


# Ball Splines

## One End Tapped

**One End Tapped**



RoHS10

One End Tapped	Spline Shaft / 52100 Bearing Steel Nut / 4115 Alloy Steel Equivalent / Hardness: 58 HRC min.	Spline Shaft, Nut / Material: 440C Stainless Steel Equivalent / Hardness: 55HRC min.
	Nut 1 pc.	Nut 1 pc.
With Round Flange Nut	BSFM	BSFMS
With Compact Flange Nut	BSFN	—
With Straight Nut	BSFS	BSFSS

Part Number Alterations

Part Number **BSFS10** - **L** - **M** - (SC, FC, NTW)

Example **BSFS10** - **350** - **M5** - **SC15**

When selecting Overall Length (L Dimension), check the Annealing Range. **P.409**

Accuracy **P.407**

Choose Accessories Nuts from the following Shapes.

**Round Flange Nuts**

No. 6, 8 (3-d Oil Hole)

No. 10, 13 (4-d Oil Hole)

No. 16, 20, 25, 30 (5-d Oil Hole)

**Compact Flange Nuts**

No. 6, 8 (2-Mounting Holes, 3-d Oil Hole)

No. 10 (2-Mounting Holes, 4-d Oil Hole)

**Straight Nuts**

No. 6, 8 (3-d Oil Hole)

No. 10, 13 (4-d Oil Hole)

No. 16, 20, 25, 30 (5-d Oil Hole)

**Dimension of Attached Key**

\* The key is press-fit into the nut.

Type	Part Number	L 1mm Increment		M (Coarse)						D	Mass (kg/m)
		No.	1-Nut Type								
BSFM	*6	60-400 (190)	3							6	0.23
	*8	60-400 (190)	3	4						8	0.39
BSFN	*10	60-600 (390)	3	4	5					10.4	0.65
	*13	60-600 (390)	4	5	6				13.4	1.11	
BSFS	*16	70-600 (390)	4	5	6	8			16.6	1.65	
	20	80-700	5	6	8	10			20.6	2.57	
BSFMS	25	90-900	5	6	8	10	12			25.8	4.04
	30	100-1150	6	8	10	12	16			30.8	5.85

For BSFS and BSFMS, only \*marked sizes are available, and the Max. L dimension is in ( ).

For BSFN, only No. 6, 8 and 10 are available.

No.	D (h6)	L	Df	H	P.C.D.	d <sub>1</sub>	d <sub>2</sub>	h	W	d	B	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)
												Dynamic C <sub>t</sub> (N-m)	Static C <sub>st</sub> (N-m)	Dynamic C (kN)	Static C <sub>0</sub> (kN)	M <sub>01</sub> (N-m)	M <sub>02</sub> (N-m)	
6	14	25	30	6	22	3.5	6	3.1	6.5	1.5	18	3.8	7	1.2	2.1	5	36	0.03
8	16	32	32	6	24	4.5	8	4.4 (5.3)	14 (8.5)	1.5	21	4.8	8.7	1.2	2.1	5	36	0.04
10	21	40 (33)	42 (41)	6 (8)	32 (30)	5.5	9.5	5.4	22.5	2	25	19 (11)	34 (21)	3.8 (2.4)	6.9 (4.3)	26 (15)	181 (102)	0.09
13	24	44 (36)	44 (45)	7 (8)	33 (34)	6.6	11	6.5	26.5	2.5	28 (20)	52 (37)	4.6 (3.3)	8.3 (5.9)	36 (22)	251 (148)	0.11	
16	31	50	51	7	40	7.5	13	7.5	33	3	35	51	93	6.2	11.1	56	386	0.2
20	35	63	58	9	45	8.5	15.3	8.5	40	3.5	40	85	154	8.5	15.3	83	611	0.3
25	42	71	65	10	52	9.5	18	9.5	48	4	45	193	348	15.4	27.7	173	1248	0.4
30	47	80	75	10	60	11	21	11	57	4.5	50	272	490	18.5	33.3	212	1581	0.57

Dimensions in ( ) are for 440C Stainless Steel. Allowable static moment M<sub>01</sub> is a value measured when a single nut is used, and M<sub>02</sub> is a value measured when two nuts are used.

