machine by means of an electric security device as prescribed in K.1.3.1. must be initiated as described below.

H.7.1.1. Motors supplied from AC or DC mains

The supply to the motor must be cut by two independent contactors.

(x) It is good practice that in the above conditions the speed of the lift is not less than 8 % of the rated speed.

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H.7.1.2. Motors fed by DC through a VV supply

One of the following methods must be used :

1) Two independent contactors must either :

   a) - both cut the motor generator loop, or
   b) - one cut the excitation of the generator and the other cut the loop.

2) A single contactor which cuts the generator excitation supply supplemented by an anti-remanent device (for example a suicide circuit in a classic Ward-Leonard system).

H.7.1.3. AC or DC Motors fed by static elements

One or other of the following methods must be used :

1) The motor supply must be cut by two independent contactors.

2) A device must initiate :

   a) - the functioning of the normal switching device,

   b) - the monitoring direct or indirect of the effectiveness of the normal switching device,

   c) - the cutting by at least one contactor of all the poles feeding energy to the machine if the action of the normal switch has not been effective.

H.7.1.3.1. Checking the stopped condition of the machine

In the case considered in H.7.1.3. (2) a device shall initiate by means of at least one contactor the cutting of all the poles feeding energy to the machine in the case where one door being open for whatever reason, the driving motor continuous of itself in motion.

(1) Restoring the lift to service shall not be possible without deliberate action in the machine room.

H.8. Checking the retardation of the machine when reduced stroke buffers are used (ref. Clause F.4.2.2.)

H.8.1. Electric security devices shall check that the slow down is effective before arrival at terminal landings.

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H.8.2. The functioning of these devices shall be completely independent of the normal stopping switches, at terminal landings.

H.8.3. If the slowdown is not effective these devices shall cause the car speed to be reduced at such a rate that if it contacts the buffers, the striking speed shall not exceed the designed value.

This reduction of speed shall not be at a rate exceeding g. (g being gravity acceleration)

H.8.4. These devices shall be installed on the car, in the well or in the machine room.

They shall :

H.8.4.1. Conform to the requirements of Clause K.1.2.3. "Security Circuits".

H.8.4.2. They may be contacts operated by the displacement of the car

1) If they are installed in the well or on the car they shall conform to the requirements of Clause K.1.2.2. "Security Contacts".

2) If they are installed in the machine room, they shall be operated by device mechanically coupled to the car and driven by it.

a) The tracking of the car position shall not depend on devices driven by friction or by synchro-motor.

b) If a connection by tape, chain or rope is used to track the position of the car from the machine room, the feed to the machine and brake must be cut if this connection breaks.

H.8.5. If the device checking the slow down is not independent of the direction of travel, a separate device shall check that the movement of the car is in the intended direction.

H.9. Protection of Machines

Keys in shafts and other rotating parts which project, overhanging spindles, pinions, gears and belting must be appropriately guarded.

Particular Case. Exception is made for pulleys, hand wheels, brake pulleys and the like which are smooth and round and therefore, not dangerous. Such items however, shall be painted yellow, at least in part.

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Annex I

J - ELECTRICAL EQUIPMENT AND INSTALLATION WORK

J.1. General Provisions

J.1.1. Considering its importance relative to safety, the electrical installation as well as the constituent parts of it shall be of good quality and manufactured with particular care in order to avoid all possible risk either through contact with live components or faulty insulation, or through the use of the lift.

J.1.1.1. The components of the installation must be protected against climatic conditions and dust.

If the surroundings present particular risks (humidity, gas, fumes) appropriate precautions must be taken.

J.1.1.2. Where particular requirements are not laid down, the electrical installation work of the lift and the component parts shall conform with the relevant European Standards.

J.1.1.2. (1) In the absence of relevant European Standards, International Standards should be applied.

J.1.2. Every exposed component which is normally live, or carrying current must be effectively protected against all contact. Where special requirements are not laid down, they shall comply with the following requirements :

J.1.2.1. Components covered by Clause J.1.2. which are accessible from landings or located on the car top, or which are used for manual operation of the lift from the machine room must be inaccessible to the CENELEC test finger, type IP2 XX.

J.1.2.2. Any other components covered by Clause J.1.2. shall be protected against accidental contact by a protective shield equivalent at least to I P 10.

J.1.3. The electrical installation and its components shall be protected against overloads, short circuits and earthing faults.

J.1.4. If the risk of deterioration through mechanical action is significant, the installation and its components shall be effectively protected.

J.1.5. The insulation resistance between circuits, and between circuits and earth, in power circuits and in circuits involving electric security devices, shall be greater than 500,000 ohms.

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J.1.6. The voltage between control circuits and security circuits or between these circuits and earth, shall not exceed 250 V average effectiveness.

J.1.7. Earthing

J.1.7.1. Each accessible metal component capable of being subjected to a voltage, reserve or average, greater than 50 V because of a fault, shall be earthed in a satisfactory manner.

J.1.7.2. No earth conductor shall carry current during normal conditions.

J.2. Contacts and relays

J.2.1. The main contacts and relays shall meet the specifications of recommendation C.E.I. 158.I.

J.2.2. Switches, power cutting appliances and their components fitted downstream of electrical safety devices shall meet the specifications of recommendation C.E.I. 158.I.

J.3. Protection of Motors

J.3.1. Driving motors connected directly to the mains, as well as motors driving a generator supplying direct current to the lift motor, shall be protected by an automatic device against short circuits and overloads.

J.3.1.1. This device shall in case of short circuits interrupt all the poles feeding the motor. This requirement applies for each winding of the motor if it is a pole changer. After the operation of this device returning the lift to service shall depend on the action of a competent person.

J.3.1.2. If the device used for overload protection operates through the temperature increase in the windings it may reset itself automatically after cooling down.

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J.4. Main Switches

J.4.1. General Provisions

1) Main switches shall conform to :

- the specifications of recommendation C.E.I. 408 for power and motor switches,
- the specifications of recommendation C.E.I. 292-I for starter motors and motor switches having a circuit-breaker in the event of over intensity.

2) The operating mechanism controlling main switches shall conform to the specifications of recommendation C.E.I. 158.I.

3) Circuit-breaking capacity shall be as provided for AC 3 categories.

J.4.2. Machine rooms shall contain a main switch for each lift capable of breaking simultaneously on all poles the supply to the lift. This switch shall be capable of interrupting the highest current involved in normal operation of the lift. It shall have stable open and closed positions.

This switch shall not cut the circuits feeding :

- car light or ventilation
- car top power outlet
- lighting of machine and pulley rooms
- machine room power outlets
- lighting of lift well
- alarm systems.

J.4.2.1. The lever or operating mechanism for the main switch shall be easily and rapidly accessible from the entrance to the machine room. If the machine room is common to several lifts, the main switch for each lift shall be clearly identified.

J.4.2.1.(1) If the main switch is not manually operated, its opening must be controlled by an electric security device in accordance with the conditions for use specified in Table I, in the circuits feeding the coil of the main switch.

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The closing of the main switch may not be effected or made possible, except by means of the device which caused it to open.

J.4.3. When the machines and the rest of the lift equipment are located in separate machine rooms, each machine room must contain

- either a main switch as described in J.4.2.,
- or an auxiliary device as described in J.4.2.1.(1).

J.4.4. In the case of an interconnected group of lifts if, after the opening of one main switch, parts of the control circuits remain live, these circuits shall be capable of being separately isolated in the machine room, if necessary cutting the supply to the remaining lifts.

J.5. Electric Wiring

J.5.1. General requirements

In the machine and pulley rooms and lift wells the wires and cable connected to the electric security devices on landing doors shall be in accordance with one of the following CENELEC standards :

CC.20.1.- Either section 2.3. or 2.4. or 2.5. or 2.6. or 2.7.

CC.20.2.- Either section 2.1. or 2.2. or 2.3. or 2.4.

J.5.1.1. The other conductors and cables shall be chosen by reference to the voltages used and the ambient conditions, in accordance with the CENELEC standards, or if not appropriate, the CEI standards.

J.5.1.2. Conductors, whether flexible or not, may only be used in a tube (either insulated or not insulated) or equivalent ducting.

J.5.1.3. Cables may only be used in clearly fixed mountings, or in a tube (whether or not insulated) or equivalent ducting.

J.5.1.4. Flexible cables with round or flat sheaths shall conform to the specifications for flexible lift cables in recommendations CEI-227 and 245. They shall only be used for connection to moving components.

The fixed parts of flexible cables which are exposed to possible mechanical damage shall be placed in a tube or equivalent ducting.

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J.5.1.5. The requirements of Clause J.5.1.2., J.5.1.3. and J.5.1.4. do not apply :

a) to conductors or cables not connected to electric security devices as landing doors provided :

- they are not subject to more than 100 VA
- the voltage between poles (or phases) or between pole (or phase) and earth to which they are normally subject does not exceed 50 V.

b) to wiring of control or distribution devices, in cupboards or switchboards,

- either between different pieces of electrical equipment,
- or between these pieces of equipment and the connection terminals.

J.5.2. Cross Section of conductor

The cross section of conductors shall be determined in relation to the admissible currents, following CEN standard x) (actually Harmonisation Document CENELCOM 64 (B) (Se) 204-71). In any event the cross section of conductor feeding electric security circuits of landing doors must not be less than 0.75 mm^2.

J.5.3. Electrical protection of conductors

J.5.3.1. Conductors and cables shall be protected against overload, in accordance with CENELEC standard No x (actually draft harmonisation document CENELCOM 64 B (Se) 203-72 and its supplements).

J.5.3.2. If a single duct, tube or cable contains conductors at different voltage levels, all the conductors or cables shall have insulation appropriate to the highest level.

J.5.4. Method of installation

J.5.4.1. The electrical installation shall be provided with appropriate means of identification. The earth conductors if insulated must be green/yellow colour. Conductors of this colour shall not be used for any other purpose.

J.5.4.2. Terminal strips, except those defined in J.1.2. must be located in cubicles, boxes or on panels provided for this purpose.

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J.5.4.3. If after the opening of the main switch of a lift some terminal strips can remain live, they shall be clearly separated from strips which are not live, and if the voltage exceeds 50 V, they shall be suitably marked.

J.5.4.4. Terminal strips whose accidental interconnection could lead to dangerous malfunction of the lift shall be clearly separated unless their mode of construction obviates this risk.

J.5.4.5. In order to ensure continuity of mechanical protection, the protective sheathing of conductors and cables shall enter fully the casings of switches and relays.

J.5.4.5.(1) Enclosed frames of landing and car doors are regarded as switch casings.

However, if there is a risk of mechanical damage due to movement of parts or sharp edges of structural members, the conductors feeding electric security devices shall be protected by a shield.

J.5.5. Tubes and conduits

The total cross-section of conductors or cables, including insulation, shall not exceed 40 % of the tube or conduit, or 60 % where laid in trunking or troughs.

J.5.6. Connectors

Junction boxes and tapping devices shall be designed and constructed in accordance with CENELEC specification 17 D-Sec I (CEI 439).

