

The following information is associated with Network Rail Standard:
[NR/SP/ELP/27228](#) Issue 1

Additional Content Access

Click the links below to access non PDF related content associated with this standard.

Word Documents

- [NR/SP/ELP27228 Appendix B](#)

If you have any questions, or need assistance, please contact [IHS Support](#)

Information accessed via the links above is the property of the Copyright holder

IHS Additional Content Page

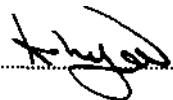
Ref	NR/SP/ELP/27228
Issue	I
Date	October 2005

Business Process Document

Specification for new and upgraded lifts

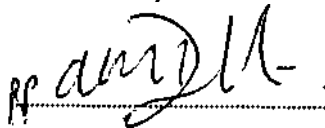
Endorsement & Authorisation

Endorsed by:



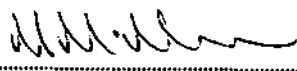
K. Lydford, Professional Head of Electrification & Plant Engineering

Authorised by:



A. McNaughton, Chief Engineer

Accepted for issue by:



M. McManus, National Standards Manager

This document is the property of Network Rail. It shall not be reproduced in whole or part nor disclosed to a third party without the written permission of the Standard Owner.

©Copyright 2005 Network Rail

Uncontrolled copy once printed from its electronic source.

Published & Issued by: Network Rail 40 Melton Street, London NW1 2EE



Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

Issue record

Issue	Date	Comments
I	October 2005	New standard that replaces RT/E/S/40043 and RT/E/S/40065

Implementation

I October 2005

Compliance

This Network Rail Specification is mandatory and must be complied with by Network Rail and its suppliers and contractors from 2 March 2006.

When this Specification is implemented, it is permissible for all projects, which have formally completed GRIP Level 4, to continue to comply with the Issue of any relevant Network Rail Standards current when GRIP Level 4 was reached and not to comply with requirements contained herein unless the head of electrification and fixed plant has stipulated otherwise in the accompanying Briefing Note.

Where the head of electrification and fixed plant has specified that all projects will comply with the requirements, specific authority not to comply can be sought in the usual manner using the appropriate non-compliance authority processes described in Network Rail Standard, [NR/SP/STP/045](#) Managing the Process for Non-compliance Authority (formerly RT/LS/P/045).

Disclaimer

In issuing this document for its stated purpose, Network Rail makes no warranties, express or implied, that compliance with all or any documents it issues is sufficient on its own to ensure safe systems of work or operation. Users are reminded of their own duties under health and safety legislation.

Supply

Copies of documents are available electronically, within Network Rail's organisation. Hard copies of this document will be available to Network Rail employees on request to the Document Controller and to other organisations from IHS Technical Indexes (01344 404409)

Contents

1	Purpose	6
2	Introduction	6
3	Reference documentation	6
4	Initial planning	6
5	Technical Requirements for Lift Installation	8
5.1	Lift Performance and Equipment Requirements	8
5.1.1	Servicing	8
5.2	Controller	9
5.3	Drive components	10
5.3.1	Traction lifts	10
5.3.2	Hydraulic lifts	11
5.3.3	Levelling accuracy	12
5.4	Suspension, counterweight, safety gear and governor	12
5.4.1	Bi-directional safety gear	12
5.4.2	Overspeed governor	13
5.5	Lift car and associated equipment	13
5.5.1	Voice synthesiser – for passenger lifts only	14
5.5.2	Lift car lighting	15
5.5.3	Car sling	15
5.5.4	Ventilation	15
5.5.5	Car roof	15
5.5.6	Crown bar records	15
5.5.7	Car top maintenance control	16
5.5.8	Bump rails and handrails	16
5.5.9	Additional features for lifts conveying trolleys:	16
5.6	Emergency call system	17
5.7	Doors and automatic power door operator	18
5.8	Passenger protection	20
5.9	Landing station and indicators	20
5.10	Machine room access	21
5.10.1	Signs and labels	22
5.10.2	Additional sundry facilities within the machine room	22
5.11	Lift well	22

