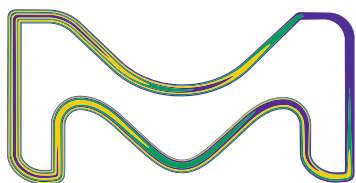


# ASSET™ EZ4 Dry Samplers for Isocyanates

First Class Sampling and Analysis



## Two ASSET™ EZ4 Samplers Available

ASSET™ EZ4 dry samplers for isocyanates are easy-to-use dry samplers offering exceptional sensitivity for collection and measurement of vapor phase and particulate isocyanates. The ASSET™ EZ4-NCO dry sampler collects the full range of isocyanate monomers and oligomers; while the ASSET™ EZ4-ICA sampler is designed to collect isocyanic acid (ICA) and methyl isocyanate (MIC) at low levels.

The science behind the ASSET™ EZ4 sampler is based on dibutylamine (DBA) impregnated glass fiber filters housed in a denuder and filter cassette. This ensures both the vapor phase and aerosol/particulate isocyanates are completely derivatized and form stable derivatives. The sampling method is fully validated according to ISO 17734-1:2013.

### Key Features and Benefits

- Easy to use and safe to wear
- Increases workplace productivity during industrial hygiene (IH) sampling, as work shifts are not interrupted for sampler exchange
- Reduces the cost of analysis through a reduction in required samplers to cover a work shift
- Ability to achieve reliable, low detection limits of 50-100x below existing methods
- Only device to measure vapor phase and particulate isocyanates
- Fully supported by certified reference materials for LC-MS analysis (calibration and internal standards)
- No interferences, no field extraction
- Reduces shipping and handling charges
- 2-year shelf life



ASSET™ EZ4-NCO Dry Sampler



ASSET™ EZ4-ICA Dry Sampler

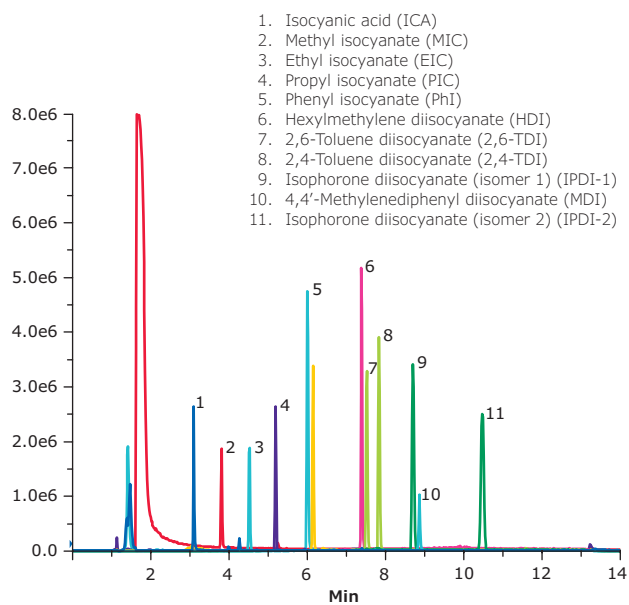
|                           | ASSET™ EZ4-NCO Dry Sampler          | ASSET™ EZ4-ICA Dry Sampler                                |
|---------------------------|-------------------------------------|---|
| <b>Sampling Flow Rate</b> | From 20 mL/min – 850 mL/min         | From 20 mL/min – 200 mL/min                               |
| <b>Sampling Time</b>      | From 5 minutes up to 12 hrs.        | From 5 minutes up to 4 hrs.                               |
| <b>Storage</b>            | Ambient (before and after sampling) | Refrigeration (before sampling); Ambient (after sampling) |
| <b>Stability</b>          | 4 weeks after sampling              | 2 weeks after sampling                                    |

## Did You Know?

- In 2013, several piperazine compounds, a common chemical used in the derivatization process of isocyanates in several existing sampling devices, were added to the banned substance list in the United Kingdom.
- Several common isocyanate sampling devices require the use of toluene, a Class 3 hazardous chemical, as a component of sampling, requiring the high cost of compliance shipping hazardous chemicals to the laboratory.