J.6. Lighting

J.6.1. Lighting supplies

The supply of electric lighting to the car, the well and machine rooms shall be fed independently of the supply to the machine, either through a separate circuit or taken from the main supply but before the main switch or switches referred to in J.4.

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The feed to socket outlets required on the car top and in machine or pulley rooms shall also be taken from this circuit.

J.6.2. Isolation of lighting circuit

1) The lighting circuit must be provided with a main switch to cut the supply.

2) A switch shall control the supply to the car light.

3) A switch shall control the lighting circuit to the machine room.

4) A switch shall control the lighting circuit to the well.

5) These switches shall be located in the machine room.

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Annex I

K - PROTECTION AGAINST ELECTRIC FAULTS, OPERATIONAL SIGNALS AND PRIORITIES

K.1. Protection against electric faults

K.1.1. General disposition

Any one of the faults envisaged in K.1.1.1. in the electric equipment of the lift must not on its own be the cause of a dangerous malfunction of the lift.

K.1.1.1. Faults envisaged

1) Absence of voltage
2) Voltage drop
3) Fracture of a conductor
4) Insulation fault to earth
5) Short circuit or interruption in an electrical component such as resistance, condensor, transistor, lamp
6) Non attraction
7) Non spring of the moving armature of a contactor or relay.

K.1.1.2. The eventuality of the non opening of a contact need not be considered if it is caused by security contacts corresponding to the prescription of K.1.2.2.

K.1.1.3. The earthing of a circuit in which there is an electrical security device shall :

- either cause the immediate stoppage of the machine,
- or prevent restarting of the machine after the first normal stop.

The return to service must not be possible except by a competent person.

K.1.2. Electric security devices

K.1.2.1. General conditions

An electric security device is constituted by :

- one or more security contacts, satisfying K.1.2.2.
- one or more security circuits, satisfying K.1.2.3.
- a combination of contacts whether or not of the security type, and of security circuits.

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K.1.2.1.(1) a) An electric security device must not be inserted in earth conductors.

b) Apart from exceptions permitted in this annex, no electric apparatus may be connected in parallel with an electric security device.

c) The effects of induction or capacity internal or external shall not interfere with the switching of electric security devices.

d) An output signal emanating from an electric security device shall not be altered by a parasitic signal emanating from another electric device placed further down the same circuit.

e) In electric security circuits comprising several parallel channels, all signals for providing information or instruction shall all pass through a single one of these channels.

f) Circuits which store or delay calls shall not, even in event of fault, prevent or appreciably delay the stopping of the machine through the functioning of an electric security device.

g) The construction and arrangement of the current supply circuits must be such as to prevent the appearance of false signals at outputs of electric security devices, as a result of switching processes. In particular, voltage peaks arising from normal operation of the lift or other equipment on the network shall not create inadmissible surges in electronic components (noise immunity).

K.1.2.2. Security contacts

K.1.2.2.(1) When a security contact operates the contacts must be positively and physically separated.

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(2) If the security contacts are accommodated in housing at least of the type IP 4 X the leakage paths and air gaps and the distances for breaking contacts must at least correspond to those indicated for an insulating voltage of 250-volts in recommendation R.C.3. of the general Rules Committee of E.E.C. (Geneva).

(3) 1) If the protective housings are not at least of the type IP 4 X the air gaps and leakage paths must be at least 6 mm and the separation of contacts at least 4 mm after breaking.

2) The live parts of security contacts shall be accomodated in housings. However, this requirement is not obligatory in locations which are dry, dust-free and without danger of explosion for :

a) hook switches whose contacts are protected against being accidentally touched and

b) door contacts of which the live parts meet the requirements by not being accessible to the CENELEC test finger.

(4) In the case of a double break in a general circuit bridge, the distance after breaking between the contacts must be at least 2 mm.

(5) The contact elements must not rub on the insulating parts. Conductive dust must not lead to short circuiting of contacts.

K.1.2.3. <u>Security Circuits</u>

Security circuits comprise devices with :

- galvanic separation (contacts of classical relays, classical contacts with magnetic control, Reed contacts ...)
- and without galvanic separation (static contacts, Hall generators, static switching devices F.E.T.S. ...).

K.1.2.3.1. Security circuits must comply with the requirements of article K.1.1. relative to the appearance of a fault.

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K.1.2.3.2. Furthermore,

a) If one fault could, in the event of a particular second fault occurring at the same time, lead to a dangerous operating condition, then if this fault occurs on its own the lift shall be stopped at the latest before the next operating sequence in which the faulty operating element could participate.

All further operation of the lift shall then be impossible.

The possibility of the second fault occurring after the first fault has appeared and before the lift has been stopped, need not be considered in the equipment design.

b) The possibility of a dangerous malfunction due to the appearance of a third fault need not be considered, if the situation could only become dangerous through the appearance of the three faults in a certain order.

K.1.3. Operation of electrical security devices

K.1.3.1. When operating to ensure safety, electric security devices must prevent the setting in motion of the equipment or initiate immediately its stopping. The electrical feed to the brake must likewise be cut.

K.1.3.2. The electrical security devices must act directly on the equipment controlling the supply of energy to the machine in accordance with requirements of Clause H.7.1.

K.1.3.3. If because of the power to be transmitted auxiliary contactors are used to control the machine these shall be considered as equipment directly controlling the power of supply to the machine for slowing down and stopping. The requirements of Clauses H.7.1.1., H.7.1.2. and H.7.1.3. are then equally applicable to the auxiliary contactors and to the main contactors.

K.1.4. Control of electrical security devices

K.1.4.1. The components controlling the electrical security devices must be built to function under the mechanical stresses of continuous normal operation. In particular it shall be ensured that the contact separation distances according to Clause K.1.2.2. are maintained even if mechanical play occurs.

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K.1.4.2. If an actuating device for an electrical security device is through the nature of its installation accessible to unauthorised persons it must be so built so that these electrical security devices cannot be rendered inoperative by simple means.

Note : It must be stated in the commentary that a magnet or a bridge piece is not considered a simple means.

K.1.4.3. In the case of redundancy type electrical security circuits, in the event of mechanical fault no unnoticed loss of redundancy must occur, this being assured by mechanical or geometric arrangements of the transmitter elements.

K.2. Operating signals

K.2.1. Despatch signals

Despatch signals shall be effected electrically.

K.2.1.1. Normal movement control

In general this control shall be by the aid of buttons. These shall be placed in control boxes, such that no live parts are accessible.

Employment of cables, cords or levers as a means of control between the car and the machine room is forbidden.

K.2.1.2. Levelling and self re-levelling with doors open

As an exception to Clause C.7.2. displacement of the car with landing and car doors open, with door locks disengaged, is permitted for levelling and self re-levelling on condition that

- the movement is limited to the unlocking zone (C.7.2.1.(1).).
- the speed of levelling does not exceed 0.8 m/s, and self re-levelling 0.3 m/s.

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K.2.1.2.(1) All displacement of the car outside the unlocking zone shall be prevented by two independent switches in series in the circuitbridging the door and lock security devices.

A single switch suffices for checking the state of the car door.

These switches shall either be :

- security contacts satisfying Clause K.1.2.2.
- or circuits connected in such a way as to satisfy Clause K.1.2.3. (security circuits).

(2) In the case of self re-levelling with doors open, the speed shall be limited

a) on machines whose speed is determined by the fixed frequency of the supply, there must be a check that the signal has been given for levelling speed to be engaged;

b) on machines supplied from static convertors, there must be a check that self re-levelling speed is not exceeding 0.3 m/s.

(3) In levelling operations

a) the device which makes the security devices inoperative must only function after the stopping signal for a level has been given.

b) on lifts with hinged landing doors or manual sliding doors, there must be a check that the levelling speed is not exceeding 0.8 m/s.

K.2.1.3. Car top control

To facilitate inspection and servicing an easily accessible control station shall be provided on the car top. The master switch putting this device into operation shall satisfy the requirements for security contacts.

(1) This master switch shall be protected against involuntary operation.

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K.2.1.3.1. The following conditions must be satisfied simultaneously :

1) Operating the master switch shall prevent normal calls, including associated movement of automatic doors. Docking control (Clause K.2.1.5.) and emergency control (Clause K.2.1.4.) where provided, shall also be prevented.

   a) If the switching devices used to prevent calls specified in Clause K.2.1.3.1.(1) are not security contacts integral with the master switch mechanism, they must still prevent all accidental movement of the car even in the event of one of the faults listed in Clause K.1.1.1.

2) The movement of the car shall be controlled by a constant pressure push button protected against accidental operation and with the direction of movement clearly indicated.

3) The control station may incorporate special switches protected against involuntary action for controlling the operation of automatic doors.

4) The car speed shall not exceed 0.63 m/s.

5) Under car top control the car shall not be able to be driven beyond the terminal landings.

6) The operation of the lift must remain dependent on the security devices.

K.2.1.4. Emergency machine room control station

For machines where the manual effort to raise the car with its rated load exceeds 400 N an emergency control station shall be installed in the machine room which satisfies the requirements of Clause K.1.2.2. for security contacts.

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K.2.1.4.1. Operation of the master switch shall permit, from the machine room, the control of car movement by constant pressure pushes protected against involuntary operation. The direction of movement must be clearly shown.

K.2.1.4.2. After operation of the master switch, all movement of the car except in response to this machine room control station, shall be prevented. However, the car top control station called for in K.2.1.3. shall have priority over the machine room control switch.

K.2.1.4.3. This control station may render inoperative by itself or another electrical security device the electrical security device required in Clause E.9.11.2. for the speed governor.

K.2.1.4.4. This control station shall render inoperative by itself or another electrical security device the following electrical security devices.

a) Those mounted on the safety gear, according to Clause E.9.11.1.

b) Those mounted on the buffers, according to Clause F.4.2.4.

c) Final limit switches according to Clause F.5.

K.2.1.4.5. This control station and its buttons shall be so placed that the machine can readily be observed during operation.

K.2.1.4.6. The movement of the cabin shall not be carried out at a speed exceeding 0.63 m/s.

K.2.1.5. <u>Docking control (following C.7.2.1.(2).)</u>

As exception to C.7.2., operation with car door open is permitted above the unlocking zone of a landing, to permit the loading or unloading of lifts reserved for instructed and authorised users, on the following conditions.

a) The movement must only be possible in a zone not exceeding 1.65 m above the level of the corresponding landing.

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b) The movement shall be limited by an electrical security device, conforming to the requirements of Clause K.1.2. and following the conditions for use in Table I.

c) The speed shall not exceed 0.3 m/s.

d) Only the car door facing the entrance may be open.

e) The zone of movement shall be clearly visible from the docking control position.

f) The docking control shall only be possible after the closing of a key operated security contact, and the key may only be withdrawn when the circuit is broken.

g) The closing of the key operated switch :

1) shall prevent normal operation. If the switching devices used to achieve this are not security contacts integral with the key operated switch, all accidental movement of the car shall be prevented, even under any one of the fault conditions referred to in Clause K.1.1.1.