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

5.11.1	Lifting Beam	23
5.11.2	Guides	23
5.11.3	Guide shoes	23
5.11.4	Smoke detector and alarm sounders	23
5.12	Lift well shaft and pit	23
5.12.1	Counterweight screen	24
5.12.2	Decoration	24
5.13	Guarding	24
5.14	Maintenance intercom	25
5.15	Lifts at unmanned stations	25
5.16	Remote monitoring	25
5.17	Handwinding	25
6	Electrical – standard of materials and workmanship	26
6.1	Electrical supplies	26
6.2	Auxiliary Services	26
6.3	Shaft lighting	27
6.4	Socket outlets	28
6.5	Car lighting	28
6.6	Car top maintenance control and maintenance intercom	28
6.7	Machine room heating and ventilation	28
6.8	General	28
6.9	Lift electricity supply	28
6.10	Electrical Supplies (General)	29
6.11	Fusing	29
6.12	Cables	29
6.13	Flexible cords	30
6.14	Trailing cables	30
6.15	Final sub-circuits	31
6.16	Conduits and boxes	31
6.17	Flexible steel conduit	32
6.18	Steel trunking/cable trays	32
6.19	Connections to equipment	32
6.20	Earthing and bonding	33

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

6.21	Labels	33
6.22	Circuit lists	34
6.23	Testing	34
7	Tests and inspections during construction, on completion and handback	35
8	Lifts at unmanned stations	36
9	Facilities for meeting the needs of the disabled	36
10	Requirements for vandal resistant lifts	38
10.1	Passenger information	38
10.2	Well	38
10.3	Machine room	38
10.4	Car and landing doors	39
10.5	Sills and their fixings	41
10.6	Emergency unlocking of landing doors	41
10.7	Lift car	41
10.8	Car control panel	42
10.9	Steel work	42
11	Requirements for Information	42
9	APPENDIX A	43
10	APPENDIX B	52

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

1 Purpose

This specification describes the technical requirements that must be met by any Lift installed on Network Rail Infrastructure.

2 Introduction

Four types of Lift are used on the network:

- a) Goods Lift
- b) Passenger Lift
- c) Passenger Lift – Vandal Resistant
- d) Passenger Lift – Unmanned Installation and Vandal Resistant

In addition to the general requirements for each, this document describes the specific requirements for the particular applications.

Builder's works, including internal decoration of the lift shaft and machine room, are covered in the specification.

3 Reference documentation

	The Lifts Regulations 1997
	Disability Discrimination Act 1995
	HSE Guidance on Stations - Part 2 Section B
	SRA Code of Practice - Train and Station Services for Disabled Passengers.
BS EN81	Safety Rules For The Construction and Installation Of Lifts
BS 7255	Safe Working on Lifts
BS 5588	Fire Precautions In The Design, Construction and Use Of Buildings
NR/GN/ELP/27230	Lift Design, Installation and Operation Guidance Note
GI/RT/7014	Infrastructure Requirements at Station.
GI/RT/7015	Automatic Ticket Gates at Stations
GI/RT/7016	Interface between Station Platforms, Track & Trains.
GC/RT/5161	Station Design and Maintenance Requirements.
RT/D/P/088	Responsibility of Maintenance of Changed Assets.

4 Initial planning

When planning new or modernised lifts full consideration shall be given to any known passenger flow/traffic analysis held by the station operators [GI/RT7015](#).

Layouts to entrances to new or modernised lifts must avoid congestion. [GC/RT/5161](#).

New lifts must comply with the Lifts Regulations 1997, EN81 and must address the SRA Code of Practice for the Provision of Train & Station Services for Disabled Passengers, with the exception of lift car sizes. As far as practicable, modernisation and refurbishment projects shall comply with the requirements of this specification.

For modernisation and refurbishment in existing buildings or stations full use must be made of the existing shaft dimensions to provide the maximum practical size for the lift cars and entrances.

Lifts in stations must be capable of providing facilities to meet the needs of unaided disabled persons. In addition, consideration should be given to the transportation of goods as the lift(s) may provide the only practical means for goods access to and from the platforms.

All lift car dimensions must meet or exceed the values shown in the table below.

