

Lifts and service lifts —

Part 9: Specification for guide rails

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Foreword

This Part of BS 5655, prepared under the direction of the Mechanical Handling Standards Committee, is the ninth Part of BS 5655 relating to lifts and service lifts, which will be progressively published to supersede portions of BS 2655. The complete standard will comprise the following Parts.

- *Part 1: Safety rules for the construction and installation of electric lifts (implementing EN 81/1), together with PD 6500 “Explanatory supplement to BS 5655-1”;*
- *Part 2: Specification for hydraulic lifts;*
- *Part 3¹⁾: Safety rules for the construction and installation of electric service lifts (will implement EN 81-3);*
- *Part 4¹⁾: Safety rules for the construction and installation of hydraulic service lifts (will implement EN 81-4 if published);*
- *Part 5: Specification for dimensions of standard electric lift arrangements (implementing ISO 4190/1 and ISO 4190/3);*
- *Part 6²⁾: Code of practice for selection and installation;*
- *Part 7: Specification for manual control devices, indicators and additional fittings (implementing ISO 4190/5);*
- *Part 8: Specification for eyebolts for lift suspension;*
- *Part 9: Specification for guide rails (implementing ISO 7465);*
- *Part 10²⁾: Methods for testing and inspecting electric and hydraulic lifts.*

The publication of further Parts is anticipated.

This Part implements the technical requirements of ISO 7465-1983 “Passenger lifts and service lifts — Guide rails for lifts and counterweights — T type”, published by the International Organization for Standardization (ISO). The national committee has however decided to optimize the selection of sizes for use in the United Kingdom and to include a number of other sizes of rail not included in the International Standard: the ISO sizes are identified in this British Standard.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 18, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

¹⁾ Not yet in preparation.

²⁾ In preparation.

1 Scope

This Part of BS 5655 specifies the grades and quality, the dimensional characteristics and tolerances and the surface finish of nine sizes of tee section guide rails and their fishplates.

The dimensional tolerances include the tolerances on shape, straightness, twisting and perpendicularity defects.

In addition, this Part defines the designation system for the guide rails.

Appendix A provides instructions to lift contractors on how to evaluate the forces and stresses on, and deflections of, guide rails under normal operating conditions and during safety gear operation and hence select the appropriate guide rail and its maximum fixing spaces for each installation.

The standard is applicable to guide rails used in lift and service lift installations to provide optimum guiding for the lift car and its counterweight.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 5655, the following definitions apply.

2.1

guide rail

a component that provides guiding for a lift car or its counterweight, if there is one

2.2

fishplate

a component used to connect guide rails

3 Symbols and units

The following symbols and corresponding units of measurement are used in this Part of BS 5655.

Measurements	Symbol	Unit
Guide width	b_1	mm
Fishplate width	b_2	mm
Distance between the axes of the holes (in the transverse direction of the guide)	b_3	mm
Width of the connecting part of the foot to the blade	c	mm
Hole diameter	d	mm
Countersink or counterbore diameter (optional)	d_1	mm
Distance from the rear surface of guide rail to its centre of gravity	e	mm
Foot depth at its connection with the blade	f	mm

Measurements	Symbol	Unit
Foot depth at its extremity in a transverse plane	g	mm
Guide height at the level of the machined surface for the location of the fishplate	h	mm
Sectional height of guide	h_1	mm
Moment of inertia of the cross-sectional area of the guide related to the x-x axis	I_{xx}	cm ⁴
Moment of inertia of the cross-sectional area of the guide related to the y-y axis	I_{yy}	cm ⁴
Radius of gyration corresponding to the x-x axis	i_{xx}	mm
Radius of gyration corresponding to the y-y axis	i_{yy}	mm
Blade width	k	mm
Machined surface length for the location of the fishplate	l	mm
Fishplate length	l_1	mm
Distance, in the guide longitudinal direction, between the axis of the farthest holes from the end of the guide and this end and	l_2	mm
Distance, in the fishplate longitudinal direction, between the axis of the farthest holes from the transverse axis of the fishplate and this axis		mm
Distance, in the guide longitudinal direction, between the axis of the nearest holes from the end of the guide and this end and	l_3	mm
Distance, in the fishplate longitudinal direction, between the axis of the nearest holes from the transverse axis of the fishplate and this axis		mm
Machining sub-length for the location of the fishplate	l_x l_y	mm
Width of the keyway for the junction of the guides	m_1	mm
Width of the key for the junction of the guides	m_2	mm
Blade height	n	mm
Foot depth (in the case of a flat foot)	p	mm

