Thermo Scientific Surfer
The Analyzer of Surfaces

Latest and gratest Analyzer of specific surfer area and pore size by gas adsorption

Ceramic materials

Powder metal oxides

Activated carbons and adsorbents

Catalysts

Pharmaceuticals

Cements and concrete

Pigments

Part of Thermo Fisher Scientific

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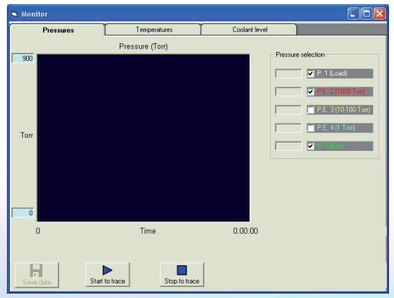
Instrument control, data acquisition and reprocessing

Surfer is computer controlled through a LAN port thus can be connected to a network. The control software has been designed for easy operation and full monitoring of all the instrument parameters, pumps control, analytical procedures, configuration set up, etc.

Data acquisition features the on-line display of the isotherm (volume vs pressure) and the graphic display of all parameters versus time (pressure values, temperatures and coolant level). These data can be then saved in a separate text file and imported in any spreadsheet software.

A new innovative analytical method set up to collect the experimental points permits to measure the equilibrium pressures where needed on the isotherm, enhancing the precision in the region of interest. Unprecedented isotherm resolution is now achievable by Surfer.



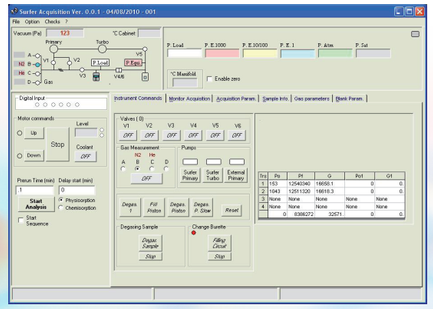
- Mode “Zones”: the user can select up to 10 + 10 (adsorption and desorption) pressure regions, choosing for each region the pressure steps and the equilibration conditions

- Mode “NPT” (Next Point Triangulation method): it is an automatic mode suitable for non-porous, macro and mesoporous materials. Surfer decides automatically the pressure steps at which equilibrium pressures must be collected with a degree of resolution decided by the user

- Mode “NPLT ” (Next Point Logarithmic Triangulation method): specially designed for micro and ultra-microporous materials (works also if mesopores are present), when the equilibrium pressure falls at extremely low values

- Acquisition parameters and experimental conditions can also be imported from a previously collected experiment or from a standard method prepared in advance

Data reprocessing software is comprehensive of all the latest updates of calculation models, like BET 2 and 3 parameters, Langmuir, NLDFT, ESW, BJH, Horvath-Kavazoe, Saito-Foley and many more.



In addition to these offices, Thermo Fisher Scientific maintains a network of representative organizations throughout the world.

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Thermo SCIENTIFIC

SURFER - The Analyzer of surfaces

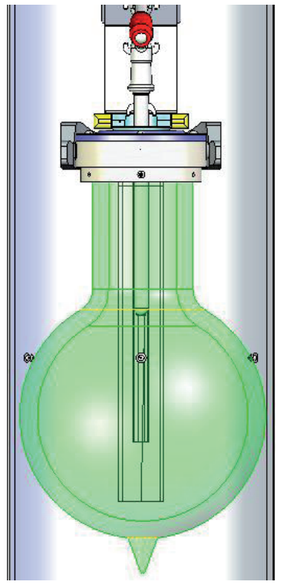
Thermo Scientific Surfer

Introducing Thermo Scientific Surfer, the specialist surface analyzer

Thermo Scientific Surfer applies the principle of static volumetric gas adsorption under controlled conditions of temperature and pressure to determine micro structural properties of solids and powders. Thermo Scientific Surfer determines rapidly and precisely the following properties of porous materials:

- Specific surface area (including krypton BET)
- Ultra micro, micro and mesopore size distribution
- Specific pore volume
- Exposed active sites concentration on catalysts

Surfer is composed by two separate modules that can be used independently or connected together, the analyzer and the sample preparation degasser. Prior the experiment, porous samples need to be dried and degassed and often the sample preparation is a time consuming operation as it depends on the material nature and pore dimensions. Thermo Scientific Surfer features a degasser module with three independent vacuum ports so that up to three samples can be prepared at once, shortening the total experiment time.



New exclusive coolant level device assures a stability of the cryogenic liquid within 100 microns!!

Thermo Scientific Surfer configurability

Configurability and modularity are important plus of Thermo Scientific Surfer, matching exactly what is needed to obtain best results in terms of surface area and pore size for any kind of material, from extremely low surface area (non-porous) to very high surfaces and large pore volumes (like in the case of micro and mesopore samples).
Surfer can be configured and customized easily on demand also according to the available budget, choosing in a wide range of vacuum pumps, pressure gauges, type of valves, etc.
The system can be easily upgraded and improved at any time.

Thermo Scientific Surfer highlights
Modules for analysis and sample preparation can be used independently providing a more flexible lab design
Fully configurable to match any analytical demand and budget availability
Full set of gauges is available to cover the complete pressure range with maximum resolution
Pressure reading zone mounted in closest vicinity of sample zone minimizing dead volumes thus improving sensitivity
Specifically designed A/D converter (8 channels at 24 bit plus 4 channels at 12 bit) assure the best resolution in pressure and temperature readings
Computer communication through a LAN port allows the remote control of Surfer in a network
Surfer can fit up to two of the available vacuum pumps (rotative, diaphragm, scroll, molecular drag or turbo)
PID temperature controlled cabinet encloses the manifold and all pressure sensors for unmatched stability
New and high precision coolant level control
Three vacuum independent degassing stations with two temperature zones up to 450 °C with controlled

What makes Thermo Scientific Surfer the specialist gas adsorption analyzer

The precision and reliability of surface area and pore size determination is related to several independent but interconnected factors. The amount of gas adsorbed by a porous material is directly related to the pore volume and the exposed surface area while the pressure at which the gas is adsorbed is linked to the pore dimension.

The volume of adsorbed gas is determined by the difference between the adsorbate introduced in the sample cell less the amount of adsorbate staying in the gaseous phase thus the sensitivity in measuring surface area is directly related to the minimized free space over the sample and to the precision in determining the dosed quantity of gas.

- Surfer minimizes the free space over the sample permitting to use less sample mass and thus less time for the experiment

- The gas dosed is measured by a separate transducer in a reference calibrated stainless steel chamber where the gas temperature is measured with 0.01 °C resolution

- PID temperature control (+/- 0.1 °C stability) of the cabinet containing the manifold and all the tubing in contact with the measuring gas assures unmatched pressure stability in the system independently from environment temperature changes. No corrections of pressure are needed

- Unmatched stability of gas pressure in the sample zone is assured by Surfer thanks to its unique and specifically designed device for liquid coolant level control (within 100 microns!!) assuring a stable pressure reading in the cold space zone

Pressure reading precision in Surfer is assured by the use of absolute capacitive transducers connected to a 24 bit A/D converter. In some analytical situations, like in the case of ultra-micro porous materials, also the geometry of the manifold and the relative position of the pressure reading zone and the sample zone can influence with evidence the pressure signal. Surfer manifold has been designed to optimize the distance and dead volume between the transducers and the sample, thus, in most of cases, the pressure data can be used without any correction.

Surfer provides real and true raw data that can be used as they are.