

Electrostatic vs Pleated Hydrophobic Media

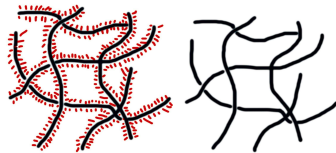
Electrostatic Media

Efficiency: achieved through electrical charge in the media (created through friction during manufacture).

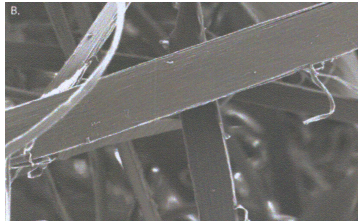
Consistency: the electrical charge will dissipate when exposed to moisture, leaving a more open matrix.

Inconsistency arises when the charge has dissipated but insufficient particulates have been collected between the fibres to aid mechanical filtration.

Protection: electrostatic media cannot repel blood or fluids. If the filter becomes wet its function deteriorates, and if occluded by fluid the fluid can penetrate and enter the device.



Filter matrix with and then without electrostatic charge.

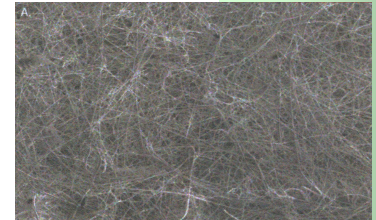


Pleated Hydrophobic Media

Efficiency: achieved by using high-grade paper which is then pleated to increase the filtration area.

Consistency: maintained throughout filter use as the fibre matrix is much closer with performance related to the volume of media to achieve efficiency, rather than an electrical change to boost it. There is no risk of inconsistency arising as with electrostatic filters.

Protection: a special treatment of the media enables it to repel blood and fluids thereby preventing it from passing into the system and risking contamination, or the filter losing efficiency at being able to filter the air.



MHRA Compares Performance

In 2004 the MHRA reported its long-awaited comparison report based on the new evaluation standard. The tables below illustrate the difference between the two formats of filters.

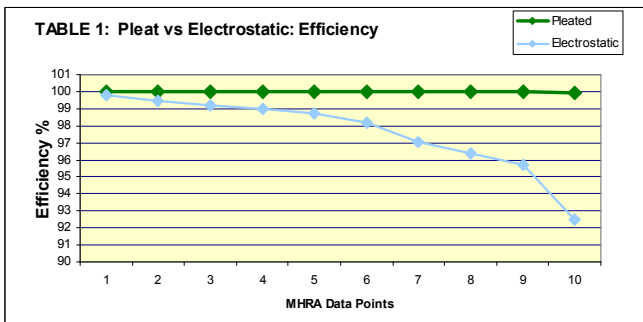


Table 1: Analysis

This table plots the efficiency of all the adult pleated filters tested by the MHRA against all of the adult electrostatic filters.

Conclusion: The efficiency of pleated filters remains consistent and high regardless as to which manufacturer produced the pleated filter. In comparison, the efficiencies of electrostatic filters varies substantially between manufacturer from being relatively high and comparable with pleats to being incredibly low.

Recommendation: Special care should be taken if opting for electrostatic filters as a low price could indicate a low efficiency level. Purchasers are recommended to refer to the full MHRA report for an independent evaluation of efficiency under the new standard.

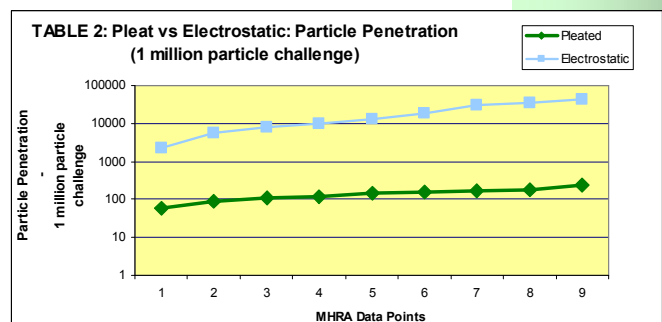


Table 2: Analysis

This table reverses efficiency to calculate the particle penetration to show how many particles out of 1 million would penetrate the filter and make their way into the patient's airways.

Conclusion: Even the best performing electrostatic filter permitted substantially higher particle penetration than the 'worst' performing pleat. The best performing electrostatic still allows more than 30 times more particles to penetrate than the best performing pleat.

Recommendation: To gain a true reflection of filter performance reverse the percentage on efficiency to obtain the particle penetration percentage, then apply the 1 million particle challenge test to see how many particles will enter the airway. Be aware that exposure to anaesthetic gases will further increase penetration, as shown in A.R. Wilkes' tests.

Full details of test methodology, filters tested and their results are published as follows:
 Medicines and Healthcare products Regulatory Agency (MHRA), MHRA Evaluation Number 04005, published March 2004. The report is available from:
 MHRA, Business Services, Room 1207, Hannibal House, Elephant and Castle, London SE1 6TQ.
 Price: £60. Available free of charge to NHS Trusts and Clinics.