



*EffecTech*

Global Leaders in  
Gas Measurement



# Calibration Gases and Services



# Message from the CEO, EffecTech Group

I am passionate about the quality culture that exists in our business. A core value that was created in the beginning has been cultivated and nurtured and now thrives across the entire organisation. As a consequence, the EffecTech brand is known worldwide for quality and added value. I am convinced the continuing success of the Group is due to this commitment.

EffecTech has pledged to exceed customer expectations and to increase customer satisfaction through the culture of continuous improvement. This commitment is demonstrated through a constant focus on innovation and improvement in the range and quality of our products and services. We do not settle for anything less than excellence in every part our business and we continually strive to improve by having the courage to change.

As you browse this brochure you will realise that everything we offer here is covered by one or more of our quality accreditations. We are rightly proud of the success we have achieved in being awarded these badges of quality from the United Kingdom Accreditation Service (UKAS). We are proud of our UKAS logos. So when you see these on our certificates, reports and labels please take a moment to be reassured of our passionate commitment behind these and to remember that our quality is your confidence.

Dr Gavin Squire BSc CChem FRSC



## ACCREDITATIONS

**For our latest  
schedules of  
accreditation,  
please visit the  
UKAS website:**

**[ukas.org](https://www.ukas.org)**



The scopes of accreditation included in this brochure are correct at time of printing.



# Contents

## Calibration Gases and Liquids

- 6** Why Choose EffectTech Calibration Gases?
- 7** Certified Reference Materials and Calibration Gas Mixtures
- 8** Natural Gas and LNG
- 10** Sulphur and Odourant Gases
- 11** Continuous Emission Monitoring (CEM) Gases
- 12** Blast Furnace Gases
- 13** Collapsible Liquid Vessel Cylinders for LPG and NGL Mixtures
- 14** Luxfer Cylinders

## Gas Quality Services

- 16** Performance Evaluation and Inspection Overview
- 17** Performance Evaluation of Analytical Equipment
- 18** Performance Evaluations of Inferential Devices
- 19** Inspection of Gas Quality Measurement Systems
- 20** Flow Metering Validations
- 21** Proficiency Testing Schemes Overview
- 22** Global Gas and LNG Scheme
- 23** SEPTS and On-Demand
- 24** EffectTech® Training Academy
- 26** Natural Gas Sample Analysis

## LNG and Transition Fuels

- 28** What are Transition Fuels?
- 29** Consultancy and Research
- 30** LNG Metrology – Calibration of Direct Measurement Devices
- 31** LNG Sampling System Inspection
- 32** Biomethane Overview
- 33** Biomethane Services
- 34** Hydrogen
- 34** Performax Cylinders

# About Us



EffectTech is a global leader in gas measurement, providing specialist accredited products, support services, and consultancy to customers using gaseous fuels to create energy, and plays a key role in the global measurement system ensuring traceability and accuracy of the analysis of transition fuels.

Our highly trained and experienced staff provide fast and effective solutions to your fiscal, regulatory, contractual, safety and environmental gas measurement requirements.

## UK Headquarters

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Global Leaders in Gas Measurement

**Our UKAS schedules of accreditation:**

[effecttech.co.uk/schedules](http://effecttech.co.uk/schedules)

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The background of the entire page is a deep blue gradient. It is populated with several 3D molecular models. The most prominent is a large, complex molecule in the upper right, featuring a central dark blue sphere with a bright white highlight, connected by thick, light blue, tapered rods to other spheres. Scattered throughout the scene are several smaller, simpler molecules, each consisting of a central dark blue sphere with three smaller, lighter blue spheres attached at an angle. These smaller molecules appear to be floating or orbiting the larger structure. The overall aesthetic is clean, scientific, and modern.

# Calibration Gases and Liquids

# Why Choose EffecTech Calibration Gases?



EffecTech is a leading supplier of calibration gases to customers all over the world. All mixtures supplied under EffecTech's ISO 17034 and ISO 17025 accreditations are traceable to international standards.

## Quality

*"world leading quality coupled with fantastic customer service."*

ISO 17034 and ISO 17025 calibration accreditations provide confidence in the high-quality gases you will receive from EffecTech.

## Delivery

*"we do everything possible to get your calibration gas to you when you need it."*

Express delivery for hydrocarbon mixtures is 1 week to UK or ex works worldwide. Standard delivery for hydrocarbon mixtures is 2-3 weeks, emissions gases is 2-4 weeks and sulphur mixtures is 4-5 weeks to UK or ex works worldwide.

## No cylinder rental charge

Your cylinder is purchased outright initially with the first mixture and refilled when required at a lower price.

Cylinder pressure tests are included with this service at no extra cost.

## Equipment

Calibration gases are provided in a range of sizes and valve connections to suit customer requirements. We also supply gas control equipment with your calibration gas to ensure the integrity of the high-quality gas is maintained on delivery to the instrument.

