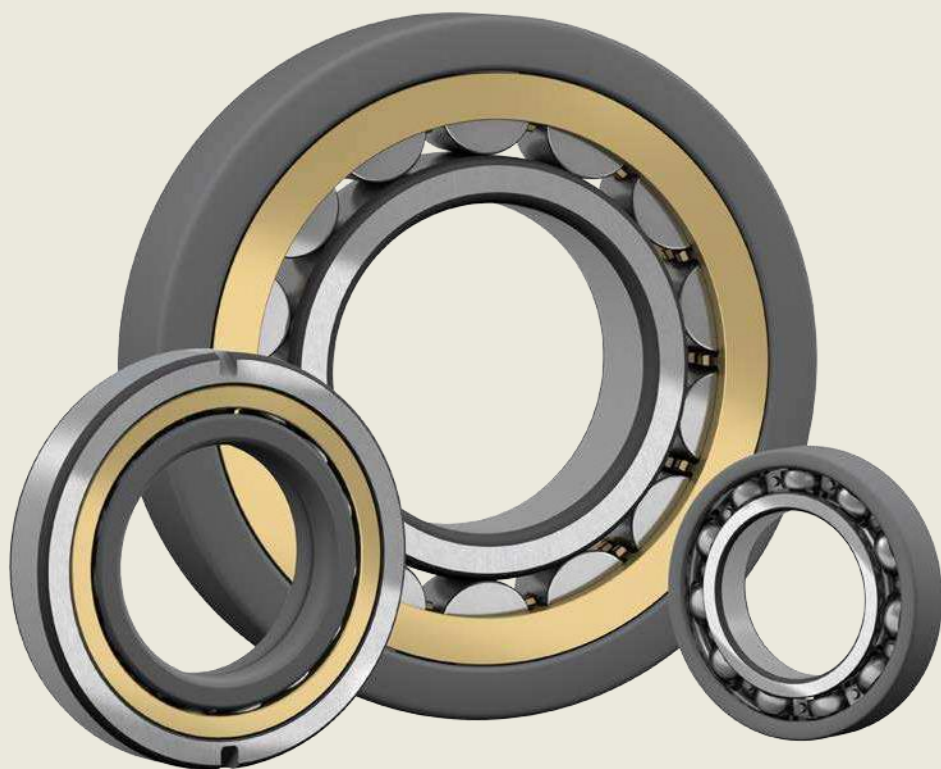




20

# INSOCOAT bearings



# 20 INSOCOAT bearings

## More information

### General bearing knowledge 17

### Bearing selection process 59

Lubrication 109

Bearing interfaces 139

Seat tolerances for standard conditions 148

Selecting internal clearance or preload 182

Sealing, mounting and dismounting 193

### Mounting instructions for individual bearings † [skf.com/mount](https://skf.com/mount)

Electric motors, generators and associated equipment are at risk when an electric current passes through their bearings. This can damage the contact surfaces of rolling elements and raceways in the bearings (electrical erosion) and rapidly degrade the grease. An additional risk in electric motors and generators comes from high frequency currents caused by the inherent stray capacitance. The risk of damage increases where the application uses a frequency converter.

INSOCOAT bearings:

- are designed to prevent electric current from passing through the bearing
- have the external surfaces of either their inner or outer ring coated with an insulating aluminium oxide layer, by applying a sophisticated plasma-spray process for an outstanding quality finish
- are a very cost-effective solution compared with other insulation methods

## Bearing features

### • Protection against electrical erosion

With insulating properties integrated into the bearing, INSOCOAT bearings can improve reliability and increase machine uptime by virtually eliminating the problem of electrical erosion.

### • High electrical resistance

The aluminium oxide coating provides a minimum electrical resistance of 200 MΩ and can withstand voltages up to 3 000 V DC.

### • Consistent electrical performance

Plasma-spray coatings are normally hygroscopic and, therefore, vulnerable to penetration caused by condensation. To protect against this effect, INSOCOAT bearings are treated with a unique sealant.

Fig. 1

### INSOCOAT bearings, outer ring coated



Single row deep groove ball bearing



Single row cylindrical roller bearing

## Assortment

The standard assortment of INSOCOAT bearings (fig. 1 and fig. 2) listed here constitutes the most commonly used sizes and variants of:

- single row deep groove ball bearings
- single row cylindrical roller bearings

For bearing types and sizes not listed in the product tables, contact SKF

For applications where smaller bearings than those listed are needed, SKF recommends using SKF Hybrid bearings (Hybrid bearings, [page 1043](#))

In addition to the standard assortment, SKF can supply special INSOCOAT bearings and bearing units with complex ring geometries (fig. 3), such as:

- four-point contact ball bearings
- flanged tapered roller bearings
- tapered roller bearing units (TBU)
- traction motor bearing units

For availability and detailed information, contact SKF

## Designs and variants

### INSOCOAT bearings with a coated outer ring

INSOCOAT bearings typically have the external surfaces of the outer ring coated with aluminium oxide (fig. 1). These bearings are identified by the following designation suffixes:

- VL0241 – standard layer
- VL0246 – advanced layer for higher electrical resistance

For availability, contact SKF

Fig. 2

#### INSOCOAT bearings, inner ring coated



Single row deep groove ball bearing



Single row cylindrical roller bearing

Fig. 3

#### Special INSOCOAT bearings and bearing units



Four-point contact ball bearing



Flanged tapered roller bearing



Tapered roller bearing unit



Traction motor bearing unit

# INSOCOAT bearings with a coated inner ring

INSOCOAT bearings that have the external surfaces of the inner ring coated with aluminium oxide (fig. 2, page 1031) provide enhanced protection against high frequency electric currents. These bearings are identified by the following designation suffixes:

- VL2071 – standard layer
- VL2076 – advanced layer for higher electrical resistance

For availability, contact SKF

## Capped bearings

Some INSOCOAT deep groove ball bearings can be supplied capped (Capped bearings, page 242). For availability, contact SKF

