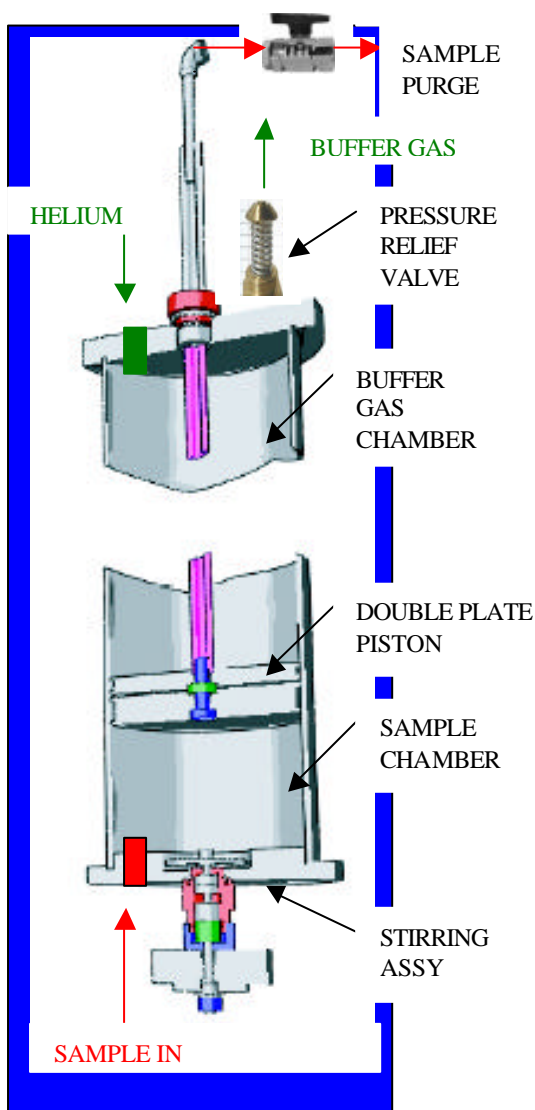


# NATURAL GAS SPOT SAMPLING FLOATING PISTON CYLINDER

## PURPOSE:

Determination of the composition and properties of organic gas samples such as LNG or LPG is highly dependant of spot sampling technique. The constant pressure piston balanced sampler ISOSAMPLE 1000 complies with the most advanced usual standard guideline ISO 10 715-1977 for sample collection, conditioning and handling.



## 1- ISOSAMPLE 1000 MAIN FEATURES:

- \*Sample is drawn into floating piston cylinder at pipeline pressure which is specified by ISO 10 715-1977 as the best method giving analytical results that agree closely with on line analysis.
- \*Patented double plate piston barrier prevents weathering and off-gasing.
- \*Cylinder wall autocleaning by piston scrapper and sample chamber reduced to the nominal zero volume before use and during purging.
- \*All parts in 316 L S.S. polished to  $0.2 \mu\text{m Ra}$  and PTFE, no wetted soldered seams: prevents contamination and accepts any type of sample.
- \*Optional mixing device to keep standard homogeneity and enable representative subsampling when required.
- \*Closed level indicator; pressure gauge and relief valve on buffer gas exhaust and sample purge valve are supplied.
- \*Full range of optional ancillaries: sample take-off probe – Flow control needle valve heated – Sample purge hose - Condensates separator

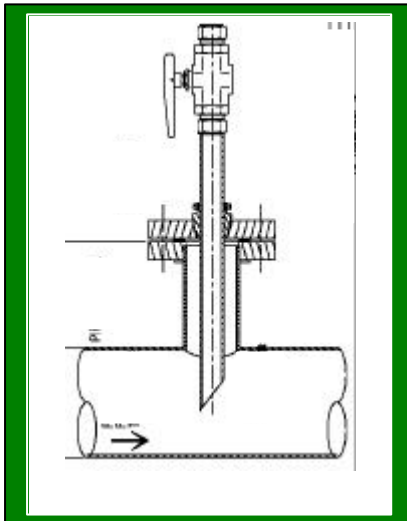
## 2- SAMPLING PREPARATION:

### PRE CHARGE:

The constant pressure piston cylinder must be pre charged with a buffer gas (typically Helium) non contaminant for natural gas at pipeline pressure + 1 barg by tuning the pressure relief valve set point. The piston is fully displaced against the sample inlet end plate.

### PROBE:

A sample take-off probe (optional ancillary N°1) must be located in gas stream on the top of horizontal part of pipe to withdraw gas from the center one third of diameter. No aerosols or dust at this point and recommendation is to locate sampling point at least at 20 pipe diameters downstream of flow disturbing element.



SAMPLE TAKE-OFF PROBE



METERING VALVE

**TUBING:**

Sampling line must be short with small diameter but not less than 3mm (electropolished pipe is recommended).

**FLOW CONTROL :**

A metering valve (optional ancillary N°2) must be provided to control the flow -rate injected in the cylinder sample chamber. This metering valve must be suitable for transferring the total sample volume within a period of 10 min approximately.

