

product overview

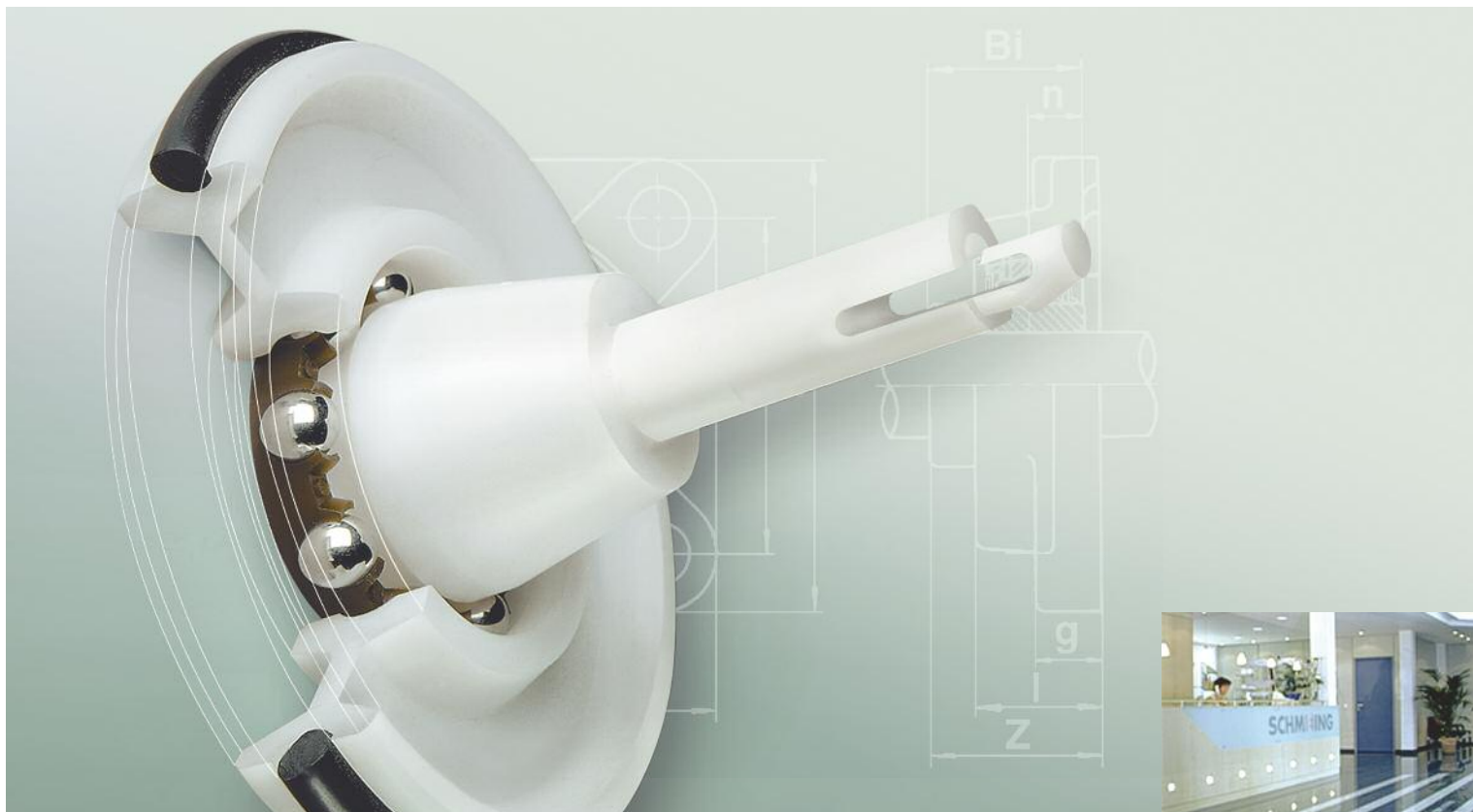
plastic ball bearings & components

PLASTICS TECHNOLOGY



SIMIG[®]

INNOVATIVE SOLUTIONS MADE OF PLASTICS



Characteristics and advantages of plastic ball bearings:

- Flexibility in design for the best possible production integration
- No lubrication, maintenance-free
- Outstanding running characteristic due to free material selection
- Very low weight (up to 80 % less than steel)
- Electrically isolating
- Resistant to acid and lye
- Temperature resistance of up to above 200°C

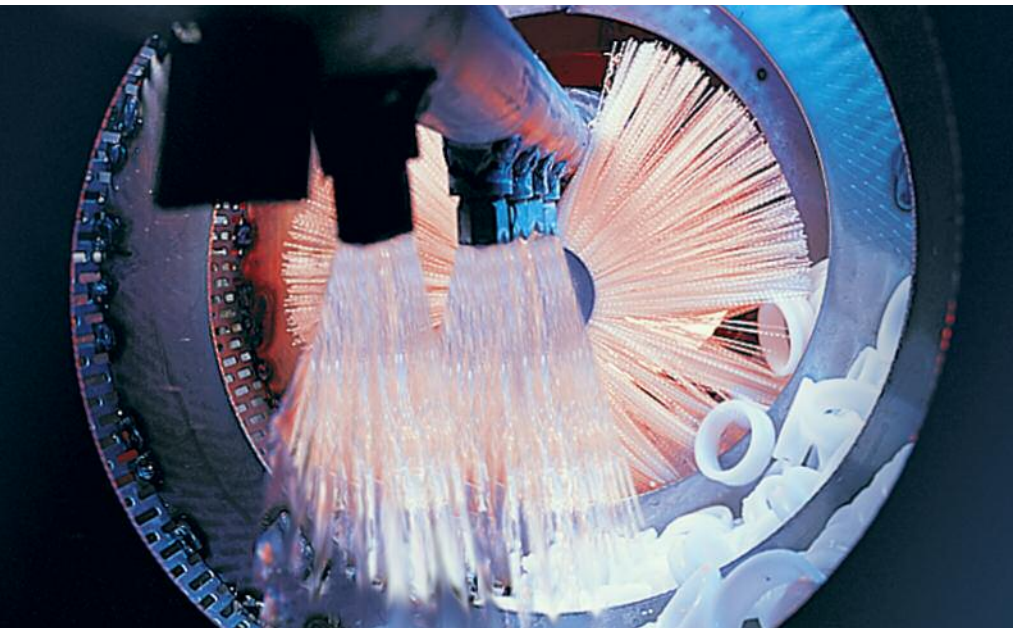
Under the brand of SMG, Schmeiing offers a wide-ranging assortment of technically sophisticated and high-quality parts and components made of plastics. From the planning stage through the production of prototypes to serial production the customer is supported in an integrated manner. The combination of construction, cutting manufacturing, tool making and injection moulding results in products with optimally adapted details.

In this scope SMG stands for a variety of standard products, such as radial and thrust ball bearings as well as ball transfer units on the one hand. On the other hand

SMG also offers services in the field of plastic processing, which include the customer-designed production of turned, milled and injection moulded parts. This often opens out into customised developments which help overcoming challenges whilst producing cost reductions especially in the case of special applications.

For example plastic ball-bearings made of PEEK, PPS or PI with balls made of glass or stainless steel for the usage in the high-temperature range. These do not require any lubrication and are suitable even in a high-humidity atmosphere and under steam.

QUALITY IS OUR DEMAND



CLEANING PROCESS

DIN EN ISO 9001 certified

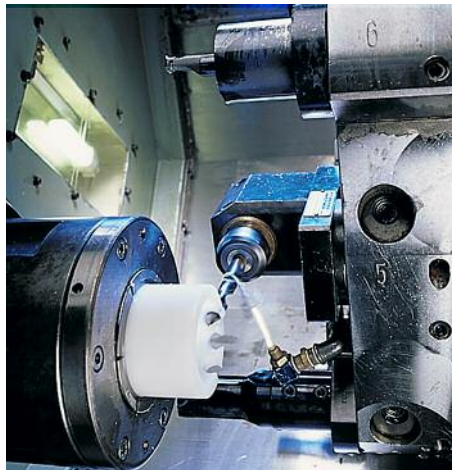
Our products apply to strict quality controls. The quality of our products is analysed with modern test equipment under any specific equipment. To analyse the lifetime of our products we use our own test machines.

Our quality products will be used in several industries worldwide

No matter if available product or service ordered: Latest testing and measuring machines as well as an own laboratory for the material control lay the ideal foundations.

SMG a brand of SCHMEING GmbH & Co. KG, is a member of the Groz-Beckert Group. Groz-Beckert is the leading manufacturer of needles and precision components for the manufacturing of textile fabrics employing approx. 8.800 people worldwide.

