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

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



Reference number  
ISO 7465:2007(E)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 7465 was prepared by Technical Committee ISO/TC 178, *Lifts, escalators and moving walks*.

This fourth edition cancels and replaces the third edition (ISO 7465:2001), which has been technically revised.

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

## 1 Scope

This International Standard 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 International Standard defines a designation system for guide rails.

This International Standard 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 referenced documents are indispensable for the application 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.

### 3.1

#### **guide rails**

components that provide 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 used in this International Standard**

| Symbol    | Dimension                                                                                                                                         | Unit            |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| $b_1$     | Guide rail width                                                                                                                                  | mm              |
| $b_2$     | Fishplate width                                                                                                                                   | mm              |
| $b_3$     | 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              |
| $I_{x-x}$ | Moment of inertia of the cross-sectional area of the guide rail related to the x-x axis                                                           | cm <sup>4</sup> |
| $I_{y-y}$ | Moment of inertia of the cross-sectional area of the guide rail related to the y-y axis                                                           | cm <sup>4</sup> |
| $i_{x-x}$ | Radius of gyration corresponding to the x-x axis                                                                                                  | cm              |
| $i_{y-y}$ | 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              |
| $l_{2g}$  | 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            |

Table 1 (continued)

| Symbol    | Dimension                                                | Unit          |
|-----------|----------------------------------------------------------|---------------|
| $Ra$      | Surface roughness (see ISO 1302)                         | $\mu\text{m}$ |
| $r_s$     | Foot radius                                              | mm            |
| $S$       | Cross-sectional area of the guide rail                   | $\text{cm}^2$ |
| $t_n$     | $t_1$ 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            |
| $W_{x-x}$ | Cross-sectional area modulus related to the x-x axis     | $\text{cm}^3$ |
| $W_{y-y}$ | Cross-sectional area modulus related to the y-y axis     | $\text{cm}^3$ |

## 5 Manufacture and materials

Guide rails may be cold drawn or machined. In this International Standard, 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”.

The tensile strength of the raw material used (steel) shall be at least  $370 \text{ N/mm}^2$  and not more than  $520 \text{ N/mm}^2$ . For this purpose, it is recommended to use steel grade E 235 B for cold-drawn guide rails and steel grade E 275 B for machined guides, in accordance with ISO 630:1995.

## 6 Guide rails

### 6.1 Designation

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

- 1st element: Number of this International Standard, followed by a hyphen: ISO 7465-;
- 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.

EXAMPLE 1 Lift guide rail ISO 7465-T82/A.

EXAMPLE 2 Lift guide rail ISO 7465-T125/BE.

EXAMPLE 3 Lift guide rail ISO 7465-T140-1/B.

## 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  $\pm 2$  mm. It is recommended to supply bars of 5 000 mm length.

### 6.2.2 Dimensions

See Tables 2 to 7.

Two series of dimensions are proposed:

— preferred dimensions, designated without round brackets;

EXAMPLE    T82/A.

— non-preferred dimensions, designated within round brackets.

EXAMPLE    (T89/A).

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

#### 6.2.2.1 Cold-drawn, parallel foot-and-blade flange guide rail

See Figure 1 and Tables 2 and 3.

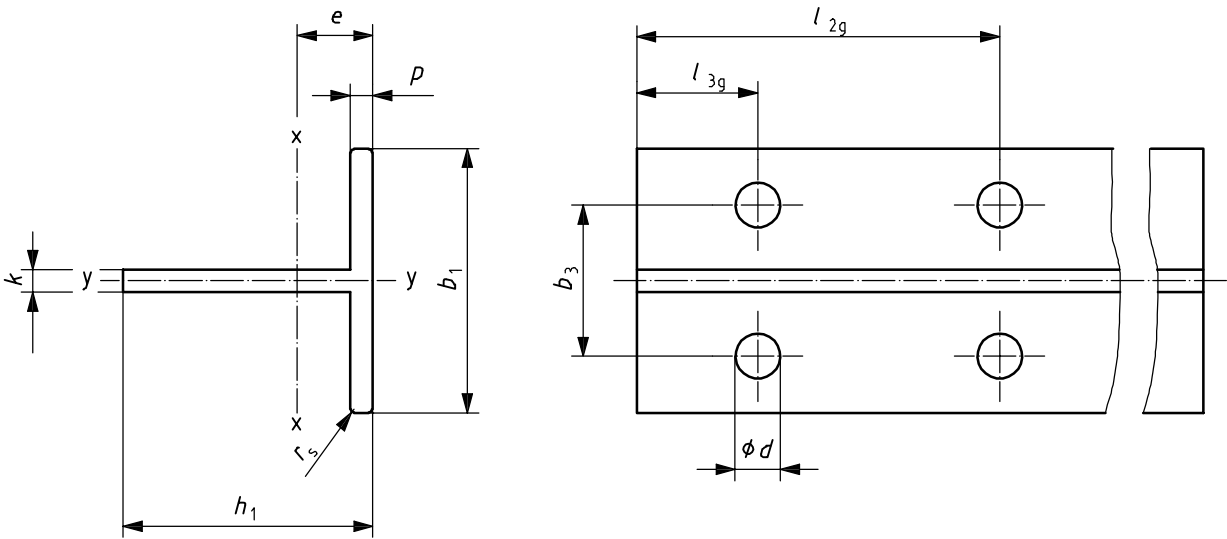


Figure 1 — Cold-drawn, parallel foot-and-blade flange guide rail

Table 2 — Technical characteristics of cold-drawn, parallel foot-and-blade flange guide rails  
(see Figure 1)

