SKF Cooper split spherical roller bearings

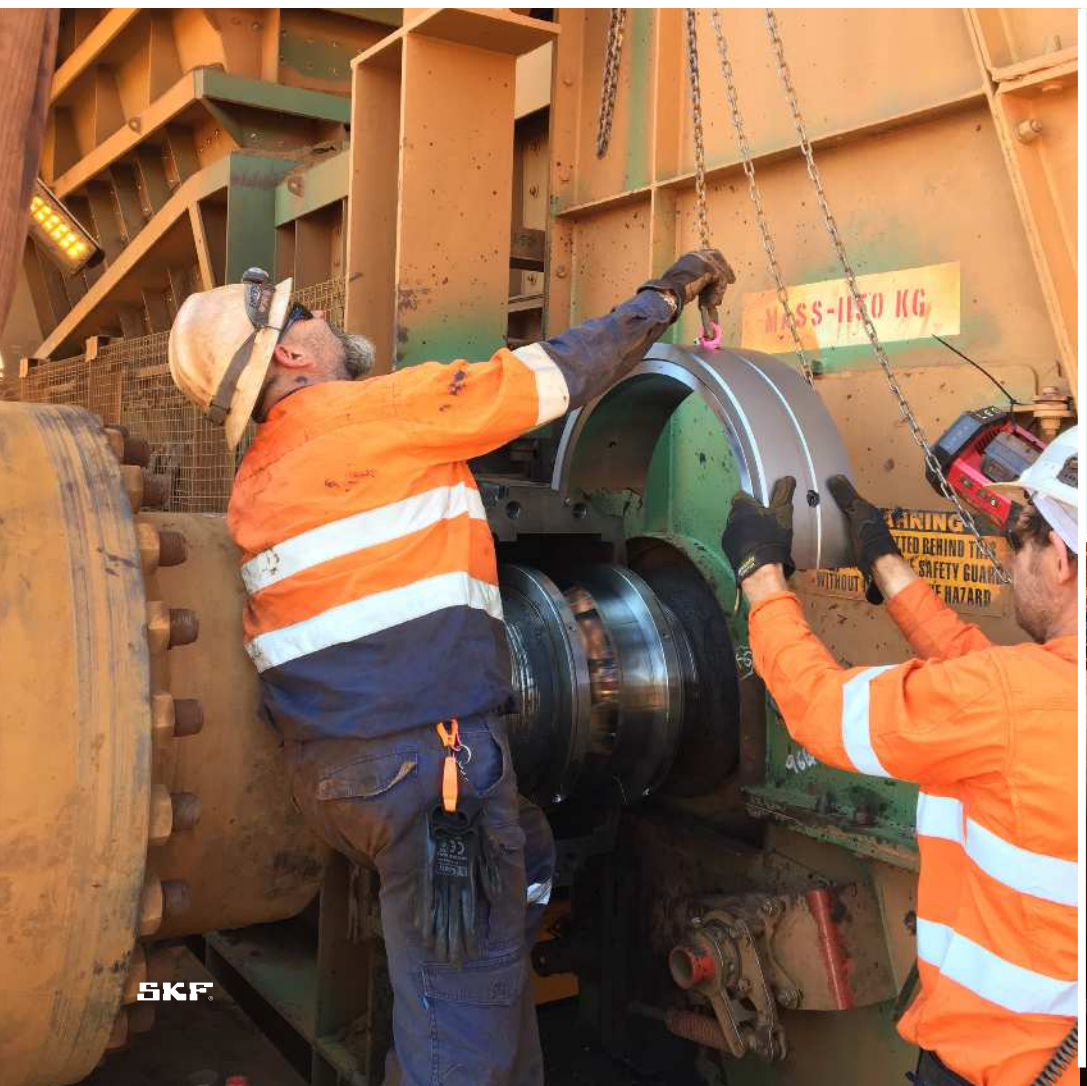
Reduce MTTR for increased productivity – and improve worker safety



Cut downtime to a minimum

For customers looking for bearings designed to be easily replaced in situ with little disturbance to the shaft alignment or driveline, SKF Cooper split spherical roller bearings offer a solution – reducing mean time to repair (MTTR) by 70%.