The German production site is a high quality feature for SMG.



CNC-TURNING MACHINE

The SMG-team offers a broad advisory service on material selection, conception, construction, tool manufacture and production to design and produce your customized product according your application.

Our qualified tool manufacturer translates the CAD-parameters into the tool using latest CNC turning and milling machines.



INJECTION MOULDING MACHINE

CUSTOMIZED SOLUTIONS

Examples for applications: Conveying systems, apparatus engineering, air conditioning, electroplating, food processing, vacuum applications, fibre processing, conveyor ovens, textile finishing, medical radiation (sterilization), photo processing, computer assembly, ...



Deep groove plastic ball bearings

Application:

Specially designed to be used as pulleys for flat and round belts in the production of computer motherboards.

Advantages:

Simplified construction of the installation and outstanding chemical resistance when using special materials resulting in cost reduction.



Single row and double row plastic ball bearings and guide rollers

Application:

These ball bearings and guide rollers are designed to serve as pulleys improving side guidance in conveyor technique.

Advantages:

These ball bearings do not require any lubrication even at high humidity or under steam. When using high performance plastics the bearings can be used even in the high-temperature range of up to 250°C.



Special ball bearings

Application:

Special rolling bearings for special applications integrated into the product as complete structural component or as ball bearing with toothed wheel. Designed for the use in the transport technology.

Advantages:

Customized products, generate customer benefit, save costs.



SPECIAL THRUST BALL BEARING WITH STAINLESS STEEL ROLLERS AND PEEK-HOUSING.

RADIOLOGENT, RESISTANT TO RADIATION, HIGH CHEMICAL AND TEMPERATURE RESISTANCE.



Standard steel ball bearings with plastic-covered outer ring

Application:
Used as rope pulleys or deflection rollers inside digital printers and large-scale copiers.

Advantages:
Offer noise attenuation and are suitable for the transport of sensitive goods.



Deep groove ball bearings with Z-shields, insert bearings, etc.

Application:
Used for patient transportation trolleys with bearings made of PEEK, radiolucent and resistant to radiation.

Advantages:
Simplified construction of the installation, suitable for the use in medical engineering. Could be designed with special materials for the use in applications of the food and pharma industry.

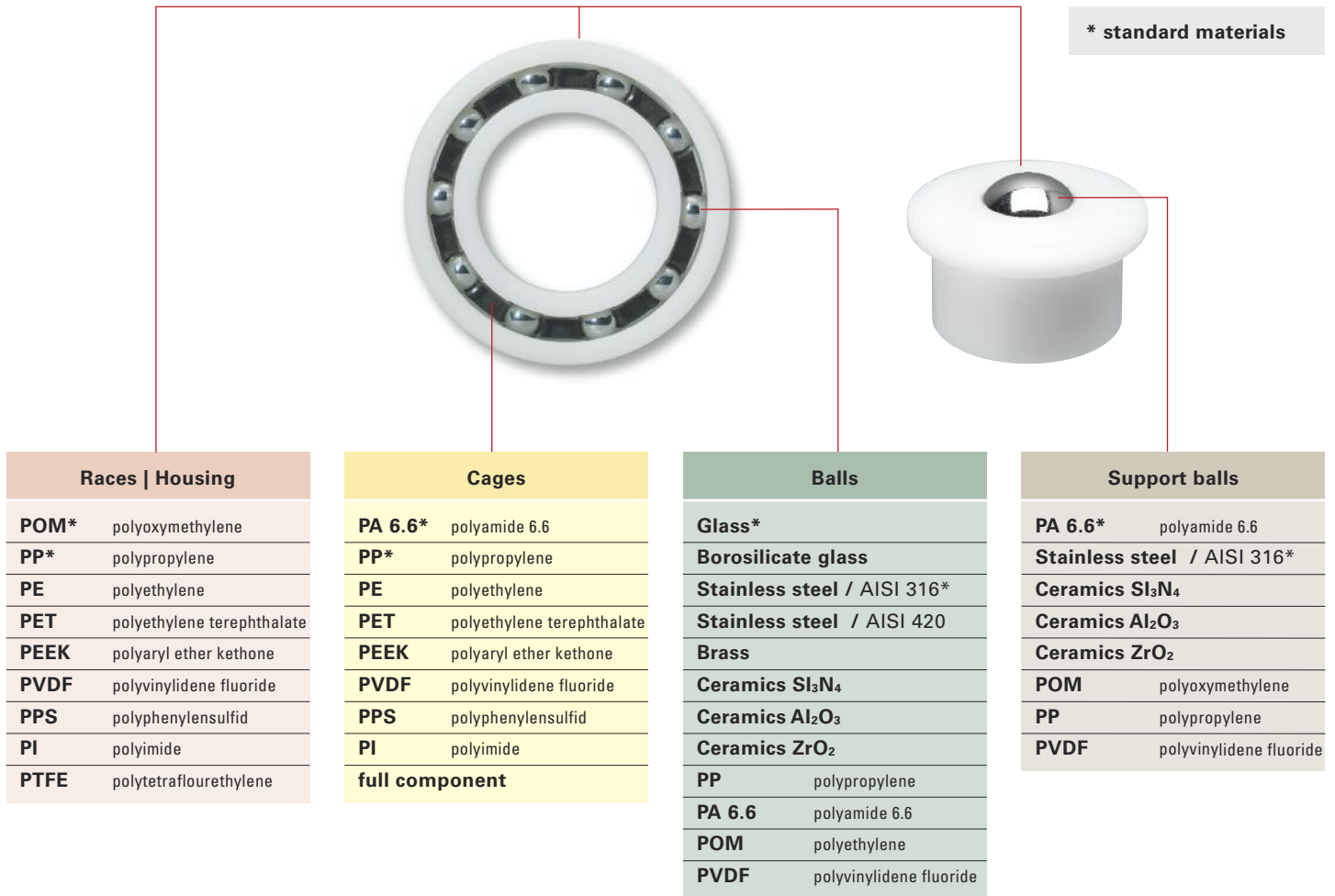


Linear guides made of plastics

Application:
For use in many applications. Especially produced for customer requirements.

Advantages:
Customized products, which can be used without any grease or oil, so they are suitable for the use in a variety of applications. The linear guides show low kinetic energy due to the use of plastics.

MATERIAL CHARACTERISTICS



APPLICATIONS

| Ball Bearings | Races | Cages | Balls |
|--|--------|-------|----------|
| Conveying systems, apparatus engineering, air conditioning | POM | PA | AISI 316 |
| Electro plating | PP | PP | Glass |
| Food processing | POM | PP | AISI 316 |
| Vacuum applications | PVDF | PVDF | Glass |
| Fiber processing | POM | PA | Glass |
| Conveyor ovens | PPS | PPS | Glass |
| Textile finishing | POM | PA | AISI 316 |
| Medical radiation | PET | PET | AISI 316 |
| Medical radiation (sterilization) | PPS | PPS | Glass |
| Photo processing | PP/PET | PP | AISI 316 |
| Computer assembly | POM | PA | AISI 316 |
| Automotive application (high temperature) | PPS | PPS | AISI 316 |
| Automotive application | POM | PA | AISI 316 |
| Model and lightweight construction | POM | PA | Glass |

| Ball transfer units | Housing | Support Balls |
|-------------------------------------|---------|---------------|
| Materials-handling technology | POM | AISI 316 / PA |
| Swivel tables | POM | AISI 316 / PA |
| Food processing | POM | AISI 316 |
| Electroplating | PP/PVDF | Ceramics |
| Semiconductor industry | PP/PVDF | Ceramics |
| Medical engineering (sterilization) | PEEK | AISI 316 |
| Electrical engineering | POM | PA |
| Vacuum systems | PVDF | PVDF |
| Air conditioning | PE | AISI 316 |

Fig.1

MATERIAL CHARACTERISTICS



Dynamic load capacity depending on speed and operating temperature

The dynamic load capacity depends on the operating conditions. The chart below gives an estimation of the influences the operating temperature and the speed have on the dynamic load capacity.

Example:

An application uses a bearing type 6204 with POM races. From the product chart no. 1 shown on page 8 you take a dynamic load capacity of 420 N and a maximal operating speed of 1050 min⁻¹. The operating temperature is 80 °C at an operating speed of 630 min⁻¹.

