

# FAG Spindle Bearings

X-life ultra Bearings



5: FAG X-life ultra Spindle Bearings

## X-life ultra Bearings

X-life ultra Bearings were designed for maximum demands on speed-ability and load. They are Hybrid Bearings with rings made of Cronidur 30, a high nitrogen stainless steel. Compared to the conventional rolling bearing steel 100Cr6, Cronidur 30 exhibits a substantially finer structure, thus ensuring cooler operation and higher admissible contact pressure.

Tests of the material fatigue life exceeded the calculated values by such a large degree that it can be considered practically fail-safe in the field of application. Under mixed friction conditions, this steel also lasted up to 10 times longer than the standard material 100Cr6. This steel is likewise significantly superior to conventional rolling bearing steels in terms of Hertzian compression strength, corrosion resistance and hot hardness.

Compared to conventional bearings, the extended service life of X-life ultra Bearings makes an enormous contribution to reducing system costs. In principle, all Spindle Bearing designs are available as X-life ultra Bearings. To take full advantage of the performance capability of X-life ultra Bearings, the structure surrounding the bearing arrangement must be designed appropriately.

# Bearing Code of FAG Spindle Bearings

**B 70 08-C**  
**HSS 70 08-C**  
**HCB 70 08-C**  
**B 70 08-C**  
**B 70 08-C**  
**-T-P4S-UL\***  
**-T-P4S-UL**  
**-T-P4S-UL**  
**-T-P4S-UL**  
**-T-P4S-UL**  
**-T-P4S-UL-L075**

## Bearing Type

|            |                                                           |
|------------|-----------------------------------------------------------|
| <b>B</b>   | Standard<br>Steel balls                                   |
| <b>HCB</b> | Hybrid Standard<br>Ceramic balls                          |
| <b>XCB</b> | Cronidur Standard<br>Ceramic balls                        |
| <b>HS</b>  | High Speed Bearings<br>Steel balls                        |
| <b>HSS</b> | High Speed Bearings<br>Steel balls, sealed                |
| <b>HC</b>  | High Speed Bearings<br>Ceramic balls                      |
| <b>HCS</b> | High Speed Bearings<br>Ceramic balls, sealed              |
| <b>XC</b>  | Cronidur,<br>High Speed Bearings<br>Ceramic balls         |
| <b>XCS</b> | Cronidur,<br>High Speed Bearings<br>Ceramic balls, sealed |

## Dimension Series

|            |                    |
|------------|--------------------|
| <b>718</b> | Ultra-light series |
| <b>719</b> | Light series       |
| <b>70</b>  | Medium series      |
| <b>72</b>  | Heavy series       |

## Bore Reference Number

|           |               |
|-----------|---------------|
| <b>6</b>  | 6 mm          |
| <b>7</b>  | 7 mm          |
| <b>8</b>  | 8 mm          |
| <b>9</b>  | 9 mm          |
| <b>00</b> | 10 mm         |
| <b>01</b> | 12 mm         |
| <b>02</b> | 15 mm         |
| <b>03</b> | 17 mm         |
| <b>04</b> | 4 · 5 = 20 mm |
| <b>05</b> | 5 · 5 = 25 mm |

## Contact Angle

|          |     |
|----------|-----|
| <b>C</b> | 15° |
| <b>E</b> | 25° |

## External Form

|              |                                                       |     |
|--------------|-------------------------------------------------------|-----|
|              | DIRECT LUBE                                           |     |
| <b>-CDLR</b> | Direct radial lubrication holes with integral O rings | 15° |
| <b>-EDLR</b> | Integral O-ring                                       | 25° |

## Seal

|              |                                                                                                               |
|--------------|---------------------------------------------------------------------------------------------------------------|
| <b>-2RSD</b> | Sealed at both sides and lubricated<br>Sealed designs are indicated with<br>a point (•) in the bearing tables |
|--------------|---------------------------------------------------------------------------------------------------------------|

