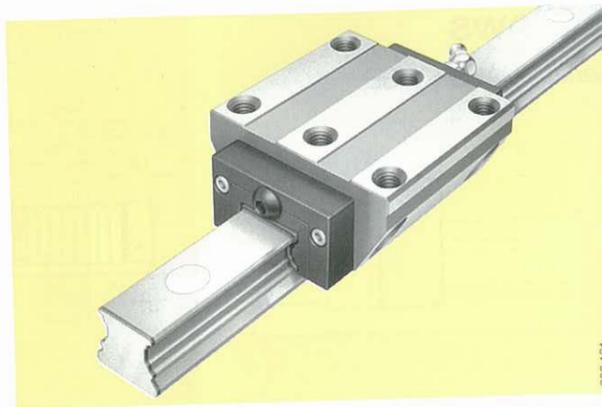
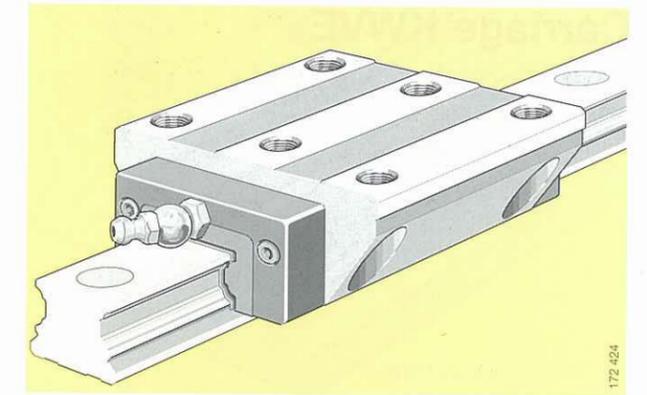


Four-row linear recirculating ball bearing and guideway assembly KUVE



Four-row linear recirculating ball bearing and guideway assembly KUVE



Four-row linear recirculating ball bearing and guideway assembly KUVE

A linear recirculating ball bearing and guideway assembly of series KUVE consists of at least one carriage KWVE on a guideway TKVD. The unit has a full complement ball guidance system which is preloaded as standard. This linear ball bearing and guideway assembly can take loads from all directions and moments about all axes.

The linear ball bearing and guideway assembly KUVE contains four rows of balls in two point contact with the raceways.

The carriages KWVE and guideways TKVD can be ordered separately.

Where higher accuracy is required, linear recirculating ball bearing and guideway assemblies KUVE can be ordered as preassembled units.

When selecting a monorail guidance system, the technical principles must also be taken into consideration:

- Corroctect® corrosion protection plating, page 16
- Accuracy, page 24
- Preload, page 26
- Lubrication, page 28
- Friction, page 36
- Operating limits, page 37
- Contact geometry, page 40
- Load carrying capacity and life, page 42
- Design of bearing arrangements, page 52
- Fitting, page 62.

Linear recirculating ball bearing and guideway assembly KUVE: components

Linear recirculating ball bearing and guideway assemblies

KUVE	Linear recirculating ball bearing and guideway assembly with carriage KWVE and guideway TKVD
------	--

Carriages (can also be ordered individually)

KWVE	Compact carriage with four rows of balls
------	--

Guideways (can also be ordered individually)

TKVD	Guideway with hardened and ground raceways and locating faces, can be fixed to adjacent construction from above
------	---

Linear recirculating ball bearing and guideway assembly KUVE: variants

Suffix	Differences from standard executions (can be combined in some cases)
L	Extended carriage
C	Short carriage
E	Economy Version
K	Guideway for clamping to profiled section
H	Narrow carriage with increased section height
S	Narrow carriage
N	Carriage with reduced section height
W	Wide carriage Wide guideway
RRF	Linear recirculating ball bearing and guideway assembly with corrosion-resistant carriage and corrosion-resistant guideway
RRFT	Linear recirculating ball bearing and guideway assembly with corrosion-resistant guideway only

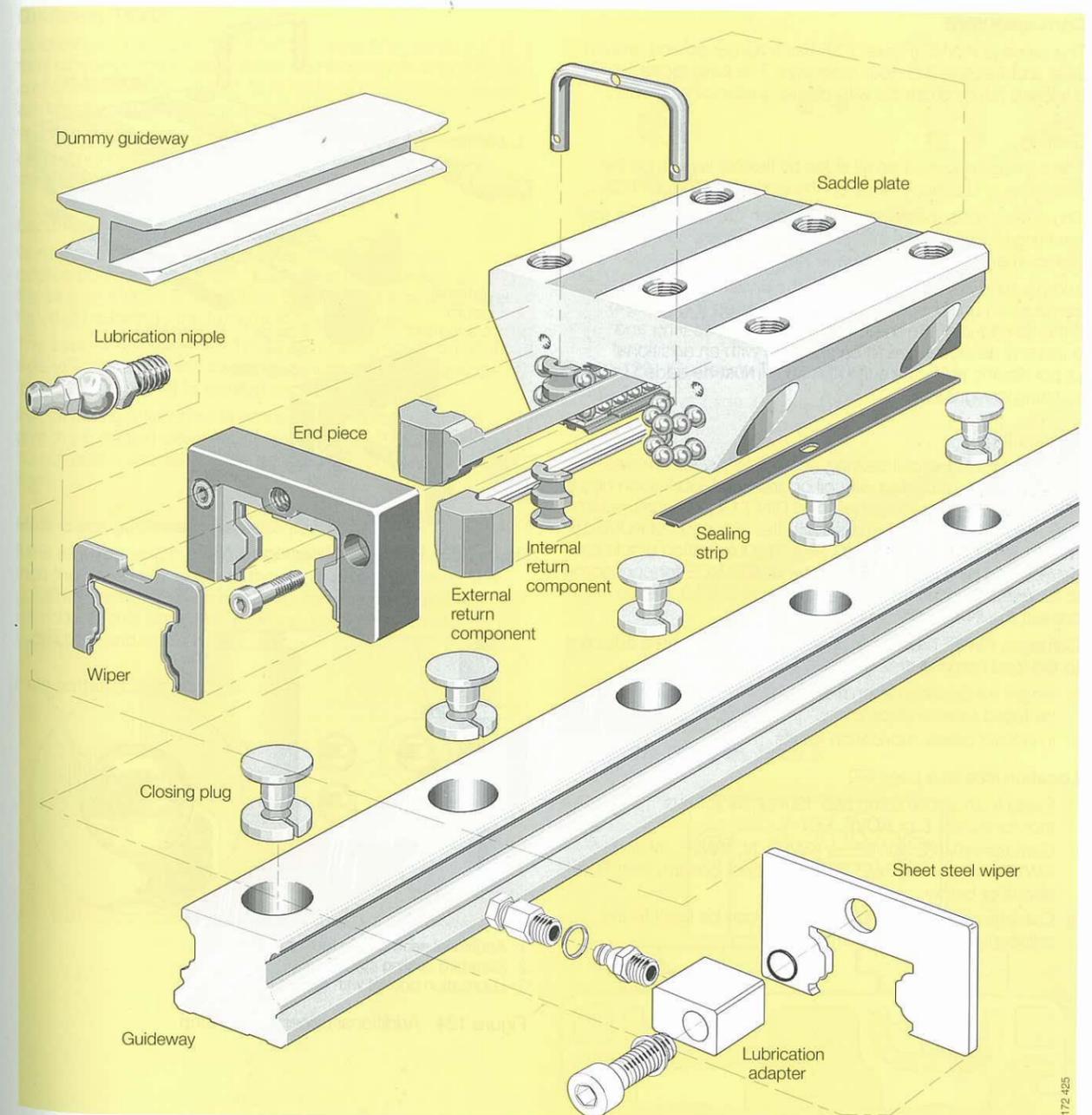
Accessories

Standard accessories

KA..TN A	Plastic closing plugs
MKVD MKVD..W	Dummy guideway

Special accessories

APLVE APLVE..W	Sheet steel wiper
SMAD KFE SMAD KOE	Lubrication adapters for grease (FE) and oil (OE)



KUVE



KUVS



KUE



KUME



LF



WF

Carriage KWVE

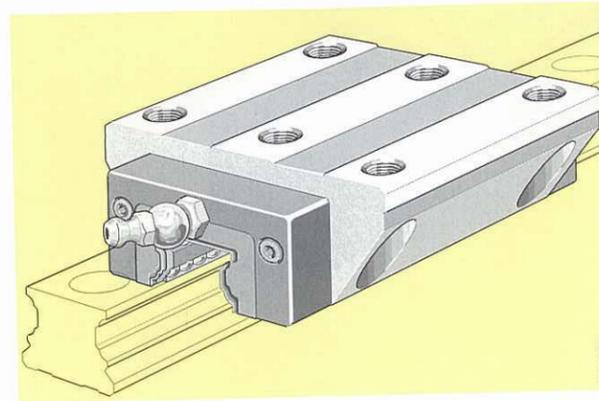


Figure 122 · Carriage KWVE

Carriage KWVE

The carriage KWVE (Figure 122) has a hardened and ground steel saddle plate with four raceways. The balls recirculate in enclosed return channels with plastic guidance elements.

Sealing

The carriage is sealed on all sides by flexible wipers on the end faces and sealing strips on the underside (Figure 123).

The wipers are separate elements which are clipped into the retaining devices of the end pieces. The wipers can easily be replaced even once the carriage is fitted.

In order to increase the sealing of the underside of the carriage, an upper sealing strip may be fitted (Figure 124). If the carriages of the linear recirculating ball bearing and guideway assembly are to be supplied with an additional upper sealing strip, the suffix "FA 551" must be added to the ordering designation.

Lubrication

Linear recirculating ball bearing and guideway assemblies KUVE may be lubricated with oil or grease. A lubrication nipple NIP KG M6 with a tapered head to DIN 71 412 is screwed into one end face of the carriage (with the exception of KUVE 15: NIP A1 and KUVE 20: NIP KG M6). The lubrication nipple can be replaced by a lubrication adapter SMAD KOE for connection to a central lubrication system (for size KUVE 20, please consult the INA engineering service).

Carriages KWVE have lubrication pockets in the area adjacent to the load carrying area (Figure 124); these ensure

- longer relubrication intervals (reduced maintenance costs)
- in certain cases, lubrication for life.

Location (see also page 57)

- Fixing from above using two, four or six screws (not for KUVE..E or KUVE..EC)
- Carriages KWVE, KWVE..L, KWVE..N, KWVE..W and KWVE..WL can be fixed to the adjacent construction from above or below
- Carriages KWVE..E and KWVE..EC can be fixed to the adjacent construction from below.