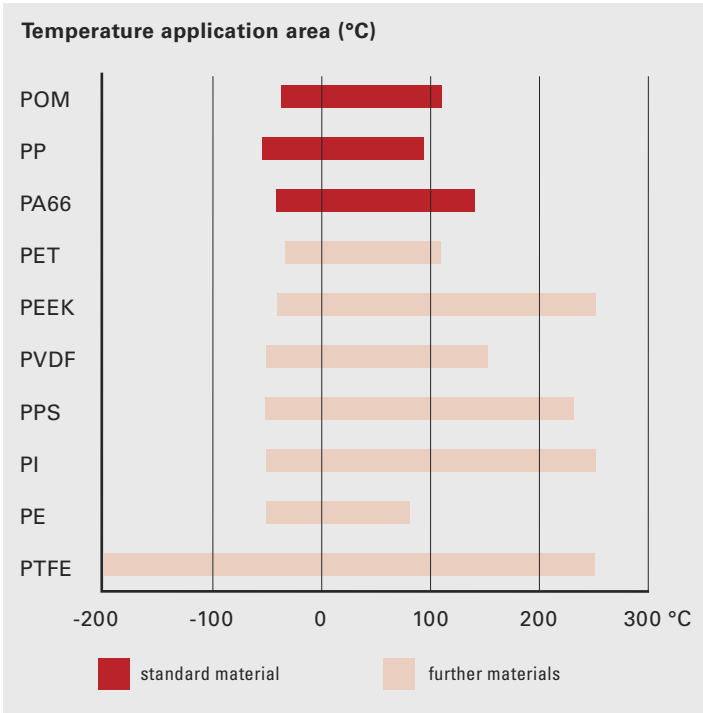


Fig.2

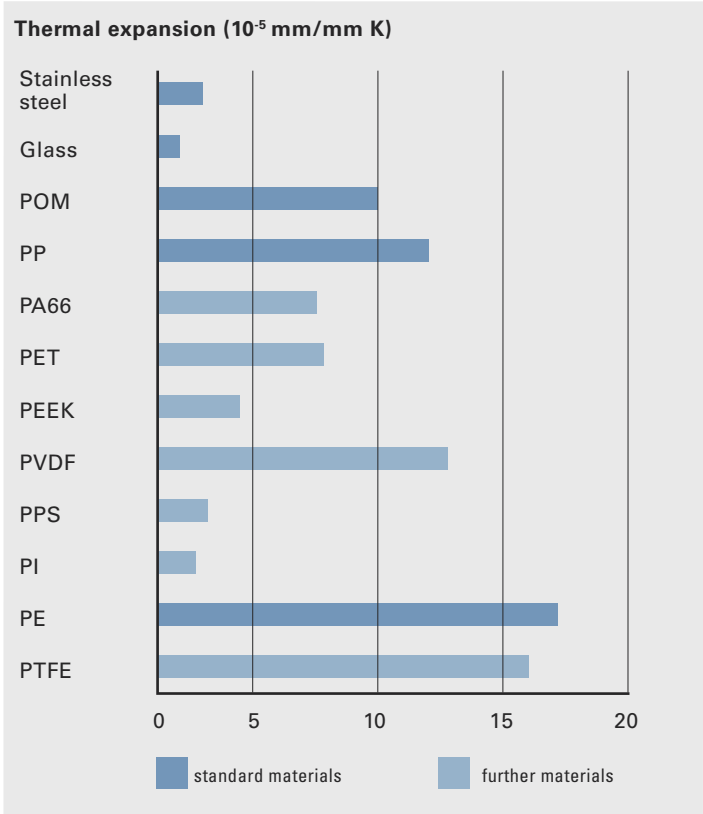


Fig.3

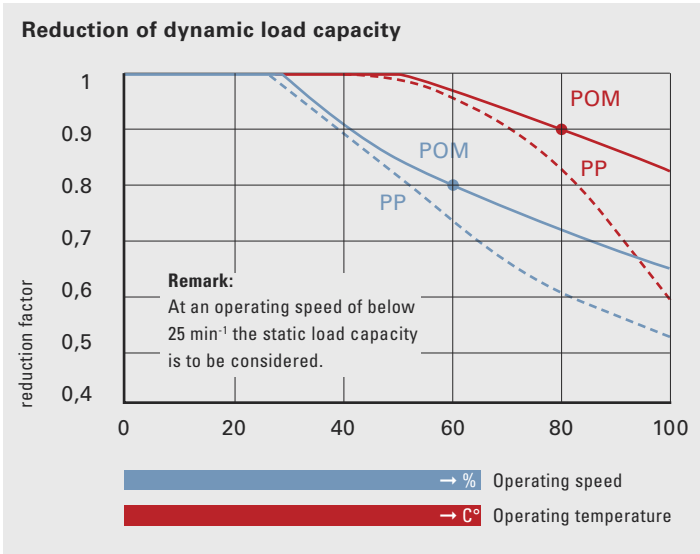


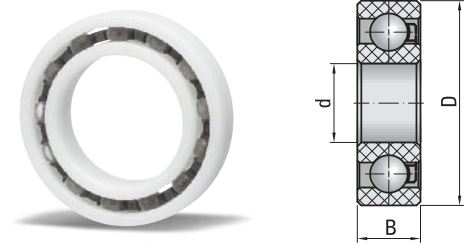
Fig.4

The chart states a reduction factor for the operating temperature of approx. 0.90. The reduction factor for the speed of 630 min⁻¹ (60 % of the max. speed) shows a factor of approx. 0.80.

In our application example the load should not exceed **420 N x 0,90 x 0,80 ≈ 300 N**