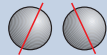
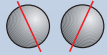
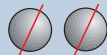
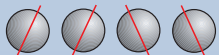
## Grease Filling By Manufacturer

|             |                                                                                                                              |
|-------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>L075</b> | FAG Grease Arcanol L075<br>for non-sealed bearings<br>Bearings sealed at both<br>sides are lubricated<br>for-life with L075. |
|-------------|------------------------------------------------------------------------------------------------------------------------------|

## Preload

|          |        |
|----------|--------|
| <b>L</b> | Light  |
| <b>M</b> | Medium |
| <b>H</b> | Heavy  |

## Bearing Arrangement

|            |                                                                                                                                                |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>U</b>   | Single bearing<br>arrangeable as desired                                                                                                       |
| <b>DU</b>  | Set of 2 universal bearings                                                                                                                    |
| <b>TU</b>  | Set of 3 universal bearings                                                                                                                    |
| <b>QU</b>  | Set of 4 universal bearings                                                                                                                    |
| <b>PU</b>  | Set of 5 universal bearings                                                                                                                    |
| <b>DB</b>  | Set of 2 bearings<br>O arrangement<br>                    |
| <b>DF</b>  | Set of 2 bearings<br>X arrangement<br>                    |
| <b>DT</b>  | Set of 2 bearings<br>Tandem arrangement<br>               |
| <b>TBT</b> | Set of 3 bearings<br>Tandem – O – arrangement<br>         |
| <b>QBC</b> | Set of 4 bearings<br>Tandem – O – Tandem arrangement.<br> |

## Accuracy

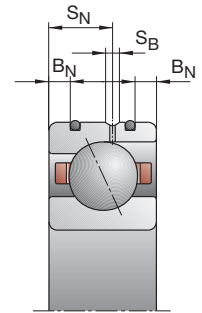
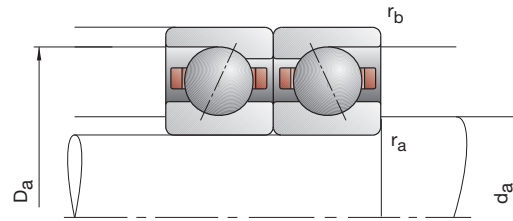
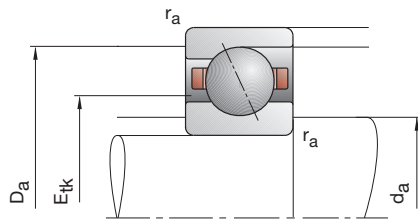
|               |                                                           |
|---------------|-----------------------------------------------------------|
| <b>P4S</b>    | FAG Standard<br>better than P4 according to<br>DIN 620    |
| <b>P4S-K5</b> | P4S but with mean sorting of<br>bore and outside diameter |

## Cage

|            |                                                                       |
|------------|-----------------------------------------------------------------------|
| <b>T</b>   | Textile laminated phenolic resin,<br>outer ring guided                |
| <b>TX</b>  | Textile laminated phenolic resin,<br>outer ring guided                |
| <b>TPA</b> | Textile laminated phenolic resin,<br>series B718<br>outer ring guided |

\* Special designs are available by agreement. You can find more information in the “Customized Solutions” chapter.