2) Shall only permit car movement by operation of a constant pressure push. The direction of travel shall be clearly indicated.

3) May directly, or through another electric security device chosen according to conditions of use in Table I, render inoperative :

- the electric security device of the lockpin on the landing door concerned,
- the electric security device for proving door closure of the landing door concerned,
- the electric security device for proving door closure on the car at the dock level side.

h) The effects of this switch shall be cancelled by the interlocking of the car top inspection switch.

j) There shall be a stop switch in the car.

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K.2.2. Stop switches

These shall consist of electric security devices meeting the conditions of use laid down in Table I.

K.2.2.1. Cars with doors at all entrances

There shall not be a stop device in the car. If the doors close by power operation, a device must be provided permitting reverse of the closing movement.

K.2.2.2. Cars having one or more entrances without doors

Passengers must have an emergency stop switch available at a distance not exceeding 1.50 m from the entrances concerned, to stop the car and keep it in the stopped condition.

1) This switch shall be a button or toggle switch with the lever in the down position for stop.

2) The control button or the switch lever shall be red.

K.2.2.3. Other stop switches

A device for stopping, and maintaining the car stopped, shall be provided :

- on the car top at 1 m at most from the entry point for inspection or servicing personnel
- in the pulley room (B.4.5.)
- in the pit (A.7.3.4.).

K.2.3. Emergency alarm device

K.2.3.1. In order to call for outside assistance, passengers shall have available in the car an easily recognizable and accessible device for this purpose.

K.2.3.2. This device must be fed either from the emergency lighting supply called for in D.17.1.(2); or from an equivalent supply.

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K.2.3.3. This device may take the form of a bell, internal phone external phone or similar.(x)

K.2.3.4. The organisation within the building shall be such that it can respond effectively without undue delay to such emergency calls.

K.2.3.5. An internal phone, or similar device shall be installed between the car and the machine room if the lift travel exceeds 30 m.

K.2.4. Priorities and signals

K.2.4.1. A switching device shall prevent a car leaving a landing for a period of at least 2 seconds after arrival, for lifts with manual opening doors.

K.2.4.2. A user who enters the car must have a time of at least 2 seconds after the doors have closed, to enable him to register his call before any external call buttons can become effective. Exception is made in the case of lifts with car doors, operating on collective control.

1) In the case of collective operation, an illuminated signal, clearly visible to those on a landing must indicate the intended direction of movement of the car from that landing.

2) For banks of lifts, car position indicators at landings are not recommended, however it is recommended that the arrival of a car should be preceded by an audible signal.

(x) In the case of connection to a public telephone network, Clause K.2.3.2. does not apply.

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L - DISPLAY OF OPERATING INSTRUCTIONS

L.1. General requirements

All labels, notices and operating instructions shall be clearly legible and readily understood, (if necessary aided by signs or symbols). They shall be untearable, of durable material, placed in a visible position, and written in the language of the country where the lift is installed (or if necessary in several languages).

L.2. In the car

L.2.1. The rated load in kilograms as well as the maximum number of persons shall be displayed.

For lifts freely available to users, the maximum number of persons shall be calculated as a function of the maximum available area of the car floor, following the table figuring in D.2.1.

The notice shall be made out as follows :

x kg - y persons.

L.2.1.1. The minimum height of the letters for the notice referred to in L.2.1. shall be :

- 10 mm for capital letters and numbers
- 7 mm for small letters.

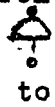
However for motor car lifts the minimum height of letters shall be :

- 100 mm for capital letters and numbers
- 70 mm for small letters.

L.2.2. The name of the lift installer and the identification number of the lift shall be displayed. The year of manufacture shall be inscribed.

L.2.3. Other signs

L.2.3.1. The stop control switch (possibly) shall be red and identified by the word "STOP" so placed that there can be no risk of error in identifying it.

The alarm control switch shall be yellow and identified by the symbol  .

It is forbiden to use the colours red and yellow for other buttons, in the non-illuminated state.

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L.2.3.2. The push buttons and control switches shall be clearly identified; for this purpose it is recommended to use :

- for car buttons the symbols -2, -1, 0, 1, 2, 3, etc....
- for the door re-open button where applicable the symbol ◁ ▷
- if there are other control switches they shall be identified as appropriate to their function.

L.2.4. Instructions for operation and for safety shall be affixed whenever the need for these is apparent.

In particular it is obligatory to indicate :

1) for a door-less car :

- that passengers shall keep clear of the flush well front,
- that standing in front or behind a load is prohibited,
- that loads shall be kept away from the well front,
- that mobile loads shall be prevented from moving and be kept away from the well front;

2) for lifts with "docking" control - the special instructions relating to this operation;

3) for lifts with links to external or internal telephone systems - the instruction for using the telephone;

4) the instruction for action to be taken in event of fire.

L.3. <u>On the car top</u>

The following information shall be given :

- on or near the stop device switch, the word "STOP" so placed that there can be no risk of error in identifying it;
- on or near the master switch, the indication of "NORMAL" and "INSPECTION" positions;
- near the operating buttons, the direction of motion.

L.4. <u>On the car crosshead</u>

Near the rope-hitch there shall be a plaque indicating :

- maximum static load carried by the ropes,

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- number of ropes or chains, breaking load of rope or chain and the details necessary for their replacement without risk of error.

L.5. In the machine and pulley rooms

L.5.1. A placard carrying the inscription :

"Lift Machine - Danger -
Access forbidden to all unauthorised personnel -
Do not forget to close and lock"

shall be fixed to the doors or access panels leading to the machines.

In the case of trapdoors opening upwards, a visible notice shall indicate to those using the trapdoor :

"Danger of falling - Reclose the trapdoor".

L.5.2. Notices shall be provided to permit easy identification of the main switch and the light switch.

L.5.2.1. If there are machines for several lifts in one room, the notices shall permit the identification of the switches appropriate to each lift.

If after opening of a main switch components remain live, a notice shall indicate the switches making possible the cutting off of current.

L.5.3. There shall be in the machine room or the interior of the machine enclosure a notice detailing the measures to be taken in event of lift breakdown, particularly the means of manual or electric emergency movement of the car.

L.5.3.1. There shall be on or near the hand winding wheel, an indication of direction of movement of the car.

If the wheel is removeable, the indication must be on a fixed part of the machine.

L.5.3.2. There shall be on or near the machine room emergency control buttons, markings to show the direction of corresponding car movement.

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L.5.4. There shall be in the pulley rooms, near the stop switch, the word "STOP" so placed that there can be no risk of error in identifying the stop position.

L.6. On the outside of the well

L.6.1. Near the inspection doors for the well there shall be a notice stating :

"Lift well - Danger -
Access forbidden to unauthorised personnel -
Do not forget to close and lock"

L.6.2. Landing doors with manual opening, if they risk being confused with other adjacent doors, shall be marked with the word "LIFT".

L.6.3. Landing doors of lifts which are reserved for authorised and instructed users, shall have fixed beside the door the notice :

"Lift forbidden to unauthorised persons".

L.6.3.1. The landing doors referred to in Clause L.6.3. shall in addition carry an indication of the rated car load if they give access to specialised lifts which are reserved for transport of goods and which have no car doors.

L.7. On the overspeed governor

There shall be a plaque which shows :

- the makers name
- the type reference
- the rated speed if it exceeds 0.63 m/s
- the maximum rated speed if the speed does not exceed 0.63 m/s
- the breaking load of the rope and the details necessary for replacement without risk of error
- the type approval sign and references.

L.8. In the pit

There shall be adjacent to the stop switch the word "STOP" so placed that there can be no risk of error in identifying the stop position.

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L.9. On the hydraulic buffers

There shall be a plaque which shows :

- the makers name
- the type reference
- the maximum impact speed
- the maximum permitted load
- the minimum permitted load
- the type of liquid
- the type approval sign and references.

L.10. Landing identification

Clearly visible notices or signals shall permit persons in the car to know at what landing the lift has stopped.

L.11. Electrical identification

L.11.1. Contactors, relays, fuses and connection strips for cables coming into the controller, shall be marked in accordance with the diagram.

This requirement does not apply to lock connections.

L.11.2. Direction contactors shall carry indication of the corresponding direction of lift motion.

L.12. Emergency unlocking keys

Emergency unlocking keys shall carry the notice :

"After use of the emergency unlocking key make sure that the door is properly locked when closed".

L.13. Alarm device

The bell or other device actuated from the car shall be clearly marked "Lift Alarm".

L.14. Locking and safety gear devices

Locking and safety gear devices shall bear the type approval sign and the references.

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Annex I

M - SERVICING AND INSPECTION OF LIFTS

M.1. Servicing

The lift and its accessories shall be maintained in good working order. To this end regular servicing of the lift shall be carried out by competent personnel.

M.2. Inspection

M.2.1. If a preliminary authorisation is required by national regulation before the construction of a lift is put in hand, the information furnished to obtain that authorisation shall be such as to ensure that the constituent parts are correctly calculated and that the design corresponds to the technical requirements.

This examination can only relate to items or such of them which shall be inspected prior to putting the lift in service, and which are detailed in Annex III of the Directive.

M.2.2. Lifts shall be inspected before going into service, in order to verify their conformity to the documents relating to the preliminary authorisation (where this is required). This inspection shall be made by a person or organisation acceptable to or approved by the public authorities (where such a requirement exists in the country concerned). The tests to be made in such an inspection are shown in Annex IV of the Directive.

M.2.2.1. It may be required in the case of lifts for which a preliminary authorisation is not needed, to furnish calculations according to the details in Annex III of the Directive.

M.2.2.2. A certificate of conformity shall be provided relating to type tests made by an approved laboratory for :

- locking devices
- safety gear
- overspeed governor
- buffers and the doors.

M.2.3. Lifts shall be subject to periodic inspection after going into service and after important modifications to check that they continue to conform to the technical requirements and are in good condition. The tests to be made in course of such inspections are shown in Annex V.

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M.3. Register

M.3.1. The particulars of the lift shall be recorded in a register, or folder, kept up to date. It shall comprise :

M.3.1.1. A technical section giving particulars of the lift and any major modifications. The installation plans in the building shall be attached and the circuit diagrams, which may be limited to circuits necessary from the viewpoint of the safety aspects of the assembly. The symbols used must be explained.

M.3.1.2. There shall be a section relating to inspection where duplicate dated copies of periodic inspections are kept, with observations.

M.3.2. The register or folder, must be available to those in charge of the servicing, and to the person or organisation responsible for periodical inspection.

Annex I

T A B L E I

Conditions for use of electric security devices

Types of electric security devices

a) Electric security contacts (K.1.2.2.)

b) Electric security circuits (K.1.2.3.) whatever the type of installation.

c) Electric security circuits (K.1.2.3.) authorised in the case of installation requiring special protection against humidity or explosion.

The "x" indicates the type of device authorised. If there are several "x"s, there is a choice of devices.