SINGLE ROW RADIAL BALL BEARINGS

SINGLE AND DOUBLE ROW*



Material combinations

Standard

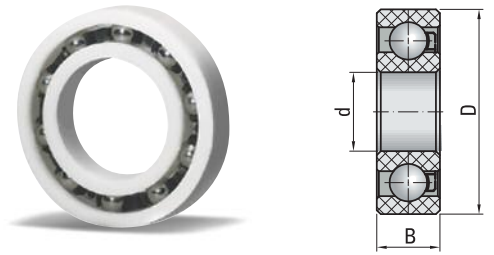
Chart 1

| TYPE | ID mm | OD mm | W mm | capacity | | n max. speed rpm | Races | | | | Races | | | |
|-------|----------|----------|---------|-----------|----------|---------------------------|--------------------------|-------------|-----------------------|-------------|--------------------------|-------------|-----------------------|-------------|
| | | | | stat N | dyn N | | POM | | PP | | PP | | PP | |
| | | | | | | | SMG part no. AISI 316 | weight g | SMG part no. glass | weight g | SMG part no. AISI 316 | weight g | SMG part no. glass | weight g |
| 623 | 3 | 10 | 4 | 30 | 45 | 4500 | 464.623 | 0,4 | 465.623 | 0,3 | 470.623 | 0,4 | 468.623 | 0,2 |
| 624 | 4 | 13 | 5 | 40 | 60 | 3600 | 464.624 | 0,9 | 465.624 | 0,7 | 470.624 | 0,5 | 468.624 | 0,5 |
| 625 | 5 | 16 | 5 | 45 | 65 | 3050 | 464.625 | 1,4 | 465.625 | 1,0 | 470.625 | 1,3 | 468.625 | 0,8 |
| 626 | 6 | 19 | 6 | 50 | 70 | 2600 | 464.626 | 2,8 | 465.626 | 1,8 | 470.626 | 2,4 | 468.626 | 1,4 |
| 607 | 7 | 19 | 6 | 50 | 70 | 2600 | 464.607 | 2,2 | 465.607 | 1,5 | 470.607 | 1,7 | 468.607 | 1,1 |
| 627 | 7 | 22 | 7 | 55 | 80 | 2200 | 464.627 | 3,9 | 465.627 | 2,6 | 470.627 | 3,2 | 468.627 | 1,9 |
| 608 | 8 | 22 | 7 | 55 | 80 | 2200 | 464.608 | 3,6 | 465.608 | 2,4 | 470.608 | 3,0 | 468.608 | 1,8 |
| 609 | 9 | 24 | 7 | 60 | 90 | 2050 | 464.609 | 7,8 | 465.609 | 6,6 | 470.609 | 5,7 | 468.609 | 4,5 |
| 629 | 9 | 26 | 8 | 70 | 100 | 1900 | 464.629 | 6,3 | 465.629 | 4,1 | 470.629 | 5,2 | 468.629 | 3,9 |
| 6000 | 10 | 26 | 8 | 90 | 130 | 1900 | 464.100 | 6,2 | 465.100 | 4,1 | 470.100 | 5,1 | 468.100 | 3,0 |
| 6200 | 10 | 30 | 9 | 110 | 160 | 1650 | 464.200 | 8,9 | 465.200 | 6,5 | 470.200 | 7,1 | 468.200 | 4,7 |
| 6300 | 10 | 35 | 11 | 190 | 280 | 1400 | 464.300 | 17,4 | 465.300 | 11,3 | 470.300 | 14,5 | 468.300 | 8,4 |
| 6001 | 12 | 28 | 8 | 110 | 160 | 1750 | 464.101 | 7,1 | 465.101 | 4,6 | 470.101 | 5,9 | 468.101 | 3,5 |
| 6201 | 12 | 32 | 10 | 150 | 220 | 1550 | 464.201 | 11,9 | 465.201 | 7,7 | 470.201 | 99,9 | 468.201 | 5,7 |
| 6301 | 12 | 37 | 12 | 210 | 310 | 1300 | 464.301 | 21,8 | 465.301 | 13,4 | 470.301 | 18,6 | 468.301 | 10,2 |
| 16002 | 15 | 32 | 8 | 130 | 190 | 1500 | 464.002 | 8,0 | 465.002 | 5,5 | 470.002 | 6,5 | 468.002 | 4,1 |
| 6002 | 15 | 32 | 9 | 140 | 200 | 1500 | 464.102 | 9,1 | 465.102 | 6,4 | 470.102 | 7,4 | 468.102 | 4,7 |
| 6202 | 15 | 35 | 11 | 170 | 250 | 1400 | 464.202 | 14,3 | 465.202 | 9,4 | 470.202 | 11,8 | 468.202 | 7,0 |
| 6302 | 15 | 42 | 13 | 260 | 370 | 1200 | 464.302 | 27,3 | 465.302 | 17,5 | 470.302 | 23,0 | 468.302 | 13,2 |
| 16003 | 17 | 35 | 8 | 160 | 240 | 1400 | 464.003 | 9,6 | 465.003 | 6,6 | 470.003 | 7,9 | 468.003 | 4,9 |
| 6003 | 17 | 35 | 10 | 170 | 260 | 1400 | 464.103 | 11,4 | 465.103 | 8,4 | 470.103 | 9,0 | 468.103 | 6,0 |
| 6203 | 17 | 40 | 12 | 220 | 320 | 1250 | 464.203 | 19,1 | 465.203 | 13,9 | 470.203 | 15,4 | 468.203 | 10,2 |
| 6303 | 17 | 47 | 14 | 260 | 370 | 1050 | 464.303 | 37,5 | 465.303 | 24,5 | 470.303 | 31,3 | 468.303 | 18,2 |
| 16004 | 20 | 42 | 8 | 190 | 290 | 1150 | 464.004 | 13,8 | 465.004 | 9,8 | 470.004 | 10,5 | 468.004 | 7,0 |
| 6004 | 20 | 42 | 12 | 200 | 300 | 1150 | 464.104 | 20,7 | 465.104 | 14,2 | 470.104 | 16,8 | 468.104 | 10,9 |
| 6204 | 20 | 47 | 14 | 270 | 420 | 1050 | 464.204 | 33,4 | 465.204 | 22,1 | 470.204 | 27,6 | 468.204 | 16,4 |
| 6304 | 20 | 52 | 15 | 350 | 500 | 950 | 464.304 | 48,6 | 465.304 | 31,7 | 470.304 | 40,5 | 468.304 | 23,6 |
| 16005 | 25 | 47 | 8 | 210 | 310 | 1050 | 464.005 | 19,1 | 465.005 | 10,9 | 470.005 | 16,2 | 468.005 | 9,0 |
| 6005 | 25 | 47 | 12 | 240 | 360 | 1050 | 464.105 | 23,8 | 465.105 | 1,6 | 470.105 | 19,3 | 468.105 | 12,1 |
| 6205 | 25 | 52 | 15 | 320 | 480 | 950 | 464.205 | 39,6 | 465.205 | 27,0 | 470.205 | 32,5 | 468.205 | 26,6 |
| 6305 | 25 | 62 | 17 | 400 | 600 | 725 | 464.305 | 76,4 | 465.305 | 49,5 | 470.305 | 63,9 | 468.305 | 36,9 |
| 16006 | 30 | 55 | 9 | 240 | 370 | 900 | 464.006 | 26,2 | 465.006 | 17,3 | 470.006 | 21,6 | 468.006 | 13,0 |
| 6006 | 30 | 55 | 13 | 280 | 420 | 900 | 464.106 | 35,4 | 465.106 | 24,2 | 470.106 | 28,9 | 468.106 | 17,7 |
| 6206 | 30 | 62 | 16 | 360 | 550 | 800 | 464.206 | 63,4 | 465.206 | 41,6 | 470.206 | 52,6 | 468.206 | 30,8 |
| 6306 | 30 | 72 | 19 | 460 | 700 | 675 | 464.306 | 113,8 | 465.306 | 72,0 | 470.306 | 95,7 | 468.306 | 53,9 |
| 16007 | 35 | 62 | 9 | 270 | 410 | 800 | 464.007 | 32,3 | 465.007 | 21,8 | 470.007 | 26,3 | 468.007 | 16,3 |
| 6007 | 35 | 62 | 14 | 320 | 480 | 800 | 464.107 | 47,4 | 465.107 | 32,0 | 470.107 | 38,9 | 468.107 | 23,5 |
| 6207 | 35 | 72 | 17 | 410 | 620 | 700 | 464.207 | 94,9 | 465.207 | 60,3 | 470.207 | 79,8 | 468.207 | 45,2 |
| 6307 | 35 | 80 | 21 | 490 | 750 | 600 | 464.307 | 153,7 | 465.307 | 98,7 | 470.307 | 129,6 | 468.307 | 74,4 |
| 16008 | 40 | 68 | 9 | 300 | 450 | 750 | 464.008 | 37,7 | 465.008 | 29,3 | 470.008 | 30,6 | 468.008 | 19,2 |
| 6008 | 40 | 68 | 15 | 350 | 520 | 750 | 464.108 | 52,3 | 465.108 | 39,4 | 470.108 | 45,5 | 468.108 | 28,7 |
| 6208 | 40 | 80 | 18 | 440 | 660 | 625 | 464.208 | 131,4 | 465.208 | 79,8 | 470.208 | 102,5 | 468.208 | 60,9 |
| 6308 | 40 | 90 | 23 | 520 | 800 | 575 | 464.308 | 207,5 | 465.308 | 130,7 | 470.308 | 174,8 | 468.308 | 97,9 |
| 16009 | 45 | 75 | 10 | 330 | 500 | 650 | 464.009 | 48,9 | 465.009 | 33,6 | 470.009 | 39,7 | 468.009 | 24,4 |
| 6009 | 45 | 75 | 16 | 380 | 560 | 650 | 464.109 | 74,8 | 465.109 | 50,6 | 470.109 | 61,4 | 468.109 | 37,2 |
| 6209 | 45 | 85 | 19 | 470 | 720 | 580 | 464.209 | 138,0 | 465.209 | 86,3 | 470.209 | 117,0 | 468.209 | 65,4 |
| 6309 | 45 | 100 | 25 | 540 | 900 | 500 | 464.309 | 296,4 | 465.309 | 177,1 | 470.309 | 256,8 | 468.309 | 135,5 |
| 6010 | 50 | 80 | 16 | 390 | 580 | 600 | 464.110 | 82,0 | 465.110 | 55,9 | 470.110 | 67,0 | 468.110 | 40,9 |
| 6210 | 50 | 90 | 20 | 540 | 770 | 550 | 464.210 | 153,8 | 465.210 | 96,5 | 470.210 | 130,1 | 468.210 | 72,8 |
| 6011 | 55 | 90 | 18 | 400 | 600 | 550 | 464.111 | 120,8 | 465.111 | 80,8 | 470.111 | 99,6 | 468.111 | 59,6 |
| 6012 | 60 | 95 | 18 | 420 | 640 | 500 | 464.112 | 127,0 | 465.112 | 80,6 | 470.112 | 104,3 | 468.112 | 61,3 |

* Double row ball bearings with ZZ-shields on request. The basic load rating and speed limits stated herein are basic figures. Due to different operating conditions the figures gained under real-life conditions can vary to a high extent. Please see the information given in fig. 4 on page 7 to partly consider the environmental influences.

