VE Conditioning Unit (VECU)
Technical Data Sheet

VECU

The VE Conditioning Unit is a compact unit through which the gas passes to eliminate the risk of retrograde condensation associated with the **Joule Thomson effect***. By heating the gas prior to the pressure drop, the gas sample cannot cross the phase boundary, into the two phase region, (as shown by the green line in the phase diagram below).

The gas passes through a 0.4micron heated inline filter before being heated within the unit. Next the gas exits the unit through a critical orifice, which is sized according to process conditions and customer requirements to reduce the pressure.

Preheating the sample guarantees the phase boundary is not crossed; this is essential to representative sampling.

*The **Joule Thomson Effect** is where there is a temperature drop, associated with a pressure drop. A rule of thumb for natural gas is a 0.5°C temperature drop per 1 Bar (approximately 1°F per 15 Psi) pressure drop. This provides the potential to cross the phase boundary. Without showing any signs of alteration, the sample has been altered and the validity of the results compromised.

Benefits

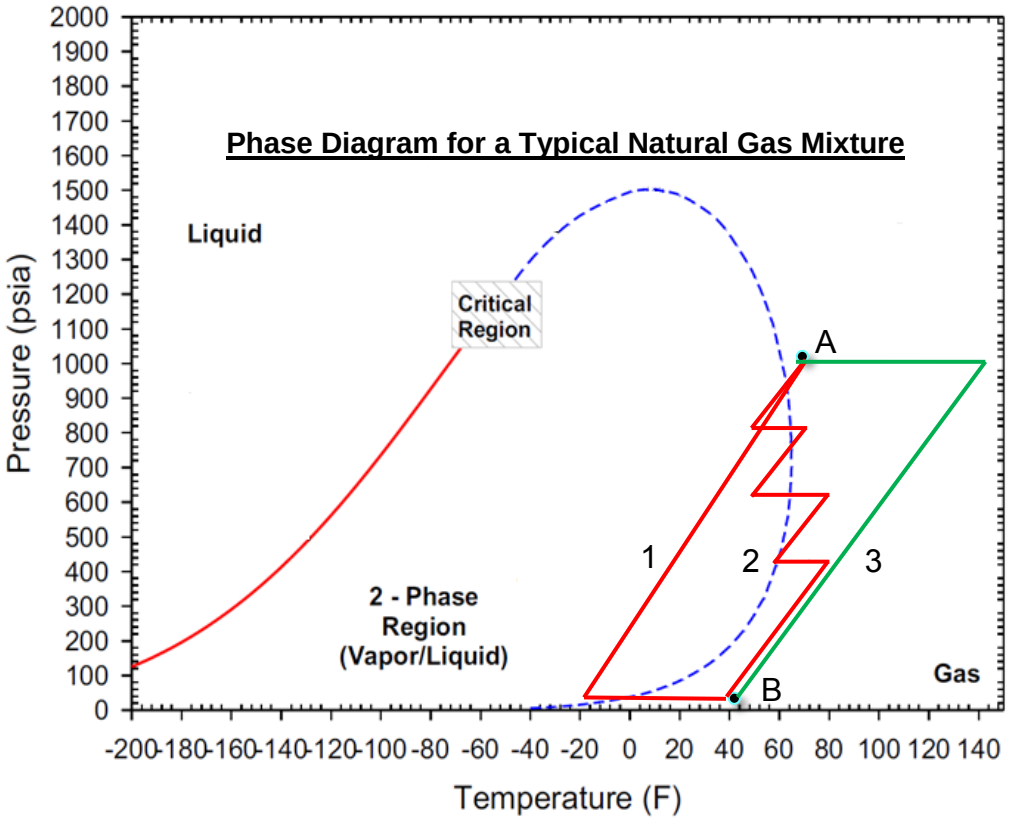
1) **Preheats the gas** to avoid retrograde condensation due to the Joule Thomson effect.

