



**ZKL** GROUP

# Bearings for machines and equipment for palm oil processing



# ZKL spherical roller bearings for machines and equipment for palm oil processing

Palm oil is currently the most common and widely traded oil in the world, primarily used in the food industry and cosmetics production. It is obtained by pressing the pulp and kernels of the tropical oil palm fruit. The palm oil processing involves several stages, including sterilization, separation of fruits from kernels, grinding, pressing, and purification. Each step requires specialized machinery that must operate reliably under the extreme conditions of the pressing process.

Bearings are a key component in these machines. However, the demands for smooth and stable operation are challenged by the harsh operating conditions, such as high axial and radial loads, hot steam, water, and dust. At ZKL, we are fully aware of this and provide effective solutions for such demanding applications where high durability and operational reliability are required.

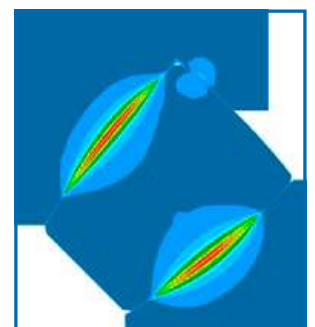
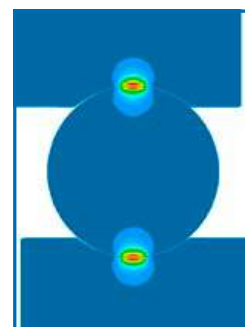
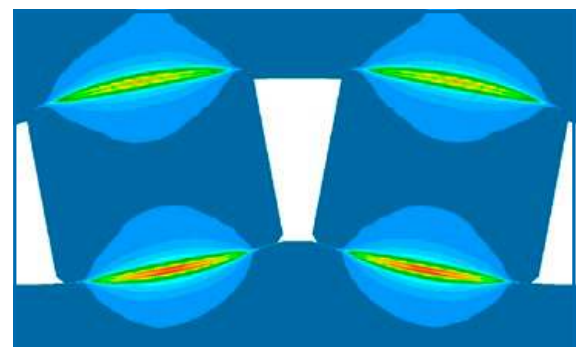


## Our engineering approach

At ZKL, when developing new bearings or enhancing existing ones, we apply the latest techniques and computational analyses. This approach helps reduce the costs associated with physical prototype testing. One of the key methods we use is the Finite Element Method (FEM):

- Optimizing the contact between the raceways of bearing rings and rolling elements
- Reducing contact stress
- Eliminating edge stress under the most challenging load conditions
- Considering related components in specialized projects

The upgraded ZKL New Force series bearings offer an optimal solution, providing ideal internal geometry, superior surface quality, competitive pricing, and high performance.

