



Maintenance Guide



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INTRODUCTION

This Guide's aim is to assist those in Western Australia concerned with the legislative and other requirements affecting the maintenance of lifts, escalators and similar products. It enables those persons purchasing maintenance to recognise and understand their responsibilities in relation to those they do business with and the need to recognise that it requires commitment from both parties if the work is to be undertaken safely.

All parties entering into maintenance agreements need to recognise what is entailed and the importance of reporting equipment condition and making activities transparent with regards to what is being done or needs to be done.

This document does not include all the necessary provisions of a contract. Users are responsible for its correct application. It should not be quoted as if it was a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Lifts and escalators are among the very few modes of transportation available for continuous unsupervised use by all persons from the very young to the elderly and infirm. Despite this they are amongst the safest form of travel. However, they are classified as high risk plant.

The Occupational Safety and Health Regulations, 1996 require that lifts must be maintained, inspected, and tested by a competent person in accordance with AS 1735 and the manufacturer's instructions.

The Australian Elevator Association recommends that a maintenance program should be developed and undertaken in accordance with the standard EN13015 "Maintenance for lifts and escalators – Rules for maintenance instructions." Contact Standards Australia for a copy of this if required. EN13015 Scope This European Standard specifies the elements necessary for the preparation of the instructions for the maintenance operations, which are provided for new installed passenger lifts, goods passenger lifts, accessible goods only lifts, service lifts, escalators and passenger conveyors.

EXCLUSIONS

This document does not address the requirements of plant in special environmental condition such as lifts in potentially explosive atmospheres, mines, tunnel, exposed masts, ships or chemically aggressive atmospheres.

It does not cover requirements related to 3rd parties (Thorough Examinations) such as those conducted by engineering plant surveyors, insurance inspectors etc. It does not cover non plant related equipment installed in machinery spaces or lift wells such as fire detecting equipment, sprinklers, emergency lighting, general lighting, air conditioning, heating equipment or other equipment related to the building.

TERMS AND DEFINITIONS

For the purposes of this document the following terms and definitions apply.

Formal exclusion (schedule) written statement within or attached to an agreement clearly identifying items not covered by the agreement.

Planned/Scheduled Periodic Maintenance all the necessary operations to ensure the safe and intended functioning of the installation and its components following the completion of the installation and throughout its life cycle.

Maintenance includes:

a) lubrication and cleaning of the plant, etc.;

However, the following cleaning operations are not considered as maintenance items:

- 1) cleaning of the external parts of a lift well;
- 2) cleaning of the external parts of the escalator or passenger conveyor;
- 3) cleaning of the inside of the car.
- 4) heavy contamination of pit area or removal of water due to ingress or flooding.

b) functional checks;

c) check of passenger rescue functionality;

d) the operations of setting and adjustment;

e) repair or changing of components that are included in the maintenance agreement which may occur due to wear and tear and do not affect the characteristics of the installation.

The following are not considered as maintenance operations:

a) renewal of a major component such as the machine, the lift car/cage, the control panel, etc., or safety component such as safety gear, etc., even if the characteristics of the new component are the same as the original;

b) replacement of the installation;

c) rescue operations carried out by Fire Services;

d) modernisation or refurbishment of the installation, including the changing of any characteristic of the installation (such as speed, load, etc.);

e) Thorough Examinations and Supplementary Tests, and third party inspections.

Maintenance contractor a suitably qualified party that is contracted to maintain the scope of equipment scheduled in a maintenance agreement.

Passenger person requiring use of a lift, lifting platform, escalator or moving walk etc.

Plant lift, lifting platform, escalator or moving walk to be maintained.

Reporting act of providing a condition report to the Responsible Person for the equipment and any necessary remedial work to ensure continued safety of the equipment.

Responsible person legal entity having right of possession of a lift, lifting platform, escalator or moving walk and responsibility for its safe working.

Note The responsible person is usually the owner or duty holder, sometimes the occupier, of the building in which the plant is situated.

Responsible person's (owner) information manual Information provided by the installer of new equipment to the original purchaser explaining how it should be used, maintained and dismantled. For example, as provided according to EN 13015.

Note 1 the manual is the property of the owner but it is intended that the document is made available to any maintenance contractor.

Note 2 the document is valuable to the owner, we therefore recommend a copy (not the original) is provided to any maintenance contractor.

Note 3 it is intended that the manual is updated throughout the life of the plant when modifications and changes to the original specification are made.

Note 4 The information manual includes information on the use of essential special tools and software access codes.

Risk assessment comprehensive estimation of the probability and the degree of possible injury or damage to health in a hazardous situation, in order to select appropriate safety measures.

Thorough examination an examination conducted by a party independent of the maintainer.

Special tools tools and/ or software essential for maintenance which can only be purchased direct from the original manufacturer and cannot be purchased on the open market. Special tools may include electronic tools and software.

User person making use of the services of a lift, lifting platform, escalator or moving walk.

Note A user is not necessarily the same as a passenger and includes persons waiting for a lift, lifting platform etc. or those working on it.

Workplace premises or part of premises where work is carried out.

Note 1 This can include:

- a) any place which is accessible to those at the workplace;
- b) any means of access to/from the workplace e.g. staircase, corridor, road.

Note 2 A workplace is usually non-domestic, although the term can refer equally to domestic premises.

REGULATIONS

Standards

AS 1657 Fixed platforms, walkways, stairways and ladders – Design, construction and installation

AS 1735 Standards for Lifts, escalators and moving walks

AS 4360 replaced with AS/NZS ISO 3100

AS 4431 Guidelines for safe working on new lift installations in new constructions

AS 4836 Safe working on or near low-voltage electrical installations and equipment

AS/NZ 3000 Wiring Rules

EN81–20 Safety rules for the construction and installation of lifts. Lifts for the transport of persons and goods. Passenger and goods passenger lifts

EN81–80 Safety rules for the construction and installation of lifts. Existing lifts. Rules for the improvement of safety of existing passenger and goods passenger lifts

EN 115–2 Safety of escalators and moving walks – Part 2: Rules for the improvement of safety of existing escalators and moving walks

EN 13015 Maintenance for Lifts and escalators– Rules for Maintenance instructions

ISO14798 Lifts (lifts), escalators and moving walks – Risk assessment and reduction methodology

ISO 25743 Lifts (lifts) – Study of the use of lifts for evacuation during an emergency

ISO 25745 parts 1 to 3 Energy performance of lifts, escalators and moving walks

ISO/IEC Guide 2 Standardisation and relative activities – General Vocabulary

NCC 2014 National Construction Code

Legislation

Occupational Safety and Health Act 1984, Western Australia

Occupational Safety and Health Regulations 1996, Western Australia

CURRENT LEGAL FRAMEWORK

The Western Australian State Government is replacing the Occupational Safety and Health Act with a modernised Work Health & Safety (WHS) Act, which is based on the National Act. The National Act has been adopted by most states has created a raft of new WHS legislative package. The package includes Act, Regulations, Codes of Practice and Guidance documents. Many of which impact on those involved with lifts or moving walks.

The WHS legislative package reinforces that everyone in the workplace has a work health and safety duty. There are some new concepts and terms. “Person conducting businesses or undertaking” and the term and its abbreviation “PCBU” will become more common over time. These changes reflect changes in the social expectations and nature of work in our society. Commonly used terms are changing also, which reflects changes in the social fabric of our society. Elevators are being referred to as ‘lifts’. Lifts, escalators and moving walks are more often being classified as ‘vertical transport’. In addition, lifts, escalators and moving walks are classified in the WHS legislation and guidance as ‘high risk plant’.

Although there is no requirement for a lift contractor to inform a building maintenance manager of changes in codes of practice or legislation, there falls to both parties a responsibility under the Occupational Safety and Health Act and under both criminal and civil law to provide safe plant and equipment, safe systems of work, adequate information, instruction, training and supervision and failure to do so may render those concerned in breach of criminal and/or civil law.

FUTURE COST IMPLICATIONS

It is impossible to predict costs that might arise out of implementing future legislative changes which are not always required to have immediate effect. In order therefore to budget for possible expenditure, it is clearly important that the building maintenance manager is aware of prospective changes at the earliest possible time. This is particularly relevant in the case of lifts and escalators which tend to have a longer life cycle than most if not all forms of transportation.

Also to be considered is that within the useful life expectancy of a building, which may be as much as 60 years, an up-grading, or even total replacement, of the equipment may occur on three, if not four occasions. It is clearly desirable therefore to take this into account when looking at long term budgeting arrangements.

GENERAL DUTY OF CARE

Both employers and employees have a duty of care in relation to the health and safety of people or property which may be affected by their actions, or failure to act. Therefore, building owners, or those who have responsibility for controlling buildings are required under Occupational Safety and Health Act to ensure that their premises are safe and free from risk to health, so far as is reasonably practicable.

REPORTING OF ACCIDENTS

There is a legal requirement to report certain types of injury by virtue of section 231 of the Occupational Safety and Health Act 1984. All fatalities or incidents involving serious injury at work must be reported as soon as possible.

The types of injuries that must be reported are:

- ⊗ A fracture of the skull, spine or pelvis;
- ⊗ A fracture of any bone in the arm (other than in the wrists or hand) or in the leg (other than a bone in the ankle or foot);
- ⊗ An amputation of an arm, a hand, finger, finger joint, leg, foot, toe or toe joint;
- ⊗ The loss of sight of an eye; and
- ⊗ Any injury other than the above which, in the opinion of a medical practitioner, is likely to prevent the employee from being able to work within 10 days of the day on which the injury occurred.