NETWORK RAIL - MINIMUM LIFT CAR DIMENSIONS

Lift Car	Width Depth Height	1600 mm 1600 mm 2300 mm
Lift Car Entrance	Width Height	1100 mm 2100 mm
Rated Load		16 persons 1200 kg

- The above configuration provides minimum footprint for a 16-person lift, and practical wheelchair access, including Type C electric buggy.
- The minimum shaft width dimensions additionally suits island platform applications.

In all cases there must be a clear space at each landing 1500mm by 1500mm directly in front of the lift entrance.

Where there is heavy goods traffic separate lifts must be provided for passengers and general goods use.

Lift service must be provided to all floors where the public require general access and. If this includes access to a basement, foot tunnel, over-bridge, below ground or multi-storey car park, then traffic calculations must be carried out and documented to ensure selection of the correct number of lifts.

The finishes to all lifts and entrances should be aesthetically acceptable but durable and suitable for use by the disabled, using colour-contrasting materials.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

Installations must be designed for ease of use and to eliminate all risks and hazards for users and maintenance personnel.

Guidance on planning and installation may be found in [NR/GN/ELP/27230](#).

5 Technical Requirements for Lift Installation

All installations shall comply with BS EN 81 and BS 7255.

All lift installations shall have their own dedicated lift machine room.

In all instances variable frequency motor control shall be utilised to minimise noise and heat generation.

Generic equipment shall be used wherever possible. In all cases equipment shall be specified and rated for a minimum 25 year service life.

Equipment that can be maintained by a competent, established, lift company shall be used.

5.1 Lift Performance and Equipment Requirements

5.1.1 Servicing

All lift equipment must be generic, non-proprietary with spares and support readily available to persons other than the original supplier or installer. Use of equipment not generally available to the lift trade, to maintain or access any of the installed equipment will not be acceptable. All hand test tools plus passwords and codes required for maintenance, adjustments, settings or any operation required for any purpose on the lift, must be provided and shall unequivocally become the property of Network Rail on completion. For the life of the equipment all such tools and software must be freely available to third parties.

All equipment must be in accordance with BS EN 81-1 for electric lifts, BS EN 81-2 for hydraulic lifts, BS 5655 and BS 7255. All safety critical items must be C.E. marked. The factor of safety must be 5 or greater for all parts of the equipment and the installation must be capable of functioning under the following conditions without prejudicing the overall performance:

- Machine Room Temperature between +5°C and +40°C.
- Dust and dirt laden atmosphere subject to the effects of moisture, electrically noisy supply and mechanical vibration.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

5.2 Controller

The controller shall be housed in a sheet steel enclosure with hinged door that shall be provided with a key operated lock.

Goods only lifts must be fully automatic push button control with call and send at each landing, having manual car and landing shutter doors and pushes at each level served.

All other lifts must be full collective control with power operated car and landing doors, up and down landing pushes and position indicators at each level served with visual and audible indication of lift travel direction. The equipment must have been in commercial operation for a minimum of one year and must have a substantial record of reliability operating on continuous duty and in a similar environment.

The controller must incorporate field proven microprocessors and must provide indication circuits for:

1. Car position,
2. Call acceptance,
3. Lift on car preference,
4. Lift out of service,
5. Lift undergoing maintenance,
6. Lift direction of travel,
7. Lift overloaded.
8. Urine detected. (optional)

Fault logging must be provided, with battery backup for a minimum of 30 days and minimum 24 events, and must record the following events in English text:

1. Memory fault/self test result,
2. Programme fault,
3. Primary safety circuit failure,
4. Door close protection fault,
5. Door open protection fault,
6. Landing door interlock not made up,
7. Car door interlock not made up,

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

8. Start failure,
9. Door open failure,
10. Lift stopped outside door zone,
11. Landing call failure,
12. Car call failure,
13. Failure to complete journey in double time,
14. Car overload,
15. Opening of locks while running,
16. Shutdown after three successive attempts to start,
17. Operation of emergency alarm in the lift car,
18. Status of door detector edges,
19. Oil over temperature,
20. Lift remotely isolated.
21. Urine detected within the lift car.
- 22 – 24 Network Rail requirements.

