

The World Market for Gas Flow Measurement, 5th Edition

– OVERVIEW –



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Publication Date: Q4 2026

Core Study: The World Market for Gas Flow Measurement, 5th Edition

Flow Research is working on a new edition of our study on gas flow measurement worldwide, *Core Study: The World Market for Gas Flow Measurement, 5th Edition*, and its companion study, *Module A: Applications for Hydrogen, Natural Gas, Renewable Natural Gas, and Other Renewable and Nonrenewable Gases*.

Our objective is to give suppliers, systems integrators, and end-users the information they need to make informed decisions in pursuing new business and in gaining higher returns in this immense market. The *Core Study* is designed to provide the most comprehensive picture of the worldwide gas flow measurement market available today. It examines the gas flow measurement market on both a worldwide and regional basis, covering each flow technology used for gas flow measurement. The research shows where growth is occurring and where it is not, and where to expect the highest returns. *Module A* discusses gas applications for both renewable and nonrenewable natural gas, including hydrogen, natural gas, and other renewable and nonrenewable gases. It discusses different types of hydrogen and which flowmeters are best suited for measuring it.

This research is a continuation of our resolve to view flow measurement from many perspectives, whether it is by fluid type, flow technology type, industry or application. In offering these different perspectives, we give suppliers, system integrators, and end-users the knowledge and understanding they need to successfully maneuver within the markets they serve.

Flow Research has been following the market for gas flow measurement regularly since we published the first edition of our worldwide gas flow measurement study in 2004. Our user interviews show that the interest in natural gas flow measurement is at a very high level. New opportunities have also emerged in the measurement of other gases.

This study will achieve multiple goals:

- Determine worldwide market size for gas flow measurement in 2019 for each technology
- Forecast market growth through 2024 for each technology used in this market
- Analyze factors contributing to and limiting growth
- Identify market growth sectors
- Provide average selling prices in the market worldwide and by region
- Determine supplier market shares for the gas flow measurement market in 2025, worldwide and by technology type
- Provide company profiles of the main suppliers of flowmeters used for gas flow measurement
 - Analyze the gas flow measurement products of the main suppliers in this market

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Natural Gas Is a Major Portion of the Total Market for Gas Flow Measurement

The worldwide natural gas market has experienced extraordinary growth over the last decade, and with this growth has come exceptional interest in its future. The global search for new sources of energy has been spurred on by the emergence of major new demands on energy supplies from China, India, and other developing economies. Natural gas has become an important answer to the question, “How will these new energy demands be satisfied?”

Recent discoveries of new gas fields and new production methods have boosted natural gas availability. While gas exploration is an on-going process, gas production has been experiencing a revolution due to new extraction technologies coming on line. These technologies not only boost the volume of natural gas available to the market, but also increase the complexity of its management.

The production of natural gas is still found primarily in traditional topside locations, but increasingly the growth in production has been at offshore and subsea locations. These latter fixed sites have required the evolution of line sharing and pooling technologies. And, most recently, gas production has begun to include the use of floating LNG ships. These many innovations have constantly stretched and tested the limits of gas flow measurement applications.

The seeming abundance of natural gas has been welcomed by the world community for several major reasons. First, of course, is that it can help to meet the energy needs of every country and is available now. Second, it is currently at a favorable price point due to its surging supply. Third, it can be delivered in a number of forms and through a variety of means, making it a highly versatile commodity and potentially lowering its cost of distribution. And, fourth, natural gas is considered a relatively clean alternative to coal and to crude oil and petroleum fuels – an important factor in a world becoming convinced of the need to implement environmental protections now.

Flow Research believes this is an optimal time to quantify the growth in the gas flow measurement market, and to take an in-depth look at its present and future prospects.

Market Changes and Dynamics

This study’s fifth edition continues our analysis of the worldwide gas flow measurement market we began in 2004. There has been an enormous amount of change since that time, both from the standpoint of technology as well as from corporate and even country perspectives.

Natural gas – traditionally a major source of energy for the entire world – is now an even more valued commodity. It is largely considered a cleaner and more economical alternative to oil as an energy source, and an interim step toward renewable supplies. New technology is making recovery and delivery of natural gas more feasible than ever before, even from subsea wells. And newly developed natural gas reserves in North America and elsewhere are making it possible for Western countries to be less dependent on foreign suppliers.