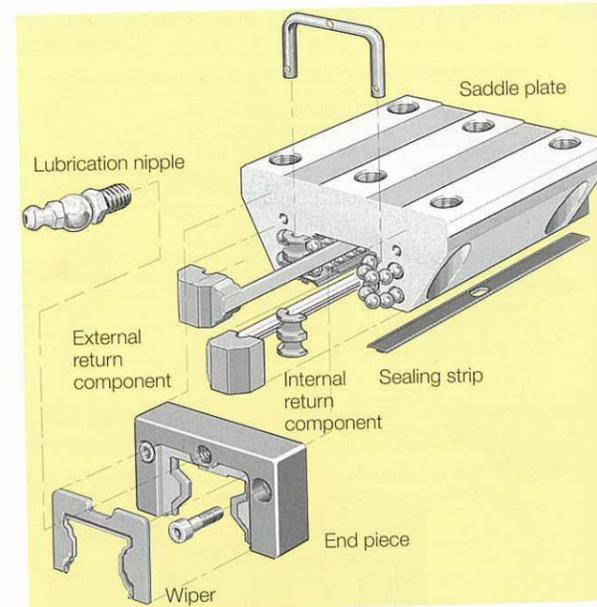
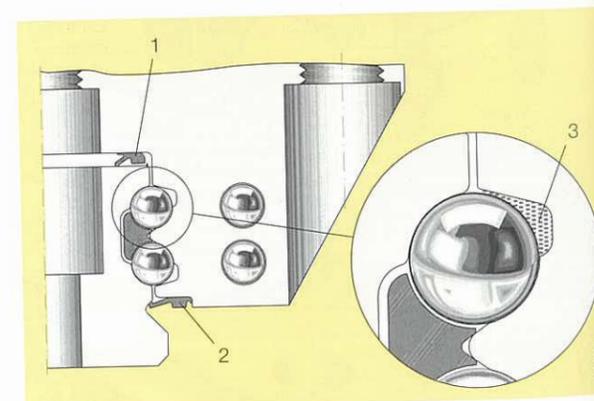


Figure 123 · Elements of carriage KWVE



- 1 Additional sealing strip (optional)
- 2 Standard sealing strip
- 3 Lubrication pocket with grease reservoir

Figure 124 · Additional upper sealing strip

Guideway TKVD

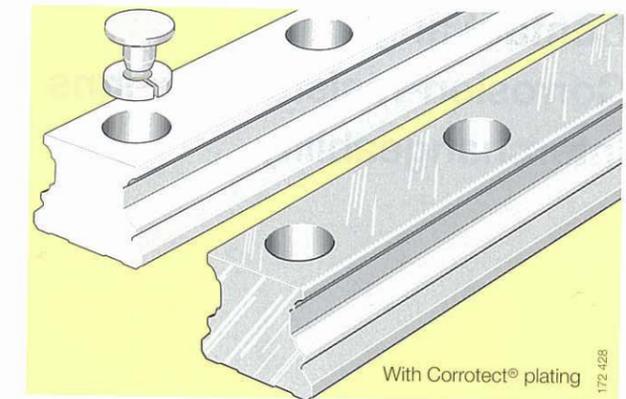


Figure 125 · Guideway TKVD

Guideway TKVD

Guideways TKVD and TKVD..W are made from steel; their raceways and locating faces are hardened (670 to 840 HV) and ground (Figures 125 to 127). Both sides of the guideway are equally suitable for use as locating faces.

The end faces of the guideway are chamfered; the carriage can be pushed directly onto the guideway TKVD from the dummy guideway MKVD.

Location (see also page 58)

Guideways TKVD have fixing holes as standard with counterbores for the screw heads. Due to the design of the closing plugs KA..TN A (see page 145), there is no need for sharp edges on the fixing hole counterbores.

The base of the guideway TKVD 25 K has grooves on either side which are gripped by clamping lugs or clamping strips (page 147) screwed to profiled sections (Figure 128).

INA clamping strips should be used in preference. These give more reliable clamping of the guideway TKVD 25 K and do not create as many sharp edges, thus reducing the risk of injury.

Multi-piece guideways (see also page 59)

If the required length of the linear guidance system is greater than the maximum length of the single piece guideway, the guidance system can be made up from several guideway sections. In this case, the guideway sections are matched to each other and marked.

Hole patterns: see page 60.

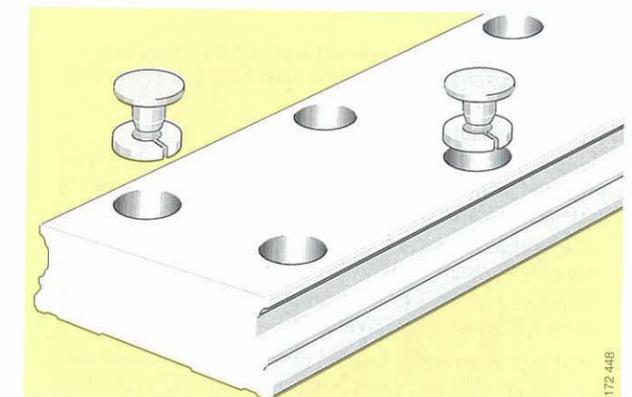


Figure 126 · Guideway TKVD..W

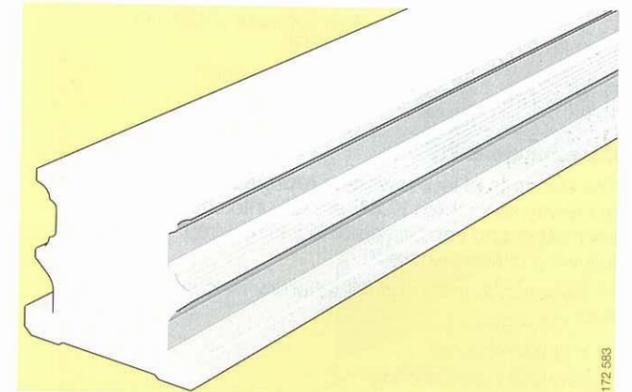


Figure 127 · Guideway TKVD..K

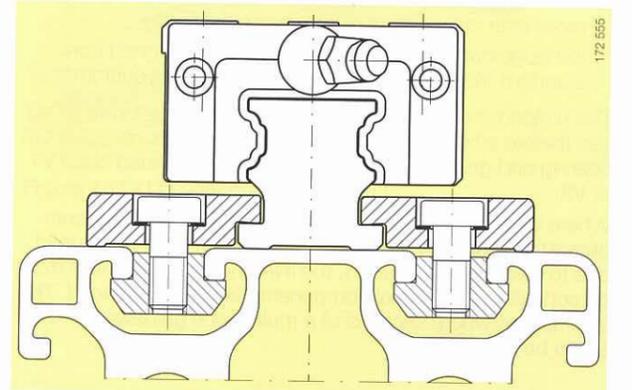


Figure 128 · Guideway TKVD 25 K located using clamping lugs

Contact angle

Corrosion-resistant designs

Interchangeability

Contact angle

The rows of balls have a contact angle of 45°; they can support compressive, tensile and lateral loads (Figure 129).

Corrosion-resistant designs

If carriages KWVE and guideways TKVD are ordered separately, the Corrotect® corrosion protection plating (page 16) is ordered as follows:

- Carriage with corrosion protection, suffix RRF, example: KWVE..RRF
- Guideway with corrosion protection, suffix RRF, example: TKVD..RRF.

If linear recirculating ball bearing and guideway assemblies KUVE are ordered as preassembled units, the Corrotect® corrosion protection plating (page 16) is available in two variants:

- Carriage and guideway with corrosion protection, suffix RRF, example: KUVE..RRF
- Guideway with corrosion protection only, suffix RRFT, example: KUVE..RRFT.

Interchangeability

The elements of four-row linear recirculating ball bearing and guideway assemblies KUVE are fully interchangeable with each other and can be combined as required; this has the following consequences:

- interchangeability and full suitability for combination of:
 - carriages
 - guideways
- simplified stockholding
- simpler assembly
- rapid spare parts acquisition
- more than one preload class on one guideway
- KUVE guidance systems can be quickly designed from standard elements ordered individually by the customer.

The preload is determined by the carriage. A guideway TKVD can therefore be used as the basis of a linear recirculating ball bearing and guideway assembly KUVE with preload class V1 or V2.

Where linear recirculating ball bearing and guideway assemblies KUVE supplied as preassembled units have been used due to their higher accuracy, the INA engineering service must be consulted if individual components are to be replaced. This also applies where sections of a multi-piece guideway TKVD are to be replaced.

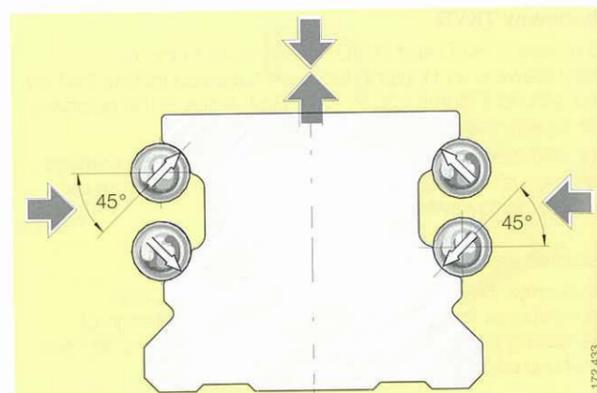


Figure 129 · Contact angles of the four rows of balls

Standard accessories

Closing plugs KA..TN A
Dummy guideways MKVD and MKVD..W

Closing plugs KA..TN A

Plastic closing plugs KA..TN A close off the fixing holes in the guideway flush with the surface (Figure 130).

Closing plugs KA..TN A have a clinch ring which ensures that the closing plug is securely seated in the guideway. The fixing holes do not therefore require sharp-edged counterbores.

Plastic closing plugs (KA..TN A) are included in the delivery.

Dummy guideways MKVD and MKVD..W

The dummy guideways MKVD and MKVD..W prevent damage to the rolling elements of the carriage while it is separate from the guideway (Figure 131).

A dummy guideway MKVD is supplied with each linear recirculating ball bearing and guideway assembly.

⚠ The carriage and guideway of a linear recirculating ball bearing and guideway assembly KUVE supplied as a preassembled unit should only be separated if this is absolutely necessary for installation.

Push the carriage directly from the guideway onto the dummy guideway.

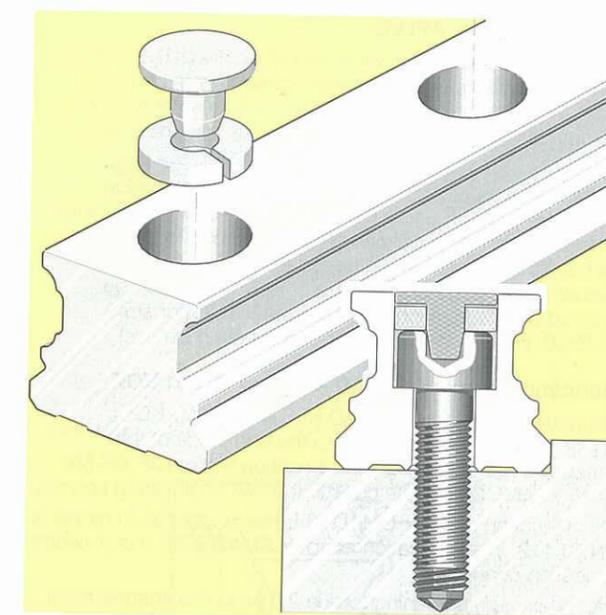


Figure 130 · Closing plugs KA..TN A

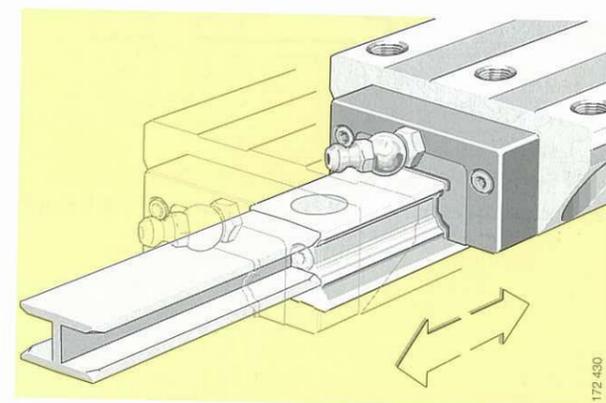


Figure 131 · Dummy guideway MKVD

Special accessories

Sheet steel wiper APLVE
 Lubrication adapters SMAD KFE and SMAD KOE

Sheet steel wiper APLVE

The additional sheet steel wiper APLVE protects the seal lips of the standard wiper from coarse contaminants and hot swarf. It is screwed to the end of the carriage (Figure 132), leaving a small gap between the guideway and the sheet steel wiper.

