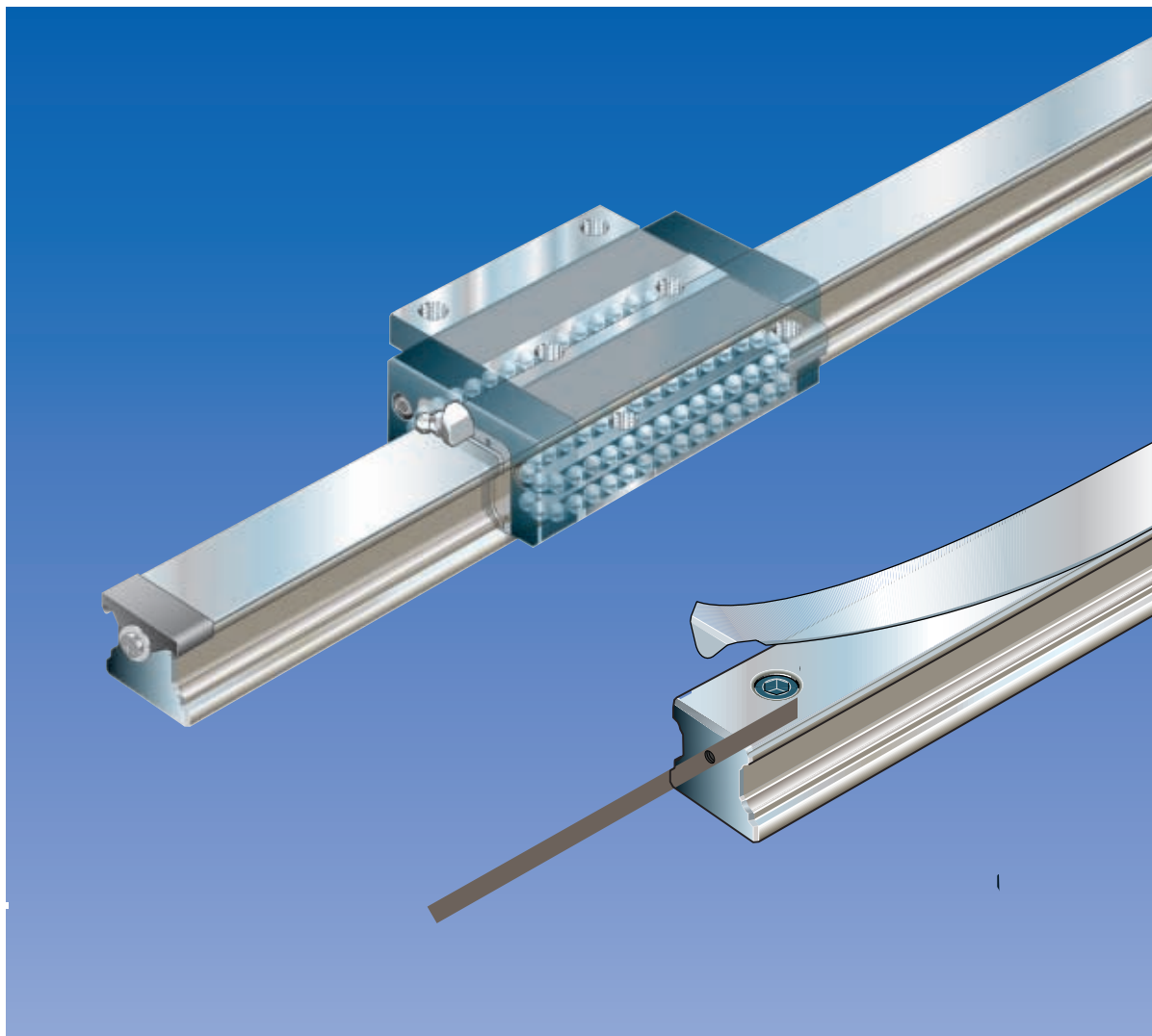




Ball Rail® Systems



Linear Motion and
Assembly Technologies

STAR – Ball Rail® Systems

Product Overview

STAR Ball Rail® Systems were specially developed for use in machine tools and industrial robots calling for compact, rolling-element linear motion guideways. Ball Rail® Systems are available in various accuracy classes, each with extremely high load capacity and high rigidity.

These compact assemblies are available in 8 common sizes and offer the same high load capacities in all four main load directions.

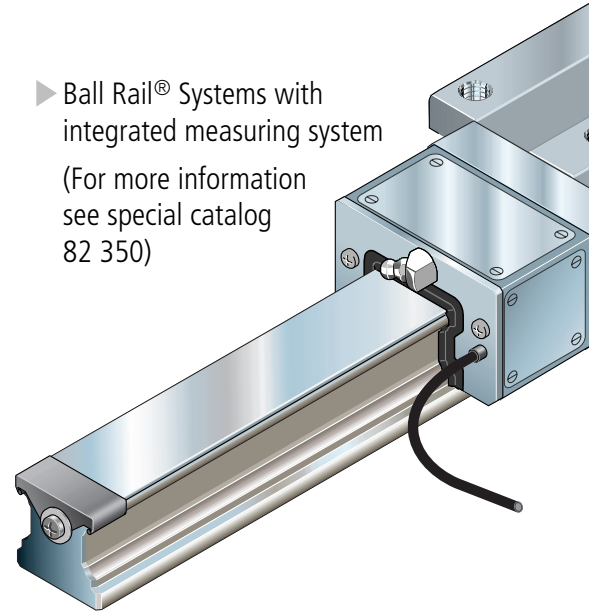
Make up your own compact linear motion guideways from interchangeable standard stock elements...

STAR manufactures its guide rails and runner blocks with such high precision, especially in the ball track zone, that each individual component element can be replaced by another at any time. This makes infinite combinations possible within each accuracy class.

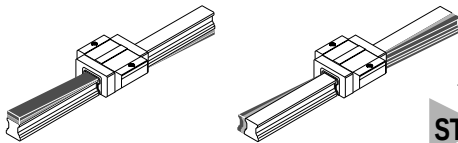
Each element can be individually ordered and separately stocked.

Both sides of the guide rail can be used as reference edges.

- Ball Rail® Systems with integrated measuring system
(For more information see special catalog 82 350)



