

Clutch bearing units



SKF – the knowledge engineering company

From one simple but inspired solution to a misalignment problem in a textile mill in Sweden, and fifteen employees in 1907, SKF has grown to become a global industrial knowledge leader.



Over the years we have built on our expertise in bearings, extending it to seals, mechatronics, services and lubrication systems. Our knowledge network includes 46 000 employees, 15 000 distributor partners, offices in more than 130 countries, and a growing number of SKF Solution Factory sites around the world.

Research and development

We have hands-on experience in over forty industries, based on our employees' knowledge of real life conditions. In addition our world-leading experts and university partners who pioneer advanced theoretical research and development in areas including tribology, condition monitoring, asset management and bearing life theory. Our ongoing commitment to research and development helps us keep our customers at the forefront of their industries.

Meeting the toughest challenges

Our network of knowledge and experience along with our understanding of how our core technologies can be combined helps us create innovative solutions that meet the toughest of challenges. We work closely with our customers throughout the asset life cycle, helping them to profitably and responsibly grow their businesses.

Working for a sustainable future

Since 2005, SKF has worked to reduce the negative environmental impact from our own operations and those of our suppliers. Our continuing technology development introduced the SKF BeyondZero portfolio of products and services which improve efficiency and reduce energy losses, as well as enable new technologies harnessing wind, solar and ocean power. This combined approach helps reduce the environmental impact both in our own operations and in our customers'.



SKF Solution Factory makes SKF knowledge and manufacturing expertise available locally, to provide unique solutions and services to our customers.

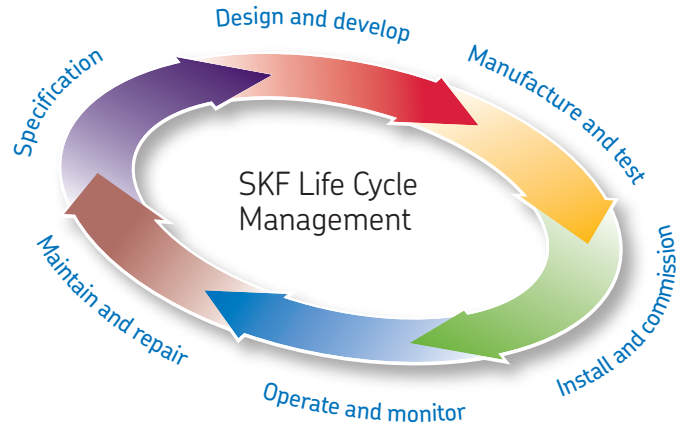


Working with SKF IT and logistics systems and application experts, SKF Authorized Distributors deliver a valuable mix of product and application knowledge to customers worldwide.



Our knowledge – your success

SKF Life Cycle Management is how we combine our technology platforms and advanced services, and apply them at each stage of the asset life cycle, to help our customers to be more successful, sustainable and profitable.



Working closely with you

Our objective is to help our customers improve productivity, minimize maintenance, achieve higher energy and resource efficiency, and optimize designs for long service life and reliability.



Bearings

SKF is the world leader in the design, development and manufacture of high performance rolling bearings, plain bearings, bearing units and housings.

Innovative solutions

Whether the application is linear or rotary or a combination of the two, SKF engineers can work with you at each stage of the asset life cycle to improve machine performance by looking at the entire application. This approach doesn't just focus on individual components like bearings or seals. It looks at the whole application to see how each component interacts with the next.



Machinery maintenance

Condition monitoring technologies and maintenance services from SKF can help minimize unplanned downtime, improve operational efficiency and reduce maintenance costs.

Design optimization and verification

SKF can work with you to optimize current or new designs with proprietary 3-D modeling software that can also be used as a virtual test rig to confirm the integrity of the design.



Sealing solutions

SKF offers standard seals and custom engineered sealing solutions to increase uptime, improve machine reliability, reduce friction and power losses, and extend lubricant life.



Mechatronics

SKF fly-by-wire systems for aircraft and drive-by-wire systems for off-road, agricultural and forklift applications replace heavy, grease or oil consuming mechanical and hydraulic systems.



Lubrication solutions

From specialized lubricants to state-of-the-art lubrication systems and lubrication management services, lubrication solutions from SKF can help to reduce lubrication related downtime and lubricant consumption.



Actuation and motion control

With a wide assortment of products – from actuators and ball screws to profile rail guides – SKF can work with you to solve your most pressing linear system challenges.

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Foreword

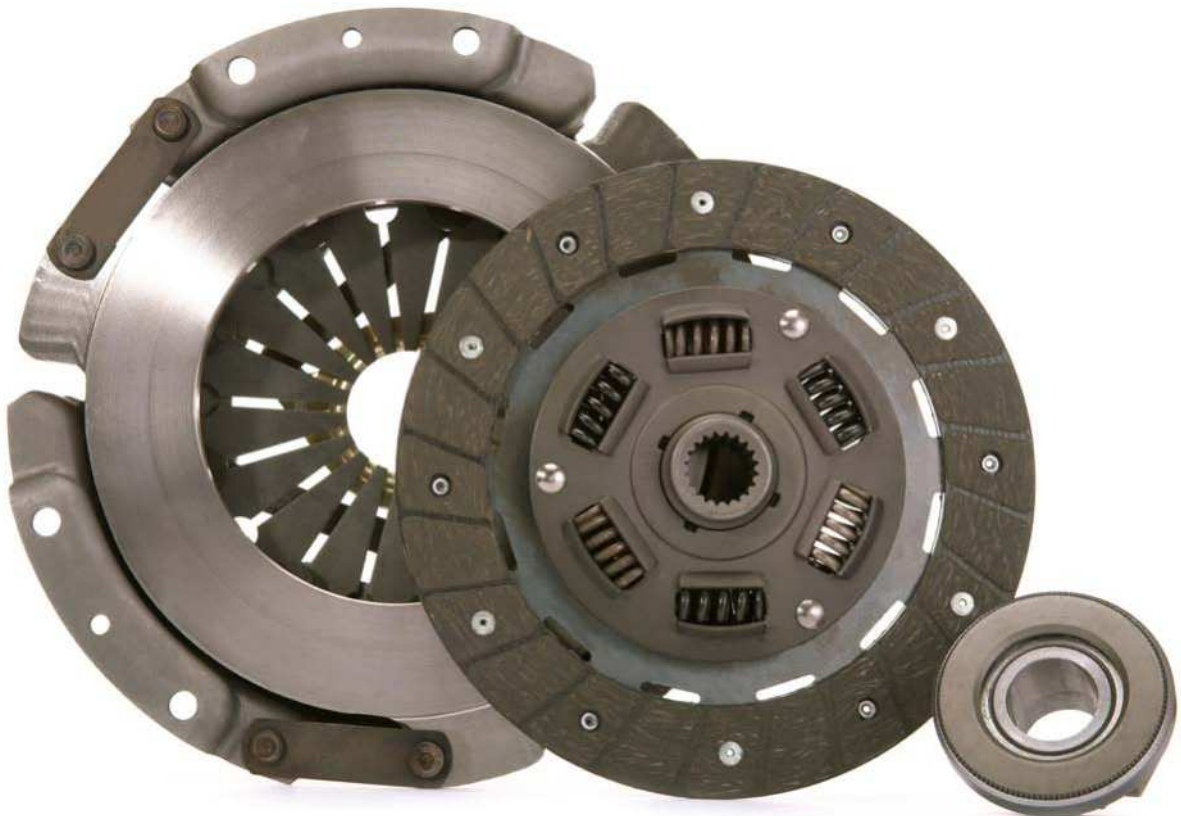
This catalogue has been created to provide clutch customers with information on the products that SKF offers, and to help them find the products that best match their needs.

This catalogue displays currently available products in production, grouped according to the following categories:

- clutch release bearing
- clutch bearing fork actuation
- clutch bearing hydraulic actuation
- double clutch transmission
- support bearing

You can easily make your product choice by selecting products from the index tables which show the overall dimensions of each product. An image of the selected product can be found on the product page.

Our extensive knowledge and experience in clutch bearing development make SKF an ideal partner for developing optimised, customer-specific solutions for clutch products. For additional information, please contact your local SKF representative.