PLANT REGISTRATION

A current Item Registration Certificate issued by the Worksafe must be obtained before a lift, escalator or moving walk can be placed in general service. Where an item of plant is to be used prior to practical completion during the construction period of a building i.e. as a “Builders Lift” then it is recommended that any specific requirements for Item Registration be confirmed with the local statutory authority.

INSURANCE

Both building owner and lift maintenance contractor have a responsibility to carry insurance. There is a potential liability for claims from tenants and passengers in the event of accidental damage and clients should seek to satisfy themselves on the extent of the contractor’s insurance cover.

Insurance can cover damages awarded by the civil courts but insurance is not available against penalties imposed under criminal law. This applies equally to the building owner and the lift maintenance contractor.

It also needs to be borne in mind that any insurance policy may well include ‘exceptions to cover.

LEGISLATION, STANDARDS, CODES OF PRACTICE AND OTHER RECOMMENDATIONS

Where building maintenance managers have their equipment regularly examined by an insurance inspector then they too will normally advise on matters where there might be a breach of legislation or where passenger safety is concerned.

MAINTENANCE OBJECTIVES

The level of maintenance will depend on what the responsible person wishes to achieve.

The aim may be to:

- ④ Satisfy the legal requirement;
- ④ Plan financial expenditure and therefore an agreement that covers the cost of repairs will make it easy to forecast costs for coming years;
- ④ Protect the investment made in equipment and to keep it running at optimum performance.

Regardless of how good the equipment purchased, it will wear and deteriorate through use.

Due to the complexity of modern systems and dangers in the environment, only specialists trained in this field will know what to do and how to do it in safety.

In the market place maintenance contractors may offer products that cover more than that described within this document or may give their service agreement a commercial name different to that described here.

PLANNING MAINTENANCE REQUIREMENTS

WHAT THE CUSTOMER SHOULD EXPECT FROM THE MAINTENANCE CONTRACTOR

- ④ Make a service agreement offer that meets the customer's stated requirements;
- ④ Carry out a Risk Assessment and a compile a Method Statement prior to commencing work on site;
- ④ Provide an efficient plant breakdown and repair service;
- ④ Provide an adequate emergency passenger release service;
- ④ Provide an initial condition report;
- ④ Complete maintenance visits in accordance with a planned maintenance programme;
- ④ Maintain plant so that with consideration to fair wear and tear, original or altered design parameters are maintained in relation to performance and safety;
- ④ Report to the responsible person and post warning notices before commencing work and on completion of the work;
- ④ To repair equipment as specified in individual contracts
- ④ Keep the work area tidy and uncluttered;
- ④ Immediately notify the responsible person of any condition that is unsafe or is likely to become unsafe within a short time;
- ④ Will provide a maintenance log card and make entries after each visit;
- ④ Will advise customers of changes to relevant Standards and Regulations;
- ④ Provide advice in relation to their expertise as is reasonably required by the owner.

WHAT THE MAINTENANCE CONTRACTOR SHOULD EXPECT FROM THE CUSTOMER

- ④ Specify their maintenance objectives and advise on issues such as the frequency and intensity of usage of the plant and any additional/ special features e.g. fireman's/ firefighting/evacuation;
- ④ Allow potential new maintenance contractors sufficient time and access to inspect/ survey the plant, if needed, prior to submitting an offer;
- ④ Make available the original technical information and relevant service history of the plant together with any essential special tools supplied by the manufacturer;
- ④ Where original manufacturer's documents have been lost the responsible person should make endeavours to source replacements from the original manufacturer where possible.
- ④ Make available the Health and Safety file and draw the attention of the prospective maintenance contractor to any relevant hazards;
- ④ Provide safe access to the work areas, including suitable access ladders where required and portable landing barriers;
- ④ Make efforts to improve the safety of the plant by taking into account the recommendations of the initial condition report;
- ④ Act upon the recommendations of the contractor in a timely manner particularly in respect of defective or missing safety devices;
- ④ Where plant has been taken out of service due to an unsafe condition, not reinstate it until sufficient measure have been taken to restore it to safe use;
- ④ Arrange for the plant to undergo a periodic thorough examination by an independent competent person; at intervals not exceeding 6 months in respect of a passenger carrying lift or 12 months for a non-passenger carrying lift;
- ④ Will report any defects immediately to the contractor and carry out simple daily checks.

PREVENTATIVE MAINTENANCE

Maintenance of lifts and escalators is not an optional feature. In addition to equipment being required to be of good mechanical construction, of sound material and adequate strength, the statutory provisions extend to requiring proper maintenance. Preventative maintenance is best employed in order to preserve the operational integrity of the installation.

Regular site visits:

- ④ Ensure continued safe functioning of the equipment.
- ④ Minimise the time that equipment might otherwise be out-of-service.
- ④ Secure the availability of trained personnel able to respond promptly in the event of breakdown.
- ④ Prolong the life and performance of the installation.

Preventative maintenance also has the benefit of protecting the value of the investment in the product and spreading the cost more evenly over a longer period of time.

Whilst the extent of maintenance undertaken may vary, a fully comprehensive maintenance arrangement is that which will provide maximum cover for the client fulfilling the benefits described above. This type of agreement serves to anticipate the needs of the equipment and therefore the cost and provision of parts requiring replacement as they become worn.

Manufacturers/maintainers can thus spread their costs to the benefit of the client and over a period which may extend for up to twenty years. Lesser agreements are available but will not afford the same benefits. It is important in these cases to consider the scope of what is being offered and the exclusions.

LIFE EXPECTANCY OF EQUIPMENT

Life expectancy of equipment depends largely on environment and usage. As a general guide, providing proper maintenance has been undertaken, generally geared type lift equipment can have a life expectancy of 25 years for the main components and 15 years for the control systems. In the case of gearless machines the main drive machinery could have a life of 40 years

FREQUENCY OF VISITS

A fully comprehensive agreement will provide for the appropriate number of visits to suit a particular installation, the needs of the client and the age of the equipment. However, where there is a high usage or if a continuation of service is particularly vital, the frequency of visits may need to be increased to once a month (or more often in some cases). On the other hand there may be occasions where fewer visits can be tolerated i.e. where the equipment has limited use. In any event consideration should be given as to when the equipment being taken out of service for maintenance will cause least inconvenience. A lift/ escalator is an essential feature of building services and their continued availability reflects upon the effectiveness and efficiency of the building as a whole, and therefore its value to the occupier.

QUALIFICATIONS, TRAINING AND COMPETENCE

The quality of maintenance offered inevitably rests on the skills of the operative, together with those who provide specialist support. The extent to which such persons have been trained is therefore important particularly in keeping abreast of changes in technology and current safety legislation. Building maintenance managers should therefore seek reassurance to this effect from the company whose services they intend to employ. They might wish at the same time to enquire about the company's Safety Policy and whether the company has undertaken a risk assessment of the work to be undertaken.

For a competent person to perform inspection of lifts, escalators or moving walks they:

- ⊗ Should have a trade qualification in a mechanical associated trade, electrical trade or associate engineering qualification
- ⊗ Should have a comprehensive understanding of relevant design and safe use/maintenance standards this would include the relevant design standard used
- ⊗ Should have a minimum of 5 years' experience in the lift industry

COMPETENCE OF SUB-CONTRACTORS

The responsible person should ensure that any work carried out on plant is performed only by authorised and competent persons. The competency of all trained persons should be assessed and documented annually. Documentation should list the competencies achieved, and made available when requested.

Work by persons other than the regular maintenance contractor may have implications for the plant and the maintenance agreement in place. Following work by others, the regular maintenance contractor may therefore want to carry out operational and safety checks of the plant prior to recommencing their maintenance regime.

EMERGENCY RELEASE OF PASSENGERS

With every lift machine there should be information on the safe release of passengers. The building maintenance manager may have members of staff trained specifically to undertake such a task. Information on release of passengers may be found in the owners' instruction manual supplied with the equipment. Where relevant due to the carrier being enclosed, e.g. lifts and enclosed lifting platforms, are provided with an emergency communication system linked to a rescue service, the maintenance provider should ensure that alarm calls from the equipment are received and acted upon. The response of the maintenance contractor should be defined as part of the maintenance agreement.

Arrangements should be put in place between the responsible person and the maintenance provider to ensure that there is a permanently available communications link. The responsibility for this link is usually with the responsible person e.g. where the public telephone network is used.

The responsible person should retain landing door unlocking keys and machinery space access keys secure and establish control measures for their issue and use. In many cases, passengers trapped in enclosed lifting platforms or in lift cars are not in immediate danger. Release and landing door unlocking procedures undertaken by untrained personnel could result in trapped passengers and others in the vicinity being placed at risk.

TRAINING IN EMERGENCY RELEASE

The training of individuals in the responsible person's organisation would usually be appropriate only where there were suitably competent and trained persons are available. Where training is agreed, this should be provided by the maintenance provider who should be invited to risk assess the equipment and assess the competence of those being offered for training. Refresher training should be provided at least annually.

The maintenance contractor should undertake the training and then assess the competence of the trainees. The scope of rescue and release procedure for which they have been assessed to be competent, and the time before they need refresher training, should be clearly set out. Refresher training should be provided at least annually.

CALL-OUTS OR BREAKDOWNS

The scope of attendance to breakdowns or calls should be defined as part of the maintenance agreement. Where some call-outs are included and others are not included, e.g. call-outs for misuse/ vandalism excluded or call-outs out of normal working hours excluded, these should be clearly specified as part of the agreement. Most specialist contractors can provide a 24 hour, seven day breakdown attendance. However, attendance at night times, weekends or during public holidays can be costly and care should be taken in considering the extent of need before requiring such provision.

