



Customer Success Story

We pioneer motion

An impressive bearing lubricant

Increased operation time, savings of more than 200,000 euros

A major peruvian copper producer uses high-quality grease in the high-pressure grinding rolls (HPGR) of an open-pit mine over the andes. Laboratory analyses which were conducted in the old crushing plant have shown that the Arcanol LOAD1000 grease not only has a higher load capacity but is also more productive than the competitor greases used to date, enabling the copper producer to economize on several tons of grease every year while making a simultaneous and sustainable contribution to the environment.

Increased operating life: Additional 1,000 hours thanks to the use of high-performance lubricant Schaeffler Arcanol LOAD1000

The solution impressed with

- Increased grease service and bearing life
- Customized lubricant: perfectly designed for high bearing loads
- Best suited for working conditions involving a high degree of contamination and shock loads

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Customer

Copper producer, Peru

Sector

Mining & Processing

Application

High-pressure grinding rolls (HPGR)

Solution

Bearing lubricant

SCHAEFFLER

What our customer does ...

Challenge

The customer has expanded the concentrator plant from 120,000 to 360,000 metric tons per day, providing an additional annual copper and molybdenum production of around 600 million pounds and 15 million pounds, respectively. In fact, since 2018, the customer has had the capacity to mine up to 409,500 tons of ore per day with its concentrator plant, thus exposing the crushers and mills to higher loads and placing the bearings under strain.

Special HPGR mills are also used in addition to primary and secondary crushers for the comminution process. The grinding tools comprise two counter-rotating rollers, between which the grinding stock is crushed. One roller is designed as a fixed roller, the other as a floating roller. Strong pressure forces are effective during the grinding process. This pressure, combined with shock loads and contaminants, places the bearings in the rollers under considerable strain. For this reason, particular emphasis is placed on lubricating the bearings correctly. As the use of three different brands of lubricating grease were leading to significant fluctuations in the roller mills performance, the challenge involved deciding on an optimal grease solution that would improve the overall efficiency of the machine. The locally authorized Schaeffler distributor BC Bearing Peru was selected as the lubricating grease supplier for the HPGR bearings during a tendering process.



Arequipa plant facilities, Peru



Arequipa plant facilities, Peru



High-pressure grinding rolls (HPGR)

Technical data of the high-pressure rolls mills (HPGR)

Type	Model: PM8-24/17M
Pressure	250 megapascal (MPa)
Flow rate	2,000 tonnes/h
Grinding material	Grains up to 60 mm
Lubrication	Lubrication grease
Cylinder diameter	2,400 mm
Cylinder width	1,650 mm
Grinding power	17,000 kW
Max. motor output	2 x 2,800 kW

What Schaeffler is offering ...

Solution

The Arcanol LOAD1000 performance grease was used in two high-pressure grinding rolls for a year. Grease samples were taken every month by the copper manufacturer.

All the individual results were documented and discussed in detail between the customer's maintenance personnel and Schaeffler engineers. The various tests, analyses, and comparisons with competitor greases succeeded in convincing the customer's maintenance management personnel of the quality of the Arcanol LOAD1000 grease. Schaeffler's expert, holistic advice on the optimal tribological interaction between rolling bearings and rolling lubricant also scored highly with the copper producer.

Ultimately, Arcanol LOAD1000 emerged victorious among all the greases compared, precisely because the performance grease lasts up to 1,000 hours longer than the competitor greases tested, despite being used under harsh ambient conditions (see calculation on the following page).

What's special

The customer was extremely satisfied with the holistic solutions and technical support provided by Schaeffler on site. For this reason, the copper producer is using Arcanol LOAD1000 high-quality grease in a total of 12 high-pressure grinding rolls. Good to know: Schaeffler offers an extensive range of rolling bearing lubricants with optimized application features - from multi-purpose greases to special lubricants.



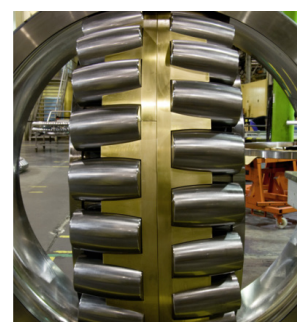
arcanol LOAD1000 Bearing Grease

Information on the high-performance grease Arcanol LOAD1000

Worked penetration / 0,1 mm	265-295
Drop point	≥ 180
Copper corrosion after 24h/120°C (T2 cooper, 100°C/24h)	≤ 2
Base oil viscosity 40°C	1000 mm ² /s
Base oil viscosity 100 °C	38 mm ² /s
Water resistance (79 °C, 1 h)	≤1-90 %
Corrosion protection (Emcor)	≤ 0 / 0
FE8 (536050,7.5/80-RT)	≤ 35 mg
FE9 bearing lifetime (A/1500/6000-140°C, L50)	≥ 150 h
Maximum speed (roller bearing)	200,000 mm/min.



Maintenance work on the HPGR



Ready to install: huge spherical roller bearings with a brass cage, an outer diameter of 1,420 mm, and weight of over three tonnes.

What our customer saves ...

Savings due to reduced annual HPGR maintenance expenses

HPGR repair costs	€ 25,424
Downtime between HPGR replacement	36 h
Replacement of HPGR bearings	€ 169,492
Production losses	€ 91,525
Total expenses due to HPGR repair (Bearings & production losses)	€ 286,477
Assumption of annual repair costs	6
Annual expenses of HPGR replacement	€ 1,718,860
Savings of HPGR maintenance expenses due to increased bearing life time of 10%	€ 171,886

* All 12 HPGR in operation

** Mean value considering lubricant performance trials on HPGRs from Concentrator 1 noting that bearing lifetime increase occurred using grease Arcanol Load1000 (Considering HPGR lifetime only depends of bearing wear (not of stud wear, operating conditions, ore law)

*** Considering 12 HPGRs are operating during all year

Savings due to less grease consumption

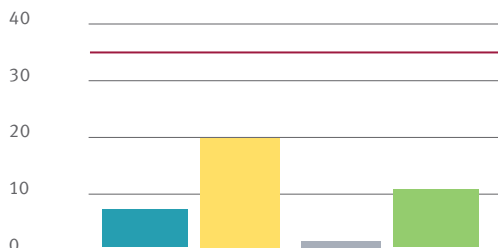
Monthly* grease consumption	17 drums x 180 kg
Annual grease consumption	204 drums x 180 kg
Increased bearing lifetime due to better lubricant performance**	10%
Savings in grease consumption due to better lubricant performance	20,4 drums x 180 kg
Annual savings due to less grease consumption***	€ 30,600

€ 202,486

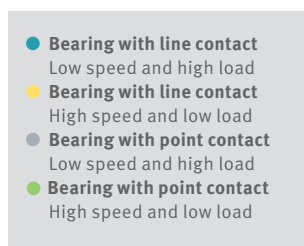
Total annual savings for 12 HPGR due to reduced maintenance expenses & lubricants savings by using Arcanol LOAD1000

10%

Increased bearing lifetime due to better performance of lubricant Schaeffler Arcanol LOAD1000



FE8 test rig results: Arcanol LOAD1000/ wear in mg



— Maximum wear 35 mg (Schaeffler specification)

Arcanol LOAD1000 has excellent wear properties for various bearing types and application conditions.

Customer

The copper producer is based in Arequipa (Peru). Almost 5,000 employees worldwide are directly or indirectly involved in the preparation and processing of copper and molybdenum concentrations and copper cathodes. The company generated revenue of 6.8 million euros in 2019.



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