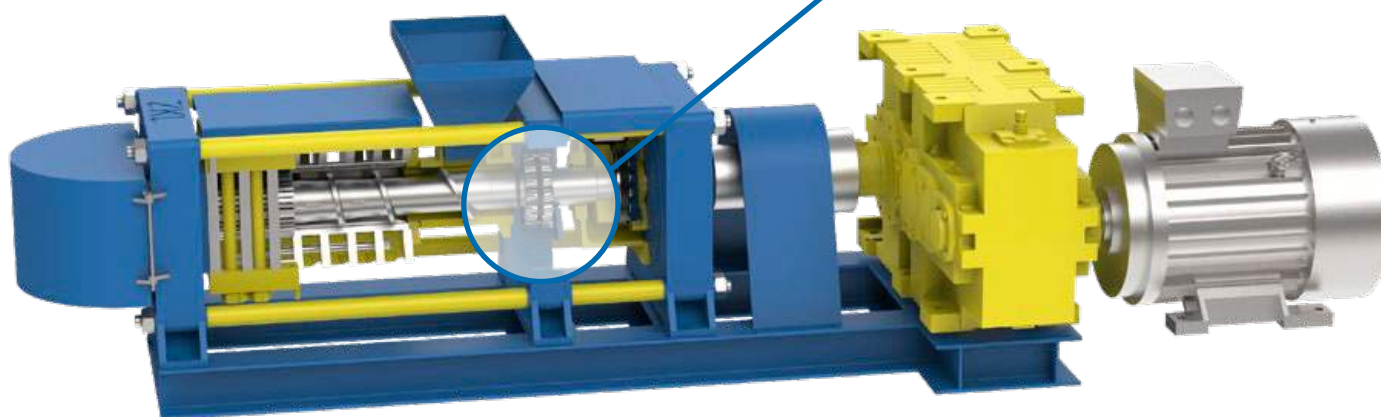




## Spherical roller bearings

Spherical roller bearings are a main component of palm oil processing machines and must withstand the demanding conditions of processing plants. They are designed to handle high radial and axial loads in both directions. Thanks to the spherical shape of the outer ring's raceway, they can compensate for angular misalignments, such as those caused by shaft misalignment. A disadvantage of this type of bearing is the lower maximum speed compared to, for example, cylindrical or tapered roller bearings. Due to these characteristics, spherical roller bearings are an ideal solution for heavy industry, mining, energy, and many other sectors.

ZKL offers a wide range of spherical roller bearings suitable for various applications, such as with steel cages, one-piece or two-piece brass cages, cylindrical bores, tapered bores, and more. ZKL continues to work on the development of spherical roller bearings and the optimization of internal geometry to achieve the highest possible load capacities and reliability. These newly developed bearings are labeled as NEW FORCE and, with their performance parameters, are comparable to premium brands on the market.



ZKL offers an extensive range of spherical roller bearings, with inner diameters ranging from 25 mm to 1,250 mm. The range includes bearings with either steel or brass cages. Tapered bores in the inner ring of the bearing are also available. The manufactured series include 213, 222, 223, 230, 231, 232, 233, 238, 239, 240, and 241.

### EJ+CJ design



### EMH design



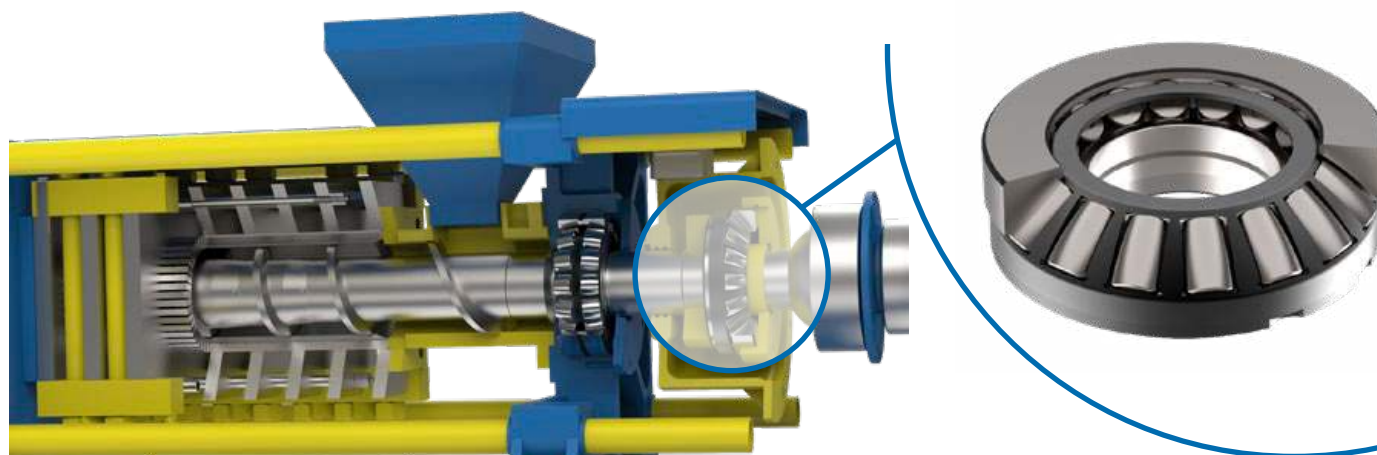
## Examples of ZKL spherical roller bearings for palm oil processing machines

