



Onsite Gas Production, Bulk Gases, Specialty Gases
and Related Services and Products for the Chemical Industry

MATHESON Technology, Flexibility, and Experience Help You Maximize
Safety • Reliability • Compliance • Productivity • Profitability



MATHESON
The Gas Professionals

For more than 90 years, **MATHESON** has provided gases, equipment, and expertise to a breadth of industries – including the chemical industry.

MATHESON, and its sister, Taiyo Nippon Sanso, having constructed its first air separation plant in 1935, are today recognized as global leaders in the design, fabrication, and operation of ASUs (air separation units) used for production of nitrogen, oxygen, and argon. Beyond that, as a part of our ongoing business, we have accumulated expertise in plant design and operations for the production of ALL gases.

Access to gases and gas management will impact the operational excellence of any chemical plant; and to that end, we offer our products and global experience to chemical plants seeking over-the-fence and onsite gas production. In addition to our own captive expertise, we partner with best of breed technology providers for specialized proficiencies.

Even with our years of experience, we remain inventive and proactively flexible ... always looking for the best solution for each application challenge.

Total Solutions for the Chemical Industry



MATHESON Steam Methane Reformer, Pensacola, FL



MATHESON Air Separation Unit, San Antonio, TX

MATHESON delivers gas, gas handling, application and engineering expertise, plus plant or sub-system construction, maintenance, expansion, and upgrades.

Over-the-Fence Gas Supply

A wide range of gases -- including hydrogen, oxygen, nitrogen, argon, carbon dioxide, hydrocarbons, and more -- produced on-site or delivered by pipeline. Bulk and cylinder supply also available.

Onsite Air Separation Units (ASUs)

Design, construction, maintenance, and ongoing systems operation for onsite generation of oxygen, nitrogen, and argon.

- Cryogenic air separation for larger volume applications
- Non-cryogenic separation, including selective adsorption (PSA and VSA) and membrane separation

Onsite HYCO (syngas) and Hydrogen Plants

Services include design, construction, maintenance, and operation of:

- Steam methane reformers (SMR)
- Autothermal reformers (ATR)
- Partial oxidation (POX)
- Gasification

Deep Desulfurization Technology

Nanochem® GuardBed™ desulfurization sorbents and systems for sulfur removal to ppm and sub-ppm levels from gas streams and liquid streams – for finished product and feedstocks.

Research and Development

- Specialty gases
- Calibration mixtures
- High purity gas handling equipment
- Analytical equipment
- Regulatory and environmental compliance

With our Total Solution approach, we work with your plant experts to design the customized package that addresses your specific requirements.

Gases and Applications

Chemical Production:

Oxygen is a required feedstock in many chemical manufacturing processes, including ethane cracking, ethylene oxide, titanium dioxide, propylene oxide, MEG, vinyl chloride monomer, vinyl acetate monomer. Many of these compounds are the backbone of the petrochemicals industry, so a safe, economical and reliable supply of Oxygen is a necessity. Oxygen can also be used in oxidation and liquefaction processes, to produce syngas and for air enrichment.

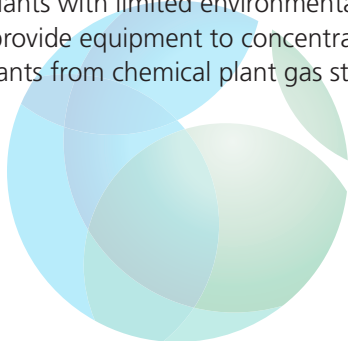
Hydrogen, Carbon Monoxide and Syngas can also be important in the petrochemical industry. The advent of low cost NG in the US has forged an upturn in the chemical industry, requiring Hydrogen, Carbon Monoxide and Syngas from NG. **MATHESON** can design, build, own and operate facilities to provide a safe and reliable supply of these products to meet process needs of any size. Hydrogenation, ammonia, methanol, FT, MTR, oxo-alcohols and acetate acid are just a few of the chemical production processes that can benefit from an economical supply of H_2 , CO or Syngas.

Pressure and Leak Testing, Purging and Blanketing, Emissions Control, Instrumentation and Safety:

An inert gas such as **Nitrogen** finds a multitude of applications in a chemical facility. Nitrogen can be used to pressurize new, repaired, or modified tanks, pipelines or vessels to check process integrity and leak tightness. Plant tanks and storage vessels can be purged and blanketed with nitrogen to displace air and flammable vapors for both safety and quality purposes. Nitrogen can be used to maintain an inert atmosphere to prevent product degradation by contaminants, moisture, or oxygen. Nitrogen helps extend the life and reliability of instrumentation and products. **MATHESON** supplies nitrogen in a variety of purities and delivery formats.