Where there is a need to call for a visit to site, outside the contracted visits, every endeavour will be made to ensure this takes place the same day, and in the shortest possible time particularly in the event persons are entrapped in the car and require assistance. It follows therefore great care should also be exercised in delegating responsibility to those authorised to summon attendance where this is required outside normal working hours and where there is no provision for this to be undertaken under the maintenance/service agreement. Nevertheless it is well recognised that for certain types of premises such as hospitals and hotels there is justification for having a maintenance agreement which provides for a full 24 hour seven day week attendance. However it is unlikely the same need could be justified for an office building.

It should be appreciated that repair work arising out of damage or misuse will not normally be covered under any service or maintenance agreement. This is something which needs to be allowed for as an additional contingency when budgeting in addition to any up-dating of the product which might be necessary in order to comply with changes in legislative or safety requirements.

PARTS AND EXCLUSIONS

The extent to which the supply and replacement of parts is included as an element of the maintenance agreement should be defined. In particular, parts not included should be clearly defined.

REPORTING AND RETENTION OF RECORDS

When a new maintenance contractor is appointed and takes over the maintenance of the equipment or within a reasonable time, they should survey the plant and provide an initial condition report to the responsible person.

The responsible person should retain reports of the condition of plant made by a maintenance contractor and thereafter when updated. The responsible person should keep a record of maintenance activities for each item of plant. To assist the responsible person in this task the maintenance contractor should provide the responsible person with a record of maintenance activity. There should be some form of log for recording work carried out during visits to site. The maintenance company will keep a similar record at its office. If in addition clients require periodic reports on the state of the equipment, then the maintenance company must be informed as to the required frequency of such reports. The extent of information required and the person to whom this should be submitted should be clearly stated.

Wiring diagrams /technical information are essential for the safe investigation of faults and such diagrams are the property of the responsible person and not the maintenance company.

The responsible person should keep a record of any inspections, Thorough Examinations and any supplementary tests undertaken and make these available to the maintenance contractor. The responsible person should report to the maintenance contractor any tests or inspections of the electrical supply to the plant. The reports should contain details of the items inspected and / or maintained together with any recommendations, and depending on the type of maintenance agreement should identify items that were replaced or renewed or that require attention clearly stating by when they should be completed.

If a critical safety problem is reported it should be ensured that it has been received by those that require the report and in a position such that agreement can be confirmed on the actions to be taken.

The maintenance contractor should report in writing to the responsible person any issues reportable under the Reporting of Injuries, Occupational Safety and Health Regulations 1996, Western Australia.

REMOTE MONITORING

Where required to monitor the equipment as an aid for collecting data or for diagnostic purposes, the equipment might be linked to the maintenance provider's system. Features typically available include: basic monitoring of the equipment and whether it is in service, the ability to make some checks remotely (e.g. check operation of the lift and doors in the event of an alarm call), gathering of data on the reliability and performance of the equipment, condition monitoring of key aspects etc.

PRICE VARIATION

It is usual in the case of long term agreements to provide for a variation of the price at a predetermined anniversary date and in accordance with an agreed method.

ADDITIONAL WORKS

Work normally excluded from a maintenance agreement will include:

- ⊕ Repairs in the case of a service type agreement.
- ⊕ All repairs arising from damage or misuse.
- ⊕ Upgrading of decorative finishes.
- ⊕ Upgrading to accommodate changes in technology.
- ⊕ Amendments to satisfy changes in standards or legislation.

With regard to upgrading of car finishes and other decoration within the car, it is important to appreciate these items have a fundamental effect on the design of the equipment. Careful consideration needs to be given to the weight of material used to ensure that the lift does not become overloaded and thus unsafe.

Such work should only be placed with a specialist lift contractor.

TERMS FOR PAYMENT

Terms for payment will be subject to agreement between the parties concerned.

AGREEMENT RENEWAL

Where an agreement is arranged so that its renewal is automatic, the maintainer should notify the responsible person or company with which the agreement is held in advance of the renewal date.

The early notification of renewal should make clear any changes to terms and conditions of the maintenance agreement.

TERMINATION OF AGREEMENTS

Long term agreements will usually be on a continuing basis but will provide for a period of notice of termination as well as for price variation.

At the end of the maintenance agreement, the maintenance provider should ensure that all documents, drawings, tools, including essential special tools, software access codes, and equipment provided by the responsible person is handed back to the responsible person. The maintenance provider should ensure that no changes are made to the plant which result in it either becoming unavailable for use or result in it becoming not maintainable by the subsequent maintenance provider.

At the end of the maintenance agreement, the responsible person should ensure that any documents, drawings, tools, including essential special tools, software access codes, and equipment returned by the maintenance provider are retained so that they can be made available to the subsequent maintenance provider.

FIRST INSPECTION VISIT

In an ideal situation before an item of plant is taken onto a maintenance agreement the proposed maintainer should inspect the item of plant to be maintained to determine their condition and the frequency of maintenance or amount of repairs work that would be required to get the plant to a safe condition.

In some instances such as tendering a bulk agreement pre inspection is not always possible.

In such situations an initial inspection should be made within 4 months of securing the agreement or at the first scheduled maintenance visit and a report of condition issued to the responsible person.

The initial report of condition should include at least the following indicative checks (as applicable) but individual companies may wish to add or customise it in some manner according to the needs of the equipment, maintenance offered etc. This is perfectly acceptable but certain elements are essential such as the risk level for any particular defect or issue.

The condition report may result in the need for the responsible person to place an order for corrective works to be undertaken. In such situations it will assist the responsible person if they know what is vital or critical as against desirable.

FIRST INSPECTION CHECKS – ELECTRIC AND HYDRAULIC LIFTS

Load plate details in the lift car	Distance from counterweight to top of buffer (measured with car level at top floor). State dimension in mm.
Safety check-list in Annex B of EN81-80	Is it satisfactory to avoid collision between car and top of well obstructions?
Machinery access	If run-by under counterweight will result in collisions the situation is to be reported for immediate attention.
Access lighting	Check operation in the event of fire.
Machine room lighting	Check emergency alarm device operation normally and with electrical power supply disconnected.
Written evidence of electrical supply test	Check condition of rechargeable batteries used in lift car emergency lighting, emergency alarm devices, rescue systems which depend on battery backup.
Safety signage	Buffer condition (polyurethane degraded, hydraulic buffer fitted with switch)
Lockable main isolator.	Check lubricant levels
Proof of governor calibrations.	Controller general condition, cleanliness etc.
General condition of governor.	Controller fitted with correct fuses
Governor tension frame condition	General condition of contactors and switches
Groove condition, bearings etc.	
Machine traction sheave groove condition.	
Machine brake condition and lining condition.	
It should be considered if the machine is able to drive through the brake.	
Is the brake in need of dismantling and internal inspection and cleaning.	
Pit condition and access.	
Pit access ladder condition.	
Pit should be dry and free of refuse.	
Pit stop switches are mushroom type.	

FIRST INSPECTION CHECKS – LIFTING PLATFORMS

Type of drive: (Traction, Hydraulic, Screw and nut, Chain, Rack and pinion, Scissor mechanism, Other?)	
Type of lifting platform: (Open platform/open liftway, Open platform/enclosed liftway, Partially enclosed platform/open liftway, Partially enclosed platform/enclosed liftway, enclosed platform/enclosed liftway)	
Load plate details	Guards in place
Machinery access	Sensitive edges and surfaces working
Access lighting	Check operation in the event of fire.
Written evidence of electrical supply test	Check emergency alarm device operation normally and with electrical power supply disconnected.
Safety signage	Check condition of rechargeable batteries used in lift car emergency lighting, emergency alarm devices, rescue systems which depend on battery backup.
Lockable main isolator.	General condition of safety components.
Controller general condition, cleanliness etc.	
Controller fitted with correct fuses	
General condition of contactors and switches	
Pit stop switches are mushroom type.	
General condition and cleanliness of the major components, Drive system, Brake, Controller	

FIRST INSPECTION CHECKS – ESCALATORS AND MOVING WALKS

Load plate details	Controller general condition, cleanliness etc.
Safety check-list in Annex B of EN115-2	Controller fitted with correct fuses
Machinery access	General condition of contactors and switches
Access lighting	Gaps between steps/ pallets.
Written evidence of electrical supply test	Handrail tension.
Safety signage	Chain tension
Lockable main isolator.	

MAINTENANCE AGREEMENTS

TYPES OF AGREEMENT

Whilst there is a range of different types of agreement, usually these fall into three basic categories. In addition to the three types of agreements described, a separate report on the general condition of the equipment might be required for the information of the tenant, owner or insurer. Such a report would arise out of an inspection only and would not involve work on the equipment of any nature.

Typically, maintenance can vary from a basic level where no replacement of parts is included to a fully comprehensive form (usually over many years) with no or very few exclusions. Typically, however, even maintenance described as “comprehensive” often has exclusions.

Exclusions could typically be:

- ⊕ Items such as lift car lighting, cleaning of decorative finishes inside the lift or on landings, cleaning of glass exterior of the lift car or in the lift well, hydraulic cylinders dismantling or in the case of cylinder in bore hole its inspection, concealed hydraulic pipe work;
- ⊕ Work outside normal working hours of the maintainer, disposal of waste materials, storage of materials and or lubricants;
- ⊕ Specific parts e.g. inspection or replacement of ropes, machine, control system or where components have failed due to mis-use or vandalism
- ⊕ Parts, assemblies or items of equipment no longer in production, stock or supported by the original manufacturer or alternatives legally available on the open market.

