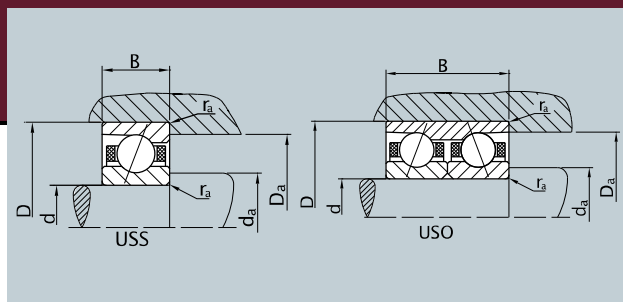


UKF Spindle Bearings

Series 719 USS, 719 USO
and 70 USS, 70 USO

Single-/Double row with
fibre cage, preloaded,
optimal angle of contact $\alpha = 21^\circ$;
15°...25° upon request.

Calculation factors for
Speed Limit (Precision,
Preload, Configuration)
🔧 Calculation Principles



Dimensions:

USS comparable to Single Row Bearing Series 719/70

USO comparable to a Pair Single Row Bearings Series 719/70

| Nominal Size | | | UKF Type | | | Ratings | | Speed Limit | | Seat Dimensions | | | Mass |
|--------------|----|----|------------|------------|-----------|----------------|-------|-----------------------|----------------------------|-----------------|----------------|----------------|------|
| d | D | B | | | | C ₀ | C | n _{lim} RPM | | r _a | d _a | D _a | m |
| mm | | | | | | N | N | Grease lubrication | minimum oil lubrication | | mm | | kg |
| 15 | 28 | 7 | 719 | USS | 15 | 2600 | 4600 | 44000 | 67000 | 0,15 | 17,5 | 25,5 | 0,02 |
| | 28 | 14 | 719 | USO | 15 | 5100 | 7500 | 41000 | 64000 | 0,15 | 17,5 | 25,5 | 0,03 |
| | 32 | 9 | 70 | USS | 15 | 3600 | 6400 | 39500 | 61000 | 0,3 | 18,5 | 28,5 | 0,03 |
| | 32 | 18 | 70 | USO | 15 | 7200 | 10500 | 37500 | 58000 | 0,3 | 18,5 | 28,5 | 0,06 |
| 17 | 30 | 7 | 719 | USS | 17 | 2800 | 4800 | 40000 | 62000 | 0,15 | 19,5 | 27,5 | 0,02 |
| | 30 | 14 | 719 | USO | 17 | 5700 | 7900 | 37500 | 59000 | 0,15 | 19,5 | 27,5 | 0,03 |
| | 35 | 10 | 70 | USS | 17 | 4000 | 6800 | 36000 | 55000 | 0,3 | 21,0 | 31,0 | 0,04 |
| | 35 | 20 | 70 | USO | 17 | 8000 | 11000 | 34000 | 53000 | 0,3 | 21,0 | 31,0 | 0,08 |
| 20 | 37 | 9 | 719 | USS | 20 | 3700 | 6400 | 33000 | 51000 | 0,15 | 23,0 | 34,0 | 0,04 |
| | 37 | 18 | 719 | USO | 20 | 7500 | 10400 | 31000 | 48000 | 0,15 | 23,0 | 34,0 | 0,07 |
| | 42 | 12 | 70 | USS | 20 | 6400 | 10800 | 30000 | 46000 | 0,6 | 25,0 | 37,0 | 0,07 |
| | 42 | 24 | 70 | USO | 20 | 12800 | 17600 | 28000 | 44000 | 0,6 | 25,0 | 37,0 | 0,14 |
| 25 | 42 | 9 | 719 | USS | 25 | 4600 | 6900 | 28000 | 43000 | 0,15 | 28,0 | 39,0 | 0,04 |
| | 42 | 18 | 719 | USO | 25 | 9200 | 11200 | 26500 | 41000 | 0,15 | 28,0 | 39,0 | 0,08 |
| | 47 | 12 | 70 | USS | 25 | 7300 | 11300 | 26000 | 40000 | 0,6 | 30,0 | 42,0 | 0,08 |
| | 47 | 24 | 70 | USO | 25 | 14500 | 18400 | 24000 | 38000 | 0,6 | 30,0 | 42,0 | 0,16 |
| 30 | 47 | 9 | 719 | USS | 30 | 5500 | 7800 | 24000 | 37500 | 0,15 | 33,0 | 44,0 | 0,05 |