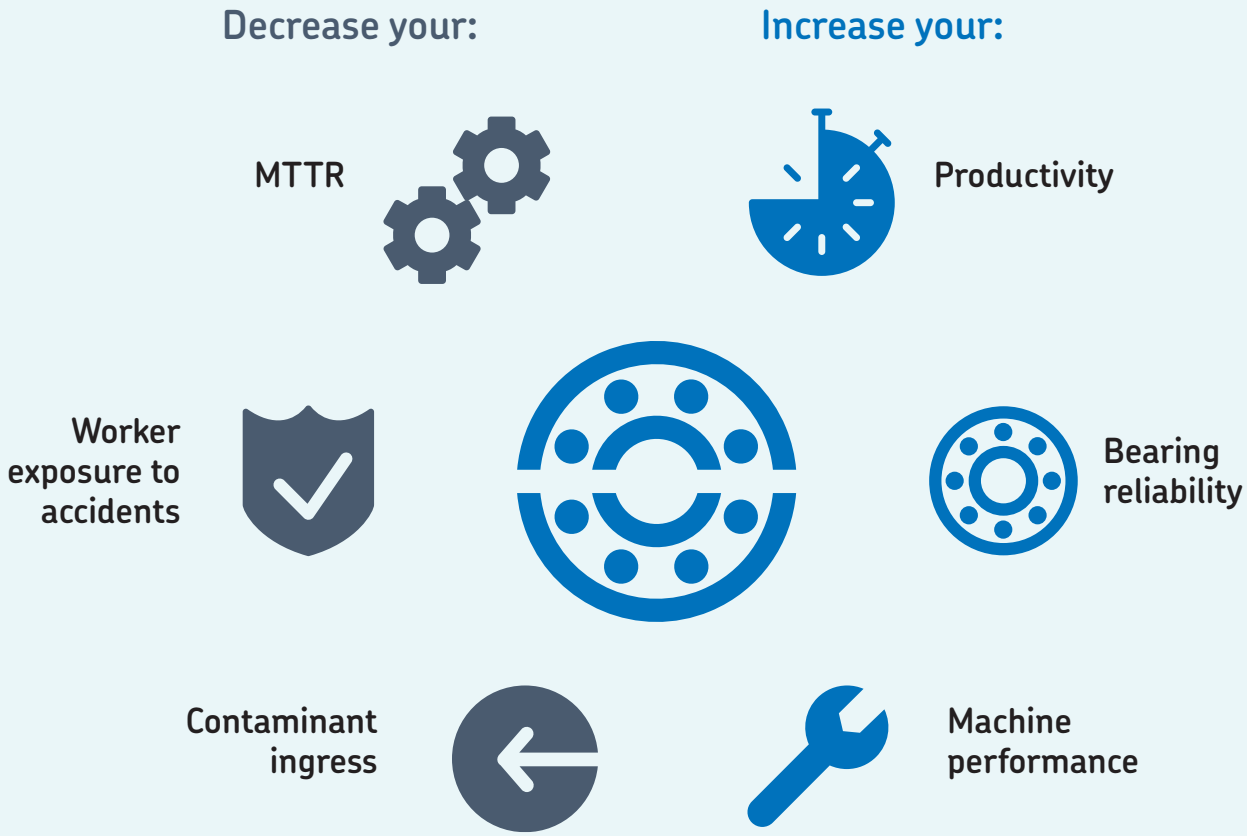
- Allows safer and time-saving in situ bearing replacements in the trapped position on conveyor pulleys, stacker reclaimers and other machinery
- Sealed variant available for increased protection against contamination and reduced maintenance
- Longer service life (MTBF) compared to other split bearings, thanks to the wire cut inner and outer ring manufacturing technique and sealed versions
- Sealed variant reduces grease consumption – and cuts environmental impact
- Compatible with SKF metric and inch split block housings e.g. SNLD, SMS and SAF / SDAF
- Reduced risk of shaft fretting with better axial clamping
- Interchangeable with competitors' split spherical roller bearings and split block housings



