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ISO 8100-33

First edition
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Lifts for the transport of persons and goods —

Part 33: T-type guide rails for lift cars and counterweights

Ascenseurs et monte-charges pour le transport des personnes et des marchandises —

Partie 33: Guides à profil en T des cabines et contrepoids

Reference number
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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 178, *Lifts, escalators and moving walks*.

This first edition of ISO 8100-33 cancels and replaces the fourth edition of ISO 7465:2007, which has been technically revised.

The main changes are as follows:

— in Clause 5 and Bibliography, the reference to ISO 630:1995 is updated with ISO 630-2:2021;

— in Clause 5, steel grades detailed in Table 2, GR235 and GR275, shall be used for the raw material of guide rails;

— Figures 2 and 3, and Tables 6 and 8 include the minimum distance between the spot-facing and the surface in contact with the fishplate; this parameter affects only to guide rails with inclined foot flange where spot-facing is manufactured;

— some non-preferred rail types have become preferred types in Tables 5, 6, 7 and 8 (T90/A, T75/B, T78/B, T90/B, T114/B, T127-1B or BE);

— in Table 7, the second moment of area related to the X-axis of T127-2/B, I_x is corrected; it was 201,7 cm^4 and it is 200,17 cm^4;

— in Table 7, the radius of gyration of T127-1/B is corrected; it was i_x = 3,065 cm and i_y = 2,361 cm and it is i_x = 2,875 cm and i_y = 2,567 cm;

— in Table 8, the dimension g of T125/B or BE has been corrected; it was 8 mm and it is 9 mm;

— in 6.2.8, the length of short waves is corrected from 500 mm to 1 000 mm;

— in Table 10, the values of the tolerances t_{10} and t_{18} are shifted.

— in Table 10 and Figure 5, tolerance for the parallelism between the top of the blade and the surface in contact with the fishplate t_{19} is added;

— in Figure 5, the envelope requirements for the base machining height at the guide rail ends are removed;

— in 7.1, the sentence, which obliges to have a specific tensile strength on the fishplate that depends on the tensile strength of the guide rail, is deleted.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Lifts for the transport of persons and goods —

Part 33:
T-type guide rails for lift cars and counterweights

1 Scope

This document specifies the grades and quality, the dimensional characteristics, the dimensional and geometrical tolerances, and the surface finish of standardized guide rails and their fishplates.

In addition, this document defines a designation system for guide rails.

This document is applicable to guide rails used in passenger lift and service lift installations to provide guiding for the car and the counterweight.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1302, *Geometrical Product Specifications (GPS) — Indication of surface texture in technical product documentation*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
guide rail
component that provides guiding for the car or the counterweight

3.2
fishplate
piece of steel used to connect the guides

4 Symbols and units

See Table 1.

Table 1 — Symbols and corresponding units of measurement

Symbol	Dimension	Unit
b_1	Guide rail width	mm
b_2	Fishplate width	mm

Table 1 *(continued)*

Symbol	Dimension	Unit
b_3	Distance between the axes of the holes (in the transverse direction of the guide and of the fishplate)	mm
c	Width of the connecting part of the foot to the blade	mm
d	Hole diameter	mm
d_1	Countersink diameter	mm
e	Distance from the rear surface to the centre of gravity of the guide rail	cm
f	Foot depth at its connection with the blade	mm
g	Foot depth at its extremity in a transverse plane	mm
h	Guide height at the level of the machined surface for the location of the fishplate	mm
h_1	Guide rail height (for cold-drawn guide rail or on non-machined surface)	mm
I_x	Second moment of area related to the X-axis	cm^4
I_y	Second moment of area related to the Y-axis	cm^4
i_x	Radius of gyration corresponding to the X-axis	cm
i_y	Radius of gyration corresponding to the Y-axis	cm
k	Blade width	mm
l	Machined surface length for the location of the fishplate	mm
l_1	Fishplate length	mm
l_{2g}	Distance, in the guide rail longitudinal direction, between the axis of the farthest holes from the end of the guide rail and this end	mm
l_{2f}	Distance, in the fishplate longitudinal direction, between the axis of the farthest holes from the transverse axis of the fishplate and this axis	mm
l_{3g}	Distance, in the guide rail longitudinal direction, between the axis of the nearest holes to the end of the guide rail and this end	mm
l_{3f}	Distance, in the fishplate longitudinal direction, between the axis of the nearest holes to the transverse axis of the fishplate and this axis	mm
l_g	Length of the guide rail	mm
l_m	Maximum length for the junction area between the machined surface for the fishplate and the non-machined surface	mm
m_1	Width of the keyway for the junction of the guide rails	mm
m_2	Width of the key for the junction of the guide rails	mm
n	Blade height	mm
p	Foot depth (in the case of a flat foot)	mm
q_1	Linear density for a finished guide rail	kg/m
Ra	Surface roughness (see ISO 1302)	µm
r_s	Foot radius	mm
S	Cross-sectional area of the guide rail	cm^2
t_1 to t_n	Tolerances for geometrical dimensions	mm
u_1	Depth of the keyway for the junction of the guides rails	mm
u_2	Length of the key for the junction of the guides rails	mm
v	Fishplate thickness (when machined)	mm
W_x	Modulus of cross-sectional area related to the X-axis	cm^3
W_y	Modulus of cross-sectional area related to the Y-axis	cm^3

5 Manufacture and materials

Guide rails may be cold drawn or machined. In this document, the manufacturing process for each type of guide is indicated by the symbol /A for "cold drawn", the symbol /B for "machined", and the symbol /BE for "machined high quality".

