

INTERNATIONAL STANDARD

ISO
7465

Second edition
1997-09-15

Passenger lifts and service lifts — Guide rails for lifts and counterweights — T-type

*Ascenseurs et monte-charge — Guides de cabine et de contrepoids —
Profils en T*



Reference number
ISO 7465:1997(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7465 was prepared by Technical Committee ISO/TC 178, *Lifts, escalators, passenger conveyors*.

This second edition cancels and replaces the first edition (ISO 7465:1983), which has been technically revised.

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X.400 c=ch; a=400net; p=iso; o=isocs; s=central

Printed in Switzerland

Passenger lifts and service lifts — Guide rails for lifts and counterweights — T-type

1 Scope

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

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

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

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

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 468:1982, *Surface roughness — Parameters, their values and general rules for specifying requirements*.

ISO 630:1995, *Structural steels — Plates, wide flats, bars, sections and profiles*.

ISO 1302:1992, *Technical drawings — Method of indicating surface texture on drawings*.

3 Definitions

For the purposes of this International Standard, the following definitions apply:

3.1 guide rails: Components which provide guiding for the car or the counterweight, if there is one.

3.2 fishplate: Piece of steel used to connect the guides.

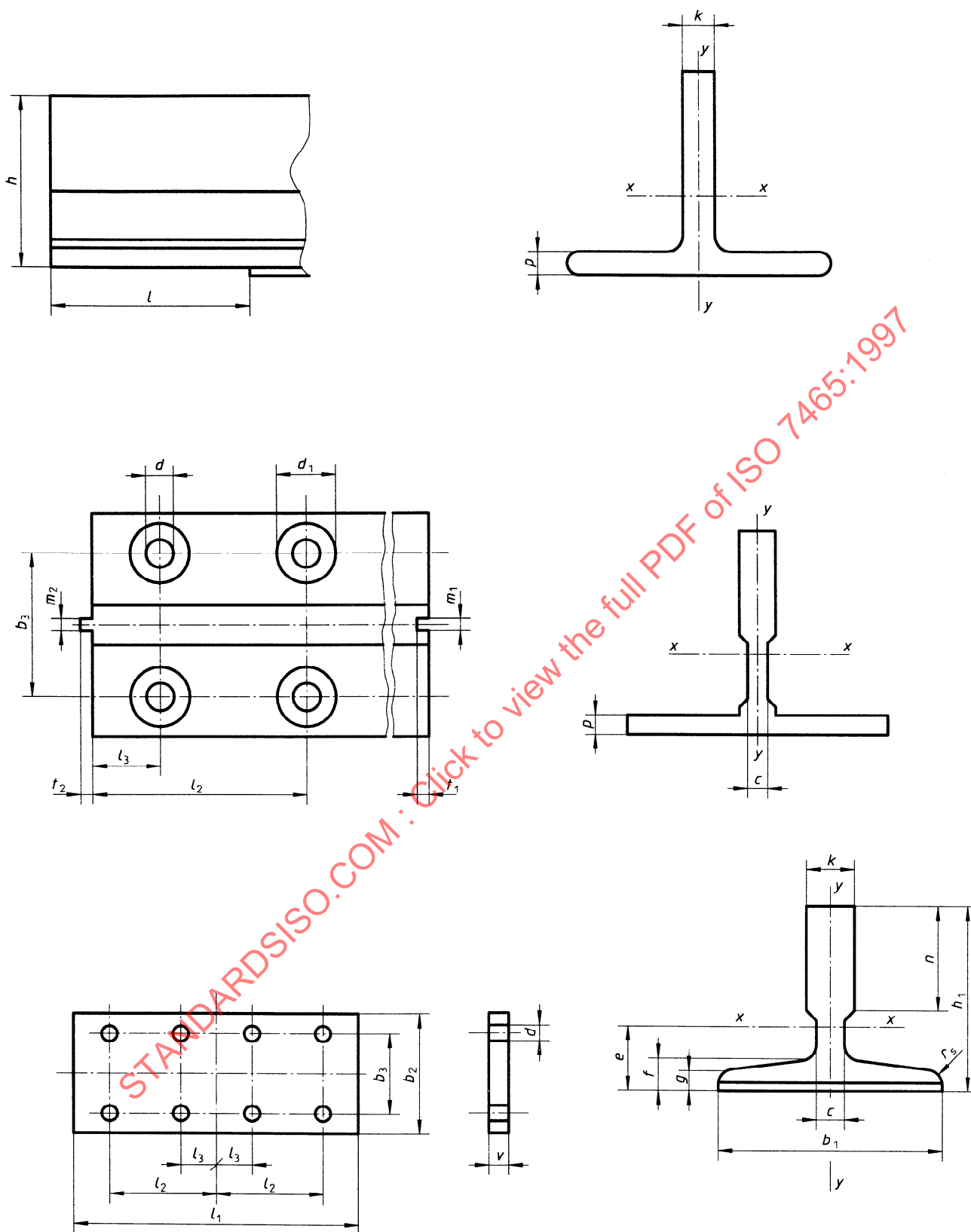
4 Symbols and units (see also figure 1)