| Designation | <i>S</i>        | <i>q</i> <sub>1</sub> | <i>e</i> | <i>I</i> <sub>x-x</sub> | <i>W</i> <sub>x-x</sub> | <i>i</i> <sub>x-x</sub> | <i>I</i> <sub>y-y</sub> | <i>W</i> <sub>y-y</sub> | <i>i</i> <sub>y-y</sub> |
|-------------|-----------------|-----------------------|----------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|             | cm <sup>2</sup> | kg/m                  | cm       | cm <sup>4</sup>         | cm <sup>3</sup>         | cm                      | cm <sup>4</sup>         | cm <sup>3</sup>         | cm                      |
| (T45/A)     | 4,25            | 3,34                  | 1,31     | 8,08                    | 2,53                    | 1,38                    | 3,84                    | 1,71                    | 0,95                    |
| T50/A       | 4,75            | 3,73                  | 1,43     | 11,24                   | 3,15                    | 1,54                    | 5,25                    | 2,1                     | 1,05                    |



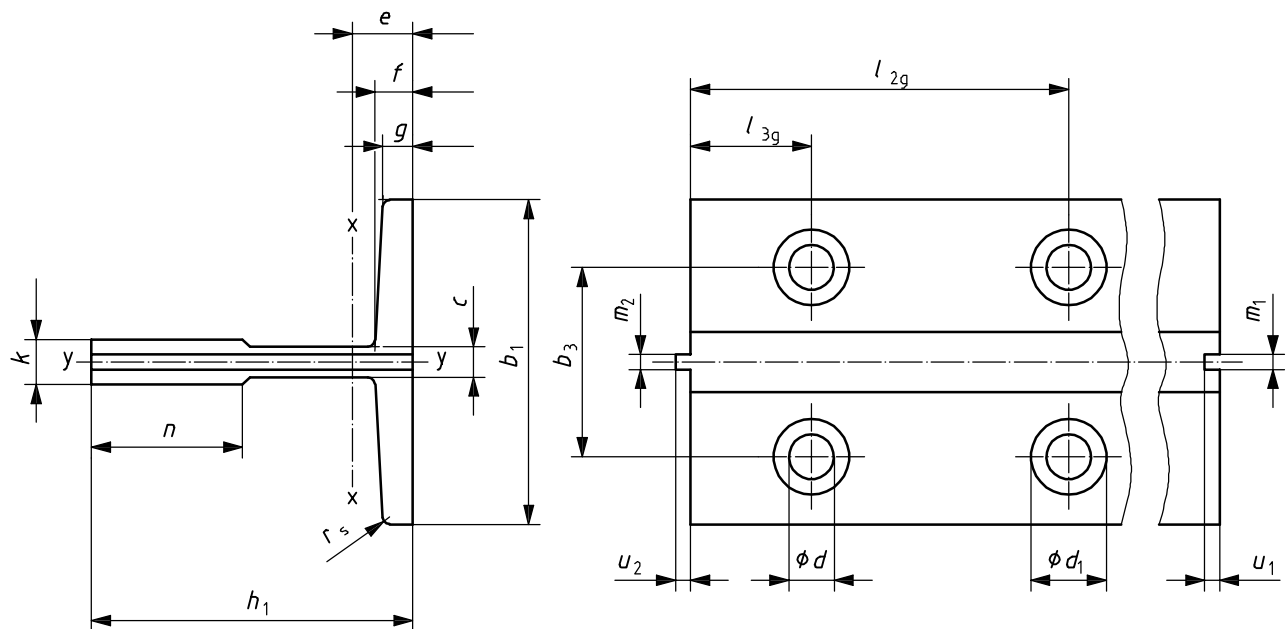
**Table 3 — Dimensions and tolerances of cold-drawn, parallel foot-and-blade flange guide rails**  
(see Figure 1)

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        |
| <b>Tolerances</b>                                                                                                                                           | $\pm 1$ | $\pm 0,2$ | $\pm 0,15$ | $\pm 0,5$ | —     | $\pm 0,2$ | $\pm 0,2$ | —   | $\pm 0,2$ |
| NOTE Dimensions $l_{2g}$ , $l_{3g}$ , $d$ , $b_3$ are identical to and have the same tolerances as fishplate dimensions $l_{2f}$ , $l_{3f}$ , $d$ , $b_3$ . |         |           |            |           |       |           |           |     |           |

### 6.2.2.2 Cold-drawn, inclined-foot flange guide rail

See Figure 2 and Tables 4 and 5.