Type /A guide rails shall be manufactured from steel grade GR235 listed in Table 2. The final properties shall be by agreement between the guide rail manufacturer and the customer.

Type /B guide rails shall be manufactured to one of the steel grades listed in Table 2. The steel grade, if specified, shall be included in the guide rail designation per 6.1.

NOTE For a general description of recommended steels, see ISO 630-2:2021 grades S235B and S275B.

Table 2 — Raw material mechanical properties of guide rails

Material grade	k_m mm	UTS N/mm²	YS N/mm²	EL %
GR235	≤ 16	370 to 510	235	26
	> 16 to ≤ 40		225	
GR275	≤16	410 to 520	275	22
	> 16 to ≤ 40		265	

Key

k_m Raw material blade thickness

UTS Ultimate tensile strength

YS Minimum yield strength

EL Minimum elongation

6 Guide rails

6.1 Designation

Guide rails complying with the requirements of this document shall be designated as follows:

— 1st element: number of this document, followed by a hyphen: ISO 8100-33-

— 2nd element: guide rail shape: T;

— 3rd element: rounded value of the foot width with, if necessary, the number of the variant for different profiles with the same foot width: 45; 50; 70; 75; 78; 82; 89; 90; 114; 125; 127-1; 127-2; 140-1; 140-2; 140-3;

— 4th element: manufacturing process:
  — cold drawn: /A;
  — machined: /B;
  — machined high quality types: /BE;

— 5th element (optional): steel grade for type /B guide rails only:
  — GR235;
  — GR275;

EXAMPLE 1 Lift guide rail ISO 8100-33 -T82/A.

EXAMPLE 2 Lift guide rail ISO 8100-33 -T89/B/GR235.

EXAMPLE 3 Lift guide rail ISO 8100-33 -T140–1/BE/GR275.

EXAMPLE 4 Lift guide rail ISO 8100-33 -T125/B.

NOTE In EXAMPLE 4, either GR235 or GR275 of Table 2 can be used.

6.2 Dimensional characteristics and tolerances

6.2.1 Length

The length of the guide rail shall be indicated in millimetres, with a tolerance of ±2 mm. It is recommended to supply bars of 5 000 mm length.

6.2.2 Dimensions

6.2.2.1 General

See Tables 3 to 8.

Two series of dimensions are proposed:

— preferred dimensions, designated without round brackets;

EXAMPLE 1 T82/A.

— non-preferred dimensions, designated within round brackets.

EXAMPLE 2 (T89/A).

Guide rails with other dimensions can be delivered on specific agreement between the guide rails manufacturer and the customer.

6.2.2.2 Cold-drawn, parallel foot-and-blade flange guide rail

See Figure 1 and Tables 3 and 4.

