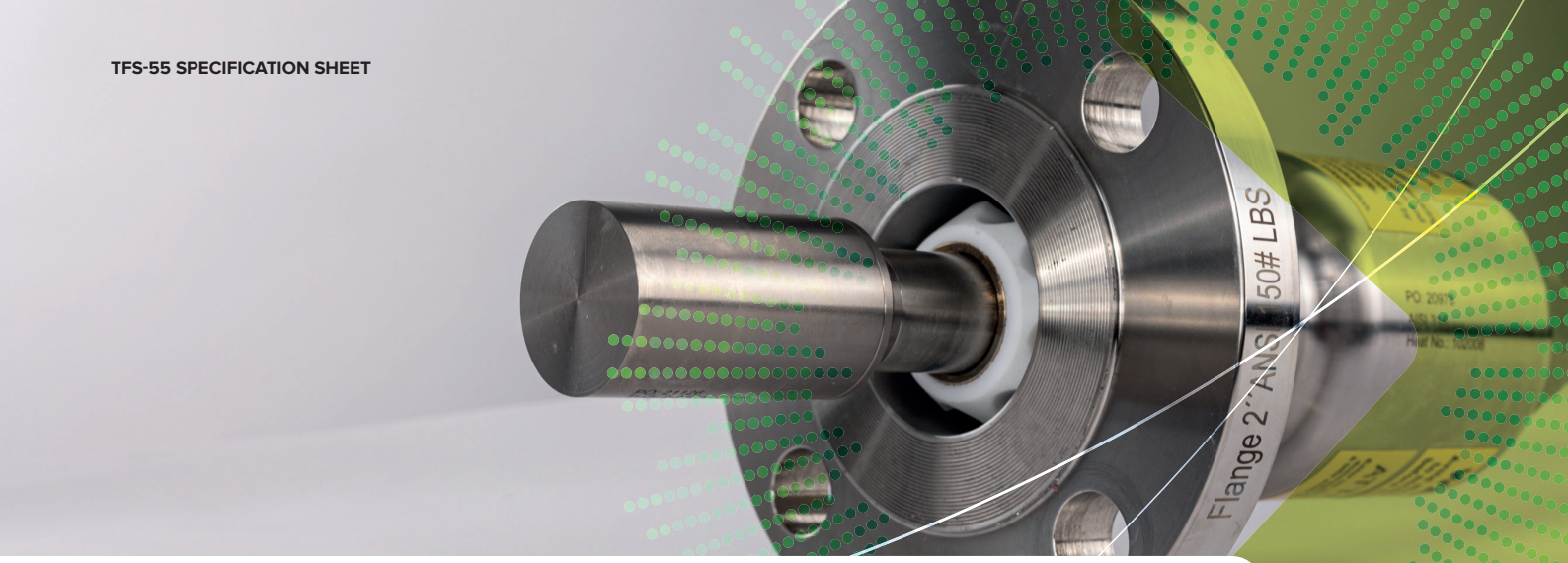


FLUENTA TFS-55

HIGH CO_2/HYDROCARBON ULTRASONIC TRANSDUCER

PRODUCT INFORMATION

Fluenta's ultrasonic transducers are designed to be a non-intrusive method of measurement capable of being used in difficult, rapidly changing process conditions and fluctuating flow velocities.

With an operating temperature range of -70°C to +145°C, this transducer is suitable for most standard flaring applications in both onshore and offshore installations.

The TFS-55 transducer operates at a lower frequency to the standard TFS. This means that gas compositions which absorb ultrasound, such as those with higher concentrations of CH_4 and CO_2 can also be accurately measured.

Like all TFS sensors, TFS-55 features dual ultrasound measurement modes, one of them being a "CHIRP" signal, which, when combined with a continuous frequency signal, allows much more accurate time of flight measurements. TFS transducers in a single path configuration, once calibrated, are able to achieve accuracies of better than ±1%.

TFS-55 OPERATING PRINCIPLES

Why Ultrasonic?