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

**Table 4 — Technical characteristics of cold-drawn, inclined-foot flange guide rails**  
(see Figure 2)

| Designation | $S$             | $q_1$ | $e$   | $I_{x-x}$       | $W_{x-x}$       | $i_{x-x}$ | $I_{y-y}$       | $W_{y-y}$       | $i_{y-y}$ |
|-------------|-----------------|-------|-------|-----------------|-----------------|-----------|-----------------|-----------------|-----------|
|             | cm <sup>2</sup> | kg/m  | cm    | cm <sup>4</sup> | cm <sup>3</sup> | cm        | cm <sup>4</sup> | cm <sup>3</sup> | 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 5 — Dimensions and tolerances of cold-drawn, inclined-foot flange guide rails (see Figure 2)

Dimensions in millimetres

| Designation                                                                                                                                                 | $b_1$     | $h_1$     | $k$                                               | $n$                                             | $c$ | $f$        | $g$        | $m_1$                                              | $m_2$                                              | $u_1$      | $u_2$      | $d$ | $d_1$ | $b_3$     | $l_{2g}$  | $l_{3g}$  | $r_s$ |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|---------------------------------------------------|-------------------------------------------------|-----|------------|------------|----------------------------------------------------|----------------------------------------------------|------------|------------|-----|-------|-----------|-----------|-----------|-------|
| T70/A                                                                                                                                                       | 70        | 65        | 9                                                 | 34                                              | 6   | 8          | 6          | 3,00                                               | 2,97                                               | 3,50       | 3,00       | 13  | 26    | 42        | 105       | 25        | 1,5   |
| (T75/A)                                                                                                                                                     | 75        | 62        | 10                                                | 30                                              | 8   | 9          | 7          | 3,00                                               | 2,97                                               | 3,50       | 3,00       | 13  | 26    | 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    | 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    | 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    | 57,2      | 114,3     | 38,1      | 4     |
| <b>Tolerances</b>                                                                                                                                           | $\pm 1,5$ | $\pm 0,1$ | $\begin{smallmatrix} +0,1 \\ 0 \end{smallmatrix}$ | $\begin{smallmatrix} +3 \\ 0 \end{smallmatrix}$ | —   | $\pm 0,75$ | $\pm 0,75$ | $\begin{smallmatrix} +0,06 \\ 0 \end{smallmatrix}$ | $\begin{smallmatrix} 0 \\ -0,06 \end{smallmatrix}$ | $\pm 0,10$ | $\pm 0,10$ | —   | —     | $\pm 0,2$ | $\pm 0,2$ | $\pm 0,2$ | —     |
| 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 Machined guide rail

See Figure 3 and Tables 6 and 7.