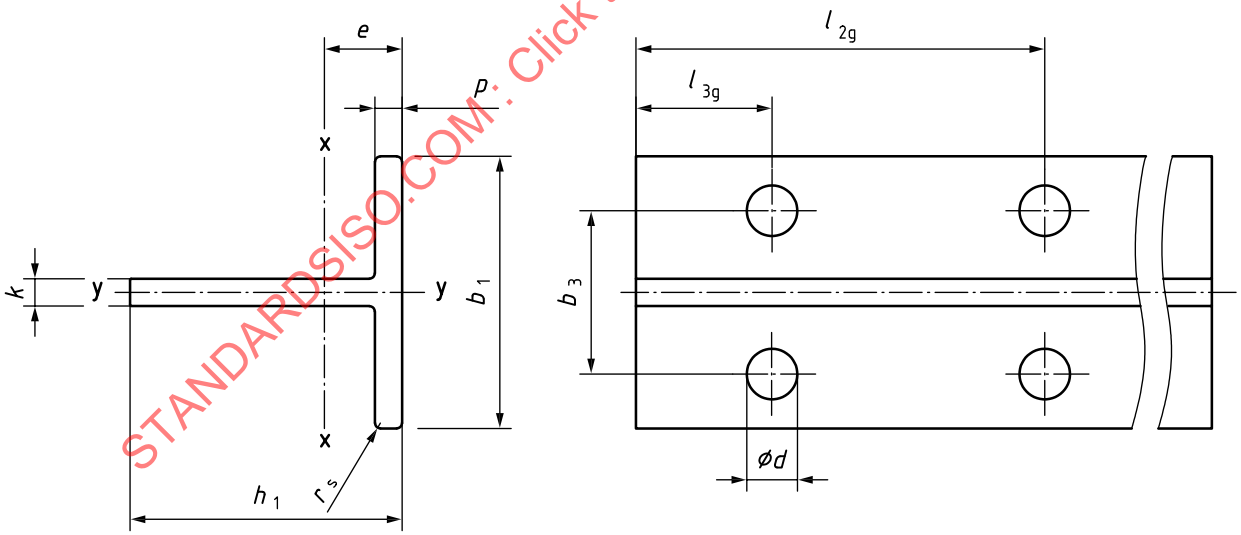


Figure 1 — Cold-drawn, parallel foot-and-blade flange guide rail

Table 3 — Technical characteristics of cold-drawn, parallel foot-and-blade flange guide rails (see Figure 1)

Designation	S	q_1	e	I_x	W_x	i_x	I_y	W_y	i_y
	cm^2	kg/m	cm	cm^4	cm^3	cm	cm^4	cm^3	cm
(T45/A)	4,25	3,34	1,31	8,08	2,53	1,38	3,84	1,71	0,95

Table 3 *(continued)*

Designation	S	q_1	e	I_x	W_x	i_x	I_y	W_y	i_y
	cm^2	kg/m	cm	cm^4	cm^3	cm	cm^4	cm^3	cm
T50/A	4,75	3,73	1,43	11,24	3,15	1,54	5,25	2,1	1,05

Table 4 — Dimensions and tolerances of cold-drawn, parallel foot-and-blade flange guide rails (see Figure 1)

Dimensions in millimetres

Designation	b_1	h_1	k	p	r_s	l_{2g}	l_{3g}	d	b_3
(T45/A)	45	45	5	5	1	65	15	9	25
T50/A	50	50	5	5	1	75	25	9	30
Tolerances	±1	±0,2	±0,15	±0,5	—	±0,2	±0,2	—	±0,2
NOTE Dimensions l_{2g}, l_{3g}, d, b_3 are identical to and have the same tolerances as fishplate dimensions l_{2f}, l_{3f}, d, b_3.									

6.2.2.3 Cold-drawn, inclined-foot flange guide rail

See Figure 2 and Tables 5 and 6.

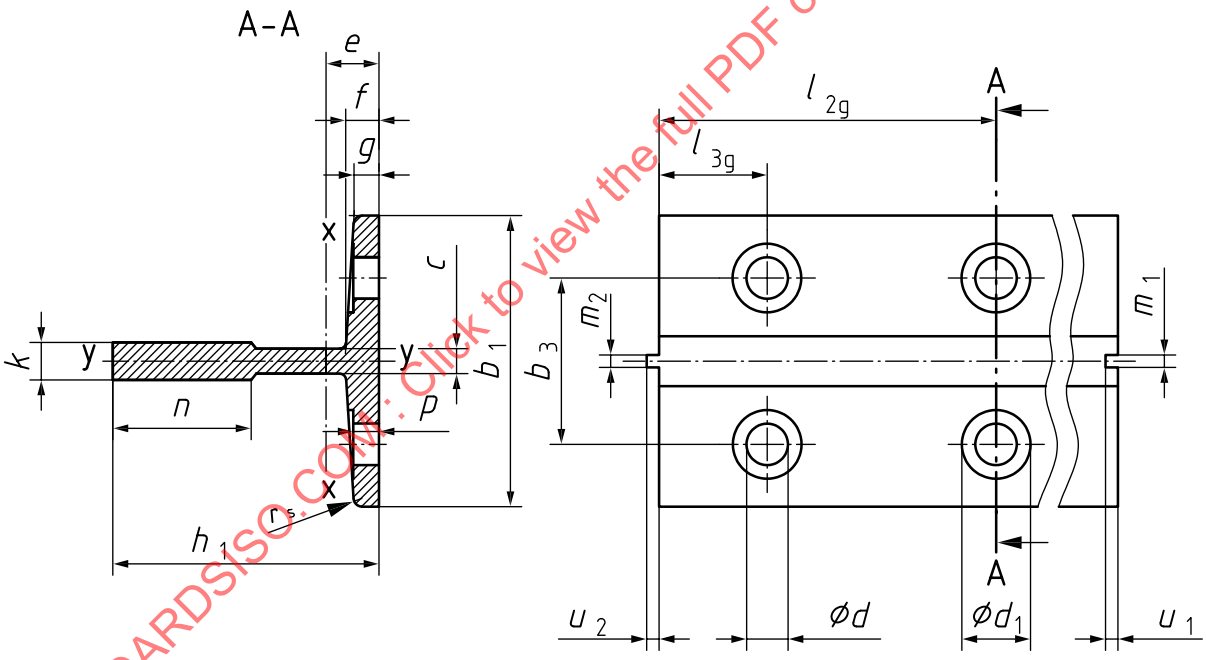


Figure 2 — Cold-drawn, inclined-foot flange guide rail

Table 5 — Technical characteristics of cold-drawn, inclined-foot flange guide rails (see Figure 2)

