

HPVA

High Pressure Volumetric Analyzer

Features

- *Pressure Ranges from ultra-high vacuum to 200 bars.*
- *Temperatures from cryogenic to 500 °C. Excellent control of sample temperature by means of a constant temperature bath.*
- *Fully automated analysis and sample evacuation.*
- *Excellent data reproducibility.*
- *Single port, or multiple sample ports with simultaneous analysis.*
- *Handles typical adsorbates such as Nitrogen, Hydrogen, Methane, Argon, Oxygen, Carbon Monoxide, and Carbon Dioxide.*
- *Comprehensive Data Analysis Package using Microsoft® Excel® macros for data processing and graphing.*
- *Software includes NIST RefProp Database 23.*



HPVA-100 and HPVA-100-4

The HPVA Series of gas adsorption analyzers from Particulate Systems is designed to obtain high-pressure adsorption isotherms using gases such as hydrogen, methane, and carbon dioxide using the static volumetric method.

The volumetric technique consists of introducing (dosing) a known amount of gas (adsorptive) into

the chamber containing the sample to be analyzed. When the sample reaches equilibrium with the adsorbate gas, the final equilibrium pressure is recorded. These data are then used to calculate the quantity of gas adsorbed by the sample. This process is repeated at given pressure intervals until the maximum preselected pressure is

reached. Each of the resulting equilibrium points (volume adsorbed and equilibrium pressure) is then plotted to provide an isotherm. Excellent reproducibility and accuracy are obtained by using separate transducers for dosing the sample and for monitoring the pressure in the sample chamber.

Characterizations for:

- Catalysts
- Zeolites
- Activated Carbons
- Carbon Nanotubes
- Hydrides

Materials for:

- Hydrogen and NG Storage
- Fuel cells and batteries
- Stack gas scrubbers
- Hydrocarbon traps

HPVA High Pressure Volumetric Analyzer

Models HPVA-100 and HPVA-100-4

Components

Manifold

All the valves in the manifold are pneumatically operated high-pressure valves. All valve connections are made with heavy wall 316L stainless-steel, and are either welded or use VCR or VCO connections. All gas lines are fitted with 2 micron in-line filters. The manifold is leak-tested to 10^{-9} cm³ atm/sec.

Pressure Transducer

Depending on the maximum operational pressure of the unit, the transducer is either a capacitance manometer-type (MKS Baratron) or an electronic Bourdon gauge-type (Mensor). In both cases, connections are made via VCR connectors.

Vacuum System

Consists of a 5-CFM mechanical pump and Pirani vacuum gauge. Turbo or Molecular Drag pump optional.

Constant Temperature Bath

The operator-selected sample temperature is maintained constant by the refrigerated circulation bath (provided).

Activation Unit

For multiport units, the HPVA analyzer includes a separate activation unit for drying or activating the samples before testing, this unit consists of a vacuum system, a furnace and a manifold with a one inch diameter pneumatic valve connecting the vacuum system to the manifold. VCO connectors are used to attach the sample holders to the analysis manifold. A helium line is also provided for back filling. The furnace is capable of temperatures up to 500 °C, controlled with a PID routine which includes ramp and soak capabilities.