Measurements	Symbol	Unit
Linear density for a finished guide rail	q_1	kg/m
Mass of a finished fishplate	q_2	kg
Foot radius	r_s	mm
Cross-sectional area of the guide	S	cm ²
Depth of the keyway for the junction of the guides	t_1	mm
Length of the key for the junction of the guides	t_2	mm
Fishplate thickness	v	mm
Cross-sectional area modulus related to the x-x axis	W_{xx}	cm ³
Cross-sectional area modulus related to the y-y axis	W_{yy}	cm ³
Permissible twist	γ	prime/m

4 Guide rails

4.1 Designation

Guide rails shall be designated as follows.

- 1st element. Reference to this standard, i.e. BS 5655/9
- 2nd element. Guide shape, i.e. "T"
- 3rd element. Nominal width of rail foot, in millimetres, e.g. 50, 70, etc., with, where relevant, the number of the variant for different profiles with the same foot width.
- 4th element. Manufacturing process, i.e. cold drawn "A" or machined "B":

Example

Lift guide rail BS 5655/9 – T 127-1/B.

4.2 Physical properties

The physical properties of the guide rails shall comply with Table 1.

4.3 Material

Guide rails shall be manufactured from a structural steel and have a tensile strength (R_m) of not less than 370 N/mm² and not greater than 520 N/mm².

NOTE The following steels are recommended:

- BS 4360 grade 40A for cold drawn guide rails
- BS 4360 grade 43A for machined guide rails

4.4 Dimensions

4.4.1 Sectional. The dimensions and tolerances of the guide rails at any point along their length shall be in accordance with Table 2.

4.4.2 Ends. The dimensions and tolerances of the key, keyway, fishplate attachment faces and bolt holes at each end of the guide rails shall be in accordance with Table 3 and Table 4.

4.4.3 Length. The length of the guide rail shall be subject to a tolerance of ± 2 mm.

NOTE It is recommended that guide rails should be manufactured and purchased in 5 m lengths.

4.5 Surface texture

The surface texture of the guide blade and the surfaces for the attachment of the fishplate, when assessed in accordance with BS 1134-1, shall comply with the following:

- a) *Blade surfaces* (see Figure 2)
 - 1) longitudinal direction:
 - cold drawn: $3.2 \mu\text{m} \leq R_a \leq 6.3 \mu\text{m}$
 - machined: $R_a = 1.6 \mu\text{m}$;
 - 2) transverse direction:
 - cold drawn and
 - machined: $3.2 \mu\text{m} \leq R_a \leq 6.3 \mu\text{m}$;
- b) *Fishplate attachment surface* (see Figure 3)
 - machined: $R_a = 6.3 \mu\text{m}$.

4.6 Straightness

The maximum straightness ratio $A : B$ of the blade, illustrated in Figure 5, throughout the length of finished guide rails shall comply with Table 5 where

- A is the shortest distance between reference point and measuring point;
- B is the greatest distance between the measuring point and the reference plane;
- a is the inspection length ≥ 1 m.

NOTE 1 If the above measurements are made in a non-vertical attitude, the natural deflection due to the mass of the guide rail and to the location of the supports may be disregarded.

NOTE 2 It is recommended that the guide rail should have no repetitive wave effect. For this purpose distance B should be measured or a fixed length a moving along the entire length of the rail.

4.7 Twist

The maximum angle of twist in the guide rail, illustrated in Figure 6, measured over a length ≥ 1 m, shall comply with Table 6.

5 Fishplates

5.1 Material

Fishplates shall be manufactured from the same steel used in the manufacture of the guide rails (see 4.3).