## Gas mixture shelf life reminder

For reactive gases and those with limited shelf-life, EffecTech will send reminders to clients when they approach the end of their shelf lives to prevent the use of out of date mixtures.

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**For more information, visit**  
[effectech.co.uk/calibrationgases](http://effectech.co.uk/calibrationgases)

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A certificate of calibration is provided with every gas mixture including reference values and uncertainties, as well as physical properties and phase diagrams (where appropriate), and advice on handling and storage.



# Certified Reference Materials and Calibration Gas Mixtures

ISO 17034 and ISO 17025 certified reference gas mixtures and calibrated gas mixtures are the industry standard recommendation for customers who wish to ensure the measurement accuracy of analytical equipment and avoid the financial consequences of long term mismeasurement.

EffectTech offers the following reference gas mixtures:

## Primary Reference Gas Mixtures (PRGM – ISO 17025 accreditation only)

PRGMs are the highest quality standards available for use by commercial organisations. These reference gases have the lowest achievable uncertainties and are often used by ISO 17025 laboratories who need to establish reference values for internal gas standards and customers wishing to use the lowest possible uncertainties in their measurements.

## Certified Reference Materials (CRM)

CRMs are the most frequently used calibration gases for the calibration of gas chromatographs and other analytical devices because they balance low uncertainties with value for money, especially when supplied in large volume cylinders.

EffectTech supplies CRMs for:

- Natural gas and LNG gases, sulphur and odourant gases for the oil and gas industry
- Binary emission gas mixtures for continuous emissions monitoring
- Blast furnace gases for process control and emissions trading requirements (ISO 17025 accreditation only)

## Calibrated Gas Mixtures (CGM)

EffectTech supplies calibrated gas mixtures (CGM) covered by its ISO 17025 accreditation. EffectTech calibrates gas mixtures supplied by speciality gas suppliers requiring accredited calibration for their customers. We also offer a recalibration service for customers returning mixtures to EffectTech.

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**For more information, contact**  
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# Natural Gas and LNG



Natural gas composition varies from source to source and often varies on a daily and seasonal basis. Using a calibration gas that is specifically designed for your application ensures that you will continue to achieve the best possible gas quality measurements.

EffecTech's experienced staff draw on over 25 years of experience in the gas industry to design calibration gases to suit each customer's specific requirements.

The CRM ranges we offer can be seen in the table below:

component	amount fraction range (% mol/mol)	component	amount fraction range (% mol/mol)
nitrogen	0.1 to 22	2,2-dimethylbutane	0.001 to 0.35
carbon dioxide	0.05 to 15	benzene	0.001 to 0.2
methane	34 to 100	cyclohexane	0.001 to 0.2
ethane	0.1 to 35	n-heptane	0.001 to 0.2
propane	0.05 to 15	toluene	0.001 to 0.1
iso-butane	0.01 to 2	methylcyclohexane	0.001 to 0.1
n-butane	0.01 to 2	n-octane	0.0005 to 0.05
neo-pentane	0.002 to 0.35	n-nonane	0.0005 to 0.02
iso-pentane	0.005 to 0.35	n-decane	0.0005 to 0.005
n-pentane	0.005 to 0.35	hydrogen	0.005 to 0.2
n-hexane	0.001 to 0.35	helium	0.005 to 0.2
2-methylpentane	0.001 to 0.35	oxygen	0.001 to 22.5
3-methylpentane	0.001 to 0.35		

Please note - the upper limit for oxygen may be limited due to restrictions in place required for the safe manufacture of such mixtures. Calibration of oxygen in gas mixtures by ISO 12963:2017 using galvanic fuel cell sensors. Calibration of gas mixtures using gas chromatography with TCD and FID detection. Please see our accreditation schedule for PRGM ranges at [www.ukas.com](http://www.ukas.com)



## Composition

EffecTech's calibration gas design takes into account:

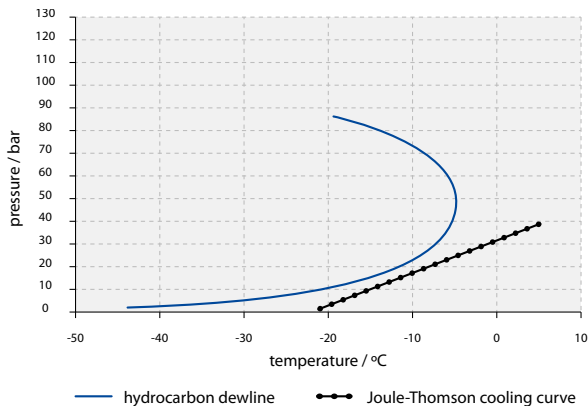
- Variation of stream gas composition
- Operational temperature and pressure
- Accuracy needed to make it fit for purpose

to deliver the optimal gas mixture for your measurement needs.

