



TESTING TO EN13274-7:2019 WITH THE MODEL 8130A-EN

APPLICATION NOTE AFT-006 (US)

This application note addresses changes to EN 149 and EN 143 regarding the paraffin oil testing.

Preceding Standards: EN 149 and EN 143

EN 149 and EN 143 are well-established European standards that govern respiratory protective devices (such as filtering half-facepiece respirators), and particle filters that are used within those devices, respectively. The standards were revised most recently in 2009 and 2006 to give the currently published versions EN 149:2001+A1:2009 and EN 143:2000/A1:2006, respectively. While they have garnered extensive attention in recent years, they are currently (as of Oct. 2020) under revision once more, due to new challenges in meeting needs for personal protective equipment (PPE).

In **EN 149:2001+A1:2009**, as well as in the current draft revision of **EN 143:2000/A1:2006**, the filter penetration test has been removed from the standards. In its place is now a reference to the methods now contained in EN 13274-7:2019: “Respiratory Protective Devices - Methods of Test - Part 7: Determination of Particle Filter Penetration” instead.

EN13274-7:2019 Requirements and Performance of TSI® 8130A-EN

EN13274-7:2019 contains several requirements pertaining to the use of paraffin oil in filter testing. Table 1 below details those requirements, and demonstrates how the TSI® Model 8130A-EN Automated Filter Tester complies with each of them.

Table 1: Paraffin oil aerosol test requirements specified by EN13274-7:2019, and the corresponding performance characteristics of the TSI® Model 8130A-EN Automated Filter Tester.

Attribute		Requirement of EN13274-7:2019	TSI® 8130A-EN		
			Design & Performance	Compliant?	
Oil heating during aerosol generation		≤ 60 °C	Ambient temp. operation	YES	
Aerosol size distribution of the paraffin oil aerosol	Count med. diam. (µm)	0.29 to 0.45	0.30	See Fig. 1	YES
	Geom. stan. dev. (GSD)	1.6 to 2.2	1.70 to 1.75		YES
	Concentration (mg/m³)	15 to 25	17 to 21		YES
	Recommended size distribution measurement method	Electrical mobility (ISO 15900)	TSI® 3938 SMPS™ spectrometer		YES
Location of measurement of aerosol concentration		“...immediately before and after the filter by the aerosol photometer...”	Two photometers, located immediately before and after the filter (simultaneous measurement)		YES



Figure 1 shows a typical size distribution produced by the TSI® Model 1081414R-EN aerosol generator used in the TSI® Model 8130A-EN Automated Filter Tester. This size distribution was measured using a TSI® 3938 SMPS™ spectrometer. Blue open circles are measurement points provided by the SMPS™ spectrometer, while the pink curve is a single-mode lognormal fit. This fitted curve has a count median diameter (CMD) of 300 nm and a geometric standard deviation (GSD) of 1.64.

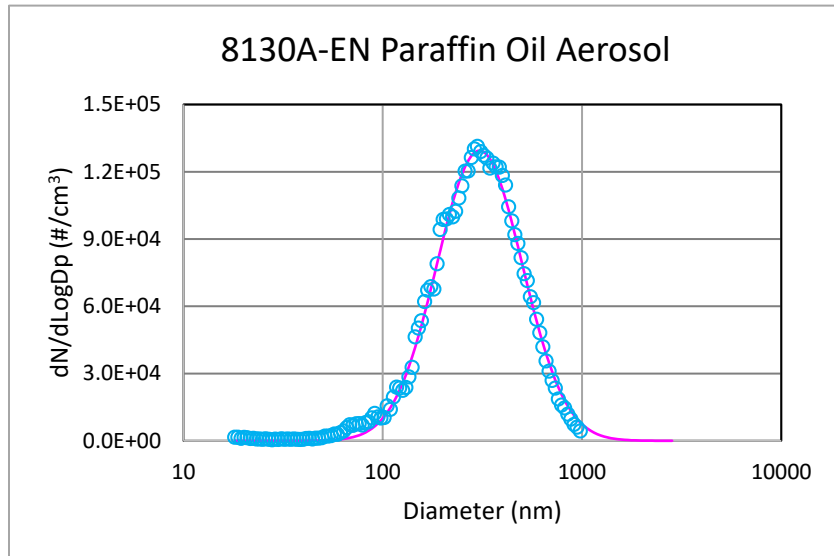


Figure 1: Number-weighted particle size distribution of Sigma-Aldrich® PX0047 paraffin oil used in the TSI Model 1081414R-EN aerosol generator, as part of the TSI™ Model 8130A-EN Automated Filter Tester.

Paraffin Oil Requirements

EN13274-7 requires that the paraffin oil have a CAS number of 8012-95-1, and a density of 0.818 to 0.875 g/cm³ at 20 °C.

The 8130A-EN performance data shown in Table 1 and Figure 1 were collected while using paraffin oil from Sigma Aldrich® (#PX0047, CAS 8012-95-1, density 0.87 g/cm³ at 20 °C).

Conclusion

The TSI® Model 8130A-EN Automated Filter Tester, when used with the TSI® Model 1081414R-EN aerosol generator, is immediately ready to meet your testing needs for EN 13274-7:2019.

References

1. [Respiratory Protective Devices - Particle Filters - Requirements, Testing, Marking. European Standard EN 143:2000/A1:2006.](#) Date of availability: 2006-06-01.
2. [Respiratory Protective Devices - Filtering Half Masks to Protect Against Particles - Requirements, Testing, Marking.](#) European Standard EN 149:2001+A1:2009. Date of availability: 2009-05-06.
3. [Respiratory Protective Devices - Methods of Test - Part 7: Determination of Particle Filter Penetration.](#) European Standard EN 13274-7:2019. Date of availability: 2019-06-19.
4. EN 143 and Related Standards. [Application Note](#).



UNDERSTANDING, ACCELERATED

TSI Incorporated – Visit our website www.tsi.com for more information.

USA Tel: +1 800 680-1220
 UK Tel: +44 149 4 459200
 France Tel: +33 1 41 19 21 99
 Germany Tel: +49 241 523030

India Tel: +91 80 67877200
 China Tel: +86 10 8219 7688
 Singapore Tel: +65 6595 6388

TSI and TSI logo are registered trademarks of TSI Incorporated in the United States and may be protected under other country's trademark registrations. SMPS is a trademark of TSI Incorporated. Sigma-Aldrich is a registered trademark of Sigma-Aldrich Co., LLC