5.3 Drive components

5.3.1 Traction lifts

The winding gear unit including the motor, worm reduction gear, brake and pedestal bearings must be mounted on a cast iron or steel construction bedplate and be designed for quiet operation. Isolation from noise and vibration must be provided between the support steels and building fabric.

The traction sheave must not be less than 47 times the diameter of the main suspension ropes and must not be greater than 1.5 times the diameter of the worm wheel.

The centre distance of the worm gear must not be less than 37.5% of the effective diameter of the traction sheave.

The hoist motor must be variable frequency closed loop control and must incorporate thermistors embedded in the stator windings to give protection against overheating. Flange mounted motors are acceptable.

The system of gear and motor must be rated for a minimum of 180 starts per hour.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

5.3.2 Hydraulic lifts

The pump, pump motor and oil storage tank must be mounted on one robust bed-plate. The power unit must be variable frequency control and be specifically designed for lift duty and must operate with the minimum of noise and vibration. The power unit must be mounted on vibration insulators above the machine room floor.

A silencer must be fitted in the system to minimise the transmission of pulsations from the pump to the car and reduce the emission of airborne noise to less than 45dB(A) at 1m measured in the horizontal plane from the tank or pump casing.

Automatic heating and cooling must be provided as necessary to ensure the oil temperature is maintained within the normal operating temperature range.

The system must be rated at a minimum of 120 lift starts per hour.

A visual oil level indicator shall be provided.

The cylinder must be mounted such that it is subjected to vertical loads only and arranged such that the ram can be readily withdrawn for examination.

The control must provide electronic variable frequency closed-loop speed and acceleration with constant rates under all load conditions.

In all cases the use of energy accumulation drive shall be utilised to reduce start and run currents and provide energy savings for the life of the installation.

A pressure gauge connection point and a permanent pressure testing point together with permanent valve bypass pipework shall be provided on all lifts.

An oil spillage catchment tank must be provided to contain, as a minimum, 110% of the total system capacity

A clear label providing details of a) oil type, capacity of tank and date of last oil change and b) characteristics and test requirements of the accumulators shall be provided.

The system shall utilise biodegradable, environmentally friendly hydraulic oil.

Where there is an identified risk of damp conditions within the lift shaft or lift shaft pit, all hydraulic fittings and equipment within the pit shall be stainless steel.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

5.3.3 Levelling accuracy

The control system must be capable of bringing the car smoothly to rest without judder, stopping within a landing tolerance of +/- 6mm irrespective of load. Levels must be maintained after loading /unloading.

5.4 Suspension, counterweight, safety gear and governor

Suspension ropes: the minimum number of ropes shall be four and the minimum diameter 13mm. Anchorage of the ropes must be by an approved method and incorporate an approved device to prevent rotation.

Tenderers must submit details of the terminal fittings to be employed at the anchorage points.

Compensating ropes/chains: where fitted tenderers are to state the number of and type of ropes or chains proposed. Any rope or chain must be of the quiet running type, where a return pulley is fitted then this must be provided with a slack/broken rope switch.

The counterweight must be a framed unit incorporating cast iron filler weights of uniform section secured to the frame by restraining straps or tie rods. At mid point in the shaft the suspended weight of the counterweight must equal the suspended weight of the car plus 45 to 50% of the lift contract load.

The base of the counterweight must incorporate 2 fabricated steel adjustment spacers 100mm high (box section or similar) designed to act as a striker for the counterweight buffer. The spacers must be secured with a minimum of two 20mm studs and lock nuts and be easily removable to allow for rope stretch. A clearly labelled stowage must be provided adjacent to the counterweight buffer to allow secure storage of removed spacers until required (i.e. when the ropes are shortened). The guide rollers must be secured direct to the counterweight frame.

The complete counterweight must be finished yellow.

5.4.1 Bi-directional safety gear

A CE marked and certified bi-directional, progressive wedge type safety gear shall be provided, fixed to the bottom members, or to both top and bottom members of the lift car sling, and be designed to decelerate and stop the lift car in either direction of travel should the suspension ropes fail or the lift car overspeeds.

