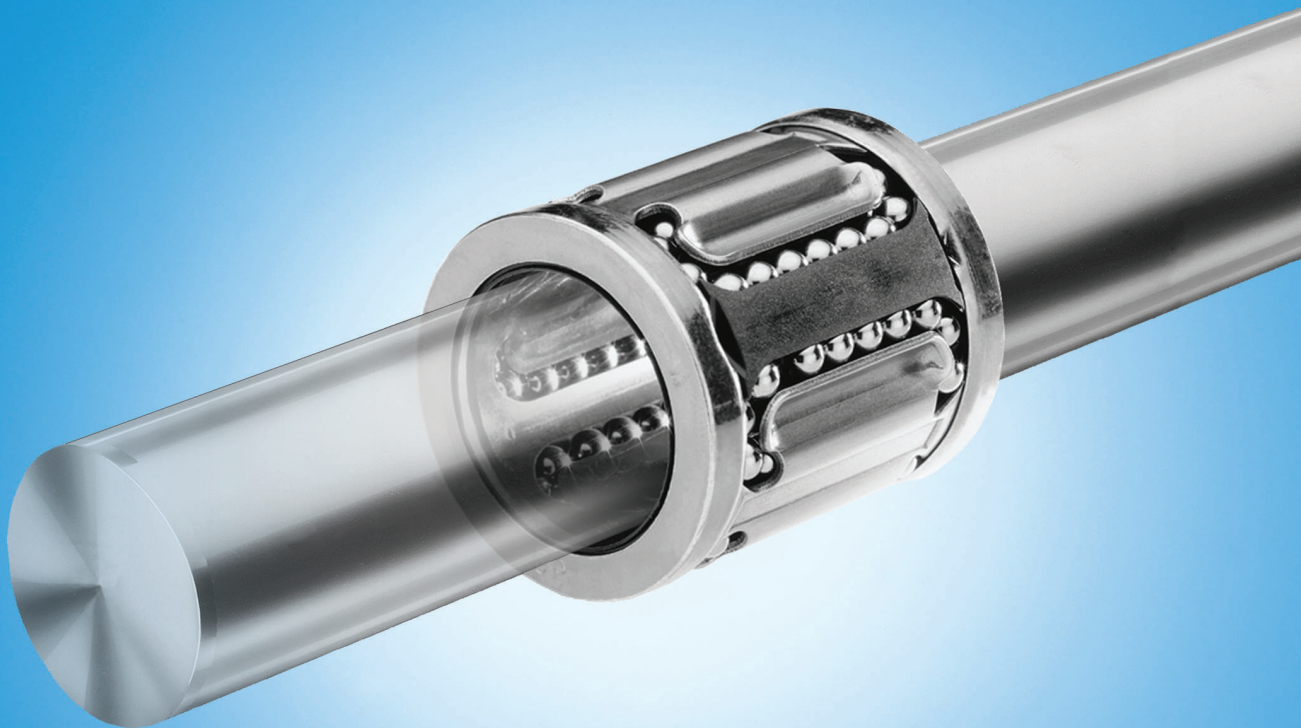


# eLINE Linear Bushings and Shafts

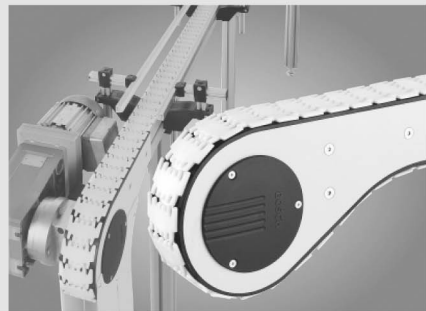
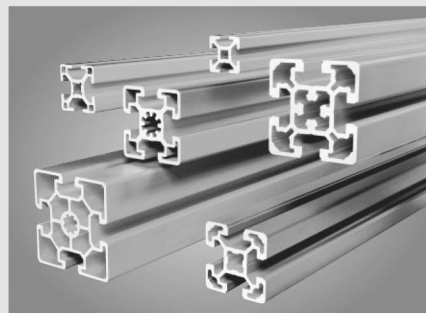
R310EN 3105 (2005.06)

The Drive & Control Company



# Linear Motion and Assembly Technologies

Ball Rail Systems  
Roller Rail Systems  
Linear Bushings and Shafts  
Ball Screw Drives  
Linear Motion Systems  
Basic Mechanical Elements  
Manual Production Systems  
Transfer Systems



# eLINE Linear Bushings and Shafts

|                                        |           |
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# Product Overview

