

Ballscrews

Rolled ballscrews

4. Rolled ballscrews

4.1 Properties

One of the benefits of rolled ballscrews is that feed systems equipped with them have less friction and are quieter than standard threads.

HIWIN manufactures them using state-of-the-art rolling technologies where the processes of material selection, rolling, heat treatment, machining and assembly are very closely coordinated.

Rolled ballscrews from HIWIN can be flexibly used in virtually all areas of industry. Rolled ballscrew shafts with diameters of 8 mm to 63 mm are always kept in stock and can be supplied at short notice. They can be supplied with or without end machining. Complete bearing units combined with standardised shaft ends enable us to supply complete ballscrews.

4.2 Tolerance classes

Table 4.1 shows the tolerance classes of rolled ballscrews. The lead accuracy is defined using the deviation from nominal path over any 300 mm section of the entire length. The path deviation over the entire useful path is determined by formula F 3.1 on Page 17.

| Path deviation | Tolerance class | | |
|----------------|-----------------|-------|------|
| | T5 | T7 | T10 |
| V_{300p} | 0.023 | 0.052 | 0.21 |

Unit: mm

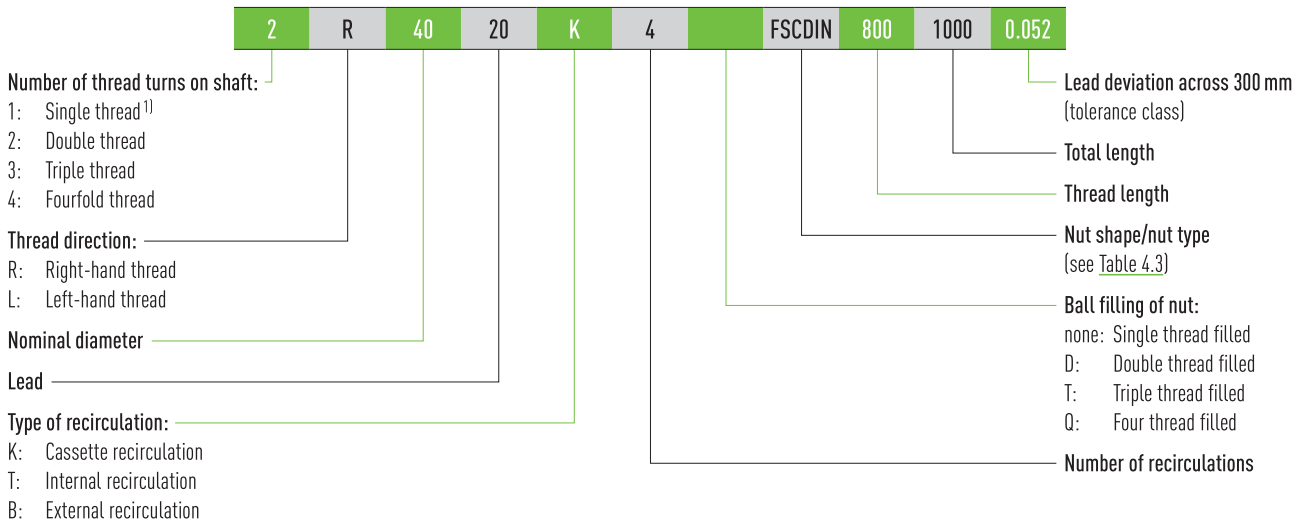
| Nominal diameter | Lead | | | | | | | | | | | | | | | | | Max. shaft length | | |
|------------------|------|------|---|-----|---|----|----|------|---|---|----|----|----|----|----|----|----|-------------------|-------|---------|
| | 1 | 1.25 | 2 | 2.5 | 3 | 4 | 5 | 5.08 | 6 | 8 | 10 | 12 | 16 | 20 | 25 | 32 | 40 | 50 | T5 | T7, T10 |
| 8 | ○ | | ○ | ○× | ○ | | ○ | | | | | | | | | | | | — | 800 |
| 10 | | | ○ | ○× | ○ | ○× | ○ | | ○ | | ○ | | | | | | | | 600 | 1,500 |
| 12 | | | ○ | ○ | ○ | ○× | ○× | ○ | | ○ | ○× | ○ | | | | | | | 600 | 1,500 |
| 15 | | | | | | | ○× | | | | ○ | | | ○ | | | | | 1,500 | 3,000 |
| 16 | ○ | | ○ | ○ | | ○ | ○× | ○ | ○ | ○ | ○× | ○ | ○× | ○× | | ○ | | | 1,500 | 3,000 |
| 20 | | | | ○ | | ○ | ○× | ○ | ○ | ○ | ○× | | | ○× | | | ○ | | 1,500 | 3,000 |
| 25 | | | | ○ | | ○ | ○× | ○ | ○ | ○ | ○× | | | | ○× | | | | 2,500 | 4,500 |
| 32 | | | | | ○ | | ○× | ○ | ○ | ○ | ○× | | | ○× | | ○× | ○ | | 2,500 | 4,500 |
| 40 | | | | | | | ○× | | ○ | ○ | ○× | ○ | ○ | ○× | ○ | | ○× | | 3,000 | 5,600 |
| 50 | | | | | | | ○× | | ○ | | ○× | ○ | ○ | ○× | | | ○× | ○ | 4,000 | 5,600 |
| 63 | | | | | | | | | | | ○× | ○ | ○ | ○ | | | ○ | | 4,000 | 5,600 |

