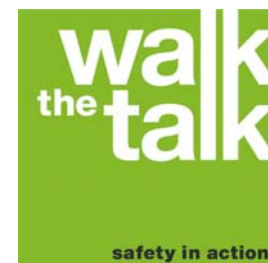




ISOPA PRODUCT STEWARDSHIP PROGRAMMES

“Walk the Talk”

TDI USERS



Elastogran



BASF Group

HUNTSMAN



Shell Chemicals

**REPSOL
YPF**



Bayer MaterialScience

sopa
EUROPEAN DIISOCYANATE & POLYOL
PRODUCERS ASSOCIATION

Walk the Talk - TDI Users



Content

- Essential data
- Good practice
- When things go wrong . . .

→ *Dialogue*

TDI Classification

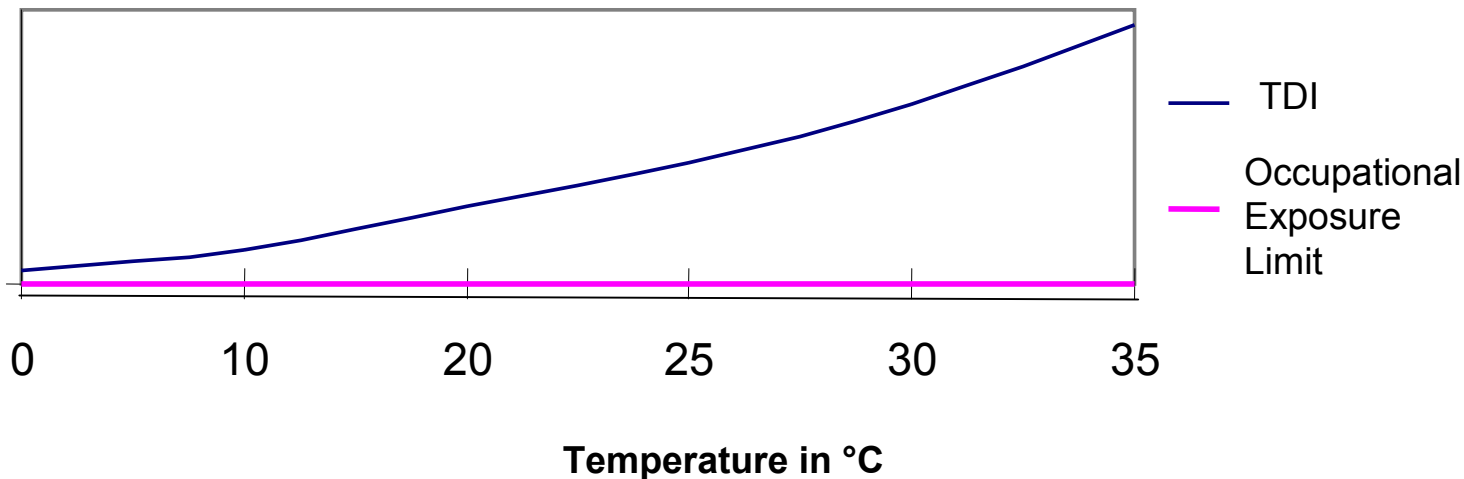
- Very toxic by inhalation
- Irritating to eyes, respiratory system and skin
- May cause sensitisation by inhalation and skin contact
- Limited evidence of a carcinogenic effect
- Harmful to aquatic organisms
- May cause long-term adverse effects in the aquatic environment