- For the majority of all applications:
STAR Runner Blocks, steel version

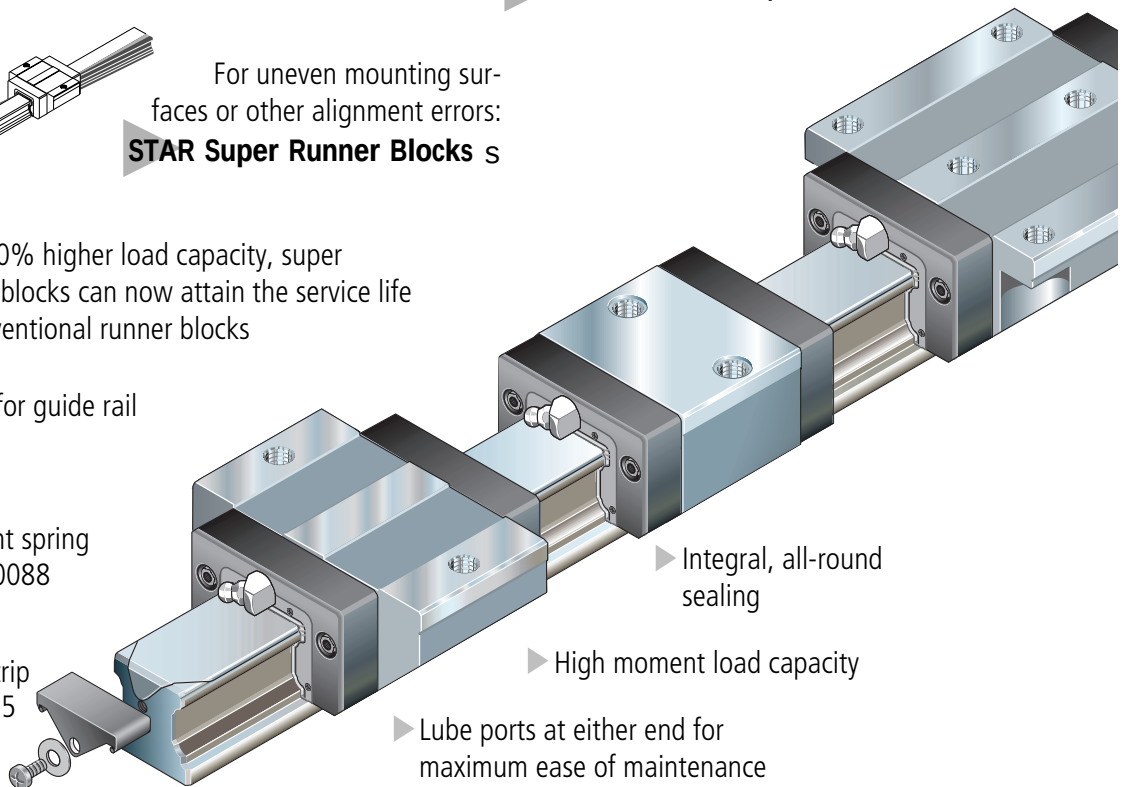


- For uneven mounting surfaces or other alignment errors:
STAR Super Runner Blocks s

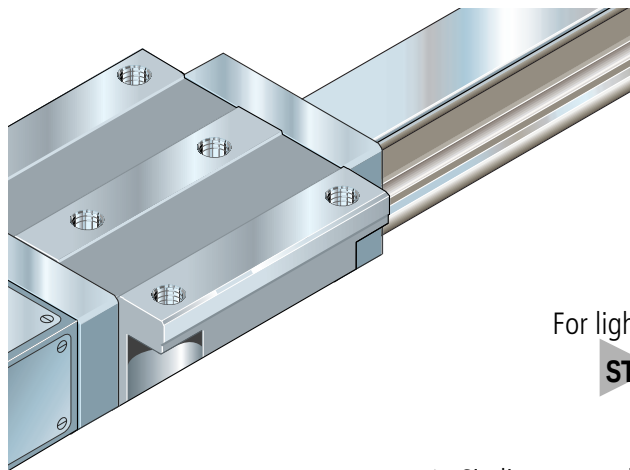
- With 30% higher load capacity, super runner blocks can now attain the service life of conventional runner blocks

Proven Rail Seal® cover strip for guide rail mounting holes:

- One cover for all holes
- Material: corrosion resistant spring steel to DIN 17230 / EN 10088
- Easy clip-on mounting
- 0.3 mm Rail Seal® cover strip as standard for sizes 35 - 65



- One guide rail profile for all runner blocks



30% higher dynamic load capacities and moments as standard in all accuracy classes:

- extends service life by a factor of 2.2
- field-proven
- Equal load rating in all four main load directions

For lightweight applications:

STAR Runner Blocks, aluminum version

- ▶ Simline runner blocks for all configurations

For low-noise applications:

STAR Runner Blocks with spacer balls

- ▶ 4 different preload classes

- ▶ Mounting of flanged runner block from above or below

- ▶ Optimized entry-zone geometry and the high number of balls per track greatly reduce variations in elastic deflection

- ▶ Smooth, light running due to optimized ball recirculation and ideal track geometry

- ▶ End face mounting holes for attachment of bellows, lubrication plates or scraper plates

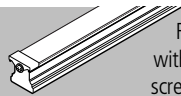
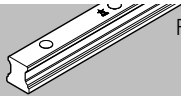
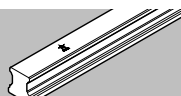
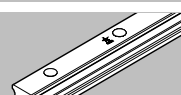
- ▶ Guide rail with mounting hole plugs

For high moment loads:

STAR Wide Ball Rail® Systems

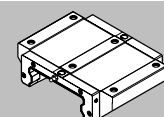
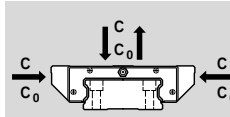
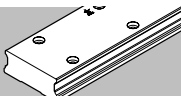
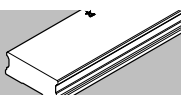
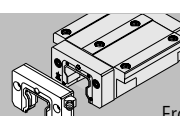
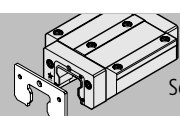
STAR – Ball Rail® Systems

Product Overview with Load Capacities

		Page		
Guide rails *Also available as special version: zinc-iron coating with yellow chromating in accuracy class N	 For mounting from above, with Rail Seal cover strip and screw-down protective caps* 1605-.6.-	80		
	 For mounting from above, with plastic (or steel) mounting hole plugs* 1605-.0.- (1606-.0.-)	82		
	 For mounting from below* 1607-	84		
	 For mounting from above – thin dense chrome plated 1645-	86		
	 For mounting from below – thin dense chrome plated 1647-	88		
	- Rail Seal mounting hole cover strip - Mounting hole plugs - Protective caps			

Basis for load capacities p. 11:

Determination of load dynamic capacity C is based on a travel life of 100,000 m to DIN 636. Load capacities on the basis of 50,000 m are also given for comparison.

Wide Ball Rail Systems Runner Blocks, steel version	 Wide 1671-	96		
Wide Ball Rail Systems Guide rails	 Wide, for mounting from above* 1675-	98		
Also available as special version: zinc-iron coating with yellow chromating in accuracy class N	 Wide, for mounting from below 1677-	100		
Accessories	 Front lube unit	102	 Scraper plate	

STAR – Ball Rail® Systems

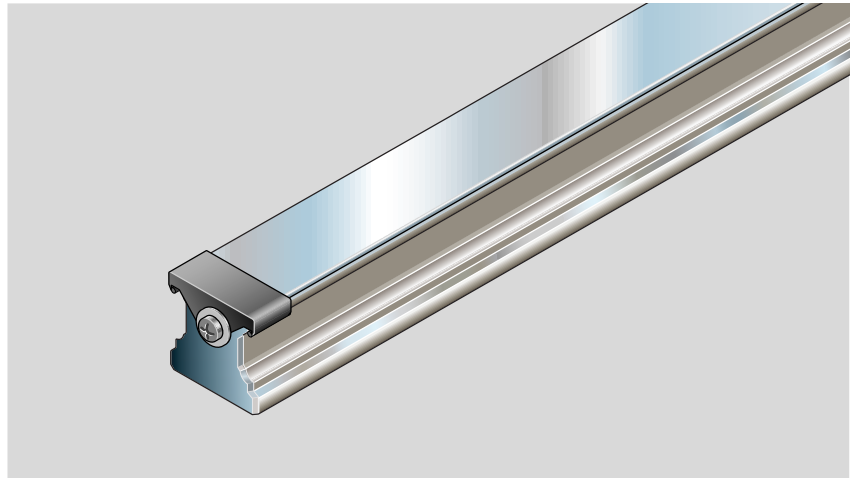
Guide Rails with Rail Seal® Mounting Hole Cover Strip

Guide rails 1605-.6. -

For mounting from above, with Rail Seal® and screw-down protective caps

Note

The guide rails are also available as composite rails, see Ordering Example 3.