Unit: mm

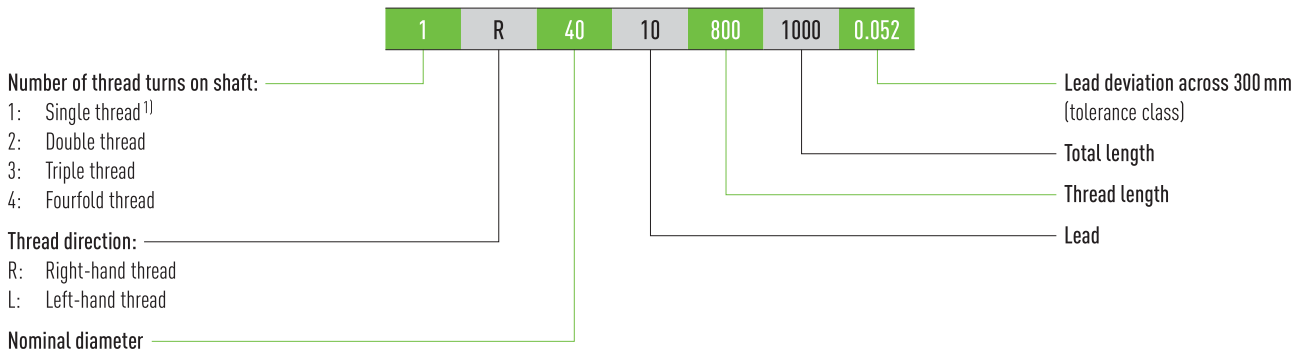
- Right-hand and left-hand thread
- Only right-hand thread
- × Preferred type for right-hand thread with fast delivery in T7
- × Preferred type for right-hand thread with fast delivery in T5 and T7

4.3 HIWIN order code for rolled ballscrews

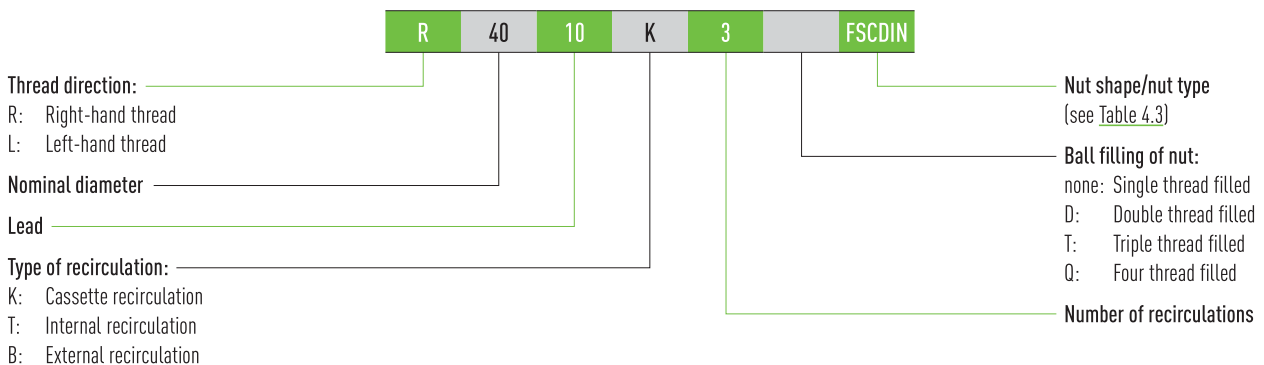
In order to clearly identify the ballscrew, information about the ballscrew shaft and nut is needed.



