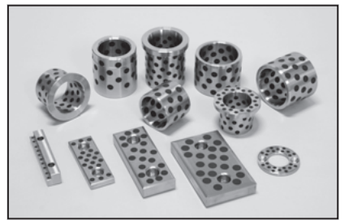
# Metallic Bearings



# Oiles 500SP1 High-strength brass bearings with embedded solid lubricant



RoHS2 ELV Lead Free

## Feature

- Serviceable without the need for lubrication.
- Demonstrates high performance under high-load and low-speed operations.
- Demonstrates superior wear resistance in applications where oil film is seldom produced such as reciprocating motions, oscillation, frequent starts and stops, etc.
- Superior chemical resistance and corrosion resistance.
- Standard products are available in various sizes.

| Service range | 500SP1 SL1 | | 500SP1 SL4 |
|---|---|---|---|
| Lubrication condition | Dry | periodic lubrication | Dry |
| Service temperature range ℃ | −40～+300 | −40～+150 | −40～+80 |
| Allowable max. pressure P N/mm² {kgf/cm²} | 29 (150) {296 (1,530)} | | 49 (150) {500 (1,530)} |
| Allowable max. velocity V m/s {m/min} | 0.50 {30} | 1.00 {60} | 0.25 {15} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 1.65 {1,010} | 3.25 {1,990} | 1.65 {1,010} |

The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s[0.1m/min]).

## Mechanical properties

| | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 7.8 |
| Tensile strength | JIS Z 2241 | N/mm² {kgf/mm²} | 755 {77} |
| Tensile elongation at break | JIS Z 2241 | % | 12 |
| Compressive strength | —— | N/mm² {kgf/mm²} | 345 {35} (Note) |
| Impact strength | JIS Z 2242 | J/cm² {kgfm/cm²} | 19 {1.9} |
| Hardness | JIS Z 2243 | HBW | 210 |
| Modulus of longitudinal elasticity | —— | N/mm² {kgf/mm²} | 105,000 {10,700} |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 2.12 |
| Thermal conductivity | —— | W/m℃ {cal/sec℃cm} | 87.8 {0.21} |

※The values shown above are typical values, not the standard values.
(Note) Compressive strength is 0.1%

⚠ When you use standard 500SP1 seires in the temperature of 150℃ and over, contact us for more information.

⚠ Refer to page 36 for the suitable solid lubricant for made-to-order bearings.

⚠ Please indicate the type of motion (rotation, reciprocating, rotation & reciprocating) for custom-made products.

⚠ Solid lubricant, SL401 and SL403 are not lead-free.

## Lathe turning

| | | |
|---|---|---|
| Cutting tool | carbide tool (JIS) | |
| | Relief angle | 5～10° |
| | Rake angle | 2～5° |
| | Nose radius (mm) | 0.40～0.80 |
| Condition | Speed (m/min) | 100～200 |
| | Cut depth (mm) | 0.05～0.30 |
| | Feed (mm/rev) | 0.08～0.30 |

Some products require application of solid lubricants on the sliding surface after processing.
※Contact us for grinding and milling information.

## Machining accuracy (bushing)

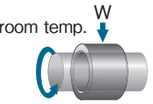
| I.D. | O.D. | Length |
|---|---|---|
| class 7 to 8 | class 6 to 7 | class 8 to 9 |

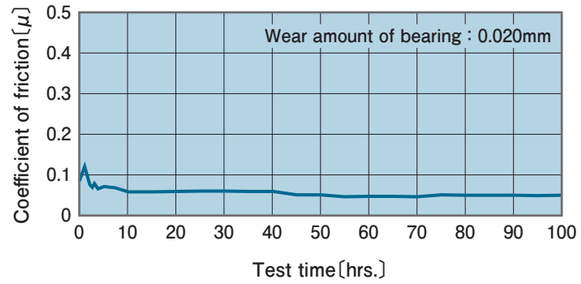
Classes here are in JIS standard.
This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

## Test data

### Journal rotation test 500SP1-SL1

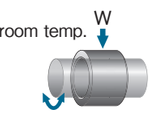
<Testing conditions>
Bearing dimension : φ40×φ50× ℓ 30
Mating material : S45C high frequency quenched
Pressure : 24.5N/mm² {250.0kgf/cm²}
Velocity : 0.033m/s {2.0m/min}
Test time : 100hrs.
Ambience : in the atmosphere, room temp.
Lubrication : dry

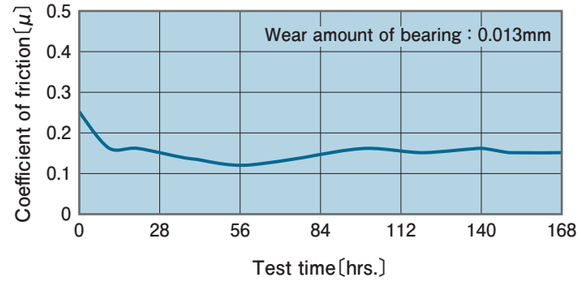



### Journal oscillation test 500SP1-SL1

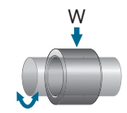
<Testing conditions>
Bearing dimension : φ40×φ50× ℓ 30
Mating material : S45C
Pressure : 19.6N/mm² {200.0kgf/cm²}
Velocity : 0.025m/s {1.5m/min}
Oscillating cycle : 24cpm
Oscillating angle : ±45°
Test time : 168hrs.
Ambience : in the atmosphere, room temp.
Lubrication : dry

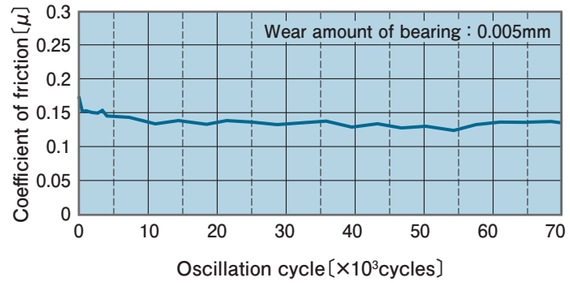



### Journal oscillation test 500SP1-SL4

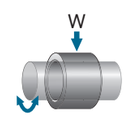
<Testing conditions>
Bearing dimension : φ40×φ50×ℓ30
Mating material : SUS304
Pressure : 29.4N/mm² {300kgf/cm²}
Velocity : 0.012m/s {0.75m/min}
Oscillating cycle :12cpm
Oscillating angle : ±45°
Test cycle : 70,000cycle (97.2h)
Ambience : in the atmosphere, room temp.
Lubrication : initial grease SL464g coating

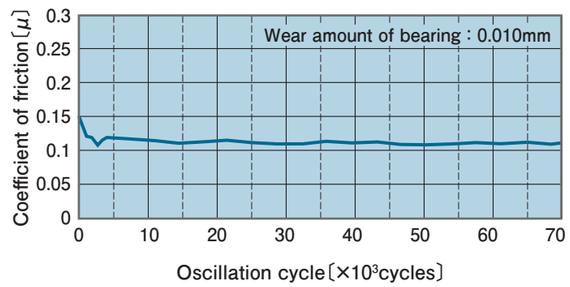



### Journal oscillation test 500SP1-SL4

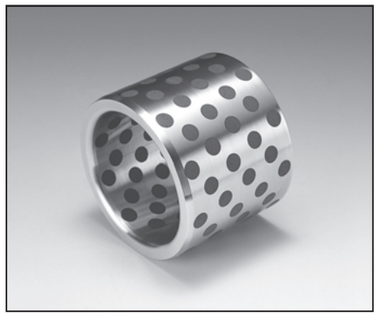
<Testing conditions>
Bearing dimension : φ60×φ75×ℓ50
Mating material : SUS403
Pressure : 24.5N/mm² {250kgf/cm²}
Velocity : 0.018m/s {1.13m/min}
Oscillating cycle :12cpm
Oscillating angle : ±45°
Test cycle : 70,000cycle (97.2h)
Ambience : in the purified water
Lubrication : initial grease SL464g coating



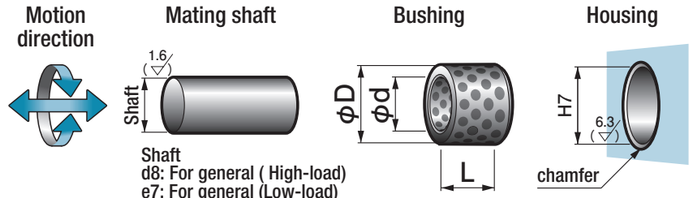
# SPB Oiles 500SP1 SL1 Bushings (I.D. φ6~φ45)

RoHS2 ELV Lead Free

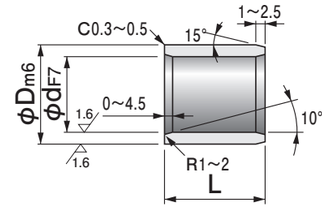


Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 25mm, O.D. is 33mm, and length is 20mm.

**SPB - 253320**
**Part No.**

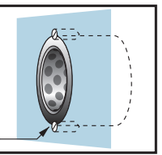



Shaft
d8: For general ( High-load)
e7: For general (Low-load)
f7: For high accuracy

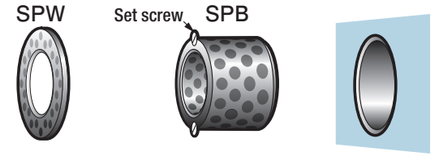



- Applicable to rotation, oscillation, and reciprocating motion.
- Do not use this under water.
- 31.5mm I.D bushing can be used as an intermediate trunnion bushing for hydraulic cylinders.

It is recommended to use a set screw to prevent dislocation.




Use this product together with the Oiles #500SP washer (SPW shown on page 197) in a position where thrust loads are applied.




※Be sure to determine the position with a countersunk head screw and fix when the SPW with ★ shown in the table below is used, since the inner diameter is larger than the shaft diameter.

All SPB bushings have engraved OILES mark.

| I.D. | | O.D. | | Length L Tolerance $^{-0.1}_{-0.3}$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| φd | Tolerance | φD | Tolerance | 8 | 10 | 12 | 15 | 16 | 19 | 20 | 25 |
| 6 | +0.022 +0.010 | 10 | +0.015 +0.006 | 061008 | 061010 | 061012 | | | | | |
| 8 | +0.028 +0.013 | 12 | +0.018 +0.007 | 081208 | 081210 | 081212 | 081215 | | | | |
| 10 | +0.028 +0.013 | 14 | +0.018 +0.007 | 101408 | 101410 | 101412 | 101415 | | | 101420 | |
| 12 | +0.034 +0.016 | 18 | +0.018 +0.007 | 121808 | 121810 | 121812 | 121815 | 121816 | 121819 | 121820 | 121825 |
| 13 | +0.034 +0.016 | 19 | +0.021 +0.008 | | 131910 | 131912 | 131915 | | | 131920 | 131925 |
| 14 | +0.034 +0.016 | 20 | +0.021 +0.008 | | 142010 | 142012 | 142015 | | | 142020 | 142025 |
| 15 | +0.034 +0.016 | 21 | +0.021 +0.008 | | 152110 | 152112 | 152115 | 152116 | | 152120 | 152125 |
| 16 | +0.034 +0.016 | 22 | +0.021 +0.008 | | 162210 | 162212 | 162215 | 162216 | 162219 | 162220 | 162225 |
| 17 | +0.034 +0.016 | 23 | +0.021 +0.008 | | | | 172315 | | | | |
| 18 | +0.034 +0.016 | 24 | +0.021 +0.008 | | 182410 | 182412 | 182415 | 182416 | | 182420 | 182425 |
| 19 | +0.041 +0.020 | 26 | +0.021 +0.008 | | | | 192615 | | | 192620 | |
| 20 | +0.041 +0.020 | 28 | +0.021 +0.008 | | 202810 | 202812 | 202815 | 202816 | 202819 | 202820 | 202825 |
| 20 | +0.041 +0.020 | 30 | +0.021 +0.008 | | 203010 | 203012 | 203015 | 203016 | | 203020 | 203025 |
| 22 | +0.041 +0.020 | 32 | +0.025 +0.009 | | | 223212 | 223215 | | | 223220 | 223225 |
| 25 | +0.041 +0.020 | 33 | +0.025 +0.009 | | | 253312 | 253315 | 253316 | | 253320 | 253325 |
| 25 | +0.041 +0.020 | 35 | +0.025 +0.009 | | | 253512 | 253515 | 253516 | | 253520 | 253525 |
| 28 | +0.041 +0.020 | 38 | +0.025 +0.009 | | | | | | | 283820 | 283825 |
| 30 | +0.041 +0.020 | 38 | +0.025 +0.009 | | | 303812 | 303815 | | | 303820 | 303825 |
| 30 | +0.041 +0.020 | 40 | +0.025 +0.009 | | | 304012 | 304015 | | | 304020 | 304025 |
| 31.5 | +0.050 +0.025 | 40 | +0.025 +0.009 | | | | | | | | |
| 32 | +0.050 +0.025 | 42 | +0.025 +0.009 | | | | | | | 324220 | |
| 35 | +0.050 +0.025 | 44 | +0.025 +0.009 | | | | | | | 354420 | 354425 |
| 35 | +0.050 +0.025 | 45 | +0.025 +0.009 | | | | | | | 354520 | 354525 |
| 38 | +0.050 +0.025 | 48 | +0.025 +0.009 | | | | | | | | |
| 40 | +0.050 +0.025 | 50 | +0.025 +0.009 | | | | 405015 | | | 405020 | 405025 |
| 40 | +0.050 +0.025 | 55 | +0.030 +0.011 | | | | 405515 | | | | |
| 45 | +0.050 +0.025 | 55 | +0.030 +0.011 | | | | | | | | |
| 45 | +0.050 +0.025 | 56 | +0.030 +0.011 | | | | | | | | |
| 45 | +0.050 +0.025 | 60 | +0.030 +0.011 | | | | | | | | |

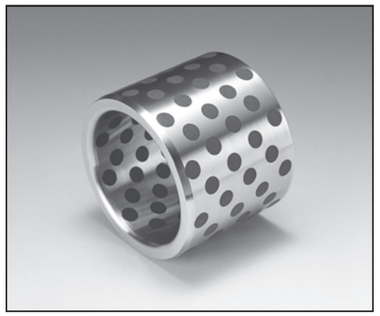
| Length L Tolerance $^{-0.1}_{-0.3}$ | | | | | | | I.D. tolerance after press fitting (reference) | Washer | I.D. |
|---|---|---|---|---|---|---|---|---|---|
| 30 | 35 | 40 | 50 | 60 | 70 | 80 | | SPW | φd |
| | | | | | | | +0.019 +0.007 | 0603 | 6 |
| | | | | | | | +0.025 +0.010 | 0803 | 8 |
| | | | | | | | +0.025 +0.010 | 1003 | 10 |
| 121830 | | | | | | | +0.031 +0.013 | 1203 | 12 |
| 131930 | | | | | | | +0.030 +0.012 | 1303 | 13 |
| 142030 | | | | | | | +0.030 +0.012 | 1403 | 14 |
| 152130 | 152135 | 152140 | | | | | +0.030 +0.012 | 1503 | 15 |
| 162230 | 162235 | 162240 | | | | | +0.030 +0.012 | 1603 | 16 |
| | | | | | | | +0.030 +0.012 | 1803★ | 17 |
| 182430 | 182435 | 182440 | | | | | +0.030 +0.012 | 1803 | 18 |
| | | | | | | | +0.037 +0.016 | 2005★ | 19 |
| 202830 | 202835 | 202840 | 202850 | | | | +0.037 +0.016 | 2005 | 20 |
| 203030 | 203035 | 203040 | 203050 | | | | +0.037 +0.016 | 2505★ | 20 |
| | | | | | | | +0.037 +0.016 | 2505★ | 22 |
| 253330 | 253335 | 253340 | 253350 | 253360 | | | +0.037 +0.016 | 2505 | 25 |
| 253530 | 253535 | 253540 | 253550 | 253560 | | | +0.037 +0.016 | 3005★ | 25 |
| 283830 | | 283840 | | | | | +0.037 +0.016 | 3005★ | 28 |
| 303830 | 303835 | 303840 | 303850 | 303860 | | | +0.037 +0.016 | 3005 | 30 |
| 304030 | 304035 | 304040 | 304050 | 304060 | | | +0.037 +0.016 | 3505★ | 30 |
| 314030 | | 314040 | | | | | +0.046 +0.021 | 3505★ | 31.5 |
| 324230 | | 324240 | | | | | +0.046 +0.021 | 3505★ | 32 |
| 354430 | 354435 | 354440 | 354450 | 354460 | | | +0.046 +0.021 | 3505 | 35 |
| 354530 | 354535 | 354540 | 354550 | 354560 | | | +0.046 +0.021 | 4007★ | 35 |
| | | 384840 | | | | | +0.046 +0.021 | 4007★ | 38 |
| 405030 | 405035 | 405040 | 405050 | 405060 | 405070 | 405080 | +0.046 +0.021 | 4007 | 40 |
| 405530 | 405535 | 405540 | 405550 | 405560 | | | +0.045 +0.020 | 4507★ | 40 |
| 455530 | 455535 | 455540 | 455550 | 455560 | | | +0.045 +0.020 | 4507 | 45 |
| 455630 | 455635 | 455640 | 455650 | 455660 | | | +0.045 +0.020 | 4507 | 45 |
| 456030 | 456035 | 456040 | 456050 | 456060 | 456070 | 456080 | +0.045 +0.020 | 4507 | 45 |

※The I.D. tolerance after press fitting is for reference only.
※I.D. φ50~φ200 are shown on pages 189 to 190.

⚠ The dimensional tolerances are the values measured at +25℃.

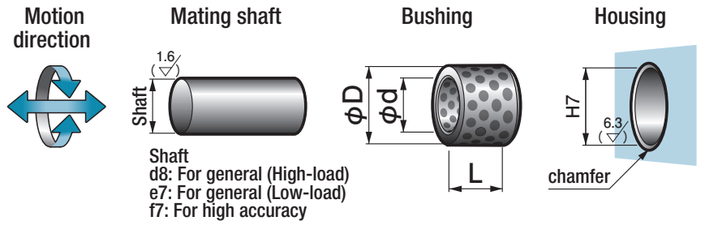
# SPB Oiles 500SP1 SL1 Bushings (I.D. ϕ50~ϕ200)

RoHS2 ELV Lead Free

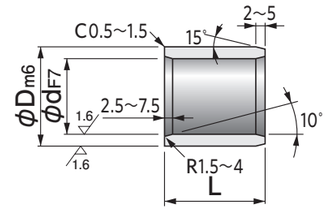


Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 80mm, O.D. is 96mm, and length is 70mm.

**SPB - 809670**
**Part No.**

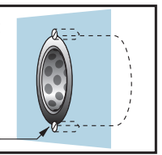



Shaft
d8: For general (High-load)
e7: For general (Low-load)
f7: For high accuracy

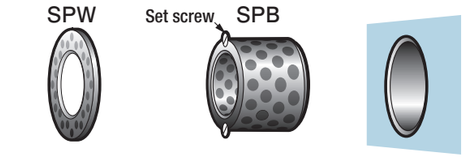



- Applicable to rotation, oscillation, and reciprocating motion.
- Do not use this under water.
- 63mm I.D bushing can be used as an intermediate trunnion bushing for hydraulic cylinders.

It is recommended to use a set screw to prevent dislocation.




Use this product together with the Oiles #500SP washer (SPW shown on page 197) in a position where thrust loads are applied.




※Be sure to determine the position with a countersunk head screw and fix when the SPW with ★ shown in the table below is used, since the inner diameter is larger than the shaft diameter.

All SPB bushings have engraved OILES mark.

| I.D. | | O.D. | | Length L Tolerance $^{-0.1}_{-0.3}$ | | | | | | | | Length L Tolerance $^{-0.1}_{-0.3}$ | | | | | | | I.D. tolerance after press fitting (reference) | Washer | I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ϕd | Tolerance | ϕD | Tolerance | 20 | 30 | 35 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 130 | 140 | 150 | 200 | | SPW | ϕd |
| 50 | +0.050 +0.025 | 60 | +0.030 +0.011 | 506020 | 506030 | 506035 | 506040 | 506050 | 506060 | 506070 | 506080 | | | | | | | | +0.045 +0.020 | 5008 | 50 |
| 50 | +0.050 +0.025 | 62 | +0.030 +0.011 | | 506230 | 506235 | 506240 | 506250 | 506260 | 506270 | 506280 | | | | | | | | +0.045 +0.020 | 5008 | 50 |
| 50 | +0.050 +0.025 | 65 | +0.030 +0.011 | | 506530 | | 506540 | 506550 | 506560 | 506570 | 506580 | | 5065100 | | | | | | +0.045 +0.020 | 5008 | 50 |
| 55 | +0.060 +0.030 | 70 | +0.030 +0.011 | | 557030 | 557035 | 557040 | 557050 | 557060 | 557070 | | | | | | | | | +0.055 +0.025 | 5508 | 55 |
| 60 | +0.060 +0.030 | 74 | +0.030 +0.011 | | 607430 | 607435 | 607440 | 607450 | 607460 | 607470 | 607480 | | | | | | | | +0.055 +0.025 | 6008 | 60 |
| 60 | +0.060 +0.030 | 75 | +0.030 +0.011 | | 607530 | 607535 | 607540 | 607550 | 607560 | 607570 | 607580 | | 6075100 | | | | | | +0.055 +0.025 | 6008 | 60 |
| 63 | +0.060 +0.030 | 75 | +0.030 +0.011 | | | | | | 637560 | 637570 | 637580 | | | | | | | | +0.055 +0.025 | 6508★ | 63 |
| 65 | +0.060 +0.030 | 80 | +0.030 +0.011 | | | | 658040 | 658050 | 658060 | 658070 | 658080 | | | | | | | | +0.055 +0.025 | 6508 | 65 |
| 70 | +0.060 +0.030 | 85 | +0.035 +0.013 | | 708530 | 708535 | 708540 | 708550 | 708560 | 708570 | 708580 | | 7085100 | | | | | | +0.054 +0.024 | 7010 | 70 |
| 70 | +0.060 +0.030 | 90 | +0.035 +0.013 | | | | | 709050 | 709060 | 709070 | 709080 | | | | | | | | +0.054 +0.024 | 7010 | 70 |
| 75 | +0.060 +0.030 | 90 | +0.035 +0.013 | | | | | 759050 | 759060 | 759070 | 759080 | | 7590100 | | | | | | +0.054 +0.024 | 7510 | 75 |
| 75 | +0.060 +0.030 | 95 | +0.035 +0.013 | | | | | | 759560 | 759570 | 759580 | | 7595100 | | | | | | +0.054 +0.024 | 7510 | 75 |
| 80 | +0.060 +0.030 | 96 | +0.035 +0.013 | | | | 809640 | 809650 | 809660 | 809670 | 809680 | | 8096100 | 8096120 | | | | | +0.054 +0.024 | 8010 | 80 |
| 80 | +0.060 +0.030 | 100 | +0.035 +0.013 | | | | 8010040 | 8010050 | 8010060 | 8010070 | 8010080 | | 80100100 | 80100120 | | 80100140 | | | +0.054 +0.024 | 8010 | 80 |
| 85 | +0.071 +0.036 | 100 | +0.035 +0.013 | | | | | | 8510060 | | 8510080 | | | | | | | | +0.065 +0.030 | 9010★ | 85 |
| 90 | +0.071 +0.036 | 110 | +0.035 +0.013 | | | | | 9011050 | 9011060 | | 9011080 | 9011090 | 90110100 | 90110120 | | | | | +0.065 +0.030 | 9010 | 90 |
| 100 | +0.071 +0.036 | 120 | +0.035 +0.013 | | | | | 10012050 | 10012060 | 10012070 | 10012080 | 10012090 | 100120100 | 100120120 | | 100120140 | | | +0.065 +0.030 | 10010 | 100 |
| 110 | +0.071 +0.036 | 130 | +0.040 +0.015 | | | | | 11013050 | | 11013070 | 11013080 | | 110130100 | 110130120 | | | | | +0.064 +0.029 | 12010★ | 110 |
| 120 | +0.071 +0.036 | 140 | +0.040 +0.015 | | | | | | | 12014070 | 12014080 | 12014090 | 120140100 | 120140120 | | 120140140 | | | +0.064 +0.029 | 12010 | 120 |
| 125 | +0.083 +0.043 | 145 | +0.040 +0.015 | | | | | | | | | | 125145100 | 125145120 | | | | | +0.076 +0.036 | — | 125 |
| 130 | +0.083 +0.043 | 150 | +0.040 +0.015 | | | | | | | | 13015080 | | 130150100 | | 130150130 | | | | +0.076 +0.036 | — | 130 |
| 140 | +0.083 +0.043 | 160 | +0.040 +0.015 | | | | | | | | | | 140160100 | | | 140160140 | | | +0.076 +0.036 | — | 140 |
| 150 | +0.083 +0.043 | 170 | +0.040 +0.015 | | | | | | | | 15017080 | | 150170100 | | | | 150170150 | | +0.076 +0.036 | — | 150 |
| 160 | +0.083 +0.043 | 180 | +0.040 +0.015 | | | | | | | | 16018080 | | 160180100 | | | | 160180150 | | +0.076 +0.036 | — | 160 |
| 170 | +0.083 +0.043 | 190 | +0.046 +0.017 | | | | | | | | | | ∗170190100 | | | | ∗170190150 | | +0.076 +0.036 | — | 170 |
| 180 | +0.083 +0.043 | 200 | +0.046 +0.017 | | | | | | | | | | ∗180200100 | | | | ∗180200150 | | +0.076 +0.036 | — | 180 |
| 190 | +0.096 +0.050 | 210 | +0.046 +0.017 | | | | | | | | | | ∗190210100 | | | | ∗190210150 | | +0.088 +0.042 | — | 190 |
| 200 | +0.096 +0.050 | 230 | +0.046 +0.017 | | | | | | | | | | | | | | ∗200230150 | ∗200230200 | +0.088 +0.042 | — | 200 |

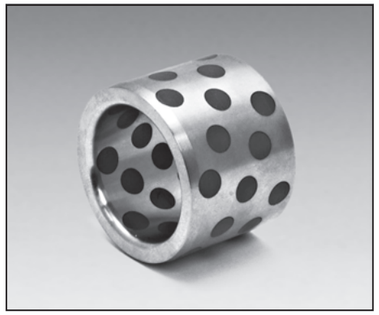
※Part No. with ∗ are custom-made.
※The I.D. tolerance after press fitting is for reference only.
※I.D. ϕ6~ϕ45 are shown on pages 187 to 188.

⚠ The dimensional tolerances are the values measured at +25℃.

# SPBL Oiles 500SP1 SL4 Bushings

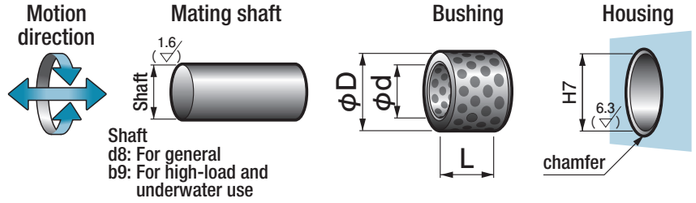
## General • Underwater

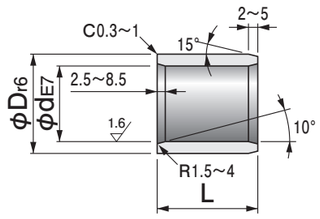
RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 60mm, O.D. is 75mm, and length is 80mm.

**SPBL - 607580**
**Part No.**




- Applicable to rotational, oscillating, and reciprocating motion.
- Be sure to apply grease supplied with the product to the inner sliding surface before assembling the bearing. Run in the bearing.
- May be used over the maximum allowable speed or maximum allowable PV value in short-time intermittent operations. Inquire us in such a case.
- Use a stainless steel or chrome-plated (30μm or more) mating shaft when using the product in water, in a water-splashed place, etc.
- Use a mating shaft made of high-grade stainless steel with higher corrosion resistance or plated with thicker chrome when using the product in severe corrosive conditions. Supply grease for rust prevention.
- Provide the bushing with a set screw when using the product for high loads.
- Usable without the need for lubrication in the air and water. Use lithium grease with extreme pressure additive if greasing is required.

**※Operating Temperature Range: −40～ +80℃ (−40～ +176℉)**

**Solid Lubricant : SL464 (refer to page 36)**

| I.D. | | O.D. | | Length L Tolerance $^{-0.1}_{-0.3}$ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| φd | Tolerance | φD | Tolerance | 20 | 25 | 30 | 35 | 40 | 50 | 60 | 70 | 80 |
| 12 | +0.050 +0.032 | 18 | +0.034 +0.023 | 121820 | | | | | | | | |
| 15 | +0.050 +0.032 | 21 | +0.041 +0.028 | 152120 | | | | | | | | |
| 16 | +0.050 +0.032 | 22 | +0.041 +0.028 | 162220 | | 162230 | | | | | | |
| 18 | +0.050 +0.032 | 24 | +0.041 +0.028 | 182420 | | | | | | | | |
| 20 | +0.061 +0.040 | 30 | +0.041 +0.028 | 203020 | | 203030 | | 203040 | | | | |
| 25 | +0.061 +0.040 | 35 | +0.050 +0.034 | 253520 | 253525 | 253530 | | 253540 | 253550 | | | |
| 30 | +0.061 +0.040 | 40 | +0.050 +0.034 | 304020 | 304025 | 304030 | | 304040 | 304050 | | | |
| 35 | +0.075 +0.050 | 45 | +0.050 +0.034 | 354520 | | 354530 | 354535 | 354540 | 354550 | 354560 | | |
| 40 | +0.075 +0.050 | 50 | +0.050 +0.034 | | | 405030 | | 405040 | 405050 | 405060 | | |
| 40 | +0.075 +0.050 | 55 | +0.060 +0.041 | | | | | 405540 | 405550 | 405560 | | |
| 45 | +0.075 +0.050 | 60 | +0.060 +0.041 | | | 456030 | | | 456050 | 456060 | | |
| 50 | +0.075 +0.050 | 60 | +0.060 +0.041 | | | | | 506040 | 506050 | 506060 | | |
| 50 | +0.075 +0.050 | 65 | +0.060 +0.041 | | | | | 506540 | 506550 | 506560 | 506570 | |
| 55 | +0.090 +0.060 | 70 | +0.062 +0.043 | | | | | 557040 | | 557060 | 557070 | |
| 60 | +0.090 +0.060 | 75 | +0.062 +0.043 | | | | | | 607550 | 607560 | 607570 | 607580 |
| 65 | +0.090 +0.060 | 80 | +0.062 +0.043 | | | | | | | 658060 | 658070 | 658080 |
| 70 | +0.090 +0.060 | 90 | +0.073 +0.051 | | | | | | | 709060 | 709070 | 709080 |
| 75 | +0.090 +0.060 | 95 | +0.073 +0.051 | | | | | | | | 759570 | |
| 80 | +0.090 +0.060 | 100 | +0.073 +0.051 | | | | | | | 8010060 | | 8010080 |
| 90 | +0.107 +0.072 | 110 | +0.076 +0.054 | | | | | | | 9011060 | | 9011080 |
| 100 | +0.107 +0.072 | 120 | +0.076 +0.054 | | | | | | | 10012060 | | 10012080 |
| 110 | +0.107 +0.072 | 130 | +0.088 +0.063 | | | | | | | | | |
| 120 | +0.107 +0.072 | 140 | +0.088 +0.063 | | | | | | | | | 12014080 |
| 130 | +0.125 +0.085 | 150 | +0.090 +0.065 | | | | | | | | | |
| 140 | +0.125 +0.085 | 160 | +0.090 +0.065 | | | | | | | | | |
| 150 | +0.125 +0.085 | 170 | +0.093 +0.068 | | | | | | | | | |
| 160 | +0.125 +0.085 | 180 | +0.093 +0.068 | | | | | | | | | |
| 170 | +0.125 +0.085 | 190 | +0.106 +0.077 | | | | | | | | | |
| 180 | +0.125 +0.085 | 200 | +0.106 +0.077 | | | | | | | | | |
| 190 | +0.146 +0.100 | 210 | +0.109 +0.080 | | | | | | | | | |
| 200 | +0.146 +0.100 | 230 | +0.113 +0.084 | | | | | | | | | |

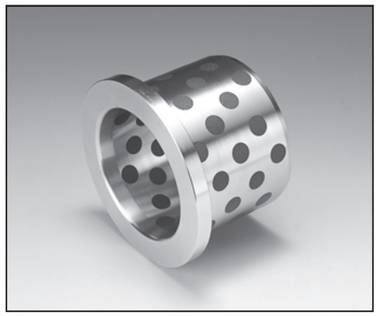
| Length L Tolerance $^{-0.1}_{-0.3}$ | | | | | | | | I.D. tolerance after press fitting (reference) | I.D. |
|---|---|---|---|---|---|---|---|---|---|
| 90 | 100 | 110 | 120 | 130 | 140 | 150 | 200 | | φd |
| | | | | | | | | +0.031 +0.013 | 12 |
| | | | | | | | | +0.026 +0.008 | 15 |
| | | | | | | | | +0.026 +0.008 | 16 |
| | | | | | | | | +0.026 +0.008 | 18 |
| | | | | | | | | +0.037 +0.016 | 20 |
| | | | | | | | | +0.032 +0.011 | 25 |
| | | | | | | | | +0.032 +0.011 | 30 |
| | | | | | | | | +0.046 +0.021 | 35 |
| | | | | | | | | +0.046 +0.021 | 40 |
| | | | | | | | | +0.040 +0.015 | 40 |
| | | | | | | | | +0.040 +0.015 | 45 |
| | | | | | | | | +0.040 +0.015 | 50 |
| | | | | | | | | +0.040 +0.015 | 50 |
| | | | | | | | | +0.053 +0.023 | 55 |
| | | | | | | | | +0.053 +0.023 | 60 |
| | | | | | | | | +0.053 +0.023 | 65 |
| 709090 | 7090100 | | | | | | | +0.046 +0.016 | 70 |
| | 7595100 | | | | | | | +0.046 +0.016 | 75 |
| 8010090 | 80100100 | 80100110 | | | | | | +0.046 +0.016 | 80 |
| 9011090 | 90110100 | | | | | | | +0.060 +0.025 | 90 |
| | 100120100 | | 100120120 | | | | | +0.060 +0.025 | 100 |
| | 110130100 | 110130110 | | | | | | +0.052 +0.017 | 110 |
| | 120140100 | | 120140120 | | | | | +0.052 +0.017 | 120 |
| | 130150100 | | | 130150130 | | 130150150 | | +0.068 +0.028 | 130 |
| | 140160100 | | | | 140160140 | | | +0.068 +0.028 | 140 |
| | 150170100 | | | | | 150170150 | | +0.065 +0.025 | 150 |
| | 160180100 | | | | | 160180150 | | +0.065 +0.025 | 160 |
| | ∗170190100 | | | | | ∗170190150 | | +0.065 +0.025 | 170 |
| | ∗180200100 | | | | | ∗180200150 | | +0.065 +0.025 | 180 |
| | ∗190210100 | | | | | ∗190210150 | | +0.078 +0.032 | 190 |
| | | | | | | ∗200230150 | ∗200230200 | +0.078 +0.032 | 200 |

※Part No. with ∗ are made-to-order.
※The I.D. tolerance after press fitting is for reference only.

⚠ The dimensional tolerances are the values measured at +25℃.

# SPF Oiles 500SP1 SL1 Flange Bushings

RoHS2 ELV Lead Free

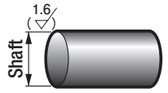


Specify Part No. by required I.D. and Length.
(e.g.) I.D. is 50mm and length is 30mm.