No.	D (h6)	L	b	Tolerance	t +0.05/0	d	α	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)	Dimension of Key (Included)				
								Dynamic C <sub>t</sub> (N-m)	Static C <sub>st</sub> (N-m)	Dynamic C (kN)	Static C <sub>0</sub> (kN)	M <sub>01</sub> (N-m)	M <sub>02</sub> (N-m)		B	Tolerance	h	Tolerance	L <sub>1</sub>
6	14	25	2.5	0	1.2	1.5	15°	3.8	7	1.2	2.1	5	36	0.012	2.5	2.5	0	10.5	1.25
8	16	32	3	+0.014/0	1.5	1.5	25°	4.8	8.7	1.2	2.1	5	36	0.013	3	3	0	10.5	1.5
10	21	40 (33)	4	0	2	2	—	19 (11)	34 (21)	3.8 (2.4)	6.9 (4.3)	26 (15)	181 (102)	0.06	3	3	-0.025	17 (14)	1.5
13	24	44 (36)	5	0	2.5	2.5	—	28 (20)	52 (37)	4.6 (3.3)	8.3 (5.9)	36 (22)	251 (148)	0.07	4	4	0	17 (14)	1.5
16	31	50	3.5	+0.018/0	2.5	2.5	—	51	93	6.2	11.1	56	386	0.15	3.5	3.5	0	18	1.75
20	35	63	4	0	2.5	2.5	—	85	154	8.5	15.3	83	611	0.2	4	4	0	29	2
25	42	71	4	0	2.5	2.5	—	193	348	15.4	27.7	173	1248	0.29	4	4	-0.030	33	2
30	47	80	4	0	2.5	2.5	—	272	490	18.5	33.3	212	1581	0.37	4	4	0	42	2

Dimensions in ( ) are for 440C Stainless Steel. Allowable static moment M<sub>01</sub> is a value measured when a single nut is used, and M<sub>02</sub> is a value measured when two nuts are used.

# Ball Splines

## One End Tapped, continued

**Part Number Alterations**

Part Number **BSFS10** - **L** - **M** - (SC, FC, NTW)

Example **BSFS10** - **350** - **M5** - **SC15**

Alterations	Wrench Flats	Set Screw Flat	Additional Spline Nuts																																													
<b>Code</b>	<b>SC</b>	<b>FC</b>	<b>NTW</b>																																													
<b>Spec.</b>	Adds a wrench flat. SC=1mm Increment SC+ℓ <sub>1</sub> ≤L <table border="1"> <thead> <tr><th>No.</th><th>W</th><th>ℓ<sub>1</sub></th></tr> </thead> <tbody> <tr><td>6</td><td>5</td><td>—</td></tr> <tr><td>8</td><td>7</td><td>8</td></tr> <tr><td>10</td><td>8</td><td>—</td></tr> <tr><td>13</td><td>11</td><td>—</td></tr> <tr><td>16</td><td>14</td><td>10</td></tr> <tr><td>20</td><td>17</td><td>—</td></tr> <tr><td>25</td><td>22</td><td>—</td></tr> <tr><td>30</td><td>27</td><td>15</td></tr> </tbody> </table>	No.	W	ℓ <sub>1</sub>	6	5	—	8	7	8	10	8	—	13	11	—	16	14	10	20	17	—	25	22	—	30	27	15	Adds a set screw flat. Ordering Code: FC10-A8 FC, A=1mm Increment FC≤3xD When 1.5xD<FC, FC≤L/2 A=0 or A≥2 <table border="1"> <thead> <tr><th>No.</th><th>h</th></tr> </thead> <tbody> <tr><td>6</td><td>—</td></tr> <tr><td>8</td><td>—</td></tr> <tr><td>10</td><td>1</td></tr> <tr><td>13</td><td>—</td></tr> <tr><td>16</td><td>—</td></tr> <tr><td>20</td><td>—</td></tr> <tr><td>25</td><td>2</td></tr> <tr><td>30</td><td>—</td></tr> </tbody> </table>	No.	h	6	—	8	—	10	1	13	—	16	—	20	—	25	2	30	—	Adds a nut. (from one to two) Applicable to BSFS, BSFM, BSFN only.
No.	W	ℓ <sub>1</sub>																																														
6	5	—																																														
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Alternative grease types available.

When selecting multiple alteration additions, more than 2 mm is needed between each feature to be added. Orientation between wrench flats or set screw flats to the spline nut keyway or flange counterbores are random and cannot be specified.

### Cautions for Ball Spline

- Lubrication**  
Ball splines are shipped greased. Reapply lubrication with Lithium soap based grease (Alvania Grease S2 by Showa Shell Sekiyu K.K), etc. as needed.
- Tolerance for Mating Bores**  
An H7 tolerance is recommended for mating bores for the spline nuts.
- Nut Removal**  
Balls do not fall out when the spline shaft is pulled out. Once the nuts are removed from the spline shaft, reassemble the ball spline while confirming match No.'s, character orientations, and positional relationship of these parts.  
Nuts and shafts are offered as the set product. Thus, when using multiple pcs. of them, do not change the default combination.
- Adding Nuts**  
The ball spline ensures clearance and accuracy by integrating the nuts and shaft into one set. Thus, the nuts or shafts are not sold as separate items. When two nuts are required, select the 2-nut type part number.