## Cages

SKF INSOCOAT deep groove ball bearings are fitted with one of the following cages:

- a stamped steel cage, riveted, ball centred (no designation suffix)
- a machined brass cage, riveted, ball centred (designation suffix M)

For additional information, refer to Cages, page 249

SKF INSOCOAT cylindrical roller bearings are fitted with one of the following cages:

- a glass fibre reinforced PA66 cage, window-type, roller centred (designation suffix P)
- a machined brass cage, riveted, roller centred (designation suffix M)
- a machined brass cage, window-type, inner or outer ring centred (depending on bearing design) (designation suffix ML)

For additional information, refer to Cages, page 502

When used at high temperatures, some lubricants can have a detrimental effect on polyamide cages. For additional information about the suitability of cages, refer to Cages, page 187

Table 1

### Electrical properties

| Coating               | Breakdown voltage (DC) | Minimum electrical resistance |
|-----------------------|------------------------|-------------------------------|
| Designation suffix    |                        |                               |
| –                     | V                      | MΩ                            |
| <b>Standard layer</b> |                        |                               |
| VL0241, VL2071        | 3 000                  | 200                           |
| <b>Advanced layer</b> |                        |                               |
| VL0246, VL2076        | 3 000                  | 400                           |

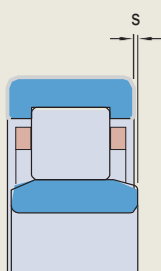
Valid if:  
• Temperature  $T \leq 40^{\circ}\text{C}$  ( $105^{\circ}\text{F}$ )  
• Relative humidity  $rH \leq 60\%$

# Bearing data

|                                                                                          | Deep groove ball bearings                                                                                                                                                                                                                                                                   | Cylindrical roller bearings                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Dimension standards</b>                                                               | Boundary dimensions: ISO 15                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                            |
| <b>Tolerances</b><br><br>For additional information<br>* <a href="#">page 35</a>         | Normal<br>Tighter tolerances (up to P5) for some bearings on request<br><br>Values: ISO 492 ( <a href="#">table 2, page 38</a> , to <a href="#">table 4, page 40</a> )<br>The aluminium oxide layer on the external surfaces of either the inner or the outer ring does not affect accuracy | Normal                                                                                                                                                                                                                                                                                     |
| <b>Internal clearance</b><br><br>For additional information<br>* <a href="#">page 26</a> | C3<br><br>Values: ISO 5753-1 ( <a href="#">table 6, page 252</a> )<br><br>Values are valid for unmounted bearings under zero measuring load                                                                                                                                                 | C3<br>Check availability of other clearance classes<br><br>Values: ISO 5753-1 ( <a href="#">table 3, page 506</a> )                                                                                                                                                                        |
| <b>Permissible misalignment</b>                                                          | Identical to standard bearings<br>* <a href="#">page 250</a>                                                                                                                                                                                                                                | * <a href="#">page 504</a>                                                                                                                                                                                                                                                                 |
| <b>Permissible axial displacement</b>                                                    | –                                                                                                                                                                                                                                                                                           | $s_{\max}$ → <a href="#">product tables, page 1036</a><br>NU design INSOCOAT bearings can accommodate axial displacement ( <a href="#">fig. 4</a> ) Displacement of the shaft relative to the housing occurs within these bearings As a result, there is virtually no increase in friction |
| <b>Electrical properties</b>                                                             | <a href="#">table 1</a>                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                            |

Fig. 4

## Axial displacement



## Loads

For recommendations about minimum load, axial load carrying capacity and equivalent bearing loads, refer to Loads of the relevant standard bearing:

- deep groove ball bearings, [page 254](#)
- cylindrical roller bearings, [page 509](#)

The required INSOCOAT bearing specific values and factors are listed in the relevant product tables:

- INSOCOAT deep groove ball bearings, [page 1036](#)
  - basic static load rating  $C_0$
  - calculation factors  $f_0$  and  $k_r$
- INSOCOAT cylindrical roller bearings, [page 1038](#)
  - calculation factor  $k_r$
  - reference speed

## Temperature limits

The permissible operating temperature for INSOCOAT bearings can be limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant

Where temperatures outside the permissible range are expected, contact SKF

### Bearing rings and rolling elements

SKF INSOCOAT bearings are heat stabilized up to at least 150 °C (300 °F)

### Cages

Steel or brass cages can be used at the same operating temperatures as the bearing rings and rolling elements. For temperature limits of PA66 cages, refer to Polymer cages, [page 188](#)

### Lubricants

For temperature limits of SKF greases, refer to Selecting a suitable SKF grease, [page 116](#)

When using lubricants not supplied by SKF, temperature limits should be evaluated according to the SKF traffic light concept ([page 117](#))

## Permissible speed

The speed ratings in the product tables (INSOCOAT deep groove ball bearings, [page 1036](#), and INSOCOAT cylindrical roller bearings, [page 1038](#)) indicate:

- the **reference speed**, which enables a quick assessment of the speed capabilities from a thermal frame of reference
- the **limiting speed**, which is a mechanical limit that should not be exceeded unless the bearing design and the application are adapted for higher speeds

For additional information, refer to Operating temperature and speed, [page 129](#)

SKF recommends oil lubrication for bearings with a ring centred cage (designation suffix ML). When these bearings are grease lubricated, the  $nd_m$  value is limited to  $\leq 250\,000$  mm/min

where

$d_m$  bearing mean diameter [mm]  
 $= 0,5 (d + D)$

$n$  rotational speed [r/min]

# Design considerations

## Abutment dimensions

To maximize the effectiveness of the insulation, SKF recommends the following guidelines for dimensioning the shaft and housing shoulders (**ig. 5**):

- Bearings with a coated outer ring (designation suffix VL0241 or VL0246): housing abutment diameter  $\geq D_{a\min}$
- Bearings with a coated inner ring (designation suffix VL2071 or VL2076): shaft abutment diameter  $\leq d_{a\max}$