**SPF - 5030**
**Part No.**

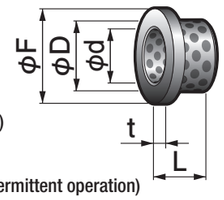
Motion direction

Mating shaft

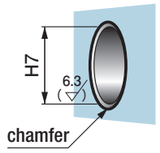


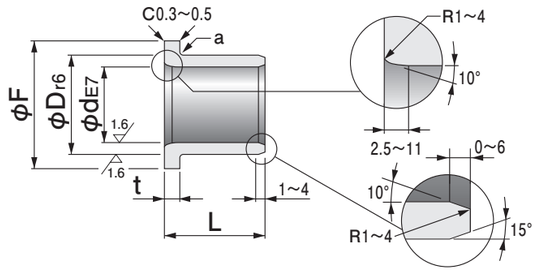

Shaft
d8: For general (high-load)
e7: For general (low-load)
f7: For high accuracy
g6: For high accuracy (intermittent operation)

Flange bushing




Housing




a: Chamfering for under flange

| φd | ~18 | ~65 | ~160 |
|---|---|---|---|
| a | R0.3 | R0.5 | R1 |

(mm)

★ 4 model number of SPF-6040/6050/6080/6367 is R1.

- Applicable to rotational, oscillating, and reciprocating motion.
- Flange surface is not subject to a thrust load as no lubricant is embedded.
- Do not use this under water.
- 31.5mm I.D. and 63mm I.D bushing can be used as an intermediate trunnion bushing for hydraulic cylinders.

| I.D. | | O.D. | | Flange | | | | Length L Tolerance $^{-0.1}_{-0.3}$ | | | | | | | | I.D. tolerance after press fitting (reference) | I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| φd | Tolerance | φD | Tolerance | φF | Tolerance | t | Tolerance | 10 | 12 | 15 | 17 | 18 | 20 | 23 | 25 | | φd |
| 6 | +0.032 +0.020 | 10 | +0.028 +0.019 | 16 | 0 −0.3 | 2 | 0 −0.1 | 0610 | 0612 | | | | | | | +0.016 +0.004 | 6 |
| 8 | +0.040 +0.025 | 12 | +0.034 +0.023 | 20 | 0 −0.3 | 2 | 0 −0.1 | 0810 | 0812 | 0815 | | | | | | +0.021 +0.006 | 8 |
| 10 | +0.040 +0.025 | 14 | +0.034 +0.023 | 22 | 0 −0.3 | 2 | 0 −0.1 | 1010 | 1012 | 1015 | 1017 | | 1020 | | | +0.021 +0.006 | 10 |
| 12 | +0.050 +0.032 | 18 | +0.034 +0.023 | 25 | 0 −0.3 | 3 | 0 −0.1 | 1210 | 1212 | 1215 | | | 1220 | | 1225 | | 12 |
| 13 | +0.050 +0.032 | 19 | +0.041 +0.028 | 26 | 0 −0.3 | 3 | 0 −0.1 | 1310 | 1312 | 1315 | | | 1320 | | 1325 | +0.026 +0.008 | 13 |
| 14 | +0.050 +0.032 | 20 | +0.041 +0.028 | 27 | 0 −0.3 | 3 | 0 −0.1 | | | 1415 | | | 1420 | | 1425 | +0.026 +0.008 | 14 |
| 15 | +0.050 +0.032 | 21 | +0.041 +0.028 | 28 | 0 −0.3 | 3 | 0 −0.1 | 1510 | 1512 | 1515 | | | 1520 | | 1525 | +0.026 +0.008 | 15 |
| 16 | +0.050 +0.032 | 22 | +0.041 +0.028 | 29 | 0 −0.3 | 3 | 0 −0.1 | | 1612 | 1615 | | 1618 | 1620 | 1623 | 1625 | +0.026 +0.008 | 16 |
| 18 | +0.050 +0.032 | 24 | +0.041 +0.028 | 32 | 0 −0.3 | 3 | 0 −0.1 | | | 1815 | | | 1820 | | 1825 | +0.026 +0.008 | 18 |
| 20 | +0.061 +0.040 | 30 | +0.041 +0.028 | 40 | 0 −0.3 | 5 | 0 −0.1 | | | 2015 | | | 2020 | | 2025 | +0.037 +0.016 | 20 |
| 25 | +0.061 +0.040 | 35 | +0.050 +0.034 | 45 | 0 −0.3 | 5 | 0 −0.1 | | | 2515 | | | 2520 | | 2525 | +0.032 +0.011 | 25 |
| 30 | +0.061 +0.040 | 40 | +0.050 +0.034 | 50 | 0 −0.3 | 5 | 0 −0.1 | | | | | | 3020 | | 3025 | +0.032 +0.011 | 30 |
| 31.5 | +0.075 +0.050 | 40 | +0.050 +0.034 | 50 | 0 −0.3 | 5 | 0 −0.1 | | | | | | 3120 | | | +0.046 +0.021 | 31.5 |
| 35 | +0.075 +0.050 | 45 | +0.050 +0.034 | 60 | 0 −0.3 | 5 | 0 −0.1 | | | | | | 3520 | | 3525 | +0.046 +0.021 | 35 |
| 40 | +0.075 +0.050 | 50 | +0.050 +0.034 | 65 | 0 −0.3 | 5 | 0 −0.1 | | | | | | 4020 | | 4025 | +0.046 +0.021 | 40 |
| 45 | +0.075 +0.050 | 55 | +0.060 +0.041 | 70 | 0 −0.3 | 5 | 0 −0.1 | | | | | | | | | +0.040 +0.015 | 45 |
| 50 | +0.075 +0.050 | 60 | +0.060 +0.041 | 75 | 0 −0.3 | 5 | 0 −0.1 | | | | | | | | | +0.040 +0.015 | 50 |
| 55 | +0.090 +0.060 | 65 | +0.060 +0.041 | 80 | 0 −0.3 | 5 | 0 −0.1 | | | | | | | | | +0.055 +0.025 | 55 |
| 60 | +0.090 +0.060 | 75 | +0.062 +0.043 | 90 | 0 −0.3 | 7.5 | 0 −0.1 | | | | | | | | | +0.053 +0.023 | 60 |
| 63 | +0.090 +0.060 | 75 | +0.062 +0.043 | 85 | 0 −0.3 | 7.5 | 0 −0.1 | | | | | | | | | +0.053 +0.023 | 63 |
| 65 | +0.090 +0.060 | 80 | +0.062 +0.043 | 95 | 0 −0.3 | 7.5 | 0 −0.1 | | | | | | | | | +0.053 +0.023 | 65 |
| 70 | +0.090 +0.060 | 85 | +0.073 +0.051 | 105 | 0 −0.3 | 7.5 | 0 −0.1 | | | | | | | | | +0.046 +0.016 | 70 |
| 75 | +0.090 +0.060 | 90 | +0.073 +0.051 | 110 | 0 −0.3 | 7.5 | 0 −0.1 | | | | | | | | | +0.046 +0.016 | 75 |
| 80 | +0.090 +0.060 | 100 | +0.073 +0.051 | 120 | 0 −0.3 | 10 | 0 −0.1 | | | | | | | | | +0.046 +0.016 | 80 |
| 90 | +0.107 +0.072 | 110 | +0.076 +0.054 | 130 | 0 −0.3 | 10 | 0 −0.1 | | | | | | | | | +0.060 +0.025 | 90 |
| 100 | +0.107 +0.072 | 120 | +0.076 +0.054 | 150 | 0 −0.3 | 10 | 0 −0.1 | | | | | | | | | +0.060 +0.025 | 100 |
| 120 | +0.107 +0.072 | 140 | +0.088 +0.063 | 170 | 0 −0.3 | 10 | 0 −0.1 | | | | | | | | | +0.052 +0.017 | 120 |
| 130 | +0.125 +0.085 | 150 | +0.090 +0.065 | 180 | 0 −0.3 | 10 | 0 −0.1 | | | | | | | | | +0.068 +0.028 | 130 |
| 140 | +0.125 +0.085 | 160 | +0.090 +0.065 | 190 | 0 −0.3 | 10 | 0 −0.1 | | | | | | | | | +0.068 +0.028 | 140 |
| 150 | +0.125 +0.085 | 170 | +0.093 +0.068 | 200 | 0 −0.3 | 10 | 0 −0.1 | | | | | | | | | +0.065 +0.025 | 150 |
| 160 | +0.125 +0.085 | 180 | +0.093 +0.068 | 210 | 0 −0.3 | 10 | 0 −0.1 | | | | | | | | | +0.065 +0.025 | 160 |

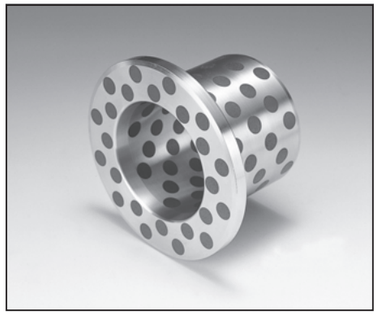
| Length L Tolerance $^{-0.1}_{-0.3}$ | | | | | | | | | I.D. tolerance after press fitting (reference) | I.D. |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | 35 | 40 | 50 | 60 | 67.5 | 80 | 100 | 120 | | φd |
| | | | | | | | | | +0.016 +0.004 | 6 |
| | | | | | | | | | +0.021 +0.006 | 8 |
| | | | | | | | | | +0.021 +0.006 | 10 |
| 1230 | | | | | | | | | +0.031 +0.013 | 12 |
| 1330 | | | | | | | | | +0.026 +0.008 | 13 |
| | | | | | | | | | +0.026 +0.008 | 14 |
| 1530 | | | | | | | | | +0.026 +0.008 | 15 |
| 1630 | 1635 | 1640 | | | | | | | +0.026 +0.008 | 16 |
| 1830 | 1835 | 1840 | | | | | | | +0.026 +0.008 | 18 |
| 2030 | 2035 | 2040 | | | | | | | +0.037 +0.016 | 20 |
| 2530 | 2535 | 2540 | 2550 | | | | | | +0.032 +0.011 | 25 |
| 3030 | 3035 | 3040 | 3050 | | | | | | +0.032 +0.011 | 30 |
| 3130 | 3135 | 3140 | | | | | | | +0.046 +0.021 | 31.5 |
| 3530 | 3535 | 3540 | 3550 | | | | | | +0.046 +0.021 | 35 |
| 4030 | 4035 | 4040 | 4050 | | | | | | +0.046 +0.021 | 40 |
| 4530 | 4535 | 4540 | 4550 | 4560 | | | | | +0.040 +0.015 | 45 |
| 5030 | 5035 | 5040 | 5050 | 5060 | | | | | +0.040 +0.015 | 50 |
| | | 5540 | | 5560 | | | | | +0.055 +0.025 | 55 |
| | | ★6040 | ★6050 | 6060 | | ★6080 | | | +0.053 +0.023 | 60 |
| | | | | | ★6367 | | | | +0.053 +0.023 | 63 |
| | | | | 6560 | | | | | +0.053 +0.023 | 65 |
| | | | 7050 | | | 7080 | | | +0.046 +0.016 | 70 |
| | | | | 7560 | | | | | +0.046 +0.016 | 75 |
| | | | | 8060 | | 8080 | 80100 | | +0.046 +0.016 | 80 |
| | | | | 9060 | | 9080 | | | +0.060 +0.025 | 90 |
| | | | | | | 10080 | 100100 | | +0.060 +0.025 | 100 |
| | | | | | | 12080 | 120100 | | +0.052 +0.017 | 120 |
| | | | | | | ∗13080 | ∗130100 | | +0.068 +0.028 | 130 |
| | | | | | | ∗14080 | ∗140100 | | +0.068 +0.028 | 140 |
| | | | | | | | ∗150100 | ∗150120 | +0.065 +0.025 | 150 |
| | | | | | | | ∗160100 | ∗160120 | +0.065 +0.025 | 160 |

※Part No. with ∗ are made-to-order.
※The I.D. tolerance after press fitting is for reference only.

⚠ The dimensional tolerances are the values measured at +25℃.

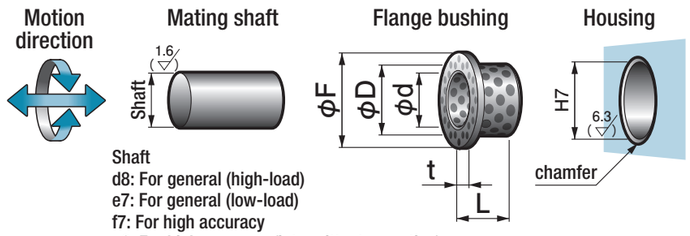
# SPFG Oiles 500SP1 SL1 Thrust Bushings

RoHS2 ELV Lead Free

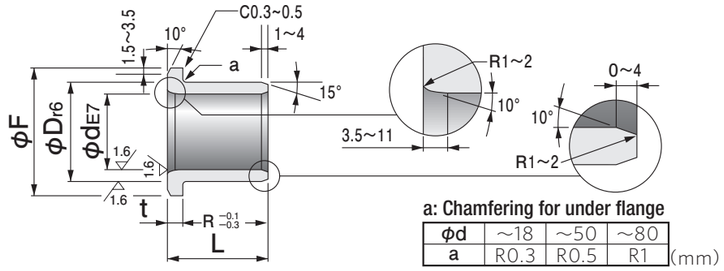


Specify Part No. by required I.D. and Length.
(e.g.) I.D. is 35mm and length is 25mm.

**SPFG - 3525**
**Part No.**




Shaft
d8: For general (high-load)
e7: For general (low-load)
f7: For high accuracy
g6: For high accuracy (intermittent operation)




a: Chamfering for under flange

| ϕd | ~18 | ~50 | ~80 |
|---|---|---|---|
| a | R0.3 | R0.5 | R1 |

(mm)

- Applicable to rotational, oscillating, and reciprocating motion.
- This bushing can be subject to both radial-journal and thrust load.
- Improve machining by more accurate flange thickness.

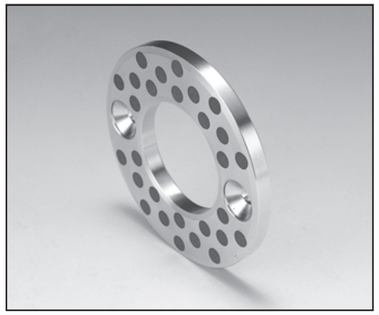
| I.D. | | O.D. | | Flange | | | | Length L | | | | | | | | | | | | I.D. tolerance after press fitting (reference) | I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ϕd | Tolerance | ϕD | Tolerance | ϕF | Tolerance | t | Tolerance | 11 | 13 | 18 | 20 | 23 | 25 | 27 | 35 | 37 | 38 | 47 | 48 | 50 | 58 | 60 | 68 | 80 | 90 | | ϕd |
| 6 | +0.032 +0.020 | 10 | +0.028 +0.019 | 20 | 0 −0.3 | 3 | 0 −0.03 | **0611** | | | | | | | | | | | | | | | | | | +0.016 +0.004 | 6 |
| 8 | +0.040 +0.025 | 12 | +0.034 +0.023 | 25 | 0 −0.3 | 3 | 0 −0.03 | | **0813** | | | | | | | | | | | | | | | | | +0.021 +0.006 | 8 |
| 10 | +0.040 +0.025 | 14 | +0.034 +0.023 | 25 | 0 −0.3 | 3 | 0 −0.03 | | **1013** | **1018** | | | | | | | | | | | | | | | | +0.021 +0.006 | 10 |
| 12 | +0.050 +0.032 | 18 | +0.034 +0.023 | 30 | 0 −0.3 | 3 | 0 −0.03 | **1211** | | **1218** | | **1223** | | | | | | | | | | | | | | +0.031 +0.013 | 12 |
| 13 | +0.050 +0.032 | 19 | +0.041 +0.028 | 30 | 0 −0.3 | 3 | 0 −0.03 | | **1313** | **1318** | | **1323** | | | | | | | | | | | | | | +0.026 +0.008 | 13 |
| 15 | +0.050 +0.032 | 21 | +0.041 +0.028 | 35 | 0 −0.3 | 3 | 0 −0.03 | | **1513** | **1518** | | **1523** | | | | | | | | | | | | | | +0.026 +0.008 | 15 |
| 16 | +0.050 +0.032 | 22 | +0.041 +0.028 | 35 | 0 −0.3 | 3 | 0 −0.03 | | **1613** | **1618** | | **1623** | | | | | | | | | | | | | | +0.026 +0.008 | 16 |
| 18 | +0.050 +0.032 | 24 | +0.041 +0.028 | 40 | 0 −0.3 | 3 | 0 −0.03 | | | **1818** | | **1823** | | | | | | | | | | | | | | +0.026 +0.008 | 18 |
| 20 | +0.061 +0.040 | 28 | +0.041 +0.028 | 45 | 0 −0.3 | 5 | 0 −0.03 | | | | **2020** | | **2025** | | | | | | | | | | | | | +0.037 +0.016 | 20 |
| 25 | +0.061 +0.040 | 33 | +0.050 +0.034 | 50 | 0 −0.3 | 5 | 0 −0.03 | | | | **2520** | | **2525** | | | | | | | | | | | | | +0.032 +0.011 | 25 |
| 30 | +0.061 +0.040 | 38 | +0.050 +0.034 | 55 | 0 −0.3 | 5 | 0 −0.03 | | | | **3020** | | **3025** | | **3035** | | | | | | | | | | | +0.032 +0.011 | 30 |
| 35 | +0.075 +0.050 | 44 | +0.050 +0.034 | 65 | 0 −0.3 | 5 | 0 −0.03 | | | | **3520** | | **3525** | | **3535** | | | | | | | | | | | +0.046 +0.021 | 35 |
| 40 | +0.075 +0.050 | 50 | +0.050 +0.034 | 70 | 0 −0.3 | 7 | 0 −0.03 | | | | | | | **4027** | | **4037** | | **4047** | | | | | | | | +0.046 +0.021 | 40 |
| 50 | +0.075 +0.050 | 62 | +0.060 +0.041 | 90 | 0 −0.3 | 8 | 0 −0.04 | | | | | | | | | | **5038** | | **5048** | | **5058** | | | | | +0.040 +0.015 | 50 |
| 60 | +0.090 +0.060 | 74 | +0.062 +0.043 | 110 | 0 −0.3 | 8 | 0 −0.04 | | | | | | | | | | **6038** | | **6048** | | **6058** | | **6068** | | | +0.053 +0.023 | 60 |
| 70 | +0.090 +0.060 | 85 | +0.073 +0.051 | 120 | 0 −0.3 | 10 | 0 −0.04 | | | | | | | | | | | | | **7050** | | | | **7080** | | +0.046 +0.016 | 70 |
| 80 | +0.090 +0.060 | 96 | +0.073 +0.051 | 140 | 0 −0.3 | 10 | 0 −0.04 | | | | | | | | | | | | | | | **8060** | | | **8090** | +0.046 +0.016 | 80 |

※The I.D. tolerance after press fitting is for reference only.

⚠ The dimensional tolerances are the values measured at +25℃.

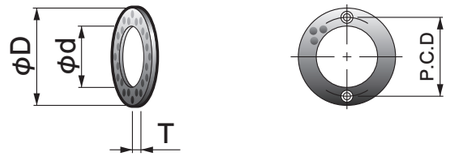
# SPW Oiles 500SP1 SL1 Thrust Washers

RoHS2 ELV Lead Free



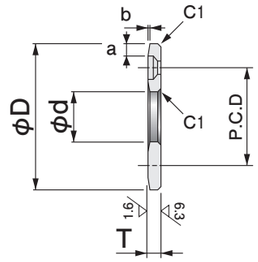
Specify Part No. by required I.D. and thickness.
(e.g.) I.D. is 30.2mm and thickness is 5mm.

**SPW - 3005**
**Part No.**

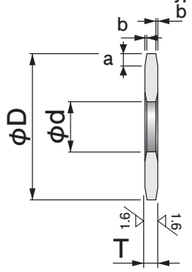



- May be combined with the SPB.
- See the description of the SPB for combination. (Pages 187 to 190)
- The products with the N marks at the end of the part numbers have no mounting holes.

Countersink type




No hole type




a b: Chamfering for I.D. and O.D.

| ϕd | ~10.2 | ~18.2 | ~35.2 | ~45.2 | ~55.3 | ~100.5 | 120.5 |
|---|---|---|---|---|---|---|---|
| a | 1.5 | 2 | 2.5 | 3 | 4 | 5 | 4 |
| b | 0.3 | 0.4 | 0.4 | 0.5 | 0.6 | 0.8 | 0.8 |

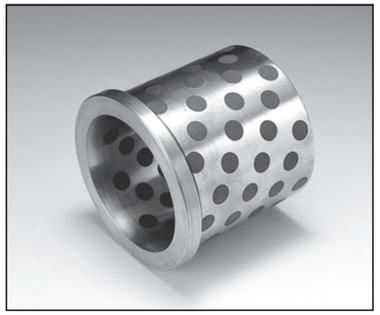
(mm)

| Part No. | I.D. | | O.D. | Thickness | | Mounting hole | | |
|---|---|---|---|---|---|---|---|---|
| | ϕd | Tolerance | ϕD | T | Tolerance | P.C.D | No. of holes | Countersink screw size |
| SPW-0603 | 6.2 | +0.2 +0.1 | 25 | 3 | 0 −0.1 | 15 | 2 | M3 |
| SPW-0803 | 8.2 | +0.2 +0.1 | 28 | 3 | 0 −0.1 | 18 | 2 | M3 |
| SPW-1003 | 10.2 | +0.2 +0.1 | 30 | 3 | 0 −0.1 | 20 | 2 | M3 |
| SPW-1203 | 12.2 | +0.2 +0.1 | 40 | 3 | 0 −0.1 | 28 | 2 | M3 |
| SPW-1203N | 12.2 | +0.2 +0.1 | 40 | 3 | 0 −0.1 | no hole | | |
| SPW-1303 | 13.2 | +0.2 +0.1 | 40 | 3 | 0 −0.1 | 28 | 2 | M3 |
| SPW-1403 | 14.2 | +0.2 +0.1 | 40 | 3 | 0 −0.1 | 28 | 2 | M3 |
| SPW-1503 | 15.2 | +0.2 +0.1 | 50 | 3 | 0 −0.1 | 35 | 2 | M3 |
| SPW-1603 | 16.2 | +0.2 +0.1 | 50 | 3 | 0 −0.1 | 35 | 2 | M3 |
| SPW-1603N | 16.2 | +0.2 +0.1 | 50 | 3 | 0 −0.1 | no hole | | |
| SPW-1803 | 18.2 | +0.2 +0.1 | 50 | 3 | 0 −0.1 | 35 | 2 | M3 |
| SPW-2005 | 20.2 | +0.2 +0.1 | 50 | 5 | 0 −0.1 | 35 | 2 | M5 |
| SPW-2505 | 25.2 | +0.2 +0.1 | 55 | 5 | 0 −0.1 | 40 | 2 | M5 |
| SPW-2505N | 25.2 | +0.2 +0.1 | 55 | 5 | 0 −0.1 | no hole | | |
| SPW-3005 | 30.2 | +0.2 +0.1 | 60 | 5 | 0 −0.1 | 45 | 2 | M5 |
| SPW-3005N | 30.2 | +0.2 +0.1 | 60 | 5 | 0 −0.1 | no hole | | |
| SPW-3505 | 35.2 | +0.2 +0.1 | 70 | 5 | 0 −0.1 | 50 | 2 | M5 |

| Part No. | I.D. | | O.D. | Thickness | | Mounting hole | | |
|---|---|---|---|---|---|---|---|---|
| | ϕd | Tolerance | ϕD | T | Tolerance | P.C.D | No. of holes | Countersink screw size |
| SPW-4007 | 40.2 | +0.2 +0.1 | 80 | 7 | 0 −0.1 | 60 | 2 | M6 |
| SPW-4507 | 45.2 | +0.2 +0.1 | 90 | 7 | 0 −0.1 | 70 | 2 | M6 |
| SPW-5008 | 50.3 | +0.3 +0.1 | 100 | 8 | 0 −0.1 | 75 | 4 | M6 |
| SPW-5508 | 55.3 | +0.3 +0.1 | 110 | 8 | 0 −0.1 | 85 | 4 | M6 |
| SPW-6008 | 60.3 | +0.3 +0.1 | 120 | 8 | 0 −0.1 | 90 | 4 | M8 |
| SPW-6508 | 65.3 | +0.3 +0.1 | 125 | 8 | 0 −0.1 | 95 | 4 | M8 |
| SPW-7010 | 70.3 | +0.3 +0.1 | 130 | 10 | 0 −0.1 | 100 | 4 | M8 |
| SPW-7510 | 75.3 | +0.3 +0.1 | 140 | 10 | 0 −0.1 | 110 | 4 | M8 |
| SPW-8010 | 80.3 | +0.3 +0.1 | 150 | 10 | 0 −0.1 | 120 | 4 | M8 |
| SPW-9010 | 90.5 | +0.3 +0.1 | 170 | 10 | 0 −0.1 | 140 | 4 | M10 |
| SPW-10010 | 100.5 | +0.3 +0.1 | 190 | 10 | 0 −0.1 | 160 | 4 | M10 |
| SPW-12010 | 120.5 | +0.3 +0.1 | 200 | 10 | 0 −0.1 | 175 | 4 | M10 |

# SGF Oiles 500SP1 SL1 Flange Guide Bushings

RoHS2 ELV Lead Free

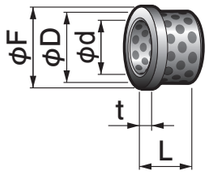


Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 65mm, O.D. is 80mm, and length is 80mm.

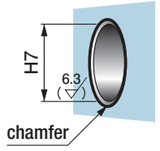
**SGF - 658080**
**Part No.**

Motion direction

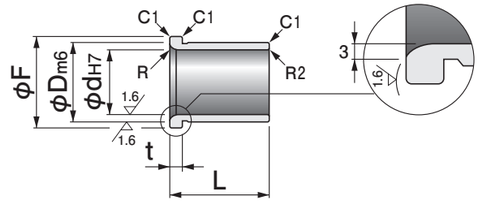
Flange bushing




Housing




- Applicable to rotation, oscillation, and reciprocating motion.
- It is recommended to use a set screw to prevent dislocation.



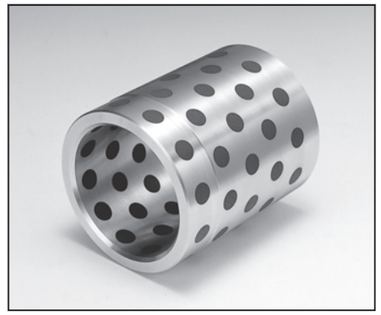

| Part No. | I.D. | | O.D. | | Flnage | | Length | | R |
|---|---|---|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | φF | t | L | Tolerance | |
| SGF-253540 | 25 | +0.021 0 | 35 | +0.025 +0.009 | 45 | 7 | 40 | 0 −0.3 | 10 |
| SGF-304050 | 30 | +0.021 0 | 40 | +0.025 +0.009 | 50 | 10 | 50 | 0 −0.3 | 20 |
| SGF-405570 | 40 | +0.025 0 | 55 | +0.030 +0.011 | 65 | 10 | 70 | 0 −0.3 | 20 |
| SGF-506580 | 50 | +0.025 0 | 65 | +0.030 +0.011 | 75 | 10 | 80 | 0 −0.3 | 20 |
| SGF-607580 | 60 | +0.030 0 | 75 | +0.030 +0.011 | 85 | 10 | 80 | 0 −0.3 | 20 |
| SGF-658080 | 65 | +0.030 0 | 80 | +0.030 +0.011 | 90 | 10 | 80 | 0 −0.3 | 20 |
| SGF-6580120 | 65 | +0.030 0 | 80 | +0.030 +0.011 | 90 | 10 | 120 | 0 −0.3 | 20 |
| SGF-80100100 | 80 | +0.030 0 | 100 | +0.035 +0.013 | 110 | 10 | 100 | 0 −0.3 | 20 |
| SGF-80100140 | 80 | +0.030 0 | 100 | +0.035 +0.013 | 110 | 10 | 140 | 0 −0.3 | 20 |
| SGF-100120100 | 100 | +0.035 0 | 120 | +0.035 +0.013 | 130 | 10 | 100 | 0 −0.3 | 20 |
| SGF-100120140 | 100 | +0.035 0 | 120 | +0.035 +0.013 | 130 | 10 | 140 | 0 −0.3 | 20 |

⚠ The dimensional tolerances are the values measured at +25℃.



# SGB Oiles 500SP1 SL1 Guide Bushings

RoHS2 ELV Lead Free

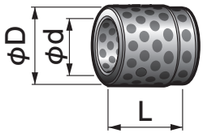


Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 60mm, O.D. is 80mm, and length is 90mm.

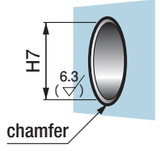
**SGB - 608090**
**Part No.**

Motion direction

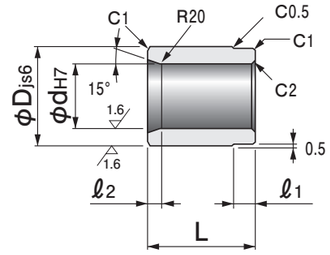
Bushing




Housing




- Applicable to reciprocating motion.
- It is recommended to use a set screw to prevent dislocation.

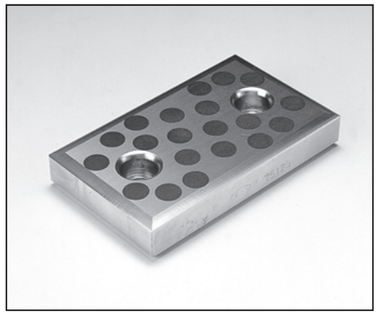



| Part No. | I.D. | | O.D. | | Length | | ℓ1 | ℓ2 |
|---|---|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | L | Tolerance | | |
| SGB-254040 | 25 | +0.021 0 | 40 | ±0.008 | 40 | 0 −0.2 | 10 | 5 |
| SGB-305050 | 30 | +0.021 0 | 50 | ±0.008 | 50 | 0 −0.2 | 10 | 5 |
| SGB-356055 | 35 | +0.025 0 | 60 | ±0.0095 | 55 | 0 −0.2 | 15 | 5 |
| SGB-406060 | 40 | +0.025 0 | 60 | ±0.0095 | 60 | 0 −0.2 | 10 | 5 |
| SGB-507075 | 50 | +0.025 0 | 70 | ±0.0095 | 75 | 0 −0.2 | 15 | 10 |
| SGB-608090 | 60 | +0.030 0 | 80 | ±0.0095 | 90 | 0 −0.2 | 20 | 10 |
| SGB-80100120 | 80 | +0.030 0 | 100 | ±0.011 | 120 | 0 −0.2 | 25 | 10 |
| SGB-100120150 | 100 | +0.035 0 | 120 | ±0.011 | 150 | 0 −0.2 | 25 | 10 |
| SGB-120140180 | 120 | +0.035 0 | 140 | ±0.0125 | 180 | 0 −0.2 | 25 | 10 |

⚠ The dimensional tolerances are the values measured at +25℃.

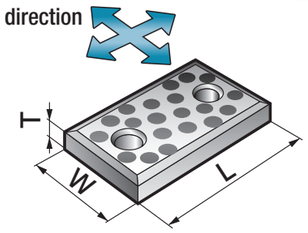
# SWP Oiles 500SP1 SL1 Wear Plates

RoHS2 ELV Lead Free

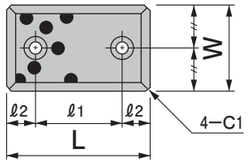


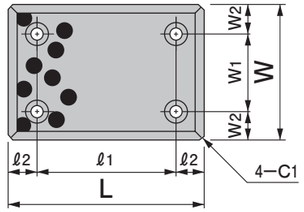
Specify Part No. by required width and length.
(e.g.) Width is 75mm and length is 200mm. **SWP - 75200**
**Part No.**

Motion direction

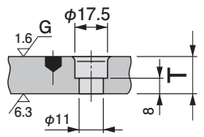



● Motion direction: width and length direction



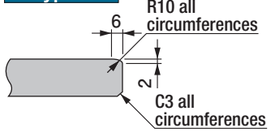




## Cross-section

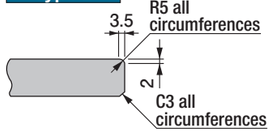



## Chamfering

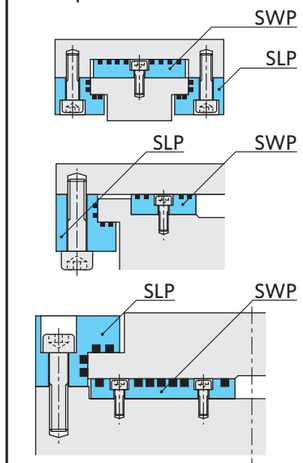
**Type A**




**Type B**



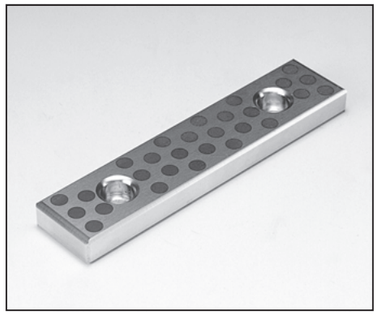

■ Example of combination use with SLP.



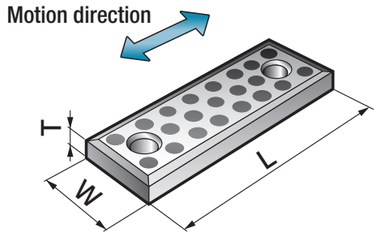

| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | | | | Attach bolts | | Chamfering |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | $W_1$ | Tolerance | $W_2$ | $\ell_1$ | Tolerance | $\ell_2$ | Type | Qty | |
| SWP-4875 | 48 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.025 | — | — | — | 45 | ±0.2 | 15 | M10 Hexagon socket head | 2 | B |
| SWP-48100 | 48 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.025 | — | — | — | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| SWP-48125 | 48 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.025 | — | — | — | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| SWP-48150 | 48 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.025 | — | — | — | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| SWP-7575B | 75 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.025 | — | — | — | 25 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| SWP-75100B | 75 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.025 | — | — | — | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| SWP-75125 | 75 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.025 | — | — | — | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| SWP-75150 | 75 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.025 | — | — | — | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| SWP-75200 | 75 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.025 | — | — | — | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| SWP-100100 | 100 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.025 | 50 | ±0.2 | 25 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| SWP-100125 | 100 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.025 | 50 | ±0.2 | 25 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| SWP-100150 | 100 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.025 | 50 | ±0.2 | 25 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| SWP-100200 | 100 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.025 | 50 | ±0.2 | 25 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| SWP-100250 | 100 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.025 | 50 | ±0.2 | 25 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| SWP-125150 | 125 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.025 | 50 | ±0.2 | 37.5 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| SWP-125200 | 125 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.025 | 50 | ±0.2 | 37.5 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| SWP-125250 | 125 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.025 | 50 | ±0.2 | 37.5 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| SWP-150150 | 150 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.025 | 100 | ±0.2 | 25 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| SWP-150200 | 150 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.025 | 100 | ±0.2 | 25 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| SWP-150250 | 150 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.025 | 100 | ±0.2 | 25 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |

# SFP Oiles 500SP1 SL1 Flat Plates

RoHS2 ELV Lead Free

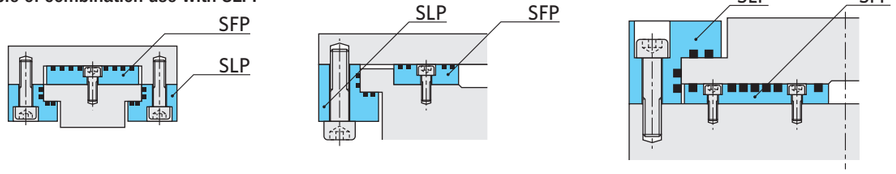


Specify Part No. by required width and length.
(e.g.) Width is 28mm and length is 150mm. **SFP - 28150**
**Part No.**

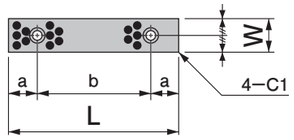


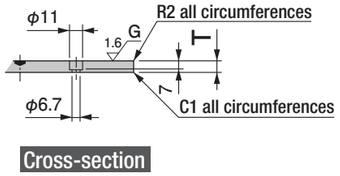

● Motion direction: length direction

■ Example of combination use with SLP.




