한국SKF씰(주)

www.skfkorea.co.kr

CEO message

SKF Sealing Solutions Korea is a joint ventured with AB SKF Group of Sweden that has a history of a century. We are a global oil seal specialist in both in name and reality, being awarded the ministry of knowledge & economy prize, 50million USD export prize 2014 and were selected as Supplier of the year by GM for four consecutive years in 2010, 2011, 2012, 2013 based on steady technology development and rich know-how as well as partner's advanced technologies.

We are growing up as being a global oil seal manufacturer by doing business with five major domestic automotive makers such as Hyundai, kia, GM korea, Renault samsung, Ssangyong as well other honored companies like GM(North America, China), Toyota and Mazda.

We always thank you for your love and consideration to our company and will promise to become SKF Sealing Solutions Korea that make the future hand in hand with our customers.

President / CEO Hur, Yong-Joon

SKF Sealing Solutions Korea

the knowledge engineering company

Contents

SKF

We are making continuous efforts to improve our technology and making our best efforts.

Company History

2017 – Received "World Class 300 Company" by Korean Government.

2015 – Received "GM Supplier Quality Excellence Award 2015"

2014 – Received "50MUSD Export Award"
– Received "2013 Supplier of the Year"award from GM

2013 – Received "2012 Supplier of the Year"award from GM

2012 – Awarded the Iron Tower Order of industrial Service Merit
– Received "2011 Supplier of the Year"award from GM

2011 – Received certificate of commendation from the Ministry of Knowledge Economy
– Received "20MUSD Export Award"
– Received "2010 Supplier of the Year"award from GM

2010 – Received "10MUSD Export Award"

2005 – Renamed SKF Sealing Solutions Korea from CR–Korea
– QS9000, ISO 9002 quqlified

