

DEEP GROOVE BALL BEARINGS

FOR PEAK MACHINERY AND EQUIPMENT PERFORMANCE





SMOOTH. QUIET. EFFICIENT.

SINGLE ROW DEEP GROOVE BALL BEARINGS

Single row deep groove ball bearings are inarguably the most widely used and versatile bearing type, owing to their simple, low-maintenance design and robust performance. NSK deep groove ball bearings deliver superior total operating and energy efficiency through our core development and manufacturing technologies with:

- > Optimized rolling contact for reduced noise, energy use and power loss
- Advanced lubricant technologies and seal designs for durability and reliability
- Special materials, coatings and innovation to contend with extraordinary environments
- > An extensive catalog of types and variants for easy adoption

For virtually any rotating machinery and equipment application – in virtually any working environment – NSK deep groove ball bearings quietly deliver exceptional performance and a reliably long service life for lower total cost of operation.



HIGHER SPEEDS. LOWER NOISE. LONGER LIFE.

OPTIMIZED DESIGN, MATERIAL AND MANUFACTURING



With our single row deep groove ball bearings, NSK brings our core technologies to bear to deliver unsurpassed performance and reliability to a nearinfinite range of machinery, equipment, applications and operating conditions with:

- > Ultra-clean steel to promote greater fatigue strength and longer operating life
- Super-finished raceways to minimize running noise and improve lubricant distribution
- > High-performance cages to support smooth and reliable operation at high speeds
- > **Optimized seals and shields** to provide problem-free performance in challenging environments
- Advanced lubrication technology to ensure durability and reliability

ULTRA-CLEAN STEEL EXTENDS BEARING LIFE

NSK ultra-clean steel is a highly pure, vacuum-degassed highcarbon chromium steel containing a minimum of non-metallic inclusions. In conjunction with appropriate heat treatment, it significantly increases bearing life by providing:

- > high rolling contact fatigue strength
- > high hardness
- > high wear resistance
- > high dimensional stability



AN EXTENSIVE RANGE OF TYPES, DESIGN AND CONSTRUCTION

Pictured from left:

- Standard pressed steel cage with tightly controlled clearances to deliver reduced friction and even distribution of lubricant
- Polyamide resin cage for high-speed applications, with low temperature rise to extend grease life while reducing noise and power loss
- Machined brass cage for larger size bearings and for applications with high mechanical stresses





Table 1: Single row deep groove ball bearings series and size range

NSK offers an extensive range of single row deep groove ball bearing dimension series and bore diameters, shown in **Table 1** above.

The basic construction of single row deep groove ball bearings may consist of a number of design / construction variants that include:

- optional seals and shields for protection against the ingress of contaminant
- cages constructed from pressed steel, polyamide resin (for high speeds) or machined brass (for larger sizes or severe mechanical stresses)
- > outer ring snap ring grooves, with / without snap rings
- > internal clearances ranging from tight to extra-loose
- filling slots to accommodate a larger number of balls (maximum capacity type)
- > noise level specifications
- high performance grease options for a wide range of operating conditions

Table 2: Standard cages of deep groove ball bearings

DIMENSION SERIES	PRESSED STEEL	MACHINED BRASS			
68	6800 to 6838	6840 to 68/800			
69	6900 to 6936	6938 to 69/800			
160	16001 to 16026	16028 - 16064			
60	6000 to 6040	6044 to 60/670			
62	6200 to 6240	6244 to 6272			
63	6300 to 6332	6334 to 6356			

LONG-LIFE DURABILITY AND RELIABILITY

EFFICIENT SEALING AND LUBRICATION SELECTION

TROUBLE-FREE OPERATION - SEALS, SHIELDS

Deep groove ball bearings equipped with seals or shields can deliver years of trouble-free operation, retaining clean grease free from external contaminants. Selection of appropriate sealing is based not only by the severity of the application environment, but also with consideration of operating speeds, seal torque and temperatures.