BALL BEARINGS

INCH DIMENSIONS: SINGLE AND DOUBLE ROW*



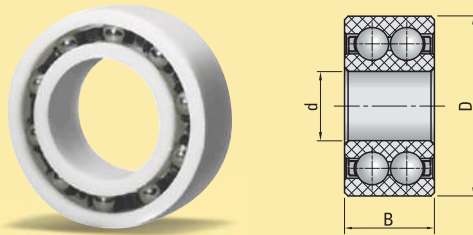
Material combinations

| Races | POM | | | |
|--------------|---------|--------------|---------|------|
| Cage | PA 6.6 | | | |
| Balls | | | | |
| SMG part no. | weight | SMG part no. | weight | |
| AISI 316 | g | glass | g | |
| R4 | 464.040 | 1,2 | 465.040 | 0,9 |
| R6 | 464.060 | 3,3 | 465.060 | 2,1 |
| R8 | 464.080 | 6,3 | 465.080 | 3,9 |
| R10 | 464.090 | 9,0 | 465.090 | 5,9 |
| R12 | 464.120 | 16,6 | 465.120 | 10,1 |
| R16 | 464.160 | 29,5 | 465.160 | 22,1 |

Chart 2

| TYPE | ID | | OD | | W | | capacity | | n max. speed rpm |
|------|------|-------|--------|-------|-------|-------|----------|-------|------------------|
| | inch | mm | inch | mm | inch | mm | stat N | dyn N | |
| | R4 | 1/4" | 6,35 | 5/8" | 15,88 | 3/8" | 9,53 | 40 | |
| R6 | 3/8" | 9,53 | 7/8" | 22,22 | 7/16" | 11,11 | 60 | 80 | |
| R8 | 1/2" | 12,7 | 1-1/8" | 28,58 | 7/16" | 11,11 | 110 | 160 | |
| R10 | 5/8" | 15,88 | 1-3/8" | 34,93 | 9/32" | 7,14 | 170 | 250 | |
| R12 | 3/4" | 19,05 | 1-5/8" | 41,28 | 5/16" | 7,94 | 200 | 300 | |
| R16 | 1" | 25,4 | 2" | 50,80 | 1/2" | 12,70 | 240 | 360 | |

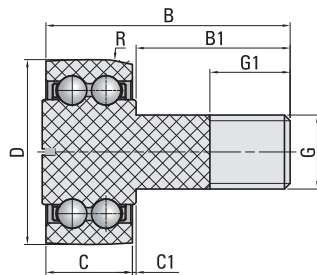
* Double row editions of ball bearings listed in charts 1 and 2 on request.



* Double row ball bearings with ZZ-shields on request. The basic load rating and speed limits stated herein are basic figures. Due to different operating conditions the figures gained under real-life conditions can vary to a high extent. Please see the information in fig. 4 on page 7 to partly consider the environmental influences.

GUIDE ROLLERS

AVAILABLE ALSO IN INCH-DIMENSIONS*



Material combinations

| Races | POM | |
|--------------|---------|------|
| Cage | PA 6.6 | |
| Balls | | |
| SMG part no. | weight | |
| AISI 316 | g | |
| KR16 | 480.416 | 4,3 |
| KR19 | 480.419 | 7,2 |
| KR22 | 480.422 | 10,1 |
| KR26 | 480.426 | 15,0 |
| KR30 | 480.430 | 20,9 |
| KR32 | 480.432 | 23,9 |
| KR35 | 480.435 | 40,1 |
| KR40 | 480.440 | 55,2 |
| KR47 | 480.447 | 91,5 |

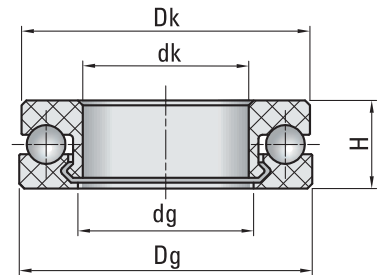
Chart 3

| TYPE | D mm | B mm | B1 mm | G mm | G1 mm | C mm | C1 mm | capacity | | n max. speed rpm |
|------|------|-------|-------|---------|-------|------|-------|----------|-------|------------------|
| | | | | | | | | stat N | dyn N | |
| | | | | | | | | KR16 | 16 | |
| KR19 | 19 | 31,5 | 20 | M8 | 10 | 11 | 0,5 | 90 | 126 | |
| KR22 | 22 | 36 | 23 | M10 | 12 | 1 | 0,6 | 99 | 144 | |
| KR26 | 26 | 36 | 23,4 | M10x1 | 12 | 12 | 0,6 | 162 | 234 | |
| KR30 | 30 | 39,6 | 25 | M12x1,5 | 13 | 14 | 0,6 | 198 | 288 | |
| KR32 | 32 | 39,6 | 25 | M12x1,5 | 13 | 14 | 0,6 | 198 | 288 | |
| KR35 | 35 | 51,3 | 32,5 | M16x1,5 | 17 | 18 | 0,8 | 306 | 450 | |
| KR40 | 40 | 57,25 | 36,5 | M18x1,5 | 19 | 20 | 0,8 | 396 | 576 | |
| KR47 | 47 | 65,3 | 40,5 | M20x1,5 | 21 | 24 | 0,8 | 486 | 756 | |

* Double row ball bearings with ZZ-shields on request. The basic load rating and speed limits stated herein are basic figures. Due to different operating conditions the figures gained under real-life conditions can vary to a high extent. Please see the information given in fig. 4 on page 7 to partly consider the environmental influences.

THRUST BALL BEARINGS

SMG manufactures thrust ball bearings in nearly all metric and inch dimensions. Also customized editions can be offered. The standard material combination for the races is POM in full complement execution with alternating balls out of AISI 316 and POM. Thrust ball bearings made of any other material listed on page 6 are available upon request.



Material combinations

| Chart 4 TYPE | dk mm | DG mm | dg mm | Dk mm | H mm | capacity | | n max. speed rpm | Races | | | | | |
|--------------------------|-------------|-----------------------|-------------|----------|---------|-----------|----------|---------------------------|---------|-------|---------|------|--|--|
| | | | | | | stat N | dyn N | | POM | | | | | |
| | | | | | | | | | Balls | | POM | | | |
| SMG part no. AISI 316 | weight g | SMG part no. glass | weight g | | | | | | | | | | | |
| 51100 | 10 | 24 | 11 | 23 | 9 | 200 | 250 | 600 | 464.500 | 5,2 | 465.500 | 4,0 | | |
| 51200 | 10 | 26 | 11 | 25 | 11 | 210 | 260 | 600 | 464.520 | 7,9 | 465.520 | 6,1 | | |
| 51101 | 12 | 26 | 13 | 25 | 9 | 320 | 400 | 540 | 464.501 | 5,6 | 465.501 | 4,4 | | |
| 51201 | 12 | 28 | 13 | 27 | 11 | 330 | 410 | 540 | 464.521 | 9,5 | 465.521 | 7,2 | | |
| 51102 | 15 | 28 | 16 | 27 | 9 | 500 | 625 | 500 | 464.502 | 6,1 | 465.502 | 4,7 | | |
| 51202 | 15 | 32 | 16 | 31 | 12 | 520 | 650 | 500 | 464.522 | 11,5 | 465.522 | 9,3 | | |
| 51103 | 17 | 30 | 18 | 29 | 9 | 570 | 710 | 480 | 464.503 | 6,8 | 465.503 | 5,2 | | |
| 51203 | 17 | 35 | 18 | 34 | 12 | 600 | 750 | 480 | 464.523 | 14,9 | 465.523 | 10,7 | | |
| 51104 | 20 | 35 | 21 | 34 | 10 | 650 | 810 | 460 | 464.504 | 10,3 | 465.504 | 7,6 | | |
| 51204 | 20 | 40 | 21 | 39 | 14 | 690 | 860 | 460 | 464.524 | 20,5 | 465.524 | 15,7 | | |
| 51105 | 25 | 42 | 26 | 41 | 11 | 710 | 880 | 410 | 464.505 | 14,6 | 465.505 | 11,3 | | |
| 51205 | 25 | 47 | 26 | 46 | 15 | 750 | 930 | 400 | 464.525 | 26,5 | 465.525 | 22,2 | | |
| 51106 | 30 | 47 | 31 | 46 | 11 | 760 | 950 | 400 | 464.506 | 17,3 | 465.506 | 13,4 | | |
| 51206 | 30 | 52 | 21 | 51 | 16 | 820 | 1025 | 375 | 464.526 | 34,0 | 465.526 | 26,9 | | |
| 51107 | 35 | 52 | 36 | 51 | 12 | 810 | 1010 | 390 | 464.507 | 20,8 | 465.507 | 16,6 | | |
| 51207 | 35 | 62 | 36 | 61 | 18 | 870 | 1090 | 365 | 464.527 | 56,9 | 465.527 | 44,3 | | |
| 51108 | 40 | 60 | 41 | 59 | 13 | 890 | 1110 | 375 | 464.508 | 31,2 | 465.508 | 24,7 | | |
| 51208 | 40 | 68 | 41 | 67 | 19 | 940 | 1175 | 350 | 464.528 | 67,1 | 465.528 | 53,1 | | |
| 51109 | 45 | 65 | 46 | 64 | 14 | 950 | 1185 | 360 | 464.509 | 37,5 | 465.509 | 28,2 | | |
| 51209 | 45 | 73 | 46 | 72 | 20 | 1010 | 1260 | 330 | 464.529 | 86,7 | 465.529 | 62,1 | | |
| 51110 | 50 | 70 | 51 | 69 | 14 | 1020 | 1275 | 340 | 464.510 | 40,5 | 465.510 | 30,5 | | |
| 51210 | 50 | 78 | 51 | 77 | 22 | 1100 | 1375 | 310 | 464.530 | 107,0 | 465.530 | 80,4 | | |
| 51111 | 55 | 78 | 56 | 77 | 16 | 1050 | 1310 | 310 | 464.511 | 63,6 | 465.511 | 52,1 | | |
| 51112 | 60 | 85 | 61 | 84 | 17 | 1120 | 1400 | 280 | 464.512 | 87,5 | 465.512 | 67,9 | | |