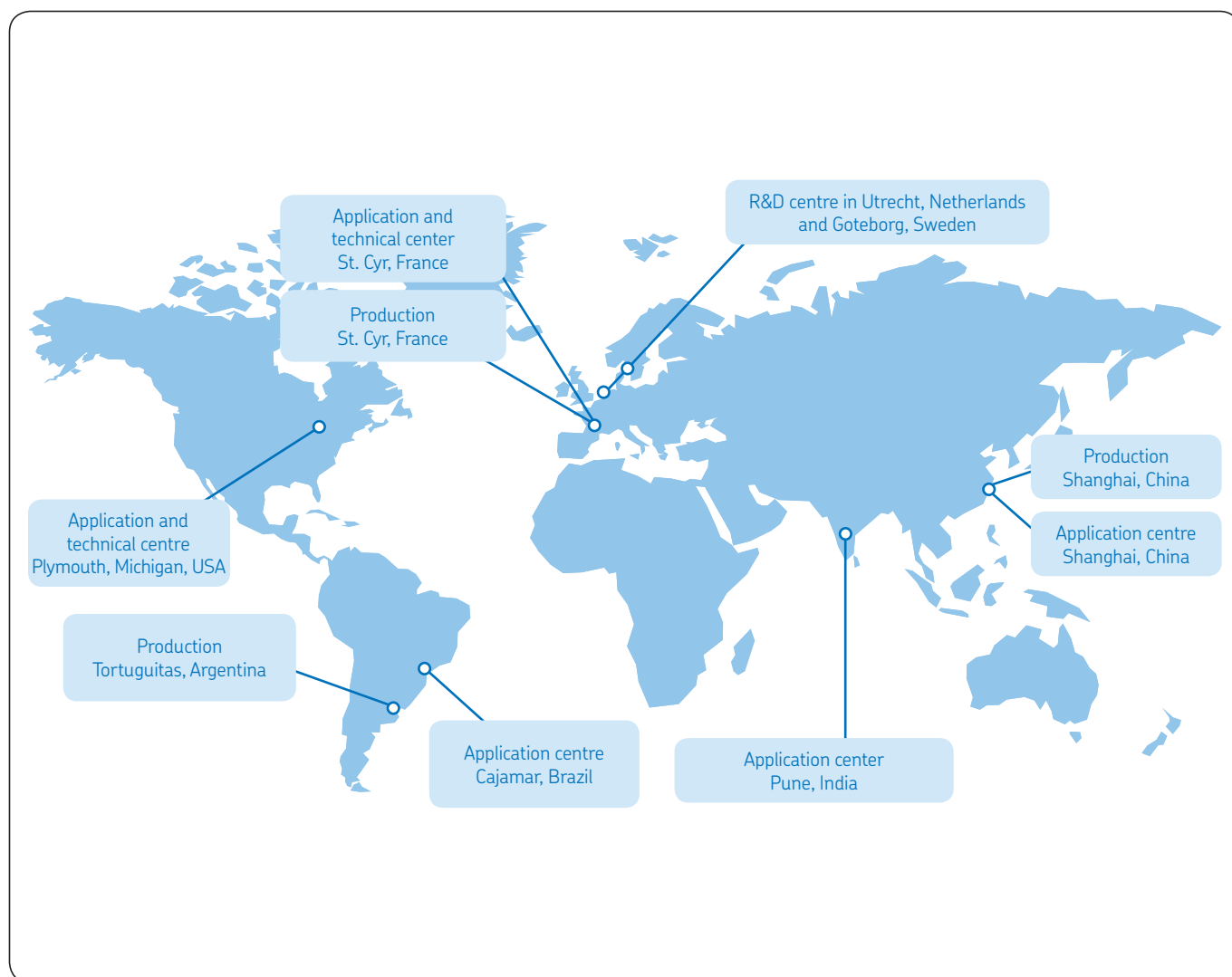


Global SKF presence of clutch release bearings

Competition is increasingly becoming global. At SKF, we follow customer globalization strategies. We have a worldwide presence, global supplier base and distribution network. We offer local engineering and sales support. Our manufacturing facilities and technical centres in all major regions help you increase quality, speed and flexibility throughout the development process. We have the resources to support you with global and local solutions. Our dedicated global project managers work to improve

project performance and reduce your business risk. Unlike conventional component suppliers, our solutions and wide range of competencies have been developed based on industry needs and close cooperation with automotive industry leaders:

- three production sites worldwide
- development, technical and application centres in Europe, Asia and America
- research centre in Europe

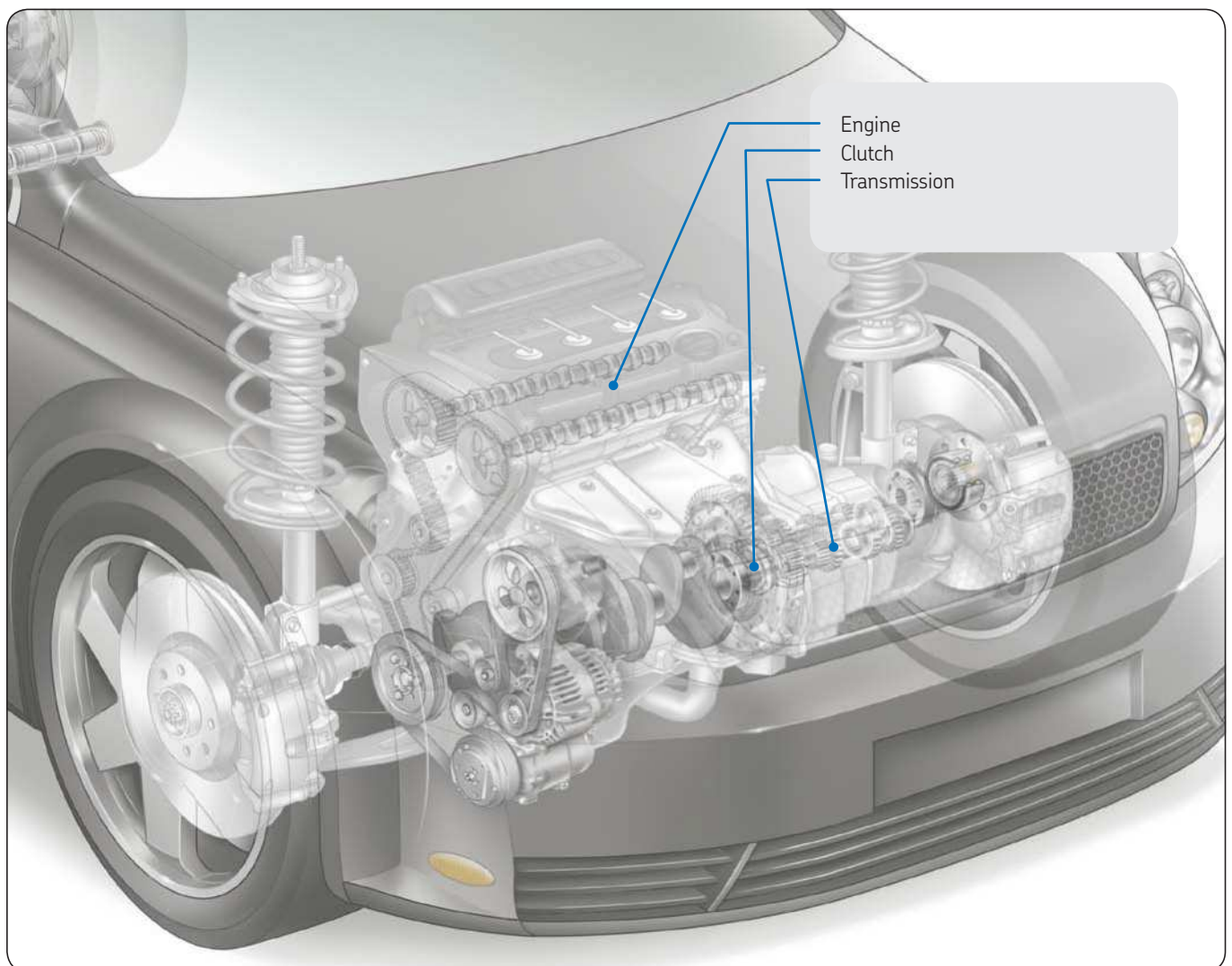


About the clutch system

The clutch pedal pressed by the driver, transmits an actuation load to the clutch through the bearing. The actuation load lifts the clutch pressure plate, which disengages the clutch disk, and interrupts the engine torque transmission. This operation allows the engine to rotate at idle speed when the car is stopped, and also to change gears.

There are two types of clutch concepts:

- pushed, where the clutch bearing pushes the spring diaphragm to interrupt the engine torque transmission.
- pulled, where the clutch bearing pulls the spring diaphragm to interrupt the engine torque transmission. With this concept, the clutch bearing is attached to the spring diaphragm.



How the clutch system works

Clutch system for manual transmissions

The clutch system for a manual transmission consists of four major components:

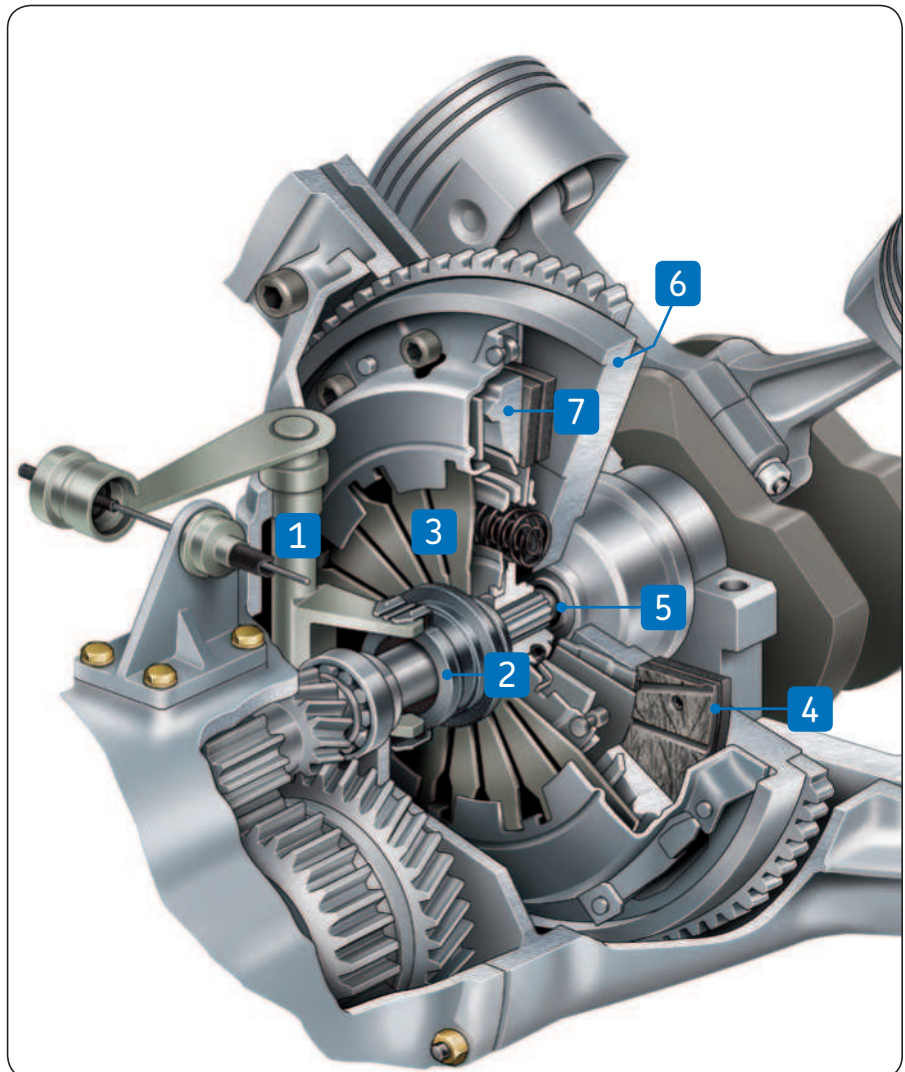
- a flywheel, which is bolted to the engine
- a clutch disc assembly which is connected to the transmission input shaft via splines
- a clutch cover assembly which consists of a diaphragm (Bellville type) spring and a pressure plate
- a clutch release bearing

When a clutch pedal is disengaged (in the up position), the clutch cover assembly is under load. In other words, the diaphragm spring is maintaining a constant axial load on the pressure plate, forcing it and the clutch disc assembly against the flywheel. The clutch disc assembly which is connected to the transmission input shaft via splines can then transfer power from the flywheel to the transmission.

