

A close-up, high-contrast photograph of industrial gears. The gears are made of a dark, polished metal, possibly steel or bronze, and are arranged in a series of concentric circles. The lighting is warm and directional, coming from the upper right, which creates bright highlights on the teeth of the gears and deep shadows in the recesses. The background is blurred, showing more gears and a warm, orange glow, suggesting a factory or industrial setting.

Rokolub[®] AD series

Ashless antiwear additives

General information

Rokolub® AD series is an aryl phosphate ester-based, ashless AW/EP additive for lubricants and functional fluids, providing significant anti-wear and mild extreme pressure performance. Its unique ability to form an efficient lubricating layer on metal surfaces assures good surface protection in various equipment.

Rokolub® AD additives are particularly effective in both mixed-film and the boundary lubrication, where an extremely thin lubricating film is required. Moreover, due to the fact this product range is considered to be an ashless additive, it prevents the valves and hydraulics from getting clogged up and forming sludges.

Key applications

- Industrial gear oils
- Compressor oils
- Hydraulic fluids
- Turbine oils
- Greases
- Metalworking fluids
- Lubricants used at high temperature

Typical properties

Product name	Chemical name	Appearance	Acid number	Water content	Kinematic viscosity (at 40°C)	Density (at 20°C)	Phosphorous content
		visual method	in-house method	ISO 760	ISO 3104	ISO 2811	based on composition (GC-MS analysis)
		—	mgKOH/g	% w/w	mm ² /s	g/cm ³	% w/w
Rokolub® AD 122	phenol isopropylated phenyl phosphate	transparent, colourless to slightly yellow liquid	< 0.1	< 0.1	22	1.20	8.5
Rokolub® AD 132			< 0.1	< 0.1	32	1.12	7.9
Rokolub® AD 232	tert-butylphenyl phenyl phosphate	transparent, colourless to slightly yellow liquid	< 0.1	< 0.1	32	1.16	8.3
Rokolub® AD 246			< 0.1	< 0.1	46	1.15	8.0
Rokolub® AD 246 plus			< 0.1	< 0.1	46	1.14	7.9
Rokolub® AD 246 ultra	tert-butylphenyl phenyl phosphate	transparent, colourless to slightly yellow liquid	< 0.1	< 0.1	46	1.15	7.8
Rokolub® AD 268			< 0.1	< 0.1	68	1.13	7.5
Rokolub® AD 268 LTPP	tert-butylphenyl phenyl phosphate	transparent, colourless to slightly yellow liquid	< 0.1	< 0.1	68	1.14	7.8
Rokolub® AD 290 LTPP			< 0.1	< 0.1	90	1.12	7.4

Features & Benefits

Our developments are created with a high regard for the environment, health, and safety. We are fully committed to producing innovative additives requiring neither labels nor classification in accordance with Globally Harmonized System. In compliance with these objectives, Rokolub® AD 246 ultra, Rokolub® AD 268, Rokolub® AD 268 LTPP and Rokolub® AD 290 LTPP which provide great anti-wear performance and meet non-hazard criteria, were formulated.