* **Double row thrust bearings with ZZ-shields on request.** The basic load rating and speed limits stated herein are basic figures. Due to different operating conditions the figures gained under real-life conditions can vary to a high extent. Please see the information given in fig. 4 on page 7 to partly consider the environmental influences.



OPERATION GUIDELINE

Dimensions

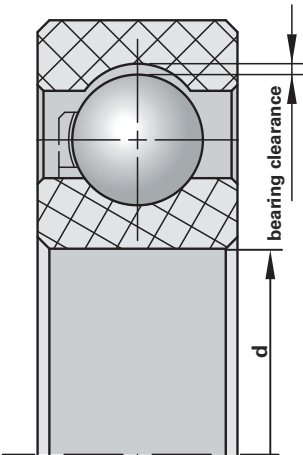
The main dimensions of the radial plastic ball bearings are similar with the specification of DIN 625, except for the distance between the edges. The main dimensions of the plastic thrust bearings, with the exception of the distances between the edges, are similar to the specification of DIN 711.

Assembly instructions (radial ball bearings)

To ensure a proper assembly we recommend a press fit on the ID and a loose fit on the OD (or vice versa).

A simultaneous press fit on the ID and OD will result in a preliminary wear of the bearing.

For any questions on this matter, please contact SMG.

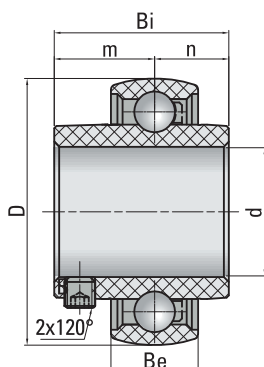


| Bore d [mm] | | Radial bearing clearance [µm] | |
|----------------|-------|----------------------------------|-----|
| more than | up to | min | max |
| - | 9 | 60 | 140 |
| 9 | 17 | 70 | 150 |
| 17 | 20 | 80 | 160 |
| 20 | 25 | 80 | 170 |
| 30 | 35 | 90 | 180 |
| 35 | 45 | 100 | 200 |
| 45 | 60 | 110 | 210 |

The listed tolerances are valid for ball bearings with races made of POM. Other materials may require different tolerances. These data are standard values for our radial bearings. The bearing clearance can be changed according to customer's order.

INSERT BEARINGS

SINGLE ROW*



Material combinations

| | |
|--------------|---------------|
| Races | POM |
| Cage | PA 6.6 |
| Balls | |
| SMG part no. | weight |
| AISI 316 | g |

| Chart 5 TYPE | d mm | D mm | Bi mm | Be mm | m mm | n mm | capacity | | n max. speed rpm | SMG part no. | weight g |
|-----------------|---------|---------|----------|----------|---------|---------|-----------|----------|---------------------------|--------------|-------------|
| | | | | | | | stat N | dyn N | | | |
| UC 200 | 10 | 47 | 31 | 17 | 18,3 | 12,7 | 270 | 420 | 1050 | 464.700 | 51,8 |
| UC 201 | 12 | 47 | 31 | 17 | 18,3 | 12,7 | 270 | 420 | 1050 | 464.701 | 50,3 |
| UC 202 | 15 | 47 | 31 | 17 | 18,3 | 12,7 | 270 | 420 | 1050 | 464.702 | 47,5 |
| UC 203 | 17 | 47 | 31 | 17 | 18,3 | 12,7 | 270 | 420 | 1050 | 464.703 | 45,9 |
| UC 204 | 20 | 47 | 31 | 17 | 18,3 | 12,7 | 270 | 420 | 1050 | 464.704 | 42,0 |
| UC 205 | 25 | 52 | 34,1 | 17 | 19,6 | 14,5 | 320 | 480 | 950 | 464.705 | 51,6 |
| UC 206 | 30 | 62 | 38,1 | 19 | 22,2 | 15,9 | 360 | 550 | 800 | 464.706 | 82,7 |
| UC 207 | 35 | 72 | 42,9 | 20 | 25,4 | 17,5 | 410 | 620 | 700 | 464.707 | 124,1 |
| UC 208 | 40 | 80 | 49,2 | 21 | 30,2 | 19 | 440 | 660 | 625 | 464.708 | 175,1 |
| UC 209 | 45 | 85 | 49,2 | 22 | 30,2 | 19 | 470 | 720 | 580 | 464.709 | 197,8 |

* **Double insert bearings with ZZ-shields on request.** The basic load rating and speed levels stated herein are basic figures.

Due to different operating conditions the figures gained under real-life conditions can vary to a high extent. Please see the information given in fig. 4 on page 7 to partly consider the environmental influences.

All insert bearings fit in the plastic housings listed on page 13 and in the established cast steel housings. The standard material combination for insert bearings are rings made of POM, bearings made of stainless steel AISI 316 and cages made of PA.

Certainly any other material combination as listed on page 6 is possible.

Special editions are available on request.



PILLOW BLOCKS AND BOLT FLANGE HOUSINGS MADE OF FIBRE REINFORCED PLASTIC



SMG housings are manufactured from extra strong glass fibre reinforced polyamide. Zinc-plated sleeves strengthen the bolt holes by default. Optionally also stainless steel sleeves are available.

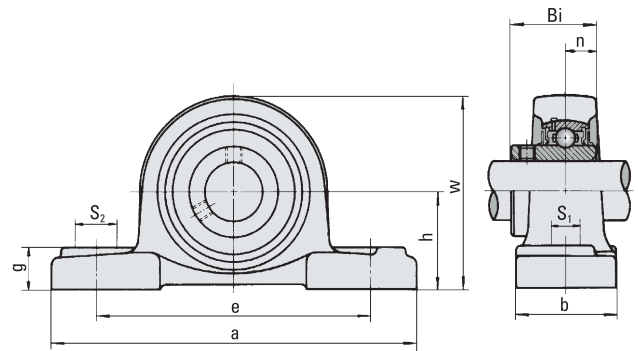
The dimensions of the housings are in line with common cast steel housings.

They have an exceptional chemical resistance and are noncorrosive and much lighter than steel housings.

In addition to the plastic inserts listed on page 12, our housings also accept many customary steel inserts.