The values for  $D_{a\min}$  and  $d_{a\max}$  can be obtained from the product tables:

- INSOCOAT deep groove ball bearings, [page 1036](#)
- INSOCOAT cylindrical roller bearings, [page 1038](#)

## Mounting

During mounting, INSOCOAT bearings should be handled in the same way as standard bearings

When using an induction heater for bearings with a coated inner ring (designation suffix VL2071 or VL2076), use a protective sleeve or an additional plastic support block

In cases where springs are used to apply preload to deep groove ball bearings or lock nuts are used for axial clamping, SKF recommends inserting a steel spacer ring between the bearing and the preload or locking device (**ig. 6**)

The values for  $d_{a\min}$  and  $d_{a\max}$  can be obtained from the product tables:

- INSOCOAT deep groove ball bearings, [page 1036](#)
- INSOCOAT cylindrical roller bearings, [page 1038](#)

## Designation system

Refer to Designation system of the relevant standard bearing:

- deep groove ball bearings, [page 258](#)
- cylindrical roller bearings, [page 514](#)

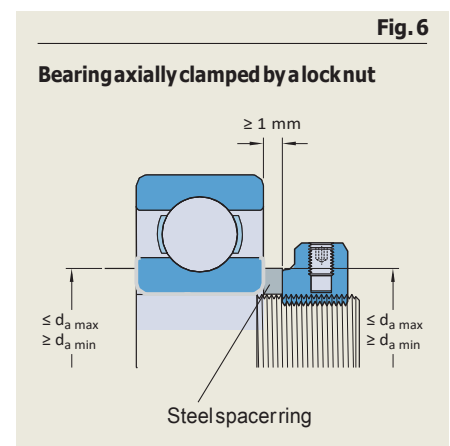
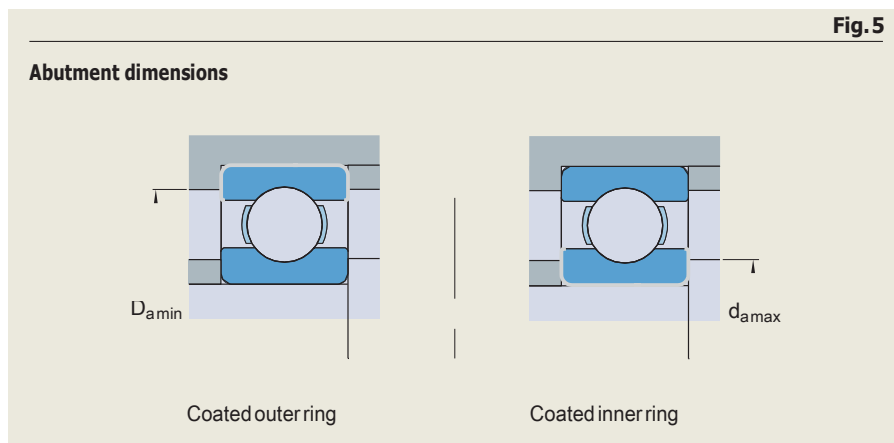
The designation suffixes used to identify INSOCOAT bearings are explained in the following

**VL0241** External surfaces of the outer ring are coated – standard layer

**VL0246** External surfaces of the outer ring are coated – advanced layer

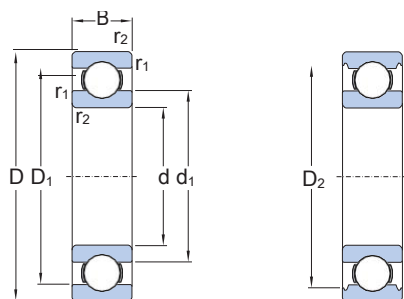
**VL2071** External surfaces of the inner ring are coated – standard layer

**VL2076** External surfaces of the inner ring are coated – advanced layer



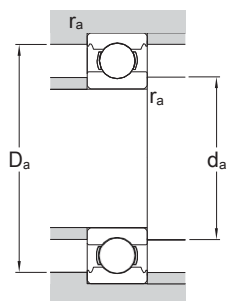
## 20.1 INSOCOAT deep groove ball bearings

