ALBERDINGK BOLEY

Technology Information



# ALBODUR®

## Castor oil based polyols

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## ALBERDINGK BOLEY in a nutshell

| | | |
|---|---|---|
| Leading global manufacturer of environmentally friendly water-based binders and oils with unique properties to refine, refurbish, bind and protect multiple types of substrates | Medium sized, privately owned company<br><br>> a partner to our customers for more than 250 years | > 500 employees |
| Dynamic,<br>Innovative<br>and flexible<br><br>Pioneers in biobased polymer dispersions | **Dispersions:**<br>Acrylic, Vinyl acetate, Polyurethane and hybrid dispersions<br><br>**Oils:**<br>Linseed oil,<br>Castor oil,<br>Derivatives | **Locations:**<br>• Krefeld, Germany<br>• Kerpen, Germany<br>• Leuna, Germany<br>• Treviso, Italy<br>• Congleton, UK<br>• Greensboro, USA<br>• Shenzhen, China<br>• Zhuhai, China |

For more information about ALBERDINGK BOLEY and our product offerings, visit www.alberdingk-boley.de.



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## Key facts about ALBODUR®

Full range of 100% solid polyols for various application fields

- **Green Product Based on castor oil ➔ renewable resources**
- Branched polyether-polyester polyols
- Adjustable from soft-elastic to hard properties
- Very low viscosity, very hydrophobic nature
- Easy to formulate / high pigment-filler loading
- Crosslinkable with aromatic & aliphatic polyisocyanate
- No VOC – absolutely solvent-free
- Economically attractive

### General Applications



Floorings (MDI-based)



Coatings (HDI-based)



Elastomers/ Sealants



Corrosion Protection



Potting resin



Adhesives 1-and 2-pack



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## ALBODUR® portfolio overview

| | Reactive Diluant | 1K adhesives and elastomers | 2K adhesives (aromatic isocyanate cure) | 2K, 100% solids sports flooring, membranes (aromatic isocyanate cure) | 2K, 100% solids roofing, waterproofing and membranes (aromatic isocyanate cure) | 2K, 100% solids comfort flooring (aromatic isocyanate cure) | 2K, 100% solids industrial flooring (aromatic isocyanate cure) | 2K, 100% solids Epoxy-like flooring (aromatic isocyanate cure) | 2K, 100% solids decorative and comfort flooring (aliphatic isocyanate cure) | 2K, 100% solids industrial flooring (aliphatic isocyanate cure) | 2K, Stonecarpet (aliphatic isocyanate cure) | 3K, PU Cement Floor | Heavy Corrosion Protection - DTM (aromatic isocyanate cure) | Heavy Corrosion Protection -Topcoat (aliphatic isocyanate cure) | Potting Resin | Pipe Coating |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albodur 102 | x | x | | | | | | | | | | | | | | |
| Albodur 110 | x | x | | | | | | | | | | | | | | |
| Albodur 901 | | | x | x | | | | | | | | | | | | |
| Albodur 903 | | | | x | | | | | | | | | | | | |
| Albodur 906 | | | | | x | | | | | | | | | | | |
| Albodur 912 | | | x | | | x | | | | | | | x | | | |
| Albodur 917 | | | | | | | x | | | | x | | | | | |
| Albodur 921 | | | x | | | | x | | | | | | x | | | |
| Albodur 145 | | | | | | | x | | | | | | | | | |
| Albodur 923 | | | | | | | x | | | | | | | | x | |
| Albodur 942 | | | | | | | | x | | | | | x | | x | |
| Albodur 1021 | | | | | | | | | | | | | | | | x |
| Albodur 957 | | | | | | | x | x | | x | x | | | | | |
| Albdour 965 | | | | | | | | | x | | | | | | | |
| Albodur 1054 | | | | | | | | | x | | x | | | x | | |
| Albdour 3003 | | | | | | | | | | | | x | | | | |

These are our initial recommendations for the applications mentioned above. Contact us to discuss other **ALBODUR®** grades that may be better suited to your specific needs.



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## Technical data

| ALBODUR®-product | Viscosity [mPas] | OH-value [mg KOH/g] | Shore A[1] | Shore D[1] | Biobased Content [%][2] | Features |
|---|---|---|---|---|---|---|
| **ALBODUR® 102** | 700 | 89 | n.a. | n.a. | 75 | Reactive diluent, suitable for Prepolymer |
| **ALBODUR® 110** | 300 | 62 | n.a. | n.a. | 100 | Reactive diluent, suitable for Prepolymer |
| **ALBODUR® 901** | 600 | 185 | 75 | 25 | 94 | Flexible systems |
| **ALBODUR® 903** | 600 | 160 | 65 | 15 | 89 | Medium flexible |
| **ALBODUR® 906** | 500 | 170 | 70 | 20 | n.d. | Medium flexible |
| **ALBODUR® 912** | 600 | 208 | 93 | 44 | 86 | Medium hard but flexible |
| **ALBODUR® 917** | 3,000 | 165 | 98 | 65 | 83 | Standard medium hard quality |
| **ALBODUR® 921** | 600 | 218 | 97 | 60 | 82 | Hard but flexible |
| **ALBODUR® 145** | 2,900 | 235 | 100 | 80 | 68 | Standard hard quality |
| **ALBODUR® 923** | 3,000 | 234 | 99 | 75 | n.d. | Hard polyol, less moisture sensitive |
| **ALBODUR® 942** | 500 | 318 | 99 | 80 | 70 | Very hard (epoxy-like) polyol |
| **ALBODUR® 1021 VP** | 550 | 270 | 90 | 65 | 79 | Hard polyol, for pipe coatings |
| **ALBODUR® 957** | 2,800 | 265 | 95 | 55 | 70 | Hard aliphatic-curable |
| **ALBODUR® 965** | 1,100 | 291 | 93 | 45 | 78 | Soft aliphatic-curable |
| **ALBODUR® 1054** | 2,900 | 210 | 80 | 30 | 74 | UV stable polyol |
| **ALBODUR® 3003 VP** | 350 | 215 | 85 | 70 | n.d. | Self-emulsifying in water, for 3K systems |

[1] ALBODUR® 901 to ALBODUR® 1021 VP crosslinked with SUPRASEC®2496 and ALBODUR® 957 to ALBODUR® 1054 crosslinked with Tolonate® HDT, with a cross-linking ratio of 110%.

[2] C-14 Analysis according to ASTM D6866-22 Method B (AMS) TOC. Certificate upon request.



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## Why is castor oil the perfect base for polyols?

Castor oils are the only OH functional natural oils which can be used in polyurethane systems. The oil characteristics offer polyurethane systems a natural hydrophobicity and supports isolation properties as well as fire resistance.

Unlike other oils, castor oil viscosity is strongly dependent on temperature.

The lowest viscosity can be achieved at 40°C, therefore castor oil is ideally delivered between 30 and 40°C. That provides easy handling, low energy consumption on pumping, high pigment loading etc.