TDI Physical Properties

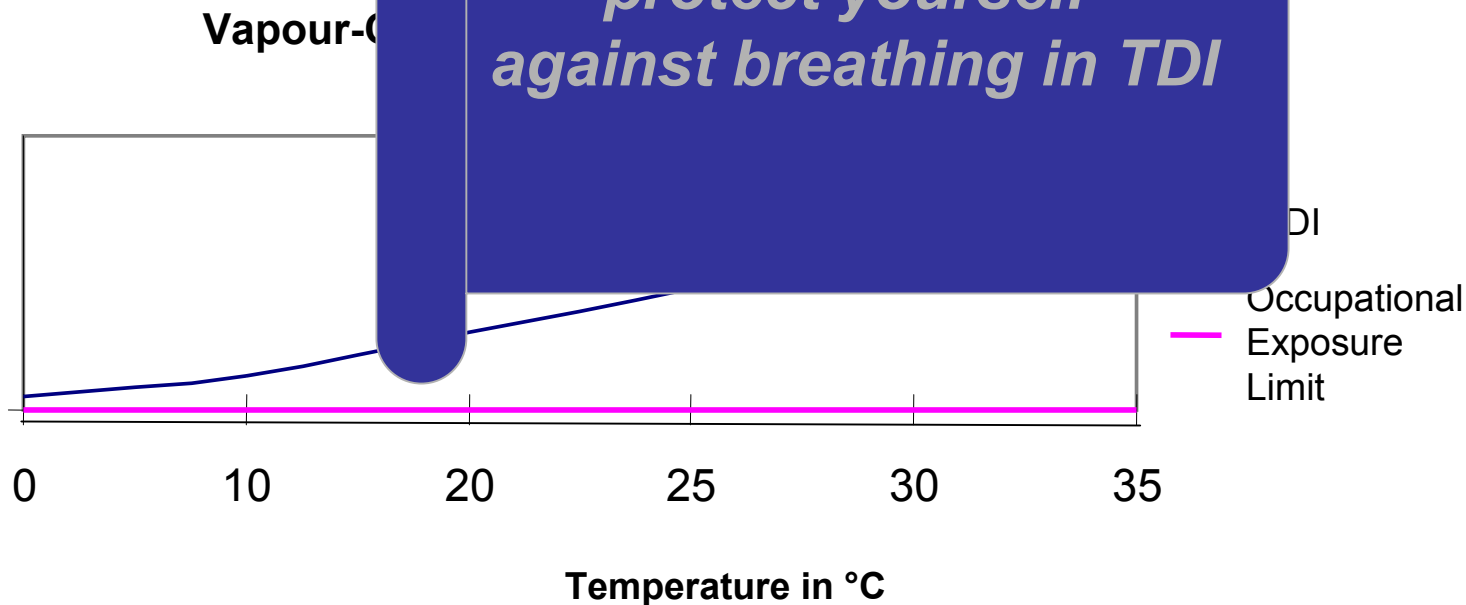
- If uncontrolled, TDI evaporates quickly leading to a high concentration in air
- TDI has a significant vapour pressure giving a high concentration in air above the liquid

Vapour-Concentration of TDI in air



TDI Physical Properties

- If uncontrolled, TDI evaporates quickly leading to a high concentration in air
- TDI has a significant vapour concentration above the liquid



TDI Chemical Properties

TDI will react with many compounds – especially water, polyol, amines, ammonium hydroxide, alkalides

Higher temperatures mean faster reactions
(beware temperatures $> 40\text{ }^{\circ}\text{C}$)

During reaction heat & gases (CO_2) will be formed
→ Risk of burns/dangerous pressures

Where do you find these conditions ?

Where do you find these conditions?

- Drums – decontamination
- Polyol / isocyanate stored together
- Spillage into a drain
- Bulk off-loading of wrong chemical into a bulk tank
- TDI in eyes or other soft tissue
- TDI in wet disposal (waste) drums
- High temperature operations
- In the foam crushing unit
- Foam storage areas
- Foam curing area