The following symbols and corresponding units of measurement are used in this International Standard.

Symbols	Dimension	Units
b_1	Guide width	mm
b_2	Fishplate width	mm
b_3	Distance between the axes of the holes (in the transverse direction of the guide)	mm
c	Width of the part that connects the foot to the blade	mm
d	Hole diameter	mm
d_1	Countersinking diameter	mm
e	Distance from the rear surface to the centre of gravity	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 height	mm
I_{xx}	Moment of inertia of the cross-sectional area of the guide related to the x-x axis	cm ⁴
I_{yy}	Moment of inertia of the cross-sectional area of the guide related to the y-y axis	cm ⁴
i_{xx}	Radius of gyration corresponding to the x-x axis	cm
i_{yy}	Radius of gyration corresponding to the y-y axis	cm
k	Blade width	mm
l	Machined surface length for the location of the fishplate	mm
l_1	Fishplate length	mm
l_2	Distance, in the guide longitudinal direction, between the axis of the holes farthest from the end of the guide and this end; and distance, in the fishplate longitudinal direction, between the axis of the holes farthest from the transverse axis of the fishplate and this axis	mm
l_3	Distance, in the guide longitudinal direction, between the axis of the holes nearest to the end of the guide and this end; and distance, in the fishplate longitudinal direction, between the axis of the holes nearest to the transverse axis of the fishplate and this axis	mm
l_x, l_y	Machining sub-length for the location of the fishplate	mm
m_1	Width of the keyway for the junction of the guides	mm
m_2	Width of the key for the junction of the guides	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
q_2	Mass of a finished fishplate	kg
Ra	Roughness (see ISO 468)	m
r_s	Foot radius	mm
S	Cross-sectional area of the guide	cm ²
t_1	Depth of the keyway for the junction of the guides	mm
t_2	Length of the key for the junction of the guides	mm
v	Fishplate thickness (when machined)	mm
v_{basic}	Fishplate thickness (when not machined)	mm
W_{xx}	Cross-sectional area modulus related to the x-x axis	cm ³
W_{yy}	Cross-sectional area modulus related to the y-y axis	cm ³

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NOTE — For cold-drawn guides, the dimension h is identical to the dimension h_1 .

Figure 1 — Dimension symbols

5 Manufacture and materials

5.1 Guide rails

Guide rails may be cold-drawn or machined. In this International Standard, the manufacturing process for each type of guide is indicated by the letter A for cold-drawn and B for machined.

The strength of the steel raw material used shall be at least 370 N/mm² and not more than 520 N/mm². For this purpose, it is recommended to use steel grade Fe 360 B for cold-drawn guides and steel grade Fe 430 B for machined guides, in accordance with ISO 630.

5.2 Fishplate

The steel grade shall be the same as for the guide rails (see 5.1).

6 Dimensional characteristics and tolerances

6.1 Guide rails

6.1.1 Dimensions

See tables 1 and 2.

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

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

6.1.2 Machined surface for the location of the fishplate

Depending on the machining method, three cases can occur.