Designation	S	q_1	e	I_x	W_x	i_x	I_y	W_y	i_y
	cm^2	kg/m	cm	cm^4	cm^3	cm	cm^4	cm^3	cm
T70/A	9,400	7,379	2,034	40,95	9,169	2,087	18,86	5,389	1,417
(T75/A)	10,91	8,564	1,861	40,29	9,286	1,921	26,47	7,060	1,557
T82/A	10,91	8,564	1,998	49,31	10,27	2,126	30,17	7,358	1,663
(T89/A)	15,77	12,38	2,032	59,83	14,35	1,948	52,41	11,78	1,823
T90/A	17,25	13,54	2,612	102,00	20,86	2,431	52,48	11,66	1,744

Table 6 — Dimensions and tolerances of cold-drawn, inclined-foot flange guide rails (see Figure 2)

Dimensions in millimetres

Designation	b_1	h_1	k	n	c	f	g	m_1	m_2	u_1	u_2	d	d_1	$p_{min.}$	b_3	l_{2g}	l_{3g}	r_s
T70/A	70	65	9	34	6	8	6	3,00	2,97	3,50	3,00	13	26	4,70	42	105	25	1,5
(T75/A)	75	62	10	30	8	9	7	3,00	2,97	3,50	3,00	13	26	5,70	42	105	25	1,5
T82/A	82	68	9	34	7,5	8,25	6	3,00	2,97	3,50	3,00	13	26	4,70	50,8	81	27	3
(T89/A)	89	62	16	34	10	11,1	7,9	6,40	6,37	7,14	6,35	13	26	6,60	57,2	114,3	38,1	3
T90/A	90	75	16	42	10	10	8	6,40	6,37	7,14	6,35	13	26	6,70	57,2	114,3	38,1	4
Tolerances	±1,5	±0,1	$^{+0,1}_{0}$	$^{+3}_{0}$	—	±0,75	±0,75	$^{+0,06}_{0}$	$^{0}_{-0,06}$	±0,10	±0,10	—	—	—	±0,2	±0,2	±0,2	—
NOTE Dimensions l_{2g}, l_{3g}, d, b_3 are identical to and have the same tolerances as fishplate dimensions l_{2f}, l_{3f}, d, b_3.																		

6.2.2.4 Machined guide rail

See Figure 3 and Tables 7 and 8.