The safety gear shall be operated by an independent steel wire governor rope and shall be fitted with an electric switch to immediately stop the lift in the event of operation.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

The switch shall require a manual reset to return the lift to service.

All electrical contact switches shall be robust and environmentally enclosed.

5.4.2 Overspeed governor

A generic type over speed governor must be provided for all rope suspended lifts. The governor rope tensioning weight must be fitted with a slack/broken rope switch connected in the lift safety circuit.

5.5 Lift car and associated equipment

The lift car enclosure must be designed to be vandal resistant and finished with durable materials which must have a surface spread of flame not inferior to Class 2 to BS476 P7 not support combustion. Stainless steel is the preferred finish and shall be Grade AISI 316 or superior. Anti-corrosion measures to prevent damage from cleaning materials and body fluids must be taken for the car, sling, platform, supporting members and the landing sill supports.

The manufacturer shall ensure that the internal dimensions are permanently and clearly displayed.

The car construction detailed in Section 11 is to be used where vandal resistance is required.

The lift car must provide the following controls and indicators:

Lift identification number,

Position and message indicator with amber illumination, 40mm high by 3 characters width,

Contract load in kgs and persons,

Hands free emergency telephone unit with speech prompt which together with the emergency alarm must be connected to a continuously manned location, (see also 5.6),

Integrated maintenance intercom.

Alarm push, plus low level alarm push,

Floor pushes,

Door open push,

Car preference key switch,

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

Speech synthesiser,

Lift arrival buzzer (for goods/passenger lifts with manual gates),

Where extended loading periods will be involved, consideration must be given to providing a key operated door open/hold switch.

The car pushes must be as follows:

Tactile, colour contrasted and Braille, half illuminance in standby mode, changing to full illuminance to indicate a call registered. The illuminance shall be amber for call pushes, green for door open and yellow for the alarm push.

Have the pressel a minimum of 50mm by 50mm, be robust, vandal and flame resistant, any shock loads on the pressel transmitted to the body of the unit and not the contacts.

Be of a design to prevent deliberate fixing of the pressels in the depressed position.

Be located at heights between 900mm and 1100mm, centred on 1000mm from floor level. The main exit level push shall be raised 5mm from the surface of the car push station faceplate.

Be located a minimum of 400mm from the front or rear of the lift car.

Incorporate audible indication of call accepted.

The pushes shall be incorporated into a 2.6mm thickness stainless steel faceplate and must be secured with rear tamper proof fixings. The faceplate shall be powder coated New Gardenia to provide colour contrast with both the pushes and the car wall.

5.5.1 Voice synthesiser – for passenger lifts only

The synthesiser must be digital quality, must incorporate volume control and must provide for the following messages in a male voice, each of which must be easily disabled from the machine room without the need to reprogram the unit. The messages shall be repeated within the lift car and at each landing push station.

Floor identification,

Direction of travel,

Doors opening and closing,

Lift overloaded,

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

Lift returning to evacuation level,

Information message for trapped passengers via emergency call system.

5.5.2 Lift car lighting

The Car lighting shall have a minimum of two light fittings.

The fittings shall be housed behind securely fixed vandal resistant flush fitting diffusers and shall provide a minimum of 200lux at floor and threshold levels.

Emergency lighting shall comprise a minimum of one non-maintained fitting in each housing providing a minimum of 8 lux at threshold level for a period of 3 hours.

Access to the light fittings shall be from the car top only.

5.5.3 Car sling

In all cases construction must be based on a fabricated steel framework. The whole of the car enclosure must be so supported in, and insulated from, the car frame such that noise and vibration in the car is reduced to a minimum.

5.5.4 Ventilation

The car interior must be provided with clearly visible ventilation apertures at high and low level; they must be backed to the shaft side with a baffle to prevent a rod of any section to pass through.

5.5.5 Car roof

The roof of the car must be provided with a 150mm high toe guard to protect the exposed edges, finished bright yellow. The roof is to be designed to provide a level-working surface. 1.1m high handrails with intermediate rails are to be provided to the rear and sides of the car roof.