For an example of 5dm<sup>3</sup> sample chamber volume filled at 7 barg: a flow-rate of 4 l/min. must be controlled corresponding to a CV orifice of 0.014. Referring to response curve of our metering valve this is corresponding to the 10 vernier graduation.

**TEMPERATURE CONTROL:**

It will be checked on thermometer (optional ancillary N°4) that sampling line is at 10°C minimum above of the sample expected condensation temperature. If this condition is not achieved the electrical heater ATEX II 2G EExd IICT4 (optional ancillary N°5) must be provided on metering valve. For information, the Joule-Thomson effect on circuit based on 0.35 b differential pressure between process and sample chamber will be negligible ( less than 0.5°C. temperature drop).

**CONDENSATES:**

Condensates separator or drip pot is not recommended in sampling line however if the sample contents heavy ends liquid phase a separator is provided (optional ancillary N°6) to prevent downstream contamination. If at the end of sampling condensates are found in the drip pot the sample is not representative and must be rejected.

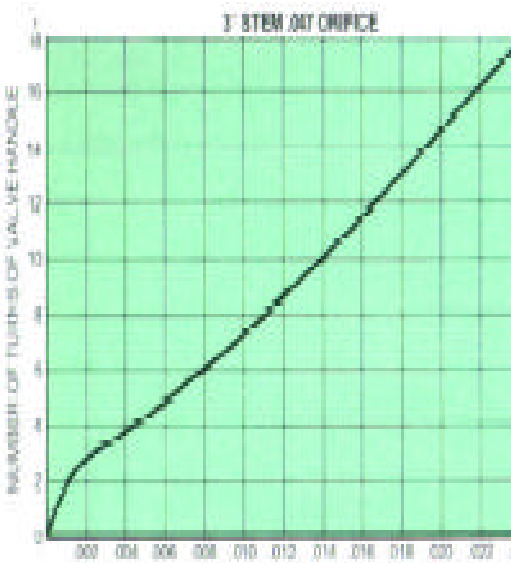
**3- SAMPLING PURGING**

The buffer gas chamber been pre charged with piston in down position and the sampling connected with metering valve vernier tuned at the 10 min sampling period (graduation 10 in our example) the sample purge valve is turned to open for purging the tiny dead volume between piston/end plate through the piston shaft venting to atmosphere. For a sampling line of 2 m with 3 mm OD tubing electropolished a purging cycle of 1min will be operated, then the purge valve shall be closed.

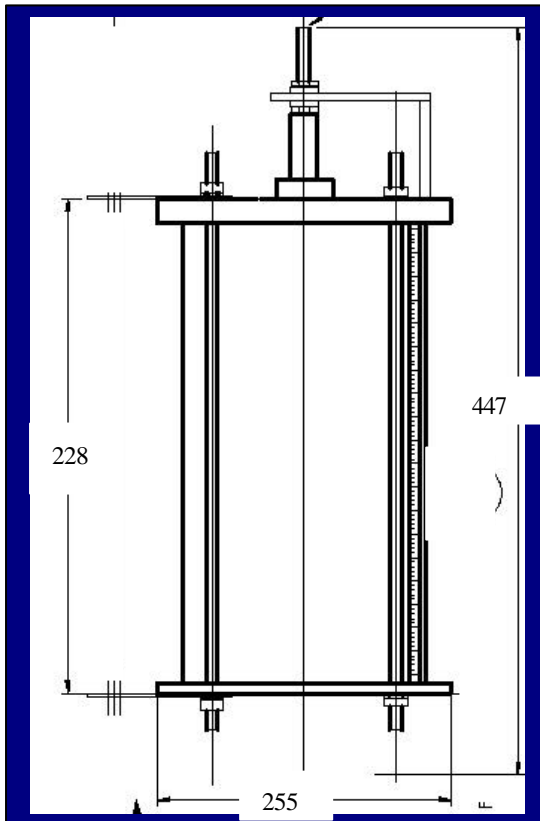
**4- SAMPLE COLLECTION**

Slowly open the probe valve, the piston shall not move as the buffer gas pressure (BP) is higher than the pipeline pressure (PP); by tuning the buffer gas pressure relief valve to reduce BP to PP- 0.35 bar the buffer and sample gas of both side of piston are unbalanced and the sample chamber is fed at constant flow while the level indicator is progressively rising.

With the metering valve tuned to the calculated value (graduation 10 in example) the sampling period will be approximately of 10min.



RESPONSE CURVE



SAMPLER LAY-OUT

#### 5- LNG APPLICATION:

Our high vacuum thermal insulated sample take-off probe and sample coil vaporizer has to be implemented for this application .

#### 6- SPECIFICATIONS:

Sample chamber capacity: 5dm<sup>3</sup>

Design pressure: 18 barg as standard or 30 barg or 150 barg for high pressure application.

Sample temperature: -20 to 120°C.

Material: all wetted parts in 316 L S.S. and PTF seals.



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