New Leaktest Procedure

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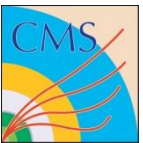


History of the different Pressure Drop cuts used

Gap Type	RE4/3 TW	RE4/3 TN	RE4/3 B
Pressure Drop (mbar/10min) to be certified with +20mbar (CERN)	0,1	0,3	0,4
Pressure Drop (mbar/10min) to be certified with +20mbar - 10th of May (KODEL)	0,3	0,4	0,5
Pressure Drop (mbar/10min) to be certified with +20mbar - 23rd of October (KODEL)	0,2	0,3	0,4
Discussion about new possible cuts for all the sites	0,2	0,2	0,2

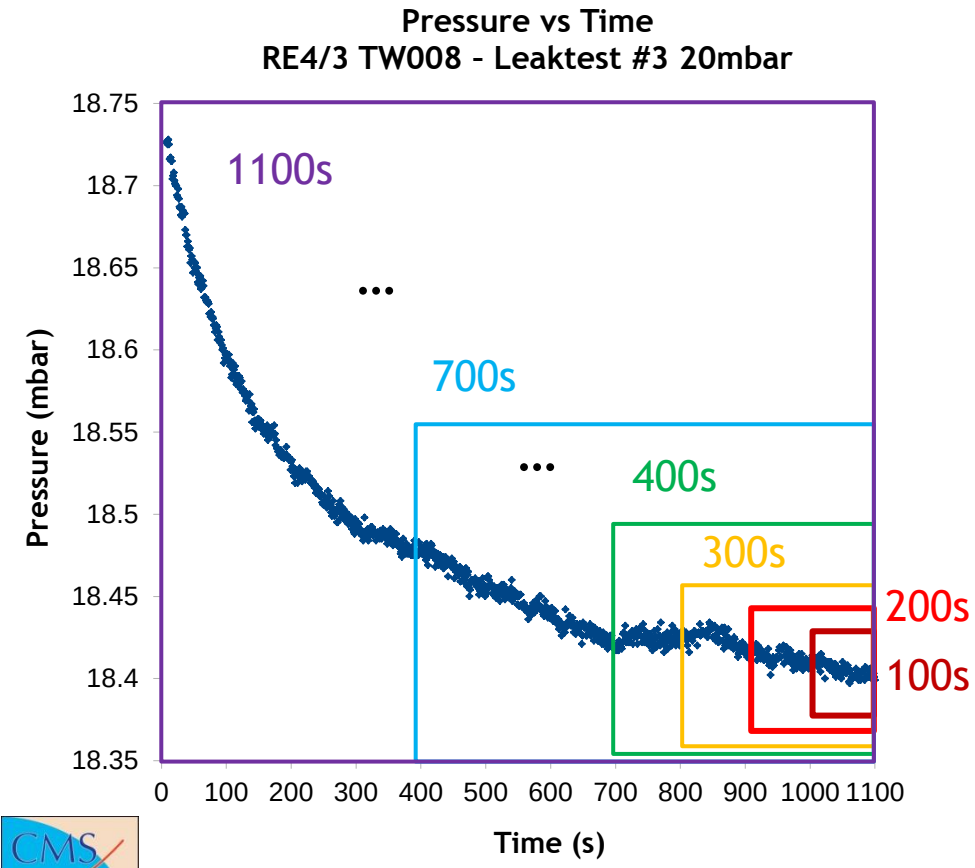
New procedure for the leaktest

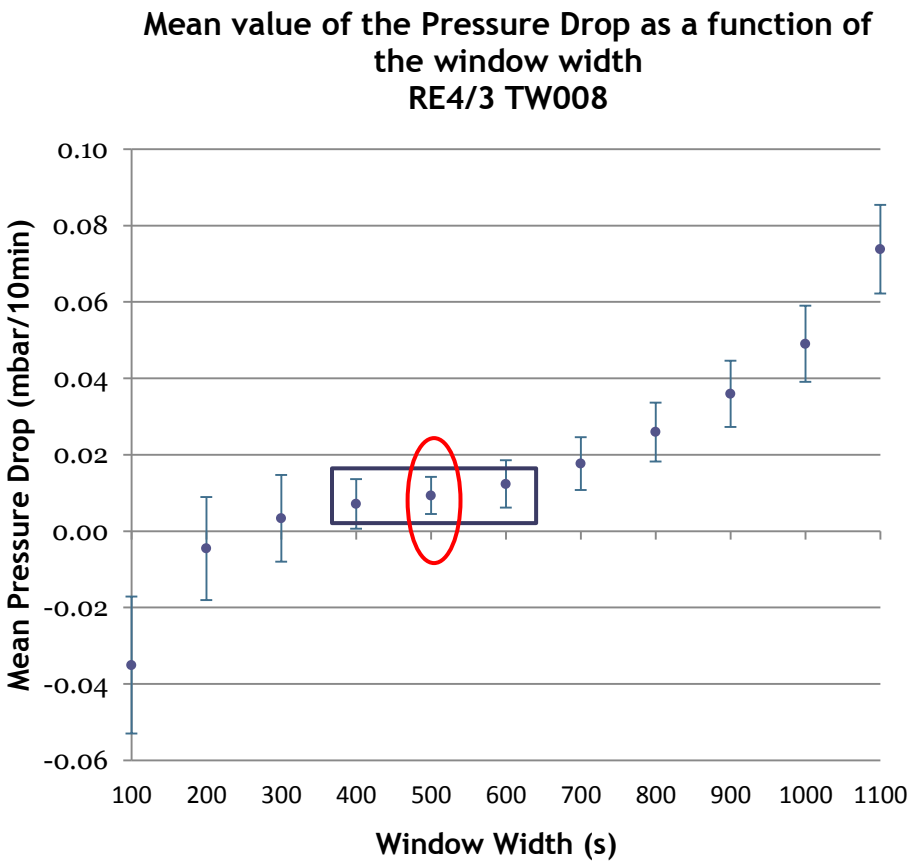
The new leaktest procedure is the following :

1. Increasing of the pressure until 5mbar
2. Wait 600s to obtain the system stability
3. Leak test at 5mbar during 500s
4. Increasing of the pressure until 20mbar
5. Wait 600s to obtain the system stability
6. Leak test at 20mbar during 500s
7. Spacer test at 20mbar (at the end in order to not perturb the leaktest)

