

# WORKING with diisocyanates

(MDI/TDI)

one  
step  
ahead

Safety in Action

## What are diisocyanates?

Diisocyanates are chemicals which may be supplied as liquids, solids or solutions. In combination with polyols (e.g. polyesters and polyethers bearing free hydroxyl groups) or other compounds with active hydrogen atoms, they are used for the manufacture of cellular and non-cellular polyurethane polymers, coatings, adhesives, sealants, elastomers and varnishes.

## Where are diisocyanates used?

One of the major uses for diisocyanates is in the production of polyurethane foams. Polyurethanes are used in a number of major industries such as construction, insulation, automotive, furniture, domestic appliances, textiles and shoes.

## Safe handling

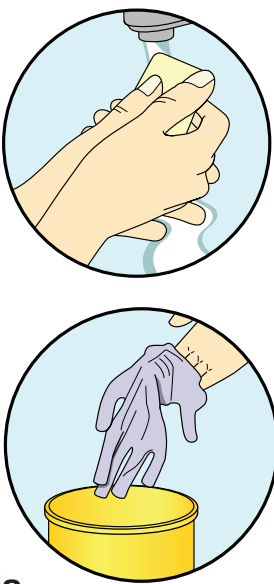
Diisocyanates are reactive chemicals which require correct handling to ensure that they are used safely. This means avoiding direct exposure of the body via inhalation, skin contact or ingestion (by mouth). Ways of achieving this are outlined on this wallchart. In particular, inhalation of vapours, aerosols and dusts should be avoided, since this can lead to irritation and in some cases to a reduction of lung function and/or sensitisation (asthma).

## Continuous use of the correct Personal Protective Equipment (PPE) PPE's are Risk Management Measures



## Good personal hygiene

- Creams to ensure good skin condition can be used
- Creams are not a replacement for protective gloves
- 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 eyewash facilities
- Do not eat, drink or smoke in the workplace
- Creams to ensure good skin condition can be used
- Creams are not a replacement for protective gloves



## Respiratory Protective Equipment (PPE) as Risk Management Measure

- MDI at elevated temperature
- Spray applications
- Dust with unreacted MDI
- Hoods
- Masks:
  - Half-mask, Full face mask
  - Air filter:
    - A2 for vapour only
    - A2/P2 or 3 Vapour & aerosol/dusts
    - Typically to be replaced after 2 days unless different guidance from supplier.
  - Supplied Fresh Air
- Respiratory equipment should be readily available (and well maintained)

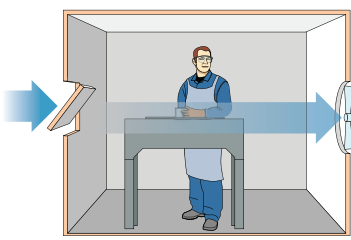


## Good workplace ventilation

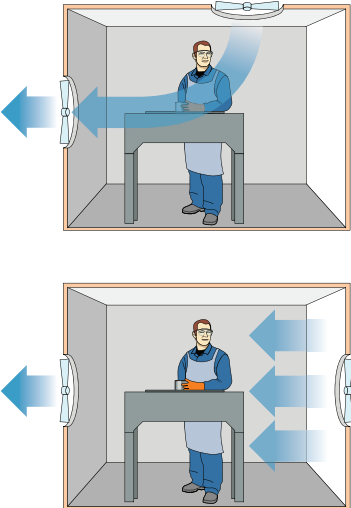
- Check that the extraction/ventilation system is switched on
- Place hood as near as possible above the source
- Repeatedly check flow-direction



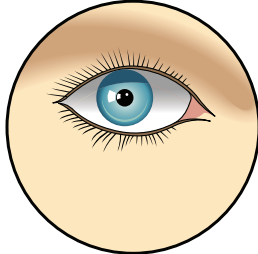
Bad



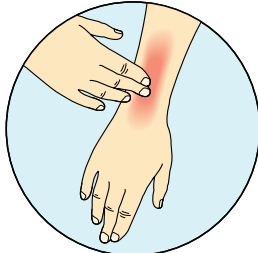
Best



## Emergency procedures: First aid



- Force open the eyelids
- Flush with lots of water for at least 15 minutes
- If in doubt, keep flushing
- See eye specialist as soon as possible
- Advice not to wear contact lenses, they could complicate treatment in case of emergency.



- Immediately remove contaminated clothing and wash with soap & water
- A diisocyanates skin decontamination study demonstrated that cleaning very soon after exposure is important, and that a polyglycol-based skin cleanser or corn oil may be more effective than soap and 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: Fire

Chemical fires need to be extinguished with foam, dry-chemical, carbon dioxide or water fog



### Follow your normal factory emergency procedure

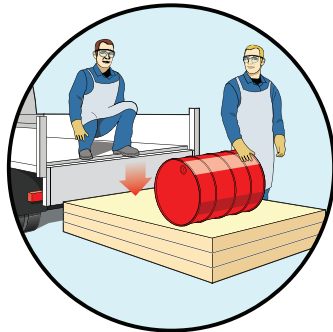
- Sound Alarm
- EVACUATE
- Use trained specialists to fight fire
- Ensure protection from diisocyanates emissions

## Transport

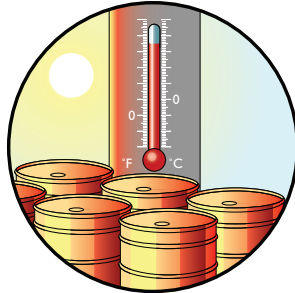
- Secure drums against damage with foam and tie on pallets
- Do not transport together with edible, flammable or oxidizing material
- Have documents available according to local regulations (e.g. MSDS, emergency numbers & information)