When the clutch pedal is actuated by the driver, the clutch release bearing is pushed into the diaphragm spring and the clutch cover assembly becomes unloaded. This removes the axial load from the pressure plate, allowing the clutch disc assembly to free-wheel.

The release bearing moves forward axially during disengagement and returns to position when the clutch is engaged.

- 1 Fork/actuation device
- 2 Clutch release bearing
- 3 Diaphragm
- 4 Friction disc
- 5 Input shaft
- 6 Flywheel
- 7 Pressure plate

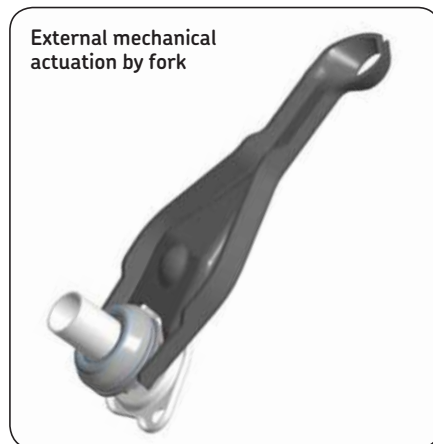
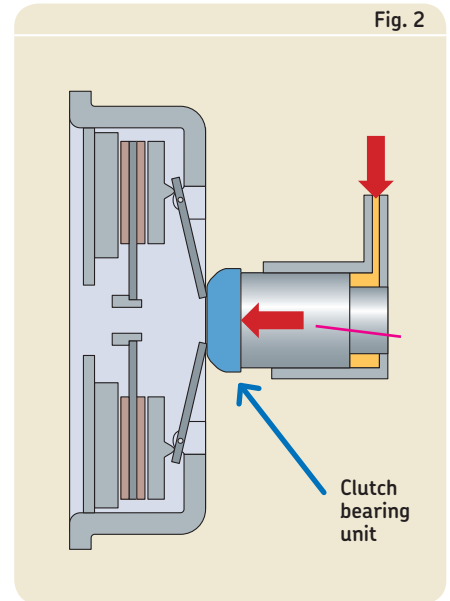
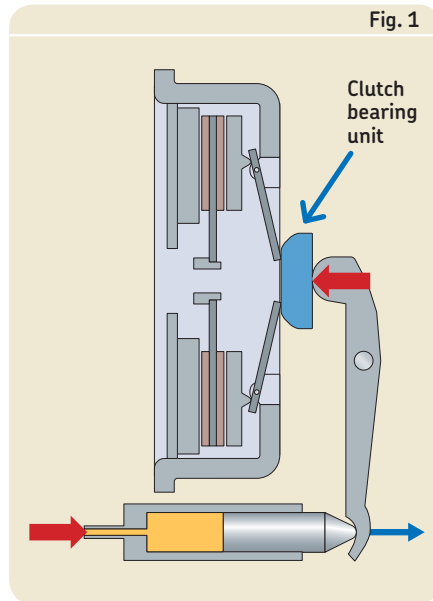


Clutch actuation technology

Conventional clutches for manual gearboxes are engaged when the clutch pedal is released and disengaged when the pedal is pressed.

In mechanical actuation systems, the fork acting on the clutch release bearing is connected to the pedal either by a cable or by an external hydraulic system (→ **fig. 1**).

In hydraulic actuation systems, the actuation is provided by a hydraulic cylinder (concentric slave cylinder) acting directly on the release bearing (→ **fig. 2**).



Clutch release bearing unit

Product purpose

A clutch release bearing unit is used to engage and disengage the clutch via the diaphragm spring and pressure plate. Included in this compact design are provisions to guide the fork or piston radially.

Current applications

Manual gearboxes, robotized gearboxes and double clutch gearboxes.

Design approach

Based on a modular design approach, SKF's clutch release bearing units comprise a precision ground sheet metal bearing unit and a polymer/steel sleeve or carrier. This design can be applied to push or pull clutch actuation with lever or concentric, hydraulic actuation. SKF has multiple designs available with inner or outer ring rotation for a variety of applications including motorsport and Formula 1.

Our bearing units are designed taking into account all constraints:

- higher number of operations with stop / start systems
- automated manual transmission or dual clutch transmission
- increased operating temperature
- increased application loads
- longer warranty period for the clutch

Design features

SKF has developed advanced designs using cutting edge technology and state-of-the-art testing procedures.

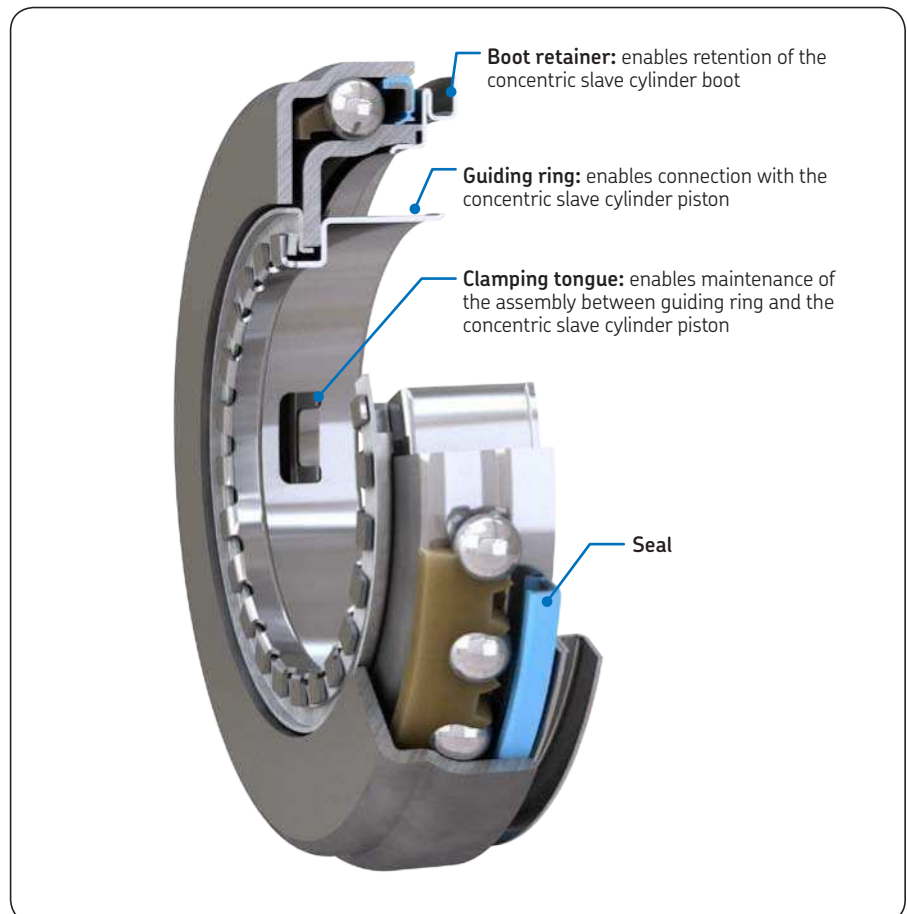
The design features of the clutch release bearing units are:

- sealed and greased for life
- compact design
- easy installation
- high performance grease
- accommodates axial and radial misalignment
- optimized drag torque

Design advantages

The clutch release bearing units add value by delivering the following critical advantages:

- extended bearing service life
- cost-effective solution
- flexibility of design
- integration of functions
- low weight solution



Clutch bearing unit portfolio

Some typical SKF clutch release bearing unit solutions

SKF can supply either a clutch release bearing unit, ready for use, or just a clutch release bearing to be fitted to the piston or guiding sleeve.

Clutch release bearing

Angular contact ball bearing with stamped steel rings, ground raceways and capped with a seal or shield depending on the application conditions. To be assembled on piston or on guiding sleeve (→ **fig. 1**).

