Monomer Analysis
Analysis by Gas Chromatography
Monomer Analysis

Impurities in feedstocks can adversely affect the quality of the final polymer, cause irreversible catalyst poisoning, and lead to costly plant downtime.

Our customers enjoy the benefits of the turn-key systems that we provide on the Agilent latest platform. The analyzers are completely developed including the installation of all valving, additional heated zones, and analytical columns. The analytical method is tested using certified calibration blends. We then deliver, install, and provide training on the application.

The instrument and analytical performance of our turn-key systems are guaranteed for one year.

Monomer Solutions by Application Number

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<thead>
<tr>
<th>Matrix</th>
<th>Impurities</th>
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<td>Ethylene</td>
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<td>Hydrocarbons</td>
<td>Trace CO / CO2</td>
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<td>Oxygenates</td>
<td>Sulfurs</td>
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<td>Perm Gases</td>
<td>Arsenic / Phosphine</td>
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<td>w/ Hydrogen</td>
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<th>Applications</th>
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<th>253</th>
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<th>660</th>
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Polymer Grade Monomer Analysis
Polymer Grade Monomer Analysis

The Turn-key Analytical Concept

- The analyzer is completely developed including valves, additional heated zones, and analytical columns.
- The chromatography is tested using certified calibration blends.
- The gas chromatograph is delivered to the customer’s facility.
- A service engineer comes to the customer’s site to perform installation and training.
- The instrument guarantee covers all parts and analytical performance during the first year.

Monomer Solutions

Wasson-ECE provides turn-key solutions for the following monomers:

- Ethylene
- Propylene
- 1-Butene
- Isobutylene
- 1,3-Butadiene
- Vinyl chloride monomer
- Styrene

All of our systems are built to order, so that we can meet your specific analytical needs.
App 26X: Hydrocarbons

FID 1 detects trace hydrocarbon impurities in the monomer matrix. Separation is accomplished using a high resolution PLOT column with a proprietary phase.

App 26X: FID/Methanizer

FID 2 detects trace carbon monoxide, methane, carbon dioxide, and acetylene (in propylene only) to a lower quantifiable limit of 50 ppb. A methanizer is used for the analysis of carbon monoxide and carbon dioxide.

The 26X Family of Analyses

- Application 260 - Impurities in Ethylene
- Application 261 - Impurities in Propylene
- Application 262 - Impurities in Ethylene and Propylene

Why Utilize the 26X Applications?

All components are analyzed in a single run. You can choose to analyze ethylene, propylene, or both on the same instrument, depending on your analytical requirements.
**Application 253**

Oxygenate Analysis by FID

The FID detects trace oxygenates in ethylene, propylene, butane/butenes, gasoline and naphtha. The lower quantifiable limit for this analysis is 4 ppm.

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**Application 410**

Analysis by PDHID

A Valco pulsed discharge helium ionization detector (PDHID) detects hydrogen, argon, oxygen, nitrogen, methane, carbon monoxide, and carbon dioxide to a lower quantifiable limit of 200 ppb.
The MSD detects alcohols to a lower quantifiable limit of 0.05 ppm.

1. t-Butanol, 15.5 ppm
2. Isopropanol, 2.2 ppm
3. sec-Butanol, 15.6 ppm
4. n-Propanol, 1.5 ppm
5. n-Butanol, 9.4 ppm

Selective Ion Mode
Maximizes Sensitivity!

1. Methyl Mercaptan, 2.6 ppm
2. Methanol, 1.2 ppm

MeSH and MeOH Analysis
The MSD detects methyl mercaptan and methanol is achieved to a lower quantifiable limit of 0.05 ppm.
The 46X Family of Monomer Analysis

Application 460 - Impurities in Propylene by MSD
Application 460B - Impurities in Ethylene and Propylene by MSD
Application 462 - Impurities in Propylene by MSD/PDHID
Application 462B - Impurities in Ethylene and Propylene by MSD/PDHID

Monomer Analysis by MSD allows for maximum flexibility

The 46X applications allow the user to identify a large variety of monomer impurities on one instrument. The 46X family of applications combines the MSD with the Valco PDHID to allow even greater analysis power.

On-Board Vaporizer
Converts propylene liquid to the gas phase prior to injection.

The 46X Family Analyses

The 46X family uses three different methods to analyze for a variety of species. Method 1 uses a mass spec detector (MSD) to detect oxygenates and mercaptans to a lower quantifiable limit of 0.05 ppm. This is achieved by using selective ion mode on the MSD to maximize sensitivity.

The 46X Family of Monomer Analysis

Application 460 - Impurities in Propylene by MSD
Application 460B - Impurities in Ethylene and Propylene by MSD
Application 462 - Impurities in Propylene by MSD/PDHID
Application 462B - Impurities in Ethylene and Propylene by MSD/PDHID

Application 46X: MS Analysis

The 46X GCMS analysis of MTBE, ethyl mercaptan, dimethyl sulfide, diethyl sulfide, isopropanol, ethanol, n-propanol, and n-butanol.
Method 2 utilizes the MSD selective ion mode to detect carbonyl sulfide and hydrogen sulfide to a lower quantifiable limit of 0.05 ppm.

The MSD selective ion mode allows the detection of arsine and phosphine to a lower quantifiable limit of 0.05 ppm.
An Agilent Technologies Sulfur Chemiluminescence Detector (SCD) is configured for sulfur speciation. The SCD is an equimolar detector with a lower quantifiable limit of 20 ppb.

An Agilent Technologies Nitrogen Chemiluminescence Detector (NCD) is configured to perform the analysis of trace ammonia in ethylene to a lower quantifiable limit of 50 ppb.

Why Utilize the 660/670?
The Agilent Chemiluminescence family of detectors provide sulfur and nitrogen specific analyses, avoiding the problem of hydrocarbon interference experienced by other types of detectors.
The dynamic blender is a portable blending device that dilutes a sample or a certified standard with a matrix gas of choice. The device can blend both liquids and gases. An inert flow path and heated bridge eliminate adsorption and condensation problems when blending gas standards that include sulfur, nitrogen, and other reactive compounds. The samples are fed directly to a gas chromatograph, eliminating the need to store multiple gas samples.

The dynamic blender may optionally contain a digital flow controller that allows the diluent gas to be controlled digitally.

The Wasson-ECE Dynamic Blender provides reliable point-of-use calibration blends.

The on-board vaporizer allows the user to dilute and vaporize heavy liquid samples into the gas phase. The dynamic blender then delivers the sample to the gas chromatograph for reliable calibration. The final concentration is a function of the flow rates of the sample and the diluent gas.
Wasson-ECE Instrumentation specializes in configuring and modifying new or existing gas chromatographs exclusively from Agilent Technologies to become guaranteed, turn-key analytical systems. Our customers describe their objectives and their samples: analytes, concentration ranges, phases, temperature, throughput, and any special needs. From this dialog we configure a task specific instrument. We add extra ovens, valves, plumbing, flow control, columns, electronics, and software to yield a complete solution. This saves our clients valuable time and delivers instruments that are state-of-the-art and ready for use upon installation.

The complete analytical method is developed, tested, and documented utilizing our experience working with numerous companies that have similar needs and goals. The resulting chromatograms and reports are inspected by our application chemists and you, to ensure system performance and design quality. Our field engineers then install each system and provide training. After installation, and throughout the life of the chromatograph, our support chemists are ready to help. We can assist with application details, questions, training, calibration, maintenance, and on-site service. Wasson-ECE brings experience and efficiency to your project, giving you confidence in the quality of your results.
Please contact us for more information

Engineered Solutions, Guaranteed Results.