Where a maintenance agreement has a comprehensive element to cover the replacement of parts, this is not usually consistent either with a low frequency of maintenance visits or with a short term agreement (less than 2 years).

SERVICE AGREEMENTS

These will normally include for cleaning, oiling and simple adjustment of the equipment as well as the undertaking of an inspection and provision of a report in the event any defects are discovered. Service agreements are more appropriate for those choosing to take a short term view leaving the owner of the equipment to decide on the degree and timing of his repair investment programme. In the event the lift/escalator is in a building which may be left unoccupied for any period of time, and where no other form of maintenance/service agreement exists, interim maintenance will be required in order that the equipment is kept in a satisfactory operating condition. The reason is that lack of use can itself cause deterioration as the equipment relies upon movement for its own lubrication.

This type of agreement often aims to minimise the basic cost of planned maintenance by limiting the frequency of maintenance. It therefore may not aim to minimise unplanned shut down or ensure the equipment is operating at the peak of its performance.

However, a higher frequency of maintenance visits, relative to the age and condition of the equipment, could allow for improved reliability and performance.

The aim of basic maintenance is to keep the equipment clean enough to minimise fire hazards and inform the responsible person when a particular item of equipment needs to be replaced or repaired to enable it to continue to operate in safety. The responsible person is provided with a condition report by the maintenance contractor after each visit clearly identifying any item needing attention to maintain safety and/ or reliability. Any report should explain, in simple language, why an item needs attention and by when.

The responsible person should agree to take action to have the defective item repaired or replaced within the agreed time scale. If this is not done by the specified date, the maintainer should advise the responsible person if continued operation of the plant places users at risk and the need for the plant to be removed from service by the responsible person.

COMPREHENSIVE MAINTENANCE AGREEMENTS

These are similar to the fully comprehensive agreements but the replacement of major components will be excluded, e.g. the main machine, cylinder and piston in the case of a hydraulic lift, controller etc. This allows clients to make their own insurance arrangements if desired.

The maintenance contractor may formally exclude certain items such as failures resulting from misuse or abuse that are outside the maintainer's control. Exclusions should be clearly stated in a schedule of exclusions. This arrangement should, subject to the exclusions, enable the responsible person to foresee the cost of operating the plant and make appropriate budgetary provisions.

This type of maintenance is intended to manage the cost of maintenance including parts not excluded. It may not minimise the number of unplanned breakdowns or ensure that equipment is operating at peak performance. It should also include the requirements of a Service Agreement where similar comments about frequency of maintenance visits apply.

FULLY COMPREHENSIVE MAINTENANCE AGREEMENTS

These may cover the replacement of most, if not all, component parts required to keep the equipment in a satisfactory working order and may include performance related maintenance in appropriate circumstances.

This type of arrangement covers a range of premium maintenance arrangements which aim to minimise breakdowns and keep equipment running, ensure all parts of the plant are cleaned, lubricated where necessary, inspected and operating as they should. This will mean the contractor would replace parts scheduled within the terms of the agreement where the performance of the plant would deteriorate if replacement is not made. Such arrangements are ideal where tenants demand high level of service due to high rental charges or where a high level of service is critical due to the type of activity being undertaken on the premises.

This type of maintenance may have a wide range of aspects such as remote monitoring, to make limited checks on performance, or condition based monitoring. These are intended to improve reliability and the response by the maintenance company.

However, they also make it difficult to include prescriptive requirements for what should be included as maintenance companies will have differing options and solutions.

This form of maintenance would not usually be appropriate for lifting platforms which are by their nature not subject to frequent use.

ON SITE WORK

PRECAUTIONS TO BE TAKEN BY SERVICE TECHNICIANS ON SITE

The service technician should report his presence to the responsible person in the building and before putting the equipment 'out of service', suitable warning notices should be posted and in the case of lifts at each landing entrance. All rules of safe conduct for the building or surrounding area are to be observed and the fire drill procedures should be understood.

On completion of the work warning notices should be removed, the log recording the visit updated, any keys returned and the responsible person advised accordingly.

RESPONSIBILITY FOR WORK ON SITE

Work on site is to be performed safely without risk to those performing the work or persons in its proximity. This is a joint responsibility of the responsible person and maintainer and requires the close cooperation of both parties at all times. Where issues of safety are discovered that cannot be easily addressed by procedures adopted by the maintainer, the maintainer should report them in writing to the responsible person and discuss and agree a practical resolution.

REMOVAL OF PLANT FROM SERVICE

The maintenance contractor should advise the responsible person that the plant will need to be removed from service as part of the maintenance work. The maintenance contractor should display safety signs before work commences, to warn others that the plant is out of service.

If the maintenance contractor is of the opinion that the plant is in a dangerous condition, or likely to degrade to a dangerous condition before repairs can be made, then the maintenance contractor should report this to the responsible person, record this and then not return the plant to service. The maintenance contractor may isolate the plant but should not immobilise the plant e.g. if an isolator is padlocked off, the key should be given to the responsible person.

In the event that the maintenance contractor has reported that the plant is in a condition where it should be removed from service, the responsible person should not reinstate the plant until sufficient measures have been taken to allow the plant to be returned to service.

HOUSEKEEPING

If required, the responsible person, in conjunction with the maintenance contractor, should establish procedures for the temporary protection of floor coverings and walls used to access landings and machinery spaces.

The responsible person should not allow machine rooms and machinery spaces to be used for storage of materials or any other purpose.

LANDING ENTRANCES AND ESCALATOR LANDINGS

The provision of items such as landing entrance barriers are crucial for safe working. The size of these is such that they are not usually considered to be tools, but provided by the responsible person on site. In the case that the responsible person provides these, the maintenance contractor should ensure that they are in a safe and acceptable condition. If their condition is not satisfactory, or they are not available on site, the maintenance contractor should advise the responsible person accordingly (see 4.3 reporting procedures).

LANDING ENTRANCES

Persons engaged in the maintenance and the inspection of lifts, or in effecting the release of passengers, may need to open a landing door while the car is not at that landing, e.g. in order to gain access to the pit or to the roof of the car. In such cases it is essential that the responsible person only makes the unlocking key available to trained and authorised persons and any persons (other than those working on the lift) be prevented from making use of such a landing entrance.

Whenever a landing door is unlocked, or open with the car not stationary or at the level of that landing, there are many hazards to which persons on that landing might be exposed.

All protective barriers should incorporate relevant safety signs.

EMERGENCY ALARM CALLS

Where there is an emergency alarm device requiring it, arrangements should be put in place by the responsible person to ensure that there is a permanently available communications link.

The responsibility for this link is usually with the responsible person e.g.

- ④ Is programmed with correct numbers to reach their rescue service (where using auto dialler type systems);
- ④ Alarm calls from the equipment are received and acted upon;
- ④ The rescue service is able to recognise the source of the alarm call where transmitted by the alarm equipment;
- ④ The operation of the emergency alarm equipment (including the line or communications link);
- ④ If the equipment depends on a battery backup in the event of a power failure, the health of this supply is checked as part of a schedule of regular checks.

RESPONSIBLE PERSON CHECKS

Despite great care taken to ensure the safety of users, service personnel and inspectors it is essential that equipment is regularly checked and properly maintained and that any such work is entrusted only to competent persons with the relevant specialist knowledge. A duty of care placed upon lift owners makes it a legal requirement to ensure lifts and escalators are maintained to a safe standard.

In addition to those examinations and tests which building maintenance managers are responsible for having undertaken by a competent person, there are certain inspections/checks which they should carry out in their own interest.

Checks by the building maintenance manager are not a substitute for the checks to be undertaken by the maintenance contractor. In the event of a defect being discovered, the unit should be switched off and the maintenance contractor called.

TAKING OVER A NEW OR FULLY MODERNISED LIFT/ESCALATOR INSTALLATION

The building maintenance manager may expect that new equipment will comply with all current legislation and standards as well as any other Health and Safety Executive requirements.

The contractor supplying the equipment will normally have provided a 12 month warranty covering parts and labour and in some cases as an extension of the commissioning phase. The contract for supply may include certain maintenance work. The building maintenance manager should be aware of such arrangements but should also appreciate that the warranty is not a substitute for the maintenance that is essential from the time the equipment is put into service. Such maintenance, at least for the first year of service, should be placed with the manufacturer in order to protect the rights under the warranty and ensure necessary adjustments are undertaken.

Owners have a responsibility to keep up to date on any changes that might affect their lift/escalator equipment. It is recognised that this is a highly specialised and sometimes complicated field but assistance is available and can be provided by reputable lift manufacturers and maintenance contractors.

TAKING OVER AN EXISTING LIFT/ESCALATOR INSTALLATION

In the case of an existing installation it should not be assumed that the equipment complies with all current regulations and/or standards. This is particularly unlikely in the event of equipment which is over ten years of age. Consideration for example may need to be given to access for the disabled because old equipment is unlikely to meet present day requirements.

It is therefore recommended that the building maintenance manager arranges to have the equipment surveyed either by a specialist building services consultant or a lift/escalator contractor.

In addition to checking for breach of legislation or current health and safety requirements, checks should be made for other shortcomings in the equipment which might have a bearing upon safe working.

For example, top of car inspection control, pit stop switches, shaft lighting, pit props and safe access should be provided.

Escalators require balustrade skirting deflector devices, adequate stop buttons and appropriate safety notices.

The general condition of the equipment should be inspected regarding wear and tear and anything that might require urgent attention, and to assist in budgeting for future requirements.

Particular attention should be given to the following:-

FIRE

If a 'fireman's' lift exists does it perform satisfactorily? If a 'firefighting' lift exists are the arrangements in place for the necessary tests to be undertaken?