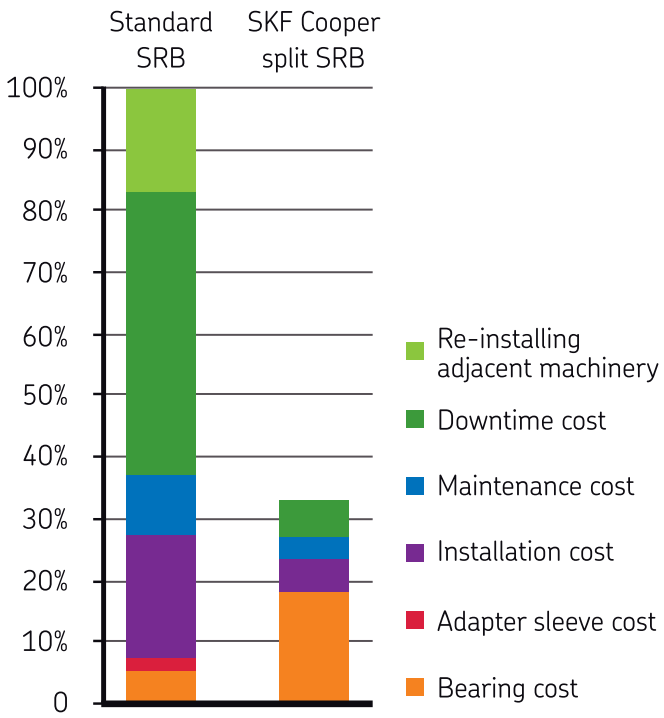
MTTR: FROM 24 HOURS TO 8 HOURS*

* In-field reports of bearing changes for mining customers





Cost savings







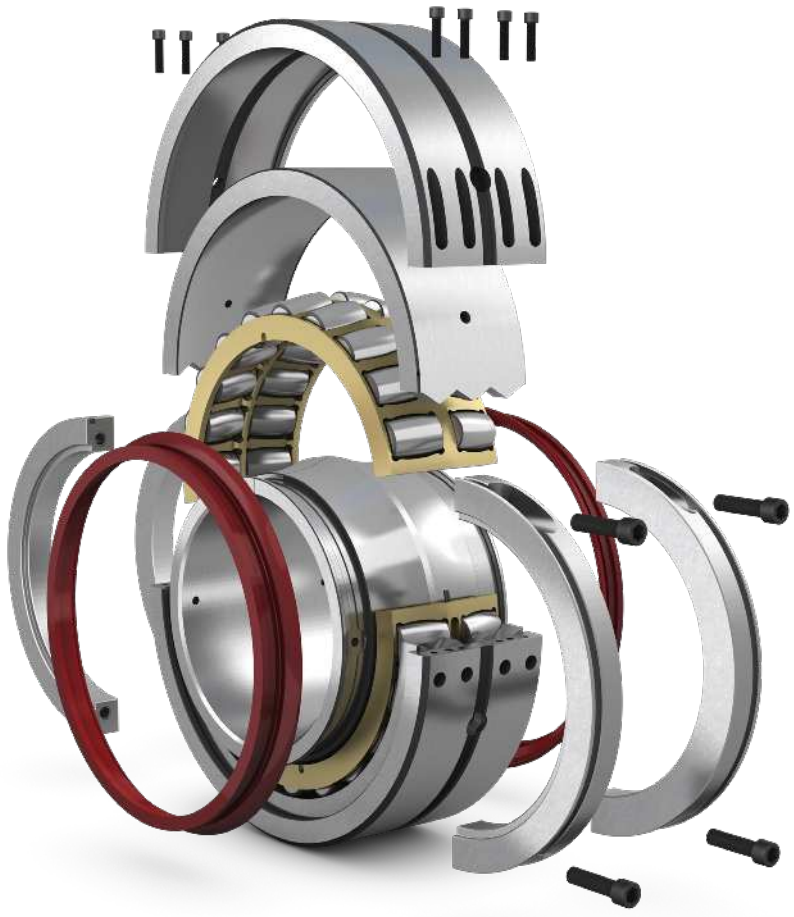
Taking on your biggest challenge

Tough enough for heavy-duty industries

- Mining
- Mineral processing
- Cement

And a wide range of applications

- Conveyor pulleys
- Rope sheaves
- Bucket elevators
- Stackers/reclaimers
- Hoists and winches
- Horizontal grinding mill pinions
- Mixers and agitators
- Jack shafts
- Fans





Boost worker safety

43% of accidents in the mining and cement industry occur while workers perform maintenance or checks on conveyors. With the SKF Cooper split spherical roller bearings there is no need to dismount the drive coupling or the cantilevered drive to replace the bearing thus avoiding realignment. This greatly reduces the safety risk to workers.

Meet your requirements

SKF Cooper split spherical roller bearings are manufactured to ISO Normal precision and running accuracy. The mounted internal radial clearance of the split bearing is slightly more or less than the mounted clearance of a standard (CN) spherical roller bearing mounted on an adapter sleeve. Other bearing internal clearances (e.g. C3) are available upon request.

The SKF Cooper split spherical roller bearing can be used with SKF metric and inch split block housings. The split bearing outer shroud is the same dimension as a standard ISO spherical bearing outer ring.