6.1.2.1 Case 1 — Cross horizontal milling

See figure 2.

$$l = \left(\frac{l_1}{2} + 3 \right) {}^{+3}_0 \text{ mm (no sub-length)}$$

6.1.2.2 Case 2 — Vertical milling

See figure 2.

$$l = \left(\frac{l_1}{2} + 3 \right) {}^{+3}_0 \text{ mm (sub-length: } l_y = 10 \text{ mm max.)}$$

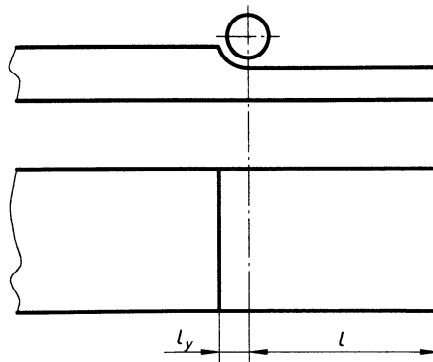


Figure 2 — Machined surface — Cases 1 and 2

6.1.2.3 Case 3 — Longitudinal horizontal milling

See figure 3. The machining sub-length is given in table 3.

$$l = \left(\frac{l_1}{2} + 3 \right) {}^{+3}_0 \text{ mm}$$

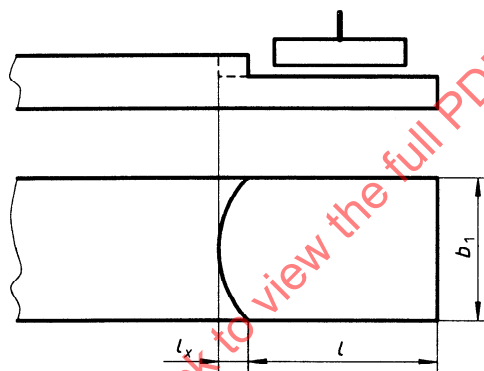


Figure 3 — Machined surface — Case 3

Table 1 — Technical characteristics of guide rails

Designation ¹⁾	S cm ²	q ₁ kg/m	e cm	I _{xx} cm ⁴	W _{xx} cm ³	i _{xx} cm	I _{yy} cm ⁴	W _{yy} cm ³	i _{yy} cm
T 45/A	4,25	3,34	1,31	8,08	2,53	1,38	3,84	1,71	0,95
T 50/A	4,75	3,73	1,43	11,24	3,15	1,54	5,25	2,10	1,05
T 70-1/A	9,51	7,47	2,04	41,3	9,24	2,09	18,65	5,35	1,40
T 70-2/A	10,52	8,26	2,02	47,43	9,63	2,12	23,13	6,61	1,48
T 75-1/A	7,98	6,26	1,76	24,60	6,58	1,76	15,60	4,17	1,40
T 75-2/A	10,12	7,95	1,81	37,32	8,49	1,92	26,12	6,97	1,61
T 75-3/A-B	10,99	8,63	1,86	40,35	9,29	1,92	26,49	7,06	1,55
T 82/A-B	10,9	8,55	1,98	49,4	10,20	2,13	30,50	7,40	1,67
T 89/A-B	15,70	12,30	2,02	59,52	14,25	1,95	52,4	11,8	1,83
T 90/A-B	17,25	13,55	2,61	102,0	20,87	2,43	52,6	11,8	1,75
T 125/A-B	22,83	17,90	2,43	151,0	26,20	2,57	159	25,4	2,64
T 127-1/B	22,64	17,77	2,75	186,2	30,4	2,87	148	23,4	2,56
T 127-2/A-B	28,63	22,48	2,47	198,4	30,9	2,63	230	36,2	2,83
T 140-1/B	35,20	27,60	3,24	404	53,4	3,39	310	44,3	2,97
T 140-2/B	43,22	33,92	3,47	457	68,0	3,25	358	51,2	2,88
T 140-3/B	58,57	46,0	4,38	953	114,6	4,03	486	69,4	2,88