Clutch bearing fork actuation

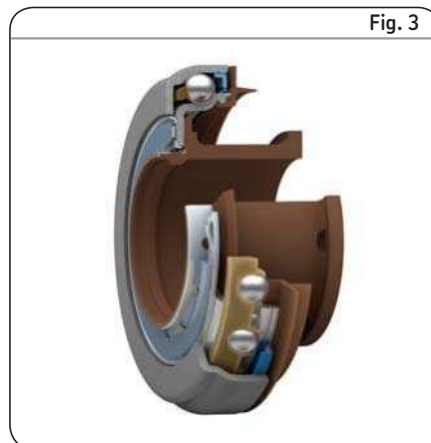
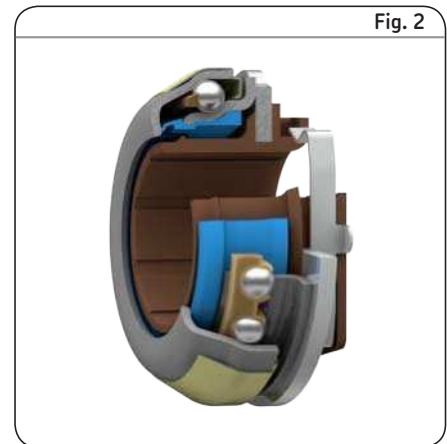
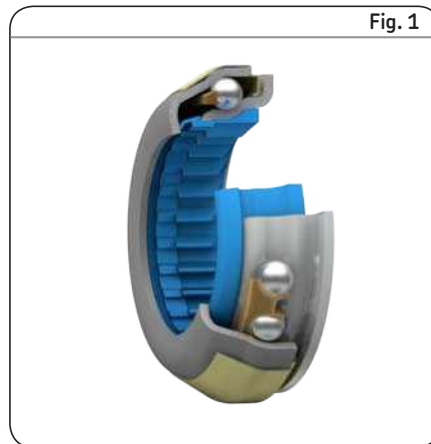
Modular design to meet mechanical (fork) actuation requirements. Contains a plastic guide sleeve and a rubber sleeve to accommodate misalignment (→ **fig. 2**).

Clutch bearing hydraulic actuation

Compact design with a boot interface to accommodate a hydraulic cylinder (concentric slave cylinder) (→ **fig. 3**).

SKF Double Clutch Bearing Set

Special design to meet hydraulic actuation requirements (concentric slave cylinder) on a double clutch system for both large and small clutch release bearings (→ **fig. 4**).



Clutch release bearing unit details

Clutch release bearings from SKF are based on the design of an angular contact ball bearing. These bearings are made of stamped steel inner and outer rings with precision ground raceways, a polymer cage and either seals or shields and are pre-greased at the factory with a high quality lubricant.

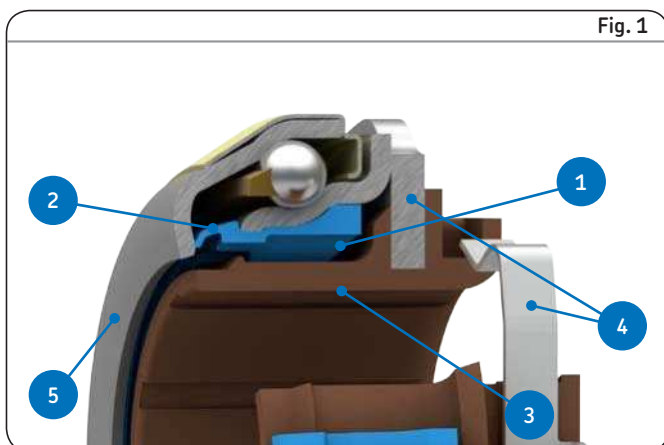
SKF clutch release bearing units integrate additional functions (→ **fig. 1 and 2**):

- 1 Self-aligning:** to compensate for misalignment between the engine and transmission, a clutch release bearing unit must be able to align itself so that it maintains its alignment with the diaphragm spring. This capability helps to prevent premature bearing failure as a result of uneven load distribution.
- 2 Sealing solutions:** capped with either a metal shield or contact seal, the sealing solution is designed to retain the lubricant inside and prevent contaminants from entering the bearing. Although clutch release bearings are usually well protected, requirements vary according to region. As a result, SKF has sealing solutions for virtually every geographic region:

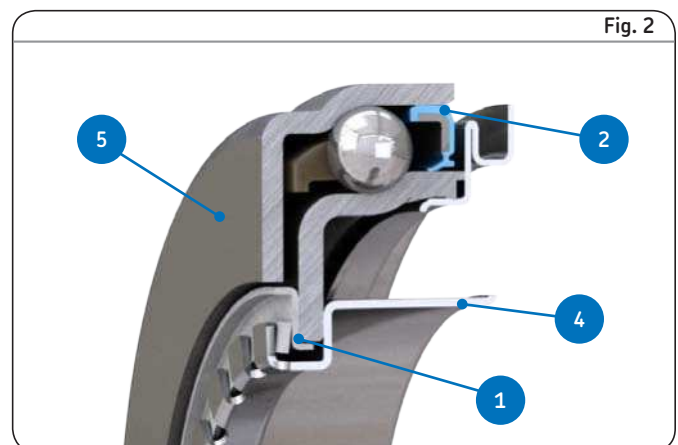
- Europe: solutions generally based on a single seal on one side and a shield or sheet metal labyrinth on the other side
- Asia: solutions generally based on a seal on both sides
- America: solutions generally based on a single or double seal design

- 3 Axial guidance:** to enable a clutch release bearing unit to move axially, without stick-slip, SKF bearings have a specially designed polymer sleeve that slides on a guiding tube connected to the gearbox, integrated for this purpose.
- 4 Interface with actuation device:** the clutch release bearing unit integrates components connecting/holding the unit to the actuation system (fork or concentric slave cylinder piston).
- 5 Interface with diaphragm spring:** to carry the load and minimise friction and wear on the diaphragm.

Design for fork actuation



Design for concentric slave cylinder actuation



Clutch bearing fork actuation

The SKF Clutch release bearing unit has been designed for use with a manual gearbox with mechanical fork actuation.

In this configuration, the clutch bearing unit consists of the following components (→ fig. 3):

- 1 Clutch release bearing
- 2 Rubber sleeve for self-aligning function of the unit
- 3 Rear plate for interface with the fork
- 4 Polymer sleeve (connected to the rear plate) to allow axial displacement on the guiding tube when actuated by the fork
- 5 Clips to hold the unit to the fork

The rubber sleeve is designed with radial teeth and is installed in the inner ring bore. Tooth flexibility gives the required degree of radial freedom to compensate for misalignment between engine and transmission input shaft.

The polymer sleeve on a guiding tube is installed inside the inner diameter of the rubber sleeve.

Clutch bearing hydraulic actuation

The SKF Clutch release bearing unit has been designed to meet the requirements of manual and automated manual transmission gearboxes that use hydraulic actuation by means of a concentric slave cylinder. The hydraulic clutch cylinder and the clutch release bearing are combined into one system.

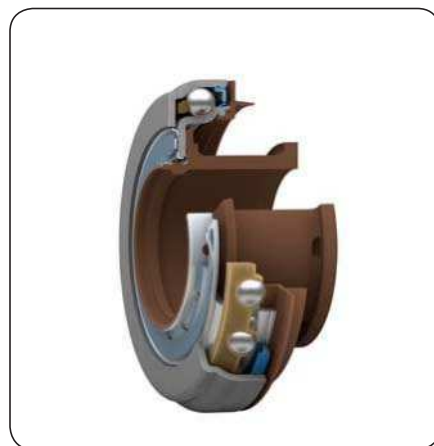
In this configuration, the clutch release bearing unit usually consists of the following components (→ fig. 4):

- 1 Clutch release bearing
- 2 Metallic spring washer for the self-aligning function of the unit
- 3 Boot retainer to connect the bearing to the boot and locate the pre-load spring
- 4 Polymer piston or metallic sleeve connected with the concentric slave cylinder for axial displacement of the unit against the diaphragm

The working principle of the metallic spring washer is based on friction management between the small teeth of the spring ring and the bearing ring, as a function of the radial load. This is achieved by controlling the axial deformation of the teeth. The resulting axial load must be above a minimum value to prevent abnormal noise and must stay below a maximum level to allow radial displacement.

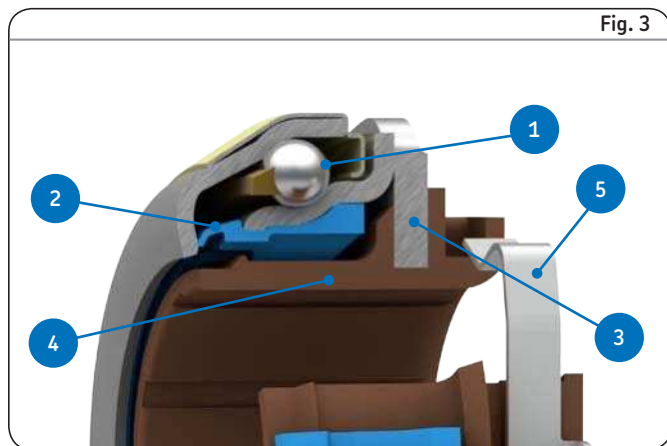


Metallic sleeve integrated in the bearing and connected to the polymer piston from the concentric slave cylinder.

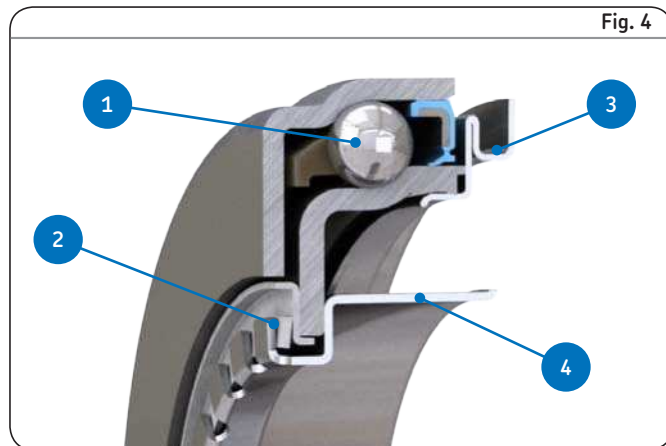


Polymer piston integrated in the bearing and connected directly to the concentric slave cylinder chamber.