## Maximising gas volume

Proposed designs will also maximise cylinder fill pressures, where appropriate, through gas liquid phase equilibrium calculations so you receive the highest gas volume possible within the required parameters.

Phase diagram of your calibration gas mixture



Each certificate of calibration for hydrocarbon mixtures includes a phase diagram calculated using equations of state showing how the stated storage and usage temperatures have been derived.

## Physical properties

Physical properties for all natural gas and LNG calibration mixtures are included on certificates of calibration and can be supplied for different reference conditions. These can be used for measurement confirmation as part of your quality control procedures and validation.

**Physical properties of calorific value, relative density, real density, Wobbe index, mean molar mass and compression factor** are calculated from composition according to ISO 6976, GPA 2172 or ASTM D3588.

## Bespoke calibration gas design

EffecTech can use a performance evaluation to identify suitable alternative calibration gas compositions in

circumstances where the stream gas composition may be impractical. These mixtures replicate the same results as the stream gas and provide you with a more practical, cost-effective solution.

**For more information, contact**  
[info@effectech.co.uk](mailto:info@effectech.co.uk)

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# Sulphur and Odourant Gases

EffectTech supplies sulphur gas mixtures to help you meet your network entry/exit requirements or for strict process control and monitoring.

Binary or multi-component mixtures are available in methane, nitrogen or natural gas matrices.

Due to the reactive nature of sulphur components, each mixture is calibrated twice, a week apart, to ensure the stability of the gas mixture. You will be contacted before the end of the mixture's shelf life so you can reorder before the mixture expires.

The CRM ranges we offer can be seen in the table:

**For more information, contact**  
[info@effecttech.co.uk](mailto:info@effecttech.co.uk)

component	amount fraction range (μmol/mol)
hydrogen sulphide	0.2 to 10
carbonyl sulphide	0.2 to 10
methanethiol (methyl mercaptan)	0.2 to 10
ethanethiol (ethyl mercaptan)	0.2 to 10
dimethyl sulphide	0.2 to 10
1-propanethiol (n-propyl mercaptan)	0.2 to 10
2-propanethiol (iso-propyl mercaptan)	0.2 to 10
ethyl methyl sulphide (methyl ethyl sulphide)	0.2 to 10
1-butanethiol (n-butyl mercaptan)	0.2 to 10
2-methyl-2-propanethiol (tert-butyl mercaptan)	0.2 to 10
2-methyl-1-propanethiol (iso-butyl mercaptan)	0.2 to 10
1-methyl-1-propanethiol (sec-butyl mercaptan)	0.2 to 10
diethyl sulphide	0.2 to 10
n-hexyl mercaptan	0.2 to 10
tetrahydrothiophene (THT)	0.2 to 10

## ACCREDITATIONS



Calibration of gas mixtures using gas chromatography with sulphur chemiluminescence detection (SCD).

# Continuous Emission Monitoring (CEM) Gases

Binary gas mixtures in a nitrogen or air balance (where possible) are available for customers who require calibration gases accredited for CEM and personal monitoring systems.

Accredited mixtures are required for Quality Assurance Level 2 (QAL2) and the Annual Surveillance Test (AST).

The CRM ranges we offer can be seen in the table below:

component	amount fraction range (% mol/mol)
carbon dioxide (in nitrogen or air)	0.1 to 15
oxygen in nitrogen	0.001 to 25
methane in nitrogen	0.1 to 5
methane in air	0.1 to 2.5

Calibration of oxygen mixtures to 22.5 %mol/mol by ISO 12963:2017 using galvanic fuel cell sensors.  
Calibration of all other gas mixtures using dynamically generated reference gases in accordance with ISO 6145 Part 7: Thermal Mass Flow Controllers.



component	amount fraction range (μmol/mol)
carbon monoxide	10 to 1000
nitric oxide	5 to 600
nitrogen dioxide	5 to 500
sulphur dioxide	5 to 1000

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# Blast Furnace Gases



EffecTech supplies ISO 17025 accredited blast furnace calibration gases for process control measurement and EU/ETS requirements for iron and steel manufacturers producing large quantities of carbon (CO and CO<sub>2</sub>).

The range of blast furnace calibration gases available from EffecTech are:

component	amount fraction range (% mol/mol)
nitrogen	27 to 54
carbon dioxide	20 to 31
hydrogen	1 to 16
carbon monoxide	20 to 31

The range of basic oxygen steelmaking (BOS) calibration gases available from EffecTech are:

component	amount fraction range (% mol/mol)
nitrogen	11 to 30
carbon dioxide	12 to 20
carbon monoxide	45 to 75
hydrogen	0.4 to 3
oxygen	0.3 to 1.3

Calibration of gas mixtures in accordance with ISO 6143:2001 using gas chromatography with thermal conductivity (GC-TCD).