W=18、28、38、48

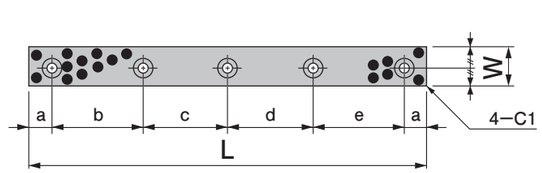


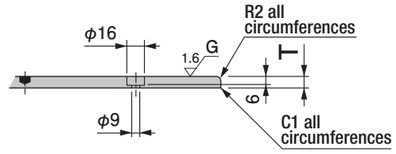




Cross-section

| Part No. | Width | Length | Thickness | | Hole intervals | | Attach bolts | |
|---|---|---|---|---|---|---|---|---|
| | W | L | T | Toleramce | a | b | Type | Qty |
| SFP-1875 | 18 | 75 | 10 | +0.04 +0.01 | 15 | 45 | M6 Hexagon socket head | 2 |
| SFP-18100 | 18 | 100 | 10 | +0.04 +0.01 | 25 | 50 | M6 Hexagon socket head | 2 |
| SFP-18125 | 18 | 125 | 10 | +0.04 +0.01 | 25 | 75 | M6 Hexagon socket head | 2 |
| SFP-18150 | 18 | 150 | 10 | +0.04 +0.01 | 25 | 100 | M6 Hexagon socket head | 2 |
| SFP-2875 | 28 | 75 | 10 | +0.04 +0.01 | 15 | 45 | M6 Hexagon socket head | 2 |
| SFP-28100 | 28 | 100 | 10 | +0.04 +0.01 | 25 | 50 | M6 Hexagon socket head | 2 |
| SFP-28125 | 28 | 125 | 10 | +0.04 +0.01 | 25 | 75 | M6 Hexagon socket head | 2 |
| SFP-28150 | 28 | 150 | 10 | +0.04 +0.01 | 25 | 100 | M6 Hexagon socket head | 2 |
| SFP-3875 | 38 | 75 | 10 | +0.04 +0.01 | 15 | 45 | M6 Hexagon socket head | 2 |
| SFP-38100 | 38 | 100 | 10 | +0.04 +0.01 | 25 | 50 | M6 Hexagon socket head | 2 |
| SFP-38125 | 38 | 125 | 10 | +0.04 +0.01 | 25 | 75 | M6 Hexagon socket head | 2 |
| SFP-38150 | 38 | 150 | 10 | +0.04 +0.01 | 25 | 100 | M6 Hexagon socket head | 2 |
| SFP-4875 | 48 | 75 | 10 | +0.04 +0.01 | 15 | 45 | M6 Hexagon socket head | 2 |
| SFP-48100 | 48 | 100 | 10 | +0.04 +0.01 | 25 | 50 | M6 Hexagon socket head | 2 |
| SFP-48125 | 48 | 125 | 10 | +0.04 +0.01 | 25 | 75 | M6 Hexagon socket head | 2 |
| SFP-48150 | 48 | 150 | 10 | +0.04 +0.01 | 25 | 100 | M6 Hexagon socket head | 2 |

W=35、50

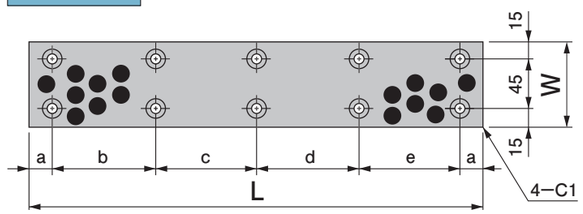


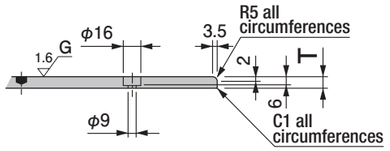




Cross-section

| Part No. | Width | Length | Thickness | | Hole intervals | | | | | Attach bolts | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | L | T | Toleramce | a | b | c | d | e | Type | Qty |
| SFP-35100 | 35 | 100 | 10 | ±0.025 | 20 | 60 | — | — | — | M8 Flat head | 2 |
| SFP-35150 | 35 | 150 | 10 | ±0.025 | 20 | 55 | 55 | — | — | M8 Flat head | 3 |
| SFP-35200 | 35 | 200 | 10 | ±0.025 | 20 | 55 | 50 | 55 | — | M8 Flat head | 4 |
| SFP-35250 | 35 | 250 | 10 | ±0.025 | 20 | 70 | 70 | 70 | — | M8 Flat head | 4 |
| SFP-35300 | 35 | 300 | 10 | ±0.025 | 20 | 65 | 65 | 65 | 65 | M8 Flat head | 5 |
| SFP-35350 | 35 | 350 | 10 | ±0.025 | 20 | 80 | 75 | 75 | 80 | M8 Flat head | 5 |
| SFP-50100 | 50 | 100 | 10 | ±0.025 | 20 | 60 | — | — | — | M8 Flat head | 2 |
| SFP-50150 | 50 | 150 | 10 | ±0.025 | 20 | 55 | 55 | — | — | M8 Flat head | 3 |
| SFP-50200 | 50 | 200 | 10 | ±0.025 | 20 | 55 | 50 | 55 | — | M8 Flat head | 4 |
| SFP-50250 | 50 | 250 | 10 | ±0.025 | 20 | 70 | 70 | 70 | — | M8 Flat head | 4 |
| SFP-50300 | 50 | 300 | 10 | ±0.025 | 20 | 65 | 65 | 65 | 65 | M8 Flat head | 5 |
| SFP-50400 | 50 | 400 | 10 | ±0.025 | 20 | 90 | 90 | 90 | 90 | M8 Flat head | 5 |

W=75



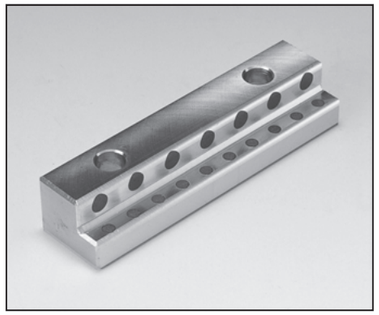




Cross-section

| Part No. | Width | Length | Thickness | | Hole intervals | | | | | Attach bolts | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | L | T | Toleramce | a | b | c | d | e | Type | Qty |
| SFP-75150 | 75 | 150 | 10 | ±0.025 | 20 | 110 | — | — | — | M8 Flat head | 4 |
| SFP-75200 | 75 | 200 | 10 | ±0.025 | 20 | 80 | 80 | — | — | M8 Flat head | 6 |
| SFP-75250 | 75 | 250 | 10 | ±0.025 | 20 | 105 | 105 | — | — | M8 Flat head | 6 |
| SFP-75300 | 75 | 300 | 10 | ±0.025 | 20 | 85 | 90 | 85 | — | M8 Flat head | 8 |
| SFP-75400 | 75 | 400 | 10 | ±0.025 | 20 | 120 | 120 | 120 | — | M8 Flat head | 8 |
| SFP-75500 | 75 | 500 | 10 | ±0.025 | 20 | 115 | 115 | 115 | 115 | M8 Flat head | 10 |

# SLP Oiles 500SP1 SL1 L Type Plates

RoHS2 ELV Lead Free

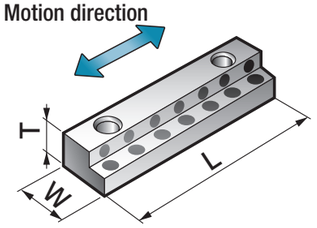


● Motion direction: length direction

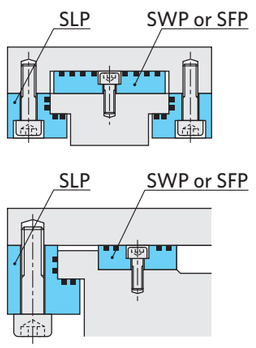
Specify Part No. by required width and length.
(e.g.) Width is 50mm and length is 300mm.

**SLP - 50300A**
**Part No.**

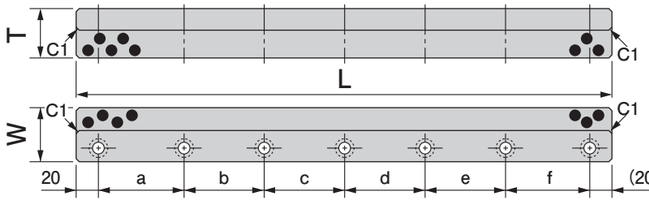
Motion direction

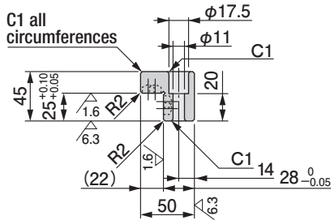



■ Example of combination use with SWP or SFP.



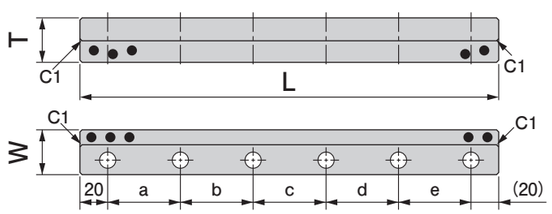

● Hexagonal socket head bolts are fitted.

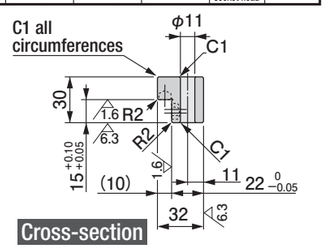



Cross-section

| Part No. | Width | Length | Thickness | Hole intervals | | | | | | Attach bolts | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | L | T | a | b | c | d | e | f | Type | Qty |
| SLP-50200A | 50 | 200 | 45 | 55 | 50 | 55 | — | — | — | M10 Hexagon socket head | 4 |
| SLP-50250A | 50 | 250 | 45 | 70 | 70 | 70 | — | — | — | M10 Hexagon socket head | 4 |
| SLP-50300A | 50 | 300 | 45 | 65 | 65 | 65 | 65 | — | — | M10 Hexagon socket head | 5 |
| SLP-50350A | 50 | 350 | 45 | 80 | 75 | 75 | 80 | — | — | M10 Hexagon socket head | 5 |
| SLP-50500A | 50 | 500 | 45 | 80 | 75 | 75 | 75 | 75 | 80 | M10 Hexagon socket head | 7 |

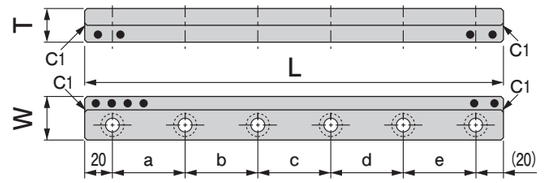


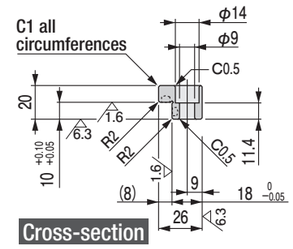




Cross-section

| Part No. | Width | Length | Thickness | Hole intervals | | | | | Attach bolts | |
|---|---|---|---|---|---|---|---|---|---|---|
| | W | L | T | a | b | c | d | e | Type | Qty |
| SLP-32100B | 32 | 100 | 30 | 60 | — | — | — | — | M10 | 2 |
| SLP-32150B | 32 | 150 | 30 | 55 | 55 | — | — | — | M10 | 3 |
| SLP-32200B | 32 | 200 | 30 | 55 | 50 | 55 | — | — | M10 | 4 |
| SLP-32250B | 32 | 250 | 30 | 70 | 70 | 70 | — | — | M10 | 4 |
| SLP-32400B | 32 | 400 | 30 | 75 | 70 | 70 | 70 | 75 | M10 | 6 |

● Hexagonal socket head bolts are fitted.




Cross-section

| Part No. | Width | Length | Thickness | Hole intervals | | | | | | Attach bolts | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | L | T | a | b | c | d | e | (20) | Type | Qty |
| SLP-26100C | 26 | 100 | 20 | 60 | — | — | — | — | | M8 Hexagon socket head | 2 |
| SLP-26150C | 26 | 150 | 20 | 55 | 55 | — | — | — | | M8 Hexagon socket head | 3 |
| SLP-26200C | 26 | 200 | 20 | 55 | 50 | 55 | — | — | | M8 Hexagon socket head | 4 |
| SLP-26400C | 26 | 400 | 20 | 75 | 70 | 70 | 70 | 75 | | M8 Hexagon socket head | 6 |







Cross-section

| Part No. | Width | Length | Thickness | Hole intervals | | | | Attach bolts | |
|---|---|---|---|---|---|---|---|---|---|
| | W | L | T | a | b | c | d | Type | Qty |
| SLP-2050 | 20 | 50 | 20 | 10 | 30 | — | — | M8 Hexagon socket head | 2 |
| SLP-20100 | 20 | 100 | 20 | 20 | 60 | — | — | M8 Hexagon socket head | 2 |
| SLP-20150 | 20 | 150 | 20 | 20 | 55 | 55 | — | M8 Hexagon socket head | 3 |
| SLP-20200 | 20 | 200 | 20 | 20 | 55 | 50 | 55 | M8 Hexagon socket head | 4 |





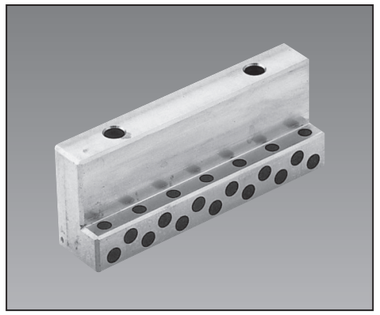


Cross-section

| Part No. | Width | Length | Thickness | Hole intervals | | | | Attach bolts | |
|---|---|---|---|---|---|---|---|---|---|
| | W | L | T | a | b | c | d | Type | Qty |
| SLP-1550 | 15 | 50 | 15 | 10 | 30 | — | — | M6 Hexagon socket head | 2 |
| SLP-15100 | 15 | 100 | 15 | 20 | 60 | — | — | M6 Hexagon socket head | 2 |
| SLP-15150 | 15 | 150 | 15 | 20 | 55 | 55 | — | M6 Hexagon socket head | 3 |
| SLP-15200 | 15 | 200 | 15 | 20 | 55 | 50 | 55 | M6 Hexagon socket head | 4 |

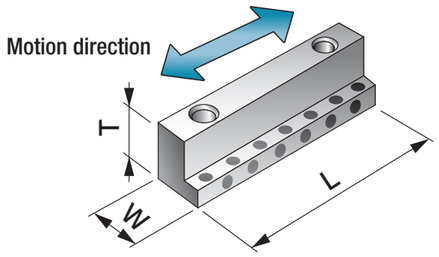
# SLC Oiles 500SP$_1$ SL1 Slide Guide Rails

RoHS2 ELV Lead Free



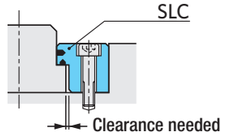
Specify Part No. by required thickness and length.
(e.g.) Thickness is 20mm and length is 100mm.

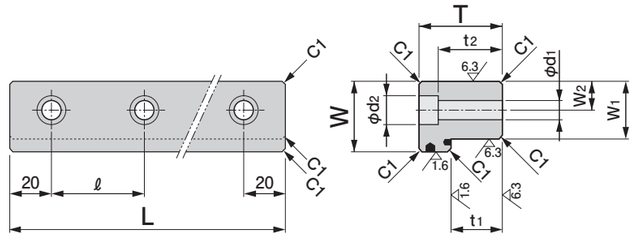
**SLC - 41100**
**Part No.**




● Motion direction: length direction

■ Example of attachment.

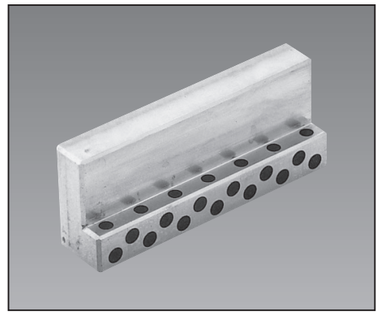



| Part No. | Thickness | Length | Width | | | | | | | | | | | Attach bolts | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | T | L | W | Tolerance | $t_1$ | Tolerance | $W_1$ | Tolerance | $\ell$ | $W_2$ | $\phi d_1$ | $\phi d_2$ | $t_2$ | Type | Qty |
| SLC-30100 | 30 | 100 | 23 | $^{-0.01}_{-0.05}$ | 15 | $^{+0.05}_{+0.02}$ | 15 | $^{0}_{-0.05}$ | 60 | 7.5 | 7 | 11 | 23 | M6 Hexagon socket head | 2 |
| SLC-30130 | 30 | 130 | 23 | $^{-0.01}_{-0.05}$ | 15 | $^{+0.05}_{+0.02}$ | 15 | $^{0}_{-0.05}$ | 90 | 7.5 | 7 | 11 | 23 | M6 Hexagon socket head | 2 |
| SLC-30160 | 30 | 160 | 23 | $^{-0.01}_{-0.05}$ | 15 | $^{+0.05}_{+0.02}$ | 15 | $^{0}_{-0.05}$ | 60 | 7.5 | 7 | 11 | 23 | M6 Hexagon socket head | 3 |
| SLC-30220 | 30 | 220 | 23 | $^{-0.01}_{-0.05}$ | 15 | $^{+0.05}_{+0.02}$ | 15 | $^{0}_{-0.05}$ | 60 | 7.5 | 7 | 11 | 23 | M6 Hexagon socket head | 4 |
| SLC-41100 | 41 | 100 | 23 | $^{-0.01}_{-0.05}$ | 26 | $^{+0.05}_{+0.02}$ | 15 | $^{0}_{-0.05}$ | 60 | 7.5 | 7 | 11 | 34 | M6 Hexagon socket head | 2 |
| SLC-41130 | 41 | 130 | 23 | $^{-0.01}_{-0.05}$ | 26 | $^{+0.05}_{+0.02}$ | 15 | $^{0}_{-0.05}$ | 90 | 7.5 | 7 | 11 | 34 | M6 Hexagon socket head | 2 |
| SLC-41160 | 41 | 160 | 23 | $^{-0.01}_{-0.05}$ | 26 | $^{+0.05}_{+0.02}$ | 15 | $^{0}_{-0.05}$ | 60 | 7.5 | 7 | 11 | 34 | M6 Hexagon socket head | 3 |
| SLC-41220 | 41 | 220 | 23 | $^{-0.01}_{-0.05}$ | 26 | $^{+0.05}_{+0.02}$ | 15 | $^{0}_{-0.05}$ | 60 | 7.5 | 7 | 11 | 34 | M6 Hexagon socket head | 4 |
| SLC-56100 | 56 | 100 | 28 | $^{-0.01}_{-0.05}$ | 26 | $^{+0.05}_{+0.02}$ | 20 | $^{0}_{-0.05}$ | 60 | 10 | 9 | 14 | 47 | M8 Hexagon socket head | 2 |
| SLC-56160 | 56 | 160 | 28 | $^{-0.01}_{-0.05}$ | 26 | $^{+0.05}_{+0.02}$ | 20 | $^{0}_{-0.05}$ | 60 | 10 | 9 | 14 | 47 | M8 Hexagon socket head | 3 |
| SLC-56220 | 56 | 220 | 28 | $^{-0.01}_{-0.05}$ | 26 | $^{+0.05}_{+0.02}$ | 20 | $^{0}_{-0.05}$ | 60 | 10 | 9 | 14 | 47 | M8 Hexagon socket head | 4 |

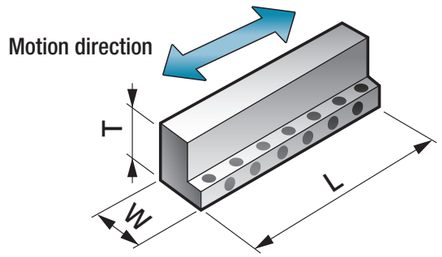
# SLI Oiles 500SP$_1$ SL1 Slide Guide Rails for Additional Machining

RoHS2 ELV Lead Free

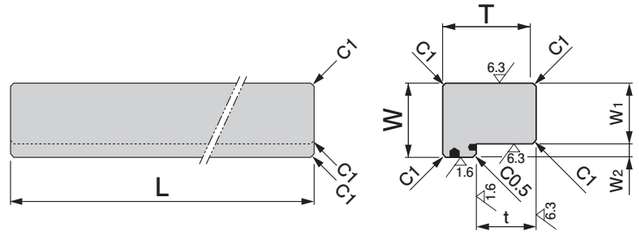


Specify Part No. by required thickness and length.
(e.g.) Thickness is 20mm.

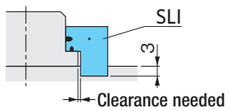
**SLI - 20300**
**Part No.**



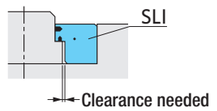

● This slide guide rail may be cut to the necessary dimension or bored for bolts.
● The movement direction is lengthwise.




■ Attachment type A

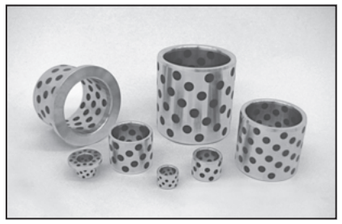



■ Attachment type B




| Part No. | Thickness | Length | Width | | | | | | | Attachment type |
|---|---|---|---|---|---|---|---|---|---|---|
| | T | L | W | Tolerance | t | Tolerance | $W_1$ | Tolerance | $W_2$ | |
| SLI-20300 | 20 | 300 | 15 | $^{-0.01}_{-0.05}$ | 11 | $^{+0.05}_{+0.02}$ | 10 | $^{0}_{-0.05}$ | 5 | A |
| SLI-25300 | 25 | 300 | 23 | $^{-0.01}_{-0.05}$ | 10 | $^{+0.05}_{+0.02}$ | 15 | $^{0}_{-0.05}$ | 8 | B |

# Oiles 500SP4 High-strength brass bearings with embedded solid lubricant



RoHS2 ELV Lead Free

## Feature

- 500SP4 is a self-lubricating bearing with embedded solid lubricant and metal base that conforms to the universally-acknowledged ASTM Standards (C86300).
- Serviceable without the need for lubrication.
- Demonstrates high performance under high-load and low-speed operations.
- Demonstrates superior wear resistance in applications where oil film is seldom produced such as reciprocating motions, oscillation, frequent starts and stops, etc.
- Superior chemical resistance and corrosion resistance.

| Service range | 500SP4 SL1 | |
|---|---|---|
| Lubrication condition | Dry | periodic lubrication |
| Service temperature range ℃ | −40～+300 | −40～+150 |
| Allowable max. pressure P N/mm² {kgf/cm²} | 29 (150) {296 (1,530)} | |
| Allowable max. velocity V m/s {m/min} | 0.50 {30} | 1.00 {60} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 1.65 {1,010} | 3.25 {1,990} |

The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s[0.1m/min]).

※Above values are applicable when solid lubricants SL1 are used.

※Use the solid lubricant SL464 (lead-free) in water or in environments where the bearings are always exposed to water splashes. The operating temperature range is from -40˚C to +80˚C (-40˚F to 176˚F).

| Lathe turning | | |
|---|---|---|
| Cutting tool | carbide tool (JIS) | |
| | Relief angle | 5～10˚ |
| | Rake angle | 2～5˚ |
| | Nose radius (mm) | 0.40～0.80 |
| Condition | Speed (m/min) | 100～200 |
| | Cut depth (mm) | 0.05～0.30 |
| | Feed (mm/rev) | 0.08～0.30 |

Some products require application of solid lubricants on the sliding surface after processing.

※Contact us for grinding and milling information.

| Machining accuracy (bushing) | | |
|---|---|---|
| I.D. | O.D. | Length |
| class 7 to 8 | class 6 to 7 | class 8 to 9 |

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

| Mechanical properties | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 7.8 |
| Tensile strength | JIS Z 2241 | N/mm² {kgf/mm²} | 755 {77} |
| Tensile elongation at break | JIS Z 2241 | % | 12 |
| Compressive strength | —— | N/mm² {kgf/mm²} | 345 {35} (Note) |
| Impact strength | JIS Z 2242 | J/cm² {kgfm/cm²} | 19 {1.9} |
| Hardness | JIS Z 2243 | HBW | 223 |
| Modulus of longitudinal elasticity | —— | N/mm² {kgf/mm²} | 105,000 {10,700} |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 2.2 |
| Thermal conductivity | —— | W/m℃ {cal/sec℃cm} | 87.8 {0.21} |

※The values shown above are typical values, not the standard values.
(Note) Compressive strength is 0.1%

⚠Please indicate the type of motion (rotation, reciprocating, rotation & reciprocating) for custom-made products.
⚠Solid lubricant, SL401 and SL403 are not lead-free.



# Oiles 500SPR Hard special copper alloy bearings with embedded solid lubricant

RoHS2 ELV Lead Free

## Features

- Applicable to higher pressure than 500HP.
- Help realize a long-life operation or a compact design.

| Service range | 500SPR SL1 | |
|---|---|---|
| Lubrication condition | Dry | periodic lubrication |
| Service temperature range ℃ | −40～+150 | |
| Allowable max. pressure P N/mm² {kgf/cm²} | 90 (200) {918 (2,041)} | |
| Allowable max. velocity V m/s {m/min} | 0.25 {15} | 0.50 {30} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 1.65 {1,010} | 3.25 {1,990} |

The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s[0.1m/min]).

※Above values are applicable when solid lubricants SL1 are used.

| Mechanical properties | | | | | | | |
|---|---|---|---|---|---|---|---|
| Density | —— | g/cm³ | 7.49 | Hardness | JIS Z 2243 | HBW | 280 |
| Tensile strength | JIS Z 2241 | N/mm² {kgf/mm²} | 780 {79} | Modulus of longitudinal elasticity. | —— | N/mm² {kgf/mm²} | 105,000 {10,720} |
| Tensile elongation at break | JIS Z 2241 | % | 1.0 | Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 1.97 |
| Compressive strength | —— | N/mm² {kgf/mm²} | 460 {47} (Note) | | | | |

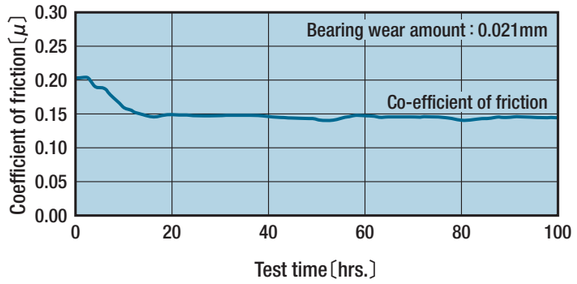
※The values shown above are typical values, not the standard values.
(Note) Compressive strength is 0.1%

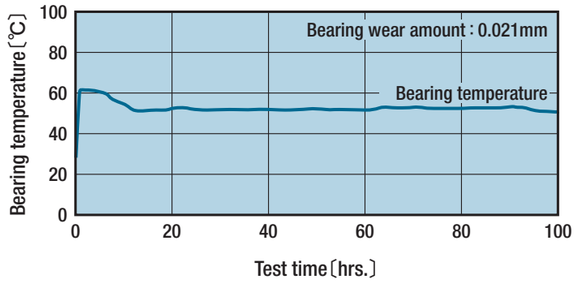
⚠Please indicate the type of motion (rotation, reciprocating, rotation & reciprocating) for custom-made products.
⚠Solid lubricant, SL401 and SL403 are not lead-free.

## Test data

**Journal oscillation test** 500SPR-SL1

<Testing conditions>
Bearing dimension : φ60×φ75×ℓ42
Mating material : SCM440 quenched by high frequency induction hardening
Pressure : 90N/mm² {918kgf/cm²}
Volocity : 0.008m/s {0.47m/min}
Oscillation cycle : 5cpm
Oscillation angle : ±45˚
Test time : 100hrs.
Ambience : in the atmosphere, room temp.
Lubricataion : initially-greased only



# Oiles 500SP5 Special high-strength brass bearings with embedded solid lubricant

RoHS2 ELV Lead Free

## Feature

- Bears higher loads than the 500SP1.
- Demonstrates superior wear resistance under high-load and low-speed applications.

| Service range | 500SP5 SL1 | |
|---|---|---|
| Lubrication condition | Dry | periodic lubrication |
| Service temperature range ℃ | −40～+150 | |
| Allowable max. pressure P N/mm² {kgf/cm²} | 49 (170) {500 (1,735)} | |
| Allowable max. velocity V m/s {m/min} | 0.25 {15} | 0.50 {30} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 1.65 {1,010} | 3.25 {1,990} |

The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s [0.1m/min]).

※Above values are applicable when solid lubricants SL1 are used.

| Mechanical properties | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 7.8 |
| Tensile strength | JIS Z 2241 | N/mm² {kgf/mm²} | 785 {80} |
| Tensile elongation at break | JIS Z 2241 | % | 10 |
| Compressive strength | —— | N/mm² {kgf/mm²} | 392 {40} (Note) |
| Hardness | JIS Z 2243 | HBW | 235 |
| Modulus of longitudinal elasticity. | —— | N/mm² {kgf/mm²} | 98,000 {10,000} |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 2.13 |

※The values shown above are typical values, not the standard values.
(Note) Compressive strength is 0.1%

⚠ Please indicate the type of motion (rotation, reciprocating, rotation & reciprocating) for custom-made products.

⚠ Solid lubricant, SL401 and SL403 are not lead-free.



# SP5B Oiles 500SP5 SL1 Ultrathin Bushings

RoHS2 ELV Lead Free

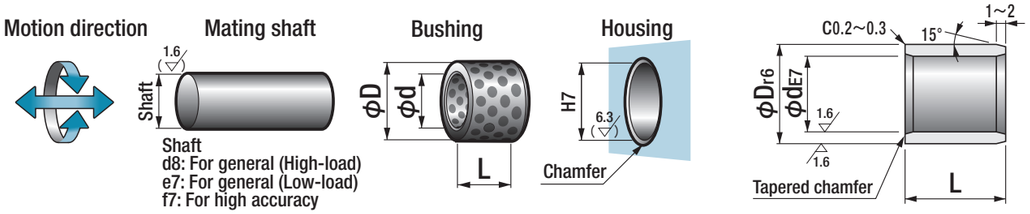
## A long-life bearing with compact design and high durability.

Its wall thickness is 33-50% thinner comparing to #500SP1-SL1 "SPB series (P187)".

As it is made of OILES original metal material that has high strength and wear resistance, it has a long operating life inspite of possessing a thin wall.

Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 10mm, O.D. is 12mm, and length is 15mm.

**SP5B - 101215**
**Part No.**




| I.D. | | O.D. | | Thickness | Length L Tolerance −0.1 −0.3 | | | | | | | | I.D. tolerance after press fitting (reference) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| φd | Tolerance | φD | Tolerance | mm | 8 | 10 | 12 | 15 | 16 | 20 | 25 | 30 | |
| 6 | +0.032 +0.020 | 8 | +0.028 +0.019 | 1.0 | 060808 | 060810 | 060812 | 060815 | 060816 | | | | +0.016 +0.004 |
| 8 | +0.040 +0.025 | 10 | +0.028 +0.019 | 1.0 | 081008 | 081010 | 081012 | 081015 | 081016 | | | | +0.024 +0.009 |
| 10 | +0.040 +0.025 | 12 | +0.034 +0.023 | 1.0 | | 101210 | 101212 | 101215 | 101216 | | | | +0.021 +0.006 |
| 12 | +0.050 +0.032 | 15 | +0.034 +0.023 | 1.5 | | | 121512 | 121515 | 121516 | 121520 | | | +0.031 +0.013 |
| 15 | +0.050 +0.032 | 18 | +0.034 +0.023 | 1.5 | | | 151812 | 151815 | 151816 | 151820 | | | +0.031 +0.013 |
| 16 | +0.050 +0.032 | 20 | +0.041 +0.028 | 2.0 | | | 162012 | 162015 | 162016 | 162020 | 162025 | | +0.026 +0.008 |
| 20 | +0.061 +0.040 | 24 | +0.041 +0.028 | 2.0 | | | | 202415 | 202416 | 202420 | 202425 | 202430 | +0.037 +0.016 |
| 25 | +0.061 +0.040 | 29 | +0.041 +0.028 | 2.0 | | | | | 252916 | 252920 | 252925 | 252930 | +0.037 +0.016 |

※The I.D. tolerance is reference value as press fitting into H7 housing.

# Oiles 500HP Hard special copper alloy bearings with embedded solid lubricant

RoHS2 ELV Lead Free

## Features

- Bears higher loads than the 500SPs.
- Demonstrates superior wear resistance under high-load and low-speed applications.

| Service range | 500HP SL1 | |
|---|---|---|
| Lubrication condition | Dry | periodic lubrication |
| Service temperature range ℃ | −40～+150 | |
| Allowable max. pressure P N/mm² {kgf/cm²} | 73 (180) {745 (1,837)} | |
| Allowable max. velocity V m/s {m/min} | 0.10 {6} | 0.25 {15} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 1.65 {1,010} | 3.25 {1,990} |

The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s [0.1m/min]).

※Above values are applicable when solid lubricants SL1 are used.

| Mechanical properties | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 7.6 |
| Tensile strength | JIS Z 2241 | N/mm² {kgf/mm²} | 540 {55} |
| Tensile elongation at break | JIS Z 2241 | % | 0.3 |
| Compressive strength | —— | N/mm² {kgf/mm²} | 490 {50} (Note) |
| Hardness | JIS Z 2243 | HBW | 245 |
| Modulus of longitudinal elasticity. | —— | N/mm² {kgf/mm²} | 127,000 {13,000} |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 1.8 |

※The values shown above are typical values, not the standard values.
(Note) Compressive strength is 0.2%

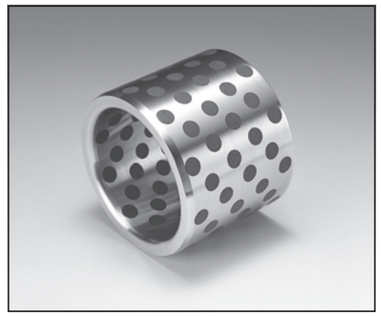
⚠ Please indicate the type of motion (rotation, reciprocating, rotation & reciprocating) for custom-made products.

⚠ Solid lubricant, SL401 and SL403 are not lead-free.



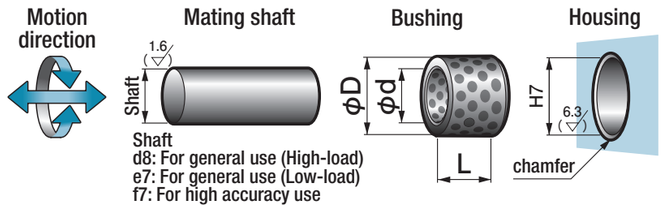
# HPB Oiles 500HP SL1 Bushings

RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 30mm, O.D. is 40mm, and length is 40mm.

**HPB - 304040**
**Part No.**







| Part No. | I.D. | | O.D. | | Length | | I.D. tolerance after press fitting (reference) |
|---|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | L | Tolerance | |
| HPB-203020 | 20 | +0.061 +0.040 | 30 | +0.041 +0.028 | 20 | −0.1 −0.3 | +0.037 +0.016 |
| HPB-203025 | 20 | +0.061 +0.040 | 30 | +0.041 +0.028 | 25 | −0.1 −0.3 | +0.037 +0.016 |
| HPB-203030 | 20 | +0.061 +0.040 | 30 | +0.041 +0.028 | 30 | −0.1 −0.3 | +0.037 +0.016 |
| HPB-253520 | 25 | +0.061 +0.040 | 35 | +0.050 +0.034 | 20 | −0.1 −0.3 | +0.030 +0.009 |
| HPB-253530 | 25 | +0.061 +0.040 | 35 | +0.050 +0.034 | 30 | −0.1 −0.3 | +0.030 +0.009 |
| HPB-304030 | 30 | +0.061 +0.040 | 40 | +0.050 +0.034 | 30 | −0.1 −0.3 | +0.032 +0.011 |
| HPB-304040 | 30 | +0.061 +0.040 | 40 | +0.050 +0.034 | 40 | −0.1 −0.3 | +0.032 +0.011 |
| HPB-405040 | 40 | +0.075 +0.050 | 50 | +0.050 +0.034 | 40 | −0.1 −0.3 | +0.046 +0.021 |
| HPB-405050 | 40 | +0.075 +0.050 | 50 | +0.050 +0.034 | 50 | −0.1 −0.3 | +0.046 +0.021 |
| HPB-506050 | 50 | +0.075 +0.050 | 60 | +0.060 +0.041 | 50 | −0.1 −0.3 | +0.045 +0.020 |
| HPB-506060 | 50 | +0.075 +0.050 | 60 | +0.060 +0.041 | 60 | −0.1 −0.3 | +0.045 +0.020 |
| HPB-607550 | 60 | +0.090 +0.060 | 75 | +0.062 +0.043 | 50 | −0.1 −0.3 | +0.053 +0.023 |
| HPB-607560 | 60 | +0.090 +0.060 | 75 | +0.062 +0.043 | 60 | −0.1 −0.3 | +0.053 +0.023 |

※The I.D. tolerance after press fitting is for reference only.