# FAG Spindle Bearings



| Bearing code      | Dimensions |     |    |                   |                    | Abutment dimensions |                |                |                | DLR dimensions |                |                |                 | Load rating      |                    |
|-------------------|------------|-----|----|-------------------|--------------------|---------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|------------------|--------------------|
|                   | d          | D   | B  | r <sub>smin</sub> | r <sub>1smin</sub> | d <sub>a</sub>      | D <sub>a</sub> | r <sub>a</sub> | r <sub>b</sub> | B <sub>N</sub> | S <sub>N</sub> | S <sub>B</sub> | E <sub>tk</sub> | C <sub>dyn</sub> | C <sub>0stat</sub> |
|                   | mm         |     |    |                   |                    |                     |                |                |                |                |                |                |                 | kN               |                    |
| FAG               |            |     |    |                   |                    |                     |                |                |                |                |                |                |                 |                  |                    |
| B71824-C-TPA-P4   | 120        | 150 | 16 | 1,00              | 0,30               | 126                 | 143,5          | 1,0            | 0,3            |                |                |                | 131,2           | 32,00            | 39,00              |
| B71824-E-TPA-P4   | 120        | 150 | 16 | 1,00              | 0,30               | 126                 | 143,5          | 1,0            | 0,3            |                |                |                | 131,2           | 30,00            | 36,00              |
| HCB71824-C-TPA-P4 | 120        | 150 | 16 | 1,00              | 0,30               | 126                 | 143,5          | 1,0            | 0,3            |                |                |                | 131,2           | 22,00            | 27,00              |
| HCB71824-E-TPA-P4 | 120        | 150 | 16 | 1,00              | 0,30               | 126                 | 143,5          | 1,0            | 0,3            |                |                |                | 131,2           | 20,80            | 25,00              |
| B71924-C-T-P4S    | 120        | 165 | 22 | 1,10              | 1,10               | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,2           | 73,50            | 85,00              |
| B71924-E-T-P4S    | 120        | 165 | 22 | 1,10              | 1,10               | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,2           | 69,50            | 80,00              |
| HCB71924-C-T-P4S  | 120        | 165 | 22 | 1,10              | 1,10               | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,2           | 51,00            | 58,50              |
| HCB71924-E-T-P4S  | 120        | 165 | 22 | 1,10              | 1,10               | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,2           | 48,00            | 55,00              |
| XCB71924-C-T-P4S  | 120        | 165 | 22 | 1,10              | 1,10               | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,2           | 114,00           | 58,50              |
| XCB71924-E-T-P4S  | 120        | 165 | 22 | 1,10              | 1,10               | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,2           | 108,00           | 55,00              |
| HS71924-C-T-P4S   | 120        | 165 | 22 | 1,10              |                    | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,9           | 36,50            | 48,00              |
| HS71924-E-T-P4S   | 120        | 165 | 22 | 1,10              |                    | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,9           | 34,00            | 45,00              |
| HC71924-C-T-P4S   | 120        | 165 | 22 | 1,10              |                    | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,9           | 25,00            | 33,50              |
| HC71924-E-T-P4S   | 120        | 165 | 22 | 1,10              |                    | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,9           | 23,60            | 31,00              |
| XC71924-C-T-P4S   | 120        | 165 | 22 | 1,10              |                    | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,9           | 56,00            | 33,50              |