Plant Expansion and Gas Clean-up:

MATHESON has the expertise to help meet your expansion and gas clean-up needs. We can provide technology solutions to increase the capacity of your existing plants with limited environmental impacts. We can also provide equipment to concentrate and remove contaminants from chemical plant gas streams.



Advanced Sulfur Removal Technology:

The Nanochem® GuardBed™ Series of Deep De-Sulfurization purifiers is a lineup of high performance purifiers specifically targeting **Sulfur Removal** ... to ppm, sub ppm, and even sub-0.1 ppm levels. Nanochem® GuardBed™ can be used with gas and liquid streams such as: natural gas, liquid hydrocarbons (natural gas liquids, iC4 / iC5 feedstock), fuels (diesel, jet fuel, logistic fuel, bioethanol), LPG, olefins, refinery off-gases. Nanochem® GuardBed™ sorbents offer high capacity, are regenerable, and can be used for removal of difficult sulfur-containing species such as COS, thiophenes and disulfides.

Sulfur Recovery and Acid Gas Plants:

The use of **Oxygen** in a sulfur recovery unit (SRU) can increase plant capacity and help with contaminants and low hydrogen sulfide streams. Oxygen can also be used to boost temperature. Oxygen use can be intermittent or continuous. **Hydrogen** can also be added to the tail gas treating unit (TGTU) of a sulfur plant when the streams to be treated are leaner (i.e., less H_2S).

Turnaround Services:

MATHESON can arrange to provide **Nitrogen** and turnaround services to help your chemical plant get back up and running as quickly as possible. Using state-of-the-art equipment and **MATHESON** gases, we can provide cooling, heating and purging services on a short-term or intermittent basis.



MATHESON Steam Methane Reformer, Columbus, MS

About **MATHESON**

MATHESON is a single source for industrial, medical, specialty and electronic gases, gas handling equipment, high performance purification systems, engineering and gas management services, and on-site gas generation. Our mission is to deliver innovative solutions for global customer requirements.

MATHESON is part of the Nippon Sanso Holdings Group, a global corporation with 300 group companies and approximately 20,000 staff, operating in four regions around the world: Japan, the United States, Europe, and Asia/Oceania.

We have a depth of technology and resources that can come only from a global enterprise.

MATHESON *and Safety*

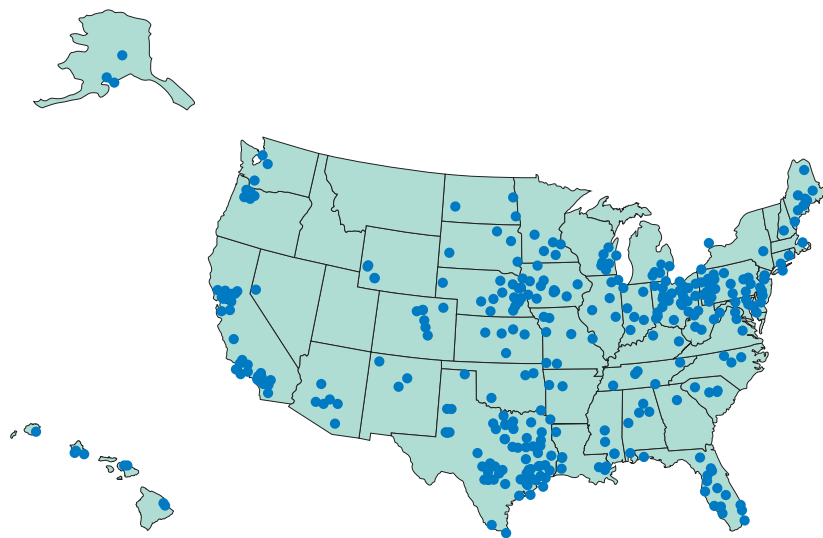
MATHESON places the highest value on Safety – every day. We value our safety record, and we've received many industry awards for our safe operations. All of our employees are thoroughly trained on an ongoing basis to deliver MATHESON's safety standards.

MATHESON *and Quality*

MATHESON also places the highest value on Quality. Our plants are certified to ISO 9001 standards, and we employ Lean Six Sigma (LSS) principles to measure and improve our quality results on a basis of continuous improvement

MATHESON *and Sustainability*

MATHESON is committed, at all levels, and in all locations, to principles of Sustainability and Corporate Responsibility. Our principles embrace Environmental Sensitivity, Community Support, and Financial Performance. Our aim is to ensure uninterrupted access to our products and services.



Our **Mission:**

Our core competency is the supply, delivery, and management of gases and gas production sub-systems and plants. Your core competency is putting those gases to work to make your process safer, more efficient, and more profitable.

Our Mission is to focus on our core competency so you can focus on yours.

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The Gas Professionals

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