⚠ The dimensional tolerances are the values measured at +25℃.

# Oiles 500AB Aluminum bronze bearings with embedded solid lubricant

RoHS2 ELV Lead Free

## Features

- Usable in seawater.
- Has superior heat resistance.
- Not brittle at low temperatures and may be used at very low temperatures.

| Service range | 500AB SL1 | |
|---|---|---|
| Lubrication condition | Dry | periodic lubrication |
| Service temperature range ℃ | −250～+400 | −40～+150 |
| Allowable max. pressure P N/mm² {kgf/cm²} | 24 (100) {245 (1,020)} | |
| Allowable max. velocity V m/s {m/min} | 0.25 {15} | 0.50 {30} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 1.25 {765} | 2.45 {1,500} |

The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s[0.1m/min]).

※Above values are applicable when solid lubricants SL1 are used.
When you use standard #500AB series in the temperature and over, contact us for more information.

| Mechanical properties | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 7.6 |
| Tensile strength | JIS Z 2241 | N/mm² {kgf/mm²} | 590 {60} |
| Tensile elongation at break | JIS Z 2241 | % | 15 |
| Compressive strength | —— | N/mm² {kgf/mm²} | 240 {24} (Note) |
| Impact strength | JIS Z 2242 | J/cm² {kgfm/cm²} | 25 {2.5} |
| Hardness | JIS Z 2243 | HBW | 160 |
| Modulus of longitudinal elasticity | —— | N/mm² {kgf/mm²} | 108,000 {11,000} |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 1.6 |
| Thermal conductivity | —— | W/m℃ {cal/sec℃cm} | 58.6 {0.14} |

※The values shown above are typical values, not the standard values.
(Note) Compressive strength is 0.2%

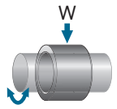
⚠Please indicate the type of motion (rotation, reciprocating, rotation & reciprocating) for custom-made products.

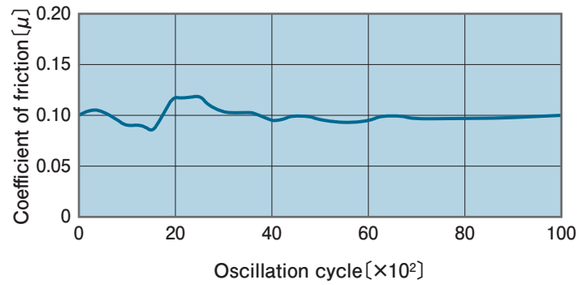
⚠Solid lubricant, SL401 and SL403 are not lead-free.

## Test data

### Journal oscillation test in sea water

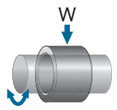
<Testing conditions>
Mating material : SUS304
Pressure : 15.7N/mm² {160.0kgf/cm²}
Oscillating cycle : 60cpm
Oscillating angle : ±10°
Test cycle (time) : 100,000cycle (27.8hrs.)
Ambience : in artificial sea water
temperature 20±5°
*SL4 is used for this test data.

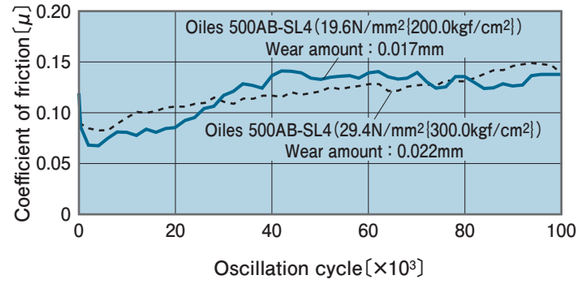



### Journal oscillation test in water

<Testing conditions>
Bearing dimension : φ80×φ100×ℓ60
Mating material : S45C hard chrome plating
Pressure : 19.6N/mm² {200.0kgf/cm²}
29.4N/mm² {300.0kgf/cm²}
Velocity : 0.004m/s {0.25m/min}
Oscillating cycle : 6cpm
Oscillating angle : ±15°
Test cycle (time) : 100,000cycle (278hrs.)
Ambience : in the purified water
Lubrication : SL4L coating



# Oiles 500B Bronze bearings with embedded solid lubricant

## Feature

- Serviceable without the need for lubrication.
- Demonstrates high performance under middle-load and middle-speed operations.
- Usable at high temperatures.
- Has superior chemical and corrosion resistances.
- Standard products are available in various sizes.

| Service range | 500B1 SL2 | |
|---|---|---|
| Lubrication condition | Dry | periodic lubrication |
| Service temperature range ℃ | −40～+250 | −40～+150 |
| Allowable max. pressure P N/mm² {kgf/cm²} | 15 (49.0) {153 (500)} | |
| Allowable max. velocity V m/s {m/min} | 0.40 {24} | 0.85 {51} |
| Allowable max. PV value N/mm² • m/s {kgf/cm² • m/min} | 1.00 {612} | 1.65 {1,010} |

The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s[0.1m/min]).

※Above values are applicable when solid lubricants SL2 are used.

| Mechanical properties | | | 500B1 | 500B2 |
|---|---|---|---|---|
| Density | —— | g/cm³ | 8.8 | 8.7 |
| Tensile strength | JIS Z 2241 | N/mm² {kgf/mm²} | 195 {20} | 245 {25} |
| Tensile elongation at break | JIS Z 2241 | % | 15 | 15 |
| Compressive strength | —— | N/mm² {kgf/mm²} | 95 {9.5} (Note1) | 130 {13} (Note) |
| Impact strength | JIS Z 2242 | J/cm² {kgfm/cm²} | 10 {1} | —— |
| Hardness | JIS Z 2243 | HBW | 60 | 70 |
| Modulus of longitudinal elasticity | —— | N/mm² {kgf/mm²} | 83,000 {8,500} | 103,000 {10,500} |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 1.8 | 2.0 |
| Thermal conductivity | —— | W/m℃ {cal/sec℃cm} | 71.1 {0.17} | 75.3 {0.18} |

※The values shown above are typical values, not the standard values.
(Note) Compressive strength is 0.2%

⚠Please indicate the type of motion (rotation, reciprocating, rotation & reciprocating) for custom-made products.

⚠Base metal contains lead.

## Lathe turning

| | | |
|---|---|---|
| Cutting tool | carbide tool (JIS) | |
| | Relief angle | 5～10° |
| | Rake angle | 2～5° |
| | Nose radius (mm) | 0.40～0.80 |
| Condition | Speed (m/min) | 100～200 |
| | Cut depth (mm) | 0.05～0.30 |
| | Feed (mm/rev) | 0.08～0.30 |

Apply solid lubricant or grease to the sliding surface after machining.

## Machining accuracy (bushing)

| I.D. | O.D. | Length |
|---|---|---|
| class 7 to 8 | class 6 to 7 | class 8 to 9 |

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

## 500B1 Test data

Journal rotational load resistance test

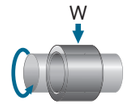
<Testing conditions>

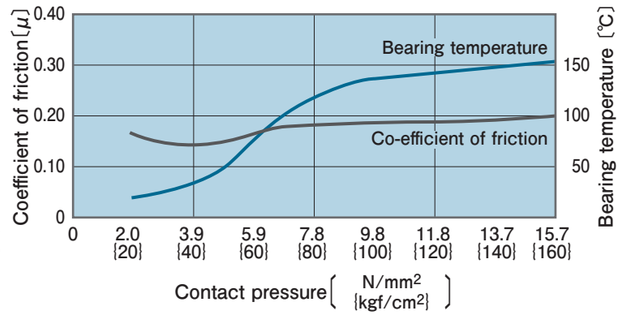
Mating material : S45C

Pressure : 0.98N/mm² {10.0kgf/cm²} is loaded incrementally per 10minutes

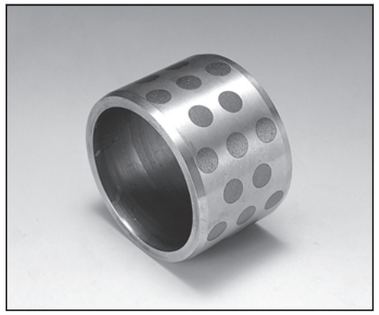
Velocity : 0.083m/s {5.0m/min}

Lubrication : dry



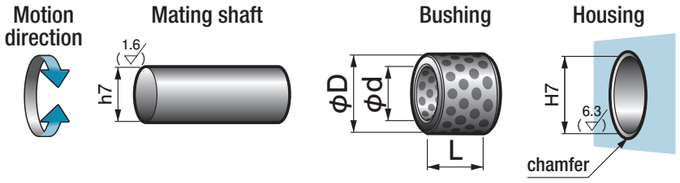



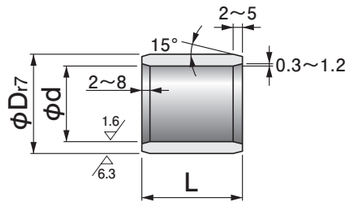
# BCB Oiles 500B$_1$ SL2 Bushings



Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 60mm, O.D. is 75mm, and length is 50mm.

**BCB - 607550**
**Part No.**




- Both ends have the same chamfering.
- Applicable to rotation and oscillating motion.
- Do not remove lubricant applied to the inner surface of the product. Otherwise, the product will not demonstrate its performance.

| I.D. | | O.D. | | Length L Tolerance $^{0}_{-0.2}$ | | | | | | Length L Tolerance $^{0}_{-0.2}$ | | | I.D. tolerance after press fitting (reference) | I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ϕd | Tolerance | ϕD | Tolerance | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 | 120 | | ϕd |
| 20 | +0.105 +0.072 | 30 | +0.049 +0.028 | 203020 | 203025 | 203030 | | | | | | | +0.077 +0.044 | 20 |
| 25 | +0.105 +0.072 | 35 | +0.059 +0.034 | 253520 | | 253530 | 253540 | | | | | | +0.071 +0.038 | 25 |
| 30 | +0.105 +0.072 | 40 | +0.059 +0.034 | | 304025 | 304030 | 304040 | | | | | | +0.071 +0.038 | 30 |
| 30 | +0.105 +0.072 | 42 | +0.059 +0.034 | | 304225 | 304230 | 304240 | | | | | | +0.071 +0.038 | 30 |
| 32 | +0.144 +0.105 | 42 | +0.059 +0.034 | | | 324230 | 324240 | | | | | | +0.110 +0.071 | 32 |
| 32 | +0.144 +0.105 | 45 | +0.059 +0.034 | | | 324530 | 324540 | | | | | | +0.110 +0.071 | 32 |
| 35 | +0.144 +0.105 | 45 | +0.059 +0.034 | | | 354530 | 354540 | 354550 | | | | | +0.110 +0.071 | 35 |
| 35 | +0.144 +0.105 | 48 | +0.059 +0.034 | | | 354830 | 354840 | 354850 | | | | | +0.110 +0.071 | 35 |
| 40 | +0.144 +0.105 | 50 | +0.059 +0.034 | | | 405030 | 405040 | 405050 | | | | | +0.110 +0.071 | 40 |
| 40 | +0.144 +0.105 | 55 | +0.071 +0.041 | | | 405530 | 405540 | 405550 | | | | | +0.103 +0.064 | 40 |
| 45 | +0.144 +0.105 | 55 | +0.071 +0.041 | | | | 455540 | 455550 | | | | | +0.103 +0.064 | 45 |
| 45 | +0.144 +0.105 | 60 | +0.071 +0.041 | | | | 456040 | 456050 | | | | | +0.103 +0.064 | 45 |
| 50 | +0.144 +0.105 | 60 | +0.071 +0.041 | | | | 506040 | 506050 | 506060 | | | | +0.103 +0.064 | 50 |
| 50 | +0.144 +0.105 | 65 | +0.071 +0.041 | | | | 506540 | 506550 | 506560 | | | | +0.103 +0.064 | 50 |
| 55 | +0.190 +0.144 | 70 | +0.073 +0.043 | | | | | 557050 | 557060 | | | | +0.147 +0.101 | 55 |
| 55 | +0.190 +0.144 | 75 | +0.073 +0.043 | | | | | 557550 | 557560 | | | | +0.147 +0.101 | 55 |
| 60 | +0.190 +0.144 | 75 | +0.073 +0.043 | | | | | 607550 | 607560 | 607580 | | | +0.147 +0.101 | 60 |
| 60 | +0.190 +0.144 | 80 | +0.073 +0.043 | | | | | 608050 | 608060 | 608080 | | | +0.147 +0.101 | 60 |
| 65 | +0.190 +0.144 | 80 | +0.073 +0.043 | | | | | | 658060 | 658080 | | | +0.147 +0.101 | 65 |
| 65 | +0.190 +0.144 | 85 | +0.086 +0.051 | | | | | | 658560 | 658580 | | | +0.139 +0.093 | 65 |
| 70 | +0.190 +0.144 | 85 | +0.086 +0.051 | | | | | | 708560 | 708580 | | | +0.139 +0.093 | 70 |
| 70 | +0.190 +0.144 | 90 | +0.086 +0.051 | | | | | | 709060 | 709080 | | | +0.139 +0.093 | 70 |
| 75 | +0.190 +0.144 | 90 | +0.086 +0.051 | | | | | | 759060 | 759080 | | | +0.139 +0.093 | 75 |
| 75 | +0.190 +0.144 | 95 | +0.086 +0.051 | | | | | | 759560 | 759580 | | | +0.139 +0.093 | 75 |
| 80 | +0.190 +0.144 | 95 | +0.086 +0.051 | | | | | | 809560 | 809580 | 8095100 | | +0.139 +0.093 | 80 |
| 80 | +0.190 +0.144 | 100 | +0.086 +0.051 | | | | | | 8010060 | 8010080 | 80100100 | | +0.139 +0.093 | 80 |
| 85 | +0.242 +0.188 | 100 | +0.086 +0.051 | | | | | | | 8510080 | 85100100 | | +0.191 +0.137 | 85 |
| 85 | +0.242 +0.188 | 105 | +0.089 +0.054 | | | | | | | 8510580 | 85105100 | | +0.188 +0.134 | 85 |
| 90 | +0.242 +0.188 | 110 | +0.089 +0.054 | | | | | | | 9011080 | 90110100 | | +0.188 +0.134 | 90 |
| 90 | +0.242 +0.188 | 115 | +0.089 +0.054 | | | | | | | 9011580 | 90115100 | | +0.188 +0.134 | 90 |
| 95 | +0.242 +0.188 | 115 | +0.089 +0.054 | | | | | | | 9511580 | 95115100 | | +0.188 +0.134 | 95 |
| 95 | +0.242 +0.188 | 120 | +0.089 +0.054 | | | | | | | 9512080 | 95120100 | | +0.188 +0.134 | 95 |
| 100 | +0.242 +0.188 | 120 | +0.089 +0.054 | | | | | | | 10012080 | 100120100 | 100120120 | +0.188 +0.134 | 100 |
| 100 | +0.242 +0.188 | 125 | +0.103 +0.063 | | | | | | | 10012580 | 100125100 | 100125120 | +0.179 +0.125 | 100 |

※The I.D. tolerance after press fitting is for reference only.

⚠ The dimensional tolerances are the values measured at +25℃.

# Oiles 500F Cast iron bearings with embedded solid lubricant


RoHS2 ELV Lead Free

## Feature

- Serviceable without the need for lubrication.
- Demonstrates high performance under low- and middle-load, low-speed operations.
- Demonstrates superior wear resistance in applications where oil film is seldom produced such as reciprocating motions, oscillation, frequent starts and stops, etc.
- Lower prices than the bearings with copper alloy bases.
- Standard products are available in various sizes.

## Test data

### Reciprocation test

<Testing conditions>

Bearing dimension : □40×□40×t20

Mating material : FC250 ground

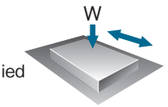
Pressure : 5.9N/mm²{60.0kgf/cm²}

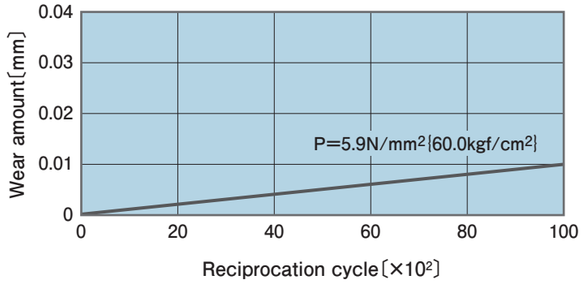
Velocity : 0.12m/s{7.0m/min}

Stroke : 80mm

Test cycle : 100,000cycle

Lubrication : initial grease applied




## Service range

| Service range | 500F SL1 | |
|---|---|---|
| Lubrication condition | Dry | periodic lubrication |
| Service temperature range ℃ | −40～+400 | −40～+150 |
| Allowable max. pressure P N/mm² {kgf/cm²} | 5 (73.5) {51 (750)} | 8 (73.5) {82 (750)} |
| Allowable max. velocity V m/s {m/min} | 0.15 {9} | 0.25 {15} |
| Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min} | 0.50 {306} | 0.80 {490} |

The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s [0.1m/min]).

## Lathe turning

| | | |
|---|---|---|
| Cutting tool | carbide tool (JIS) | |
| | Relief angle | 5～10° |
| | Rake angle | 2～5° |
| | Nose radius (mm) | 0.40～0.80 |
| Condition | Speed (m/min) | 100～200 |
| | Cut depth (mm) | 0.05～0.30 |
| | Feed (mm/rev) | 0.08～0.30 |

Apply solid lubricant or grease to the sliding surface after machining.

※Contact us for grinding and milling information.

## Mechanical properties

| Mechanical properties | | | 500F₁ | 500F₂ |
|---|---|---|---|---|
| Density | —— | g/cm³ | 7.3 | 7.1 |
| Tensile strength | JIS Z 2241 | N/mm² {kgf/mm²} | 250 {26} | 150 {15} |
| Compressive strength | —— | N/mm² {kgf/mm²} | 740 {75} | 440 {45} |
| Impact strength | JIS Z 2242 | J/cm² {kgfm/cm²} | 4 {0.4} | 1 {0.1} |
| Hardness | JIS Z 2243 | HBW | 190 | 160 |
| Modulus of longitudinal elasticity | —— | N/mm² {kgf/mm²} | 107,800 {11,000} | 78,000 {8,000} |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 1.2 | 1.2 |
| Thermal conductivity | —— | W/m℃ {cal/sec℃cm} | 50.2 {0.12} | 50.2 {0.12} |

※The values shown above are typical values, not the standard values.

## Machining accuracy (bushing)

| I.D. | O.D. | Length |
|---|---|---|
| class 7 to 8 | class 6 to 7 | class 8 to 9 |

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

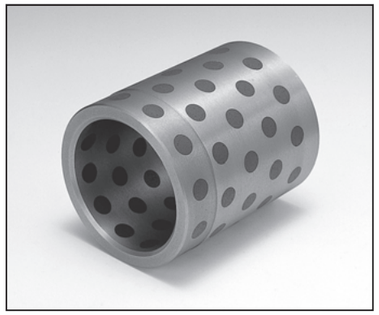
⚠When you use standard 500F series in the temperature of 150℃ and over, contact us for more information.

⚠Please indicate the type of motion (rotation, reciprocating, rotation & reciprocating) for custom-made products.

⚠Solid lubricant, SL401 and SL403 are not lead-free.

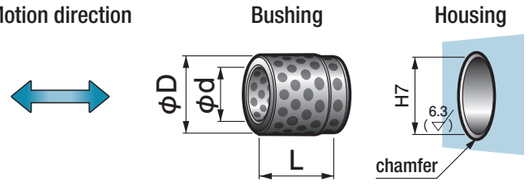
# FGB Oiles 500F SL1 Guide Bushings

RoHS2 ELV Lead Free

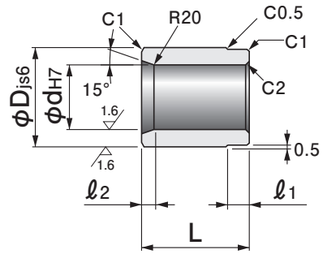


Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 60mm, O.D. is 80mm, and length is 90mm.

**FGB - 608090**
**Part No.**




- 500F, is used as base steel.
- Applicable to reciprocating motion.
- It is recommended to use a set screw to prevent dislocation.



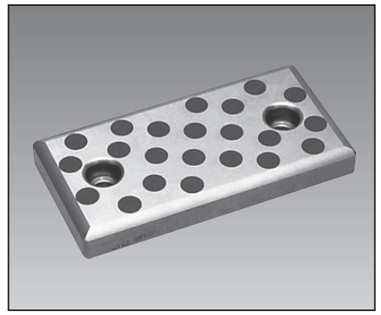

| Part No. | I.D. | | O.D. | | Length | | ℓ1 | ℓ2 |
|---|---|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | L | Tolerance | | |
| FGB-254040 | 25 | +0.021 0 | 40 | ±0.008 | 40 | 0 −0.2 | 10 | 5 |
| FGB-305050 | 30 | +0.021 0 | 50 | ±0.008 | 50 | 0 −0.2 | 10 | 5 |
| FGB-356055 | 35 | +0.025 0 | 60 | ±0.0095 | 55 | 0 −0.2 | 15 | 5 |
| FGB-406055 | 40 | +0.025 0 | 60 | ±0.0095 | 55 | 0 −0.2 | 15 | 5 |
| FGB-406060 | 40 | +0.025 0 | 60 | ±0.0095 | 60 | 0 −0.2 | 10 | 5 |
| FGB-507075 | 50 | +0.025 0 | 70 | ±0.0095 | 75 | 0 −0.2 | 15 | 10 |
| FGB-608090 | 60 | +0.030 0 | 80 | ±0.0095 | 90 | 0 −0.2 | 20 | 10 |
| FGB-80100120 | 80 | +0.030 0 | 100 | ±0.011 | 120 | 0 −0.2 | 25 | 10 |
| FGB-100120150 | 100 | +0.035 0 | 120 | ±0.011 | 150 | 0 −0.2 | 25 | 10 |
| FGB-120140180 | 120 | +0.035 0 | 140 | ±0.0125 | 180 | 0 −0.2 | 25 | 10 |

⚠ The dimensional tolerances are the values measured at +25℃.



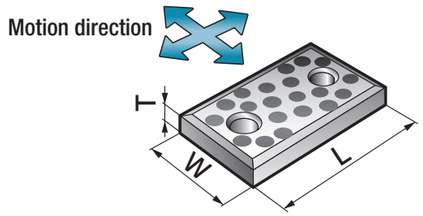
# FWPT Oiles 500F SL1 Wear Plates

RoHS2 ELV Lead Free



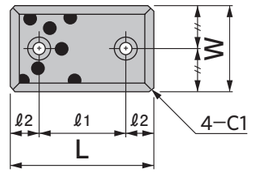
Specify Part No. by required width and length.
(e.g.) Width is 100mm and length is 100mm.

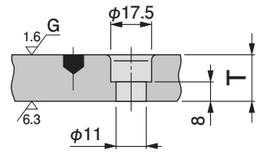
**FWPT - 100100**
**Part No.**




- 500F, is used as base steel.

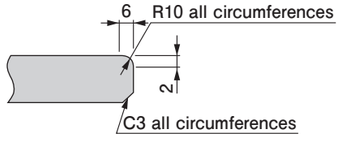
Cross-section




Chamfering

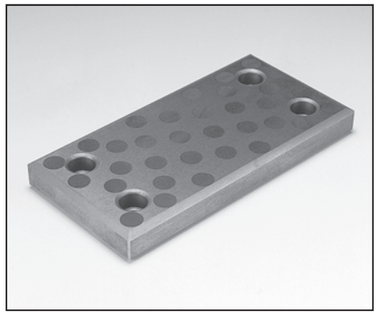
Type A




| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | Attach bolts | | Chamfering |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | ℓ1 | Tolerance | ℓ2 | Type | Qty | |
| FWPT-100100 | 100 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-100125 | 100 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-100150 | 100 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-100200 | 100 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-100250 | 100 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-125125 | 125 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-125150 | 125 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-125200 | 125 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-125250 | 125 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-150150 | 150 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-150200 | 150 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-150250 | 150 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWPT-150300 | 150 | −0.1 −0.3 | 300 | −0.1 −0.3 | 20 | ±0.01 | 250 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |

# FWP Oiles 500F SL1 Wear Plates

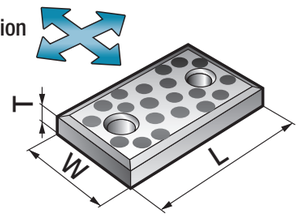
RoHS2 ELV Lead Free



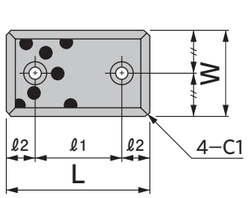
Specify Part No. by required width and length.
(e.g.) Width is 58mm and length is 100mm.

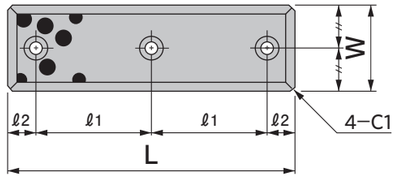
**FWP - 58100**
**Part No.**

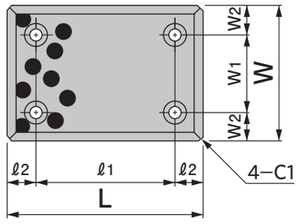
Motion direction



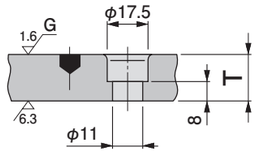

- 500F, is used as base steel.
- Motion directions for FWP-4875 to FWP-200300 are width and length.
- Motion directions for FWP-2875 to FWP-38200 are length direction only.



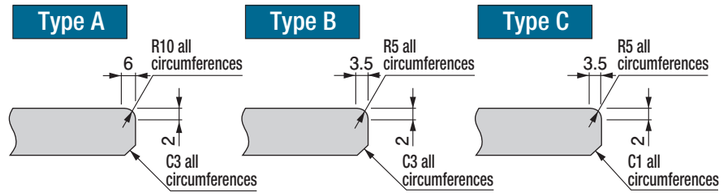




Cross-section



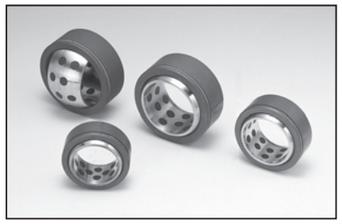

Chamfering




| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | Attach bolts | | Chamfering |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | ℓ1 | Tolerance | ℓ2 | Type | Qty | |
| FWP-2875 | 28 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.01 | 45 | ±0.2 | 15 | M10 Hexagon socket head | 2 | C |
| FWP-28100 | 28 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | C |
| FWP-28125 | 28 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | C |
| FWP-28150 | 28 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | C |
| FWP-28200 | 28 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | C |
| FWP-3875 | 38 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.01 | 45 | ±0.2 | 15 | M10 Hexagon socket head | 2 | C |
| FWP-38100 | 38 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | C |
| FWP-38125 | 38 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | C |
| FWP-38150 | 38 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | C |
| FWP-38200 | 38 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | C |
| FWP-4875 | 48 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.01 | 45 | ±0.2 | 15 | M10 Hexagon socket head | 2 | B |
| FWP-48100 | 48 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| FWP-48125 | 48 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| FWP-48150 | 48 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| FWP-48200 | 48 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 50 | M10 Hexagon socket head | 2 | B |
| FWP-48200A | 48 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| FWP-48250 | 48 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 3 | B |
| FWP-5875 | 58 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.01 | 45 | ±0.2 | 15 | M10 Hexagon socket head | 2 | B |
| FWP-58100 | 58 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| FWP-58125 | 58 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| FWP-58150 | 58 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |

| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | | | | Attach bolts | | Chamfering |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | W1 | Tolerance | W2 | ℓ1 | Tolerance | ℓ2 | Type | Qty | |
| FWP-7575B | 75 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 25 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWP-75100B | 75 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWP-75125 | 75 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWP-75150 | 75 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWP-75200 | 75 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| FWP-100100 | 100 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-100125 | 100 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-100150 | 100 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-100200 | 100 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-100250 | 100 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-125125 | 125 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 75 | ±0.2 | 25 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-125125A | 125 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 37.5 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-125150 | 125 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 37.5 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-125200 | 125 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 37.5 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-125250 | 125 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 37.5 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-150150 | 150 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-150200 | 150 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-150250 | 150 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-200200 | 200 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-200250 | 200 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| FWP-200300 | 200 | −0.1 −0.3 | 300 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | 250 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |

# Oiles 500SP1 Spherical Bearings Unit bearings



RoHS2 ELV Lead Free

## Feature

- Conforms to the ISO Standard E type bearings. Compatible with them dimensionally. High precision.
- The inner surface of the inner race is subject to sliding. The outer surface of the inner race bears self-aligning.
- Applicable to higher loads than other self-lubricating spherical bearings.
- Applicable to large oscillating angles in circumferential oscillating motion.
- Serviceable without the need for lubrication. Features quite long service life.

## Service range

| | |
|---|---|
| Lubrication condition | Dry |
| Service temperature range ℃ | −40～+150 |
| Allowable max. pressure P N/mm² {kgf/cm²} | 39.2 {400} |
| Allowable max. velocity V m/s {m/min} | 0.15 {9} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 0.80 {490} |

※Above is the value when applying SL1 as solid lubricant.

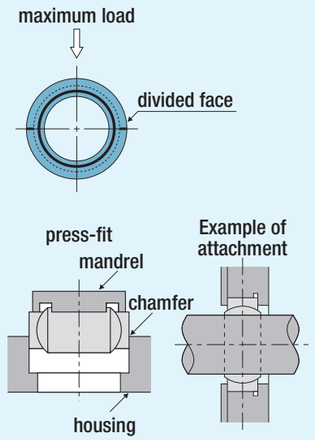
| Part No. | Allowable dynamic load (Note 1) N {kgf} | Allowable static load (Note 2) N {kgf} |
|---|---|---|
| SPS-2035E | 9,410 { 960} | 23,500 { 2,400} |
| SPS-2542E | 15,600 { 1,600} | 39,200 { 4,000} |
| SPS-3047E | 21,100 { 2,160} | 52,900 { 5,400} |
| SPS-3555E | 27,400 { 2,800} | 68,600 { 7,000} |
| SPS-4062E | 34,500 { 3,520} | 86,200 { 8,800} |
| SPS-4568E | 44,100 { 4,500} | 109,000 {11,200} |
| SPS-5075E | 54,900 { 5,600} | 137,000 {14,000} |
| SPS-6090E | 84,700 { 8,640} | 211,000 {21,600} |
| SPS-70105E | 109,000 {11,200} | 274,000 {28,000} |
| SPS-80120E | 141,000 {14,400} | 353,000 {36,000} |
| SPS-90130E | 176,000 {18,000} | 441,000 {45,000} |
| SPS-100150E | 215,000 {22,000} | 539,000 {55,000} |
| SPS-110160E | 237,000 {24,200} | 593,000 {60,500} |
| SPS-120180E | 329,000 {33,600} | 823,000 {84,000} |

(Note 1) The allowable dynamic loads are calculated based on the allowable bearing pressure in oscillating motion, which is 39.2 N/mm² [400 kgf/cm²]. They apply to the long-term loads under normal conditions.

(Note 2) The allowable static loads are calculated based on the allowable static bearing pressure 98.0 N/mm² [1,000 kgf/cm²] (i.e., allowable bearing pressure when accompanied with no sliding or accompanied with sliding at quite low speed not more than 0.0017 m/s [0.1 m/min.]. They apply to the accidental short-term loads under abnormal conditions.

## Bearing Fixing Method

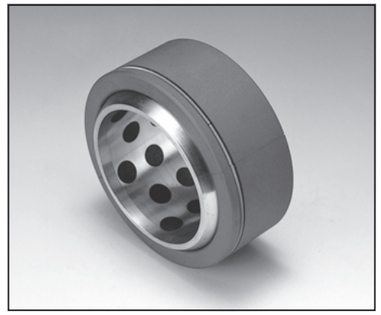
The outer race is split into two parts. Assemble them as shown below so that the split parts are not located at the maximum load point. the bearing to fix it. Press it slowly with a vice or press by the intermediation of a as shown below. Chamfering the housing end is more effective.






# SPS Oiles 500SP1 SL1 Spherical Bearings

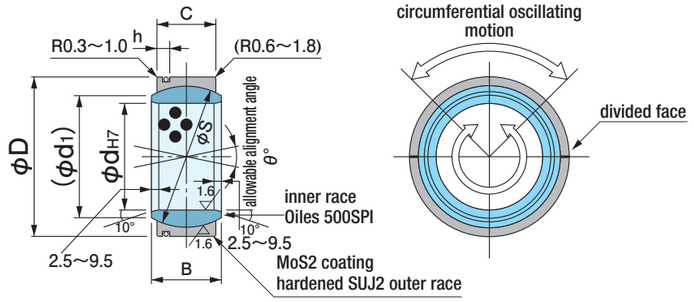
RoHS2 ELV Lead Free



Specify Part No. by required I.D. and O.D.
(e.g.) I.D. is 50mm and O.D. is 75mm.

**SPS - 5075 E**
**Part No.**

- Mating shaft
  For general: e7 (Recommended housing K7)
  For high load: d8 (Recommended housing N7)

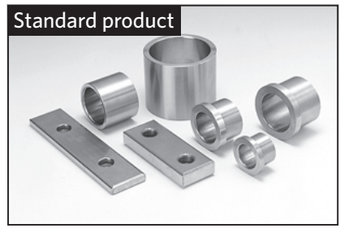



| Part No. | I.D. φd | Tolerance | O.D. φD | Tolerance | φd1 | B | C | Tolerance | φS | h | θ° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPS-2035E | 20 | +0.021 0 | 35 | 0 −0.011 | 24 | 16 | 12 | 0 −0.24 | 29 | 3.5 | 9 |
| SPS-2542E | 25 | +0.021 0 | 42 | 0 −0.011 | 29 | 20 | 16 | 0 −0.24 | 35.5 | 5.0 | 7 |
| SPS-3047E | 30 | +0.021 0 | 47 | 0 −0.011 | 34 | 22 | 18 | 0 −0.24 | 40.7 | 5.0 | 6 |
| SPS-3555E | 35 | +0.025 0 | 55 | 0 −0.013 | 40 | 25 | 20 | 0 −0.3 | 47 | 6.0 | 6 |
| SPS-4062E | 40 | +0.025 0 | 62 | 0 −0.013 | 45 | 28 | 22 | 0 −0.3 | 53 | 6.0 | 7 |
| SPS-4568E | 45 | +0.025 0 | 68 | 0 −0.013 | 51 | 32 | 25 | 0 −0.3 | 60 | 6.0 | 7 |
| SPS-5075E | 50 | +0.025 0 | 75 | 0 −0.013 | 56 | 35 | 28 | 0 −0.3 | 66 | 6.0 | 6 |
| SPS-6090E | 60 | +0.030 0 | 90 | 0 −0.015 | 67 | 44 | 36 | 0 −0.4 | 80 | 6.0 | 6 |
| SPS-70105E | 70 | +0.030 0 | 105 | 0 −0.015 | 78 | 49 | 40 | 0 −0.4 | 92 | 7.0 | 6 |
| SPS-80120E | 80 | +0.030 0 | 120 | 0 −0.015 | 89 | 55 | 45 | 0 −0.4 | 105 | 7.0 | 6 |
| SPS-90130E | 90 | +0.035 0 | 130 | 0 −0.018 | 98 | 60 | 50 | 0 −0.5 | 115 | 7.0 | 5 |
| SPS-100150E | 100 | +0.035 0 | 150 | 0 −0.018 | 110 | 70 | 55 | 0 −0.5 | 130 | 7.0 | 7 |
| SPS-110160E | 110 | +0.035 0 | 160 | 0 −0.018 | 121 | 70 | 55 | 0 −0.5 | 140 | 8.0 | 6 |
| SPS-120180E | 120 | +0.035 0 | 180 | 0 −0.018 | 136 | 85 | 70 | 0 −0.5 | 160 | 8.0 | 6 |

※φD toherance is nominal.