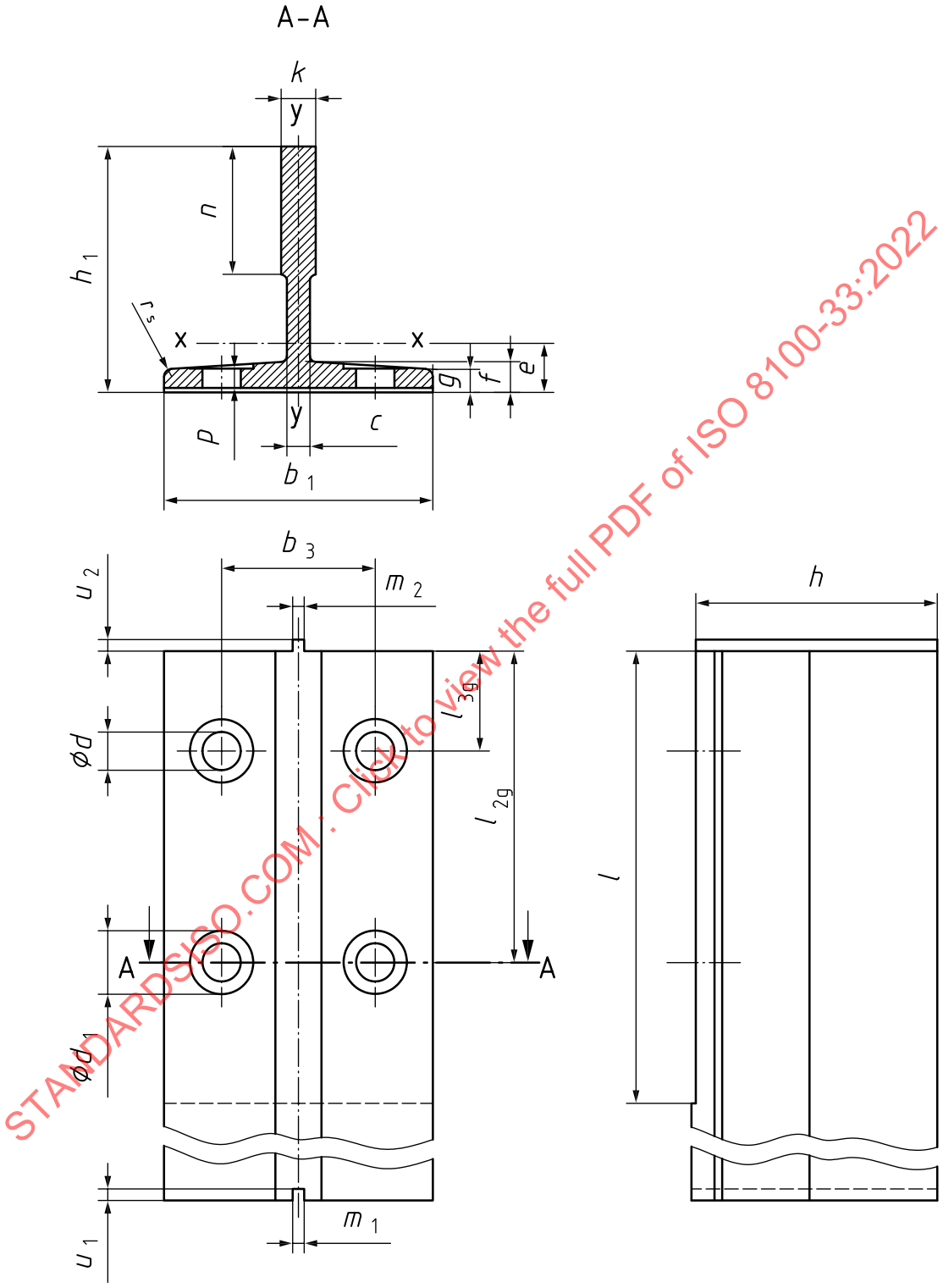


Figure 3 — Machined guide rail

Table 7 — Technical characteristics for machined guide rails (see Figure 3)

Designation	S	q_1	e	I_x	W_x	i_x	I_y	W_y	i_y
	cm^2	kg/m	cm	cm^4	cm^3	cm	cm^4	cm^3	cm
T75/B	10,91	8,564	1,861	40,29	9,286	1,921	26,47	7,060	1,557
T78/B	9,847	7,730	1,645	29,92	7,564	1,743	26,39	6,766	1,637
T89/B	15,77	12,38	2,032	59,83	14,35	1,948	52,41	11,78	1,823
T90/B	17,25	13,54	2,612	102,0	20,86	2,431	52,48	11,66	1,744
T114/B	20,89	16,40	2,865	179,3	29,70	2,930	108,6	19,05	2,280
T125/B or BE	22,82	17,91	2,430	151,0	26,16	2,572	159,1	25,46	2,641
T127–1/B or BE	22,74	17,85	2,770	187,9	30,65	2,875	149,9	23,61	2,567
T127–2/B or BE	28,72	22,55	2,478	200,17	31,17	2,640	229,9	36,20	2,829
T140–1/B or BE	35,15	27,59	3,236	403,3	53,32	3,387	309,7	44,24	2,968
T140–2/B or BE	43,21	33,92	3,484	456,7	68,01	3,251	358,2	51,18	2,879
T140–3/B or BE	57,52	45,15	4,418	947,5	114,4	4,059	466,7	66,67	2,848

NOTE Values based on nominal dimensions.

Table 8 — Dimensions and tolerances of guide rails (see Figure 3)