EVACUATION

Do the building construction content documents permit that any lifts be used for evacuation purposes, if so are the relevant building management systems and periodic testing arrangements in place?

ALARM SYSTEMS

It will also be advisable to check on the adequacy of the communications/alarm system for when persons may become entrapped in the lift car. Many existing lifts rely upon an alarm bell to attract attention, this may not be sufficient particularly where the equipment might be used when the building has been otherwise vacated. Often a telephone or some form of oral communication system will be necessary even if the extent of access to external lines is restricted. There are a number of possibilities which will depend on the building usage and degree of internal security.

Many maintenance contractors now have a 24 hour manned call facility and can provide two-way voice communication in the event passengers become entrapped in lift cars, whilst at the same time initiating an emergency call-out for release purposes.

Such facilities are normally part of a remote monitoring system, which may also apply in the event of escalator breakdown, informing a control centre immediately a fault takes place.

LIGHTING

Is there adequate emergency lighting in the lift car and motor room? In the event of a power failure such illumination will assist in comforting passengers and in gaining safe access to the machine room to enable release procedures to be carried out.

RECOMMENDED DAILY CHECKS FOR LIFTS

1. Visual inspection of the lift car operating panel.
2. Check that all the indicators are working correctly.
3. Ensure the alarm/communication system functions correctly.
4. Check that the lift doors open when the 'door open' button is depressed.
5. Check that all position indicators on the landing are working correctly.
6. Check all lighting is in working order.
7. Check any mechanical/electronic door protection device (safety edge) such that when the safety edge is operated the door re-opens and after operation and removal of any obstruction the door closes.
8. Check that the floor in the immediate vicinity of the landing door is in a clean and safe condition. Check that the lift stops level at each floor.
9. Check the landing doors/gates and architraves ensuring there is nothing which can snag a passenger's clothing.
10. Clean door bottom tracks.
11. Undertake a full ascent and descent to assess for any unusual noise.

Caution needs to be exercised when carrying out the following tasks:-

- ⓘ Moving heavy equipment, i.e. safes and office machinery due to weight and dimensions.
- ⓘ Keeping secure from other than authorised persons, the machine room/ machinery area access key and keeping control of landing door emergency release keys and the distribution of car preference control keys.
- ⓘ Cleaning enclosures for glass lifts. No person should have access to the lift well without the lift maintenance engineer present.

RECOMMENDED CHECKS FOR LIFTS WITH SPECIAL OPERATION IN THE EVENT OF FIRE

Many lifts have special features e.g. for use in the event of fire or evacuation. These should be checked as follows:

1. Fireman's, firefighting or evacuation lift switches should be checked weekly;
2. A failure of the primary electrical supply should be simulated monthly to check the secondary supply and operation of the lift on the supply.
3. An annual test of all functions including communication systems. This should be specified to be included as part of the maintenance agreement.

RECOMMENDED DAILY CHECKS FOR LIFTING PLATFORMS

1. Visual inspection of the platform operating panel.
2. Check that all the indicators are working correctly.
3. Ensure the alarm/communication (if any) system functions correctly.
4. Check that the lift doors are closed and locked if the platform is not at that level.

5. Check that the inside face of the enclosure is smooth and undamaged.
6. Check all lighting is in working order.
7. Check any mechanical/electronic door protection device (safety edge) such that when the safety edge is operated the door re-opens and after operation and removal of any obstruction the door closes.
8. Check that the floor in the immediate vicinity of the landing door is in a clean and safe condition and that check lift levelling at each floor.
9. Check the landing doors/gates and architraves ensuring there is nothing which can snag a passenger's clothing.
10. Clean door bottom tracks.
11. Undertake a full ascent and descent to assess for any unusual noise.

Caution needs to be exercised when carrying out the following tasks:-

- ⓘ Moving heavy equipment is not usually permitted on lifting platforms which are designed for people with impaired mobility. The unit must be used only according to the manufacturer's instructions.
- ⓘ Keeping secure from other than authorised persons, the machinery area access key and keeping control of landing door emergency release keys and the distribution of any keys controlling access.
- ⓘ Cleaning enclosures for glass lifts. No person should have access to the lift well without the maintenance engineer present.

RECOMMENDED DAILY CHECKS FOR ESCALATORS AND MOVING WALKS

1. A visual inspection of the escalator/moving walk for any deficiencies e.g. cracked glass or loose panels.
2. Check that approaches to all landings are free of obstructions and provide sufficient unrestricted space (usually at least 2.5m deep).
3. Check that all lighting is adequate – especially at top and bottom.
4. Check that all walking surfaces are free from tripping or slipping hazards.
5. Check handrails for damage.
6. Check skirting/deflector devices are securely fixed.
7. Check that the comb plates at the top and bottom of the escalator or at the ends of the moving walk do not contain broken teeth.
8. Check that all warning signs and safety pictographs are clearly visible. Other signs or indicators e.g. for shop guide or advertisements should be kept clear of landings.
9. If all the above are acceptable and the escalator/ moving walk is clear of passengers, run the unit and examine it for at least one complete cycle of the steps/ pallets. Check visually for excessive clearances (greater than 4mm) between steps/ pallets and skirting. Check that step treads and risers have no obvious signs of damage. Listen for any excessive or unusual noise. Check escalator stop buttons.

RECOMMENDATION CONCERNING IMPROVEMENT OF SAFETY OF EXISTING LIFTS

The release of new installation product standards instigated a review of the safety of existing equipment. The review recommendations comprise ten items which briefly cover the following:-

1. The lift should be fitted with car doors.
2. That suspension cables are inspected and replaced where necessary.
3. That control systems will provide an adequate degree of levelling at landings.
4. Controls to be capable of being used by an unaccompanied disabled person.
5. The fitting of human presence detectors on automatic doors.
6. Safety gears when initiated to provide controlled deceleration.
7. A two-way 24 hour communication system in the event of breakdown.
8. Elimination of any asbestos, particularly in braking systems.
9. The fitting of a device to prevent uncontrolled upward movement of the car.
10. Provision of emergency lighting.

The list is not exhaustive and it is recommended the European EN 81 Standards be applied wherever possible. In particular EN81 Part 80 'Rules for the improvement of safety of existing passenger and goods passenger lifts'. Based on established risk assessment principles, the standard identifies where hazards can occur and, from a risk analysis viewpoint, illustrates these with proposed corrective actions.

OWNER COMMITMENTS AND RESPONSIBILITIES

From an owner/ manager viewpoint, you no doubt plan for your future needs and financial commitments. Where your lift installation is concerned, such plans will have regard for life expectancy and improvements to service as well as taking into account legislative requirements.

You will also be conscious of your responsibilities for control of the building, which impose a duty of care to ensure the premises are safe and free from risks to health, so far as is reasonably practicable.

LIFT MAINTENANCE CONTRACTORS' RESPONSIBILITIES

Lift maintenance contractors have duties as employers to ensure that those within their employment are not exposed to health and safety risks from their business activities. This is something that cannot always be fulfilled in isolation when working on equipment belonging to others.

LIFT SAFETY CHECKLIST

The below checklist assists in fulfilling the mutual obligations where the safety and comfort of passengers are concerned, whilst at the same time providing a better quality of service from the installation and extending the life of the equipment.

The areas of risk identified in this guide are not exhaustive, and other standards may need to be consulted to ensure you have a compliant lift. They have been selected since technological advancement can now significantly reduce the risk of injury. There is no order of priority – this will vary according to circumstances. The objective is improved safety for all those who use and work on lifts.