Paragraph	Function or device	Electric security device a	b	c
A.2.2.2.	Door closed proving of inspection doors and trap doors	x		x
A.4.3.(2)	Particular case (2) Pit door locked proving	x		x
A.7.3.4.	Pit switch	x		x
B.4.5.	Stop switch in pulley rooms	x		x
C.7.3.1.	Door locked proving of landing doors	x		x
C.7.4.	Door closed proving of landing doors	x		x
C.7.4.1.	Door closed proving of multi-panel landing doors, mechanically linked panels	x		x
C.7.4.2.	Door closed proving of multi-panel landing doors, indirectly linked panels	x		x
D.9.2.	Door closed proving of car door	x		x
D.10.1.(1) and D.10.2.	Door closed proving of car door, in the case of multiple panel type sliding doors	x		x
D.12.5.2.	Door closed proving of trap doors and emergency or inspection doors in car	x		x
E.5.3.1.	Rope - or chain-stretch switch	x		x
E.6.1.(2)	Tension of anti-rebound device	x		x
E.6.2.(1)	Anti-rebound switch	x		x

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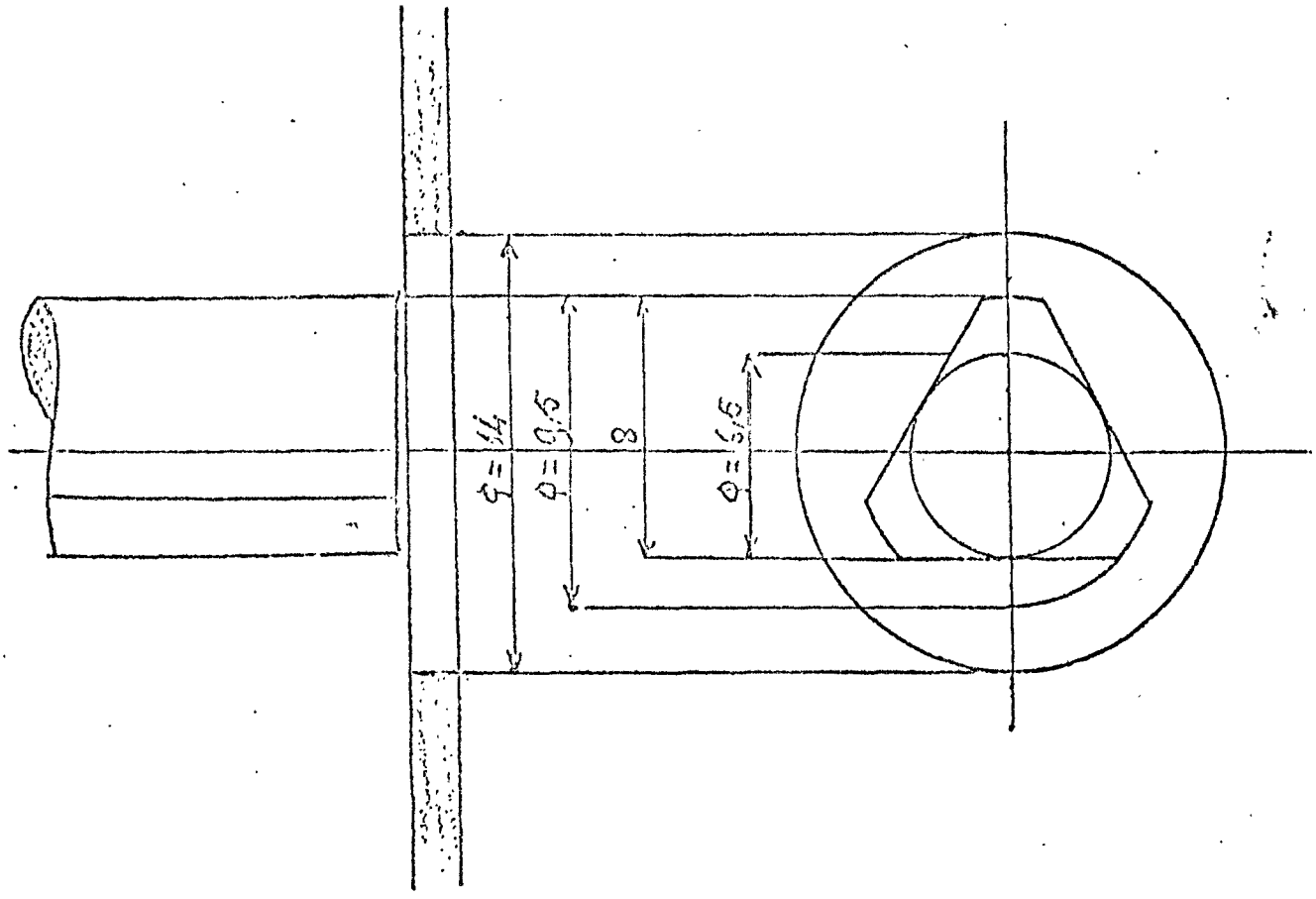
Paragraph	Function or device	Electric security device		
		a	b	c
E.9.11.1.	Safety gear switch	x		x
E.9.11.2.	Governor switch	x		x
E.9.11.3.	Rope tension switch for governor	x		x
F.4.2.4.	Buffer return switch	x		x
F.6.1.1.	Slack rope or slack chain switch	x		x
H.7.1.3.(2)	Check on stopping of lift for motors supplied though static devices	x	x	x
H.8.4.1.	Check on deceleration for lifts with reduced stroke buffers	x	x	x
J.4.2.1.(1)	Tripping of main switch	x		x
K.2.1.2.(1)	Check on self re-levelling	x	x	x
K.2.1.3.	Car top control master switch	x		x
K.2.1.4.	Emergency machine room control master switch	x		x
K.2.1.5.	Docking control :			
	- key switch contacts	x		x
	- travel limit switches	x	x	x
K.2.2.2.(1)	Stop switch in car	x		x
K.2.2.3.	Car top stop switch	x		x

FIGURE - I

UNLOCKING TRIANGLE



ANNEX II

Requirements for the inspection of lift components subject to E.E.C. type approval for components

1. Summary

Chapter A - Approval of locking devices of landing doors

Chapter B - Approval of landing door fire resistance capabilities

Chapter C - Approval of safety gears

Chapter D - Approval of overspeed governors

Chapter E - Approval of hydraulic buffers

2. General requirements

2.1. The application of the tests for type approval figuring in the following chapters may not be taken out of relation to the corresponding text of the directive. In particular all components being certified shall conform to the requirements of the directive and to the rules of good construction.

2.2. The request for E.E.C. type approval for components shall be made by the manufacturer, the lift installer, the erector or the importer and shall be addressed to one of the Test Laboratories appearing on the list furnished by National Authorities.

2.3. The despatch of specimens for certification shall be made by agreement between the Laboratory and the applicant.

2.4. The applicant may attend the tests.

2.5. If the Laboratory entrusted with the complete examination of one of the components covered by the type testing procedure has not available appropriate means for certain tests or examinations it may under its responsibility have these made by other Laboratories.

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CHAPTER A

APPROVAL OF LIFT LANDING DOOR LOCKING DEVICES

1. General

1.1. Scope

These procedures are applicable to locking devices for lift landing entrances. It is to be understood that each component taking part in the locking of landing doors and in the checking of the locking is a part of the complete locking device.

1.2. Objects and extent of the test

The locking device is submitted to a test procedure to check that insofar as concerns construction and operation, it conforms to the requirements imposed by the directive.

It will be checked in particular that the mechanical and electrical components of the device are of adequate size and that in the course of time the device does not lose its effectiveness particularly through wear.

If the locking device is needed to satisfy particular requirements (water or fire risk) the applicant shall specify this so that supplementary tests under appropriate criteria may be made.

The test described below relates to locking devices of current design. In the case of constructions presenting special or unforeseen characteristics a modified test procedures may be devised.

1.3. Documents to be submitted

The following documents shall be attached to the request for a type test.

1.3.1. General arrangement drawings with description of operation.

This drawing shall show clearly all the details relating to the functioning and the safety features of the locking device and in particular :

- the operation of the device in normal service showing the effective engagement of the locking elements and the point at which the electrical contact is made;
- the operation of the mechanical check on the locking position if this exists;
- the means of operation of the emergency unlocking device.

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1.3.2. Plan of assembly and nomenclature.

This plan must show the assembly of the parts which are important to the functioning of the locking device, in particular those required to conform to requirements of the directive. A table shall indicate the list of principal parts, the materials used, and the characteristics of the means of mounting the components.

1.4. Test specimen

Two specimens at least of the locking device shall be provided, one for the test, the other to remain in the Laboratory as a reference specimen.

If the test is carried out on a prototype it shall be repeated later on a production model.

If the test of the locking device is only possible when mounted in an assembly of the corresponding door (for example multiple panel sliding doors or hinged doors with several panels) the device shall be mounted in such a complete door. However, the door dimensions may be reduced by comparison with a production model, on condition that these do not falsify the test results.

2. Examination and tests

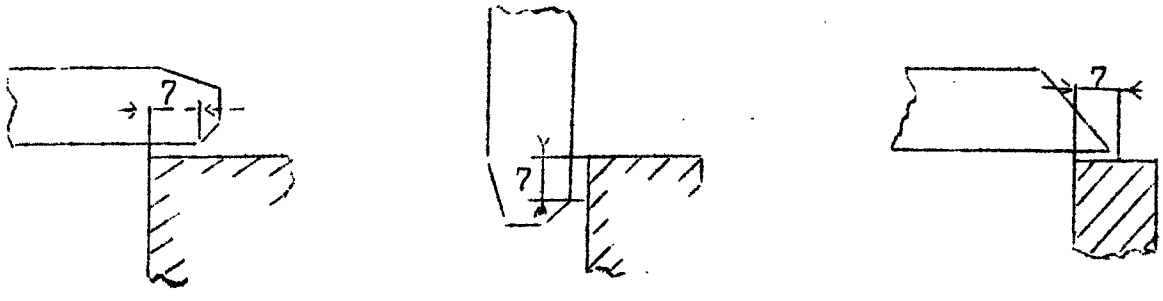
2.1. Examination of operation

This examination has the aim of checking perfect functioning from the point of view of safety of the assembly of the electrical and mechanical components of the locking device, its conformity to the requirements of the directive and the agreement between the device as supplied and the particulars provided in the application for test.

Particular checks will be made as follows :

2.1.1. The minimum engagement of 0.007 m of the components assuring locking, before the electric contact is established (C.7.3.1.(1)).

E x a m p l e s :



2.1.2. It shall not be possible from positions normally accessible to users to operate the lift with a door open or unlocked after one action, not forming part of the normal operating sequence (C.7.5.2.).

2.1.3. In the case of hinged doors the melting point of the metal employed for the locking device is at least 850 °C.

2.2. Mechanical tests

These tests have the purpose of checking the strength of the mechanical locking parts and of the electrical parts.

The specimen of the locking device in its normal operating condition is submitted to operation by the normal means.

The specimen shall be lubricated in accordance with the makers requirements.