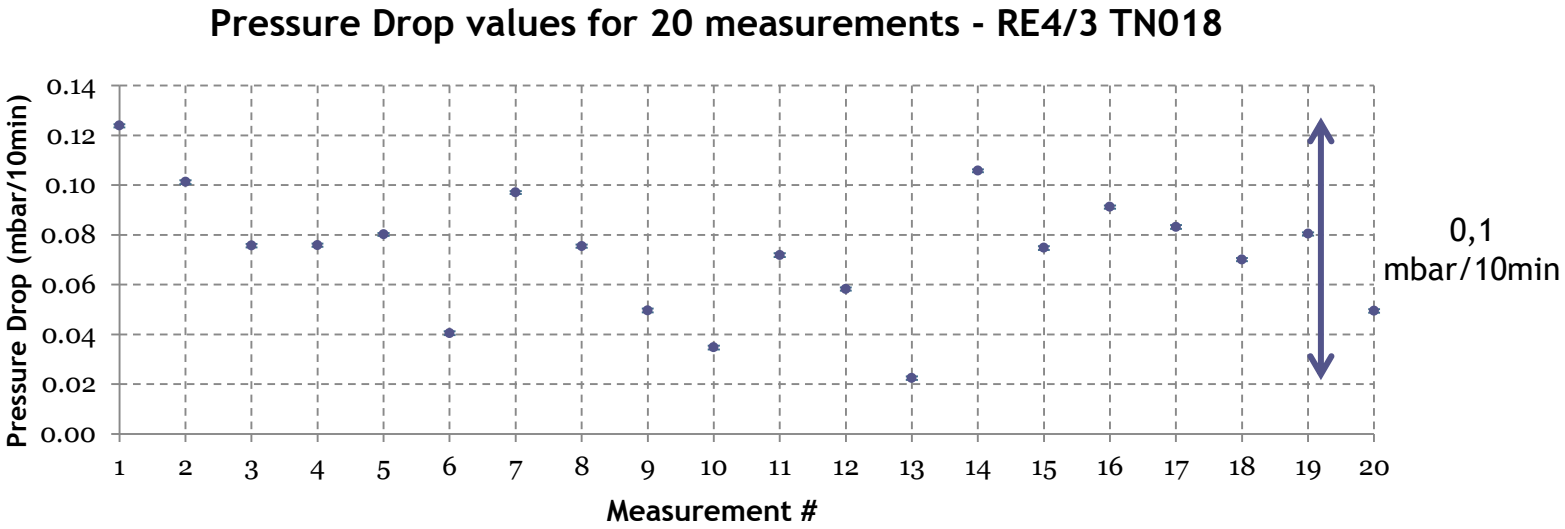
Choice of the optimal measurement time

10 independent measurements were realized.
11 windows from 100 to 1100s were opened starting from the end of each measurement.
For each window width has been performed a calculation of the Mean Pressure Drop which gives :





Definition of a tolerance on measurements