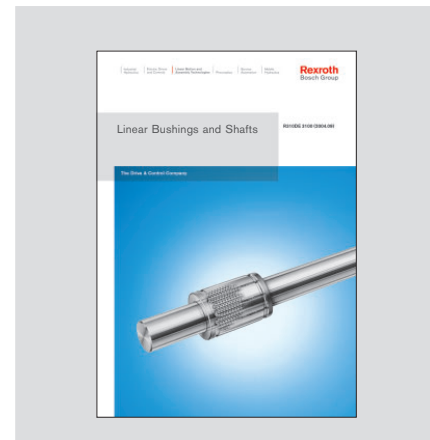
## Background

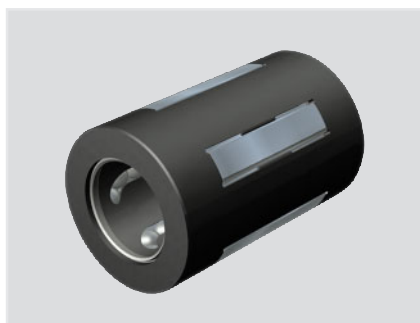
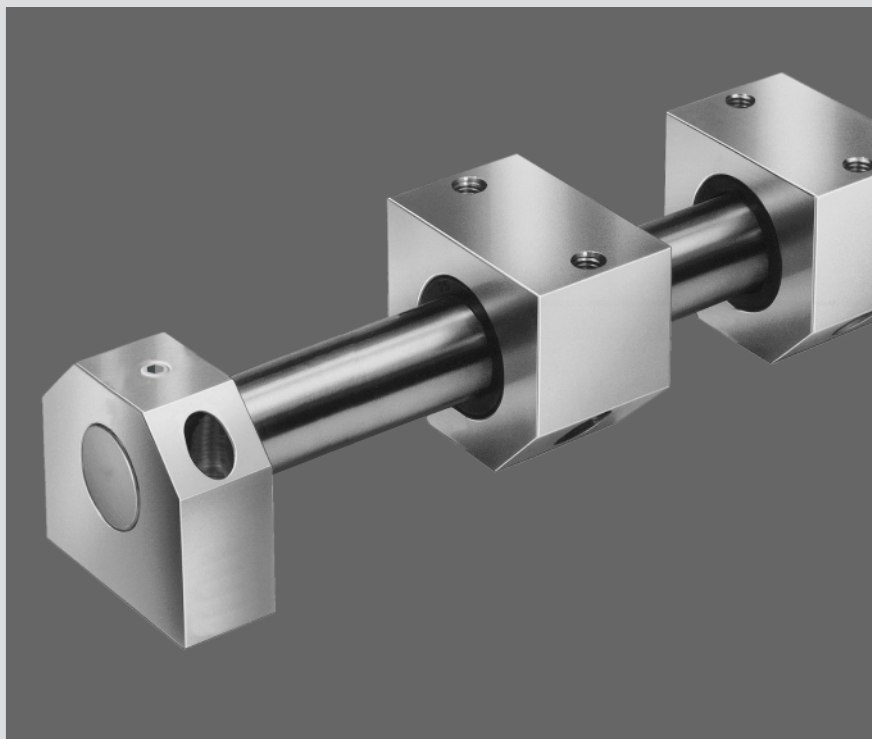
eLINE Linear Bushings and Shafts are a refinement of the well-known Linear Bushings and Shafts range. The Linear Bushings and Linear Sets are supplied in zero-clearance versions. They come pre-lubricated and are therefore lubed for life.

## Benefits of eLINE Linear Bushings

- Very attractively priced linear bushing for general requirements
- Small outside dimensions for especially compact constructions
- Integrated metal holding rings with approx. 0.1 mm oversize on the outer diameter (size 12 to 40) for secure seating in the housing bore
- Easy installation:  
Simply press in – no additional retention necessary
- Hardened steel segments with ball lubrication in the running tracks for high load capacity and long life
- High travel speed (5 m/s)
- Numerous pockets as lubricant reservoirs for long in-service lubrication intervals or lubrication for life
- Pockets also whisk away any dirt that may have worked its way in and so prevent jamming of the linear bushing
- Integrated seals
- Corrosion resistant versions available for medical, chemical and food industry applications
- Linear Sets with aluminum housing
- Lubed for life

More information in the main Linear Bushings and Shafts catalog

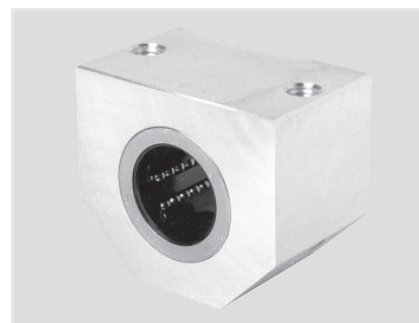




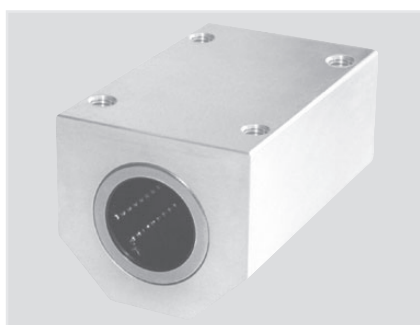
**eLINE Linear Bushings**  
Shaft diameter 8 and 10



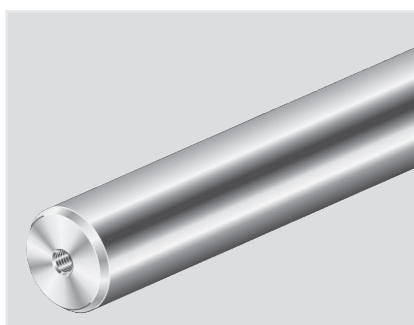
**eLINE Linear Bushings**  
Shaft diameter 12 to 40