Other gases are also changing in their availability, utility, and worth – and how and where they are measured. Modern assembly lines dependent on robotic equipment rely on compressed air, there

is an emerging market in hydrogen as a vehicular fuel source, and requirements in the continuous emissions measurement and control arena for gases are constantly being tightened.

All of these changes are helping to create a world much different than just five years ago. Gas trade routes have substantially changed as the demand for natural gas is met by a rapid increase in new LNG supplies. What were once emerging regional economies in China and India are now leading centers of natural gas consumption. The United States became a net exporter of natural gas in 2017, even as domestic demand steadily increased. Today, many observers wonder what forms the gas industry will take, given gas prices and world market volatility.

This study describes in detail the effects these dynamics and other factors have had on the gas flowmeter market since our last full report on the subject in 2020. We believe that this report is the most comprehensive and up-to-date review of the gas flowmeter market available today.

Segmentation

Our research of the worldwide gas flowmeter market is based on an examination of the following individual market segments:

Geographic Regions

- Worldwide
- North America (United States and Canada)
- Western Europe
- Eastern Europe/FSU (Former Soviet Union)
- Mideast/Africa
- Japan
- China
- Asia/Pacific (including India)
- Latin America (Mexico, Central and South America)

Gas Flowmeter Technologies

New-Technology Flowmeters

- Coriolis
- Ultrasonic
- Vortex
- Thermal

Conventional Flowmeters

- Differential Pressure Transmitters
- Primary Elements
- Positive Displacement
- Turbine
- Variable Area

In-depth Market Analysis

The study reviews each of the included gas flowmeter technologies in a dedicated, comprehensive chapter. These technology chapters include discussions of the particular gas flowmeter's

advantages and disadvantages. They also detail specific **products** offered by leading manufacturers.

The study provides **Market Size** as well as five-year **Growth Forecasts** for each gas flowmeter type in both revenues and units. We present all this data both on a worldwide basis and broken down by each of the eight geographic regions.

In addition, the technology chapters provide **Average Selling Prices** as well as five-year **Price Projection** forecasts for each gas flowmeter type, both on a worldwide basis and by the eight geographic regions.

Chapter Descriptions

We use a consistent research methodology for collecting data as well as for presenting it throughout the study itself. We believe this careful consistency facilitates the use of the study findings.

Below is a summary of the contents of each chapter in this study, including examples of individual chapter highlights:

Chapter 1: **Executive Summary**

- Introduction and summary capturing major themes, data, and conclusions

Chapter 2: **Scope and Method**

- Overviews of study objectives and methodology
- Definitions of flowmeter technologies
- Overview of Flow Research products, services, and capabilities

Chapter 3: **Paradigm Case Analysis**

- Review and discussion of the ideal applications for each gas flowmeter technology

Chapter 4: **The Worldwide Gas Flowmeter Market**

- Natural Gas is a cleaner alternative
- Natural Gas should continue to grow despite today's low prices
- Gas flowmeter technologies
- Market Size and Growth Forecasts for All Gas Flowmeters by Type Worldwide
 - in Dollars
 - in Units

Chapter 5: **Coriolis Gas Flowmeters, Market Size, and Forecasts**

- Advantages: Accuracy/Reliability/and more
- Product analyses of leading companies such as Micro Motion and Endress+Hauser
- Growth factors: "Best-in-class" accuracy now available in large line sizes

Chapter 6: **Ultrasonic Gas Flowmeters, Market Size, and Forecasts**

- Advantages: Approved for custody transfer/Versatile configurations/and more

- Product analyses of leading companies such as Honeywe/Elster and Endres+Hauser/SICK
- Growth factors: “More calibration facilities have been built.”

Chapter 7: Vortex Gas Flowmeters, Market Size, and Forecasts

- Advantages: Multivariable types provide mass flow measurement/and more
- Product analyses of leading companies such as KRONNE, Emerson, and Yokogawa
- Growth factors: Provides accurate and reliable flow measurement at a competitive price

Chapter 8: Thermal Gas Flowmeters, Market Size, and Forecasts

- Advantages: Medium cost/well-suited for stack flow measurement/and more
- Product analyses of leading companies such as ABB and Fluid Components International
- Growth factors: Continuous Emissions Monitoring requirements

Chapter 9: Differential Pressure Transmitters for Gas Flow, Market Size, and Forecasts

- Advantages: Lower cost/technology is well understood/and more
- Product analyses of leading companies such as Emerson and Siemens
- Growth factors: Advanced design features in differential pressure flow transmitters