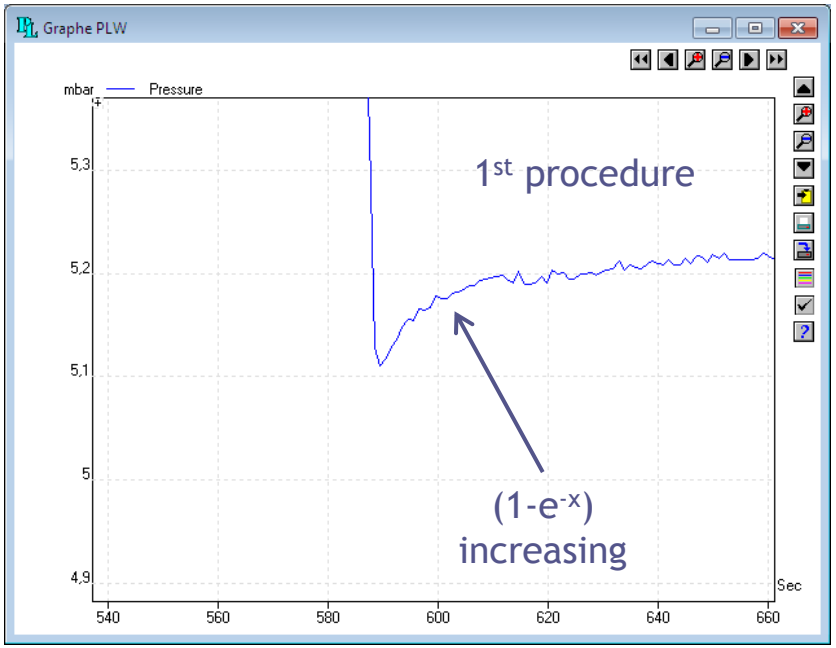
The results are contained in windows of 0.1mbar

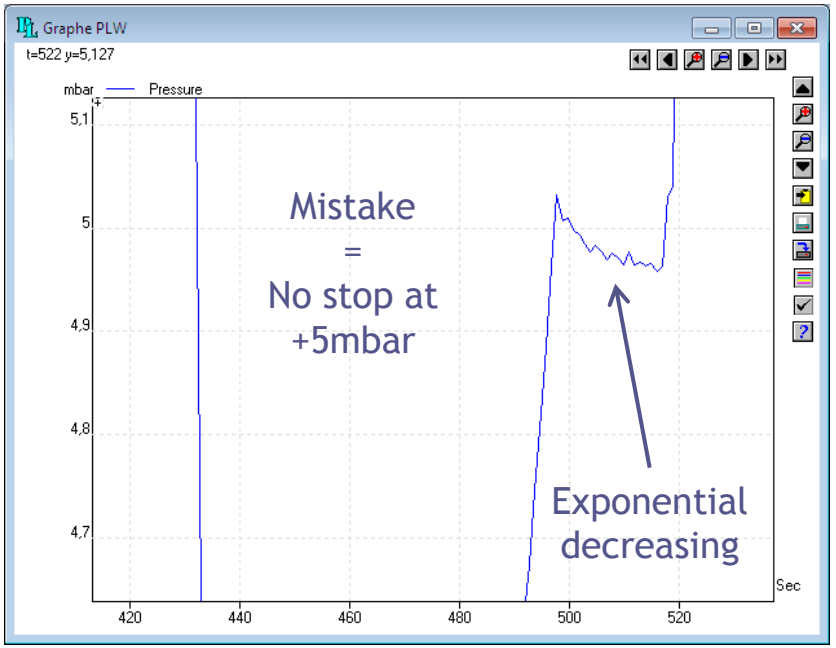
Gap Type	TW	TN	B
Pressure Drop (mbar/10min) to be certified with +20mbar for RE4/3	(0.2+0.1)	(0.3+0.1)	(0.4+0.1)
Pressure Drop (mbar/10min) to be certified with +20mbar for RE4/2	(0.2+0.1)	(0.2+0.1)	(0.3+0.1)

Backup

A New Procedure ?

