

EBM068: BS EN ISO 16890 STANDARD OVERVIEW

The standard for the testing of air filters BS EN 779:2012 has now been withdrawn and replaced by a new ISO Standard, BS EN ISO 16890:2016. Most air filters play a key role in systems such as HVAC, industrial, pharmaceutical, nuclear and defence processes, all industries and applications that EMCEL are proud to support and supply. The filters role is to provide clean air to the environment, process or equipment that it is serving and with the advancements in technology and better understanding of particles which are required to be filtered, the specific classification of the filter's performance is becoming more essential.

The traditional G1 to F9 to BS EN 779:2012 has now been superseded by the ePM classification to BS EN ISO 16890:2016 and this document aims to give you an overview of how the old standard compares with the new. Formally, BS EN 779 centred its filter classification around the products ability to arrest a single sized particle during test which was 0.4µm. The new BS EN ISO 16890 standard utilises a test which is more in line with the operating conditions that the filter will be exposed to during use. The test is carried out against a range of particle sizes from 0.3µm to 10µm and subject to the results classifies the filter within four initial BS EN ISO 16890 efficiency groups as shown in Figure 1.

BS EN ISO 16890 GROUP EFFICIENCY OVERVIEW

CATEGORY	PERFORMANCE REQUIREMENT
ISO COARSE	< 50% of PM 10
ISO ePM 10	≥ 50% PM 10
ISO ePM 2.5	≥ 50% PM 2.5
ISO ePM 1	≥ 50% PM 1

Figure 1. BS EN ISO 16890 Group Efficiency Overview

Within these four categories the filter can then be further classified to align themselves with more specific performance requirements. These are identified by their performance against the particle sizes the filter is being tested against challenge the sizes being 10µm, 2.5µm and 1µm.

The table below, Figure 2, provides guidance in comparing BS EN ISO 16890 filter performance to those of the BS EN 779 standard.

BS EN ISO 16890 / BS EN 779 COMPARISON

BS EN 779	BS EN ISO 16890			
	ISO ePM ₁	ISO ePM _{2.5}	ISO ePM ₁₀	ISO COARSE
G2	-	-	-	< 50 %
G3	-	-	-	< 50 %
G4	-	-	-	< 50 %
M5	-	-	> 50 %	-
M6	-	50-65 %	> 60 %	-
F7	50-65 %	65-80 %	> 85 %	-
F8	65-80 %	> 80 %	> 90 %	-
F9	> 80 %	> 95 %	> 95 %	-

Figure 2. BS EN ISO 16890 / BS EN 779 Comparison Chart

Examples of the possible effects of the three particle sizes to which BS EN ISO 16890 filters are categorised can be seen in Figure 3.

PARTICULAR MATTER (PM) EFFECT EXAMPLES

PM ₁₀	PM _{2.5}	PM ₁
These can reach the respiratory ducts and potentially cause decreased lung function.	These can penetrate the lungs and cause decreased lung function, skin and eye problems.	These are the most dangerous and are small enough to enter the bloodstream and may lead to cancer, cardiovascular diseases and dementia.

Figure 3. Examples of the possible effect on the Human Body of Particular Matter (PM) at the particle sizes (µm) detailed in accordance with BS EN ISO 16890 classification.

The BS EN ISO 16890 Standard is written in relation to the effects of Particular Matter (PM) on human health and EMCEL can offer a number of products which perform at each classification level, as well as products which are compliant with the withdrawn BS EN 779 Standard to which some specifications may still refer. As with our renowned bespoke filtration solutions capability and where the need arises, we are also in a position to offer specific performance sub-classification (such as ISO ePM₁ 75%) subject to accredited third-party testing. The standard also allows for better system design to ensure that it can cope with the actual pollutants in a given location, ultimately the air quality in the location of the system will determine the level of filtration which is required which also allows for more energy efficient solutions.

Should you require more information on this standard or regarding EMCEL products and solutions which conform to the requirements of either standard then please contact our Technical Sales Team on any of our platforms detailed below.