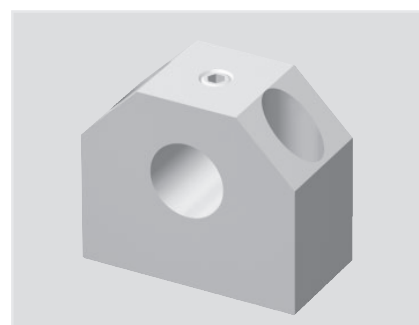
**eLINE Linear Set**



**eLINE Tandem Linear Set**



**Precision steel shafts**



**Shaft support blocks**

## Technical Data, Dimensioning, Mounting

### Speed

$$v_{\max} = 5 \text{ m/s}$$

### Acceleration

$$a_{\max} = 150 \text{ m/s}^2$$

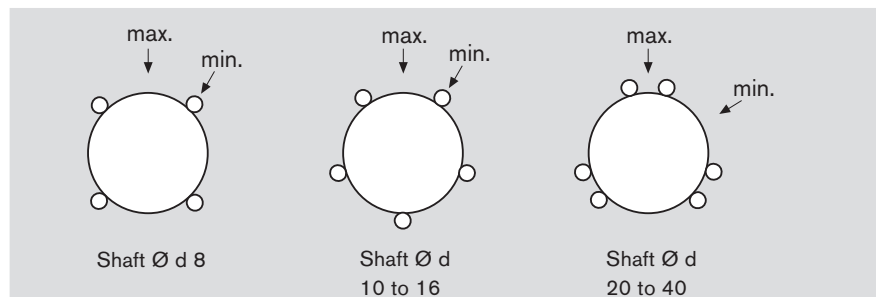
### Operating temperature

$$-20 \text{ }^{\circ}\text{C to } +100 \text{ }^{\circ}\text{C}$$

### Dimensioning

The load capacity ratings should be selected according to whether the components are to be installed in the “min.” or the “max.” position. Normally, the linear bushing should be dimensioned so that 10% to 25% of the load capacity will be utilized when an external load is applied.

If the direction of loading is clearly defined and the eLINE linear bushings can be mounted in the “max.” position, the  $C_{\max}$  load capacity (dynamic load capacity) can be used. If fully aligned installation is not possible, or if the direction of loading is not defined, the minimum load capacities should be assumed.



## Mounting

Bevel the edge of the housing bore and press the eLINE Linear Bushing in.  
Recommended bore tolerance: H7.

## Retention

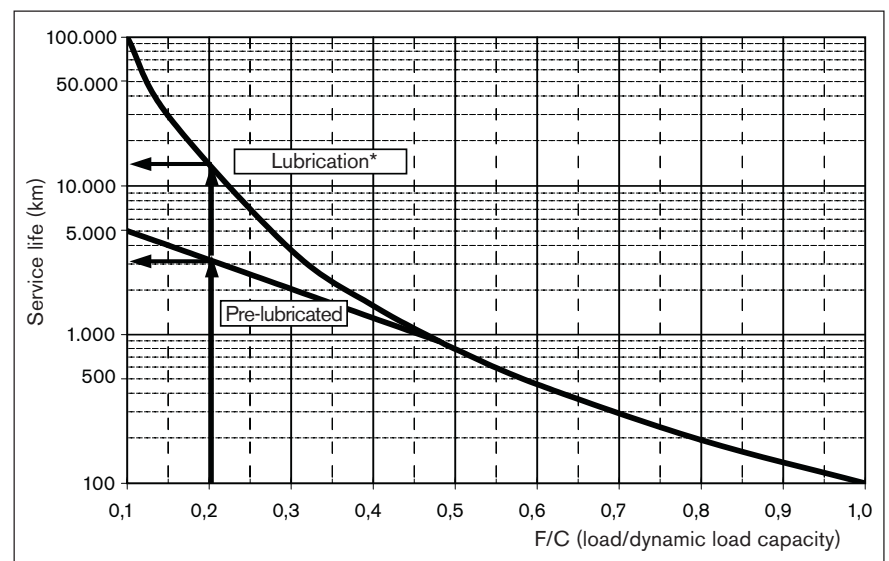
Shaft Ø 8 and 10: The plastic outer sleeve is oversized.

For applications subject to vibration or with higher acceleration rates, additional retention will be necessary.

Shaft Ø 12 to 40: The metal holding rings have an oversized outer diameter.

No additional retention needed (bore length  $\geq C$ ).

## Service life of eLINE Linear Bushings



\* Lubrication = With in-service lubrication

## Example:

If a pre-lubricated eLINE Linear Bushing is loaded with 20% of the dynamic load capacity, it will run for 3,000 km on the initial lubrication alone under test conditions. If the bushing is lubricated after every 3,000 km in service, it can achieve a service life of 15,000 km.