A sheet steel wiper APLVE is supplied with a lubrication adapter SMAD KFE and a fixing screw. The lubrication nipple in the lubrication adapter can be replaced by a central lubrication connector with a thread to DIN 13 M8 x 1. Alternatively, the lubrication adapter SMAD KFE can be replaced by a lubrication adapter SMAD KOE (for size KUBE 20, please consult the INA engineering service).

Lubrication adapters SMAD KFE and SMAD KOE

The lubrication adapters SMAD KFE and SMAD KOE (Figure 133) can be screwed into the end piece of the carriage KWVE instead of the lubrication nipple NIP KG M6 (for size KUBE 20, please consult the INA engineering service). The lubrication adapter SMAD KFE has a lubrication nipple to DIN 71412. The lubrication adapter SMAD KOE has a central lubrication connector.

⚠ Maximum tightening torque 2,5 Nm. The adapter must not be subjected to moment load.

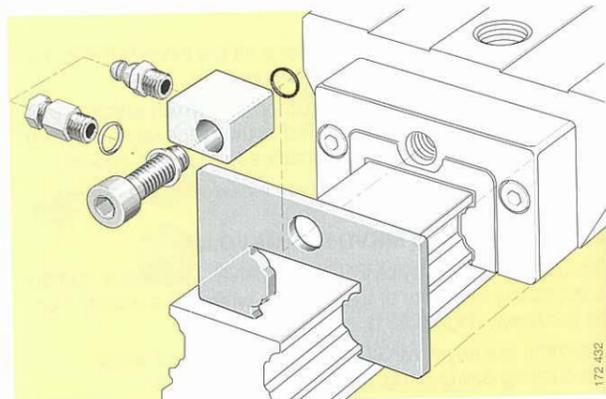


Figure 132 · Sheet steel wiper APLVE

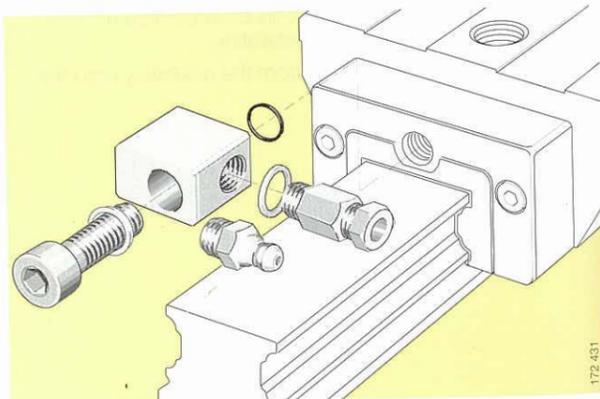


Figure 133 · Lubrication adapters SMAD KFE and SMAD KOE

Special accessories

Clamping lugs SPPR
 Clamping strips SPPL

Clamping lugs SPPR and clamping strips SPPL

Clamping lugs SPPR and clamping strips SPPL (Figure 134) are used to clamp guideway TKVD 25 K to profiled sections (Figure 135).

Clamping lugs SPPR and clamping strips SPPL are made from aluminium.

INA clamping strips should be used in preference. These give more reliable clamping of the guideway TKVD 25 K and do not create as many sharp edges, thus reducing the risk of injury.

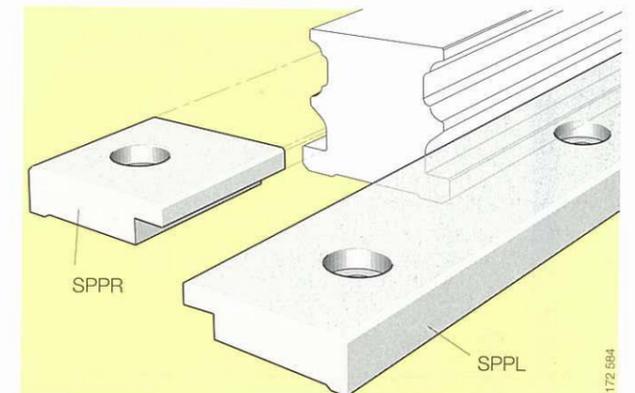


Figure 134 · Clamping lugs SPPR and clamping strips SPPL

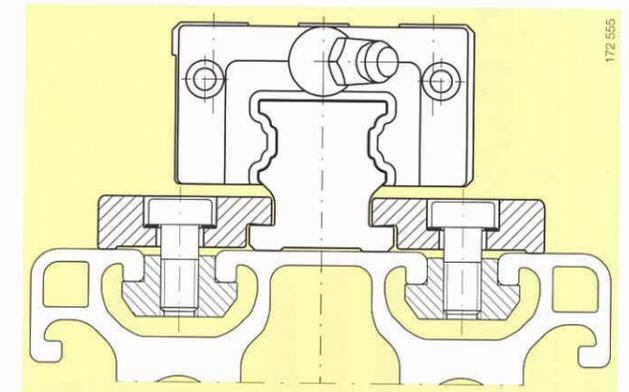


Figure 135 · Guideway TKVD 25 K located using clamping lugs

Load carrying capacity

The load carrying capacity of the four-row linear recirculating ball bearing and guideway assembly KUVE is shown in Figures 136 and 138. The basic load ratings are the same for tensile, compressive and lateral load.

The data are based on a displacement distance of 100 000 m. For a displacement distance of only 50 000 m, the basic dynamic load ratings given (Figure 138) should be multiplied by a factor of 1,26. Calculation based on a displacement distance of 50 000 m is common amongst rolling bearing manufacturers from the Far East.

The usable load carrying capacity is influenced by the connections between the guidance elements and the adjacent construction.

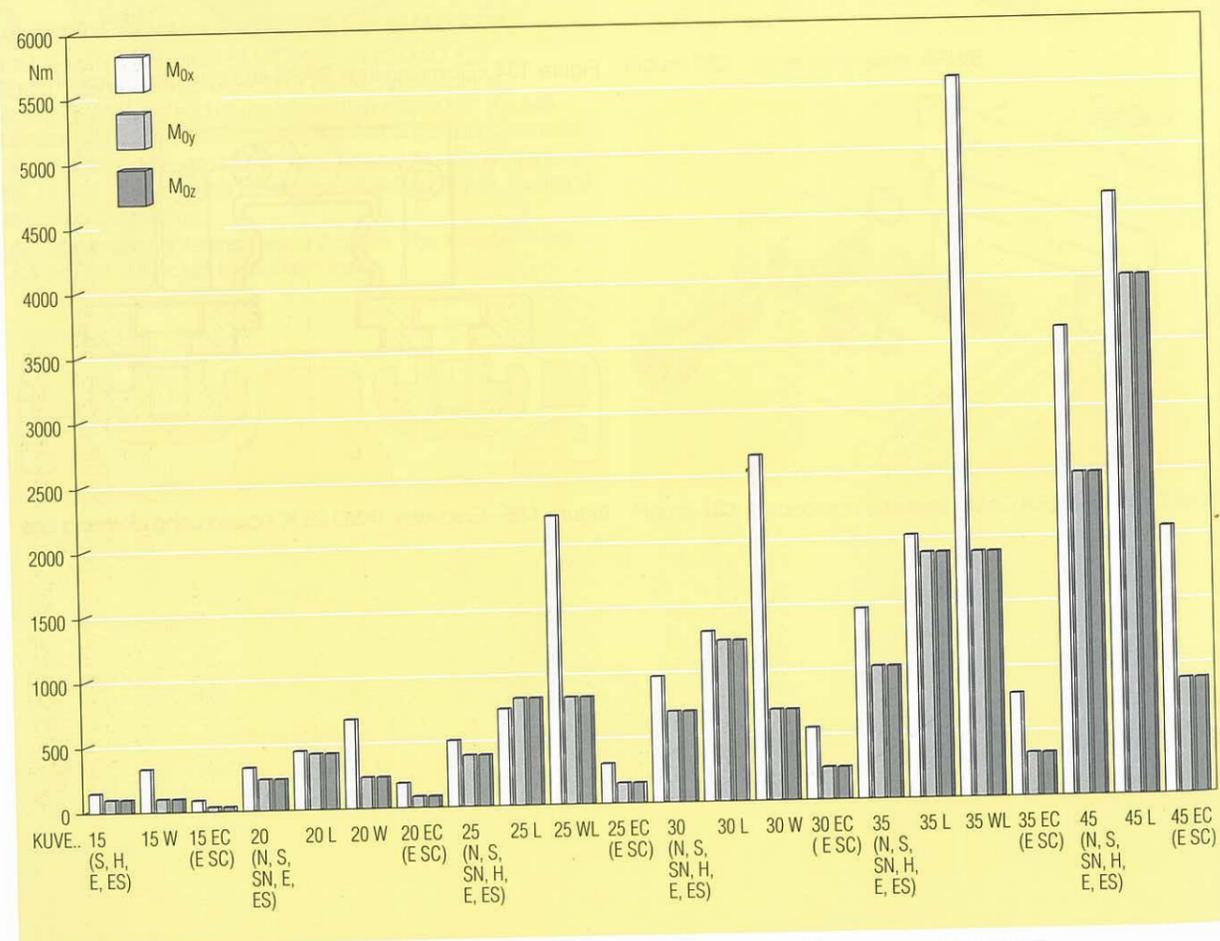


Figure 136 · Basic static moment ratings of linear recirculating ball bearing and guideway assemblies KUVE

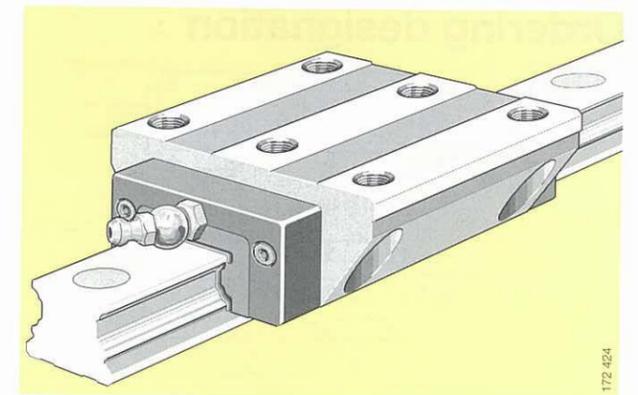


Figure 137 · Four-row linear recirculating ball bearing and guideway assembly KUVE