Main Features

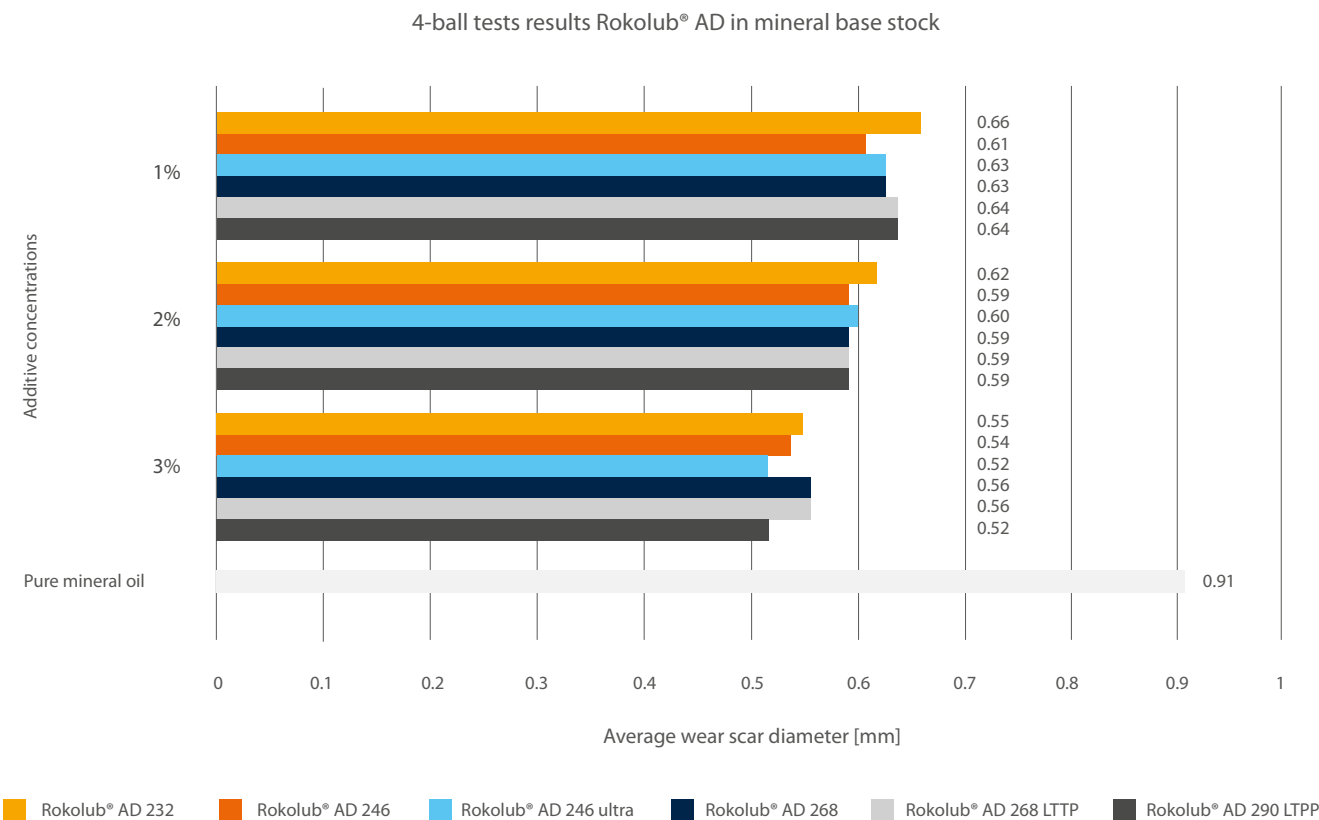
- Ashless
- Low threat level
- Superior lubricity
- Great anti-wear performance
- Mild extreme-pressure performance
- Soluble in a wide range of base stocks
- Compatible with most other types of additives
- Improved environmental & human health hazard statements

Product name	Product profile	
Rokolub® AD 122	balanced influence on environment & human health	
Rokolub® AD 132		
Rokolub® AD 232		
Rokolub® AD 246	balanced environmental impact and negligible influence on human health	
Rokolub® AD 246 plus		
Rokolub® AD 246 ultra	negligible influence on environment & human health	(no GHS class.)
Rokolub® AD 268		
Rokolub® AD 268 LTPP		
Rokolub® AD 290 LTPP		