1st : +5mbar leaktest



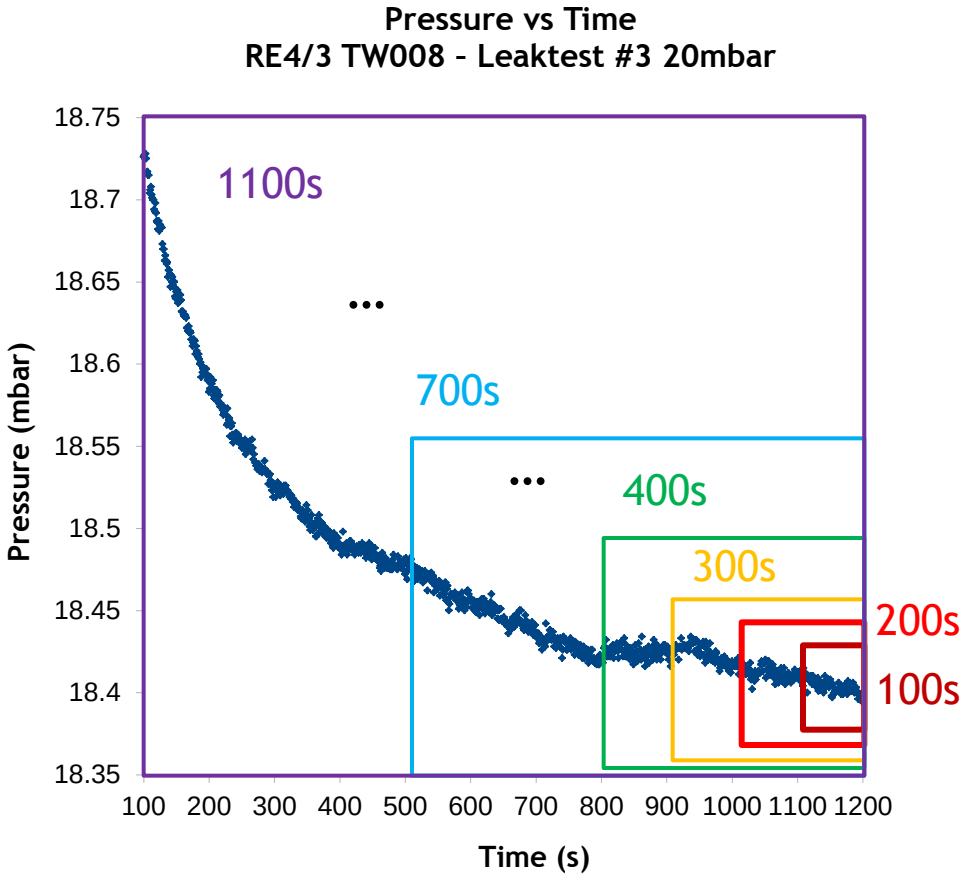


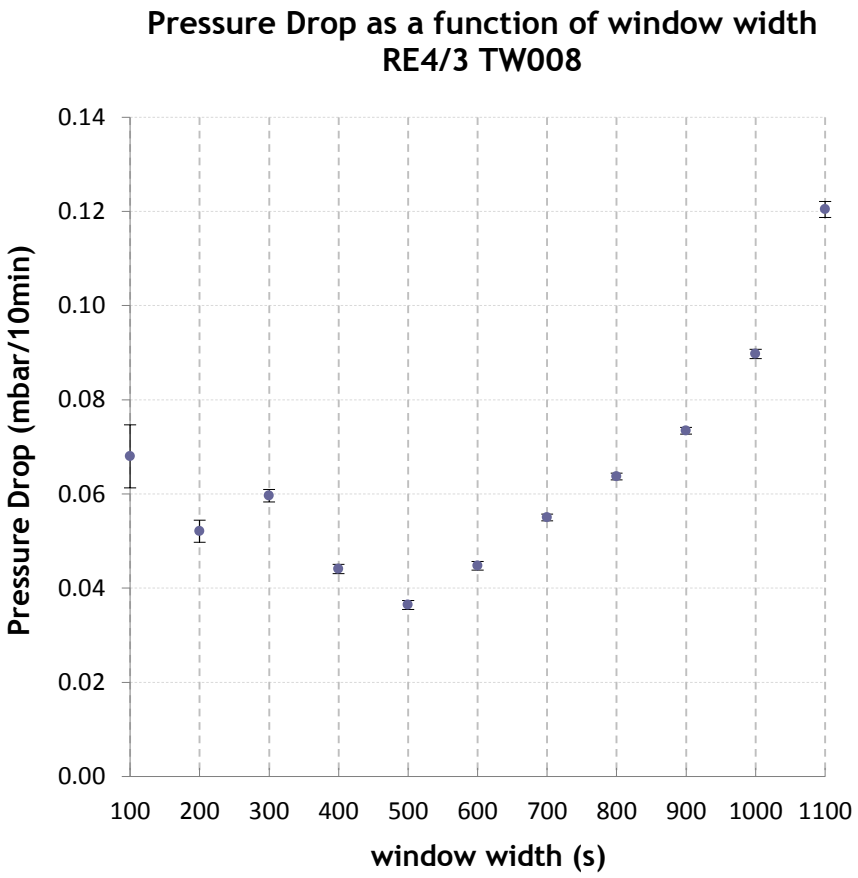
Decrease P = decrease T : the system temperature will increase until the stabilization.

Increase P = increase T : the system temperature will decrease until the stabilization.

To be consistent with the +20mbar leaktest, a procedure where T decrease until the stabilization has to be chosen.