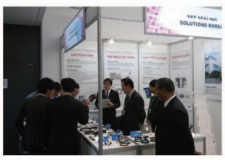
1998 – Joint ventured with AB SKF Group

Exhibition

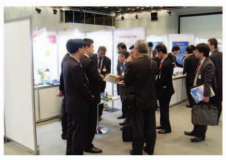
2012

GMTH Auto parts plaza in Thailand

Isuzu Korea Auto parts plaza



Nissan Korea Auto parts plaza



Avtovaz KAP

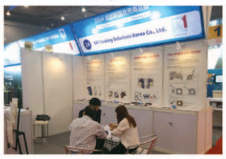
2013

Honda Korea Auto parts plaza

Automechainka Dubai

2014

Korean Expo 2014



2014 KOAA Show

2015

2015 Korea Show

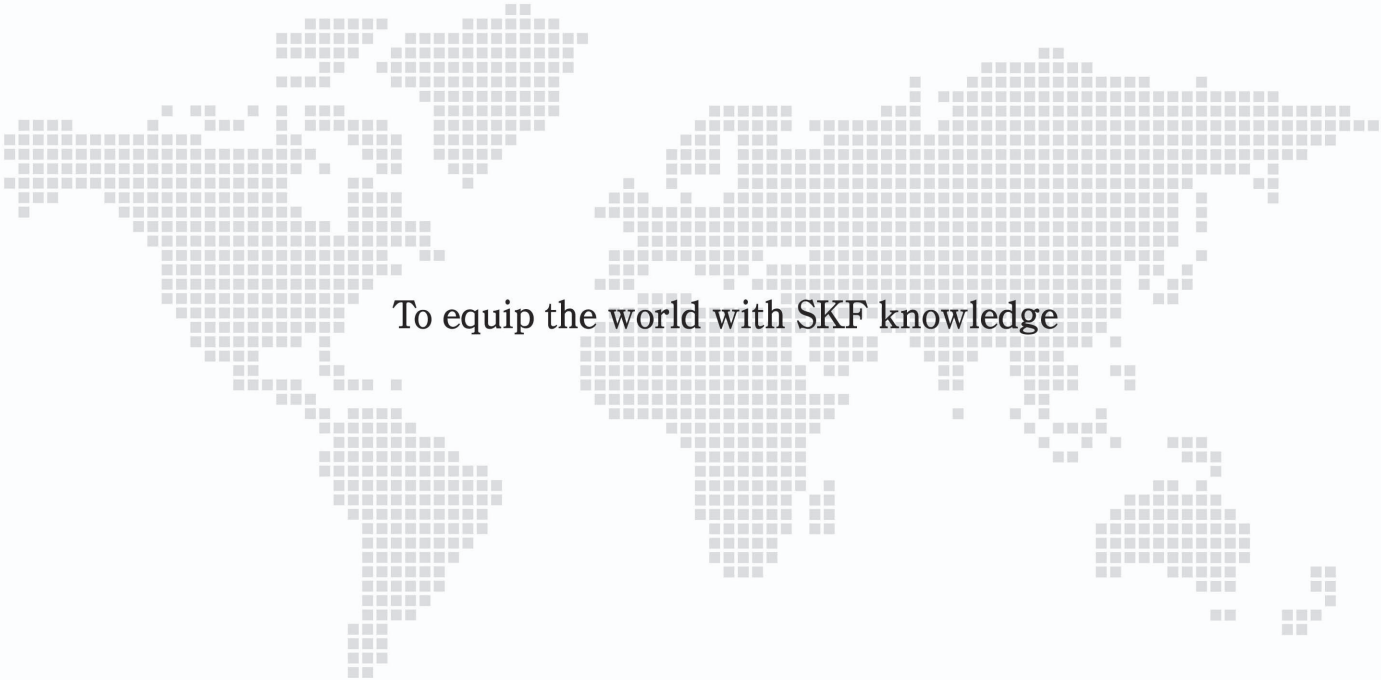
2016

KOAA Show

2017

KOAA Show

Automotive world 2017 in Tokyo



To equip the world with SKF knowledge

GM HYUNDAI KIA ILJIN SSANGYONG MOTOR HYUNDAI POWERTECH HYUNDAI WIA HYUNDAI MOBIS

TOYOTA Smile for Tomorrow mazda NISSAN S&T Motiv Ford SCHAEFFLER TRW

BorgWarner dac

www.skfkorea.co.kr

Head office · #1 Factory

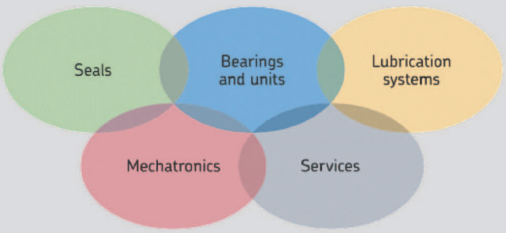
#2 Factory

#3 Factory

Company Profile (2018)

Company	SKF Sealing Solutions Korea Co.,Ltd.
Head Office	Daegu, Korea
2nd, 3rd factory	5min from Head office
Employees	460
Sales amount	110,200 MKRW
History	Joint venture with AB SKF Group (1998)

SKF's five technology platforms



Award / Certification


2010 Supplier of the Year


2011 Supplier of the Year


2012 Supplier of the Year


2013 Supplier of the Year

OHSAS 18001


ISO/TS 16949

GM Supplier Quality Excellence Award 2013, 2014, 2015

To equip the world with SKF knowledge

— The global leading company which has the state of the art technology for automotive oil seal

— IATF 16949, ISO 14001, OHSAS 18001

— Joint venture with AB SKF group that has over 100 years history

— 2010Y, 2011Y, 2012Y, 2013Y Awarded GM Supplier of the Year Award

Automotive

Engine Seals

OFSS(Optimized Friction Solution Seal)
Crank Shaft RR Sensor Module
PTFE Seal
Valve Stem Seal
Magnetic Tone Ring
Gasket & O-ring

[Engine Seal]

OFSS(Optimized Friction Solution Seal)

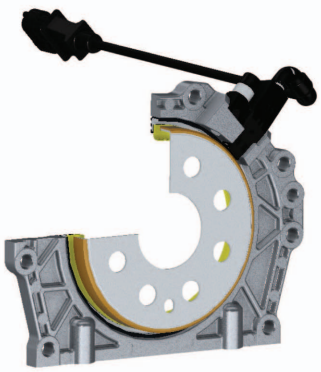
Rotating elastomeric shaft seals offering high durability and low friction.

SKF OFSS(Optimized Friction Solution Seal) is based on the technology of the PTFE seals, but use sophisticated elastomer materials. These seals can be incorporated into all sealing solutions and modules.

Low friction and power loss to help minimize fuel consumption and CO_2 emissions.
Outstanding sealing lip for the engine air leak test.

- Robust sealing and high durability, even at high speed
- Improved capability on eccentricity and dynamic run-out compared to PTFE seals
- Good dry-running ability
- Minimal shaft wear
- Excellent dirt exclusion
- Simple installation
- Air tightness
- Special custom designs available, e.g. plastic bayonet fitting and SKF ROTOSTAT sealing module

Crank Shaft RR Sensor Module



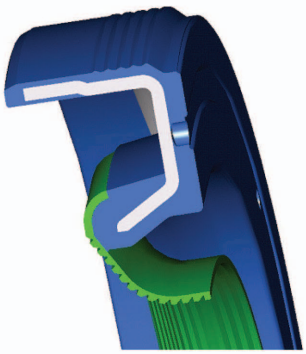
Crank Shaft RR Sensor Module for engine management adds value to the vehicles on which they are used by delivering the following advantages:

- Simplified, ready-to-install modular assembly saving installation time and cost
- Elastmer, PTFE or low friction dynamic sealing Lip for optimum sealing performance
- Self-centering to cylinder block by a integrating dowels in the retainer stamping
- Highly economic solution

The intelligent combination of optimized sealing system assembled aluminum housing with an integrated engine management sensor and trigger wheel.

[Engine Seal]

PTFE Seal



Rotating shaft seals offering optimum performance in extreme temperature and fluid environments.

PTFE radial shaft seals utilize a PolyTetraFluoroEthylene wafer for dynamic sealing. SKF offers a range of PTFE solution including bonded and unitized designs.

A thoroughly tested, long-life solution to sealing needs, the PTFE seals add value by delivering advantages such as:

- Superior chemical resistance for most aggressive oils and fluids
- Wider temperature range than elastomers
- Lower friction and power loss compared to spring loaded designs
- Helps overcome shaft deficiencies due to a long lip lay down
- Reduced shaft wear
- Excellent dry-running capability

SKF has a long experience with PTFE sealing solutions, allowing us to develop the most advanced designs using leading-edge technology. This technology results in a highly economical and effective product.