Design for fork actuation



Design for concentric slave cylinder actuation



Double clutch technologies – wet and dry

Double clutch transmission

The primary function of a clutch release bearing installed in a manual transmission is to decouple the engine from the gearbox in order to allow for gear change.

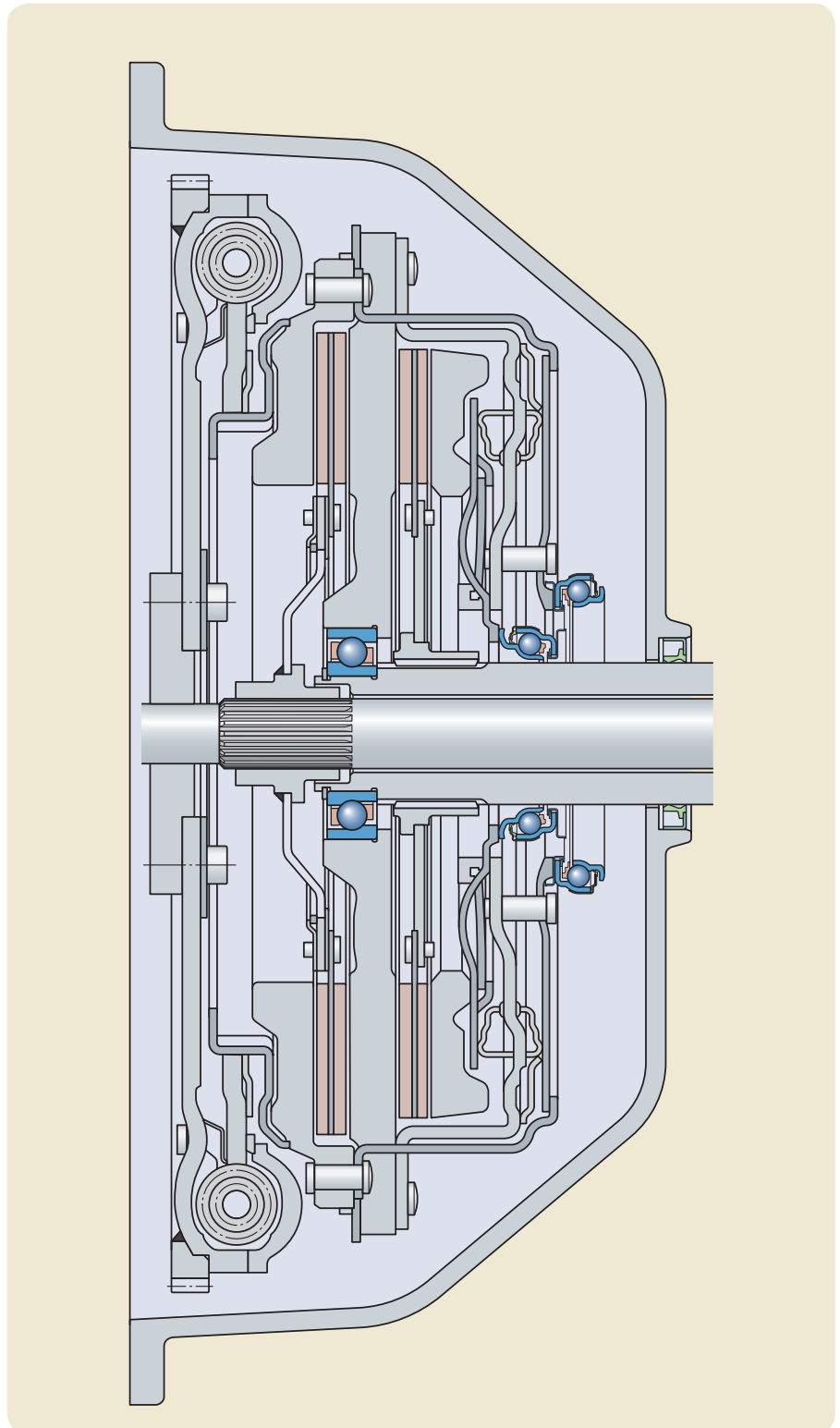
A double clutch transmission system is composed of two separated clutches. Linked to the double clutch transmission system, the gearbox is split into two shafts, one for odd gears (1, 3, 5 ...) and the other for even gears (2, 4, 6 ...). Actuation is performed by two clutch release bearings. SKF has developed bearings for these high demand applications which are able to withstand:

- higher loads
- higher temperature
- higher number of clutch operations
- bigger dimensions
- longer life expectancy
- high packaging constraints

Double clutch transmission gearboxes currently on the market are equipped with either wet (double wet clutch) or dry (double dry clutch) systems depending on the transmitted torque and the operating conditions.

In both systems, the clutches are actuated by either hydraulic pistons or mechanical devices, and the driving plate is supported by a support bearing. The function of the support bearing is to locate the driving plate in both radial and axial directions, to balance the axial load of the system and to enable a difference in rotational speed between the crankshaft and input shaft during clutch actuation.

- one support bearing
- two clutch release bearings



SKF Double Clutch Bearing Set

Based on double clutch transmission design, actuation is mainly performed by two clutch release bearings, which are designed to perform the same functions as those described for a conventional clutch. Because of the compactness of the double clutch transmission system, the first clutch release bearing is nested in the second one. Thus, there is an inner and an outer bearing.

Additional functionality such as self alignment and radial guiding of the bearing and provisions for actuation by either a mechanical fork or hydraulic piston, are also included in this compact design. All bearing components are specifically designed for each application.

In this configuration, the SKF Double Clutch Bearing Set (→ fig. 1) comprises the following features:

- clutch sealed against contaminants
- compact design
- high load-carrying capacity
- high temperature resistance
- easy assembly in the application
- low weight solution

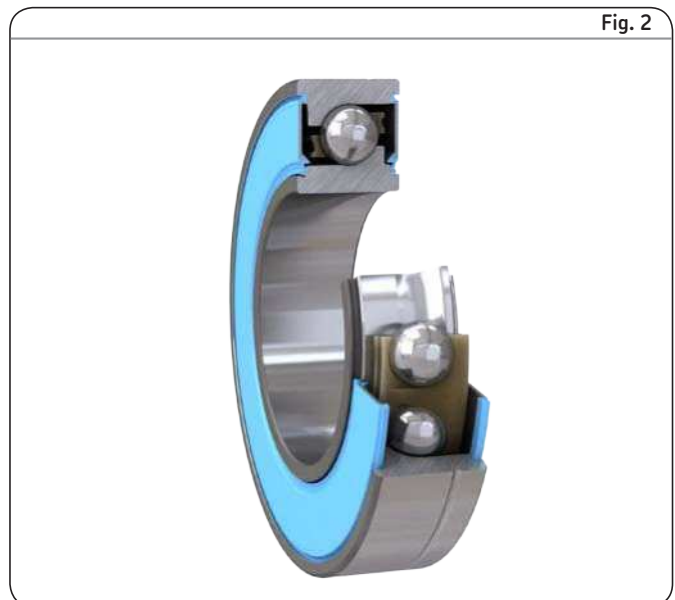
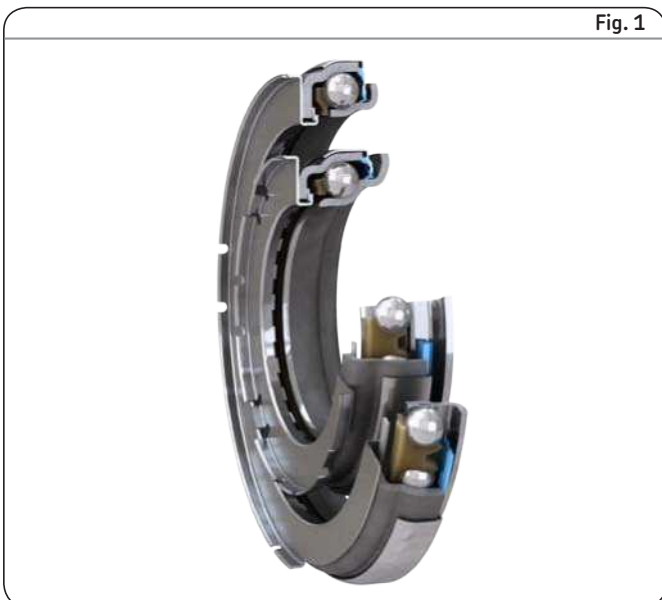
Clutch support bearing

Angular contact ball bearings (→ fig. 2), and four point contact ball bearings are specially designed for double clutch applications which are exposed to higher temperatures than clutch release bearings. SKF single row angular contact ball bearings are designed to accommodate simultaneously acting radial and axial loads. They incorporate special features that enable them to run cooler and smoother, thereby reducing lubricant consumption and extending bearing service life.