Antiwear Performance

Four-ball test results for Rokolub® AD additives used in mineral base stock oil



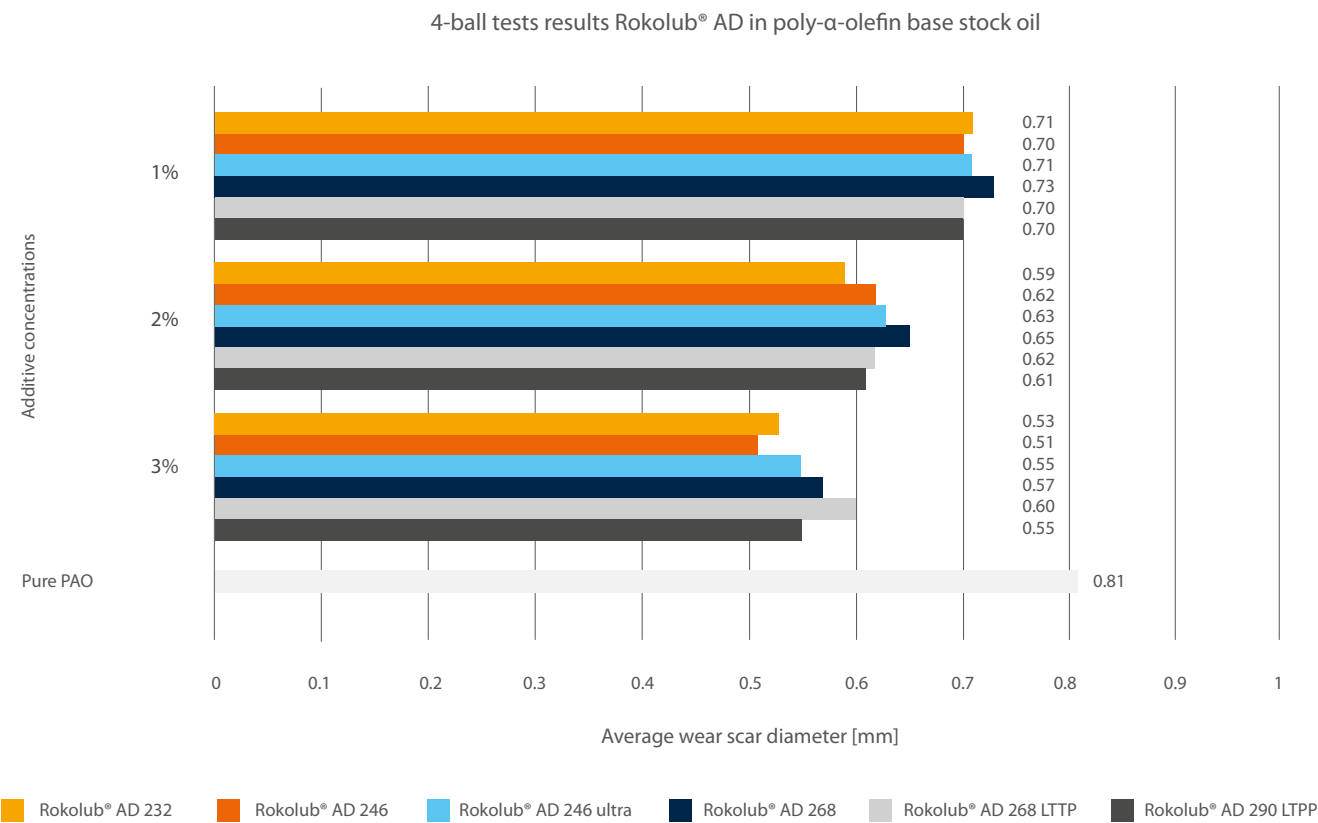
Applications

Product name	General Industrial				
	Gear oils	Turbine fluids	Hydraulic fluids	Compressor oils	Greases
Rokolub® AD 122	●	●	●	●	○
Rokolub® AD 132	●	●	●	●	○
Rokolub® AD 232	●	●	●	●	○
Rokolub® AD 246	●	●	●	●	○
Rokolub® AD 246 plus	●	●	●	●	○
Rokolub® AD 246 ultra	●	●	●	●	○
Rokolub® AD 268	●	●	●	●	○
Rokolub® AD 268 LTPP	●	●	●	●	○
Rokolub® AD 290 LTPP	●	●	●	●	○