Part numbers

Size	Accuracy class	Guide Rail		Hole spacing T (mm)
		One-piece Part number, Rail length L (mm)	Composite Part number, Number of sections Rail length L (mm)	
15	UP	1605-169-31,....	1605-169-3,....	60
	SP	1605-161-31,....	1605-161-3,....	
	P	1605-162-31,....	1605-162-3,....	
	H	1605-163-31,....	1605-163-3,....	
	N	1605-164-31,....	1605-164-3,....	
20	UP	1605-869-31,....	1605-869-3,....	
	SP	1605-861-31,....	1605-861-3,....	
	P	1605-862-31,....	1605-862-3,....	
	H	1605-863-31,....	1605-863-3,....	
	N	1605-864-31,....	1605-864-3,....	
25	UP	1605-269-31,....	1605-269-3,....	
	SP	1605-261-31,....	1605-261-3,....	
	P	1605-262-31,....	1605-262-3,....	
	H	1605-263-31,....	1605-263-3,....	
	N	1605-264-31,....	1605-264-3,....	
30	UP	1605-769-31,....	1605-769-3,....	80
	SP	1605-761-31,....	1605-761-3,....	
	P	1605-762-31,....	1605-762-3,....	
	H	1605-763-31,....	1605-763-3,....	
	N	1605-764-31,....	1605-764-3,....	
35	UP	1605-369-61,....	1605-369-6,....	
	SP	1605-361-61,....	1605-361-6,....	
	P	1605-362-61,....	1605-362-6,....	
	H	1605-363-61,....	1605-363-6,....	
	N	1605-364-61,....	1605-364-6,....	
45	UP	1605-469-61,....	1605-469-6,....	105
	SP	1605-461-61,....	1605-461-6,....	
	P	1605-462-61,....	1605-462-6,....	
	H	1605-463-61,....	1605-463-6,....	
	N	1605-464-61,....	1605-464-6,....	
55	UP	1605-569-61,....	1605-569-6,....	120
	SP	1605-561-61,....	1605-561-6,....	
	P	1605-562-61,....	1605-562-6,....	
	H	1605-563-61,....	1605-563-6,....	
	N	1605-564-61,....	1605-564-6,....	
65	UP	1605-669-61,....	1605-669-6,....	150
	SP	1605-661-61,....	1605-661-6,....	
	P	1605-662-61,....	1605-662-6,....	
	H	1605-663-61,....	1605-663-6,....	
	N	1605-664-61,....	1605-664-6,....	

Special version:
Zinc-iron coating with yellow chromating
in accuracy class N.

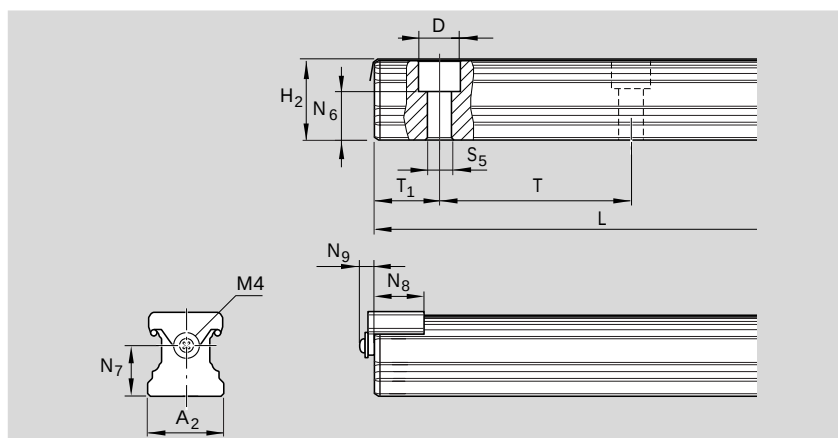
Part numbers:

1646-.64-3. (end faces uncoated)

1646-.64-4. (end faces coated)

¹⁾ Dimension H_2 with Rail Seal®

²⁾ For sizes 20 – 45, one-piece guide rails up
to approx. 6000 mm in length can be supplied
in special cases.

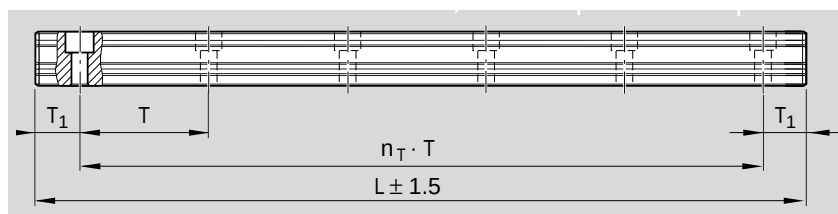


Size	A_2	$H_2^{1)}$	$N_6^{\pm 0.5}$	N_7	N_8	N_9	D	S_5	$T_{1S}^{\pm 0.5}$	$T_{1\min}$	T	$L_{\max}^{2)}$	Mass kg/m
15	15	16.3	10.3	9.8	14.0	6.5	7.4	4.4	28.0	12	60	3000	1.4
20	20	20.7	13.2	13.0	14.0	6.5	9.4	6.0	28.0	13	60	4000	2.4
25	23	24.4	15.2	15.0	15.2	6.5	11.0	7.0	28.0	13	60	4000	3.2
30	28	28.5	17.0	18.0	15.2	7.0	15.0	9.0	38.0	16	80	4000	5.0
35	34	32.15	20.5	22.0	18.0	7.0	15.0	9.0	38.0	16	80	4000	6.8
45	45	40.15	23.5	30.0	20.0	7.0	20.0	14.0	50.5	18	105	4000	10.5
55	53	48.15	29.0	30.0	20.0	7.0	24.0	16.0	58.0	20	120	4000	16.2
65	63	60.15	38.5	40.0	20.0	7.0	26.0	18.0	73.0	21	150	4000	22.4

Ordering a guide rail

Ordering example 1:

Guide rail size 35 with Rail Seal®,
accuracy class H,
rail length 1756 mm,
($21 \cdot T$, number of holes $n_B = 22$)
Ordering data: **1605-363-61, 1756 mm**



Part numbers for composite guide rails

For rail lengths over $L_{\max}$, the part numbers
given here are also valid except that the
dot after the figure **3.** or **6.** is replaced by
the number of sections.

See Ordering Example 3.

Intermediate lengths

Calculation of rail length L and ordering
examples:

- The preferred dimension is T_{1S}
- If T_{1S} cannot be used, then
 - Select an end space T_1 between
 T_{1S} and $T_{1\min}$
 - Do not go below the minimum
spacing $T_{1\min}$!

Note

- T_1 , $T_{1\min}$, T_{1S} are the same at either
end of the rail.

$L = n_B \cdot T - 4$ or $L = n_T \cdot T + 2 \cdot T_{1S}$	L = rail length (mm) T = hole spacing*) (mm) T_{1S} = preferred dimension*) (mm) n_B = number of holes n_T = number of spaces *) see tables for values
--	---

Ordering example 2 (up to $L_{\max}$):

Guide rail size 35 with Rail Seal®,
accuracy class H,
rail length 1676 mm,
($20 \cdot T$, preferred dimension $T_{1S} = 38$ mm;
number of holes $n_B = 21$)

Ordering data:

Part number, length (mm)
 $T_{1S} / n_T \cdot T / T_{1S}$ (mm)
1605-363-61, 1676 mm
38 / 20 · 80 / 38 mm

Rail lengths above $L_{\max}$ are made up of
fitted rail sections mounted end to end.