Features of SKF support bearings include:

- custom boundary dimensions
- a highly effective contact seal to keep the lubricant in and contaminants out of the bearing
- high temperature grease and good anti-brinelling properties (double dry clutch configuration)
- Lubricated with clutch oil (double wet clutch configuration)
- manufactured to P6 dimensional accuracy and P5 running accuracy

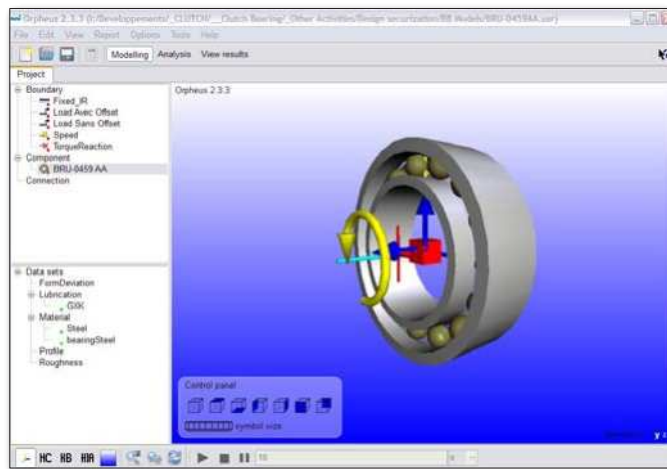
- unique raceway-shoulder transition to avoid edge stress
- unique heat treatment



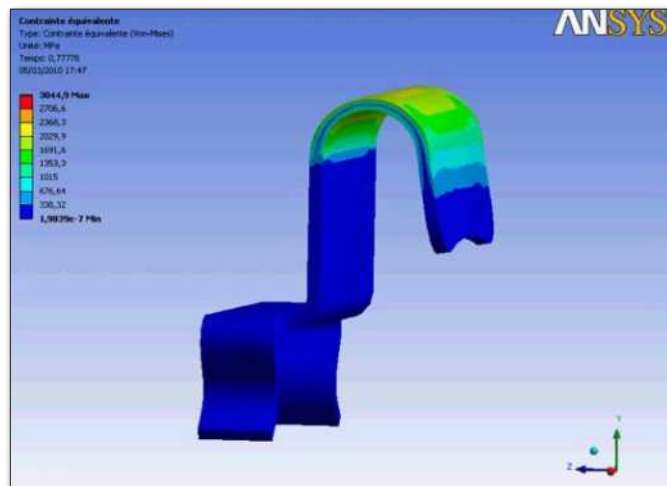
Product validation

During product development, several activities were undertaken to evaluate and validate bearing performance against internal specifications as well as customer specifications. The typical design validation plan (DVP) related to clutch bearing units includes:

Computer aided engineering analyses to design and evaluate the product



Theoretical calculation performed with SKF Bearing Beacon simulation software, where the customer boundary conditions (loads, speed, temperature, duty cycle, etc.) and internal bearing geometry have been taken into account to perform a calculation for L10 lifetime, maximum contact pressure, truncation rate, etc.



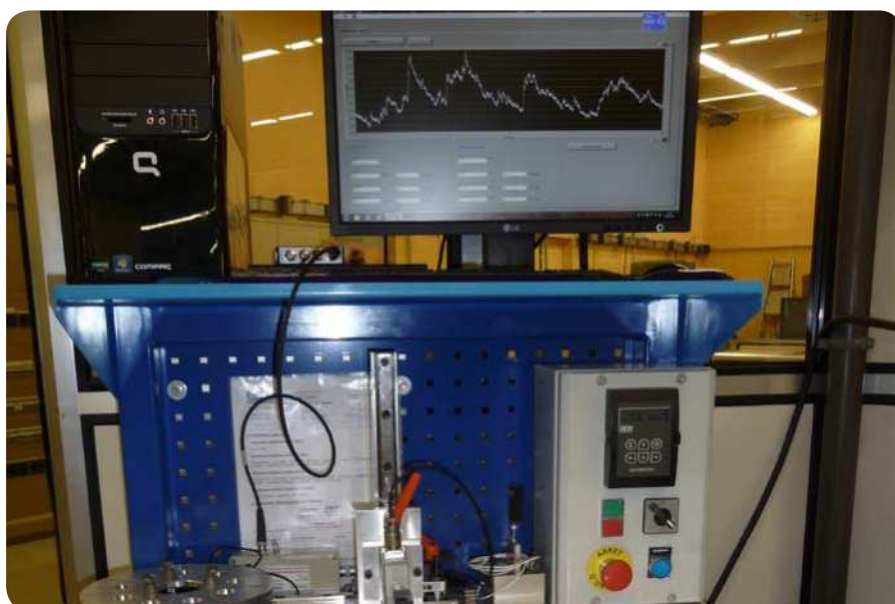
FEM calculation with Ansys to evaluate the stress and deformation of the bearing/component under load conditions.

Bearing characteristics evaluation conducted by SKF to demonstrate that the product's design is adequate for its intended application.



SKF noise level measurement

A test designed to evaluate the bearing noise level under various conditions of speed and load.



SKF friction torque measurement

A test designed to evaluate the bearing friction torque under various conditions of speed and load.



SKF self-alignment measurement

A test designed to evaluate the self-alignment ability of the unit by recording the radial force as a function of radial displacement under axial load.

Bearing performance evaluation conducted by SKF to demonstrate that the product's design is adequate for its intended application.



SKF bearing endurance test

A test designed to evaluate the performance of the bearing ball-set function under operating conditions similar to the application in relation to regarding loads, speeds and temperatures.



SKF unit endurance test

A test designed to evaluate the performance of the complete unit under operating conditions representative of the application in relation to loads, speeds and temperatures.



SKF application simulation test

A test designed to evaluate the performance of the complete unit using the application components (diaphragm and fork or concentric slave cylinder) under operating conditions representative of the application in relation to loads, speeds and temperatures.

Pull and push clutch release bearing range

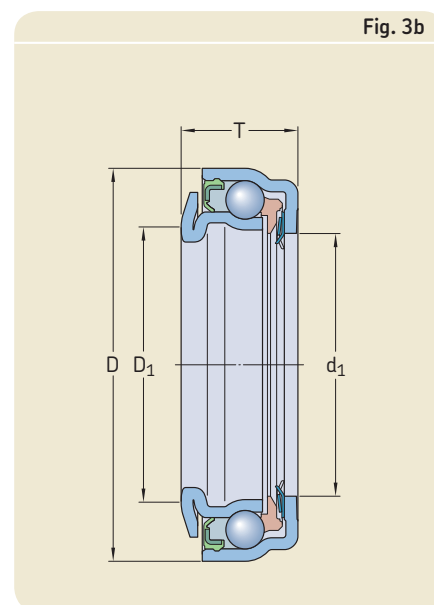
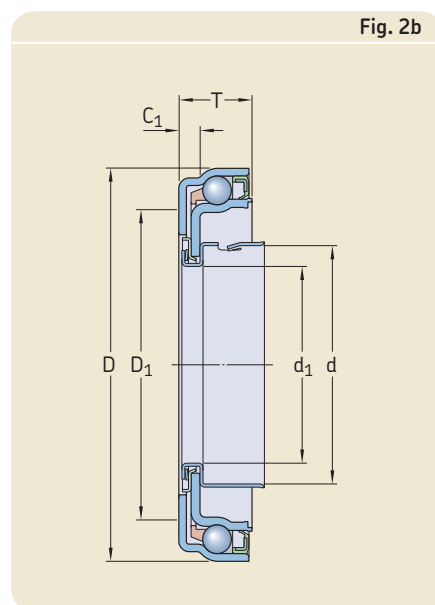
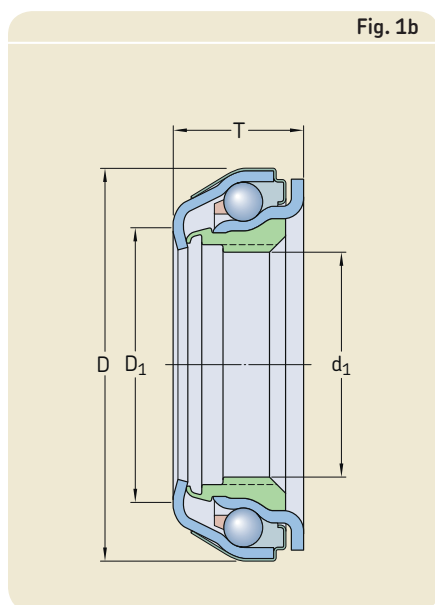
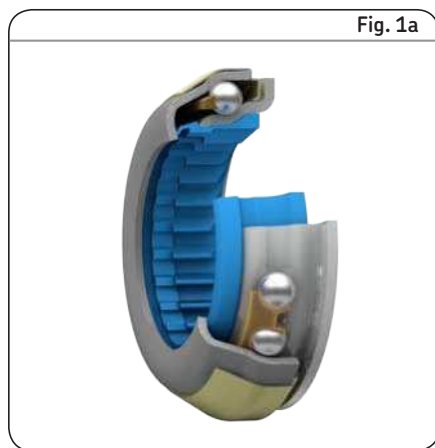
SKF clutch release bearings are classified into three different families based on their geometry.

The following tables show the range of pull and push clutch release bearings in production.