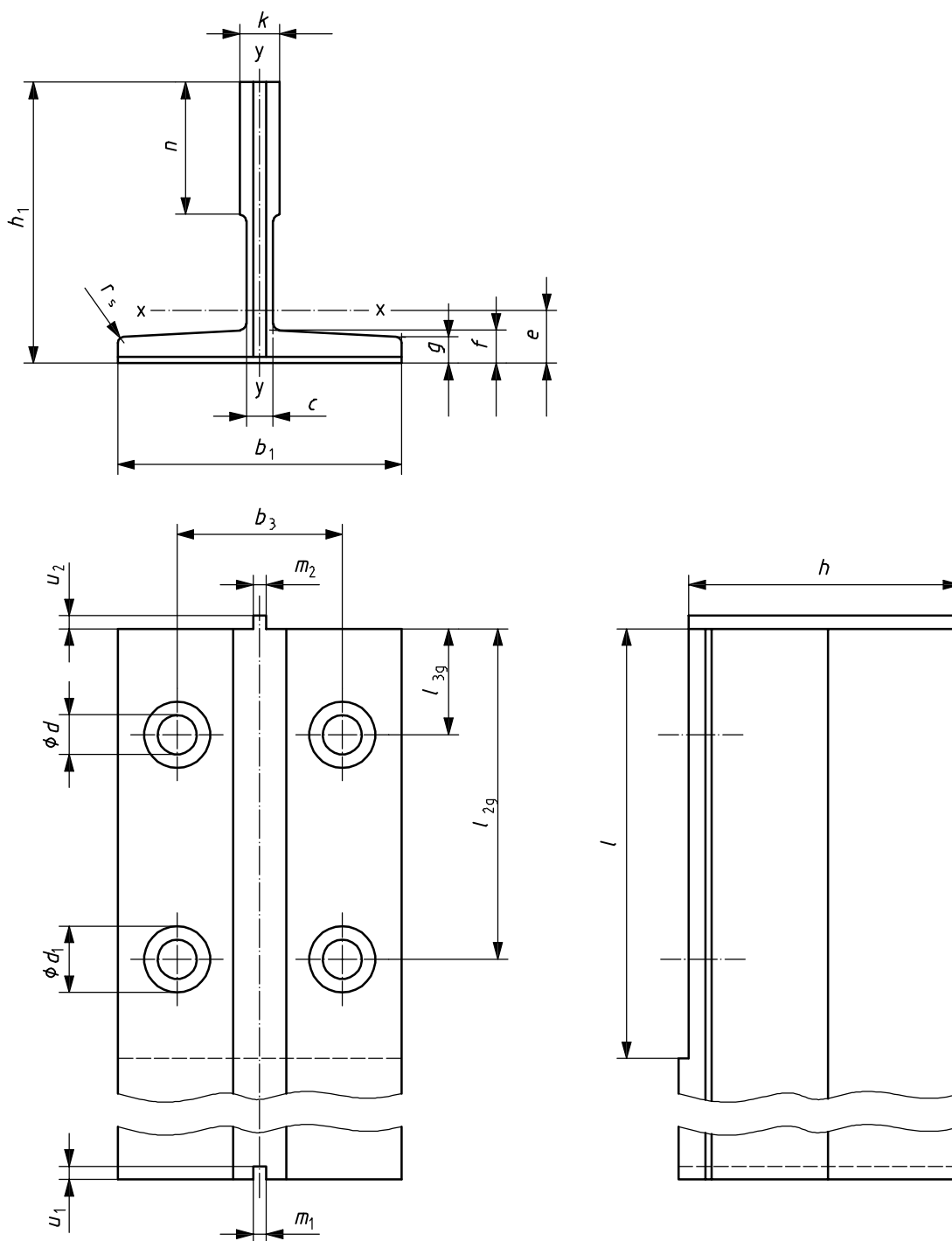


Figure 3 — Machined guide rail

**Table 6 — Technical characteristics for machined guide rails (see Figure 3)**

| Designation      | $S$             | $q_1$ | $e$   | $I_{x-x}$       | $W_{x-x}$       | $i_{x-x}$ | $I_{y-y}$       | $W_{y-y}$       | $i_{y-y}$ |
|------------------|-----------------|-------|-------|-----------------|-----------------|-----------|-----------------|-----------------|-----------|
|                  | cm <sup>2</sup> | kg/m  | cm    | cm <sup>4</sup> | cm <sup>3</sup> | cm        | cm <sup>4</sup> | cm <sup>3</sup> | 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           | 3,065     | 149,9           | 23,61           | 2,361     |
| T127-2/B or BE   | 28,72           | 22,55 | 2,478 | 201,7           | 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     |

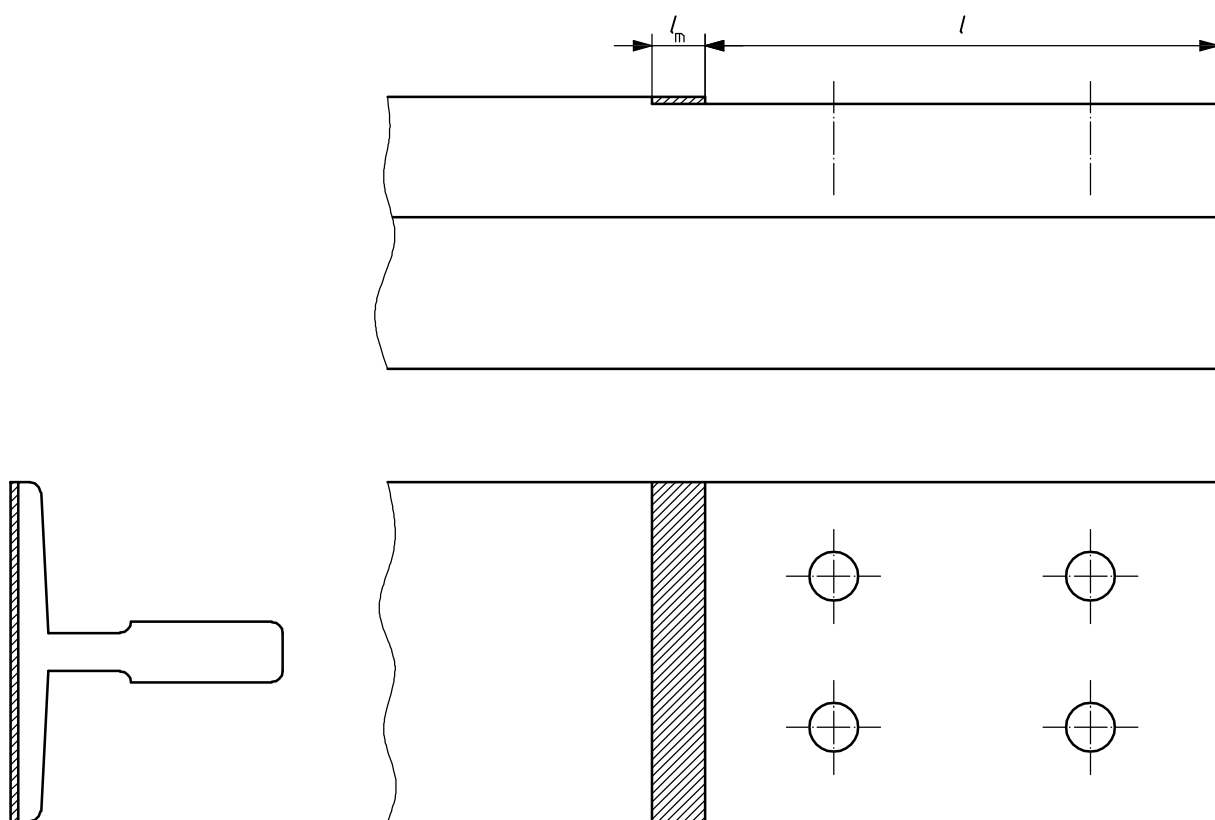
Table 7 — Dimensions and tolerances of guide rails (see Figure 3)