When there are several possible means of operation or positions of operation the endurance tests shall be made in the arrangement which seems the most unfavourable from the point of view of the forces of the components.

The number of complete cycles of operation and the travel of the locking devices shall be registered by mechanical or electrical counters.

2.2.1. Endurance test

a) The locking device is submitted to 1 million complete cycles (one cycle comprises forward and return movement over the full travel possible in both directions).

The engagement of the device shall be smooth, without shocks, and at a rate of about 60 cycles per minute.

During the endurance test the electrical contact of the lock shall close a circuit simulating normal lift service under the maximum voltage for which the device is designed and at a current double that of normal usage.

b) If the locking device is provided with a mechanical checking device for the locking pin or for the locking element this device shall be submitted to an endurance test of 100.000 cycles. This test shall be made in accordance with the procedure laid down in a).

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2.2.2. Static tests

For locking devices intended for hinged doors a test will be made for the progressive loading over a period of 300 seconds with a static force mounting progressively to a value of 3000 N.

This force will be applied in the opening direction of the door and in a position corresponding so far as possible to that applied when a user attempts to open the door. The force applied shall be 1000 N if it is to operate locking devices intended for sliding doors.

2.2.3. Dynamic tests

The locking device in the locked position shall be submitted to a shock test in the locking direction.

The shock shall correspond to an impact of a rigid mass of 4 kgs falling in free fall from a height of 0.5 m.

2.3. Criteria for mechanical tests

After the endurance test (2.2.1.), the static test (2.2.2.) and the dynamic test (2.2.3.) there must not be any wear deformation or mechanical failure which could affect safety.

2.4. Electrical tests

2.4.1. Endurance test of contacts

These tests are included in the endurance test laid down in 2.2.1.a).

2.4.2. Test of ability to break circuit

This test shall check that the ability to break a live circuit is sufficient. This test shall be made in accordance with the procedure CEI 357.1/1970. The voltages and current levels serving as a base for the test shall be those indicated by the manufacturer.

If there is nothing specified the test values shall be as follows :

- alternating current 220 v 2 A
- direct current 180 v 2 A

In the absence of a request to the contrary the capacity to break circuit will be examined for both AC and DC conditions.

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The tests will be carried out with the locking device in its normal position of operation. If several positions are possible the test will be made in the position which the Laboratory judges to be the most difficult to satisfy.

The specimen tested shall be provided with covers and electric wiring as used in normal service.

2.4.2.1. For the AC test, the locking devices shall open and close 50 times at normal speed and at intervals of 10 seconds, an electrical circuit under a voltage equal to 110 % of the nominal value. The contact shall rest closed at least 0.5 seconds.

The circuit shall comprise in series a choke and a resistance. Its power factor shall be 0.7 and the test current shall be 10 times the nominal value indicated by the manufacturer.

2.4.2.2. For the DC test the locking devices shall open and close 20 times at normal speed and at intervals of 10 seconds, an electric circuit under a voltage equal to 110 % of the nominal value. The contact shall remain closed at least 0.5 seconds. The circuit shall comprise in series a choke and a resistance and have a time constant of 200 ms. A resistance absorbing 1 % of the test current shall be placed in parallel with this circuit.

The test current shall be 110 % of the nominal value indicated by the manufacturer.

2.4.2.3. The tests are considered as satisfactory if no tracking or arcs are produced and if no deterioration occurs which could affect security.

2.4.3. Tests for resistance to leakage currents

This test shall be made in accordance with the procedure CEI.112/1959. The electrodes shall be connected to a source providing an AC voltage which is practically sinusoidal at 175 volts-50.

2.4.4. Tests of leakage paths and air gaps

These shall be made in accordance with clauses K.1.2.2.(2) and K.1.2.2.(3) of Annex I of the directive and the check on their effectiveness shall be in accordance with the procedure given in the specification E.E.C. (Geneva) N° 3 (October 1964).

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2.4.5. Examination of the requirements appropriate to safety contacts and their accessibility (K.1.2.2.)

This examination shall be made taking account of the position of fixing, and of the position of the locking device, as appriate.

3. Tests particular to certain types of locking devices

3.1. Locking devices for horizontal or vertical sliding doors with several panels.

The devices providing direct mechanical linkage between panels according to Clause C.7.6.1. or indirect mechanical linkage according to C.7.6.2. shall be considered as forming part of the locking device.

These devices shall be submitted in a reasonable manner to the tests mentioned in paragraph 2, Chapter A, of this Annex. The frequency of operation in such endurance tests shall be suited to the dimensions of the construction.

3.2. Flap type locking devices for hinged doors.

3.2.1. If this device is provided with an electric safety device required to check the subsequent deformation of the flap and if after the test of a static nature envisaged in 2.3.2. there are any doubts on the solidity of the device the load should be increased progressively up to the point where following a permanent deformation of the flap the safety device commences to open. The other components of the locking device or of the landing door shall not be damaged nor deformed by such an applied load.

3.2.2. If after the static test, the dimensions and means of construction leave no doubt as to its solidarity, it is not necessary to proceed to the endurance test of a flap type lock.

4. Certificate

3 copies of the certificate must be provided :

- two for the applicant
- one to remain in the Laboratory

The certificate shall indicate :

- the name of the maker;
- the type of the locking device;
- the mark of the Laboratory and the number of the certificate;
- the details of the permitted voltage and maximum current levels.

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Annex II

CHAPTER B

APPROVAL OF LANDING DOOR FIRE RESISTANCE CAPABILITIES

1. General requirements

The methods of test will be those defined by the standard ISO/3008.

The tests described here have the object of establishing criteria appropriate to lift landing doors, taking account of the factors peculiar to them and in particular the following :

- that in practice the barrier to fire consists in two landing doors, one mounted above another;
- that it is the landing side only of the door which is liable to be exposed to fire;
- that there is no storage of materials behind the door;
- that the lifts will not continue in use if the temperature on the landings exceeds 70 °C.

2. Equipment

2.1. Furnace to conform to ISO/3008-4.1.

2.2. Canopy to conform to ISO/3008-4.2.

3. Test specimen

3.1. Dimensions

The specimen for testing shall be a full size one.

3.1.1. The certification granted is valid for doors of dimensions which differ slightly from the test door within the following limits :

- width ± 15 %
- height ± 10 %

These tolerances include the frame.

3.1.2. In the case of doors whose dimensions are greater than those of the test furnace the test specimen shall be the largest possible compatible with the furnace.

On the basis of these tests and taking into consideration the door construction the Laboratory will judge whether approval can be given to such a large door.

3.2. Construction

The test will be carried out on a door assembly comprising the following : one or more panels, their frames including sills and attachments to the surrounding brickwork or masonry, transoms or other fixed panels, joints and joint covers, insulation

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elements (thermal or acoustic), means of suspension of the panels (locks, handles, plates).

The bulk of non-metallic components on the non exposed face not being tested shall be limited to 500 grams per door plus 200 grams per square metre of the door surface.

Metallic surface cladding need not be tested.

Nonmetallic facings on the exposed face need not be tested if their thickness does not exceed 2 mm.

4. Test procedures

Test specimens will be exposed on the landing face to the conditions of heat specified in standard ISO/R 834.

Measurements and observations indicated below in para 5 shall be carried out in the course of the test. The test will be stopped when the criteria listed in para 5 are satisfied or at a different stage of the test by prior agreement between the applicant and the Laboratory.

5. Measurements and observations

5.1. Pressure of the furnace

The pressure shall be measured in accordance with ISO/3008.7.1. The positive pressure maintained on the upper 2/3 of the door shall be as near as possible to 1.5 mm H^2O.

5.2. Temperature under the canopy

The temperature should be measured in accordance with ISO/3008.7.2. While anticipating that ISO will improve the canopy tests, all necessary action shall be taken to avoid, at least in the proximity of the canopy, any turbulance likely to upset the results.

5.3. Temperature on the non exposed face

The temperature shall be measured in accordance with ISO/3008.7.3.

5.4. Radiation on the non exposed face

The radiation shall be measured in accordance with ISO/3008.7.4.

6. Criteria of performance

The lift landing doors shall satisfy the following criteria.

6.1. Stability

After the fire test of 1½ hours the door shall remain in place and its constituent parts shall continue to give protection against falls down the well with normal pressure on the door.

It shall be recorded whether the door can be opened after cooling down.

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6.2. Imperviability

6.2.1. Flaming

The moment shall be recorded when flames maintain themselves spontaneously for a period of more than 10 seconds on the non exposed face. For a lift landing door this moment must not occur during the first 15 minutes of test.

6.2.2. Canopy test

The temperature of the thermo-couples shall be recorded. At the end of 30 minutes the average temperature of the six thermo-couples shall not exceed by more than 250° the initial temperature and no single thermo-couple shall exceed by more than 300 °C the initial temperature. The temperature shall continue to be recorded during the 90 minutes of the test.

6.3. Insulation

No particular requirement is formulated for the tests 6.3.1., 6.3.2. or 6.3.3., for lift doors. However the temperatures shall be recorded throughout the test in order to determine eventually a fire resistant classification (coupe-feu).

6.3.1. Average temperatures of the non exposed face of the door.

6.3.2. Maximum temperature of the non exposed face of the door.

6.3.3. Maximum temperature of the non exposed face of the frame.

6.3.4. Radiation from the non exposed face of the door.

The radiation during the first 30 minutes of the test shall not exceed 1.25 w/cm^2 measured at a distance from the test specimen equal to its width.

7. Certificate

The certificate will be provided in triplicate.

It shall indicate :

a) Name of door maker.
b) Mark of the Laboratory and the test number.
c) Type of door and its classification if there is one.
d) Details of the construction of the door, materials employed. clearances and gaps between panels and between panels and frame.
e) Method of fixing the test specimen to the walls of the well.
f) Description of glazing if there is any.
g) Result of the tests.
h) All other observations on the performance of the specimen made in the course of the test including the possibility of opening the door after cooling down.

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Annex II

CHAPTER C

APPROVAL OF SAFETY GEARS

1. General requirements

1.1. The design and the manufacture of the safety gear shall be in accordance with the present directive.

1.2. Documents to be submitted

In addition to the particulars required in Annex III in the case of preliminary authorisation, detailed information must be provided on the material used, the type of guides and the state of their surfaces (drawn, milled, ground).

In the case of safety gears with buffered effect there must also be provided a load diagram relating to the components forming the spring.

2. Instantaneous safety gears

2.1. Samples to submit

The Laboratory should be provided with two assemblies with sets of jaws with wedges or knurled rollers and two guide devices. The arrangement and the fixing details for the specimens will be settled by the Laboratory in accordance with the equipment that it uses.

If the same assembly is used with different types of guide a new test will not be required if the thickness of the guides the surface condition and the width of the jaws are the same.

2.2. Test

2.2.1. Method of test

A test will be made using a press which moves at a constant speed.

Measurements shall be made of :

a) the distance travelled as a function of force
b) the deformation of the safety gear block as a function of force or as a function of distance travelled.