NSK offers a variety of standard sealing solutions designed to achieve optimal sealing while mitigating power loss in a wide variety of application conditions:

- > non-contact V seals for high performance at high speeds, particularly for electric motor applications
- > **light-contact DW seals** for high contamination protection with 1/3 lower friction than a full contact seal
- contact DU seals for maximum protection against contaminant ingress - small particle, dust and water
- > non-contact Z shields for moderate protection at high speeds through a wide temperature range

Special seal designs and seal materials for highly corrosive, dust-laden and high temperature environments, as well as for low drag requirements, are also available.



Clockwise from top left: non-contact seal (V), light-contact seal (DW), contact seal (DU), non-contact shield (Z)

	CLOSURE TYPE AND RELATIVE PERFORMANCE						
	vv	DDW	DDU	ZZ			
Resistant to dust	good	excellent	excellent	normal			
Resistant to water intrusion	not suitable	normal	excellent	not suitable			
Effective against grease leakage	good	excellent	excellent	normal			
Torque	very low	low	normal	very low			
Speed capability	high	good	normal	high			

Table 3: Comparison of seal / shield performance



GREASE CODE / BRAND NAME		OPERATING TEMP. °C				
		min	max	KET FEATUKES		
AS2	Shell Alvania S2	-10	+110	good general purpose lithium grease with good rust prevention for normal and high loads	general purpose industrial applications	
B32	Beacon 325	-50	+100	superior low temperature grease with low viscosity synthetic base oil capable of high speeds	motors in low temperature applications / arctic service	
EA6	NSK Grease EA6	K Grease EA6-40+160synthetic oil base, delivers long life at high temperatures with good wear resistance and rust prevention			induction motors, compressors, ventilators, vacuum cleaners	
EA7	NSK Grease EA7	-40	+160	improved fretting resistance in environments with micro-vibrations	servomotors, actuators, oscillatory applications	
EA9	NSK Grease EA9	-40	+140	low torque with reduced bearing heat generation at high speeds, low fill with extended grease life	high-efficiency motors, EV motors	
EEM	Exxon Mobil Polyrex EM	-5	+140	good rust prevention and low noise performance	general industrial applications and industrial motors	
LGU	NSK Grease LGU	-40	+120	significantly reduces particle emissions, preventing encoder contamination and brake slip	servomotors, ball screws, linear guides, clean rooms	
NS7	NS Hi-Lube	-40	+130	exceptional low torque and low noise performance particularly at low temperature	motors, ventilators, pumps, compressors	

Table 4: High performance greases for deep groove ball bearings

LONG OPERATING LIFE - ADVANCED LUBRICANTS

Lubrication is essential to minimize friction and wear between rolling contact surfaces of bearings. NSK sealed and shielded deep groove ball bearings are factoryfilled with water-resistant grease for general industrial machinery, or with special lubricant formulations for operating considerations that include:

- > stability in high/low temperature environments
- > low torque and heat generation at high speeds
- > additive rust prevention
- resistance to micro-vibrations
- > reduced particle emissions

Table 4 illustrates a variety of grease types commonlyemployed by NSK for sealed or shielded single rowdeep groove ball bearings, each with unique attributesand suitability to meet various operating andenvironmental conditions.

Temperature ranges shown are general recommendations and do not reflect absolute limits. When operating outside of these ranges, consultation with NSK or the grease manufacturer is recommended.

Additional grease types and formulations (thickeners, base oils, additive chemistry) are available - contact NSK.