1) A = Cold-drawn
B = Machined

Table 2 — Dimensions of guide rails

Dimensions in millimetres

Designation ¹⁾	b_1	h_1	h	k	n	c	g	f	P	r_s	m_1	m_2	t_1	t_2
Tolerances														
	±0,5	±0,2		±0,15					±0,5					
T 45/A	45	45		5		2)			5	1				
T 50/A	50	50		5		2)			5	1				
Tolerances														
	±1,5	A:±0,10 B:±0,75	±0,1	+0,1 0	+3 0		±0,75		±0,75		+0,06 0	0 -0,06	±0,10	±0,10
T 70-1/A	70	65		9	34	6	6	8		1,5	3	2,95	3,50	3
A	70	65		9	34	6	-	-	7	1,5	3	2,95	3,50	3
T 70-2/A	70	70		8	62	8			8	1,5	3	2,95	3,50	3
T 75-1/A	75	55		9	30	7,5	4	5,8		3	3	2,95	3,50	3
/A	75	55		9	30	7,5			4,9	1,5	3	2,95	3,50	3
T 75-2/A	75	62		9	30	7	7	9		3	3	2,95	3,50	3
/A	75	62		9	30	7			8	1,5	3	2,95	3,50	3
T 75-3/A	75	62		10	30	8	7	9		3	3	2,95	3,50	3
/A	75	62		10	30	8			7,5	1,5	3	2,95	3,50	3
/B	75	62	61	10	30	8	7	9		3	3	2,95	3,50	3
T 82/A	82,5	68,25		9	25,4	7,5	6	8,25		3	3	2,95	3,50	3
/A	82,5	68,25		9	25,4	7,5			7	3	3	2,95	3,50	3
/B	82,5	68,25	66,6	9	25,4	7,5	6	8,25		3	3	2,95	3,50	3
T 89/A	89	62		15,88	33,4	10	7,9	11,1		3	6,40	6,37	7,14	6,35
/A	89	62		15,88	33,4	10			9	3	6,40	6,37	7,14	6,35
/B	89	62	61	15,88	33,4	10	7,9	11,1		3	6,40	6,37	7,14	6,35
T 90/A	90	75		16	42	10	8	10		4	6,40	6,37	7,14	6,35
/A	90	75		16	42	10			9	4	6,40	6,37	7,14	6,35
/B	90	75	74	16	42	10	8	10		4	6,40	6,37	7,14	6,35
T 125/A	125	82		16	42	10	9	12		4	6,40	6,37	7,14	6,35
/A	125	82		16	42	10			10,5	4	6,40	6,37	7,14	6,35
/B	125	82	81	16	42	10	9	12		4	6,40	6,37	7,14	6,35
T 127-1/B	127	88,9	88	15,88	44,5	10	7,9	11,1		4	6,40	6,37	7,14	6,35
T 127-2/A	127	88,9		15,88	50,8	10	12,7	15,9		5	6,40	6,37	7,14	6,35
/A	127	88,9		15,88	50,8	10			14	5	6,40	6,37	7,14	6,35
/B	127	88,9	88	15,88	50,8	10	12,7	15,9		5	6,40	6,37	7,14	6,35
T 140-1/B	140	108	107	19,0	50,8	12,7	12,7	15,9		5	6,40	6,37	7,14	6,35
T 140-2/B	140	102	101	28,6	50,8	17,5	14,5	17,5		5	6,40	6,37	7,14	6,35
T 140-3/B	140	127	126	31,75	57,2	19	17,5	25,4		5	6,40	6,37	7,14	6,35
¹⁾ A = Cold-drawn B = Machined ²⁾ See figure 1 (top right); in this case $c = k$.														

Table 3 — Machining sub-length l_x
Dimensions in millimetres

b_1	$l_{x \max}$
70	10
75	10
82	12
89	14
90	14
125	30
127	32
140	40

6.1.3 Blade shape

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

- length of the chamfer side: 1 mm max.
- radius: 1 mm max.

6.1.4 Surface finish

Guide rails shall have the following surface finishes, as specified in ISO 468 and in accordance with the roughness grades specified in ISO 1302.

6.1.4.1 Guide rail blade

a) In the longitudinal direction:

- machined guide rails: roughness N7, i.e. $Ra \leq 1,6 \mu\text{m}$
- cold-drawn guide rails: roughness between N7 and N9, i.e. $1,6 \mu\text{m} \leq Ra \leq 6,3 \mu\text{m}$

b) In the transverse direction:

- machined and cold-drawn guide rails: roughness between N7 and N9, i.e. $1,6 \mu\text{m} \leq Ra \leq 6,3 \mu\text{m}$

6.1.4.2 Foot rear surface of machined guide rails

- roughness N9, i.e. $Ra = 6,3 \mu\text{m}$

6.1.5 Straightness and twisting

6.1.5.1 Straightness (see figure 4)

The ratio B/A shall not be greater than the values given in table 4, where:

- A is the shortest length between the reference point and the measuring point;
- B is the maximum distance between the measuring point and the reference plane;
- a is the shortest length inspected, at least equal to 1 m.

The inspection shall be carried out at the works where the finished guide rails are made. If the measurement is made in a non-vertical position, the natural deflection due to the mass of the guide and to the location of the supports shall be disregarded for the values indicated.