# eLINE Linear Bushings R0658

## Standard

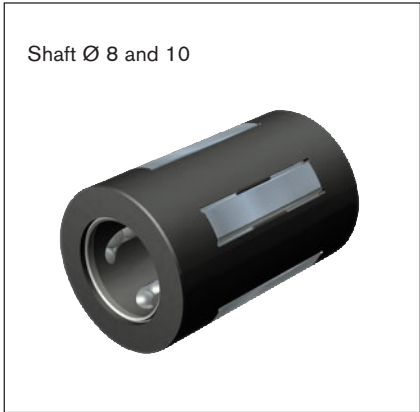
### Structural design

- POM cage
- Integrated seals
- Balls made of antifriction bearing steel
- Hardened steel segments
- Metal holding rings (from shaft Ø 12 mm and up)
- Pre-lubricated with Dynalub 510

**Corrosion resistant**  
(antifriction bearing steel to ISO 683-17 / EN 10088)

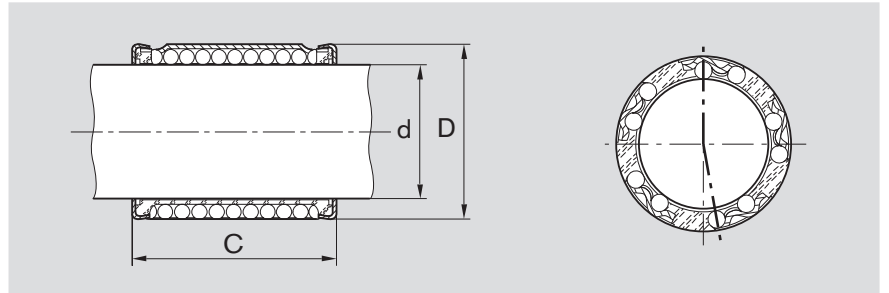
### Structural design

- POM cage
- Integrated seals
- Balls made of antifriction bearing steel
- Corrosion resistant steel segments
- Corrosion resistant metal holding rings (from shaft Ø 12 mm and up)
- Pre-lubricated with Dynalub 510



| Shaft<br>Ø d<br>(mm) | Part numbers with two integrated seals |                     | Weights<br><br>(kg) |
|----------------------|----------------------------------------|---------------------|---------------------|
|                      | Standard                               | Corrosion resistant |                     |
| 8                    | R0658 262 44                           | R0658 262 34        | 0,011               |
| 10                   | R0658 261 44                           | R0658 261 34        | 0,014               |
| 12                   | R0658 251 44                           | R0658 251 34        | 0,016               |
| 16                   | R0658 252 44                           | R0658 252 34        | 0,025               |
| 20                   | R0658 253 44                           | R0658 253 34        | 0,028               |
| 25                   | R0658 254 44                           | R0658 254 34        | 0,058               |
| 30                   | R0658 255 44                           | R0658 255 34        | 0,080               |
| 40                   | R0658 256 44                           | R0658 256 34        | 0,140               |

## Dimensions



| Dimensions (mm) |    |           | No. of ball<br>circuits | Load capacities (N)        |      | Corrosion resistant<br>dyn. C |      |
|-----------------|----|-----------|-------------------------|----------------------------|------|-------------------------------|------|
| Ø d             | D  | C<br>±0,2 |                         | Standard<br>dyn. C<br>min. | max. | min.                          | max. |
| 8               | 15 | 24        | 4                       | 500                        | 580  | 350                           | 410  |
| 10              | 17 | 26        | 5                       | 600                        | 720  | 420                           | 500  |
| 12              | 19 | 28        | 5                       | 730                        | 870  | 510                           | 610  |
| 16              | 24 | 30        | 5                       | 950                        | 1120 | 660                           | 780  |
| 20              | 28 | 30        | 6                       | 1120                       | 1410 | 780                           | 990  |
| 25              | 35 | 40        | 6                       | 2330                       | 2930 | 1630                          | 2050 |
| 30              | 40 | 50        | 6                       | 3060                       | 3250 | 2140                          | 2700 |
| 40              | 52 | 60        | 6                       | 5040                       | 6380 | 3520                          | 4470 |

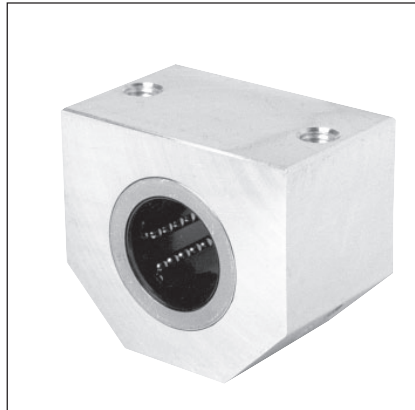
eLINE Linear Bushings and Shafts

## eLINE Linear Sets R1027, closed type

### Standard

#### Structural design

- Precision housing in lightweight construction (aluminum)
- eLINE linear bushing, standard version
- Two integrated seals
- Pre-lubricated with Dynalub 510