- highly recommended use
- optional use

Antiwear Performance

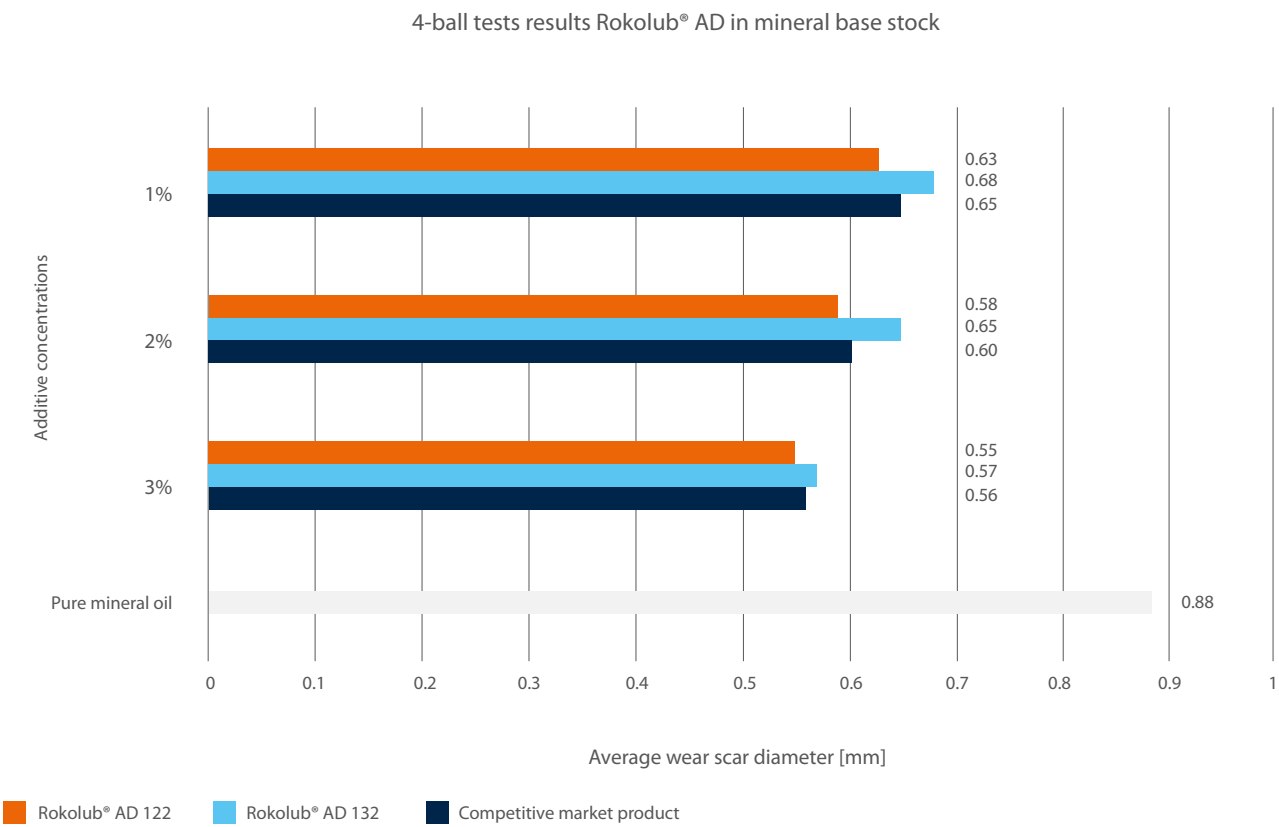
Four-ball test results for Rokolub® AD additives used in poly-α-olefin base stock oil



Power Generation		Aviation		Metalworking	
Turbine fluids	Hydraulic fluids	Turbine fluids	Hydraulic fluids	Cooling lubricants	Neat cutting oils
●	●	○	○	●	●
●	●	○	○	●	●
●	●	○	○	●	●
●	●	○	○	●	●
●	●	○	○	●	●
●	●	○	○	●	●
●	●	○	○	●	●
●	●	○	○	●	●
●	●	○	○	●	●