### Chromatogram of DBA Standard (equivalent 0.20 µg/mL each underivatized monomer)

column: Ascentis® Express C18, 15 cm x 4.6 mm I.D., 2.7 µm particles (53829-U)  
 mobile phase: (A) 5:95 acetonitrile:water w/ 0.05% formic acid; (B) 95:5 acetonitrile:water w/ 0.05% formic acid  
 gradient: 40% to 70% B in 3 min; 70% to 90% B in 2 min; hold at 90% for 6 min, 90% to 40% in 0.1 min, hold at 40% for 3.9 min  
 flow rate: 1 mL/min  
 column temp.: 35 °C  
 detector: AB3200 QTrap™ MS, ESI(+), SIM  
 injection: 2 µL



| Description  | Qty. | Cat. No. |
|--|------|----------|
| <b>Sampling Device</b>                                     |      |          |
| ASSET™ EZ4-NCO Dry Sampler                                 | 10   | 5027-U   |
|  | 50   | 5028-U   |
| Sample kit – Includes 2 samplers and fittings              | 2    | 5047-U   |
| ASSET™ EZ4-ICA Dry Sampler                                 | 10   | 28517-U  |
|  | 40   | 28518-U  |
| Calibration Fitting  | 10   | 5048-U   |
| <b>HPLC Columns</b>  |      |          |
| LC-MS-MS Ascentis® Express C18, 5 cm x 2.1 mm I.D., 2.7 µm | 1    | 53822-U  |
| LC-MS Ascentis® Express C18, 15 cm x 4.6 mm I.D., 2.7 µm   | 1    | 53829-U  |

## Certified Reference Materials

Our isocyanate-dibutylamine (DBA) calibration and isocyanate-dibutylamine-d<sub>9</sub> internal standard mixes were developed for use with the Supelco® ASSET EZ4 dry samplers. These certified reference materials (CRMs) are produced in an ISO/IEC 17025 and ISO 17034 accredited lab and are traceable to a NIST Standard Reference Material (SRM). A certificate of analysis fulfilling the requirements of ISO Guide 31 is provided with each CRM.