### Corrosion resistant

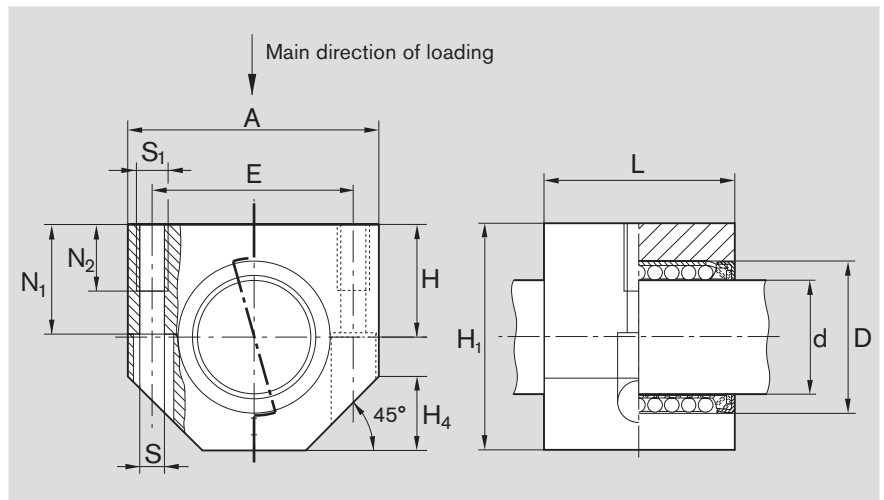
#### Structural design

- Precision housing in lightweight construction (aluminum)
- eLINE linear bushing, corrosion resistant version
- Two integrated seals
- Pre-lubricated with Dynalub 510

| Shaft<br>Ø d<br>(mm) | Part numbers |                                   | Weights<br>(kg) |
|----------------------|--------------|-----------------------------------|-----------------|
|                      | Standard     | Corrosion resistant <sup>1)</sup> |                 |
| 12                   | R1027 251 44 | R1027 251 34                      | 0,08            |
| 16                   | R1027 252 44 | R1027 252 34                      | 0,11            |
| 20                   | R1027 253 44 | R1027 253 34                      | 0,15            |
| 25                   | R1027 254 44 | R1027 254 34                      | 0,27            |
| 30                   | R1027 255 44 | R1027 255 34                      | 0,40            |
| 40                   | R1027 256 44 | R1027 256 34                      | 0,75            |

<sup>1)</sup> Corrosion resistant linear bushing (antifriction bearing steel to ISO 683-17 / EN 10088)

## Dimensions



| Dimensions (mm) |    | H  | Tolerance<br>for H <sup>1)</sup> (μm) | H <sub>1</sub> | A  | L  | E<br>±0,15 | S <sup>2)</sup> | S <sub>1</sub> | N <sub>1</sub> | N <sub>2</sub> | H <sub>4</sub> |
|-----------------|----|----|---------------------------------------|----------------|----|----|------------|-----------------|----------------|----------------|----------------|----------------|
| Ø d             | D  |    |                                       |                |    |    |            |                 |                |                |                |                |
| 12              | 19 | 17 | ±12                                   | 33             | 40 | 28 | 29         | 4,3             | M5             | 16             | 11             | 11             |
| 16              | 24 | 19 | ±12                                   | 38             | 45 | 30 | 34         | 4,3             | M5             | 18             | 11             | 13             |
| 20              | 28 | 23 | +13<br>-12                            | 45             | 53 | 30 | 40         | 5,3             | M6             | 22             | 13             | 15             |
| 25              | 35 | 27 | +13<br>-12                            | 54             | 62 | 40 | 48         | 6,6             | M8             | 26             | 18             | 17             |
| 30              | 40 | 30 | +13<br>-12                            | 60             | 67 | 50 | 53         | 6,6             | M8             | 29             | 18             | 19             |
| 40              | 52 | 39 | +14<br>-12                            | 76             | 87 | 60 | 69         | 8,4             | M10            | 38             | 22             | 24             |

| Shaft<br>Ø d<br>(mm) | Load capacities <sup>3)</sup> (N) |                            |
|----------------------|-----------------------------------|----------------------------|
|                      | Standard<br>dyn. C                | Corros. resist.*<br>dyn. C |
| 12                   | 810                               | 570                        |
| 16                   | 1050                              | 730                        |
| 20                   | 1410                              | 990                        |
| 25                   | 2930                              | 2050                       |
| 30                   | 3850                              | 2700                       |
| 40                   | 6380                              | 4470                       |

<sup>1)</sup> Relative to nominal shaft dimension d.

<sup>2)</sup> Mounting screws ISO 4762-8.8.

<sup>3)</sup> The load capacities apply for the main direction of loading.

If the load does not act in the main direction of loading, the load capacities must be multiplied by the following factors:

Shaft Ø 12 and 16: f = 0.90

Shaft Ø 20 to 40: f = 0.79

\* Corros. resist. = Corrosion resistant

eLINE Linear Bushings and Shafts

## eLINE Tandem Linear Sets R1029, closed type

### Standard

#### Structural design

- Precision tandem housing in light-weight construction (aluminum)
- Two eLINE linear bushings, standard version
- Two integrated seals
- Pre-lubricated with Dynalub 510