Order code for ballscrew shaft without the nut



Order code for ballscrew nut without the shaft



¹⁾ Standard; can be omitted with single-thread shafts

Ballscrews

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Table 4.3 Overview of nut shapes

| Nut designation | Description |
|-----------------|--|
| FSIDIN | Flange single nut with internal single recirculation |
| FSCDIN | Flange single nut with cassette recirculation |
| RSI | Cylindrical single nut with internal single return |
| RSIT | Cylindrical single nut with screw-in thread and internal single return |

4.4 Nuts for rolled ballscrews

4.4.1 Flange single nut FSCDIN/FSIDIN

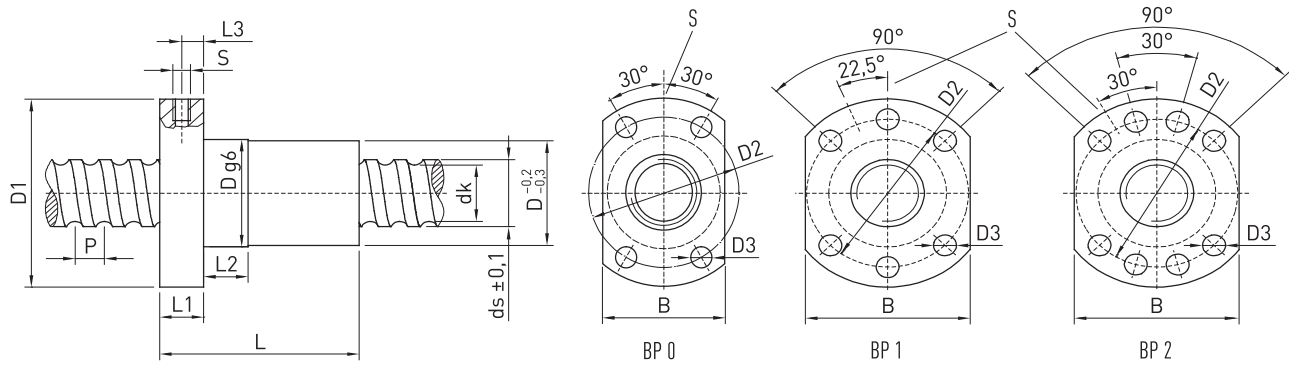


Table 4.4 Nut dimensions

| Type | ds | P | D | D1 | D2 | D3 | Hole pattern BP | L | L1 | L2 | L3 | Lubrication hole S | B | dk | C _{dyn} [N] | C ₀ [N] | Max. axial play [mm] | Mass [kg/piece] |
|------------------|------|----|----|----|----|-----|-----------------|----|----|----|----|--------------------|----|------|----------------------|--------------------|----------------------|-----------------|
| R12-05K4-FSCDIN | 11.7 | 5 | 24 | 40 | 32 | 4.5 | 0 | 33 | 8 | 8 | 4 | M3 | 26 | 9.9 | 5,500 | 12,000 | 0.02 | 0.11 |
| R12-10K3-FSCDIN | 11.8 | 10 | 24 | 40 | 32 | 4.5 | 0 | 43 | 8 | 8 | 4 | M3 | 26 | 9.6 | 5,100 | 10,100 | 0.02 | 0.13 |
| R15-05K4-FSCDIN | 13.9 | 5 | 28 | 48 | 38 | 5.5 | 1 | 38 | 10 | 10 | 5 | M6 | 40 | 11.8 | 12,600 | 21,000 | 0.04 | 0.18 |
| R16-05T3-FSIDIN | 15.5 | 5 | 28 | 48 | 38 | 5.5 | 1 | 40 | 10 | 10 | 5 | M6 | 40 | 12.9 | 6,500 | 11,700 | 0.04 | 0.18 |
| R16-10K3-FSCDIN | 14.7 | 10 | 28 | 48 | 38 | 5.5 | 1 | 45 | 10 | 10 | 5 | M6 | 40 | 12.5 | 9,100 | 19,300 | 0.04 | 0.20 |