| XC71924-E-T-P4S   | 120        | 165 | 22 | 1,10              |                    | 128                 | 157            | 0,6            | 0,6            |                |                |                | 138,9           | 53,00            | 31,00              |
| B7024-C-T-P4S     | 120        | 180 | 28 | 2,00              | 2,00               | 131                 | 169            | 2,0            | 1,0            |                |                |                | 143,3           | 112,00           | 116,00             |
| B7024-E-T-P4S     | 120        | 180 | 28 | 2,00              | 2,00               | 131                 | 169            | 2,0            | 1,0            |                |                |                | 143,3           | 106,00           | 110,00             |
| HCB7024-C-T-P4S   | 120        | 180 | 28 | 2,00              | 2,00               | 131                 | 169            | 2,0            | 1,0            |                |                |                | 143,3           | 78,00            | 81,50              |
| HCB7024-E-T-P4S   | 120        | 180 | 28 | 2,00              | 2,00               | 131                 | 169            | 2,0            | 1,0            |                |                |                | 143,3           | 73,50            | 76,50              |
| XCB7024-C-T-P4S   | 120        | 180 | 28 | 2,00              | 2,00               | 131                 | 169            | 2,0            | 1,0            |                |                |                | 143,3           | 173,00           | 81,50              |
| XCB7024-E-T-P4S   | 120        | 180 | 28 | 2,00              | 2,00               | 131                 | 169            | 2,0            | 1,0            |                |                |                | 143,3           | 163,00           | 76,50              |
| HS7024-C-T-P4S    | 120        | 180 | 28 | 2,00              |                    | 131                 | 169            | 2,0            | 1,0            |                |                |                | 145,4           | 51,00            | 63,00              |
| HS7024-E-T-P4S    | 120        | 180 | 28 | 2,00              |                    | 131                 | 169            | 2,0            | 1,0            |                |                |                | 145,4           | 48,00            | 58,50              |
| HC7024-C-T-P4S    | 120        | 180 | 28 | 2,00              |                    | 131                 | 169            | 2,0            | 1,0            |                |                |                | 145,4           | 35,50            | 44,00              |
| HC7024-E-T-P4S    | 120        | 180 | 28 | 2,00              |                    | 131                 | 169            | 2,0            | 1,0            |                |                |                | 145,4           | 33,50            | 41,50              |
| XC7024-C-T-P4S    | 120        | 180 | 28 | 2,00              |                    | 131                 | 169            | 2,0            | 1,0            |                |                |                | 145,4           | 80,00            | 44,00              |
| XC7024-E-T-P4S    | 120        | 180 | 28 | 2,00              |                    | 131                 | 169            | 2,0            | 1,0            |                |                |                | 145,4           | 75,00            | 41,50              |
| B7224-C-T-P4S     | 120        | 215 | 40 | 2,10              | 2,10               | 140                 | 195            | 2,1            | 2,1            |                |                |                | 158,0           | 204,00           | 196,00             |
| B7224-E-T-P4S     | 120        | 215 | 40 | 2,10              | 2,10               | 140                 | 195            | 2,1            | 2,1            |                |                |                | 158,0           | 196,00           | 186,00             |
| HCB7224-C-T-P4S   | 120        | 215 | 40 | 2,10              | 2,10               | 140                 | 195            | 2,1            | 2,1            |                |                |                | 158,0           | 140,00           | 137,00             |
| HCB7224-E-T-P4S   | 120        | 215 | 40 | 2,10              | 2,10               | 140                 | 195            | 2,1            | 2,1            |                |                |                | 158,0           | 134,00           | 129,00             |