### Corrosion resistant

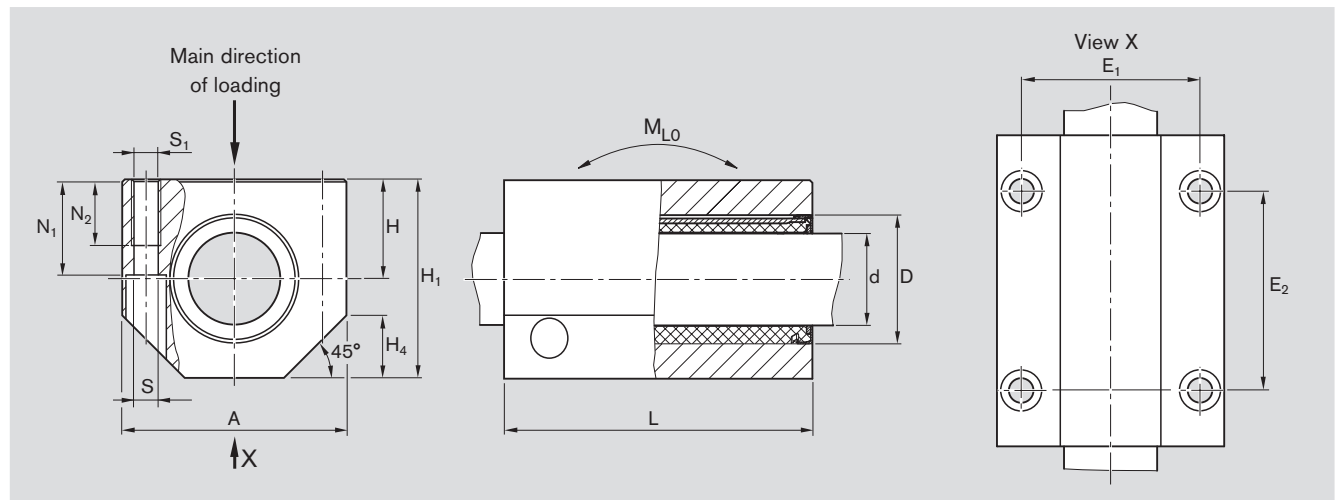
#### Structural design

- Precision tandem housing in light-weight construction (aluminum)
- Two eLINE linear bushings, corrosion resistant version
- Two integrated seals
- Pre-lubricated with Dynalub 510

| Shaft<br>Ø d<br>(mm) | Part numbers |                                   | Weights<br>(kg) |
|----------------------|--------------|-----------------------------------|-----------------|
|                      | Standard     | Corrosion resistant <sup>1)</sup> |                 |
| 12                   | R1029 251 44 | R1029 251 34                      | 0,17            |
| 16                   | R1029 252 44 | R1029 252 34                      | 0,24            |
| 20                   | R1029 253 44 | R1029 253 34                      | 0,31            |
| 25                   | R1029 254 44 | R1029 254 34                      | 0,57            |
| 30                   | R1029 255 44 | R1029 255 34                      | 0,80            |
| 40                   | R1029 256 44 | R1029 256 34                      | 1,54            |

<sup>1)</sup> Corrosion resistant linear bushing (antifriction bearing steel to ISO 683-17 / EN 10088)

## Dimensions



| Dimensions (mm) |    |    |                                                 |                |    |     |                              |                              |                 |                |                |                |                |
|-----------------|----|----|-------------------------------------------------|----------------|----|-----|------------------------------|------------------------------|-----------------|----------------|----------------|----------------|----------------|
| $\varnothing d$ | D  | H  | Tolerance for H <sup>1)</sup> ( $\mu\text{m}$ ) | H <sub>1</sub> | A  | L   | E <sub>1</sub><br>$\pm 0,15$ | E <sub>2</sub><br>$\pm 0,15$ | S <sup>2)</sup> | S <sub>1</sub> | N <sub>1</sub> | N <sub>2</sub> | H <sub>4</sub> |
| 12              | 19 | 17 | $\pm 12$                                        | 33             | 40 | 60  | 29                           | 35                           | 4,3             | M5             | 16             | 11             | 11             |
| 16              | 24 | 19 | $\pm 12$                                        | 38             | 45 | 65  | 34                           | 40                           | 4,3             | M5             | 18             | 11             | 13             |
| 20              | 28 | 23 | +13<br>-12                                      | 45             | 53 | 65  | 40                           | 45                           | 5,3             | M6             | 22             | 13             | 15             |
| 25              | 35 | 27 | +13<br>-12                                      | 54             | 62 | 85  | 48                           | 55                           | 6,6             | M8             | 26             | 18             | 17             |
| 30              | 40 | 30 | +13<br>-12                                      | 60             | 67 | 105 | 53                           | 70                           | 6,6             | M8             | 29             | 18             | 19             |
| 40              | 52 | 39 | +14<br>-12                                      | 76             | 87 | 125 | 69                           | 85                           | 8,4             | M10            | 38             | 22             | 24             |

| Shaft<br>$\varnothing d$<br>(mm) | Load capacities <sup>3)</sup> (N) |                     | Tilting moment (Nm)<br>stat. |
|----------------------------------|-----------------------------------|---------------------|------------------------------|
|                                  | Standard                          | Corrosion resistant |                              |
|                                  | dyn. C                            | dyn. C              | M <sub>Lo</sub>              |
| 12                               | 1310                              | 1180                | 13                           |
| 16                               | 1700                              | 1180                | 18                           |
| 20                               | 2290                              | 1610                | 21                           |
| 25                               | 4760                              | 3330                | 59                           |
| 30                               | 6250                              | 4385                | 103                          |
| 40                               | 10360                             | 7260                | 204                          |

<sup>1)</sup> Relative to nominal shaft dimension d.

