

VIBRATING SCREEN



IKL recommendations to increase the life of bearings







Purpose:

Grade aggregate into different sizes

Method:

- Angled screen is vibrated which causes the material to travel across the surface
- Screens of varying mesh grade aggregate to the require size



Classification of Mechanical Screens



Inclined screens

- Have a circular action
- Use a two-bearing single shaft unit and four bearing single shaft unit
- Typically stationary screens

Horizontal screens

- Have a reciprocation action
- Use multiple shafts, two bearings per shaft
- Typically portable screens











Problems encountered in vibrating screens:

- High radial and impact loads
- High rotational speeds
- High temperatures
- Severe misalignment

Type of bearings:

Spherical roller bearings series 23 (Type 223xx)

Major damage to the bearings

- Braking of the cage
- Fretting / Fretting Corrosion
- Abrasive Wear And Debris Denting





Damage



CORROSION



FRETTING, FRETTING CORROSION, FRICTION OXIDATION



ABRASIVE WEAR



LUBE FAILURE





The most common types of bearing damages are often caused by:

- Improper design and quality of the bearing
- bearing steel
- Cage
- Radial internal clearance of the bearing
- Tolerance class of bore and outer diameter of the bearing
- Insufficient maintenance practices
- Improper installation and adjustment practices
- Inadequate lubrication





IKL PROPOSAL for bearings for vibratory applications



Bearing designation:

- 223xx W33 MAC3(C4)
- 223xx W33MA P6ARx-x
- W33: Lubrication Groove and Oil Holes in Outer Ring
- MA: Outer ring guided machined brass cage for
- C3(C4): Clearance classes
- P6A: Reduced O.D. and bore tolerances
- Rx-x: Radial Clearance Range in Microns, 2/3 of C4









P6ARx-x Specification

STANDARD			P6ARx-x		
Bearing:	23332 W33AMC4	23332	23332 W33AMP6AR240-280		
0.D.	340.000 / 339.958P6A	33	339.986 / 339.971		
Housing bore	339.910 / 339.946		339.910 / 339.946		
Fit	0.012 T / 0.090 T		0.025 T / 0.0076 T		
Bearing bore	160.000 / 159.974		160.000 / 159.986		
Shaft diameter	159.943 / 159.961	P6A	159.947 / 159.959		
Fit	0.013 L / 0.057 L		0.027 L/0.053 L		
Clear. bef. mounting : 0.220 / 0.280 2		2/3 of C4	0.240/0.280		
Clear. after mounting : 0.144 / 0.269			0.173/0.256		

Unit:mm

KL







- Single shaft two bearing, double shaft four bearing and triple shaft – six bearing should use:
 - **P6 (tight fit) on the housing**
 - ↗ f4 (loose fit) on the shaft
- Single shaft four bearings should use:
 7 H7 (loose fit) on the housing
 7 m6 (tight fit) on the shaft
 - P6 (tight fit) on the housing
 - ↗ f4 (loose fit) on the shaft

main bearings

eccentric bearings



Interchange Table

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IKL.	TIMKEN	SKF old references	FAG	NTN
22308W33MAP6AR85-100 22309W33MAP6AR85-100 22310W33MAP6AR85-100 22311W33MAP6AR100-120 22312W33MAP6AR100-120	22308VCFW33C4 22309VCFW33C4 22310VCFW33C4 22311VMW33W800C4 22312VMW33W800C4	452308 CAC M2/M/502 452309 CAC M2/M/502 452310 CAC M2/M/502 452311 CAC M2/M/502 452312 CAC M2/M/502	22308ESJPAT41A 22309ESJPAT41A 22310EASMAT41A 22311EASMAT41A 22312EASMAT41A	22308CVS2 22309CVS2 22310CVS2 22311BVS2 22312BVS2
22313W33MAP6AR100-120 22314W33MAP6AR120-145 22315W33MAP6AR120-145 22316W33MAP6AR120-145 22316W33MAP6AR120-145 22317W33MAP6AR150-180	22313YMW33W800C4 22314YMW33W800C4 22315YMW33W800C4 22315YMW33W800C4 22316YMW33W800C4 22317YMW33W800C4	452313CACM2/W502 452314CACM2/W502 452315CACM2/W502 452315CACM2/W502 452315CACM2/W502 452317CACM2/W502	22313EASMAT41A 22314EASMAT41A 22315EASMAT41A 22316EASMAT41A 22317EASMAT41A	22313BVS2 22314UAVS2A 22315UAVS2A 22315UAVS2A 22315UAVS2A 22317UAVS2A
22318W/33MAP6AR150-180 22319W/33MAP6AR150-180 22320W/33MAP6AR150-180 22322W/33MAP6AR150-180 22322W/33MAP6AR180-210 22324W/33MAP6AR180-210	22318YMW33W800C4 22319YMW33W800C4 22320YMW33W800C4 22322YMW33W800C4 22322YMW33W800C4 22324YMW33W800C4	452318CACM2/N/502 452319CACM2/N/502 452320CACM2/N/502 452322CACM2/N/502 452324CACM2/N/502	22318EASMAT41A 22319EASMAT41A 22320EASMAT41A 22322EASMAT41A 22324EASMAT41A	22318UAVS2A 22319UAVS2A 22320UAVS2A 22322UAVS2A 22322UAVS2A 22324UAVS2A
22326\W33MAP6AR205-240 22328\W33MAP6AR205-240 22330\W33MAP6AR240-280 22332\W33MAP6AR240-280 22334\W33MAP6AR240-280 22334\W33MAP6AR160-310	22326YMW33W800C4 22328YMW33W800C4 22330YMW33W800C4 22332YMW33W800C4 22332YMW33W800C4 22334YMW33W800C4	452328 CAC M2/W502 452328 CAC M2/W502 452330 CAC M2/W502 452332 CAC M2/W502 452332 CAC M2/W502 452334 CAC M2/W502	22326EASMAT41A 22328EASMAT41A 22330EASMAT41A 22332AMAT41A 22332AMAT41A	22326UAVS2A 22328UAVS2A 22330UAVS2A 22332UAVS2A 22332UAVS2A 22334UAVS2A
22336W33MAP6AR260-310 22338W33MAP6AR285-340 22340W33MAP6AR285-340	22335YMW33W80004 22338YMW33W80004 22340YMW33W80004	452336 CAC M2/W502 452338 CAC M2/W502 452340 CAC M2/W502	22336AMAT41A 22338AMAT41A 22340AMAT41A	22336UAVS2A 22338UAVS2A 22340UAVS2A

Recommendations for Bearing Grease



Main functions of the Lubrication:

- Reduce friction and wear
- Transfer heat from the working surfaces
- Protect the bearing from corrosion and contamination

Necessary information for choosing the grease:

- Load
- Rotation speed
- temperature on the housing
- Rotation speed
- Environment (temperature, contamination, humidity, etc.)



Recommendations for Bearing Grease



Main Characteristics of Bearing Grease for Vibratory Screens

- Thickener Lithium soap
- Base Oil mineral oil
- Base oil kinematic viscosity at 40 °C from 130 to 200 mm2/s
- Worked penetration class NLGI 2 or 3
- EP additives
- Water resistance





Experience with application of bearings 223xxW33MAC3 (C4) in vibratory screens in India has shown bearing life extension with more than 40% compared with the bearings with different cage design such as 223xx M, 223xx MB, 223xx C, 223xx CA, 223xx CC, etc.