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[info@effectech.co.uk](mailto:info@effectech.co.uk)

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## Collapsible Liquid Vessel Cylinders for LPG and NGL Mixtures

The Collapsible Liquid Vessel (CLV) cylinder is an innovative new cylinder technology that offers the highest quality hydrocarbon liquid mixtures in a conventional cylinder and dip-tube valve, without the complexities and ongoing costs of owning a piston cylinder.

Developed in EffectTech's cutting-edge research and development laboratory, this new, patented technology keeps the Liquefied Petroleum Gas (LPG) / Natural Gas Liquids (NGL) in a single liquid phase. This innovation provides a stable liquid composition over the lifetime of the cylinder and so is perfect for LPG / NGL reference standards or reference materials. Unlike the piston or constant pressure cylinder, this new approach uses an adapted traditional gas cylinder but offers comparable results.

CLV cylinders are perfect for liquid reference mixtures.

The CLV cylinder is suitable for any liquid analytical measurements:

- Laboratory applications
- LPG testing laboratories
- Natural gas processing laboratories
- Petrochemical testing laboratories
- Laboratories carrying out incremental gas/liquid sampling
- Process applications
- Process measurements at gas terminals
- Process measurements at refineries
- Cracking processors
- Gas to Liquid processors

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**For more information, contact**  
[info@effecttech.co.uk](mailto:info@effecttech.co.uk)

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# Luxfer Cylinders



EffectTech represents Luxfer cylinders for their speciality gas cylinder range.

Luxfer aluminium cylinders, which are used by EffectTech, are designed to handle a huge range of rare, volatile, speciality and high-purity gases, including gases used in the manufacture of semiconductors and other electronic products, in which maintaining gas purity and stability is essential. Cylinders are also available for the containment of calibration gases, as well as a wide variety of other industrial applications.

## Lead-times for UK / Ex Works worldwide

- Standard delivery is 1-2 weeks
- Express delivery is 1 week

EffectTech can offer the cylinder either unvalved or valved: we hold BS, DIN, CGA and AFNOR valves in stock and can supply connectors if required.

## Refurbished Cylinders

EffectTech can also offer fully refurbished, retested aluminium cylinders.

## About Luxfer

Luxfer Gas Cylinders is the world's largest manufacturer of high-pressure composite and aluminium cylinders.

More than 70 million Luxfer cylinders in service around the world have an exemplary record for dependability and safety in a variety of industry applications.



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## For more information, contact

[info@effecttech.co.uk](mailto:info@effecttech.co.uk)

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The background of the entire image is a blue gradient. Scattered throughout are several 3D molecular models. The most prominent ones are large, dark blue spheres connected by thick, light blue, tapered rods. These rods extend towards the edges of the frame. Smaller, more complex molecular structures, consisting of a central dark blue sphere with three or four smaller, lighter blue spheres attached by thin rods, are also visible. These smaller molecules are positioned at various points, some near the larger structures and others floating independently. The lighting on the spheres creates highlights and shadows, giving them a three-dimensional appearance.

# Gas Quality Services



# Performance Evaluation and Inspection Overview



Gas quality mismeasurements can put companies at risk of financial or legal litigation, and also lead to poor process control.

Maintaining confidence in analytical measurements used to calculate the physical properties and ultimately the commercial value of the gas, is vital for the long-term successful operation of a custody transfer / fiscal measurement system.

By investing in annual performance evaluation and inspection, you can be sure that:

- Traceability and accuracy of your data is guaranteed
- Your instruments and systems are validated
- Quality of the data generated will be greatly improved

EffectTech provides inspections and performance evaluations on process gas chromatographs and gas quality measurement systems in accordance with the international standards ISO 17020 and ISO 10723.

Our highly trained and experienced engineers provide fast and effective solutions and support to help you meet your fiscal, regulatory, contractual, safety, and environmental gas measurement obligations.

EffectTech's services are independent and recommendations can be regarded as objective.

Such validations are often used for:

- Factory acceptance tests
- Site acceptance tests
- Fiscal metering and custody transfer requirements
- Compliance with emissions trading schemes, such as EU/ETS and UK/ETS
- Biomethane site requirements

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[info@effectech.co.uk](mailto:info@effectech.co.uk)

# Performance Evaluation of Analytical Equipment

## Why do I need a performance evaluation?

A performance evaluation of a process gas chromatograph can:

- Improve fiscal gas quality metering
- Conform with EU emissions trading legislation
- Validate your analytical system
- Limit financial and legal exposure from mismeasurement

The objective of the performance evaluation is to assess the instrument's performance against the requirements of:

- Measurement precision
- Maximum Permissible Errors (MPE)
- Maximum Permissible Bias (MPB)

## What is a performance evaluation?

An experienced EfecTech engineer assesses the process gas chromatograph on-site by the measurement of a suite of gas mixtures with a range of compositions designed for your measurement.

The engineer then evaluates the performance of the instrument to determine errors, bias and uncertainties of the measurement.

The ISO 10723 standard is applied to provide quantitative measures of the instrument's performance which can be compared against contractual specifications, regulatory requirements or other previously established benchmarks.