Chapter 10: Primary Elements for Gas Flow, Market Size, and Forecasts

- Advantages: Inexpensive material replacement/Variety of types/and more
- Product analyses of leading companies such as Emerson, Daniel, and Sensia
- Growth factors: Growth in the use of multivariable DP flowmeters

Chapter 11: Positive Displacement Gas Flowmeters, Market Size, and Forecasts

- Advantages: Good for low flowrates/accommodate high viscosities/and more
- Product analyses of leading companies such as Badger Meter and OVAL Corporation
- Growth factors: New applications and improved PD components

Chapter 12: Turbine Gas Flowmeters, Market Size, and Forecasts

- Advantages: Low to medium cost/good turndown ratios/and more
- Product analyses of leading companies such as Daniel and Honeywell/Elster
- Growth factors: Turbine flowmeters are widely accepted

Chapter 13: Variable Area Gas Flowmeters, Market Size, and Forecasts

- Advantages:Very low cost/don't require electricity/and more
- Product analyses of leading companies such as KROHNE and Yokogawa
- Growth factors:Variable area flowmeters are a low-cost solution

Chapter 14: Gas Flowmeter Supplier Market Shares

- Provides market shares of the major suppliers of flowmeters for gas flow measurement
- Market shares are provided for the total worldwide market for each flow technology

Chapter 15: Supplier Profiles

- Provides information on all major gas flowmeter suppliers worldwide, including:
 - Company Overview
 - Company History and Organization
 - Product Lines
 - Strategies

Company Profiles

Below is a partial list of companies profiled in this study:

- ABB
- AMETEK (Solartron)
- Azbil
- Emerson
- Endress+Hauser/SICK
- Fluid Components Int'l
- Goldcard Smart Group
- Honeywell/Elster
- KROHNE
- Panametrics
- Sensia
- Siemens
- Schneider Electric (Foxboro)
- Yokogawa

And More

Module A: Applications and Strategies for Gas Flow Measurement

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Oman Gas Company (Photo by Flow Research)



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Module A: Applications and Strategies for Gas Flow Measurement

Module A: Applications and Strategies for Gas Flow Measurement examines the gas flow measurement market from the perspective of gas flowmeters and gas applications. It is a companion study to *Core Study: The World Market for Gas Flow Measurement, 5th Edition*. Together the two studies examine the gas flowmeter market, gas flowmeter types, applications and market influences, suppliers, flowmeters in the oil & gas industry, and regional market influences. These include hydrogen, natural gas, and other renewable and conventional gases, as well as providing strategies for suppliers. These two studies provide the best understanding of the whole market, although the individual studies can also be purchased separately.

The Oil & Gas Industry accounts for a large portion of the gas flowmeter market, as well as a significant portion of the flowmeter market in general. To create a comprehensive, multi-perspective view of the gas market, meters, and applications, *Module A* covers many gas flow measurement applications and market influences by gas flowmeter types.

Gas flow measurement applications and their associated revenues have grown significantly during the last few years. A major driver of this growth worldwide has been the expansion in demand for natural gas and related energy products. There has also been significant new growth in capital projects in large regional economies such as North America, India, China, and the Mideast during this time as well. Given the recent volatility of some major oil and gas countries, we believe that this is an optimal time to quantify the growth in this market, and to take another in-depth look at an expanding market.

Module A achieves multiple purposes:

- Examines gas types and gas applications
- Examines strengths, weaknesses and specific applications for each gas flowmeter type: Coriolis, ultrasonic, vortex, thermal, differential pressure transmitters, primary elements, positive displacement, and turbine flowmeters
- Reports on 2025 shipments worldwide for each of the gas flowmeter types by application
- Provides growth rate forecasts to 2030 for gas flowmeters used in all gas applications
- Provides strategies for competing in these markets.

Key topics addressed in Module A

- Gas measurement applications by flow measurement technology
- Best areas for future growth
- Tactical and strategic recommendations for suppliers

Segmentation

Our research on the worldwide gas flowmeter market is based on an examination of the individual market segments by region and flow measurement technology type, and these are common throughout. *Module A* discusses gases and gas applications, and gas applications for each of the flowmeter types. Individual chapters are devoted to each of the gas flowmeter types.

