QUALITY LUBRICATES.

Anderol® 465 in sintered bearings
The type of lubricant that is used in a sintered bearing has a direct impact on the lifespan of the bearing and how well it works in its application. A Chinese powder metallurgy parts manufacturer succeeds by switching to Anderol® 465.
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Anderol®

QUALITY WORKS.

LANXESS
Energizing Chemistry

SINTERED BEARINGS

CASE STUDY

Sintered or self-lubricating bearings

Unlike non-porous bearings which require lubricating oil to be applied during operation, the oil-impregnated sintered bearing is always well-lubricated. The lubricating oil is contained inside the porous bearing material.

With a pore volume of between 15 and 30 percent, the pores inside the sintered bearing are used as an oil reservoir for the bearing's entire service life so that friction never becomes a concern.

During operation, the oil reservoir inside the bearing produces a permanent lubricating film on the sliding surface and enables the lubricant to circulate in the bearing.

Applications

Oil-impregnated sintered sliding bearings are a fundamental element in many different machineries. They can be used in a variety of smaller electric motors and household actuators, in the consumer goods industry, automotive applications and in general mechanical engineering applications.

Typical automotive applications include bearings for windshield wipers, window mechanisms, seat adjusters, sunroofs and fan motors.

Sintered bearings are also found in many general household appliances, such as microwaves, air fryers and juicers, as well as office equipment, electric drills and fishing reels.

Manufacturing process

The process to create oil-impregnated sintered bearings is called powder metallurgy. Firstly metal powder (typically iron, copper, tin or bronze) is mixed with powder additives; the next step is the forming or shaping of the bearings, followed by sintering; and lastly the oil is impregnated. The pressure inside the oil impregnation tank is reduced to the atmospheric pressure or lower so that the oil is easily infused into the product.

Selecting the right lubricant

The type of lubricating oil impregnated into the bearing is selected based on the bearing load, the sliding speed, and the bearing temperature. Poor lubricating oil can cause seizures, abnormal wear, noise, and shorten the life expectancy of the bearing.

For the standard bearing operating temperature range (0 to 80°C), mineral-based lubricating oil can be used. If the operating temperature range is expected to be higher or lower than this range, a synthetic-based lubricating oil suitable for the application temperature is selected. Ester based lubricants have excellent wetting properties, load carrying and greater material consistency compared to mineral oils.

Bearing life and the importance of lubricating oil

The life of the oil-impregnated sintered bearing is determined by the rate of consumption of the lubricating oil infused into the bearing. Once 40 percent of the oil has been consumed, bearing wear begins to accelerate and performance deteriorates accordingly. Therefore, once the residual lubricating oil drops to 60 percent, the bearing is generally regarded as having reached the end of its service life. In addition, the lubricating oil is adversely affected by high temperature, and the maximum allowable temperature is generally considered to be 80°C for mineral oils and 130°C for synthetic oils.

Using a synthetic lubricating oil, the oil-impregnated sintered bearing can be used for a longer period of time, has superior durability at high temperatures and low noise levels.

ANDEROL® 465

SUCCESS STORY

The situation

A Chinese powder metallurgy parts manufacturer produces mainly copper, iron and copper-iron based oil-impregnated sintered bearings, typically used in motors for small home appliances, such as microwaves, air fryers and juicers.

Price and noise are the main considerations of the customers of these sintered bearings. Therefore, in order to reduce costs, an ISO 68 mineral hydraulic oil was used for impregnating the bearings.

Some customers complained of excessive noise, slow startup at low temperatures, inability to withstand high temperatures and an inadequate service life.

The solution

The customer switched to Anderol® 465 – an ISO 68 synthetic di-ester based lubricant that is formulated to offer extended lubrication over a wide temperature range, resist gumming and speed fluctuations and to minimize wear. Anderol® 465 has excellent oxidation resistance, reduces friction, good load carrying, excellent corrosion and rust protection, and the nominal operating temperature range is between -35°C to 130°C (-35° F to 270° F). Anderol® 465 is suitable as an impregnating fluid for sintered metal bearings.

The result

The previous product was an ISO 68 hydraulic oil. Tests were carried out at 130 degrees Celsius and the results as follows:

- Poor high temperature performance (oil loss within less than one hour)
- Service life of approximately 300 hours
- The noise reached more than 70db and the bearing was badly worn.

The customer was recommended Anderol® 465 as a replacement oil. Tests were carried out at 130 degrees Celsius and the results were as follows:

- Excellent high temperature performance
- Service life of more than 1000 hours
- The noise level was significantly reduced

Comparison table

	ISO 68 hydraulic lubricant	Anderol® 465
Time, oil loss at 130°C	<1 hr	~3 hrs
Bearing service life	~300 hrs	>1000 hrs
Noise level	>70db	<60db

Anderol BV
Groot Egtenrayseweg 23
5928 PA Venlo
The Netherlands

www.anderol.com
info@anderol.com
+31 (0)77 396 0340

North America
+1 833 LANXESS
customer.care@lanxess.com

South & Central America
+55 19 3522 5083
atendimento.cliente@lanxess.com

Asia Pacific
+86 21 6109 6666
Orders.apac@lanxess.com