NOTE — It is recommended to check that the guide rail has no repetitive wave effect. For this purpose, B can be measured on a fixed length a moving along the whole length of the bar.

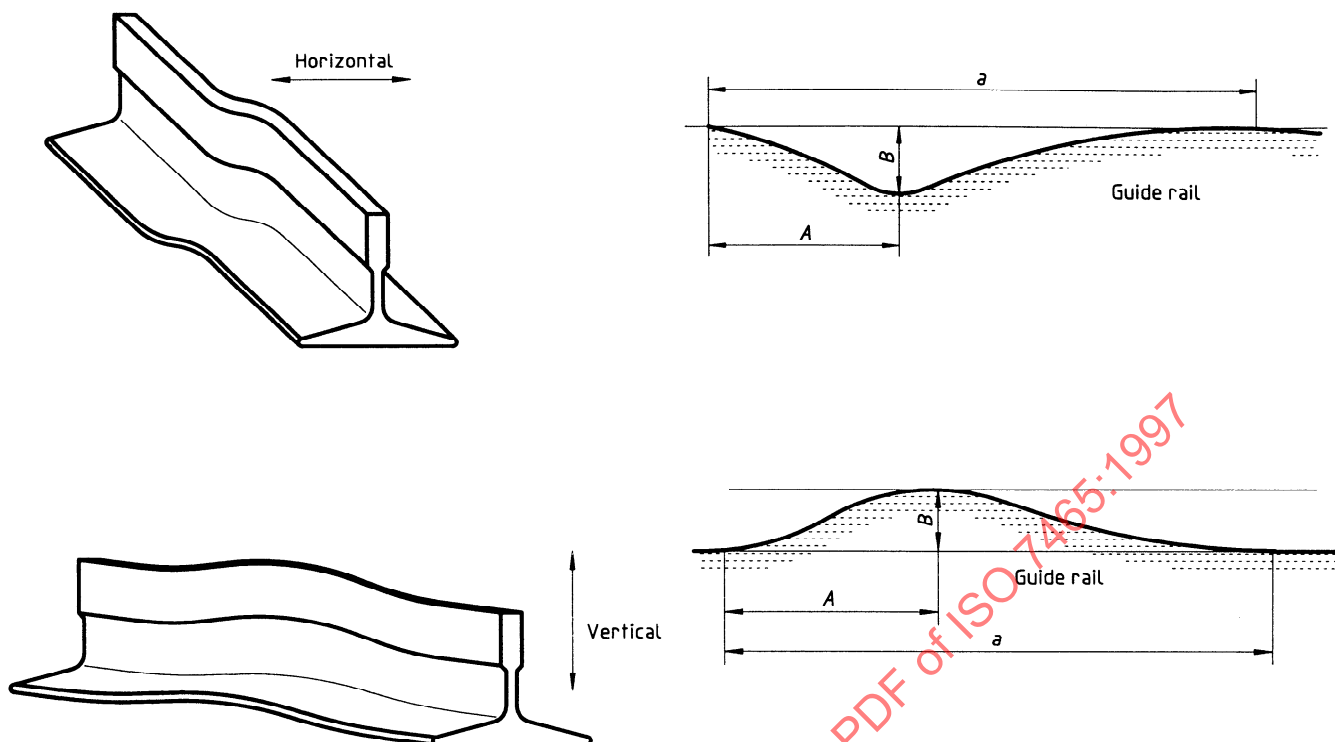


Figure 4 — Straightness

Table 4 — Ratio B/A

Guide type		B/A max.
Cold-drawn	45 × 45	0,001 6
	50 × 50	
	Others	0,001 4
Machined		0,001 0

6.1.5.2 Twisting

The twisting angle γ , measured on a guide rail length of at least 1 m, shall not be greater than the values given in table 5 (see also figure 5).

The inspection shall be carried out at the works where the finished guide rails are made. The measurement may be made with the guide rail vertical or horizontal.