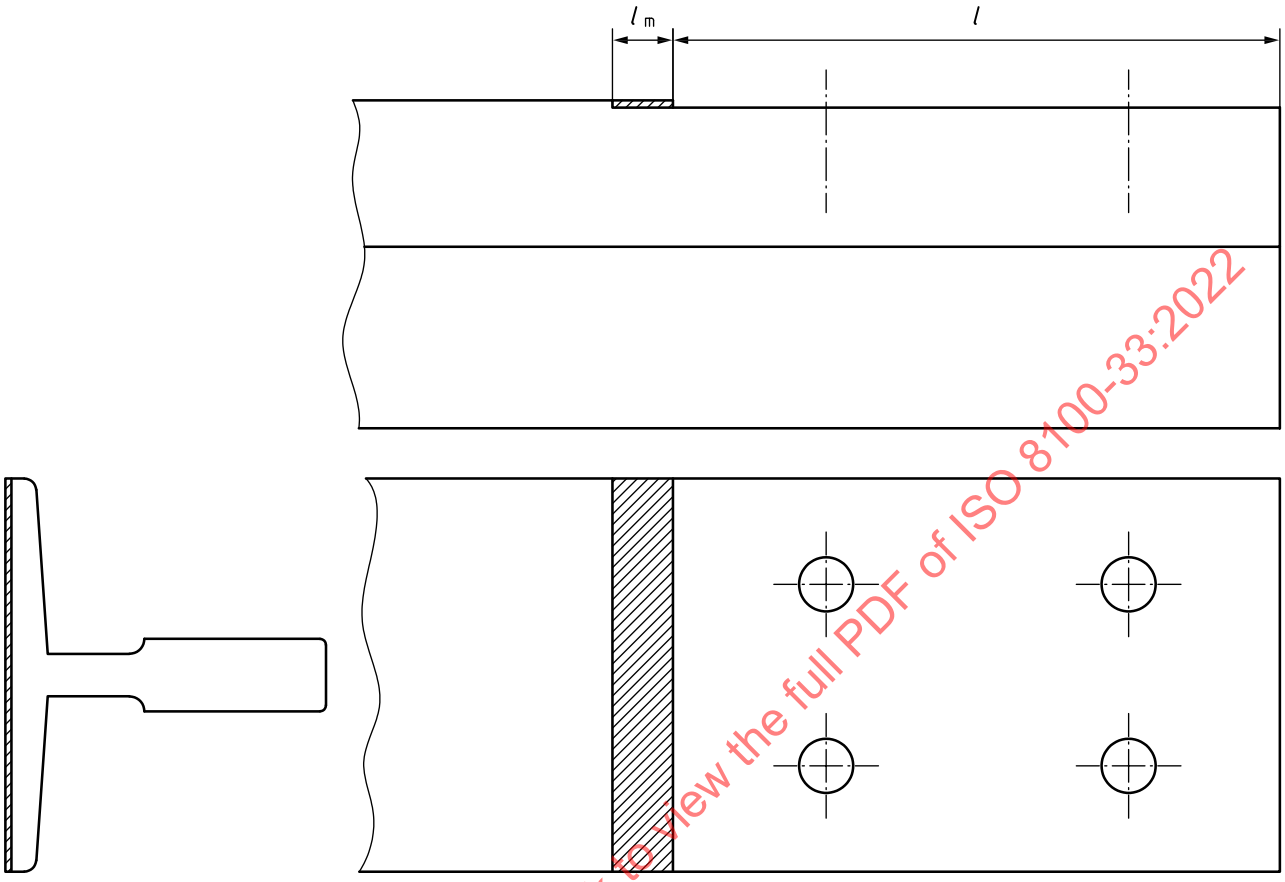
Dimensions in millimetres

Designation	b_1	h_1	k	n	c	f	g	r_s	m_1	m_2	u_1	u_2	d	d_1	p_{min}	b_3	l_{2g}	l_{3g}	l	h
T75/B	75	62	10	30	8	9	7	3	3,00	2,97	3,50	3,00	13	26	3,90	42	105	25	138	61
T78/B	78	56	10	26	7	8,5	6	2,5	3,00	2,97	3,50	3,00	13	26	2,90	42	105	25	138	55
T89/B	89	62	16	34	10	11,1	7,9	3	6,40	6,37	7,14	6,35	13	26	4,80	57,2	114,3	38,1	156	61
T90/B	90	75	16	42	10	10	8	4	6,40	6,37	7,14	6,35	13	26	4,90	57,2	114,3	38,1	156	74
T114/B	114	89	16	38	9,5	11	8	4	6,40	6,37	7,14	6,35	17	33	4,90	70	114,3	38,1	156	88
T125/B or BE	125	82	16	42	10	12	9	4	6,40	6,37	7,14	6,35	17	33	5,90	79,4	114,3	38,1	156	81
T127–1/B or BE	127	89	16	45	10	11	8	4	6,40	6,37	7,14	6,35	17	33	4,90	79,4	114,3	38,1	156	88
T127–2/B or BE	127	89	16	51	10	15,9	12,7	5	6,40	6,37	7,14	6,35	17	33	9,60	79,4	114,3	38,1	156	88
T140–1/B or BE	140	108	19	51	12,7	15,9	12,7	5	6,40	6,37	7,14	6,35	21	40	9,60	92,1	152,4	31,8	193	107
T140–2/B or BE	140	102	28,6	51	17,5	17,5	14,5	5	6,40	6,37	7,14	6,35	21	40	11,40	92,1	152,4	31,8	193	101
T140–3/B or BE	140	127	31,75	57	19	25,4	17,5	5	6,40	6,37	7,14	6,35	21	40	14,40	92,1	152,4	31,8	193	126
Tolerances Class: /B	±1,5	±0,75	+0,1 0	+3 0	—	±0,75	±0,75	—	+0,06 0	0 −0,06	±0,10	±0,10	—	—	—	±0,2	±0,2	±0,2	+3 0	±0,1
Tolerances Class: /BE	±1,5	±0,75	+0,05 0	+3 0	—	±0,75	±0,75	—	+0,03 0	0 −0,03	±0,10	±0,10	—	—	—	±0,2	±0,2	±0,2	+3 0	+ 0,05

NOTE Dimensions l_{2g}, l_{3g}, d, b_3 are identical to and have the same tolerances as fishplate dimensions l_{2f}, l_{3f}, d, b_3.

6.2.3 Machined surface for the location of the fishplate (for machined guide rails)

See Figure 4.



