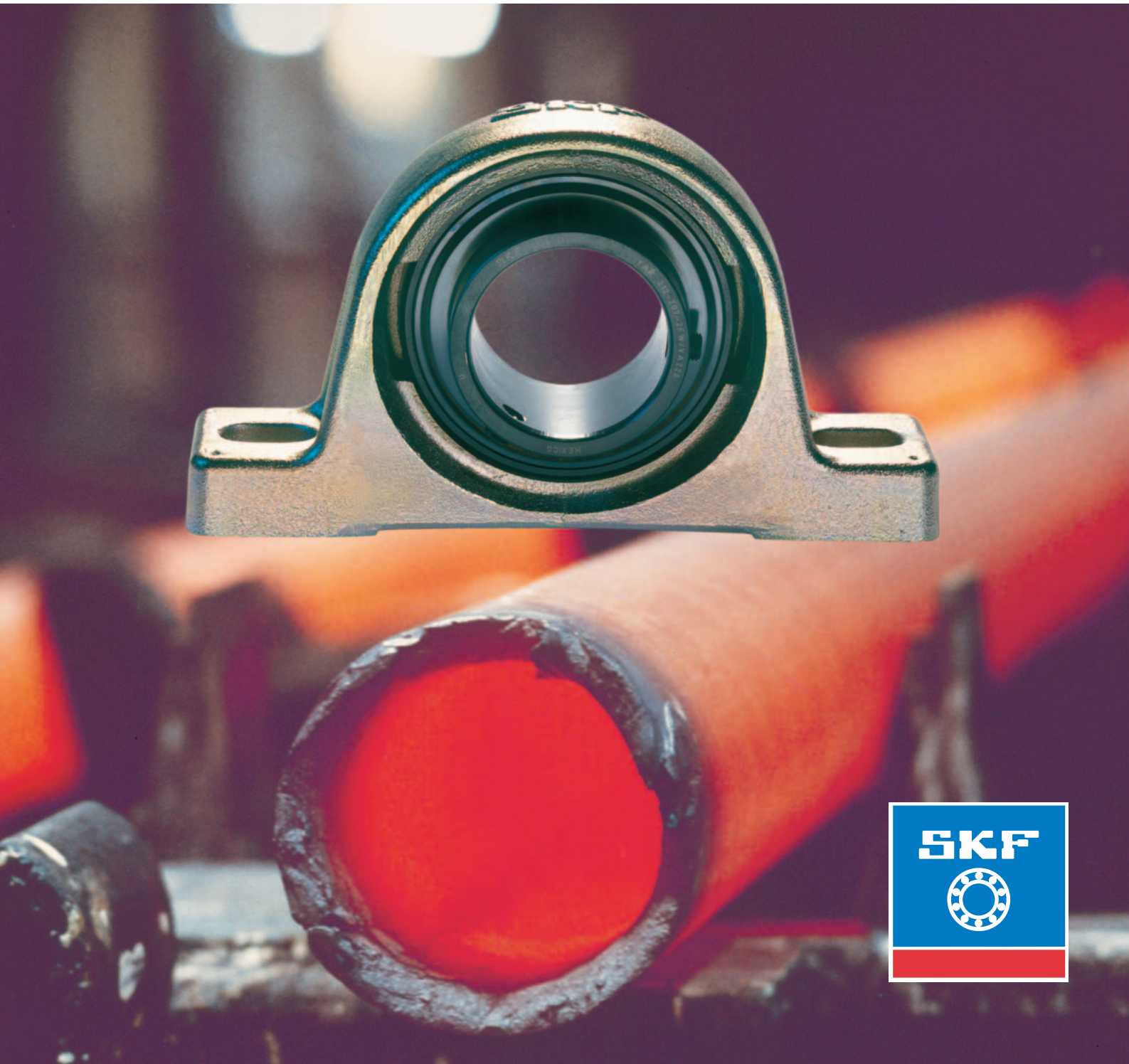
SKF Y-bearing units for high temperatures



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Made by SKF® stands for excellence. It symbolizes our consistent endeavor to achieve total quality in everything we do. For those who use our products, “Made by SKF” implies three main benefits.

Reliability – thanks to modern, efficient products, based on our worldwide application know-how, optimized materials, forward-looking designs and the most advanced production techniques.

Cost effectiveness – resulting from the favorable ratio between our product quality plus service facilities, and the purchase price of the product.

Market lead – which you can achieve by taking advantage of our products and services. Increased operating time and reduced down-time, as well as improved output and product quality are the key to a successful partnership.

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From –238 to +662 °F

(–150 to +350 °C)

The range of SKF bearings and bearing units for high temperatures has been extended. The range now includes, in addition to the well-proven deep groove ball bearings and axlebox units of the TVN design for autoclave wagons, also Y-bearing units which are suitable for very high as well as very low temperatures.

The new Y-bearing units are available in three different housing styles with a choice of two main bearing designs.

SKF has, therefore, the widest range of bearings and bearing units for high temperatures; it more than meets the demands for

- reduced machine operating costs,
- extended service life,
- high operational reliability and
- minimum maintenance.



From –238 to +662°F (–150 to +350 °C)

Y-bearing units

Y-bearing units have been on the market for many years now and, because of their special properties and advantages, they are well-respected. They consist of a deep groove ball bearing with a convex sphered outside diameter (sometimes referred to as an insert bearing) and a housing with a corresponding concave sphered seating. These sphered seating surfaces enable initial errors of alignment between shaft and housing to be compensated for.

The Y-bearings incorporated in the Y-bearing units differ from traditional deep groove ball bearings basically in four respects. They have

- a sphered outside diameter, plus tolerances in the bore for easy mounting on commercial drawn shafting,
- an extended inner ring with holes to take grub (set) screws for easy attachment to the shaft, and
- highly efficient shields which protect the bearing even under extreme conditions.

Y-bearing units for high temperatures

SKF Y-bearing units for high temperatures have housings of grey cast iron. The housings are available in the following designs

- Plummer block
- Flanged housing; square flange with four holes for attachment bolts
- Flanged housing; oval flange with two holes for attachment bolts

To meet the widely differing engineering demands in this wide temperature range, two main versions of bearings of series YAR 2-2FW are used: one for extreme demands and one for more normal demands.

The Y-bearing housings

The cast housings of the units for high temperatures are interchangeable with those of the standard SKF Y-bearing units except for a few sizes which have some dimensions which differ slightly. The principle differences apart from this are

- the surfaces are coated with zinc and yellow chromate; this galvanized layer provides added protection against corrosion and gives the housings a distinctive appearance;
- the housing bore is coated with a lubricating paste and the tolerances are such that misalignment compensation can be achieved at all times and at all temperatures;
- there is no grease nipple for obvious reasons – the bearings are lubricated for life.

The Y-bearings

SKF Y-bearings for high temperatures belong to series YAR 2, have inner rings extended at both sides and are fastened to the shaft by grub screws. The range covers bearings with bore diameters of 20 to 60 mm and $^{3}/_{4}$ to 2 $^{7}/_{16}$ inches and meets most market needs. The bearings are available in two main designs (VA228 and VA201), however SKF also offers two other variants (VA224 and VA226) to support high temperature applications.



VA224 – for high temperature and high speeds
These variants incorporate a pressed steel cage and contain a high-temperature grease which can support higher speeds than the VA201 variant. These bearings are fitted with shields and flingers that will protect it from contamination. The bearings have a radial internal clearance of C4 and are recommended for temperatures up to 356 °F (180 °C).

VA226 – for fan applications
This variant has similar features to the VA224, however, special features have also been added to make this bearing suitable for fan applications running under high temperature. The bearings use a high temperature grease with special consistency for efficient running on vertical configurations or high vibration. Special aligning torque and stop pin are incorporated to prevent the bearing from rotating inside the housing when it is running at high speeds. The bearings have a radial internal clearance of C4 and are recommended for temperatures up to 356 °F (180 °C).

For availability of these variants, please contact SKF.