- \* options; • = possible, – = not possible  
 \*\* see section Engineering, Speeds  
 \*\*\* see section Engineering, Deflection and Rigidity

## Designation examples:

### Sealed design

B7024-C-2RSD-T-P4S-UL  
 HSS7024-E-T-P4S-UL

### Hybrid ceramic design

HC7024-E-T-P4S-UL  
 HCB71824-C-TPA-P4-UL

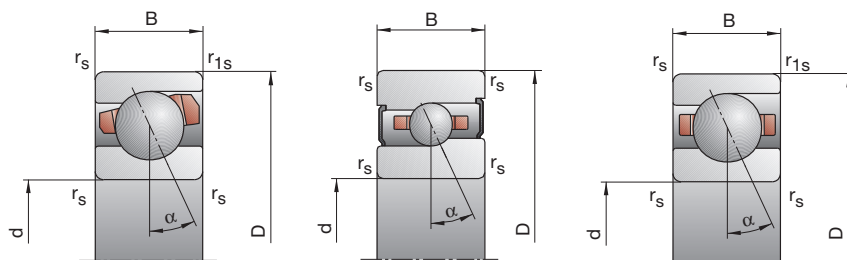
### X-life ultra design

XCB7024-E-2RSD-T-P4S-UL  
 XC7024-E-T-P4S-UL

# B718..C/E, B719, B70, B72 HS719..C/E, HS70

C: Contact angle  $\alpha = 15^\circ$

E: Contact angle  $\alpha = 25^\circ$



120

| Attainable speed** |         | Preloading force |       |        | Unloading force*** |        |        | Axial rigidity*** |       |       | Sealed design* | Weight | Bearing code      |
|--------------------|---------|------------------|-------|--------|--------------------|--------|--------|-------------------|-------|-------|----------------|--------|-------------------|
| Grease             | Oil     | F <sub>V</sub>   |       |        | K <sub>aE</sub>    |        |        | c <sub>a</sub>    |       |       |                |        |                   |
|                    | minimal | L                | M     | H      | L                  | M      | H      | L                 | M     | H     |                |        |                   |
| min <sup>-1</sup>  |         | N                |       |        |                    |        |        | N/μm              |       |       |                | kg     | FAG               |
| 7 500              | 12 000  | 146              | 527   | 1 119  | 445                | 1 734  | 3 956  | 80,1              | 141,0 | 206,3 | —              | 0,5    | B71824-C-TPA-P4   |
| 7 000              | 11 000  | 184              | 779   | 1 725  | 530                | 2 323  | 5 308  | 178,5             | 305,9 | 421,9 | —              | 0,5    | B71824-E-TPA-P4   |
| 10 000             | 17 000  | 79               | 319   | 700    | 237                | 1 015  | 2 358  | 70,8              | 125,0 | 179,7 | —              | 0,5    | HCB71824-C-TPA-P4 |
| 8 500              | 14 000  | 80               | 445   | 1 049  | 231                | 1 318  | 3 188  | 151,4             | 279,6 | 388,1 | —              | 0,5    | HCB71824-E-TPA-P4 |
| 7 000              | 11 000  | 408              | 1 344 | 2 773  | 1 257              | 4 462  | 9 838  | 109,5             | 186,0 | 267,5 | •              | 1,2    | B71924-C-T-P4S    |
| 6 700              | 10 000  | 591              | 2 087 | 4 388  | 1 726              | 6 291  | 13 620 | 256,2             | 411,5 | 555,9 | •              | 1,2    | B71924-E-T-P4S    |
| 9 000              | 15 000  | 212              | 742   | 1 566  | 642                | 2 370  | 5 263  | 95,1              | 158,4 | 222,4 | •              | 1,0    | HCB71924-C-T-P4S  |
| 8 000              | 13 000  | 277              | 1 110 | 2 421  | 811                | 3 315  | 7 395  | 222,7             | 365,9 | 492,3 | •              | 1,0    | HCB71924-E-T-P4S  |
| 12 000             | 19 000  | 212              | 742   | 1 566  | 642                | 2 370  | 5 263  | 95,1              | 158,4 | 222,4 | •              | 1,0    | XCB71924-C-T-P4S  |
| 10 000             | 17 000  | 277              | 1 110 | 2 421  | 811                | 3 315  | 7 395  | 222,7             | 365,9 | 492,3 | •              | 1,0    | XCB71924-E-T-P4S  |
| 9 000              | 15 000  | 127              | 382   | 764    | 374                | 1 179  | 2 462  | 77,6              | 121,2 | 164,9 | •              | 1,3    | HS71924-C-T-P4S   |
| 8 000              | 13 000  | 207              | 621   | 1 242  | 591                | 1 806  | 3 680  | 196,3             | 291,4 | 378,6 | •              | 1,3    | HS71924-E-T-P4S   |