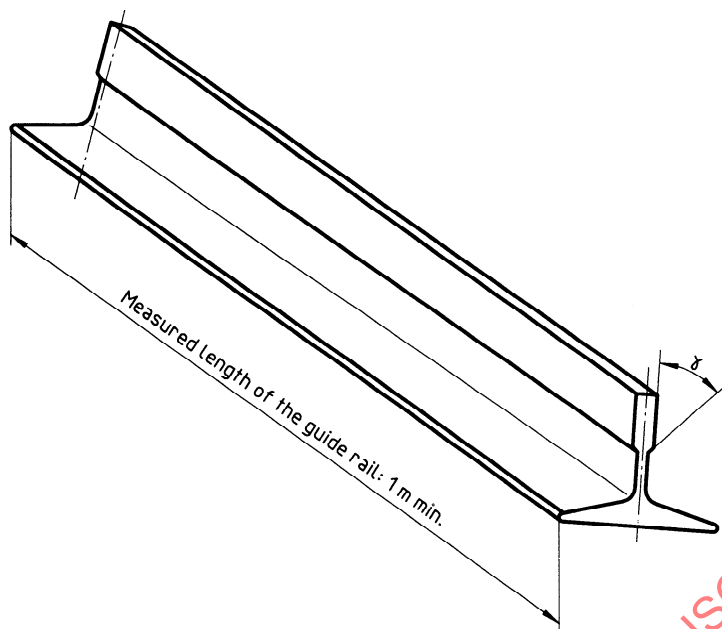


Figure 5 — Twisting

Table 5 — Twisting angle

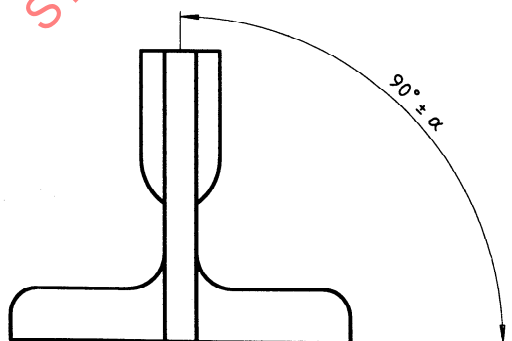
Guide rail type		γ
Cold-drawn	45 × 45	50'/m
	50 × 50	
	Others	40'/m ^{*)}
Machined		30'/m

^{*)} A twisting angle γ of 30' per metre can be demanded for cold-drawn guides by special agreement between the manufacturer and the customer.

6.1.6 Perpendicularity

6.1.6.1 Angle of the fishplate location surface with the key/keyway

See figure 6.



Non-machined fishplate location surface: $\alpha = 10'$

Machined fishplate location surface: $\alpha = 5'$

Figure 6 — Angle with key/keyway

6.1.6.2 Angle of fishplate location surface and the front surface

See figure 7.

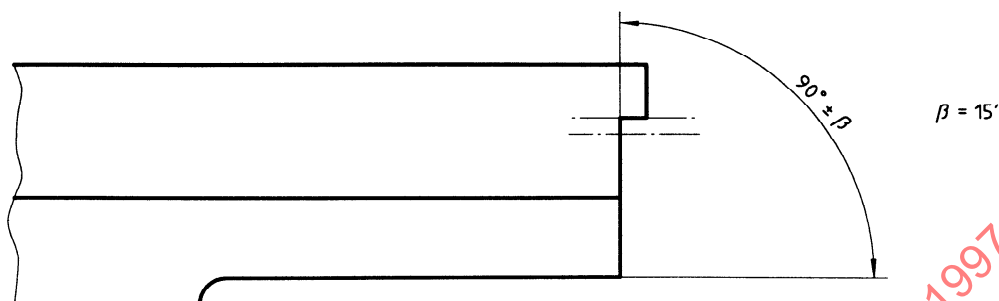


Figure 7 — Angle with front surface

6.1.7 Parallelism

The tolerance of parallelism between the blade upper surface (*B*) and the fishplate location surface shall be 0,2 mm (see figure 8).

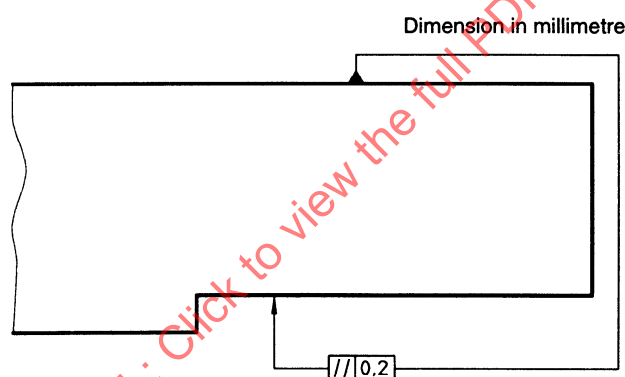


Figure 8 — Parallelism

6.1.8 Keys and keyways

Guide rails are generally joined by means of keys and keyways but other means of assembly can be used by specific agreement between the manufacturer and the customer.