Valve Stem Seal

Provide a defined metering rate of oil to the valve stem interface of internal combustion engines, while ensuring low engine emissions and competitive pricing.

Superior product materials, SKF formulated Fluoropolymer, are used in the manufacturing of the valve stem seals resulting in:

- Excellent chemical resistance
- Excellent temperature resistance
- High reliability
- Low wear

High pressure valve stem seal

Improve the quality of emissions and enhance engine operation by withstanding high pressures in the exhaust and intake ports of the engine, while maintaining their primary function as an oil metering device.

The design characteristics of the valve stem seals allow for dynamic sealing abilities such as:

- Flexible lip to allow valve stem movement and static eccentricity
- Lip stabilization by bonded reinforced ring
- Constant radial force by tempered garter spring

[Engine Seal]

Magnetic Tone Ring

The magnetic poles provide a signal that is received by a sensor connected to a central control unit.

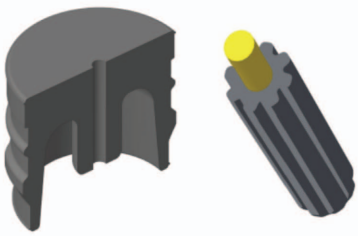
Designs available:

- Trigger wheels for axial and radial readings
- Sensor solutions with trigger wheels and optimized sensor
- Integrated into a sealing module.

Features of the product:

- Superior pitch precision
- Excellent chemical resistance
- Excellent temperature resistance
- Magnetic signal allows reduction of size and cost of the sensor
- Simple installation because of:
  -easy integration into a sealing module
  -availability as a system complete with sensor
- Trigger wheel can be used as the running surface of the seal for a cassette system
- Weight reduction compared to traditional metallic trigger wheels
- Magnetization with different pole patterns at no additional cost
- High pitch precision for accurate sensing and optimum engine control
- Excellent chemical resistance and temperature range for long life

Gasket & O-ring



Gaskets for use in static as well as dynamic sealing applications.

Static seals are those where the mating parts of the gland do not have movement relative to each other.
Dynamic seals include reciprocating, floating pneumatic, oscillating, and rotary applications.

Benefits

- Faster, more cost-efficient assembly process
- Reduction of gas permeability
- Suitable for nearly all standard shapes

Application Examples

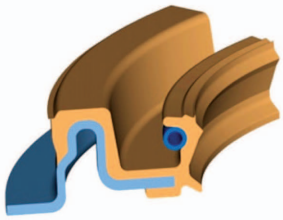
- Engine lower crank case
- Transmission torque converter
- Transfer case

Automotive

Transmission Seals

Shaft seal
Bonded piston seal

[Transmission Shaft Seal]



Provide oil sealing for transmissions and differentials with a selection of materials, while offering optimum performance in extreme temperature and fluid environments.

Available applications

Car and truck transmissions, axles and transfer cases.

SKF can offer a variety of designs for transmission seals such as:

- Radial contacting axial lips
- High flex designs with radial dirt lips
- Rear extension and RockGuard designs for output seals
- Standard designs for input seals
- Dual spring lip designs for both input and output seals as well as unitized solutions

SKF has a proven success record in the production of transmission seals with an extensive high volume customer base.

SKF's custom design capabilities, superior testing procedures and extensive production experience allow us to develop the most advanced designs. The superior features of the transmission seals are:

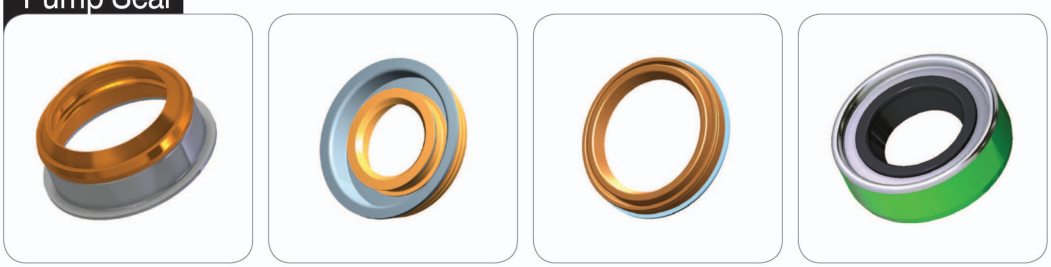
- Superior base resistant elastomer material
- Superior dirt exclusion
- High flexibility in design-most capable of dynamic run-out and shaft to bore misalignment
- Can retain or separate lubricants

The SKF transmission seals add value by delivering the following critical advantages:

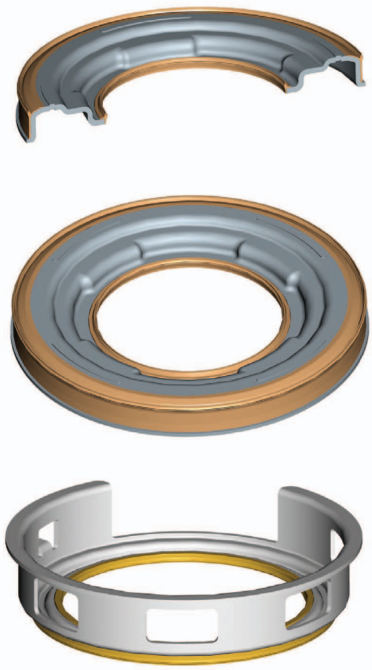
- More fluid compatibility with oil additive packages
- Wide temperature ranges
- Long life - increased reliability

Shaft Seal

Pump Seal



[Bonded Piston Seal]



Industry leading material and processing are used in the production of the SKF bonded piston seals to provide enhanced performance and better bonded integrity.