Geographic Regions

- Worldwide
- North America (United States and Canada)
- Western Europe
- Eastern Europe/FSU (Former Soviet Union)
- Mideast/Africa
- Japan
- China
- Asia/Pacific (including India)
- Latin America (Mexico, Central and South America)



Gas Flowmeter Types

New-technology Flowmeters

- Coriolis
- Ultrasonic
- Vortex
- Thermal

Conventional Flowmeters

- Differential Pressure Transmitters
- Primary Elements
- Positive Displacement
- Turbine

Each gas flowmeter type's chapter includes:

- 2025 shipments of the flowmeter type by gas application worldwide and by region
- Forecasts to 2030 for the flowmeter type by gas application worldwide and for each region
- Advantages and disadvantages of the flowmeter type
- Applications for the flowmeter type (see lists that follow)
- Factors affecting the market for the flowmeter type

Chapters in Module A

Chapter One: Executive Summary

Chapter Two: Scope and Method

Chapter Three: Applications for Gas Flow Measurement: Hydrogen

Chapter Four: Applications for Gas Flow Measurement: Natural Gas

Chapter Five: Coriolis Flowmeter Gas Applications

Chapter Six: Ultrasonic Flowmeter Gas Applications

Chapter Seven: Vortex Flowmeter Gas Applications

Chapter Eight: Thermal Flowmeter Gas Applications

Chapter Nine: Differential Pressure Flowmeter and Primary Elements Gas Applications

Chapter Ten: Positive Displacement Flowmeter Gas Applications

Chapter Eleven: Turbine Flowmeter Gas Applications

Chapter Eleven: Strategies for Success

Applications by Gas Flowmeter Type

New-Technology Flowmeter Applications

Coriolis

- Custody Transfer of Natural Gas (CTNG)
- Allocation Metering
- Process Measurement
- Industrial Gases
- Compressed Natural Gas (CNG)
- Utility Metering
- Other

Ultrasonic

- Custody Transfer of Natural Gas (CTNG)
- Check Metering
- Leak Detection
- Process Gas Measurement
- CNG
- Flare/Stack Gas
- Other

Vortex

- Custody Transfer of Natural Gas (CTNG)
- Non-Custody Transfer of Natural Gas
- Industrial Gases
- Other

Thermal

- Continuous Emissions Monitoring (CEM)
- Flare Gas/Flue Gas
- Landfill Gas Recovery
- Biogas Recovery
- Biomass Fermentation and Recovery
- Coal Mine Methane Recovery
- Boiler Inlet
- Wastewater Treatment

Traditional Technology Flowmeter Applications

Differential Pressure (DP) Transmitters and Primary Elements

- Custody Transfer of Gas
- Non-Custody Transfer of Gas
- Wet Gas Metering
- Allocation Metering of Gas
- LNG
- CNG
- Gas Gathering Stations
- In-plant Measurement
- HVAC
- Other

Positive Displacement

- Upstream Gas
- Gas Distribution
- Gas Utility
- Other

Turbine

- Custody Transfer of Natural Gas
- Utility / Billing
- In-plant Processing
- Shale Gas / LNG
- Other

Flow Research, Inc.

Flow Research is the only market research company that publishes studies on all nine flowmeter types and whose primary mission is to research process control instrumentation markets. In addition to studies on both new and conventional flowmeter types, we have researched pressure transmitters; temperature sensors and transmitters, infrared thermometers and thermal imagers; level devices; analytical instrumentation; and selected API-certified valves. We also publish studies on oil & gas and other major flowmeter markets. In addition, Flow Research started a working group on flowmeter calibration (FRWG.org) and published two studies on flowmeter calibration facilities, one each for liquids and gas.



Dr. Jesse Yoder, president and founder of Flow Research

Partnerships and Alliances

Flow Research helps flowmeter companies form alliances and partnerships to provide specific solutions or broaden their customer base and distribution channels. These partnerships can include manufacturers of valves, hoses, transmitters, or other flow-related products, as well as other flowmeter manufacturers.

Distributorships

Are you thinking about expanding your presence in the U.S.? We can help you find distributors for your flowmeters and other instrumentation.

Custom Projects

Companies commission us for custom projects when they want more detailed information on a specific subject than is possible in an off-the-shelf report. They may be evaluating the future or expansion of a product line, determining whether to acquire or merge with another company, or seeking to better understand their customer needs.

Consulting

We also work with companies individually to formulate strategies that help them succeed in an increasingly complex world. Dr. Yoder and his team have studied hundreds of companies and have advised most of the top flowmeter suppliers on market and product strategies.