Dimensions in millimetres

| Designation                                                                                                                                                 | $b_1$     | $h_1$      | $k$                                                | $n$                                             | $c$  | $f$        | $g$        | $r_s$ | $m_1$                                              | $m_2$                                              | $u_1$      | $u_2$      | $d$ | $d_1$ | $b_3$     | $l_{2g}$  | $l_{3g}$  | $l$                                             | $h$       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|----------------------------------------------------|-------------------------------------------------|------|------------|------------|-------|----------------------------------------------------|----------------------------------------------------|------------|------------|-----|-------|-----------|-----------|-----------|-------------------------------------------------|-----------|
| (T75/B)                                                                                                                                                     | 75        | 62         | 10                                                 | 30                                              | 8    | 9          | 7          | 3     | 3,00                                               | 2,97                                               | 3,50       | 3,00       | 13  | 26    | 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    | 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    | 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    | 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    | 70        | 114,3     | 38,1      | 156                                             | 88        |
| T125/B or BE                                                                                                                                                | 125       | 82         | 16                                                 | 42                                              | 10   | 12         | 8          | 4     | 6,40                                               | 6,37                                               | 7,14       | 6,35       | 17  | 33    | 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    | 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    | 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    | 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    | 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    | 92,1      | 152,4     | 31,8      | 193                                             | 126       |
| <b>Tolerances<br/>Class: /B</b>                                                                                                                             | $\pm 1,5$ | $\pm 0,75$ | $\begin{smallmatrix} +0,1 \\ 0 \end{smallmatrix}$  | $\begin{smallmatrix} +3 \\ 0 \end{smallmatrix}$ | —    | $\pm 0,75$ | $\pm 0,75$ | —     | $\begin{smallmatrix} +0,06 \\ 0 \end{smallmatrix}$ | $\begin{smallmatrix} 0 \\ -0,06 \end{smallmatrix}$ | $\pm 0,10$ | $\pm 0,10$ | —   | —     | $\pm 0,2$ | $\pm 0,2$ | $\pm 0,2$ | $\begin{smallmatrix} +3 \\ 0 \end{smallmatrix}$ | $\pm 0,1$ |
| <b>Tolerances<br/>Class: /BE</b>                                                                                                                            | $\pm 1,5$ | $\pm 0,75$ | $\begin{smallmatrix} +0,05 \\ 0 \end{smallmatrix}$ | $\begin{smallmatrix} +3 \\ 0 \end{smallmatrix}$ | —    | $\pm 0,75$ | $\pm 0,75$ | —     | $\begin{smallmatrix} +0,03 \\ 0 \end{smallmatrix}$ | $\begin{smallmatrix} 0 \\ -0,03 \end{smallmatrix}$ | $\pm 0,10$ | $\pm 0,10$ | —   | —     | $\pm 0,2$ | $\pm 0,2$ | $\pm 0,2$ | $\begin{smallmatrix} +3 \\ 0 \end{smallmatrix}$ | $+ 0,05$  |
| 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 hatched zone.

$l$  see Table 7

$l_m = 40 \text{ mm}$

**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

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

### 6.2.5.1 Guide rail blade roughness

See Table 8.

**Table 8 — Guide rail blade roughness**

| Guide rail class | Blade roughness                                |                                                |
|------------------|------------------------------------------------|------------------------------------------------|
|                  | Direction                                      |                                                |
|                  | Longitudinal                                   | Transverse                                     |
| /A               | $1,6 \mu\text{m} \leq Ra \leq 6,3 \mu\text{m}$ | $1,6 \mu\text{m} \leq Ra \leq 6,3 \mu\text{m}$ |
| /B               | $Ra \leq 1,6 \mu\text{m}$                      | $0,8 \mu\text{m} \leq Ra \leq 3,2 \mu\text{m}$ |
| /BE              | $Ra \leq 1,6 \mu\text{m}$                      | $0,8 \mu\text{m} \leq Ra \leq 3,2 \mu\text{m}$ |

### 6.2.5.2 Foot rear surface of machined guide rails

Maximum roughness of the surface for the location of the fishplate  $Ra = 25 \mu\text{m}$ .

