

Precision and reproducibility of the POROLUX™ 1000

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One of the main benefits of the POROLUX™ 1000 and its measuring principle is the high precision and reproducibility of the measurements. In this application note we show measurements performed on a standard paper filter. To test the precision 10 different samples were cut out of one sheet; for the reproducibility the same sample was measured 10 times.

For both tests, all other parameters were kept constant. We used 2 ml of Porefil wetting liquid dispensed with a pipette on the surface of the filter while the filter was in place inside the (25 mm) sample holder. For the wet curve, in a pressure interval of 0 to 0.25 bar, 30 measuring points were taken. The dry curve was measured with 25% of the points used for the wet curve. The stabilization routines of the measurement was set to the default values.

Figure 1 shows the overview of the 10 different samples measured to test the precision of the POROLUX™ 1000. We have to assume that the material of the standard filter we tested is uniform. In table 1 gives the results for the mean flow pore, first bubble point and smallest pore, together with the standard deviation.

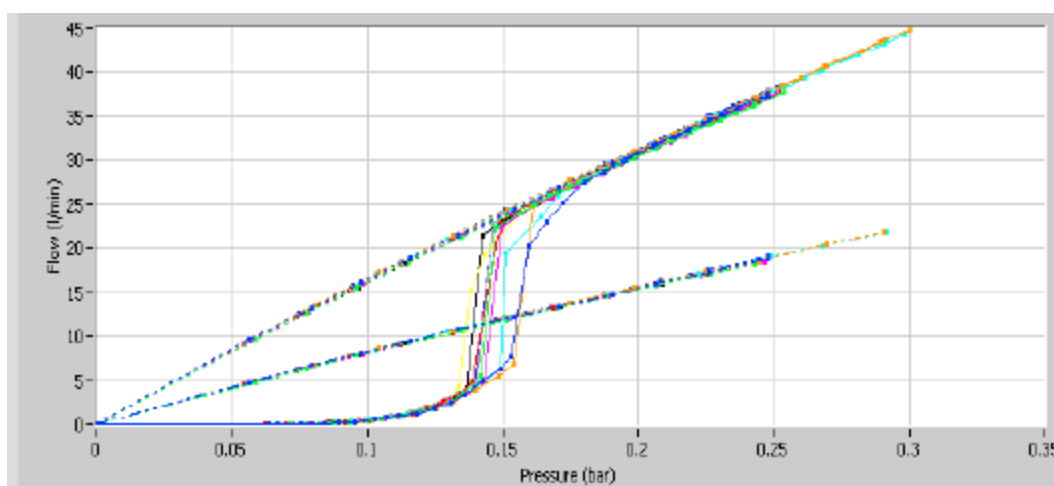


Figure 1: Precision of the POROLUX™ 1000: Wet and dry curve overlay of 10 measurements on a standard filter. From the filter, 10 samples were cut from 10 different places and measured.

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	<i>mean flow pore size (μm)</i>	<i>bubble point pore size (μm)</i>	<i>smallest pore size (μm)</i>
sample 1	4.11	9.52	2.86
sample 2	4.45	9.66	2.82
sample 3	4.10	9.53	2.76
sample 4	4.27	9.62	2.27
sample 5	4.40	9.53	2.63
sample 6	4.69	9.59	2.72
sample 7	4.50	10.22	3.05
sample 8	4.48	10.22	2.81
sample 9	4.60	9.59	2.82
sample 10	4.50	10.10	2.73
stdev	0.20	0.30	0.20

Table 1: Precision of the POROLUX™ 1000: mean flow pore size, bubble point and smallest pores of 10 individually cut and measured samples. From the filter, 10 samples were cut from 10 different places and measured.

Figure 2 shows the curve overview of the 10 measurements performed on the same sample. The repeatability is very high, only small differences can be found between all 10 samples. Table 2 gives the results and calculated standard deviations for the mean flow pore size, bubble point and smallest pore. Again, a very high reproducibility can be observed.

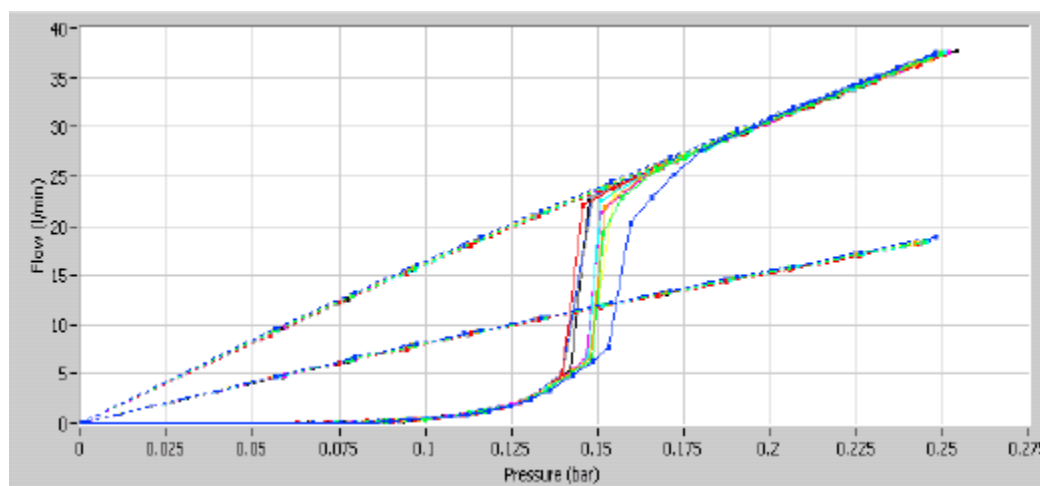


Figure 2: Reproducibility measurements on the POROLUX™ 1000: 10 consecutive measurements on the same paper filter are shown.

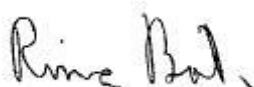
	<i>mean flow pore size (um)</i>	<i>bubble point pore size (um)</i>	<i>smallest pore size (um)</i>
sample 1	4.11	9.52	2.86
sample 2	4.27	9.53	2.81
sample 3	4.29	9.55	2.75
sample 4	4.31	9.55	3.01
sample 5	4.32	8.52	2.83
sample 6	4.28	8.56	2.64
sample 7	4.51(*)	10.16(*)	3.22
sample 8	4.47(*)	10.11(*)	3.39
sample 9	4.45(*)	9.66(*)	2.82
sample 10	4.49(*)	10.18(*)	3.01
stdev	0.13	0.59	0.23

Table 2: Mean flow pore size, bubble point pore size and smallest pore size for 10 consecutive measurements on the same sample measured with the POROLUX™ 1000.

(*) We believe that above 6 repeats, the sample slowly degrades and results in larger bubble point pore size and mean flow pore. Calculated without last 4 measurements shows stdev MFP 0.08 and stdev bubble point: 0.51

Conclusion

With the POROLUX™ 1000 precise and reproducible results can be obtained for the characteristic pore properties.



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technical support and development