

**ANALYSERS CALIBRATION**

**. CROMATOGRAPH ./ . DISTILLATION ./ . VAPOR PRESSURE ./ .  
FLASH POINT ./ . OCTANE NIR ./ . SULPHUR**

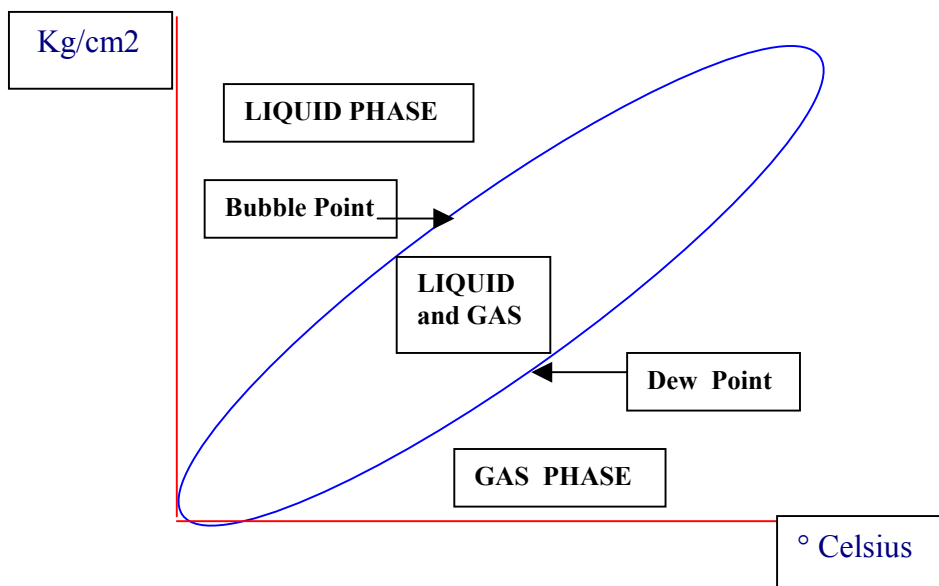
**1- FEATURES :**

- Calibration standard chamber is a piston floating cylinder to suit with split phase products . no contact between standard and motive fluid .
- Patented double piston barrier with inter-seals separation chamber to prevent any source of leak and keep full standard integrity
- All wetted parts in 316 L S.S. and PTFE
- Level indicator
- Optional :
- European Pressure Equipment Directive PED 97/23/CE mark .
- Stirring device as option within ISO 3171 to prevent stratification and keep standard homogeneity
- Level transmitter ATEX II 2 G EExi IIC T6 for remote monitoring of calibration standard contained
- Low level trip alarm ATEX IIG EEx ed IIC T6

**2- BENEFITS OF PISTON FLOATING CYLINDER :**

Quantity of worldwide releases published in oil refinery and petrochemical established the superiority of piston cylinders over the nitrogen sky tanks , the siphon cylinders and the membrane accumulators : only the results obtained with piston cylinders are in full correlation with actual composition of calibration standard .

Main difficulty is due to coexistence between gaseous and liquid phases in equilibrium in the cylinder when the boiling point of different fractions is different and the figure here under represents the multiphase envelop of a typical hydrocarbon mixture from Methane to n-Nonane .



### **3- DESCRIPTIVE :**

- Piston floating cylinder with patented double barrier and inter-seals separation chamber : this chamber can be either vented to atmosphere (double block and bleed operation) or filled with separation neutral fluid such as Nitrogen or Helium through the drilled piston shaft (neutral reference operation).
  - .If no separation fluid or atmosphere reference is required the inter-seals chamber is plugged (double block operation).
- This arrangement prevents any source of leak with deterioration of standard sample.

- Parts in contact with standard sample : 316L stainless steel body and PTFE seals .
- Graduated level indicator

### **OPTIONS :**

#### **Compliance with European Pressure Equipment Directive PED 97/23/CE :**

- Procedure complying with PED Annex III-Module A . Integrated relief valves LLOYD'S REGISTER certified on gas chamber . Maximum allowable pressure depends on vapor pressure of sample at maximum temperature . When vapor pressure is not greater than 0.5 bar above atmospheric pressure , relief valve is typically set at 10 bar g ( please check on application basis).
- Declaration of conformity and CE mark .

#### **Stirring devices :**

- pneumatic / magnetic stirrer for standard fluid viscosity under 20 cSt
- motorised stirrer within ISO 3171 for standard fluid viscosity up to 5 000 cSt ; ex-proof motor ATEX II 2 G EExdIICT4 , single phase 115/230 V- 50/60 Hz-200 W

#### **Level transmitter :**

- For remote monitoring of sample contained inside of calibration standard contained , the position of the floating piston in the cylinder is monitored by a resistive displacement level transmitter ( 0 to 10 Kohms ) tied to the piston shaft . No calibration is required within the life of this component .
- Associated to the Intrinsically Safe Barrier KFD2-PT2-Ex1 from Pepperl + Fuchs for a 4 - 20 MA or 0-10 V DC output , the transmitter loop is certified ATEX II 2 G EExi IICT6 for hazardous area .

