





MAKING IT OUR MISSION

WHAT YOU CAN MEASURE, YOU CAN CONTROL

Fluenta's mission is to deliver superior data solutions to our valued customers, with a primary focus on enhancing flare gas measurement within the energy sector. As we evolve, we're extending our expertise to serve a broader range of industrial applications.

Better data leads to better decisions in the journey to decarbonization but also enables precise record-keeping and ensures unwavering regulatory compliance.

At Fluenta, we proudly lead the way in ultrasonic flare gas measurement, setting the industry standard with our exceptional expertise. Our relentless pursuit of innovation has resulted in groundbreaking advancements; including harnessing technology and materials to measure at extreme temperatures, and advanced Digital Signal Processing techniques for measurement of difficult gases. These innovations enable us to achieve unparalleled levels of precision and consistency in measurements, even when confronted with complex gas mixtures that have traditionally posed challenges.

As we continue to explore new applications, materials, and technologies, our primary objective is to harness this newfound knowledge to create shared value. We are committed to delivering benefits to our valued customers and industry regulators, aligning with the broader environmental goals that the energy sector is actively pursuing.

Fluenta is a pioneer in the field of ultrasonic flare gas measurement.



A DIFFERENT WAY

BUILDING SOUND PARTNERSHIPS

Our core focus and expertise centre around ultrasonic measurement technologies, renowned for their unmatched precision and reliability across diverse gas flaring applications.

This specialised focus deepens our knowledge and equips our global teams to promptly address the unique challenges our customers encounter.

Our commitment to optimising your flare lines for peak efficiency and delivering pinpoint data accuracy sets us apart in our industry.

Beyond our focus and expertise, our teams excel as innate problem solvers for the intricate world of flare gas metering. We aren't merely suppliers but collaborative partners ready to tackle your specific challenges head-on.

WITH YOU WHEREVER YOU ARE

With a global presence spanning Cambridge (UK), Dubai, Gdańsk, Kuala Lumpur, and Houston, we're strategically positioned to serve you efficiently. Our local offices house project teams and in-house service engineers, ensuring prompt responses within your time zone.

In addition to our global footprint, we've established a network of Fluenta-trained engineers worldwide, collaborating seamlessly with our international teams to deliver exceptional local service.

Our portfolio has expanded significantly, encompassing diverse industries, and enabling precise measurement of high CO_2 and challenging gas mixtures. We now cater to chemical processing, bioprocessing, steel, and traditional energy sectors.

Our engineers are pivotal in large-scale infrastructure ventures, such as Carbon Capture and Hydrogen projects, including a partnership with the British Government on groundbreaking 100% Hydrogen measurement techniques. This expertise enriches our flare gas measurement capabilities, empowering us to push boundaries in CO₂ and H₂-rich projects, where ultrasonics once feared to tread.

PROGRESS COMES THROUGH CHANGE

As the energy industry collectively commits to achieving net zero emissions, the scrutiny on flaring intensifies day by day.

Energy companies, EPCs, and specifiers taking a proactive approach to emissions reduction, forging collaborative ties with regulators, and demonstrating their environmental commitment will reap rewards through increased investments, milder taxation, and broader social acceptance.

We actively engage with projects focused on measuring flare gas flow and quantifying emissions generated by flaring. We increasingly observe a growing desire to optimize flare combustion with the aim of minimizing, and ultimately eradicating, methane emissions from the equation.



CASE STUDY

Overcoming space and piping limitations

Challenge

Our Europe-based customer faced a pressing issue of insufficient straight piping and ruled out modifications for a flare gas measurement system for several reasons. Space constraints added complexity.

Solution

Our experienced engineers assessed the situation and identified the vertical flare stack as an optimal location for transducer installation. The unorthodox setup, hot-tapped 50 meters above ground, was challenging but achievable.

Results

We swiftly delivered an effective solution. Installation and commissioning were efficient. The system now operates flawlessly, ensuring accurate flare gas measurements without loss or misreporting, underscoring Fluenta's ability to overcome space and piping limitations and providing reliable engineering solutions.



GAS FLARING, A CHALLENGING NECESSITY

WHY?

Flaring is an inherent aspect of various energy production processes, primarily driven by safety considerations. It's a far more responsible alternative than directly venting greenhouse gases into the atmosphere. However, the long-term objective is clear: control, reduction, and eventual elimination.