Ordering example 3 (over $L_{\max}$):

Guide rail size 35 with Rail Seal®,
accuracy class H,
rail length 5063 mm, **2** sections
 ($62 \cdot T$, preferred dimension $T_{1S} = 38$ mm;
number of holes $n_B = 63$)

Ordering data:

Part number and number of sections,
length (mm)
 $T_{1S} / n_T \cdot T / T_{1S}$ (mm)
1605-363-62, 5036 mm
38 / 62 · 80 / 38 mm

STAR – Ball Rail® Systems

Guide Rails with Mounting Hole Plugs

Guide rails 1605-.0.-

for mounting from above,
complete with plastic mounting
hole plugs

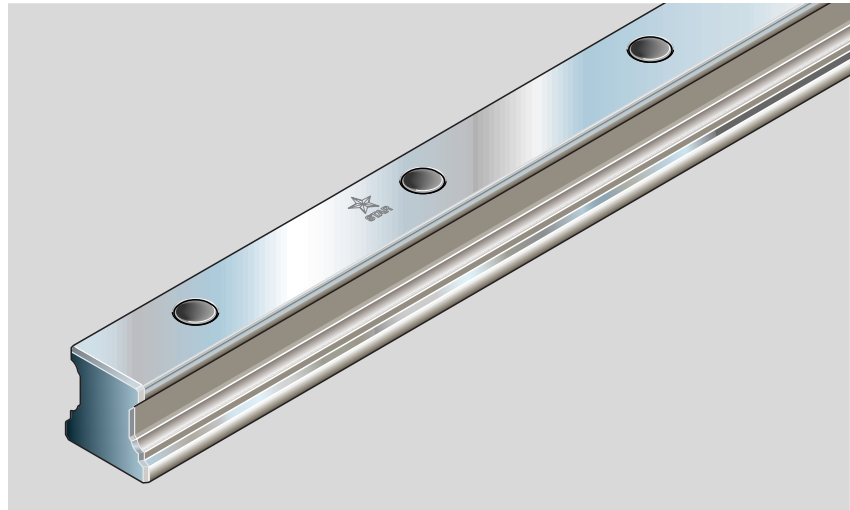
For special applications:

- Guide rails with steel mounting hole plugs for sizes 25 to 65 in accuracy classes SP, P, H, N

Part numbers: **1606-.5.-**

Steel mounting hole plugs to be ordered separately.

Observe the mounting instructions for steel mounting hole plugs.



Part numbers

Size	Accuracy class	Guide Rail		Hole spacing T (mm)
		One-piece Part number, Rail length L (mm)	Composite Part number, Number of sections Rail length L (mm)	
15	UP	1605-109-31,....	1605-109-3,....	60
	SP	1605-101-31,....	1605-101-3,....	
	P	1605-102-31,....	1605-102-3,....	
	H	1605-103-31,....	1605-103-3,....	
	N	1605-104-31,....	1605-104-3,....	
20	UP	1605-809-31,....	1605-809-3,....	
	SP	1605-801-31,....	1605-801-3,....	
	P	1605-802-31,....	1605-802-3,....	
	H	1605-803-31,....	1605-803-3,....	
	N	1605-804-31,....	1605-804-3,....	
25	UP	1605-209-31,....	1605-209-3,....	
	SP	1605-201-31,....	1605-201-3,....	
	P	1605-202-31,....	1605-202-3,....	
	H	1605-203-31,....	1605-203-3,....	
	N	1605-204-31,....	1605-204-3,....	
30	UP	1605-709-31,....	1605-709-3,....	80
	SP	1605-701-31,....	1605-701-3,....	
	P	1605-702-31,....	1605-702-3,....	
	H	1605-703-31,....	1605-703-3,....	
	N	1605-704-31,....	1605-704-3,....	
35	UP	1605-309-31,....	1605-309-3,....	
	SP	1605-301-31,....	1605-301-3,....	
	P	1605-302-31,....	1605-302-3,....	
	H	1605-303-31,....	1605-303-3,....	
	N	1605-304-31,....	1605-304-3,....	
45	UP	1605-409-31,....	1605-409-3,....	105
	SP	1605-401-31,....	1605-401-3,....	
	P	1605-402-31,....	1605-402-3,....	
	H	1605-403-31,....	1605-403-3,....	
	N	1605-404-31,....	1605-404-3,....	
55	UP	1605-509-31,....	1605-509-3,....	120
	SP	1605-501-31,....	1605-501-3,....	
	P	1605-502-31,....	1605-502-3,....	
	H	1605-503-31,....	1605-503-3,....	
	N	1605-504-31,....	1605-504-3,....	
65	UP	1605-609-31,....	1605-609-3,....	150
	SP	1605-601-31,....	1605-601-3,....	
	P	1605-602-31,....	1605-602-3,....	
	H	1605-603-31,....	1605-603-3,....	
	N	1605-604-31,....	1605-604-3,....	

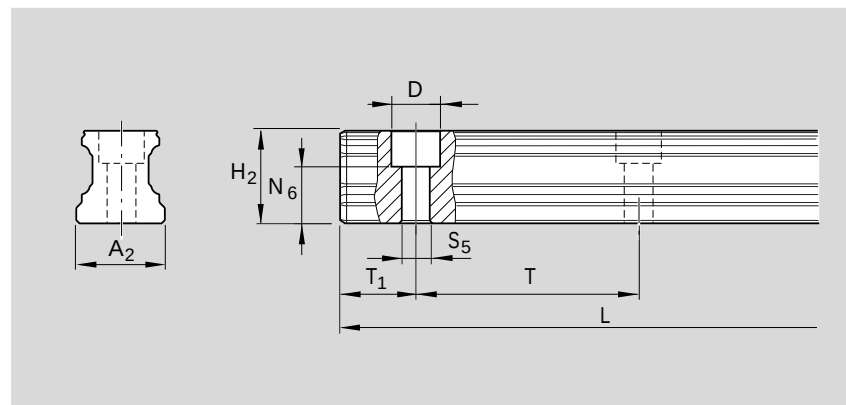
Special version:

Zinc-iron coating with yellow chromating
in accuracy class N.

Part numbers:

1646-.14-3. (end faces uncoated)

1646-.14-4. (end faces coated)



¹⁾ Dimension H_2 with Rail Seal®

²⁾ For sizes 20 – 45, one-piece guide rails
up to approx. 6000 mm in length can be
supplied in special cases

Size	Dimensions (mm)									Mass kg/m
	A_2	$H_2^{1)}$	$N_6^{±0.5}$	D	S_5	$T_{1S}^{±0.5}$	$T_{1\min}$	T	$L_{\max}^{2)}$	
15	15	16.20	10.3	7.4	4.4	28.0	10	60	3000	1.4
20	20	20.55	13.2	9.4	6.0	28.0	10	60	4000	2.4
25	23	24.25	15.2	11.0	7.0	28.0	10	60	4000	3.2
30	28	28.35	17.0	15.0	9.0	38.0	12	80	4000	5.0
35	34	31.85	20.5	15.0	9.0	38.0	12	80	4000	6.8
45	45	39.85	23.5	20.0	14.0	50.5	16	105	4000	10.5
55	53	47.85	29.0	24.0	16.0	58.0	18	120	4000	16.2
65	63	59.85	38.5	26.0	18.0	73.0	20	150	4000	22.4

Ordering a guide rail

Ordering example 1:

Guide rail size 35,
accuracy class H,
rail length 1756 mm,
($21 \cdot T$, number of holes $n_B = 22$)
Ordering data: **1605-303-31, 1756 mm**

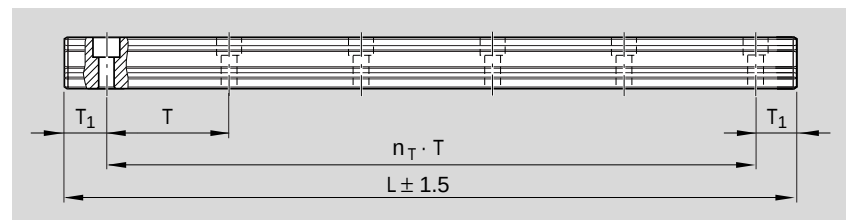
Intermediate lengths

Calculation of rail length L and ordering
examples:

- The preferred dimension is T_{1S}
- If T_{1S} cannot be used, then
 - Select an end space T_1 between T_{1S} and $T_{1\min}$
 - Do not go below the minimum spacing $T_{1\min}$!