74 POINT LIFT SAFETY CHECKLIST

No	Hazard	EN81-80 Clause	Person at Risk	No	Hazard	EN81-80 Clause	Person at Risk
1	Presence of harmful materials	5.1.4	Worker/User	40	Car without doors	5.8.3	User/Worker
2	No or limited accessibility for disabled persons	5.2.1	User/Worker	41	Unsafe locking of car roof trap door	5.8.4	User/Worker
3	Drive system with poor stopping/levelling accuracy	5.2.2	User/Worker	42	Insufficient strength of car roof	5.8.5	Worker
4	No or inadequate vandal resistance	5.3	User/Worker	43	No or inadequate balustrade on car roof (voids)	5.8.6	Worker
5	No or inadequate control functions in case of fire	5.4	User/Worker	44	Insufficient ventilation in car	5.8.7	User
6	Well enclosures with perforate walls	5.5.1.1	User/Worker	45	Inadequate lighting in car	5.8.8.1	User/Worker
7	Partially enclosed well with too low enclosure	5.5.1.2	User/Worker	46	No or inadequate emergency lighting in car	5.8.8.2	User
8	Inadequate locking devices on access doors to well and pit	5.5.2	User/Worker	47	No or inadequate protection means on sheaves, pulleys and sprockets against injury	5.9.1	Worker
9	Inadequate vertical surface below landing door sills	5.5.3	Worker/User	48	No or inadequate protection against rope/chains leaving the sheaves, pulleys or sprockets	5.9.1	Worker/User
10	Counterweight/balancing weight without safety gear in case of accessible spaces below well	5.5.4	User	49	No or inadequate protection on sheaves, pulleys or sprockets against introduction of objects	5.9.1	Worker/User
11	No or inadequate partition of counterweight balancing weight travel path at the lowest terminal	5.5.5	Worker	50	No or inadequate safety gear and/or overspeed governor on electric lifts	5.9.2	User/Worker
12	No or inadequate pit screen for several lifts in the same well	5.5.6.1	Worker	51	No or inadequate slack rope switch for governor rope	5.9.3	Worker/User
13	No or inadequate partition for several lifts in the same well	5.5.6.2	Worker	52	No protection means against ascending car overspeed	5.9.4	User/Worker
14	Insufficient safety spaces in headroom and pit	5.5.7	Worker	53	Inadequate lift machine design for preventing uncontrolled up or down movement of the car whilst the doors are open	5.9.4 5.12.1	Worker/User
15	unsafe pit access	5.5.8	Worker	54	No or inadequate protection against free fall, overspeed and creeping on hydraulic lifts	5.9.5	User/Worker
16	No or inadequate isolation devices in the pit or in the pulley room	5.5.9	Worker	55	Unsuitable guidance system for counterweight or balancing weight	5.10.1	User/Worker
17	No or inadequate lighting of the well	5.5.10	Worker	56	No or inadequate buffers	5.10.2	User/Worker
18	No alarm system in pit and on car roof	5.5.11	Worker	57	No or inadequate final limit switches	5.10.3	User/Worker
19	No or unsafe means of access to machine and pulley room	5.6.1	Worker	58	Large gap between car and wall facing the car entrance	5.11.1	User/Worker
20	Slippery floor in machine or pulley room	5.6.2	Worker	59	Excessive distance between car door and landing door	5.11.2	User/Worker
21	Insufficient clearances in machine room	5.6.3	Worker	60	No or inadequate emergency operation instruction manual for rescue of entrapped passengers	5.12.2	User/Worker
22	No or inadequate protection on different levels in machine room	5.6.4	Worker	61	No hydraulic shut-off valve	5.12.3	User/Worker
23	Inadequate lighting in machine or pulley room	5.6.5	Worker	62	No independent starting/stopping machine contactors	5.12.4	User/Worker
24	Inadequate means of handling equipment	5.6.6	Worker	63	No or inadequate slack rope/chain device	5.12.5	User/Worker
25	Perforate landing doors and car doors	5.7.1	Worker/User	64	No run-time limiter	5.12.6	User/Worker
26	Inadequate design of landing door fixings	5.7.2	User	65	No or inadequate low pressure device	5.12.7	User/Worker
27	Inappropriate glass in doors	5.7.3	User	66	Insufficient protection against electric shock and/or marking of electrical equipment	5.13.1	Worker/User
28	No or inadequate protection against dragging of fingers on sliding car or landing doors with glass	5.7.4	User	67	No or inadequate protection of lift machine electrical overload/temperature	5.13.2	User/Worker
29	No or inadequate lighting on landing	5.7.5	User/Worker	68	No lockable main switch	5.13.3	Worker/User
30	No or inadequate protective devices on power operated doors	5.7.6	User/Worker	69	No protection against phase reversal	5.14.1	User/Worker
31	Unsafe locking device of landing door	5.7.7	User/Worker	70	No or inadequate inspection control station and stopping device on car roof	5.14.2	Worker
32	Unlocking of landing door without a special tool	5.7.8.1	User	71	No or inadequate alarm device	5.14.3	User/Worker
33	Well enclosure with perforate walls near door locks	5.7.8.2	User/Worker	72	No or inadequate communication system between machine room and car (travel height ≥ 30m)	5.14.4	Worker/User
34	No automatic closing device on sliding doors	5.7.9	User/Worker	73	No or inadequate load or overload control on car	5.14.5	User/Worker
35	Inadequate link between panels of landing doors	5.7.10	User/Worker	74	Missing notices, markings and operating instructions	5.15	User/Worker
36	Inadequate fire resistance of landing doors	5.7.11	User/Worker				
37	Car door moving with open landing door	5.7.12	User/Worker				
38	Large car area in relation to rated load	5.8.1	User				
39	Inadequate length of car apron	5.8.2	User/Worker				

EN13015 REQUIREMENTS

PROVISION OF MAINTENANCE INSTRUCTIONS

Maintenance instructions form part of the basic information that should be provided by the Manufacturer or the Installer to ensure the safety of the users and workers who use or work on the lifts or escalators, as well as information on the safe and intended functioning of the system and the components.

The instructions should establish, by risk assessment, the safe conditions under which maintenance can be carried out and the responsibilities and communication requirements between the parties.

References to EN13015

Section 1 Scope

This European Standard specifies the elements necessary for the preparation of the instructions for the maintenance operations, as in 3.1.

Section 8 Format

A general framework for the maintenance instructions is detailed in this normative part of the standard.

4.2 Elements to be taken into account for the maintenance instructions

When preparing the content of the maintenance instructions (see 4.3, clauses 5 and 6) the following elements shall be taken into account:

- a) the specifications and the intended use of the installation (type of installation, performance, type of goods to be transported, type of users, etc.);
- b) the environment in which the installation and its components are installed (weather conditions, vandalism, etc.);
- c) any restriction of use;
- d) the result of the risk assessment (see clause 5) for every working area and for every task to be undertaken;
- e) the specific maintenance instructions provided by the manufacturer of safety components;
- f) in case of components other than safety components, where maintenance.

4.3.1 General

The maintenance instructions shall contain information relating to the tasks of the owner and respectively the maintenance organisation.

ALL LIFTS & ESCALATORS SHALL BE MAINTAINED

All lifts, escalators and travelators shall be maintained in accordance with *Occupational Safety and Health Regulations 1996, Western Australia*. The maintenance must be performed by competent personnel of a qualified company.

All equipment shall be maintained to guarantee safety and performance at levels consistent with the maintenance of the original equipment. This is to safeguard all users and goods transported by lifts or escalators and all personnel involved in maintenance or inspection.

EN13015 provides “Rules for Maintenance Instructions” for all new equipment.

References to EN13015

4.1 General

The installations covered by this European Standard shall be maintained in good working order in accordance with the installer's instructions. To this effect, regular maintenance of the installation shall be carried out, to ensure, in particular, the safety of the installation. The safety of an installation shall take into account the ability to be maintained without causing injury or damage to health. Regular maintenance of the installation shall be carried out to ensure the reliability of the installation.

Owner's Responsibility

4.3.2.3 The need for planned maintenance to be carried out by a maintenance organisation, at the latest when the installation is put into service or if the installation is to remain unused for a long period of time before first being put into service.

Maintenance Organisation's Responsibility

4.3.3.1 The need to carry out the work of maintenance in conformity with the maintenance instructions and based on systematic maintenance checks.

4.3.3.9 The need to carry out the maintenance periodically.

THE OWNER ACCEPTS THE NEED TO UPGRADE THE EQUIPMENT

EN13015 sets out the minimum standards for maintenance instructions that are to be in place for the maintenance of newly installed equipment. However, maintenance is a dynamic process that must be continued throughout the life cycle of the equipment.

It is therefore important to apply the principles of EN13015 to existing lifts and escalators throughout their working life to ensure that hazards are identified and actions taken to fulfil essential safety requirements.

This strong commitment to the principal of regular maintenance requires the implementation of risk assessment and the actions that enhancements that flow from the process must be used to ensure hazards are reduced to protect the safety of workers and users on a continuous basis.

References to EN13015

Owner's Responsibilities

4.3.2.9 The need for the owner of the installation to take into consideration the consequences of the risk assessment carried out by the maintenance organisation.

4.3.2.11 (c) Any action to be done as a consequence of his risk assessment is carried out.

Maintenance Organisation's Responsibility

4.3.3.4 The need for the maintenance organisation to inform the owner of the installation about any work to be carried out as a consequence of a risk assessment especially for the access and/or the environment related to the building/installation.

4.3.3.15 The need to inform in due time the owner of the installation about necessary progressive upgrading of the installation.

ALL EMERGENCY CALLS MUST BE TRANSMITTED IMMEDIATELY

It is vital to be able to talk with a person trapped in a lift, so as to avoid any stress or panic arising and to stop any person from climbing out of the car unsupervised with the possibility of them falling.

A person within the building may be trained to respond to any particular incidents concerning lift or escalator safety, however, this can not be considered a satisfactory permanent solution.

References to EN13015

General

3.1(c) Maintenance includes passenger rescue operations.

Owner's Responsibility

4.3.2.5 The need for the owner of a passenger-/goods passenger lift to keep, as described in EN 81-28, the two-way means of communication efficient and linked to a 24 h rescue service for the whole of the time that the installation can be used.

24 HOUR SERVICE MUST BE AVAILABLE

The Maintenance Organisation has to be organised to receive information from the two way communication system in order to rescue entrapped users within a maximum of one hour after reception of the message.

EN13105 includes this requirement with the addition that the remote monitoring could be used to provide information regarding the rescue.

References to EN13015

Owner's Responsibility

4.3.2.5 The need for the owner of a passenger-/goods passenger lift to keep, as described in EN 81-28, the two-way means of communication efficient and linked to a 24 h rescue service for the whole of the time that the installation can be used.

Maintenance Organisation's Responsibility

4.3.3.10 The need to provide a 24 h, all year round call-out service for rescue of persons.

NOTE A remote monitoring system can be used to provide information in order to improve the response to a call-out.

THE MAINTENANCE ORGANISATION SHALL BE VISIBLE

Communication between all parties, owners, Users and Maintenance Organisation, must be assured in order to eliminate all technical and safety problems likely to affect the reliability of the installation or cause concern to the safety of the Users.

As part of the communication process EN13015 stipulates the need to identify the Maintenance Organisation for the installed equipment.

References to EN13015

Owner's Responsibility

4.3.2.12 The need for the owner of the installation to ensure that the name and the telephone number of the maintenance organisation are always available to the user of the installation, permanently affixed and clearly visible.

MAINTENANCE ORGANISATION SHALL BE QUALITY ASSURED

EN13015 requires the Maintenance Organisation to have a certified quality system to ensure the level of quality and safety can be consistently achieved.

