What are isocyanates? Which gloves can be recommended against them?

(Di)isocyanates are used for the manufacturing of polyurethanes.

The process to obtain polyurethanes is called polymerisation. During this reaction, diisocyanates are mixed with polyols (chemicals containing 2 or more –OH groups), together with additives. By varying the ingredients during this reaction, the density and stiffness of the polyurethane can be changed. Low density foams as well as solid plastics can be obtained.

One of the major uses of diisocyanates is the production of polyurethane foams; but they are also available as coatings and sealants.

Since polyurethanes are often formed by the end-user by mixing two components, a glove recommendation must be made, based on both components.

Where are polyurethanes used?

Polyurethanes are the most versatile group of plastics, which are useable in a wide range of applications.
Polyurethanes are used in:

- Automotive market (sound insulation, seating, dashboards, steering wheel etc.)
- Appliances (insulation in refrigerators, freezers etc.)
- Coatings and adhesives (floors, anti-corrosion coatings on steel pipes, sealing windows, gaskets etc.)
- Furniture (mattresses, sofas etc.)
- Construction (insulation panels for walls etc.)
- Footwear (soles)

Which health effects are related to isocyanates?

Health effects of isocyanate exposure include irritation of skin and mucous membranes; chest tightness and difficult breathing. Isocyanates are classified as potential human carcinogens. They can also cause occupational asthma.

Why is there no breakthrough times' information available on diisocyanates?

The volatility of diisocyanates is very low. The techniques used to determine breakthrough times following EN374/ASTM, are based on the volatility of chemicals. Therefore these classic methods cannot detect diisocyanates permeating through a glove material.

What gloves can be recommended for use with diisocyanates?

Based on degradation information and different publications, the following chart was produced. This data should only be treated as guidelines and have to be tested in practice.
As a general guideline, we recommend to determine the time of use of a chosen glove in practice and in function of the application.

The recommendations are based on the pure chemicals.

Recommendations made in this note are based on extrapolations from laboratory test results and information regarding the composition of chemicals and may not adequately represent specific conditions of end use. Synergistic effects of mixing chemicals have not been accounted for. For these reasons, and because Ansell has no detailed knowledge of or control over the conditions of end use, any recommendation must be advisory only and Ansell fully disclaims any liability including warranties related to any statement contained herein.

What are isocyanates? Which gloves can be recommended against them?

Abbr.	Chemical name + synonyms	Butyl	Viton	Barrier	PVA	Nitrile	Neoprene	Natural Rubber	PVC	Suitable disposable gloves (for splash protection only)
TDI	Toluene-2,4-diisocyanate Methylbenzene-2,4-diisocyanate CAS nr 584-84-9							splash	NR	Nitrile Disposable Gloves : TouchNTuff® 92-600/92-605, Microflex Supreno SE 93-843, Microflex Supreno EC 93-853
MDI	Methylenebisphenylisocyanate Diphenylmethane-4,4'-diisocyanate CAS nr 101-68-8									Nitrile Disposable Gloves TouchNTuff®92-600/92-605, Latex Disposable Gloves TNT Latex
IPDI	Isophorondiisocyanate CAS nr 4098-71-9							splash		Nitrile Disposable Gloves : TouchNTuff® 92-600/92-605, Microflex Supreno SE 93-843, Microflex Supreno EC 93-853
HMDI	Hexamethylene diisocyanate 1,6-Hexanediol diisocyanate CAS nr 822-06-0					splash	NR	NR	NR	None
MI	Methyl isocyanate Isocyanatomethane CAS nr 624-83-9	NR	NR			NR	NR	NR	NR	None

Other typical chemicals which are often present in diisocyanate products:

Chemical name	Butyl	Viton	Barrier	PVA	Nitrile	Neoprene	Natural Rubber	PVC	Suitable disposable gloves (for splash protection only)
Acetates, i.e. ethylacetate					splash	splash			None
Ketones, i.e. acetone, MEK				splash			splash		None
Polyols, i.e. ethylene glycol									Nitrile Disposable Gloves : TouchNTuff® 92-600/92-605, Microflex Supreno SE 93-843, Microflex Supreno EC 93-853

safe use for longer periods

splash splash protection only