This is where our expertise comes into play. Precise measurement of flare activities equips us with the essential data for making informed decisions and achieving accurate reporting. These decisions can range from addressing gas leaks identified through mass balance calculations to optimizing the efficiency of flared gas combustion. Ultimately, such accurate reporting translates into significantly reduced emissions.

HOW?

While several technologies are available for measuring flare gas flow, ultrasonic technology unquestionably takes the lead.

Measuring gas flow in flare systems is arguably one of the most challenging forms of gas measurement due to fluctuating velocities, extreme temperatures, and varied compositions. Ultrasonic gas flowmeters stand out for reliably handling these conditions even in harsh environments.

The fundamental method of measuring flare gas volumes uses the time-of-flight principle to calculate the gas velocity. By strategically placing two transducers, capable of transmitting and receiving signals, facing each other at an angle across a flare line, we can calculate flow velocity along with known variables to achieve remarkable accuracy.

However, it's worth noting that different gas compositions can diffract ultrasonic pulses or absorb specific frequencies due to gas bond structures. Overcoming these challenges is where our expertise truly shines.

We engineer customized solutions by leveraging our proficiency in materials science, acoustics, digital signal processing, engineering and electronics design, installation, and service. All these facets converge with one singular objective: to provide you with accurate and reliable data.

Accuracy

Flare gas measurement is arguably the most challenging form of gas flow measurement. It grapples with rapid velocity fluctuations, sometimes reaching hundreds of meters per second, as well as ever-shifting gas compositions, presenting only the initial facets of this formidable challenge.

Within the flare lines, we encounter a multitude of complexities, including sulphur, acids, elevated CO₂ levels, heavy hydrocarbons, and a medley of contaminants that pose numerous hurdles.

However, our Fluenta meters rise to the occasion, delivering industry-leading accuracy, typically within a 1% margin of the actual flow rate, but with calibration, we can achieve even higher accuracies.

Compliance

Regulatory compliance is core to our products and services. We diligently ensure that your flaring operations sit on the right side of regulatory standards. It's a given that we meet and often surpass every safety requirement expected of flare gas metering systems.

Our collaborative approach extends to government entities globally, where we hold approvals and frequently serve as trusted partners in establishing standards where none curren exist. This dedication underscores our role as a leader in promoting compliance and safety in the industry.

CASE STUDY Innovative Custom Materials

for Corrosive Flow

Challenge

A North American customer grappled with highly corrosive gases which compromised measurement accuracy and reduced the lifespan of our transducers. Consequently, leading to elevated maintenance costs and the risk of regulatory penalties due to disrupted reporting.

Solution

The process gases being handled were highly corrosive, impacting even our Titanium and Stainless Steel transducers. After conducting research and rigorous testing, our Design and Development and Production teams selected Hastelloy alloy to create specialized transducers, guaranteeing outstanding corrosion resistance.

Results

Our custom corrosion-resistant alloy transducers continue to withstand the eroding gases. The optimized alloy along with a robust preventative maintenance plan allowed the installation to report accurate measurements vital for its safe operation close a small town.





WHAT'S AT OUR CORE

ULTRASONICS

The ceramics we use in our piezoelectric transducers are proprietary to Fluenta.

Our materials scientists consistently push the boundaries of what's achievable, relentlessly seeking ways to enhance accuracy. Recently, we pioneered new ceramic materials engineered to withstand extreme temperatures, tailor-made for ultrasonic measurement.

This breakthrough has been pivotal in creating our FlarePhase transducer range, enabling us to unlock the highest and widest temperature range available, measuring from -200 °C to +350 °C.

While this may seem niche, such temperature fluctuations are commonplace within flare lines. Using Fluenta technologies mitigates the risk of inaccurate readings during flare events.

DIGITAL SIGNAL PROCESSING TECHNOLOGIES

Our Digital Signal Processing (DSP) teams excel in developing solutions for even the most demanding scenarios.

Our flow meters rely on the fundamental time-of-flight principle, which involves accurately sending and receiving precise signals between two transducers across a pipe diameter.

Ultrasonic frequencies, operating beyond the typical industrial machinery range, serve as ideal carriers for these signals.