5.5.6 Crown bar records

The crown bar must have an engraved 10 swg brass notice securely fixed in a clearly visible position and must provide details of the following:

Name of the installer and date of installation,

Total weight of the lift car and sling,

Rated load and speed,

Rope details.

5.5.7 Car top maintenance control

The car top maintenance control, light and socket outlet must have a separate feed from the consumer unit.

The control station on top of the car must meet the requirements of BS 7255, incorporate a common direction push, have it's faceplate in the vertical plane facing the front of the car, and must incorporate the following features:

1. A permanent safety low voltage inspection lamp, separately fused and suitably protected against impact by a wire guard and must be controlled by a separate switch.
2. An emergency light of 8 watt minimum output, providing a minimum 1 lux illumination at floor level and providing a minimum duration of 3 hours.
3. A switched 13 amp socket outlet to BS 1363 incorporating a residual current device of 30ms at 30mA. For areas utilising d.c.. traction the socket must incorporate a product accepted d.c. immune RCD.
4. All switches are to be back illuminated at all times.

5.5.8 Bump rails and handrails

Colour contrasted circular section handrails of 45mm diameter must be fitted to the walls of the car interior, each extending over the full width of each wall, but not obstructing access to the car pushes. Handrails are to be fixed 60mm from the wall at a height of 900mm above the car floor and secured with tamper/vandal resistant fixings. The fixings must correspond with a structural member of the car.

Bump rails shall be provided at mid height between the floor and handrails to provide protection from trolley damage. They shall be finished in stainless steel.

The use of materials that are 'cold to the touch' shall be avoided.

5.5.9 Additional features for lifts conveying trolleys:

1. The car must have sufficient mechanical strength to withstand the shock loads caused by a laden trolley or barrow weighing 1280kg, being allowed to run at 0.5m/s into the car.
2. Adequate steelwork bracings must be fitted to strengthen the car enclosure particularly at the back and sides where it is considered the majority of the impact forces will be transmitted.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

3. The car floor is to be designed and constructed to take one or two groups of 4-point loads of 0.4 tonnes each (positioned at the corners of a rectangle 900mm x 600mm) at any point in the car.

4. The interior of the car is to be protected from damage by rubbing strakes or bump rails which are to be provided on the three walls of the car (side walls only on through cars)

5.6 Emergency call system

Pressure on the alarm push in the lift car must ring an alarm bell within the lift shaft and an additional bell external to the lift shaft positioned to alert station staff. Continuous pressure on the alarm push for a period of 3 seconds shall activate the hands-free emergency call system/auto-dialling unit in the lift car.

The unit must be capable of dialling a minimum of five separate locations automatically progressing to the next number if a number is engaged or unobtainable.

The procedure for testing the lift car emergency communication system in accordance with EN81-70 shall be fully documented

The unit must incorporate identification messages to confirm that assistance is being sought and giving the lift identification. The unit shall additionally incorporate the facility to receive calls and a reset facility for test conditions.

The unit must be flush mounted and include both speaker and microphone to allow both locations to speak simultaneously. In addition the unit shall provide visual indication of unit activated by way of a yellow pictogram, and call accepted by way of a green pictogram.

An induction loop facility for the hard of hearing must be provided and shall cover the entire area of the lift. The standard induction loop symbol must be incorporated within the Car Operating Panel (COP).

The telephone for the emergency call system shall be connected to a dedicated external line. Under no circumstance shall the emergency call system be connected to an internal line.

The emergency call points to the car top and the lift pit shall be integrated with the system.

In addition the lift must be provided with an audible alarm that shall operate in the event of any unplanned stoppage or loss of lift service. The alarm must operate under all conditions including loss of the main electrical supply and a cancellation facility shall be provided.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

5.7 Doors and automatic power door operator

Lift doors must be arranged so that they do not face the platform edge. Where this is not practical, a suitable barrier must be installed to divert passenger flow away from the platform edge. Obstructions must not be placed on the platform within 2.0m of a platform edge or encroach into the structure gauge. The aim must be to provide a minimum 1500mm by 1500mm clear space on each level served, immediately adjacent to the lift entrance.