VA228 – for maximum performance
This design is an SKF top-of-the-range product. It incorporates a "coronet" cage of special graphite which also serves as a unique lubrication system (➔ **fig** 1). The minute quantities of graphite powder generated by the cage during operation are more than adequate for bearing lubrication and allow many years of trouble-free operation without maintenance. The bearings are also protected against the ingress of solid contaminants by a combination of shield and flinger at each side.

All surfaces of the bearing are manganese phosphated and the flingers are black oxidized. This provides protection against corrosion and the phosphate layer enhances bearing performance.

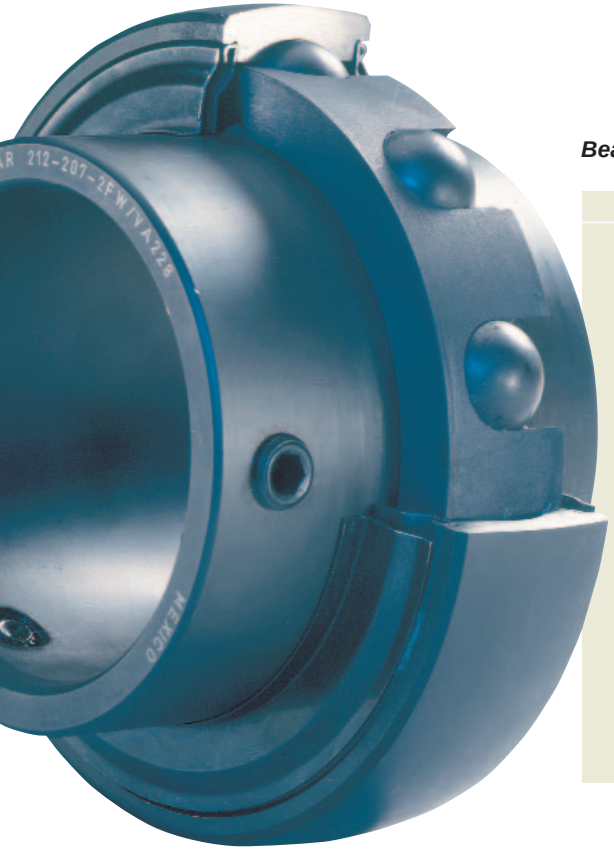
The bearings have a radial internal clearance which corresponds to twice the standard C5 clearance. The maximum permissible operating temperature range is from -238 to +662 °F (-150 to +350 °C). Another advantage of this bearing is its environmental friendliness. Even at the maximum operating temperature, no poisonous fumes or gases are produced.

VA201 – for more normal demands
These bearings have a pressed steel cage and are filled with a black, high-temperature lubricating paste (➔ **fig** 2). This paste is a mixture of polyalkylene glycol and graphite and has well-proven lubricating properties. Again the bearings are protected against the ingress of solid contaminants by a combination of shield and flinger.

All surfaces of the bearing are manganese phosphated and the flingers are black oxidized. This provides protection against corrosion and the phosphate layer provides for good adhesion of the paste and enhances bearing performance.

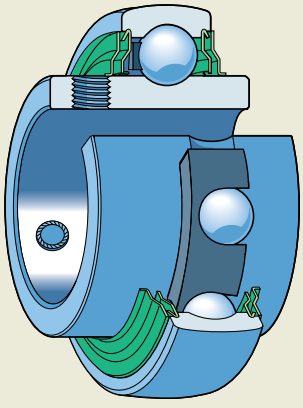
The bearings have a radial internal clearance which corresponds to twice the standard C5 clearance. The maximum permissible operating temperature range is from -40 to +482 °F (-40 to +250 °C). Dry lubrication pertains at temperatures above +392 °F (+200 °C).

Supply situation
The Y-bearing units for high temperatures are delivered already assembled and are ready to mount. If required, the Y-bearings can also be supplied separately if so, please contact your SKF representative.



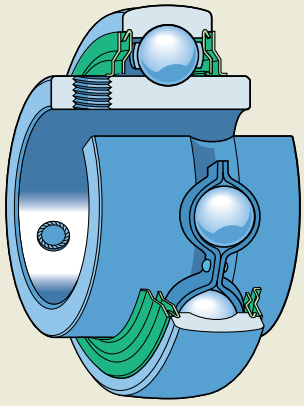
Bearing of VA228 design

Fig 1



Bearing of VA201, VA224, VA226 design

Fig 2



Design of bearing arrangements

Influence of operating temperature

At high temperatures, the load carrying capacity of the bearings is reduced. This is taken into consideration by multiplying the basic static load rating C_0 by a temperature factor f_T. Values of this factor at different temperatures will be found in **Table 1**.

Factor f_T for reduction of basic static load rating

Table 1

Operating temperature		Factor f_T
°F	°C	–
302	150	1.00
392	200	0.95
482	250	0.90
572	300	0.80
662	350	0.64

Selection of bearing size

The size of bearing or unit required for a given application is selected with reference to the loads which are to be expected.

For Y-bearings and Y-bearing units of the VA228 and VA201 designs, the requisite size is determined based on the basic static load rating C_0, as the bearings rotate at very slow speeds.

The requisite basic static load rating can be determined using

$$C_0 = 2\ (P_0/f_T)$$

where
C_0 = requisite basic static load rating of the Y-bearing or Y-bearing unit, N
P_0 = equivalent static bearing load, N
f_T = temperature factor (➔ **Table 1**)

The equivalent static bearing load is obtained from

$$P_0 = 0.6\ F_r + 0.5\ F_a$$

where
P_0 = equivalent static bearing load, N
F_r = actual radial bearing load, N
F_a = actual axial bearing load, N

When calculating P_0 the maximum load which can occur should be used and its radial and axial components inserted in the equation above. If $P_0 < F_r$, then $P_0 = F_r$ should be used.

Table 2 shows the requisite basic static load rating for different loads and temperatures.

Using the requisite basic static load rating calculated from the above, or taken from **Table 2** a suitable Y-bearing or Y-bearing unit can be selected from the product tables (from **page 10** onwards).

The bearing or unit selected should have a C_0 value which is equal to or greater than the requisite value.

Axial load carrying capacity

The axial load carrying capacity of these Y-bearing units and Y-bearings is limited to approximately 15 % of the basic static load rating C_0 because of the large radial internal clearance.

Table 2

Wheel load		Requisite basic static load rating C_0 for operating temperatures									
		302 °F	150 °C	392 °F	200 °C	482 °F	250 °C	572 °F	300 °C	662 °F	350 °C
lbf	N	lbf	N	lbf	N	lbf	N	lbf	N	lbf	N
112	**500**	225	1,000	236	1,050	250	1,110	281	1,250	351	1,560
225	**1,000**	450	2,000	473	2,100	500	2,220	563	2,500	702	3,120
450	**2,000**	900	4,000	945	4,200	999	4,440	1,125	5,000	1,406	6,250
675	**3,000**	1,350	6,000	1,418	6,300	1,501	6,670	1,688	7,500	2,115	9,400
900	**4,000**	1,800	8,000	1,890	8,400	2,003	8,900	2,250	10,000	2,813	12,500
1,125	**5,000**	2,250	10,000	2,363	10,500	2,498	11,100	2,813	12,500	3,510	15,600
1,350	**6,000**	2,700	12,000	2,835	12,600	2,993	13,300	3,375	15,000	4,230	18,800
1,575	**7,000**	3,150	14,000	3,308	14,700	3,488	15,500	3,938	17,500	4,928	21,900
1,800	**8,000**	3,600	16,000	3,780	16,800	4,005	17,800	4,500	20,000	5,625	25,000
2,025	**9,000**	4,050	18,000	4,253	18,900	4,478	19,900	5,063	22,500	6,323	28,100
2,250	**10,000**	4,500	20,000	4,725	21,000	4,995	22,200	5,625	25,000	7,043	31,300
2,475	**11,000**	4,950	22,000	5,198	23,100	5,513	24,500	6,188	27,500	7,740	34,400
2,700	**12,000**	5,400	24,000	5,670	25,200	6,008	26,700	6,750	30,000	8,438	37,500
2,925	**13,000**	5,850	26,000	6,143	27,300	6,525	29,000	7,315	32,500	–	–
3,150	**14,000**	6,300	28,000	6,615	29,400	6,998	31,100	7,875	35,000	–	–
3,375	**15,000**	6,750	30,000	7,088	31,500	7,493	33,300	8,438	37,500	–	–
3,600	**16,000**	7,200	32,000	7,560	33,600	7,875	35,000	–	–	–	–
3,825	**17,000**	7,650	34,000	8,033	35,700	8,505	37,800	–	–	–	–
4,050	**18,000**	8,100	36,000	8,505	37,800	–	–	–	–	–	–

Requisite basic static load rating C_0 for different loads and temperatures

Bearing arrangement

Y-bearing units do not permit any lateral displacement and are therefore not generally suitable for non-locating bearing arrangements. The distance between bearing positions should therefore be small or the units should be mounted in flexible sheet metal walls, to prevent them from being inadmissibly clamped.