Spherical roller bearings	Bearing dimensions			Bearing parameters		
	Inner diameter	Outer diameter	Width	Dynamic load rating	Static load rating	Mass
	d [mm]	D [mm]	B [mm]	C <sub>r</sub> [kN]	C <sub>or</sub> [kN]	m [kg]
<b>22215EW33J NF</b>	75	130	31	216	255	1,7
<b>22215EW33MH NF</b>	75	130	31	216	255	1,7
<b>22216EW33J NF</b>	80	140	33	246	295	2,1
<b>22216EW33MH NF</b>	80	140	33	246	295	2,1
<b>22217EW33J NF</b>	85	150	36	286	337	2,7
<b>22217EW33MH NF</b>	85	150	36	286	337	2,7
<b>22218EW33J</b>	90	160	40	308	406	3,4
<b>22218EW33MH NF</b>	90	160	40	339	406	3,4
<b>23218CW33J</b>	90	160	52,4	370	522	4,4
<b>22219EW33J NF</b>	95	170	43	381	464	4,2
<b>22219EW33MH NF</b>	95	170	43	381	464	4,1
<b>22220EW33J NF</b>	100	180	46	417	510	5
<b>22220EW33MH NF</b>	100	180	46	417	510	5
<b>23220CW33J</b>	100	180	60,3	465	667	6,6
<b>23220EW33MH NF</b>	100	180	60,3	512	667	6,6
<b>22222EW33J NF</b>	110	200	53	537	653	7,2
<b>22222EW33MH NF</b>	110	200	53	537	653	7,2
<b>23222CW33J</b>	110	200	69,8	586	867	9,5
<b>22224EW33J NF</b>	120	215	58	608	775	9,1
<b>22224EW33MH NF</b>	120	215	58	608	775	9,1
<b>23224CW33J</b>	120	215	76	678	1020	11,6
<b>23224EW33MH NF</b>	120	215	76	750	1020	12,1
<b>22226EW33J NF</b>	130	230	64	708	948	11,3
<b>22226EW33MH NF</b>	130	230	64	708	948	11,6
<b>23226CW33J</b>	130	230	80	753	1180	13,9
<b>23226EW33MH NF</b>	130	230	80	828	1180	14,2
<b>23228CW33J</b>	140	250	88	895	1370	18,4
<b>23228EW33MH NF</b>	140	250	88	985	1370	18,4

Bearings listed above are the most used ones in such application. To get information regarding entire production range of ZKL spherical roller bearings contact your local sales representative or scan the QR code.

## Spherical roller thrust bearings

Spherical roller thrust bearings have been manufactured by the ZKL group since the 1950s. With more than seventy years of tradition and extensive experience, ZKL bearings hold a leading position in the market and are among the



world's elite. The ZKL group is committed to continuously improving this high standard. Through ongoing modernization of the machinery, production accuracy has been enhanced, and the structure and surface integrity of the internal geometry have been improved as part of our innovation efforts. The new generation of bearings is characterized by the NEW FORCE brand, which offers our customers higher reliability, smoother operation, and reduced rolling friction, leading to lower energy consumption.

ZKL offers a comprehensive range of axial spherical roller bearings with a steel cage in the 293 and 294 series. These bearings primarily transmit axial force generated by the screw press in their applications. Their main advantages include high axial load capacity, the ability to handle combined loads and shaft misalignment. These features ensure reliable operation even in the most demanding conditions. ZKL offers versions with both steel and brass cages.