However, the true challenge lies in distinguishing noises such as echoes and reflections, and ensuring signal recognition, and accurate time-of-flight calculations, even in extreme signal attenuation.

Among the gases that routinely challenge ultrasonic measurements, CO₂ is a prominent example. The level of signal attenuation in a 36" pipe containing CO2 is staggering, reaching a factor of 100,000.

We are actively developing a new generation of transducers that, combined with our DSP expertise, enable non-intrusive transducer measurements across the entire pipe diameter, even in environments with over 95% CO₂ concentration. We take immense pride in this capability. pride in

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CASE STUDY Maximising uptime with **Project Efficiency**

Challenge

Our customer, Indorama Ventures' olefins plant in the US, urgently needed two flare gas meters to comply with environmental reporting requirements. This task had to be accomplished during an upcoming full-plant turnaround in four weeks, which meant that all necessary equipment had to be on-site in record time and ready for installation to minimize downtime.

Solution

Fluenta's sales team swiftly assembled a comprehensive package to meet specifications and the tight timeline. Despite the challenge of sourcing components from global suppliers, their extensive experience enabled them to identify critical items that might delay the project. Leveraging strong supplier relationships, they expedited materia and equipment procurement.

Results

Thanks to efficient project execution, we successfully delivered all necessary equipment to the site. We installed both flare gas meters within the full-plant turnaround period, enabling Indorama to meet its environmental reporting obligations without incurring losses that would have resulted from additional plant shutdown.



DIFFICULT INSTALLATIONS

As a dedicated and agile team, we thrive in tackling the most challenging tasks. Whether navigating tight spaces around flare lines, working in hard-to-reach locations, handling complex gas compositions, or meeting tight deadlines, we rise to the occasion. Our unwavering commitment to responding with enthusiasm and adaptability to every challenge that comes our way sets us apart.

You can count on our tenacity and resilience when unforeseen obstacles arise during a project. We persevere tirelessly until your installation functions flawlessly. Our rigorous feedback protocols consistently yield positive responses, reflecting our commitment to delivering exceptional results.



CASE STUDY

Accurate Measurement in Large diameters with High CO₂ Flare Gas

Challenge

Fluenta was selected to implement a flare gas measurement solution for Nigeria's Dangote Refinery, Africa's largest oil refinery and the world's largest single-train refinery. Our task involved dealing with flare pipes with varying diameters, including a 65" and a 90" flare line, both potentially exposed to high CO_2 levels.

Solution

Maintaining precise and shorter tipto-tip transducer distances is critical when measuring flare gas with high CO_2 composition to minimise ultrasonic signal attenuation. To ensure accurate measurements and protect the transducers from contaminants, we employed several strategies:

- Using dual-path transducers with a 0.5 offset.
- Reducing insertion angles for improved performance.
- Providing protective insertion tubes to shield the transducers from external factors.

Result

While the site commissioning is ongoing, initial results have demonstrated impressive outcomes. Our commitment to the project extends until every line is fully commissioned and compliant, underscoring our dedication to delivering reliable solutions that meet our client's needs.



OPERATING TOBENEFIT YOU

SALES TEAMS

Our global sales teams consist of seasoned industry professionals with diverse experiences. Many of them have developed their expertise within the Fluenta framework, having first-hand experience in installation and commissioning.

At our core, we are a team of adept problem-solvers. We approach the challenges you encounter with precision, both in terms of specific applications and regulatory requirements. Working closely with your engineering teams, we respond comprehensively to deliver tailored solutions that seamlessly integrate with your installation.

With office hubs strategically positioned worldwide, including locations such as Cambridge (UK), Dubai, Gdańsk, Kuala Lumpur, Houston, and Haugesund in Norway, we ensure proximity to your needs.

Furthermore, our extensive network of international VAR partners stands ready to assist you in specifying, installing, commissioning, and servicing your equipment.

ORDERING LEAD TIMES AND PROCESSES

When engaging with our global sales teams or VAR partners, we gather essential information, typically over two weeks, to ensure comprehensive understanding. For urgent RFQs, we offer expedited quotes within days.

After quote acceptance, we quickly move to manufacturing, offering a range of spool-piece materials, ball valve fitments, sensors, and custom cabling.

We also provide optional Factory Acceptance Testing and calibration post-manufacturing for enhanced accuracy and compliance. Despite long project timelines, our approach guarantees speed and efficiency.