The junction between the machined surface for the location of the fishplate and the unmachined rear surface of the foot is located in the volume defined by the hachured zone.

l see Table 8

l_m = 40 mm

Figure 4 — Machined surface for the location of the fishplate

6.2.4 Blade shape

The blade shall be chamfered or rounded, taking into account the following values:

— length of the chamfer side: 1 mm maximum, or

— radius: 1 mm maximum.

6.2.5 Surface finish

6.2.5.1 General

Guide rails shall have the surface finish in accordance with the roughness parameters specified in ISO 1302.

6.2.5.2 Guide rail blade roughness

See Table 9.

Table 9 — Guide rail blade roughness

Guide rail class	Blade roughness	
	Direction	
	Longitudinal	Transverse
/A	1,6 µm ≤ *Ra* ≤ 6,3 µm	1,6 µm ≤ *Ra* ≤ 6,3 µm
/B	*Ra* ≤1,6 µm	0,8 µm ≤ *Ra* ≤ 3,2 µm
/BE	*Ra* ≤ 1,6 µm	0,8 µm ≤ *Ra* ≤ 3,2 µm

6.2.5.3 Foot rear surface of machined guide rails

Maximum roughness of the surface for the location of the fishplate *Ra* = 25 µm.

6.2.6 Machined edges

All machined edges shall be trimmed to avoid sharp edges.

6.2.7 Holes in guide rails

The holes shall be such that their machining leads to neither cracking nor deformation in the guide rail.

6.2.8 Geometrical tolerances

See Table 10 and Figure 5.

Main principle: For the guide rails, the essential geometrical tolerances concern the blade of the guide rail. For the top of the blade, the geometrical tolerances of position t_2 define the tolerance zone within which the surface of the top of the blade is contained relative to the common plane, C-D. The principle is similar for the sides of the blade, with the symmetry t_2 relative to the common median plane, A-B.

The highest value of t_2 versus t_3/1 000 allows a guide rail with a long-wave deformation, but the value of t_3/1 000 limits the amplitude and the length of the short waves.

Table 10 — Geometrical tolerances for a guide rail with a length (l_g) of 5 000 mm

Symbols [a]	Tolerances [b]				Unit	Dimensions concerned
	Guide rail class					
	/A		/B	/BE		
	Parallel foot	Inclined foot				
t_1	0,2	0,2	0,1	0,05	mm	Blade and surface for fishplate flatness at the guide rail ends
t_2	7	7	5	2	mm	Blade position and symmetry
t_3/1 000	0,7	0,7	0,5	0,2	mm/mm	Blade flatness
t_4	—	0,2	0,1	0,05	mm	Key and keyway symmetry
t_5	+0,06 0	+0,06 0	+0,06 0	+0,03 0	mm	Keyway width: m_1

[a] See Figure 5.

[b] These tolerances are applicable for guide rails of length 2,5 m to 5 m.

[c] For *c* values, see Tables 6 and 8.

Table 10 *(continued)*

Symbols [a]	Tolerances [b]				Unit	Dimensions concerned
	Guide rail class					
	/A		/B	/BE		
	Parallel foot	Inclined foot				
t_6	$^{0}_{-0,06}$	$^{0}_{-0,06}$	$^{0}_{-0,06}$	$^{0}_{-0,03}$	mm	Key width: m_2
t_7	±0,15	$^{+0,1}_{0}$	$^{+0,1}_{0}$	$^{+0,05}_{0}$	mm	Blade width: k
t_8	0,4	0,4	0,2	0,1	mm	Surface for fishplate perpendicularity
t_9	±0,2	±0,1	±0,1	±0,05	mm	Guide rail height: h_1 for /A class, h for /B or /BE class
t_{10}	0,4	0,4	0,2	0,1	mm	Keyway and key perpendicularity
t_{11}	1	1	0,5	0,5	mm	Hole axis symmetry
t_{12}	±0,2	±0,2	±0,2	±0,2	mm	Distance between the axes of the holes: b_3
t_{13}	—	0,16 c	0,16 c	0,16 c	mm	Width of the connecting part of the foot to the blade symmetry [c]
t_{14}	—	±0,1	±0,1	±0,1	mm	Key length and keyway depth: u_1, u_2
t_{15}	±0,2	±0,2	±0,2	±0,2	mm	Distances from holes to the ends of the guide rail: l_{2g}, l_{3g}
t_{16}	±1	±1,5	±1,5	±1,5	mm	Guide rail width: b_1
t_{17}	2	3	3	3	mm	Foot symmetry: b_1
t_{18}	—	0,2	0,1	0,05	mm	Side and top blade perpendicularity
t_{19}	0,3	0,3	0,2	0,1	mm	Parallelism between the top of the blade and the surface in contact with the fishplate

[a] See Figure 5.