Performance evaluations can also be used to:

- Recalibrate response functions for correcting non-linear response in gas chromatographs operating in a Type 1 mode (ISO 6974-1)
- Assess the linearity uncertainty component for gas chromatographs operating in a Type 2 mode (ISO 6974-1)
- Design the most appropriate calibration gas composition for your needs

Performance evaluations can be combined with condition-based monitoring systems to give you confidence in your measurement system.

**For more information, contact**

**[info@effectech.co.uk](mailto:info@effectech.co.uk)**

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# Performance Evaluations of Inferential Devices

EffecTech offers performance evaluations of inferential devices to validate a new generation of instruments used for fuel gas quality measurement.



Inferential devices, or inferometers, have complex algorithms which infer a set of gas properties by direct measurement of a set of other gas properties.

The performance evaluation is carried out using dynamic dilution, generating hundreds of compositions over several hours, which means the customer can be confident that instrument is fit for purpose.

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**To find out more about performance evaluations of inferential devices, please contact [info@effectech.co.uk](mailto:info@effectech.co.uk)**

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# Inspection of Gas Quality Measurement Systems

Measurement errors can occur at any stage in the gas quality measurement system.

EffectTech's ISO 17020 accredited inspection provides an objective assessment of the sampling system, pressure reduction system, carrier and calibration gas systems against industry best practice. An accredited inspection, when combined with a performance evaluation, provides assurance that the instrument is validated and the traceability and accuracy of your data is guaranteed.

## The ISO 17020 inspection

An EffectTech ISO 17020 inspection covers:

- Sampling
- Sample conditioning
- Calibration
- Analysis
- Physical property calculation
- Staff training
- Quality control
- Maintenance

A detailed report is provided, which makes recommendations, where appropriate, to improve the measurement system.

## Support services

As part of our service we include free telephone support and advice including:

- Analytical procedures
- Calibration gas composition
- Quality control procedures
- Refinement of parameters to improve gas quality measurements

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## For more information, contact

[info@effecttech.co.uk](mailto:info@effecttech.co.uk)

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# Flow Metering Validations

Effectech offers metering system validations for measurement of gas volume.

A metering system validation will reduce exposure to commercial risk created over time by over or under measurement of gas volume.

- Gas volume uncertainties are the dominant factor in the metering of energy. Regular validations will reduce mismeasurements and unaccounted for gas
- On-site calibrations of temperature, pressure and differential pressure ensuring traceable validations with defined uncertainty

## Primary instrumentation

Orifice plates should be inspected, cleaned and regularly re-calibrated by an accredited laboratory.

Turbine and ultrasonic flow meters can be validated in-situ by monitoring various operating parameters.

## Secondary instrumentation

On-site differential pressure, pressure and temperature transmitters are calibrated to ensure a high standard of accuracy and traceability.

## Flow computer

Functions and calculations are verified against independent off-line calculations. Flow computer constants and system data such as meter factors, orifice plate and pipe dimensions, and gas composition dependent factors are inspected.



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**For more information, contact**

[info@effectech.co.uk](mailto:info@effectech.co.uk)

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# Proficiency Testing Schemes Overview

If your laboratory holds ISO 17025 accreditation, then regular participation in ISO 17043 accredited proficiency testing (PT) schemes is a mandatory requirement.

PT schemes provide an objective way of assessing the performance (bias, stability, and repeatability) of laboratories by a series of regular inter-laboratory comparisons.

Available from EffecTech:

- Global Gas and LNG Proficiency Testing Scheme (GGLNG) for the natural gas and LNG industry
- Stack Emissions Proficiency Testing Scheme (SEPTS) for companies that provide stack testing services
- On demand PT schemes designed to suit individual customer requirements

- EffecTech is an ISO 17043 accredited Proficiency Testing Scheme Provider so participation ensures compliance with ISO 17025 requirements
- Regular participation also allows companies to monitor levels of improvement against their own results as well as the results from the rest of the scheme members.

## Benefits of participation:

- Samples are prepared and calibrated by EffecTech's ISO 17025 accredited laboratory
- After completing the scheme, you can request an ISO 17025 certificate of calibration for each mixture free of charge
- No cylinder rental payments
- All initial transport of cylinders to the participant's requested location will be arranged by EffecTech and recharged at cost

Once a member of the scheme, EffecTech will contact each laboratory with a reminder for the next round.

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**For more information visit**  
[effectech.co.uk/proficiencytesting](http://effectech.co.uk/proficiencytesting)

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# Global Gas and LNG Scheme

EffecTech's Global Gas and LNG (GGLNG) proficiency testing scheme enjoys global participation from natural gas and LNG companies, providing an international scope for inter-laboratory comparisons.