Note

- T_1 , $T_{1\min}$, T_{1S} are the same at either end of the rail.



$$L = n_B \cdot T - 4$$

or

$$L = n_T \cdot T + 2 \cdot T_{1S}$$

L = rail length (mm)
T = hole spacing*) (mm)
 T_{1S} = preferred dimension*) (mm)
 n_B = number of holes
 n_T = number of spaces
) see tables for values

Ordering example 2 (up to $L_{\max}$):

Guide rail size 35,
accuracy class H,
rail length 1676 mm,
($20 \cdot T$, preferred dimension $T_{1S} = 38$ mm;
number of holes $n_B = 21$)

Ordering data:

Part number, length (mm)
 $T_{1S} / n_T \cdot T / T_{1S}$ (mm)
1605-303-31, 1676 mm
38 / 20 · 80 / 38 mm

Rail lengths above $L_{\max}$ are made up of
fitted rail sections mounted end to end.

Ordering example 3 (over $L_{\max}$):

Guide rail size 35,
accuracy class H,
rail length 5063 mm, 2 sections
($62 \cdot T$, preferred dimension $T_{1S} = 38$ mm;
number of holes $n_B = 63$)

Ordering data:

Part number and number of sections,
length (mm)
 $T_{1S} / n_T \cdot T / T_{1S}$ (mm)
1605-303-32, 5036 mm
38 / 62 · 80 / 38 mm

STAR – Ball Rail® Systems

Guide Rails

Guide rail 1607-

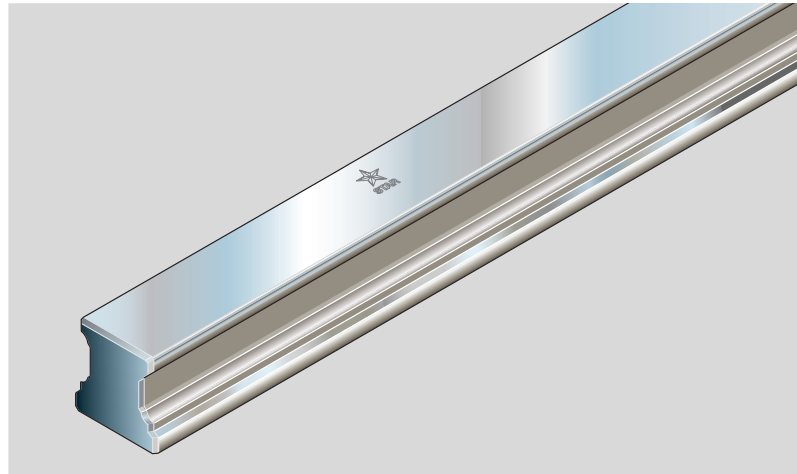
For mounting from below

Special version:
Zinc-iron coating with yellow chromating
in accuracy class N.

Part numbers:

1648-.14-3. (end faces uncoated)

1648-.14-4. (end faces coated)

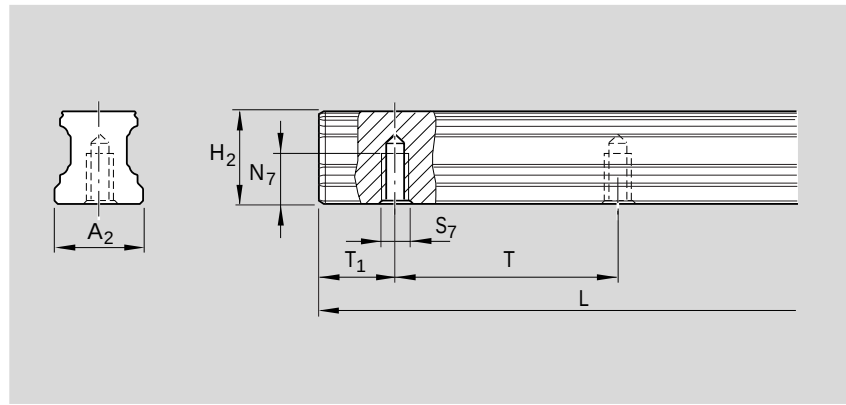


Part numbers

Size	Accuracy class	Guide Rail		Hole spacing T (mm)
		One-piece Part number, Rail length L (mm)	Composite Part number, Number of sections Rail length L (mm)	
15	UP	1607-109-31,....	1607-109-3,....	60
	SP	1607-101-31,....	1607-101-3,....	
	P	1607-102-31,....	1607-102-3,....	
	H	1607-103-31,....	1607-103-3,....	
	N	1607-104-31,....	1607-104-3,....	
20	UP	1607-809-31,....	1607-809-3,....	
	SP	1607-801-31,....	1607-801-3,....	
	P	1607-802-31,....	1607-802-3,....	
	H	1607-803-31,....	1607-803-3,....	
	N	1607-804-31,....	1607-804-3,....	
25	UP	1607-209-31,....	1607-209-3,....	
	SP	1607-201-31,....	1607-201-3,....	
	P	1607-202-31,....	1607-202-3,....	
	H	1607-203-31,....	1607-203-3,....	
	N	1607-204-31,....	1607-204-3,....	
30	UP	1607-709-31,....	1607-709-3,....	80
	SP	1607-701-31,....	1607-701-3,....	
	P	1607-702-31,....	1607-702-3,....	
	H	1607-703-31,....	1607-703-3,....	
	N	1607-704-31,....	1607-704-3,....	
35	UP	1607-309-31,....	1607-309-3,....	
	SP	1607-301-31,....	1607-301-3,....	
	P	1607-302-31,....	1607-302-3,....	
	H	1607-303-31,....	1607-303-3,....	
	N	1607-304-31,....	1607-304-3,....	
45	UP	1607-409-31,....	1607-409-3,....	105
	SP	1607-401-31,....	1607-401-3,....	
	P	1607-402-31,....	1607-402-3,....	
	H	1607-403-31,....	1607-403-3,....	
	N	1607-404-31,....	1607-404-3,....	
55	UP	1607-509-31,....	1607-509-3,....	120
	SP	1607-501-31,....	1607-501-3,....	
	P	1607-502-31,....	1607-502-3,....	
	H	1607-503-31,....	1607-503-3,....	
	N	1607-504-31,....	1607-504-3,....	
65	UP	1607-609-31,....	1607-609-3,....	150
	SP	1607-601-31,....	1607-601-3,....	
	P	1607-602-31,....	1607-602-3,....	
	H	1607-603-31,....	1607-603-3,....	
	N	1607-604-31,....	1607-604-3,....	