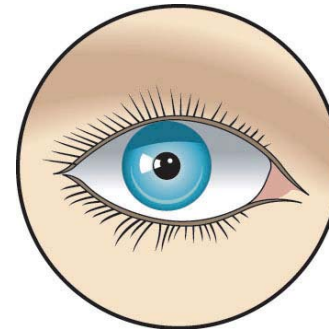


Effect of TDI on your health

Short term / one-off exposure above safe level

- Irritates mouth, throat, lungs
- Tight chest, coughing
- Difficulty in breathing
- Eyes watering
- Itching, red skin (immediately or delayed)
- May be hot or burn

***Symptoms can occur up to 24hrs
after exposure***



Effect of TDI on your health

Long term/repeated over-exposure from breathing or skin contact leads to risk of sensitisation

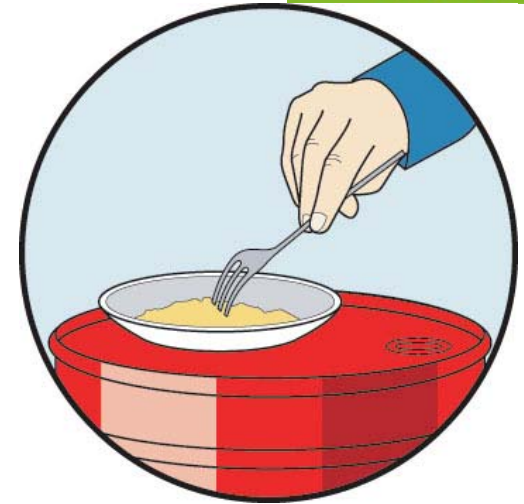
Symptoms such as occasional breathing difficulties similar to asthma, hay fever, sneezing

When sensitised, potentially severe asthma in the case of even low TDI exposure

Sensitisation will prevent working with isocyanates for life

Sensitisation is non-reversible and is a reaction of the immune system. Not to be confused with irritation

Typical examples of unsafe behaviour



Typical examples of safe behaviour



Safe handling of TDI

- Is the workplace clean and do you have good personal hygiene?
- Does anyone eat, drink or smoke in the workplace?
- Is there good workplace ventilation?
- Is there continuous use of the correct PPE – including during plant maintenance?
- Do you know where to find emergency equipment?
- Are TDI levels measured in the workplace?
- Do you know and practice emergency procedures?
- Are regular health checks performed?

Good personal hygiene

- You can use barrier and moisturising creams to prevent skin dryness – before starting work
- Wash with soap & water after finishing work and before eating, drinking or smoking
- Do not use solvents for washing
- Use disposable towels
- Do not re-use contaminated clothing or gloves



Clean and safe workplace



- Keep work area clean and tidy
- Respiratory equipment should be readily available (and well maintained)
- Know the locations of safety showers and eyebaths
- Do not eat, drink or smoke in the workplace

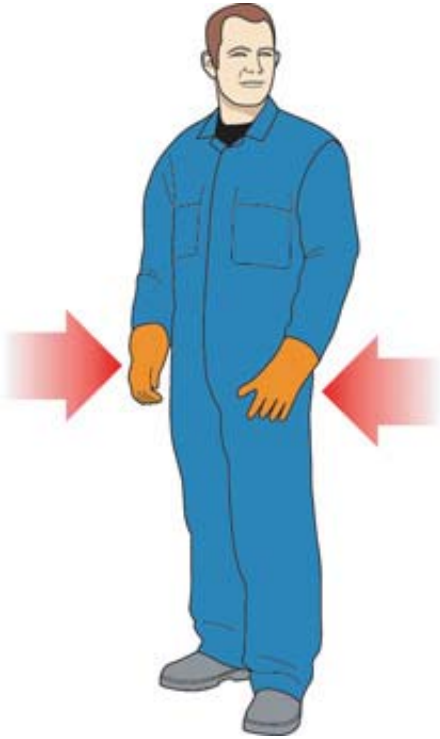
Good workplace* ventilation

- Check that extraction system is switched on
- Place hood as near as possible above the source
- Repeatedly check flow-direction
- A fume hood is most appropriate for laboratory areas
- Foam production on a conveyor requires very good extraction in the tunnel and at the cut off area.
- Air curtains improve the extraction efficiency