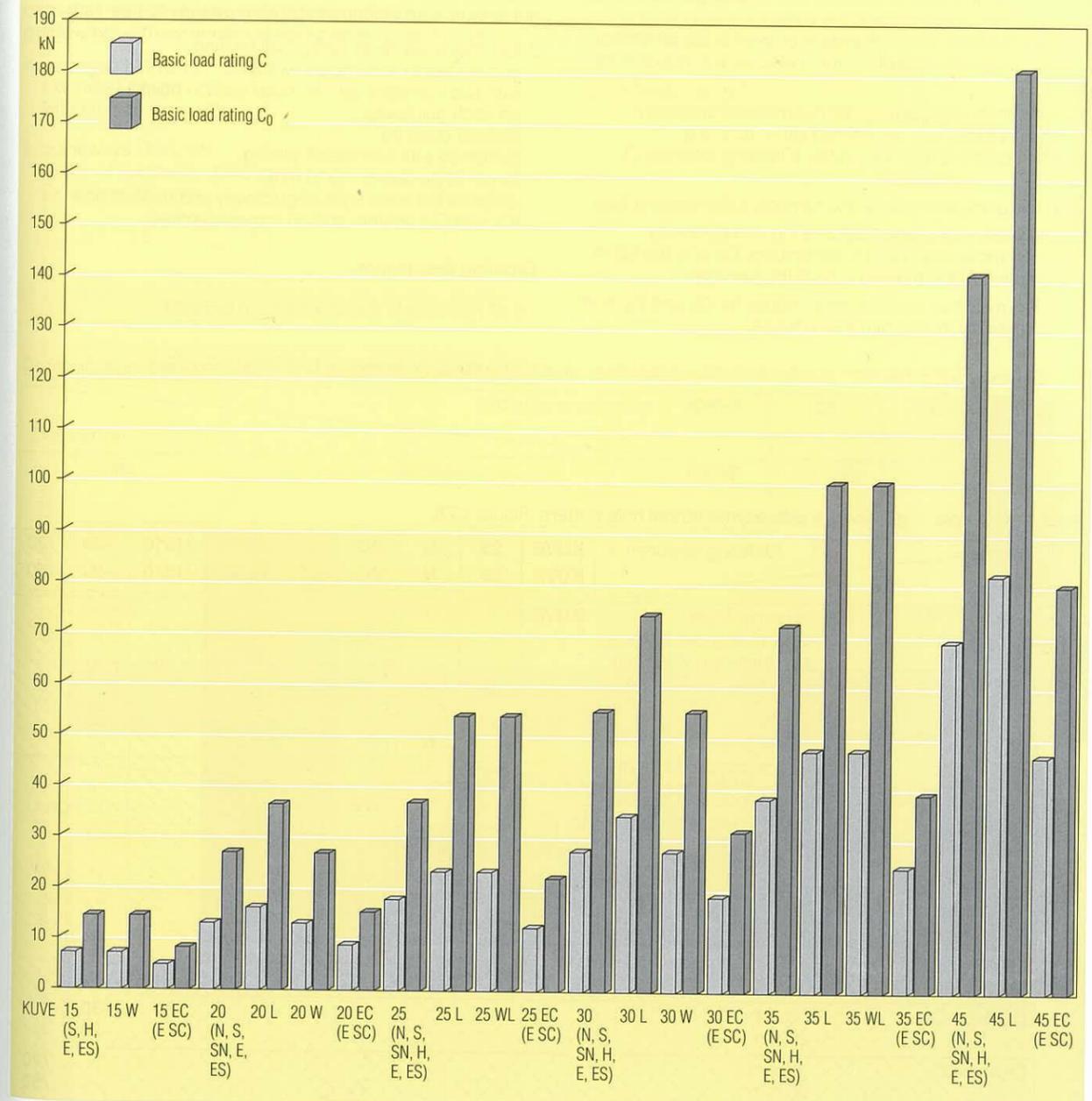


Figure 138 · Basic dynamic and static load ratings of linear recirculating ball bearing and guideway assemblies KUVE

Ordering designation

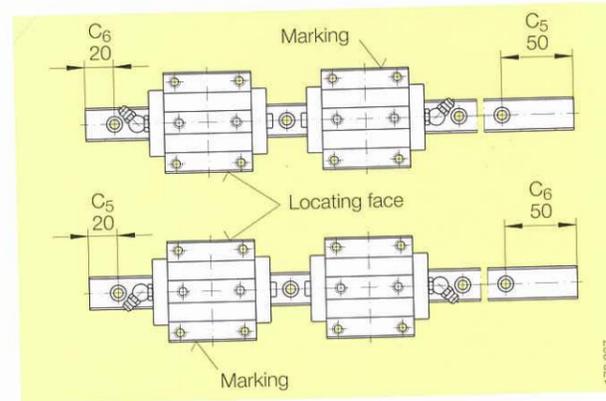


Figure 139 · Ordering example 1, guideways with asymmetrical hole pattern

The ordering designation for a four-row linear recirculating ball bearing and guideway assembly consists of the designation and specific data. The designation is given in the dimension tables. The specific data give a more precise description of the unit.

Four-row linear recirculating ball bearing and guideway assemblies KUVE can be ordered either as a unit (Ordering example 1) or separately (Ordering example 2).

⚠ The unmarked side of the carriage is the locating face.

In linear recirculating ball bearing and guideway assemblies supplied preassembled, C₅ is to the left in relation to the marked side of the carriage.

The minimum and maximum values for C₅ and C₆ must be observed; see dimension tables.

Ordering example 1, guideways with asymmetrical hole pattern (Figure 139)

- 2 four-row linear recirculating ball bearing and guideway assemblies KUVE 25 with two carriages with reduced section height on each guideway, preload class V2, guideway with Corrotect® plating, length of guideway: 1510 mm, distance between ends of guideway and nearest hole (C₅ and C₆): 20 mm and 50 mm respectively.

Ordering designation

1 off KUVE 25 N W2 V2 RRFT/1510-50/20

1 off KUVE 25 N W2 V2 RRFT/1510-20/50

Ordering example 1, guideways with asymmetrical hole pattern (Figure 139)

		Ordering designation									
Description		KUVE	25	N	W2	V2	RRFT	/1510	-50	/20	
		KUVE	25	N	W2	V2	RRFT	/1510	-20	/50	
Designation	Series	Four-row linear recirculating ball bearing and guideway assembly									
	Size code	25									
Specific data	Execution	Carriage with reduced section height			N						
	Number of carriages on a guideway	2 carriages with reduced section height per guideway			W2						
	Preload	Preload class V2			V2						
	Corrosion protection	Corrotect® plating on guideway			RRFT						
	Length of guideway	1510 mm					/1510				
	Distance C ₅	50 mm					-50				
	20 mm					-20					
Distance C ₆	20 mm										
	50 mm										
											/20
											/50

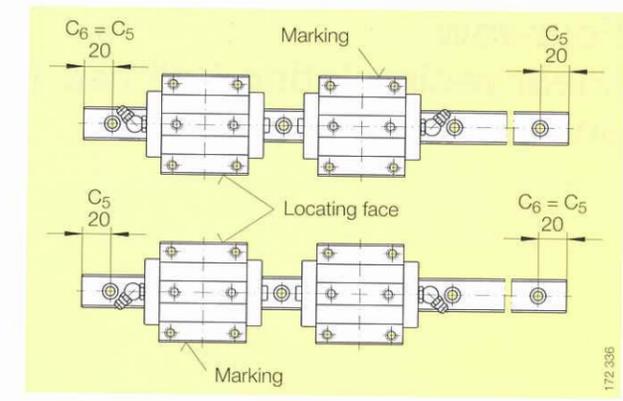


Figure 140 · Ordering example 2, carriages and guideway ordered separately, guideways with symmetrical hole pattern

Ordering example 2, carriages and guideway ordered separately, guideways with symmetrical hole pattern (Figure 140)

- 4 carriages KWVE 25 extended design with preload class V2

- 2 guideways TKVD 25 length of guideway: 1540 mm, C₅ = C₆ = 35 mm.

Ordering designation

4 off KWVE 25 L V2

2 off TKVD 25 /1570

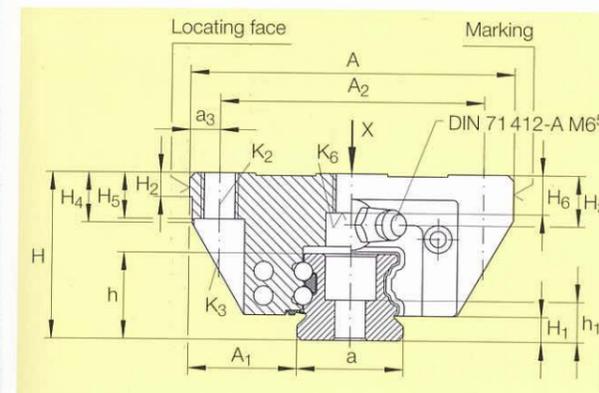
Ordering example 2, carriages and guideway ordered separately, guideways with symmetrical hole pattern (Figure 140)

		Ordering designation			
Description		KWVE	25	L	V2
Designation	Series	Carriage			
	Size code	25			
Specific data	Design	Extended carriage			L
	Preload	Preload class V2			V2

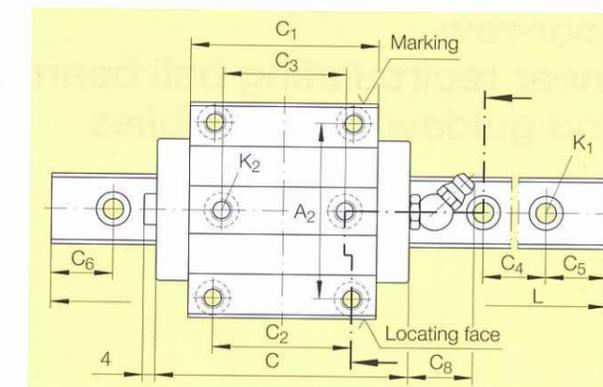
		Ordering designation		
Description		TKVD	25	/1570
Designation	Series	Guideway		
	Size code	25		
Specific data	Length of guideway	1570 mm		/1570

Four-row linear recirculating ball bearing and guideway assemblies

Series KUVE
KUVE..L
KUVE..N



KUVE



KUVE, plan view X (rotated through 90°)

Dimension table · Dimensions in mm

Unit Designation	Carriage Designation	Mass kg	Guideway Designation	Mass kg/m	Closing plugs	Dimensions				Mounting dimensions			
						L ¹⁾	H	A	C	A ₁	A ₂	a ^{-0,005 -0,03}	a ₃
KUVE 15	KWVE 15	0,25	TKVD 15	1,5	KA 08 TN A	1 200	24	47	55,6	16	38	15	4,5
KUVE 20	KWVE 20	0,58	TKVD 20	2,2	KA 10 TN A	1 980	30	63	69,8	21,5	53	20	5
KUVE 20 L	KWVE 20 L	0,8	TKVD 20	2,2	KA 10 TN A	1 980	30	63	87,3	21,5	53	20	5
KUVE 20 N	KWVE 20 N	0,47	TKVD 20	2,2	KA 10 TN A	1 980	27	63	69,8	21,5	53	20	5
KUVE 25	KWVE 25	0,71	TKVD 25	2,7	KA 11 TN A	1 980	36	70	81,7	23,5	57	23	6,5
KUVE 25 L	KWVE 25 L	1	TKVD 25	2,7	KA 11 TN A	1 980	36	70	107,5	23,5	57	23	6,5
KUVE 25 N	KWVE 25 N	0,57	TKVD 25	2,7	KA 11 TN A	1 980	31	70	81,7	23,5	57	23	6,5
KUVE 30	KWVE 30	1,4	TKVD 30	4,3	KA 15 TN A	2 000	42	90	97,6	31	72	28	9
KUVE 30 L	KWVE 30 L	1,83	TKVD 30	4,3	KA 15 TN A	2 000	42	90	122,6	31	72	28	9
KUVE 30 N	KWVE 30 N	1,12	TKVD 30	4,3	KA 15 TN A	2 000	38	90	97,6	31	72	28	9
KUVE 35	KWVE 35	2,02	TKVD 35	5,7	KA 15 TN A	2 960	48	100	110,4	33	82	34	9
KUVE 35 L	KWVE 35 L	2,71	TKVD 35	5,7	KA 15 TN A	2 960	48	100	140,2	33	82	34	9
KUVE 35 N	KWVE 35 N	1,62	TKVD 35	5,7	KA 15 TN A	2 960	44	100	110,4	33	82	34	9
KUVE 45	KWVE 45	3,75	TKVD 45	9,2	KA 20 TN A	2 940	60	120	139	37,5	100	45	10
KUVE 45 L	KWVE 45 L	4,7	TKVD 45	9,2	KA 20 TN A	2 940	60	120	167,5	37,5	100	45	10
KUVE 45 N	KWVE 45 N	3	TKVD 45	9,2	KA 20 TN A	2 940	52	120	139	37,5	100	45	10