⚠ The dimensional tolerances are the values measured at +25℃.

# Oiles 2000 Sintered multi-layer bearings with dispersed solid lubricant


Standard product

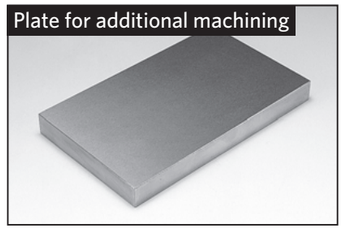


Plate for additional machining


Custom-made product

RoHS2 ELV Lead Free

## Feature

- Dispersed solid lubricant allows motions in any direction and offers superior performance for minute movements.
- Serviceable without the need for lubrication.
- Features superior load resistance, speed characteristics, and wear resistance.
- Standard products and plates for additional machining are available in various sizes.

## Service range

| Lubrication condition | Dry | periodic lubrication |
|---|---|---|
| Service temperature range ℃ | −40～+120 | |
| Allowable max. pressure P N/mm² {kgf/cm²} | 24.5 (73.5) {250 (750)} | 49 (73.5) {500 (750)} |
| Allowable max. velocity V m/s {m/min} | 0.50 {30} | 1.00 {60} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 1.63 {1,000} | 2.45 {1,500} |

The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s[0.1m/min]).

## Lathe turning

| | | |
|---|---|---|
| Cutting tool | carbide tool (JIS) | |
| | Relief angle | 5～10° |
| | Rake angle | 2～5° |
| | Nose radius (mm) | 0.40～0.80 |
| Condition | Speed (m/min) | 150～300 |
| | Cut depth (mm) | 0.10～0.20 |
| | Feed (mm/rev) | 0.05～0.15 |

Machining conditions here indicate conditions for machining back metal or length. Do not machine sliding surface.

※Contact us for grinding and milling information.

## Mechanical properties

| | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 6.3 |
| Hardness | JIS K 7202-2 | HRM | 60～95 |
| Oil impregnation rate | —— | vol% | 12 |

※The value shown above are for sintered layer.
※The values shown above are typical values, not the standard values.

## Machining accuracy (bushing)

| I.D. | O.D. | Length |
|---|---|---|
| class 7 to 8 | class 6 to 7 | class 8 to 9 |

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

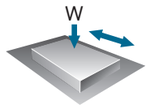
## Oil Impregnation Method

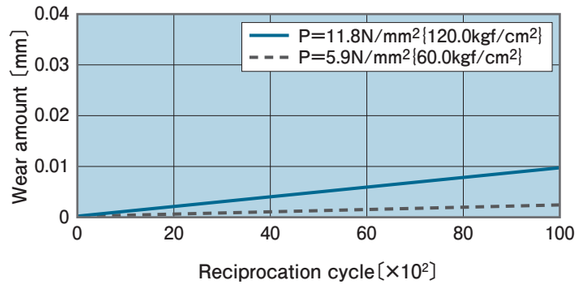
If the Oiles 2000 material is purchased and used by finishing it, it should be oil-impregnated after machining and then assembled in the housing. When the bearing is stored for long or washed, it should be oil-impregnated again and then assembled in the housing.
For the method, see the description about the oil impregnation method shown on page 250.
Dip the machined bearing in lubricating oil for 24 hours or more before using it, if oil impregnation (by heating) is disabled.

## Test data

### Horizontal reciprocation test

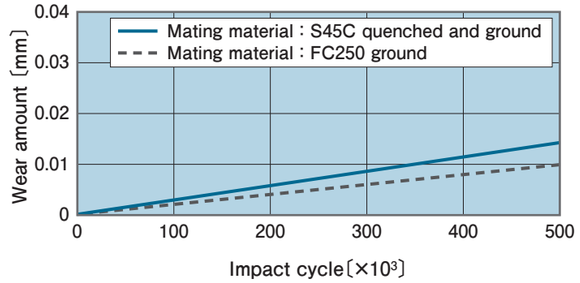
<Testing conditions>
Bearing dimension : □40×□40×t20
Mating material : FC250 ground
Pressure : 5.9、11.8N/mm² {60.0、120.0kgf/cm²}
Velocity : 0.12m/s {7.0m/min}
Reciprocation cycle : 44cpm
Stroke : 80mm
Test cycle : 100,000cycle
Lubrication : initial greasing at installation




### Cam impact test

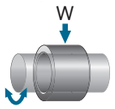
<Testing conditions>
Bearing dimension : □63×□95×t15
Mating material : FC250 ground、
S45C quenched and ground
Pressure : 19.6N/mm² {200.0kgf/cm²}
Velocity : 0.16m/s {9.6m/min}
Impact frequency : 60cpm
Stroke : 80mm
Test cycle : 500,000cycle
Lubrication : initial greasing at installation

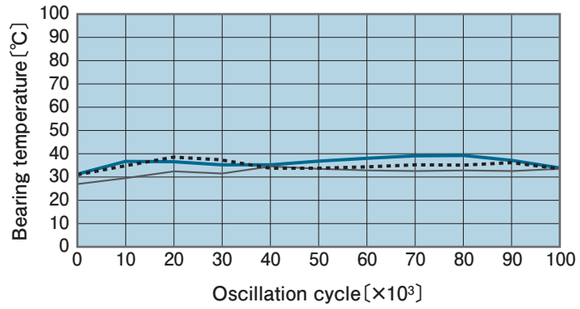


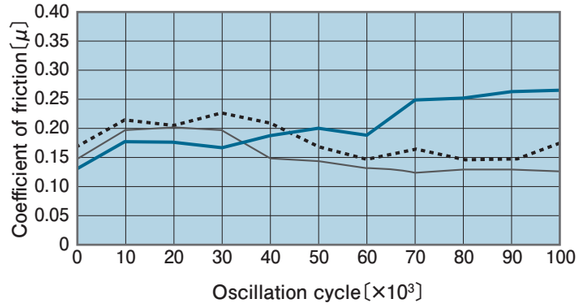

### Journal oscillation test

<Testing conditions>
Mating material : S35cw/gas nitriding SUS403
S35C/hard-chrme plating
Pressure : 24.5N/mm² {250.0kgf/cm²}
Velocity : 0.002m/s {0.105m/min}
Oscillating cycle : 10cpm
Oscillaing angle : ±5°
Test cycle (time) : 100,000cycle (166.7hrs.)
Lubrication : initial greasing at installation

S35C gas nitriding
SUS403
S35C hard-chrome plating

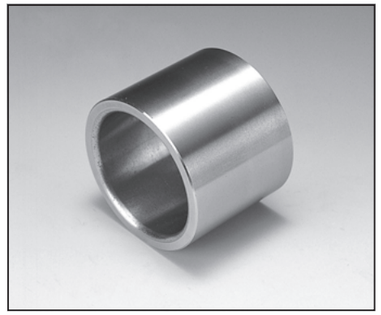


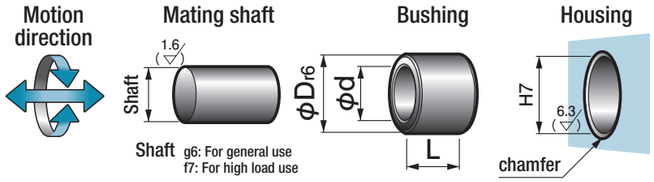
# CBB Oiles 2000 Bushings

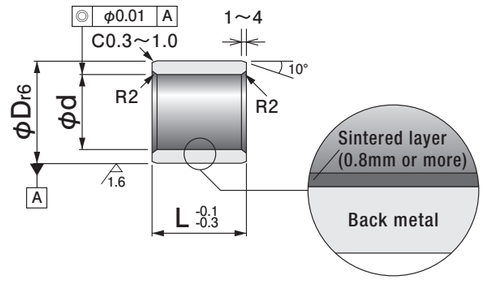
RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 35mm, O.D. is 44mm, and length is 50mm.

**CBB - 354450**
**Part No.**




- Press fitting is possible.
- Falling out or dislocation prevention is not required.

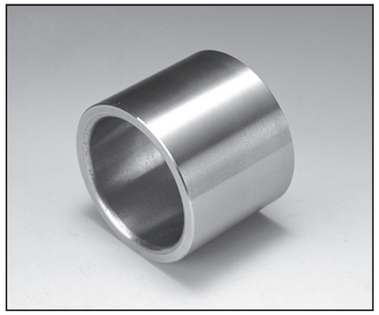
| I.D. | | O.D. | | Length L Tolerance −0.1 −0.3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| φd | Tolerance | φD | Tolerance | 8 | 10 | 12 | 15 | 16 | 19 | 20 | 25 | 30 | 35 |
| 12 | +0.049 +0.038 | 18 | +0.034 +0.023 | 121808 | 121810 | 121812 | 121815 | 121816 | 121819 | 121820 | 121825 | 121830 | |
| 13 | +0.053 +0.042 | 19 | +0.041 +0.028 | | 131910 | 131912 | 131915 | | | 131920 | 131925 | 131930 | |
| 14 | +0.053 +0.042 | 20 | +0.041 +0.028 | | 142010 | 142012 | 142015 | | | 142020 | 142025 | 142030 | |
| 15 | +0.053 +0.042 | 21 | +0.041 +0.028 | | 152110 | 152112 | 152115 | 152116 | | 152120 | 152125 | 152130 | |
| 16 | +0.053 +0.042 | 22 | +0.041 +0.028 | | 162210 | 162212 | 162215 | 162216 | 162219 | 162220 | 162225 | 162230 | 162235 |
| 18 | +0.053 +0.042 | 24 | +0.041 +0.028 | | 182410 | 182412 | 182415 | 182416 | | 182420 | 182425 | 182430 | |
| 20 | +0.060 +0.047 | 28 | +0.041 +0.028 | | 202810 | 202812 | 202815 | 202816 | 202819 | 202820 | 202825 | 202830 | 202835 |
| 20 | +0.060 +0.047 | 30 | +0.041 +0.028 | | | | 203015 | 203016 | | 203020 | 203025 | 203030 | 203035 |
| 25 | +0.065 +0.052 | 33 | +0.050 +0.034 | | | 253312 | 253315 | 253316 | | 253320 | 253325 | 253330 | 253335 |
| 25 | +0.065 +0.052 | 35 | +0.050 +0.034 | | | | 253515 | 253516 | | 253520 | 253525 | 253530 | 253535 |
| 28 | +0.065 +0.052 | 38 | +0.050 +0.034 | | | | | | | 283820 | 283825 | 283830 | |
| 30 | +0.065 +0.052 | 38 | +0.050 +0.034 | | | 303812 | 303815 | | | 303820 | 303825 | 303830 | 303835 |
| 30 | +0.065 +0.052 | 40 | +0.050 +0.034 | | | | 304015 | | | 304020 | 304025 | 304030 | 304035 |
| 35 | +0.076 +0.060 | 44 | +0.050 +0.034 | | | | | | | 354420 | 354425 | 354430 | 354435 |
| 35 | +0.076 +0.060 | 45 | +0.050 +0.034 | | | | | | | 354520 | 354525 | 354530 | 354535 |
| 40 | +0.076 +0.060 | 50 | +0.050 +0.034 | | | | 405015 | | | 405020 | 405025 | 405030 | 405035 |
| 45 | +0.081 +0.065 | 55 | +0.060 +0.041 | | | | | | | | | 455530 | 455535 |
| 45 | +0.081 +0.065 | 60 | +0.060 +0.041 | | | | | | | | | 456030 | |
| 50 | +0.081 +0.065 | 60 | +0.060 +0.041 | | | | | | | 506020 | | 506030 | 506035 |
| 50 | +0.081 +0.065 | 62 | +0.060 +0.041 | | | | | | | | | 506230 | |
| 50 | +0.081 +0.065 | 65 | +0.060 +0.041 | | | | | | | | | 506530 | |
| 55 | +0.091 +0.072 | 70 | +0.062 +0.043 | | | | | | | | | 557030 | |
| 60 | +0.091 +0.072 | 74 | +0.062 +0.043 | | | | | | | | | 607430 | 607435 |
| 60 | +0.091 +0.072 | 75 | +0.062 +0.043 | | | | | | | | | 607530 | 607535 |
| 65 | +0.091 +0.072 | 80 | +0.062 +0.043 | | | | | | | | | | |
| 70 | +0.096 +0.077 | 85 | +0.073 +0.051 | | | | | | | | | 708530 | 708535 |
| 70 | +0.096 +0.077 | 90 | +0.073 +0.051 | | | | | | | | | | |
| 75 | +0.096 +0.077 | 90 | +0.073 +0.051 | | | | | | | | | | |
| 75 | +0.096 +0.077 | 95 | +0.073 +0.051 | | | | | | | | | | |
| 80 | +0.096 +0.077 | 96 | +0.073 +0.051 | | | | | | | | | | |
| 80 | +0.096 +0.077 | 100 | +0.073 +0.051 | | | | | | | | | | |
| 90 | +0.107 +0.085 | 110 | +0.076 +0.054 | | | | | | | | | | |
| 100 | +0.107 +0.085 | 120 | +0.076 +0.054 | | | | | | | | | | |

| Length L Tolerance −0.1 −0.3 | | | | | | | | | I.D. tolerance after press fitting (reference) |
|---|---|---|---|---|---|---|---|---|---|
| 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | | |
| | | | | | | | | +0.034 +0.023 |
| | | | | | | | | +0.034 +0.023 |
| | | | | | | | | +0.034 +0.023 |
| | | | | | | | | +0.034 +0.023 |
| 162240 | | | | | | | | +0.034 +0.023 |
| 182440 | | | | | | | | +0.033 +0.022 |
| 202840 | 202850 | | | | | | | +0.042 +0.029 |
| 203040 | 203050 | | | | | | | +0.042 +0.029 |
| 253340 | 253350 | 253360 | | | | | | +0.042 +0.029 |
| 253540 | 253550 | 253560 | | | | | | +0.042 +0.029 |
| 283840 | | | | | | | | +0.042 +0.029 |
| 303840 | 303850 | 303860 | | | | | | +0.042 +0.029 |
| 304040 | 304050 | 304060 | | | | | | +0.042 +0.029 |
| 354440 | 354450 | 354460 | | | | | | +0.053 +0.037 |
| 354540 | 354550 | 354560 | | | | | | +0.053 +0.037 |
| 405040 | 405050 | 405060 | 405070 | 405080 | | | | +0.053 +0.037 |
| 455540 | 455550 | 455560 | | | | | | +0.053 +0.037 |
| 456040 | 456050 | 456060 | 456070 | 456080 | | | | +0.056 +0.040 |
| 506040 | 506050 | 506060 | 506070 | 506080 | | | | +0.053 +0.037 |
| 506240 | 506250 | 506260 | 506270 | | | | | +0.055 +0.039 |
| 506540 | 506550 | 506560 | 506570 | 506580 | | 5065100 | | +0.057 +0.041 |
| 557040 | 557050 | 557060 | 557070 | | | | | +0.064 +0.045 |
| 607440 | 607450 | 607460 | 607470 | 607480 | | | | +0.064 +0.045 |
| 607540 | 607550 | 607560 | 607570 | 607580 | | 6075100 | | +0.064 +0.045 |
| 658040 | 658050 | 658060 | 658070 | 658080 | | | | +0.064 +0.045 |
| 708540 | 708550 | 708560 | 708570 | 708580 | | 7085100 | | +0.064 +0.045 |
| | 709050 | 709060 | 709070 | 709080 | | | | +0.067 +0.048 |
| | 759050 | 759060 | 759070 | 759080 | | 7590100 | | +0.064 +0.045 |
| | | | | 759580 | | 7595100 | | +0.067 +0.048 |
| 809640 | 809650 | 809660 | 809670 | 809680 | | 8096100 | 8096120 | +0.065 +0.046 |
| 8010040 | 8010050 | 8010060 | 8010070 | 8010080 | | 80100100 | 80100120 | +0.067 +0.048 |
| | 9011050 | 9011060 | | 9011080 | 9011090 | 90110100 | 90110120 | +0.076 +0.054 |
| | 10012050 | 10012060 | 10012070 | 10012080 | 10012090 | 100120100 | 100120120 | +0.076 +0.054 |

⚠ The dimensional tolerances are the values measured at +25℃.

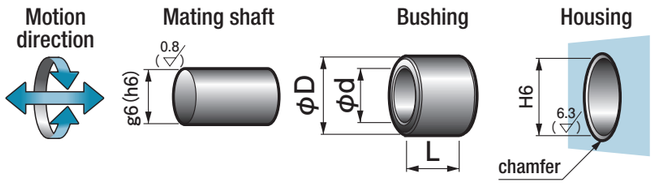
# CLB Oiles 2000 Bushings (High Precision type)

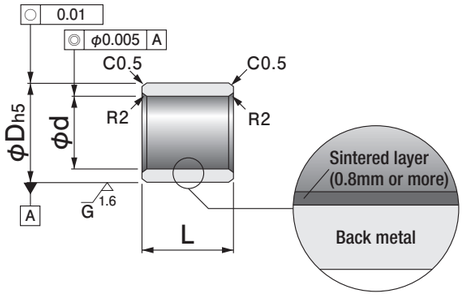
RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D. and Length.
(e.g.) I.D. is 35mm, O.D. is 44mm, and length is 50mm.

**CLB - 354450**
**Part No.**



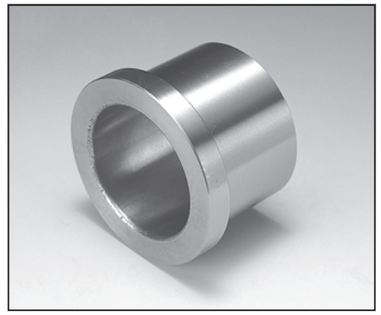




| I.D. | | O.D. | | Length L Tolerance $^{0}_{-0.3}$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| φd | Tolerance | φD | Tolerance | 16 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 | 120 |
| 12 | $^{+0.011}_{+0.003}$ | 18 | $^{0}_{-0.008}$ | 121816 | | 121825 | | | | | | | |
| 16 | $^{+0.011}_{+0.003}$ | 22 | $^{0}_{-0.009}$ | 162216 | 162220 | | 162230 | | | | | | |
| 20 | $^{+0.013}_{+0.004}$ | 28 | $^{0}_{-0.009}$ | | 202820 | | 202830 | 202840 | | | | | |
| 25 | $^{+0.013}_{+0.004}$ | 33 | $^{0}_{-0.011}$ | | | 253325 | 253330 | 253340 | 253350 | | | | |
| 30 | $^{+0.013}_{+0.004}$ | 38 | $^{0}_{-0.011}$ | | | | 303830 | 303840 | 303850 | 303860 | | | |
| 35 | $^{+0.016}_{+0.005}$ | 44 | $^{0}_{-0.011}$ | | | | | 354440 | 354450 | 354460 | | | |
| 40 | $^{+0.016}_{+0.005}$ | 50 | $^{0}_{-0.011}$ | | | | | 405040 | 405050 | 405060 | | | |
| 50 | $^{+0.016}_{+0.005}$ | 62 | $^{0}_{-0.013}$ | | | | | | 506250 | | 506280 | | |
| 60 | $^{+0.019}_{+0.006}$ | 74 | $^{0}_{-0.013}$ | | | | | | 607450 | 607460 | 607480 | | |
| 70 | $^{+0.019}_{+0.006}$ | 85 | $^{0}_{-0.015}$ | | | | | | 708550 | | | 7085100 | |
| 80 | $^{+0.019}_{+0.006}$ | 96 | $^{0}_{-0.015}$ | | | | | | 809650 | | 809680 | | 8096120 |
| 100 | $^{+0.022}_{+0.007}$ | 120 | $^{0}_{-0.015}$ | | | | | | 10012050 | | | 100120100 | 100120120 |

⚠ By the combination of the highly precise article, clearance of a mating shaft and the bearings become smaller than normal combination. When use under the foreign matter environment ,or operating frequency are high, please contact us.
⚠ The dimensional tolerances are the values measured at +25℃.

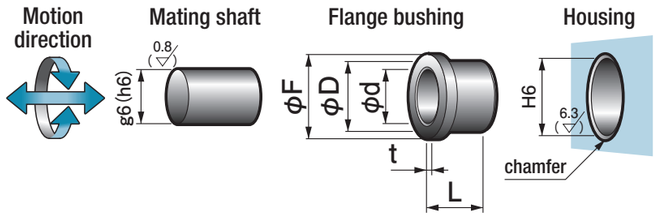
# CLF Oiles 2000 Flange Bushings (High Precision type)

RoHS2 ELV Lead Free

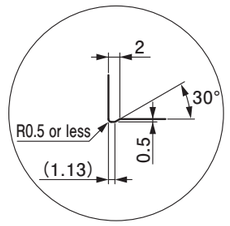


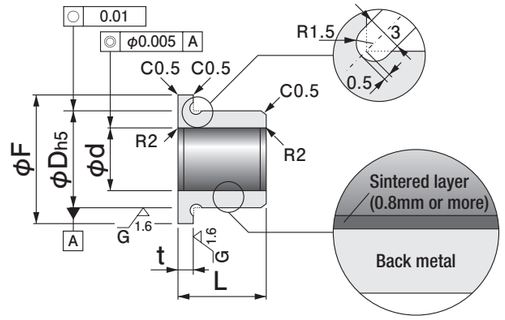
Specify Part No. by required I.D. and Length.
(e.g.) I.D. is 30mm and length is 60mm.

**CLF - 3060**
**Part No.**




● As for the flange root undercut shape, the shape shown below is also available in addition to that shown in the dimensional drawing on the right.



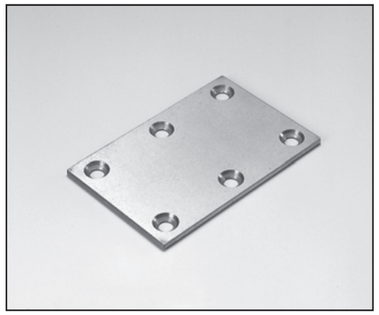




| I.D. | | O.D. | | Flange | | | | Length L Tolerance $^{0}_{-0.3}$ | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| φd | Tolerance | φD | Tolerance | φF | Tolerance | t | Tolerance | 30 | 40 | 50 | 60 | 80 | 100 | 120 |
| 20 | $^{+0.013}_{+0.004}$ | 28 | $^{0}_{-0.009}$ | 38 | $^{-0.2}_{-0.3}$ | 7 | $^{+0.05}_{0}$ | 2030 | 2040 | | | | | |
| 25 | $^{+0.013}_{+0.004}$ | 33 | $^{0}_{-0.011}$ | 43 | $^{-0.2}_{-0.3}$ | 7 | $^{+0.05}_{0}$ | 2530 | | 2550 | | | | |
| 30 | $^{+0.013}_{+0.004}$ | 38 | $^{0}_{-0.011}$ | 48 | $^{-0.2}_{-0.3}$ | 7 | $^{+0.05}_{0}$ | 3030 | | | 3060 | | | |
| 35 | $^{+0.016}_{+0.005}$ | 44 | $^{0}_{-0.011}$ | 54 | $^{-0.2}_{-0.3}$ | 10 | $^{+0.05}_{0}$ | | 3540 | | | 3580 | | |
| 40 | $^{+0.016}_{+0.005}$ | 50 | $^{0}_{-0.011}$ | 60 | $^{-0.2}_{-0.3}$ | 10 | $^{+0.05}_{0}$ | | 4040 | | | 4080 | | |
| 50 | $^{+0.016}_{+0.005}$ | 62 | $^{0}_{-0.013}$ | 72 | $^{-0.2}_{-0.3}$ | 10 | $^{+0.05}_{0}$ | | | 5050 | | | 50100 | |
| 60 | $^{+0.019}_{+0.006}$ | 74 | $^{0}_{-0.013}$ | 84 | $^{-0.2}_{-0.3}$ | 10 | $^{+0.05}_{0}$ | | | | 6060 | | | 60120 |

⚠ By the combination of the highly precise article, clearance of a mating shaft and the bearings become smaller than normal combination. When use under the foreign matter environment ,or operating frequency are high, please contact us.
⚠ The dimensional tolerances are the values measured at +25℃.

# CWT Oiles 2000 Wear Plates 5mm Thickness

RoHS2 ELV Lead Free

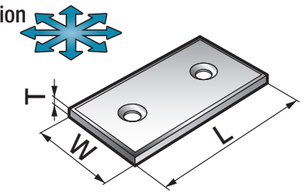


● Dedicated hexagon socket flat head bolts are attached.

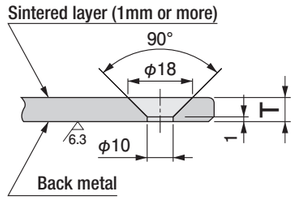
Specify Part No. by required width and length.
(e.g.) Width is 38mm and length is 150mm.

**CWT - 38150**
**Part No.**

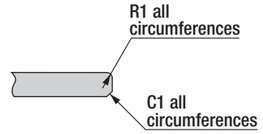
Motion direction



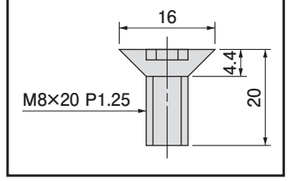

**Cross-section**

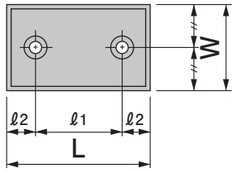


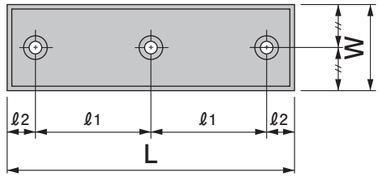

**Chamfering**

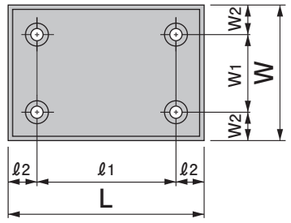


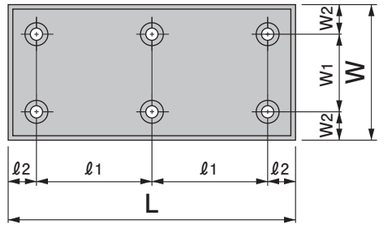

● Mounting bolts



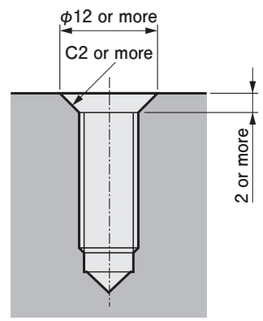




| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | No. of holes |
|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | ℓ1 | Tolerance | ℓ2 | |
| CWT-2250 | 22 | −0.1 −0.3 | 50 | −0.1 −0.3 | 5 | ±0.015 | 20 | ±0.2 | 15 | 2 |
| CWT-2275 | 22 | −0.1 −0.3 | 75 | −0.1 −0.3 | 5 | ±0.015 | 45 | ±0.2 | 15 | 2 |
| CWT-22100 | 22 | −0.1 −0.3 | 100 | −0.1 −0.3 | 5 | ±0.015 | 70 | ±0.2 | 15 | 2 |
| CWT-22150 | 22 | −0.1 −0.3 | 150 | −0.1 −0.3 | 5 | ±0.015 | 60 | ±0.2 | 15 | 3 |
| CWT-2850 | 28 | −0.1 −0.3 | 50 | −0.1 −0.3 | 5 | ±0.015 | 20 | ±0.2 | 15 | 2 |
| CWT-2875 | 28 | −0.1 −0.3 | 75 | −0.1 −0.3 | 5 | ±0.015 | 45 | ±0.2 | 15 | 2 |
| CWT-28100 | 28 | −0.1 −0.3 | 100 | −0.1 −0.3 | 5 | ±0.015 | 70 | ±0.2 | 15 | 2 |
| CWT-28150 | 28 | −0.1 −0.3 | 150 | −0.1 −0.3 | 5 | ±0.015 | 60 | ±0.2 | 15 | 3 |
| CWT-3850 | 38 | −0.1 −0.3 | 50 | −0.1 −0.3 | 5 | ±0.015 | 20 | ±0.2 | 15 | 2 |
| CWT-3875 | 38 | −0.1 −0.3 | 75 | −0.1 −0.3 | 5 | ±0.015 | 45 | ±0.2 | 15 | 2 |
| CWT-38100 | 38 | −0.1 −0.3 | 100 | −0.1 −0.3 | 5 | ±0.015 | 70 | ±0.2 | 15 | 2 |
| CWT-38150 | 38 | −0.1 −0.3 | 150 | −0.1 −0.3 | 5 | ±0.015 | 60 | ±0.2 | 15 | 3 |
| CWT-4850 | 48 | −0.1 −0.3 | 50 | −0.1 −0.3 | 5 | ±0.015 | 20 | ±0.2 | 15 | 2 |
| CWT-4875 | 48 | −0.1 −0.3 | 75 | −0.1 −0.3 | 5 | ±0.015 | 45 | ±0.2 | 15 | 2 |
| CWT-48100 | 48 | −0.1 −0.3 | 100 | −0.1 −0.3 | 5 | ±0.015 | 70 | ±0.2 | 15 | 2 |
| CWT-48150 | 48 | −0.1 −0.3 | 150 | −0.1 −0.3 | 5 | ±0.015 | 60 | ±0.2 | 15 | 3 |

| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | | | | No. of holes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | W1 | Tolerance | W2 | ℓ1 | Tolerance | ℓ2 | |
| CWT-7575 | 75 | −0.1 −0.3 | 75 | −0.1 −0.3 | 5 | ±0.015 | 45 | ±0.2 | 15 | 45 | ±0.2 | 15 | 4 |
| CWT-75100 | 75 | −0.1 −0.3 | 100 | −0.1 −0.3 | 5 | ±0.015 | 45 | ±0.2 | 15 | 70 | ±0.2 | 15 | 4 |
| CWT-75125 | 75 | −0.1 −0.3 | 125 | −0.1 −0.3 | 5 | ±0.015 | 45 | ±0.2 | 15 | 95 | ±0.2 | 15 | 4 |
| CWT-75150 | 75 | −0.1 −0.3 | 150 | −0.1 −0.3 | 5 | ±0.015 | 45 | ±0.2 | 15 | 60 | ±0.2 | 15 | 6 |
| CWT-100100 | 100 | −0.1 −0.3 | 100 | −0.1 −0.3 | 5 | ±0.015 | 70 | ±0.2 | 15 | 70 | ±0.2 | 15 | 4 |
| CWT-100125 | 100 | −0.1 −0.3 | 125 | −0.1 −0.3 | 5 | ±0.015 | 70 | ±0.2 | 15 | 95 | ±0.2 | 15 | 4 |
| CWT-100150 | 100 | −0.1 −0.3 | 150 | −0.1 −0.3 | 5 | ±0.015 | 70 | ±0.2 | 15 | 60 | ±0.2 | 15 | 6 |

Provide the mating part with C2 or larger chamfering if it is tapped for mounting.



# CWX Oiles 2000 Wear Plates 10mm Thickness

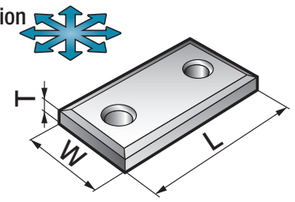
RoHS2 ELV Lead Free

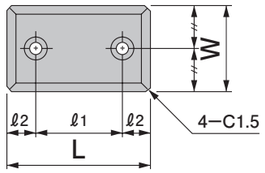
● Use the exclusive low-head bolt for mounting.
(LHS-M1020 is attached to CWX series)

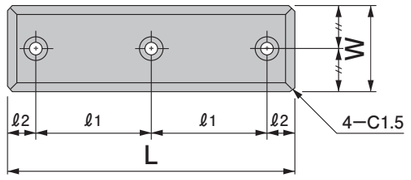
Specify Part No. by required width and length.
(e.g.) Width is 75mm and length is 125mm.

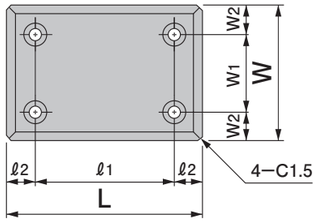
**CWX - 75125**
**Part No.**

Motion direction

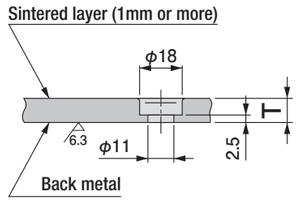


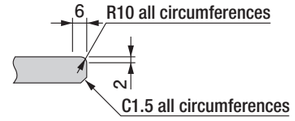




**Cross-section**

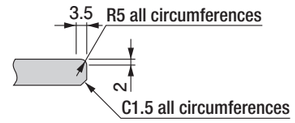



**Chamfering**

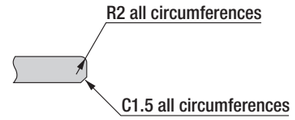
**Type A**



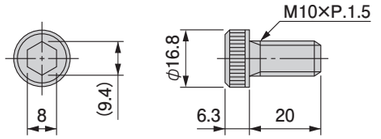

**Type B**




**Type C**




● LHS Exclusive Bolt for CWX
〔Part No. : **LHS-M1020**〕




● Exclusive bolt LHS-M1020 is attached to CWX plate.
● The Exclusive bolt has approximate breaking toque of JIS standard M10 socket head cap screw.