**ALBERDINGK BOLEY** offers various kinds of castor oil derivatives and polyols based on castor oil.

Additional to refined castor oil FSG (First Special Grade castor oil also called first press) other castor oil qualities can be used for the production of polyols but also to reduce viscosity or enhance flexibility.

| ALBERDINGK® Product | Properties / Descriptions | Application fields |
|---|---|---|
| **Castor Oil FSG/ No. 1** | standard quality | typical PU applications (see above) |
| **Pharmaceutical Castor Oil Qualities** | lowest colour and acid value, free from any technical contaminations | especially for sensitive applications with a high demand for the purity and / or colour, e. g. medical equipment |
| **Castor Oil Low Acid** | technical oil with a low acid value | especially 2-pack systems which require a long pot live time (e. g. adhesives), applications under high temperature, less side reactions with water |

| Low Moisture Oil Product | Properties / Descriptions | Application fields |
|---|---|---|
| **Albodry Castor Oil PU Quality** | water reduced standard quality (water content max. 0.05%) | typical PU applications |
| **Albodry Low Moisture 1500 Castor Oil** | utilized for applications which prohibit the use of molecular sieve, e.g. transparent systems. | typical PU applications |



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| Chemically modified Products | Properties/ Description | Application fields |
|---|---|---|
| **ALBERDINGK® Castor Oil PD** | partially dehydrated, lower hydroxyl value and lower functionality | especially for soft and flexible PU resins |
| **ALBERDINGK® Blown Castor Oil** | oxidatively polymerized Castor oil | cross-linking component, increases hardness and hydrolysis stability |

## Impact factors on 2-pack systems

### Isocyanate vs. polyol properties

In two component applications, both components have equal impact on the properties of the system. That's why the choice of Polyol is as important as the choice of isocyanate. Additionally, additives like catalysts in aliphatic systems have a strong impact on the development of the system properties as well as on yellowing or syneresis while curing.

Because of the unique chemistry of castor oil, unlike other chemical structures, the glass transition temperature (Tg) does not give a clear hint about the performance of the material like drying speed and hardness.

The following chart shows the performance of **ALBODUR®** in combination with different polyisocyanates.

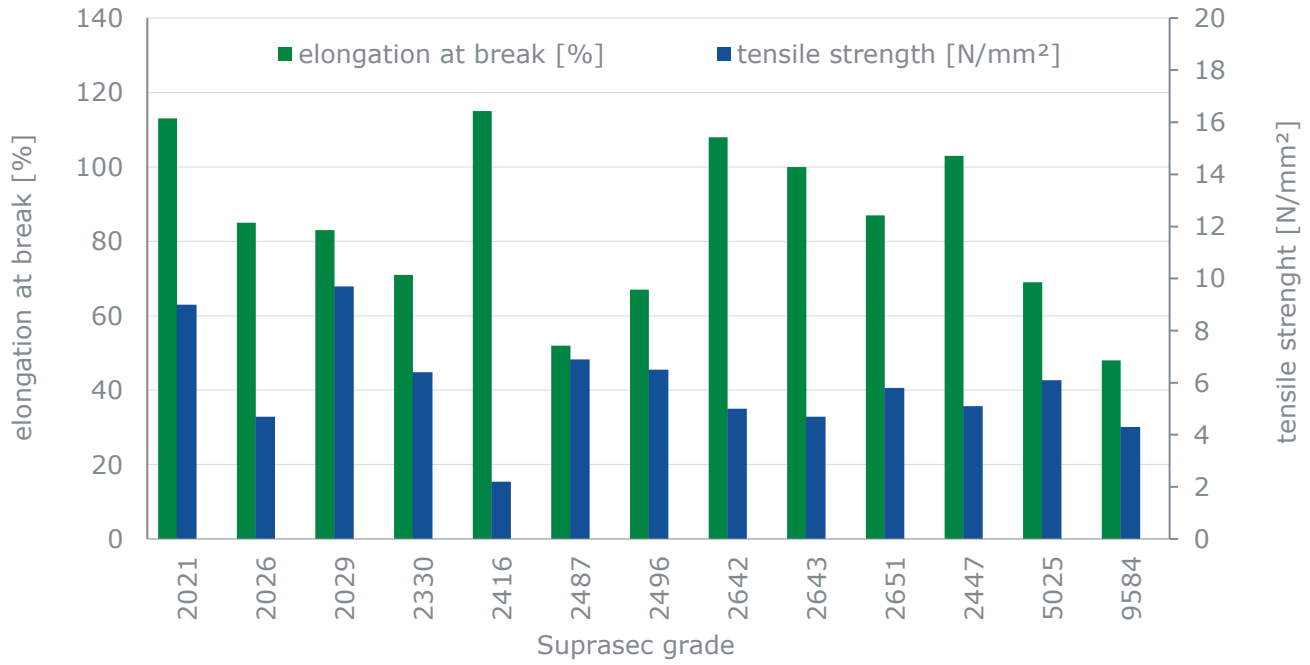


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**Impact of different Isocyanates on the mechanical properties**




## Blending of isocyanate and polyols

Castor oil and MDI normally are very compatible and can be homogenized easily. With increasing molecular weight and/or OH value of the polyol, compatibility becomes more difficult. That's why blending time and methods are very important depending on types of polyols and isocyanates.

Additionally, the polyol/isocyanate-reaction is very slow in comparison to isocyanate/water-reaction. The more isocyanate is used, the higher the tendency for faster reactions with moisture.

In elastomer applications premix equipment is used to achieve excellent homogenization. This leads to better surface quality and less surface-defects in comparison with manual mixing equipment.

## Crosslinking ratio

Secondly, the crosslinking ratio between polyol and isocyanate can be an additional adjustment. In order to provide higher application security, a slightly over-crosslinked system is used. For membranes, waterproofing or crack bringing application, a lower amount of isocyanate can adjust the flexibility.





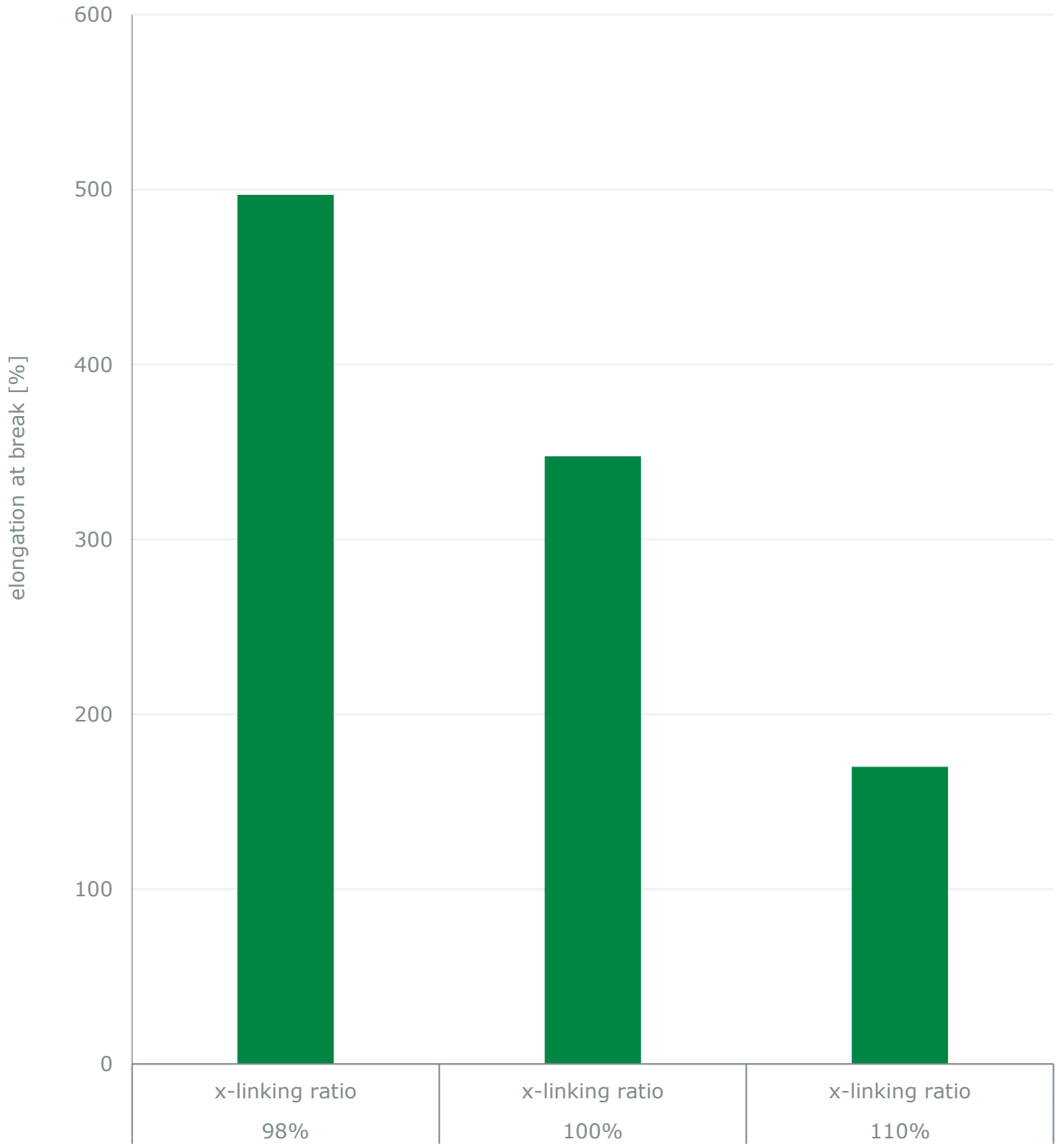
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**Mechanical properties of ALBODUR® + Suprasec® 2021**

