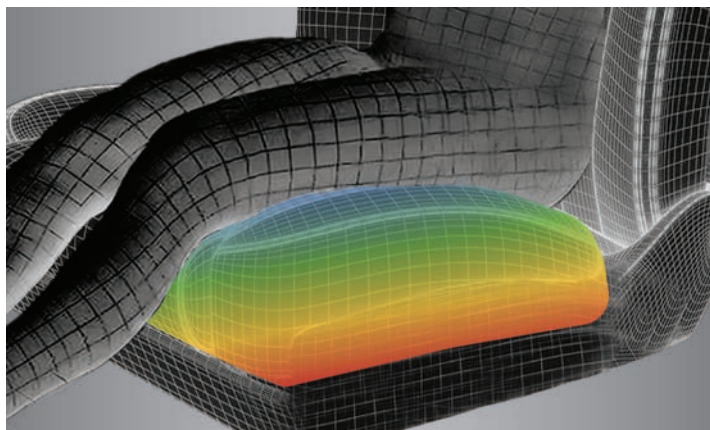


Polyurethanes

RUBIFLEX® Gradient Hardness™ polyurethane system

Developed for next generation vehicle seat comfort



PRODUCT DESCRIPTION

RUBIFLEX® Gradient Hardness™ polyurethane system can provide seat foam with very good initial softness and the high support of firmer lower layers for long-term comfort. Poured in a single shot, the RUBIFLEX® Gradient Hardness™ polyurethane system uses the same types of tools, molds and processes as conventional seating foam to deliver a softer top and firmer bottom of a single molded pad.

KEY FEATURES

- Single-shot manufacturing capability
- Soft cushioning top
- Firm bottom layer for overall support
- Tunable gradient effect enables lower layer to be up to 175% firmer than surface*

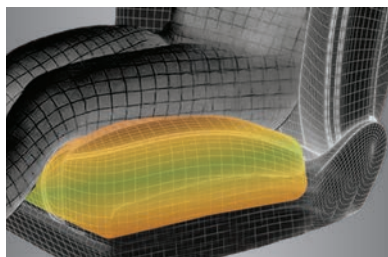
TYPICAL BENEFITS

- Can provide drivers and passengers with a plush, comfortable ride, and very good initial showroom feel
- Firmness of bottom layers can provide very good overall support, maintaining H-Point
- Better pressure distribution and rolling stability
- Cost savings for automotive manufacturers by reducing steps, time, and labor associated with other manufacturing methods of layered foam
- Minimized craftsmanship issues of separately molded foam layers

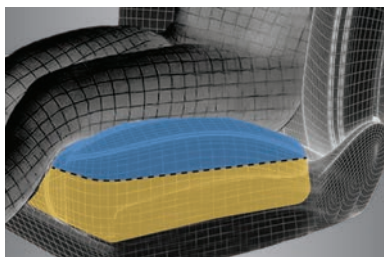
TYPICAL APPLICATION

RUBIFLEX® Gradient Hardness™ polyurethane system is used in foam seat cushions, typically for densities at or above 65kg/m³.

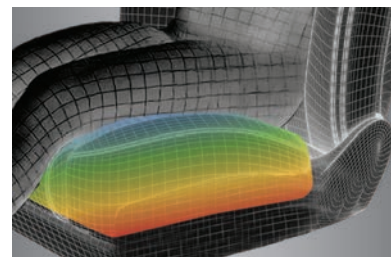
MARKET LEADING TECHNOLOGY



Conventional seating foam technology is achieved by pouring one polyurethane system targeting a single overall hardness felt at top and bottom of the pad. The result is a seat that trends toward softer with less support, or firmer with less luxurious top-feel.



Some premium seat manufacturing uses two pieces of foam or a 'topper' with pad adhered together. The bottom piece of foam is firm while the top piece of foam is soft. The result is added steps and cost in the manufacturing process.



This next generation seating foam technology by Huntsman is completed in one pour, with one formulation. Huntsman's RUBIFLEX® Gradient Hardness™ polyurethane system can provide optimal comfort for the driver and minimal steps in the manufacturing line, thus saving automakers time and money to deliver a level of comfort previously only experienced with premium seats.

TYPICAL SYSTEM PROPERTIES

RUBIFLEX® Gradient Hardness™ polyurethane system can meet the varied needs of automotive manufacturers. The following table provides an overview of the typical properties of a 65kg/m³ block at 75 Index, measuring the top, middle and bottom layers separately to demonstrate the Gradient Hardness™ effect.

Description	Test	Top	Middle	Bottom
Density range (kg/m ³)	ASTM D 3574 Test A	62	68	74
ILD 25% (N)	ASTM D 3574 Test B1	197.17		
ILD 65% (N)	ASTM D 3574 Test B1	634.8		
CFD 40% (kPa)	ISO 3386-1	3.44	5.45	7.35
Hysteresis Loss (%)	ASTM D 3574 Test N Procedure B	27	29	29

Typical properties can vary depending on local circumstances and application. These properties are not part of the specifications of RUBIFLEX® systems.
ILD = Indentation Load Deflection. CFD = Compression Force Deflection.

Range of Gradient Hardness™ Capability demonstrated by core CFDs with 5mm of skin removed per ISO 3386-1 40%.

Index	Top CFD (kPa)	Bottom CFD (kPa)
70	2.72	5.59
75	3.44	7.35
80	4.52	8.39
85	5.72	10.14
100	8.13	14.35
105	8.56	16.22

CFD = Compression Force Deflection.

DRIVING FOR SUSTAINABILITY

Our new RUBIFLEX® Gradient Hardness™ polyurethane system continues to support the United Nations Sustainable Development Goals with two of specific relevance to our work in transportation sectors:



- Improved ergonomics and comfort in seating
- Reduced pressure build-up around occupant tailbone and pelvis
- Low Volatile Organic Compound (VOC) emissions and low odor



- Reduced cost and time in manufacturing
- Quality consistency
- Lower production waste

CONTACT US

For more information about RUBIFLEX® Gradient Hardness™ polyurethane system or any other MDI-based solutions within the full suite of automotive products, please go to huntsman.com and complete the Polyurethanes Contact Us form.



Scan to contact

HUNTSMAN AUTOMOTIVE SOLUTIONS

Huntsman is a global leader in MDI-based polyurethanes, serving automotive customers along the value chain. Huntsman delivers innovative, value-added solutions to the world's best-known car brands. Specialisms include lightweight, enhanced comfort and working towards sustainability ambitions in seating, interior trim, acoustic insulation, and composite panel applications.

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Products may be toxic and require special precautions in handling. The user should obtain Safety Data Sheets from Huntsman Polyurethanes containing detailed information on toxicity, together with proper shipping, handling and storage procedures, and should comply with all applicable safety and environmental standards. Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent on the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

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