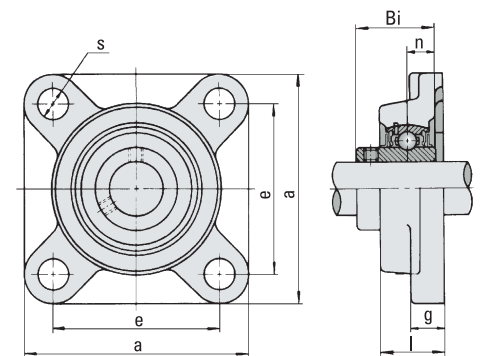
Thermoplastic Pillow Blocks

| TYPE | SMG part no. | weight g | h mm | a mm | e mm | b mm | S ₁ mm | S ₂ mm | g mm | w mm |
|----------|--------------|-------------|---------|---------|---------|---------|----------------------|----------------------|---------|---------|
| PL 200-P | 874.920 | 102,8 | 33,3 | 126 | 96 | 32 | 12 | 17,5 | 16 | 64 |
| PL 201-P | 874.920 | 102,8 | 33,3 | 126 | 96 | 32 | 12 | 17,5 | 16 | 64 |
| PL 202-P | 874.920 | 102,8 | 33,3 | 126 | 96 | 32 | 12 | 17,5 | 16 | 64 |
| PL 203-P | 874.920 | 102,8 | 33,3 | 126 | 96 | 32 | 12 | 17,5 | 16 | 64 |
| PL 204-P | 874.920 | 102,8 | 33,3 | 126 | 96 | 32 | 12 | 17,5 | 16 | 64 |
| PL 205-P | 874.921 | 120,1 | 36,5 | 134 | 105 | 32 | 12 | 17,5 | 16 | 70,5 |
| PL 206-P | 874.922 | 190,0 | 42,9 | 159 | 121 | 40 | 14,5 | 21,5 | 19 | 82 |
| PL 207-P | 874.923 | 247,2 | 47,6 | 164 | 126 | 45 | 14,5 | 21,5 | 19 | 93 |
| PL 208-P | 874.924 | 287,3 | 49,2 | 176 | 136 | 4 | 14,5 | 21,5 | 19 | 93 |



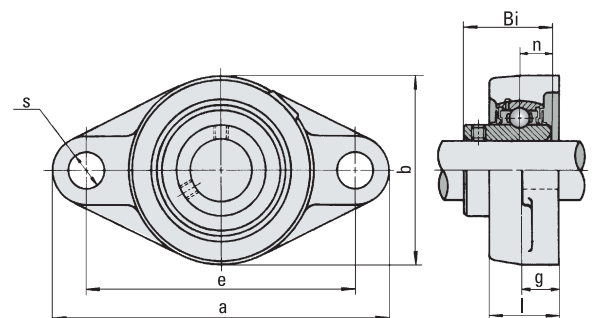
Thermoplastic 4 Bolt Flange Housings

| TYPE | SMG part no. | weight g | a mm | e mm | g mm | l mm | s mm |
|---------|--------------|-------------|---------|---------|---------|---------|---------|
| F 200-P | 874.910 | 115,2 | 86 | 63,5 | 15 | 30 | 12 |
| F 201-P | 874.910 | 115,2 | 86 | 63,5 | 15 | 30 | 12 |
| F 202-P | 874.910 | 115,2 | 86 | 63,5 | 15 | 30 | 12 |
| F 203-P | 874.910 | 115,2 | 86 | 63,5 | 15 | 30 | 12 |
| F 204-P | 874.910 | 115,2 | 86 | 63,5 | 15 | 30 | 12 |
| F 205-P | 874.911 | 138,6 | 95 | 70 | 15 | 31 | 12 |
| F 206-P | 874.912 | 182,5 | 108 | 82,5 | 15,3 | 33 | 12 |
| F 207-P | 874.913 | 235,3 | 118 | 92 | 17 | 35 | 14,5 |
| F 208-P | 874.914 | 294,5 | 130 | 101,5 | 17 | 39 | 14,5 |

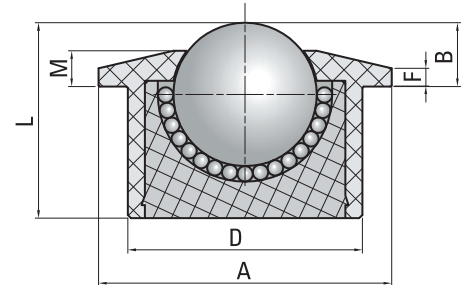


Thermoplastic 2 Bolt Flange Housings

| TYPE | SMG part no. | weight g | a mm | e mm | g mm | l mm | s mm |
|----------|--------------|-------------|---------|---------|---------|---------|---------|
| FL 200-P | 874.930 | 82,3 | 112 | 90 | 60,5 | 29,5 | 12 |
| FL 201-P | 874.930 | 82,3 | 112 | 90 | 60,5 | 29,5 | 12 |
| FL 202-P | 874.930 | 82,3 | 112 | 90 | 60,5 | 29,5 | 12 |
| FL 203-P | 874.930 | 82,3 | 112 | 90 | 60,5 | 29,5 | 12 |
| FL 204-P | 874.930 | 82,3 | 112 | 90 | 60,5 | 29,5 | 12 |
| FL 205-P | 874.931 | 99,4 | 124 | 99 | 70 | 30 | 12 |
| FL 206-P | 874.932 | 143,3 | 142,5 | 116,5 | 83 | 33 | 12 |
| FL 207-P | 874.933 | 175,1 | 156 | 130 | 96 | 35 | 14,5 |



BALL TRANSFER UNITS MADE OF PLASTICS



Material combinations

| TYPE | Material combinations | | | Dimensions (mm) | | | | | | Weight g | Basic load rating C (N) |
|------|-----------------------|---------------|--------------|-----------------|------------------------|----------------|--------------------------|---|------------------------|-------------|----------------------------|
| | SMG part no. | Support balls | Ball Ø mm | A max. Ø | B height of ball | D base Ø | F flange thickness | M bottom flange to top of outer ring | L overall height | | |
| 515 | 467.315 | 1.4401 | 15 | 31 | 9,5 | 24 | 2,8 | 6,3 | 21 | 24 | 70 |
| | 467.415 | PA | | ± 0,1 | ± 0,2 | ± 0,065 | 12 | | | 12 | |
| 522 | 467.322 | 1.4401 | 22 | 45 | 9,8 | 36 | 2,8 | 5,5 | 30 | 74 | 100 |
| | 467.422 | PA | | ± 0,1 | ± 0,2 | ± 0,080 | 36 | | | 36 | |
| 530 | 467.330 | 1.4401 | 30 | 55 | 13,8 | 45 | 4 | 8,3 | 37 | 162 | 150 |
| | 467.430 | PA | | ± 0,2 | ± 0,3 | ± 0,080 | 66 | | | 66 | |
| 545 | 467.345 | 1.4401 | 45 | 75 | 19 | 62 | 4 | 10 | 53,5 | 502 | 200 |
| | 467.445 | PA | | ± 0,2 | ± 0,4 | ± 0,095 | 176 | | | 176 | |

Advantages of ball transfer units made of plastics in comparison to steel units

- resistant to acid and lye
 - no lubrication, maintenance-free
 - low friction
 - low weight (up to 70 % less)
 - appropriate for vacuum or pressure
 - non-conductive
 - saltwater-proof
 - free of metallic components*
 - flexibility in design for best possible product integration
 - heat resistant up to 250 °C (applies to "high performance plastic")
 - transport of fragile goods such as glass*
 - customized design possible
- * depending on selection of materials

Please note:

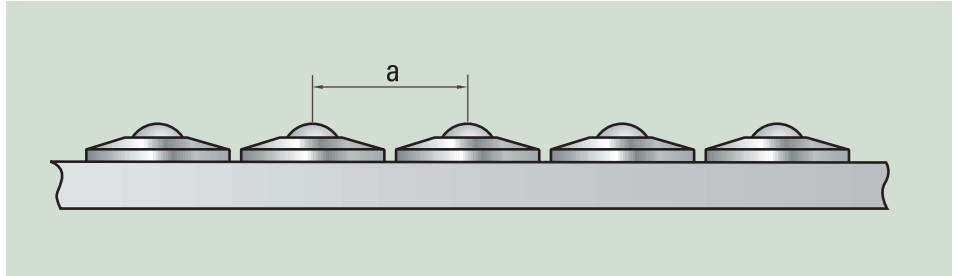
In comparison to steel units, ball transfer units out of plastics are non-conductive and offer a lower load capacity, lower thermal stability (for standard material POM approx. 90 °C) and a higher thermal expansion coefficient.

Arrangement of the ball transfer units:

For articles with a uniform, smooth under-surface the distance between the ball transfer units "a" is calculated by dividing the smallest edge length by 3.