| R16-16K3-FSCDIN | 15.0 | 16 | 28 | 48 | 38 | 5.5 | 1 | 61 | 12 | 20 | 6 | M6 | 40 | 13.0 | 7,900 | 17,000 | 0.04 | 0.26 |
| R16-20K2-FSCDIN | 14.0 | 20 | 28 | 48 | 38 | 5.5 | 1 | 56 | 10 | 10 | 5 | M6 | 40 | 11.8 | 5,200 | 10,400 | 0.04 | 0.25 |
| R20-05K4-FSCDIN | 19.6 | 5 | 36 | 58 | 47 | 6.6 | 1 | 40 | 10 | 10 | 5 | M6 | 44 | 16.9 | 13,400 | 32,740 | 0.04 | 0.28 |
| R20-10K3-FSCDIN | 19.3 | 10 | 36 | 58 | 47 | 6.6 | 1 | 48 | 10 | 10 | 5 | M6 | 44 | 16.6 | 10,000 | 23,500 | 0.04 | 0.32 |
| R20-20K2-FSCDIN | 19.7 | 20 | 36 | 58 | 47 | 6.6 | 1 | 57 | 10 | 10 | 5 | M6 | 44 | 17.1 | 6,800 | 15,300 | 0.04 | 0.37 |
| R20-20K4-DFSCDIN | 19.7 | 20 | 36 | 58 | 47 | 6.6 | 1 | 57 | 10 | 10 | 5 | M6 | 44 | 17.1 | 12,300 | 30,500 | 0.04 | 0.36 |
| R25-05K4-FSCDIN | 24.9 | 5 | 40 | 62 | 51 | 6.6 | 1 | 43 | 10 | 12 | 5 | M6 | 48 | 22.3 | 14,900 | 41,500 | 0.04 | 0.22 |
| R25-10K4-FSCDIN | 24.5 | 10 | 40 | 62 | 51 | 6.6 | 1 | 61 | 10 | 16 | 5 | M6 | 48 | 21.8 | 16,100 | 44,900 | 0.04 | 0.43 |
| R25-25K2-FSCDIN | 24.7 | 25 | 40 | 62 | 51 | 6.6 | 1 | 70 | 10 | 16 | 5 | M6 | 48 | 22.1 | 7,400 | 19,100 | 0.04 | 0.48 |
| R25-25K4-DFSCDIN | 24.7 | 25 | 40 | 62 | 51 | 6.6 | 1 | 70 | 10 | 16 | 5 | M6 | 48 | 22.1 | 13,500 | 38,200 | 0.04 | 0.46 |
| R32-05K6-FSCDIN | 31.7 | 5 | 50 | 80 | 65 | 9 | 1 | 48 | 12 | 10 | 6 | M6 | 62 | 29.1 | 23,900 | 81,900 | 0.04 | 0.59 |
| R32-10K5-FSCDIN | 31.8 | 10 | 50 | 80 | 65 | 9 | 1 | 77 | 12 | 16 | 6 | M6 | 62 | 28.6 | 31,500 | 80,100 | 0.04 | 0.82 |
| R32-20K3-FSCDIN | 31.8 | 20 | 50 | 80 | 65 | 9 | 1 | 88 | 12 | 16 | 6 | M6 | 62 | 28.6 | 17,000 | 48,500 | 0.04 | 0.91 |
| R32-32K2-FSCDIN | 31.9 | 32 | 50 | 80 | 65 | 9 | 1 | 88 | 12 | 20 | 6 | M6 | 62 | 28.7 | 11,600 | 31,800 | 0.04 | 0.90 |