If the distance between bearing positions is too long or temperatures are too high so that one bearing position must allow for shaft elongation to be compensated, it is recommended that the non-locating position is designed as follows.

The shaft at the non-locating side should be provided with two grooves at 120° to each other, to take special grub screws (which replace the standard grub screws) in the inner ring (➔ **fig 1**). This enables elongation of the shaft to be compensated for and prevents relative movement between the shaft and inner ring. To avoid problems in operation, the grub screws should have ground ends and the sliding surfaces in the shaft grooves should be coated with a suitable lubricating paste.

Shaft tolerances

Under normal operating conditions the shaft seatings for Y-bearings with grub screw locking should be machined to h7 (for light loads h8). For heavy loads it is necessary for the seatings to have an h6 tolerance. If the temperature difference between the shaft and bearing is substantial, SKF should be consulted for advice.

Mounting

It is important to remember that the Y-bearings should not be locked in position on the shaft until the housing has been firmly bolted to its support. The bearing will then occupy its correct position and detrimental stresses will be avoided.

Care must be taken so that the bearing can be mounted without interference fit between the inner ring, bore, and the shaft. In order to prevent corrosion, it is advisable to lubricate the shaft with a graphite paste prior to mounting the bearing.

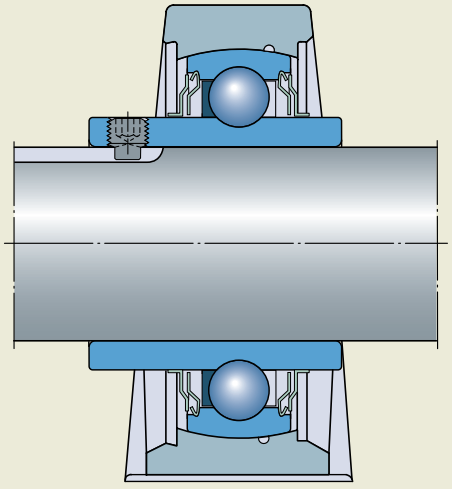
Good mounting practice calls for not using blunt objects (i.e. hammer), as the impact may damage both interior and exterior components.

For additional information, please consult SKF Bearing Installation and Maintenance Guide (#140-710) or skf.com/mount.

The grub screws in the inner ring extension should be tightened to locate the bearing on the shaft. The two screw holes are at 120° to each other. The screws should be tightened by hand using a hexagonal (Allen) key. If it is possible to measure the tightening torque, then the values given in **Table 3** should not be exceeded. The grub screw hexagonal socket dimensions are also given in **Table 3**.

Non-locating bearing arrangement

Fig 1



Grub screw hexagonal socket dimensions and tightening torques

Table 3

Bearing size over	incl.	Dimension across flats	Tightening torque max
mm		mm	Nm
Metric bearings			
	35	3	4.0
35	**45**	4	6.5
45	**60**	5	16.5
in		**in**	**lb in**
Inch-size bearings			
	1.1875	.1181	35.4040 lb in
1.1875	**1.7500**	.1575	57.5315 lb in
1.75	**2.4375**	.1969	146.0415 lb in

Bearing data – general

Dimensions
The dimensions of SKF Y-bearings of series YAR 2 conform to ISO 9628:1992.

Tolerances
SKF Y-bearings are produced with the bore and outside diameter tolerances shown in **Table 1**. Because of the manganese phosphate surface treatment applied to the VA228 and VA201 designs there may be slight deviations from these values. However, this has no influence on their arrangement or performance.

The bearings for inch shafts are made to the same tolerances as the corresponding bearings for metric shafts with the exception of bearing YAR 207-104 which has the same bore tolerances as the next smaller bearing (bearing YAR 206).

The tolerance for the height of the shaft axis above the support surface, dimension H_1 of the plummer block unit is 0/- 0.9843 in. (inch = 25.4 mm).

Internal clearance
The Y-bearings have twice the C5 clearance specified in ISO 5753:1991 for deep groove ball bearings. The inch-size bearings have the same clearance as the corresponding metric bearing. The actual clearance limits are given in **Table 2**.

Errors of alignment
Y-bearing units are able to compensate during mounting for errors of alignment up to ±5°.

Speeds
Bearings of the VA228 and VA201 designs are designed to be operated at shaft speeds up to approximately 100 r/min, while bearings from the VA224 and VA226 variants can resist higher speed due to the lubrication type used.

Cages
SKF Y-bearings for high temperatures of the VA201, VA224 and VA226 design are fitted with a pressed steel cage (➔ **fig 1**).

Those of the VA228 design have a special one-piece “coronet” cage of graphite. This separates the balls and is guided axially by one of the shields (➔ **fig 1**). The graphite is an excellent lubricant for both rolling and sliding contacts. As the bearing rotates, minute quantities of graphite powder are released which are adequate to lubricate the bearing for many years and provide trouble-free operation.

Tolerances for Y-bearings of series YAR 2

Table 1

Nominal diameter		Bore diameter Deviation		Outside diameter Deviation	
over	incl.	high	low	high	low
mm in	mm in	µm in	µm in	µm in	µm in
18 **0.7087**	**30** **1.811**	+18 0.0007	0 0	– –	– –
30 **1.811**	**50** **1.9685**	+21 0.0008	0 0	0 0	-10 -0.0004
50 **1.9685**	**80** **3.1496**	+24 0.0009	0 0	0 0	-10 -0.0004
80 **3.1496**	**120** **4.7244**	– –	– –	0 0	-15 -0.0006

Radial internal clearance

Table 2

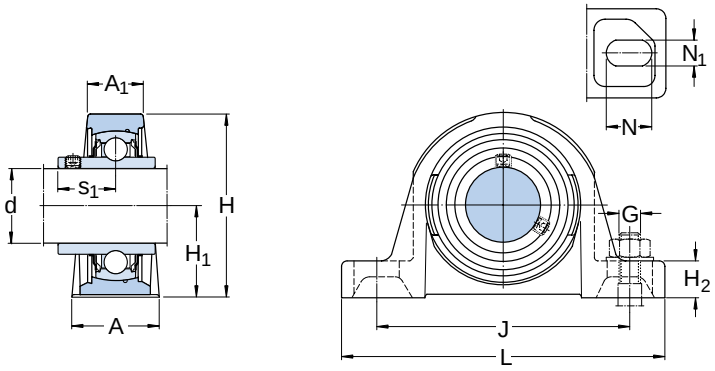
Bore diameter d		Radial internal clearance	
over	incl.	min	max
mm in		µm in	
	24 **0.0009**	56 0.0022	96 0.0038
24 **0.0009**	30 **0.0012**	60 0.0024	105 0.0041
30 **0.0012**	40 **0.0016**	80 0.0031	130 0.0051
40 **0.0016**	50 **0.0020**	90 0.0035	145 0.0057
50 **0.0020**	60 **0.0024**	110 0.0043	180 0.0071