Up to four different gas mixtures are sent to the participating laboratories for analysis. The scheme is run on a quarterly basis giving regular opportunities for participation.

component	natural gas / LNG composition (% mol/mol)	propane composition (% mol/mol)	mixed refrigerant (% mol/mol)	sulphur component mixture (μmol/mol)
nitrogen	0.1 to 8	0.1 to 2	8 to 16	
carbon dioxide	0.1 to 8			
methane	balance		balance	balance
ethane	0.1 to 14	0.25 to 3	20 to 35	
propane	0.05 to 5	balance	5 to 15	
iso-butane	0.01 to 1	0.03 to 0.7		
n-butane	0.01 to 1	0.03 to 0.7		
iso-pentane	0.005 to 0.35	0.02 to 0.08		
n-pentane	0.005 to 0.35	0.02 to 0.08		
n-hexane	0.001 to 0.35			
hydrogen sulphide / carbonyl sulphide / methyl mercaptan / ethyl mercaptan / dimethyl sulphide				1 to 10

Please see the following table to find out which items are supplied in each round.

component	Q1	Q2	Q3	Q4
natural gas / LNG composition	✓	✓*	✓	✓*
propane composition	N/A	N/A	✓	N/A
mixed refrigerant composition	✓	N/A	N/A	N/A
sulphur component composition	N/A	✓	N/A	✓

\*The natural gas / LNG composition in Q2 and Q4 will not contain carbon dioxide and the nitrogen amount fraction range will be 0.1 to 1 (% mol/mol).

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# SEPTS and On-Demand

## Stack Emissions Proficiency Testing Scheme

EffectTech's Stack Emissions Proficiency Testing Scheme (SEPTS) has been described as "excellent all round" and now has participants in the UK and Ireland as well as in the rest of Europe and Asia.

Companies with multiple testing teams need only purchase one set of gases and can submit multiple sets of results for a small additional fee.

mixture types		amount fraction range ( $\mu\text{mol/mol}$ )
sulphur dioxide in nitrogen		50 to 1000
propane in 10% oxygen / nitrogen		1 to 50
nitric oxide in nitrogen		5 to 500
carbon monoxide in nitrogen		50 to 1000
NO/NO <sub>2</sub> in nitrogen	nitric oxide (NO)	40 to 400
	nitrogen oxides (NO <sub>x</sub> )	50 to 500

mixture types	amount fraction range (% mol/mol)
oxygen in nitrogen	2 to 14
carbon dioxide in nitrogen	1 to 10

## On-demand proficiency testing schemes

In addition to the two formal schemes on offer, EffectTech provides on-demand proficiency testing schemes, in which gas mixtures are provided to a client for 'blind' measurement. After measurement and reporting of results, a short report is issued and then an ISO 17025 certificate is issued for the gas mixture(s) to provide traceable standards for quality control or calibration.

These schemes are not covered by EffectTech's ISO 17043 proficiency testing scheme accreditation.

**For more information, contact**  
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## ACCREDITATIONS



# EffecTech® Training Academy

## How much do your key staff know about gas measurements?

To avoid the financial implications of mismeasurement it is important that the engineers and managers responsible for the gas chromatographs and process instruments understand what is being measured and how it is measured, as well as being able to identify and resolve problems.

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**All of EffecTech's training courses can be provided in Uttoxeter, online or at a customer site on request. For online delivery, the practical sessions are provided as demonstrations. For more information, visit [effectech.co.uk/training.php](http://effectech.co.uk/training.php)**

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EffecTech Training Academy courses are designed to provide participants with the knowledge and tools needed to understand and apply best practice in gas quality measurement.

Courses can be tailored to suit beginners, intermediate, and advanced level learners. Students will develop knowledge and skills that they can apply in the work-place through a combination of both practical hands-on experience and theoretical presentations.



## Gas Chromatograph Training for Technicians and Managers

For this two-day course, EffecTech has a range of gas chromatographs most commonly used on-site and in laboratories. Students will gain hands-on practical experience in their use, calibration and maintenance. Theoretical aspects of gas chromatography and the calculation of physical properties will be covered.

Students will also receive an overview of the role of gas quality measurement in the natural gas / LNG industries, including what natural gas is and how and why its composition is measured.

The course can be tailored to suit the requirements of technicians who use either process or laboratory gas chromatographs.

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**For more information, contact [info@effectech.co.uk](mailto:info@effectech.co.uk)**

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### Statistics and Uncertainty

Students will receive an overview of the importance of statistics and the calculations of uncertainty when making gas measurements. Students will examine the types of errors found in gas analysis and how they are propagated. The importance of repeat measurements, trend analysis and the use of Monte Carlo simulations will also be covered. The course will include practical exercises to build confidence in developing spreadsheet-based uncertainty calculations.

### Liquefied Natural Gas and LNG Sampling

This course will provide an overview of the measurement of liquefied natural gas (LNG) and focuses on the difficulties in sampling and measurement of LNG. Current best practice will be covered along with an introduction to the cutting-edge research EffecTech has undertaken to produce known composition LNG which has been subsequently used to validate optical instruments for the direct measurement of LNG.