2nd : Slope calculation over 500s

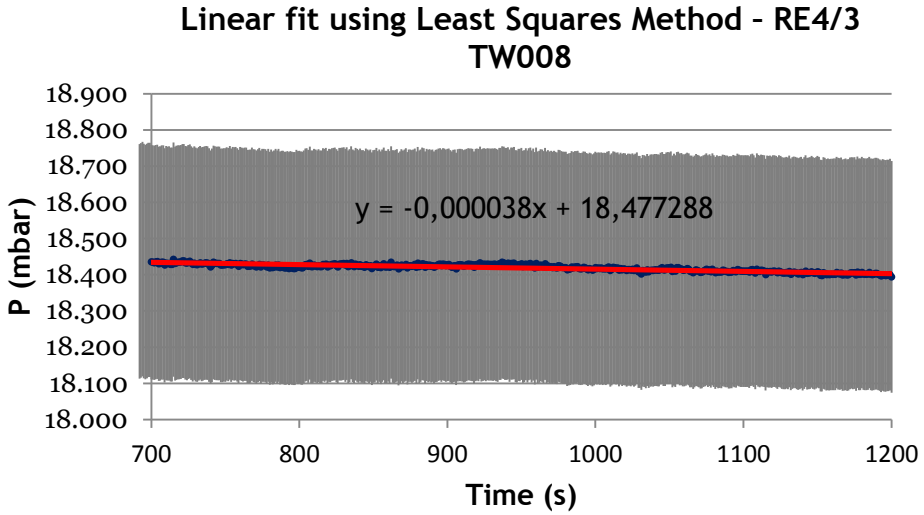


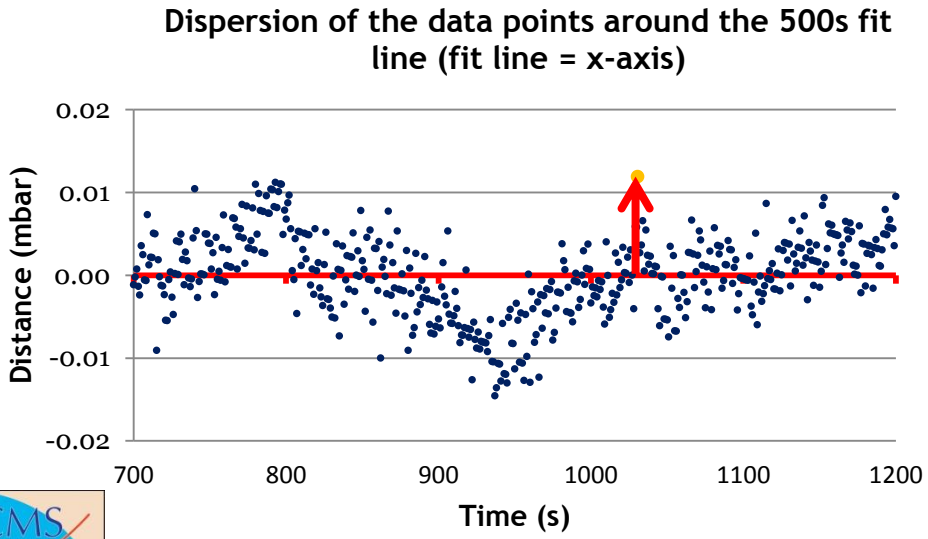


Windows from 100s to 1100s are opened from the end.

Convergence from 1100s to 500s. Smaller windows depend on fluctuations.

2nd : Slope calculation over 500s





Precision of the pressure transmitter used = 1,25%
Error on P measurement ΔP~0,3mbar at +20mbar

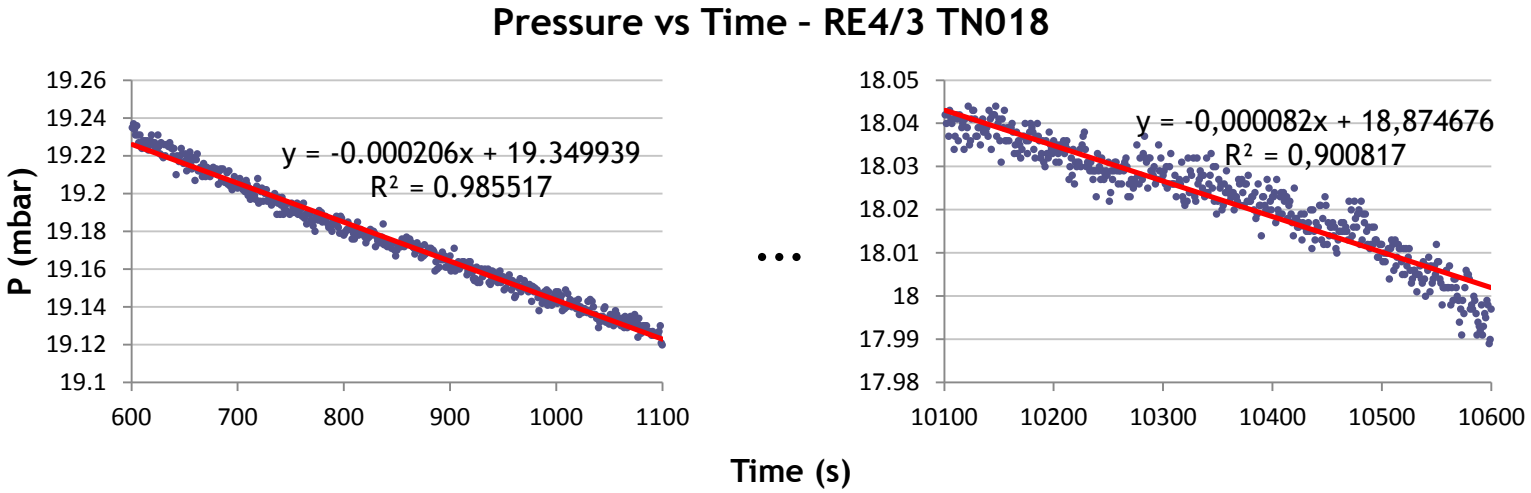
Error on the slope if a fit with the 2 extremal points of the window was used :
ΔSlope ~ 2ΔP/Δt = 0,0012mbar/s >> 0,000038mbar/s
Where Δt is the interval between the 2 points

Error on the slope with the Least Squares Method :
ΔSlope ~ 0,000002mbar/s

Dispersion of the points around the fit line
σ = 0.005mbar

Infinite leaktest

Infinite leak tests on Top Narrows



20 windows were opened over 10000s after the firsts 600s.
20 slopes were computed giving 20 values of the Pressure Drop (mbar/10min) .
This result to be compared with the pressure drop measured with a 10000s window.