Cages

Fig 1

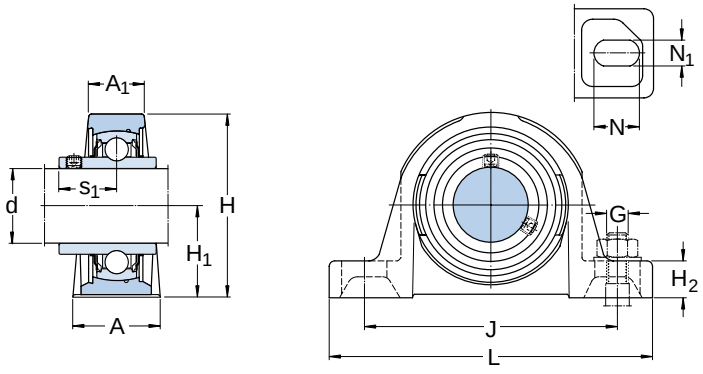


Y-bearing plummer block units
for high temperatures
for metric shafts
d **20 – 60 mm**



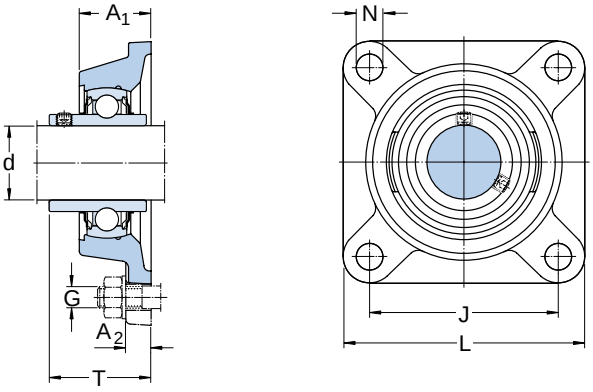
Dimensions													Basic static load rating	Mass	Designations	
															Y-bearing unit	Incorporated Y-bearing
d	A	A_1	H	H_1	H_2	J min	J max	L	N	N_1	G	s_1	C_0			
mm in													N lbf	kg lbs	–	
20	32 1.2598	20 0.7874	64 2.5197	33.3 1.311	14 0.5512	88 3.4646	106 4.1732	127 5	20.5 0.8071	11.5 0.4528	10 0.3937	18.3 0.7205	6,550 1,474	0.57 1.26	**SY 20 TF/VA201** **SY 20 TF/VA228**	YAR 204-2FW/VA201 YAR 204-2FW/VA228
25	36 1.4173	21 0.8268	70 2.7559	36.5 1.437	16 0.6299	94 3.7008	110 4.3307	130 5.1181	19.5 0.7677	11.5 0.4528	10 0.3937	19.8 0.7795	7,800 1,755	0.73 1.61	**SY 25 TF/VA201** **SY 25 TF/VA228**	YAR 205-2FW/VA201 YAR 205-2FW/VA228
30	40 1.5748	25 0.9843	82 3.2283	42.9 1.689	17 0.6692	108 4.252	127 5	152 5.9843	23.5 0.9252	14 0.5512	12 0.4724	22.2 0.874	11,200 2,520	1.1 2.43	**SY 30 TF/VA201** **SY 30 TF/VA228**	YAR 206-2FW/VA201 YAR 206-2FW/VA228
35	45 1.7717	27 1.063	93 3.6614	47.6 1.874	19 0.748	119 4.685	133 5.2362	160 6.2992	21 0.8268	14 0.5512	12 0.4724	25.4 1	15,300 3,443	1.45 3.20	**SY 35 TF/VA201** **SY 35 TF/VA228**	YAR 207-2FW/VA201 YAR 207-2FW/VA228
40	48 1.8898	30 1.1811	99 3.8976	49.2 1.937	19 0.748	125 4.9213	146 5.748	175 6.8898	24.5 0.9646	14 0.5512	12 0.4724	30.2 1.189	19,000 4,275	1.8 3.97	**SY 40 TF/VA201** **SY 40 TF/VA228**	YAR 208-2FW/VA201 YAR 208-2FW/VA228
45	48 1.8898	32 1.2598	107 4.2126	54 2.126	21 0.8268	135 5.315	152 5.9843	187 7.3622	22.5 0.8858	14 0.5512	12 0.4724	30.2 1.189	21,600 4,860	2.2 4.85	**SY 45 TF/VA201** **SY 45 TF/VA228**	YAR 209-2FW/VA201 YAR 209-2FW/VA228
50	54 2.126	34 1.3386	114 4.4882	57.2 2.252	22 0.8661	149 5.8661	165 6.4961	203 7.9921	26 1.0236	18 0.7087	16 0.6299	32.6 1.2835	23,200 5,220	2.7 5.95	**SY 50 TF/VA201** **SY 50 TF/VA228**	YAR 210-2FW/VA201 YAR 210-2FW/VA228
55	60 2.3622	35 1.3780	125 4.9213	63.5 2.5	24 0.9449	162 6.378	181 7.126	219 8.622	27.5 1.0827	18 0.7087	16 0.6299	33.4 1.315	29,000 6,525	3.6 7.94	**SY 55 TF/VA201** **SY 55 TF/VA228**	YAR 211-2FW/VA201 YAR 211-2FW/VA228
60	60 2.3622	42 1.6535	137 5.3937	69.9 2.7520	26.5 1.0433	179 7.0472	202 7.9528	240 9.4488	29.5 1.1614	18 0.7087	16 0.6299	39.7 1.563	36,000 8,100	4.45 9.81	**SY 60 TF/VA201** **SY 60 TF/VA228**	YAR 212-2FW/VA201 YAR 212-2FW/VA228

Y-bearing plummer block units
for high temperatures
for inch shafts
d 3/4 – 2 7/16 in