### Performance Evaluation Training

EffecTech also offers a performance evaluation training course for site-based technical personnel on the importance of gas quality measurements and industry best practice when using GCs in the field.

This is available as part of a package to operators who also require performance evaluations and inspections on their sites.



# Natural Gas Sample Analysis



Customers with both one-off and regular natural gas sample analysis requirements can take advantage of EffectTech's ISO 17025 accredited testing service for the analysis of natural gas samples.

The EffectTech ISO 17025 scope covers the following:

- Natural gas up to  $C_{12}$ , nitrogen, carbon dioxide, oxygen, argon, hydrogen and helium
- Sulphur content

## Testing services

### 24 hours express analysis

For urgent requirements, results can be issued within 24 hours of the sample arriving at our laboratory.

### 48 hours standard analysis

For standard requirements, results are issued within 48 hours of the sample arriving at our laboratory.

## Site sampling and training

EffectTech also offers an on-site service for companies that are unable to take their own samples. An EffectTech engineer will visit your site to take a sample of gas for immediate analysis at our ISO 17025 testing laboratory. Training is also provided so that your technicians can carry out in-house sampling for your future analysis requirements.

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**For more information, contact**  
[info@effecttech.co.uk](mailto:info@effecttech.co.uk)

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## ACCREDITATIONS



The background of the slide is a solid blue gradient. Overlaid on this are several 3D molecular models. The most prominent is a large, central molecule with a dark blue, reflective sphere at its core. This sphere is connected to several other spheres by thick, white, tapered, bone-like structures. One of these structures leads to a medium-sized blue sphere, while others lead to smaller blue spheres. Scattered around this central molecule are several smaller, identical-looking molecules, each consisting of a small blue sphere with three even smaller white spheres attached to it in a triangular arrangement. The overall aesthetic is clean, modern, and scientific.

# LNG and Transition Fuels

# What are Transition Fuels?

Climate change is still the biggest threat facing humanity. Reducing carbon dioxide (CO<sub>2</sub>) production by replacing fossil fuels with renewable resources is now a global target.

Natural gas is seen as the 'renewables best friend' during this transition to carbon-zero fuels. To reduce CO<sub>2</sub> emissions, it is necessary to measure natural gas composition.



EffectTech plays a key part in this global measurement system ensuring traceability and accuracy for natural gas and other transition fuels, including liquefied natural gas (LNG), refinery gas, biofuels/biomethane and hydrogen-enhanced gaseous hydrocarbon fuels. EffectTech's products and services are also vital for accurate billing, and for safety requirements for over a billion people across the world. EffectTech's services benefit all stages of gas use, from wellhead and biomethane plant to end-users for heating, transport, petrochemicals, power generation and industrial use.

EffectTech has capability in measurement of:

- LNG
- Biomethane
- Hydrogen-enriched methane
- Hydrogen-enriched natural gas
- Hydrogen

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**For more information, contact**  
[info@effecttech.co.uk](mailto:info@effecttech.co.uk)

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# Consultancy and Research

EffecTech has honed its expertise over 25 years of experience in the gas and LNG industries and has forged an international reputation as the global leader in the field of gas quality measurement.

This makes us perfectly positioned to offer our customers high quality consultancy services. We carry out cutting-edge research at our specially-designed research facilities at our head office in Utttoxeter, UK.

## **EffecTech offers consultancy and research services for:**

- All elements of gas quality measurement
- Gas quality / LNG research projects
- New instrument evaluation / factory performance evaluation
- Independent data processing and evaluation
- Audits and inspections of laboratory quality systems
- Calibration gas design for new measurement requirements
- Bespoke customer projects



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**If you would like to know more about our consultancy services, or have a project you would like to discuss, please contact us at [info@effectech.co.uk](mailto:info@effectech.co.uk) for more information.**

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# LNG Metrology – Calibration of Direct Measurement Devices



World's first traceable  
cryogenic LNG reference liquids  
developed at Effectech.

As Liquefied Natural Gas (LNG) continues to grow as an energy source globally, it is vital that both suppliers and users ensure that rigorous standards and measurement methods are applied to avoid the risks of mismeasurement.

LNG has its own unique measurement issues related to vapourisation and enrichment. In response to this, Effectech has developed a bespoke cryostat facility for the production of cryogenic LNG reference liquids.

## Validating your instrument

Direct measuring devices are less labour-intensive than gas chromatographs and are often preferred for bunkering ships, floating production storage and offloading units (FPSOs), and small scale terminals. However, as daily calibrations cannot be carried out, initial and regular validations of direct measuring devices are vital to ensure no mismeasurements are made.