FOR SPECIAL APPLICATIONS AND ENVIRONMENTS

When meeting the practical need for smooth, reliable motion can only be achieved through extraordinary design measures and product innovation, NSK brings our core technologies to bear to deliver specifically optimized and highly-tailored deep groove ball bearing products that include:

- Industrial machinery solutions to contend with challenges such as current transmission, corrosion, lubrication and wear, with special design deep groove ball bearings including:
- ceramic hybrid and HDY2 ceramic-coated bearings
- > ES1 stainless steel bearings
- > Molded-Oil™ / solid lubricant bearings
- > Creep-Free Bearings™
- > NSK SPACEA[™] bearings, optimized for operating environments that are too severe for standard bearings, utilizing super-engineered materials, advanced lubricants and surface treatments to deliver high performance and reliability to challenging conditions that include:
 - > vacuum
- > sanitary
- clean-room
- > non-magnetic
- > corrosive
- contamination
- high temperature
- > Thin Section bearings that deliver compact, lightweight, high-speed and low-torque solutions for robot axes and speed reducers, harmonic drives and medical devices
- > Extra Small and Miniature bearings of conventional design or with flanged outer rings, with thin-walled cross-sections, or with special geometry for synchro motors, turbomachinery, medical handpieces and measuring instruments



- > miniature bearings
- > SPACEA[™] bearings for hightemperature / vacuum and corrosive environments





DESIGNATION SYSTEM

SINGLE ROW DEEP GROOVE BALL BEARINGS

Dimension Series		Special Materials	Closure		Radial Internal Clearance		nance	Grease Code	
62 05	-	H-20 T1X	77 NR		C3 E		E	NS7 S	
Bore Reference Numbe	r	Cage Type	Retention Feature		N	Noise Level		Grease Fill	
DESIGNATION		ATTRIBUTE		DESIGNATION			ATTRIB	UTE	
	68	metric, ultra-thin section				blank	standard outer ring snap ring groove in outer ring		
	69	metric, extra-thin sectior)	ure	Ν				
	160	metric, thin section				NR	snap ring groove with snap ring		
Dimonsional sorios	60	metric, extra light series			C2	tighter	than normal clearance		
Dimensional series	62	metric, light series				blank	normal clearance (CN)		
	63	metric, medium series	Radial internal			СМ	special clearance for electric motors		
	BL2	maximum type, light ser	maximum type, light series			C3	greater	than normal clearance	
	BL3	maximum type, medium	series			C4	greater	than C3	
Bore reference number		for extra-small / miniatu multiply x 1 for bore diar	Ire: meter in mm			C5	greater	than C4	
		for reference number: 00 = 10 mm bore diame 02 = 15; 03 = 17	ter; 01 = 12;	Noise level		blank E	standar NSK ele	d noise quality ectric motor noise quality	
		for reference number 04	to 96:			ER	NSK crit	ical noise quality	
		500 mm and greater are	expressed			AS2	Shell Al	vania S2	
		as /500 = 500 mm, etc.				B32	Beacon	325	
Special materials	-H-20	stainless steel rings and	alls			EA6	NSK Gre	ease EA5	
	SN24	ceramic balls		Grease code ¹⁾		EA7	NSK Gre	ease EA6	
	blank	pressed steel cage	Grease (0)			EA9	NSK Grease EA9		
Cage type	M, MR	machined brass cage				EEM	Exxon A	Nobil Polyrex EM	
	T1X	polyamide resin cage	polyamide resin cage			LGU	NSK Gre	ease LGU	
	blank	open bearing				NS7	NS Hi-L	ube	
	Z	non-contact shield, one s	side only sides Grease fill de only			L	light fill		
	ZZ	non-contact shield, both				S	standar	d fill	
	V	non-contact seal, one sic				Н	heavy f	ill	
Closure	VV	non-contact seal, both si	des	 Grease codes shown are indicative of the range of NSK grease for general industrial machinery, for electric motors, for extreme temperatures and for special environments. 		ange of NSK greases available			
	DW	light-contact seal, one si	de only			c motors, for extreme			
	DDW	light-contact seal, both s	ides	Additional greases are available - contact NSK.			ISK.		
	DU	contact seal, one side on	ly						
	DDU	contact seal, both sides							

RANGE OF AVAILABILITY DIMENSION SERIES AND BORE SIZE







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