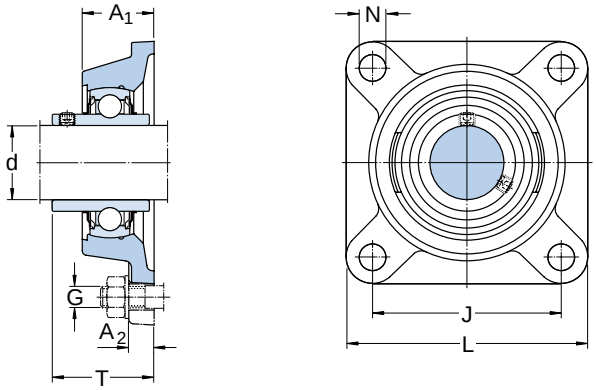
Dimensions													Basic static load rating	Mass	Designations	
															Y-bearing unit	Incorporated Y-bearing
d	A	A_1	H	H_1	H_2	J min	J max	L	N	N_1	G	s_1	C_0			
mm in													N lbf	kg lbs	–	
	32	20	64	33.3	14	88	106	127	20.5	11.5	10	18.3	6,550	0.57	**SY 3/4 TF/VA201**	YAR 204-012-2FW/VA201
3/4	1.2598	0.7874	2.5197	1.311	0.5512	3.4646	4.1732	5	0.8071	0.4528	0.3937	0.7205	1,474	1.26	**SY 3/4 TF/VA228**	YAR 204-012-2FW/VA228
	36	21	70	36.5	16	94	110	130	19.5	11.5	10	19.8	7,800	0.72	**SY 1 TF/VA201**	YAR 205-100-2FW/VA201
1	1.4173	0.8268	2.7559	1.437	0.6299	3.7008	4.3307	5.1181	0.7677	0.4528	0.3937	0.7795	1,755	1.59	**SY 1 TF/VA228**	YAR 205-100-2FW/VA228
	40	25	82	42.9	17	108	127	152	23.5	14	12	22.2	11,200	1.1	**SY 1 3/16 TF/VA201**	YAR 206-103-2FW/VA201
1 3/16	1.5748	0.9843	3.2283	1.689	0.6693	4.252	5	5.9843	0.9252	0.5512	0.4724	0.874	2,520	2.43	**SY 1 3/16 TF/VA228**	YAR 206-103-2FW/VA228
	45	27	93	47.6	19	119	133	160	21	14	12	25.4	15,300	1.5	**SY 1 1/4 TF/VA201**	YAR 207-104-2FW/VA201
1 1/4	1.7717	1.063	3.6614	1.874	0.748	4.685	5.2362	6.2992	0.8268	0.5512	0.4724	1	3,443	3.31	**SY 1 1/4 TF/VA228**	YAR 207-104-2FW/VA228
	45	27	93	47.6	19	119	133	160	21	14	12	25.4	15,300	1.45	**SY 1 7/16 TF/VA201**	YAR 207-107-2FW/VA201
1 7/16	1.7717	1.0630	3.6614	1.8740	0.7480	4.6850	5.2362	6.2992	0.8268	0.5512	0.4724	1.0000	3,443	3.20	**SY 1 7/16 TF/VA228**	YAR 207-107-2FW/VA228
	48	30	99	49.2	19	125	146	175	24.5	14	12	30.2	19,000	1.85	**SY 1 1/2 TF/VA201**	YAR 208-108-2FW/VA201
1 1/2	1.8898	1.1811	3.8976	1.937	0.748	4.9213	5.748	6.8898	0.9646	0.5512	0.4724	1.189	4,275	4.08	**SY 1 1/2 TF/VA228**	YAR 208-108-2FW/VA228
	48	32	107	54	21	135	152	187	22.5	14	12	30.2	21,600	2.30	**SY 1 11/16 TF/VA201**	YAR 209-111-2FW/VA201
1 11/16	1.8898	1.2598	4.2526	2.1260	0.8268	5.3150	5.9843	7.3622	0.8858	0.5512	0.4724	1.1890	4,860	5.07	**SY 1 11/16 TF/VA228**	YAR 209-111-2FW/VA228
	48	32	107	54	21	135	152	187	22.5	14	12	30.2	21,600	2.25	**SY 1 3/4 TF/VA201**	YAR 209-112-2FW/VA201
1 3/4	1.8898	1.2598	4.2126	2.126	0.8268	5.315	5.9843	7.3622	0.8858	0.5512	0.4724	1.189	4,860	4.96	**SY 1 3/4 TF/VA228**	YAR 209-112-2FW/VA228
	54	34	114	57.2	22	149	165	203	26	18	16	32.6	23,200	2.80	**SY 1 15/16 TF/VA201**	YAR 210-115-2FW/VA201
1 15/16	2.126	1.3386	4.4882	2.252	0.8661	5.8661	6.4961	7.9921	1.0236	0.7087	0.6299	1.2835	5,220	6.17	**SY 1 15/16 TF/VA228**	YAR 210-115-2FW/VA228
	60	35	125	63.5	24	162	181	219	27.5	18	16	33.4	29,000	3.75	**SY 2 TF/VA201**	YAR 211-200-2FW/VA201
2	2.3622	1.3780	4.9213	2.5	0.9449	6.378	7.126	8.622	1.0827	0.7087	0.6299	1.315	6,525	8.27	**SY 2 TF/VA228**	YAR 211-200-2FW/VA228
	60	35	125	63.5	24	162	181	219	27.5	18	16	33.4	29,000	3.55	**SY 2 3/16 TF/VA201**	YAR 211-203-2FW/VA201
2 3/16	2.3622	1.3780	4.9213	2.5000	0.9449	6.3780	7.1260	8.6221	1.0827	0.7087	0.6299	1.3150	6,525	7.83	**SY 2 3/16 TF/VA228**	YAR 211-203-2FW/VA228
	60	42	137	69.9	26.5	179	202	240	29.5	18	16	39.7	36,000	4.45	**SY 2 7/16 TF/VA201**	YAR 212-207-2FW/VA201
2 7/16	2.3622	1.6535	5.3937	2.7520	1.0433	7.0472	7.9528	9.4488	1.1614	0.7087	0.6299	1.563	8,100	9.81	**SY 2 7/16 TF/VA228**	YAR 212-207-2FW/VA228

Y-bearing flanged units with square housing
for high temperatures
for metric shafts
d **20 – 60 mm**



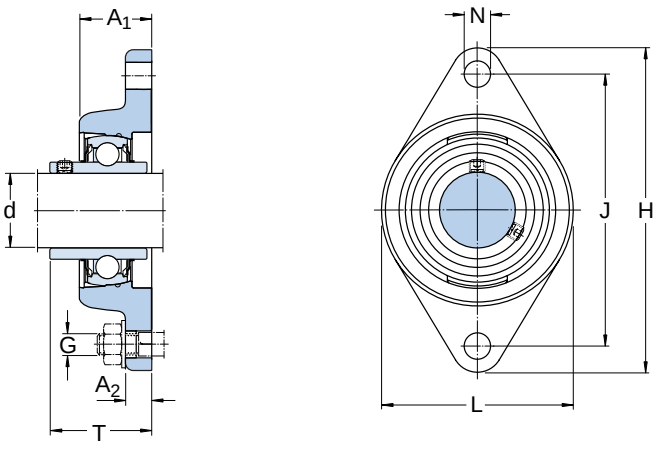
Dimensions								Basic static load rating	Mass	Designations	
										Y-bearing unit	Incorporated Y-bearing
d	A_1	A_2	J	L	N	G	T	C_0			
mm in								N lbf	kg lbs	–	
20	29.5 1.1614	11 0.4330	63.5 2.5	86 3.3858	11.5 0.4528	10 0.3937	37.3 1.4685	6,550 1,474	0.6 1.32	**FY 20 TF/VA201** **FY 20 TF/VA228**	YAR 204-2FW/VA201 YAR 204-2FW/VA228
25	30 1.1811	12 0.4724	70 2.7559	95 3.7402	11.5 0.4528	10 0.3937	38.8 1.5276	7,800 1,755	0.77 1.70	**FY 25 TF/VA201** **FY 25 TF/VA228**	YAR 205-2FW/VA201 YAR 205-2FW/VA228
30	32.5 1.2795	13 0.5118	82.5 3.248	108 4.252	11.5 0.4528	10 0.3937	42.2 1.6614	11,200 2,520	1.1 2.43	**FY 30 TF/VA201** **FY 30 TF/VA228**	YAR 206-2FW/VA201 YAR 206-2FW/VA228
35	34.5 1.3583	13 0.5118	92 3.622	118 4.6457	14 0.5512	12 0.4724	46.4 1.8268	15,300 3,443	1.4 3.089	**FY 35 TF/VA201** **FY 35 TF/VA228**	YAR 207-2FW/VA201 YAR 207-2FW/VA228
40	38.5 1.5157	14 0.5512	101.5 3.9961	130 5.1181	14 0.5512	12 0.4724	54.2 2.1339	19,000 4,275	1.9 4.20	**FY 40 TF/VA201** **FY 40 TF/VA228**	YAR 208-2FW/VA201 YAR 208-2FW/VA228
45	39 1.5354	14 0.5512	105 4.1339	137 5.3937	16 0.6299	14 0.5512	54.2 2.1339	21,600 4,860	2.1 4.63	**FY 45 TF/VA201** **FY 45 TF/VA228**	YAR 209-2FW/VA201 YAR 209-2FW/VA228
50	43 1.6929	15 0.5906	111 4.3701	143 5.6299	18 0.7087	16 0.6299	60.6 2.3858	23,200 5,220	2.5 5.51	**FY 50 TF/VA201** **FY 50 TF/VA228**	YAR 210-2FW/VA201 YAR 210-2FW/VA228
55	47.5 1.8701	16 0.6299	130 5.1181	162 6.378	18 0.7087	16 0.6299	64.4 2.5354	29,000 6,525	3.6 7.94	**FY 55 TF/VA201** **FY 55 TF/VA228**	YAR 211-2FW/VA201 YAR 211-2FW/VA228
60	52 2.0472	17 0.6693	143 5.6299	175 6.8898	18 0.7087	16 0.6299	73.7 2.9016	36,000 8,100	4.6 10.14	**FY 60 TF/VA201** **FY 60 TF/VA228**	YAR 212-2FW/VA201 YAR 212-2FW/VA228

Y-bearing flanged units with square housing
for high temperatures
for inch shafts
d 3/4 – 2 7/16 in