(after 2d RT + 3d @ 50°C)






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## Impact of moisture

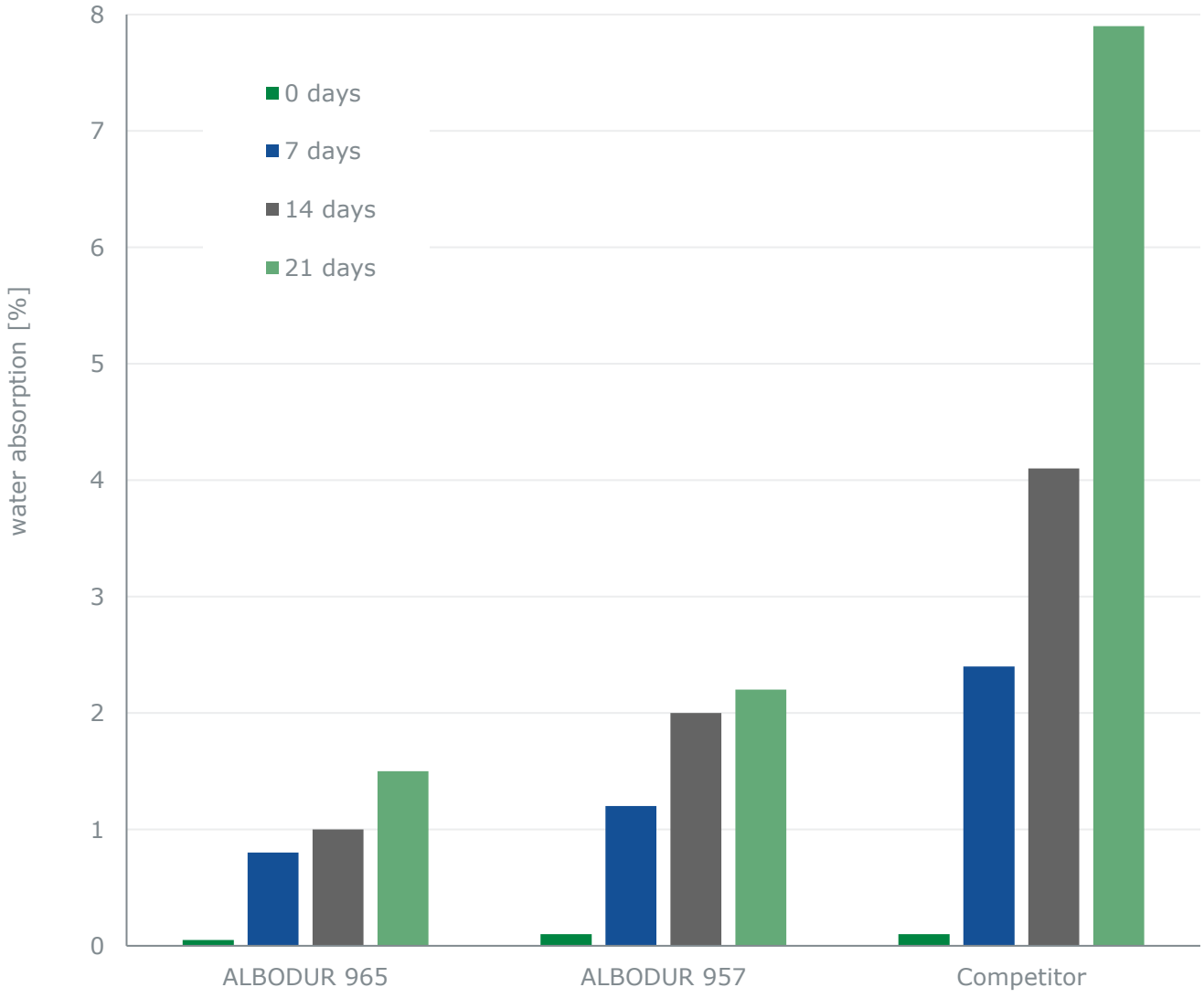
Water absorption of **ALBODUR®**

Water has a much faster reaction with the isocyanate than with castor oil based polyols. Therefore in high film thickness applications it is important to reduce the amount of water with moisture scavengers like molecular sieves or oxazolidines. **ALBODUR®**-products have a very low affinity to water and a low water absorption tendency in storage, compared to standard technologies.

Due to the compatibility of water with castor oils, water cannot be optically observed like in other oils.

That's why it is very important to store the material under the recommended conditions.

Applications which use aliphatic hardeners are even more critical to moisture than aromatics.






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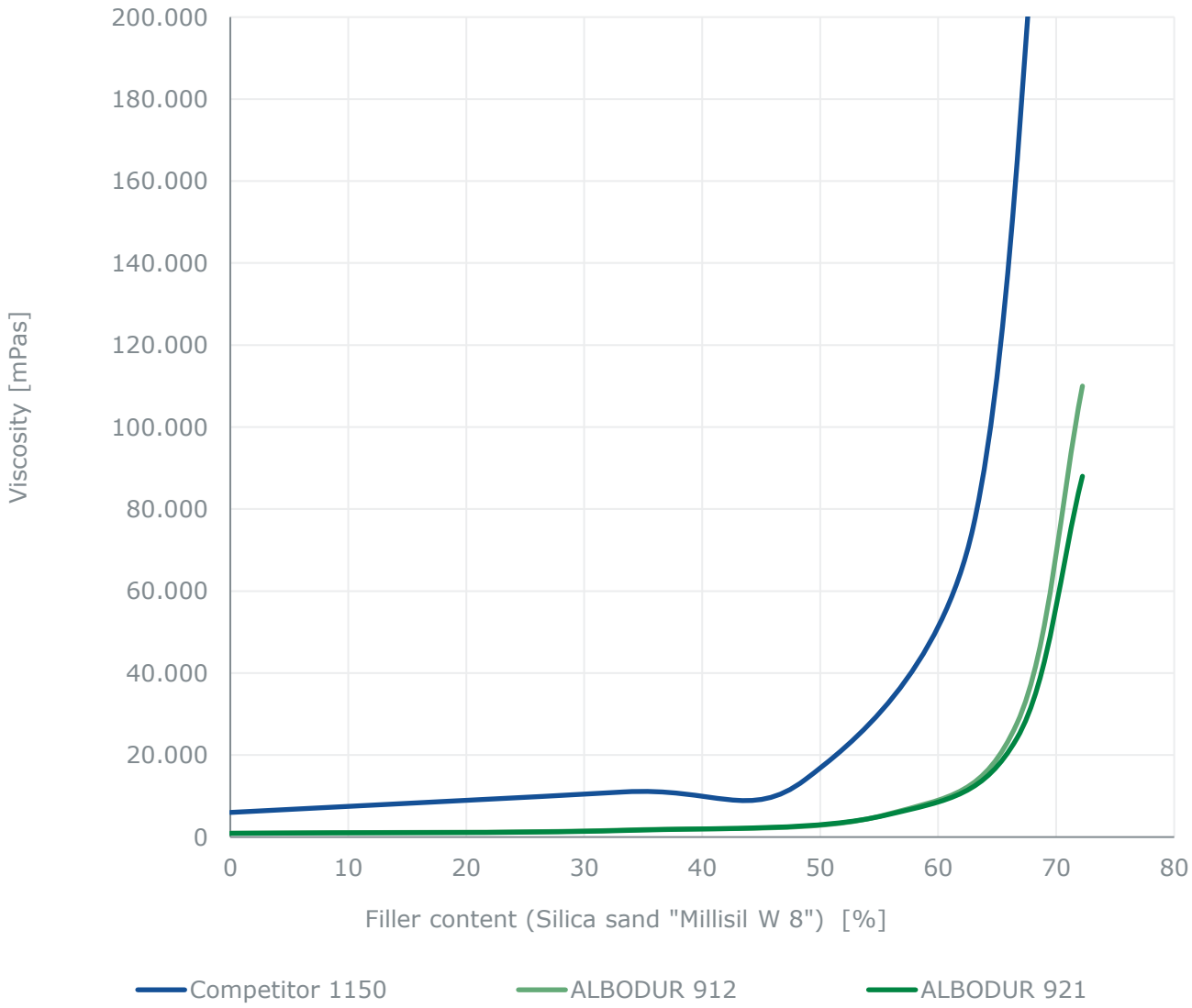
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## Impact of polyol viscosity and pigment wetting properties