Diameters and tightening torques for threads and screws⁴⁾

Designation	K ₁ For screws to DIN 912-12.9		K ₂ For screws to DIN 912-12.9		K ₃ Through holes for screws to DIN 912-12.9		K ₆ Through holes for screws to DIN 7984-8.8		K ₆ Through holes for screws to DIN 912-12.9	
		Nm		Nm		Nm		Nm		Nm
KUVE 15	M4	5	M5	5,8	M4	5	M4	2,8	-	-
KUVE 20	M5	10	M6	10	M5	10	-	-	M5	10
KUVE 20 L	M5	10	M6	10	M5	10	-	-	M5	10
KUVE 20 N	M5	10	M6	10	M5	10	M5	5,8	-	-
KUVE 25	M6	17	M8	24	M6	17	-	-	M6	17
KUVE 25 L	M6	17	M8	24	M6	17	-	-	M6	17
KUVE 25 N	M6	17	M8	24	M6	17	M6	10	-	-
KUVE 30	M8	41	M10	41	M8	41	M8	24	-	-
KUVE 30 L	M8	41	M10	41	M8	41	M8	24	-	-
KUVE 30 N	M8	41	M10	41	M8	41	M8	24	-	-
KUVE 35	M8	41	M10	41	M8	41	-	-	M8	41
KUVE 35 L	M8	41	M10	41	M8	41	-	-	M8	41
KUVE 35 N	M8	41	M10	41	M8	41	M8	24	-	-
KUVE 45	M12	140	M12	83	M10	83	-	-	M10	83
KUVE 45 L	M12	140	M12	83	M10	83	-	-	M10	83
KUVE 45 N	M12	140	M12	83	M10	83	M10	48 ⁵⁾	-	-

C ₁	C ₂	C ₃	C ₄	C ₅ ²⁾		C ₆ ²⁾		C ₈	H ₁	H ₂	H ₃	H ₄	H ₅	H ₆ ³⁾	h	h ₁
				min.	max.	min.	max.									
39,8	30	26	60	20	53	20	53	1,5	4,3	4,5	4	7,6	7,6	5,8	15,1	8,2
50,4	40	35	60	20	53	20	53	19	4,6	5	8	11,6	10	7,5	17	9,1
67,9	40	35	60	20	53	20	53	19	4,6	5	8	11,6	10	7,5	17	9,1
50,4	40	35	60	20	53	20	53	19	4,6	5	5	8,6	8	6	17	9,1
60,7	45	40	60	20	53	20	53	19	5,2	5	11	10,9	10	10	18,7	8,7
86,5	45	40	60	20	53	20	53	19	5,2	5	11	10,9	10	10	18,7	8,7
60,7	45	40	60	20	53	20	53	19	5,2	5	6	9,3	10	8	18,7	8,7
72	52	44	80	20	71	20	71	19	6	6	11,25	13,8	12	12	23,5	11,5
97	52	44	80	20	71	20	71	19	6	6	11,25	13,8	12	12	23,5	11,5
72	52	44	80	20	71	20	71	19	6	6	7,25	9,8	12	9	23,5	11,5
80	62	52	80	20	71	20	71	19	6,8	6,5	12,3	14,3	13	12	27	15
109,8	62	52	80	20	71	20	71	19	6,8	6,5	12,3	14,3	13	12	27	15
80	62	52	80	20	71	20	71	19	6,8	6,5	8,3	10,3	13	11,7	27	15
102,5	80	60	105	20	94	20	94	19	9,8	9	16,5	19,8	15	15	34,2	16,2
131,1	80	60	105	20	94	20	94	19	9,8	9	16,5	19,8	15	15	34,2	16,2
102,5	80	60	105	20	94	20	94	19	9,8	9	8,5	17,2	15	11	34,2	16,2

Load carrying capacity table

Designation	Basic load ratings		Moment ratings		
	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUVE 15	7,2	14,5	150	100	100
KUVE 20	13,1	27	332	240	240
KUVE 20 L	16,2	36,5	452	430	430
KUVE 20 N	13,1	27	332	240	240
KUVE 25	17,9	37	510	395	395
KUVE 25 L	23,4	54	745	825	825
KUVE 25 N	17,9	37	510	395	395
KUVE 30	27,5	55	970	700	700
KUVE 30 L	34,5	74	1 310	1 240	1 240
KUVE 30 N	27,5	55	970	700	700
KUVE 35	38	72	1 465	1 020	1 020
KUVE 35 L	47,5	100	2 025	1 890	1 890
KUVE 35 N	38	72	1 465	1 020	1 020
KUVE 45	69	141	3 610	2 485	2 485
KUVE 45 L	82	181	4 635	4 000	4 000
KUVE 45 N	69	141	3 610	2 485	2 485

1) Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.

2) Dimensions C₅ and C₆ are dependent on the guideway length L; see page 60 for calculation method.

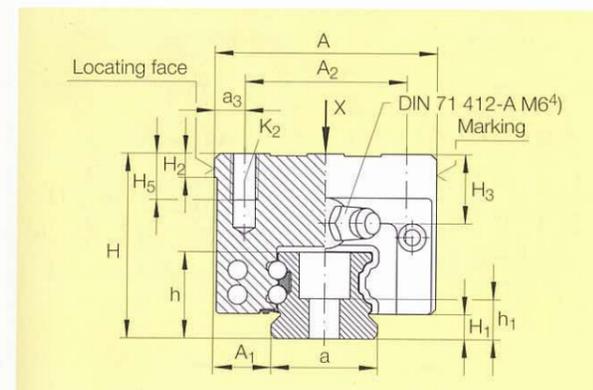
3) When mounting from above: maximum length of fixing screw for the central fixing holes H₆ +2,5 mm.

4) If there is a possibility of settling, the fixing screws should be secured against rotation.

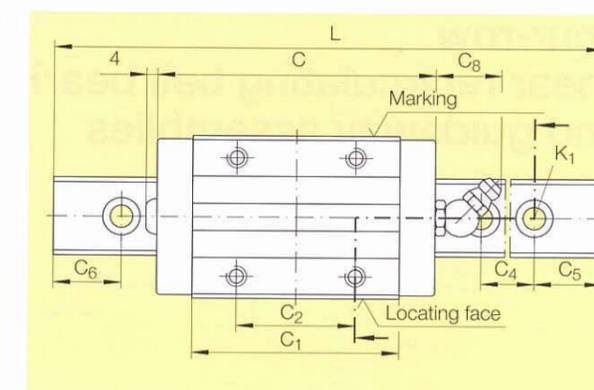
5) Taper head lubrication nipples to DIN 71 412 M6, except KUVE 20: DIN 71 412 M5 and KUVE 15: drive fit lubrication nipple.

Four-row linear recirculating ball bearing and guideway assemblies

Series KUVE..S
KUVE..SN
KUVE..H



KUVE..H



KUVE..H, plan view X (rotated through 90°)

Dimension table · Dimensions in mm

Unit Designation	Carriage Designation	Mass kg	Guideway Designation	Mass kg/m	Closing plugs	Dimensions				Mounting dimensions			
						L ¹⁾	H	A	C	A ₁	A ₂	a _{-0,005 -0,03}	a ₃
KUVE 15 S	KWVE 15 S	0,19	TKVD 15	1,5	KA 08 TN A	1 200	24	34	55,6	9,5	26	15	4
KUVE 15 H	KWVE 15 H	0,23	TKVD 15	1,5	KA 08 TN A	1 200	28	34	55,6	9,5	26	15	4
KUVE 20 S	KWVE 20 S	0,46	TKVD 20	2,2	KA 10 TN A	1 980	30	44	69,8	12	32	20	6
KUVE 20 SN	KWVE 20 SN	0,36	TKVD 20	2,2	KA 10 TN A	1 980	27	44	69,8	12	32	20	6
KUVE 25 S	KWVE 25 S	0,56	TKVD 25	2,7	KA 11 TN A	1 980	36	48	81,7	12,5	35	23	6,5
KUVE 25 SN	KWVE 25 SN	0,45	TKVD 25	2,7	KA 11 TN A	1 980	31	48	81,7	12,5	35	23	6,5
KUVE 25 H	KWVE 25 H	0,65	TKVD 25	2,7	KA 11 TN A	1 980	40	48	81,7	12,5	35	23	6,5
KUVE 30 S	KWVE 30 S	1,09	TKVD 30	4,3	KA 15 TN A	2 000	42	60	97,6	16	40	28	10
KUVE 30 SN	KWVE 30 SN	0,87	TKVD 30	4,3	KA 15 TN A	2 000	38	60	97,6	16	40	28	10
KUVE 30 H	KWVE 30 H	1,27	TKVD 30	4,3	KA 15 TN A	2 000	45	60	97,6	16	40	28	10
KUVE 35 S	KWVE 35 S	1,6	TKVD 35	5,7	KA 15 TN A	2 960	48	70	110,4	18	50	34	10
KUVE 35 SN	KWVE 35 SN	1,27	TKVD 35	5,7	KA 15 TN A	2 960	44	70	110,4	18	50	34	10
KUVE 35 H	KWVE 35 H	1,84	TKVD 35	5,7	KA 15 TN A	2 960	55	70	110,4	18	50	34	10
KUVE 45 S	KWVE 45 S	2,8	TKVD 45	9,2	KA 20 TN A	2 940	60	86	139	20,5	60	45	13
KUVE 45 SN	KWVE 45 SN	2,3	TKVD 45	9,2	KA 20 TN A	2 940	52	86	139	20,5	60	45	13
KUVE 45 H	KWVE 45 H	3,5	TKVD 45	9,2	KA 20 TN A	2 940	70	86	139	20,5	60	45	13

Diameters and tightening torques for threads and screws³⁾

Designation	K ₁ For screws to DIN 912-12.9		K ₂ For screws to DIN 912-12.9	
		Nm		Nm
KUVE 15 S	M4	5	M4	5
KUVE 15 H	M4	5	M4	5
KUVE 20 S	M5	10	M5	10
KUVE 20 SN	M5	10	M5	10
KUVE 25 S	M6	17	M6	17
KUVE 25 SN	M6	17	M6	17
KUVE 25 H	M6	17	M6	17
KUVE 30 S	M8	41	M8	41
KUVE 30 SN	M8	41	M8	41
KUVE 30 H	M8	41	M8	41
KUVE 35 S	M8	41	M8	41
KUVE 35 SN	M8	41	M8	41
KUVE 35 H	M8	41	M8	41
KUVE 45 S	M12	140	M10	83
KUVE 45 SN	M12	140	M10	83
KUVE 45 H	M12	140	M10	83

C ₁	C ₂	C ₄	C ₅ ²⁾		C ₆ ²⁾		C ₈	H ₁	H ₂	H ₃	H ₅	h	h ₁
			min.	max.	min.	max.							
39,8	26	60	20	53	20	53	1,5	4,3	4,5	4	6	15,1	8,2
39,8	26	60	20	53	20	53	1,5	4,3	4,5	8	6	15,1	8,2
50,4	36	60	20	53	20	53	19	4,6	5	8	7,5	17	9,1
50,4	36	60	20	53	20	53	19	4,6	5	5	7,5	17	9,1
60,7	35	60	20	53	20	53	19	5,2	5	11	10	18,7	8,7
60,7	35	60	20	53	20	53	19	5,2	5	6	8	18,7	8,7
60,7	35	60	20	53	20	53	19	5,2	5	15	10	18,7	8,7
72	40	80	20	71	20	71	19	6	6	11,25	13,5	23,5	11,5
72	40	80	20	71	20	71	19	6	6	7,25	11	23,5	11,5
72	40	80	20	71	20	71	19	6	6	14,25	13,5	23,5	11,5
80	50	80	20	71	20	71	19	6,8	6,5	12,3	13,5	27	15
80	50	80	20	71	20	71	19	6,8	6,5	8,3	13,5	27	15
80	50	80	20	71	20	71	19	6,8	6,5	19,3	13,5	27	15
102,5	60	105	20	94	20	94	19	9,8	9	16,5	17	34,2	16,2
102,5	60	105	20	94	20	94	19	9,8	9	8,5	16,5	34,2	16,2
102,5	60	105	20	94	20	94	19	9,8	9	26,5	17	34,2	16,2

