

Smart LNG[®] Solutions



“360°KAS serves the LNG Value Chain from production through liquefaction, shipping and storage/regasification with high-end analyzing and sampling solutions”



**360[®]
KAS**



SmartLNG[®] Solutions

360°KAS serves the LNG Value Chain with accurate, reliable and durable solutions to sample LNG from the main transfer line.

**360[®]
KAS**

LNG Sampling Systems are used for collecting samples during the custody transfer of LNG cargo. By offline (lab) analysis of these retained samples, principal proof of the transferred LNG quality can be obtained. Together with the density and the quantity transferred, the commercial value of the cargo can be determined.

With 25 years of worldwide experience 360°KAS is serving the LNG value chain with a number of solutions to sample LNG from the main transfer line:

- Sample Take-Off Assembly
- Probe & Vaporizer System
- Sample Transport Lines
- LNG Sampling System:
 - Intermittent (CP/FP) Sampling System
 - Continuous Waterless (Membrane) Sampling System
 - Continuous Water Seal (Dome) Sampling System
 - On-line Gas Chromatograph System
- Intelligent Quality Reporting Module (iQRM[®])

Sample Take-Off Assembly

LNG Probe & Vaporizer Systems are the critical elements in obtaining representative samples from the cryogenic flow in the main LNG transfer pipeline.

Typically the Sample Take-off Probe of the LNG Probe & Vaporizer System is inserted in the cryogenic sample take-off assembly, also called bypass loop. In this way the LNG Sampling System can be isolated from the process. This ensures safe working and easy maintenance as there is no need to drain and warm up the complete LNG transfer line.



Probe and Vaporizer System

In order to meet the ISO 8943 requirement 360°KAS developed a standalone operating LNG probe and vaporizer system combination. By use of integrated controls and premium materials this solution has proven to be one of the most reliable in the market.



The LNG probe and vaporizer system consists of three main elements:

- 1 SS316 vacuum insulated sampling probe**
Preferably inserted in the bypass loop to assure that easy maintenance can be performed without having to drain and warm up the complete LNG transfer pipeline.
- 2 Electrical vaporizer system with ISO 8943 sample conditioning system**
As per ISO 8943 an accumulator and sample conditioning system shall be positioned after the LNG vaporizer, also temperature and pressure transmitters are included to monitor the performance of the vaporizer.
- 3 Integrated controller for client connections**
The vaporizer heater is controlled by a dedicated temperature controller that is installed inside the local EEx d control box. As standard the EEx d control box is mounted on the side of the vaporizer cabinet as integrated part of the stand-alone solution.

The GIIGNL advises to install the vaporizer system and/or custody transfer point as close as possible to the sampling point.

Sample Transport Lines

For the transport of the vaporized LNG from the vaporizer and accumulator to the LNG sampling system, it is recommended to use heat traced tubing as sample transport line. 360°KAS is able to supply these sample transport lines as per client requirements and specifications.

LNG Sampling System

360°KAS has a long track record in the development and design of Continuous and Intermittent LNG Sampling Systems since 1994. All systems are in compliance with the ISO 8943, the ISO 10715 and the guidelines stipulated in the GIIGNL.

We can offer the following sampling Systems:

1 Continuous Water Seal (Dome) Sampler

Our automated Continuous Water seal (Dome) LNG sampling system, based on the ISO 8943 (paragraph 4.2, fig. 1) and ISO 10715 requirements, eliminates sample contamination by ambient air via a closed tank construction.



2 Continuous Waterless (Membrane) Sampler

Our automated continuous waterless (Membrane) LNG sampling system is based on the ISO 8943 (paragraph 4.2, fig. 2) and ISO 10715 requirements and collects high integrity samples for laboratory analysis.



3 Intermittent (CP/FP) Sampler

Our automated intermittent LNG sampling system is based on the ISO 8943 (paragraph 4.3, fig. 3) and ISO 10715 requirements and reduces room for human errors to a minimum.



Intelligent Quality Reporting Module (iQRM®)

During the loading or unloading of LNG, the quality of the transferred natural gas is an important parameter for the settlement of the transaction. As it becomes more and more important to have a certificate of quality with a known uncertainty immediately after transfer, LNG quality measurement systems are often equipped with PGCs. With the results the PGC analysis on the average gas composition, a certificate of quality is generated. This certificate is often prepared using spreadsheet tools that might lead to unwanted errors without the certification of an independent third party. 360°KAS developed a device that automatically generates an undisputable Certificate of Quality (CoQ), the intelligent Quality Reporting Module iQRM®.



The main features of the iQRM® are:

- Automated generation of a Certificate of Quality (CoQ)
- CoQ based on-line PGC Measurements
- Certification by an independent notified body
- Synchronization with the LNG Sampler in the field
- Automated PGC validation
- Statistical Process Control

Other solutions for the LNG market

Analyzer & Sampling Solutions

All necessary equipment to measure specified process variables in pipelines and process units within the LNG plant can be offered, such as:

- Total analyzer package solutions for composition, H₂S, hydrocarbons and Water Dew point analysis during LNG production
- Total analyzer package solutions for composition and H₂S analysis on transferred LNG
- Sampling System for Mercury Analysis on produced or transferred LNG

Lifecycle Service Management

After delivery of your system, a new project phase begins where our Customer Service Department will play an important role in various activities. Our dedicated service team offers you our dynamic life-cycle Service Management approach which helps you to realize maximum availability of your system, with minimum downtime at most economical operational cost. Our life-cycle service management program covers all the necessary areas to maintain and operate your system safely and accurately from initial startup till controlled end of life services.

We offer:

- Site Construction & Supervision
- (pre-) Commissioning & Start up
- Site Acceptance Test
- Training
- Service Level Agreements
- Preventative & Corrective Maintenance
- Spare-parts & Consumables
- Life-cycle Assessment
- Upgrades & Retrofits
- End of life services & replacement



These specific LNG related product sheets are available:

- LNG Probe and Vaporizer System.
- Continuous Water Seal (Dome) Sampler.
- Continuous Waterless (Membrane) Sampler.
- Intermittent (CP/FP) Sampler.
- Intelligent Quality Report Module (iQRM®).



360°KAS is an independent system integrator serving the global Oil & Gas, Petrochemical, LNG and Food & Feed market with high-end analyzing, sampling and pilot testing solutions. We take care of the whole process from basic and detailed design, through procurement, assembly and final system integration on site.

We believe trust is the most valuable asset in any relationship. You should be able to rely on our systems; 360°KAS is driven to be the quality leader in our field of expertise.

Our solutions are more than accurate. They are durable, reliable and keep going. That's what we call Engineering Trust. Our portfolio encompasses:

- **Analyzer & Sampling Solutions**
From consultancy and courses up to the delivery of total analyzer and sampling packages
- **Pilot Plants**
Customized test units and FCC pilot plants for the deactivation and performance testing of FCC catalyst
- **SmartLNG® Solutions**
To sample LNG from the main transfer line
- **Lifecycle Service Management**
Our dedicated Customer Service department takes care of optimal after sales support with spare part management, site services, maintenance contracts and warranty requests.

360°KAS is part of the Industry International Group. Industry International Group currently employs around 300 people across five autonomous businesses, each delivering specific technical engineered products and services in their respective fields and markets from different locations in The Netherlands, France, Africa, Middle East and the Far East.



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