

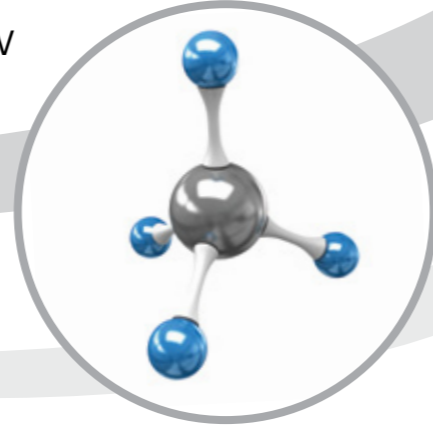
ORBITAL

GLOBAL SOLUTIONS

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Natural Gas Monitoring

Natural Gas properties measurement – Overview



“An extractive chromatograph sampling system can, when combined with the actual cycle time of the analyzer, have a response time approaching 20 minutes.”

The customary method for determining the properties of Natural Gas has traditionally been Gas Chromatography (GC). This time tested methodology is a versatile and historically established technology, however, its conservative format has rooted a number of issues and problems:

The instrument itself requires substantial infrastructure commitments to function well:

- A large sampling train to eliminate contaminants, control pressure and regulate temperature.
- Carrier and calibration gases to operate and validate the instrument
- A large cubicle or kiosk (usually involving the installation of a concrete base) that frequently requires a HVAC system and safety monitoring due to the storage and use of flammable and hazardous gases
- Gas chromatographs are complicated instruments which usually contain valves, columns and detectors within an oven and a small computer to process the data. This requires continuous monitoring and maintenance by specialist staff.

Recently, great strides have been made in the miniaturization and simplification of the technology; however, even the newest gas chromatographs still need local cylinder gases and have frequent calibration intervals.

All this means that even a basic GC installation will require substantial capital investment, significant ongoing operational expenditure, demanding frequent highly skilled intervention for maintenance and upkeep.

The other major issue is speed of measurement – An extractive chromatograph sampling system can, when combined with the actual cycle time of the analyzer, have a response time approaching 20 minutes.

Obviously a lot can happen in this time with the potential for significant fiscal/ process cost especially relevant to combustion control/compressor applications and custody transfer. There is, therefore, a mismatch of energy accounting between the instantaneous gas flow data and the delayed measurement of energy content.



GasPT – Changing the standards for gas quality measurement

“GasPT redefines the standards for fast, accurate and inexpensive measurement of Natural Gas quality and revolutionizes your ability to track the properties of your gas.”

The issues surrounding traditional gas chromatography were identified, nearly two decades ago, by the UK’s National Gas utility organization (British Gas) who undertook a substantial development program to design a new approach to gas properties measurement.

The criteria considered were:

- Compact design to reduce infra-structure demands.
- Low cost yet high accuracy and quality of measurement.
- Unmatched high speed real time measurement.
- NO maintenance, NO on-site calibration, NO carrier gases.
- Low installation costs and negligible utility requirements.
- Compatible with global natural gas mixtures.
- Low maintenance by nonspecialist staff.

Following years of development, testing and verification by Orbital and its gas industry partners the solution was found and is now available.

GasPT is a comprehensive, innovative and “game changing” instrument that provides astonishingly fast, accurate, real-time monitoring of physical properties such as Calorific Value and Relative Density etc. of Natural Gas.

It is an innovative yet proven technology with numerous installations across the world and has achieved all necessary safety standards.

GasPTi – An end to complicated and expensive gas chromatograph installations for energy determination in Natural Gas applications



“We’ve taken the fast GasPT analyzer and using experience, innovative engineering and common sense produced the world’s fastest system for Natural Gas properties analysis.”

Early in development of GasPT we recognized that there was no point in taking a instrument with a response time measured in seconds and then integrating it into a conditioning system which added a lag time several orders of magnitude higher.

At this point we decided to engineer a new solution, which by using best practices and technology, would result in a product just as innovative as the GasPT unit itself.

GasPTi has been designed by a team with over three decades of combined experience in analytical sampling systems and is a completely re-engineered approach to Natural Gas sampling and analysis. It is a complete, compact, low cost, integrated solution which can be flange mounted directly to the pipeline or onto a nearby wall or post.