## Examples of ZKL spherical roller thrust bearings for palm oil processing machines

Spherical roller thrust bearings	Bearing dimensions			Bearing parameters		
	Inner diameter	Outer diameter	Width	Dynamic load rating	Static load rating	Mass
	d [mm]	D [mm]	B [mm]	C <sub>a</sub> [kN]	C <sub>oa</sub> [kN]	m [kg]
<b>29317EJ NF</b>	85	150	39	351	1070	2,7
<b>29417EJ NF</b>	85	180	58	680	1770	6,6
<b>29318EJ NF</b>	90	155	39	395	1130	2,9
<b>29418EJ NF</b>	90	190	60	750	1980	7,6
<b>29320EJ</b>	100	170	42	425	1330	3,7
<b>29420EJ NF</b>	100	210	67	910	2450	10,5
<b>29322EJ</b>	110	190	48	572	1780	5,4
<b>29422EJ NF</b>	110	230	73	1080	2960	13,7
<b>29324EJ</b>	120	210	54	637	2080	7,4
<b>29424EJ NF</b>	120	250	78	1240	3550	17,2
<b>29326EJ</b>	130	225	58	768	2620	9,1
<b>29426EJ NF</b>	130	270	85	1470	4100	21,7
<b>29328EJ</b>	140	240	60	837	2840	10,5
<b>29428EJ</b>	140	280	85	1520	4360	22,9

Bearings listed above are the most used ones in such application. To get information regarding entire production range of ZKL spherical roller thrust bearings contact your local sales representative or scan the QR code.