| | 47 | 18 | 719 | USO | 30 | 11000 | 12500 | 23000 | 36000 | 0,15 | 33,0 | 44,0 | 0,09 |
| | 55 | 13 | 70 | USS | 30 | 9300 | 14700 | 22000 | 34000 | 1 ,0 | 36,0 | 49,0 | 0,11 |
| | 55 | 26 | 70 | USO | 30 | 18600 | 24000 | 21500 | 32000 | 1 ,0 | 36,0 | 49,0 | 0,22 |
| 35 | 55 | 10 | 719 | USS | 35 | 7700 | 10300 | 21000 | 32000 | 0,3 | 39,5 | 50,5 | 0,08 |
| | 55 | 20 | 719 | USO | 35 | 15500 | 16700 | 19500 | 30500 | 0,3 | 39,5 | 50,5 | 0,15 |
| | 62 | 14 | 70 | USS | 35 | 12300 | 18100 | 19500 | 29500 | 1 ,0 | 41,5 | 55,5 | 0,15 |
| | 62 | 28 | 70 | USO | 35 | 24100 | 32500 | 18500 | 28000 | 1 ,0 | 41,5 | 55,5 | 0,30 |
| 40 | 62 | 12 | 719 | USS | 40 | 10500 | 13500 | 18000 | 28000 | 0,3 | 44,0 | 58,0 | 0,11 |
| | 62 | 24 | 719 | USO | 40 | 21500 | 22000 | 17000 | 27000 | 0,3 | 44,0 | 58,0 | 0,22 |
| | 68 | 15 | 70 | USS | 40 | 13600 | 18500 | 17000 | 26000 | 1 ,0 | 47,0 | 61,0 | 0,18 |
| | 68 | 30 | 70 | USO | 40 | 27200 | 30000 | 16000 | 25000 | 1 ,0 | 47,0 | 61,0 | 0,36 |
| 45 | 68 | 12 | 719 | USS | 45 | 11500 | 13500 | 16500 | 25000 | 0,3 | 49,5 | 63,5 | 0,13 |
| | 68 | 24 | 719 | USO | 45 | 23500 | 22000 | 15500 | 24000 | 0,3 | 49,5 | 63,5 | 0,26 |
| | 75 | 16 | 70 | USS | 45 | 19000 | 25800 | 15500 | 24000 | 1 ,0 | 51,5 | 68,5 | 0,24 |
| | 75 | 32 | 70 | USO | 45 | 38600 | 42000 | 14500 | 23000 | 1 ,0 | 51,5 | 68,5 | 0,48 |
| 50 | 72 | 12 | 719 | USS | 50 | 12000 | 14000 | 15500 | 24000 | 0,3 | 54,0 | 68,0 | 0,13 |
| | 72 | 24 | 719 | USO | 50 | 24500 | 23000 | 14500 | 23000 | 0,3 | 54,0 | 68,0 | 0,26 |
| | 80 | 16 | 70 | USS | 50 | 22000 | 27800 | 14000 | 22000 | 1 ,0 | 56,5 | 73,5 | 0,25 |
| | 80 | 32 | 70 | USO | 50 | 44300 | 45000 | 13500 | 21000 | 1 ,0 | 56,5 | 73,5 | 0,50 |
| 55 | 80 | 13 | 719 | USS | 55 | 18700 | 19000 | 14000 | 21000 | 0,3 | 59,5 | 75,5 | 0,18 |
| | 80 | 26 | 719 | USO | 55 | 37500 | 35000 | 13000 | 20000 | 0,3 | 59,5 | 75,5 | 0,36 |
| | 90 | 18 | 70 | USS | 55 | 24200 | 28200 | 12500 | 20000 | 1 ,0 | 62,0 | 83,0 | 0,38 |
| | 90 | 36 | 70 | USO | 55 | 48400 | 46000 | 12000 | 19000 | 1 ,0 | 62,0 | 83,0 | 0,76 |
| 60 | 85 | 13 | 719 | USS | 60 | 21000 | 22500 | 13000 | 20000 | 0,3 | 64,5 | 80,5 | 0,19 |
| | 85 | 26 | 719 | USO | 60 | 42500 | 36500 | 12000 | 19000 | 0,3 | 64,5 | 80,5 | 0,37 |
| | 95 | 18 | 70 | USS | 60 | 26800 | 31400 | 12000 | 18500 | 1 ,0 | 67,0 | 88,0 | 0,41 |
| | 95 | 36 | 70 | USO | 60 | 53700 | 51000 | 11000 | 17500 | 1 ,0 | 67,0 | 88,0 | 0,82 |