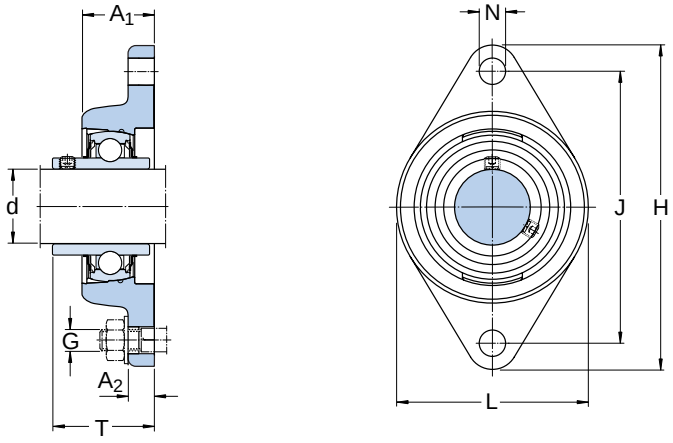
Dimensions								Basic static load rating	Mass	Designations	
										Y-bearing unit	Incorporated Y-bearing
d	A_1	A_2	J	L	N	G	T	C_0			
mm in								N lbf	kg lbs	–	
	29.5	11	63.5	86	11.5	10	37.3	6,550	0.6	**FY 3/4 TF/VA201**	YAR 204-012-2FW/VA201
3/4	1.1614	0.4330	2.5	3.3858	0.4528	0.3937	1.4685	1,474	1.32	**FY 3/4 TF/VA228**	YAR 204-012-2FW/VA228
	30	12	70	95	11.5	10	38.8	7,800	0.77	**FY 1 TF/VA201**	YAR 205-100-2FW/VA201
1	1.1811	0.4724	2.7559	3.7402	0.4528	0.3937	1.5276	1,755	1.70	**FY 1 TF/VA228**	YAR 205-100-2FW/VA228
	32.5	13	82.5	108	11.5	10	42.2	11,200	1.1	**FY 1 3/16 TF/VA201**	YAR 206-103-2FW/VA201
1 3/16	1.2795	0.5118	3.248	4.252	0.4528	0.3937	1.6614	2,520	2.43	**FY 1 3/16 TF/VA228**	YAR 206-103-2FW/VA228
	34.5	13	92	118	14	12	46.4	15,300	1.45	**FY 1 1/4 TF/VA201**	YAR 207-104-2FW/VA201
1 1/4	1.3583	0.5118	3.622	4.6457	0.5512	0.4724	1.8268	3,443	3.2	**FY 1 1/4 TF/VA228**	YAR 207-104-2FW/VA228
	34.5	13	92	118	14	12	46.4	15,300	1.4	**FY 1 7/16 TF/VA201**	YAR 207-107-2FW/VA201
1 7/16	1.3583	0.5118	3.6221	4.6457	0.5512	0.4724	1.8268	3,443	3.09	**FY 1 7/16 TF/VA228**	YAR 207-107-2FW/VA228
	38.5	14	101.5	130	14	12	54.2	19,000	1.95	**FY 1 1/2 TF/VA201**	YAR 208-108-2FW/VA201
1 1/2	1.5157	0.5512	3.9961	5.1181	0.5512	0.4724	2.1339	4,275	4.30	**FY 1 1/2 TF/VA228**	YAR 208-108-2FW/VA228
	39	14	105	137	16	14	54.2	21,600	2.15	**FY 1 11/16 TF/VA201**	YAR 209-111-2FW/VA201
1 11/16	1.5354	0.5512	4.1339	5.3937	0.6299	0.5512	2.1339	4,860	4.74	**FY 1 11/16 TF/VA228**	YAR 209-111-2FW/VA228
	39	14	105	137	16	14	54.2	21,600	2.1	**FY 1 3/4 TF/VA201**	YAR 209-112-2FW/VA201
1 3/4	1.5354	0.5512	4.1339	5.3937	0.6299	0.5512	2.1339	4,860	4.63	**FY 1 3/4 TF/VA228**	YAR 209-112-2FW/VA228
	43	15	111	143	18	16	60.6	23,200	2.5	**FY 1 15/16 TF/VA201**	YAR 210-115-2FW/VA201
1 15/16	1.6929	0.5906	4.3701	5.6299	0.7087	0.6299	2.3858	5,220	5.51	**FY 1 15/16 TF/VA228**	YAR 210-115-2FW/VA228
	47.5	16	130	162	18	16	64.4	29,000	3.75	**FY 2 TF/VA201**	YAR 211-200-2FW/VA201
2	1.8701	0.6299	5.1181	6.378	0.7087	0.6299	2.5354	6,525	8.27	**FY 2 TF/VA228**	YAR 211-200-2FW/VA228
	47.5	16	130	162	18	16	64.4	29,000	3.55	**FY 2 3/16 TF/VA201**	YAR 211-203-2FW/VA201
2 3/16	1.8701	0.6299	5.1181	6.378	0.7087	0.6299	2.5354	6,525	7.83	**FY 2 3/16 TF/VA228**	YAR 211-203-2FW/VA228
	52	17	143	175	18	16	73.7	36,000	4.50	**FY 2 7/16 TF/VA201**	YAR 212-207-2FW/VA201
2 7/16	2.0472	0.6693	5.6299	6.8898	0.7087	0.6299	2.9016	8,100	9.92	**FY 2 7/16 TF/VA228**	YAR 212-207-2FW/VA228

Y-bearing flanged units with oval housing
for high temperatures
for metric shafts
d **20 – 55 mm**



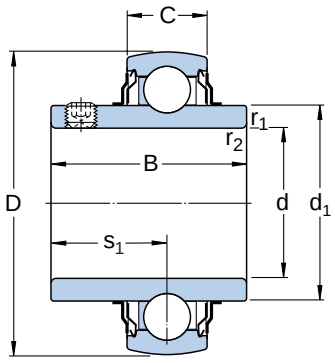
Dimensions									Basic static load rating	Mass	Designations Y-bearing unit	Incorporated Y-bearing
d	A_1	A_2	H	J	L	N	G	T	C_0			
mm in									N lbf	kg lbs	–	
20	29.5 1.1614	11 0.4331	112 4.4094	90 3.5433	60.5 2.3819	11.5 0.4528	10 0.3937	37.3 1.4685	6,550 1,474	0.5 1.10	**FYT 20 TF/VA201** **FYT 20 TF/VA228**	YAR 204-2FW/VA201 YAR 204-2FW/VA228
25	30 1.1811	12 0.4724	124 4.8819	99 3.8976	70 2.7559	11.5 0.4528	10 0.3937	38.8 1.5276	7,800 1,755	0.63 1.39	**FYT 25 TF/VA201** **FYT 25 TF/VA228**	YAR 205-2FW/VA201 YAR 205-2FW/VA228
30	32.5 1.2795	13 0.5118	141.5 5.5709	116.5 4.5866	83 3.2677	11.5 0.4528	10 0.3937	42.2 1.6614	11,200 2,520	0.93 2.05	**FYT 30 TF/VA201** **FYT 30 TF/VA228**	YAR 206-2FW/VA201 YAR 206-2FW/VA228
35	34.5 1.3583	13 0.5118	156 6.1417	130 5.1181	96 3.7795	14 0.5512	12 0.4724	46.4 1.8268	15,300 3,443	1.25 2.76	**FYT 35 TF/VA201** **FYT 35 TF/VA228**	YAR 207-2FW/VA201 YAR 207-2FW/VA228
40	38.5 1.5157	14 0.5512	171.5 6.752	143.5 5.6496	102 4.0157	14 0.5512	12 0.4724	54.2 2.1339	19,000 4,275	1.65 3.64	**FYT 40 TF/VA201** **FYT 40 TF/VA228**	YAR 208-2FW/VA201 YAR 208-2FW/VA228
45	39 1.5354	14 0.5512	178.5 7.0276	148.5 5.8465	111 4.3700	16 0.6299	14 0.5512	54.2 2.1339	21,600 4,860	1.8 3.97	**FYT 45 TF/VA201** **FYT 45 TF/VA228**	YAR 209-2FW/VA201 YAR 209-2FW/VA228
50	43 1.6929	15 0.5906	189 7.4409	157 6.1811	116 4.5669	18 0.7087	16 0.6299	60.6 2.3858	23,200 5,220	2.15 4.74	**FYT 50 TF/VA201** **FYT 50 TF/VA228**	YAR 210-2FW/VA201 YAR 210-2FW/VA228
55	47.6 1.8740	20.6 0.8110	215.9 8.5000	184.2 7.2520	127 5.0000	19.1 0.7520	16 0.625	62.8 2.4724	29,000 6,519	3.3 7.28	**FYT 55 TF/VA201** **FYT 55 TF/VA228**	YAR 211-2FW/VA201 YAR 211-2FW/VA228