The selection of door panels and entrance trim must be to suit the application and architectural requirements of the site and door panels must be colour contrasted to the surrounding finishes to clearly identify the clear entrance.

Splayed architraves are required where lifts are to be primarily used for goods traffic.

The landing fixings must not be accessible or visible from the landings or the car and the design shall illuminate all sharp edges.

Each door must have two sliding shoes each having an offset, multi-position, vertical flange secured to the well side of the door such that the shoes can be easily replaced without lifting the door. Doors and their frames must be made of metal. Each door shall additionally have two 75mm long by 3mm thick plates projecting into the cills to depth of 8mm.

Where practical, and to meet the needs of the disabled and station search procedures, it is recommended that where doors are provided with vision panels. They shall align with the car at floor level and allow a complete view of the inside of the lift car from the landing this will allow station staff to carry out security checks. A minimum of 100mm wide by 600mm high is considered suitable. Vision panels are to be provided for each door set.

All glass shall be laminated and vandal resistant and shall satisfy the requirements of Annex J to EN81. If fully glazed door panels are used suitable measures shall be implemented to ensure the safety of children and the visually impaired. This shall, as a minimum, include pressure edges within the return architraves and manifestations of the glass panels.

Doors must be suspended from hangers fitted with rollers that run above the top track and have eccentric rollers fitted below the top tracks to stabilise the doors. The rollers must rotate on roller bearings or similar with 'sealed for life' lubrication.

The doors shall be constructed from 16 swg zintec steel being of hollow construction with reinforcing and flame and soundproof packing over the entire internal door area. Have a 16 swg 316 grade patterned stainless steel skin applied and secured to the entire visible face of the hollow metal doors returning to the trailing edge of the door pinned at a maximum spacing of 200mm.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

The bottom door tracks (cills) must be manufactured in manganese bronze and be of the self-clearing type. Entrances must be constructed with a minimum fire resistance of 1 hour. A certificate as detailed within EN81, clause F2 must be provided

The sight guard must be formed in one piece, continuously braced throughout the height of the door on zintec sheet that must return to the shaft side of the door and be pinned with a maximum spacing of 200mm.

Landing doors must be provided with spring closers

The doors shall have no fixings visible or accessible from the landings.

The vertical distance between the doors and the sill shall not exceed 5mm and the horizontal clearance between the doors, door returns and architraves shall also not exceed 5mm.

Doors must have a mechanical and electrical interlock to each landing door where a lock cover is provided shall be a clear, toughened, removable plastic sealed to prevent possible ingress of moisture and allowing visible and easy adjustment without the use of special equipment.

Power operated doors must be driven by a variable frequency a.c. electric motor in both the opening and closing modes and must be rated for the anticipated duty cycle. The system must meet the following:

- i. The door speed during operation, must have sinusoidal characteristics, i.e. fast opening and close at a speed slow enough to allow Passengers to move clear of them, to avoid becoming trapped.
- ii. The operator must incorporate provision for simple adjustment of door speeds and must provide fast opening speed and slow closing speed with a check prior to impact.
- iii. It must stop, reverse and fully re-open the car door and its associated landing door if the door detector device is obstructed while the doors are closing.
- iv. A door open push must be provided in the car and it must only operate while the car is stationary at a landing.

In the absence of a signal for the movement of the lift car, in normal service, the landing doors must close automatically after a specified period of time.

- v. Standard door dwell time shall be 20 seconds in the open position but shall be readily adjustable onsite between 0 and 30 seconds.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

For lifts with manual doors standard shutter gates or multi-leaf gates must be used for robust reliable service and these must be galvanised and subsequently colour finished. A vision panel shall be provided in the leading leaf.

Lift cars and landing entrances must be protected against damage by trolleys, mobile equipment etc. The effect of shock loads on the structure of the doors and lift car walls caused by impact forces from trolleys etc must be taken into account. Reinforcing above floor level may be necessary but shall not impede clear access to the car control pushes.

With through cars, the lift car doors must be protected from damage by trolleys, mobile equipment etc. Floor stops or interconnected ramps are unacceptable for this purpose, as they create a hazard to passengers.