**ALBODUR®-**polyols have a lower viscosity and a higher hydrophobicity compared to market standard polyols. This leads to high pigment / filler loading and reduces formulation cost.

**ALBODUR® 921** can be formulated with 20% more filler silica sand than Competitor 1150. This can be even increased by wetting and dispersing additives.

The high hydrophobicity leads to low stabilisation of foam and the shear thinning behaviour of the polyol supports the self-levelling properties. Hardness and elasticity development are similar to Competitor 1150.





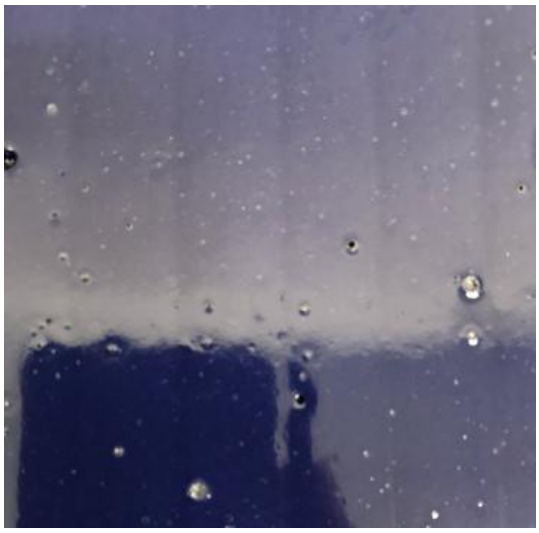

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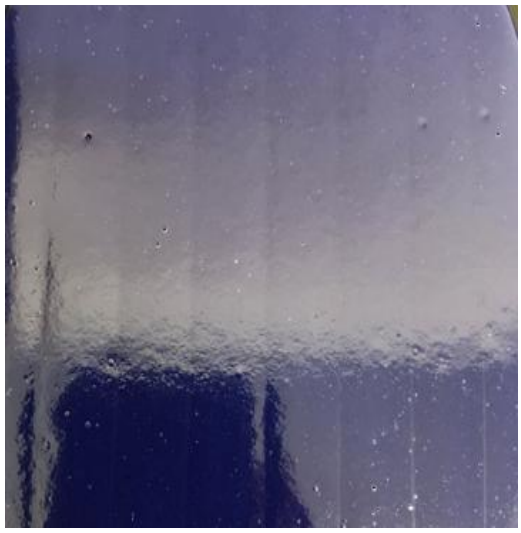
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## Comparison of 20% Polyol | 80% Calcium carbonate | no additives

Comparison foam and levelling:

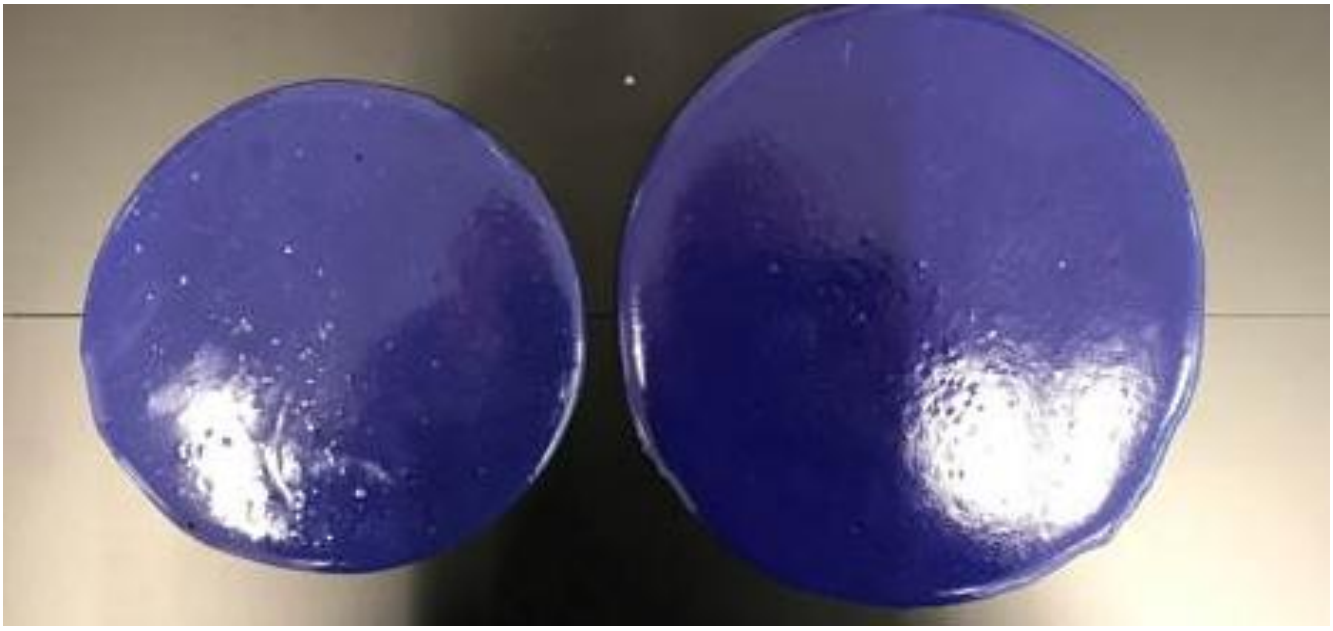


Competitor 1150



**ALBODUR® 921**

Comparison self-levelling properties:



Competitor 1150

**ALBODUR® 921**



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## Applications for ALBODUR®

## Polyol based floor coatings



Floorings (MDI-based)



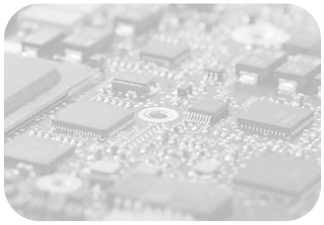
Coatings (HDI-based)



Elastomers/ Sealants



Corrosion Protection



Potting resin



Adhesives 1-and 2pack

In the past, floor coatings were mainly applied in industrial areas thanks to their high chemical and physical as well as mechanical resistance. Within the recent years, the focus of the major requirements for the floor coating market has changed.

Floor coatings are getting more attention in residential areas for decorative purposes or in hospitals due to their high hygienic demands, where the chemical resistance of the flooring in terms of cleanability is crucial.