2.2.2. Test procedure

The guide shall be moved through the safety gear jaws. Reference marks shall be traced on to the safety gear blocks in order to facilitate measurement of their deformation.

a) The distance travelled will be recorded as a function of the force applied.
b) After the test :

1 - The permanent deformation of the safety gear block shall be measured (in the case where there is not a fracture).

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2 - The hardness of the safety gear block will be measured and also the jaws and these values will be compared with those quoted by the applicant. Other checks may be necessary in special cases.

3 - The block and the jaws shall be examined for to check the deformation and change of state (for example cracks, deformation or wear of the jaws, appearance of the rubbed surfaces).

4 - Photographs will be taken of the block, the jaws and the guide as a permanent record of the deformation or fractures.

2.3. Documents

Two diagrams will be recorded

- the first will give the distance travelled as a function of force;
- the other will give the deformation of the block. It will be done in such a way that it can be related to the first diagram.

The capacity of the safety gear will be stablished by integration of the area of the distance force diagram.

The area of the diagram will take into consideration :

a) the total area if there is no permanent deformation,

b) the area limited to the point where the elastic limit has been exceeded, (or to the point at which rupture occurs).

(Account must be taken of the fact that a deformation of the guides distorts the deformation diagram of the block and therefore the calculation of the safety gear capacity).

2.4. Determination of the permissible load

2.4.1. Work done by the safety gear.

The following symbols are used :

P + Q = Dead load suspended + rated load

V = Speed of operation of safety gear in m/s

G = Acceleration of gravity in m/s^2

A = Work absorbed by a safety gear block (calculated in accordance with the diagram)

A distance of free fall is calculated with reference to the maximum tripping speed of the safety gear specified in E.9.1.

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The distance of free fall is taken as :

$$Sf = \frac{V^2}{2g} + 0.10 + 0.03$$

0.10 corresponds to the distance of travel during the response time

0.03 corresponds to the travel during take up of clearance between the jaws and the guides

The total work done by the safety gear is :

$$2A = (P + Q) \times Sf \quad \text{from which} \quad P + Q = \frac{2A}{Sf}$$

2.4.2. Total permissible load

a) If the elastic limit has not been exceeded :
2 is taken as the safety factor.
The total permissible load is $P + Q = \frac{A}{Sf}$

A is calculated by the integration of the area indicated in 2.3.a).

b) If the elastic limit is exceeded :

Two calculations must be made in order to take that which is the most favourable to the maker.

1° - calculate A' by the integration of the reduced area indicated in 2.3.b).

Taking 2 as the safety factor this gives the total permissible load as

$$P + Q = \frac{A'}{Sf}$$

2° - calculating A by the integration of the area indicated in 2.3.a), but adopting 3.5. as the safety factor.

The total permissible load becomes :

$$P + Q = \frac{2A}{3.5 \times Sf}$$

2.5. Checking the deformation of the block and of the guide

If too great a deformation of the safety jaws in the block or the guide may cause difficulty in disengaging the safety gear, the total permissible load must be reduced.

3. Progressive safety gear

3.1. Declaration and samples to be submitted

3.1.1. The applicant will state for what load and at what speed the test shall be carried out. If the safety gear is to be

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approved for different loads it will be specifically indicated if the adjustment is to be effected by stages or by a continuous process.

/The applicant shall select the suspended load by dividing the braking force by 1.6 in relation to an average deceleration of 0.6 g/

3.1.2. The laboratory shall be provided with one complete safety gear assembly, mounted on a cross-beam, the dimensions of wich have been specified by the laboratory. It shall have attached the necessary number of brake-block sets to complete the tests. In addition the length of the type guides to be used as specified by the Laboratory, shall be provided.

3.2. Test

3.2.1. Test method

The tests shall be carried out in free fall.

Positive or indirect measurement shall be made of :

a) the total drop;
b) the braking distance on the guides;
c) the slipping distance of the overspeed governor cable, or of an alternative device;
d) the total travel of the buffer-spring components.

The measurements a) and b) shall be made as a function of time.

Note shall be taken of :

e) the average braking force;
f) the maximum instantaneous braking force;
g) the minimum instantaneous braking force.

3.2.2. Test procedure

3.2.2.1. Approval of safety gear for a single suspended load.

a) The laboratory will carry out four tests with the suspended load (dead load + rated load). The brake-blocks will be expected to return to their normal temperature after each test.

b) Several sets of brake-blocks may be used during the 4 tests. However, one set of blocks shall make possible

- 3 tests if the rated speed is $\leq$ 4 m/s
- 2 tests if the rated speed is $>$ 4 m/s.

c) The free fall drop shall be calculated to correspond to the maximum release speed of the governor with which it shall be possible to use the safety gear.

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d) The tripping of the safety gear shall be carried out in such a way that it is possible to precisely determine the speed of operation.

/For example a rope can be used (the slackness having been methodically calculated) attached to a sleeve which can slide with friction on a smooth fixed rope. The friction force shall be the same as that applied by the associated safety gear governor on the control rope/.

3.2.2.2. Approval of safety gear for different suspended loads.

Adjustment in stages or continuous adjustment.

One series of tests shall be carried out for the maximum required value and another for the minimum required value. The applicant must furnish a formula or a diagram giving the variation of the braking force in relation to a defined parameter.

The Laboratory will check by a suitable method the validity of the formula (in the event of an unsatisfactory result a third series of tests shall be carried out for an intermediate point).

3.2.3. - Determination of safety gear braking force.

3.2.3.1. Approval of safety gear for a single suspended load.

The braking force of which the safety gear is capable with a given adjustment and type of guide used is equal to the average of the braking force averages noted during the four tests. Each test shall be made on an unused section of guide.

/Some tests show a considerable reduction of the friction coefficient when several successive tests are made in the same area of a machined guide. This is attributable to a change in the surface condition caused by successive brakings.

It is acknowledged that on an installation an uninduced operation of the safety gear would have every chance of occuring at the same spot.

If by chance this is not the case it shall be necessary to allow of a lesser braking force until an unused surface is reached.

Here sliding is greater than normal.

This is a further reason for not accepting an adjustment which from the start results in too slow a deceleration/.

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A verification shall be made that the average or instantaneous values noted during the tests are within the + 25 % bracket, in relation to the braking force value defined above :

3.2.3.2. Approval of safety gear for different suspended loads.

Adjustment in stages or continuous adjustment.

The braking force of which the safety gear is capable shall be calculated for the required maximum and minimum values as stated in 3.2.3.1.

3.2.4. Inspection after tests

a) A comparison of the hardness of the safety gear blocks and the jaws will be made with the original values quoted by the applicant. Other analyses may be carried out in special cases.

b) A verification of the deformation and state of change will be carried out (e.g. cracks, deformation or wear of the jaws, appearance of the rubbing surfaces).

c) Possibly photographs will be taken of the safety gear assembly, the jaws and the guides, as a permanent record of deformation or fractures.

3.3. Calculation of permissible suspended load

3.3.1. Approval of safety gear for a single suspended load.

The permissible suspended load (dead load + rated load) is :

$$P + Q = \frac{\text{Braking Force}}{1.60} \qquad (3.2.3.)$$

3.3.2. Approval of safety gear for different suspended loads.

a) Adjustment in stages

The permissible suspended load shall be calculated for each adjustment as stated in 3.3.1.

b) Continuous adjustment

The permissible suspended load is calculated as stated in 3.3.1. for the required maximum and minimum values and in accordance with the formula recommended for intermediate adjustments.

3.4. Final alteration of adjustments

If in the course of the tests the values obtained differ by more than 20 % from those expected by the applicant, further tests must be carried out with his consent after final alteration of the adjustments.

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/If the braking force is definitely greater than that reckoned by the applicant, the suspended load used for the tests shall be definitely less than that arrived at by the calculation authorised in 3.3.1. and consequently the conclusion could not be drawn from the test that the safety gear is capable of the required energy dissipation with the load arrived at by the calculation/.

4. Commentary

a) At the time of submitting an application in respect of a particular lift the total suspended load declared by the manufacturer may not differ more than + 0.15 % of the total permissible load for the safety gear taking into consideration the relative adjustment.

b) All the components transmitting force to the brake blocks shall be calculated with a safety coefficient of a least 3 for the more stringent adjustments.

c) When components are made of cast-iron or in cast steel the safety coefficient shall be 4. The use of ordinary grey cast iron is forbidden.

d) To take account of brazed or welded components reference must be made to the standards for such material.

e) A check must be made that the possible travel of the jaws is sufficient under the most unfavourable conditions (accumulation of manufacturing tolerances).

f) A check must be made that the electric safety device required in Clause E.9.11.1. has functioned properly.

g) The jaws shall be suitably guarded so that they cannot be misplaced from their operating position.

h) In the case of a progressive type safety gear it must be checked that the travel of the components forming the spring is sufficient. It shall be possible to seal adjustable components.

5. Record of tests

The test certificate shall be made in triplicate of which 2 copies are for the maker. It will record :

- the name of the maker
- the type of safety gear
- the mark of the Laboratory and the test number
- the total permissible load
- the rated speed and the speed of engagement
- the type of guide
- the permissible thickness of the guide
- the minimum width of the gripping areas
- the state of the surface of the guides
- the state of lubrication of the guides.

If they are lubricated the type and characteristics of the lubricant.

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Annex II

CHAPTER D

APPROVAL OF OVERSPEED GOVERNORS

1. General requirements

1.1. The design and the manufacture of the speed governors shall be in accordance with annex I of the directive.

1.2. The applicant shall indicate to the Laboratory :

a) the type (or the types ?) of safety gear which will be operated by the governor.

b) the maximum and minimum rated speeds of lifts for which the governor may be used.

2. Check on the characteristics of the governor

2.1. Specimens to be submitted

There shall be submitted to the Laboratory :

a) One overspeed governor.

b) One length of steel wire rope, length to be established by the Laboratory, of the type used for the governor and in the normal condition in which it is used.

c) A tensioning pulley assembly of the appropriate weight for the type of governor.

2.2. Test

2.2.1. Type of test

The following will be checked :

a) the speed of engagement
b) the functioning of the device called for in E.9.11.2 causing the lift to stop if this device is mounted on the governor
c) the functioning of the electric safety device called for in E.9.11.2.(2) preventing all movement of the lift when the governor has tripped
d) the adherence of the rope in the governor pulley or the force of engagement to operate the safety gear.

2.2.2. Test procedure

(The tests may be effected by the Laboratory in the works of the maker).

a) Twenty test stoppages at least are made in the speed ranges for engagement corresponding to the speed range of rated speeds of the lift, indicated in 1.2.b) above.

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Annex II

b) Notes :

1) The majority of tests will be made at the extreme values of the range of operating speeds.

2) The acceleration to reach the engagement speed shall be as low as possible in order to eliminate the effects of inertia.

2.2.3. Interpretation of the test results

a) In the course of 20 tests the engagement speed shall lie within the limits called for in Clause E.9.1.

