



creative design

- *different colors*
- *different combinations and patterns*
- longer life cycle
- *chemical resistance*
- *easy to repair*
- *improved mechanical properties*

Granules of different origin can be used:

- *Styrene Butadiene Rubber (SBR)*
- *Ethylene Propylene Diene Monomer (EPDM)*
- *Ethylene Vinyl Acetate copolymer (EVA)*
- ...

One-component adhesive systems.

One-component adhesive systems are most commonly used. The granules are tumbled in a mixer and coated with the isocyanate. The isocyanates are cured by reaction with water that is either added, or more commonly present in the atmosphere.

Prepolymer adhesives for wet-lay process .

Huntsman offers to formulators a number of isocyanates for in-house variant production.

Rather than pure MDI, liquid pure MDIs are used for the production of prepolymers as they improve liquid stability and facilitate storage and handling conditions.



HUNTSMAN

Enriching lives through innovation

Huntsman Polyurethanes is committed to your business and can offer fast and flexible response to your needs

Believing in confidential dialogue, we offer direct links into the laboratories with full technical backup. Commercial support and dedicated customer service is available throughout Europe, Asia and the US.

Contact us

ACE@Huntsman.com
Phone: 32 (0)2 758 9420
Fax: 32 (0)2 758 7420
www.huntsman.com/pu/ACE

The Huntsman story

Global resources for local needs

Huntsman Polyurethanes is a business division of Huntsman Corporation. Huntsman is a global manufacturer and marketer of differentiated chemicals. Its operating companies manufacture products for a variety of global industries including chemicals, plastics, automotive, aviation, textiles, footwear, paints and coatings, construction, technology, agriculture, health care, detergent, personal care, furniture, appliances and packaging. Originally known for pioneering innovations in packaging, and later rapid and integrated growth in petrochemicals, Huntsman today has 13,000 employees and 78 operations in 24 countries. The company had 2007 revenues of over \$ 10 billion.

Huntsman Polyurethanes warrants only that its products meet the specifications agreed with the buyer. Typical properties, where stated, are to be considered as representative of current production and should not be treated as specifications.

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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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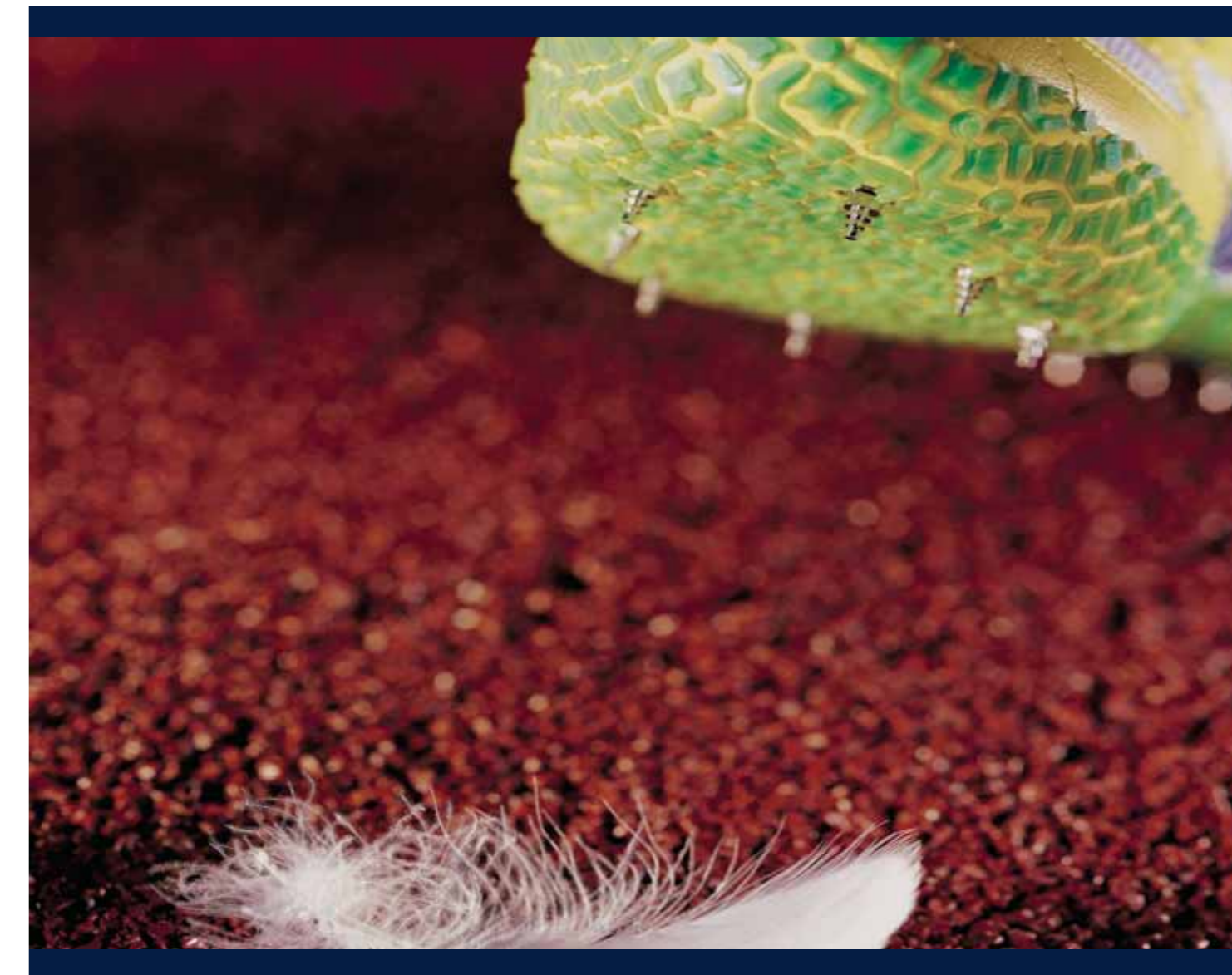
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ADHESIVES