### 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 9 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  $t_2$ , and the flatness,  $t_3/500$ , 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,  $t_2$ , and the flatness,  $t_3/500$ , relative to the common median plan, A-B.

The highest value of  $t_2$  versus  $t_3/500$  allows a guide rail with a long-wave deformation, but the value of  $t_3/500$  limits the amplitude and the length of the short waves.

Table 9 — Geometrical tolerances for a 5 000 mm length guide rail,  $l_g$ 

| Symbols <sup>a</sup>                                                                 | Tolerances <sup>b</sup>                            |                                                    |                                                    |                                                    | 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                                                 |
| $t_3/500$                                                                            | 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                                                     |
| $t_5$                                                                                | $\begin{smallmatrix} +0,06 \\ 0 \end{smallmatrix}$ | $\begin{smallmatrix} +0,06 \\ 0 \end{smallmatrix}$ | $\begin{smallmatrix} +0,06 \\ 0 \end{smallmatrix}$ | $\begin{smallmatrix} +0,03 \\ 0 \end{smallmatrix}$ | mm    | Keyway width: $m_1$                                                         |
| $t_6$                                                                                | $\begin{smallmatrix} 0 \\ -0,06 \end{smallmatrix}$ | $\begin{smallmatrix} 0 \\ -0,06 \end{smallmatrix}$ | $\begin{smallmatrix} 0 \\ -0,06 \end{smallmatrix}$ | $\begin{smallmatrix} 0 \\ -0,03 \end{smallmatrix}$ | mm    | Key width: $m_2$                                                            |
| $t_7$                                                                                | $\pm 0,15$                                         | $\begin{smallmatrix} +0,1 \\ 0 \end{smallmatrix}$  | $\begin{smallmatrix} +0,1 \\ 0 \end{smallmatrix}$  | $\begin{smallmatrix} +0,05 \\ 0 \end{smallmatrix}$ | mm    | Blade width: $k$                                                            |
| $t_8$                                                                                | 0,4                                                | 0,4                                                | 0,2                                                | 0,1                                                | mm    | Machined surface for fishplate perpendicularity                             |
| $t_9$                                                                                | $\pm 0,2$                                          | $\pm 0,1$                                          | $\pm 0,1$                                          | $\pm 0,05$                                         | mm    | Guide rail height:<br>$h_1$ for /A class,<br>$h$ for /B or /BE class        |
| $t_{10}$                                                                             | —                                                  | 0,2                                                | 0,1                                                | 0,05                                               | mm    | Keyway and key perpendicularity                                             |
| $t_{11}$                                                                             | 1                                                  | 1                                                  | 0,5                                                | 0,5                                                | mm    | Hole axis symmetry                                                          |
| $t_{12}$                                                                             | $\pm 0,2$                                          | $\pm 0,2$                                          | $\pm 0,2$                                          | $\pm 0,2$                                          | mm    | Distance between the axes of the holes: $b_3$                               |
| $t_{13}$                                                                             | —                                                  | 0,16 <sup>c</sup>                                  | 0,16 <sup>c</sup>                                  | 0,16 <sup>c</sup>                                  | mm    | Width of the connecting part of the foot to the blade symmetry <sup>c</sup> |
| $t_{14}$                                                                             | —                                                  | $\pm 0,1$                                          | $\pm 0,1$                                          | $\pm 0,1$                                          | mm    | Key length and keyway depth: $u_1, u_2$                                     |
| $t_{15}$                                                                             | $\pm 0,2$                                          | $\pm 0,2$                                          | $\pm 0,2$                                          | $\pm 0,2$                                          | mm    | Distances from holes to the ends of the guide rail:<br>$l_{2g}, l_{3g}$     |
| $t_{16}$                                                                             | $\pm 1$                                            | $\pm 1,5$                                          | $\pm 1,5$                                          | $\pm 1,5$                                          | mm    | Guide rail width: $b_1$                                                     |
| $t_{17}$                                                                             | 2                                                  | 3                                                  | 3                                                  | 3                                                  | mm    | Foot symmetry: $b_1$                                                        |
| $t_{18}$                                                                             | 0,4                                                | 0,4                                                | 0,2                                                | 0,1                                                | mm    | Side and top blade perpendicularity                                         |
| <sup>a</sup> See Figure 5.                                                           |                                                    |                                                    |                                                    |                                                    |       |                                                                             |
| <sup>b</sup> These tolerances are applicable for guide rails of length 2,5 m to 5 m. |                                                    |                                                    |                                                    |                                                    |       |                                                                             |
| <sup>c</sup> For $c$ values, see Tables 5 and 7.                                     |                                                    |                                                    |                                                    |                                                    |       |                                                                             |

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

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.



