WITH DAS LAGER GERMANY BETTER ENERGY EFFICIENCY

GREENER FUTURE

Reduced CO^2 Emissions

Reduced Fuel Consumption

We Need a Low Carbon Future:

Turbocharger Ball Bearing Unit cuts fuel consumption and CO2 emissions significantly (following the New European Driving Cycle, NEDC and Worldwide harmonized Light vehicles Test Procedures, WLTP).

Energy Saving

Das Lager Germany high precision, double-row ball bearing units that provide better energy efficiency than conventional plain bearings used in turbocharger designs. Das Lager Germany design can reduce friction by more than 50%.

Performans

The unit is designed to operate at speeds up to 300 000 r/min and withstand temperatures over 300 °C during hot shut down.

Improved Operational Accuracy

Advanced technologies and materials such as special steel, ceramic balls, optimised oil flow to the bearing and reinforced cage design, help the unit resist high temperatures and speed, ultimately extending the life of the turbocharger.

DAS LAGER® GERMANY

TURBOCHARGER BEARINGS

Type	Dimensions					Load Rating		Limiting Speed	Weight
	d	D	B	r (smin)	r (s1min)	Cr	Cor		
	mm					KN		r/min	kg
6304ADMA	20	52	15	1,1	1,1	15,9	7,9	46000	0,16
6305ADMA	25	62	17	1,1	1,1	21,7	11,3	37000	0,25
6306ADMA	30	72	19	1,1	1,1	27,6	15,6	30000	0,39
6308ADMA	40	90	23	1,5	1,5	41,1	24,3	24000	0,70
7304ADLA	20	52	15	1,1	0,6	18,2	10,2	46000	0,16
7305ADLA	25	62	17	1,1	0,6	25,2	15,2	37000	0,25
7306ADLA	30	72	19	1,1	0,6	32,4	20,8	30000	0,38
7308ADLA	40	90	23	1,5	1,0	47,4	32,3	24000	0,65
7309ADLA	45	100	25	1,5	1,0	59,6	41,1	18500	0,88
7311ADLA	55	120	29	2,0	1,0	80,8	58,5	15000	1,45
7315ADLA	75	160	37	2,1	1,1	128,0	102,0	12000	3,30
7320ADLA	100	215	47	3,0	1,1	195,0	185,0	10000	7,80
N304ADMP	20	52	15	1,1	0,6	28,0	22,1	46000	0,15
N305ADMP	25	62	17	1,1	1,1	37,3	31,5	37000	0,24
N306ADMP	30	72	19	1,1	1,1	47,3	41,5	30000	0,36
N308ADMP	40	90	23	1,5	1,5	73,2	67,5	24000	0,64
N309ADMP	45	100	25	1,5	1,5	91,8	86,6	18500	0,88
N311ADMP	55	120	29	2,0	2,0	129,0	126,0	15000	1,45
N315ADMP	75	160	37	2,1	2,1	224,0	231,0	12000	3,30
N320ADMP	100	215	47	3,0	3,0	363,0	391,0	10000	7,55
QJ304ADLA	20	52	15	1,1	1,1	24,8	19,8	46000	0,18
QJ305ADLA	25	62	17	1,1	1,1	36,3	31,5	37000	0,28
QJ306ADLA	30	72	19	1,1	1,1	48,4	41,0	30000	0,44
QJ308ADLA	40	90	23	1,5	1,5	71,4	63,3	24000	0,78
QJ309ADLA	45	100	25	1,5	1,5	90,5	79,8	18500	1,04
QJ311ADLA	55	120	29	2,0	2,0	119,0	108,0	15000	1,76
QJ315ADLA	75	160	37	2,1	2,1	191,0	195,0	12000	3,96
QJ320ADLA	100	215	47	3,0	3,0	301,0	352,0	10000	9,04

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Insured

Your production and vehicle are under warranty with our insured products.