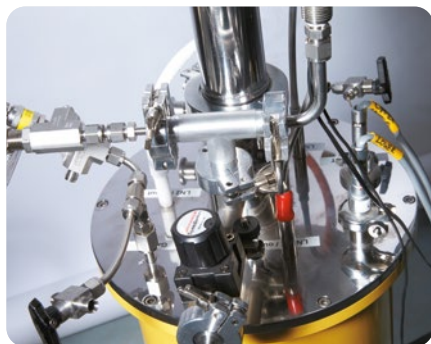
## Bespoke consultancy

Effectech is at the forefront of LNG quality measurement techniques and would like to work with partners in industry to develop LNG gas quality measurement standards.

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**If you have a project you would like to discuss, please contact us at [info@effectech.co.uk](mailto:info@effectech.co.uk)**

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# LNG Sampling System Inspection

EffecTech offers an LNG sampling system inspection service in accordance with ISO 8943 to enable customers to check that their sampling systems are fit for purpose under a full range of conditions.

An experienced EffecTech gas quality engineer will complete a full inspection of the LNG loading sampling system against the requirements of ISO 8943.

The inspection reviews the following:

- The enthalpy of sub-cooling for homogeneous sample vapourisation
- GC repeatability in line with the requirements of EN 12838 for the measurement of vapourised LNG

Based on this data, a Monte Carlo simulation is run, which will identify a safe operating envelope to ensure homogeneous sampling or vapourising.

A detailed compliance report is provided, highlighting any recommendations for change and adjustments based upon the findings.

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**For more information, contact:**

[info@effectech.co.uk](mailto:info@effectech.co.uk)

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# Biomethane Overview

Because of the way biomethane is generated, the gas can be contaminated with other components which could cause damage to the pipelines or cause safety issues.

Biomethane sites can be required by network operators to have performance evaluations to demonstrate compliance with entry agreements and safety requirements.



## Benefits of working directly with EffectTech

By working directly with EffectTech, customers can expect a fast, responsive and cost-effective service, tailored to your requirements:

- We are the experts in gas measurement – we can advise on how to improve GC performance
- All site work can be arranged to take place on one day, to reduce downtime

EffectTech's performance evaluations and metering validations provide you with the information you need to determine whether your instrument is fit for purpose, making sure:

- Your site is compliant with legal and regulation requirements
- You can limit your financial and legal exposure from mismeasurement

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**For more information, contact:**

[info@effectech.co.uk](mailto:info@effectech.co.uk)

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# Biomethane Services

## Calibration Gases and Carrier Gases for Biomethane Sites

gas mixture types	used for	standard delivery time
Type 4 hydrocarbon mixtures	calibrating the GC for network entry requirements	2-3 weeks from receipt of order
biomethane calibration gases	calibrating the instrument for network entry and safety requirements	4-5 weeks from receipt of order

## Performance Evaluations

EffectTech Performance evaluations cover the instruments' measurement of:

- Calorific value of the biomethane for billing requirements
- Oxygen and Hydrogen Sulphide against legal limits to make sure the gas is compliant with safety and operational requirements for network entry

## ME2 Validations

Metering validations ensure that the instruments used for the calculation of mass, volume or energy flowrate are functioning correctly.

EffectTech's methods are based on accepted industry standards such as National Grid's T/PR/ME/2 Parts 1-3 in the UK.

## Stock Gases

EffectTech also holds stock of the following gases:

- 35-day test gases
- carrier gases
- nitrogen
- helium

**For more information, contact:**

[info@effecttech.co.uk](mailto:info@effecttech.co.uk)

## ACCREDITATIONS



# Hydrogen

Hydrogen is the most abundant molecule in the universe and, as an energy carrier, is a key component of the carbon-zero energy mix. Technologies that utilise hydrogen without compromising safety are currently under development.

EffectTech supplies products and services to ensure accurate measurement of hydrogen.

## **Calibration gases and performance evaluations**

EffectTech can supply calibration gases with up to 20% hydrogen for the growing number of sites using hydrogen-enriched natural gas to lower their carbon foot print and move to more environmentally-friendly fuels.

EffectTech can also carry out performance evaluations on instruments measuring hydrogen-enriched natural gas.

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**For more information visit**  
[effecttech.co.uk/hydrogen](https://effecttech.co.uk/hydrogen)

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## **Performax® Cylinders**

Performax® is a new proprietary cylinder passivation treatment, designed and tested by EffectTech for the supply of highly reactive gas mixtures and high purity gases.



Fuel cells for hydrogen-powered vehicles are very sensitive to impurities, which means testing has to take place in laboratories, rather than filling stations. EffectTech is working to develop a Performax® treatment that means samples transported from filling station to the testing laboratories maintain their integrity.

It can also be used for other highly reactive components, unsuitable for standard cylinders, e.g., disulphide components with mercaptans.



Seeking excellence  
for your energy  
measurement  
through accreditation

ISO 17034 reference materials

ISO 17025 calibration

ISO 17020 inspection

ISO 17043 proficiency testing

ISO 17025 testing





*EffectTech*

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