#### **Low level trip alarm :**

- Pre-alarm and / or low level alarm by electrical contact ATEX IIG EEx ed IIC T6 is available as option .

### **4 – OPERATION :**

#### **a) Cylinder filling :**

If the fluid is coming under pressure from the process line , the motive air or Nitrogen in upper chamber must exceed the vapor pressure of standard sample at the maximum ambient temperature .

The same circuit is used for cylinder filling and injection of the standard sample into the analyzer .It is recommended to filter sample at 5 µm before filling the cylinder .

If the sample comes from laboratory , the most reliable way to keep standard integrity is to fill cylinder with standard by using a hand pump or similar device.

Once filling has been completed , a grab sample is taken-off for laboratory analysis . Special fitting consisting of elastomer septum for syringe can be used for this operation . If required , the same fitting can be employed to add a known amount of component of interest (e.g. C4 addition to Gasoline ) .

#### b) Inter-seals chamber processing :

The inter-seal chamber can be sealed if the plug of the piston drilled shaft is not removed (double block operation) or vented to atmosphere by removing plug and connecting a hose to drain ( double block and bleed operation ) .

It is also possible to fill the inter-seal chamber with neutral fluid ( neutral reference operation) for instance the inter-seal chamber should be filled with Helium if the standard fluid is injected to a Nitrogen trace analyzer in gasoline .In order to reduce the neutral fluid consumption ,low pressure in the inter-seals chamber can be controller (typically at 5 mbar ) .

#### c) Standard introduction :

Before of calibration operator must be sure that enough standard is contained in the sample chamber . A level indicator is furnished for manual calibration , for auto-cal either the level transmitter or low trip alarm option is recommended .

If the stirring device has been supplied , it must be started by air or electrical operation (depending of type ) at least 20 mn prior of calibration ( in fact stirrer can be continuously operated as air or electrical energy required is small ) . If the standard is not a pure product , stirring is recommended to avoid gravimetric separation and prevent stratification .

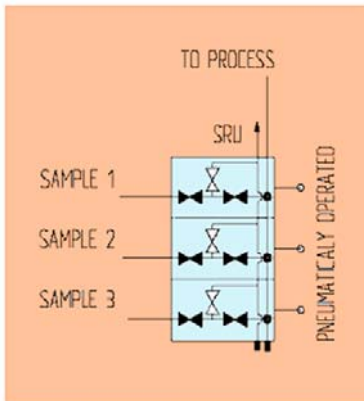
The starring air motor must be fed with low pressure compressed air , typically at 100 to 300 mbar . This can be achieved by using a needle valve at the outlet of pressure regulator ( not included in the basic scope of supply ) .

The motive air or Nitrogen pressure must exceed the vapor pressure of the standard sample but must stay under the maximum pressure authorised by the analyzer manufacturer , e.g.: maximum injection valve pressure in case of a chromatograph .

### 5- SPECIFICATIONS :

- Standard chamber capacitance : to select in the range of : 5 – 10 – 15 – 20 – 24 dm<sup>3</sup>
- Fluid motor pressure : up to 20 bars ( or as standard 10 bars if compliance with PED 97/23/CE is required )
- Design pressure : 30 bars ( check maximum allowable pressure in case of PED option )
- Hydrostatic test : 75 bars during 20 mn on standard sample chamber ( check in case of PED option ) .
- Pneumatic test : 40 bars during 120 mn on air or Nitrogen standard chamber ( check in case of PED option ) .
- Material : All wetted parts in. 316 L stainless steel and PTFE .

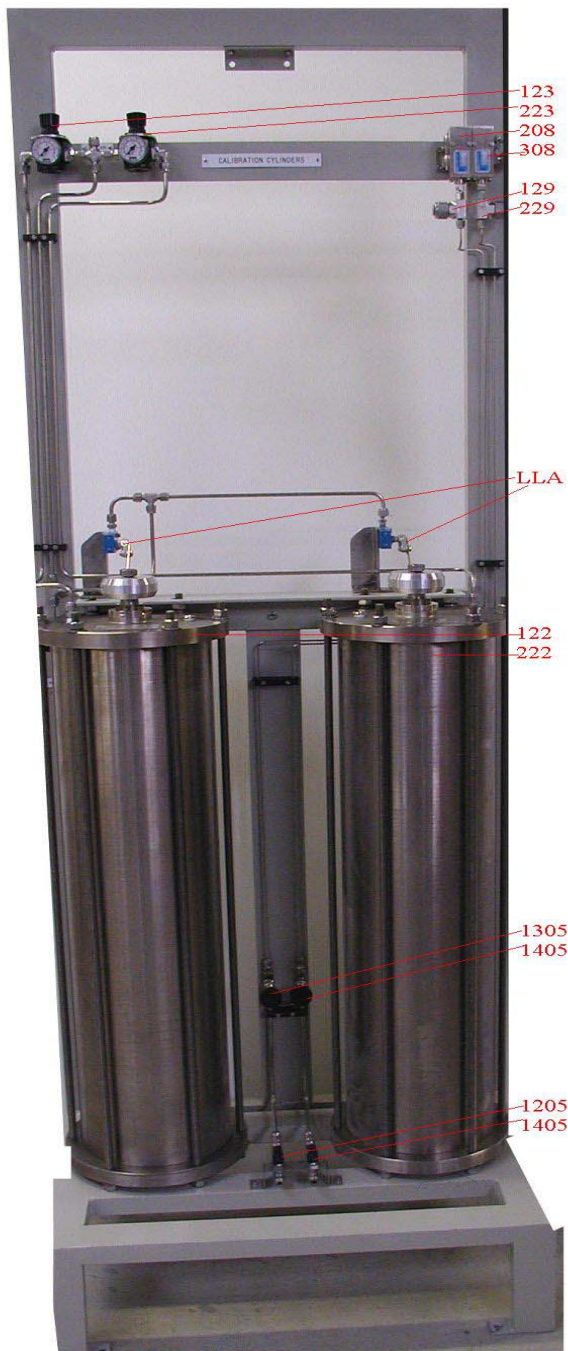
## 6 – INTEGRATION :