AVAILABILITY

We uphold rigorous standards when it comes to maintaining stock levels for long-lead-time parts and assemblies, guaranteeing our ability to respond swiftly to customer needs. This commitment extends to spares and service items, where we maintain stock not only in our central warehouse in Gdańsk Poland, but also in collaboration with our distributors and regional offices.

INSTALLATION PROCESSES

At Fluenta, our team of service and installation engineers work in synergy with an international network of Fluenta-accredited service engineers, including our valued VAR partners. Together, they are fully equipped to support your installation and commissioning projects.

Typically, we can schedule most installations within 3-4 weeks. Should you require a shorter timeframe, we are committed to making every effort to accommodate your schedule. Regardless of the timeline, our dedicated teams are unwavering in helping you achieve your project milestones.

SERVICE PROCESSES

Fluenta's products come with an 18-month guarantee and are designed for harsh flare line conditions. However, annual recalibration by a certified engineer may be needed in certain geographies due to exposure to contaminants. To improve compliance and performance while cutting costs, we've launched FlareCal. This industry-first allows operators to perform zero-point calibrations independently, minimizing the need for on-site certified engineers.



Measurement Precision in Limited Space

Challenge

Ultrasonic flare gas meters require minimum distances of straight piping, free from bends and valves, to measure accurately. However, in this case, the flare line emerged from the knockout drum into an underground channel, leaving insufficient straight piping to mount for accurate metering.

Solution

Fluenta's flare gas measuring system, requiring only 15 diameters of straight pipe tubing (shorter than industry standards), provided a solution.

The customer's piping was modified to incorporate a small loop, meeting the 15-diameter straight piping requirement. This modification enabled precise flare gas meter installation and accurate measurements.

Result

Our pipe design and the Fluenta meter's shortdiameter requirement enabled us to optimize measurement accuracy while minimizing impact and expenses. Had longer straight piping been necessary, it would have consumed valuable space and incurred higher costs for the customer.

PRODUCTS THAT DELIVER

THE DETAILS THAT MAKE A DIFFERENCE

While we provide diverse flare gas measurement solutions featuring a range of transducers, ball valves, temperature and pressure sensors, and other essential components, our solutions consistently integrate the FGM 160 field computer.

Our system is designed to provide flexibility, allowing for single measurement paths or enhanced accuracy through dual path configurations. Some of our transducers are available in a Bias 90 configuration as well.

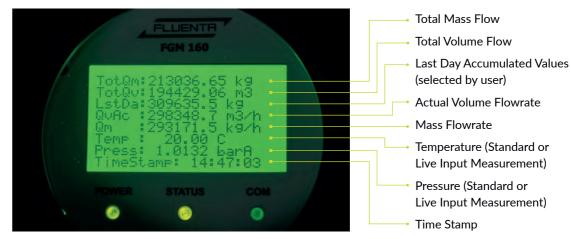
Regardless of the type of solution prescribed, the FGM 160 can be configured to support any system configuration.

The Fluenta FGM 160

Our current model of field computer, the Fluenta FGM 160, is at the heart of all of our flare gas measurement solutions. It is versatile and simple enough to integrate into any flare gas control system.







Measurement units can be set to metric or imperial.

Analogue 4-20mA Output Signals

The FGM 160 offers six analogue 4-20mA output channels, each of which is highly configurable. These channels can be tailored to output one of the following parameters:

- Standard Volume Flow rate
- Actual Volume Flow rate
- Mass Flow rate
- Density (Standard Conditions)
- Density (Actual)
- Molecular Weight
- Pressure
- Temperature
- Alarm (4mA for LOW Alarm, 20mA for HIGH Alarm)

Please note that analog outputs are disabled in the FGM 160 Foundation Fieldbus configuration.

Modbus Serial Interface

The FGM 160 offers access to its parameters via a Modbus serial interface. You can read or write all parameters or select specific ranges from an array in a single operation. These parameters are presented in single-precision floating-point format, with some arrays featuring 'Read-only' parameters and others offering 'Read/Write' capabilities.