Even in other environments like schools or in areas where food contact is important, PU floorings offering “easy to clean” properties significantly increased their market share.

Considering cruise ships for instance, the demand is to provide a system with the best weather resistance, durability, UV protected coating and excellent optical properties.

Unsurprisingly for these kind of application fields, the PU flooring market is growing as well. Besides the expectations with regards to optical performance, tightening international legislations and regulations like AgBB conformity and VOC have to be fulfilled as well.

Castor oil based polyols have been approved in polymer floorings as a UV stable and impact resistance alternative to epoxy systems for a long time. They can be used as primer and self-levelling top coats. Especially 100% polyol based primers are used on damp concrete or oily concretes.



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## General layer build up

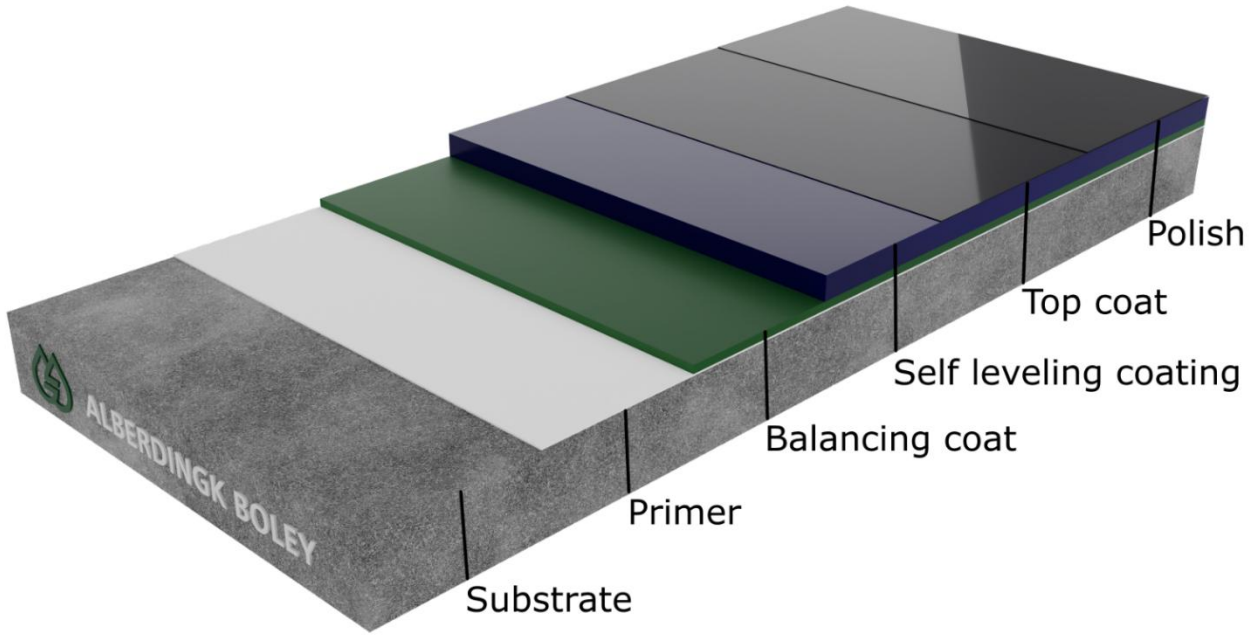
Flooring systems always have a multi-layer build up.

**The primer** layer seals dust to the concrete and provide adhesion to the following layers.

It is followed by a **balancing or levelling layer** / mortar which fills up pours and has 1mm film thickness.

Then, the most important layer which is called **self-levelling coating** is being applied. This coating provides the physical and chemical resistances and of course the color and optical appearance.

Areas with high foot or machine traffic will also need a **top coat** which is mainly solvent or water based and can be reworked with a polish.






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## Concrete as a substrate

Concrete can be a challenging substrate for coatings. It is porous, contains additives, oils and has a high pH value which leads to saponification of polyurethane systems. Further, old concrete can lose its solidity, therefore it needs additional preparation.

**Quality of concrete:**



bad good

## Primer

Primer (usually applied with layer thickness of 0.2 - 0.3mm ≈0.4 kg/m$^2$, depending on the substrate) are used for pore wetting and gluing dust to the substrate. Additionally, they provide adhesion to the following layer.

The choice of the primer depends on the condition of the substrate and on the type of polyol / dispersion chemistry which will be applied on it. For spoiled or damp surfaces we recommend to use **ALBODUR® 912** with Suprasec® 9584 (1:1).

The oily character of our poyols wets oily and damp surfaces much better than water based systems.

The high amount of polyurea (from the isocyanate water reaction), which occurs on the surface, leads to perfect adhesion of the following layers.

On fresh (green) concrete the primer must be a self-crosslinking acrylic like **ALBERDINGK® AC 2403** or styrene based. Otherwise the following layer will suffer from saponification.



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## Levelling primer and self-levelling layers

### Aromatic cured systems

Self-levelling coatings have the following purposes:

- Mechanical and chemical resistance
- Appearance
- Conductivity (Antistatic)
- Anti-Slip properties

They are usually applied with layer thickness of 1-3mm (1mm: ≈1,5kg/m$^2$). All ALBODUR® grades can be suitable.

The correct choice of the type of **ALBODUR®** depends on the required elasticity and hardness. In order to develop the best inter-coat-adhesion the primers should be harder than the top coats.

