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Features



KHK stock bevel gears are available in two types, spiral bevel gears and straight bevel gears, in gear ratios of 1.5 through 5, and are offered in a large variety of modules, numbers of teeth, materials and styles. The following table lists the main features for easy selection.

Type	Catalog Number	Module	Gear Ratio	Material	Heat Treatment	Tooth Surface Finish	Precision JIS B 1704: 1978	Secondary Operations	Features
Hypoid Gear	MHP	1, 1.5	15~60	SCM415	Carburized Note 1	Cut	3	△	Hypoid gears that have been tempered, hardened and ground that are capable of rapid deceleration.
Spiral Bevel Gears	MBSG	2~4	2	SCM415	Carburized Note 1	Ground	1	△	Gears that have been hardened and ground that has excellent accuracy, strength and abrasion resistance. Secondary operations are possible except for the teeth.
	SBSG	2~4	1.5~3	S45C	Gear teeth induction hardened	Ground	2	△	Gears that has been hardened and ground with a good balance of accuracy, wear resistance and cost. Secondary operations are possible except for the teeth.
	KSP	1.5~6	1~2	SCM415	Carburized Note 1	Ground	0	△	Gears that have been hardened and ground that has grade-0 accuracy, strength, abrasion resistance and quietness. Secondary operations can be given except for the teeth.
	MBSA/MBSB	2~6	1.5~3	SCM415	Carburized	Cut	4	×	Gears that have been fully hardened that have excellent strength and wear resistance. Can be used in the finished shape.
	SBS	1~5	1.5~4	S45C	Gear teeth induction hardened	Cut	4	△	Gears that have been hardened with excellent wear resistance. Secondary operations are possible except for the teeth.
Straight Bevel Gears	SB/SBY	1~8	1.5~5	S45C	—	Cut	3	○	Many lineups are available at a low price. The teeth can be additionally hardened.
	SUB	1.5~3	1.5~3	SUS303	—	Cut	3	○	Stainless steel gears with rust resistance.
	PB	1~3	1.5~3	MC901	—	Cut	4	○	Nylon gears can be used with no lubrication.
	DB	0.5~1	2	Duracon (R) (M90-44) NOTE 2	—	Injection Molded	6	△	Low-priced gears made through injection molding. Suitable for light loads.

[NOTE 1] Although these are carburized products, secondary operations can be performed as the bore and the hub portions are masked during the carburization. However, note that high hardness (HRC40 at maximum) occurs in some cases.

[NOTE 2] "Duracon (R)" is a registered trademark of Polyplastics Co., Ltd. in Japan as well as other countries.

○ Possible △ Partly possible × Not possible

Application Examples



KHK stock bevel gears are used as gears for power transmission of intersecting axes in various devices.

■ Differential Gear Mechanism Example

■ SHESCO 2WD Bike



Image provided by: PK Design



SB Bevel Gears are used in the driving components in both the front and rear wheels

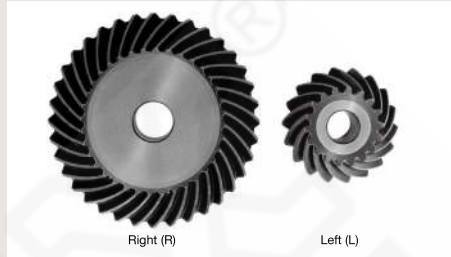
Selection Hints



Please select the most suitable products by carefully considering the characteristics of items and contents of the product tables. It is also important to read all applicable "CAUTION" notes shown below before the final selection.

1. Caution in Selecting the Mating Gears

Basically, KHK stock bevel gears should be selected as shown in the catalog in pairs (e.g. MBSG2-4020R should mate with MBSG2-2040L). But, for straight tooth bevel gears, there is some interchangeability with different series. For plastic bevel gears, we recommend metal mating gears for good heat conductivity.



■ Selection Chart for Straight Bevel Gears (○ Allowable × Not allowable)

Pinion \ Gears	SB	SUB	PB	DB
SB	○	○	○	×
SUB	○	○	○	×
PB	○	○	○	×
DB	×	×	×	○

■ Selection Chart for Spiral Bevel Gears (○ Allowable × Not allowable)

Pinion \ Gears	MBSG	SBSG	MBSA MBSB	SBS
MBSG	○	×	×	×
SBSG	×	○	×	×
MBSA/MBSB	×	×	○	×
SBS	×	×	×	○

2. Caution in Selecting Gears Based on Gear Strength

The gear strength values shown in the product pages were computed by assuming the application environment in the table below. Therefore, they should be used as reference only. We recommend that each user computes their own values by applying the actual usage conditions. To learn more about strength calculations, please refer to the technical information contained in the "Bending Strength of Bevel Gears" section, and the "Surface Durability of Bevel Gears" section.

■ Calculation of Bending Strength of Gears

Catalog Number	MBSG MBSA MBSB	SBSG/SBS	SB ^{NOTE 2} SBY	SUB	PB	DB
Formula ^{NOTE 1}	Formula of bevel gears on bending strength (JGMA403-01)				The Lewis formula	
No. of teeth of mating gears	No. of teeth of the mating gear of the set				—	
Rotational Speed of Pinion	100rpm (600rpm for MBSG and SBSG)				100rpm	
Design Life (Durability)	Over 10 ⁷ cycles				—	
Impact from motor	Uniform load				Allowable bending stress (kgf/mm ²) 1.15 (40°C with No Lubrication)	
Impact from load	Uniform load					
Direction of load	Bidirectional load (calculated with allowable bending stress of 2/3)					
Allowable bending stress at root σ_{lim} (kgf/mm ²)	47	21	19 (24.5)	10.5		
Safety factor K_R	1.2					

■ Calculation of Surface Durability (Except where it is common with bending strength)

Catalog Number	MBSG MBSA MBSB	SBSG/SBS	SB ^{NOTE 2} SBY	SUB	PB	DB
Formula ^{NOTE 1}	Formula of bevel gears on surface durability (JGMA404-01)					
Kinematic viscosity of lubricant	100cSt (50°C)					
Gear support	Shafts & gear box have normal stiffness, and gears are supported on one end					
Allowable Hertz stress σ_{Hlim} (kgf/mm ²)	166	90	49 (62.5)	41.3		
Safety factor C_R	1.15					

[NOTE 1] The gear strength formula is based on JGMA (Japanese Gear Manufacturers Association) specifications. "MC Nylon Technical Data" by Mitsubishi Chemical Advanced Materials and "Duracon (R) Gear" by Polyplastics Co. The units for the rotational speed (rpm) and the stress (kgf/mm²) are adjusted to the units needed in the formula.

[NOTE 2] Since SB Bevel Pinion Shafts are thermally refined, the allowable tooth-root bending stress and allowable hertz stress are the value shown in parentheses.