All dimensions stated without a unit are in mm

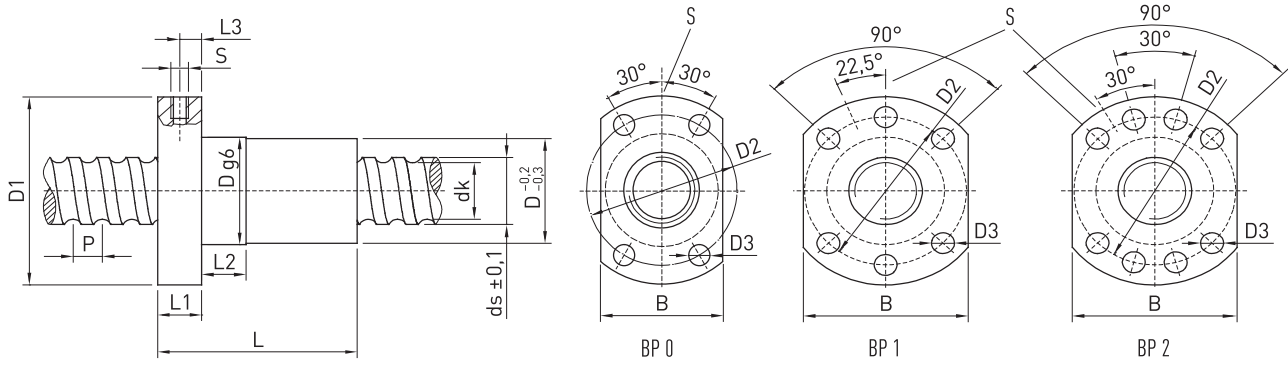


Table 4.4 Nut dimensions

| Type | ds | P | D | D1 | D2 | D3 | Hole pattern BP | L | L1 | L2 | L3 | Lubrication hole S | B | dk | C _{dyn} [N] | C ₀ [N] | Max. axial play [mm] | Mass [kg/piece] |
|-------------------------|------|----|----|-----|-----|----|-----------------|-----|----|----|----|--------------------|----|------|----------------------|--------------------|----------------------|-----------------|
| R32-32K4-DFSCDIN | 31.9 | 32 | 50 | 80 | 65 | 9 | 1 | 88 | 12 | 20 | 6 | M6 | 62 | 28.7 | 20,600 | 62,200 | 0.04 | 0.87 |
| R40-05K6-FSCDIN | 39.4 | 5 | 63 | 93 | 78 | 9 | 2 | 50 | 14 | 10 | 7 | M8 × 1 | 70 | 36.8 | 25,900 | 100,600 | 0.04 | 0.93 |
| R40-10K4-FSCDIN | 37.8 | 10 | 63 | 93 | 78 | 9 | 2 | 70 | 14 | 16 | 7 | M8 × 1 | 70 | 32.8 | 45,000 | 123,000 | 0.04 | 1.19 |
| R40-20K3-FSCDIN | 37.8 | 20 | 63 | 93 | 78 | 9 | 2 | 88 | 14 | 16 | 7 | M8 × 1 | 70 | 32.8 | 34,850 | 90,000 | 0.07 | 1.43 |
| R40-40K2-FSCDIN | 37.9 | 40 | 63 | 93 | 78 | 9 | 2 | 102 | 14 | 16 | 7 | M8 × 1 | 70 | 32.9 | 23,000 | 58,400 | 0.07 | 1.61 |
| R40-40K4-DFSCDIN | 37.9 | 40 | 63 | 93 | 78 | 9 | 2 | 102 | 14 | 16 | 7 | M8 × 1 | 70 | 32.9 | 41,500 | 115,800 | 0.07 | 1.59 |
| R50-05K6-FSCDIN | 49.4 | 5 | 75 | 110 | 93 | 11 | 2 | 50 | 16 | 10 | 8 | M8 × 1 | 85 | 46.8 | 28,300 | 127,200 | 0.07 | 1.32 |
| R50-10K6-FSCDIN | 48.0 | 10 | 75 | 110 | 93 | 11 | 2 | 90 | 16 | 20 | 8 | M8 × 1 | 85 | 42.9 | 74,500 | 250,000 | 0.07 | 2.05 |
| R50-20K5-FSCDIN | 47.9 | 20 | 75 | 110 | 93 | 11 | 2 | 132 | 18 | 25 | 9 | M8 × 1 | 85 | 42.9 | 67,200 | 217,500 | 0.07 | 2.89 |
| R50-40K3-FSCDIN | 50.0 | 40 | 75 | 110 | 93 | 11 | 2 | 149 | 18 | 45 | 9 | M8 × 1 | 85 | 45.0 | 39,000 | 123,000 | 0.07 | 2.96 |
| R50-40K6-DFSCDIN | 50.0 | 40 | 75 | 110 | 93 | 11 | 2 | 149 | 18 | 45 | 9 | M8 × 1 | 85 | 45.0 | 70,300 | 242,600 | 0.07 | 2.93 |
| R63-10T6-FSIDIN | 63.1 | 10 | 90 | 125 | 108 | 11 | 2 | 120 | 18 | 16 | 9 | M8 × 1 | 95 | 58.0 | 61,920 | 214,090 | 0.07 | 3.30 |

All dimensions stated without a unit are in mm

- Nuts with NBR wiper
- For nut housing, see Section 8.4
- No axial play on request (T5)
- FSCDIN/FSIDIN: Nut filled on one turn
- DFSCDIN: Nut filled on two turns
- R12 to R40 also available in T5