References to EN13015

General

4.1

NOTE The owner of the installation should be informed that the qualification of the maintenance organisation is in conformity with the regulations applicable in the country in which the installation operates ; if no regulations exist, the qualification can be ensured by a certified quality system in accordance with EN ISO 9001 supplemented if necessary to take into account the specific features of the installation.

THE MAINTENANCE ORGANISATION SHALL SHOW STRONG CREDENTIALS

EN13015 sets out the minimum the standards for Maintenance Organisations. It is important that Maintenance Organisations can clearly set out their credentials by;

- ⊗ Being legally registered
- ⊗ Providing adequate insurance cover
- ⊗ Having Health, Safety and Environmental processes in place
- ⊗ Ensure continuing competency of maintenance personnel

References to EN13015

General

3.2

A Maintenance Organisation is defined as a company or part of company where competent maintenance person(s) carry out maintenance operations on behalf of the owner of the installation

4.1 Note

The Owner of the installation should be informed that the qualification of the maintenance organisation is in conformity with the regulations applicable in the country in which the installation operates ; if no regulations exist, the qualification can be ensured by a certified quality system in accordance with EN ISO 9001 supplemented if necessary to take into account the specific features of the installation.

Owner's & Maintenance Organisation's Responsibility

4.3.2.1 The need for the Owner to keep the installation in a safe operating condition. To fulfil this the owner shall use a Maintenance Organisation complying with the requirements of the Standard.

NOTE It is recommended to inform the Owner of the installation about the need to use a Maintenance Organisation with adequate and proper insurance cover provided by an insurance company.

MAINTENANCE ORGANISATION SHALL ASSURE THE COMPETENCE OF ITS PERSONNEL

The Maintenance Organisation must commit itself to providing to its people to assure the competence of its maintenance personnel.

EN13015 defines the Maintenance Organisation and the competence of the personnel who work in the maintenance activity.

References to EN13015

General

A maintenance organisation is defined as;

3.2 maintenance organisation

A company or part of company where competent maintenance person(s) carry out maintenance operations on behalf of the owner of the installation.

3.3 competent maintenance person

A designated person, suitably trained (see EN ISO 9000 series), qualified by knowledge and practical experience, provided with necessary instructions and supported within their maintenance organisation to enable the required maintenance operations to be safely carried out.

Maintenance Organisation's Responsibility

4.3.3.7 The need to carry out maintenance operations by competent maintenance persons and provided with the necessary tools and equipment.

4.3.3.8 The need to maintain the competency of maintenance persons.

MAINTENANCE ORGANISATION SHALL PROVIDE A REPAIR SERVICE

Repair service is by definition part of the maintenance process. The maintenance organisation should, after failure, be capable of returning an installation to its safe and intended function.

References to EN13015

General

3.1 (e) repair or changing of components which may occur due to wear or tear and do not affect the characteristics of the installation.

Maintenance Organisation's Responsibility

4.3.3.6 The need to adapt the plan for maintenance so as to take account of any predictable failures, e.g. those due to misuse, mishandling, deterioration, etc.

4.3.3.13 The need to be organised to provide the necessary spare parts for any repair.

MAINTENANCE ORGANISATION SHALL BE ABLE TO REPORT ON IN SERVICE HISTORY

It is necessary to register all interventions such as inspections, call outs, repairs, part replacements and modernisations and must be made available upon request to the Owner/Customer. The complete history of a lift or escalator's installation, working environment, use and performance is of great importance in the implementation of the correct maintenance operations.

EN13015 reinforces the need for reporting and commissioning on in-service history. This provision on the installation of new equipment should continue throughout the life cycle of the equipment.

References to EN13015

Maintenance Organisation's Responsibility

4.3.3.6 The need to adapt the plan for maintenance so as to take account of any predictable failures, e.g. those due to misuse, mishandling, deterioration, etc.

NOTE For this purpose a remote monitoring system, based on EN 627, which is able to report events or defects, helps to provide information.

4.3.3.11 The need to keep records of the result of each intervention due to a failure of the installation. These records shall include the type of failures in order to detect any repetition. They shall be available to the owner of the installation on request.

ALL DEFECTS AND SHORTCOMINGS MUST BE REPORTED

Ensuring the correct operation of the lift or escalator is everyone's responsibility. If there is a malfunction of the installation at any time it should be reported by a responsible person representing the Owner to the maintenance Organisation.

Remote monitoring is a two way means of communication which is able to report events or defects.

EN13015 endorses the need for good communication between the Owner and Installer/Manufacturer through the preparation of equipment maintenance instructions. Communication is further reinforced by the need for both parties to implement these instructions and to check and report.

References to EN13015

General

5.1

The use of diagnostic systems (e.g. remote monitoring system, based on EN 627) may support fault finding, improve the maintainability of the installation and reduce the exposure of maintenance persons to hazards.

Owner's Responsibility

4.3.2.8 The need for the owner of the installation to inform the maintenance organisation:

- a) immediately about any perceived abnormal operation of the installation or abnormal change in its direct environment;
- b) immediately after putting the installation out of service in the case of a dangerous situation;

4.3.2.15 The need for the owner of the installation to keep the access to working areas and working rooms safe and free for the maintenance persons and to inform the maintenance organisation about any hazard or change in the workplace and/or the access ways (lighting, obstructions, ground conditions, etc.).

Maintenance Organisation's Responsibility

4.3.3.4 The need for the maintenance organisation to inform the owner of the installation about any work to be carried out as a consequence of a risk assessment especially for the access and/or the environment related to the building/installation.

4.3.3.6 The need to adapt the plan for maintenance so as to take account of any predictable failures, e.g. those due to misuse, mishandling, deterioration, etc.

NOTE For this purpose a remote monitoring system, based on EN 627, which is able to report events or defects, helps to provide information.

4.3.3.11 The need to keep records of the result of each intervention due to a failure of the installation. These records shall include the type of failures in order to detect any repetition. They shall be available to the owner of the installation on request.

4.3.3.12 The need to put out of service the installation if the maintenance organisation is aware of a dangerous situation, detected during the maintenance, which cannot be eliminated immediately, and to inform the owner of the installation of the need to keep it out of service until repaired.

SAFETY IS A PRIMARY CONCERN FOR THE OWNER/CUSTOMER AND THE MAINTENANCE ORGANISATION

Although lifts and escalators are intrinsically safe there is a need for risk assessments to be carried out and clear safety instructions to be available for all parties.

The maintenance organisation must inform the owner of any non compliance of the installation with the latest Health, Safety and Environmental standards.

EN13015 offers clear direction on matters of safety.

References to EN13015

General

The standard is based upon the principles of Risk Assessment. The key safety references in the standard are;

3.1

Maintenance is defined as all the necessary operations to ensure the safe and intended functioning of the installation and its components after the completion of the installation and throughout its life cycle.

4.1

Regular maintenance of the installation shall be carried out, to ensure, in particular, the safety of the installation. The safety of an installation shall take into account the ability to be maintained without causing injury or damage to health.

5.1

For any working area, it is necessary to identify the list of the specific hazards related to health and safety and to carry out a risk assessment for any maintenance operation, including access to the working area.

Maintenance Organisation's Responsibility

4.3.3.3 The need for the maintenance organisation to ensure that a risk assessment for any working area and for any maintenance operation has been carried out taking into account the installer's maintenance instructions and all information supplied by the owner of the installation.

4.3.3.4 The need for the maintenance organisation to inform the owner of the installation about any work to be carried out as a consequence of a risk assessment especially for the access and/or the environment related to the building/installation.

4.3.3.12 The need to put out of service the installation if the maintenance organisation is aware of a dangerous situation, detected during the maintenance, which cannot be eliminated immediately, and to inform the owner of the installation of the need to keep it out of service until repaired.

Owner's Responsibility

4.3.2.1 The need for the owner to keep the installation in a safe operating condition.

4.3.2.2 The need for the owner to take care of any National regulations and other requirements, where relevant, and their implications on maintenance.

4.3.2.7 The need for the owner to put the installation out of service in case of dangerous situations.

4.3.2.9 The need for the owner of the installation to take into consideration the consequences of the risk assessment carried out by the maintenance organisation.

4.3.2.11 The need for the building owner to ensure, through a risk assessment, that :

- a) their premises are safe and free from risk to health as far as is practicable. This includes access to the premises and installation equipment, and articles or substances used according to the regulation for the Use of Work Equipment at the Workplace;
- b) the persons using the premises are informed about any remaining risks;
- c) any action to be done as a consequence of his risk assessment is carried out.

TYPICAL EXAMPLES OF MAINTENANCE CHECKS

The following are basic checks which should be made as part of a schedule for maintenance visits. Not all checks would be needed on every visit and frequency of checks should be assessed depending on the equipment, its condition, usage etc.

Other checks might be applicable on different types of lifts whereas some of these listed might not be applicable. The schedule of checks should include all the manufacturer's checks and might be modified according to the equipment, from the first inspection/survey and from later experience with the equipment.