Y-bearing flanged units with oval housing
for high temperatures
for inch shafts
d 3/4 – 2 3/16 in

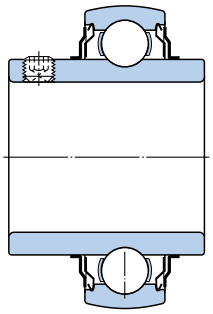


Dimensions									Basic static load rating	Mass	Designations	
											Y-bearing unit	Incorporated Y-bearing
d	A_1	A_2	H	J	L	N	G	T	C_0			
mm in									N lbf	kg lbs	–	
	29.5	11	112	90	60.5	11.5	10	37.3	6,550	0.5	**FYT 3/4 TF/VA201**	YAR 204-012-2FW/VA201
3/4	1.1614	0.4331	4.4094	3.5433	2.3819	0.4528	0.3937	1.4685	1,474	1.1023	**FYT 3/4 TF/VA228**	YAR 204-012-2FW/VA228
	30	12	124	99	70	11.5	10	38.8	7,800	0.63	**FYT 1 TF/VA201**	YAR 205-100-2FW/VA201
1	1.1811	0.4724	4.8819	3.8976	2.7559	0.4528	0.3937	1.5276	1,755	1.3889	**FYT 1 TF/VA228**	YAR 205-100-2FW/VA228
	32.5	13	141.5	116.5	83	11.5	10	42.2	11,200	0.92	**FYT 1 3/16 TF/VA201**	YAR 206-103-2FW/VA201
1 3/16	1.2795	0.5118	5.5709	4.5866	3.2677	0.4528	0.3937	1.6614	2,520	2.03	**FYT 1 3/16 TF/VA228**	YAR 206-103-2FW/VA228
	34.5	13	156	130	96	14	12	46.4	15,300	1.30	**FYT 1 1/4 TF/VA201**	YAR 207-104-2FW/VA201
1 1/4	1.3583	0.5118	6.1417	5.1181	3.7795	0.5512	0.4724	1.8268	3,443	2.87	**FYT 1 1/4 TF/VA228**	YAR 207-104-2FW/VA228
	34.5	13	156	130	96	14	12	46.4	15,300	1.20	**FYT 1 7/16 TF/VA201**	YAR 207-107-2FW/VA201
1 7/16	1.3583	0.5118	6.1250	5.1250	3.7795	0.5625	0.5000	1.8268	3,443	2.65	**FYT 1 7/16 TF/VA228**	YAR 207-107-2FW/VA228
	38.5	14	171.5	143.5	102	14	12	54.2	19,000	1.70	**FYT 1 1/2 TF/VA201**	YAR 208-108-2FW/VA201
1 1/2	1.5157	0.5512	6.752	5.6496	4.0157	0.5512	0.4724	2.1339	4,275	3.75	**FYT 1 1/2 TF/VA228**	YAR 208-108-2FW/VA228
	39	14	178.5	148.5	111	16	14	54.2	21,600	1.90	**FYT 1 11/16 TF/VA201**	YAR 209-111-2FW/VA201
1 11/16	1.5313	0.5512	7.0276	5.8438	4.3700	0.6250	0.5625	2.1339	4,860	4.19	**FYT 1 11/16 TF/VA228**	YAR 209-111-2FW/VA228
	39	14	178.5	148.5	111	16	14	54.2	21,600	1.85	**FYT 1 3/4 TF/VA201**	YAR 209-112-2FW/VA201
1 3/4	1.5354	0.5512	7.0276	5.8465	4.3700	0.6299	0.5512	2.1339	4,860	4.08	**FYT 1 3/4 TF/VA228**	YAR 209-112-2FW/VA228
	43	15	189	157	116	18	16	60.6	23,200	2.20	**FYT 1 15/16 TF/VA201**	YAR 210-115-2FW/VA201
1 15/16	1.6929	0.5906	7.4409	6.1811	4.5669	0.7087	0.6299	2.3858	5,220	4.85	**FYT 1 15/16 TF/VA228**	YAR 210-115-2FW/VA228
	47.6	20.6	215.9	184.2	127	19.1	16	62.8	29,000	3.3	**FYT 2 TF/VA201**	YAR 211-200-2FW/VA201
2	1.8740	0.8110	8.5000	7.2520	5.0000	0.7520	0.6250	2.4724	6,519	7.28	**FYT 2 TF/VA228**	YAR 211-200-2FW/VA228
	47.6	20.6	215.9	184.2	127	19.1	16	62.8	29,000	2.81	**FYT 2 3/16 TF/VA201**	YAR 211-203-2FW/VA201
2 3/16	1.8750	0.8125	8.5000	7.2520	5.0000	0.7520	0.6250	2.4724	6,519	6.20	**FYT 2 3/16 TF/VA228**	YAR 211-203-2FW/VA228

Y-bearings for high temperatures
for metric shafts
d **20 – 60 mm**



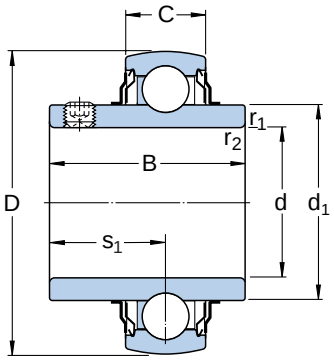
Bearing with graphite cage
VA228 design



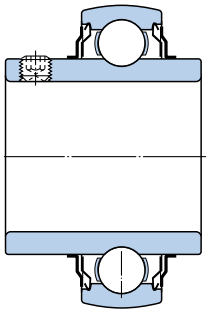
Bearing with pressed steel cage
VA201 design

Dimensions							Basic static load rating	Radial internal clearance		Mass	Designation
d	D	B	C	d_1	s_1	$r_{1,2}$ min	C_0	min	max		
mm in							N lbf			kg lbs	–
20	47 1.8504	31 1.2205	14 0.5512	28.2 1.1102	18.3 0.7205	0.6 0.0236	6,550 1,474	56 0.0022	96 0.0038	0.14 0.3086	**YAR 204-2FW/VA201** **YAR 204-2FW/VA228**
25	52 2.0472	34.1 1.3425	15 0.5906	33.7 1.3268	19.8 0.7795	0.6 0.0236	7,800 1,755	60 0.0024	106 0.0041	0.17 0.3748	**YAR 205-2FW/VA201** **YAR 205-2FW/VA228**
30	62 2.4409	38.1 1.5	18 0.7087	39.7 1.563	22.2 0.874	0.6 0.0236	11,200 2,520	80 0.0031	128 0.0050	0.28 0.6173	**YAR 206-2FW/VA201** **YAR 206-2FW/VA228**
35	72 2.8346	42.9 1.689	19 0.748	46.1 1.815	25.4 1	1 0.0394	15,300 3,443	80 0.0031	128 0.0050	0.41 0.9039	**YAR 207-2FW/VA201** **YAR 207-2FW/VA228**
40	80 3.1496	49.2 1.937	21 0.8268	51.8 2.0394	30.2 1.189	1 0.0394	19,000 4,275	80 0.0031	128 0.0050	0.55 1.2125	**YAR 208-2FW/VA201** **YAR 208-2FW/VA228**
45	85 3.3465	49.2 1.937	22 0.8661	56.8 2.2362	30.2 1.189	1 0.0394	21,600 4,860	90 0.0035	146 0.0057	0.6 1.3228	**YAR 209-2FW/VA201** **YAR 209-2FW/VA228**
50	90 3.5433	51.6 2.0315	22 0.8661	62.5 2.4606	32.6 1.2835	1 0.0394	23,200 5,220	90 0.0035	146 0.0057	0.69 1.5212	**YAR 210-2FW/VA201** **YAR 210-2FW/VA228**
55	100 3.937	55.6 2.189	25 0.9843	69.1 2.7205	33.4 1.315	1 0.0394	29,000 6,525	110 0.0043	180 0.0071	0.94 2.0723	**YAR 211-2FW/VA201** **YAR 211-2FW/VA228**
60	110 4.3307	65.1 2.563	26 1.0236	75.6 2.9764	39.7 1.563	1.5 0.0591	36,000 8,100	110 0.0043	180 0.0071	1.3 2.87	**YAR 212-2FW/VA201** **YAR 212-2FW/VA228**