UKF Spindle Bearings

Series 719 USS, 719 USO
and 70 USS, 70 USO

Bearing Sets and Calculation Factor f_3 for Speed Limit

| | | | |
|--------------------------|---|-------------|--|
| single row | $\emptyset \emptyset$ | $f_3 = 1,0$ | double row, like USO |
| DT | $\emptyset \emptyset \emptyset \emptyset$ | $= 0,95$ | |
| DB | $\emptyset \emptyset \emptyset \emptyset$ | $= 0,9$ | DB $\emptyset \emptyset = 1,0$ |
| TBT | $\emptyset \emptyset \emptyset \emptyset$ | $= 0,75$ | TBT $\emptyset \emptyset \emptyset^{**} = 0,9$ |
| QBC | $\emptyset \emptyset \emptyset \emptyset \emptyset \emptyset$ | $= 0,85$ | QBC $\emptyset \emptyset \emptyset \emptyset^{**} = 0,85$ |
| ☛ Calculation Principles | | | ** combined with USS |

| Nominal Size | | | UKF Type | Ratings | | Speed Limit | | Seat Dimensions | | | Mass |
|--------------|-----|----|---------------------|----------------|--------|----------------------|-------------------------|-----------------|----------------|----------------|------|
| d | D | B | | C ₀ | C | n _{lim} RPM | | r _a | d _a | D _a | m |
| | | | | N | N | Grease lubrication | minimum oil lubrication | | | | kg |
| 65 | 90 | 13 | 719 USS 65 | 22000 | 23000 | 12000 | 18500 | 0,3 | 69,5 | 85,5 | 0,21 |
| | 90 | 26 | 719 USO 65 | 44000 | 37500 | 11500 | 17500 | 0,3 | 69,5 | 85,5 | 0,41 |
| | 100 | 18 | 70 USS 65 | 28400 | 32100 | 11000 | 17500 | 1,0 | 72,0 | 93,0 | 0,43 |
| | 100 | 36 | 70 USO 65 | 56900 | 52000 | 10500 | 16000 | 1,0 | 72,0 | 93,0 | 0,85 |
| 70 | 100 | 16 | 719 USS 70 | 29000 | 30000 | 11000 | 17000 | 0,3 | 75,5 | 94,5 | 0,33 |
| | 100 | 32 | 719 USO 70 | 58000 | 49000 | 10000 | 16000 | 0,3 | 75,5 | 94,5 | 0,66 |
| | 110 | 20 | 70 USS 70 | 37800 | 42000 | 10000 | 16000 | 1,0 | 78,0 | 102,0 | 0,60 |
| | 110 | 40 | 70 USO 70 | 75500 | 68600 | 9500 | 15000 | 1,0 | 78,0 | 102,0 | 1,20 |
| 75 | 105 | 16 | 719 USS 75 | 30500 | 31000 | 10000 | 16000 | 0,3 | 80,5 | 99,5 | 0,35 |
| | 105 | 32 | 719 USO 75 | 61000 | 50500 | 9500 | 15000 | 0,3 | 80,5 | 99,5 | 0,70 |
| | 115 | 20 | 70 USS 75 | 40000 | 43000 | 9500 | 15000 | 1,0 | 83,0 | 107,0 | 0,61 |
| | 115 | 40 | 70 USO 75 | 80000 | 71000 | 9000 | 14500 | 1,0 | 83,0 | 107,0 | 1,35 |
| 80 | 110 | 16 | 719 USS 80 | 32000 | 31000 | 9500 | 15000 | 0,3 | 85,5 | 104,5 | 0,38 |
| | 110 | 32 | 719 USO 80 | 64000 | 51000 | 9000 | 14500 | 0,3 | 85,5 | 104,5 | 0,75 |
| | 125 | 22 | 70 USS 80 | 50500 | 57100 | 9000 | 14000 | 1,0 | 89,0 | 116,0 | 0,87 |
| | 125 | 44 | 70 USO 80 | 101000 | 92800 | 8500 | 13000 | 1,0 | 89,0 | 116,0 | 1,75 |
| 85 | 120 | 18 | 719 USS 85 | 41500 | 41000 | 9000 | 14000 | 0,6 | 92,5 | 114,5 | 0,53 |
| | 120 | 36 | 719 USO 85 | 83000 | 67000 | 8500 | 13500 | 0,6 | 92,5 | 114,5 | 1,05 |