Research Team Background

Dr. Jesse Yoder, the lead analyst for this study, is President of Flow Research Inc., which he founded in 1998. He has worked as a writer and analyst in process control and instrumentation since 1987 and has created market research studies since 1990. Since then he has written over 280 market research studies, most of them on flow and instrumentation, and over 300 articles on flow and instrumentation for trade journals.

Dr. Yoder received a PhD in philosophy from the University of Massachusetts Amherst in 1984 and spent 10 years as an adjunct philosophy professor at the University of Massachusetts Lowell and Lafayette College. Dr. Yoder also worked 10 years as a technical writer, including for the process control division of Siemens, and taught technical writing at Northeastern University and the UMass Lowell.

Dr. Yoder has received two U.S. patents for the flowtube meter, a new dual tube/dual sensor method of measuring flow, in 2015 and 2017. This meter's two prototypes have been tested at CEESI in Nunn, Colorado.

In 2015, ISA published Dr. Yoder's book, *The Tao of Measurement*, with Richard E. Morley as co-contributor. Topics included temperature, pressure, flow, time, length, and area. CRC Press published Dr. Yoder's two-book set, *Advances in Flowmeter Technology*, on the history, operating principles, growth factors, representative companies, and frontiers of research for all 10 types of flowmeters. Both volumes, *New-Technology Flowmeters* and *Conventional Flowmeters*, were published in 2023.

Belinda Burum, Vice President, joined Flow Research in 2002. Since then, she has served as senior strategic advisor and been involved with most of our projects and publications. She has also worked as a writer and editor in journalism, advertising, and high tech marketing communications and customer references for 40+ years in the U.S. and Switzerland and is a published author and book editor.



Belinda Burum

Leslie Buchanan, Research and Publication Production Associate, joined Flow Research in 2010 with skills from a variety of work and life experiences in both the US and abroad. She assists with research and writing, and handles many publication aspects of Flow Research studies.



Leslie Buchanan

Dan Sparks, Research Director, earned a PhD in chemistry from the University of North Carolina, Chapel Hill. He served as director of product management and director of business development for Omega Engineering in Norwalk, Connecticut until February 2023, and before that was marketing director at Watlow; vice president and general manager at MTS Systems.



Dan Sparks

For more information on Flow Research, please visit our website at www.flowresearch.com. Please follow us on Facebook, LinkedIn (Flow Research, Inc.), and Instagram. We also invite you to join our Flow Research LinkedIn groups.

The Flow Research *Gold Partner Program*

To produce studies that most closely match our clients' needs, Flow Research instituted the Gold PartnerProgram. This program enables companies who wish to participate at a high level in a study's research to influence its scope and segmentation. In addition, Gold Partners receive regular updates from Flow Research on study progress, and receive a significant discount on the standard retail price of the study.

Procedure: Early in the planning phase of a study, Gold Partners receive a proposal that includes the proposed segmentation. Gold Partners can propose additional segmentation, and can also suggest changes to the proposed segmentation. While the decision to adopt particular segmentation ultimately lies with Flow Research, and is based on input from all contributors, we will do our best to accommodate the specific needs of each of our clients.

Being a founding sponsor requires making an early commitment to purchase the study. However, in return, Gold Partners receive a significant discount off the regular price of the study. Payment can be made either in one amount at the beginning of the study, or split into two, with the second payment due upon delivery of the study.

For additional details, or to find out how the Gold PartnerProgram applies to any particular study, please contact Flow Research. We look forward to working with you!

If you have any questions about the Gold PartnerProgram, please contact Belinda Burum at +1 781 245-3200, or belinda@flowresearch.com.

Recent and Currently Scheduled Flow Research Studies

New-Technology Flowmeter Studies

The World Market for Coriolis Flowmeters, 8 th Edition	flowresearch.com/coriolis
The World Market for Magnetic Flowmeters, 8 th Edition	flowresearch.com/mag
The World Market for Ultrasonic Flowmeters, 8 th Edition	flowresearch.com/ultrasonic
The World Market for Vortex Flowmeters, 8 th Edition	flowresearch.com/vortex
The World Market for Thermal Flowmeters, 3 rd Edition	flowresearch.com/thermal
The World Market for Mass Flow Controllers, 4 th Edition	flowresearch.com/mfc
The World Market for Multiphase Flowmeters, 2 nd Edition	flowresearch.com/multiphase
Multiphase: Module A: The World Market for Watercut Meters	flowresearch.com/watercut

