EN 779

At Camfil, we have always put every effort into improving indoor environments. Thus, no one is more pleased than us that, from autumn 2011, a new air filter standard imposes tougher requirements. Unfortunately, the requirements are not as tough as we would have liked. For example, our Hi-Flo XLT7 (a class F7 filter) has a minimum filtration efficiency of 56 percent. For an F7 filter, the new standard requires no more than 35 percent. However, that does not meet the quality levels we have set for ourselves. Indeed, our development of the market's most efficient, energyoptimised filters will continue.

What does EN 779:2011 do?

The new European standard for air filters (EN779:2011) comes into force in autumn 2011. Its purpose is to classify air filters based on their lowest filtration efficiency. This latter is also referred to as minimum efficiency (ME). The standard is an initiative that we welcome and a step towards better indoor environments.

The new standard will help to eradicate a number of problems. One of these is presented by electrostatic charged synthetic filters. While such filters can demonstrate good initial filtration efficiency, they discharge extremely rapidly. This entails a considerable deterioration in their air cleaning ability. Unfortunately, one result of the foregoing is that far too many European properties are now using F7 class filters that have ME values of between 5 and 10 percent. This means that as much as 90 to 95 percent of the contaminants in the outdoor air find their way into buildings and pollute the indoor environment.

By basing classification on ME value, the new standard will force these filters out of the market. At the same time, it will contribute to the development of synthetic filter materials offering considerably higher particle separation. Regrettably, the price for this will include higher pressure drops and increased energy consumption.

Not all filters are the same
– even when they are in the same class!

The problem with the new classification is that, although the worst filters will vanish from the market, there is room for good filters to be made worse. Although energy savings can be achieved by having the lowest possible pressure drop, such development could be retrograde. For example, with 0.4 µm particles, our Hi-Flo XLT7 (class F7) filter has an ME value of a full 56 percent. However, for classification as an F7 filter, the standard requires no more than 35 percent. As we have already made clear, we will not be lowering the efficiency of our Hi-Flo filters. That would result in an approximately 40 percent worsening of air quality. However, there is a risk that other manufacturers will not think the same way. Instead, they may see the standard as an opportunity to reduce pressure drop and, thereby, energy consumption. This will result in poorer air quality.

Classification of air filters[1)]

Group	Class	Final pressure drop (test) Pa	Average arrestance (Am) of synthetic dust %	Average efficiency (Em) for 0.4 µm particles %	Minimum efficiency[2)] for 0.4 µm particles %
Coarse	G1	250	50≤Am<65	-	-
	G2	250	65≤Am<65	-	-
	G3	250	80≤Am<65	-	-
	G4	250	90≤Am<65	-	-
Medium	**M5**	450	450	40≤Em<60	-
	M6	450	450	60≤Em<80	-
Fine	F7	450	450	80≤Em<90	**35**
	F8	450	450	90≤Em<95	**55**
	F9	450	450	95≤Em	**70**

NOTE

[1)] The characteristics of atmospheric dust vary widely in comparison with those of the synthetic loading dust used in the tests. Because of this, the test results do not provide a basis for predicting either operational performance or service life. Loss of media charge or shedding of particles or fibres can also adversely affect efficiency. [2)] Minimum efficiency is the lowest of any of the following three values: initial efficiency, discharged efficiency or efficiency throughout the test's loading procedure.

EN 1822

This new European standard is based on particle counting methods that actually cover most needs for different applications. EN 1822:2009 differs from its previous edition (EN 1822:1998) by including the following:
An alternative method for leakage testing of Group H filters with shapes other than panels
An alternative test method for using a solid, instead of a liquid, test aerosol
A method for testing and classifying of filters made out of membrane-type media
A method for testing and classifying filters made out of synthetic fibre media

The main difference is related to the classification for the filter classes H10 - H12, which has now been changed to E10 - E12.

The following table shows the various classifications of high-efficiency filters per EN 1822:

	Integral Value		Local Value	
Filter Class	**Collection Efficiency %**	**Penetration %**	**Collection Efficiency %**	**Penetration %**
E10	85	15	-	-
E11	95	5	-	-
E12	99,5	0,5	-	-
H13	99,95	0,05	99,75	0,25
H14	99,995	0,005	99,975	0,025
U15	99,9995	0,0005	99,9975	0,0025
U16	99,99995	0,00005	99,99975	0,00025
U17	99,999995	0,000005	99,9999	0,0001

The filter class description are:

- EPA 10 - EPA 12: Efficiency Particulate Air Filters
- HEPA 13 - HEPA 14: High Efficiency Particulate Air Filters
- ULPA 15 - ULPA 17: Ultra Low Penetration Air Filters

Testing

Testing per EN 1822 is normally done with an aerosol probe which can be moved over the entire surface of the filter. This moving of the aerosol probe, or scanning, results in the measurement of many local collection efficiencies. These local efficiencies can be used to calculate the overall

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efficiency of the filter or the leak rate of a specific area of the filter. The overall efficiency calculation is often termed the integral value, while the leak rate is often termed the local value.

Tests are performed on new filters at specified nominal volumetric air flow. Filters of U15 or above must be scanned with a particle counter probe designed for this purpose. An oil thread test can be utilized on filters of H13 and H14 classification.

Filter testing includes the following measurement:

1. Pressure drop at nominal air flow
2. Overall collection efficiency at most penetrating particle size (MPPS)
3. Local collection efficiencies at MPPS
4. No leaks above H13 as specified in the table above

Camfil Farr manufactures Megalam (HEPA/ULPA) filters to the most stringent industry and/or customer standards. We also test raw material components for outgassing e.g. organophosphates from PU sealants. Solid latex spheres or silica are normally chosen as test aerosols for the microelectronic industry due to their low outgassing properties. Camfil Farr has a policy of continuous improvement as a means of ensuring our leadership position in the high-efficiency filtration marketplace. We maintain extensive joint R&D programmes with our key suppliers to develop and test next-generation filtration media. Such efforts allow us to provide the highest performing filtration products to meet the demands of emerging technologies.

Camfil Farr was the first to provide U17 grade ULPA filters utilizing low boron media. We also manufacture e-PTFE filters in grades U15 and higher.