| | 130 | 22 | 70 USS 85 | 57500 | 60500 | 8500 | 13500 | 1,0 | 94,0 | 121,0 | 0,90 |
| | 130 | 44 | 70 USO 85 | 115000 | 98800 | 8000 | 13000 | 1,0 | 94,0 | 121,0 | 1,80 |
| 90 | 125 | 18 | 719 USS 90 | 43500 | 42400 | 8500 | 13500 | 0,6 | 96,5 | 118,5 | 0,58 |
| | 125 | 36 | 719 USO 90 | 87000 | 69000 | 8000 | 13000 | 0,6 | 96,5 | 118,5 | 1,15 |
| | 140 | 24 | 70 USS 90 | 69000 | 74000 | 8000 | 12500 | 1,2 | 100,0 | 130,0 | 1,15 |
| | 140 | 48 | 70 USO 90 | 139000 | 121000 | 7500 | 12000 | 1,2 | 100,0 | 130,0 | 2,30 |
| 100 | 140 | 20 | 719 USS 100 | 59000 | 55500 | 7500 | 12000 | 0,6 | 107,0 | 132,0 | 0,78 |
| | 140 | 40 | 719 USO 100 | 118500 | 90000 | 7000 | 11500 | 0,6 | 107,0 | 132,0 | 1,56 |
| | 150 | 24 | 70 USS 100 | 78500 | 78600 | 7500 | 11500 | 1,2 | 110,0 | 140,0 | 1,30 |
| | 150 | 48 | 70 USO 100 | 157000 | 127500 | 7000 | 11000 | 1,2 | 110,0 | 140,0 | 2,60 |
| 110 | 150 | 20 | 719 USS 110 | 62000 | 55000 | 7000 | 11000 | 0,6 | 117,0 | 143,0 | 0,85 |
| | 150 | 40 | 719 USO 110 | 124000 | 90000 | 6500 | 10500 | 0,6 | 117,0 | 143,0 | 1,70 |
| | 170 | 28 | 70 USS 110 | 100000 | 103000 | 6500 | 10000 | 1,2 | 122,0 | 158,0 | 2,00 |
| | 170 | 56 | 70 USO 110 | 200000 | 167000 | 6000 | 9500 | 1,2 | 122,0 | 158,0 | 4,00 |
| 120 | 165 | 22 | 719 USS 120 | 78500 | 68900 | 6500 | 10000 | 0,6 | 128,0 | 151,0 | 1,15 |
| | 165 | 44 | 719 USO 120 | 157000 | 112000 | 6000 | 9500 | 0,6 | 128,0 | 151,0 | 2,30 |
| | 180 | 28 | 70 USS 120 | 107000 | 105000 | 6000 | 9200 | 1,5 | 132,0 | 168,0 | 2,15 |
| | 180 | 56 | 70 USO 120 | 215000 | 171000 | 5800 | 9000 | 1,5 | 132,0 | 168,0 | 4,30 |
| 130 | 180 | 24 | 719 USS 130* | 92500 | 83000 | 6000 | 9400 | 0,6 | 139,0 | 171,0 | 1,55 |
| | 180 | 48 | 719 USO 130* | 185000 | 134000 | 5500 | 9000 | 0,6 | 139,0 | 171,0 | 3,10 |
| | 200 | 33 | 70 USS 130* | 136600 | 136300 | 5600 | 8600 | 1,5 | 144,5 | 185,5 | 3,25 |
| | 200 | 66 | 70 USO 130* | 273000 | 221000 | 5000 | 8200 | 1,5 | 144,5 | 185,5 | 6,55 |
| 140 | 190 | 24 | 719 USS 140* | 100000 | 85500 | 5500 | 8500 | 0,6 | 148,5 | 181,5 | 1,63 |
| | 190 | 48 | 719 USO 140* | 201000 | 139000 | 5000 | 8000 | 0,6 | 148,5 | 181,5 | 3,26 |
| | 210 | 33 | 70 USS 140* | 146000 | 139000 | 5200 | 8000 | 1,5 | 154,5 | 195,5 | 3,50 |
| | 210 | 66 | 70 USO 140* | 293000 | 226000 | 4800 | 7500 | 1,5 | 154,5 | 195,5 | 7,00 |
| 150 | 210 | 28 | 719 USS 150* | 133000 | 115000 | 5000 | 8000 | 1,0 | 161,0 | 199,0 | 2,55 |
| | 210 | 56 | 719 USO 150* | 266500 | 187000 | 4500 | 7500 | 1,0 | 161,0 | 199,0 | 5,10 |
| | 225 | 35 | 70 USS 150* | 178000 | 175000 | 4800 | 7500 | 1,5 | 165,5 | 209,5 | 4,25 |
| | 225 | 70 | 70 USO 150* | 357000 | 284000 | 4400 | 7200 | 1,5 | 165,5 | 209,5 | 8,50 |