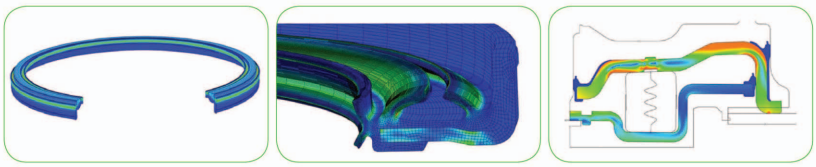
SKF's advanced manufacturing processes deliver excellent quality and performance.

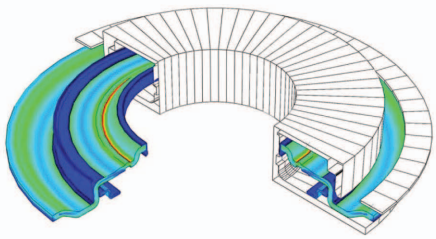
These processes ensure:

- Increased bonded strength
- Seal life in excess of requirements

The standard of excellence that goes into every SKF bonded piston seal creates:

- A greater application tolerance
- Better reliability
- A robust product for the industry





Finite Element Analysis (FEA) is used extensively in the design process to

- determine stamping component stresses and deflection
- determine the minimum allowable steel gauge and grade to suit the application while minimizing material costs
- predict stamping fatigue life under maximum anticipated loading
- validate the integrity of the rubber sealing lips to make sure it functions properly under a variety of pressure loading conditions
- make sure that the piston meets expected performance criteria

[Bonded Piston Seal]

SKF has experience in high volume production of bonded pistons and currently supplier many major automotive OEM.
We have very capable manufacturing facilities that offers the best value to the customer.

Application Variety of Designs

Test Facilities

Material Test System

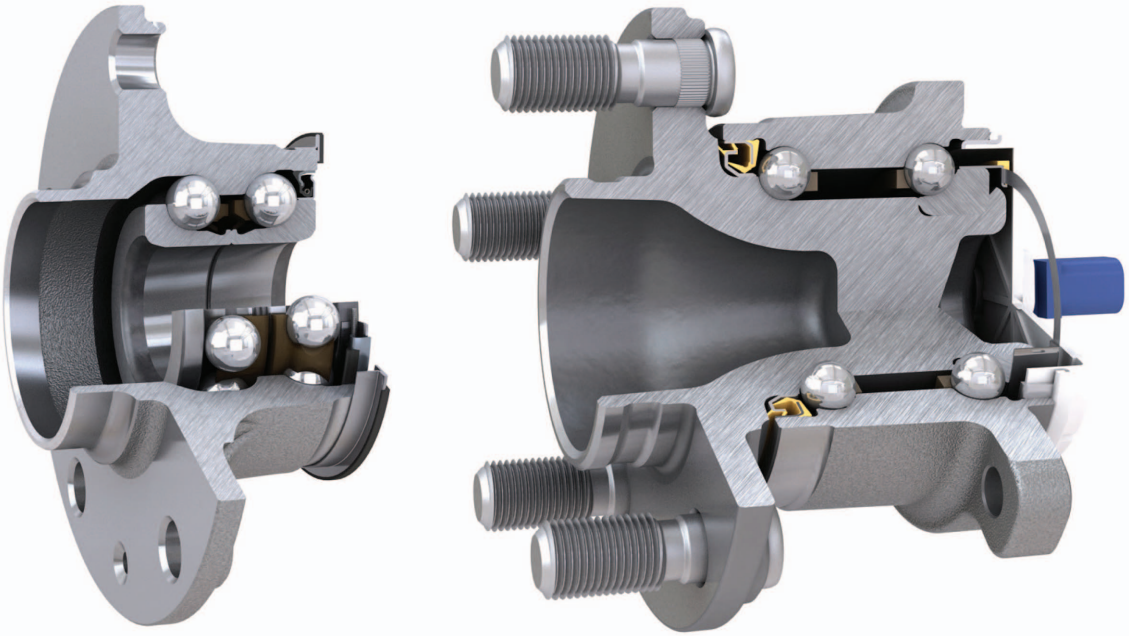
- **Purpose**
  - Sliding resistance
  - Fine vibrate stroke endurance
- **Application**
  - BPS & D-ring

Bonded piston seal tester

- **Purpose**
  - Hot & Cold Stroke durability
  - Leak and drag test
- **Application**
  - Auto Transmission
  - BPS & D-ring