N・m {kgf・m}

| Part No. | LHS-M1020 |
|---|---|
| Recommended tightening torque | 67.3 {6.86} |
| Breaking torque | 118 {12.0} |

※Bolt itself is on sale.

| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | No. of holes | Chamfering |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | ℓ1 | Tolerance | ℓ2 | | |
| CWX-2875 | 28 | −0.1 −0.3 | 75 | −0.1 −0.3 | 10 | ±0.01 | 45 | ±0.2 | 15 | 2 | C |
| CWX-28100 | 28 | −0.1 −0.3 | 100 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 2 | C |
| CWX-28125 | 28 | −0.1 −0.3 | 125 | −0.1 −0.3 | 10 | ±0.01 | 75 | ±0.2 | 25 | 2 | C |
| CWX-28150 | 28 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 2 | C |
| CWX-3875 | 38 | −0.1 −0.3 | 75 | −0.1 −0.3 | 10 | ±0.01 | 45 | ±0.2 | 15 | 2 | B |
| CWX-38100 | 38 | −0.1 −0.3 | 100 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 2 | B |
| CWX-38125 | 38 | −0.1 −0.3 | 125 | −0.1 −0.3 | 10 | ±0.01 | 75 | ±0.2 | 25 | 2 | B |
| CWX-38150 | 38 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 2 | B |
| CWX-4875 | 48 | −0.1 −0.3 | 75 | −0.1 −0.3 | 10 | ±0.01 | 45 | ±0.2 | 15 | 2 | B |
| CWX-48100 | 48 | −0.1 −0.3 | 100 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 2 | B |
| CWX-48125 | 48 | −0.1 −0.3 | 125 | −0.1 −0.3 | 10 | ±0.01 | 75 | ±0.2 | 25 | 2 | B |
| CWX-48150 | 48 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 2 | B |
| CWX-48200 | 48 | −0.1 −0.3 | 200 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 50 | 2 | B |
| CWX-48250 | 48 | −0.1 −0.3 | 250 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 3 | B |
| CWX-5875 | 58 | −0.1 −0.3 | 75 | −0.1 −0.3 | 10 | ±0.01 | 45 | ±0.2 | 15 | 2 | B |
| CWX-58100 | 58 | −0.1 −0.3 | 100 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 2 | B |
| CWX-58150 | 58 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 2 | B |
| CWX-7575 | 75 | −0.1 −0.3 | 75 | −0.1 −0.3 | 10 | ±0.01 | 25 | ±0.2 | 25 | 2 | A |
| CWX-75100 | 75 | −0.1 −0.3 | 100 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 2 | A |
| CWX-75125 | 75 | −0.1 −0.3 | 125 | −0.1 −0.3 | 10 | ±0.01 | 75 | ±0.2 | 25 | 2 | A |

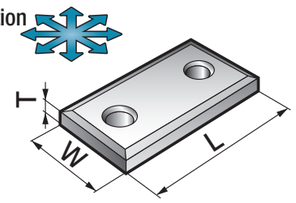
| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | | | | No. of holes | Chamfering |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | W1 | Tolerance | W2 | ℓ1 | Tolerance | ℓ2 | | |
| CWX-75150 | 75 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | — | — | — | 100 | ±0.2 | 25 | 2 | A |
| CWX-75200 | 75 | −0.1 −0.3 | 200 | −0.1 −0.3 | 10 | ±0.01 | — | — | — | 150 | ±0.2 | 25 | 2 | A |
| CWX-75250 | 75 | −0.1 −0.3 | 250 | −0.1 −0.3 | 10 | ±0.01 | — | — | — | 100 | ±0.2 | 25 | 3 | A |
| CWX-75300 | 75 | −0.1 −0.3 | 300 | −0.1 −0.3 | 10 | ±0.01 | — | — | — | 100 | ±0.2 | 50 | 3 | A |
| CWX-100100 | 100 | −0.1 −0.3 | 100 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 50 | ±0.2 | 25 | 4 | A |
| CWX-100125 | 100 | −0.1 −0.3 | 125 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 75 | ±0.2 | 25 | 4 | A |
| CWX-100150 | 100 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 100 | ±0.2 | 25 | 4 | A |
| CWX-100200 | 100 | −0.1 −0.3 | 200 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 150 | ±0.2 | 25 | 4 | A |
| CWX-100250 | 100 | −0.1 −0.3 | 250 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 200 | ±0.2 | 25 | 4 | A |
| CWX-100300 | 100 | −0.1 −0.3 | 300 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 200 | ±0.2 | 50 | 4 | A |
| CWX-125125 | 125 | −0.1 −0.3 | 125 | −0.1 −0.3 | 10 | ±0.01 | 75 | ±0.2 | 25 | 75 | ±0.2 | 25 | 4 | A |
| CWX-125150 | 125 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 37.5 | 100 | ±0.2 | 25 | 4 | A |
| CWX-125200 | 125 | −0.1 −0.3 | 200 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 37.5 | 150 | ±0.2 | 25 | 4 | A |
| CWX-125250 | 125 | −0.1 −0.3 | 250 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 37.5 | 200 | ±0.2 | 25 | 4 | A |
| CWX-125300 | 125 | −0.1 −0.3 | 300 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 37.5 | 200 | ±0.2 | 50 | 4 | A |
| CWX-150150 | 150 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 100 | ±0.2 | 25 | 4 | A |
| CWX-150200 | 150 | −0.1 −0.3 | 200 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 150 | ±0.2 | 25 | 4 | A |
| CWX-150250 | 150 | −0.1 −0.3 | 250 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 200 | ±0.2 | 25 | 4 | A |

# CWXT Oiles 2000 Wear Plates 10mm Thickness (2 hole type)

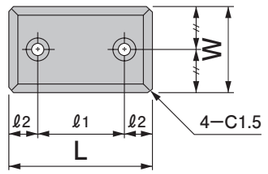
Specify Part No. by required width and length.
(e.g.) Width is 100mm and length is 200mm.

**CWXT - 100200**
**Part No.**

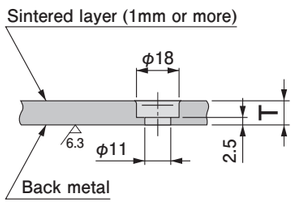
Motion direction




● Use the exclusive low-head bolt for mounting.
(LHS-M1020 is attached to CWXT series)

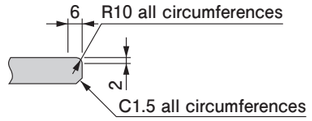



Cross-section



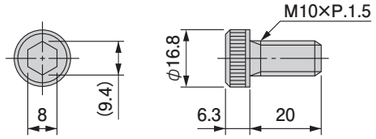

Chamfering

Type A




| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | No. of holes | Chamfering |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | ℓ1 | Tolerance | ℓ2 | | |
| CWXT-100100 | 100 | −0.1 −0.3 | 100 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 2 | A |
| CWXT-100125 | 100 | −0.1 −0.3 | 125 | −0.1 −0.3 | 10 | ±0.01 | 75 | ±0.2 | 25 | 2 | A |
| CWXT-100150 | 100 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 2 | A |
| CWXT-100200 | 100 | −0.1 −0.3 | 200 | −0.1 −0.3 | 10 | ±0.01 | 150 | ±0.2 | 25 | 2 | A |
| CWXT-100250 | 100 | −0.1 −0.3 | 250 | −0.1 −0.3 | 10 | ±0.01 | 200 | ±0.2 | 25 | 2 | A |
| CWXT-100300 | 100 | −0.1 −0.3 | 300 | −0.1 −0.3 | 10 | ±0.01 | 200 | ±0.2 | 50 | 2 | A |
| CWXT-125125 | 125 | −0.1 −0.3 | 125 | −0.1 −0.3 | 10 | ±0.01 | 75 | ±0.2 | 25 | 2 | A |
| CWXT-125150 | 125 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 2 | A |
| CWXT-125200 | 125 | −0.1 −0.3 | 200 | −0.1 −0.3 | 10 | ±0.01 | 150 | ±0.2 | 25 | 2 | A |
| CWXT-125250 | 125 | −0.1 −0.3 | 250 | −0.1 −0.3 | 10 | ±0.01 | 200 | ±0.2 | 25 | 2 | A |
| CWXT-125300 | 125 | −0.1 −0.3 | 300 | −0.1 −0.3 | 10 | ±0.01 | 200 | ±0.2 | 50 | 2 | A |
| CWXT-150150 | 150 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 2 | A |
| CWXT-150200 | 150 | −0.1 −0.3 | 200 | −0.1 −0.3 | 10 | ±0.01 | 150 | ±0.2 | 25 | 2 | A |
| CWXT-150250 | 150 | −0.1 −0.3 | 250 | −0.1 −0.3 | 10 | ±0.01 | 200 | ±0.2 | 25 | 2 | A |

● LHS Exclusive Bolt for CWXT
〔Part No. : **LHS-M1020**〕




● Exclusive bolt LHS-M1020 is attached to CWXT plate.
● The Exclusive bolt has approximate breaking toque of JIS standard M10 socket head cap screw.
N・m {kgf・m}

| Part No. | LHS-M1020 |
|---|---|
| Recommended tightening torque | 67.3 {6.86} |
| Breaking torque | 118 {12.0} |

※Bolt itself is on sale.



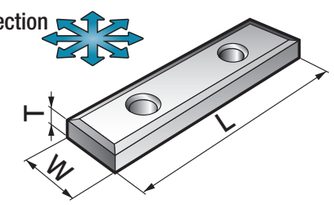
# CWA Oiles 2000 Wear Plates 10mm Thickness

RoHS2 ELV Lead Free

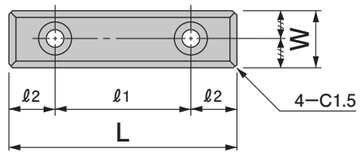
Specify Part No. by required width and length.
(e.g.) Width is 18mm and length is 100mm.

**CWA - 18100 N**
**Part No.**

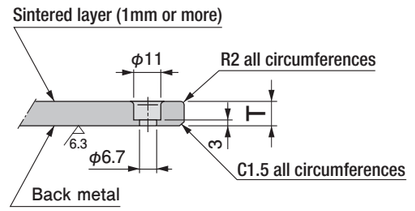
Motion direction




● Use M6×20 hexagon socket head bolt for mounting.



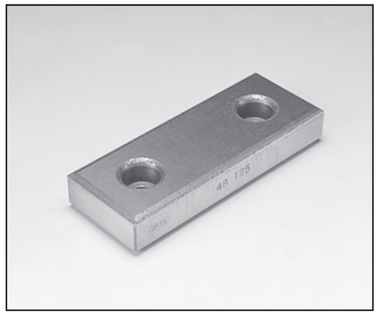

Cross-section




| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | No. of holes |
|---|---|---|---|---|---|---|---|---|---|---|
| | W | Toleramce | L | Toleramce | T | Toleramce | ℓ1 | Toleramce | ℓ2 | |
| CWA-1875N | 18 | −0.1 −0.3 | 75 | −0.1 −0.3 | 10 | ±0.01 | 45 | ±0.2 | 15 | 2 |
| CWA-18100N | 18 | −0.1 −0.3 | 100 | −0.1 −0.3 | 10 | ±0.01 | 50 | ±0.2 | 25 | 2 |
| CWA-18125N | 18 | −0.1 −0.3 | 125 | −0.1 −0.3 | 10 | ±0.01 | 75 | ±0.2 | 25 | 2 |
| CWA-18150N | 18 | −0.1 −0.3 | 150 | −0.1 −0.3 | 10 | ±0.01 | 100 | ±0.2 | 25 | 2 |

# CWP Oiles 2000 Wear Plates

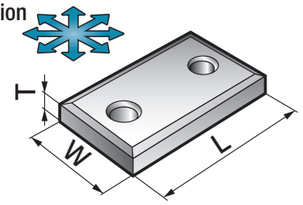
RoHS2 ELV Lead Free

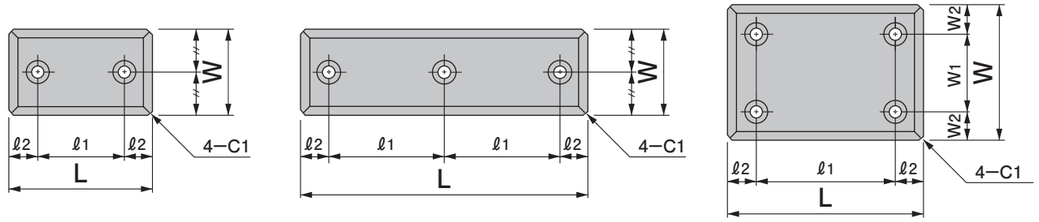


Specify Part No. by required width and length.
(e.g.) Width is 58mm and length is 150mm.

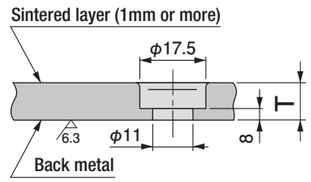
**CWP - 58150**
**Part No.**

Motion direction

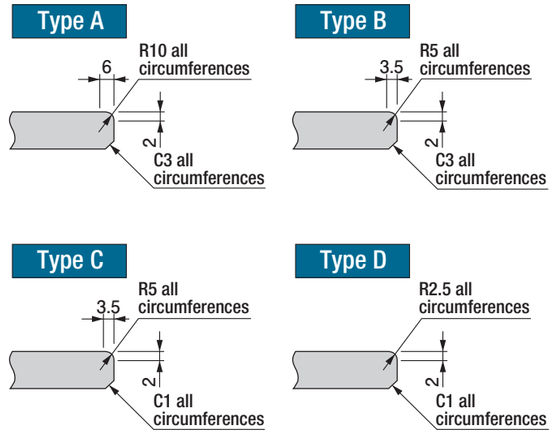



Cross-section




Chamfering




| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | Attach bolts | | Chamfering |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | ℓ1 | Tolerance | ℓ2 | Type | Qty | |
| CWP-2875 | 28 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.01 | 45 | ±0.2 | 15 | M10 Hexagon socket head | 2 | D |
| CWP-28100 | 28 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | D |
| CWP-28150 | 28 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | D |
| CWP-3875 | 38 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.01 | 45 | ±0.2 | 15 | M10 Hexagon socket head | 2 | C |
| CWP-38100 | 38 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | C |
| CWP-38150 | 38 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | C |
| CWP-4875 | 48 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.01 | 45 | ±0.2 | 15 | M10 Hexagon socket head | 2 | B |
| CWP-48100 | 48 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| CWP-48125 | 48 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| CWP-48150 | 48 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| CWP-48200 | 48 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 50 | M10 Hexagon socket head | 2 | B |
| CWP-48250 | 48 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 3 | B |
| CWP-5875 | 58 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.01 | 45 | ±0.2 | 15 | M10 Hexagon socket head | 2 | B |
| CWP-58100 | 58 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |
| CWP-58150 | 58 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | B |

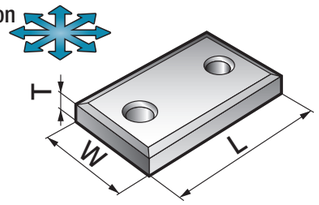
| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | | | | Attach bolts | | Chamfering |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | W1 | Tolerance | W2 | ℓ1 | Tolerance | ℓ2 | Type | Qty | |
| CWP-7575B | 75 | −0.1 −0.3 | 75 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 25 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWP-75100B | 75 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWP-75125 | 75 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWP-75150 | 75 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWP-75200 | 75 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWP-75250 | 75 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 100 | ±0.2 | 25 | M10 Hexagon socket head | 3 | A |
| CWP-75300 | 75 | −0.1 −0.3 | 300 | −0.1 −0.3 | 20 | ±0.01 | — | — | — | 100 | ±0.2 | 50 | M10 Hexagon socket head | 3 | A |
| CWP-100100 | 100 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-100125 | 100 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-100150 | 100 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-100200 | 100 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-100250 | 100 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-100300 | 100 | −0.1 −0.3 | 300 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | 200 | ±0.2 | 50 | M10 Hexagon socket head | 4 | A |
| CWP-125125 | 125 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 37.5 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-125150 | 125 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 37.5 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-125200 | 125 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 37.5 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-125250 | 125 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 37.5 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-125300 | 125 | −0.1 −0.3 | 300 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 37.5 | 200 | ±0.2 | 50 | M10 Hexagon socket head | 4 | A |
| CWP-150150 | 150 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-150200 | 150 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |
| CWP-150250 | 150 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 4 | A |

# CWPT Oiles 2000 Wear Plates 20mm Thickness (2 hole type)

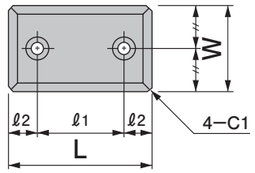
Specify Part No. by required width and length.
(e.g.) Width is 125mm and length is 150mm.

**CWPT - 125150**
**Part No.**

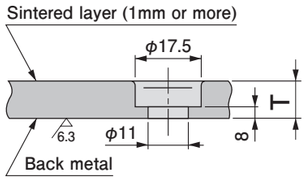
Motion direction




● CTP series were renamed CWPT series.

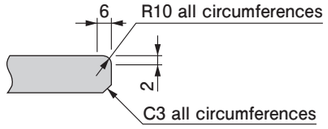



Cross-section




Chamfering

Type A

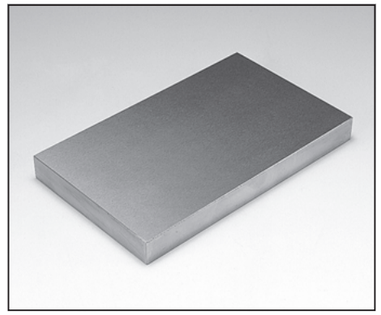



| Part No. | Width | | Length | | Thickness | | Mounting hole intervals | | | Attach bolts | | Chamfering |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W | Tolerance | L | Tolerance | T | Tolerance | ℓ1 | Tolerance | ℓ2 | Type | Qty | |
| CWPT-100100 | 100 | −0.1 −0.3 | 100 | −0.1 −0.3 | 20 | ±0.01 | 50 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-100125 | 100 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-100150 | 100 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-100200 | 100 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-100250 | 100 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-100300 | 100 | −0.1 −0.3 | 300 | −0.1 −0.3 | 20 | ±0.01 | 200 | ±0.2 | 50 | M10 Hexagon socket head | 2 | A |
| CWPT-125125 | 125 | −0.1 −0.3 | 125 | −0.1 −0.3 | 20 | ±0.01 | 75 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-125150 | 125 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-125200 | 125 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-125250 | 125 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-125300 | 125 | −0.1 −0.3 | 300 | −0.1 −0.3 | 20 | ±0.01 | 200 | ±0.2 | 50 | M10 Hexagon socket head | 2 | A |
| CWPT-150150 | 150 | −0.1 −0.3 | 150 | −0.1 −0.3 | 20 | ±0.01 | 100 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-150200 | 150 | −0.1 −0.3 | 200 | −0.1 −0.3 | 20 | ±0.01 | 150 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |
| CWPT-150250 | 150 | −0.1 −0.3 | 250 | −0.1 −0.3 | 20 | ±0.01 | 200 | ±0.2 | 25 | M10 Hexagon socket head | 2 | A |



# CWI Oiles 2000 Plates for Additional Machining

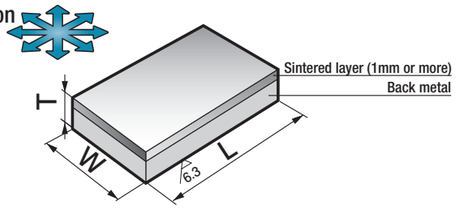
RoHS2 ELV Lead Free



Specify Part No. by required width, length, and thickness.
(e.g.) With is 100mm, length is 200mm, and thickness is 15mm.

**CWI - 10020015**
**Part No.**

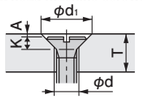
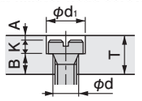
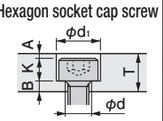
Motion direction




- For additional machining, cutting or drilling to your required dimension.
- Machine the back metal side to adjust the thickness.
- Oil impregnation is necessary by referring to the oil impregnation method, page 250 when you machined the plate.

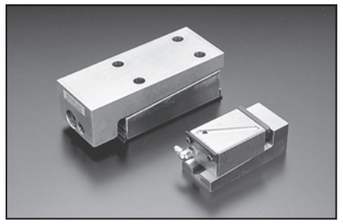
| Part No. | Width | Length | Thickness | |
|---|---|---|---|---|
| | W | L | T | Tolerance |
| CWI-504806 | 50 | 480 | 6 | ±0.02 |
| CWI-504808 | 50 | 480 | 8 | ±0.02 |
| CWI-10020010 | 100 | 200 | 10 | ±0.02 |
| CWI-4048010 | 40 | 480 | 10 | ±0.02 |
| CWI-15048010 | 150 | 480 | 10 | ±0.02 |
| CWI-10020012 | 100 | 200 | 12 | ±0.02 |
| CWI-15048012 | 150 | 480 | 12 | ±0.02 |
| CWI-10020015 | 100 | 200 | 15 | ±0.02 |
| CWI-15048015 | 150 | 480 | 15 | ±0.02 |
| CWI-12020020 | 120 | 200 | 20 | ±0.02 |
| CWI-15025020 | 150 | 250 | 20 | ±0.02 |
| CWI-15042020 | 150 | 420 | 20 | ±0.02 |
| CWI-10015025 | 100 | 150 | 25 | ±0.02 |
| CWI-15025025 | 150 | 250 | 25 | ±0.02 |
| CWI-15025030 | 150 | 250 | 30 | ±0.02 |

● Following table indicates mating dimensions used for application of general screws and bolts.

| Type | | Plate thickness T | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 6 | 8 | 10 | 12 | 15 | 20 | 25 | 30 |
| Flat head machine screws  | M | M8 | M10 | M10 | — | — | — | — | — |
| | A | 1 | 1 | 1.5 | — | — | — | — | — |
| | d | 10 | 12 | 12 | — | — | — | — | — |
| | d1 | 19.3 | 22 | 23 | — | — | — | — | — |
| | K | 4.65 | 5.0 | 5.0 | — | — | — | — | — |
| Flat fillister head screw  | M | M5 | M6 | M8 | — | — | — | — | — |
| | A | 0.7 | 1.6 | 1.8 | — | — | — | — | — |
| | d | 5.5 | 6.6 | 9 | — | — | — | — | — |
| | d1 | 10 | 12 | 16 | — | — | — | — | — |
| | B | 2 | 2.5 | 3 | — | — | — | — | — |
| Hexagon socket cap screw  | M | — | M5 | M6(10 ) | M8(10 ) | M10 | M12 | M16 | M20 |
| | A | — | 1 | 1.5( 1.2) | 1( 2.7) | 1.5 | 1.5 | 1.5 | 1.5 |
| | d | — | 5.5 | 6.7(11 ) | 9(11 ) | 11 | 14 | 18 | 22 |
| | d1 | — | 9.5 | 11 (18 ) | 15(18 ) | 17.5 | 20 | 26 | 32 |
| | B | — | 2 | 2.5( 2.5) | 3( 3 ) | 3.5 | 6.5 | 7.5 | 8.5 |

※The values in parentheses are applicable when exclusive low-head bolt LHS-M1020 are used.
※The sink dimension (A) does not conform to JIS Standard, since these are sliding materials.

# Oiles Shoe Units Unit bearings



The Oiles Shoe Units are unit bearings developed as shoe units of movable platens for injection molding machines.

RoHS2 ELV Lead Free

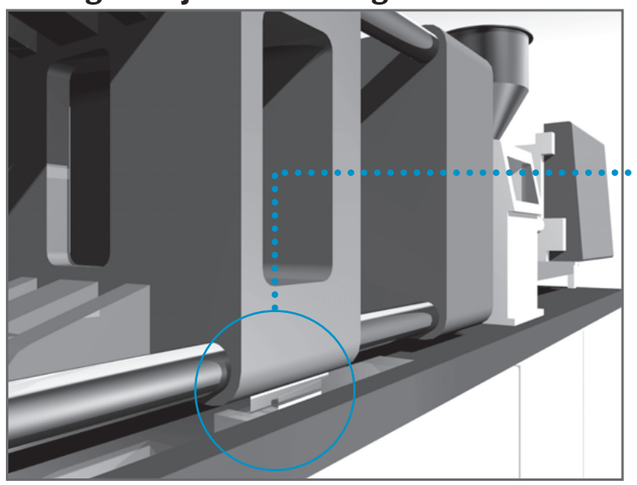
## Feature

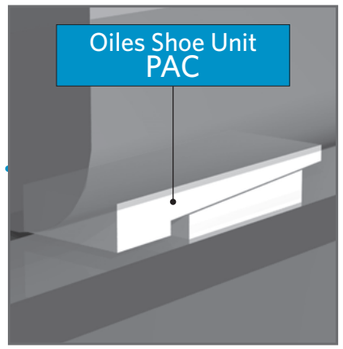
- Usable as not only movable platens but also various types of shims and spacers.
- The sliding material is made of Oiles 2000 featuring superior wear resistance.
- The slide seals are attached to the slide plates, eliminating troublesome adjustment of the slide seals after height adjustment.
- The height is adjustable in ±0.25 to ±0.7 mm range.

| Part No. | Height-adjustable range (mm) | Sliding surface length (mm) | Sliding area (cm²) | Load (Note) (N/2pc) {kgf/2pc} | Assumed mold clamping force (kN) {ton} |
|---|---|---|---|---|---|
| PAC30-90 | ±0.25 | 55 | 16.5 | 6,470 { 660} | 830 or less { 85 or less} |
| PAC40-100 | ±0.35 | 55 | 22 | 8,630 { 880} | 830～ 980 { 85～ 100} |
| PAC50-150 | ±0.35 | 100 | 50 | 19,600 { 2,000} | 980～ 2,450 {100～ 250} |
| PAC60-160 | ±0.35 | 110 | 66 | 25,900 { 2,640} | 2,450～ 3,920 {250～ 400} |
| PAC75-180 | ±0.35 | 130 | 97.5 | 38,200 { 3,900} | 3,920～ 5,880 {400～ 600} |
| PAC100-250 | ±0.7 | 250 | 250 | 98,100 {10,000} | 5,880～ 7,850 {600～ 800} |
| PAC125-250 | ±0.7 | 250 | 312.5 | 122,600 {12,500} | 7,840～12,750 {800～1,300} |
| PAC150-300 | ±0.7 | 300 | 450 | 176,500 {18,000} | 15,690 or less {1,600 or less} |

(Note) Load is based on the design surface pressure of 1.96N/mm² {20kgf/cm²}.

## Usage in Injection molding machine.

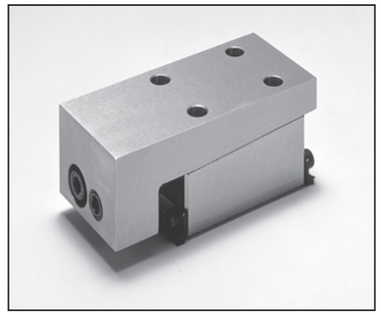







# PAC Oiles Shoe Units

RoHS2 ELV Lead Free



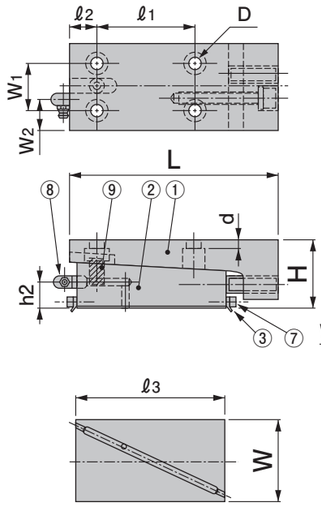
Specify Part No. by required size.
(e.g.) Width is 50mm.

**PAC 50 - 150**
**Part No.**

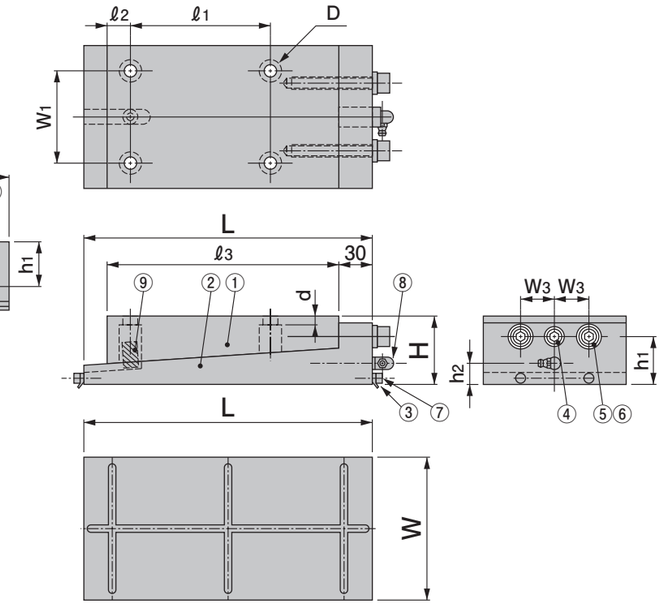
| | Part name | Material |
|---|---|---|
| ① | Table | SS400 |
| ② | Slide plate | 2000 |
| ③ | Slide seal* | NBR+SPCC |
| ④ | Adjustable push bolt | SCM435 |
| ⑤ | Adjustable pull bolt | SCM435 |
| ⑥ | Spring washers | SCM435 |
| ⑦ | Set screw for seal* | SCM435 |
| ⑧ | Grease nipple | S15C(C-PT1/8) |
| ⑨ | Spring pin | S60CM |

※PAC30-90 does not have a slide seal and set screw for seal.

W=30、40、50、60、75




W=100、125、150




| Part No. | Width W | Length L | Height H | D | W1 | W2 | W3 | ℓ1 | ℓ2 | ℓ3 | h1 | h2 | d | Adjustable bolts ④ | Adjustable bolts ⑤ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PAC30-90 | 30 | 80 | 30 | (M6) | 15 | 6.5 | 13 | 25 | 30 | 55 | 20.5 | 7.5 | 4.5 | M 8×25 | M 6×35 |
| PAC40-100 | 40 | 90 | 40 | (M6) | 25 | 8 | 13 | 35 | 15 | 55 | 23.5 | 18 | 5 | M10×30 | M 6×40 |
| PAC50-150 | 50 | 140 | 45 | (M8) | 30 | 15 | 16 | 65 | 20 | 100 | 28 | 20 | 5 | M12×35 | M 8×50 |
| PAC60-160 | 60 | 150 | 50 | (M10) | 35 | 20 | 17 | 70 | 20 | 110 | 32 | 20 | 6 | M12×35 | M 8×50 |
| PAC75-180 | 75 | 170 | 50 | (M10) | 45 | 25 | 17 | 85 | 25 | 130 | 33 | 20 | 6 | M12×35 | M 8×50 |
| PAC100-250 | 100 | 250 | 60 | (M12) | 60 | — | 25 | 120 | 20 | 200 | 43 | 20 | 10 | M16×40 | M10×70 |
| PAC125-250 | 125 | 250 | 60 | (M12) | 80 | — | 30 | 120 | 20 | 200 | 43 | 20 | 10 | M16×40 | M10×70 |
| PAC150-300 | 150 | 300 | 70 | (M16) | 100 | — | 40 | 120 | 40 | 250 | 50 | 20 | 10 | M20×40 | M12×70 |

# Oiles 2000S

## Sintered oil-impregnated bearings with dispersed solid lubricant

RoHS2 ELV Lead Free

## Feature

- Serviceable without the need for lubrication. Demonstrates higher performance when greased.
- Distributed solid lubricant allows motions in any direction.
- Features low coefficient of friction and quite superior wear resistance.
- Lower prices than bearings with copper alloy bases.

### Service range

| | |
|---|---|
| Lubrication condition | Dry (initial greasing recommended) |
| Service temperature range ℃ | −40～+120 |
| Allowable max. pressure P N/mm² {kgf/cm²} | 29 (49) {296 (500)} |
| Allowable max. velocity V m/s {m/min} | 1.00 {60} |
| Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min} | 1.63 {1,000} |

The values in parentheses are static bearing pressures, which are the bearing pressures in applications with no motion or very small motion (≦0.0017m/s [0.1m/min]).

### Mechanical properties

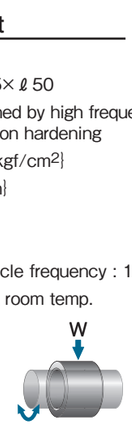
| | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 5.7 |
| Radial crushing strength | JIS Z 2507 | N/mm² {kgf/mm²} | 350 {36} |
| Hardness | JIS K 7202-2 | HRM | 90 |
| Oil impregnation rate | —— | vol% | 16 |
| Co-efficient of thermal expansion | —— | ×10⁻⁵ ℃⁻¹ | 1.2 |

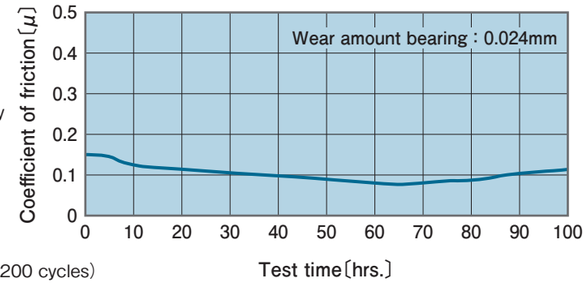
※The value shown above are for sintered layer.

## Test data

### Journal oscillation test

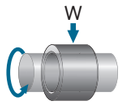
<Testing conditions>
Bearing dimension : φ60×φ75× ℓ 50
Mating material : S45C quenched by high frequency induction hardening
Pressure : 24.5N/mm² {250.0kgf/cm²}
Velocity : 0.033m/s {2.0m/min}
Oscillating cycle : 21.2cpm
Oscillating angle : ±45°
Test time : 100hrs. (durable cycle frequency : 127,200 cycles)
Ambience : in the atmosphere, room temp.
Lubrication : initial greasing

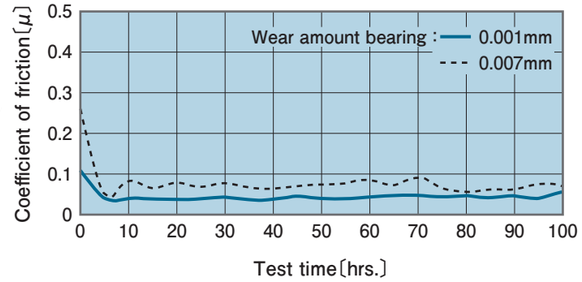



### Journal rotation test

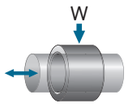
<Testing conditions>
Bearing dimension : φ40×φ50× ℓ 30
Mating material : S45C quenched by high frequency induction hardening
Test time : 100hrs.
Ambience : in the atmosphere, room temp.
Pressure : —— 9.8N/mm² {100.0kgf/cm²}
Velocity 0.167m/s {10.0m/min}
Lubrication Initial greasing
---- 19.6N/mm² {200.0kgf/cm²}
0.083m/s {5.0m/min}
Dry

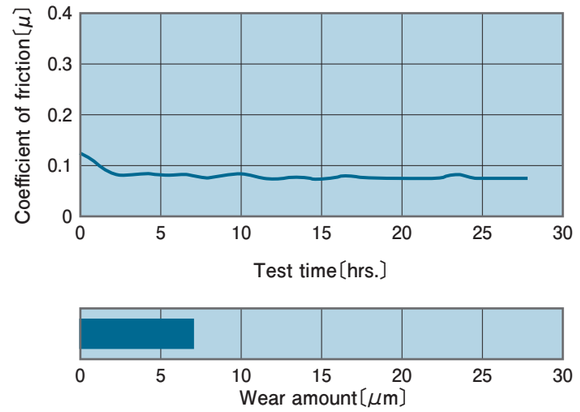



### Receprocation test

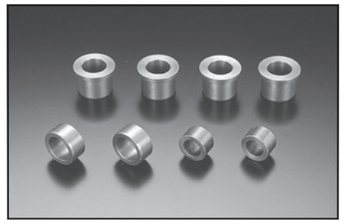
<Testing conditions>
Mating material : SCM440 hard-chrome plating
Pressure : 1.18N/mm² {12.0kgf/cm²}
Velocity : 1m/s {60m/min}
Test time : 27.8hrs.
Lubrication : Initial greasing



# Oiles Cermet M

**Sintered bearings with dispersed solid lubricant**



RoHS2 ELV Lead Free

## Feature

- Serviceable without the need for lubrication. Demonstrates higher performance when lubricated.
- Demonstrates superior wear resistance in applications where oil film is seldom produced such as reciprocating motions, oscillation, frequent starts and stops, etc.
- Standard products and materials for machining are available in various sizes.

## Service range

| Lubrication condition | Dry | periodic lubrication |
|---|---|---|
| Service temperature range ℃ | −40～+200 | −40～+150 |
| Allowable max. pressure P N/mm² {kgf/cm²} | 10 {102} | |
| Allowable max. velocity V m/s {m/min} | 0.85 {51} | 1.65 {99} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 1.65 {1,010} | 2.45 {1,500} |

## Mechanical properties

| | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 6.4 |
| Radial crushing strength | JIS Z 2507 | N/mm² {kgf/mm²} | 137 {14} |
| Hardness | JIS K 7202-2 | HRM | 73 |
| Oil impregnation rate | —— | vol% | 3 |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 1.9 |

※The value shown above are for sintered layer.

## Lathe turning

| | | |
|---|---|---|
| Cutting tool | carbide tool (JIS) | |
| | Relief angle | 2～5° |
| | Rake angle | 10～20° |
| | Nose radius (mm) | 0.40～0.80 |
| Condition | Speed (m/min) | 100～120 |
| | Cut depth (mm) | 0.20～0.30 |
| | Feed (mm/rev) | 0.03～0.10 |

Apply grease or oil impregnation after machining.

