NATURAL GAS STANDARDS

“Experience the MATHESON Commitment to Supply Chain Excellence”

MATHESON

ask. . . The Gas Professionals™
The accuracy of the Natural Gas Cylinder Standard used to calibrate BTU analyzers can have a significant impact on your company’s bottom line. Inaccurately measured BTU content can add up to tens of thousands of dollars in lost revenue when applied to millions of cubic feet of natural gas.

The MATHESON Program for Natural Gas Standards will maximize your operating efficiencies by addressing the six key parameters that customers must have from their suppliers to achieve supply chain excellence.

• **CONVENIENCE** using the MATHESON Item Master process that ensures fast re-ordering.
• **QUALITY** products and processes to ensure consistent reliability and safety
• **PRODUCTS** specifically designed for natural gas applications and with long shelf lives
• **HEALTH & SAFETY** programs, products and design integrity to protect your personnel and work environment
• **SUPPORT** whenever you need it from our technical and service support teams
• **DELIVERY** options tailored to your operating needs

Our 85+ years of experience in industrial gas applications and equipment makes MATHESON an ideal provider for your gas, equipment, and services requirements.

Call us at 800-416-2505 or email us at info@mathesongas.com and let us know how we can help you.
CONVENIENCE

The MATHESON Item Master Process

MATHESON works with our customers to capture all gas or liquid mixture components, concentrations, calculated values, hydrocarbon dew point, and temperature. All of this information is applied order after order, and cylinder after cylinder. All you have to tell us is your item number.

Additional MATHESON Convenience Features:
- Selected products stocked to provide emergency or “24-hour” delivery service
- Additional Certificate of Analysis copy available on request

Certificate of Analysis

QUALITY

Optimal Calibration

- NIST NTRM for Natural Gas give NIST traceability by analysis.
- Certificates of Analysis fully documented with components and certified concentrations, NIST traceability, calculated Specific Gravity and BTU content using industry software
- Only MATHESON purified research grade Methane, Ethane, Propane, i-Butane, and n-Butane are used eliminating raw material inconsistency and surprise chromatogram peaks
- The MATHESON technical team works with customers to optimize the cylinder fill contents with the hydrocarbon condensation (dewpoint) temperature specified by the customer

Natural Gas Phase Diagram that MATHESON uses to optimize cylinder contents vs hydrocarbon dewpoint.

- Calculated values are referenced to the latest document revisions from the Gas Processors Association, or other references specified by the customer
PRODUCTS

Natural Gas Calibration Standards

- MaxiTherm: Statistically valid 1 BTU uncertainty with both NIST traceable analytical and gravimetric validation. MATHESON has the Natural Gas NTRM to provide directly NIST traceable certifications. This grade is ideal for Central Laboratory instrument calibration.
- UniTherm: Two to 30 identical cylinders to calibrate every pipeline BTU analyzer equally.
- Primary Standard is the “industry standard” grade using high purity raw materials, high resolution gravimetric blending, and laboratory validation.
- For less demanding applications Certified Standard and Gravimetric grade are available.
- All mixture grade specifications are available (see chart).

MATHESON Natural Gas Grades

<table>
<thead>
<tr>
<th>MATHESON Grade</th>
<th>Certification</th>
<th>BTU Accuracy</th>
<th>Mixture Preparation</th>
<th>Blend Tolerance</th>
<th>Cert. Accuracy % Rel</th>
</tr>
</thead>
<tbody>
<tr>
<td>MaxiTherm</td>
<td>Dual: NIST NTRM plus Gravimetric</td>
<td>+/- 1.4 BTU/CF</td>
<td>High-resolution Gravimetric Preparation; &amp; best purity Matheson hydrocarbon raw materials</td>
<td>Methane &lt;0.1% - ≤ 1% rel. for % concentrations</td>
<td>≤ 0.1% Methane ≤ 0.2% Ethane ≤ 0.3% Propane ≤ 0.5% Butanes ≤ 1% Pentanes ≤ 2% N₂,CO₂,C₆+</td>
</tr>
<tr>
<td>MaxiTherm Custom</td>
<td>Dual: NIST NTRM plus Gravimetric</td>
<td>+/- 1.4 BTU/CF</td>
<td>High-resolution Gravimetric Preparation</td>
<td>This grade allows for components and concentrations that are not directly traceable to the NIST NTRM</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>Gravimetric Cert. confirm by analysis NTRM-Traceable Standard</td>
<td>+/- 1.5 -2 BTU/CF</td>
<td>High-resolution Gravimetric Preparation</td>
<td>Methane &lt;0.2% 1% for % concentrations</td>
<td>≤ 0.15% Methane ≤ 0.3% Ethane ≤ 0.5% Propane ≤ 1% Butanes ≤1% Pentanes ≤ 2% N₂,CO₂,C₆+</td>
</tr>
<tr>
<td>Gravimetric</td>
<td>Gravimetric only</td>
<td>+/- 2 BTU/CF</td>
<td>Gravimetric Preparation</td>
<td>1% for % concentrations</td>
<td>0.2% CH₄ by weight</td>
</tr>
<tr>
<td>Certified Standard</td>
<td>Lab Standard or Gravimetric</td>
<td>No BTU accuracy claim or calculation (generally 2 -3 BTU)</td>
<td>Gravimetric or Volumetric Preparation</td>
<td>2-5% depends on concentration</td>
<td>0.2% CH₄ by analysis</td>
</tr>
<tr>
<td>UniTherm (identical BTU cyls)</td>
<td>Dual: NIST NTRM plus Gravimetric</td>
<td>1 - 2 BTU/CF depending on grade desired</td>
<td>Unitherm Gravimetric Process</td>
<td>- ≤ 1% for % concentrations</td>
<td>≤ 0.1% CH₄ and increases</td>
</tr>
</tbody>
</table>

