

TECH NOTES



ISO-CHEK A Comparison of Method Parameters and Reagent Stability

Table 1. Comparison of Method Parameters — ISO-CHEK, OSHA 42, and NIOSH 5521

Parameter	ISO-CHEK [®]	OSHA Method 42 ¹	NIOSH Method 5521 ²
Collection Technique	Dual filter cassette	Single filter cassette	Impinger
Monomer and Oligomer Separation	Simultaneously collects and separates phases	Separation is performed during analysis	Separation is performed during analysis
HDI, TDI Monomer Free from Matrix Interference	Yes	No	No
Derivatizing Reagent	MAMA ³	1-2 PP ⁴	2-MP ⁵
Reagent stable at room temperature	Yes	No ⁶	No ²
Handling Precautions	None	Refrigerate	Refrigerate
Analysis Method	Reverse phase HPLC with UV, FD	Reverse phase HPLC with UV, FD	Reverse phase HPLC with UV, ECD
Sample Collection Time (minutes)	15	60	15 - 240
Sample Prep and Analysis Time (minutes)	45	75	75
Quantitation Limit ⁷ (10 sigma ²)			
2,6-TDI	1.0	2.3	0.5
2,4-TDI	1.0	2.5	0.7
1,6-HDI	1.0	2.9	1.0
MDI	1.0/0.27	NA	0.3
Limit of Detection ⁷ (3 sigma ²)			
2,6-TDI	0.2	1.6	0.
2,4-TDI	0.2	1.3	0.1
1,6-HDI	0.6	2.3	0.1
MDI	0.3/0.08	NA	0.1
Analysis Precision (CV)	0.02	0.009	Unknown ²
Range Tested for Precision (mg/m ³)	1 - 280	70 - 280	NA ²
Reproducibility/Accuracy ⁸ % Recovery SD	100.3 - 100.6 1 - 1.6	100.5 - 105.4 1.6 - 2.4	NA

References

- ¹ OSHA Method 42 for the analysis of diisocyanates
- ² NIOSH Method 5221, Monomeric Isocyanates
- ³ 9-(N-methylaminomethyl) anthracene
- ⁴ 1-(2-pyridyl) piperazine
- ⁵ 1-(2-methoxypyridyl) piperazine
- ⁶ Poster Session, 1996 AIHce, Paper #398: Meyer, P. and Czarnecki, M.
- ⁷ Detection limits for ISO-CHEK and OSHA Method 42 are $\mu\text{g}/\text{m}^3$ in a 15-liter sample. For NIOSH Method 5521, limits are stated as “per sample” with sample volume range given as 5 to 500 liters, and limits were established using pure standards without derivatizing reagent. For MDI, the first number of the pair for ISO-CHEK is with a UV detector, the second is with a fluorescence detector
- ⁸ Recovery of spiked standards by analysts is not associated with method.
NA Data not available or determined

Table 2. Comparison of Derivatizing Reagent Stability — ISO-CHEK and OSHA 42

% Loss of Derivatizing Reagent		
Time Exposed to Room Temperature	(MAMA) ISO-CHEK	1-(2PP) OSHA Method 42 ⁶
0	0	0
1 Hour	0	18
3 Hours	0	38
6 Hours	0	46
12 Hours	0	72
24 Hours	0	85
2 Weeks	0	90
1 Month	0	No Data
2 Months	0	No Data
10 Months	0	No Data

Data collection stopped with Method 42 after 2 weeks.

⁶ Poster Session, 1996 AIHce, Paper #398: Meyer, P. and Czarnecki, M.