HYDRAULIC ACCUMULATORS
FOR E-MOBILITY SOLUTIONS
OUTSTANDING TECHNOLOGICAL EXPERTISE

With its unique portfolio of products and services, Freudenberg Sealing Technologies is one of the world’s leading specialists in the sealing and accumulator field. Its expertise in materials and technology was built up over decades, and it is a proven supplier and an innovative development and service partner to a wide range of industries.

It has always assigned special importance to the auto industry. Aside from conventional combustion engines, its focus is increasingly on advanced powertrain concepts relating to electric mobility and fuel cells. Freudenberg Sealing Technologies has always combined market-specific know-how with unique expertise in materials, technologies and development, in order to create innovative products and services.

In the automotive industry, Freudenberg Sealing Technologies is the leading producer of accumulators as well as seals, combining high performance with efficiency and lightweight construction. Developed specifically for the customer and the application, hydraulic accumulators provide energy for state of the art automated manual transmissions, dual clutch transmissions and start-stop systems.

BENEFITS

Freudenberg Sealing Technologies stands for:

• more than six decades of experience with accumulator technology
• a complete range of hydraulic accumulators from a single source: piston, diaphragm and bladder accumulators, in all the right materials and configurations for stationary, mobile and automotive applications.
• in-house material and seal development, which means that unmatched expertise in sealing and hydraulic accumulators is concentrated under one roof.
• for seals and diaphragms that are optimized for the particular application
• for accumulators with high operating reliability and long service lives
• for energy efficiency, harmonious gear changes, good driving dynamics and comfort within the automobile

MORE DRIVING COMFORT IN BATTERY-ELECTRIC VEHICLES

Do electric vehicles need transmissions? Yes, if they are not merely intended for driving in city traffic but over long distances on highways as well. Hydraulic accumulators from Freudenberg Sealing Technologies get them moving. The combination of electric motor and transmission optimizes costs and improves efficiency.

With two-speed electric drive units based on a wet dual clutch transmission equipped with Freudenberg accumulators, electric cars travel robustly, quickly and comfortably from point A to point B – and to even more distant destinations.

> with harmonious gear changes.
> with high initial torque, remarkable acceleration, enormous rotational speeds and impressive top speeds.
> with lower energy requirements for the transmission oil pump than those for traditional solutions.

Leading the way on costs and energy efficiency with:
> a smaller and lighter transmission oil pump
> reduced CO2 emissions
> a smaller vehicle battery
> greater range

MORE EFFICIENCY IN HYBRID VEHICLES

Hybridized dual clutch transmissions (DCTs) using a high-pressure accumulator system from Freudenberg Sealing Technologies – in short, this is an ideal, energy-efficient solution for hybrid vehicles.

The reasons:
> Accumulators store energy to cover peaks in demand, keeping it immediately available and delivering it exactly when requested.
> This means the mechanical transmission oil pump does not have to run continuously
> Thanks to the hydraulic accumulator, the transmission oil pump can have smaller dimensions. This reduces energy consumption and CO2 emissions long-term.
> The system has a space-saving design and has an extremely long operating life with low maintenance expenses.
Proven a million times over and pointing the way to the future: The Freudenberg Sealing Technologies piston accumulators used in automated manual transmissions, dual clutch transmissions and start-stop systems have been improving driving comfort for more than twenty years – with maximum energy efficiency. And Freudenberg is continuing to develop these technologies. The requirements of automakers are the yardstick. One current example is set to impress at the recent Frankfurt Motor Show: lightweight, durable, energy efficient and easy handling. Lightweight high-tech seals promise reduced emissions and automatic transmissions as well as hydro-pneumatic chassis systems.

Freudenberg Sealing Technologies stands for:

- more than six decades of experience with accumulator technology
- a complete range of hydraulic accumulators from a single source: piston, diaphragm and bladder accumulators, in all the right materials and configurations for stationary, mobile and automotive applications
- in-house material and development department which ensures that unmatched expertise in sealing and hydraulic accumulator components is concentrated under one roof
- for seals and diaphragms that are optimised for the particular application
- for accumulators with high operating reliability and long service lives
- for energy efficiency, harmonious gear changes, good driving dynamics and comfort within the automobile

With its unique portfolio of products and services, Freudenberg Sealing Technologies is one of the world’s leading suppliers of sealing and accumulator technology. Its expertise in materials and technology was built up over decades, and it is a proven supplier and an innovative development and service partner to a wide range of industries.

Freudenberg Sealing Technologies is the leading producer of accumulators as well as seals, contributing high-performance with efficiency and lightweight construction. Developed specifically for the customer and the application, hydraulic accumulator provide energy for state of the art automatic transmissions, ideal for hybrid transmissions and start-stop systems.

In many automotive applications, hydraulic accumulators are driven by piston accumulators - being the lightweight high-tech seals of choice for almost every application. It’s important to ensure that the seals offer both high performance and core trend-defining sealing function.

**Benefits**

1. **Piston accumulator (steel piston)**
2. **Piston accumulator (plastic piston)**
3. **Diaphragm accumulator (aluminum shell)**
4. **Diaphragm accumulator (steel shell)**

**Diaphragm Accumulators for Automotive Applications**

<table>
<thead>
<tr>
<th>Material</th>
<th>Pressure ratio</th>
<th>Lifetime</th>
<th>Shell</th>
<th>Sealing</th>
<th>Piston</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel or Aluminum</td>
<td>EC</td>
<td>10:1</td>
<td>At least 10 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NBR, NBR, EPDM (or as required)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Piston Accumulators for Automotive Application**

<table>
<thead>
<tr>
<th>Material</th>
<th>Pressure ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>∞:1</td>
</tr>
</tbody>
</table>

**The Entire Range of Accumulators Worldwide from a Single Source: Freudenberg Sealing Technologies Stands for Cutting-edge Energy Storage Technology Across All Industries.**