## Machining accuracy (bushing)

| I.D. | O.D. | Length |
|---|---|---|
| class 7 to 8 | class 6 to 7 | class 8 to 9 |

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

## Test data

Journal rotation test

<Testing conditions>

Mating material : S45C

Pressure : 1.96N/mm²{20.0kgf/cm²}

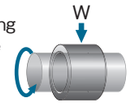
Velocity : 0.17m/s{10.0m/min}

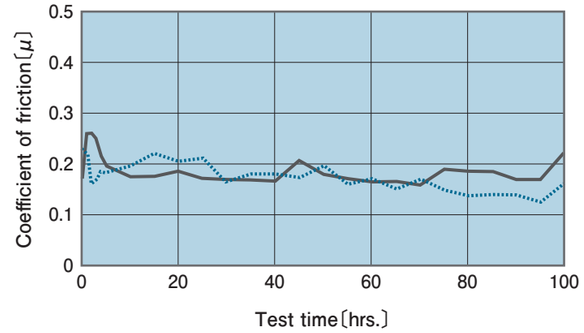
Test time : 100hrs.

Finishing method

Test piece after sizing

Machined test piece




## Oil impregnation method

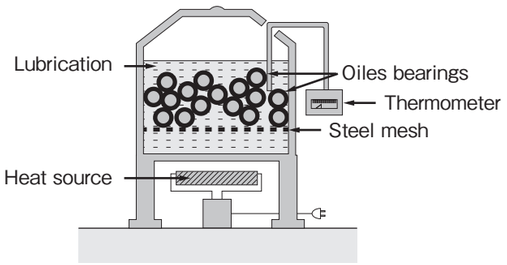
Oil impregnation is required for oil-containing OILES bearings such as Oiles Cermet M. If you purchase tube or bar stocks, please follow the procedure below to impregnate finished products with lubrication oil before installation.

If these bearings are stored for a long time or if the bearings are washed, re-impregnate before installation.

Immerse the products into an oil bath. Heat the bath up to 100 ℃ to 110 ℃. Keep the temperature for 30 to 60 minutes until no more air bubbles come up.

Cut the heat source and let it cool down to the room temperature.

Take products out of the bath to install. If oil impregnation by heating is not possible, leave the products in the oil bath for 24 hours or more.

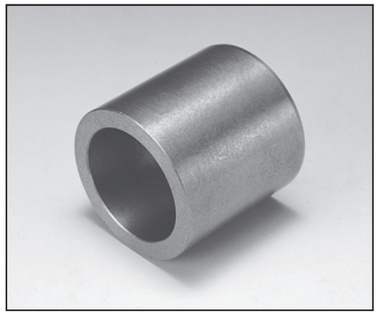



Selectoin of lubrication oil

| Operation conditions | Types of oil | Viscosity | i.e. |
|---|---|---|---|
| Low load / high speed | Lubrication oil of low viscosity | 8 to 17cst(30℃) | Spindle oil |
| Mid load / mid velocity | Lubrication oil with limited viscosity change by temp. | 8 to 15cst(98.9℃) | Motor oil |
| High load / low velocity | Lubrication oil with high viscosity | 100 to 1000cst(37℃) | Gear oil |

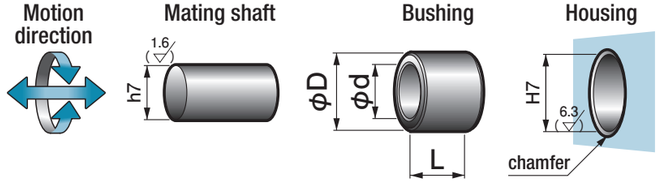
# 54B Oiles Cermet M Bushings

RoHS2 ELV Lead Free

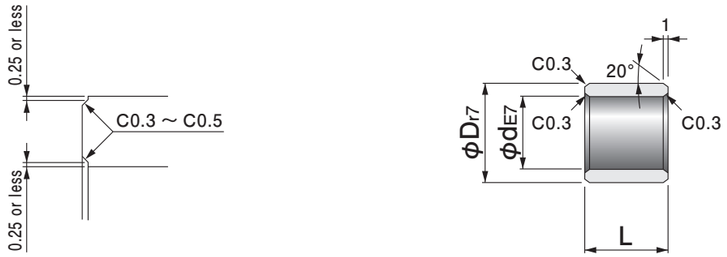


Specify Part No. by required I.D., O.D., and Length.
(e.g.) I.D. is 12mm, O.D. is 18mm, and length is 10mm.

**54B - 121810**
**Part No.**




● Some chamfering dimensions may differ from the shown dimension.




| I.D. | | O.D. | | Length L Tolerance $^{-0.1}_{-0.3}$ | | | | | | | | | | | I.D. tolerance after press fitting (reference) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| φd | Tolerance | φD | Tolerance | 3 | 4 | 5 | 6 | 8 | 10 | 15 | 20 | 25 | 30 | 40 | |
| 3 | +0.024 +0.014 | 6 | +0.027 +0.015 | 030603 | | 030605 | | | | | | | | | +0.017 +0.007 |
| 4 | +0.032 +0.020 | 7 | +0.034 +0.019 | | 040704 | 040705 | 040706 | | | | | | | | +0.023 +0.011 |
| 5 | +0.032 +0.020 | 8 | +0.034 +0.019 | | | 050805 | 050806 | 050808 | | | | | | | +0.023 +0.011 |
| 6 | +0.032 +0.020 | 10 | +0.034 +0.019 | | | 061005 | 061006 | 061008 | 061010 | | | | | | +0.023 +0.011 |
| 8 | +0.040 +0.025 | 12 | +0.041 +0.023 | | | | 081206 | 081208 | 081210 | 081215 | | | | | +0.029 +0.014 |
| 10 | +0.040 +0.025 | 16 | +0.041 +0.023 | | | | 101606 | 101608 | 101610 | 101615 | 101620 | | | | +0.029 +0.014 |
| 12 | +0.050 +0.032 | 18 | +0.041 +0.023 | | | | | 121808 | 121810 | 121815 | 121820 | | | | +0.039 +0.021 |
| 14 | +0.050 +0.032 | 20 | +0.049 +0.028 | | | | | | 142010 | 142015 | 142020 | | | | +0.036 +0.018 |
| 15 | +0.050 +0.032 | 21 | +0.049 +0.028 | | | | | | 152110 | 152115 | 152120 | 152125 | | | +0.036 +0.018 |
| 16 | +0.050 +0.032 | 22 | +0.049 +0.028 | | | | | | 162210 | 162215 | 162220 | 162225 | | | +0.036 +0.018 |
| 18 | +0.050 +0.032 | 24 | +0.049 +0.028 | | | | | | 182410 | 182415 | 182420 | 182425 | 182430 | | +0.036 +0.018 |
| 20 | +0.061 +0.040 | 28 | +0.049 +0.028 | | | | | | | 202815 | 202820 | | 202830 | | +0.047 +0.026 |
| 25 | +0.061 +0.040 | 35 | +0.059 +0.034 | | | | | | | | 253520 | 253525 | 253530 | | +0.044 +0.018 |
| 30 | +0.061 +0.040 | 40 | +0.059 +0.034 | | | | | | | | 304020 | 304025 | 304030 | 304040 | +0.044 +0.018 |

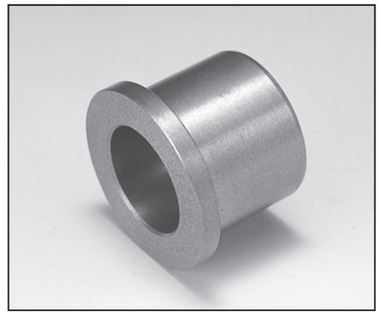
※The I.D. tolerance after press fitting is for reference only.

⚠ The dimensional tolerances are the values measured at +25℃.



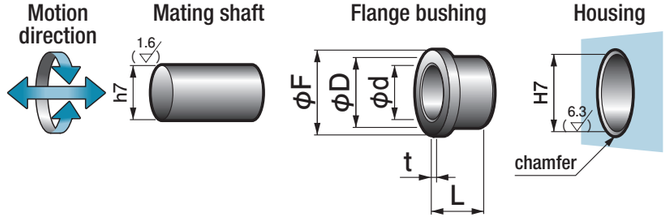
# 54F Oiles Cermet M Flange Bushings

RoHS2 ELV Lead Free

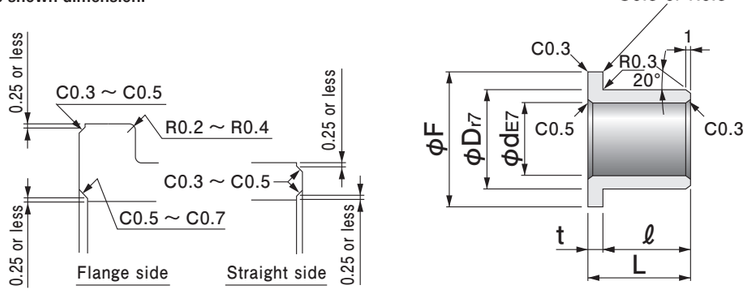


Specify Part No. by required I.D. and Length.
(e.g.) I.D. is 12mm and length is 12mm.

**54F - 1212**
**Part No.**




● Some chamfering dimensions may differ from the shown dimension.



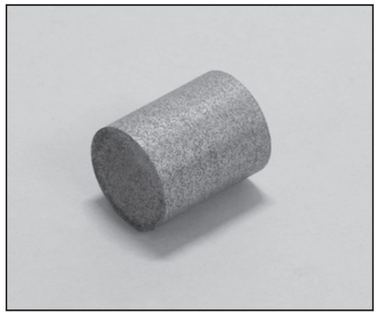

| Part No. | I.D. | | O.D. | | Flange | | | | Length | | | I.D. tolerance after press fitting (reference) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | φF | Tolerance | t | Tolerance | L | Tolerance | ℓ | |
| 54F-0303 | 3 | +0.024 +0.014 | 6 | +0.027 +0.015 | 9 | 0 −0.2 | 1.5 | 0 −0.2 | 4.5 | 0 −0.4 | 3 | +0.017 +0.007 |
| 54F-0404 | 4 | +0.032 +0.020 | 7 | +0.034 +0.019 | 10 | 0 −0.2 | 1.5 | 0 −0.2 | 5.5 | 0 −0.4 | 4 | +0.023 +0.011 |
| 54F-0505 | 5 | +0.032 +0.020 | 8 | +0.034 +0.019 | 11 | 0 −0.2 | 1.5 | 0 −0.2 | 6.5 | 0 −0.4 | 5 | +0.023 +0.011 |
| 54F-0606 | 6 | +0.032 +0.020 | 10 | +0.034 +0.019 | 14 | 0 −0.2 | 2 | 0 −0.2 | 8 | 0 −0.4 | 6 | +0.023 +0.011 |
| 54F-0808 | 8 | +0.040 +0.025 | 12 | +0.041 +0.023 | 16 | 0 −0.2 | 2 | 0 −0.2 | 10 | 0 −0.4 | 8 | +0.029 +0.014 |
| 54F-1010 | 10 | +0.040 +0.025 | 16 | +0.041 +0.023 | 20 | 0 −0.2 | 2 | 0 −0.2 | 12 | 0 −0.4 | 10 | +0.029 +0.014 |
| 54F-1212 | 12 | +0.050 +0.032 | 18 | +0.041 +0.023 | 22 | 0 −0.2 | 2 | 0 −0.2 | 14 | 0 −0.4 | 12 | +0.039 +0.021 |
| 54F-1414 | 14 | +0.050 +0.032 | 20 | +0.049 +0.028 | 24 | 0 −0.2 | 3 | 0 −0.2 | 17 | 0 −0.4 | 14 | +0.036 +0.018 |
| 54F-1515 | 15 | +0.050 +0.032 | 21 | +0.049 +0.028 | 27 | 0 −0.2 | 3 | 0 −0.2 | 18 | 0 −0.4 | 15 | +0.036 +0.018 |
| 54F-1616 | 16 | +0.050 +0.032 | 22 | +0.049 +0.028 | 28 | 0 −0.2 | 3 | 0 −0.2 | 19 | 0 −0.4 | 16 | +0.036 +0.018 |
| 54F-1817 | 18 | +0.050 +0.032 | 24 | +0.049 +0.028 | 30 | 0 −0.2 | 3 | 0 −0.2 | 20 | 0 −0.4 | 17 | +0.036 +0.018 |
| 54F-2021 | 20 | +0.061 +0.040 | 28 | +0.049 +0.028 | 34 | 0 −0.2 | 4 | 0 −0.2 | 25 | 0 −0.4 | 21 | +0.047 +0.026 |
| 54F-2521 | 25 | +0.061 +0.040 | 35 | +0.059 +0.034 | 42 | 0 −0.2 | 4 | 0 −0.2 | 25 | 0 −0.4 | 21 | +0.044 +0.023 |
| 54F-3026 | 30 | +0.061 +0.040 | 40 | +0.059 +0.034 | 48 | 0 −0.2 | 4 | 0 −0.2 | 30 | 0 −0.4 | 26 | +0.044 +0.023 |

※The I.D. tolerance after press fitting is for reference only.

⚠ The dimensional tolerances are the values measured at +25℃.

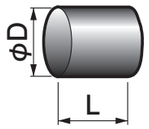
# 54M Oiles Cermet M Bar Stock

RoHS2 ELV Lead Free



Specify Part No. by required diameter and length.
(e.g.) Diameter is 21mm and length is 26mm.

**54M - 2126**
**Part No.**



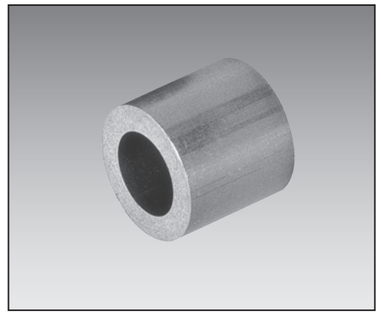

● Oil impregnation is necessary by referring to the oil impregnation method, page 250 when you machined the plate.

| Part No. | Diameter | | Length | |
|---|---|---|---|---|
| | φD | Tolerance | L | Tolerance |
| 54M-0910 | 9 | +0.6 +0.2 | 10 | +3.0 0 |
| 54M-1316 | 13 | +0.6 −0.2 | 16 | +3.0 0 |
| 54M-1821 | 18 | +0.6 −0.2 | 21 | +3.0 0 |
| 54M-2126 | 21 | +0.8 0 | 26 | +3.0 0 |
| 54M-2631 | 26 | +0.8 0 | 31 | +3.0 0 |
| 54M-3341 | 33 | +0.8 0 | 41 | +3.0 0 |
| 54M-4146 | 41 | +0.8 0 | 46 | +3.0 0 |
| 54M-6049 | 60 | +2.0 +1.0 | 49 | +3.0 0 |



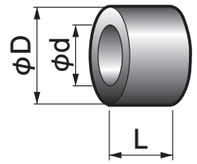
# 54S Oiles Cermet M Bushing Material

RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D., and Length.
(e.g.) I.D. is 12mm, O.D. is 18mm, and length is 10mm.

**54S - 153131**
**Part No.**

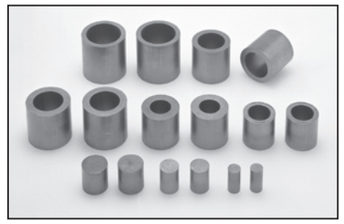



● Oil impregnation is necessary by referring to the oil impregnation method, page 250 when you machined the plate.

| Part No. | I.D. | | O.D. | | Length | |
|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | L | Tolerance |
| 54S-092333 | 9 | +0.5 −0.3 | 23 | +0.6 −0.2 | 33 | +3.0 0 |
| 54S-142631 | 14 | +0.5 −0.3 | 26 | +0.8 0 | 31 | +3.0 0 |
| 54S-153131 | 15 | +0.5 −0.3 | 31 | +0.6 −0.2 | 31 | +3.0 0 |
| 54S-244133 | 24 | +0.5 −0.3 | 41 | +0.8 0 | 33 | +3.0 0 |
| 54S-294136 | 29 | +0.5 −0.3 | 41 | +0.8 0 | 36 | +3.0 0 |
| 54S-294933 | 29 | +0.5 −0.3 | 49 | +0.6 −0.2 | 33 | +3.0 0 |

# Oiles Cermet G

**Sintered bearings with dispersed solid lubricant**



RoHS2 ELV Lead Free

## Feature

- Serviceable without the need for lubrication.
- Features superior heat resistance.
- Demonstrates superior performance in hot and hard-to-lubricate positions.
- Materials for machining are available.

## Service range

| Lubrication condition | Dry | periodic lubrication |
|---|---|---|
| Service temperature range ℃ | −40～+250 | −40～+150 |
| Allowable max. pressure P N/mm² {kgf/cm²} | 10 {102} | |
| Allowable max. velocity V m/s {m/min} | 0.50 {30} | 0.85 {51} |
| Allowable max. PV value N/mm²・m/s {kgf/cm²・m/min} | 0.86 {490} | 1.65 {1,010} |

## Mechanical properties

| | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 6.4 |
| Radial crushing strength | JIS Z 2507 | N/mm² {kgf/mm²} | 137 {14} |
| Hardness | JIS K 7202-2 | HRM | 43 |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 2.0 |

※The value shown above are for sintered layer.

## Lathe turning

| | | |
|---|---|---|
| Cutting tool | carbide tool (JIS) | |
| | Relief angle | 2～5° |
| | Rake angle | 10～20° |
| | Nose radius (mm) | 0.40～0.80 |
| Condition | Speed (m/min) | 100～120 |
| | Cut depth (mm) | 0.20～0.30 |
| | Feed (mm/rev) | 0.03～0.10 |

## Machining accuracy (bushing)

| I.D. | O.D. | Length |
|---|---|---|
| class 7 to 8 | class 6 to 7 | class 8 to 9 |

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

## ●About the material for machining

**Although it is not oil-bearing material, it can be used as-is without lubrication.**

**By applying an oil-bearing process or grease after machining, the reduction of wear and extension of life can be achieved.**

## Test data

### Thrast test

<Testing conditions>

Bearing dimension : φ16×φ28×ℓ15

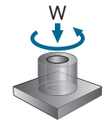
Mating material : 0.49N/mm²{5.0kgf/cm²}

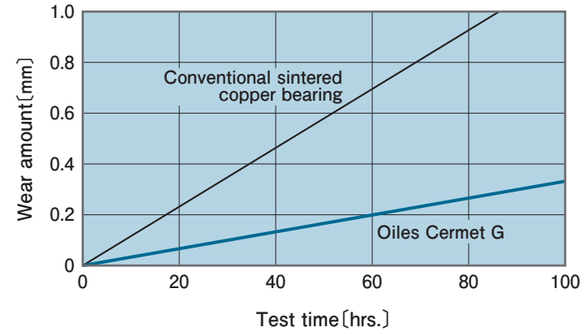
Velocity : 0.033m/s{2.0m/min}

Ambience : 300℃

Test time : 100hrs.

Lubrication : dry



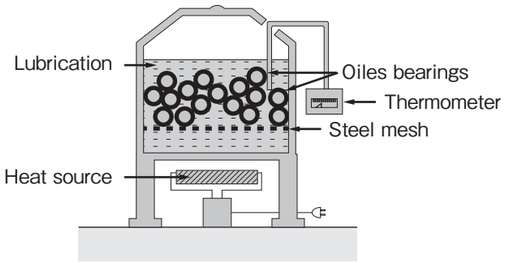

## Oil impregnation method

When you oil-impregnate Cemet G, please follow the procedure below to impregnate finished products with lubrication oil before installation. If these bearings are stored for a long time or if the bearings are washed, re-impregnate before installation.

Immerse the products into an oil bath. Heat the bath up to 100 ℃ to 110 ℃. Keep the temperature for 30 to 60 minutes until no more air bubbles come up.

Cut the heat source and let it cool down to the room temperature.

Take products out of the bath to install. If oil impregnation by heating is not possible, leave the products in the oil bath for 24 hours or more.

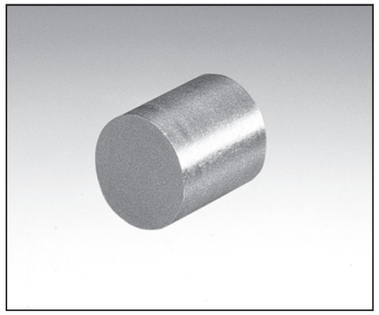



Selectoin of lubrication oil

| Operation conditions | Types of oil | Viscosity | i.e. |
|---|---|---|---|
| Low load / high speed | Lubrication oil of low viscosity | 8 to 17cst(30℃) | Spindle oil |
| Mid load / mid velocity | Lubrication oil with limited viscosity change by temp. | 8 to 15cst(98.9℃) | Motor oil |
| High load / low velocity | Lubrication oil with high viscosity | 100 to 1000cst(37℃) | Gear oil |

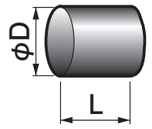
# 55M Oiles Cermet G Bar Stock

RoHS2 ELV Lead Free



Specify Part No. by required diameter.
(e.g.) Diameter is 18mm.

**55M - 18**
**Part No.**



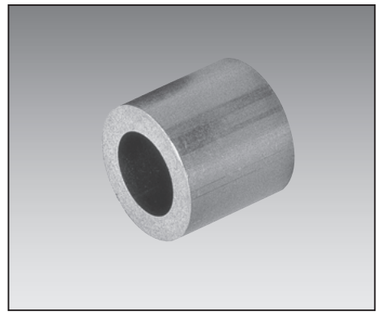

● Please refer to page 256 for the method for oil-bearing treatment.

| Part No. | Diameter | | Length | |
|---|---|---|---|---|
| | φD | Tolerance | L | Tolerance |
| 55M-11 | 11 | +0.8 0 | 21 | +3.0 0 |
| 55M-15 | 15 | +0.8 0 | 31 | +3.0 0 |
| 55M-18 | 18 | +0.8 0 | 21 | +3.0 0 |
| 55M-23 | 23 | +0.8 0 | 31 | +3.0 0 |
| 55M-31 | 31 | +0.8 0 | 31 | +3.0 0 |



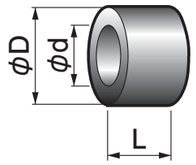
# 55S Oiles Cermet G Bushing Material

RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D., and Length.
(e.g.) I.D. is 44mm, O.D. is 56mm, and length is 51mm.

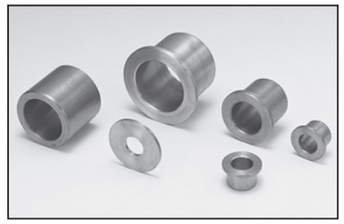
**55S - 445651**
**Part No.**




● Please refer to page 256 for the method for oil-bearing treatment.

| Part No. | I.D. | | O.D. | | Length | |
|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | L | Tolerance |
| 55S-193126 | 19 | +0.3 −0.5 | 31 | +0.3 −0.5 | 26 | +3.0 0 |
| 55S-243631 | 24 | +0.3 −0.5 | 36 | +0.3 −0.5 | 31 | +3.0 0 |
| 55S-284846 | 28 | 0 −1.2 | 48 | +1.2 0 | 46 | +3.0 0 |
| 55S-294141 | 29 | +0.3 −0.5 | 41 | +0.3 −0.5 | 41 | +4.0 0 |
| 55S-344641 | 34 | +0.3 −0.5 | 46 | +0.3 −0.5 | 41 | +4.0 0 |
| 55S-345151 | 34 | 0 −1.2 | 51 | +1.2 0 | 51 | +4.0 0 |
| 55S-395651 | 39 | +0.3 −0.5 | 56 | +1.2 0 | 51 | +4.0 0 |
| 55S-445651 | 44 | +0.3 −0.5 | 56 | +1.2 0 | 51 | +4.0 0 |
| 55S-496661 | 49 | 0 −1.2 | 66 | +1.2 0 | 61 | +4.0 0 |
| 55S-517361 | 51 | 0 −1.2 | 73 | +1.2 0 | 61 | +4.0 0 |
| 55S-547661 | 54 | 0 −1.2 | 76 | +1.2 0 | 61 | +4.0 0 |
| 55S-568161 | 56 | 0 −1.2 | 81 | +1.2 0 | 61 | +4.0 0 |

# Oiles 300 Oil-impregnated expanded cast iron bearings



RoHS2 ELV Lead Free

## Feature

- Reduces much less lubrication than copper alloy bearings.
- Maintains oil film well and features superior wear resistance and seizure resistance.
- Places no restrictions on sliding surface shapes or motion forms.
- Available in larger dimensions than oil-impregnated sintered bearings.
- Standard products and materials for machining are available in various sizes.

## Service range

| Lubrication condition | periodic lubrication | oil lubrication |
|---|---|---|
| Service temperature range ℃ | −40～+100 | −40～+150 |
| Allowable max. pressure P N/mm² {kgf/cm²} | 10 {102} | |
| Allowable max. velocity V m/s {m/min} | 1.00 {60} | 3.35 {201} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 1.25 {765} | 3.25 {1,990} |

## Mechanical properties

| | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 6.8 |
| Tensile strength | JIS Z 2241 | N/mm² {kgf/mm²} | 98 {10} |
| Compressive strength | —— | N/mm² {kgf/mm²} | 294 {30} |
| Impact strength | JIS Z 2242 | J/cm² {kgfm/cm²} | 2 {0.2} |
| Hardness | JIS Z 2246 | HS | 20 |
| Modulus of longitudinal elasticity | —— | N/mm² {kgf/mm²} | 58,000 {6,000} |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 1.1 |
| Thermal conductivity | —— | W/m℃ {cal/sec℃cm} | 50.2 {0.12} |

※The values shown above are typical values, not the standard values.

## Lathe turning

| | | |
|---|---|---|
| Cutting tool | carbide tool (JIS) | |
| | Relief angle | 5～10° |
| | Rake angle | 2～5° |
| | Nose radius (mm) | 0.40～0.80 |
| Condition | Speed (m/min) | 100～200 |
| | Cut depth (mm) | 0.05～0.30 |
| | Feed (mm/rev) | 0.08～0.30 |

Apply grease or oil impregnation after machining.

## Machining accuracy (bushing)

| I.D. | O.D. | Length |
|---|---|---|
| class 7 to 8 | class 6 to 7 | class 8 to 9 |

Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.

## Test data

### Thrust rotation test
(Comparison with various copper alloy)

<Testing conditions>

Bearing dimension : φ25×φ48×t9

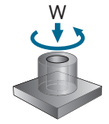
Mating material : S55C (surface roughness Rz1.5μm)

Pressure : initial contact pressure
0.99N/mm² {10.1kgf/cm²}
0.87N/mm² {8.9kgf/cm²} is
inclementally loaded every 5 minutes

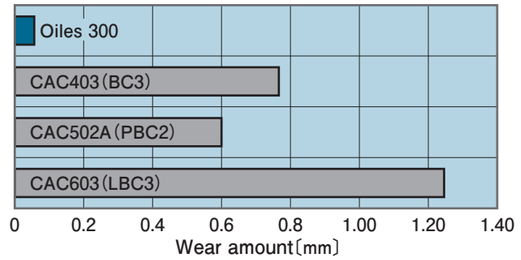
Final contact pressure : 20.2N/mm² {206.0kgf/cm²}

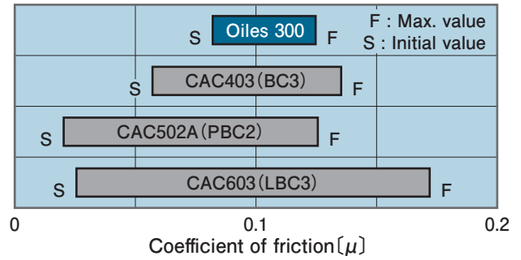
Velocity : 0.162m/s {9.7m/min}

Lubrication : in oil




Load resistance test / Final contact pressure : 20.2N/mm² {206.0kgf/cm²}



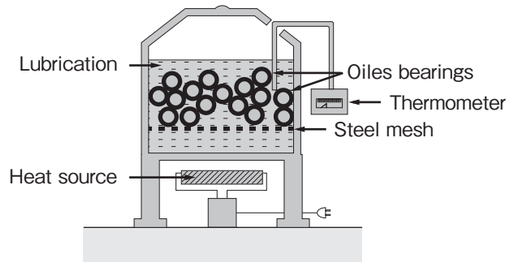

## Oil impregnation method

Oil impregnation is required for oil-containing OILES bearings such as Oiles 300. If you purchase tube or bar stocks, please follow the procedure below to impregnate finished products with lubrication oil before installation. If these bearings are stored for a long time or if the bearings are washed, re-impregnate before installation.

Immerse the products into an oil bath. Heat the bath up to 100 ℃ to 110 ℃. Keep the temperature for 30 to 60 minutes until no more air bubbles come up.

Cut the heat source and let it cool down to the room temperature.

Take products out of the bath to install. If oil impregnation by heating is not possible, leave the products in the oil bath for 24 hours or more.

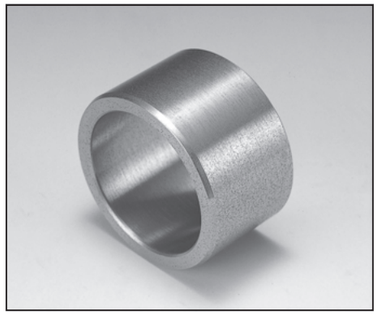



Selectoin of lubrication oil

| Operation conditions | Types of oil | Viscosity | i.e. |
|---|---|---|---|
| Low load / high speed | Lubrication oil of low viscosity | 8 to 17cst (30℃) | Spindle oil |
| Mid load / mid velocity | Lubrication oil with limited viscosity change by temp. | 8 to 15cst (98.9℃) | Motor oil |
| High load / low velocity | Lubrication oil with high viscosity | 100 to 1000cst (37℃) | Gear oil |

# 30B Oiles 300 Bushings (Thin wall)

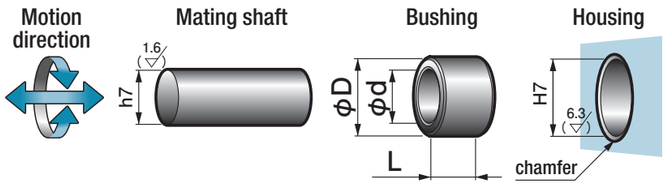
RoHS2 ELV Lead Free

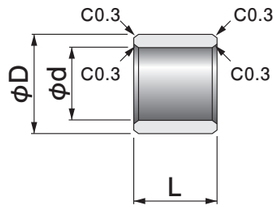


● Use Oiles 300 in lubrication oil or with periodic lubrication.

Specify Part No. by required I.D., O.D., and Length.
(e.g.) I.D. is 8mm, O.D. is 10mm, and length is 12mm.

**30B - 081012 T**
**Part No.**




| I.D. | | O.D. | | Length L Tolerance $^{0}_{-0.2}$ | | | | | | | | I.D. tolerance after press fitting (reference) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ϕd | Tolerance | ϕD | Tolerance | 5 | 6 | 8 | 10 | 12 | 15 | 20 | 30 | |
| 5 | +0.058 +0.040 | 7 | +0.034 +0.019 | 050705T | 050706T | 050708T | | | | | | +0.030 +0.012 |
| 6 | +0.058 +0.040 | 8 | +0.034 +0.019 | 060805T | 060806T | 060808T | 060810T | | | | | +0.030 +0.012 |
| 8 | +0.062 +0.040 | 10 | +0.034 +0.019 | | 081006T | 081008T | 081010T | 081012T | | | | +0.034 +0.012 |
| 10 | +0.068 +0.046 | 12 | +0.041 +0.023 | | | 101208T | 101210T | 101212T | 101215T | | | +0.034 +0.012 |
| 12 | +0.081 +0.054 | 14 | +0.041 +0.023 | | | 121408T | 121410T | 121412T | 121415T | 121420T | | +0.047 +0.020 |
| 12 | +0.081 +0.054 | 16 | +0.041 +0.023 | | | 121608T | 121610T | 121612T | 121615T | 121620T | | +0.047 +0.020 |
| 14 | +0.081 +0.054 | 16 | +0.041 +0.023 | | | | 141610T | 141612T | 141615T | 141620T | | +0.047 +0.020 |
| 14 | +0.081 +0.054 | 18 | +0.041 +0.023 | | | | 141810T | 141812T | 141815T | 141820T | | +0.047 +0.020 |
| 16 | +0.081 +0.054 | 18 | +0.041 +0.023 | | | | 161810T | | 161815T | 161820T | | +0.047 +0.020 |
| 16 | +0.089 +0.062 | 20 | +0.049 +0.028 | | | | T162010 | | 162015T | 162020T | | +0.047 +0.020 |
| 18 | +0.089 +0.062 | 22 | +0.049 +0.028 | | | | | | | 182220T | 182230T | +0.047 +0.020 |
| 20 | +0.105 +0.072 | 24 | +0.049 +0.028 | | | | | | | 202420T | 202430T | +0.063 +0.030 |

※The I.D. tolerance after press fitting is for reference only.

⚠ The dimensional tolerances are the values measured at +25℃.



# Oiles 300 Bushings Thin wall

## Press-fitting

### Press-fitting jig

Generally, as shown in the figure 1, a mandrel is used for the press-fitting. However use of a guide ring facilitates easier press-fitting. Use of a guide ring prevents damage of a bushing at the time of press-fitting. The dimension of a guide ring should be calculated from the table below.

Inner diameter of the guide ring should be the size so that the bushing can be inserted by hands. Length of the guide ring should be more than one-third of the bushing, or if possible, it should be the same length as the bushing.

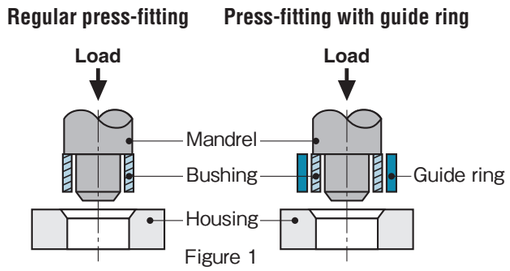


Figure 1

**The dimension of mandrel should be calculated from table below.**

| Dimension of bushing | | Dimension of mandrel |
|---|---|---|
| I.D. | D0 | d0=D0−(0.05 to 0.10) |
| O.D. | D1 | d1=D1−(0.20 to 0.30) |
| Length | L | ℓ ≧L |

**The dimension of guide ring should be calculated from table below.**

| Bushing I.D. | Guide ring I.D. | Guide ring O.D. |
|---|---|---|
| Up to ϕ20 | D1+(0.1 to 0.3) | D1+(10 to 15) |

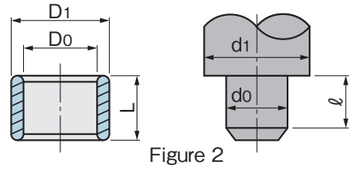
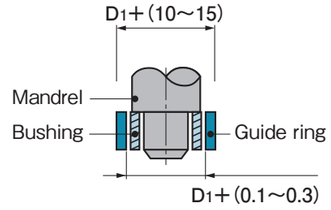


Figure 2




### Housing chamfer

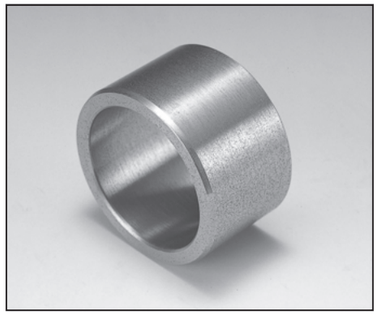
For the housing chamfer, either a round chamfer or a tapered chamfer is recommended. In case of a C-surface chamfer, (more than C1.0) make sure there is no burr. Smoother press-fitting is possible by applying small amount of grease or lubricant.

### Press-fit force

Press-fit smoothly with hydralic (pressure), pneumatic pressure, or a vice. Avoid press-fit by use of impact such as use of a hammer. It might induce damage of the bushing, or change the size of the inner diameter after press-fit.

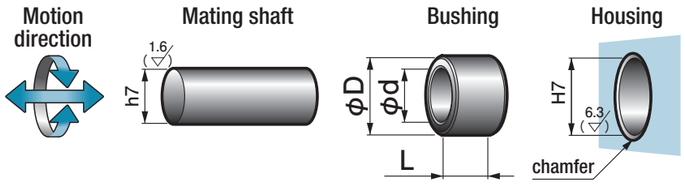
# 30B Oiles 300 Bushings

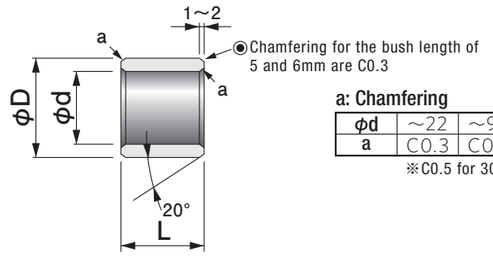
RoHS2 ELV Lead Free



Specify Part No. by required I.D., O.D., and Length.
(e.g.) I.D. is 25mm, O.D. is 37mm, and length is 20mm.