NOTE : If the limits laid down are exceeded an adjustment may be made by the maker and 20 new tests be carried out.

b) In the course of the 20 tests the operation of the devices for which the test is required in 2.2.1.b) and 2.2.1.c) above shall be effective within the limits laid down in Clause E.9.11.2.

c) The force which can be transmitted by the rope when the overspeed governor trips shall be at least twice that required by the maker for engaging the safety gear, with a minimum of 300 N.

NOTES : (1) Unless particularly required by the maker and specified in the test report, the arc of engagement shall be 180°.

(2) In the case of devices operating by gripping of the rope it must be checked that there is no permanent deformation of the rope.

3. Test Certificate

The test certificate will indicate :

- the name of the maker,
- the type of speed governor,
- the mark of the Laboratory and the test number,
- the maximum and minimum rated speeds of the lift for which the overspeed governor may be used,
- the diameter of the rope and its construction,
- in the case of a speed governor with traction pulley, the minimum tensioning force.

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Annex II

CHAPTER E

APPROVAL OF HYDRAULIC BUFFERS

1. Request for Tests

The request shall state the range of operation required (maximum impact speed, minimum and maximum loads).

1.1. Documents to submit with the initial request for test.

The following are to be provided :

- detailed and assembly drawings showing the mode of construction and operation and materials used, the dimensions and tolerances of the components.

  There must also be shown the graduation (openings for the passage of the oil) as a function of the plunger stroke.

- specification for the oil used.

  On the request of the Laboratory these documents may be required in triplicate. The Laboratory may likewise call for supplementary information which may be necessary to them for the examination and test.

2. Test specimen

The construction of the specimen must conform to the documents submitted in accordance with 1.1.

The necessary oil must be sent separately.

3. Test

3.1. Procedure for test.

The buffer is tested with the aid of weights, corresponding to the minimum and maximum loads, falling in free fall to reach at the moment of impact the maximum impact speed called for.

The speed is to be registered at least at the moment of impact of the weights.

The acceleration and the deceleration are to be measured as a function of time throughout the movement of the weights.

3.2. Equipment to use.

The equipment shall satisfy at least the following conditions :

3.2.1. The weights falling in free fall.

The weights shall correspond to ± 1 % the maximum and minimum loads.

They shall be guided vertically with the minimum of friction.

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3.2.2. Recording equipment.

The recording equipment shall permit recording of phenomena which occur in the space of time of 0.01 s.

3.2.3. Measurement of speed.

The speed is to be measured at the moment of impact of the weights on the buffer or throughout the travel of the weights, with a tolerance of ± 1 %.

3.2.4. Measurement of the deceleration.

The device for measurement shall be placed as near as possible to the axis of the buffer, the tolerance on its measurement is ± 2 %.

3.2.5. Measurement of time

Time pulses of a duration 0.01 s shall be registered, the tolerance on the measure is ± 1 %.

3.3. Ambient temperature.

The ambient temperature shall lie between 15 °C and + 25 °C. The temperature of the oil shall be measured with a tolerance of ± 5 °C.

3.4. Mounting of the buffer.

The buffer shall be placed and fixed in the same manner as in normal service.

3.5. Filling of the buffer.

The buffer is to be filled up to the index mark.

In order to check that it is completely filled the buffer shall be compressed slowly at low speed. Then it shall be permitted to reset and after an interval of 10 minutes the oil level shall be rechecked. If necessary the oil should be topped up to the index mark again. This process should be repeated until the oil level is completely stable at the correct level.

3.6. Tests.

3.6.1. Deceleration tests.

The height of free fall of the weights is chosen in such a way that the speed of the moment of impact corresponds to the speeds stipulated in the application for test.

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The deceleration shall conform to the requirements of Clause F.4.2.3. of Annex I of the present directive.

A first test is made with maximum load, with a check on the deceleration.

A second test is made with minimum load, with a check on the deceleration.

3.6.2. Check of the plunger return.

After each test the plunger shall be held in the completely compressed state for five minutes. The plunger is then freed to permit its return to normal position.

When the buffer is one with spring or gravity return the position of complete resetting shall be reached in a maximum period of 120 seconds. Before proceeding to another deceleration test there must be a delay of 30 minutes to permit the oil to return into the reservoir and for bubbles of air to escape.

3.6.3. Check of the oil loss.

The level of oil is to be checked after having made the two deceleration tests required in Clause 3.6.1. After an interval of 30 minutes the level of oil should again be sufficient to ensure correct functioning of the buffer.

3.6.4. Check of the condition of the buffer after tests.

After the two deceleration tests required in 3.6.1. there shall be no permanent deformation or other damage to the buffer.

3.7. Procedure in the case where the requirements of the test are not satisfied for the loads called for in the request.

When the test results are not satisfactory with the minimum and maximum loads called for in the request the Laboratory may in agreement with the applicant establish other acceptable limits for load.

4. Certification

The certificate must be provided in triplicate :

- 2 for the applicant,
- one to remain at the Laboratory.

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Annex II

The certificate must indicate :

- the name of the buffer maker;
- the type of buffer;
- the mark of the Laboratory and the number of certificate;
- the maximum impact speed;
- the maximum load;
- the minimum load;
- the specification of the oil and its temperature in the tests.

4.1. Attachments to the certificate.

- The document indicated in 1.1.
- The test procedure.
- The name of the makers, the type numbers and serial numbers of the measuring instruments used.
- The recovery time of the plunger.
- Observations concerning the loss of oil or deformation of the buffer.

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ANNEX III

AUTHORIZATION PRIOR TO INSTALLATION

When preliminary authorisation is required by national regulations, a dossier to be provided to enable conformity to requirements to be assessed should comprise all or the appropriate part of the details and documents figuring in the following list.

1. General

Names and addresses of the lift maker, the owner and the user.
Address of the installation.
Type of equipment - Rated load - Rated speed - Number of passengers.
Travel of the lift - Number of landings served.
Weight of the car and of the counterweight.
Means of access to the machine room, and to the pulley room, if there is one.

2. Technical details and plans

Plans and necessary cross sections covering the lift installations, including machine rooms, pulley rooms and equipment.

These plans are not intended for giving details of construction, but they shall contain the necessary particulars to verify conformity to requirements and particularly the following :

- Overtravel distances in the upper and lower ends of the well.
- Any spaces below the well.
- Access to the pit.
- Guards between the lifts if there are more than one in the same well.
- Provision for holes for fixings.
- Position and principal dimensions of the machine room with the foundations for the machine and principal devices. Dimensions of traction sheave. Ventilation holes. Reaction loads on the building.
- Access to the machine room.
- Position and principal dimensions of the pulley rooms.
- Position and dimensions of pulleys, position of other devices in this pulley room.
- Access to the pulley room.
- Position and principal dimensions of landing doors. It is not necessary to show all the doors if they are identical and if the distances between the floors are indicated.
- Position and dimensions of access and emergency doors.

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- Dimensions of the car and of its entrances.
- Distance from the sill and from the car door to the facing wall of the well.
- Distance affording entry between car door and landing door.
- Principal characteristics of the suspension.: lifting ropes (number, diameter, construction, breaking load), chains (type, construction, pitch, breaking load). Compensation ropes where provided.
- Guides. Characteristics, condition and dimensions of rubbing surfaces.

3. Schematic diagrams

Outline electric schematic diagrams of the principal circuits and of safety circuits.

These schematic diagrams shall be clear and have a table explaining the symbols used.

4. Certificates

Copies of type test certificates for locks, landing doors, safety gear, speed governor, hydraulic buffers.

If necessary, copies of certificates for other components (ropes, chains, materials, fire resistance).

Setting up certificate for the safety gear, provided by the lift manufacturer and calculations of the compression of the springs.

5. Check of calculation of certain items and their conformity to the directive

a) Means of suspension

Checking of the requirements of Chapter E. (for the ropes, e.g. : number, diameter, minimum breaking load, construction, relation between the nominal diameter of the ropes and the pitch diameter of pulleys or sheaves).

b) Adherence of the suspension ropes in the grooves of the traction sheaves.

The following formula shall be satisfied.

$$\frac{T_1}{T_2} \cdot C_1 \cdot C_2 \leqslant e^{f\alpha}$$

$\frac{T_1}{T_2}$ is the ratio of the maximum and minimum static loads in the portions of the rope situated on either side of the traction sheave in the following conditions :

- car stationary at the lowest landing with a load equivalent to 125 % of the rated load;
- car stationary at the highest landing level, unloaded.

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Annex III

C_1 coefficient taking into account accelerations, decelerations and the peculiarities of the installation.

$C_1 = \frac{g + a}{g - a}$ g being the gravity acceleration in m/s^2

a being the braking deceleration of the car in m/s^2

The coefficient shall be calculated in each particular case for the high speed lifts.

In other cases the following minimum values may be accepted for C_1

1,10	for rated speeds	$V_n \leq 0{,}63$ m/s
1,15	for rated speeds	$0{,}63 \text{ m/s} < V_n \leq 1{,}00$ m/s
1,20	for rated speeds	$1{,}00 \text{ m/s} < V_n \leq 1{,}60$ m/s
1,25	for rated speeds	$1{,}60 \text{ m/s} < V_n$

C_2 coefficient taking account of the variation of profile of the groove due to wear.

$C_2 = 1$ for semi-circular or undercut grooves

$C_2 = 1.2$ for V grooves

e is the base of natural logarithms;

f is the friction coefficient of the ropes in the grooves;

$$f = \frac{\mu}{\sin \gamma/2} \quad \text{for V grooves}$$

$$f = \frac{4\mu\,(1 - \sin \beta/2)}{\pi - \beta - \sin \beta} \quad \text{for semi-circular grooves or undercut grooves.}$$

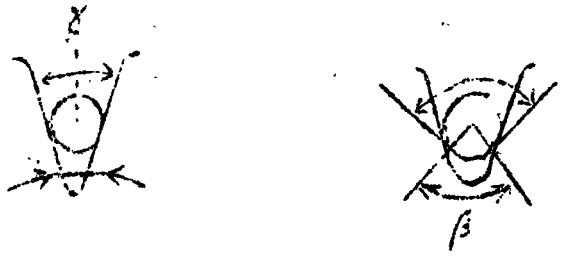
α being the angle of wrap of the ropes on the traction sheave in radians;

β being the angle of the groove in radians

($\beta = 0$ for semi-circular grooves)

γ being the angle of the V of the groove in radians;

μ being the coefficient of friction between steel ropes and cast-iron sheaves = 0.09.



c) Specific pressure

The specific pressure is calculated in accordance with the following formulae

$$P = \frac{T}{n.d.D} \cdot \frac{4.5}{\sin \gamma/2}$$ for grooves in V

$$P = \frac{T}{n.d.D} \cdot \frac{8 \cdot \cos \beta/2}{\pi - \beta - \sin \beta}$$ for undercut or semicircular grooves

d being the diameter of the ropes in mm;
D being the diameter of the traction sheave in mm;
n being the number of ropes;
p being the specific pressure in N/mm^2
T being the static load of the car side, the car with its rated load being stationary at the lowest level.

The specific pressure must be such as to satisfy the conditions for adherence specified in E.3.1.