GasPTi utilizes an innovative sampling techniques that eliminates the flaws found in conventional systems: dead legs, changes in cross-sectional area, threaded connections, Joule-Thompson cooling effect and increased sample volume due to filtration requirements.

GasPTi has only 2 components in the sample path and by design removes the need for expensive conditioning equipment, filters, pressure and flow control systems, long heated sample lines and a large cabinet/cubicle with HVAC.

The end user simply bolts the unit into position, connects the power and signal cables and GasPTi is ready to use.

There are **NO** carrier or calibration gases, **NO** civil works, few hazardous area limitations (GasPTi is certified for Zone 1 applications), **NO** specially trained personnel for installation and due to its very low power requirements **NO** large power installation is required.

GasPTi is more than a collection of components, from various manufacturers, assembled into a large, complicated and costly system. It is an evolutionary advance in sampling technology combined with an innovative and revolutionary analyzer to produce a low impact, low maintenance, highly accurate complete solution for Natural Gas properties measurement.

The use of experience, intelligent application of new technologies and a cohesive design strategy ensures GasPTi delivers all the property data that conventional systems can, in a fraction of the time, at a fraction of the cost and, by its nature in a more accurate manner.

GasPTi – The advantage is clear



With its combination of advanced technology, rapid response and high quality engineering GasPTi offers the end user substantial advantages over traditional chromatograph based systems:

- It's easy to use, easy to interface and **NO** technical support is needed on site.
- Reduced sampling uncertainty and enhanced analytical response means you are measuring gas quality as it happens **NOT** 20–30 minutes after the event, hence, improved energy determination, volume correction and fiscal tracking.
- Small and constant sample path diameter, delivering a small and uncontaminated sample to the measurement equipment in seconds.

- Sample filtration by intelligent dynamic sample tip engineering rather than conventional filtration devices.
- Flexible Modbus based communications protocol ensures easy integration into any site data system.
- Reduced emissions as GasPTi uses only a fraction of the sample gas required for traditional techniques.
- Increased safety as there are no large cylinders of support gases, GasPTi is certified for hazardous area operation and the Vortex Elimination (VE) technology eliminates stressed welds on sample points/sample probe loss.
- Better control of your combustion/compressor/turbine – GasPTi is fast enough and cost efficient enough to be a practical feed quality analyzer.

- Wide implementation range – As GasPTi measures CO₂ it can be used on >95% of Natural Gas applications.
- Low site impact – GasPTi can be mounted on the pipe (with fixed and retractable probe options) or remotely on a wall or post. It needs **NO KIOSK**, **NO CYLINDER STORE** and **NO HVAC** system.
- Low capital cost, lower installation cost and negligible running costs.
 - **NO** calibration gas
 - **NO** carrier gas
 - **NO** cylinder storage or rental
 - **NO** bi-annual maintenance or expensive technical support.

How it works GasPT and VE Technology – Faster by design



“From the point of measurement to the control room – Orbital have, by utilizing VE technology, engineered the GasPTi system to complement the high speed properties of the GasPT analyzer.”

GasPTi features significant advancements in technology to:

- Eliminate vortex issues.
- Relegate uncertainty.
- Avoid Joule Thompson effect.
- Reject contamination.
- Shorten sampling time to a minimum.
- Reduce maintenance to a negligible level.
- Simplify communication between instrument and user.
- Improved pipeline safety – by eliminating vibration and the resultant stress fractures associated with probes and thermowells.

GasPTi utilizes patented technology at the extraction point which precludes the influence of the Kármán vortex effect and features a unique aerodynamic tip to actively reject particles/aerosols and contamination. This allows us to use an extremely narrow sample path which minimizes sample transit.

Our filtration, pressure and flow control unit can accept any pressure up to 100 Bar and then cuts it to the 30mbar required by GasPT. This unit is heated to completely eliminate the Joule Thompson effect which would cause the formation of ice and loss of C6+ hydrocarbons in the sample.

The use of VE technology also has added a significant environmental benefit as we need to sample less gas than any other system wishing to match GasPTi's response time.