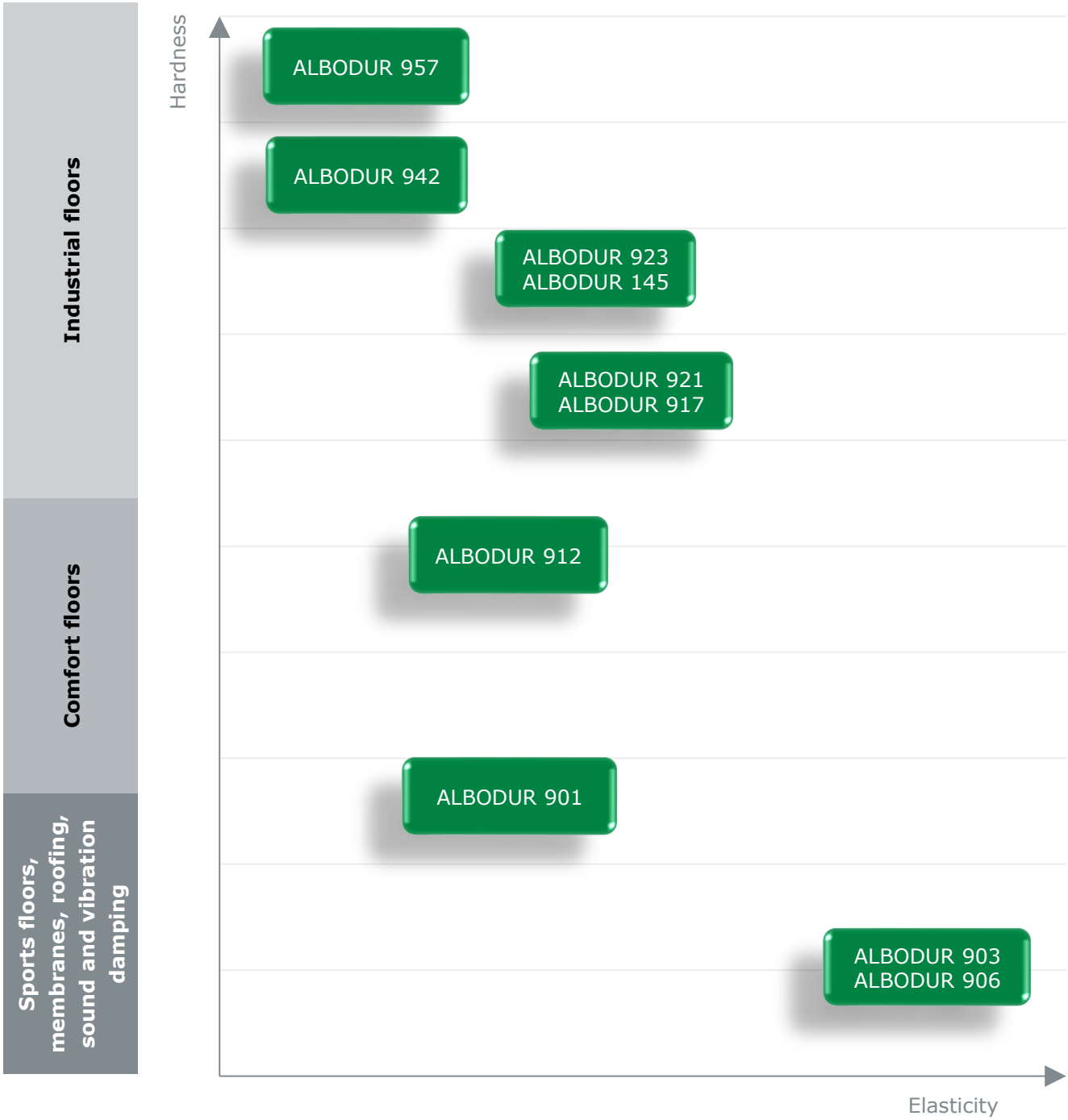


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**Hardness and Elasticity comparison of ALBODUR® - MDI based Polyisocyanate Cured**






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## Aliphatic cured systems

UV-stability and low temperature curing are becoming more important application requirements, especially for exterior applications.

Responding to modern needs, ALBERDINGK BOLEY has extended the **ALBODUR®** technology range with the products **ALBODUR® 957** and **ALBODUR® 1054**. Like **ALBODUR® 965**, they are made primarily from renewable resources. However, these products combine the hydrophobic component, derived from **Castor Oil**, with highly reactive chemical groups. This combination enables effective crosslinking with isocyanates (HDI), enhancing reactivity and functionality.

Aliphatic systems behave vice versa to aromatic systems. The hardness has to be achieved with the polyol and the elasticity is supported by the isocyanates.

Castor oil is not fully light stable because of its double bonds.

In order to push performance beyond current limits and to fulfil the market requirements mentioned earlier, ALBERDINGK BOLEY's strategic goal was to develop a product based on natural resources, which is not only unique because of its absolutely crystal clear appearance as a neat resin, but also outperforms the current market standards thanks to its excellent UV stability.

**ALBODUR® 1054** consists of more than 70% renewable resources and therefore yields an environmental friendly, VOC- and odour-free aliphatic PU system, which is AgBB compliant, offering a value-added solution to the future needs of the floor coating industry.

The low OH-value leads to a low demand of hardener which makes the product more economical and less sensitive to water absorption.

The handling of the polyol is comparable to the standard resin floor technology and fits perfectly into most product portfolios.



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The product is pale in colour which offers the opportunity to apply thick clear films as decorative top coat:

**Initially:**



ALBODUR® 1054
x-linked with aliphatic PIC



Market Standard
x-linked with aliphatic PIC



UV-stable epoxy

**After 1500h QUV:**



ALBODUR® 1054
x-linked with aliphatic PIC



Market Standard
x-linked with aliphatic PIC



UV-stable epoxy



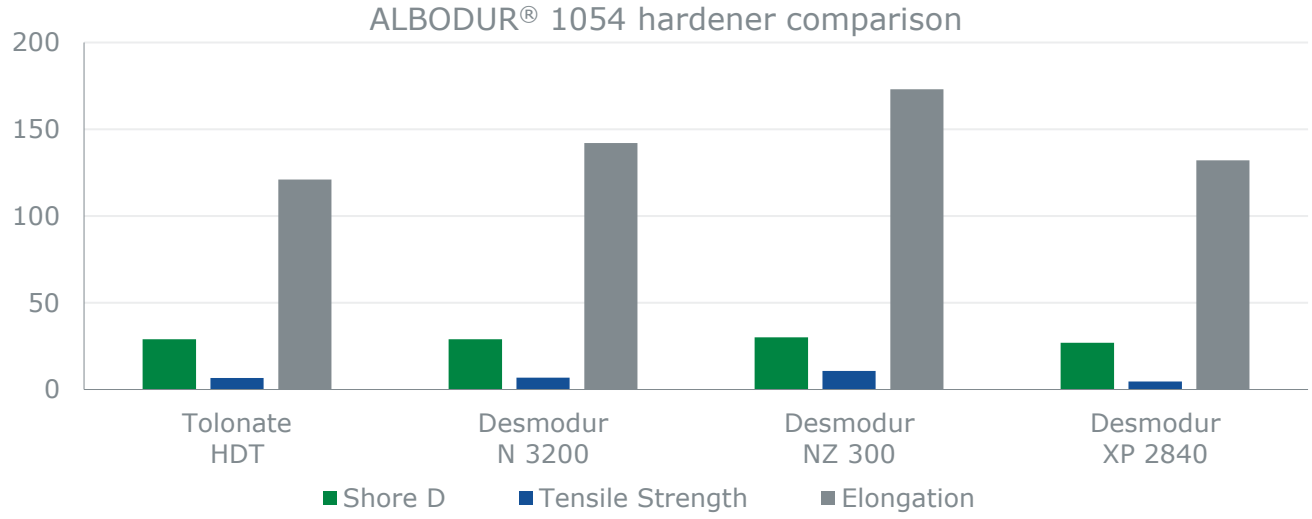
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## Impact of isocyanate and catalyst

Due to the aliphatic technology, the impact of the hardener and the catalyst is as strong as the impact of the polyol. The best catalysing effect was observed with DOTL types, especially Dioctyltincarboxylate. Additional combination products like amine modified DOTL DABCO DC 2 develop a comparable curing profile like aromatic systems.
Most hardeners are compatible with **ALBODUR® 1054** but the best hardness development can be observed with isocyanate blends which contain IPDI technology e.g. Desmodur® NZ 300 or Vestanat® 2354.




The impact can also be observed on elongation and tensile strength measurements. The resin is very compatible and can be combined with polyethers, polycarbonate and CAPA® polyesters to increase elongation or resilience.

**Compatibility with CAPA® systems**

| | Compatibility | Hardness increase | Flexibility increase | Hardener compatibility |
|---|---|---|---|---|
| CAPA® 3031 | +++ | - | + | +++ |
| CAPA® 2043 | ++ | - | ++ | ++ |
| CAPA® 4101 | + | ++ | - | + |



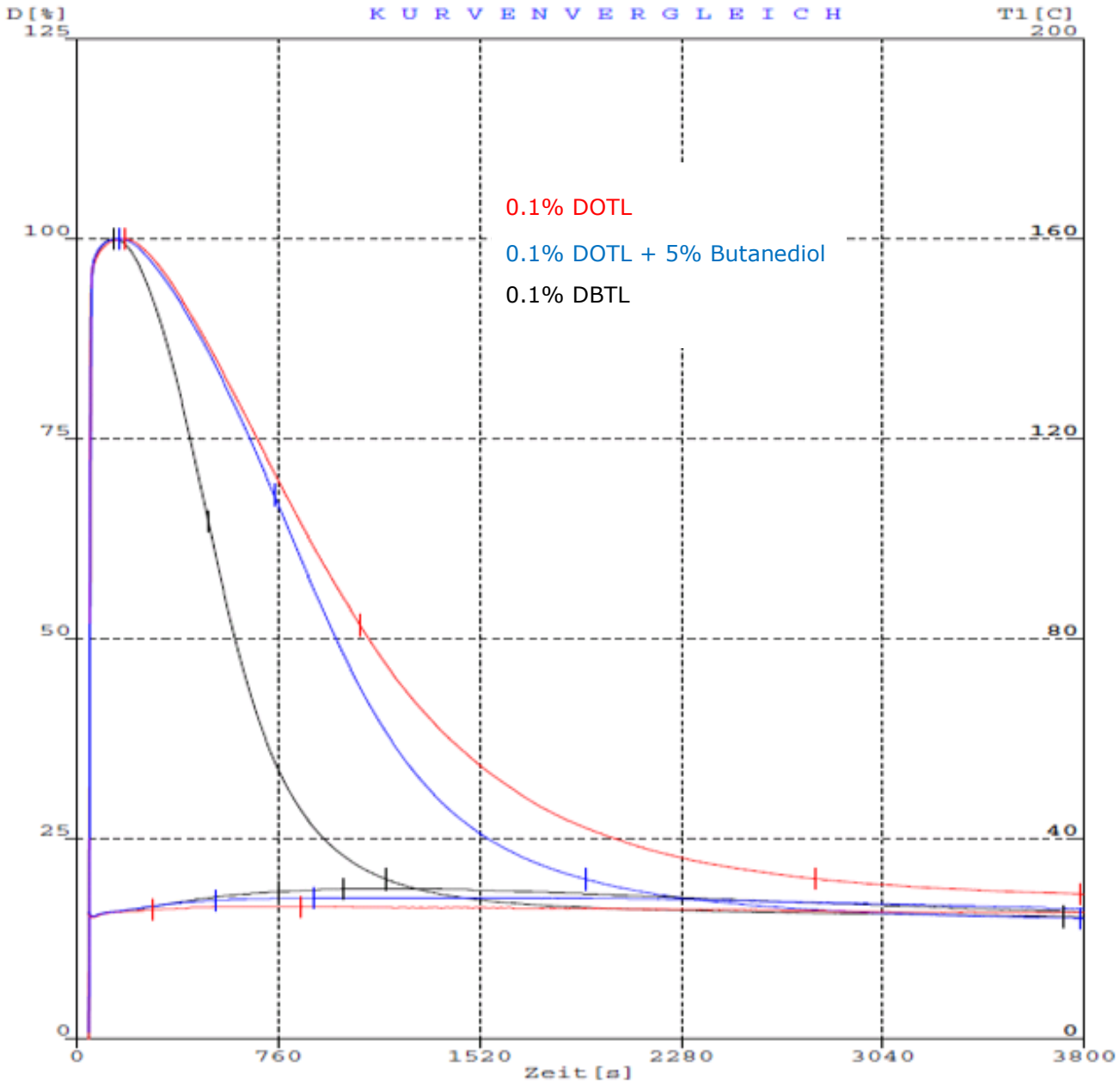
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Additional chain extenders like Butanediol or Hexanediol can be used to increase reactivity.

**Workability and pot-life: DBTL vs. DOTL**






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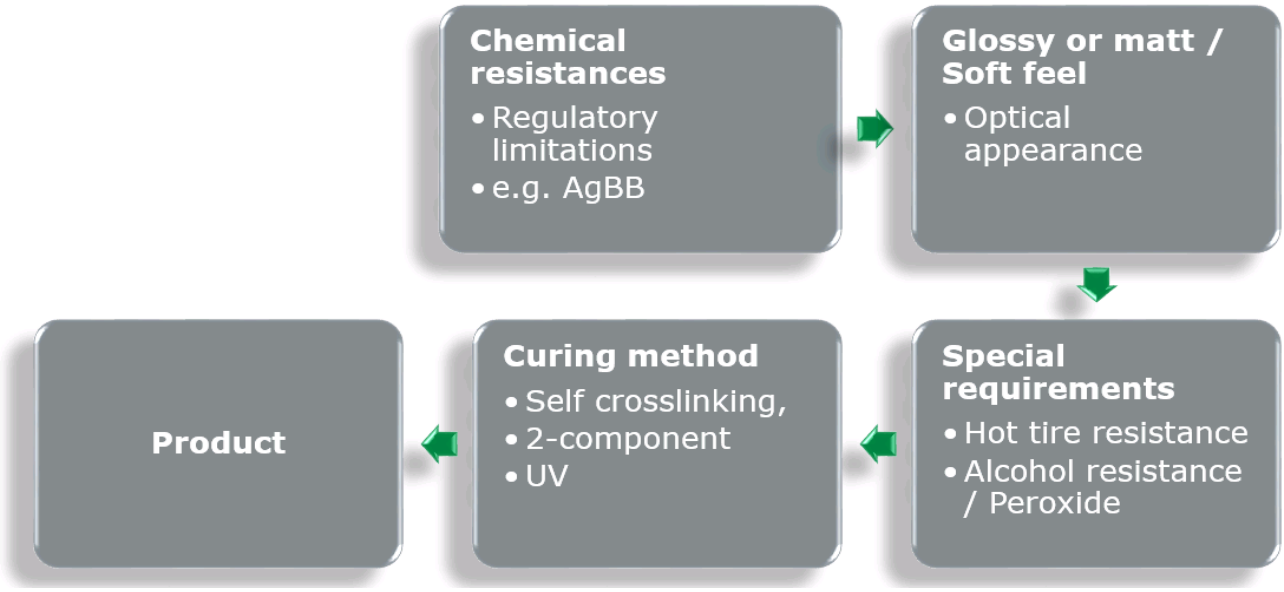
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## Topcoat

Topcoats (usually applied with layer thickness of 0.06 - 0.1mm (≈0.1 - 0.6kg/m$^2$) can provide scratch resistant and UV stable surfaces and are also often used to increase anti-slip properties.

Before choosing a dispersion for a top coat of flooring systems the following questions should be asked in order to not miss important criteria:




Generally, flooring topcoats can be divided into three product groups:
For more detailed information, please see our brochure for floor coatings.



**Industrial:**
High chemical resistance
Walking and forklift-traffic
Professional application

**AC 27401**
**AC 3699**
**AC 3770**



**Office Flooring:**
Optically attractive
Resistance against coffee & detergents
Haptic impression, comfort

**PUR-MATT 910 + U 7500**
**AC 3699**



**Garage coating:**
No professional application
Hot tire resistance
Mainly 1-component products (single-pack)

**AC 2714**
**AC 3660**



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## Waterbased dispersions for 1K and 2K topcoats

| ALBERDINGK®-product | Solids [%] | Viscosity [mPas] | pH-value | MFFT [°C] | Features |
|---|---|---|---|---|---|
| **AC 27401** | 37.0-39.0 | 700-2,000 | 7.5-8.5 | 15 | Superior chemical resistance, for matt varnishes with easy to clean properties |
| **AC 3770** | 46.0-48.0 | 200-2,000 | 7.5-8.5 | 80 | Outstanding chemical- and stain resistances, as well as hot tire resistance |
| **AC 3699** | 39.0-41.0 | 50-500 | 7.0-8.0 | 40 | Long open time, high chemical resistance and very fast drying/curing |
| **U 7500** | 33.0-35.0 | 20-200 | 7-9 | 13 | Best application properties at low VOC, Workhorse PUD |
| **PUR-MATT 910** | 34.0-36.0 | 20-2,000 | 7.0-9.0 | 30 | Best burnishing resistance, very neutral "Anfeuerung" |
| **AFU 850** | 39.0-41.0 | 20-200 | 7.0-8.5 | 25 | Amine free PUD, neutral "Anfeuerung", hard, good adhesion |
| **AC 2714** | 43.0-45.0 | 30-300 | 8.0-9.0 | 50 | Tire resistant polymer |
| **AC 3660** | 39.0-41.0 | 20-200 | 8.0-9.0 | 55 | For wet look, epoxy acrylic, high chemical resistance |



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## Elastomers and Sealants



Floorings (MDI-based)



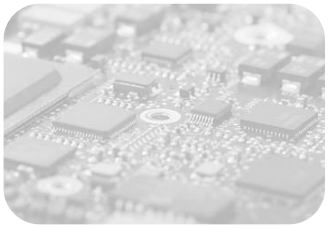
Coatings (HDI-based)



Elastomers/ Sealants



Corrosion Protection



Potting resin



Adhesives 1-and 2-pack

All **ALBODUR®**-grades can also be used in elastomeric systems. Due to changing machines, diverse equipment and various handling in the industry we do not recommend specific **ALBODUR®**-types.