Conventional Flowmeter Studies

The World Market for Pressure Transmitters, 5 th Edition	flowresearch.com/pressure
The World Market for Primary Elements, 2 nd Edition	flowresearch.com/flowplate
The World Market for Positive Displacement Flowmeters, 3 rd Edition	flowresearch.com/pd
The World Market for Turbine Flowmeters, 3 rd Edition	flowresearch.com/turbine
The World Market for Variable Area Flowmeters	flowresearch.com/va

Cross-Technology Flowmeter Studies

Volume X: The World Market for Flowmeters, 10 th Edition	flowresearch.com/volumex
Volume X: Module A: Strategies, Industries, and Applications	flowresearch.com/volumex
The World Market for Gas Flow Measurement, 5 th Edition	flowresearch.com/gasflow
Gas Module A: Applications and Strategies for Gas Flow Measurement	flowresearch.com/gasflow
Flowmeters in the Oil & Gas Industry	flowresearch.com/oilflow

Flow Calibration Studies

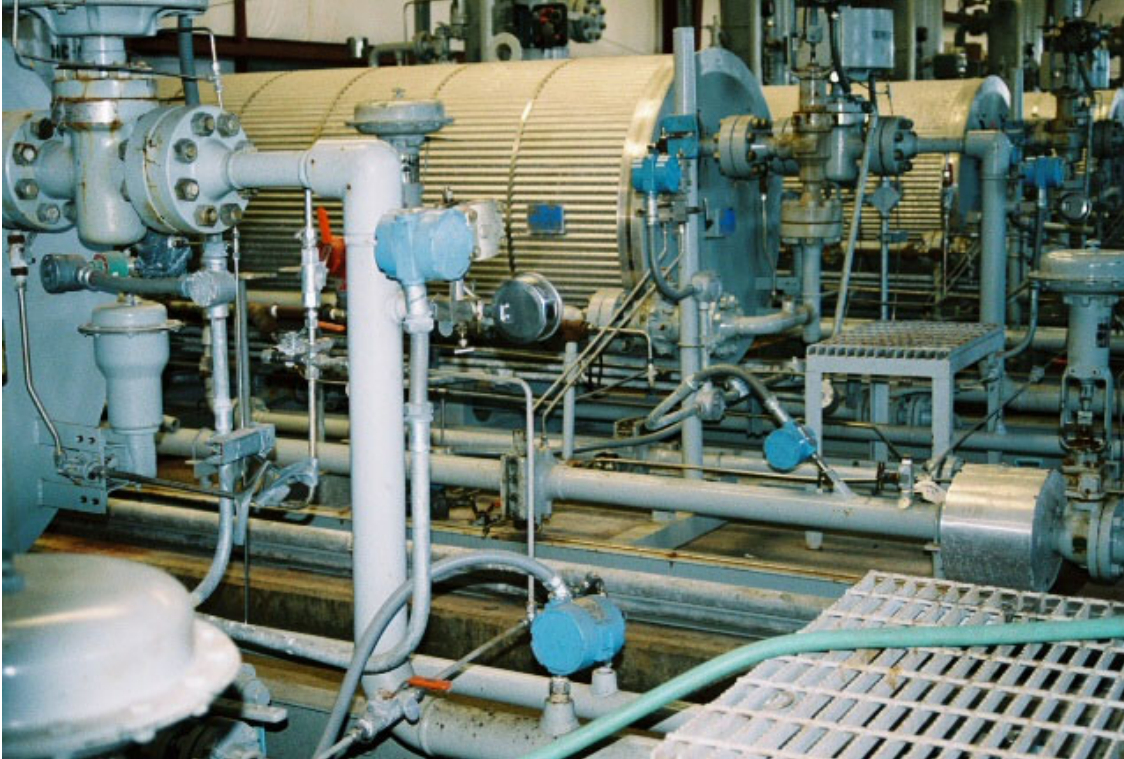
Core Study: Worldwide Gas Flow Calibration Facilities and Markets	flowresearch.com/calibration
Module A: Worldwide Liquid Flow Calibration Facilities and Markets	flowresearch.com/calibration

Temperature

Market for Temperature Sensors in the Americas, 3 rd Edition	flowresearch.com/temp
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– Overview –



Gas processing plant — Photo by Flow Research



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Why Flow Research?

We specialize in flowmeter markets and technologies.

We have researched all flowmeter types.

We study suppliers, distributors, *and* end-users.

Our worldwide network of contacts provides a unique perspective.

Our mission is to supply the data to help your business succeed.