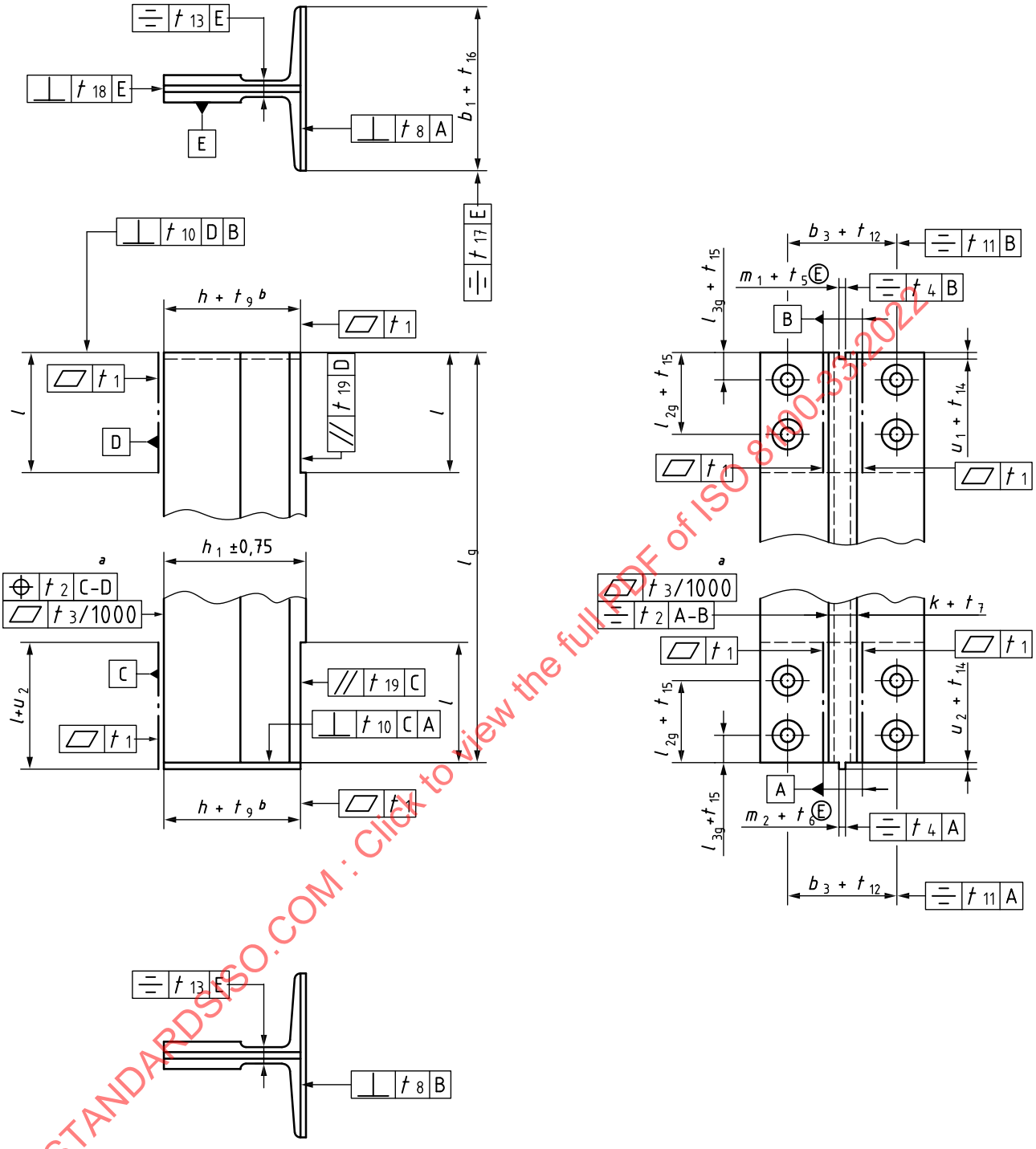
[b] These tolerances are applicable for guide rails of length 2,5 m to 5 m.

[c] For c values, see Tables 6 and 8.

Location of the measurements, the sampling plan, and measuring tools are not defined in this document.

The measurements should be made with the guide rails horizontally supported by a plane or enough supporting points, or vertically suspended, to eliminate the deformations due to gravity.

These measurements may be done at the guide rail manufacturing site (in order to build reference measurements data and, if required, allow traceability), at the lift manufacturer's site, at a measurement laboratory site, or at the final installation site (before installation, and free of mechanical constraints), as the target is to supply guide rails with the required geometrical dimensions to the final users. With suitable packaging, and transportation with care, the guide rail characteristics are identical before and after transportation.



a. On $l_g - 2l$.

b. For ends only.

Figure 5 — Geometrical tolerances for a guide rail with a length (l_g) of 5 000 mm

6.3 Marking for /BE class

To avoid confusing /A, /B and /BE classes, the /BE class guide rails shall be marked with BE at least twice per bar near the end, on the back side or the front side of the foot. For the /A or /B class guide rails, marking is not required.