InstruQuest, Inc.

VersaPyc XR™ – Versatile gas (He) Pycnometer, 1-100 + cc, Lab & Field

Description, features, and specifications

The **VersaPyc XR™** is a fast, accurate, and fully automated **gas (helium) and air (vacuum) pycnometer** in one instrument for measurements of volumes (density) of any solid-state samples using the **gas expansion method**. Dual reference chamber design allows for volume measurements from under **1 cc to over 100** cc in the basic unit. The extended range above 100 cc can be achieved by attaching external sample and reference chambers. Thanks to the embedded miniature vacuum pump, the instrument can be operated as an **air pycnometer.** Using the **vacuum technique,** no specific gas source is needed (other that ambient air) for implementation of the gas expansion technique. This unique feature and 12 VDC operation makes the pycnometer a preferred choice for field (geology, agriculture) and lab applications (R&D and QC). The built-in precision low-pressure regulator (non-relieving type) allows for setting a very repeatable pressure values during pressurization. It accepts various gas sources, up to 17 bar (250 psig), or 6 bar (100 psig) in case of dual gas option) and it eliminates any fluctuations of the high pressure regulators attached to gas cylinders. The novel approach to operational software design allows the user for easy design of experiments and repeating them using previously saved templates. The user can change parameters at any time and any important quantities can be displayed on PC screen and printed on the report. All data are saved in text format for easy transfer to other programs. The Manual mode of operation is also implemented (via software) for learning, teaching, or troubleshooting purposes. The operational software runs on any Widows based OS, 32 or 64 bit systems.

Main Features and Specifications:

- **Dual technique: Usage of pressurized gas source (typical gas expansion pycnometer) or integral vacuum pump (air) pycnometer).**

- **Dual reference chambers design results in large range of volumes measurements, from under 1 cc to over 100 in standard version, extended range via using optional or user provided auxiliary hardware.**

- **Absolute pressure transducer, typically 0-344 kPa (50 psi) range (basic accuracy 0.08%, optionally 0.05% or 0.03%).**

- **Accuracy and repeatability of volume measurements: ±0.02% of full-scale readings.**

- **User programmable analysis time: from few minutes to many hours.**

- **Operating pressure range: from 10 kPa to 340 kPa absolute pressure, about 220 kPa is recommended.**

- **Lab and field applications (powered by any suitable regulated 12 VDC source, a few Watts of power are used).**

- **Special design of hermetically closed sample holders with installed filters (2, 5, 10, 20, or 40 microns), suitable for finest powders.**

- **24-bit data acquisition system yields high accuracy and resolution.**

- **Extended calibration set (several large spheres, from 2" to 0.5"), w/ Micro set included.**

- **Universal AC power (100-240 VAC, 50-60 Hz) adapter with regulated 12 VDC output.**

- **Dual Gas Selector** (optional) – one of two gas sources can be selected by front panel switch.

- **Built-in precision low-pressure regulator** - allows for exact setting of required gas pressure.

- **Built in miniature vacuum pump with 7-10 kPa capability –** allows for the fastest and most effective outgassing of samples, especially when used in combination with pressure cycles.

- **Full control over experiment -** basic procedures are prepared as functions with parameters and their sequence is user defined in the experiment definition. Parameters can be modified during experiment run and results viewed on screen. The procedures can be saved and reused with a few mouse clicks. Data are saved in text format for future references and any further processing using spreadsheets.

- **Sample chamber dimensions: Max. Diameter - 52 mm (2.06"), Max. Height - 61 mm (2.4") or 38 mm (1.5") when flat closure adapter is used.**

- **Instrument dimensions: Depth - 30.5 cm (12"), Width - 28.5 cm (11.2"), Height - 10 cm (4"), not including protrusions at the top, back, and front.**

- **Instrument weight - 6.4 kg (14 lb).**

Additional analytical techniques, like gas transport rates through membranes utilizing pressure gradient method can be achieved with auxiliary hardware.

VersaPyc XR™ – gas/vacuum pycnometer - Ordering information

The scalable design allows for providing the user with the needed capabilities, from the basic pycnometer version to fully equipped by addition of optional equipment or custom features. Some of the options need to be ordered at the production time while others can be added later. As we advance the technologies, additional equipment and software capabilities can be listed in updated brochures.

The complete part number for ordering consists of the core instrument name (VersaPyc) and capital letters indicating options. Any digit(s) following the letter indicate a special version of the option.

VersaPyc - Complete system with single gas supply port. All standard accessories are included: One large sample holder w/ cover, one small sample holder with cover and volume reducing adapter, calibration kit, 12 VDC regulated table-top power supply (universal power input), USB adapter, extension communication cable, about 4 m of copper line 1/8" OD for gas connection, spare hardware, manuals, and Windows based software are all included.

Option A - Laptop with Microsoft Windows OS is offered almost at purchase price to make the easy installation even simpler as the software is already installed (highly recommended).

Option B - Dual gas supply ports option allow for connecting two (neutral) gases to the instrument and easy selection of one of them for a given experiment using the front panel switch. This option needs to be installed at production time.

Option C – Extended volume kit. This particular option is custom made and technical requirements need to be discussed first before providing pricing.

Option D – Powder bed porosity kit - contains special sample holder w/ cover, bed forming tool, and vibrator adapter. A suitable high quality caliper (Mitutoyo brand) can added to form D1 option.

Option E – Liner kit. Contains a special tool facilitating forming round shapes and insertion of disposable plastic bags as liners when handling difficult to clean samples.

Option F – High-pressure regulator, dual-stage, analytical grade, with CGA580 adapter for neutral gases.

Other options may include specific applications hardware for other analytical capabilities.

Ordering example: **VersaPyc -A** – this part number is for the **VersaPyc XR™** pycnometer with laptop computer (**A**) or VersaPyc-Set

For any inquiries, please use our e-mail: **info@instruquest.com**, and replies to quote requests with complete business address of destination are provided in writing only.

August l, 2021, InstruQuest Inc.

9091 SW 21st Street, Ste. A, Boca Raton, FL, 33428, USA · Ph: (561) 271-1958
Websites: www.thermopycnometer.com, www.instruquest.com, E-mail: info@instruquest.com