* includes warehouse

Continuous use of the correct PPE



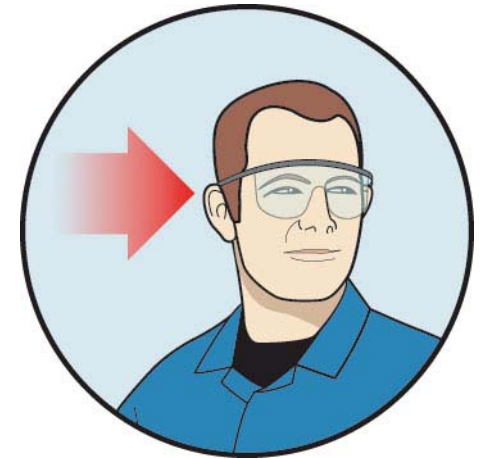
**Wear protective
gloves**



**Wear overall
& boots**



**In emergencies
wear overall
and/or heavy
duty apron**



Wear eye protection

Respiratory Equipment



If in doubt, always wear respiratory protection equipment

Dealing with a spillage of TDI

- Evacuate area
- Inform neighbours and authorities according to the safety plan
- Put on PPE including self-contained breathing apparatus
- Prevent TDI entering drains
- Cover with fire extinguishing foam to prevent escape of TDI vapours
- Control spill with wet sand absorbent
- Use decontamination solution
- Put contaminated sand in steel drums (max 2/3 full),
leave open to prevent pressure build up and monitor emissions
- Drum can only be closed when temperature is low and falling
- Treat as TDI waste
- Measure TDI levels in the atmosphere

Know where to find the emergency equipment



- Decontaminant solution
- Shovels
- Brushes and waste container
- Absorbent material such as sand

First Aid equipment

Know where your first aid equipment is

Know what to do

Know who to tell



Shower

Soap

Clean running water is best

Eyebath or eye wash bottle

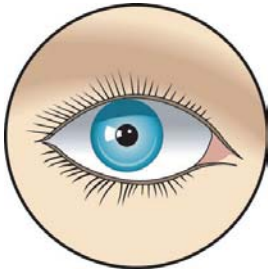
Telephone number of doctor



And don't panic !

Emergency procedures

Know First Aid for TDI



- Force open the eyelids
- Flush with lots of water for at least 10 minutes
- If in doubt, keep flushing
- See eye specialist as soon as possible



- Immediately remove contaminated clothing
- Immediately wash, wash, wash with soap & water



- Go outside into fresh air
- Doctor must be called or patient taken to medical facility
- Inform supplier – who can provide supporting information

Emergency procedures - Exposure to TDI

- A single high exposure to TDI can cause sensitisation
- Early treatment is important
- Remember that symptoms may occur later
- Help is available for the doctor from ISOPA member companies

Emergency procedures - Exposure to TDI

- A single high
 - Early treatment
 - Remember to
 - Help is available
- member contact
- ***Speed is essential***
 - ***Practice how to carry out First Aid procedure***
 - ***Seek medical advice***

Emergency procedures

Fire involving TDI

Follow your normal factory emergency procedure

- Sound Alarm
- EVACUATE
- Use trained specialists to fight fire
- Ensure protection from TDI emissions



Follow your normal factory emergency procedure

Handling of fresh TDI-based foam

Hazards:

- Exposure to TDI additives and release agent
 - Heat generated during reaction
 - Dust from sawing
-
- ➔ Wear PPE
 - ➔ Good ventilation important
 - ➔ Beware risk of fire from scorching until foam has cooled down



Typical questions

What would you do if?

- An isocyanate pump which is being serviced is still mistakenly under pressure. A technician is sprayed in the face with isocyanate
- A maintenance worker is replacing a pump – why should he need skin and respiratory protection?

Disclaimer

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