When required , material can be supplied with sampling system integrated on free standing frame or in cabinet .

Specific components such as integrated double block & bleed pneumatic valves are provided for auto-cal on the integrated systems to prevent cross contamination and eliminate dead volumes .

DOUBLE BLOCK & BLEED VALVES



**122/222**

Piston cylinders upscale/downscale

**1205 / 1305 / 1405 :**

Filling and purging valves

**129 / 229 :**

Filters 5 µm on injection line

**208 / 308 :**

Integrated double block and bleed injection valves

**121/223 :**

Filter/regulator on motive gas

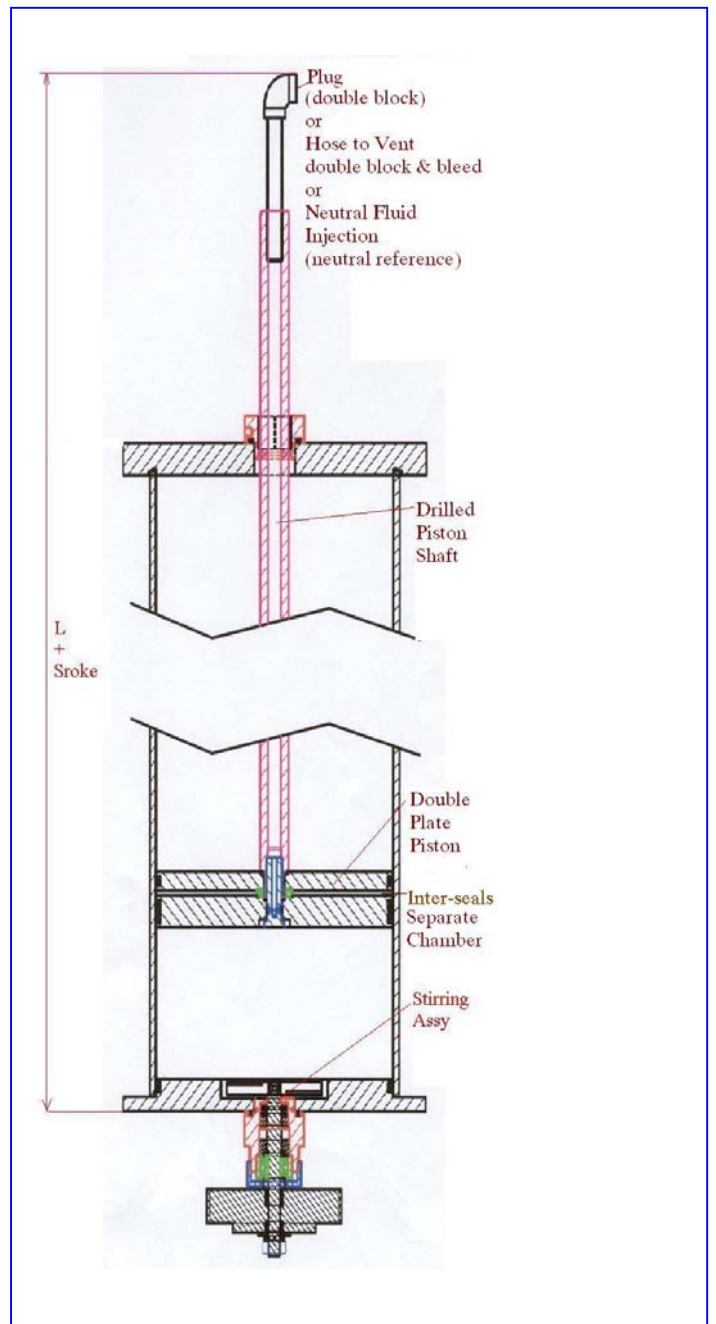
**LLA :**

Low Level Alarm

**7-VIEW :**



- 1- Level Trip Alarm
- 2- Piston Shaft
- 3- PED Relief Valve
- 4- Pneumatic/Magnetic Stirrer
- 5- Level Indicator



Capacitance dm3	5	10	15	24
L + Stroke mm	539	899	1239	1720
Stroke mm	175	365	525	765



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