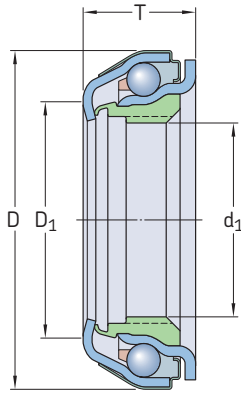
Bearing geometry family: 1

Bearing geometry family: 2

Bearing geometry family: 3

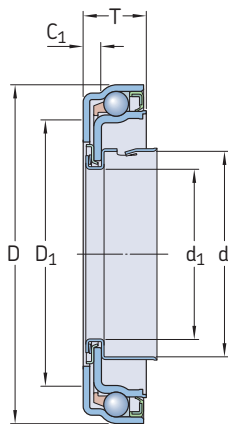


Push clutch release bearing range



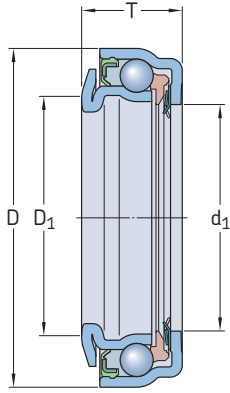
Bearing reference	Diaphragm contact		Bearing geometry family	External diameter D	Internal diameter for sleeve connection d ₁	Total height T	Mass	Rotating ring
	Type of contact	Diameter D ₁						
–	–	mm	–	mm	–	–	g	–
BC-BRUB 445310	Curve	34	1	48,65	27,75	16	57,7	Outer ring
BC-BRUB 445235	Curve	34	1	53	26,7	14,8	82,0	Outer ring
BC-BRUB 445234	Curve	39,5	1	64,5	35,7	19,4	103,0	Outer ring
BC-BRUB 445254	Curve	39,5	1	64,5	35,7	19,4	103,0	Outer ring
BC-BRUB 445280	Curve	39,5	1	64,5	35,7	21,4	106,0	Outer ring
BC-BRU-0459	Flat	42,5 ±8,5	1	61,5	34,7	17,45	108,1	Outer ring
BC-BRUB 445269	Curve	46	1	61,5	34,7	17,45	110,9	Outer ring
BC-BRU-0576	Flat	48,5 ±10,5	1	66,5	38,2	15,4	113,6	Outer ring
BC-BRUB 445328	Flat	49 ±7	1	61	38,55	13,5	108,0	Outer ring
BC-BRUB 445237	Flat	49 ±7	1	66	38,2	15,55	109,5	Outer ring
BC-BRUB 445250	Flat	49 ±7	1	66	40,9	15,55	107,5	Outer ring
BC-BRU-0598	Flat	49 ±7	1	66,5	38,2	15,7	109,8	Outer ring
BC-BRUB 445331	Curve	50	1	66	38,2	16,76	100,5	Outer ring
BC-BRUB 445236	Curve	50	1	66,1	38,2	16,75	108,0	Outer ring
BC-BRUB 445293	Curve	50	1	66,1	40,9	16,76	103,0	Outer ring
BC-BRUB 445248	Curve	51	1	63,2	38,8	13,5	95,0	Outer ring
BC-BRUB 445314	Flat	52 ±7	1	66	38,2	15,35	110,0	Outer ring
BC-BRU-0581 B	Flat	56,75 ±9,25	1	74,77	49,5	12,75	112,7	Outer ring
BC-BRU-0404	Flat	56,75 ±9,25	1	74,77	49,5	12,75	112,7	Outer ring
BC-BRU-0600	Curve	34	1	49,5	27,7	16	55	Outer ring

Push clutch release bearing range



Bearing reference	Diaphragm contact Type of contact	Diaphragm contact Diameter D ₁	Bearing geometry family	External diameter D	Internal diameter for sleeve connection d	Total height T	Inner ring bore diameter d ₁	Functional bearing height B ₁	Mass	Rotating ring
-	-	mm	-	mm				g	-	
BC-BRU-0583	Flat	48,25 ±7,55	2	65,8	30,75	15,1	48,98	5,7	105,7	Outer ring
BC-BRU-0460	Flat	48,25 ±8,25	2	66	33,3	14,2	49,3	3,75	96,1	Outer ring
BC-BRUB 445321	Flat	52 ±4	2	72,1	41,15	14	53,6	4	118,0	Outer ring
BC-BRU-0533 BAU	Flat	53 ±6	2	66,9	39,3	13,15	49,3	3,7	92,3	Outer ring
BC-BRU-0533 CBU	Curve	58	2	66,9	39,3	14,2	49,3	4,7	94,2	Outer ring
BC-BRU-0577 BB	Flat	53 ±6	2	65,4	35,8	12,1	49,8	3,5	83,1	Outer ring
BC-BRU-0375	Flat	76 ±3	2	80,5	36	13,3	48,9	3,7	133,1	Outer ring
BC-BRU-0466	Flat	53,5 ±5,5	2	66,87	36	13,15	49,2	3,7	92,0	Outer ring
BC-BRU-0422	Flat	56 ±10	2	74,77	46	16,7	56,8	6	130,3	Outer ring

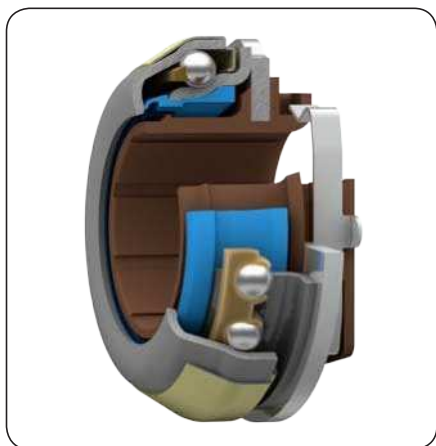
Push clutch release bearing range



Bearing reference	Diaphragm contact		Bearing geometry family	External diameter D	Internal diameter for sleeve connection d ₁	Total height T	Mass	Rotating ring
	Type of contact	Diameter D ₁						
–	–	mm	–	mm			g	–
BC-BRU-0381	Curve	34	3	48,88	32,55	14,5	60,8	Inner ring
BC-BRU 0473	Curve	39,5	3	60,4	42,65	19,5	83,0	Inner ring
BC-BRU 0474	Curve	50	3	62,4	41,4	18,89	101,3	Inner ring
BC-BRU-0605	Curve	58,4	3	63,15	45,7	17,5	97	Inner ring
BC-BRU-0606	Curve	83	3	95,1	74,6	15,1	137	Inner ring
BC-BRU-0607	Curve	79,5	3	84,8	67	14,8	104	Inner ring

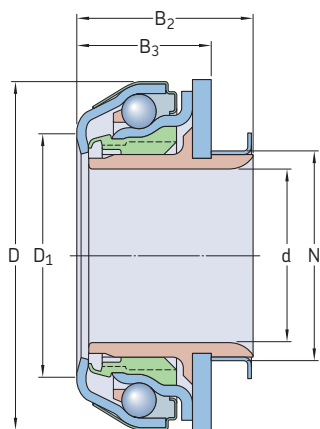
Bearing reference	Diaphragm contact Type of contact	Diaphragm contact Diameter D ₁	External diameter D	Internal diameter for sleeve connection d ₁	Total height T	Inner ring bore diameter d	Functional bearing height B ₁	Mass g	Rotating ring
-	-	mm	-	mm					-
BC-BRU-0347	Flat	46,2 ±2.9	56,1	34	31,3	39,05	-	117,5	Outer ring

Pull and push clutch bearing unit for fork actuation



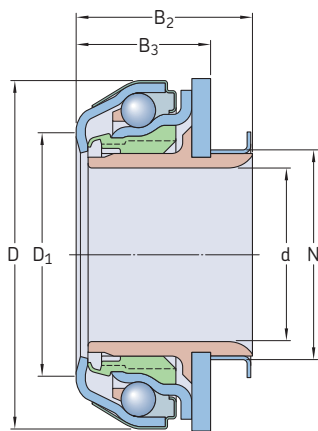
The following tables show the range of pull and push clutch bearings for fork actuation in production.

Pull clutch release bearing range



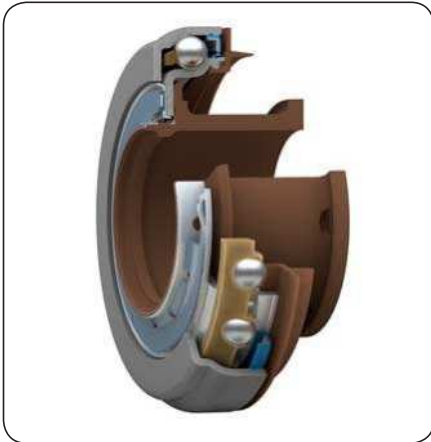
Bearing reference	Diaphragm contact		External diameter	Internal diameter	Total height	Functional height	Fork width	Mass
	Type of contact	Diameter						
-	-	D ₁	D	d	B ₂	B ₃	N	
-	-	mm						g
BRU-0347 CB	Flat	46,2 ±2,9	83,5	26,5	40	31,3	64,3	245,2

Push clutch release bearing range



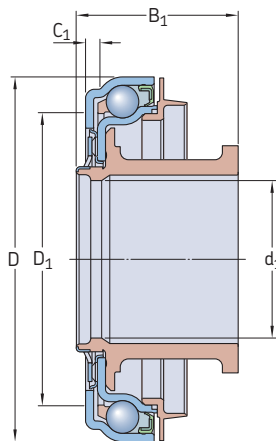
Bearing reference	Diaphragm contact Type of contact	Diaphragm contact Diameter	External diameter	Internal diameter	Total height	Functional height	Fork width	Mass
–	–	mm						g
BRU-0451 A	Curve	34	49,5	24,06	22,7	17	29	75,1
BRU-0355 DE	Curve	34	49,5	24,06	24,2	18,5	29	90,9
BRU-0599 B	Curve	34	48,65	23,6	22,95	17,75	37	80,6
BRUB 445201 DC	Curve	34	56	26	31,5	19,6	29,75	89,0
BRUB 445208 DE	Curve	34	72	24	39	20,1	68	124,0
BRUB 445329 AC	Curve	34	75	24,06	28,9	18,5	47,2	96,0
BRUB 445224 DC	Curve	34	75	24,06	30,9	20,5	47	116,6
BRUB 445235 E	Curve	34	86	23,6	21,6	18,15	60	166,0
BRUB 445301	Curve	34	87	23,6	22,2	12	60	166,0
BRUB 445232 AA	Curve	34	94,5	23,5	41,4	26	82,2	159,0
BRUB 445254 CA	Curve	34	97	28	43,2	25,8	90,2	198,0
BRUB 445290 B	Curve	39,5	84,5	26,57	44,5	25,5	17	166,6
BRUB 445280 CA	Curve	39,5	84,5	26,57	53	34	71	176,0
BRU-0459 AA	Flat	42,5 ±8,5	61,5	26,45	29	20	31,5	141,2
BRU-0403	Curve	46	62,6	31,05	30,5	22,25	41,5	145,8
BRUB 445269 EC	Curve	46	62,6	31,05	30,5	22,25	41,5	149,3
BRUB 445237	Flat	49 ±7	66	35	32,7	18,2	41,4	148,0
BRUB 445250 AE	Flat	49 ±7	66	38,2	30,6	16,75	46	132,0
BRU-0598	Flat	49 ±7	66,5	35	32,7	18,2	41,4	118,9
BRU-0441	Flat	49 ±7	84,5	33	34,1	24,1	70,5	166,0
BRU-0511 A	Curve	50	82	33	31	22	70	217,4
BRU-0477 B	Curve	50	85	33	31	22	70,1	220,8
BRUB 445331	Curve	50	84,5	33	35	25	70,5	161,0
BRUB 445236 A	Curve	50	66,1	35	33,75	19,25	41,4	135,0
BRUB 445293 C	Curve	50	66,1	38,2	29,85	17,95	46	124,0
BRU-0601 A	Curve	34	49,5	24,2	24,3	18,5	29	87
BRUB 445314 E	Flat	52 ±7	69	35,05	32,9	20,9	58	155,0

Push clutch bearing unit for concentric slave cylinder actuation



The following tables show the range of push clutch bearings for concentric slave cylinder hydraulic actuation.