Undersurface of the conveyed article
= 300 x 800 mm

Distance between the ball transfer units
 $a = 300/3 = 100 \text{ mm}$



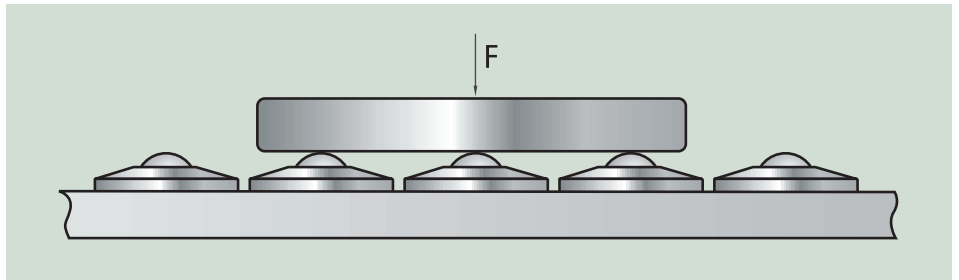
Determination of the load for ball transfer units:

To determine the load for a ball transfer unit the weight of the conveyed article is divided by the number of the loaded ball transfer units or at least by 9.

Weight = 500 N

Ball transfer unit load (F)

$F = 500/9 \approx 56 \text{ N}$ per ball transfer unit



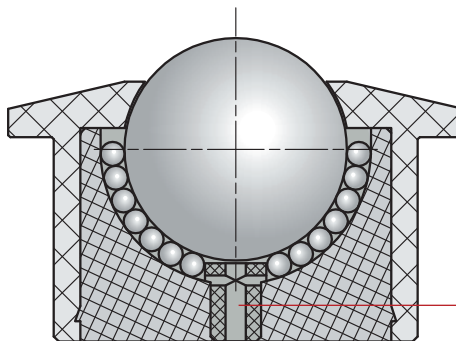
Conveying velocity: $V_{max.} = 1 \text{ m/sec.}$

| Temperature °C | Temperature factor f_T |
|----------------|--------------------------|
| 40 | 0,93 |
| 50 | 0,85 |
| 60 | 0,75 |
| 70 | 0,60 |
| 80 | 0,45 |

Temperature factor:

Operating temperature of up to 30°C.
At operating temperatures of above 30°C, please note the reduction in basic load rating.

The load capacity must be multiplied by the temperature factor.

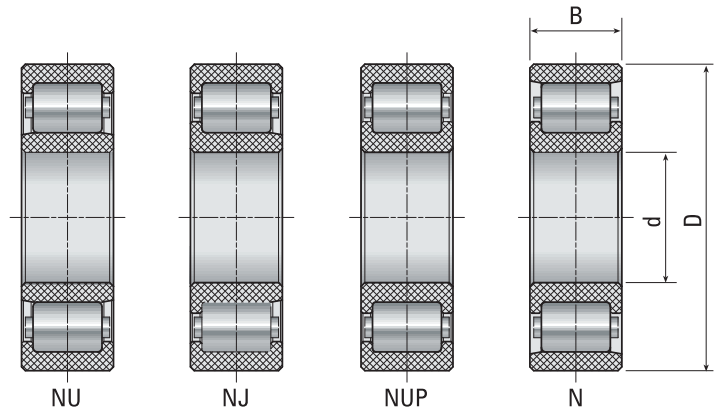


Available with drain outlet on request.

CYLINDRICAL ROLLER BEARINGS



CYLINDRICAL ROLLER BEARINGS ARE AVAILABLE ON REQUEST.



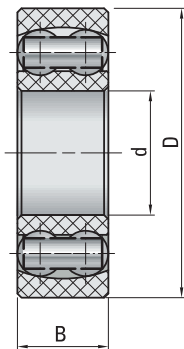
Characteristics

- Due to the usage of cylindrical rollers instead of balls the cylindrical roller bearings are able to accommodate a higher radial load
- Shaft expansion in length can be compensated by the shifting of the races (except for the edition NUP).
- Lubrication free dry operation
- These ball bearings are made to customer specification

Basic types

- Edition NU:** Two integral flanges on the outer ring and no flanges on the inner ring
- Edition NJ:** Two integral flanges on the outer ring and one integral flange on the inner ring
- Edition NUP:** Two integral flanges on the outer ring and two integral flanges on the inner ring.
- Edition N:** Outer ring without flanges and two integral flanges on the inner ring

SPHERICAL ROLLER BEARINGS



SPHERICAL ROLLER BEARINGS ARE AVAILABLE ON REQUEST.

Characteristics

- Spherical roller bearings contain two rows of rollers and a spherical raceway on the outer ring. Thereby, they are able to absorb misalignments.
- Lubrication free dry operation
- These roller bearings are made to customer specification



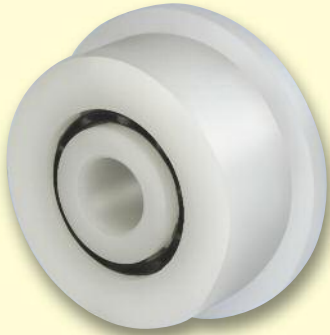
SMG – SPECIALIST IN PLASTICS



In addition to the field of ball bearings, cylindrical bearings and roller bearings, SMG also offers its customers the full premium production spectrum of precision parts made of plastics. SMG's customers benefit from the combination of construction, cutting and qualified tool-manufacture and injection moulding.

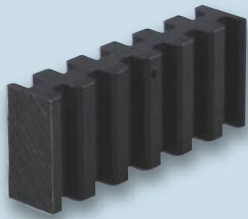


VARIABLE PRODUCTION FACILITIES MADE OF PLASTICS



Turned parts

Production facilities on latest CNC turning centers equipped with automatic bar stock feed up to a diameter of 78 mm. The maximum collet capacity amounts to 280 mm – available from single-piece to large-scale production.



Milled parts

SMG has specialized in the manufacture of small parts made of high performance materials at the highest degree of accuracy and precision – available from single-piece to large-scale production.



Moulded parts

Our SMG machine outfit includes injection moulding machines with a clamping force of up to 110 tons. Almost all thermoplastics are processed: PP, PA, POM, PMMA, PUR, ... with or without additives like carbon fiber, glass fiber, graphite, MOS2. Also high-capacity plastics such as PPS, PEEK and TPI are used for our moulded parts.



MATERIALS

Thermoplastics

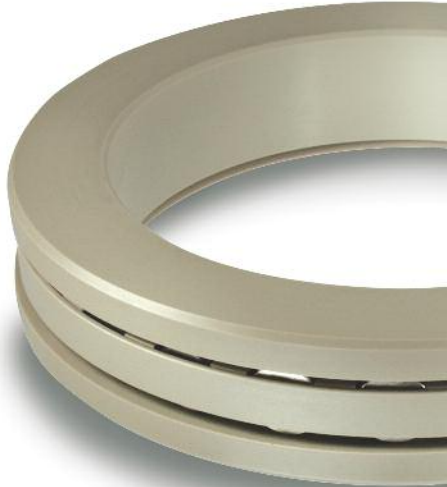
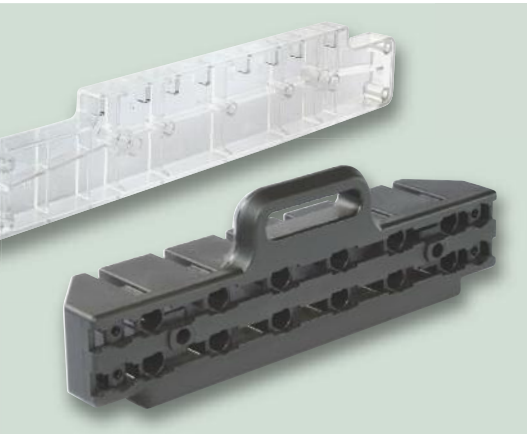
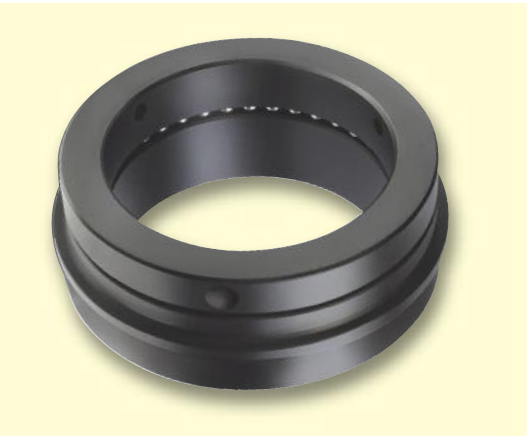
- POM
 - PA
 - PE
 - PET
 - PPS
 - PEEK
 - TPI
 - PTFE
- and many others

Special materials

- Polyimide
- Carbon
- Laminated fabrics
- Duroplastics
- High-performance plastics

Composite materials

- Duroplastics
- Thermoplastics
- Synthetic resin fabrics
- Laminated wood



BALL BEARINGS | GUIDE ROLLERS | BALL TRANSFER UNITS | CUSTOMIZED SOLUTIONS



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