



OCCUPATIONAL HYGIENE
& SAFETY SERVICES

Workplace Air Monitoring Report on Occupational Exposure to Diphenylmethane Diisocyanate

Mark Almond
Star Uretech
Blackburn

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Carried out by:
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Executive Summary

Introduction

In order to update their COSHH assessments, an investigation into operative exposure to diphenylmethane diisocyanate vapour has been conducted at Star Uretech, Enterprise House, Hollin Bridge St, Blackburn, Lancashire, BB2 4AY.

The survey investigated the exposure levels isocyanate vapour. Throughout the monitoring period a study was made of the working practices of the operatives such that the exposures could be explained and recommendations would be specific to the processes.

Methodologies

Personal, long term monitoring for isocyanate exposure was carried out as described in the HSE's MDHS 25/4 "Organic Isocyanates in Air" method.

Where possible, the results for occupational exposure are then each expressed as an 8-hour Time Weighted Average (8-hr TWA) exposure for the normal working shift (as specified in Health & Safety Executive's publication of Guidance Note EH 40/05, (Workplace Exposure Limits (WEL) 2005), (2nd edition published 2011, HSE).

Monitoring Data

- Measured values of Diphenylmethane Diisocyanate (MDI) **are below** the **Workplace Exposure Limit (WEL) of 0.02 mg/m³** in the following areas:
 - Production Area.

Conclusions

Based on the air monitoring results obtained it is clear that the control measures in place are at Star Uretech, Blackburn, in ensuring that exposure to hazardous substances in the form of isocyanate vapour in the workplace air are below their respective Workplace Exposure Limits (WELs) as defined in HSE publication EH/40 Workplace Exposure Limits 2005 (2nd edition published 2011) in the following areas:

- Production Area.

For all airborne sample results taken where the samplers were fitted to workers outside their RPE the result does not take into account the RPE protection factor. Thus their actual exposure via inhalation is likely to be much lower than that measured, although the actual quantity would be an estimate only.

Diphenylmethane Diisocyanate (MDI) Vapour

Operators in this area were observed to feed components into a mixing unit by hand before allowing the mixer to run. Mixing was observed while components for the next batch of material were weighed out as per the composition. Once a batch was complete (after around 90 minutes), operators took the vessel and discharged the mixture into buckets in readiness for packaging and dispatch.

Three personal samples were taken from the operators on the shop floor ([REDACTED] ref. nos. I1, I2 and I3), all of which returned isocyanate vapour levels of less than 0.003 mg/m³ which is less than 2% of the Workplace Exposure Limit (WEL) of 0.02 mg/m³ for Diphenylmethane Diisocyanate as listed in EH40/2005 (2nd edition, published 2011) and therefore considered **insignificant**. All results from the survey were below the analytical limit of detection, the definition of this is discussed below.

Analytical Limit of Detection (LOD)

The Analytical Limit of Detection (LOD) is the lowest quantity of a substance that can be distinguished from the absence of that substance in a particular method of measurement.

In layman's terms:

- The value recorded is less or equal to that which can be detected from a blank which is known not to contain that substance.
- The smallest concentration of a substance that can be reliably measured by an analytical procedure.

Table 1 - Isocyanate Vapour Survey of Star Uretech, Blackburn on date 03/12/2015

Sample Ref.No.	Machine area and sample position	Flow rate (l/min)	Time of run (mins)	Volume (l)	Wt. Collected (mg)	Element / Compound (mg/m ³)	Normal Shift Length (Hours)	Normal shift 8-hr TWA* (mg/m ³)
I1	- Production Manager	2.0	288	576	< 0.0002	< 0.0003	8.0	< 0.0003
I2	- Production Operator	2.0	289	578	< 0.0002	< 0.0003	8.0	< 0.0003
I3	- Production Operator	2.0	291	582	< 0.0002	< 0.0003	8.0	< 0.0003





WORKPLACE EXPOSURE LIMIT (WEL) Diphenylmethane Diisocyanate - 0.02 mg/m ³ - WEL (8-hr TWA)

LIMIT OF DETECTION	0.20	(µg)
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As per Analysis Report

* Calculated as 8 hrs of actual working time (07:00-15:30 less 30mins of total breaks)

Report Details

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