Where stainless steel is specified this shall be Grade AISI 316 or superior.

5.8 Passenger protection

The leading edge of power operated car doors must be fitted with a full height 3D electronic detector with a minimum of 180 beams. The device must be so arranged that should an obstruction be present whilst the doors are closing it must cause both car and landing doors to stop and initiate a door re-open cycle. The device must identify all colours and a strap of 4mm width and must not inhibit the full clear opening.

Where the lift can be used for the movement of loads on trolleys, it may be necessary to fit more than one device e.g. photo electric cells fitted within the architrave of each landing entrance.

If an obstruction in the doorway causes the doors to partially close and open for 4 consecutive cycles, the doors must remain open after the 4th cycle. This feature must be adjustable up to 10 cycles and be timer based. A car call must be entered to reinstate the automatic operation.

Where glass door panels are used the entrance architraves shall incorporate full height pressure sensitive edges that shall, if operated, cause doors to re-close during opening.

After one reversal constant pressure on the door open push shall override this feature.

5.9 Landing station and indicators

The landing stations must have a minimum 2.6mm thickness faceplate colour contrasted to the pushes and surrounding finishes and must incorporate a 2.6mm plain satin finish stainless steel, sliding or hinged flap capable of being locked in both the up and down position by a catch operated by the triangular emergency release key.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

In one position the flap must allow free access to all of the controls, car position indicator and voice synthesiser speaker.

When in the alternative position the flap must cover the car call button only leaving all other controls unobstructed, and must include in red 20mm high engraved letters the sign "LIFT OUT OF SERVICE".

Each station must also include:

1. Lift identification (engraved letters).
2. Car position and direction indicator, hi-resolution amber illumination, minimum 40mm high by 3 characters width.
3. Notice (engraved letters) advising,

‘DO NOT USE IN THE EVENT OF FIRE’

4. Up and Down pushes.
5. Floor designation (engraved letters).
6. Recall key switch (engraved letters).
7. Colour contrasted finish to faceplate.
8. Voice synthesiser messages.

Landing Pushes must be robust, flame resistant and for exposed locations must be water resistant to IP54. The pushes must be of the same design standard as for the lift car and be tactile and Braille and include call acceptance illumination in green and have the lowest push positioned at 900mm above finished floor level.

The landing position indicator must be located within the landing push station or with multiple lifts above the entrance header, or between entrances. The position indicator must be to the same specification as that provided to the car.

Indicator message shall be programmable on site without the need for specialist tools. Use of laptop computer is acceptable.

Landing station back box recess shall be finished flush to the shaft inside wall

5.10 Machine room access

Access platforms and ladders: where it is necessary to install access/maintenance platforms they must be designed for a minimum imposed load of 2kN/m². Ladders are to be angled to the vertical and flat tread complete with handrails.

Ref:	NR/SP/ELP/27228
Issue:	I
Date:	October 2005

Due consideration must be given to general access to the machine room including lighting of the access route with emergency fittings.

5.10.1 Signs and labels

In addition to those notices and labels specified, the following must be provided:

- i) To identify all miscellaneous switches within the machine room area including the main isolator and consumer unit.
- ii) To the controller door advising of the live condition of the equipment.
- iii) To identify all run/stop switches.
- iv) Standard warning notice for lift Machine Rooms to the outside of the machine room door, to indicate 'No Unauthorised Access'.

5.10.2 Additional sundry facilities within the machine room

The following must also to be provided within the machine room:

- i) Encapsulated, fully detailed and illustrated, hand winding and emergency release instructions.
- ii) Encapsulated electric shock notice in accordance with the current BS 7671 Regulations.
- iii) Tool rack to accommodate the landing door release key, brake release and hand winding wheel or pump handle if not integral. Each component must be clearly identified by permanent labels on a shadow board arrangement.
- iv) Service Log Book.
- v) As installed circuit diagrams for the complete lift system suitably encapsulated, framed and wall mounted.

5.11 Lift well

Where damp conditions have been identified all fixings shall be stainless steel. This shall additionally include for stainless steel fittings for all hydraulic equipment within the lift pit.