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FACTSHEET

BENEFITS OF PU FOAM IN VEHICLES

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EURO MOULDERS
European Association of Manufacturers of Moulded Polyurethane Parts for the Automotive Industry

3. BENEFITS OF PU FOAM IN VEHICLES

Introduction

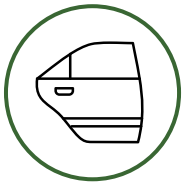
As the **second most-used plastic in cars** (up to **24 kg per vehicle**) polyurethanes are widely used in automotive interiors due to their **versatility**, **customisability**, **durability**, and – above all – **comfort** properties. The utilisation of polyurethane in vehicle interiors brings forth a multitude of benefits, making it a preferred choice for **numerous applications** such as **seating cushions** (well over 90% of market share), **instrument** and **door panels**, **carpet underlay**, **acoustic insulation**, and **battery encapsulation** in Electric Vehicles (EVs).

Comfort & Ergonomics

It is estimated that passenger car contains between **24-28kg of PU**, most of which is flexible PU foam used as **cushioning in seats (on average 8-12kg)**. Polyurethane foam used for car seating helps to **reduce pressure points** by **shaping itself to the body** and keeps seats from **getting too hot or cold**. In addition, PU foam in car seats **can hold its shape for years** without sagging, showing **stability** even **under severe conditions.** It can also be found inside the **steering wheel** and **armrests** for a pleasant touch.

Acoustics

As vehicles transition to quieter powertrains, **interior noise management** requires high-performance **sound absorption and vibration dampening**. Specialized, sound-absorbing foam is packed inside the:



doors



floorboards



dashboard



roof



engine compartment

It **attenuates airborne noise** across a **wide range of frequencies**. This is particularly relevant in **EVs**, where the absence of internal combustion engine mask noise elevates the perception of road, tyre, and wind noise. **Lightweight** yet highly effective, PU foam integrates **sound management**, **sealing**, and **structural benefits** into one material, making it hard to outperform.



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Thermal Management

Polyurethane foam serves as a primary **thermal barrier**, reducing **heating, ventilation, air conditioning energy consumption** and maintaining **cabin comfort**. Its **low thermal conductivity** insulates the cabin against temperature extremes.



Safety

Beyond all these properties, polyurethane foam plays a structural role in **vehicle safety systems and EV battery protection**. High-density, rigid PU foams are injected into **metal frame pillars and door panels**. In a side or front collision, the foam undergoes controlled progressive crushing, absorbing dynamic kinetic energy and **reinforcing cabin integrity**.

In electric cars, it takes safety even further: polyurethane foam **encapsulates the battery pack to shield cells from physical impacts**, **insulate against extreme heat**, and **prevent thermal runaway**.



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Lightweighting & Sustainability

Polyurethane delivers **high structural performance per unit density,** supporting **lightweight engineering** and **decarbonization targets**. Because polyurethane foam is a lightweight material, it helps **lower overall vehicle weight**, directly **improving fuel efficiency** for traditional engines and **extending battery range** for electric vehicles.

Versatility & Design Flexibility

The fundamental **chemistry** of polyurethanes, **reacting diisocyanates with polyols**, allows chemical engineers to **fine-tune PU foam properties**, that can be adjusted from **soft, low-density flexible foams** to **rigid structures**, allowing designers to **deploy polyurethane solutions almost anywhere** in the car.



Built for the Future: PU in Modern Vehicles

Polyurethanes are far more than an interior comfort material. It is a **critical enabler of the mobility transition**. By simultaneously solving the challenges of **occupant safety**, **cabin acoustics**, **lightweighting**, and **EV battery protection**, PU let engineers do more with less, **combining strength**, **comfort**, and **protection into a single material**. As the automotive industry shifts toward **electric cars and circular manufacturing**, polyurethane's **versatility** ensures it remains central to **designing safer**, **quieter**, and **more sustainable vehicles** for the road ahead.