* upon request



Preload and Rigidity

UKF Spindle Bearings with Steel Balls

Optimal Contact Angle $\alpha = 21^\circ$

Compared to 15° -Bearings, only slightly reduced Maximum Speed, but approximately 60 % higher Axial Rigidity !

Series 719 USS, 70 USS as Single Row (paired in O- or X-arrangement), 719 USO, 70 USO as Double Row

| UKF Type | | | Axial Preload $F_V(N)$ | | | Axial Rigidity $R_a(N/\mu m)$ | | | Radial Rigidity $R_r(N/\mu m)$ | | |
|-----------|------------------------|-----|------------------------|--------------|--------------|-------------------------------|------------|------------|--------------------------------|--------------|--------------|
| | | d | L | M | S | L | M | S | L | M | S |
| 719 70 | USS / USO USS / USO | 15 | 30 40 | 100 130 | 200 260 | 29 32 | 43 48 | 54 60 | 115 130 | 175 190 | 220 240 |
| 719 70 | USS / USO USS / USO | 17 | 40 50 | 110 150 | 220 310 | 34 36 | 50 52 | 60 66 | 135 145 | 190 210 | 240 265 |
| 719 70 | USS / USO USS / USO | 20 | 60 70 | 180 210 | 360 430 | 42 43 | 60 63 | 76 80 | 170 175 | 240 250 | 305 320 |
| 719 70 | USS / USO USS / USO | 25 | 70 80 | 200 240 | 400 470 | 49 51 | 69 74 | 87 93 | 195 205 | 280 300 | 350 375 |
| 719 70 | USS / USO USS / USO | 30 | 70 100 | 220 300 | 440 610 | 53 57 | 78 82 | 98 105 | 215 230 | 315 330 | 395 415 |
| 719 70 | USS / USO USS / USO | 35 | 90 120 | 260 350 | 520 700 | 61 68 | 87 91 | 110 120 | 245 275 | 350 390 | 445 495 |
| 719 70 | USS / USO USS / USO | 40 | 100 130 | 290 370 | 580 750 | 68 73 | 97 105 | 120 130 | 275 295 | 390 420 | 490 530 |
| 719 70 | USS / USO USS / USO | 45 | 130 170 | 380 500 | 760 1010 | 79 83 | 115 120 | 140 150 | 320 335 | 455 480 | 570 610 |
| 719 70 | USS / USO USS / USO | 50 | 130 180 | 400 530 | 800 1030 | 82 89 | 120 125 | 150 160 | 330 355 | 480 510 | 610 640 |