d 70 – 150 mm



| Principal dimensions |     |    | Basic load ratings |                          | Fatigue load limit | Speed ratings      |                   | Mass | Designation     |
|----------------------|-----|----|--------------------|--------------------------|--------------------|--------------------|-------------------|------|-----------------|
| d                    | D   | B  | dynamic<br>C       | static<br>C <sub>0</sub> | P <sub>u</sub>     | Reference<br>speed | Limiting<br>speed |      |                 |
| mm                   |     |    | kN                 |                          | kN                 | r/min              |                   | kg   | –               |
| <b>70</b>            | 150 | 35 | 104                | 68                       | 2,75               | 9 500              | 6 300             | 2,5  | ► 6314/C3VL0241 |
| <b>75</b>            | 130 | 25 | 68,9               | 49                       | 2,04               | 10 000             | 6 700             | 1,2  | ► 6215/C3VL0241 |
|                      | 160 | 37 | 114                | 76,5                     | 3                  | 9 000              | 5 600             | 3,05 | ► 6315/C3VL0241 |
| <b>80</b>            | 140 | 26 | 72,8               | 55                       | 2,2                | 9 500              | 6 000             | 1,4  | ► 6216/C3VL0241 |
|                      | 170 | 39 | 124                | 86,5                     | 3,25               | 8 500              | 5 300             | 3,55 | ► 6316/C3VL0241 |
| <b>85</b>            | 150 | 28 | 87,1               | 64                       | 2,5                | 9 000              | 5 600             | 1,75 | ► 6217/C3VL0241 |
|                      | 180 | 41 | 133                | 96,5                     | 3,55               | 8 000              | 5 000             | 4,1  | ► 6317/C3VL0241 |
| <b>90</b>            | 160 | 30 | 101                | 73,5                     | 2,8                | 8 500              | 5 300             | 2,4  | ► 6218/C3VL0241 |
|                      | 190 | 43 | 143                | 108                      | 3,8                | 7 500              | 4 800             | 4,9  | ► 6318/C3VL0241 |
| <b>95</b>            | 170 | 32 | 114                | 81,5                     | 3                  | 8 000              | 5 000             | 2,5  | ► 6219/C3VL0241 |
|                      | 200 | 45 | 153                | 118                      | 4,15               | 7 000              | 4 500             | 5,65 | ► 6319/C3VL0241 |
| <b>100</b>           | 180 | 34 | 127                | 93                       | 3,35               | 7 500              | 4 800             | 3,15 | ► 6220/C3VL0241 |
|                      | 215 | 47 | 174                | 140                      | 4,75               | 6 700              | 4 300             | 7    | ► 6320/C3VL0241 |
| <b>110</b>           | 200 | 38 | 151                | 118                      | 4                  | 6 700              | 4 300             | 4,4  | ► 6222/C3VL0241 |
|                      | 240 | 50 | 203                | 180                      | 5,7                | 6 000              | 3 800             | 9,65 | ► 6322/C3VL0241 |
| <b>120</b>           | 215 | 40 | 146                | 118                      | 3,9                | 6 300              | 4 000             | 5,2  | ► 6224/C3VL0241 |
|                      | 260 | 55 | 208                | 186                      | 5,7                | 5 600              | 3 400             | 12,5 | ► 6324/C3VL2071 |
| <b>130</b>           | 230 | 40 | 156                | 132                      | 4,15               | 5 600              | 3 600             | 5,75 | 6226/C3VL2071   |
|                      | 280 | 58 | 229                | 216                      | 6,3                | 5 000              | 3 200             | 15   | ► 6326/C3VL2071 |
| <b>140</b>           | 300 | 62 | 251                | 245                      | 7,1                | 4 800              | 3 000             | 18,5 | ► 6328/C3VL2071 |
| <b>150</b>           | 270 | 45 | 174                | 166                      | 4,9                | 5 000              | 3 200             | 9,8  | ► 6230/C3VL2071 |
|                      | 320 | 65 | 276                | 285                      | 7,8                | 4 300              | 2 800             | 23   | ► 6330/C3VL2071 |

► Popular item

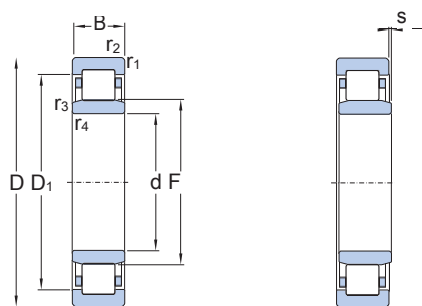


| Dimensions |                     |                     |                     |                         | Abutment and illet dimensions |                       |                       |                       |                       | Calculation factors |                |
|------------|---------------------|---------------------|---------------------|-------------------------|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------|----------------|
| d          | d <sub>1</sub><br>≈ | D <sub>1</sub><br>≈ | D <sub>2</sub><br>≈ | r <sub>1,2</sub><br>min | d <sub>a</sub><br>min         | d <sub>a</sub><br>max | D <sub>a</sub><br>min | D <sub>a</sub><br>max | r <sub>a</sub><br>max | k <sub>r</sub>      | f <sub>0</sub> |
| mm         |                     |                     |                     |                         | mm                            |                       |                       |                       |                       | –                   |                |
| <b>70</b>  | 94,9                | –                   | 132                 | 2,1                     | 82                            | –                     | 136                   | 138                   | 2                     | 0,03                | 13             |
| <b>75</b>  | 92                  | –                   | 118                 | 1,5                     | 84                            | –                     | 121                   | 121                   | 1,5                   | 0,03                | 15             |
|            | 101                 | –                   | 141                 | 2,1                     | 87                            | –                     | 146                   | 148                   | 2                     | 0,03                | 13             |
| <b>80</b>  | 101                 | –                   | 122                 | 2                       | 91                            | –                     | 128                   | 129                   | 2                     | 0,025               | 15             |
|            | 108                 | –                   | 149                 | 2,1                     | 92                            | –                     | 154                   | 158                   | 2                     | 0,03                | 13             |
| <b>85</b>  | 106                 | –                   | 134                 | 2                       | 96                            | –                     | 139                   | 139                   | 2                     | 0,025               | 15             |
|            | 114                 | –                   | 158                 | 3                       | 99                            | –                     | 163                   | 166                   | 2,5                   | 0,03                | 13             |
| <b>90</b>  | 112                 | –                   | 145                 | 2                       | 101                           | –                     | 149                   | 149                   | 2                     | 0,025               | 15             |
|            | 121                 | –                   | 166                 | 3                       | 104                           | –                     | 171                   | 176                   | 2,5                   | 0,03                | 13             |
| <b>95</b>  | 118                 | –                   | 151                 | 2,1                     | 107                           | –                     | 156                   | 158                   | 2                     | 0,025               | 14             |
|            | 127                 | –                   | 174                 | 3                       | 109                           | –                     | 179                   | 186                   | 2,5                   | 0,03                | 13             |
| <b>100</b> | 124                 | –                   | 160                 | 2,1                     | 112                           | –                     | 165                   | 168                   | 2                     | 0,025               | 14             |
|            | 135                 | –                   | 186                 | 3                       | 114                           | –                     | 191                   | 201                   | 2,5                   | 0,03                | 13             |
| <b>110</b> | 138                 | –                   | 179                 | 2,1                     | 122                           | –                     | 184                   | 188                   | 2                     | 0,025               | 14             |
|            | 149                 | –                   | 207                 | 3                       | 124                           | –                     | 213                   | 226                   | 2,5                   | 0,03                | 13             |
| <b>120</b> | 150                 | –                   | 189                 | 2,1                     | 132                           | –                     | 194                   | 203                   | 2                     | 0,025               | 14             |
|            | 164                 | 215                 | –                   | 3                       | 134                           | 158                   | –                     | 246                   | 2,5                   | 0,03                | 14             |
| <b>130</b> | 160                 | 198                 | –                   | 3                       | 144                           | 154                   | –                     | 216                   | 2,5                   | 0,025               | 15             |
|            | 177                 | 232                 | –                   | 4                       | 147                           | 171                   | –                     | 263                   | 3                     | 0,03                | 14             |
| <b>140</b> | 190                 | 249                 | –                   | 4                       | 157                           | 185                   | –                     | 283                   | 3                     | 0,03                | 14             |
| <b>150</b> | 190                 | 228                 | –                   | 3                       | 164                           | 185                   | –                     | 256                   | 2,5                   | 0,025               | 15             |
|            | 205                 | 264                 | –                   | 4                       | 167                           | 200                   | –                     | 303                   | 3                     | 0,03                | 14             |



