

WHITEPAPER



# POLYURETHANE MATERIAL FOR APPLICATIONS AROUND THE GLOBE

NEW POLYURETHANE GENERATION 94 AU 30000  
MAKES LONGER OPERATING TIMES UNDER EXTREME CONDITIONS POSSIBLE

FREUDENBERG  
SEALING TECHNOLOGIES

 **FREUDENBERG**  
INNOVATING TOGETHER

# NEW POLYURETHANE GENERATION FOR MOBILE MACHINERY

## NEW HIGH-PERFORMANCE MATERIAL IS VERSATILE AND INCREASES OPERATING LIFE AND RESISTANCE TO WEAR

### Initial Situation

Hydraulic systems in mobile machinery often operate under extreme temperatures around the world. Seals made of appropriate materials are incorporated to guarantee a reliable function, whatever the conditions. The characteristics of a low-temperature seal differ from those of a seal devised specifically for use in the tropics.

But even seals adapted to these requirements wear out simply due to extreme temperature swings and inadequate maintenance. Difficulties also arise due to operators of mobile machinery increasingly turning to leased equipment in the heavy-duty segment. This not only means much longer operating times per year, but also the maximum capacity of the equipment is more frequently exceeded as well. The results are malfunctions, delays in the completion of projects, and high follow-up costs.

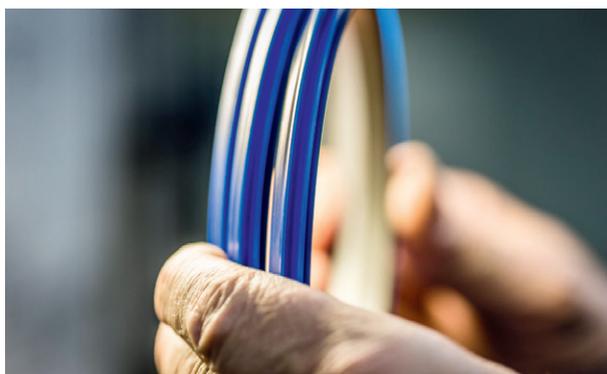
As a result, new materials are in demand that meet more stringent requirements and make longer operating times possible, increasing availability. Manufacturers of mobile machinery also expect more universal sealing solutions. They are expected to cover a broader range of applications than they have in the past, reducing the warehousing of different kinds of seals.

### The Freudenberg Solution

More than 40 years ago, Freudenberg introduced a material made of polyurethane for high-performance seals, setting new standards in the process. Today, with the 94 AU 30000 polyurethane generation, it has succeeded in developing and manufacturing a new, outstanding basic material for seals. The company's core competencies include the development of its own materials.

Designed for a broader range of applications, the new 94 AU 30000 material displays a much longer operating life as well as greater resistance to water and the impact of moisture than a standard PU seal. It even functions reliably at a temperature of 120 °C (248 °F). This was achieved with the targeted modification of precisely the PU components that are responsible for temperature characteristics – without compromising the remaining features. Key parameters such as hardness and tensile strength are thus comparable to Freudenberg's proven polyurethane materials.

The visco-elastic behavior of the new material has been fine-tuned so that the flexibility of the soft segments persist despite wide temperature ranges. That means that seals made of the new polyurethane generation are still sufficiently flexible at low temperatures and satisfactorily stable at high temperatures. In this way, they expand the options for use in pressure and temperature ranges that have only been feasible with special seals until now.

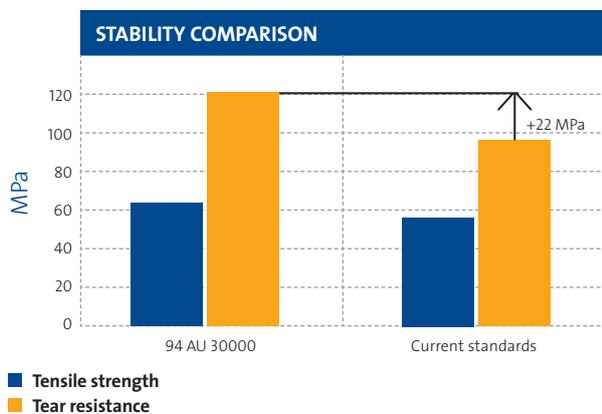


**New Polyurethane Generation Expands the Boundaries of Use**

Polyurethane 94 AU 30000 is superior to all standard, commercial polyurethanes. In comparison tests under extreme conditions, seals made of the new material show no appreciable sign of wear while conventional seals fail prematurely. Its tear resistance of 120 MPa, which is important for wear performance, is approximately 30% higher than that of comparable polyurethanes.