Antiwear Performance

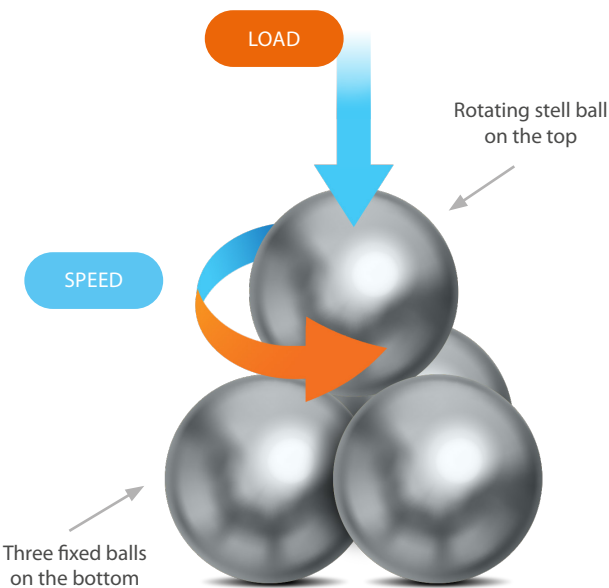
Four-ball test results for Rokolub® AD additives used in mineral base stock oil



Four-ball test

The four-ball test is a widely used method to evaluate both anti-wear and extreme pressure efficiency of lubricants. Metal surface of three balls is exposed on test conditions determined in the standards. Surface damages are evaluated and marked as a test results. The size of the scar on steel balls shows the ability of the lubricant to prevent wear and under heavy load weld point can be determined.

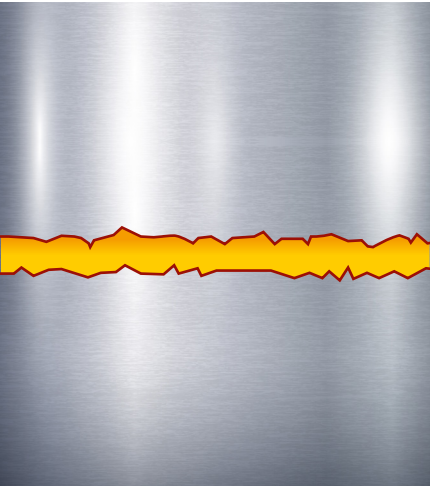
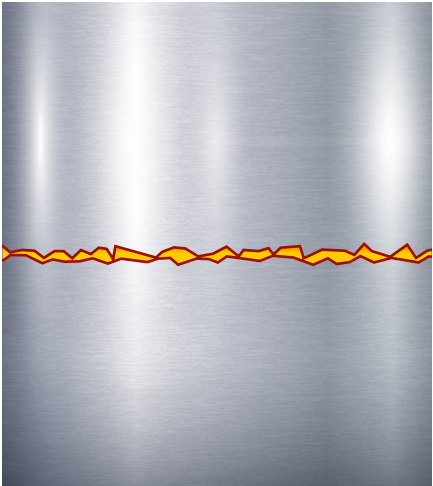
In this catalogue test result refers to standard ASTM D4172, method B. Applied conditions: temperature 75°C, duration 60 min, load 40 kg (392 N).



Metal surface interactions

As it is widely known lubricants create a film thickness to separate two metal surfaces. However, operating under high loads with low-speed result in the mixed-film and boundary lubricating regimes. Such events may cause partially wearing surfaces, or even lubricating film breakdown, if applied base lubricant is not sufficient formulated to working conditions. Anti-wear/extreme

pressure additive are used to create additional thin layer on metal to strengthen its protection. Thanks to these additives a **chemically bonded lubricating** film is created on metal surfaces. In practice, that film features significantly better strength and that is the best opportunity for reducing friction and wear under severe conditions.

full-film lubrication	mixed-film lubrication	boundary lubrication
peaks and valleys share load equally	majority of loads rest on surface peaks	more than 90% loads rest on surface peaks
		



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The information in the catalogue is believed to be accurate and compiled to the best of our knowledge; however, it should be considered as introductory only. Detailed information about our products is available in TDS and MSDS.

The suggestions for product applications are based on our best knowledge.

The responsibility for the use of products in conformity or otherwise with the suggested application, and for determining product suitability for the user's own purposes rests with the user.

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