Dimensions and masses

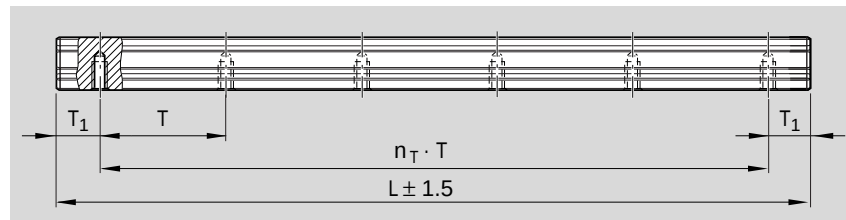


Size	Dimensions (mm)								Mass kg/m
	A ₂	H ₂	N ₇	S ₇	T _{1S} ^{±0.5}	T _{1min}	T	L _{max}	
15	15	16.20	7.5	M5	28.0	10	60	3000	1.4
20	20	20.55	8.0	M6	28.0	10	60	4000	2.4
25	23	24.25	12.0	M6	28.0	10	60	4000	3.2
30	28	28.35	15.0	M8	38.0	12	80	4000	5.0
35	34	31.85	15.0	M8	38.0	12	80	4000	6.8
45	45	39.85	19.0	M12	50.5	16	105	4000	10.5
55	53	47.85	22.0	M14	58.0	18	120	4000	16.2
65	63	59.85	25.0	M16	73.0	20	150	4000	22.4

Ordering a guide rail

Ordering example 1:

Guide rail size 35,
accuracy class H,
rail length 1756 mm,
(21 · T, number of holes n_B = 22)
Ordering data: **1607-303-31, 1756 mm**



Intermediate lengths

Calculation of rail length L and ordering examples:

- The preferred dimension is T_{1S}
- If T_{1S} cannot be used, then
 - Select an end space T₁ between T_{1S} and T_{1min}
 - Do not go below the minimum spacing T_{1min}!

Note

- T₁, T_{1min}, T_{1S} are the same at either end of the rail.

$$L = n_B \cdot T - 4$$

or

$$L = n_T \cdot T + 2 \cdot T_{1S}$$

L = rail length (mm)
T = hole spacing*) (mm)
T_{1S} = preferred dimension*) (mm)
n_B = number of holes
n_T = number of spaces
) see tables for values

Ordering example 2 (up to L_{max}):

Guide rail size 35,
accuracy class H,
rail length 1676 mm,
(20 · T, preferred dimension T_{1S} = 38 mm;
number of holes n_B = 21)

Ordering data:

Part number, length (mm)
T_{1S} / n_T · T / T_{1S} (mm)

1607-303-31, 1676 mm

38 / 20 · 80 / 38 mm

Rail lengths above L_{max} are made up of fitted rail sections mounted end to end.

Ordering example 3 (over L_{max}):

Guide rail size 35,
accuracy class H,
rail length 5063 mm, 2 sections
(62 · T, preferred dimension T_{1S} = 38 mm;
number of holes n_B = 63)

Ordering data:

Part number and number of sections,
length (mm)

T_{1S} / n_T · T / T_{1S} (mm)

1607-303-32, 5036 mm

38 / 62 · 80 / 38 mm

STAR – Ball Rail® Systems

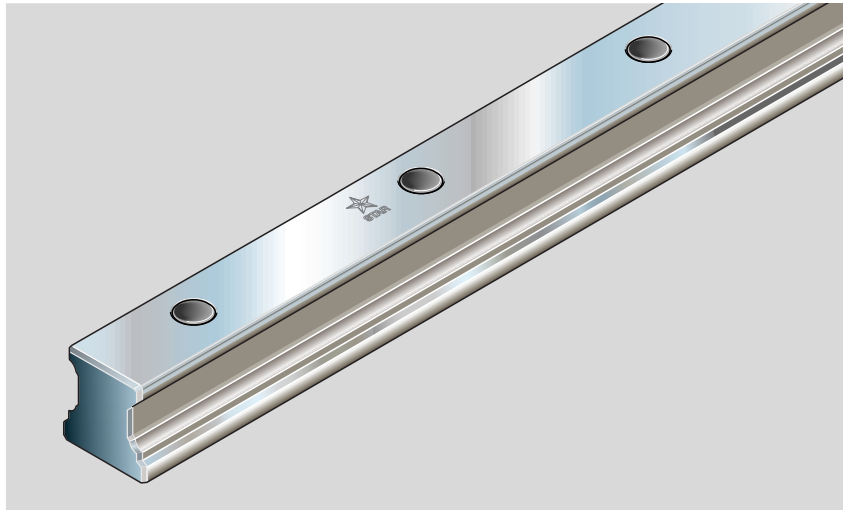
Guide Rails

Guide rail

Thin dense chrome plated
1645-

for mounting from above,
complete with plastic mounting
hole plugs

– Mounting holes are not chrome plated



Part numbers

Size	Accuracy class	Guide Rail		Hole spacing T (mm)
		One piece Part number, Rail length L (mm)	Composite Part number, Number of sections Rail length L (mm)	
15	H	1645-103-31,....	1645-103-3,.....	60
20	H	1645-803-31,....	1645-803-3,.....	
25	H	1645-203-31,....	1645-203-3,.....	
30	H	1645-703-31,....	1645-703-3,.....	80
35	H	1645-303-31,....	1645-303-3,.....	
45	H	1645-403-31,....	1645-403-3,.....	105
55	H	1645-503-31,....	1645-503-3,.....	120
65	H	1645-603-31,....	1645-603-3,.....	150

Recommended runner blocks

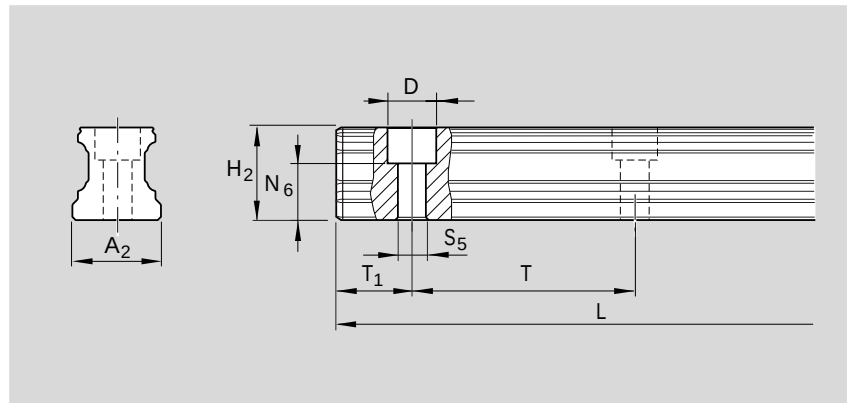
When using a combination of guide rails and runner blocks of different accuracy classes, the dimensions H and A_3 change by approx. 20 μm .

(For dimensions H and A_3 see "Accuracy classes and their tolerances" under runner blocks, technical data)

Size	Accuracy class	Recommended runner blocks	
		Runner blocks up to approx. 10 μm clearance	Runner blocks preload 0.02 C
15	H	16..-193-10	
20	H	16..-893-10	
25	H	16..-293-10	
30	H	16..-793-10	
35	H	16..-393-10	16..-313-10
45	H	16..-493-10	16..-413-10
55	H	16..-593-10	16..-513-10
65	H	16..-693-10	16..-613-10



Dimensions and masses



Ordering a guide rail

Ordering example 1:

Guide rail size 35,
accuracy class H,
rail length 1756 mm,
($21 \cdot T$, number of holes $n_B = 22$)
Ordering data: **1645-303-31, 1756 mm**

Intermediate lengths

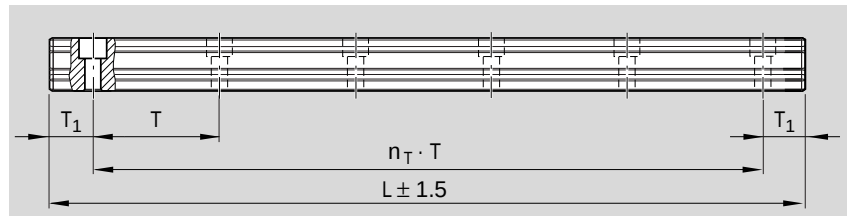
Calculation of rail length L and ordering examples:

- The preferred dimension is T_{1S}
- If T_{1S} cannot be used, then
 - Select an end space T_1 between T_{1S} and T_{1min}
 - Do not go below the minimum spacing T_{1min} !