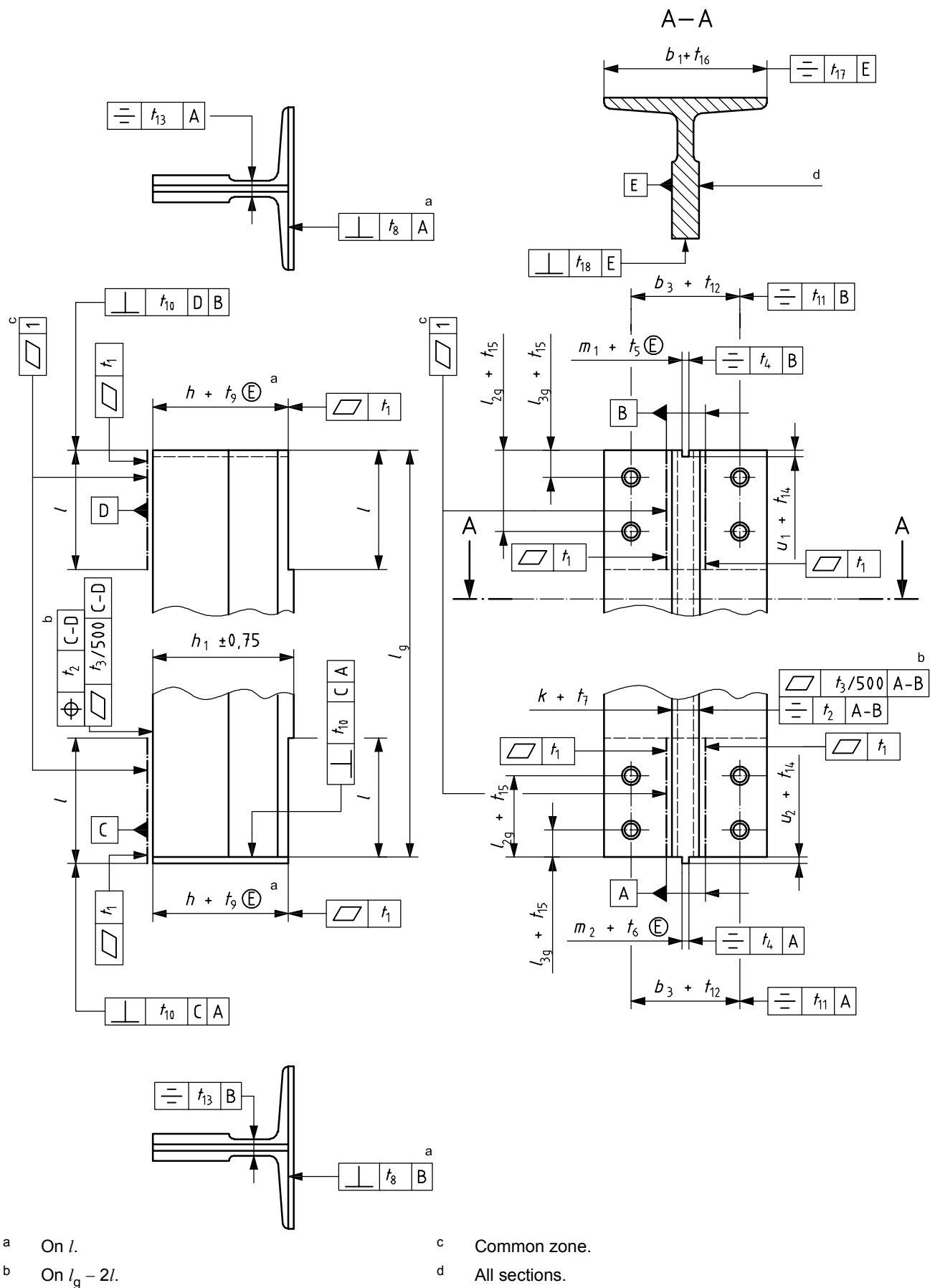


Figure 5 — Geometrical tolerances for a 5 000 mm length guide rail,  $l_g$

### 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.

The marking for /BE class shall have a minimum height of 10 mm.

## 7 Fishplates

### 7.1 Fishplate materials

The steel grade shall be the same as for the guide rails (see Clause 5). The tensile strength of the steel raw material used shall be at least equal to the tensile strength of the steel raw material used for the guide rails.

### 7.2 Fishplate dimensions

See Table 10 and Figure 6.

