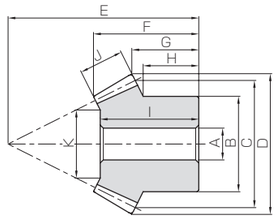
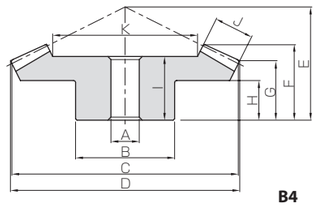
KSBS Spiral Bevel Gears

Specifications	
Precision grade	JIS B 1704: 1978 grade 4
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35° ＊
Material	S45C
Heat treatment	Teeth induction hardened
Tooth hardness	50 ～ 60HRC
Surface treatment	Black oxide coating

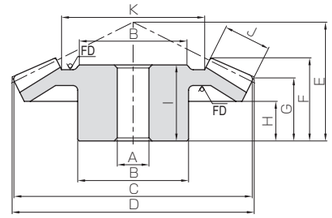
＊ 39° for 6015R and 1560L of SBS1.5/2 products.



B3



B4



B5

＊ FD has die-forged finish.

Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Shape	Bore A	Hub dia. B	Pitch dia. C	Outside dia. D	Mounting distance E	Total length F	Crown to back length G
KSBS2-4515R	3	***m*2**	45	R	B4	12	40	90	90.67	40	30.29	26.01
KSBS2-1545L			15	L	B3	10	24	30	34.78	60	29.66	15.80
KSBS2.5-4515R		***m*2.5**	45	R	B4	15	50	112.5	113.32	50	38.25	32.47
KSBS2.5-1545L			15	L	B3	12	30	37.5	43.36	75	38.27	19.73
KSBS3-4515R		***m*3**	45	R	B4	20	60	135	135.99	55	40.59	33.98
KSBS3-1545L			15	L	B3	15	38	45	52.08	90	44.98	23.68
KSBS4-4515R		***m*4**	45	R	B5	20	80	180	181.3	70	50.62	41.95
KSBS4-1545L			15	L	B3	16	50	60	69.30	115	54.37	26.55
KSBS5-4515R		***m*5**	45	R	B5	30	90	225	226.61	75	50.05	39.92
KSBS5-1545L			15	L	B3	20	60	75	86.55	145	66.89	34.43
KSBS1.5-6015R	4	***m*1.5**	60	R	B4	12	60	90	90.36	32	24.08	21.48
KSBS1.5-1560L			15	L	B3	8	18	22.5	26.09	56	22.95	11.45
KSBS2-6015R		***m*2**	60	R	B4	15	80	120	120.46	42	31.5	27.91
KSBS2-1560L			15	L	B3	10	24	30	34.68	75	30.94	15.58
KSBS2.5-6015R		***m*2.5**	60	R	B4	20	100	150	150.5	53	39.68	35.24
KSBS2.5-1560L			15	L	B3	12	30	37.5	44.16	94	38.9	19.83
KSBS3-6015R		***m*3**	60	R	B4	20	120	180	180.57	64	47.61	42.64
KSBS3-1560L			15	L	B3	15	38	45	52.64	112	44.01	22.96