Note

- T_1, T_{1min}, T_{1S} are the same at either end of the rail.
- The length L_{max} is also the standard length for chrome plated rails.
- The end faces are thin dense chrome plated and finished as a joint for end to end mounting.
- The end faces of shorter rails are not chrome plated.

Size	Dimensions (mm)									Mass kg/m
	A_2	H_2	$N_6^{\pm 0.5}$	D	S_5	$T_{1S}^{\pm 0.5}$	T_{1min}	T	L_{max}	
15	15	16.20	10.3	7.4	4.4	28.0	10	60	1980	1.4
20	20	20.55	13.2	9.4	6.0	28.0	10	60	1980	2.4
25	23	24.25	15.2	11.0	7.0	28.0	10	60	1980	3.2
30	28	28.35	17.0	15.0	9.0	38.0	12	80	2000	5.0
35	34	31.85	20.5	15.0	9.0	38.0	12	80	2000	6.8
45	45	39.85	23.5	20.0	14.0	50.5	16	105	1995	10.5
55	53	47.85	29.0	24.0	16.0	58.0	18	120	1920	16.2
65	63	59.85	38.5	26.0	18.0	73.0	20	150	1950	22.4



$$L = n_B \cdot T - 4$$

or

$$L = n_T \cdot T + 2 \cdot T_{1S}$$

L = rail length (mm)
T = hole spacing*) (mm)
 T_{1S} = preferred dimension*) (mm)
 n_B = number of holes
 n_T = number of spaces
) see tables for values

Ordering example 2 (up to L_{max}):

Guide rail size 35,
accuracy class H,
rail length 1676 mm,
($20 \cdot T$, preferred dimension $T_{1S} = 38$ mm;
number of holes $n_B = 21$)

Ordering data:

Part number, length (mm)
 $T_{1S} / n_T \cdot T / T_{1S}$ (mm)

1645-303-31, 1676 mm
38 / 20 · 80 / 38 mm

Rail lengths above L_{max} are made up of fitted rail sections mounted end to end.

Ordering example 3 (over L_{max}):

Guide rail size 35,
accuracy class H,
rail length 3676 mm, 2 sections
($45 \cdot T$, preferred dimension $T_{1S} = 38$ mm;
number of holes $n_B = 46$)

Ordering data:

Part number and number of sections,
length (mm)
 $T_{1S} / n_T \cdot T / T_{1S}$ (mm)

1645-303-32, 3676 mm
38 / 45 · 80 / 38 mm

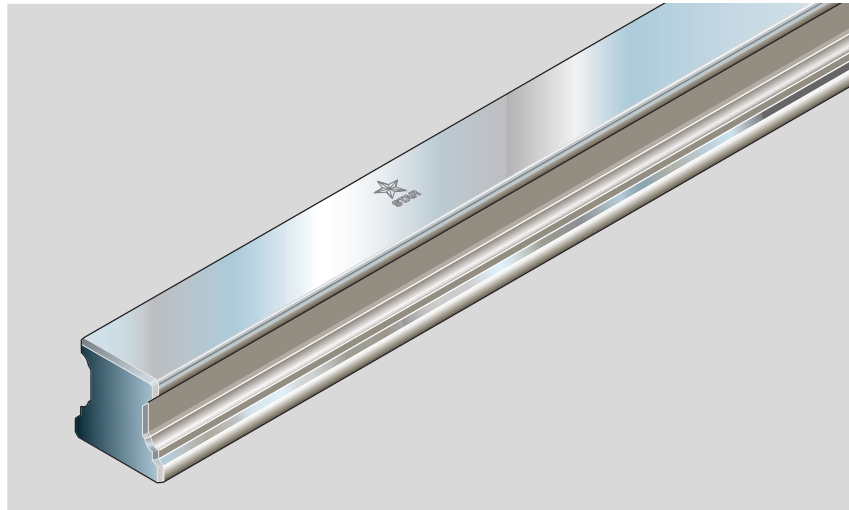
STAR – Ball Rail® Systems

Guide Rails

Guide rail
Thin dense chrome plated
1647-

For mounting from below

- Mounting holes are not chrome plated



Part numbers

Size	Accuracy class	Guide Rail		Hole spacing T (mm)
		One-piece Part number, Rail length L (mm)	Composite Part number, Number of sections Rail length L (mm)	
15	H	1647-103-31,....	1647-103-3,.....	60
20	H	1647-803-31,....	1647-803-3,.....	
25	H	1647-203-31,....	1647-203-3,.....	
30	H	1647-703-31,....	1647-703-3,.....	80
35	H	1647-303-31,....	1647-303-3,.....	
45	H	1647-403-31,....	1647-403-3,.....	105
55	H	1647-503-31,....	1647-503-3,.....	120
65	H	1647-603-31,....	1647-603-3,.....	150

Recommended runner blocks

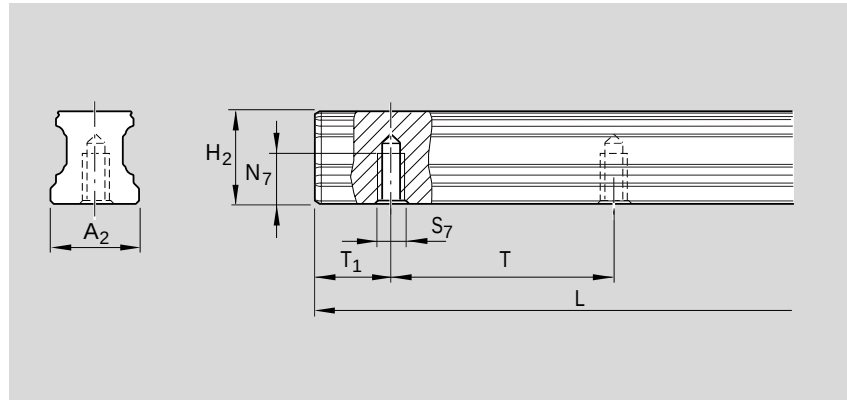
When using a combination of guide rails and runner blocks of different accuracy classes, the dimensions H and A_3 change by approx. 20 μm .

(For dimensions H and A_3 see "Accuracy classes and their tolerances" under runner blocks, technical data)

Size	Accuracy class	Recommended runner blocks	
		Runner blocks up to approx. 10 μm clearance	Runner blocks preload 0.02 C
15	H	16...193-10	
20	H	16...893-10	
25	H	16...293-10	
30	H	16...793-10	
35	H	16...393-10	16...313-10
45	H	16...493-10	16...413-10
55	H	16...593-10	16...513-10
65	H	16...693-10	16...613-10



Dimensions and masses



Ordering a guide rail

Ordering example 1:

Guide rail size 35,
accuracy class H,
rail length 1756 mm,
($21 \cdot T$, number of holes $n_B = 22$)
Ordering data: **1647-303-31, 1756 mm**

Intermediate lengths

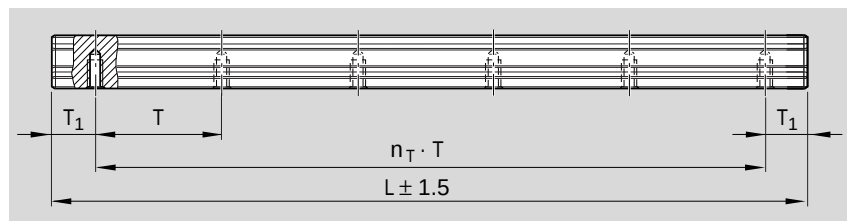
Calculation of rail length L and ordering examples:

- The preferred dimension is T_{15}
- If T_{15} cannot be used, then
 - Select an end space T_1 between T_{15} and T_{1min}
 - Do not go below the minimum spacing T_{1min} !