<sup>2)</sup> Mounting screws ISO 4762-8.8.

<sup>3)</sup> The load capacities apply for the main direction of loading.

If the load does not act in the main direction of loading, the load capacities must be multiplied by the following factors:

Shaft  $\varnothing$  12 and 16:  $f = 0.90$

Shaft  $\varnothing$  20 to 40:  $f = 0.79$

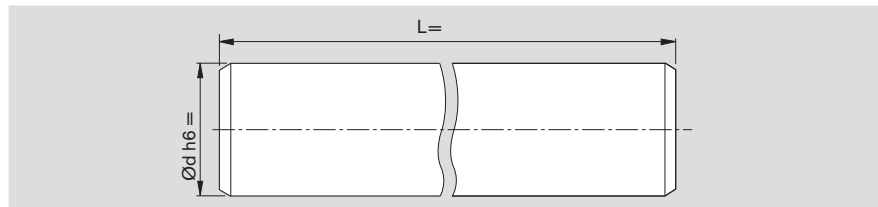
# Precision Steel Shafts

## Overview

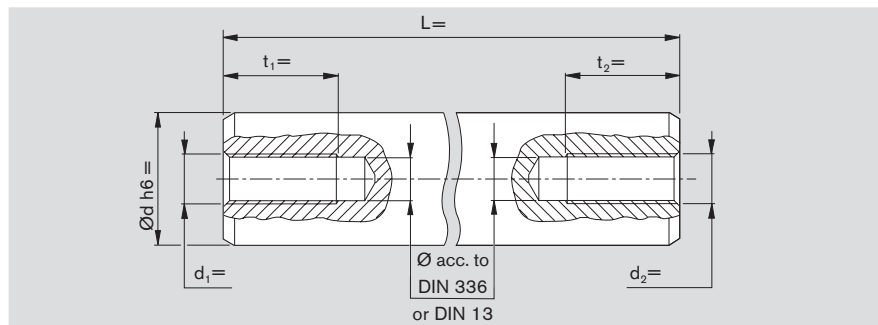
| Shaft<br>Ø d<br>(mm) | Part numbers for solid shafts |               |                          | L <sub>max</sub><br>(m) |
|----------------------|-------------------------------|---------------|--------------------------|-------------------------|
|                      | Heat-treatable steel<br>h6    | X46Cr13<br>h6 | Hard chrome plated<br>h6 |                         |
| 8                    | R1000 008 00                  | R1000 008 30  |                          | 3,5                     |
| 10                   | R1000 010 00                  | R1000 010 30  |                          | 6 (stainless 3,5)       |
| 12                   | R1000 012 00                  | R1000 012 30  | R1000 012 60             | 6                       |
| 16                   | R1000 016 00                  | R1000 016 30  | R1000 016 60             | 6                       |
| 20                   | R1000 020 00                  | R1000 020 30  | R1000 020 60             | 6                       |
| 25                   | R1000 025 00                  | R1000 025 30  | R1000 025 60             | 6                       |
| 30                   | R1000 030 00                  | R1000 030 30  | R1000 030 60             | 6                       |
| 40                   | R1000 040 00                  | R1000 040 30  | R1000 040 60             | 6                       |

## Shaft machining

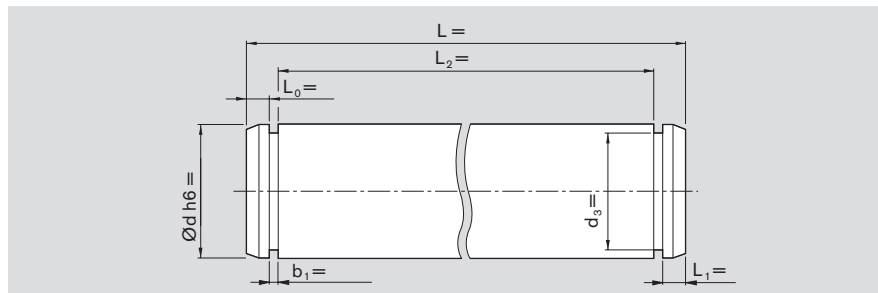
### Cut to length and beveled



### Shaft end with tapped hole



### Shaft end with retaining ring groove to DIN 471



## Recommended dimensions

### Ordering example

4 linear shafts Ø 20h6, 480 mm long from heat-treatable steel with beveling at both ends and tapped hole M12 x 28 at one end:  
4x R1000 020 00, 480 mm, tapped hole M12 x 28 at one end

| Dimensions (mm) |                                |                                |                        |                | Retaining ring DIN 471- |              |
|-----------------|--------------------------------|--------------------------------|------------------------|----------------|-------------------------|--------------|
| Ød              | d <sub>1</sub> /d <sub>2</sub> | t <sub>1</sub> /t <sub>2</sub> | b <sub>1</sub><br>+0,1 | d <sub>3</sub> | Dimensions (mm)         | Part numbers |
| 8               | M4                             | 10                             | 0,9                    | 7,6 -0,06      | 8x0,8                   | R3410 737 00 |
| 10              | M4                             | 10                             | 1,1                    | 9,6 -0,11      | 10x1                    | R3410 745 00 |
| 12              | M5                             | 12,5                           | 1,1                    | 11,5 -0,11     | 12x1                    | R3410 712 00 |
| 16              | M6                             | 16                             | 1,1                    | 15,2 -0,11     | 16x1                    | R3410 713 00 |
| 20              | M8                             | 19                             | 1,3                    | 19 -0,13       | 20x1,2                  | R3410 735 00 |
| 25              | M10                            | 22                             | 1,3                    | 23,9 -0,21     | 25x1,2                  | R3410 750 00 |
| 30              | M12                            | 28                             | 1,6                    | 28,6 -0,21     | 30x1,5                  | R3410 724 00 |
| 40              | M12                            | 28                             | 1,85                   | 37,5 -0,25     | 40x1,75                 | R3410 726 00 |