Patented VE Technology at the point of extraction –

Helical strakes eliminate Kármán vortex street effect

Electro polished aerodynamic tip actively rejects contamination

Low volume sample extraction with polished internals ensures a small representative, high speed sample is passed into the analysis system



GasPTi – Future proof and Flexible



“The energy networks of the 21st century will depend on conventional and unconventional gas sources. GasPTi is ready for this challenge now.”

Unlike others – from its inception GasPT has been developed specifically for Natural Gas applications.

Using innovative, unique and evolutionary technologies GasPTi measures, across the complete range of Natural Gases the physical properties of the gas mixture and derives the following effective criteria:

Methane, Ethane, Propane, Nitrogen and the measured Carbon Dioxide.

From this simplified gas mixture the system then utilizes the standard ISO6976 gross characterisation method to calculate the gas quality parameters –

Calorific Value (CV), Relative Density (RD), Wobbe Index (WI) and Compression Factor (Z).

In any gas analysis system the most significant factor affecting accuracy and response is the design of the sampling train. Orbital has applied key design parameters based upon three decades of experience with gas analysis systems in some of the most arduous and demanding of applications.

We integrate this remarkable instrument into a thoroughly developed and comprehensively specified sampling system which has been designed to eliminate all the traditional drawbacks of extractive chromatography. It has the added benefits of accurate real time analysis, low Total Cost Ownership, reduced environmental impact and increased safety of operation.

Components and solutions



GasPT

If you are a systems integrator or wish to incorporate GasPT technology into an existing system we can supply GasPT on an instrument only basis together with any relevant support equipment.



Complete solutions

We supply, integrate and install a wide range of analyser types including: Gas Chromatographs, UVF/CLD, FID, TCD, NDIR, Laser, Ultrasonic, Paramagnetic & Electrochemical.

These instruments have been utilised by Orbital in literally thousands of applications and sites for the determination of gas properties in industries including:

- Process control.
- Power Generation.
- LNG Ballasting.
- MCERTS/CEMS applications.
- Bio-Gas/Bio-Methane.
- Fiscal Metering.
- GS(M)R compliance.
- Marine pollution control and engine management.
- Natural Gas quality.



“Orbital can supply GasPT and VE Technology as stand alone products or integrated into a package. For more information please visit our website.”



VE Technology®

VE (Vortex elimination) Technology is not just for use with GasPTi as the unique and patented design makes it suitable for use with any in-situ or extractive measurement.

If you have issues with an existing installation the answer may be VE technology. Similarly, it can be used for simple thermowells and pressure measurement in aggressive environments. Find out more about VE Technology here – www.vetechnology.co.uk