### EJ design



### EM design

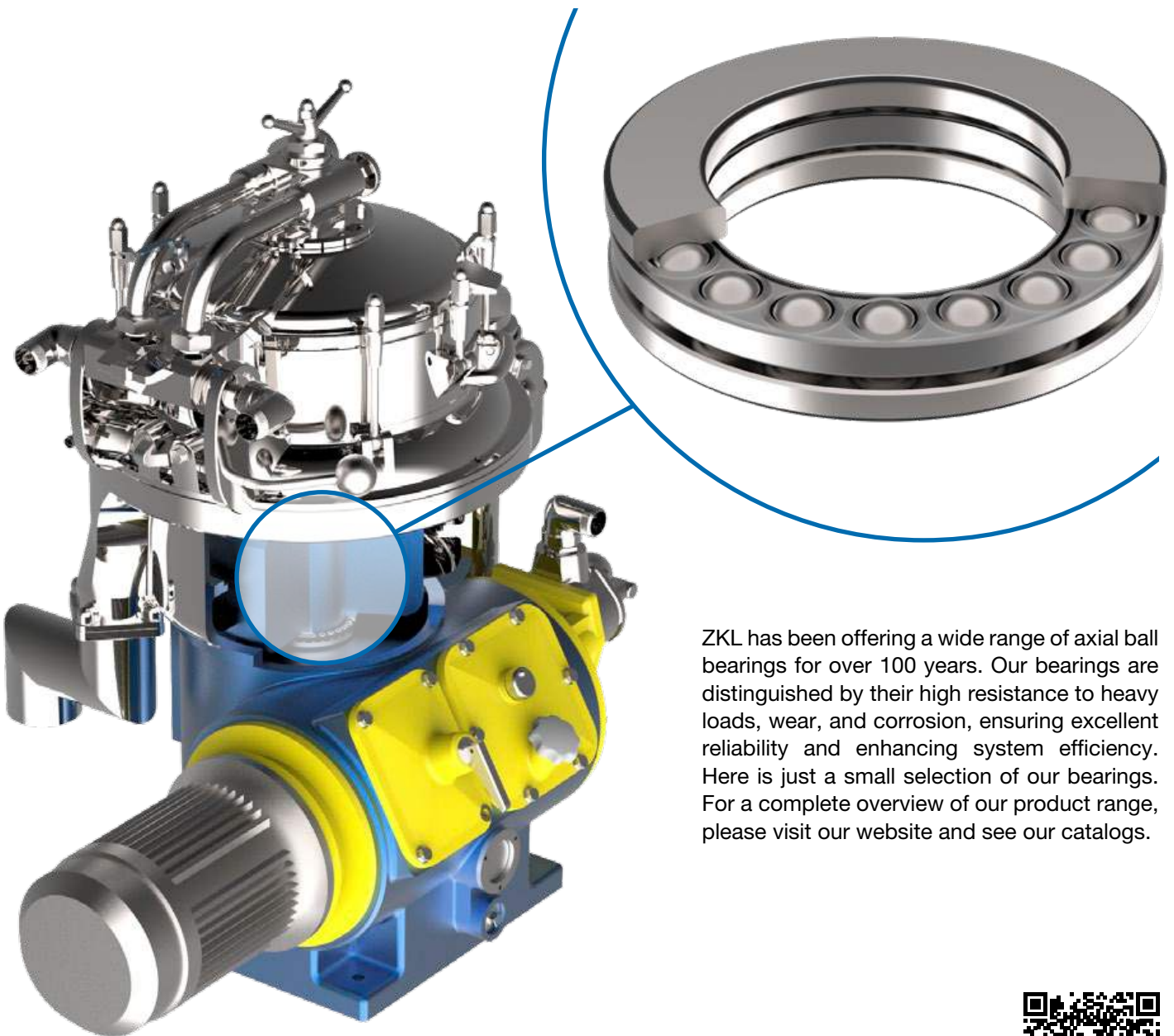






## ZKL thrust ball bearings for machines and equipment for palm oil processing

Thrust ball bearings are specifically designed to transmit axial loads. There are two main types of thrust bearings: single-direction and double-direction. Single-direction bearings can handle loads in one direction, while double-direction bearings can handle loads in both directions. This ability to transmit axial force is particularly useful in machines that process palm oil. These bearings are installed in screw presses, where they provide support and stabilization to the screw mechanism during pressing, as oil is extracted from the fruit pulp. They must withstand the high axial forces exerted during the pressing process, ensuring smooth and uninterrupted oil production. Additionally, they are used in clarification tanks and separators. After the oil is extracted in the press, the crude palm oil is contaminated with water and solid particles that need to be removed. This process is carried out using mixers and centrifugal force, which separate the oil from water and impurities. High speeds and effective continuous centrifugation are crucial for properly separating the oil from the water and pulp residues, directly impacting the quality of the final product.



ZKL has been offering a wide range of axial ball bearings for over 100 years. Our bearings are distinguished by their high resistance to heavy loads, wear, and corrosion, ensuring excellent reliability and enhancing system efficiency. Here is just a small selection of our bearings. For a complete overview of our product range, please visit our website and see our catalogs.



## Examples of ZKL thrust ball bearings for palm oil processing machines

Thrust ball bearings	Bearing dimensions			Bearing parameters		
	Inner diameter	Outer diameter	Width	Dynamic load rating	Static load rating	Mass
	d [mm]	D [mm]	B [mm]	C <sub>a</sub> [kN]	C <sub>oa</sub> [kN]	m [kg]
<b>51112A NF</b>	60	85	17	46,4	113	0,29
<b>51114A NF</b>	70	95	18	46,6	127	0,35
<b>51116A NF</b>	80	105	19	50	141	0,42
<b>51118A NF</b>	90	120	22	66,9	190	0,66
<b>51120A NF</b>	100	135	25	95,3	268	0,97
<b>51122A NF</b>	110	145	25	97,8	288	1,1
<b>51124 NF</b>	120	155	25	95,1	308	1,1
<b>51232 NF</b>	160	225	51	289	874	6,2
<b>51236 NF</b>	180	250	56	325	1030	8,3

Bearings listed above are the most used ones in such application. To get information regarding entire production range of ZKL thrust ball bearings contact your local sales representative or scan the QR code.

## About us

We are a leading global manufacturer of technologically advanced bearings. Since 1921, **ZKL** has been a trusted name in the design and manufacture of high-quality bearings, delivering innovative solutions to industries worldwide. We specialize in providing cutting-edge bearings for leading companies in sectors such as **energy**, **transportation**, and a wide range of **industrial applications**.


As a proud **Czech company**, our global reach extends far beyond our roots. With production facilities in the **Czech Republic (Europe)** and a presence in over **70 countries** across **Europe**, **America**, **Asia**, and **Africa**, ZKL products are built to meet the rigorous demands of modern industries.

Our bearings are recognized for their **reliability**, **durability**, and **precision**, ensuring smooth and efficient operations for businesses. **ZKL** is committed to helping the world move forward with confidence.




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