Environmental Monitoring

- For Compressors with CEMs and Gas Processing Facilities
- EPA Protocols and CalMat 1 and 2 grades
- Nitric Oxide/N₂ ≥ 2.5 ppm, CO/N₂ ≥ 2.5 ppm, Nitrogen Dioxide/N₂ or Air ≥ 20 ppm
- UHP or MATHESON Nitrogen for NDIR and Chemiluminescent instrument zero gas
- Zero Air or Oxygen CP grade for Chemiluminescent instrument ozonators

Pipeline Monitoring of Sulfur Compounds and Water Impurity

- H₂S, COS, and Methyl Mercaptan ≥ 1 ppm in Methane or N₂ in Microshield treated aluminum cylinders for long term stability (other sulfur compounds available!)
- UHP or MATHESON grade Helium for sulfur instrument carrier gas
- Water in Methane or Nitrogen in the MATHESON Microshield treated aluminum cylinder provides stable water measurement calibrations
MATHESON Equipment for Pipeline and Central Laboratory Support

- Regulators for Gas Cylinders

<table>
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<tr>
<th>Natural Gas Standard Regulator</th>
<th>Delivery Pressure Gauge</th>
<th>Cylinder Pressure Gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 3537-350</td>
<td>0-60 psig</td>
<td>0-3000 psig</td>
</tr>
<tr>
<td>Model 3538-350</td>
<td>0-60 psig</td>
<td>0-1000 psig</td>
</tr>
</tbody>
</table>

- Gas Panels for Instrument Gases
  Models 53 and 54 Single Station Manifolds

- Gas Detection for Flammable Gases and Oxygen Concentration

  Handheld Detectors
  - Model 8067 Multigas Leak Detector
  - Model GX-2003: 1 to 5 gases including Methane, Oxygen deficieny, % LEL, Carbon Monoxide, Hydrogen Sulfide

  Fixed Gas Detection System
  - Gas Scanner Series for 1, 2, 4 or 8 channels including sensors for any of LEL, Oxygen, H₂S, Carbon Monoxide, or CO₂

- Cylinder Heat Blankets
  - Model HQ2015 Series Therma-Cal Gas Cylinder Blankets
  - HQ2015A-1A fits 1A cylinders
  - HQ2015A-1F fits 1F cylinders

Note: For indoor temperature greater than 50° F (10° C)
HEALTH & SAFETY

Monitoring for OSHA Compliance
• MATHESON Portables LEL and H₂S/CO/Methane/Air mixtures for your safety and industrial health programs. Many more standard and custom mixtures and pure gases, and gas delivery products are available (see the MATHESON Portables Catalog)
• Gas Cabinets and Panels for safe hazardous gas handling and delivery to point of use
• Hazardous gas monitoring systems including fixed and portable instruments, plus Kitagawa tubes
• On-site safety training programs and education products to enhance and improve safety awareness

SUPPORT

MATHESON Technical and Service Support Teams
• Expert natural gas mixture engineering that includes the latest hydrocarbon mixture phase envelope software
• Specialty Gas Team who understand natural gas mixtures: Product Manager, Technical Service Coordinator, Gas Operations Team and Customer Service
• Personalized service at your door with field sales, and on the phone with dedicated customer service representatives

DELIVERY
• Designed to suit your facility and operating hours
• Options for delivery

MATHESON is committed, without limitation, to be your “go to” company for maximizing profits and minimizing operating costs.

Thank you for your interest in our specialty gas and equipment products. For more information, please visit the MATHESON website @ www.mathesongas.com, or call our customer service center @ 800-416-2505 to have one of our sales representatives contact you directly.