HART 5, 6, and 7

The FGM 160 is equipped with a single analogue output channel that can be configured as a HART output interface. HART is a bi-directional communication protocol that provides data access between intelligent field instruments and host systems. A host can be any software application from technician's hand-held device or laptop to a plant's process control, asset management, safety or other system using any control platform. Communication occurs between two HART-enabled devices, typically a smart field device and a control or monitoring system. Instrumentation grade wiring and standard termination practices assure reliable communication.

Frequency Output

The Fluenta FGM 160 boasts three frequency or pulse output channels that offer versatile configuration options for mass and volume totalization. Among these channels, two can be configured to function as frequency output channels, with an impressive frequency range spanning from 10Hz to 4kHz. These output channels are adaptable for both mass and volume flow rate measurements.

FOUNDATION Fieldbus

As an option the FGM 160 can be modified to have a FOUNDATION Fieldbus output in place of the Analogue 4-20mA output signals. FOUNDATION Fieldbus provides an all-digital communication infrastructure for process automation, with powerful multivariable measurement capabilities, robust device diagnostics, and the ability to integrate wireless devices across multiple networks. The block structure of FOUNDATION Fieldbus is unique, enabling true distributed functionality, improved data management, and alarm and alert management.

Data Processing

Inside the FGM 160, data processing occurs, including data from transducers, pressure, and temperature transmitters. The field computer manages signal transmission, signal detection from transducers, and critical transit time measurements

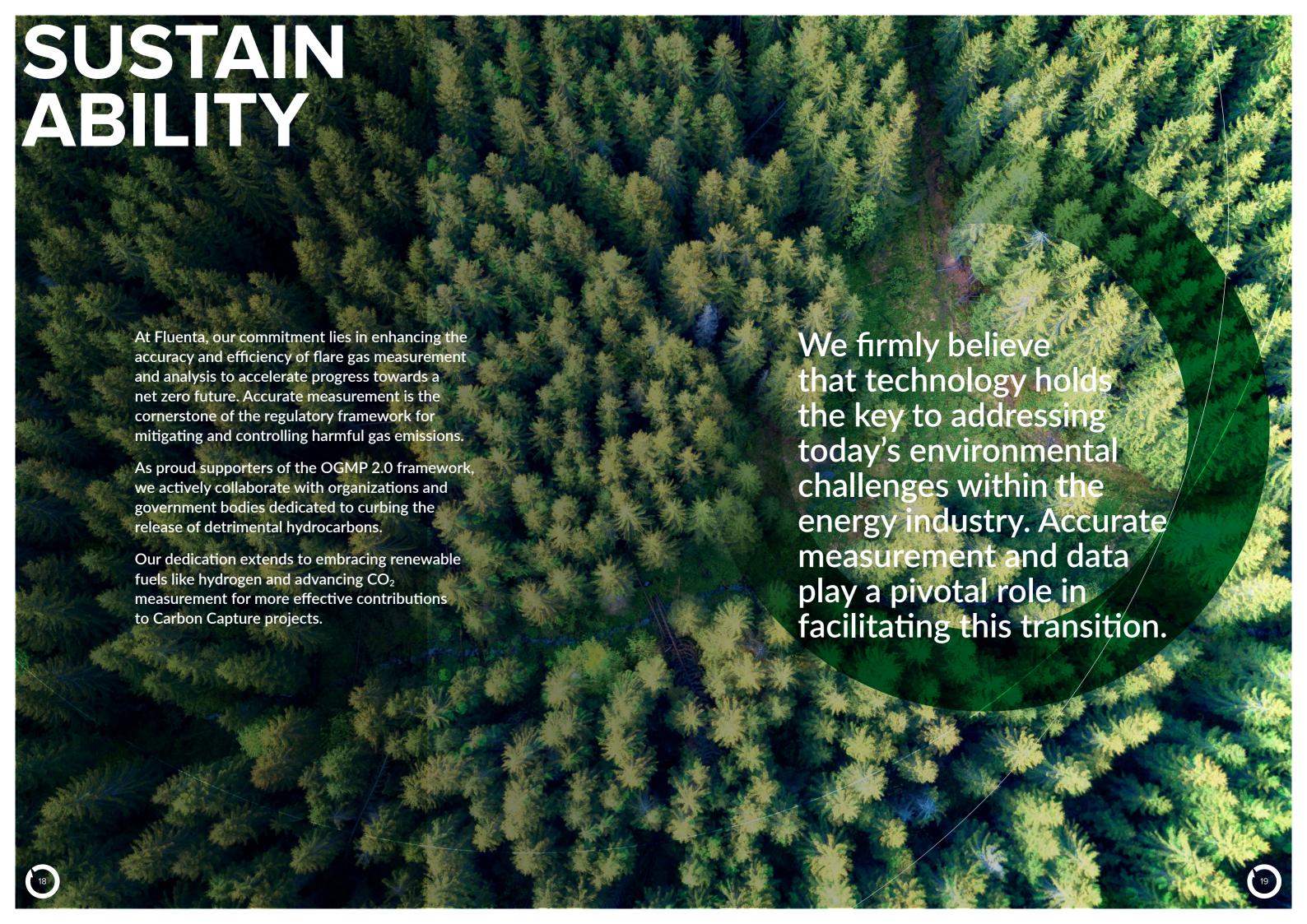
It also performs calculations based on these measurements and presents data and alarm messages.