**Table 10 — Fishplate dimensions and tolerances**

Dimension in millimetres

| Guide rail designation | $d$ | $l_1$     | $l_{2f}$  | $l_{3f}$  | $b_2$ | $b_3$     | $v$       |
|------------------------|-----|-----------|-----------|-----------|-------|-----------|-----------|
| (T45/A)                | 9   | 160       | 65        | 15        | 50    | 25        | 8         |
| T50/A                  | 9   | 200       | 75        | 25        | 50    | 30        | 8         |
| T70/A                  | 13  | 250       | 105       | 25        | 70    | 42        | 10        |
| (T75/A)                | 13  | 250       | 105       | 25        | 70    | 42        | 10        |
| (T75/B)                | 13  | 250       | 105       | 25        | 70    | 42        | 10        |
| (T78/B)                | 13  | 250       | 105       | 25        | 70    | 42        | 10        |
| T82/A                  | 13  | 216       | 81        | 27        | 80    | 50,8      | 10        |
| (T89/A) T89/B          | 13  | 305       | 114,3     | 38,1      | 90    | 57,2      | 13        |
| (T90/A) (T90/B)        | 13  | 305       | 114,3     | 38,1      | 90    | 57,2      | 13        |
| (T114/B)               | 17  | 305       | 114,3     | 38,1      | 120   | 70        | 18        |
| T125/B                 | 17  | 305       | 114,3     | 38,1      | 130   | 79,4      | 18        |
| T125/BE                | 17  | 305       | 114,3     | 38,1      | 130   | 79,4      | 28        |
| (T127-1/B)             | 17  | 305       | 114,3     | 38,1      | 130   | 79,4      | 18        |
| (T127-1/BE)            | 17  | 305       | 114,3     | 38,1      | 130   | 79,4      | 28        |
| T127-2/B               | 17  | 305       | 114,3     | 38,1      | 130   | 79,4      | 18        |
| T127-2/BE              | 17  | 305       | 114,3     | 38,1      | 130   | 79,4      | 28        |
| T140-1/B               | 21  | 380       | 152,4     | 31,8      | 140   | 92,1      | 28        |
| T140-1/BE              | 21  | 380       | 152,4     | 31,8      | 140   | 92,1      | 38        |
| T140-2/B               | 21  | 380       | 152,4     | 31,8      | 140   | 92,1      | 28        |
| T140-2/BE              | 21  | 380       | 152,4     | 31,8      | 140   | 92,1      | 38        |
| T140-3/B               | 21  | 380       | 152,4     | 31,8      | 140   | 92,1      | 38        |
| T140-3/BE              | 21  | 380       | 152,4     | 31,8      | 140   | 92,1      | 48        |
| <b>Tolerances</b>      | —   | $^{+3}_0$ | $\pm 0,2$ | $\pm 0,2$ | —     | $\pm 0,2$ | $^{+3}_0$ |

Fishplates with a higher moment of inertia (thicker or other shape) may be used when more stringent requirements are necessary for the junction between guide rails (for example, in a seismic area).

### 7.3 Fishplate form tolerances

See Figure 6.

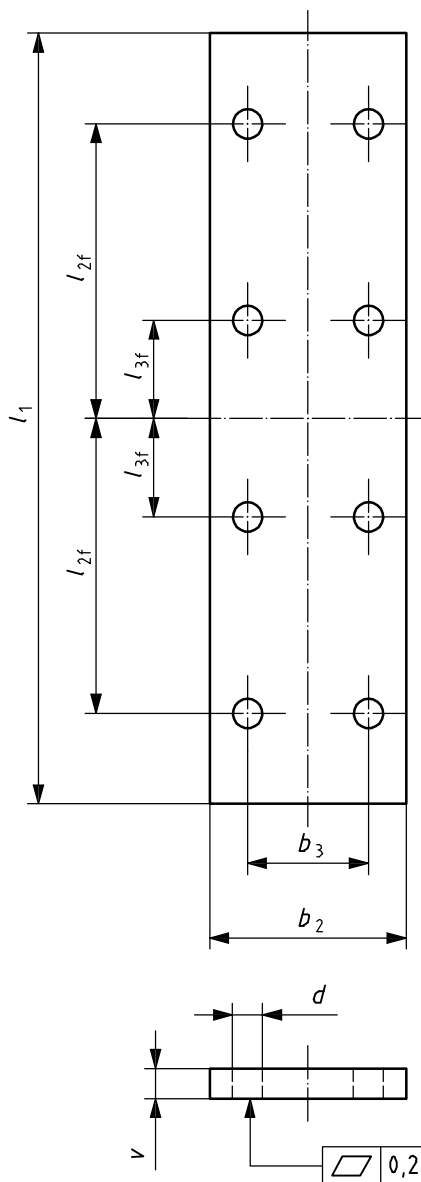


Figure 6 — Fishplate

The maximal roughness,  $R_a$ , of the side of the fishplate with the flatness tolerance of 0,2 mm shall be  $\leq 25 \mu\text{m}$ .

### 7.4 Fishplate holes

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

## Bibliography

- [1] ISO 286-1, *ISO system of limits and fits — Part 1: Bases of tolerances, deviations and fits*
- [2] ISO 630:1995, *Structural steels — Plates, wide flats, bars, sections and profiles*
- [3] ISO 1101, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*
- [4] ISO 5458, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Positional tolerancing*
- [5] ISO 5459, *Technical drawings — Geometrical tolerancing — Datums and datum-systems for geometrical tolerances*
- [6] ISO 8015, *Technical drawings — Fundamental tolerancing principle*

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