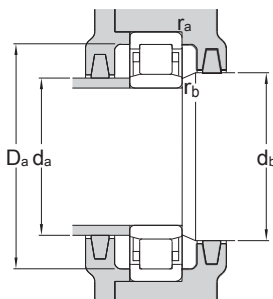
## 20.2 INSOCOAT cylindrical rollerbearings

d 50 – 95 mm



| Principal dimensions |     |    | Basic load ratings |                | Fatigue load limit | Speed ratings   |                | Mass | Designation                  |
|----------------------|-----|----|--------------------|----------------|--------------------|-----------------|----------------|------|------------------------------|
| d                    | D   | B  | C                  | C <sub>0</sub> | P <sub>u</sub>     | Reference speed | Limiting speed |      |                              |
| mm                   |     |    | kN                 |                | kN                 | r/min           |                | kg   | –                            |
| <b>50</b>            | 80  | 16 | 47,3               | 57             | 7,2                | 9 500           | 9 500          | 0,27 | <b>NU 1010 ECP/C3VL0241</b>  |
|                      | 90  | 20 | 66                 | 72             | 9,15               | 7 500           | 9 000          | 0,48 | <b>NU 210 ECM/C3VL0241</b>   |
|                      | 110 | 27 | 112                | 116            | 15,3               | 6 000           | 8 000          | 1,35 | <b>NU 310 ECM/C3VL0241</b>   |
| <b>55</b>            | 90  | 18 | 57,2               | 69,5           | 9                  | 8 500           | 13 000         | 0,4  | <b>NU 1011 ECP/C3VL0241</b>  |
|                      | 90  | 18 | 57,2               | 69,5           | 9                  | 8 500           | 13 000         | 0,45 | <b>NU 1011 ECML/C3VL0241</b> |
|                      | 100 | 21 | 85,8               | 100            | 12,9               | 7 000           | 8 000          | 0,78 | <b>NU 211 ECM/C3VL0241</b>   |
|                      | 120 | 29 | 138                | 146            | 19                 | 5 600           | 7 000          | 1,75 | <b>NU 311 ECM/C3VL0241</b>   |
| <b>60</b>            | 95  | 18 | 38                 | 45,5           | 5,85               | 8 000           | 13 000         | 0,48 | <b>NU 1012 ML/C3VL0241</b>   |
|                      | 95  | 18 | 58,3               | 73,5           | 8,8                | 8 000           | 8 000          | 0,48 | <b>NU 1012 ECP/C3VL0241</b>  |
|                      | 110 | 22 | 96,8               | 106            | 14                 | 6 300           | 7 500          | 0,97 | ► <b>NU 212 ECM/C3VL0241</b> |
|                      | 130 | 31 | 151                | 160            | 20,4               | 5 000           | 6 700          | 2,15 | <b>NU 312 ECM/C3VL0241</b>   |
| <b>65</b>            | 100 | 18 | 62,7               | 81,5           | 10,6               | 7 500           | 7 500          | 0,45 | <b>NU 1013 ECP/C3VL0241</b>  |
|                      | 120 | 23 | 110                | 122            | 16                 | 5 600           | 6 700          | 1,25 | <b>NU 213 ECM/C3VL0241</b>   |
|                      | 140 | 33 | 183                | 196            | 25,5               | 4 800           | 6 000          | 2,65 | ► <b>NU 313 ECM/C3VL0241</b> |
| <b>70</b>            | 110 | 20 | 70,4               | 85             | 10,8               | 7 000           | 7 000          | 0,69 | <b>NU 1014 ECM/C3VL0241</b>  |
|                      | 110 | 20 | 76,5               | 93             | 12                 | 7 000           | 7 000          | 0,62 | <b>NU 1014 ECP/C3VL0241</b>  |
|                      | 125 | 24 | 121                | 140            | 18,6               | 5 300           | 6 300          | 1,35 | <b>NU 214 ECM/C3VL0241</b>   |
|                      | 150 | 35 | 209                | 228            | 29                 | 4 300           | 5 600          | 3,1  | ► <b>NU 314 ECM/C3VL0241</b> |
| <b>75</b>            | 115 | 20 | 58,3               | 71             | 9,3                | 6 700           | 6 700          | 0,75 | <b>NU 1015 M/C3VL0241</b>    |
|                      | 130 | 25 | 132                | 160            | 21,2               | 5 300           | 6 000          | 1,5  | <b>NU 215 ECM/C3VL0241</b>   |
|                      | 160 | 37 | 242                | 270            | 34                 | 4 000           | 5 300          | 3,9  | <b>NU 315 ECM/C3VL0241</b>   |
|                      | 160 | 37 | 242                | 270            | 34                 | 4 000           | 5 300          | 3,9  | ► <b>NU 315 ECP/VL0241</b>   |
| <b>80</b>            | 125 | 22 | 99                 | 127            | 16,3               | 6 000           | 6 000          | 1,05 | <b>NU 1016 ECM/C3VL0241</b>  |
|                      | 140 | 26 | 142                | 173            | 22                 | 4 800           | 5 600          | 1,85 | <b>NU 216 ECM/C3VL0241</b>   |
|                      | 170 | 39 | 264                | 290            | 36                 | 3 800           | 5 000          | 4,6  | <b>NU 316 ECM/C3VL0241</b>   |
| <b>85</b>            | 130 | 22 | 72,1               | 91,5           | 11,6               | 6 000           | 6 000          | 1,1  | <b>NU 1017 M/C3VL0241</b>    |
|                      | 150 | 28 | 168                | 200            | 25,5               | 4 500           | 5 300          | 2,25 | <b>NU 217 ECM/C3VL0241</b>   |
|                      | 180 | 41 | 297                | 340            | 41,5               | 3 600           | 4 800          | 5,3  | ► <b>NU 317 ECM/C3VL0241</b> |
| <b>90</b>            | 140 | 24 | 85,8               | 110            | 13,7               | 5 600           | 5 600          | 1,35 | <b>NU 1018 M/C3VL0241</b>    |
|                      | 160 | 30 | 187                | 224            | 28                 | 4 300           | 5 000          | 2,75 | <b>NU 218 ECM/C3VL0241</b>   |
|                      | 190 | 43 | 319                | 360            | 44                 | 3 400           | 4 500          | 6,25 | ► <b>NU 318 ECM/C3VL0241</b> |
| <b>95</b>            | 145 | 24 | 88                 | 116            | 14,3               | 5 300           | 5 300          | 1,4  | <b>NU 1019 ML/C3VL0241</b>   |
|                      | 170 | 32 | 224                | 270            | 33,5               | 4 000           | 4 800          | 2,85 | <b>NU 219 ECM/C3VL0241</b>   |
|                      | 200 | 45 | 341                | 390            | 46,5               | 3 200           | 4 300          | 7,25 | ► <b>NU 319 ECM/C3VL0241</b> |

