

NATO STANDARD

AAMedP-1.22

PERFORMANCE OF PORTABLE FILTER-BLOWERS FOR AIRCREW CBRN RESPIRATORS

Edition A Version 1

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NORTH ATLANTIC TREATY ORGANIZATION

ALLIED AEROMEDICAL PUBLICATION

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NATO LETTER OF PROMULGATION

28 January 2019

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CHAPTER 1 INTRODUCTION

1.1. AIM

The aim of this standard is to ensure that the performance of portable filter-blowers for the positive ventilation of aircrew CBRN respirators used by one participating nation allows these portable filter-blowers to be used on the ground to supply similar aircrew CBRN respirators of other participating nations.

1.2. DEFINITIONS

The following terms and definitions are employed for the purpose of this agreement only.

1.2.1. Filter Efficiency

The ability of a filter to remove contaminants from the outside environment during respiration through a mask. The efficiency is the ratio of gases, particles or both (aerosol) trapped by the filter over the total number of particles upstream from the filter. Specific particle sizes or the total number of particles of all sizes may be used in the calculation.

1.2.2. Ambient Temperature and Pressure Dry (ATPD)

Volume of gas expressed as dry gas at the prevailing atmospheric pressure and temperature. In the context of this standard the atmospheric pressure is the absolute pressure of the gas within the respiratory compartment of the respirator assembly and the temperature is constant at 15 °C.

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2.1. TYPES OF AIRCREW RESPIRATORS

Many aircrew CBRN respirators provide protection to the respiratory tract and the eyes by ventilating either the hood compartment or both the respiratory and hood compartments of the respirator with air free of harmful agents and particles. The air free of harmful agents and particles is delivered at a pressure greater than that of the environment and flows through the compartment(s) at ambient pressure. The flow of filtered air to the hood and respiratory compartments must be adequate to maintain a positive pressure, both to maintain the required protection factor and to avoid excessive resistance to breathing.

2.2. PORTABLE FILTER-BLOWER UNITS

Portable filter-blower units are used to supply filtered air to an aircrew respirator when the wearer is on the ground outside the aircraft, and during cockpit entry and exit procedures. In some aircraft, portable filter-blower units may also be used to supply air free of harmful agents and particles to an aircrew respirator in flight, the portable unit being stowed at a suitable site within the cabin.

A portable filter-blower unit comprises one or more (usually 2 or 3) standard CBRN filter canisters, a fan and electric fan motor fitted with an on/off facility (switch or other means), a battery and a filtered air delivery hose. Air free of harmful agents and particles air is provided at the desired pressure by drawing or forcing ambient air through suitable CBRN filters. The electrical power is provided by batteries, which may be rechargeable, and once in the cockpit may be derived from the aircraft supplies.

The portable unit is fitted with a handle or strap, enabling it to be carried or worn by the user. A means of replacing the CBRN filter canisters and, where appropriate, a spare battery, must be provided.

2.3. INTEROPERABILITY

On landing at a base of another participating nation a portable filter-blower unit will be required to ventilate the aircrew CBRN respirator to allow the wearer to leave his aircraft and transit to and from collective protection. This standard is designed to ensure that a portable filter-blower of the nation receiving the aircraft will be compatible with the aircrew member's respirator and allow him to transit safely to and from collective protection.

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CHAPTER 3 DETAILS OF THE NATO STANDARD

3.1. GENERAL REQUIREMENTS

3.1.1. The filters shall be combined gas/vapour filters and particle filters.

3.1.2. The portable filter-blower and mask assembly units shall be resistant to chemicals to the extent that air free of harmful agents and particles is delivered to a positively ventilated aircrew respirator under all conditions of use.

CBRN filter blower units shall be resistant to chemicals used in cleaning and disinfection and exposure to these shall not impair performance.

3.2. SPECIFIC PERFORMANCE REQUIREMENTS

The minimum performance of a portable filter-blower unit used, to supply an aircrew CBRN respirator shall meet the following standards as measured at the coupling (or at the outlet) of an adaptor by which the hose from the unit is connected to the aircrew CBRN respirator:

3.2.1. Filter Efficiency. The filter efficiency shall be at least 10^4 at all operating instant flow rates.

3.2.2. Portable Blower-Filter Unit Supplying Eye Compartment Only

3.2.2.1. Delivery Pressure-Flow Characteristics. The pressure at which filtered air is delivered at a flow of 1.0 litre (ATPD) sec^{-1} at ground level shall be within the limits +0.25 to +1.0 kPa (+1.0 to +4.0 inch water gauge).

3.2.3. Portable Blower-Filter Unit Supplying Respiratory and Eye Compartments

3.2.3.1. Delivery Pressure-Flow Characteristics with Blower Operating. The pressure at which filtered air is delivered when the blower is operating shall be within the following limits:

Flow Demanded (litre (ATPD sec^{-1}))	Delivery Pressure (kPa (Inch water gauge))
0 - <1.0	+0.25 (+1.0) to +1.2 (4.8)
1.0 - <1.6	+0.25 (+1.0) to +0.88 (+3.5)
1.6 to max flow capacity	Positive pressure

3.2.3.2. Delivery Pressure-Flow Characteristics with Blower Inoperative.
The suction required to draw a flow of 1.6 litre (ATPD) sec⁻¹ of air from the unit when the blower is inoperative shall not exceed 1.0 kPa (4.0 inch water gauge).

3.2.4 Coupling / Adapters

The filtered air is to be delivered through a flexible hose which is fitted with a half coupling which will form a gas-tight connection to the air inlet of the aircrew respirator. Whenever possible this coupling is to be used universally on portable blower-filter units and man-mounted respirators. In the absence of such standardization, gas-tight adaptors are to be provided; the visiting nation shall be responsible for developing and providing any portable blower-filter units and adaptors it intends to use while at a host nation's airbase.

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