Bearing

Hub Bearing Seals



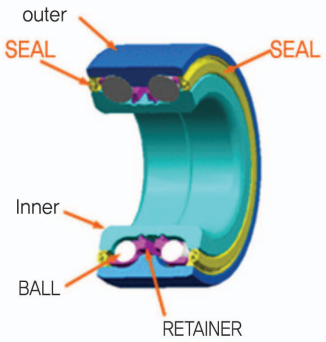
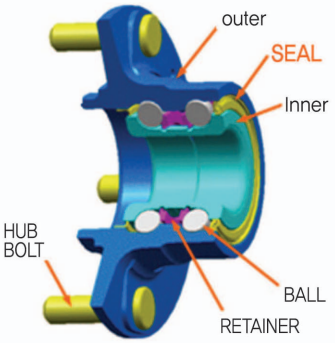
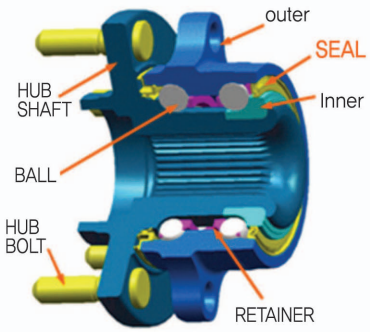
[Hub Bearing Seal]

Inboard/Outboard

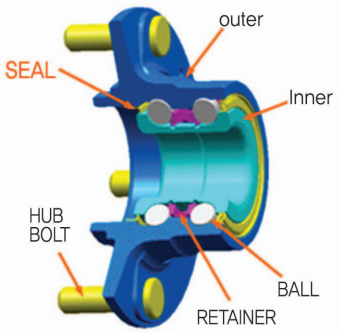
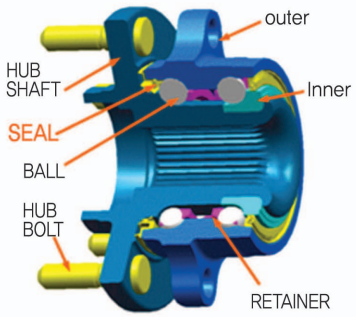
Product Function

To prevent entering the water from outside and leak grease inside the bearing.
It also block up noise and seizure of bearing.

Inboard

Generation 1	Generation 2	Generation 3
		

Outboard

	Generation 2	Generation 3
Schematic view of bearing		

Generation of Hub bearing

1st bearing

2nd bearing

3rd bearing

Bearing seal development

2005
Active Seal

2007
Dual Pack Seal

2008
Cartridge Seal

2009
Open seal / Hi pack seal

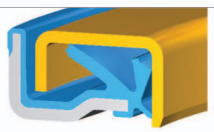
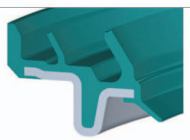
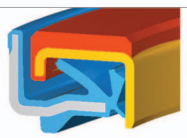
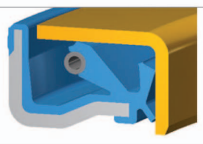
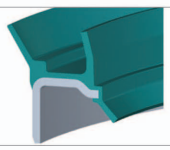
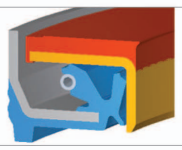
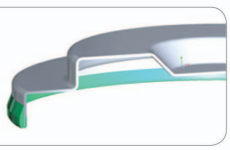
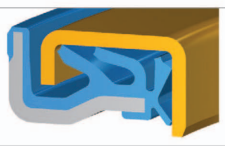
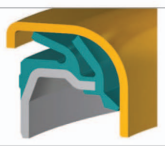
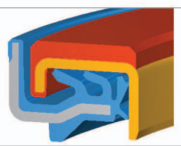
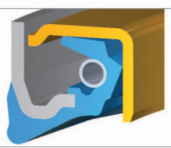
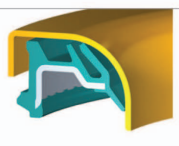
2017
Low Temp. Pack Seal & Open Seal

2012
3G Pack Seal

2011
Open Seal

2010
Encoder Seal

Design

Inboard Seal	Outboard Seal	Encoder Seal	Dust Cap
			
			
			
			

Magnetizing process for encoder seal

in-house process capabilities

Magnetizing line

100% inspection

Magnetizing

Test facilities

Shaft seal Durability Tester

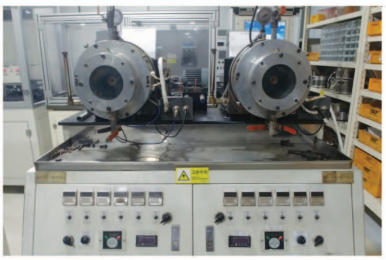
- Purpose
  - Shaft seal durability & oil leak performance test
  - Shaft seal oil pumping rate test
  - Muddy slurry test
- Application
  - Radial rotation seal (Engine, Mission & Axle)
  - Hub Bearing Seal

Cold & Hot Temp. Tester

- Purpose
  - Test for seal performances at low temperature
  - Life-time test for seal under various test conditions (Shaft speed, temperature, pressure, and vacuum)
- Application
  - Radial rotation seal (Engine, Mission & Axle)
  - Hub bearing seal