Where to use GasPTi



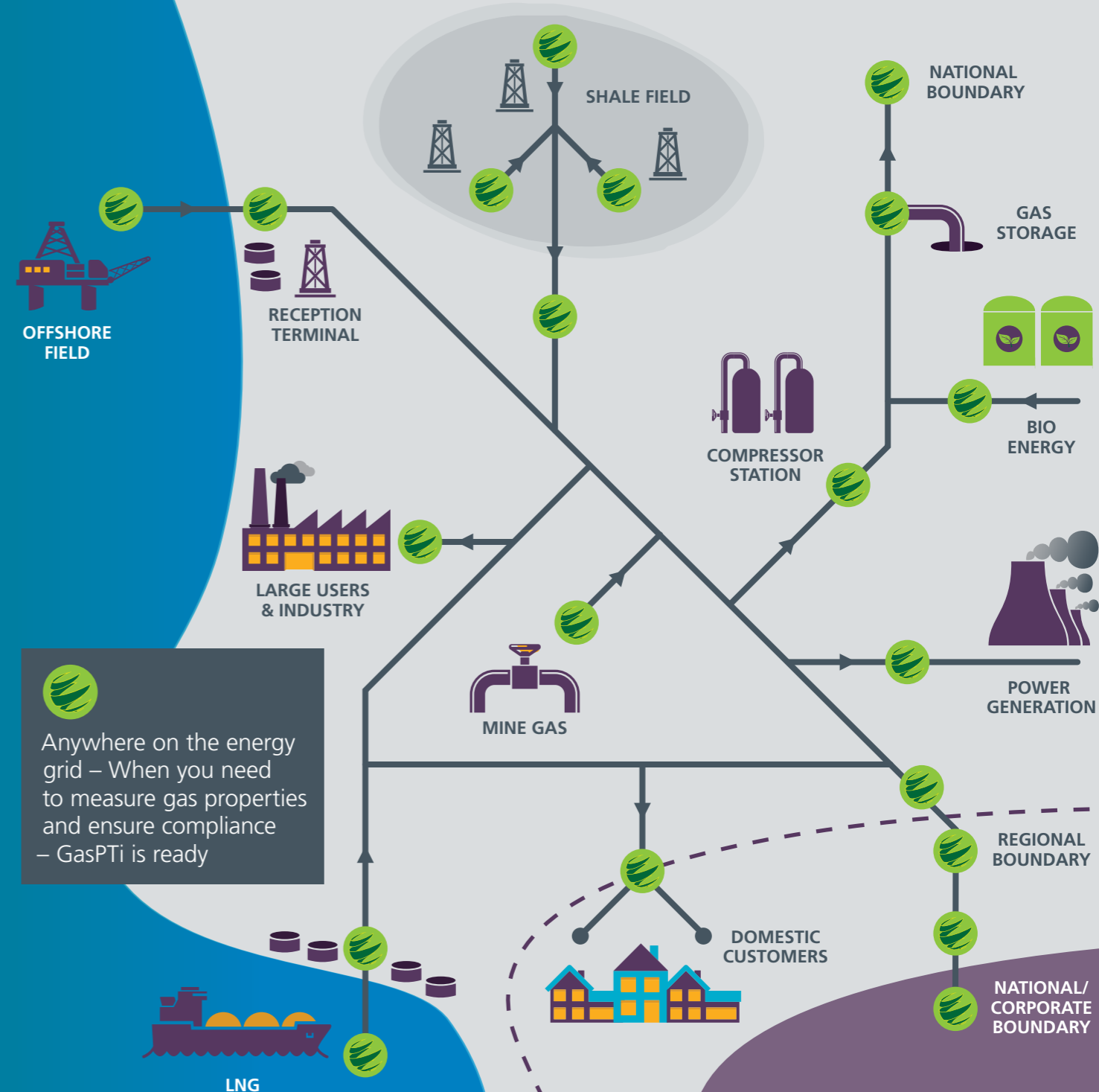
“Fast, flexible and cost efficient – Like no other GasPTi offers real time data about your gas which produces reduced uncertainty, improvements in safety and tangible fiscal benefits.”

GasPTi is suitable for any application that needs to determine the key parameters of Natural Gas. It can operate in any environment, is suitable for safe and hazardous area use and can communicate with any local/remote telemetry communications system or protocol.

Typical applications for GasPTi include:

- Analysis of Natural Gas in power plants – For quality control – For turbine optimization.
- Analysis of Natural Gas for control, blending and custody transfer across gas transmission and distribution networks.
- Pipeline monitoring.
- Analysis of Natural Gas for large volume users who wish to optimize process or combustion – Glass manufacture, Heat treatment, Brickworks (kilns), Fibre Glass manufacturing.
- Offshore platforms – production monitoring.
- Determination of gas quality at storage sites.

- Analysis of Natural Gas for quality control, development and product performance – turbine manufacturers, gas appliance manufacturers.
- Analysis of Bio-Natural Gas in pre-processing plants.
- Existing gas chromatograph systems – performance checking and validation.
- Analysis of Natural Gas in liquefaction and regasification plants (LNG Regasification and Storage).
- Marine safety applications for bulk LNG transportation and LNG driven marine engines.
- Determination of calorific value on compressors or gas transfer stations.
- Gas blending and ballasting.
- Analysis of calorific value in Natural Gas preparation plants.



Anywhere on the energy grid – When you need to measure gas properties and ensure compliance – GasPTi is ready



Who uses GasPT and GasPTi

ExxonMobil



TATA STEEL

nationalgrid

TOKYO GAS



FLUXYS



fermaca



Design Your Energy 夢を今から
OSAKA GAS



KEMA

PERENCO

Tullis Russell
PAPERMAKERS



WALES&WEST
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ENERGY TRANSFER



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