



POREEXPERT v2

Getting Started Guide

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1. Welcome

Thank you for using PoreXpert version 2, which we hope will provide an extremely useful and interesting experience. The software is new and continually developing, guided by its users, so please do not hesitate to contact us via the website <http://www.porexpert.com>. PoreXpert is the successor to Pore-Cor, which has been used in 20 countries worldwide - and all the feedback we received about that software has been built into the much more advanced PoreXpert. PoreXpert version 2 is even more powerful, with its unique, patented method of identifying voids which are actually clusters of smaller voids.

1.1. Purpose of the software

As someone working with porous materials, you will be aware how difficult they are to characterise. Microscopy gives a 2-dimensional view, with no information about the 3-dimensional connectivity of voids – and it is that connectivity which hugely affects properties such as the permeability, diffusion and trapping of pore fluids, and filtration characteristics. Microtoming gives information layer by layer, but connections of voids between layers have to be guessed. Tomography gives a 3-dimensional mapping of the voids, but not to sufficiently high resolution to give all the interconnections. Percolation characteristics, gained from mercury intrusion, water retention or porometry, give clues about the inter-connectivity of the voids, but give no explicit information about large voids hidden by smaller voids or connections.

PoreXpert is designed to bring all this partial information together, by constructing a realistic simulation of your porous material. The implicit and endemic approximation in the literature – invoked every time you take the slope of a mercury intrusion, water retention or porometry curve – is that the pore structure comprises a bundle of capillary tubes of different sizes – a bundle of different sized drinking straws, if you like. Just like the drinking straws, the assumption is that

they are not inter-connected. For a very few materials, such as track etch membrane filters, this assumption is correct – and you can explicitly generate such a structure in PoreXpert. However, for most materials, it is not – the fully interconnected PoreXpert structure is very much closer to reality. The shapes of the features in the PoreXpert structure are simplistic – boxes connect by tubes – but for most practical purposes voids shapes do not matter – it is the cross-sectional sizes and interconnectivity of the voids that really matter, and those are matched quantitatively to the experimental information you supply.

Once the structure is generated, a large amount of information can be gained about it, and downloaded in a variety of formats, e.g. for quality control purposes. Then a wide range of properties can be calculated, including permeability, wettability, tortuosity, diffusion, filtration and thermal conductivity.

And a very important feature of the software is *What if?*, for example :

- how will my material age?
- how will my material react to perturbations such as compression?
- how will the permeability change if my material is flooded with small particles?
- how will its filtration characteristics be altered if I enlarge all the smallest voids by 10%?

The features of PoreXpert are designed to move you beyond trial and error optimisation of your product, and into tailored engineering and design.

1.2. Purpose of this guide

This brief Getting Started Guide is intended simply to get you going with the software. It is not intended to be a User Manual, so is not comprehensive; a complete User Manual can be downloaded from the

Downloads page of the website www.porexpert.com. All the individual pages of the User Manual are also supplied with the program. If you are online while using the software, then it will access the latest version of these over the internet.

1.3. Versions of the software

Various versions, sub-versions and international versions of the software are available – see <https://www.porexpert.com/help2/index.html?versions.htm> .

1.4. Other products

1.4.1. Unit cell viewer

This is a stand-alone viewer of PoreXpert void structures for your personal computer, that can be used without having to install the full PoreXpert software. It is also useful for showing structures to colleagues and clients. A free download, and example structures, are on the website Download page: <https://www.porexpert.com/product-download>.

1.4.2. PoreXtract

PoreXtract reads and displays results from PoreXpert on your Android, Google or Apple mobile phone or tablet. Download the free app from your app store.

1.4.3. PoreXpand

Porexpand corrects for sample compression during mercury porosimetry, for Micromeritics porosimeter users who do not have that facility built in to the porosimeter control software.

2. Installation

2.1. Minimum System Requirements

Please see the relevant page of the Software support page of the website: <https://www.porexpert.com/support/system-requirements/> .

2.2. Installation Instructions

Download the PoreXpert installer zip file, obtained from the PoreXpert USB stick, an email from PoreXpert Ltd, or the PoreXpert website, into any convenient directory on your computer. Unzip the installer file, and save it. Double-click on the installation program and accept where required. Both Visual Studio and PoreXpert files need to be accepted.

During the installation, the drivers are installed for the Sentinel HASP Key (USB 'dongle'). Once the installation has finished please insert the Sentinel HASP Key into a spare USB port.