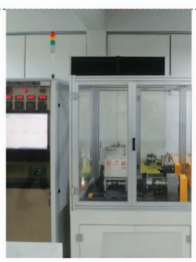
Dust Durability Tester

- Purpose
  - Shaft seal durability & oil leak performance test
  - Shaft seal oil pumping rate test
  - Muddy slurry test
- Application
  - Radial rotation seal (Engine, Mission & Axle)
  - Hub Bearing Seal



Seal Torque Tester

- Purpose
  Measure torque value of seal when shaft rotates
- Application
  - Radial rotation seal (Engine, Mission & Axle)
  - Hub Bearing Seal
  - Housing type
  - Shaft type



Industrial sealing solutions

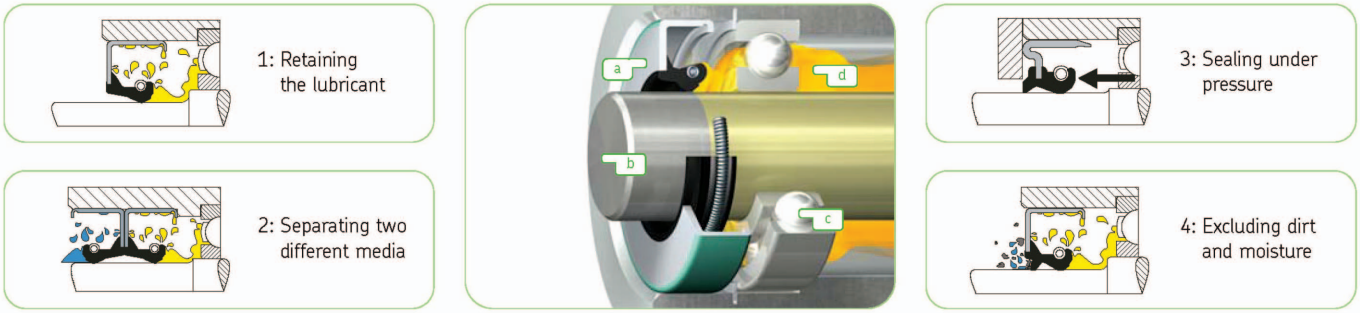
Industrial Seal

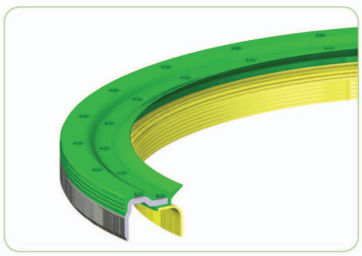
Industrial shaft seals are used to seal the opening between a rotating and a stationary component, or between two components in relative motion. Primary seal functions include;

- Retain the lubricant
- Exclude contaminants
- Separate two different media
- Seal under pressure

SKF industrial shaft seals for rotating machine components are manufactured from many different designs, materials and executions. Each specific properties, making them suitable for a particular application.

Function a:Radial shaft seal b:Shaft c:Bearing d:Lubricant





PTFE Seal

SKF has a long experience with PTFE Sealing solutions, allowing us to develop the most advanced designs using leading-edge technology.
This technology results in a highly economical and effective product. A thoroughly tested, long-life solution to sealing needs, the PTFE seals add value by delivering advantages.

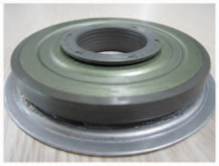
Mudblock Seal

SKF Mudblock seals are a new generation of radial shaft sealing units specifically cassette developed for heavy-duty applications in harsh environments and difficult operating condition.
The geometry of cassette seals provides optimum protection against water, dust, mud and other contaminant.

Applications

Agriculture

Bus



Wash machine

Process Map

Rubber Process

Weighing

Measure material weight

Mixing 1

Mix polymer and ingredients in mixer

Mixing 2

Mix polymer and ingredients in mixer

Aging

Store mixed rubber in cooling temperature

Preforming

Make rubber fitting for molding

Steel Process

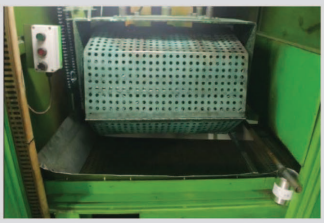
Stamping

Make the stamping (Outsourcing)

Phosphating

To prevent rust on metal surface and facilitate bonding after removing oil and other dirty material

Cementing



Apply adhesive on metal surface to increase bonding strength between rubber and stamping in molding

Molding

Vulcanize stamping and rubber in high temp and pressure and form the product

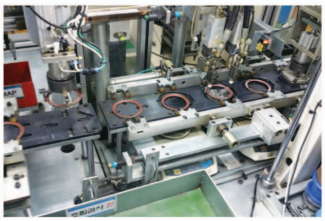
Packaging

Pack final product for shipping

Final inspection

Inspect final product

Assembly



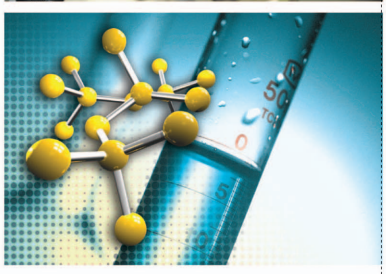
Assemble the spring and apply grease

Trimming

Remove rubber flash of molded part

Material Development

- Development of polymeric materials (elastomers and plastics)
- Application specific compound formulation
- Optimization of the use of materials (including adhesives/phosphating/metals)
- In-house testing equipment for chemical, physical, rheological, low temperature, aging (air, oils, fluids), corrosion analysis and laboratory mixing room, etc.
- Magnetization development