Minimum load

The requisite minimum load to be applied to spherical roller bearings can be estimated using $P_m = 0{,}01\ C_0$ where:

- P_m = Equivalent minimum load, kN
- C_0 = basic static load rating, kN

Shaft and housing fitting

- Shaft ISO h9 (IT5/2 and surface roughness, Ra = 0,8)
- Housing ISO G7 (IT6/2)

Grease lubrication (grease ordered separately)

Fill the bearing with one of the following recommended SKF greases at assembly:

Ambient conditions

- Normal LGEP 2
- High temperatures (to +120 °C *(+248 °F)*) LGHB 2
- Cold temperatures (to –30 °C *(–22 °F)*) LGWM 2

Alternative Lithium/Lithium Complex NLGI 2 greases with suitable base oil viscosity can be used.

The bearing should be relubricated with grease through its W33 groove according to the following formula: $G_p = 0{,}0015 \times D \times B$ for sealed bearings where:

- G_p = grease quantity, grams
- D = bearing outside diameter, mm
- B = bearing outer ring width, mm

The frequency of the relubrication should be according to the General Catalogue and based on the bearing size, shaft speed, operating temperature, etc.

SKF SYSTEM24 lubricators with SKF LGWA 2 grease can be used to relubricate the bearings.

Oil lubrication

Use ISO VG 220 oil or ISO VG 320 oil as required.

Temperature limits

Bearing components are heat stable up to 120 °C at continuous operation. The seals have a limit of –40 to +90 °C *(–40 °F to +194 °F)*. Check that the bearing is adequately lubricated for normal operating conditions.

Bearing rating life

SKF Cooper uses ISO 281:2007 to calculate the L_{10m} modified rating life of the split spherical roller bearing. The sealed split bearing will have minimum two times longer rating life than the open (unsealed) bearings because of the improved exclusion of contamination.

Bearing equivalent load, P_r

The bearing equivalent dynamic load is calculated the same as a standard (non-split) spherical roller bearing with a dynamic factor, fd. See table.

- $P_r = fd\ (X F_r + Y F_a)$

ISO modified rating life, L_{10mh}

The modified rating life is calculated the same as a standard spherical bearing using the following:

$$L_{10mh} = a_{ISO} \left(\frac{C_r}{P_r} \right)^{\frac{10}{3}} \frac{1000000}{60n}$$

Consult SKF Applications Engineering for assistance.

Permissible axial load

Owing to the steel inner ring clamp ring design, the SKF Cooper split spherical roller bearings have 50–100% higher permissible axial shaft clamp load capability compared to competitor's bearings.

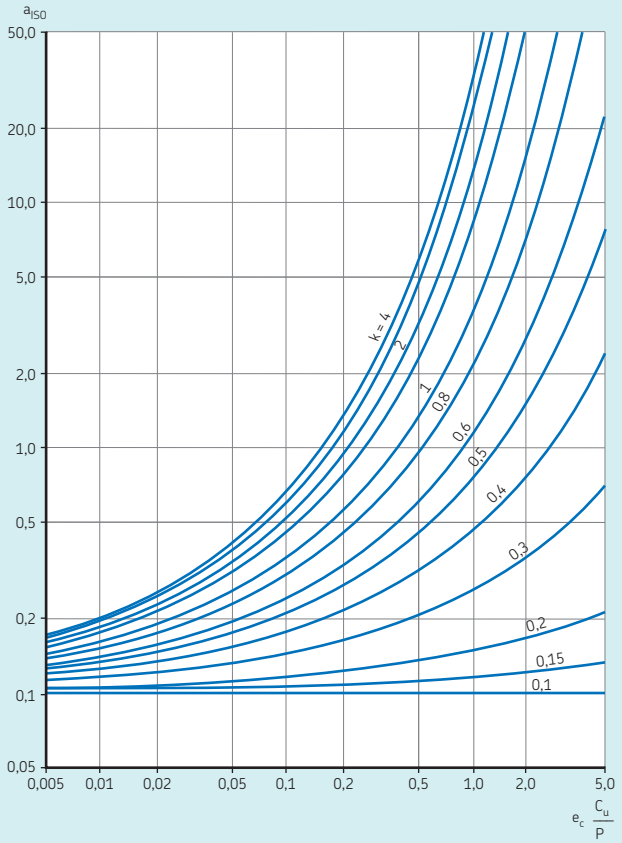
Misalignment

The split spherical roller bearing has a permissible angular misalignment between the inner and outer ring of 2° for bearings with shaft diameter less than 280 mm and 3° for bearings with 280 mm shaft diameter and larger. Sealed bearings have a permissible misalignment of ± 0.5°. This is the same permissible misalignment as the SKF TK taconite seal mounted in the SKF split block housings.