2) **Small, easy to install and replace filter.** (TDS 011)

3) **Stable and reliable pressure reduction.** The small, easy to install critical orifice which effectively reduces the pressure and controls the flow through the sample system. (TDS 011)

4) **Reducing the pressure as soon as possible** is essential when sampling, therefore, there is an option to mount the VECU directly on to the head of the sample probe. This reduces the sample lag time down to a minimum.

5) **Small sample volume** increases the sample speed, accuracy and reduces the quantity of vented gas.



Point A represents the conditions you might expect in a high pressure pipeline. Point B represents the conditions required for analytical equipment to operate safely and effectively. The purpose of the sampling equipment is to deliver a sample to the analyser while remaining representative of the main body of the gas, without crossing or nearing blue phase boundary, shown above.

It is impossible to assess the state of the gas during its journey from A to B. However, pre-heating the gas guarantees that the phase boundary is not crossed, thus maintaining a representative sample.

Line 1 – No additional heat input (re-heated by ambient temperature).
Line 2 – Multistage pressure reduction.
Line 3 – VE conditioning unit.

Key Components

VE Conditioning Unit TDS 001

Inline 0.4µm Filter TDS 011

Critical Orifice TDS 011

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Dimensions	Height – 160mm Diameter – 100mm
Weight	3.5 kg (8 lb)
Temperature Range	T4: Ambient -50°C to + 80°C (-58°F to +176°F) as standard T3: Ambient -50°C to + 160°C (-58°F to +320°F) as standard *Different temperature set points subject to process and pressure drop. Please contact us for more information.
Supply Voltage	110/240Vac – Unit is suitable for either with no modification 240V nominal, unit suitable for 230 – 265V 24Vdc or 18-28Vdc
Power Consumption	T4: Typical: 10 – 50W subject to pressure drop, flow rate and ambient conditions Maximum: 60W T3: Typical: 20 – 80W subject to pressure drop, flow rate and ambient conditions Maximum: 140W
Certification	**ATEX Certificate: Baseefa10 ATEX 0249X** **IECEx: BAS 10.0115X** T4: Ex II 1G ma IIC T4 Ga -50°C < Ta <+80°C T3: Ex II 1G ma IIC T3 Ga -50°C < Ta <+160°C **FM UL CSA: T4; 12370-1S T3; 12938-2S** Ex ma IIC T4 Ga; Class I Zone 0 AEx ma IIC T4 Ga; -50°C ≤ Ta ≤ 80°C Ex ma IIC T3 Ga; Class I Zone 0 AEx ma IIC T3 Ga; -50°C ≤ Ta ≤ 160°C
Protection Rating	IP67
Connections	Cable glands – flying lead (1.5m) as standard – extended length available along with flexible or ridged conduit Heating – 3 core (18AWG) power cable – Brown/Blue/Earth (O.D. 8.2mm +/- 0.4mm) Temperature sensor – 3 wire (18AWG) PT100 – Red/Red/White (O.D. 9mm +/- 0.6mm)
Sample Conditions	Permissible inlet pressure – 100 barg as standard (extended range available) Outlet Pressure – Maximum 40% inlet pressure Sample flow – Up to 10NL/min, extended range available
Materials	Wetted by sample – Electropolished stainless steel (SilcoNert® coating available on request) Housing – 316 stainless steel Cable glands and Earth lug – Corrosion resistant brass or Nickel plated brass (stainless steel available on request)
Installation and Mounting	User instructions - Please see IOM 001 Special conditions for installation: ○ The electrical supply must include a fuse capable of interrupting a potential short circuit current of 1500A ○ This system includes an integral cable which must be terminated in a suitably certified enclosure or safe area ○ The integral cable must be secured and mechanically protected within the Zone 0 area ○ The supply must include 30mA RCD protection Mounting options: ○ Integrated on to VE Technology® sample probe ○ Free standing in lab (attached to frame work) ○ Installed into cabinet

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