1 - Lifts

In any case the ropes must not exceed the following values because of specific pressure, the car being loaded to rated load :

$V_c \leq$ 1.6 m/s maximum pressure 9.0 N/mm^2

$V_c >$ 1.6 m/s maximum pressure 7.5 N/mm^2

2 - Lifts especially for the conveyance of accompanied loads :

$$p = \frac{12.5 + 4\ V_c}{1 + V_c}$$ V_c is the rope speed corresponding to the rated car speed in m/s.

d) Guides

The stress in each guide at the moment of operation of the safety gear is calculated according to the following formulae :

- instantaneous safety gears (except captive roller type)

$$\sigma_k = \frac{2.5\ (F + Q) \cdot \omega}{A}$$

- captive roller type safety gear

$$\sigma_k = \frac{1.5 \cdot (F + Q) \cdot \omega}{A}$$

- progressive safety gear

$$\sigma_k = \frac{(F + Q) \cdot \omega}{A}$$

σ_k not to exceed : 140 N/mm^2 for steel of 370 N/mm^2
210 N/mm^2 for steel of 520 N/mm^2

F is the dead load on the carside
Q is the rated load
A is the cross section of the guide in square centimetres

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Annex III

ω is read in the following tables as a function of λ

$$\lambda = \frac{l_k}{i}$$

l_k is the distance between guide attachments in centimetres

i is the radius of gyration of the guide

e) Pit bottom reactions

They may be evaluated in the following manner :

- under the buffer supports : 4 times the weight (car + load) or the counterweights
- under the guides : weight of the guides added to the reaction in the case of safety gear operation.

Values of ω

Steel 370 N/mm^2

λ	0	1	2	3	4	5	6	7	8	9	λ
20	1.04	1.04	1.04	1.05	1.05	1.06	1.06	1.07	1.07	1.08	20
30	1.08	1.09	1.09	1.10	1.10	1.11	1.11	1.12	1.13	1.13	30
40	1.14	1.14	1.15	1.16	1.16	1.17	1.18	1.19	1.19	1.20	40
50	1.21	1.22	1.23	1.23	1.24	1.25	1.26	1.27	1.28	1.29	50
60	1.30	1.31	1.32	1.33	1.34	1.35	1.36	1.37	1.39	1.40	60
70	1.41	1.42	1.44	1.45	1.46	1.48	1.49	1.50	1.52	1.53	70
80	1.55	1.56	1.58	1.59	1.61	1.62	1.64	1.66	1.68	1.69	80
90	1.71	1.73	1.74	1.76	1.78	1.80	1.82	1.84	1.86	1.88	90
100	1.90	1.92	1.94	1.96	1.98	2.00	2.02	2.05	2.07	2.09	100
110	2.11	2.14	2.16	2.18	2.21	2.23	2.27	2.31	2.35	2.39	110
120	2.43	2.47	2.51	2.55	2.60	2.64	2.68	2.72	2.77	2.81	120
130	2.85	2.90	2.94	2.99	3.03	3.08	3.12	3.17	3.22	3.26	130
140	3.31	3.36	3.41	3.45	3.50	3.55	3.60	3.65	3.70	3.75	140
150	3.80	3.85	3.90	3.95	4.00	4.06	4.11	4.16	4.22	4.27	150
160	4.32	4.38	4.43	4.49	4.54	4.60	4.65	4.71	4.77	4.82	160
170	4.88	4.94	5.00	5.05	5.11	5.17	5.23	5.29	5.35	5.41	170
180	5.47	5.53	5.59	5.66	5.72	5.78	5.84	5.91	5.97	6.03	180
190	6.10	6.16	6.23	6.29	6.36	6.42	6.49	6.55	6.62	6.69	190
200	6.75	6.82	6.89	6.96	7.03	7.10	7.17	7.24	7.31	7.38	200
210	7.45	7.52	7.59	7.66	7.73	7.81	7.88	7.95	8.03	8.10	210
220	8.17	8.25	8.32	8.40	8.47	8.55	8.63	8.70	8.78	8.86	220
230	8.93	9.01	9.09	9.17	9.25	9.33	9.41	9.49	9.57	9.65	230
240	9.73	9.81	9.89	9.97	10.05	10.14	10.22	10.30	10.39	10.47	240
250	10.55										

The intermediate resistance quality of steel is determined by the linear interpolation value of ω.

Annex III

Steel 520 N/mm^2

λ	0	1	2	3	4	5	6	7	8	9	λ
20	1.06	1.06	1.07	1.07	1.08	1.08	1.09	1.09	1.10	1.11	20
30	1.11	1.12	1.12	1.13	1.14	1.15	1.15	1.16	1.17	1.18	30
40	1.19	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27	40
50	1.28	1.30	1.31	1.32	1.33	1.35	1.36	1.37	1.39	1.40	50
60	1.41	1.43	1.44	1.46	1.48	1.49	1.51	1.53	1.54	1.56	60
70	1.58	1.60	1.62	1.64	1.66	1.68	1.70	1.72	1.74	1.77	70
80	1.79	1.81	1.83	1.86	1.88	1.91	1.93	1.95	1.98	2.01	80
90	2.05	2.10	2.14	2.19	2.24	2.29	2.33	2.38	2.43	2.48	90
100	2.53	2.58	2.64	2.69	2.74	2.79	2.85	2.90	2.95	3.01	100
110	3.06	3.12	3.18	3.23	3.29	3.35	3.41	3.47	3.53	3.59	110
120	3.65	3.71	3.77	3.83	3.89	3.96	4.02	4.09	4.15	4.22	120
130	4.28	4.35	4.41	4.48	4.55	4.62	4.69	4.75	4.82	4.89	130
140	4.96	5.04	5.11	5.18	5.25	5.33	5.40	5.47	5.55	5.62	140
150	5.70	5.78	5.85	5.93	6.01	6.09	6.16	6.24	6.32	6.40	150
160	6.48	6.57	6.65	6.73	6.81	6.90	6.98	7.06	7.15	7.23	160
170	7.32	7.41	7.49	7.58	7.67	7.76	7.85	7.94	8.03	8.12	170
180	8.21	8.30	8.39	8.48	8.58	8.67	8.76	8.86	8.95	9.05	180
190	9.14	9.24	9.34	9.44	9.53	9.63	9.73	9.83	9.93	10.03	190
200	10.13	10.23	10.34	10.44	10.54	10.65	10.75	10.85	10.96	11.06	200
210	11.17	11.28	11.38	11.49	11.60	11.71	11.82	11.93	12.04	12.15	210
220	12.26	12.37	12.48	12.60	12.71	12.82	12.94	13.05	13.17	13.28	220
230	13.40	13.52	13.63	13.75	13.87	13.99	14.11	14.23	14.35	14.47	230
240	14.59	14.71	14.83	14.96	15.08	15.20	15.33	15.45	15.58	15.71	240
250	15.83										

ANNEX IV

INSPECTION BEFORE GOING INTO SERVICE

After the erection of the lift and before putting it into service the following checks and tests shall be carried out.

- comparison of the installation with the documents listed in Annex III (if there is a requirement for preliminary authorisation) and with the requirements of the directive;
- comparison of the details given in the approval certificates for the items for which type tests are required, with the details of the equipment provided;
- check of the mechanical and electric safety devices;
- check of the means of suspension and their attachments;
- check of the area of ventilation openings;
- test of the alarm devices;
- visual check of the application of the rules of good construction to the components for which the directive has not any special requirements.

The following tests shall in particular be carried out.

Note that for a series of identical lifts it is not necessary to repeat on each item of equipment the check of components which are independent of the individual installation (for example adherence).

1. Adherence

   a) The adherence shall be checked in the upward direction of travel with the car empty.

      The tests consist in making several stops with the brake set at its most severe normal setting compatible with the installation. At each test the complete stoppage of the car shall be achieved.

   b) It must be checked that the empty car cannot be raised, when the counterweight rests on its compressed buffers.

   c) Checking of the conformity of the counterweight balance with the value given by the maker. This check may be made by current measurement.

2. Car safety gear and, where provided, counterweight safety gear

   As the safety gear has been type tested, the aim of site test is solely to make sure that it is in working order.

   The tests shall be made with empty car at reduced speed (for example at relevelling speed or inspection speed).

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3. Overspeed governor

The mechanical tripping speed of the governor shall be checked, with the governor disconnected from the car.

4. Buffers functioning through energy dissipation

The test will be carried out in the following way :

- the car with its rated load (likewise the counterweight if appropriate) is brought into contact with the buffers at rated speed, or at the reduced speed if use is made of reduced speed buffers.

To carry out this test the final limit switches and terminal limit switches shall be rendered inoperative.

5. Lifting ropes or chains

It must be checked that the characteristics are those indicated on the data plate on the car sling and in accordance with Annex III.

6. Mechanical brake

The mechanical brake is tested with the car descending at rated speed with rated load or ascending empty.

In the case of cars without counterweight the car is loaded with 125 % of rated load.

ANNEX V

INSPECTIONS MADE PERIODICALLY OR AFTER AN IMPORTANT MODIFICATION OR AFTER AN ACCIDENT

1. Periodical examinations

Periodical examinations shall be made at least once every two years to check the satisfactory condition of the lift and of the safety devices.

If in the course of his examination the inspector considers it necessary to make tests these shall not be such that through their repetition they provoke excessive wear or impose stresses likely to diminish the safety of the installation.

In any event such tests shall not be more stringent than those required when the lift is being put into service for the first time.

The examination should bear particularly on the following points :

- locking devices;
- safety gear;
- overspeed governor;
- buffers;
- lifting ropes or chains;
- mechanical brake;
- alarm systems.

The tests shall be made under the same conditions as for the check before putting into service.

If the mechanical braking elements are such that in case of failure of one of them the other is not sufficient to retard the car, a detailed examination shall be made of the nuts, spindles, linkages etc. to ensure that there is no wear, corrosion or deterioration affecting their satisfactory operation - (it is not necessary to make a particular check on adherence. This would become self evident during normal running).

2. Examination after an important modification or after an accident

After an important modification of one of the components for which details are called for in Annex III (preliminary authorisation) the new documents or particulars necessary shall be sent to the person or organisation in charge of the inspections.

The modifications or accidents shall be recorded in the register called for in M.5.

The inspector will judge whether it is necessary to proceed to a test of the modified or replaced components.

This test would at most be that required for the original component at the time of the lift first going into service.

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Annex VI

ANNEX VI

CERTIFICATE OF EEC COMPONENT TYPE-APPROVAL

Inspecting Authority

Application of Council Directive Nr. ..... of .....

Distinctive EEC type approval for components code Nr. .....

Type of component for .....

Date :

Designation of lift component :

Manufacturer's Name and Address :

The undersigned hereby declares that he has :

- verified that the tests prescribed at points ..... of Annex II of the Directive were carried out successfully, on ..... under the type heading submitted.

General remarks : the plan which was the subject of approval is annexed hereto.

Done and certified this ..... day of ..... at .....

.....
(signature and capacity)