DAS LAGER® GERMANY

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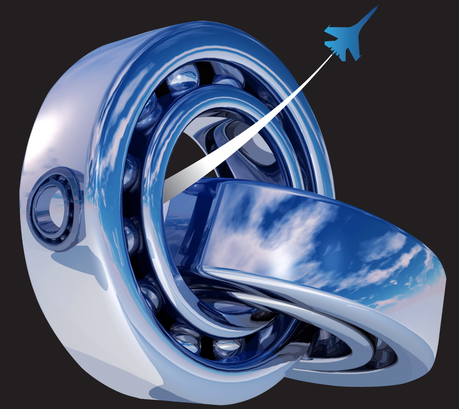
TURBOCHARGER

BEARINGS SYSTEMS



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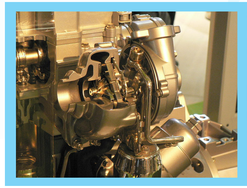
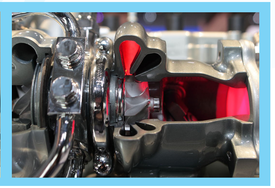
“Turbocharger Bearings Systems are one of most critical component of the turbocharger but it’s often overlooked. A properly designed bearing system can mean the difference between a turbocharger design that operates efficiently and effectively over the life of the engine and one that is plagued by durability problems.”

Design Considerations

Turbocharger bearings systems are often overlooked but critical component of the turbocharger. A properly designed bearing system can spell the difference between a turbocharger design that operates efficiently and effectively over the life of the engine and one that is plagued by durability problems. Turbocharger bearing systems are the face of increased pressure to reduce engine fuel consumption and emissions. Newer engines often demand higher turbocharger efficiencies that in many cases, can be partially achieved by reducing losses due to the bearing system.





The turbocharger bearing system must be tolerant:

High Thrust Loading
High boost pressure acting on the compressor wheel can create significant thrust loads.

Oil Contaminants
Longer engine oil change intervals and higher loading due to engine emission controls can lead to oil contamination that can corrode bearing surfaces.

Oil Supply Delay
Low ambient temperature and long oil feed pipescan increase the time it takes for lubricating oil to reach the turbocharger upon engine start-up. It can lead to potential problems with bearing system wear.

Hot Shutdown
Continuous operation at high exhaust temperature followed immediately by an engine shutdown without idle can cause localized overheating and cooking of the oil in the bearing housing and subsequent damage to bearing surfaces.

Modern commercial turbocharger bearing systems can be split into two principal types hydrodynamic journal bearing systems and ball bearing systems. Hybrid systems are also possible that combine journal and ball bearings.

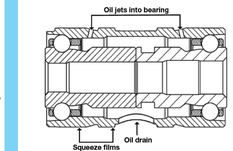
Advantages of ball rolling element bearing turbochargers over the conventional oil film turbocharger bearing systems originate from the fundamental change in the friction mechanism present in the system. Multiple rolling elements replace a thin oil film under high-shear conditions, significantly reducing system friction. When compared to plain (journal) bearings, the DAS LAGER GERMANY Turbocharger Ball Bearing design can reduce friction by more than 50%. Significant benefits are noticeable especially at cold start. This does not only improves turbo efficiency, but also has a positive impact on transient response and engine performance.

Turbocharger Bearings:

The turbocharger shaft and turbine wheel assembly rotates at speeds up to 300,000 rpm. Turbocharger life should correspond to that of the engine, which could be 1,000,000 km for a commercial vehicle. The bearing system can be designed for optimal performance, life expectancy, reduction of friction and materials sensitivity. Turbochargers must operate in extreme temperatures. We have already considered cold starts with regard to friction reduction and should now explore the hot running requirements.Only specially produced bearings can work DAS LAGER GERMANY offer specially designed and produced bearing solutions.

Das Lager Hybrid Bearing Solution:

DAS LAGER GERMANY ball bearings for turbocharger are of the angular contact type. Typically, these bearings take advantages of ceramic balls, cages, anti-rotation devices, an outer ring, a compressor side inner ring, a turbine side inner ring and a series of oil duct features for lubrication, cooling and for supplying the squeeze film damper.



Roller Bearings

Roller contact bearings are very advantages regarding frictional losses. They generate less frictional loss compared to a conventional floating ring journal bearing. These types of bearings are especially useful running at low speed, which results in increased idle speed and faster temporary response. Roller bearing still due to durability issues at high turbocharger speeds and high roller bearings costs, roller bearings are not used in small mass-produced turbochargers.

DAS LAGER®
GERMANY

TURBOCHARGER BEARINGS

Operational Features

- High grade steel
- Super precision ceramic balls
- Single, rigid unit
- Super precision quality
- Compact design with integrated
- Customized anti-rotation

Operational Benefits

- Increased turbo power density for downsizing
- Improved temporary response
- Good cold startup performance
- Single unit simplifies mounting
- Improved reliability and durability
- Improved operating accuracy
- Excellent temperature resistance

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