The keys and keyways axis shall be contained between two parallel planes 0,2 mm apart and placed symmetrically with respect to the plane of symmetry (*y-y*) of the guide rail, as shown in figure 10.

6.1.9 Holes in guide rails

The holes shall be such that their machining will cause no crack or deformation in the guide rail.

6.2 Fishplate

6.2.1 Dimensions

See table 6.

6.2.2 Surface finish

The flatness tolerance of one side of the fishplate shall be 0,2 mm (see figure 9).

Dimensions in millimetres

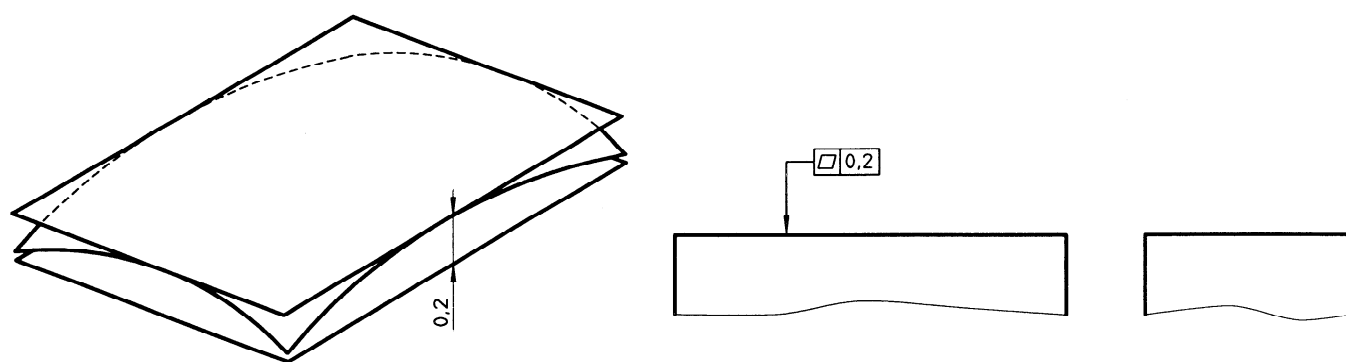


Figure 9 — Surface finish

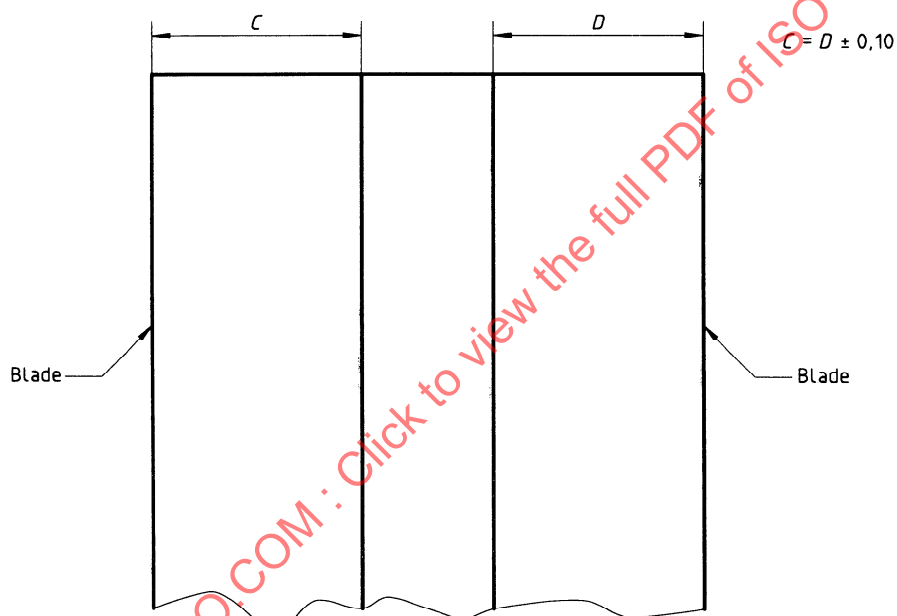


Figure 10 — Maximum out-of-centre of keys and keyways

6.2.3 Holes

The holes shall be such that their machining will cause no crack or deformation in the fishplate.