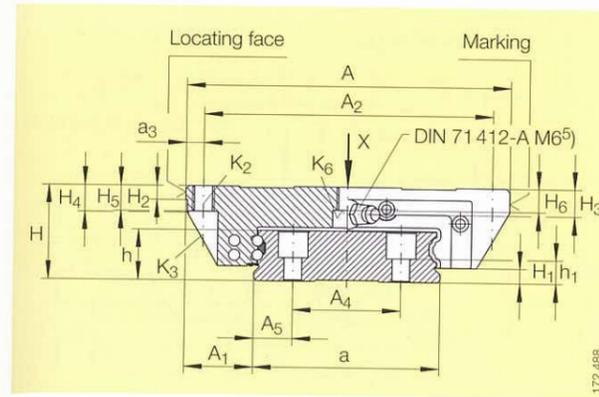
Load carrying capacity table

Designation	Basic load ratings		Moment ratings		
	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUVE 15 S	7,2	14,5	150	100	100
KUVE 15 H	7,2	14,5	150	100	100
KUVE 20 S	13,1	27	332	240	240
KUVE 20 SN	13,1	27	332	240	240
KUVE 25 S	17,9	37	510	395	395
KUVE 25 SN	17,9	37	510	395	395
KUVE 25 H	17,9	37	510	395	395
KUVE 30 S	27,5	55	970	700	700
KUVE 30 SN	27,5	55	970	700	700
KUVE 30 H	27,5	55	970	700	700
KUVE 35 S	38	72	1 465	1 020	1 020
KUVE 35 SN	38	72	1 465	1 020	1 020
KUVE 35 H	38	72	1 465	1 020	1 020
KUVE 45 S	69	141	3 610	2 485	2 485
KUVE 45 SN	69	141	3 610	2 485	2 485
KUVE 45 H	69	141	3 610	2 485	2 485

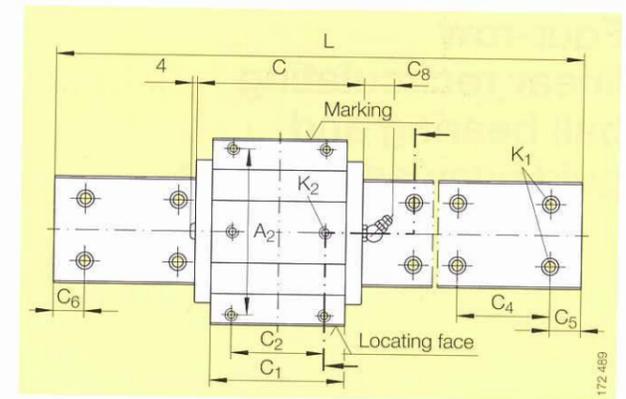
- Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- Dimensions C₅ and C₆ are dependent on the guideway length L; see page 60 for calculation method.
- If there is a possibility of settling, the fixing screws should be secured against rotation.
- Taper head lubrication nipples to DIN 71 412 M6, except KUVE 20: DIN 71 412 M5 and KUVE 15: drive fit lubrication nipple.

Four-row linear recirculating ball bearing and guideway assemblies

Series KUVE..W
KUVE..WL



KUVE..W



KUVE..W, plan view X (rotated through 90°)

Dimension table - Dimensions in mm

Unit Designation	Carriage Designation	Mass kg	Guideway Designation	Mass kg/m	Closing plugs	Dimensions				Mounting dimensions			
						L ¹⁾	H	A	C	A ₁	A ₂	A ₄	A ₅
KUVE 15 W	KWVE 15 W	0,27	TKVD 15 W	3,6	KA 08 TN A	1 200	21	68	55,6	15,5	60	22	7,5
KUVE 20 W	KWVE 20 W	0,56	TKVD 20 W	5	KA 08 TN A	1 980	27	80	69,8	19	70	24	9
KUVE 25 WL	KWVE 25 WL	1,46	TKVD 25 W	9,4	KA 11 TN A	2 000	35	120	107,5	25,5	107	40	14,5
KUVE 30 W	KWVE 30 W	1,95	TKVD 30 W	13,6	KA 15 TN A	2 000	42	142	97,6	31	124	50	15
KUVE 35 WL	KWVE 35 WL	4,11	TKVD 35 W	17,4	KA 15 TN A	2 960	50	162	140,2	36	144	60	15

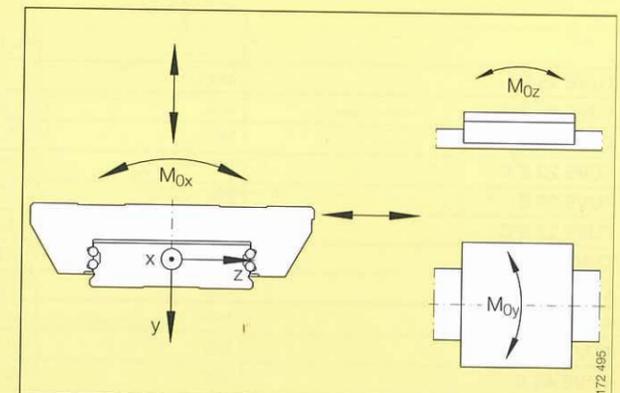
- Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- Dimensions C₅ and C₆ are dependent on the guideway length L; see page 60 for calculation method.
- When mounting from above: maximum length of fixing screw for the central fixing holes H₆ +2,5 mm.
- If there is a possibility of settling, the fixing screws should be secured against rotation.
- Taper head lubrication nipples to DIN 71 412 M6, except KUVE 20: DIN 71 412 M5, KUVE 15: drive fit lubrication nipple.

Diameters and tightening torques for threads and screws⁴⁾

Designation	K ₁ For screws to DIN 912-12.9		K ₂ For screws to DIN 912-12.9		K ₃ Through holes for screws to DIN 912-12.9		K ₆ Through holes for screws to DIN 7984-8.8		K ₆ Through holes for screws to DIN 912-12.9	
		Nm		Nm		Nm		Nm		Nm
KUVE 15 W	M4	5	M5	5,8	M4	5	M4	2,8	-	-
KUVE 20 W	M4	5	M6	10	M5	10	M5	5,8	-	-
KUVE 25 WL	M6	17	M8	24	M6	17	-	-	M6	17
KUVE 30 W	M8	41	M10	41	M8	41	M8	24	-	-
KUVE 35 WL	M8	41	M10	41	M8	41	-	-	M8	41

Load carrying capacity table

Designation	Basic load ratings		Moment ratings		
	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUVE 15 W	7,2	14,5	332	100	100
KUVE 20 W	13,1	27	687	240	240
KUVE 25 WL	23,4	54	2 225	825	825
KUVE 30 W	27,5	55	2 660	700	700
KUVE 35 WL	47,5	100	5 550	1 890	1 890



Load directions



KUVE



KUVS



KUE



KUME



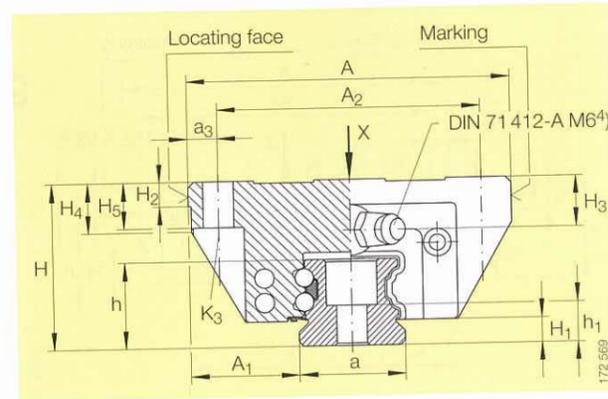
LF



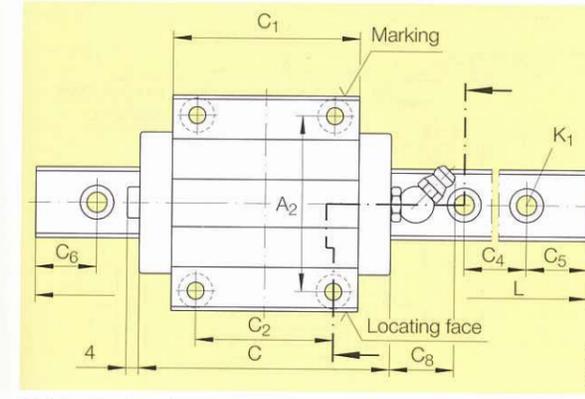
WF

Four-row linear recirculating ball bearing and guideway assemblies

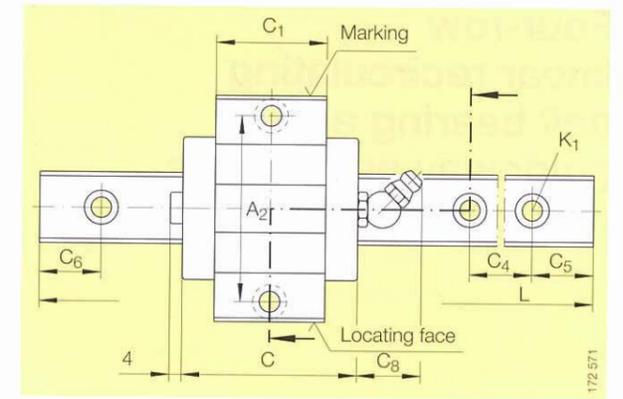
Series KUVE..E
KUVE..E C



KUVE..E, KUVE..E C



KUVE..E, plan view X (rotated through 90°)



KUVE..E C, plan view X (rotated through 90°)

Dimension table · Dimensions in mm

Unit Designation	Carriage Designation	Mass kg	Guideway Designation	Mass kg/m	Closing plugs	Dimensions			
						L ¹⁾	H	A	C
KUVE 15 E	KWVE 15 E	0,26	TKVD 15	1,5	KA 08 TN A	1 200	24	52	55,6
KUVE 15 E C	KWVE 15 E C	0,17	TKVD 15	1,5	KA 08 TN A	1 200	24	52	38,9
KUVE 20 E	KWVE 20 E	0,43	TKVD 20	2,2	KA 10 TN A	1 980	28	59	69,8
KUVE 20 E C	KWVE 20 E C	0,28	TKVD 20	2,2	KA 10 TN A	1 980	28	59	48,8
KUVE 25 E	KWVE 25 E	0,75	TKVD 25	2,7	KA 11 TN A	1 980	33	73	81,7
KUVE 25 E C	KWVE 25 E C	0,47	TKVD 25	2,7	KA 11 TN A	1 980	33	73	57
KUVE 30 E	KWVE 30 E	1,45	TKVD 30	4,3	KA 15 TN A	2 000	42	90	97,6
KUVE 30 E C	KWVE 30 E C	0,9	TKVD 30	4,3	KA 15 TN A	2 000	42	90	67,6
KUVE 35 E	KWVE 35 E	2	TKVD 35	5,7	KA 15 TN A	2 960	48	100	110,4
KUVE 35 E C	KWVE 35 E C	1,2	TKVD 35	5,7	KA 15 TN A	2 960	48	100	74,6
KUVE 45 E	KWVE 45 E	3,75	TKVD 45	9,2	KA 20 TN A	2 940	60	120	139
KUVE 45 E C	KWVE 45 E C	2,3	TKVD 45	9,2	KA 20 TN A	2 940	60	120	96,2

- 1) Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 2) Dimensions C₅ and C₆ are dependent on the guideway length L; see page 60 for calculation method.
- 3) If there is a possibility of settling, the fixing screws should be secured against rotation.
- 4) Taper head lubrication nipple to DIN 71412 M6.