Note

- T_1 , T_{1min} , T_{15} are the same at either end of the rail.
- The length L_{max} is also the standard length for chrome plated rails.
- The end faces are thin dense chrome plated and finished as a joint for end to end mounting.
- The end faces of shorter rails are not chrome plated.

Size	Dimensions (mm)								Mass kg/m
	A_2	H_2	N_7	S_7	$T_{15}^{+0.5}$	T_{1min}	T	L_{max}	
15	15	16.20	7.5	M5	28.0	10	60	1980	1.4
20	20	20.55	8.0	M6	28.0	10	60	1980	2.4
25	23	24.25	12.0	M6	28.0	10	60	1980	3.2
30	28	28.35	15.0	M8	38.0	12	80	2000	5.0
35	34	31.85	15.0	M8	38.0	12	80	2000	6.8
45	45	39.85	19.0	M12	50.5	16	105	1995	10.5
55	53	47.85	22.0	M14	58.0	18	120	1920	16.2
65	63	59.85	25.0	M16	73.0	20	150	1950	22.4



$$L = n_B \cdot T - 4$$

or

$$L = n_T \cdot T + 2 \cdot T_{15}$$

L = rail length (mm)
T = hole spacing*) (mm)
 T_{15} = preferred dimension*) (mm)
 n_B = number of holes
 n_T = number of spaces
) see tables for values

Ordering example 2 (up to L_{max}):

Guide rail size 35,
accuracy class H,
rail length 1676 mm,
($20 \cdot T$, preferred dimension $T_{15} = 38$ mm;
number of holes $n_B = 21$)

Ordering data:

Part number, length (mm)
 $T_{15} / n_T \cdot T / T_{15}$ (mm)

1647-303-31, 1676 mm

38 / 20 · 80 / 38 mm

Rail lengths above L_{max} are made up of fitted rail sections mounted end to end.

Ordering example 3 (over L_{max}):

Guide rail size 35,
accuracy class H,
rail length 3676 mm, 2 sections
($45 \cdot T$, preferred dimension $T_{15} = 38$ mm;
number of holes $n_B = 46$)

Ordering data:

Part number and number of sections,
length (mm)
 $T_{15} / n_T \cdot T / T_{15}$ (mm)

1647-303-32, 3676 mm

38 / 45 · 80 / 38 mm

STAR – Ball Rail® Systems

Rail Seal Mounting Hole Cover Strip, Protective Caps, Mounting Hole Plugs

Guide Rails with Rail Seal – Shipment

One-piece guide rails:

One-piece guide rails are shipped with the rail seal already clipped on.

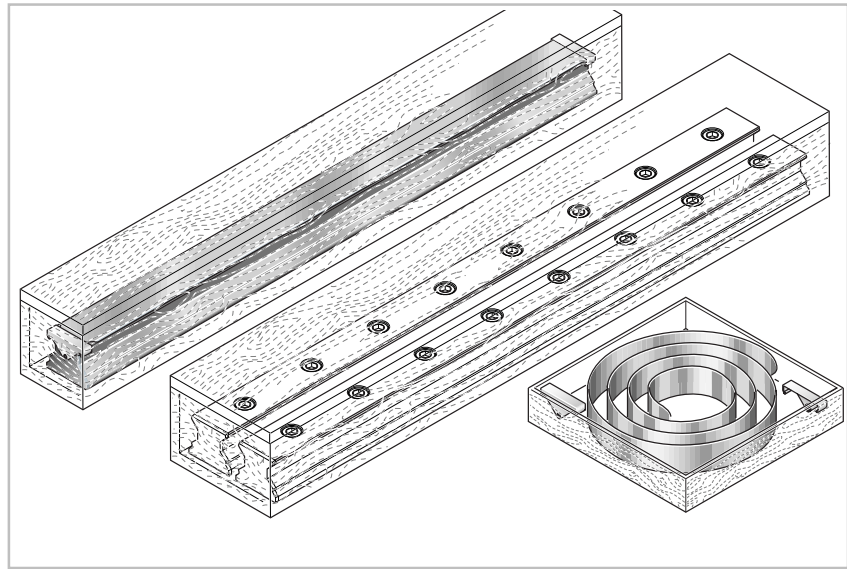
Composite guide rails:

For composite guide rails, a one-piece rail seal to cover the total length is supplied separately.

Standard version:

Snap-fit Rail Seal.

Rail seal with prefabricated sliding fit available on request. Please state dimension for sliding fit in clear text.



Separate standard snap-fit rail seal 1619- (as spare/replacement part)

Ordering example:

- Guide rail size 35
- Guide rail length 2696 mm

Ordering data:

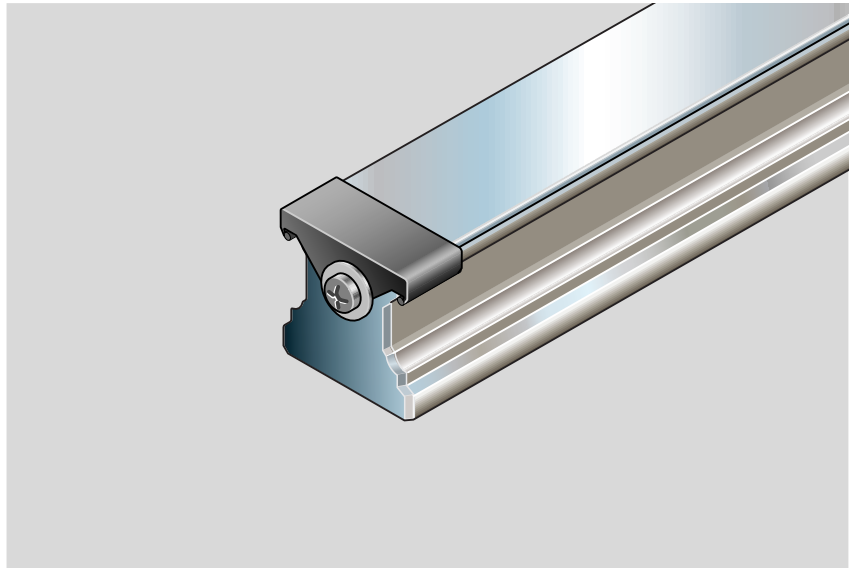
Part number, length (mm)

1619-330-20, 2696 mm

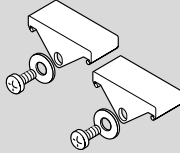
Size	Standard Rail Seal Part numbers, length (mm)
15	1619-130-00,
20	1619-830-00,
25	1619-230-00,
30	1619-730-00,
35	1619-330-20,
45	1619-430-20,
55	1619-530-20,
65	1619-630-20,

Protective Caps

STAR recommends the use of screw-down protective caps.



Part numbers for protective caps

Size	Protective caps Part numbers	
		
15	1619-139-00	1619-139-20
20	1619-839-00	1619-839-20
25	1619-239-00	1619-239-20
30	1619-739-00	1619-739-20
35	1619-339-00	1619-339-20
45	1619-439-00	1619-439-20
55	1619-539-00	1619-539-20
65	1619-639-00	1619-639-20

Mounting Hole Plugs

Part numbers for Mounting Hole Plugs		
Size	Plastic	Steel
15	1605-100-90	–
20	1605-800-90	–
25	1605-200-90	1606-200-75
30	1605-300-90	1606-300-75
35	1605-300-90	1606-300-75
45	1605-400-90	1606-400-75
55	1605-500-90	1606-500-75
65	1605-600-90	1606-600-75

A mounting jig with instruction leaflet is available for mounting steel mounting hole plugs.

Size	Part numbers Mounting jig
25	1619-210-00
35	1619-310-00
45	1619-410-00
55	1619-510-00
65	1619-610-00