7 Designation

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

- | | |
|--------------|---|
| 1st element: | Reference to this International Standard, i.e. ISO 7465 |
| 2nd element: | Guide 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	89
50	90
70-1	125
70-2	127-1
75-1	127-2
75-2	
75-3	
82	

4th element:

Manufacturing process:

cold-drawn A
machined B

EXAMPLE

Lift guide rail ISO 7465-T 127-1/B

Table 6 — Dimensions of holes and fishplates

Designation ¹⁾	d mm	$d_1^{2)}$ mm	l mm	b_2 mm	b_3 mm	l_1 mm	l_2 mm	l_3 mm	v mm	v_{basic} mm	q_2 kg
Tolerances											
					±0,3	±1,5	±0,2	±0,2			
T 45/A	9			50	25	160	65	15	8	8	0,50
T 50/A	9			50	30	200	75	25	8	8	0,60
Tolerances											
			+3 0		±0,2	±1,5	±0,2	±0,2	+2 0		
T 70-1/A	13	26		70	42	250	105	25	8,5	10	1,10
T 70-2/A	13			70	42	250	105	25	8,5	10	1,10
T 75-1/A	13	26		70	43	240	90	30	8,5	10	1,05
T 75-2/A	13	26		70	43	240	90	30	8,5	10	1,05
T 75-3/A	13	26		75	43	240	90	30	8,5	10	1,05
/B	13	26	123	75	43	240	90	30	8,5	10	1,05
T 82/A	13	26		80	50,8	216	81	27	8,5	10	1,10
/B	13	26	111	80	50,8	216	81	27	8,5	10	1,10
T 89/A	13	26		90	57,2	305	114,3	38,1	13	15	2,70
/B	13	26	156	90	57,2	305	114,3	38,1	13	15	2,70
T 90/A	13	26		90	57,2	305	114,3	38,1	13	15	2,70
/B	13	26	156	90	57,2	305	114,3	38,1	13	15	2,70
T 125/A	17	33		130	79,4	305	114,3	38,1	17	20	5,00
/B	17	33	156	130	79,4	305	114,3	38,1	17	20	5,00
T 127-1/B	17	33	156	130	79,4	305	114,3	38,1	17	20	5,00
T 127-2/A	17	33		130	79,4	305	114,3	38,1	17	20	5,00
/B	17	33	156	130	79,4	305	114,3	38,1	17	20	5,00
T 140-1/B	21	40	193	140	92,1	380	152,4	31,8	25	28	11,0
T 140-2/B	21	40	193	140	92,1	380	152,4	31,8	25	28	11,0
T 140-3/B	21	40	193	140	92,1	380	152,4	31,8	30	32	13,2

1) A = Cold-drawn

B = Machined

2) Dimension d applies only with countersinking; countersinking is optional and is subject to agreement between the manufacturer and the customer.

8 High-quality types "E"

8.1 Application

Applies to the following types:

T125/BE
T127-1/BE
T127-2/BE
T140-1/BE
T140-2/BE
T140-3/BE

8.2 Reduced tolerances

See table 7.

Table 7 — Reduced and normal tolerances

Parameter ¹⁾	Reduced tolerances	Normal tolerances
Dimension h	$\pm 0,05$	$\pm 0,1$
Dimension k	$+0,05$ 0	$+0,1$ 0
Dimension m_1	$+0,03$ 0	$+0,06$ 0
Dimension m_2	0 $-0,03$	0 $-0,06$
Ratio B/A	0,000 4	0,001 0
Angle γ	15'/m	30'/m
1) See table 2.		

See 6.1.4:

Surface finishes Transverse $1,6 \mu\text{m} \leq Ra \leq 3,2 \mu\text{m}$
(normal $1,6 \mu\text{m} \leq Ra \leq 6,3 \mu\text{m}$)

See 6.1.7 and figure 8:

Parallelism //0,1 (normal //0,2)

See 6.1.8:

Keys and keyways $C = D \pm 0,05$ (normal : $C = D \pm 0,10$)

8.3 Identification of BE class

To avoid mixing of A/B and BE classes, the BE class guide rails shall be marked "BE" on the back-side at least twice per bar.

Markings shall have a minimum height of 30 mm.