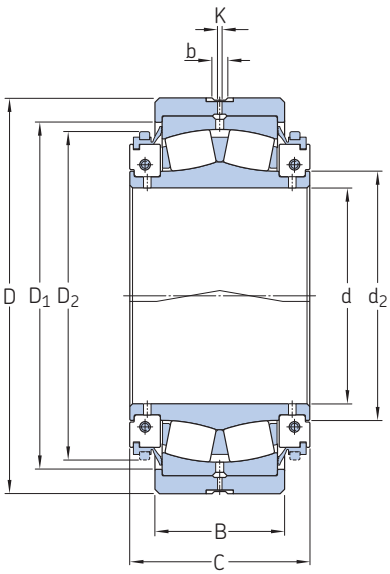
Dynamic factor

The appropriate dynamic factor (fd) may be taken from the chart.

Conditions	fd
Steady load or small fluctuations	1.0 –1.3
Light shock	1.3 – 2.3
Heavy shock, vibration or reciprocation	2.0 – 3.5



Life modification factor, aISO for radial roller bearings based on ISO 281



INSTALLATION

Mount the split spherical bearing according to the instructions provided with the packaging. **Safety is very important. Read all installation instructions carefully before starting work.**

Follow all warnings and precautions and wear proper PPE as required. The requisite minimum tightening torques for the screws are provided in the tables.

Principal dimensions				Dimensions					Basic load ratings dynamic	static	Fatigue load limit	Speed rating Limiting speed		Designations open	sealed
d	D	B	C	d_2	D_1	D_2	b	K	C_r	C_o	C_u	sealed	unsealed		
Shaft diameter															
mm				mm					kN			r/min		–	
240	440	144	200	277	386	365	16	9	1 675	2 885	246	170	510	**231S240M**	**231S240M-2SRS**
260	460	146	200	300	421	396	16	9	2 120	3 705	307	155	455	**231S260M**	**231S260M-2SRS**
280	500	160	220	321	446	422	16	9	2 140	3 805	311	145	455	**231S280M**	**231S280M-2SRS**
300	540	176	230	346	482	452	22	9	2 604	4 670	372	135	410	**231S300M**	**231S300M-2SRS**
320	580	190	254	370	522	482	22	12	3 041	5 530	432	125	385	**231S320M**	**231S320M-2SRS**
340	600	192	262	394	553	508	22	12	3 582	6 560	502	120	340	**231S340M**	**231S340M-2SRS**
360	620	194	262	415	576	534	22	12	3 638	6 710	506	115	340	**231S360M**	**231S360M-2SRS**
380	650	200	274	435	592	552	22	12	3 546	6 555	489	105	340	**231S380M**	**231S380M-2SRS**
400	700	224	292	455	632	575	22	12	3 790	7 075	521	105	320	**231S400M**	**231S400M-2SRS**
410	720	226	292	455	632	575	22	12	3 790	7 075	521	105	320	**231S410M**	**231S410M-2SRS**
430	760	240	306	484	682	628	22	12	4 791	8 990	648	95	295	**231S430M**	**231S430M-2SRS**
450	790	248	310	508	700	643	22	12	4 853	9 260	659	90	290	**231S450M**	**231S450M-2SRS**

Calculation factors					Designations open	sealed
e	Y_1	Y_2	Y_0	Mass		
–				kg	–	
0,3	2,3	3,4	2,2	120	**231S240M**	**231S240M-2SRS**
0,31	2,1	3,3	2,2	131	**231S260M**	**231S260M-2SRS**
0,3	2,3	3,4	2,2	171	**231S280M**	**231S280M-2SRS**
0,3	2,3	3,4	2,2	212	**231S300M**	**231S300M-2SRS**
0,31	2,2	3,3	2,2	272	**231S320M**	**231S320M-2SRS**
0,31	2,2	3,3	2,2	293	**231S340M**	**231S340M-2SRS**
0,3	2,3	3,4	2,2	308	**231S360M**	**231S360M-2SRS**
0,3	2,3	3,4	2,2	344	**231S380M**	**231S380M-2SRS**
0,28	2,4	3,6	2,5	438	**231S400M**	**231S400M-2SRS**
0,28	2,4	3,6	2,5	464	**231S410M**	**231S410M-2SRS**
0,3	2,3	3,4	2,2	564	**231S430M**	**231S430M-2SRS**
0,3	2,3	3,4	2,2	613	**231S450M**	**231S450M-2SRS**

Consult SKF for availability of inch dimension bearings and other series and sizes

skf.com

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