Rubber Crumb Adhesive Systems



SUPRASEC® MDI



Adhesives

Adhesives based on Huntsman Polyurethanes' technology bond an extensive range of materials and resist a wide variety of adverse physical conditions and chemical environments. Their versatility makes them a raw material of choice for the formulation of sealants, rubbercrumb, panel laminating, flexible packaging or reactive hot melt adhesives.

Rubber crumb adhesives

Moisture-cured polyurethane adhesives are used to bind re-milled rubber waste or rubber crumb. Designed to meet the specific needs of a variety of applications, from running tracks to garden tiles, rubbercrumb adhesives need to suit a range of processing conditions, including wet-lay and moulding processes. Each demands a different adhesives mix - from high flexibility to rigid, low to high viscosity -and very low to highly reactive types. All these mixes are covered by the SUPRASEC® MDI*-based product range from Huntsman Polyurethanes.

* Methylene di-isocyanate

Application techniques

To manufacture these polyurethane composites the rubber granules are wetted with a prepolymer and transferred to a mould or press, where the mix is compressed and cured. Or for sports/play surfaces laid directly at the building site, by processes similar to those employed in road construction for the laying of asphalt. The properties of the composites depend on the particle size of the rubber granules, the constitution and the amount of the polyurethane one-component adhesive and in case of the moulding process also on the degree of compaction during curing.

Advantages

Bonding rubber granules with polyurethane adhesives opens possibilities to create high attractive products for

- improved comfort
- noise and vibration dampening
- slip resistance
- shock absorption



Typical properties

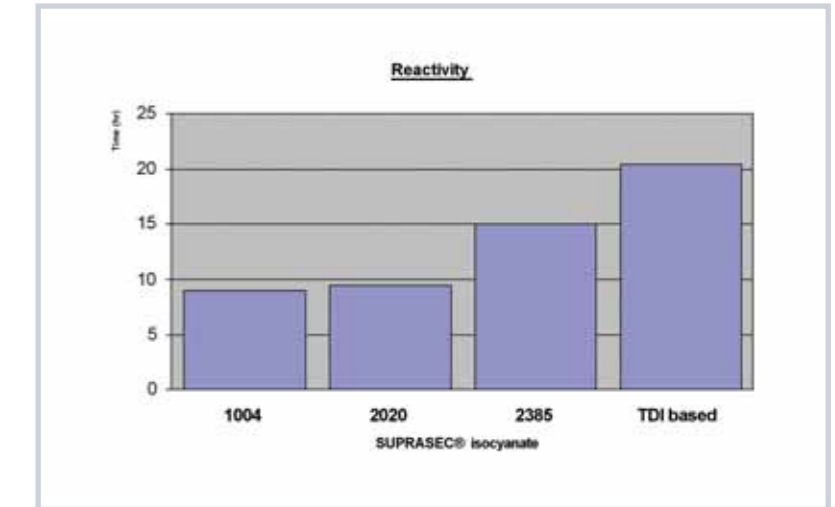
| SUPRASEC® | NCO(%) | Fn | Viscosity 25°C (mPas) | Storage conditions |
|-----------|--------|-----|------------------------|--------------------|
| 1004 | 32.9 | 2.0 | 13 | 20°C |
| 2020 | 29.5 | 2.2 | 40 | 15°C |
| 2385 | 30.9 | 2.1 | 25 | 10°C |

Prepolymer adhesives used for the wet-lay process for sport flooring applications usually have an isocyanate value of about 10 percent and are produced from linear or slightly -branched polyether polyols and MDI, a mixture of MDI and TDI, or TDI alone, with the market trend moving towards use of all MDI systems.

e.g. with Daltocel F 456 (PO diol with OH value 56), in slow curing adhesives with easy-to-handle viscosities. As internal reference TDI is incorporated.

Reactivity

- Cure characteristic (23°C and 50% humidity)



Mechanical properties

When tested in wet-lay process, using EPDM granules, following typical mechanical properties can be obtained at a 10% binder level:

