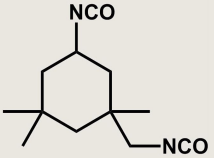
Product information

VESTANAT® IPDI (US origin)

ISOPHORONE DIISOCYANATE
3-ISOCYANATOMETHYL
-3,5,5-TRIMETHYLCYCLOHEXYL ISOCYANATE



GENERAL DESCRIPTION

VESTANAT® IPDI is a cycloaliphatic diisocyanate. It is a low viscosity liquid with a weak but specific odour.

SPECIFICATION

Property	Value	Unit	Test method
NCO content	37.5 – 37.8	% by wt.	DIN EN ISO 11 909 / ASTM D 2572
Purity	≥ 99.5	% by wt	gas chromatography

TYPICAL DATA

Property	Value	Unit	Test method
Total chlorine	≤ 10	ppm	-
Density at 20 °C	1.058	g/cm^3	DIN EN ISO 2811 / ASTM D 2111
Viscosity at 23 °C	13 - 15	mPa·s	DIN EN ISO 3219
Colour (APHA)	< 10	-	DIN EN ISO 6271
Refractive index n^{25}_D	1.483	-	DIN 51 423, Part 2
Vapour pressure at 20 °C	6.35 x 10^{-4}	hPa	-
Flash point (closed cup)	151	°C	DIN EN ISO 2719
Ignition temperature	430	°C	DIN 51 794

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PROPERTIES AND APPLICATIONS

Being a cycloaliphatic diisocyanate VESTANAT® IPDI meets all important requirements for the manufacture of lightstable and weather-resistant polyurethanes.

With suitable choice of the co-reactants (polyols) it imparts to the resulting PUR systems high resistance to yellowing as well as the typical properties of polyurethanes such as good mechanical properties and chemical resistance.

Due to its prim. and sec. isocyanate groups VESTANAT® IPDI exhibits a selectivity in urethane reactions like prepolymer synthesis. This leads to excellent reproducibility, selective product formation, narrow molecular weight distribution, low viscosity and low concentration of residual diisocyanate monomer.

VESTANAT® IPDI and polyisocyanates and prepolymers based on this PUR raw material are characterized by excellent compatibility with other resins and good solubility in all groups of common solvents such as ketones, esters, ether esters, aromatics, etc. The good solubility and compatibility with aliphatic hydrocarbons such as white spirits is unusual.

VESTANAT® IPDI is technically important mainly as a starting isocyanate for the manufacture of PUR coating raw materials. It is used in various ways and in the whole range of PUR coating systems.

Other important fields of applications are the solvent free, light stable PUR RIM technology and waterborne or hot-melt adhesives.

In PUR resin technology waterborne PUR dispersions is the most important application for VESTANAT® IPDI because this starting raw material combines a low prepolymer viscosity and therefore a low co-solvent content of the final product with imparting hard segments into the resin.

Urethane acrylates for radiation curables – conventional or waterborne – based on VESTANAT® IPDI are used if excellent yellowing resistance, low concentration of reactive diluents or co-solvents are required.

Moisture curing prepolymers is another group of PUR resins in which the use of VESTANAT® IPDI is beneficial. Those products are characterized by yellowing resistance, low viscosity and low concentration of residual diisocyanate monomer.

Solvent borne, high-molecular polyurethanes based on VESTANAT® IPDI are used wherever there is a heavy-duty requirement, particularly long-term flexibility combined with light-fastness. Typical applications include PUR leathercloth or painting of natural leather.

Urethanization of alkyd resins with VESTANAT® IPDI to form urethane alkyds and urethane oils substantially improves the resistance of these resins to yellowing combined with excellent drying properties and development of hardness.

In the field of 2K PUR coatings VESTANAT® IPDI is used as adducts with trifunctional alcohols (e.g. TMP adduct) or as isocyanurate (VESTANAT® T 1890). The main fields of application are large vehicle and automotive (OEM and refinish) Coatings.

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VESTANAT® IPDI and its polyisocyanates are used to manufacture blocked polyisocyanates as cross-linkers in electrostatically applied powder coatings and solvent-based industrial paints, particularly for can coating and coil coating systems.

VESTANAT® IPDI-based crosslinking agents lead to light stability as well as good mechanical properties of solvent-free two-component polyurethanes.

These systems are used mainly in flexible coatings and cast resins. Rigid systems are used in tooling applications.

REACTIVITY AND CATALYSIS

Aliphatic and cycloaliphatic diisocyanates are less reactive than aromatic diisocyanates. VESTANAT® IPDI usually requires appropriate catalysis for acceleration of the urethane reaction. Dibutyl tin dilaurate (DBTDL) is recommended as a urethane catalyst and should always be used when VESTANAT® IPDI or adducts of this product are used as cross-linking agents in polyurethane formulations at ambient and elevated temperatures.

Where a complete or partial reaction of the isocyanate groups with water (moisture) is required, a catalyst combination of dibutyl tin dilaurate and tertiary amines such as diazabicyclo [2.2.2.] octane (DABCO® Crystal) is recommended.

In addition to dibutyl tin dilaurate, Fe (III) acetyl acetonate and bismuth salts have proved to be effective catalysts for solvent-free polyurethanes (elastomers and cast resins).

A reaction without catalysts is possible at higher temperatures in resin synthesis, e.g. prepolymer manufacture. The difference in the reactivity of the two isocyanate groups of VESTANAT® IPDI is reduced both by working without DBTDL and by increasing the temperature. The best selectivity can be achieved at reaction temperatures below 50 °C and using DBTDL as catalyst.

STORAGE AND PACKAGING

VESTANAT® IPDI can be stored in unopened containers for at least one year without loss of quality in accordance with the above specification. Longer storage may result in an increase in colour number.

VESTANAT® IPDI is supplied in non returnable 30 kg cans and non returnable 200 kg drums. Shipment in road tankers, tank containers and 1-ton intermediate bulk container (IBC) is also possible.

SAFETY AND HANDLING

The product is used as raw material for the industrial manufacture of resins and hardeners for coating materials, adhesives, sealants and elastomers. The handling of such materials containing reactive polyisocyanates and residual monomeric diisocyanates requires appropriate protective measures. Therefore these products may be used only in industrial or professional applications. They are not suitable for use in homeworker (DIY) applications.

For further information on the safe handling of VESTANAT® IPDI please refer to our Material Safety Data Sheet and to the technical information "VESTANAT® IPDI – Properties and Handling“ (no. 43.01.062e).

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Marl, January 9, 2019; This data sheet replaces all former issues.

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