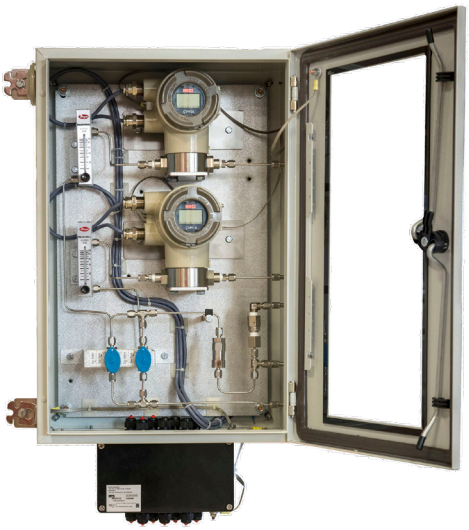
Gas Calorimeter

CVM 16 Cabinet version



Flow computers | Measuring sytems | Remote Terminal Unit | Supervisory system

MECI integrated inside an instrumented box one or two CVM 16. CVM 16 gas calorimeter measures the thermal conductivity of a gas mixture at different temperatures and calculates the inferior or superior calorific value or wobbe index of the gas based on its thermal conductivity.

CVM 16 is a compact, lightweight, and high-precision gas calorimeter that complies with international legal metrology standards. It is approved for custody transfer measurement of gases according to OIML R140.

OIML R 140 and Welmec compliant device

Approved according to OIML R140 international recommendation and developed according to Welmec guide, CVM 16 can be used as a calorimeter or as a calorific value determining device (CVDD) for natural gas custody transfer measurement.

Compact and easy to install device

Unlike conventional gas calorimeters, CVM 16 is small and lightweight, allowing a variety of installation site choices. It is ATEX approved and suitable for mounting in zone 1.

Fast response measuring system

CVM 16 represents a revolutionary continuous measurement solution. It can detect a change of quality of gas in processes in near real time by measuring every 2 seconds.
The time constant for 90 % response is within 30 seconds resulting in very fast output of gas calorific value.

High stability measurement

CVM 16 automatic calibration functionality guarantees prolonged measurement stability. The automatic calibration uses pure methane and guarantees long-term stable operation.

A wealth of diagnostic functions

Ambient temperature diagnostic
CVM 16 determines whether the operating environment is suitable, making use of a temperature sensor embedded on the same chip as the thermal conductivity sensor.

Operation time tracker
CVM 16 keeps track of the total operation time for comparison with the recommended replacement period (70 000 hours) for the calorimeter.

Automatic calibration history check
CVM 16 shows up to 5 of the latest automatic calibration records to check changes in the calibration factor.

Measurement principle

CVM 16 measures the thermal conductivity of natural gas at different temperatures, changing the temperature of the thermal conductivity sensor in multiple stages.
The calorimeter uses the support vector regression (SVR) method that is also employed for differential pressure transmitters.
The quality of gas is calculated from the measured thermal conductivity values of the process using a characteristics formula created in advance based on thermal conductivities measured at different temperatures of the gas.

Technical data - Gas Calorimeter Cabinet version

Model		CVM 16
Applications		Gas quality analysis, control of burners, laboratory measurement, field measurement
Functions	Calculated values	Superior calorific value and/or inferior calorific value and/or wobbe index
	Number of stream	1 or 2
	Analysis time	2 seconds
	Data storage	Up to 5 calibration records

Measured gas specifications

Component	High Natural Gas	Low Natural Gas	LNG (gaseous)	Biogas
C2H6	0 - 11%	0 - 4%	0 - 14%	0
C3H8	0 - 5%	0 - 1%	0 - 4%	0
C4+	0 - 2%	0 - 0.05%	0 - 2%	0
N2 + O2	0 - 7%	0 - 15%	0 - 1%	0 - 60
CO2	0 - 2%	1 - 2.5%	0%	0 - 60
CH4	80 - 100%	77 - 100%	80 - 100%	40 -60

Standards & performances	Accuracy	+/- 1 % of reading (OIML R140 CVDD compliant model)
	Repeatability and T90	+/- 0.02%, T90 between 5 sec to 22 sec (OIML compliance)
Equipment	Detector	Micro TCD (Thermal Conductivity Detector)
	Display	Until two LCD, 5 digits
	Enclosure	Metal 750 x 520 x 285 mm with the possibility of a glass door , Weight: 23,4 kg
	Process gas connection	1/8" OD
	Electric connection	Electrical connection via junction box : cable gland
Inputs/Outputs	Analog output	One or two output 4–20 mA
	Digital outputs	Until 2x 2 open collectors, 24 VDC +/-10 %, 50 mA max. for status output 1 A max for calibration output
	Serial link	HART Version 7.0
Languages		English, French

Operating conditions

Temp ref °C	Units MJ/m3	Output	Natural gas *biomethane*	LNG	Biogas
15/15 20/20 25/20	SCV	Superior Calorific Value	35 - 45	37 - 47	13.97 - 37.94
	WI_Hs	Wobbe index with SCV	46 - 56	48 - 58	
	ICV	Inferior Calorific Value	31 - 41	33 - 43	
	WI_Hi	Wobbe index with ICV	41 - 51	43 - 53	
0/0 25/0 15/0	SCV	Superior Calorific Value	32-42 ; 37-47	39 - 49	15.97 - 39.94
	WI_Hs	Wobbe index with SCV	41-53 ; 48-58	50 - 60	
	ICV	Inferior Calorific Value	33 - 43	35 - 45	
	WI_Hi	Wobbe index with ICV	43 - 53	45 - 55	

	Temperature	-20°C à + 50 °C with heating
	Humidity, Moisture	95 % RH max. Dew-point temperature -20 °C max.
	Pressure and llow rate	110 kPa abs max. / 16 PSI abs - at CVM 16 process connection port inlet 50 mL/min +/-10 mL/min
	Dust	Particles size less than 1 µm, 1 mg/m3 max.
	Calibration	Automatic or manual, Pure methane (99.995 purity min.)
Installation conditions	Protection class	IP 65
	Power Supply	24 Vdc +/-10 %, 0.6 A
Certifications	ATEX	⟨Ex⟩II2G IIB T3 Gb
	Custody transfer approval	According to OIML R140

C75082-01-GB-REV00-08/19

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