5.2 Dimensions

The dimensions of the fishplates shall be in accordance with Table 4.

6 Surface treatment

Guide rails and fishplates shall be supplied in the self-colour condition, free from rust and shall be covered all over with a wax or oil-based corrosion preventative coating.

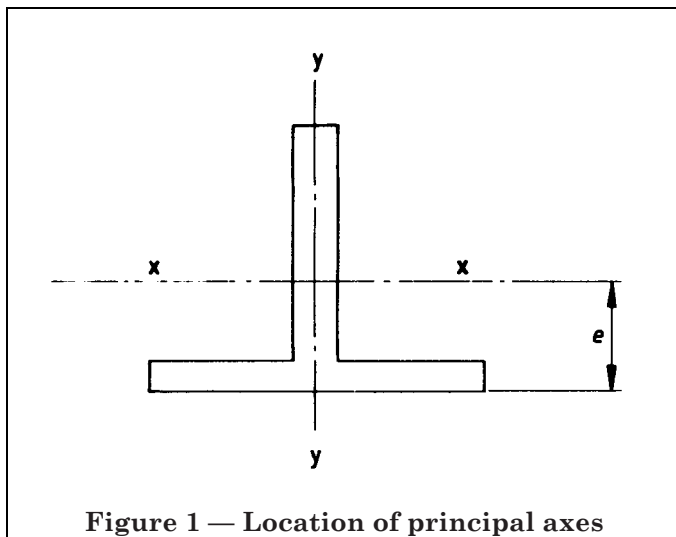


Table 1 — Physical properties of guide rails

Designation A = Cold drawn B = Machined	S	q_1	e	I_{xx}	W_{xx}	i_{xx}	I_{yy}	W_{yy}	i_{yy}	Former designation ^b
	cm ²	kg/m	mm	cm ⁴	cm ³	mm	cm ⁴	cm ³	mm	
T 50/A ^a	4.75	3.73	14.3	11.24	3.15	15.4	5.25	2.10	10.5	—
T 70-3/B	11.54	9.30	17.3	27.50	8.52	15.2	25.8	7.54	15.0	T 163
T 75-3/B ^a	10.99	8.63	18.6	40.35	9.29	19.2	26.49	7.06	15.5	—
T 89/B ^a	15.70	12.30	20.7	59.60	14.50	19.5	52.50	11.80	18.3	T 161
T 127-1/B ^a	22.50	17.8	27.0	187.00	30.00	28.6	151.00	24.00	26.5	T 12
T 127-2/B ^a	28.90	22.70	24.6	200.00	31.00	26.3	234.00	36.80	28.5	T 160
T 140-1/B	35.10	27.50	32.0	403.00	52.90	33.8	310.00	44.40	29.7	T 171
T 140-2B	43.22	32.70	34.8	452.00	67.50	32.5	365.00	52.30	29.2	T 22
T 140-3B	57.35	47.60	44.2	946.00	114.00	40.6	488.00	70.00	29.2	T 32

^a Guide rail specified in ISO 7465.
^b An informal designation formerly used by the industry.