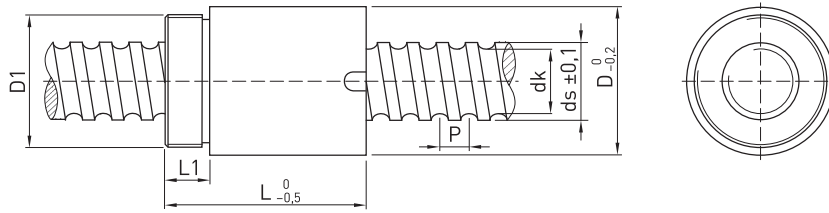
Order example:

| | | | | | | | |
|---|----|----|----|--------|-----|-----|-------|
| R | 25 | 10 | K3 | FSCDIN | 650 | 730 | 0.052 |
|---|----|----|----|--------|-----|-----|-------|

Ballscrews

Rolled ballscrews

4.4.2 Cylindrical single nut with screw-in thread RSIT



Sufficient lubricant supply to the shaft must be guaranteed via a lubricant channel in the adjacent construction.



Table 4.5 Nut dimensions

| Type | ds | P | D | D1 | L | L1 | dk | Dynamic load rating C_{dyn} [N] | Static load rating C_0 [N] | Max. axial play [mm] | Mass [kg/piece] |
|-------------------------------|------|-----|------|-------|------|------|-----|-----------------------------------|------------------------------|----------------------|-----------------|
| R08-02.5T2-RSIT ¹⁾ | 7.7 | 2.5 | 17.5 | M15×1 | 27.5 | 7.5 | 6.1 | 1,300 | 1,750 | 0.04 | 0.03 |
| R10-02.5T2-RSIT ²⁾ | 9.9 | 2.5 | 19.5 | M17×1 | 25.0 | 7.5 | 8.1 | 1,780 | 2,630 | 0.04 | 0.04 |
| R10-04T2-RSIT ²⁾ | 9.9 | 4.0 | 24.0 | M22×1 | 32.0 | 10.0 | 7.7 | 1,980 | 2,820 | 0.04 | 0.08 |
| R12-04B1-RSIT ¹⁾ | 12.0 | 4.0 | 25.5 | M20×1 | 34.0 | 10.0 | 9.5 | 3,000 | 5,700 | 0.04 | 0.08 |

All dimensions stated without a unit are in mm

¹⁾ Polyamide wiper on one side

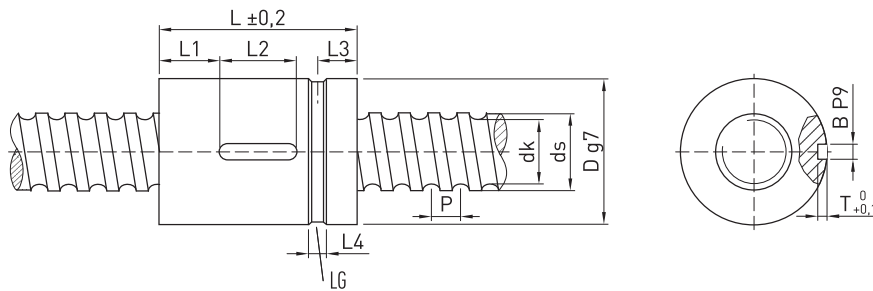
²⁾ Without dirt wiper

- Reduced axial play on request
- Nuts with dirt wipers

Order example:

| | | | | | | | |
|---|----|---|----|------|-----|-----|-------|
| R | 12 | 4 | B1 | RSIT | 350 | 405 | 0.052 |
|---|----|---|----|------|-----|-----|-------|

4.4.3 Cylindrical single nut RSI



LG Groove for lubricant supply



Table 4.6 Nut dimensions

| Type | ds | P | D | L | L1 | L2 | L3 | L4 | T | B | dk | Dynamic load rating C_{dyn} [N] | Static load rating C_0 [N] | Max. axial play [mm] | Mass [kg/piece] |
|--------------|------|----|----|----|----|----|------|----|-----|---|------|-----------------------------------|------------------------------|----------------------|-----------------|
| R16-10T3-RSI | 15.4 | 10 | 28 | 60 | 8 | 20 | 9.5 | 5 | 2.5 | 4 | 12.9 | 6,100 | 10,800 | 0.04 | 0.17 |
| R20-10T3-RSI | 19.9 | 10 | 34 | 60 | 20 | 20 | 12.0 | 4 | 2.0 | 5 | 17.5 | 8,100 | 12,600 | 0.04 | 0.35 |

All dimensions stated without a unit are in mm

- Reduced axial play on request
- Nuts with dirt wipers

Order example:

| | | | | | | | |
|---|----|----|----|-----|-----|-----|-------|
| R | 16 | 10 | T3 | RSI | 350 | 405 | 0.052 |
|---|----|----|----|-----|-----|-----|-------|