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## Corrosion resistance



Floorings (MDI-based)



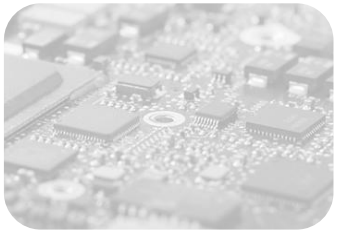
Coatings (HDI-based)



Elastomers/ Sealants



Corrosion Protection



Potting resin



Adhesives 1-and 2-pack

The low viscosity and the high hydrophobic behaviour is very beneficial for heavy duty coatings. In our studies we observed a correlation between the hardness of the polyol (high OH value) and the corrosion resistance: The harder, the better!

Additionally, we recommend to use special aromatic and aliphatic hardeners for metal adhesion.

| ALBODUR®-product | Viscosity [mPas] | OH-value [mg KOH/g] | Shore D | Features |
|---|---|---|---|---|
| **Aromatic crosslinking:** | | | | |
| **ALBODUR® 921** | 600 | 218 | 60 | Direct to metal, pipe coatings |
| **ALBODUR® 942** | 500 | 318 | 80 | Direct to metal, heavy duty coatings |
| **Aliphatic crosslinking:** | | | | |
| **ALBODUR® 1054** | 3,000 | 210 | 30 | Topcoat application |



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**Protective DTM Top Coat based on ALBODUR® 1054**
**Application field: Marine and pipe coatings**

| Pos. | Raw Material | Amount | Product | Supplier |
|---|---|---|---|---|
| **1** | **ALBODUR® 1054** | **58.00** | **polyol** | **Alberdingk Boley** |
| 2 | ANTI-TERRA-203 | 0.80 | dispersing agent | BYK-Chemie |
| 3 | RHEOBYK-100 | 1.40 | rheology modifier | BYK-Chemie |
| 4 | Heucophos ZPA | 20.10 | corrosion inhibitor / pigment | Heubach GmbH |
| 5 | Heucorin RZ | 2.00 | corrosion inhibitor | Heubach GmbH |
| 6 | Bayferrox 130 M | 6.70 | pigment | LANXESS |
| 7 | Sylosiv A3* | 4.00 | molecular sieve | Grace |
| 8 | Tinuvin 1130 | 2.70 | UV-absorber | BASF |
| 9 | Tinuvin 292 | 1.30 | HALS | BASF |
| 10 | Dynasylan VTMO* | 1.30 | moisture scavenger | Evonik |
| 11 | BYK-354 | 0.50 | surface additive | BYK-Chemie |
| 12 | BYK-358 | 0.50 | surface additive | BYK-Chemie |
| 13 | BYK-085 | 0.50 | defoamer | BYK-Chemie |
| 14 | TIB Kat 318<br>(10% in Butylacetate) | 0.20 | catalyst | TIB Chemicals |
| | **Total** | **100.00** | | |

*Moisture scavenger and molecular sieve need at least 24 hours after incorporation for the reaction with water. Afterwards it is possible to use the coating for further application.

**Crosslinking:**
We recommend an x-linking ratio of NCO:OH of 110% or 100.00 parts of a.m. formulation require 46.8 parts of Desmodur NZ 300.



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**General Properties:**

| | |
|---|---|
| Pot-life: | ca. 40 minutes |
| Drying Time [120µm wft @ RT]: | |
| Touch dry: | ca. 5 h |
| Hard dry: | ca. 7h |
| Gloss: | ca. 89 [60°] |
| Cupping Test [Flexibility]: | more then 9,0mm, crack free |
| Impact-resistances [1kg, 1m]: | no cracks, front and reverse test |
| Adhesion / Crosscut: | 4B / 5B |



Cupping Test
[Flexibility]



Impact-resistance
[1kg, 1m]



Adhesion / Crosscut



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## Potting resin



Floorings (MDI-based)



Coatings (HDI-based)



Elastomers/ Sealants



Corrosion Protection



Potting resin



Adhesives 1-and 2-pack

Unlike a lot of other polyols and due to its chemical structure, castor oil provides natural isolation properties and a long term heat resistance. To increase saponification stability and hardness under high temperatures, we modify castor oil into specific polyols for potting resins.

Additionally most polyols from ALBERDINGK BOLEY pass the UL 94 test for cable isolation.

| ALBODUR®-product | Viscosity [mPas] | OH-value [mg KOH/g] | Shore A/D | Elongation % | Features |
|---|---|---|---|---|---|
| **ALBODUR® 923** | 3,000 | 234 | 99/75 | 10 | Hard, good isolation properties |
| **ALBODUR® 942** | 500 | 318 | 99/80 | 15 | Very hard |



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## Adhesives



Floorings (MDI-based)



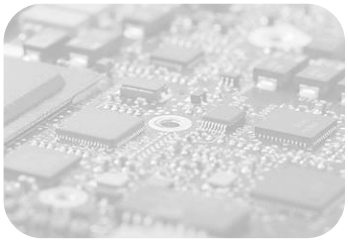
Coatings (HDI-based)



Elastomers/ Sealants



Corrosion Protection



Potting resin



Adhesives 1-and 2-pack

### 1-pack adhesives

For the production of moisture cured one pack systems, polyols with an elastic character, low viscosity and a high hydrophobicity are preferred. As a functional alternative to traditional PPG 2000, **ALBODUR® 102** is recommended.

The product is much more compatible with MDI and leads to an easy control and reduction of the NCO content. The final film is glossier and more storage stable than PPG types.

We recommend to exchange up to 60% of the PPG to **ALBODUR® 102**. **ALBODUR® 110** can be used as a reactive diluent.



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**GREEN polyols for sustainable 1-pack adhesive and elastomer solutions**

| Exemplary formula ingredients | **ALBODUR®** polyols for 1-pack systems with green backbone |
|---|---|
| MDI-based isocyanate | e.g. SUPRASEC® 1306 |
| Polypropylene Glycol (1.000 Mw, fct. 2.0) | **ALBODUR®** |
| Polypropylene Glycol (2.000 Mw, fct. 2.0) | **ALBODUR® 102** |
| Extenders | Silica, Barium sulfate |
| Stabilizers / Additives | Rheology modifier, pigments, defoamers, … |
| Plasticizer / Reactive diluent | **ALBODUR® 110** |

## 2-pack adhesives

**ALBODUR® 921** and **ALBODUR® 912** combine a high filler loading with a high tensile strength.

The products are very compatible and easy to formulate with high functional isocyanates (2.9).

**GREEN polyols for sustainable 2-pack adhesive and elastomer solutions**

| Exemplary formula ingredients | **ALBODUR®** polyols for 2-pack systems with green backbone |
|---|---|
| Polypropylene Glycol (1.000 Mw, fct. 2.0) | **ALBODUR®** |
| Polypropylene Glycol (2.000 Mw, fct. 2.0) | **ALBODUR® 102** |
| Branched Polyether/Polyester Polyol (~3.500 mPas) | **ALBODUR® 921** |
| Branched Polyester Polyol | Not needed with **ALBODUR®** |
| Extenders | Silica, Barium sulfate, Talkum |
| Stabilizers / Additives | Rheology modifier, pigments, defoamers, … |
| MDI-based polyisocyanate | e.g. SUPRASEC® 5025 |



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