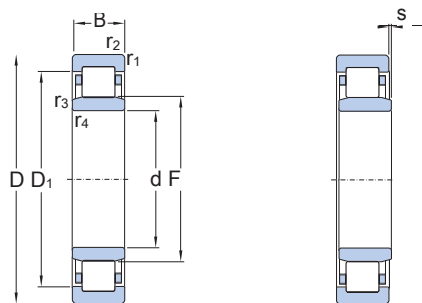
► Popular item



| Dimensions |                     |       |                         |                         |          | Abutment and illet dimensions |                       |                       |                       |                       |                       |                       | Calculation factor |
|------------|---------------------|-------|-------------------------|-------------------------|----------|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------|
| d          | D <sub>1</sub><br>≈ | F     | r <sub>1,2</sub><br>min | r <sub>3,4</sub><br>min | s<br>max | d <sub>a</sub><br>min         | d <sub>a</sub><br>max | d <sub>b</sub><br>min | D <sub>a</sub><br>min | D <sub>a</sub><br>max | r <sub>a</sub><br>max | r <sub>b</sub><br>max | k <sub>r</sub>     |
| mm         |                     |       |                         |                         |          | mm                            |                       |                       |                       |                       |                       |                       | —                  |
| <b>50</b>  | 70                  | 57,5  | 1,1                     | 0,6                     | 1        | 53,2                          | 56                    | 60                    | 74                    | 75,4                  | 1                     | 0,6                   | 0,1                |
|            | 78                  | 59,5  | 1,1                     | 1,1                     | 1,5      | 57                            | 57                    | 62                    | 83                    | 83                    | 1                     | 1                     | 0,15               |
|            | 92,1                | 65    | 2                       | 2                       | 1,9      | 61                            | 63                    | 67                    | 96                    | 99                    | 2                     | 2                     | 0,15               |
| <b>55</b>  | 79                  | 64,5  | 1,1                     | 1                       | 0,5      | 59,6                          | 63                    | 67                    | 80                    | 84                    | 1                     | 1                     | 0,1                |
|            | 79                  | 64,5  | 1,1                     | 1                       | 0,5      | 59,6                          | 63                    | 67                    | 80                    | 84                    | 1                     | 1                     | 0,1                |
|            | 86,3                | 66    | 1,5                     | 1,1                     | 1        | 62                            | 64                    | 68                    | 91                    | 91                    | 1,5                   | 1                     | 0,15               |
|            | 101                 | 70,5  | 2                       | 2                       | 2        | 66                            | 68                    | 73                    | 106                   | 109                   | 2                     | 2                     | 0,15               |
| <b>60</b>  | 81,6                | 69,5  | 1,1                     | 1                       | 2,9      | 64,6                          | 68                    | 72                    | 85                    | 89                    | 1                     | 1                     | 0,1                |
|            | 81,6                | 69,5  | 1,1                     | 1                       | 1,7      | 64,6                          | 68                    | 72                    | 85                    | 89                    | 1                     | 1                     | 0,1                |
|            | 95,7                | 72    | 1,5                     | 1,5                     | 1,4      | 69                            | 70                    | 74                    | 101                   | 101                   | 1,5                   | 1,5                   | 0,15               |
|            | 110                 | 77    | 2,1                     | 2,1                     | 2,1      | 72                            | 74                    | 79                    | 115                   | 118                   | 2                     | 2                     | 0,15               |
| <b>65</b>  | 88,5                | 74    | 1,1                     | 1                       | 1        | 69,6                          | 72                    | 77                    | 90                    | 94                    | 1                     | 1                     | 0,1                |
|            | 104                 | 78,5  | 1,5                     | 1,5                     | 1,4      | 74                            | 76                    | 81                    | 109                   | 111                   | 1,5                   | 1,5                   | 0,15               |
|            | 119                 | 82,5  | 2,1                     | 2,1                     | 2,2      | 77                            | 80                    | 85                    | 123                   | 128                   | 2                     | 2                     | 0,15               |
| <b>70</b>  | 97,5                | 79,5  | 1,1                     | 1                       | 1,3      | 74,6                          | 78                    | 82                    | 101                   | 104                   | 1                     | 1                     | 0,1                |
|            | 97,5                | 79,5  | 1,1                     | 1                       | 1,3      | 74,6                          | 78                    | 82                    | 101                   | 104                   | 1                     | 1                     | 0,1                |
|            | 109                 | 83,5  | 1,5                     | 1,5                     | 1,2      | 79                            | 81                    | 86                    | 115                   | 116                   | 1,5                   | 1,5                   | 0,15               |
|            | 127                 | 89    | 2,1                     | 2,1                     | 1,8      | 82                            | 86                    | 91                    | 131                   | 138                   | 2                     | 2                     | 0,15               |
| <b>75</b>  | 101                 | 85    | 1,1                     | 1                       | 3        | 79,6                          | 83                    | 87                    | 106                   | 109                   | 1                     | 1                     | 0,1                |
|            | 114                 | 88,5  | 1,5                     | 1,5                     | 1,2      | 84                            | 86                    | 91                    | 119                   | 121                   | 1,5                   | 1,5                   | 0,15               |
|            | 136                 | 95    | 2,1                     | 2,1                     | 1,8      | 87                            | 92                    | 97                    | 141                   | 148                   | 2                     | 2                     | 0,15               |
|            | 136                 | 95    | 2,1                     | 2,1                     | 1,8      | 87                            | 92                    | 97                    | 141                   | 148                   | 2                     | 2                     | 0,15               |
| <b>80</b>  | 109                 | 91,5  | 1,1                     | 1                       | 1,5      | 86                            | 90                    | 94                    | 114                   | 119                   | 1                     | 1                     | 120                |
|            | 123                 | 95,3  | 2                       | 2                       | 1,4      | 91                            | 93                    | 98                    | 128                   | 129                   | 2                     | 2                     | 0,15               |
|            | 144                 | 101   | 2,1                     | 2,1                     | 2,1      | 92                            | 98                    | 104                   | 149                   | 158                   | 2                     | 2                     | 0,15               |
| <b>85</b>  | 114                 | 96,5  | 1,1                     | 1                       | 3,3      | 89,6                          | 95                    | 99                    | 119                   | 124                   | 1                     | 1                     | 0,1                |
|            | 131                 | 100,5 | 2                       | 2                       | 1,5      | 96                            | 98                    | 103                   | 136                   | 139                   | 2                     | 2                     | 0,15               |
|            | 153                 | 108   | 3                       | 3                       | 2,3      | 99                            | 105                   | 111                   | 158                   | 166                   | 2,5                   | 2,5                   | 0,15               |
| <b>90</b>  | 122                 | 103   | 1,5                     | 1,1                     | 3,5      | 96                            | 101                   | 106                   | 128                   | 133                   | 1,5                   | 1                     | 0,1                |
|            | 140                 | 107   | 2                       | 2                       | 1,8      | 101                           | 104                   | 110                   | 144                   | 149                   | 2                     | 2                     | 0,15               |
|            | 162                 | 113,5 | 3                       | 3                       | 2,5      | 104                           | 110                   | 116                   | 167                   | 176                   | 2,5                   | 2,5                   | 0,15               |
| <b>95</b>  | 127                 | 108   | 1,5                     | 1,1                     | 3,5      | 101                           | 106                   | 111                   | 133                   | 138                   | 1,5                   | 1                     | 0,1                |
|            | 149                 | 112,5 | 2,1                     | 2,1                     | 1,7      | 107                           | 110                   | 115                   | 154                   | 158                   | 2                     | 2                     | 0,15               |
|            | 170                 | 121,5 | 3                       | 3                       | 2,9      | 109                           | 118                   | 124                   | 175                   | 186                   | 2,5                   | 2,5                   | 0,15               |

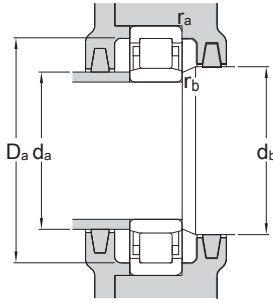
## 20.2 INSOCOAT cylindrical roller bearings

d 100 – 150 mm



| Principal dimensions |     |    | Basic load ratings |                | Fatigue load limit | Speed ratings   |                | Mass | Designation                  |
|----------------------|-----|----|--------------------|----------------|--------------------|-----------------|----------------|------|------------------------------|
| d                    | D   | B  | C                  | C <sub>0</sub> | P <sub>u</sub>     | Reference speed | Limiting speed |      |                              |
| mm                   |     |    | kN                 |                | kN                 | r/min           |                | kg   | –                            |
| <b>100</b>           | 150 | 24 | 89,7               | 122            | 15                 | 5 000           | 5 000          | 1,45 | <b>NU 1020 M/C3VL0241</b>    |
|                      | 180 | 34 | 251                | 310            | 38                 | 3 800           | 4 500          | 4    | ► <b>NU 220 ECM/C3VL0241</b> |
|                      | 215 | 47 | 391                | 440            | 51                 | 3 000           | 3 800          | 8,65 | <b>NU 320 ECM/C3VL0241</b>   |
| <b>110</b>           | 170 | 28 | 130                | 173            | 20,8               | 4 500           | 4 500          | 2,3  | <b>NU 1022 M/C3VL0241</b>    |
|                      | 200 | 38 | 297                | 375            | 44                 | 3 400           | 4 000          | 5,6  | ► <b>NU 222 ECM/C3VL0241</b> |
|                      | 240 | 50 | 468                | 540            | 61                 | 2 600           | 3 400          | 12   | ► <b>NU 322 ECM/C3VL0241</b> |
| <b>120</b>           | 180 | 28 | 138                | 190            | 22,4               | 4 000           | 4 000          | 2,55 | <b>NU 1024 M/C3VL2071</b>    |
|                      | 215 | 40 | 341                | 440            | 50                 | 3 000           | 3 600          | 6,65 | <b>NU 224 ECM/C3VL0241</b>   |
|                      | 260 | 55 | 539                | 620            | 69,5               | 2 400           | 3 200          | 15   | ► <b>NU 324 ECM/C3VL0241</b> |
| <b>130</b>           | 200 | 33 | 168                | 232            | 27                 | 3 800           | 5 600          | 3,85 | <b>NU 1026 M/C3VL2071</b>    |
|                      | 230 | 40 | 369                | 465            | 52                 | 2 800           | 3 400          | 7,6  | <b>NU 226 ECM/C3VL2071</b>   |
|                      | 280 | 58 | 627                | 750            | 81,5               | 2 200           | 3 000          | 18,5 | <b>NU 326 ECM/C3VL2071</b>   |
| <b>140</b>           | 210 | 33 | 179                | 255            | 29                 | 3 600           | 3 600          | 4,05 | <b>NU 1028 M/C3VL2071</b>    |
|                      | 250 | 42 | 396                | 520            | 58,5               | 2 600           | 3 200          | 9    | <b>NU 228 ECM/C3VL2071</b>   |
|                      | 300 | 62 | 682                | 830            | 88                 | 2 200           | 2 800          | 25   | <b>NU 328 ECM/C3VL2071</b>   |
| <b>150</b>           | 225 | 35 | 194                | 275            | 18                 | 3 200           | 3 200          | 4,9  | <b>NU 1030 M/C3VL2071</b>    |
|                      | 270 | 45 | 457                | 610            | 65,5               | 2 400           | 2 800          | 12   | <b>NU 230 ECM/C3VL2071</b>   |
|                      | 320 | 65 | 765                | 950            | 100                | 2 000           | 2 600          | 31   | <b>NU 330 ECM/C3VL2071</b>   |