Unlike other technologies, ultrasonic measurement is less impacted by the composition or cleanliness of the gas flow, which enables it to deliver good repeatability regardless of turndown ratio or temperature range. With the currently available technology, ultrasonic transducers are the only devices which can deliver highly accurate results in flaring applications. While regulations typically ask for 5% accuracy today, ultrasonic transducers futureproof the installation for when regulations inevitably tighten and require higher accuracies.

Fluenta transducers are also designed to be non-intrusive and without any moving parts which means less fouling and minimal maintenance required. With the FGM 160 flow computer being able to be installed up to 50 meters away, Fluenta transducers offer flexibility in installation in addition to being able to be removed from the line without expensive shutdowns.

How TFS-55 sensors work?

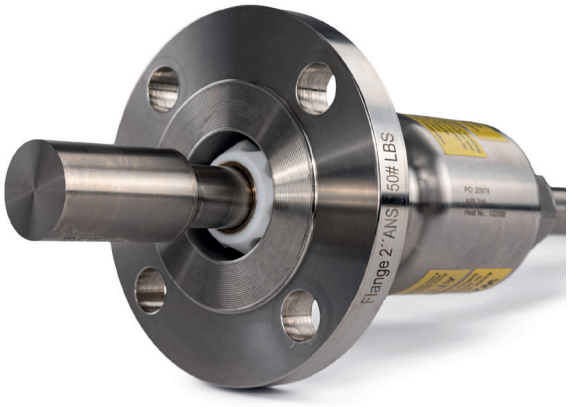
A piezo-electric crystal is mounted inside the titanium housing at the front of the transducers. It is attached to a front membrane.

When the crystal is subjected to an alternating electrical signal, it generates an ultrasonic signal of the same frequency. Vice versa when it receives an ultrasonic signal it generates an electrical signal of the same frequency. Thus, both transducers in a pair act as receivers and emitters.

The time of flight in both directions, with and against the flow, is analysed by the FGM 160 to calculate the axial gas flow velocity and volumetric flow rate in the pipeline with an accuracy as high as ±1%.

Being compatible with pipe diameters from 6" to 72", Fluenta's ultrasonic transducers are suitable for a wide range of applications.

TFS-55 TRANSDUCER SPECIFICATIONS



Functional Characteristics

Transducer Type	Ultrasonic/time of flight/ wetted non-intrusive
Materials	SS316/Titanium (Incomel/Hastelloy/6Mo/ Duplex may also be available upon request)
Certifications (temp range -110 to 120C)	IECEx, ATEX, NRTL (CSA), TR-CU, INMETRO
Measurement Generated with FGM 160	Volume and Mass flow, gas velocity, molecular weight, density, pressure, temperature
Service Requirements	Annual clean and calibration
Dimensions	In operation: 0.71m Retracted: 1.03m Cable up to 20m (may be extended to 50m)
Weight	13kg
Resolution	0.003ft/s (0.0008m/s)
Repeatability	Better than 1% of volume flow for velocity 0.3 – 100m/s
Accuracy	Standard: ±2.5% to 5% Optional: ±1% to 2%
Turn Down Ratio	4000:1

Operating Conditions

Temperature	-70°C to +145°C (-94 °F to +293°F)
Operating Pressure	11.6 to 145 psiA (0.8 to 10 barA)
Flow Velocity Range	0.03 to 120 m/s (0.1 to 394 ft/s)
Ball Valves	6” to 72” (for pipe sizes out of this range please contact a Fluenta representative)
Process Connections	2” and 3” 150#&300# Rf Full bore to customer specification
Straight Pipe Needed	10 x ID Upstream 5 x ID Downstream
Transducer Installation	For 6” to 10” pipe: 42°/48° For 12” to 72” pipe:45°/45°
Configurations	Single Path Dual Path

For detailed addresses and worldwide presence, visit **Fluenta.com**

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Scan for more information on the TFS-55