**30B - 253720**
**Part No.**




◉Chamfering for the bush length of 5 and 6mm are C0.3

a: Chamfering

| φd | ~22 | ~95 | 100 |
|---|---|---|---|
| a | C0.3 | C0.5 | C1※ (mm) |

※C0.5 for 30B-10012080

● Use Oiles 300 in lubrication oil or with periodic lubrication.

| I.D. φd | Tolerance | O.D. φD | Tolerance | Length L Tolerance $^{0}_{-0.2}$ 5 | 6 | 8 | 10 | 12 | 15 | 16 | 20 | 25 | 30 | 35 | 40 | 50 | I.D. tolerance after press fitting (reference) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | +0.058 +0.040 | 8 | +0.034 +0.019 | 050805 | 050806 | 050808 | | | | | | | | | | | +0.030 +0.012 |
| 6 | +0.058 +0.040 | 10 | +0.034 +0.019 | 061005 | 061006 | 061008 | 061010 | | | | | | | | | | +0.030 +0.012 |
| 8 | +0.068 +0.046 | 12 | +0.041 +0.023 | | 081206 | 081208 | 081210 | 081212 | 081215 | | | | | | | | +0.034 +0.012 |
| 10 | +0.068 +0.046 | 14 | +0.041 +0.023 | | 101406 | 101408 | 101410 | 101412 | 101415 | | 101420 | | | | | | +0.034 +0.012 |
| 10 | +0.068 +0.046 | 16 | +0.041 +0.023 | | 101606 | 101608 | 101610 | 101612 | 101615 | | 101620 | | | | | | +0.045 +0.023 |
| 10 | +0.068 +0.046 | 18 | +0.041 +0.023 | | | 101808 | 101810 | 101812 | 101815 | | 101820 | | | | | | +0.045 +0.023 |
| 12 | +0.068 +0.041 | 18 | +0.041 +0.023 | | | 121808 | 121810 | 121812 | 121815 | 121816 | 121820 | 121825 | | | | | +0.045 +0.018 |
| 12 | +0.068 +0.041 | 20 | +0.049 +0.028 | | | | 122010 | 122012 | 122015 | | 122020 | 122025 | | | | | +0.040 +0.013 |
| 14 | +0.068 +0.041 | 20 | +0.049 +0.028 | | | | 142010 | 142012 | 142015 | | 142020 | 142025 | | | | | +0.040 +0.013 |
| 14 | +0.068 +0.041 | 22 | +0.049 +0.028 | | | | 142210 | 142212 | 142215 | | 142220 | 142225 | | | | | +0.040 +0.013 |
| 15 | +0.068 +0.041 | 22 | +0.049 +0.028 | | | | | | 152215 | 152216 | 152220 | 152225 | | | | | +0.040 +0.013 |
| 16 | +0.068 +0.041 | 22 | +0.049 +0.028 | | | | | | 162215 | 162216 | 162220 | 162225 | 162230 | 162235 | | | +0.040 +0.013 |
| 16 | +0.068 +0.041 | 25 | +0.049 +0.028 | | | | | | 162515 | | 162520 | 162525 | 162530 | | | | +0.040 +0.013 |
| 18 | +0.068 +0.041 | 25 | +0.049 +0.028 | | | | | | 182515 | | 182520 | 182525 | 182530 | | | | +0.040 +0.013 |
| 18 | +0.068 +0.041 | 28 | +0.049 +0.028 | | | | | | 182815 | | 182820 | 182825 | 182830 | | | | +0.040 +0.013 |
| 20 | +0.088 +0.055 | 28 | +0.049 +0.028 | | | | | | 202815 | 202816 | 202820 | 202825 | 202830 | 202835 | 202840 | | +0.060 +0.027 |
| 20 | +0.088 +0.055 | 30 | +0.049 +0.028 | | | | | | | | 203020 | 203025 | 203030 | 203035 | 203040 | | +0.060 +0.027 |
| 22 | +0.088 +0.055 | 30 | +0.049 +0.028 | | | | | | | | 223020 | 223025 | 223030 | | 223040 | | +0.060 +0.027 |
| 22 | +0.088 +0.055 | 32 | +0.059 +0.034 | | | | | | | | 223220 | 223225 | 223230 | | 223240 | | +0.054 +0.021 |
| 25 | +0.088 +0.055 | 33 | +0.059 +0.034 | | | | | | | 253316 | 253320 | 253325 | 253330 | | 253340 | 253350 | +0.054 +0.021 |
| 25 | +0.088 +0.055 | 35 | +0.059 +0.034 | | | | | | | | 253520 | 253525 | 253530 | 253535 | 253540 | 253550 | +0.054 +0.021 |
| 25 | +0.088 +0.055 | 37 | +0.059 +0.034 | | | | | | | | 253720 | | 253730 | | 253740 | | +0.054 +0.021 |
| 28 | +0.088 +0.055 | 38 | +0.059 +0.034 | | | | | | | | | 283825 | | | 283840 | | +0.054 +0.021 |
| 28 | +0.088 +0.055 | 40 | +0.059 +0.034 | | | | | | | | | 284025 | | | 284040 | | +0.054 +0.021 |
| 30 | +0.088 +0.055 | 38 | +0.059 +0.034 | | | | | | | | 303820 | 303825 | 303830 | | 303840 | 303850 | +0.054 +0.021 |
| 30 | +0.088 +0.055 | 40 | +0.059 +0.034 | | | | | | | | 304020 | 304025 | 304030 | 304035 | 304040 | 304050 | +0.054 +0.021 |
| 30 | +0.088 +0.055 | 42 | +0.059 +0.034 | | | | | | | | | 304225 | 304230 | | 304240 | | +0.054 +0.021 |
| 32 | +0.112 +0.073 | 42 | +0.059 +0.034 | | | | | | | | | | 324230 | | 324240 | | +0.078 +0.039 |
| 32 | +0.112 +0.073 | 45 | +0.059 +0.034 | | | | | | | | | | 324530 | | 324540 | | +0.078 +0.039 |

※The I.D. tolerance after press fitting is for reference only.

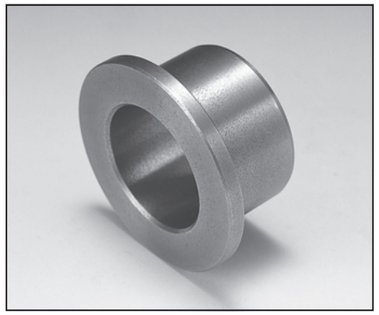
⚠ The dimensional tolerances are the values measured at +25℃.

| I.D. φd | Tolerance | O.D. φD | Tolerance | Length L $^{0}_{-0.2}$ 30 | 40 | 50 | 60 | Length L $^{0}_{-0.4}$ 80 | 100 | 120 | I.D. tolerance after press fitting (reference) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | +0.112 +0.073 | 45 | +0.059 +0.034 | 354530 | 354540 | 354550 | | | | | +0.078 +0.039 |
| 35 | +0.112 +0.073 | 48 | +0.059 +0.034 | 354830 | 354840 | 354850 | | | | | +0.078 +0.039 |
| 40 | +0.112 +0.073 | 50 | +0.059 +0.034 | 405030 | 405040 | 405050 | | | | | +0.078 +0.039 |
| 40 | +0.112 +0.073 | 55 | +0.073 +0.041 | 405530 | 405540 | 405550 | | | | | +0.070 +0.031 |
| 45 | +0.112 +0.073 | 55 | +0.073 +0.041 | | 455540 | 455550 | | | | | +0.070 +0.031 |
| 45 | +0.112 +0.073 | 60 | +0.073 +0.041 | | 456040 | 456050 | | | | | +0.070 +0.031 |
| 50 | +0.112 +0.073 | 60 | +0.073 +0.041 | | 506040 | 506050 | 506060 | | | | +0.070 +0.031 |
| 50 | +0.112 +0.073 | 65 | +0.073 +0.041 | | 506540 | 506550 | 506560 | | | | +0.070 +0.031 |
| 55 | +0.144 +0.098 | 70 | +0.073 +0.041 | | | 557050 | 557060 | | | | +0.102 +0.056 |
| 55 | +0.144 +0.098 | 75 | +0.073 +0.041 | | | 557550 | 557560 | | | | +0.102 +0.056 |
| 60 | +0.144 +0.098 | 75 | +0.073 +0.041 | | | 607550 | 607560 | 607580 | | | +0.102 +0.056 |
| 60 | +0.144 +0.098 | 80 | +0.073 +0.041 | | | 608050 | 608060 | 608080 | | | +0.102 +0.056 |
| 65 | +0.144 +0.098 | 80 | +0.073 +0.041 | | | | 658060 | 658080 | | | +0.102 +0.056 |
| 65 | +0.144 +0.098 | 85 | +0.089 +0.051 | | | | 658560 | 658580 | | | +0.092 +0.046 |
| 70 | +0.144 +0.098 | 85 | +0.089 +0.051 | | | | 708560 | 708580 | | | +0.092 +0.046 |
| 70 | +0.144 +0.098 | 90 | +0.089 +0.051 | | | | 709060 | 709080 | | | +0.092 +0.046 |
| 75 | +0.144 +0.098 | 90 | +0.089 +0.051 | | | | 759060 | 759080 | | | +0.092 +0.046 |
| 75 | +0.144 +0.098 | 95 | +0.089 +0.051 | | | | 759560 | 759580 | | | +0.092 +0.046 |
| 80 | +0.144 +0.098 | 95 | +0.089 +0.051 | | | | 809560 | 809580 | 8095100 | | +0.092 +0.046 |
| 80 | +0.144 +0.098 | 100 | +0.089 +0.051 | | | | 8010060 | 8010080 | 80100100 | | +0.092 +0.046 |
| 85 | +0.188 +0.134 | 100 | +0.089 +0.051 | | | | | 8510080 | 85100100 | | +0.136 +0.082 |
| 85 | +0.188 +0.134 | 105 | +0.089 +0.051 | | | | | 8510580 | 85105100 | | +0.136 +0.082 |
| 90 | +0.188 +0.134 | 110 | +0.089 +0.051 | | | | | 9011080 | 90110100 | | +0.136 +0.082 |
| 90 | +0.188 +0.134 | 115 | +0.089 +0.051 | | | | | 9011580 | 90115100 | | +0.136 +0.082 |
| 95 | +0.188 +0.134 | 115 | +0.089 +0.051 | | | | | 9511580 | 95115100 | | +0.136 +0.082 |
| 95 | +0.188 +0.134 | 120 | +0.089 +0.051 | | | | | 9512080 | 95120100 | | +0.136 +0.082 |
| 100 | +0.188 +0.134 | 120 | +0.089 +0.051 | | | | | 10012080 | 100120100 | 100120120 | +0.136 +0.082 |
| 100 | +0.188 +0.134 | 125 | +0.108 +0.063 | | | | | 10012580 | 100125100 | 100125120 | +0.123 +0.069 |

※The I.D. tolerance after press fitting is for reference only.

# 30F Oiles 300 Flange Bushings

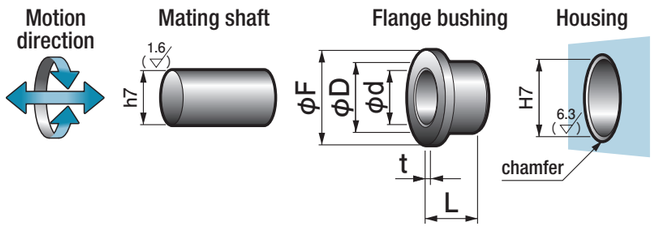
RoHS2 ELV Lead Free

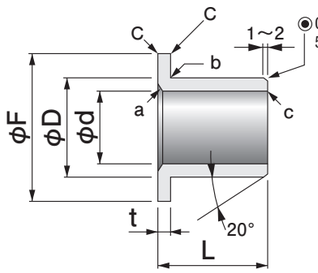


- Use Oiles 300 in lubrication oil or with periodic lubrication.

Specify Part No. by required I.D. and length.
(e.g.) I.D. is 30mm and length is 40mm.

**30F - 3040**
**Part No.**




◉Chamfering for the bush length of 5 and 6mm are C0.3

**a b c: Chamfering** (mm)

| ϕd | ~22 | ~50 | ~60 |
|---|---|---|---|
| a | C0.5 | C1 | C1.5 |

| ϕd | ~22 | ~50 | ~60 |
|---|---|---|---|
| b | R0.3 | R0.5 | R1 |

| ϕd | ~22 | ~60 |
|---|---|---|
| c | C0.3 | C0.5 |

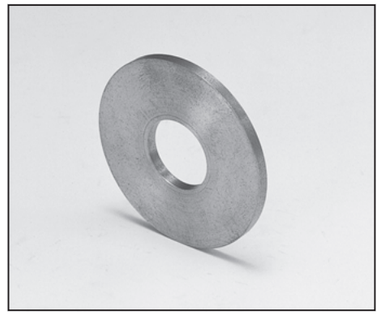
| I.D. | | O.D. | | Flange | | | | Length L Tolerance $_{-0.3}^{0}$ | | | | | | | | | | | I.D. tolerance after press fitting (reference) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ϕd | Tolerance | ϕD | Tolerance | ϕF | Tolerance | t | Tolerance | 5 | 8 | 10 | 12 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | |
| 5 | +0.058 +0.040 | 8 | +0.034 +0.019 | 11 | 0 −0.3 | 1.5 | 0 −0.1 | 0505 | 0508 | | | | | | | | | | | +0.030 +0.012 |
| 6 | +0.058 +0.040 | 10 | +0.034 +0.019 | 14 | 0 −0.3 | 2 | 0 −0.1 | | 0608 | 0610 | | | | | | | | | | +0.030 +0.012 |
| 8 | +0.068 +0.046 | 12 | +0.041 +0.023 | 20 | 0 −0.3 | 2 | 0 −0.1 | | | 0810 | 0812 | 0815 | | | | | | | | +0.034 +0.012 |
| 10 | +0.068 +0.046 | 16 | +0.041 +0.023 | 23 | 0 −0.3 | 3 | 0 −0.1 | | | 1010 | 1012 | 1015 | 1020 | | | | | | | +0.045 +0.023 |
| 12 | +0.068 +0.041 | 18 | +0.041 +0.023 | 25 | 0 −0.3 | 3 | 0 −0.1 | | | 1210 | 1212 | 1215 | 1220 | 1225 | | | | | | +0.045 +0.018 |
| 14 | +0.068 +0.041 | 20 | +0.049 +0.028 | 27 | 0 −0.3 | 3 | 0 −0.1 | | | 1410 | 1412 | 1415 | 1420 | 1425 | | | | | | +0.040 +0.013 |
| 15 | +0.068 +0.041 | 21 | +0.049 +0.028 | 28 | 0 −0.3 | 3 | 0 −0.1 | | | 1510 | 1512 | 1515 | 1520 | 1525 | 1530 | | | | | +0.040 +0.013 |
| 16 | +0.068 +0.041 | 22 | +0.049 +0.028 | 29 | 0 −0.3 | 3 | 0 −0.1 | | | | 1612 | 1615 | 1620 | 1625 | 1630 | | | | | +0.040 +0.013 |
| 18 | +0.068 +0.041 | 25 | +0.049 +0.028 | 33 | 0 −0.3 | 3.5 | 0 −0.1 | | | | | 1815 | 1820 | 1825 | 1830 | | | | | +0.040 +0.013 |
| 20 | +0.088 +0.055 | 28 | +0.049 +0.028 | 38 | 0 −0.3 | 4 | 0 −0.1 | | | | | 2015 | 2020 | 2025 | 2030 | 2040 | | | | +0.060 +0.027 |
| 22 | +0.088 +0.055 | 30 | +0.049 +0.028 | 40 | 0 −0.3 | 4 | 0 −0.1 | | | | | 2215 | 2220 | 2225 | 2230 | 2240 | | | | +0.060 +0.027 |
| 25 | +0.088 +0.055 | 35 | +0.059 +0.034 | 45 | 0 −0.3 | 5 | 0 −0.1 | | | | | 2515 | 2520 | 2525 | 2530 | 2540 | | | | +0.054 +0.021 |
| 28 | +0.088 +0.055 | 38 | +0.059 +0.034 | 48 | 0 −0.3 | 5 | 0 −0.1 | | | | | | | 2825 | 2830 | | | | | +0.054 +0.021 |
| 30 | +0.088 +0.055 | 40 | +0.059 +0.034 | 50 | 0 −0.3 | 5 | 0 −0.1 | | | | | | | | 3030 | 3040 | | | | +0.054 +0.021 |
| 32 | +0.112 +0.073 | 42 | +0.059 +0.034 | 52 | 0 −0.3 | 5 | 0 −0.1 | | | | | | | | 3230 | 3240 | | | | +0.078 +0.039 |
| 35 | +0.112 +0.073 | 45 | +0.059 +0.034 | 60 | 0 −0.3 | 5 | 0 −0.1 | | | | | | | | 3530 | 3540 | | | | +0.078 +0.039 |
| 40 | +0.112 +0.073 | 50 | +0.059 +0.034 | 65 | 0 −0.3 | 5 | 0 −0.1 | | | | | | | | | 4040 | 4050 | | | +0.078 +0.039 |
| 45 | +0.112 +0.073 | 55 | +0.073 +0.041 | 70 | 0 −0.3 | 5 | 0 −0.1 | | | | | | | | | 4540 | 4550 | | | +0.070 +0.031 |
| 50 | +0.112 +0.073 | 60 | +0.073 +0.041 | 75 | 0 −0.3 | 5 | 0 −0.1 | | | | | | | | | | 5050 | 5060 | | +0.070 +0.031 |
| 55 | +0.144 +0.098 | 70 | +0.073 +0.041 | 85 | 0 −0.3 | 7.5 | 0 −0.1 | | | | | | | | | | 5550 | 5560 | | +0.102 +0.056 |
| 60 | +0.144 +0.098 | 75 | +0.073 +0.041 | 90 | 0 −0.3 | 7.5 | 0 −0.1 | | | | | | | | | | | 6060 | 6080 | +0.102 +0.056 |

※The I.D. tolerance after press fitting is for reference only.
⚠ The dimensional tolerances are the values measured at +25℃.



# 30W Oiles 300 Washers

RoHS2 ELV Lead Free

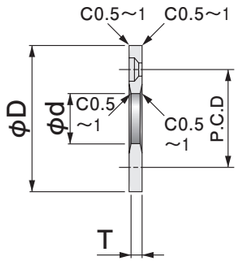


- Use Oiles 300 in lubrication oil or with periodic lubrication.
- Part no. with N at the end is no-hole type.

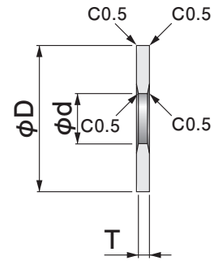
Specify Part No. by required I.D. and thickness.
(e.g.) I.D. is 18.2mm and thickness is 3mm.

**30W - 1803**
**Part No.**


Countersink type




No hole type




| Part No. | I.D. | | O.D. | Thickness | | Mounting hole | | |
|---|---|---|---|---|---|---|---|---|
| | ϕd | Tolerance | ϕD | T | Tolerance | P.C.D | No. of holes | Countersink screw size |
| 30W-1003N | 10.2 | +0.2 +0.1 | 30 | 3 | 0 −0.1 | no attach hole | | |
| 30W-1203N | 12.2 | +0.2 +0.1 | 40 | 3 | 0 −0.1 | no attach hole | | |
| 30W-1303N | 13.2 | +0.2 +0.1 | 40 | 3 | 0 −0.1 | no attach hole | | |
| 30W-1403N | 14.2 | +0.2 +0.1 | 40 | 3 | 0 −0.1 | no attach hole | | |
| 30W-1603N | 16.2 | +0.2 +0.1 | 50 | 3 | 0 −0.1 | no attach hole | | |
| 30W-1803 | 18.2 | +0.2 +0.1 | 50 | 3 | 0 −0.1 | 35 | 2 | M3 |
| 30W-2005 | 20.2 | +0.2 +0.1 | 50 | 5 | 0 −0.1 | 35 | 2 | M5 |
| 30W-2505 | 25.2 | +0.2 +0.1 | 55 | 5 | 0 −0.1 | 40 | 2 | M5 |
| 30W-3005 | 30.2 | +0.2 +0.1 | 60 | 5 | 0 −0.1 | 45 | 2 | M5 |
| 30W-3505 | 35.2 | +0.2 +0.1 | 70 | 5 | 0 −0.1 | 50 | 2 | M5 |
| 30W-4007 | 40.2 | +0.2 +0.1 | 80 | 7 | 0 −0.1 | 60 | 2 | M6 |
| 30W-4507 | 45.2 | +0.2 +0.1 | 90 | 7 | 0 −0.1 | 70 | 2 | M6 |
| 30W-5008 | 50.3 | +0.3 +0.1 | 100 | 8 | 0 −0.1 | 75 | 4 | M6 |

# 30M Oiles 300 Bar Stock

RoHS2 ELV Lead Free

Specify Part No. by required diameter.
(e.g.) Diameter is 40mm.

**30M - 40**
**Part No.**

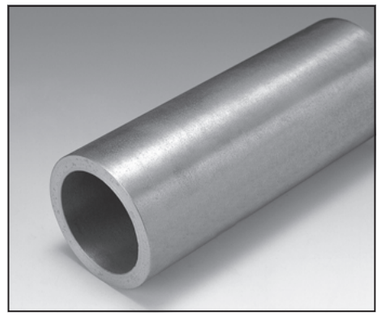

- Length and diameter shown here are rough finished dimensions.
- Oil impregnation is necessary by referring to the oil impregnation method, page 260 when you machined the plate.

| Part No. | Diameter | | Length | |
|---|---|---|---|---|
| | φD | Tolerance | L | Tolerance |
| 30M-15 | 15 | +1.0 0 | 150 | +3.0 0 |
| 30M-21 | 21 | +1.0 0 | 200 | +3.0 0 |
| 30M-23 | 23 | +1.0 0 | 200 | +3.0 0 |
| 30M-25 | 25 | +1.0 0 | 200 | +3.0 0 |
| 30M-27 | 27 | +1.0 0 | 200 | +3.0 0 |
| 30M-31 | 31 | +1.0 0 | 200 | +3.0 0 |
| 30M-33 | 33 | +1.0 0 | 200 | +3.0 0 |
| 30M-35 | 35 | +1.0 0 | 200 | +3.0 0 |
| 30M-37 | 37 | +1.0 0 | 200 | +3.0 0 |
| 30M-40 | 40 | +1.0 0 | 200 | +3.0 0 |
| 30M-43 | 43 | +1.0 0 | 200 | +3.0 0 |
| 30M-45 | 45 | +1.0 0 | 200 | +3.0 0 |
| 30M-47 | 47 | +1.0 0 | 200 | +3.0 0 |
| 30M-50 | 50 | +1.0 0 | 200 | +3.0 0 |
| 30M-55 | 55 | +1.0 0 | 200 | +3.0 0 |
| 30M-60 | 60 | +1.0 0 | 200 | +3.0 0 |
| 30M-65 | 65 | +1.0 0 | 200 | +3.0 0 |
| 30M-70 | 70 | +1.0 0 | 200 | +3.0 0 |
| 30M-80 | 80 | +1.0 0 | 250 | +3.0 0 |
| 30M-90 | 90 | +1.0 0 | 250 | +3.0 0 |
| 30M-100 | 100 | +1.0 0 | 250 | +3.0 0 |



# 30S Oiles 300 Bushing Material

RoHS2 ELV Lead Free



Specify Part No. by required I.D. and O.D.
(e.g.) I.D. is 69mm and O.D. is 86mm.

**30S - 6986**
**Part No.**


| Part No. | I.D. | | O.D. | | Length | |
|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | L | Tolerance |
| 30S-2941 | 29 | 0 −1.0 | 41 | +1.0 0 | 100 | +3.0 0 |
| 30S-3143 | 31 | 0 −1.0 | 43 | +1.0 0 | 100 | +3.0 0 |
| 30S-3446 | 34 | 0 −1.0 | 46 | +1.0 0 | 150 | +3.0 0 |
| 30S-3449 | 34 | 0 −1.0 | 49 | +1.0 0 | 150 | +3.0 0 |
| 30S-3753 | 37 | 0 −1.0 | 53 | +1.0 0 | 150 | +3.0 0 |
| 30S-3951 | 39 | 0 −1.0 | 51 | +1.0 0 | 200 | +3.0 0 |
| 30S-3956 | 39 | 0 −1.0 | 56 | +1.0 0 | 200 | +3.0 0 |
| 30S-4456 | 44 | 0 −1.0 | 56 | +1.0 0 | 200 | +3.0 0 |
| 30S-4461 | 44 | 0 −1.0 | 61 | +1.0 0 | 200 | +3.0 0 |
| 30S-4961 | 49 | 0 −1.0 | 61 | +1.0 0 | 200 | +3.0 0 |
| 30S-4966 | 49 | 0 −1.0 | 66 | +1.0 0 | 200 | +3.0 0 |
| 30S-5471 | 54 | 0 −1.0 | 71 | +1.0 0 | 200 | +3.0 0 |
| 30S-5971 | 59 | 0 −1.0 | 71 | +1.0 0 | 200 | +3.0 0 |
| 30S-5976 | 59 | 0 −1.0 | 76 | +1.0 0 | 200 | +3.0 0 |
| 30S-6481 | 64 | 0 −1.0 | 81 | +1.0 0 | 200 | +3.0 0 |
| 30S-6486 | 64 | 0 −1.0 | 86 | +1.0 0 | 200 | +3.0 0 |
| 30S-6986 | 69 | 0 −1.0 | 86 | +1.0 0 | 200 | +3.0 0 |
| 30S-6991 | 69 | 0 −1.0 | 91 | +1.0 0 | 200 | +3.0 0 |

| Part No. | I.D. | | O.D. | | Length | |
|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | L | Tolerance |
| 30S-7491 | 74 | 0 −1.0 | 91 | +1.0 0 | 200 | +3.0 0 |
| 30S-7496 | 74 | 0 −1.0 | 96 | +1.0 0 | 200 | +3.0 0 |
| 30S-7996 | 79 | 0 −1.0 | 96 | +1.0 0 | 200 | +3.0 0 |
| 30S-79101 | 79 | 0 −1.0 | 101 | +1.0 0 | 200 | +3.0 0 |
| 30S-84106 | 84 | 0 −1.0 | 106 | +1.0 0 | 200 | +3.0 0 |
| 30S-89111 | 89 | 0 −1.0 | 111 | +1.0 0 | 200 | +3.0 0 |
| 30S-94121 | 94 | 0 −1.0 | 121 | +1.0 0 | 200 | +3.0 0 |
| 30S-99126 | 99 | 0 −1.0 | 126 | +1.0 0 | 200 | +3.0 0 |
| 30S-103132 | 103 | 0 −1.0 | 132 | +1.0 0 | 250 | +3.0 0 |
| 30S-103142 | 103 | 0 −1.0 | 142 | +1.0 0 | 250 | +3.0 0 |
| 30S-108137 | 108 | 0 −1.0 | 137 | +1.0 0 | 250 | +3.0 0 |
| 30S-108147 | 108 | 0 −1.0 | 147 | +1.0 0 | 250 | +3.0 0 |
| 30S-113142 | 113 | 0 −1.0 | 142 | +1.0 0 | 250 | +3.0 0 |
| 30S-113152 | 113 | 0 −1.0 | 152 | +1.0 0 | 250 | +3.0 0 |
| 30S-118147 | 118 | 0 −1.0 | 147 | +1.0 0 | 250 | +3.0 0 |
| 30S-118157 | 118 | 0 −1.0 | 157 | +1.0 0 | 250 | +3.0 0 |
| 30S-123152 | 123 | 0 −1.0 | 152 | +1.0 0 | 250 | +3.0 0 |
| 30S-123162 | 123 | 0 −1.0 | 162 | +1.0 0 | 250 | +3.0 0 |

- Length and diameter shown here are rough finished dimensions.
- Oil impregnation is necessary by referring to the oil impregnation method, page 260 when you machined the plate.

## 〈Thick wall〉

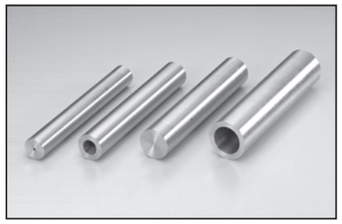
| Part No. | I.D. | | O.D. | | Length | |
|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | L | Tolerance |
| 30S-3570 | 35 | 0 −1.0 | 70 | +1.0 0 | 200 | +3.0 0 |
| 30S-4075 | 40 | 0 −1.0 | 75 | +1.0 0 | 200 | +3.0 0 |
| 30S-4580 | 45 | 0 −1.0 | 80 | +1.0 0 | 200 | +3.0 0 |
| 30S-5090 | 50 | 0 −1.0 | 90 | +1.0 0 | 200 | +3.0 0 |
| 30S-55100 | 55 | 0 −1.0 | 100 | +1.0 0 | 200 | +3.0 0 |

| Part No. | I.D. | | O.D. | | Length | |
|---|---|---|---|---|---|---|
| | φd | Tolerance | φD | Tolerance | L | Tolerance |
| 30S-60110 | 60 | 0 −1.0 | 110 | +1.0 0 | 200 | +3.0 0 |
| 30S-65120 | 65 | 0 −1.0 | 120 | +1.0 0 | 250 | +3.0 0 |
| 30S-70130 | 70 | 0 −1.0 | 130 | +1.0 0 | 250 | +3.0 0 |
| 30S-80140 | 80 | 0 −1.0 | 140 | +1.0 0 | 250 | +3.0 0 |

- Length and diameter shown here are rough finished dimensions.
- Oil impregnation is necessary by referring to the oil impregnation method, page 260 when you machined the plate.

# Oiles 600 Wear-resistant copper alloy bearings

RoHS2 ELV



## Feature

- Demonstrates wear resistance and seizure resistance in lubricated conditions.
- Reduces the frequency of lubrication.
- Demonstrates especially high running-in characteristics.
- Materials for machining are available.

### Service range

| Lubrication condition | periodic lubrication | oil lubrication |
|---|---|---|
| Service temperature range ℃ | −40～+150 | |
| Allowable max. pressure P N/mm² {kgf/cm²} | 15 {153} | |
| Allowable max. velocity V m/s {m/min} | 1.65 {99} | 5.00 {300} |
| Allowable max. PV value N/mm² · m/s {kgf/cm² · m/min} | 1.65 {1,010} | 3.25 {1,990} |

### Lathe turning

| | | |
|---|---|---|
| Cutting tool | carbide tool (JIS) | |
| | Relief angle | 5～10° |
| | Rake angle | 2～5° |
| | Nose radius (mm) | 0.40～0.80 |
| Condition | Speed (m/min) | 100～200 |
| | Cut depth (mm) | 0.05～0.30 |
| | Feed (mm/rev) | 0.08～0.30 |

### Mechanical properties

| | | | |
|---|---|---|---|
| Density | —— | g/cm³ | 8.5 |
| Tensile strength | JIS Z 2241 | N/mm² {kgf/mm²} | 150 {15} |
| Impact strength | JIS Z 2242 | J/cm² {kgfm/cm²} | 10 {1} |
| Hardness | JIS Z 2243 | HBW | 60 |
| Modulus of longitudinal elasticity | —— | N/mm² {kgf/mm²} | 83,000 {8,500} |
| Co-efficient of linear expansion | —— | ×10⁻⁵ ℃⁻¹ | 1.8 |
| Thermal conductivity | —— | W/m℃ {cal/sec℃cm} | 71.1 {0.17} |

※The values shown above are typical values, not the standard values.

### Machining accuracy (bushing)

| I.D. | O.D. | Length |
|---|---|---|
| class 7 to 8 | class 6 to 7 | class 8 to 9 |

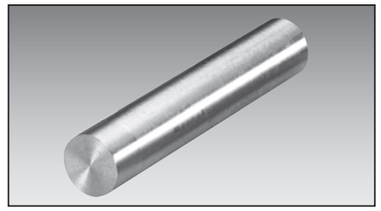
Classes here are in JIS standard.

This product demonstrates satisfactory performance at the slide surface roughness of Rz6.3 to 12.5μm.



# 36M Oiles 600 Bar Stock

RoHS2 ELV



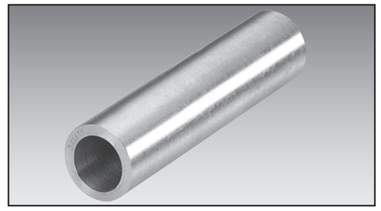
- Length and diameter shown here are rough finished dimensions.
- Need to be oil-impregnated before use.

Specify Part No. by required diameter.
(e.g.) Diameter is 36mm. **36M - 36** (Part No.)


| Part No. | Diameter φD | Tolerance | Length L | Tolerance |
|---|---|---|---|---|
| 36M-16 | 16 | +0.5 0 | 202 | +1.0 0 |
| 36M-21 | 21 | +0.5 0 | 202 | +1.0 0 |
| 36M-26 | 26 | +0.5 0 | 202 | +1.0 0 |
| 36M-31 | 31 | +0.5 0 | 202 | +1.0 0 |
| 36M-36 | 36 | +0.5 0 | 202 | +1.0 0 |
| 36M-41 | 41 | +0.5 0 | 202 | +1.0 0 |
| 36M-46 | 46 | +0.5 0 | 202 | +1.0 0 |
| 36M-51 | 51 | +0.5 0 | 202 | +1.0 0 |
| 36M-56 | 56 | +0.5 0 | 202 | +1.0 0 |
| 36M-61 | 61 | +0.5 0 | 202 | +1.0 0 |

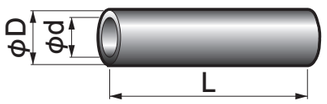
# 36S Oiles 600 Bushing Material

RoHS2 ELV



- Inner and outer diameter and Length shown here are rough finished dimensions.
- Need to be oil-impregnated before use.

Specify Part No. by required I.D. and O.D.
(e.g.) I.D. is 34mm and O.D. is 51mm. **36S - 3451** (Part No.)




| Part No. | I.D. φd | Tolerance | O.D. φD | Tolerance | Length L | Tolerance |
|---|---|---|---|---|---|---|
| 36S-1931 | 19 | 0 −0.5 | 31 | +0.5 0 | 202 | +1.0 0 |
| 36S-1936 | 19 | 0 −0.5 | 36 | +0.5 0 | 202 | +1.0 0 |
| 36S-2436 | 24 | 0 −0.5 | 36 | +0.5 0 | 202 | +1.0 0 |
| 36S-2941 | 29 | 0 −0.5 | 41 | +0.5 0 | 202 | +1.0 0 |
| 36S-2946 | 29 | 0 −0.5 | 46 | +0.5 0 | 202 | +1.0 0 |
| 36S-3446 | 34 | 0 −0.5 | 46 | +0.5 0 | 202 | +1.0 0 |
| 36S-3451 | 34 | 0 −0.5 | 51 | +0.5 0 | 202 | +1.0 0 |
| 36S-3951 | 39 | 0 −0.5 | 51 | +0.5 0 | 202 | +1.0 0 |
| 36S-3966 | 39 | 0 −0.5 | 66 | +0.5 0 | 202 | +1.0 0 |
| 36S-4456 | 44 | 0 −0.5 | 56 | +0.5 0 | 202 | +1.0 0 |
| 36S-4961 | 49 | 0 −0.5 | 61 | +0.5 0 | 202 | +1.0 0 |
| 36S-4971 | 49 | 0 −0.5 | 71 | +0.5 0 | 202 | +1.0 0 |
| 36S-5981 | 59 | 0 −0.5 | 81 | +0.5 0 | 202 | +1.0 0 |
| 36S-6986 | 69 | 0 −0.5 | 86 | +0.5 0 | 202 | +1.0 0 |