System Configuration

The FGM 160 consists of two integral enclosures: the Ex-d enclosure and the Ex-e enclosure. The Ex-d enclosure houses the computer unit and all system electronics. Because of these enclosures, the FGM 160 can be mounted in a zone 1 area. It is IP66 rated for harsh environments and is painted 316L stainless steel to survive maritime conditions.







STRONG RELATIONSHIPS

Measured by time.

ExonMobil HELLA Motoroil **TotalEnergies** ConocoPhillips SINOPEC Petrofac n SAIPEM MCDERMOTT

POLICIES

That build strong relationships.

Commitment to Diversity, Equity, Inclusion & Wellbeing

At Fluenta, we are driven by the principle that the wellspring of innovation lies in the diverse minds that come together to solve complex challenges. Our dedication to Diversity, Equity, Inclusion, and Wellbeing is not just a policy; it's a cultural cornerstone that fuels our journey to excellence.

Our Commitments:

- Diversity: We celebrate the uniqueness of each individual. Our workforce spans various ages, genders, ethnicities, and abilities, reflective of the global community we serve.
- Equity: We are committed to a fair work environment. From recruitment to career development, our processes are designed to give each employee an equitable shot at success.
- Inclusion: We go beyond just opening doors. Our inclusion strategy aims to create a work culture where everyone feels valued, heard, and empowered.
- Wellbeing: We understand that a healthy employee is a productive one. Our comprehensive wellbeing programmes cover mental, emotional, and physical health.

Actions We Take:

- Training & Development: Mandatory diversity and inclusion training modules for all employees.
- Resource Groups: Formation of Employee Resource Groups that cater to various demographics.
- Flexible Working Conditions: Customizable work schedules and remote work options.

Measurable Impact:

We rigorously track key performance indicators (KPIs) to assess the efficacy of our initiatives. Our employee satisfaction rate consistently surpasses 82%.

Through these commitments, actions, and impacts, we're not just building a company; we're fostering a community where every voice is important. At Fluenta, your uniqueness isn't just welcomed—it's celebrated.

VALUES

The backbone of action.

Integrity: Trust as our True North

Integrity is the foundation upon which all else stands at Fluenta. From transparent dealings with customers to ethical governance, we strive for honesty and fairness in every action. It's not just about following rules; it's about being the kind of company you can trust implicitly.

Understanding and Empathy: More Than Just Business

At the core of our operations is a deep sense of understanding and empathy. We listen, learn, and act based on a holistic understanding of our customers' needs and our employees' well-being. We're not just solving problems; we're building relationships rooted in care and respect.

Courage: Boldly Navigating Challenges

Courage fuels our spirit of innovation. We tackle complex challenges headon, unafraid to venture into uncharted territories or question the status quo. Whether it's pushing the envelope in flare gas measurement technology or standing up for what's right, courage guides us.

Collaboration: Unity in Diversity

Collaboration isn't just teamwork; it's the synthesis of diverse perspectives into solutions greater than the sum of their parts. We actively seek and incorporate views from across the spectrum—be it in skills, culture, or experience—to build a more robust, agile, and inclusive work environment.







Established in 1985, Fluenta now proudly extends its expertise across all continents. With a robust network of offices and representing partners, we are dedicated to serving our global customers.



Scan the QR code for contact details or visit www.fluenta.com