| Description  | Concentration   | Synonym   | Pkg.     | Cat. No.        |
|--|---|---|----------|-----------------|
| <b>Mixtures</b>  |   |   |          |                 |
| <i>TraceCERT</i> ® DBA Isocyanate Monomers Mix                 | in acetone:methanol (99:1) (varied conc.)*<br>Isocyanic acid-di-n-butylamine<br>Ethyl isocyanate-di-n-butylamine derivative<br>1,6-Hexamethylene diisocyanate-2(di-n-butylamine) derivative<br>Isophorone isocyanate-2(di-n-butyl amine) Isomer 1 derivative<br>Isophorone isocyanate-2(di-n-butyl amine) Isomer 2 derivative<br>4,4'-Methylenediphenyl diisocyanate-2(di-n-butylamine) derivative<br>Methyl isocyanate-di-n-butylamine derivative<br>Phenyl isocyanate-di-n-butylamine derivative<br>Propyl isocyanate-di-n-butylamine derivative<br>2,4-Toluene diisocyanate-2(di-n-butylamine) derivative<br>2,6-Toluene diisocyanate-2(di-n-butylamine) derivative  | ICA-DBA<br>EIC-DBA<br>HDI-2(DBA)<br>IPDI-2(DBA)<br>IPDI-2(DBA)<br>4,4'-MDI-2(DBA)<br>MIC-DBA<br>PhI-DBA<br>PIC-DBA<br>2,4-TDI-2(DBA)<br>2,6-TDI-2(DBA)  | 1 x 1 mL | <b>CRM40569</b> |
| <i>TraceCERT</i> ® d <sub>9</sub> -DBA Isocyanate Monomers Mix | in acetone (varied conc.)*<br>Isocyanic acid-di-n-butylamine-d <sub>9</sub> derivative<br>Ethyl isocyanate-di-n-butylamine-d <sub>9</sub> derivative<br>1,6-Hexamethylene diisocyanate-2(di-n-butylamine-d <sub>9</sub> ) derivative<br>Isophorone diisocyanate-2(di-n-butylamine-d <sub>9</sub> ) Isomer 1 derivative<br>Isophorone diisocyanate-2(di-n-butylamine-d <sub>9</sub> ) Isomer 2 derivative<br>4,4-Methylenediphenyl diisocyanate-2(di-n-butylamine-d <sub>9</sub> ) derivative<br>Methyl isocyanate-di-n-butylamine-d <sub>9</sub> derivative<br>Phenyl isocyanate-di-n-butylamine-d <sub>9</sub> derivative<br>Propyl isocyanate-di-n-butylamine-d <sub>9</sub> derivative<br>2,4-Toluene diisocyanate-2(di-n-butylamine-d <sub>9</sub> ) derivative<br>2,6-Toluene diisocyanate-2(di-n-butylamine-d <sub>9</sub> ) derivative | ICA-DBA-d <sub>9</sub><br>EIC-DBA-d <sub>9</sub><br>HDI-2(DBA-d <sub>9</sub> )<br>IPDI-2(DBA-d <sub>9</sub> )<br>IPDI-2(DBA-d <sub>9</sub> )<br>4,4'-MDI-2(DBA-d <sub>9</sub> )<br>MIC-DBA-d <sub>9</sub><br>PhI-DBA-d <sub>9</sub><br>PIC-DBA-d <sub>9</sub><br>2,4-TDI-2(DBA-d <sub>9</sub> )<br>2,6-TDI-2(DBA-d <sub>9</sub> ) | 1 x 1 mL | <b>CRM40570</b> |
| <i>TraceCERT</i> ® HDI-DBA Oligomers Standard                  | in methanol (varied conc.)<br>HDI-Monomer di-n-butylamine<br>HDI-Uretdione di-n-butylamine<br>HDI-Biuret di-n-butylamine<br>HDI-Isocyanurate di-n-butylamine  |   | 1 x 1 mL | <b>CRM40589</b> |
| <i>TraceCERT</i> ® HDI-DBA-d <sub>9</sub> Oligomers Standard   | in methanol (varied conc.)<br>HDI-Monomer di-n-butylamine-d <sub>9</sub><br>HDI-Uretdione di-n-butylamine-d <sub>9</sub><br>HDI-Biuret di-n-butylamine-d <sub>9</sub><br>HDI-Isocyanurate di-n-butylamine-d <sub>9</sub>  |   | 1 x 1 mL | <b>CRM40590</b> |
| <i>TraceCERT</i> ® MDI-DBA Oligomers Standard                  | in methanol (varied conc.)<br>Total MDI-di-n-butylamine monomers<br>MDI-3-Ring-di-n-butylamine<br>MDI-4-Ring-di-n-butylamine  |   | 1 x 1 mL | <b>CRM40603</b> |
| <i>TraceCERT</i> ® MDI-DBA-d <sub>9</sub> Oligomers Standard   | in methanol (varied conc.)<br>MDI-Monomers-di-n-butylamine-d <sub>9</sub><br>MDI-3-Ring-di-n-butylamine-d <sub>9</sub><br>MDI-4-Ring-di-n-butylamine-d <sub>9</sub>   |   | 1 x 1 mL | <b>CRM40604</b> |
| <i>TraceCERT</i> ® IPDI-DBA Oligomers Standard                 | in methanol (varied conc.)<br>IPDI-Monomer-di-n-butylamine (Isomer 1)<br>IPDI-Monomer-di-n-butylamine (Isomer 2)<br>IPDI-Isocyanurate-di-n-butylamines Oligomers  |   | 1 x 1 mL | <b>CRM40605</b> |
| <i>TraceCERT</i> ® IPDI-DBA-d <sub>9</sub> Oligomers Standard  | in methanol (varied conc.)<br>IPDI-Monomer-di-n-butylamine-d <sub>9</sub> (Isomer 1)<br>IPDI-Monomer-di-n-butylamine-d <sub>9</sub> (Isomer 2)<br>IPDI-Isocyanurate-di-n-butylamine-d <sub>9</sub> (Oligomers)  |   | 1 x 1 mL | <b>CRM40606</b> |

\*Target is 100 µg/mL for individual components, with the exception of the mixes having isomer 1 and isomer 2. For isomers, the sum of the isomers should be 100 µg/mL. Factual concentration will be given in the lot specific certificate of analysis.

### References

- ISO 17734-1:2013, Determination of organonitrogen compounds in air using liquid chromatography and mass spectrometry — Part 1: Isocyanates using dibutylamine derivatives.
- ISO 17734-2:2013, Determination of organonitrogen compounds in air using liquid chromatography and mass spectrometry — Part 2: Amines and aminoisocyanates using dibutylamine and ethyl chloroformate derivatives.
- ISO/TR 17737:2007, Workplace air — Guidelines for selecting analytical methods for sampling and analyzing isocyanates in air.
- Brady J. M., et al. *Environ. Sci. Technol.* 2014, 48, 11405-11412
- Karlsson, D., Dalene, M., Scarping, G., Marand, A. *J. Environ. Monit.* 2001, 3, 432-436.
- HSE, WATCH/2008/4, ANNEX 2 "Assessment of the Potential for Isocyanic Acid and Other Monoisocyanates to Cause Respiratory Irritation and Sensitation".

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