Diameters and tightening torques for threads and screws³⁾

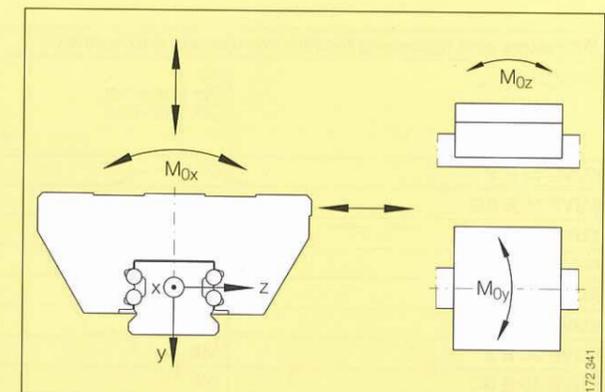
Designation	K ₁ For screws to DIN 912-12.9		K ₃ Through hole for screws to DIN 912-12.9	
		Nm		Nm
KUVE 15 E	M4	5	M4	5
KUVE 15 E C	M4	5	M4	5
KUVE 20 E	M5	10	M5	10
KUVE 20 E C	M5	10	M5	10
KUVE 25 E	M6	17	M6	17
KUVE 25 E C	M6	17	M6	17
KUVE 30 E	M8	41	M8	41
KUVE 30 E C	M8	41	M8	41
KUVE 35 E	M8	41	M8	41
KUVE 35 E C	M8	41	M8	41
KUVE 45 E	M12	140	M10	83
KUVE 45 E C	M12	140	M10	83

Mounting dimensions

A ₁	A ₂	a -0,005 -0,03	a ₃	C ₁	C ₂	C ₄	C ₅ ²⁾		C ₆ ²⁾		C ₈	H ₁	H ₂	H ₃	H ₄	H ₅	h	h ₁
							min.	max.	min.	max.								
18,5	41	15	5,5	39,8	26	60	20	53	20	53	1,5	4,3	4,5	4,05	6,1	7	15,1	8,2
18,5	41	15	5,5	23,1	-	60	20	53	20	53	1,5	4,3	4,5	4,05	6,1	7	15,1	8,2
19,5	49	20	5	50,4	32	60	20	53	20	53	19	4,6	5	6	8,8	9	17	9,1
19,5	49	20	5	29,4	-	60	20	53	20	53	19	4,6	5	6	8,8	9	17	9,1
25	60	23	6,5	60,7	35	60	20	53	20	53	19	5,2	5	8	7,85	10	18,7	8,7
25	60	23	6,5	36	-	60	20	53	20	53	19	5,2	5	8	7,85	10	18,7	8,7
31	72	28	9	72	40	80	20	71	20	71	19	6	6	11,25	13,8	12	23,5	11,5
31	72	28	9	42	-	80	20	71	20	71	19	6	6	11,25	13,8	12	23,5	11,5
33	82	34	9	80	50	80	20	71	20	71	19	6,8	6,5	12,3	14,3	13	27	15
33	82	34	9	44,2	-	80	20	71	20	71	19	6,8	6,5	12,3	14,3	13	27	15
37,5	100	45	10	102,5	60	105	20	94	20	94	19	9,8	9	16,5	19,9	15	34,2	16,2
37,5	100	45	10	59,7	-	105	20	94	20	94	19	9,8	9	16,5	19,9	15	34,2	16,2

Load carrying capacity table

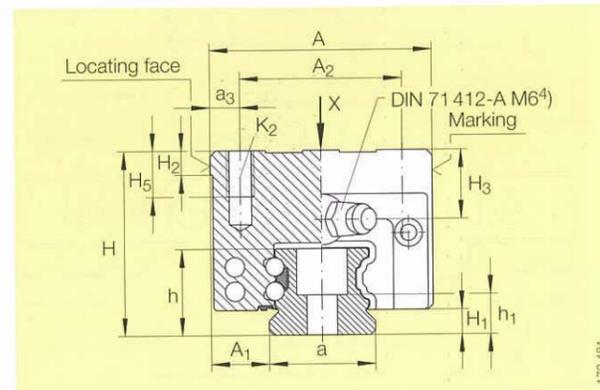
Designation	Basic load ratings		Moment ratings		
	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUVE 15 E	7,2	14,5	150	100	100
KUVE 15 E C	4,9	8,3	86	35	35
KUVE 20 E	13,1	27	332	240	240
KUVE 20 E C	8,9	15,4	190	85	85
KUVE 25 E	17,9	37	510	395	395
KUVE 25 E C	12,5	22,2	305	155	155
KUVE 30 E	27,5	55	970	700	700
KUVE 30 E C	18,7	31,5	554	248	248
KUVE 35 E	38	72	1 465	1 020	1 020
KUVE 35 E C	24,6	39	790	330	330
KUVE 45 E	69	141	3 610	2 485	2 485
KUVE 45 E C	46,5	80	2 060	883	883



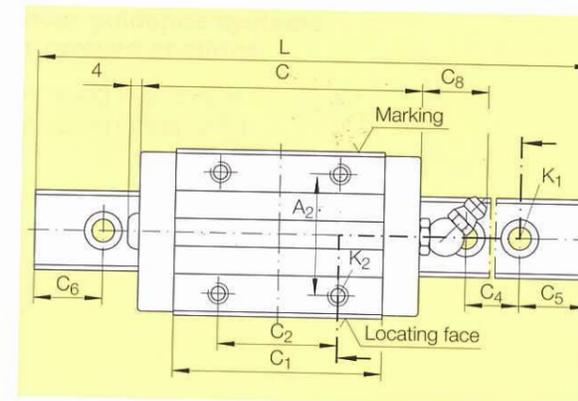
Load directions

Four-row linear recirculating ball bearing and guideway assemblies

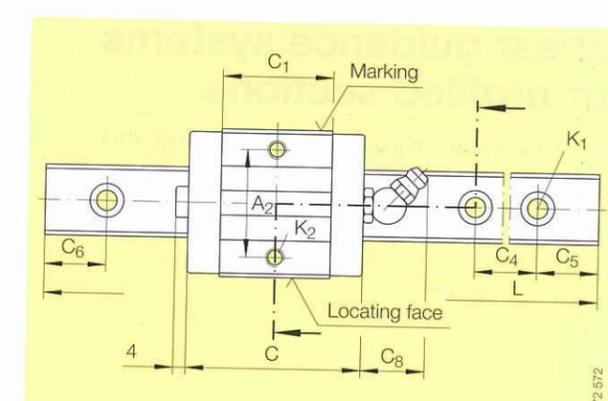
Series KUVE..E S
KUVE..E SC



KUVE..E S, KUVE..E SC



KUVE..E S, plan view X (rotated through 90°)



KUVE..E SC, plan view X (rotated through 90°)

Dimension table - Dimensions in mm

Unit Designation	Carriage Designation	Mass kg	Guideway Designation	Mass kg/m	Closing plugs	Dimensions			
						L ¹⁾	H	A	C
KUVE 15 E S	KWVE 15 E S	0,2	TKVD 15	1,5	KA 08 TN A	1200	24	34	55,6
KUVE 15 E SC	KWVE 15 E SC	0,13	TKVD 15	1,5	KA 08 TN A	1200	24	34	38,9
KUVE 20 E S	KWVE 20 E S	0,33	TKVD 20	2,2	KA 10 TN A	1980	28	42	69,8
KUVE 20 E SC	KWVE 20 E SC	0,22	TKVD 20	2,2	KA 10 TN A	1980	28	42	48,8
KUVE 25 E S	KWVE 25 E S	0,6	TKVD 25	2,7	KA 11 TN A	1980	33	48	81,7
KUVE 25 E SC	KWVE 25 E SC	0,35	TKVD 25	2,7	KA 11 TN A	1980	33	48	57
KUVE 30 E S	KWVE 30 E S	1	TKVD 30	4,3	KA 15 TN A	2000	42	60	97,6
KUVE 30 E SC	KWVE 30 E SC	0,67	TKVD 30	4,3	KA 15 TN A	2000	42	60	67,6
KUVE 35 E S	KWVE 35 E S	1,5	TKVD 35	5,7	KA 15 TN A	2960	48	70	110,4
KUVE 35 E SC	KWVE 35 E SC	0,9	TKVD 35	5,7	KA 15 TN A	2960	48	70	74,6
KUVE 45 E S	KWVE 45 E S	2,8	TKVD 45	9,2	KA 20 TN A	2940	60	86	139
KUVE 45 E SC	KWVE 45 E SC	1,8	TKVD 45	9,2	KA 20 TN A	2940	60	86	96,2

- Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- Dimensions C₅ and C₆ are dependent on the guideway length L; see page 60 for calculation method.
- If there is a possibility of settling, the fixing screws should be secured against rotation.
- Taper head lubrication nipple to DIN 71412 M6.

Diameters and tightening torques for threads and screws³⁾

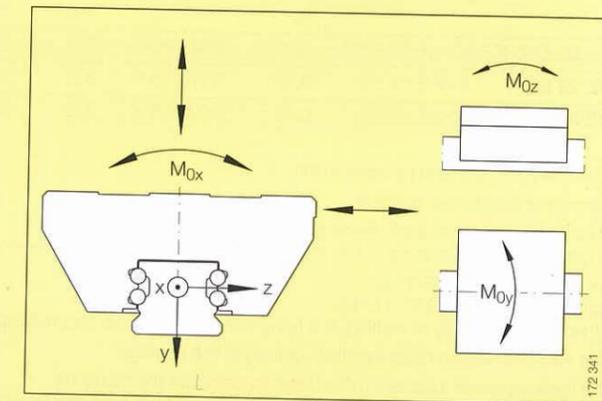
Designation	K ₁ For screws to DIN 912-12.9	Nm		K ₂ For screws to DIN 912-12.9	Nm	
KUVE 15 E S	M4		5	M4		5
KUVE 15 E SC	M4		5	M4		5
KUVE 20 E S	M5		10	M5		10
KUVE 20 E SC	M5		10	M5		10
KUVE 25 E S	M6		17	M6		17
KUVE 25 E SC	M6		17	M6		17
KUVE 30 E S	M8		41	M8		41
KUVE 30 E SC	M8		41	M8		41
KUVE 35 E S	M8		41	M8		41
KUVE 35 E SC	M8		41	M8		41
KUVE 45 E S	M12		140	M10		83
KUVE 45 E SC	M12		140	M10		83

