

MILITARY RESPIRATOR SPECIFICATIONS

APPLICATION NOTE AFT-004

Introduction

Procedures for testing and certifying air-purifying and particulate respirators for military use are often not governed by standards. Instead military respirators are usually built to a specification called out in contracts that can vary depending on the expected use of the respirators. Military specifications are frequently based on the commercial respirator standards in the country in which the military organization is based. Examples are the US military specification which is based on 42 CFR part 84 and the specifications for European military organizations which are based on EN 143. Because these are specifications instead of standards there can be differences between requirements on different contracts in the same country. The information in this application note are examples of specifications compared to the commercial respirator standards.

US Military Respirators

The USA military test specifications are based on the DOP oil aerosol tests described in the commercial respirator standard 42 CFR part 84. For more information on the 42 CFR part 84 standard see our application note, [42 CFR part 84 Standard \(AFT-001\)](#). The particle size, mass concentration and detector type (light scatter photometer) are consistent with that standard. The differences are in the maximum penetration and the flow rate. The maximum penetration allowed is 0.01% (99.99% efficiency). This is a factor of three better than the highest DOP efficiency for commercial respirators (in types R100 and P100). The flow rate is specified as 50 liters per minute (L/min) for a dual canister filter. This is slightly higher than 42.5 required for dual filters (on commercial respirators). The TSI model 8127 (and the 8130 using oil) meets these requirements!

European Military Respirators

European military test specifications are based on the European commercial respirator standard EN 143. An example is the German Army technical specs TL 4240-0017. This technical specification requires the same oil aerosol specs as in EN 143. For more information on the EN 143 standard see our application note, [EN 143 and related standards \(AFT-003\)](#). The particle size, mass concentration and detector type (laser photometer) of the –EN versions of TSI testers (8127-EN and 8130-EN using oil) are consistent with the oil tests in that standard.



The differences from the commercial standard are the specification for maximum penetration and the flow rate. The maximum penetration allowed is 0,003% (99,997% efficiency). This is more than a factor of 10 times lower penetration than the highest paraffin oil efficiency for commercial respirators. The flow rate is specified as 80 L/min for a single filter and 40 L/min for dual filters. The TSI model 8127-EN (and the 8130-EN using oil) meets these requirements!

An additional requirement is loading the filters with paraffin oil (instead of with dolomite dust which is used when testing commercial respirators). The specification calls for loading with high concentration paraffin oil (450 mg/m³), and loading the filter with a total of 900 mg of oil. This type of loading test is destructive. Quality control testing does not require this type of destructive test.

Summary

While military specifications in different parts of the world vary, they tend to follow the commercial respirator standards in their region of the world. The models 8127 and 8130 filter testers (and the European equivalent versions 8127-EN and the 8130-EN) meet the rigorous requirements of the US military and the various European military organizations.

TSI model 8127 and 8130 filter testers have been industry standard for more than a decade in meeting commercial respirator standards. A large number of filter manufacturers have used these filter testers for their filter development and manufacturing programs.

Requirements of respirator standards and military specifications around the world can be met with the TSI model 8130, when equipped with both the standard and –EN style generators. Now one filter tester can be used where multiple testers were previously needed.

For more information about applications of TSI's automated filter testers go to <http://filtertest.tsi.com/>.



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