Other outstanding features include applications in mineral hydraulic fluids up to 120 °C (248 °F) and high resistance to hydrolysis even in hot water, at temperatures as high as 80 °C (176 °F). In this way, the new seals fulfill their designated functions over a much longer timeframe than the current standard solutions and thus increase the equipment’s availability for use.

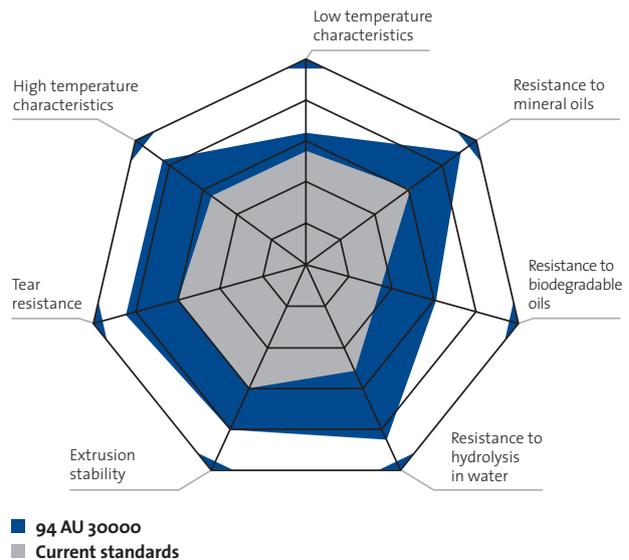
In addition, extrusion stability, that is, resistance to damage from high pressures, has been greatly improved. This ensures that damage from spike pressures in heavy-duty equipment is avoided. It also adds to the operating life of the seals. Due to the cited characteristics, the new polyurethane generation achieves much better results than other materials available on the market to date, based on all the relevant criteria.



Extrusion tests in the Freudenberg Sealing Technologies materials lab demonstrate 94 AU 30000’s greatly improved tear resistance

**FACTS AND BENEFITS AT A GLANCE**

- Ability to withstand stress
  - High extrusion stability allows operating pressures up to 50 MPa
  - High tear resistance boosts operating life and resistance to wear
  - Stability in temperatures from -35 to +120 °C
  - Outstandingly suited to mineral and biodegradable hydraulic fluids
- Versatility
  - Mobile machinery (agricultural/construction equipment, material-handling technology)
  - General hydraulic applications for use around the world



Benefits of the new polyurethane material 94 AU 30000 (in blue) compared to current standards (in gray)

Editorial Information

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**The Specialist in the Processing Industry**

The technology specialist Freudenberg Sealing Technologies is a supplier, development and service partner for customers from a variety of market segments, such as the automotive industry, civil aviation, mechanical engineering and shipbuilding, food processing and pharmaceuticals, or the agricultural and construction machinery industry. On the basis of the Simmerring developed by Freudenberg in 1929, Freudenberg Sealing Technologies now has a broad and continuously customer-oriented product portfolio of seals. Based on detailed process knowledge, innovative development methods and selected materials, the range includes both customized individual solutions as well as complete seal packages.

Together with its partners NOK Corporation, Japan, USA, Sigma Freudenberg NOK, India, and NOK-Freudenberg Group China, Freudenberg Sealing Technologies forms a global network which aims to supply its customers all over the world with products of the same high quality.

Freudenberg Sealing Technologies Process Seals is the sealing specialist for demanding applications in the food, beverage, chemical and pharmaceutical industries.