Main polymer in Seal Industry

Formal Name	Abbreviation	Service Temp(℃)	Oil Resistance
Acrylonitrile-butadiene	NBR	-55 to 120	Excellent
Ethylene-Propylene Diene Terpolymer	EPDM	-55 to 150	Poor
Polychloroprene	CR	-40 to 110	Fair
Polyacrylate	ACM	-40 to 150	Good
Polyethylene-Acrylate	AEM	-40 to 150	Good
Polysiloxane	VMQ	-90 to 200+	Fair
Hydrogenated Acrylonitrile-butadiene	HNBR	-40 to 150	Excellent
Fluorocarbon	FKM	-20 to 225	Excellent
Fluorinated Polysiloxane	FVMQ	-90 to 200	Excellent

Physical Properties

- Hardness (indentation)
  - Durometer
  - IRHD
- Modulus (resistance to force)
  - Tension
  - Compression
  - Shear
- Tensile at break
- Elongation at break
- Specific Gravity
- Resilience
- Compression Set
- Low Temperature Properties
  - Brittleness
  - Glass transition

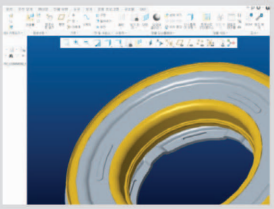
Research & Development

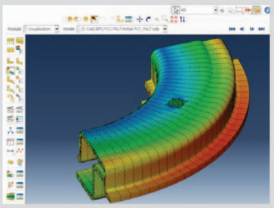
Design

- PRO-E
- UG
- Auto Cad

FEA

- Abaqus





SKF Sealing Solutions Korea R&D Center established in 2003 plays an important role as a global leading oil seal manufacturer in the oil seal market by harmony with SKF technical center

We are making efforts to meet the best quality and customer satisfaction by building advanced in frastructure of Analysis and validation related to product design and development.

Engineering support

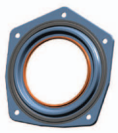
- Custom design to suit application & requirements
- Development according to customer specifications
- Prototype development
- Finite Element Analysis to optimize designs & reduce lead time

Process development capabilities

- In-house capability to design & develop new prossess
- Manufacturing equipment
- Automated processes development
- Vison inspection systems
- Encoders magnetization & control

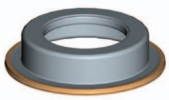
SKF New Tech. Product

1997 Rotostat
- Ready-to-install modular
- First double injection type seal
- Reduce components and cost
- Simplified to process
- Reduction of leak path



1998 Integrated valve stem seal
- Integrated seal & spring seal type
- First applied in Korea
- Reduction of components and cost
- Customer process reduction

2001 Bonded piston seal
- Replaced die casting+D-ring
- Integrated bonded seals
- Enhanced durability
- Reduction of components
- Compact module
- Applied to all auto OEM's AT
- First applied in Korea



2003 PTFE seal
- Meet the advanced technology
- Low friction and power loss reduction
- Robust desion
- Reduced shaft wear
- First applied in Korea

2009 Magnetic bearing seal
- Easy to control ABS
- 3rd generation hub unit
- Improved sensing accuracy
- Reduction of components, cost and space
- First applied in Korea

2018 Aluminum BPS
- SKF beaded lip designs reduce friction
- Improve response times and reduced cocking
- Reduce weight and improve response time
- Cost reduction by eliminating O-ring/D-ring and machining groove process on piston
- Minimizes damage/ scoring of the housing

2017 Low Temp. Pack Seal & Open Seal
- Low material application: Enhance sealing performances under low temperature
- Low friction design
- Using low torque grease

2014 OFSS
- Optimized friction solution seal
- Reduction CO_2 emissions
- Low torque
- Air leak test capable
- Durability increased
- Studying with OEM in Korea
- Minimize fuel consumption

2011 Low friction BPS
- Improve response of shift change
- Prevent clutch wear
- First applied in Korea
- Being applied by Japanese OEM

2010 Sensor module unit
- First applied to EURO5 engine in Korea
- Crankshaft speed and position management
- Simplified to install
- Integration of sensor and trigger wheel
- Improved sensing accuracy

[Research & Development]

Tester list

Material	Durability	Measurement
Rheometer (MDR 2000)	Cold & Hot Temp. Tester	CMM (Contact & Non-contact)
Mooney Viscometer	PSS Tester (Rack & Pinion)	CMM (Non-contact only)
UTM (Tensor Meter)	Rotary Seal Tester (4 stations)	Profile projector
Brittleness Tester	MTS (Material Test System)	Contour measurer
TR Tester	Torque Tester (Friction)	Radial load Tester
Oil Immersion Tester	Valve Stem Seal Tester	Roughness measurer
IRHD (Micro Hardness)	Dust Tester(2 stations)	OD/ID Micrometer
Specific Gravimeter	Manual Shaft Seal Test	Spring Tester
Lab Mixer (3L)	BPS Tester(4 stations)	Roundness tester (RA-1600)
-	Lip Opening Pressure Tester	-