| 719 70 | USS / USO USS / USO | 55 | 180 240 | 540 720 | 1040 1420 | 95 105 | 140 150 | 170 185 | 385 415 | 560 600 | 690 750 |
| 719 70 | USS / USO USS / USO | 60 | 190 250 | 560 750 | 1120 1520 | 105 110 | 160 165 | 190 200 | 420 435 | 600 630 | 760 800 |
| 719 70 | USS / USO USS / USO | 65 | 200 250 | 580 760 | 1160 1540 | 110 115 | 165 170 | 195 205 | 440 455 | 630 660 | 790 830 |
| 719 70 | USS / USO USS / USO | 70 | 250 330 | 750 1000 | 1500 1940 | 120 130 | 175 185 | 220 235 | 485 520 | 700 750 | 880 940 |
| 719 70 | USS / USO USS / USO | 75 | 260 340 | 780 1020 | 1560 2040 | 125 135 | 180 195 | 230 245 | 510 545 | 730 790 | 920 990 |
| 719 70 | USS / USO USS / USO | 80 | 270 410 | 810 1260 | 1620 2520 | 130 140 | 190 205 | 240 255 | 530 570 | 760 820 | 960 1040 |
| 719 70 | USS / USO USS / USO | 85 | 320 430 | 960 1280 | 1920 2560 | 145 150 | 205 215 | 260 270 | 580 600 | 840 860 | 1050 1080 |
| 719 70 | USS / USO USS / USO | 90 | 370 510 | 1100 1520 | 2200 3040 | 155 170 | 225 245 | 280 310 | 630 690 | 900 990 | 1140 1250 |
| 719 70 | USS / USO USS / USO | 100 | 440 540 | 1320 1620 | 2640 3200 | 170 180 | 250 260 | 310 330 | 690 730 | 1000 1060 | 1260 1320 |
| 719 70 | USS / USO USS / USO | 110 | 470 720 | 1420 2140 | 2840 4300 | 180 205 | 260 295 | 330 375 | 730 830 | 1050 1190 | 1330 1500 |
| 719 70 | USS / USO USS / USO | 120 | 550 730 | 1650 2200 | 3300 4400 | 200 215 | 290 310 | 365 390 | 810 860 | 1170 1240 | 1470 1560 |
| 719 70 | USS / USO USS / USO | 130 | 670 930 | 2020 2780 | 4040 5600 | 220 230 | 315 335 | 395 420 | 880 940 | 1270 1350 | 1600 1700 |
| 719 70 | USS / USO USS / USO | 140 | 720 940 | 2160 2880 | 4320 5760 | 230 240 | 330 350 | 415 440 | 920 970 | 1330 1410 | 1680 1780 |
| 719 70 | USS / USO USS / USO | 150 | 890 1100 | 2680 3240 | 5360 6440 | 250 260 | 360 370 | 450 465 | 1000 1040 | 1450 1490 | 1830 1880 |