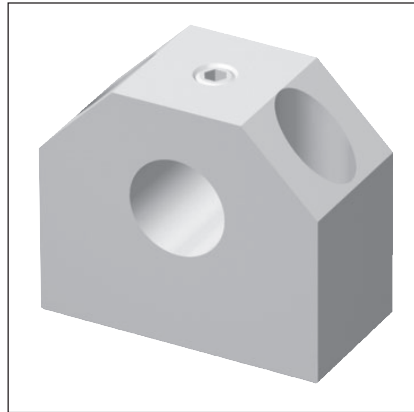
# Shaft Support Blocks R1058

## Material

- Aluminum

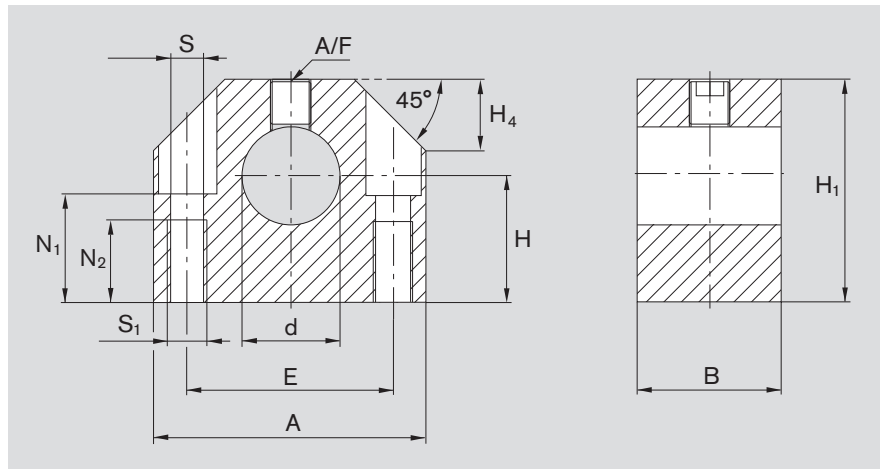
## Structural design

- Especially low profile for Linear Sets with eLINE Linear Bushings
- Clamping from above for better accessibility
- Enhanced safety thanks to clamping screw with greater thread diameter
- Tapped hole for mounting from below
- Through-holes for mounting from above



| Shaft<br>Ø d<br>(mm) | Part numbers | Weights |
|----------------------|--------------|---------|
|                      |              | (kg)    |
| 12                   | R1058 012 00 | 0,045   |
| 16                   | R1058 016 00 | 0,065   |
| 20                   | R1058 020 00 | 0,110   |
| 25                   | R1058 025 00 | 0,170   |
| 30                   | R1058 030 00 | 0,220   |
| 40                   | R1058 040 00 | 0,470   |

## Dimensions



| Dimensions (mm) |         |                          |                |    |    |            |                 |                |                |                |                |     | Tightening<br>torque<br>(Nm) |
|-----------------|---------|--------------------------|----------------|----|----|------------|-----------------|----------------|----------------|----------------|----------------|-----|------------------------------|
| Ø d             | d<br>H8 | H <sup>1)</sup><br>±0,01 | H <sub>1</sub> | A  | B  | E<br>±0,15 | S <sup>2)</sup> | S <sub>1</sub> | N <sub>1</sub> | N <sub>2</sub> | H <sub>4</sub> | A/F |                              |
| 12              | 12      | 19                       | 33             | 40 | 18 | 27         | 5,3             | M6             | 16             | 13             | 11             | 2,5 | 3,8                          |
| 16              | 16      | 22                       | 38             | 45 | 20 | 32         | 5,3             | M6             | 18             | 13             | 13             | 2,5 | 3,8                          |
| 20              | 20      | 25                       | 45             | 53 | 24 | 39         | 6,6             | M8             | 22             | 18             | 15             | 3,0 | 6,6                          |
| 25              | 25      | 31                       | 54             | 62 | 28 | 44         | 8,4             | M10            | 26             | 22             | 17             | 4,0 | 16                           |
| 30              | 30      | 34                       | 60             | 67 | 30 | 49         | 8,4             | M10            | 29             | 22             | 19             | 4,0 | 16                           |
| 40              | 40      | 42                       | 76             | 87 | 40 | 66         | 10,5            | M12            | 38             | 26             | 24             | 5,0 | 30                           |

<sup>1)</sup> Relative to nominal shaft dimension d.

<sup>2)</sup> Mounting screws ISO 4762-8.8.

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Subject to technical modifications.