



## CVM 16

Flow computers

Measuring systems

Remote Terminal Unit

Supervisory system

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. CVM16 can be integrated inside an instrumented box with a second CVM16.

It is approved for custody transfer measurement of gases according to OIML R140.

### OIML R 140 and Welmeq compliant device

Approved according to OIML R140 international recommendation and developed according to Welmeq 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

Model		CVM 16				
Applications	Gas quality analysis, control of burners, laboratory measurement, field measurement					
Functions	Calculated values	Calorific value (superior or inferior), wobbe index				
	Number of stream	1				
	Analysis time	2 seconds				
	Data storage	Up to 5 calibration records				
Measured gas specifications	Component	High Natural Gas	Low Natural Gas biomethane	LNG (gaseous)	Biogas	
	C2H6	0 - 11%	0 - 4%	0 - 14%	0	
	C3H8	0 - 5%	0 - 1%	0 - 4%	0	
	C4+	0 - 2%	0 - 0.5%	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	LCD, 5 digits				
	Enclosure	Aluminum alloy, Window : reinforced glass, Dimensions: 160 x 130 x 120 mm, Weight : 2.5 kg				
	Process gas connection	NPT 1/8" female				
	Electric connection	Cable gland M20 or 1/2" NPT				
Inputs/Outputs	Analog output	1 output 4-20 mA				
	Digital outputs	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	LNG	Biogas
	15/15	SCV	Superior Calorific Value	35 - 45	37 - 47	13.97 - 37.94
		WI_Hs	Wobbe Index with SCV	46 - 56	48 - 58	
	20/20	ICV	Inferior Calorific Value	31 - 41	33 - 43	
		WI_Hi	Wobbe Index with ICV	41 - 51	43 - 53	
	25/20	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	
	25/0	ICV	Inferior Calorific Value	33 - 43	35 - 45	
		WI_Hi	Wobbe Index with ICV	43 - 53	45 - 55	
	0/0	SCV	Superior Calorific Value	32-42 ; 37-47	39 - 49	15.97 - 39.94
	25/0	WI_Hs	Wobbe Index with SCV	41-53 ; 48-58	50 - 60	
	15/0	ICV	Inferior Calorific Value	33 - 43	35 - 45	
15/0	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 & Flow 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 66				
	Power Supply	24 Vdc +/-10 %, 0.6 A				
Certifications	ATEX	II2G / Ex dIIBT6Gb				
	Custody transfer approval	According to OIML R140				

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