Clutch bearing unit range (concentric slave cylinder actuation)



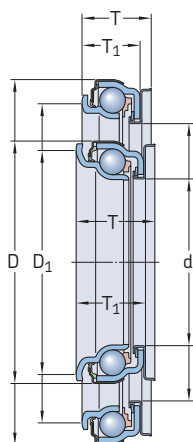
Bearing reference	Diaphragm contact		External diameter	Internal diameter	Total height	Functional height	Piston integrated or metallic sleeve	Mass
	Type of contact	Diameter						
–		D ₁	D	d	B ₁	C ₁	N	
–	–	mm					–	g
BRU-0583	Flat	48,25 ±7,55	66	28,05	23,6	6,2	Metallic sleeve	119,9
BRU-0576	Flat	48,5 ±10,5	69	35,05	32,9	20,9	Piston integrated	157,0
BRU-0533 BA	Flat	52,75 ±6,25	66,9	33,79	27,3	3,7	Piston integrated	134,7
BRU-0375 EA	Flat	53,3 ±5,1	80	30	39,4	15,3	Piston integrated	133,1
BRU-0466 AC	Flat	53,5 ±5,5	66,87	28,85	29,6	5,35	Piston integrated	119,0
BRU-0577 BB	Flat	53,6 ±6	65,4	32,5	15,14	3,5	Metallic sleeve	99,1
BRU-0422 CD	Flat	56 ±10	77,3	38,7	24,1	6,8	Metallic sleeve	164,8

Double clutch bearing unit range



The following tables show the range of double clutch bearing units.

Double clutch bearing unit range



Bearing reference	Diaphragm contact Type of contact	Diameter	External diameter	Internal diameter	Total height	Functional height	Piston integrated or metallic sleeve	Mass
		D ₁	D	d	T	T ₁		
-	-	mm						g
BRU-0605	Curve	58.4	63.15	42.8	20.5	18	Metallic sleeve	106
BRU-0606	Curve	83	95.1	72.1	18	15.6	Metallic sleeve	152
BRU-0607*	Curve	79.5	84.8	64.3	14.8	14.8	No sleeve integrated	104

* This bearing is designed for wet application, to work with transmission oil only.

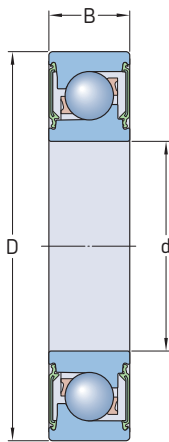
Clutch support bearings

Clutch support angular contact ball bearing



The following tables show the range of support bearings.

Clutch support angular contact ball bearing



Bearing reference	Axial loading	External diameter	Internal diameter	Total height	Dynamic capacity	Mass
		D	d	B		
–	–	mm			N	g
BA1-7221	in 1 direction only	62	35	14	17 400	150

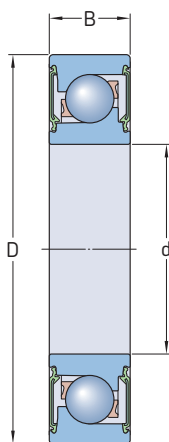
Clutch support bearings

Four point contact ball bearing



The following tables show the range of support bearings.

Four point contact ball bearing as clutch support



Bearing reference	Axial loading	External diameter	Internal diameter	Total height	Dynamic capacity	Mass
-	-	D	d	B	N	g
mm						
BAQ-3817*	in both directions	58	27	16	26 500	172

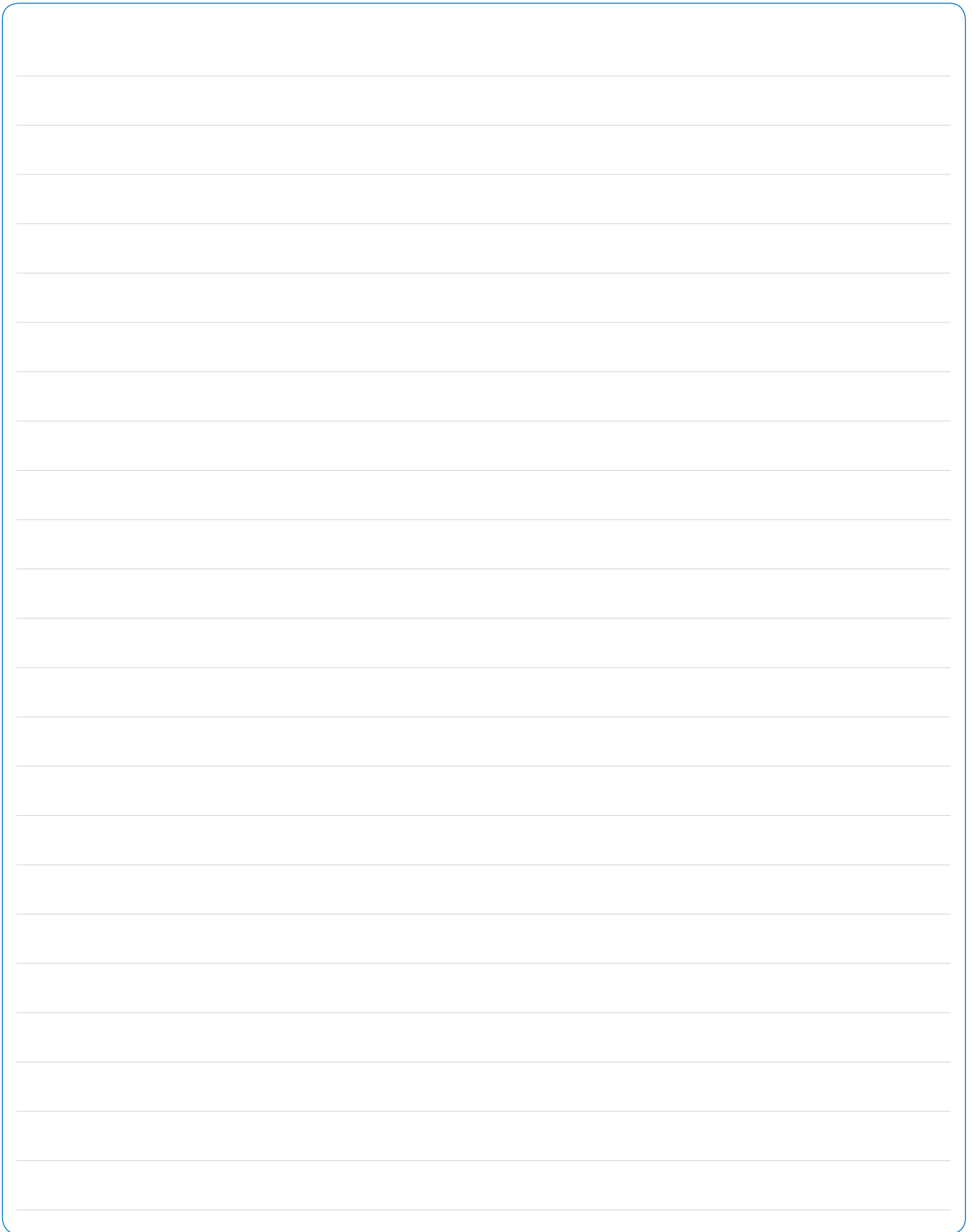
* This bearing is designed for wet application, to work with transmission oil only.

Clutch bearing application data list

Application data sheet. Here you can provide SKF the basic information that is needed to make an engineering evaluation of the application.

Dimensional Data	Customer supplied data
∅ contact with diaphragm spring	
∅ guiding tube	
Fork width (if applicable)	
Type of actuation (fork or concentric slave cylinder)	
Bearing size	
Outer diameter	
Width	
Flat contact face	
Vehicle operating conditions	
Mileage	
Number of clutching and declutching cycles	
Stroke	
Noise level requested (on new bearing)	
Bearing deflection under load	
Bearing radial displacement under load (self-alignment min or max)	
Operating temperature	
Steady	
Peak	
Maximum release load [N]	
Pre-load (N)	
Contamination	
Test conditions	
Bench test procedure	
Speed	
Number of cycles	
Duration of one cycle	
Temperature	
Acceptance criteria	
Noise level after test	
Wear	
Sleeve	
Bearing	
Rear plate	
Preload (N)	
Application drawing requested	
Assembly	
Value X (distance between cylinder housing and flywheel nose face)	
Clutch housing	
Fork	
Guiding tube	
Material	
Mechanism	

Notes



A large rectangular area with rounded corners, outlined in blue, containing 25 horizontal lines for writing notes. The lines are evenly spaced and extend across the width of the area.



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