► Popular item



| Dimensions |                     |       |                         |                         |          | Abutment and illet dimensions |                       |                       |                       |                       |                       |                       | Calculation factor |
|------------|---------------------|-------|-------------------------|-------------------------|----------|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------|
| d          | D <sub>1</sub><br>≈ | F     | r <sub>1,2</sub><br>min | r <sub>3,4</sub><br>min | s<br>max | d <sub>a</sub><br>min         | d <sub>a</sub><br>max | d <sub>b</sub><br>min | D <sub>a</sub><br>min | D <sub>a</sub><br>max | r <sub>a</sub><br>max | r <sub>b</sub><br>max | k <sub>r</sub>     |
| mm         |                     |       |                         |                         |          | mm                            |                       |                       |                       |                       |                       |                       | —                  |
| <b>100</b> | 132                 | 113   | 1,5                     | 1,1                     | 3,5      | 106                           | 111                   | 116                   | 138                   | 143                   | 1,5                   | 1                     | 0,1                |
|            | 157                 | 119   | 2,1                     | 2,1                     | 1,7      | 112                           | 116                   | 122                   | 162                   | 168                   | 2                     | 2                     | 0,15               |
|            | 182                 | 127,5 | 3                       | 3                       | 2,9      | 114                           | 124                   | 130                   | 192                   | 201                   | 2,5                   | 2,5                   | 0,15               |
| <b>110</b> | 149                 | 125   | 2                       | 1,1                     | 3,8      | 116                           | 123                   | 128                   | 155                   | 161                   | 2                     | 1                     | 0,1                |
|            | 174                 | 132,5 | 2,1                     | 2,1                     | 2,1      | 122                           | 130                   | 135                   | 179                   | 188                   | 2                     | 2                     | 0,15               |
|            | 201                 | 143   | 3                       | 3                       | 3        | 124                           | 139                   | 146                   | 207                   | 226                   | 2,5                   | 2,5                   | 0,15               |
| <b>120</b> | 159                 | 135   | 2                       | 1,1                     | 3,8      | 126                           | 133                   | 138                   | —                     | 171                   | 2                     | 1                     | 0,1                |
|            | 188                 | 143,5 | 2,1                     | 2,1                     | 1,9      | 132                           | 140                   | 146                   | 193                   | 203                   | 2                     | 2                     | 0,15               |
|            | 219                 | 154   | 3                       | 3                       | 3,7      | 134                           | 150                   | 157                   | 225                   | 246                   | 2,5                   | 2,5                   | 0,15               |
| <b>130</b> | 175                 | 148   | 2                       | 1,1                     | 4,7      | 136                           | 145                   | 151                   | —                     | 191                   | 2                     | 1                     | 0,1                |
|            | 202                 | 153,5 | 3                       | 3                       | 2,1      | 144                           | 145                   | 156                   | —                     | 216                   | 2,5                   | 2,5                   | 0,15               |
|            | 236                 | 167   | 4                       | 4                       | 3,7      | 147                           | 156                   | 170                   | —                     | 263                   | 3                     | 3                     | 0,15               |
| <b>140</b> | 185                 | 158   | 2                       | 1,1                     | 4,4      | 146                           | 155                   | 161                   | —                     | 201                   | 2                     | 1                     | 0,1                |
|            | 217                 | 169   | 3                       | 3                       | 2,5      | 154                           | 160                   | 172                   | —                     | 236                   | 2,5                   | 2,5                   | 0,15               |
|            | 252                 | 180   | 4                       | 4                       | 3,7      | 157                           | 168                   | 183                   | —                     | 283                   | 3                     | 3                     | 0,15               |
| <b>150</b> | 198                 | 169,5 | 2,1                     | 1,5                     | 4,9      | 157                           | 167                   | 173                   | —                     | 215                   | 2                     | 1,5                   | 0,1                |
|            | 234                 | 182   | 3                       | 3                       | 2,5      | 163                           | 172                   | 185                   | —                     | 256                   | 2,5                   | 2,5                   | 0,15               |
|            | 270                 | 193   | 4                       | 4                       | 4        | 167                           | 182                   | 196                   | —                     | 303                   | 3                     | 3                     | 0,15               |