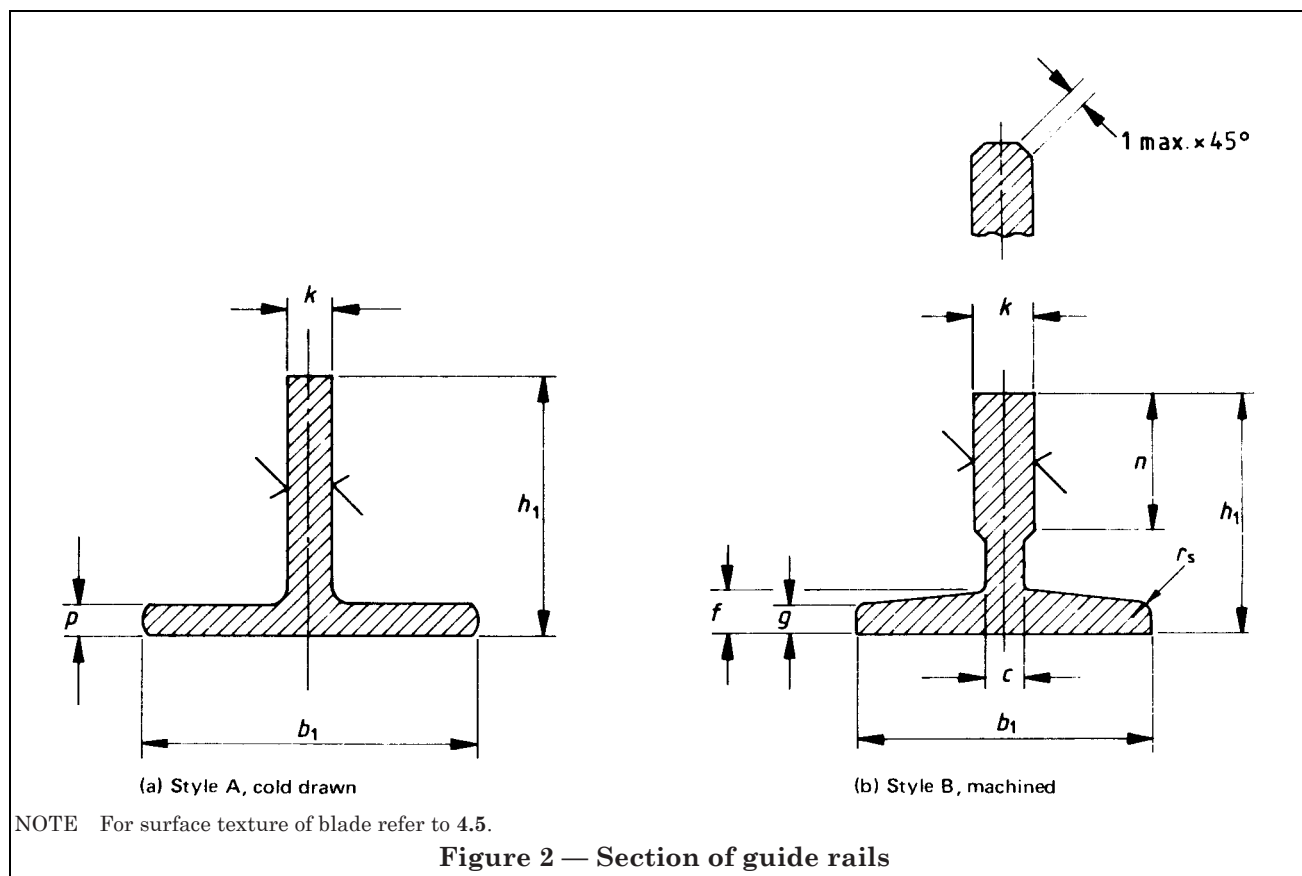


Table 2 — Dimensions of guide rail sections

Designation A = Cold drawn B = Machined	b_1 mm	h_1 mm	k mm	n mm	c mm	g mm	f mm	p mm	r_s mm	Style
Tolerances										
	± 0.5		± 0.15					± 0.5		
T 50/A	50	50	5.00	39.0				5.0	1.00	A
Tolerances										
	± 1.5		+ 0.10 - 0	+ 3 - 0		± 0.75				
T 70-3/B	70.0	49.2	15.88	25.4	9.5	7.9	9.5	—	4.76	B
T 75-3/B	75.0	62.0	10.00	30.00	8.0	7.0	9.0	—	3.00	B
T 89/B	89.0	62.0	15.88	33.4	9.5	7.9	11.1	—	3.00	B
T 127-1/B	127.0	88.9	15.88	44.5	9.5	7.9	11.1	—	4.00	B
T 127-2/B	127.0	88.9	15.88	50.8	9.5	12.7	15.9	—	5.00	B
T 140-1/B	139.7	107.9	19.00	50.0	12.7	12.7	15.9	—	3.20	B
T 140-2/B	139.7	101.6	28.60	50.8	19.0	14.3	17.0	—	3.20	B
T 140-3/B	139.7	127.0	31.70	57.1	25.4	17.5	25.4	—	3.20	B