Y-bearings for high temperatures
for inch shafts
d 3/4 – 2 7/16 in



Bearing with graphite cage
VA228 design



Bearing with pressed steel cage
VA201 design

Dimensions							Basic static load rating	Radial internal clearance		Mass	Designation
d	D	B	C	d_1	s_1	$r_{1,2}$ min	C_0	min	max		
mm in							N lbf			kg lbs	–
	47	31	14	28.2	18.3	0.6	6,550	56	96	0.14	**YAR 204-012-2FW/VA201**
3/4	1.8504	1.2205	0.5512	1.1102	0.7205	0.0236	1,474	0.0022	0.0038	0.3086	**YAR 204-012-2FW/VA228**
	52	34.1	15	33.7	19.8	0.6	7,800	60	106	0.17	**YAR 205-100-2FW/VA201**
1	2.0472	1.3425	0.5906	1.3268	0.7795	0.0236	1,755	0.0024	0.0041	0.3748	**YAR 205-100-2FW/VA228**
	62	38.1	18	39.7	22.2	0.6	11,200	80	128	0.27	**YAR 206-103-2FW/VA201**
1 3/16	2.4409	1.5	0.7087	1.563	0.874	0.0236	2,520	0.0031	0.0050	0.6173	**YAR 206-103-2FW/VA228**
	72	42.9	19	46.1	25.4	1	15,300	80	128	0.46	**YAR 207-104-2FW/VA201**
1 1/4	2.8346	1.689	0.748	1.815	1	0.0394	3,443	0.0031	0.0050	0.9039	**YAR 207-104-2FW/VA228**
	72	42.9	19	46.1	25.4	1	15,300	80	128	0.380	**YAR 207-107-2FW/VA201**
1 7/16	2.8346	1.6890	0.7480	1.8150	1	0.0394	3,440	0.0031	0.0050	0.836	**YAR 207-107-2FW/VA228**
	80	49.2	21	51.8	30.2	1	19,000	80	128	0.59	**YAR 208-108-2FW/VA201**
1 1/2	3.1496	1.937	0.8268	2.0394	1.189	0.0394	4,275	0.0031	0.0050	1.2125	**YAR 208-108-2FW/VA228**
	85	49.2	22	56.8	30.2	1	21,600	90	146	0.66	**YAR 209-111-2FW/VA201**
1 11/16	3.3465	1.9370	0.8661	2.2362	1.189	0.039	4,856	0.0035	0.0057	1.46	**YAR 209-111-2FW/VA228**
	85	49.2	22	56.8	30.2	1	21,600	90	146	0.62	**YAR 209-112-2FW/VA201**
1 3/4	3.3465	1.937	0.8661	2.2362	1.189	0.0394	4,860	0.0035	0.0057	1.3228	**YAR 209-112-2FW/VA228**
	90	51.6	22	62.5	32.6	1	23,200	90	146	0.71	**YAR 210-115-2FW/VA201**
1 15/16	3.5433	2.0315	0.8661	2.4606	1.2835	0.0394	5,220	0.0035	0.0057	1.5212	**YAR 210-115-2FW/VA228**
	100	55.6	25	69.1	33.4	1	29,000	110	180	1.10	**YAR 211-200-2FW/VA201**
2	3.937	2.189	0.9843	2.7205	1.315	0.0394	6,525	0.0043	0.0071	2.0723	**YAR 211-200-2FW/VA228**
	100	55.6	25	69.1	33.4	1	29,000	110	180	0.92	**YAR 211-203-2FW/VA201**
2 3/16	3.9370	2.1890	0.9843	2.7205	1.315	0.039	6,519	0.0043	0.0071	2.03	**YAR 211-203-2FW/VA228**
	110	65.1	26	75.6	39.7	1.5	36,000	110	180	1.30	**YAR 212-207-2FW/VA201**
2 7/16	4.3307	2.563	1.0236	2.9764	1.563	0.0591	8,100	0.0043	0.0071	2.87	**YAR 212-207-2FW/VA228**

The SKF Group – a worldwide corporation

SKF is an international industrial Group operating in some 130 countries and is world leader in bearings.

The company was founded in 1907 following the invention of the self-aligning ball bearing by Sven Wingquist and, after only a few years, SKF began to expand all over the world.

Today, SKF has some 40,000 employees and around 80 manufacturing facilities spread throughout the world. An international sales network includes a large number of sales companies and some 7,000 distributors and retailers. Worldwide availability of SKF products is supported by a comprehensive technical advisory service.

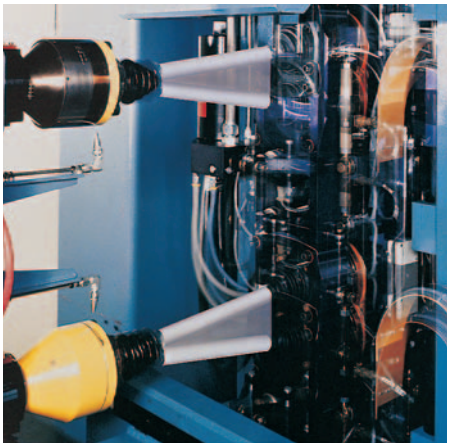
The key to success has been a consistent emphasis on maintaining the highest quality of its products and services. Continuous investment in research and development has also played a vital role, resulting in many examples of epoch-making innovations.

The business of the Group consists of bearings, seals, special steel and a comprehensive range of other high-tech industrial components. The experience gained in these various fields provides SKF with the essential knowledge and expertise required in order to provide the customers with the most advanced engineering products and efficient service.





The SKF Group is the first major bearing manufacturer to have been granted approval according to ISO 14001, the international standard for environmental management systems. The certificate is the most comprehensive of its kind and covers more than 60 SKF production units in 17 countries.



The SKF Engineering & Research Centre is situated just outside Utrecht in The Netherlands. In an area of 17,000 square meters (185,000 sq.ft) some 150 scientists, engineers and support staff are engaged in the further improvement of bearing peformance. They are developing technologies aimed at achieving better materials, better designs, better lubricants and better seals – together leading to an even better understanding of the operation of a bearing in its application. This is also where the SKF Life Theory was evolved, enabling the design of bearings which are even more compact and offer even longer operational life.



SKF has developed the Channel concept in factories all over the world. This drastically reduces the lead time from raw material to end product as well as work in progress and finished goods in stock. The concept enables faster and smoother information flow, eliminates bottlenecks and bypasses unnecessary steps in production. The Channel team members have the knowledge and commitment needed to share the responsibility for fulfilling objectives in areas such as quality, delivery time, production flow etc.



SKF manufactures ball bearings, roller bearings and plain bearings. The smallest are just a few millimeters (a fraction of an inch) in diameter, the largest several meters. SKF also manufactures bearing and oil seals which prevent dirt from entering and lubricant from leaking out. SKF's subsidiaries CR and RFT S.p.A. are among the world's largest producers of seals.

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