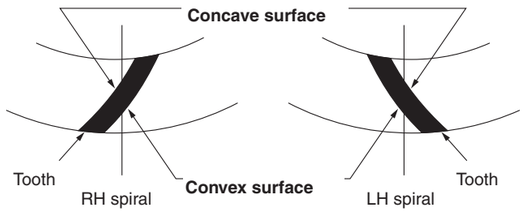
Hub width H	Length of bore I	Face width J	Holding surface dia. K	Allowable torque (N·m) Bending strength	Allowable torque (N·m) Surface durability	Allowable torque (kgf·m) Bending strength	Allowable torque (kgf·m) Surface durability	Backlash (mm)	Weight (kg)	Catalog No.
17	26	15	59.04	31.7	18.8	3.23	1.92	0.06~0.16	0.60	**KSBS2-4515R**
14	29		19.13	10.1	6.27	1.03	0.64		0.095	**KSBS2-1545L**
22	35	20	72.82	64.3	38.7	6.56	3.94	0.07~0.17	1.21	**KSBS2.5-4515R**
17.5	37		20.51	20.6	12.9	2.10	1.31		0.19	**KSBS2.5-1545L**
20	35	23	88.18	108	65.8	11.1	6.71	0.08~0.18	1.99	**KSBS3-4515R**
21.33	44		28.54	34.7	21.9	3.54	2.24		0.34	**KSBS3-1545L**
24	45	30	118.08	253	156	25.8	15.9	0.12~0.27	4.04	**KSBS4-4515R**
23.33	52		32.26	81.1	52.0	8.27	5.30		0.76	**KSBS4-1545L**
20	44	35	152.88	473	295	48.3	30.0	0.14~0.34	6.08	**KSBS5-4515R**
30	65		48.64	152	98.2	15.5	10.0		1.44	**KSBS5-1545L**
12	21	12	65.39	17.9	12.9	1.83	1.31	0.05~0.15	0.70	**KSBS1.5-6015R**
10.43	22.5		15.55	4.22	3.21	0.43	0.33		0.042	**KSBS1.5-1560L**
16	27	16	87.02	42.5	30.9	4.33	3.15	0.06~0.16	1.59	**KSBS2-6015R**
14.25	30		18.06	10.0	7.73	1.02	0.79		0.10	**KSBS2-1560L**
20	34	20	108.64	96.1	58.4	9.79	5.95	0.07~0.17	3.13	**KSBS2.5-6015R**
18.06	37.5		20.58	22.6	14.6	2.31	1.49		0.20	**KSBS2.5-1560L**
25	41	22	134.4	156	95.7	15.9	9.76	0.08~0.18	5.38	**KSBS3-6015R**
21.12	43		31.58	36.8	23.9	3.75	2.44		0.35	**KSBS3-1560L**

[Caution on Product Characteristics]
① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 303 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ These gears produce axial thrust forces. See Page 304 for more details.
④ Due to heat treating, some deformation of the bore may occur. It may be necessary to ream the bore to bring it to the stated dimensions.

[Caution on Secondary Operations]
① Please read "Caution on Performing Secondary Operations" (Page 304) when performing modification and/or secondary operations for safety concerns.
② Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).

■ Contact Surface of Spiral Bevel Gears

Tooth surfaces of spiral gears have concave and convex sides. Changes in the rotational direction of the driving gear alter the contact surface accordingly. The illustrations show the top view of RH and LH Spiral Gears, and the tables on the right explain the different contact surface depending on the situation.



RH Spiral as a driving gear

Rotating Direction of Driving Gear Note 1	Contact Surface	
	Driving Gear (RH Spiral)	Driving Gear (LH Spiral)
RH Rotation (Clockwise)	Convex Surface	Concave Surface
LH rotation (counterclockwise)	Concave Surface	Convex Surface

LH Spiral as a driving gear

Rotating Direction of Driving Gear Note 1	Contact Surface	
	Driving Gear (LH Spiral)	Driving Gear (RH Spiral)
RH Rotation (Clockwise)	Concave Surface	Convex Surface
LH Rotation (Counterclockwise)	Convex Surface	Concave Surface

〔Note 1〕 Rotation directions given in the tables are for viewing the gears from the hub side.

■ Forces Acting on Spiral Bevel Gear Teeth

For a spiral bevel gear with shaft angle Σ=90° , pressure angle α_n=20° , and spiral angle βm=35° , the tables below show the axial thrust force *Fx* and the radial force *Fr* when a tangential force *Ft* of 100 units is applied at the center of face width. For details, please refer to separate technical reference book, section of "Features of Tooth Surface Contact" (Page 107).

The tables show the values of $\frac{\text{Axial Thrust Force } Fx}{\text{Radial Force } Fr}$

(1) Forces acting upon pinion

Contact Surface	Gear Ratio z_2/z_1 1.0	1.5	2.0	2.5	3.0	4.0	5.0
Concave Surface	80.9 / − 18.1	82.9 / − 1.9	82.5 / 8.4	81.5 / 15.2	80.5 / 20.0	78.7 / 26.1	77.4 / 29.8
Convex Surface	− 18.1 / 80.9	− 33.6 / 75.8	− 42.8 / 71.1	− 48.5 / 67.3	− 52.4 / 64.3	− 57.2 / 60.1	− 59.9 / 57.3

(2) Forces acting upon gear

Contact Surface	Gear Ratio z_2/z_1 1.0	1.5	2.0	2.5	3.0	4.0	5.0
Concave Surface	80.9 / − 18.1	75.8 / − 33.6	71.1 / − 42.8	67.3 / − 48.5	64.3 / − 52.4	60.1 / − 57.2	57.3 / − 59.9
Convex Surface	− 18.1 / 80.9	− 1.9 / 82.9	8.4 / 82.5	15.2 / 81.5	20.0 / 80.5	26.1 / 78.7	29.8 / 77.4