

THE DETERMINATION OF PAPER PERMEABILITY USING
THE FILTRONA PPM 100 MANUAL METER

SUMMARY

The linear-flow of air which passes through a paper sample at a pressure drop of 10 cm water gauge (w.g.) is measured. Results are displayed by the instrument and presented with sample statistics on a print-out as CORESTA UNITS. Linear-flow and pressure drop for individual readings are also shown.

CORESTA UNITS by this method are defined as the linear flow (cm^3/min) passing through 1 cm^2 of paper at a pressure drop of 10 cm W.G.
i.e. $\text{cm}^3/\text{min}/\text{cm}^2$. 10 cm W.G.

APPARATUS

Filtrona PPM 100

Manometer

Primary Sintered Calibration Standards; A, B and C

Secondary Perforated Plate Standards; 1, 2, 3, 4 and 5

2 cm^2 Circular Sample Clamp (1.595 cm diameter)

2 cm^2 Rectangular Sample Clamp (2 x 1 cm rounded corners)

2 cm^2 Adjustable Rectangular Clamp (2 x 1 cm rounded corners)

METHOD

A. Preparing the Instrument and Manometer for Calibration

(Note 1)

1. Ensure the CORESTA button light is off.
2. Set the air supply pressure to 50 p.s.i. (Note 2).
3. Unscrew the clamp-locking ring and remove the aperture clamp.
4. Without touching the sintered centre (Note 3), fit calibration disc A into the clamp-locking ring so that the rubber O-ring faces the measuring head and the flow calibration reading faces away from the instrument. Carefully screw the locking ring and disc A onto the measuring head.
5. Erect the manometer and check level indicators to ensure it is on an even surface. This can be adjusted by means of the manometer feet.

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6. Remove the two fluid stops from the top of the column and fluid reservoir. Adjust the fluid level to 0 by the adjusting knob.
7. Slightly open the SET PRESSURE control on the PPM 100, connect the red tube to the fluid reservoir and open the glass tap.
8. The instrument and manometer are now ready for calibration.

B. Primary Calibration

The primary calibration can be followed using the Action, Display and Response as shown in the Primary Calibration Sequence, Table 1.

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TABLE 1
PRIMARY CALIBRATION SEQUENCE

Action	Display	Response
1. Press CAL	Insert Disc A - Press MEASURE	Ensure Disc A fitted Manometer connected
2. Press MEASURE	SET PD = 100 W - Press MEASURE	Adjust set pressure control so manometer reads 98-99 mm W.G.
3. Press MEASURE	CAL PD XXXXW	If needed, adjust the PD Preset so instrument and manometer give the the same W.G. reading.
4. Close glass tap, disconnect manometer and replace fluid stops.		
5. Press MEASURE	CAL A ML/MIN-SET PD=100MMW- Press MEASURE -	
6. Press MEASURE	XXXX A = XXXX (Pressure) (Flow)	Adjust set pressure to give 100 MMW. Adjust Preset A so displayed flow = Disc A value.
7. Press MEASURE	Insert Disc B - Press MEASURE	Remove disc A and fit disc B.
8. Press MEASURE	CAL B ML/MIN-SET PD=100MMW- Press MEASURE	
9. Press MEASURE	XXXX B = XXXX	Adjust Preset B, Flow = disc B value.
10. Press MEASURE	Insert Disc C - Press MEASURE	Remove disc B and fit disc C.
11. Press MEASURE	CAL C ML/MIN-SET PD=100MMW Press MEASURE	
12. Press MEASURE	XXXX C = XXXX	Adjust Preset C, Flow=disc C value.
13. Press MEASURE	READY N = 0	Fit required measuring head.

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C. Measurement of Secondary Standards

Fit the required measuring head.

The secondary calibration sequence is shown in Table 2.

TABLE 2
SECONDARY CALIBRATION SEQUENCE

Action	Display	Response
1. Press CORESTA	READY N=0	Insert Standard Adjust SET PRESSURE to get 100W Insert next standard continue from step 3 until all 5 standards have been measured.
2. Press RESET	READY N=0	
3. Press MEASURE	XXXXW XXXXC	
4. Press MEASURE	READY N=1	
5. Press RESET	READY N=0	

Remove the print-out from the printer and compare to the previous five calibration readings. File in the Secondary Standards folder if satisfactory.

D. Requirements of Sample Types

The number of tests and type of measuring head used will be dependent upon the sample type. For perforated papers the orientation of the perforation to the measuring head shape and size will influence the results, (i.e. there will be more perforations in the 2 cm direction). The recommendations for different sample types are shown in Table 3.

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TABLE 3
REQUIREMENTS OF SAMPLE TYPES

Sample Type	Recommended Head	Standard Number of Tests	Note
Cigarette Paper Outturns	2 cm ² Rectangular	10 per outturn	<p>Ensure that perforations are clamped in the 2 cm direction.</p> <p>Ensure lap seam and overtipping are removed before test. Ensure tobacco side faces away from the instrument. Ensure length of spill is in the 2 cm direction.</p> <p>Ensure perforations are clamped across the 1 cm direction. Quote results as cm³/min/cm length of perforation at 10 cm WG.</p>
Perforated Cigarette Paper (EP) outturns	2 cm ² Rectangular	10 per outturn	
Cigarette Paper Spills from made Cigarettes	2 cm ² Rectangular	1 per spill x 4 spills	
Perforated Tipping Outturns	2 cm ² Adjustable Rectangular	5 per side of outturn	
Plugwrap Outturns:			
Highly Porous	2 cm ² Rectangular	20 per outturn	
Standard	2 cm ² Rectangular	10 per outturn	

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RESULTS

With the CORESTA button depressed results are given as $\text{cm}^3/\text{min}/\text{cm}^2$ at 10 cm W.G.

E. Measurement of Samples

1. The procedure for the secondary calibration sequence Table 3, may be used.
2. At Action 2/Response the sample is placed in the measuring head.
3. After the final sample measurement press CAL (not MEASURE) to output the data.
4. Before the next sample, RESET the instrument.

NOTES

1. The instrument must be calibrated every day prior to use or if it has been inadvertently switched off.
2. The air supply provides the air-flow and clamp pressure. It must not exceed 150 p.s.i. as this will damage the instrument. It must also be clean filtered air to avoid contamination.
3. The sintered centre of the primary calibration standards must be kept clean, dry and free of any contamination. A small blockage of any part of the sinter could cause a bad calibration and produce erroneous results.
4. The printer used in L.S.D. is a MANNESMAN TALLY. The SEL light on the printer must be on for the data to be printed.
5. If there is a discrepancy, inform the laboratory supervisor.

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