ELECTRIC LIFTS

General	Final Limit Switches
Check all components are clean and kept free from dust and corrosion.	Check operation.
Pit Area	Overspeed Governor and Tension Pulley
Check for excess oil/grease at bottom of guides.	Check moving parts for free movement and wear.
Check the pit area is clean, dry and free from debris.	Check operation.
Anti-rebound Device and Switch (where fitted)	Check switch.
Check for free movement and operation.	Main rope diverter pulley(s)
Check for equal tension of ropes.	Check condition and grooves for wear.
Check switch where fitted.	Check bearings for abnormal noise and/or vibrations.
Check lubrication.	Check guarding.
Buffers	Check lubrication.
Check oil level.	Car/Counterweight Guides
Check lubrication.	Check for film of oil where required on all guide surfaces.
Check switch where fitted.	Check fixings.
Check fixings.	Car/Counterweight Guide Shoes
Drive Motor/Generator	Check guide shoes/rollers for wear.
Check bearings for wear.	Check fixings.
Check lubrication.	Check lubrication where necessary.
Check condition of commutator.	Check parts for wear.
Gearbox	Check stopping accuracy.
Check gear for wear.	Electric Wiring
Check lubrication.	Check insulation.
Traction Sheave	Lift Car
Check condition and grooves for wear.	Check emergency lighting, car buttons, key switches.
Brake	Check fixings of panels and ceiling.
Check braking system.	Rope/Chains Terminations
Suspension Ropes/Chains	Check for deterioration and wear.
Check for wear, elongation and tension.	Check fixings.
Check lubrication only where intended.	Floor Level
Controller	Check stopping accuracy at landing.
Check cabinet is clean, dry and free from dust.	Motor Run Time Limiter
	Check operation.

Safety Gear(s)/Ascending Car Over Speed Protection Means	Car Door
Check moving parts for free movement and wear.	Check door closed contact or lock.
Check lubrication.	Check doors for free running.
Check fixings.	Check door guiding.
Check operation.	Check door gaps.
Check switch.	Check wire rope or chain when used for integrity.
Landing Entrances	Check passenger door protective device.
Check operation of landing locks.	Check lubrication.
Check doors for free running.	Electric Safety Devices
Check door guiding.	Check operation.
Check door gaps.	Check electric safety chain.
Check wire rope, chain or belt when used, for integrity.	Check correct fuses are fitted.
Check emergency unlocking device.	Emergency Alarm Device
Check lubrication.	Check operation.
Landing Controls and Indicators	Well Lighting
Check operation.	Check operation.

HYDRAULIC LIFTS

General	Safety Gear/Pawl/Clamping Devices
Check all components are clean and kept free from dust and corrosion.	Check moving parts for free movement and wear.
Pit Area	Check lubrication.
Check for excess oil/grease at bottom of guides.	Check fixings.
Check the pit area is clean, dry and free from debris.	Check operation.
Buffers	Check switch.
Check oil level.	Suspension Ropes/Chains
Check lubrication.	Check for wear, elongation and tension.
Check switch where fitted.	Check lubrication only where intended.
Check fixings.	Ropes/Chains Terminations
Tank Unit	Check for deterioration and wear.
Check hydraulic fluid level.	Check fixings.
Check tank and valve unit for leakage.	Landing Entrances
Jack	Check operation of landing locks.
Check for oil leakage.	Check doors for free running.
Telescopic Jack	Check door guiding.
Check for synchronisation.	Check door gaps.
Controller	Check wire rope, chain or belt when used, for integrity.
Check cabinet is clean, dry and free from dust.	Check emergency unlocking device.
Overspeed Governor and Tension Pulley	Check lubrication.
Check moving parts for free movement and wear.	Car Door
Check operation.	Check door closed contact or lock.
Check switch.	Check doors for free running.
Main Rope Pulley(s)	Check door guiding.
Check condition and grooves for wear.	Check door gaps.
Check bearings for abnormal noise and/or vibrations.	Check wire rope or chain when used for integrity.
Check guarding.	Check passenger door protective device.
Check lubrication.	Check lubrication.
Car/Balancing Weight/Jack Guides	Floor Level
Check for film of oil where required on all guide surfaces.	Check stopping accuracy at landing.
Check fixings.	Final Limit Switch
Car/Balancing Weight/Jack Guide Shoes	Check operation.
Check guide shoes/rollers for wear.	Motor Run Time Limiter
Check fixings.	Check operation.
Check lubrication where necessary.	Electric Safety Devices
Electric Wiring	Check operation.
Check insulation.	Check electric safety chain.
Lift Car	Check correct fuses are fitted.
Check emergency lighting, car buttons, key switches.	Emergency Alarm Device
Check fixings of panels and ceiling.	Check operation.
Landing Controls and Indicators	Well Lighting
Check operation.	Check operation.

Anti-creep Device	Manual Lowering Valve
Check operation.	Check operation.
Rupture Valve/One Way Restrictor	Hand Pump
Check operation.	Check operation.
Pressure Relief Valve	Hose/Pipe Work
Check operation.	Check for damage and leakage.

LIFTING PLATFORMS

General	Guide shoes
Check all components are clean and kept free from dust and corrosion.	Check guide shoes/rollers for wear.
Pit area	Check fixings.
Check for excess oil/grease at bottom of guides.	Check lubrication where required.
Check the pit area is clean, dry and free from debris.	Electric wiring
Check operation of prop and safety contact.	Check insulation.
Pit stop switch Check operation.	Trailing flexes
Controller	Check terminations.
Check cabinet is clean, dry and free from dust.	Check condition.
Check contactors.	Lifting platform
Drive system (general)	Check normal and emergency lighting.
Check components for wear.	Check control buttons, key switches, visual and audible indicators (if fitted).
Check lubrication.	Check fixings of panels and ceiling.
Check condition of motor.	Check safety edges around sides and on carriage.
Check guarding in place.	Check safety edges under platform (where applicable).
Screw and nut drive system	Check functionality of overload device (if fitted).
Check condition and lubrication of screw and nut and correct lubricant used. Check condition of waste lubricant.	Safety gear and overspeed governor
Check correct alignment of threads at joints in the screw.	Check moving parts for free movement and wear.
Check wear on drive nut.	Where safety gear engaged by slack rope, check actuation mechanism.
Check condition, setting and operation of safety nut and safety contact.	Check lubrication.
Brake	Check fixings. Check operation.
Check braking system.	Check safety contact.
Check parts for wear. Check stopping accuracy.	Suspension ropes/ chains/ belts
Hydraulic drive system	Check for wear and condition.
Checks as appropriate to hydraulic jack, power unit and rupture/ restrictor valve	Check ropes against wire discard criteria, condition and nominal diameter.
Check lowering valve.	Check lubrication only where intended.
Check hand pump (if fitted).	Check even tensions.
Check pressure relief valve.	Check elongation (sufficient car over-travel/counterweight under-travel).
Check hose and pipework.	Check condition monitoring devices and any system counting the number of cycles.
Anti-creep device	Suspension ropes/ chains/ belts terminations
Check operation	Check for deterioration and wear.
Hydraulic power unit.	Check fixings.
Check hydraulic fluid level	Check correct fitting according to type (check fixing correctly tightened where rope grips used).
Check tank and valve unit for leakage.	Guides
Check valve block filters.	Check for correct lubricant and, if required, film of oil where required on all guide surfaces.
Hydraulic jack	Check alignment.
Check for oil leakage and waste oil collection.	Check fixings.
Check fixing to platform frame or piston head pulley.	Check alignment.
Hand winding and rescue system	Internal surfaces of well
Check parts are available e.g. hand-winding wheel.	Check surfaces are smooth, flush and undamaged.
Check notices displayed/ available.	Check clearances to lifting platform.
Where system relies on batteries in the event of power failure, check battery health.	Floor level
Pulley(s)	Check stopping accuracy at landing.
Check condition and grooves for wear.	Record worst case.
Check bearings for abnormal noise and/or vibrations.	
Check guarding.	
Check lubrication.	

Landing entrances	Final limit switch
Check operation of landing locks.	Check operation.
Check doors for free running. Check door guiding.	Motor run time limiter
Check door gaps.	Check operation.
Check emergency unlocking device.	Motor overload protection
Check doors self-close (relock?).	Check setting.
Check doors self-lock when no power.	Electric safety devices
Cabin door (if any) Check door closed contact or lock.	Check operation.
Check doors for free running. Check door guiding.	Check electric safety chain.
Check door gaps.	Check correct fuses are fitted.
Check wire rope or chain when used for integrity.	Emergency alarm device
Check passenger door protective device.	Check operation.
Check lubrication.	Check operation with electrical supply disconnected.
Check door reversal device and record force required to prevent doors closing.	Landing controls and indicators
Check and record kinetic energy of closing doors.	Check operation.
Lighting	Check keys witch operation (if fitted).
Check operation and adequate lighting levels to platform and landings.	
Check emergency lighting.	

ESCALATORS AND MOVING WALKS

Controller
Check cabinet is clean, dry and free from dust.
Gearbox
Check gear and associated parts.
Check lubrication.
Drive Motor
Check bearings for wear.
Check lubrication.
Brake
Check braking system.
Check parts for wear.
Auxiliary Brake
Check braking system.
Check parts for wear.
Intermediate Gearbox
Check gear and associated parts.
Check lubrication.
Main Drive Chain
Check for tension and wear.
Check lubrication.
Step/Pallet Chain
Check for tension and wear.
Check lubrication.
Step/Pallet
Check step/pallet and step/pallet wheels for integrity.
Conveyor Belt
Check for condition and tension.
Drive Belt
Check for condition and tension.

Clearances
Check step to step and step to skirting clearances.
Combs
Check condition.
Check meshing with steps, pallets or belt.
Comb Plate
Check clearances and operation.
Handrails
Check for free running and condition.
Check tension.
Check synchronisation between step/pallet band and the handrail.
Track System
Check for condition and wear.
Check fixings.
Safety Devices
Check operation.
Deflector Devices
Check condition.
Lighting
Check operation.
Display
Check operation.
Signs/Pictograms
Check condition.
Balustrade
Check condition of panels.
Check fixings of interior claddings.

Concept to Completion
Flexibility in Design & Personalised Service



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Design & Layout by Eyecue Design | Perth
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