## Unloading

- Unload on concrete floor and not in proximity of drains
- Use forklift if available or prevent drum damage by using high density foam or tires for drum protection during unloading



## Storage



- Do not store in sun or rain
- Store drums upright in dry well ventilated conditions in between 15-40°C
- Have foam fire extinguishers, decontamination and emergency material available
- Do not stack drum pallets higher than three levels
- Leave space for visual inspection in between drums or pallets

## Decontamination

- 1 Wear correct Personal Protective Equipment (PPE)
- 2 Prepare decontaminant (see recipe proposed)
- 3 Choose well ventilated with concrete floors area for decontamination not in proximity of drains
- 4 Open the drum
- 5 Make sure the drum is completely empty and drip free; Don't remove labels
- 6 Fill decontaminant in drum and close drum
- 7 Roll drum four times
- 8 Stand drum upright again
- 9 Open drum to release pressure and label clearly as decontaminated
- 10 Leave drum open and upright for at least one week

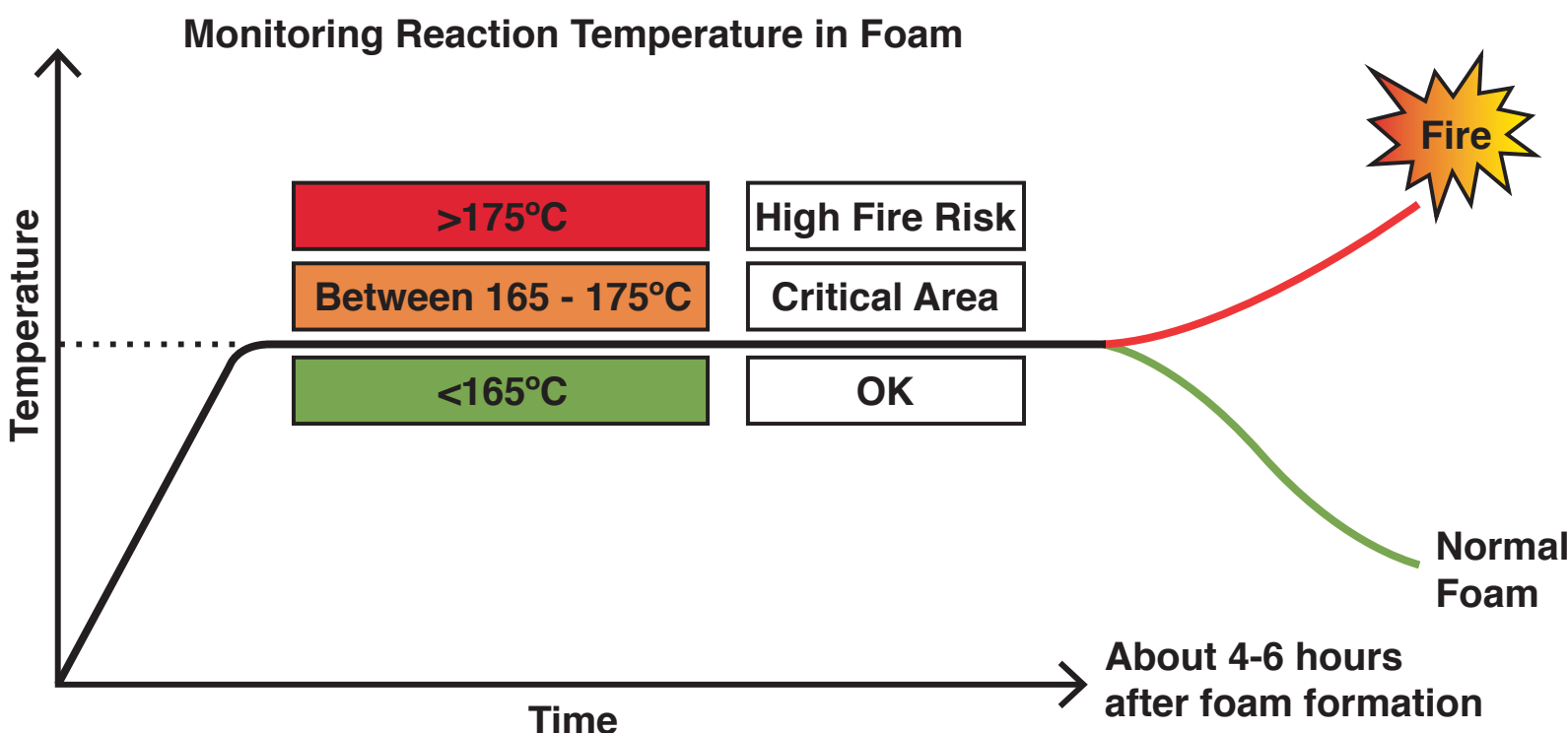


## POSSIBLE DECONTAMINANT RECIPE

- Liquid / yellow soap: **0,2 – 2%**
- Sodium carbonate: **5 – 10%**
- Water: fill to **100%**

## Foam Exotherm & Fire Risk

- The heat generated by the chemical reactions during foaming can induce fire if exotherm is too high.
- Understand, simulate and monitor the exotherm in your foam manufacture process
- Restrict smoking and fire in the foam manufacture and storage area
- Develop abatement methods and emergency procedures if foam temperature rises too high
  - Have fire extinguishers available
  - Segregate the foam moving it out of the factory
  - Cut foam into small pieces
  - Spray with water to cool down



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For more detailed information regarding safe working with diisocyanates please refer to product and safety data sheets from the raw material suppliers.