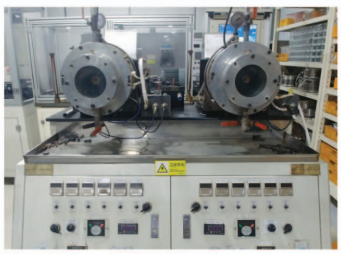
Shaft seal Durability Tester
- Shaft seal durability & oil leak
- Shaft seal oil pumping rate test
- Muddy slurry test

BPS Tester
- Hot & Cold Stroke durability for BPS
- Leak and drag test for BPS

Cold & Hot Temp. Tester
- Test for seal performances at low & high temperature
- Life-time test for seal under various test conditions (Shaft speed, temperature, pressure, and vacuum)

Seal Torque Tester
- Measure torque value of seal when shaft rotates

Hydraulic Vibration Exciter
- Sliding resistance test
- Fine vibrate stroke endurance test
- BPS, D-ring



Dust Durability Tester
- Shaft seal durability & oil leak
- Shaft seal oil pumping rate test
- Muddy slurry test

Power Steering Seal Tester
- Durability and leak performance (Power Steering Seal)

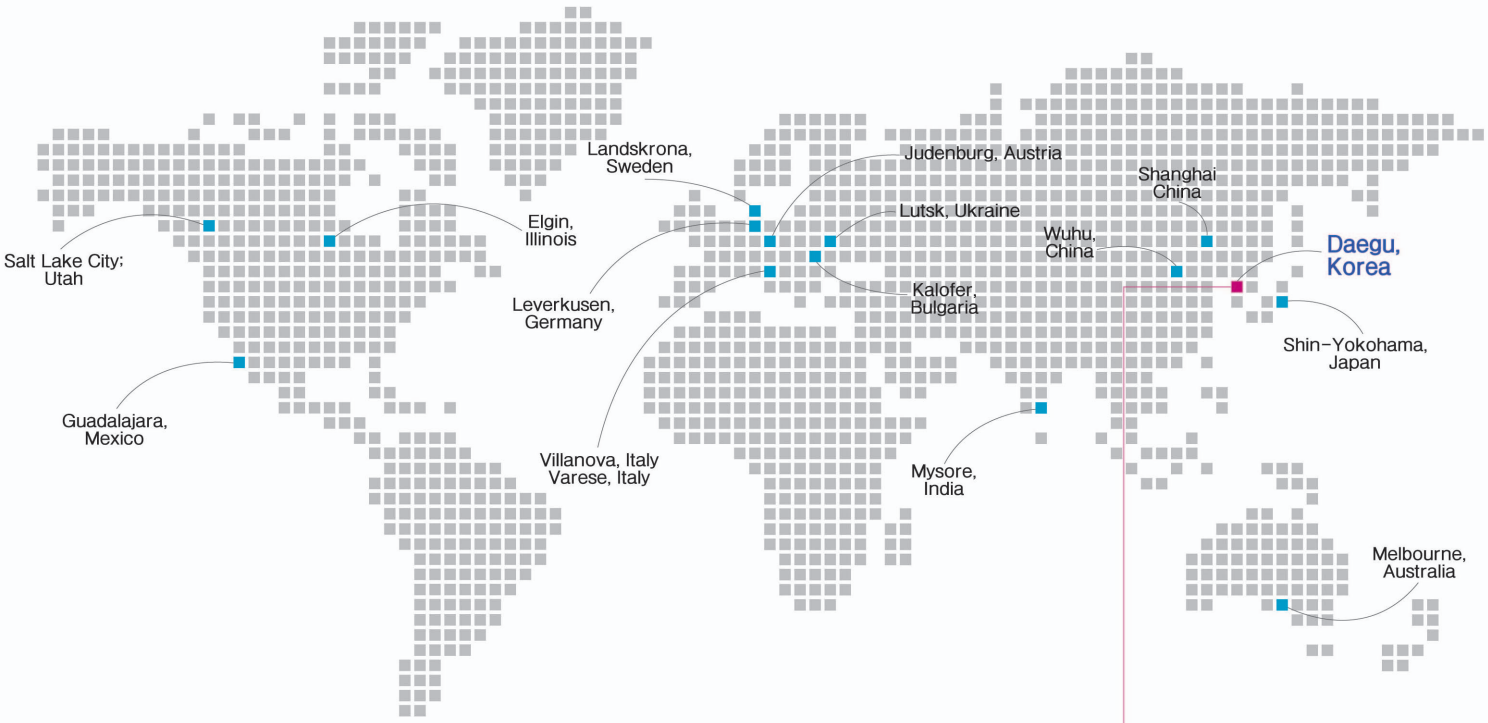
Cold & Hot Temp. Tester
- Test for seal performances at low & high temperature
- For bearing seal

Cold & Hot Temp. Tester
- Test for seal performances at low & high temperature
- For shaft seal (Engine, Transmission)

www.skfkorea.co.kr

SKF Sealing Solutions Korea is the Leading oil seal manufacturer with advanced technology.

SKF Sealing Solutions Global Network



#1 Factory
Head office

#2 Factory

#3 Factory