| 11 000             | 18 000  | 88               | 263   | 525    | 260                | 802    | 1 654  | 76,7              | 116,7 | 155,7 | •              | 1,3    | HC71924-C-T-P4S   |
| 9 500              | 15 000  | 143              | 428   | 856    | 413                | 1 248  | 2 528  | 196,6             | 288,6 | 371,6 | •              | 1,3    | HC71924-E-T-P4S   |
| 14 000             | 22 000  | 88               | 263   | 525    | 260                | 802    | 1 654  | 76,7              | 116,7 | 155,7 | •              | 1,3    | XC71924-C-T-P4S   |
| 12 000             | 19 000  | 143              | 428   | 856    | 413                | 1 248  | 2 528  | 196,6             | 288,6 | 371,6 | •              | 1,3    | XC71924-E-T-P4S   |
| 6 700              | 10 000  | 657              | 2 107 | 4 308  | 2 035              | 7 046  | 15 410 | 123,7             | 208,9 | 300,3 | •              | 2,1    | B7024-C-T-P4S     |
| 6 300              | 9 500   | 989              | 3 317 | 6 881  | 2 896              | 10 031 | 21 490 | 291,7             | 461,2 | 621,8 | •              | 2,1    | B7024-E-T-P4S     |
| 8 500              | 14 000  | 351              | 1 175 | 2 437  | 1 068              | 3 775  | 8 244  | 108,3             | 178,0 | 248,9 | •              | 1,8    | HCB7024-C-T-P4S   |
| 7 500              | 12 000  | 488              | 1 782 | 3 795  | 1 434              | 5 334  | 11 621 | 257,6             | 410,6 | 548,6 | •              | 1,8    | HCB7024-E-T-P4S   |
| 11 000             | 18 000  | 351              | 1 175 | 2 437  | 1 068              | 3 775  | 8 244  | 108,3             | 178,0 | 248,9 | •              | 1,8    | XCB7024-C-T-P4S   |
| 9 500              | 16 000  | 488              | 1 782 | 3 795  | 1 434              | 5 334  | 11 621 | 257,6             | 410,6 | 548,6 | •              | 1,8    | XCB7024-E-T-P4S   |
| 8 500              | 14 000  | 179              | 536   | 1 072  | 530                | 1 659  | 3 480  | 82,1              | 128,0 | 175,0 | •              | 2,3    | HS7024-C-T-P4S    |
| 7 500              | 12 000  | 288              | 863   | 1 725  | 824                | 2 511  | 5 114  | 205,8             | 305,6 | 397,2 | •              | 2,3    | HS7024-E-T-P4S    |
| 10 000             | 17 000  | 123              | 369   | 737    | 363                | 1 128  | 2 336  | 80,5              | 123,2 | 164,9 | •              | 2,1    | HC7024-C-T-P4S    |
| 9 000              | 14 000  | 199              | 598   | 1 196  | 575                | 1 747  | 3 543  | 205,8             | 303,1 | 390,8 | •              | 2,1    | HC7024-E-T-P4S    |
| 13 000             | 20 000  | 123              | 369   | 737    | 363                | 1 128  | 2 336  | 80,5              | 123,2 | 164,9 | •              | 2,1    | XC7024-C-T-P4S    |
| 11 000             | 18 000  | 199              | 598   | 1 196  | 575                | 1 747  | 3 543  | 205,8             | 303,1 | 390,8 | •              | 2,1    | XC7024-E-T-P4S    |
| 6 000              | 9 000   | 1 269            | 3 957 | 8 038  | 3 947              | 13 275 | 28 900 | 140,0             | 233,9 | 335,7 | —              | 5,5    | B7224-C-T-P4S     |
| 5 300              | 8 000   | 2 003            | 6 418 | 13 107 | 5 898              | 19 505 | 41 076 | 335,4             | 522,0 | 699,7 | —              | 5,5    | B7224-E-T-P4S     |
| 7 500              | 12 000  | 684              | 2 190 | 4 478  | 2 088              | 7 051  | 15 167 | 122,8             | 198,5 | 275,8 | —              | 4,4    | HCB7224-C-T-P4S   |
| 6 300              | 9 500   | 1 047            | 3 506 | 7 288  | 3 085              | 10 550 | 22 362 | 301,6             | 467,4 | 618,6 | —              | 4,4    | HCB7224-E-T-P4S   |