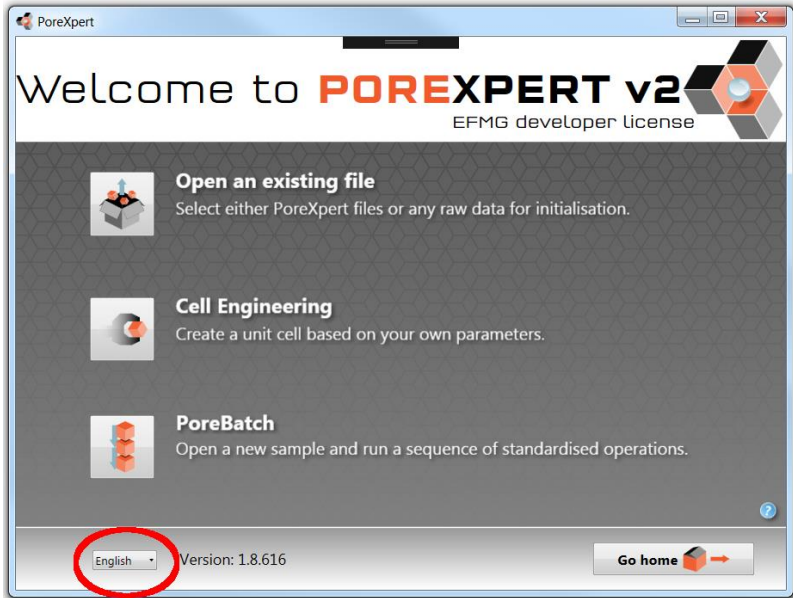
If the Sentinel HASP Key has installed correctly a red light will be visible on the Key.

If the Sentinel Hasp Key has not installed correctly, the most up-to-date drivers can be downloaded from: <https://sentinelcloud.com/sentineldownloads>. Download the latest Sentinel HASP LDK Windows GUI Run-time installer, and carry out the installation.


After the installation process has finished and the Sentinel Hasp Key is correctly installed, you are then able to launch PoreXpert, with the version dependent on your licence. When you run PoreXpert for the first time you will be asked to register the software, so that we can provide you with support and notify you of software upgrades available during your licence term.

3. Using PoreXpert

Once you have successfully loaded and started PoreXpert v2, you should see a Welcome Screen:



To change the language, choose an option from the dropdown menu, shown circled bottom left.

For assistance, click the  icon bottom right, or, for most computers, click your F1 function key. Then instructions and tutorials (all in English) will appear.

Keyboard shortcut controls, and 3D fullscreen viewer controls are on the last two pages of this booklet, so that you can detach them if you wish – since control instructions are not accessible while in that mode.

You are ready to go. We wish you an interesting, useful and rewarding experience. Best regards, The PoreXpert team

Notes

4. PoreXpert keyboard shortcuts

Initialisation

Operation	Immediate Calculation	Add to PoreBatch
Sampling	Ctrl + 1	n/a
Fitting	Ctrl + 2	Shift + 2
Building	Ctrl + 3	Shift + 3

Engineering

Operation	Immediate calculation	Add to PoreBatch
Targeted Modification	Ctrl + T	Ctrl + T

Calculation

Operation	Immediate Calculation	Add to PoreBatch
Permeability	Ctrl + 4	Shift + 4
Conductivity	Ctrl + 5	Shift + 5
Tortuosity	Ctrl + 6	Shift + 6
Filtration	Ctrl + 7	Shift + 7
Fluid Uptake	Ctrl + 8	Shift + 8
Fluid Migration	Ctrl + 9	Shift + 9

Analysis

Operation	Immediate Calculation	Add to PoreBatch
Connectivity Distribution	Ctrl + Alt + 1	Shift + Alt + 1
Content Distribution	Ctrl + Alt + 2	Shift + Alt + 2
Pore & Throat Size Distribution	Ctrl + Alt + 3	Shift + Alt + 3
Microtoming	Ctrl + Alt + 5	Shift + Alt + 5
Fluid Uptake Progress	Ctrl + Alt + 6	Shift + Alt + 6

Reporting

Operation	Immediate Calculation	Add to PoreBatch
Save as PoreXpert File	Ctrl + S	n/a

Batch Mode

Operation	Porebatch
Run Batch List	Shift + R

Controls for viewing unit cells using 3D fullscreen view in PoreXpert, stand-alone viewer and PoreXtract

- Hold down left-hand mouse button and drag mouse to rotate the cell.
- Hold down left-hand mouse button, drag mouse and release – keep the cell rotating.
- Hold down right-hand mouse button and drag to zoom in or out (can also be achieved by rotating the mouse wheel if your mouse has one).
- Hold down central mouse button and drag to move whole structure.
- Press the spacebar to return the structure to the default position.
- Click the **h** key on your keyboard to display shortcut keys as listed below.
- To exit the view, click your **Esc** key.

The shortcuts can be displayed by clicking **h** while viewing the unit cell, and apply to the PC and built-in unit cell viewer only.

Keyboard Shortcut	Function
C	Toggle continuous screen capture
S	Output statistics to console
Space Bar	Reset the viewing position to home
Z	Toggle camera path playback.
c	Take screenshot to the directory containing the cell viewer. The file is called <i>filename.poreXpert_0_n.jpg</i> , where <i>filename</i> is the name of the PoreXpert file you are viewing, and <i>n</i> is the screenshot number. Successive screenshots will increment <i>n</i> . However, if you wish to keep a screenshot, you are advised to rename and move it, as screenshots from new viewer sessions may over-write old ones.
h	On screen help.
s	On screen statistics.
z	Toggle camera path recording.