Mounting dimensions

A ₁	A ₂	a -0,005 -0,03	a ₃	C ₁	C ₂	C ₄	C ₅ ²⁾		C ₆ ²⁾		C ₈	H ₁	H ₂	H ₃	H ₅	h	h ₁
							min.	max.	min.	max.							
9,5	26	15	4	39,8	26	60	20	53	20	53	1,5	4,3	4,5	4,05	6	15,1	8,2
11	32	20	5	50,4	32	60	20	53	20	53	1,5	4,3	4,5	4,05	6	15,1	8,2
11	32	20	5	29,4	-	60	20	53	20	53	19	4,6	5	6	7,5	17	9,1
12,5	35	23	6,5	60,7	35	60	20	53	20	53	19	4,6	5	6	7,5	17	9,1
12,5	35	23	6,5	36	-	60	20	53	20	53	19	5,2	5	8	10	18,7	8,7
16	40	28	10	72	40	80	20	71	20	71	19	6	6	11,25	13,5	23,5	11,5
16	40	28	10	42	-	80	20	71	20	71	19	6	6	11,25	13,5	23,5	11,5
18	50	34	10	80	50	80	20	71	20	71	19	6,8	6,5	12,3	13,5	27	15
18	50	34	10	44,2	-	80	20	71	20	71	19	6,8	6,5	12,3	13,5	27	15
20,5	60	45	13	102,5	60	105	20	94	20	94	19	9,8	9	16,5	17	34,2	16,2
20,5	60	45	13	59,7	-	105	20	94	20	94	19	9,8	9	16,5	17	34,2	16,2

Load carrying capacity table

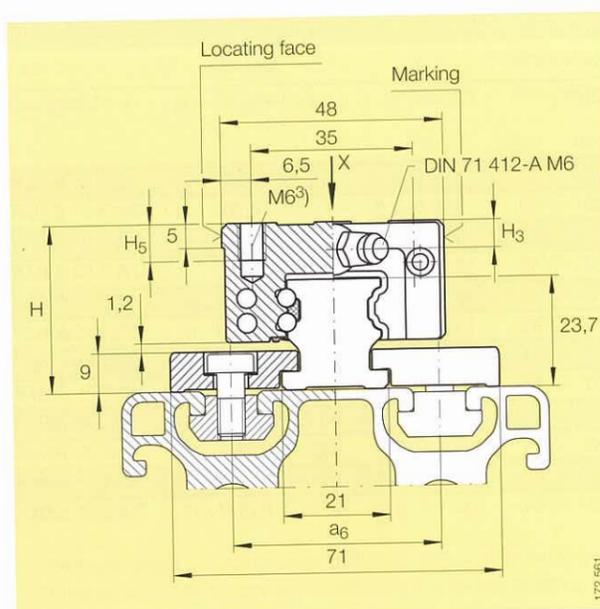
Designation	Basic load ratings		Moment ratings		
	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUVE 15 E S	7,2	14,5	150	100	100
KUVE 15 E SC	4,9	8,3	86	35	35
KUVE 20 E S	13,1	27	332	240	240
KUVE 20 E SC	8,9	15,4	190	85	85
KUVE 25 E S	17,9	37	510	395	395
KUVE 25 E SC	12,5	22,2	305	155	155
KUVE 30 E S	27,5	55	970	700	700
KUVE 30 E SC	18,7	31,5	554	248	248
KUVE 35 E S	38	72	1465	1020	1020
KUVE 35 E SC	24,6	39	790	330	330
KUVE 45 E S	69	141	3610	2485	2485
KUVE 45 E SC	46,5	80	2060	883	883



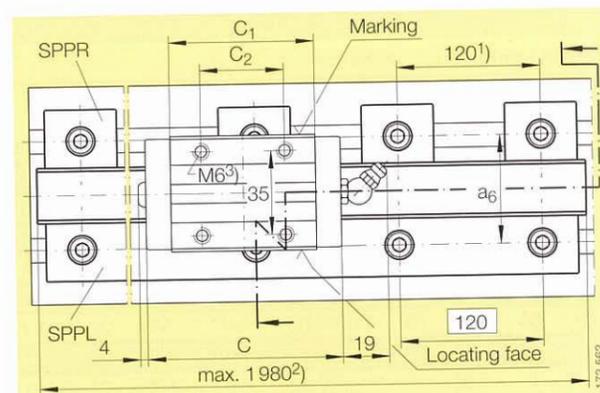
Load direction

Linear guidance systems for profiled sections

Four-row linear recirculating ball bearing and guideway assembly KUVE..K



KUVE..K with SPPR and SPPL



KUVE..K with SPPR and SPPL, plan view X (rotated through 90°)

Dimension table · Dimensions in mm

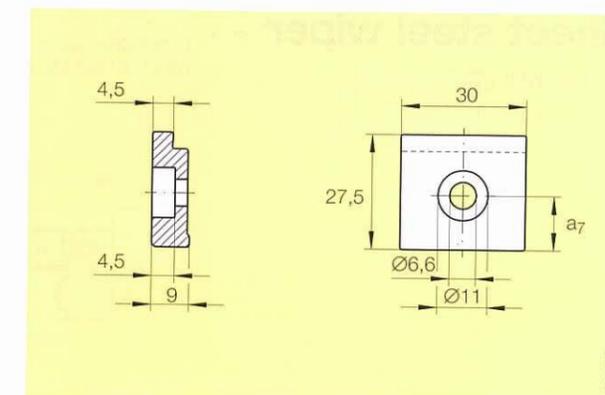
Unit	Carriage		Guideway		Dimensions		Mounting dimensions					Load carrying capacity kN
	Designation	Mass kg	Designation	Mass kg/m	H	C	a ₆	C ₁	C ₂	H ₃	H ₅	
KUVE 25 ESC K	KWVE 25 ESC	0,41	TKVD 25 K	3,2	38	57	40/45/50	36	- ⁴⁾	8	10	12,5
KUVE 25 ES K	KWVE 25 ES	0,56	TKVD 25 K	3,2	38	81,7	40/45/50	60,7	35	8	10	17,9
KUVE 25 SN K	KWVE 25 SN	0,45	TKVD 25 K	3,2	36	81,7	40/45/50	60,7	35	6	8	17,9

Other designs available by agreement.

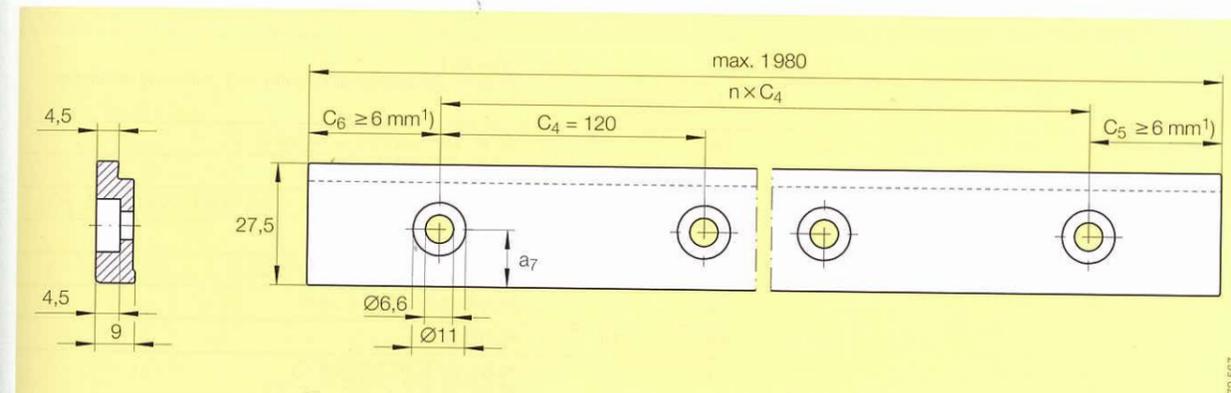
- 1) Recommended screw spacing.
- 2) Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 3) For screws to DIN 912-12.9. Tightening torque for M6: 17 Nm. If there is a possibility of settling, the fixing screws should be secured against rotation.
- 4) One row of threaded holes located centrally in the carriage.
- 5) The basic dynamic load rating C is used to calculate the rating life. The permissible load is dependent on the profile and the type and number of fasteners used.

Linear guidance systems for profiled sections

Clamping lugs SPPR
Clamping strips SPPL



Clamping lug SPPR



Clamping strip SPPL

Dimension table - Clamping lugs, clamping strips · Dimensions in mm

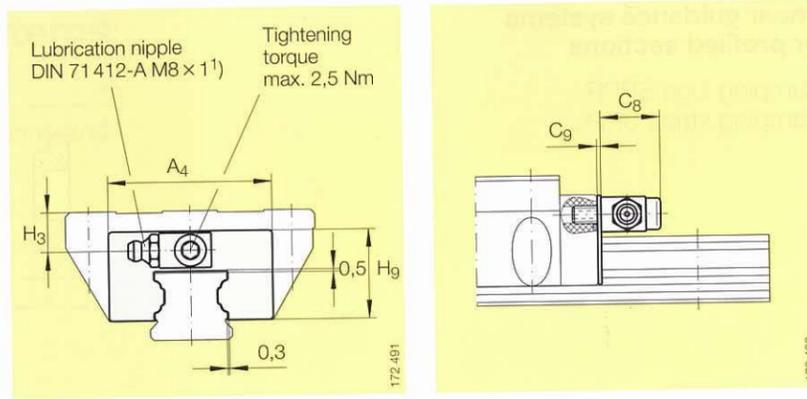
Clamping lug Designation	Mass g	Clamping strip Designation	Mass g/m	Dimensions	
				a ₆	a ₇
SPPR 25 40	0,02	SPPL 25 40	0,6	40	15,5
SPPR 25 45	0,02	SPPL 25 45	0,6	45	13
SPPR 25 50	0,02	SPPL 25 50	0,6	50	10,5

! Risk of injury.
The design must be such that no-one can reach into areas containing moving parts.

¹⁾ Dimensions C₅ and C₆ are dependent on the length of the strip; see page 60 for calculation method.

Sheet steel wiper

Series APLVE
APLVE..W



APLVE

Dimension table - Dimensions in mm

Designation	Dimensions					Suitable for linear recirculating ball bearing and guideway assembly
	A ₄	H ₉	C ₉	H ₃	C ₈	
APLVE 20	40,6	21,9	0,8	8	17,5	KUVE 20, KUVE 20 L, KUVE 20 S
				5	17,5	KUVE 20 SN, KUVE 20 N
				6	17,5	KUVE 20 E, KUVE 20 ES, KUVE 20 EC, KUVE 20 E SC
APLVE 20 W	62,6	21,9	0,8	5	17,5	KUVE 20 W
APLVE 25	46	25,1	0,8	11	19	KUVE 25, KUVE 25 L, KUVE 25 S
				6	19	KUVE 25 SN, KUVE 25 N
				15	19	KUVE 25 H
				8	19	KUVE 25 E, KUVE 25 E C, KUVE 25 E S, KUVE 25 E SC
APLVE 25 W	92	25,1	0,8	10	19	KUVE 25 WL
APLVE 30	58	31,3	0,8	11,25	19	KUVE 30, KUVE 30 L, KUVE 30 S, KUVE 30 E, KUVE 30 ES, KUVE 30 EC, KUVE 30 E SC
				7,25	19	KUVE 30 SN, KUVE 30 N
				14,25	19	KUVE 30 H
APLVE 30 W	110	31,3	0,8	11,25	19	KUVE 30 W
APLVE 35	68	36,5	0,8	12,3	19	KUVE 35, KUVE 35 L, KUVE 35 S, KUVE 35 E, KUVE 35 ES, KUVE 35 EC, KUVE 35 E SC
				8,3	19	KUVE 35 SN, KUVE 35 N
				19,3	19	KUVE 35 H
APLVE 35 W	127,4	36,5	0,8	14,3	19	KUVE 35 WL
APLVE 45	84,6	41,5	0,8	16,5	19	KUVE 45, KUVE 45 L, KUVE 45 S, KUVE 45 E, KUVE 45 ES, KUVE 45 EC, KUVE 45 E SC
				8,5	19	KUVE 45 SN, KUVE 45 N
				26,5	19	KUVE 45 H

1) Except KUVE 20: DIN 71 412-A M6.
During fitting, it must be ensured that the gap between the guideway and the sheet steel wiper is of the correct size.

