



Material Information Sheet

Reference Material

MASK-1

Medical Mask Reference Material for Particle Filtration Efficiency

MASK-1 is a medical mask reference material (RM) from the National Research Council of Canada (NRC). This material, distributed as a single medical mask, is intended for the determination of particle filtration efficiency for respiratory protection devices. Reference values for MASK-1 have been established, as listed in Table 1.

Table 1: Reference value and expanded uncertainty (95 %) for MASK-1

Quantity	Value*
Log-penetration	-2.28 ± 0.52
Particle filtration efficiency (relative)	$0.9947 \pm [+0.0036, -0.0117]$

*Note: The values are obtained with the medical mask tested flat at a face velocity of 10 cm/s. Refer to the sections below for additional explanations.

Period of validity: until November 2027
Storage conditions: room temperature

Intended use

This reference material is primary intended for use for the determination of particle filtration efficiency for respiratory protection devices.

Preparation of material

This material was acquired from a commercial supplier and was used as received. The material was packaged into amber bags in a controlled environment at 18 % relative humidity. Each unit contains one medical mask.

Characterization of material

The reference value for MASK-1 (Table 1) is based on results from data obtained at the NRC using two automated filter testers, specifically the photometer-based TSI 8130A. The results were generated by testing the material flat at a face velocity of 10 cm/s with a minimal loading of sodium chloride.

Homogeneity

The material was tested for homogeneity at the NRC using an automated filter tester and the between-unit variability was determined to be negligible.

Stability

The transportation and long-term stability of MASK-1 was assessed using an automated filter tester. Impacts of various temperatures and relative humidity's on the units was assessed for up to eight-weeks as well as the impact of UV light after one-week. The long-term stability of MASK-1 stored in a sealed bag at room temperature was assessed and compared to the initial particle filtration efficiency. No differences in the particle filtration efficiency of the material were observed for any of the various testing conditions. Therefore, the results for both the transportation and long-term stability showed no instability trends.

Uncertainty

The expanded uncertainty (U) for all values is equal to $U = ku_c$, where u_c is the combined standard uncertainty calculated according to the Joint Committee for Guides in Metrology (JCGM) [2] and k is the coverage factor.

Included in the combined uncertainty estimate of the reference value in Table 1 are uncertainties in the batch characterization, uncertainties related to possible between-unit variation, and uncertainties related to stability. Uncertainties in the batch characterization are based on the reproducibility of results observed during several interlaboratory comparisons of particle filtration efficiency [3].

Storage

The material shall be stored at room temperature.

Instructions for handling and use

The medical mask shall be tested flat by cutting the seams to release the pleats in the material. The sample shall be tested at a face velocity of 10 cm/s at the initial loading up to a maximum loading of 1.5 mg sodium chloride [3]. The reference value is only guaranteed if the unit is analyzed shortly after opening. The unit is intended for one-time use.

Health and safety information

Only qualified personnel should handle the material and appropriate disposal methods should be used. This material is not hazardous. For laboratory use only; not for human consumption, therapeutic, drug, household, or any other uses.

Period of validity

The reference value is valid until November 2027, provided the storage and instructions for handling and use specified in this material information sheet are followed.

Quality Management System

The NRC is Canada's national metrology institute (NMI) and is a signatory of the International Committee for Weights and Measures Mutual Recognition Arrangement (CIPM MRA). The CIPM MRA was developed in a response to a growing need for an open, transparent, and comprehensive scheme to give users reliable quantitative information on the comparability of national metrology services and to provide the technical basis for wider agreements negotiated for international trade, commerce, and regulatory affairs. Our Quality Management System for measurement services and certified reference materials conforms to the requirements of ISO/IEC 17025 and ISO 17034.

Description of terms

Reference values are those for which not all uncertainty contributions may have been fully investigated or metrological traceability has not been fully established by the NRC.

Supplemental information

Bibliographic information and any additional technical supplemental information is available at [10.4224/crm.2025.mask-1](https://doi.org/10.4224/crm.2025.mask-1).

References

1. DerSimonian R, Laird N. Meta-analysis in clinical trials. *Control Clin Trials*. 1986; 7: 177-188. [https://doi.org/10.1016/0197-2456\(86\)90046-2](https://doi.org/10.1016/0197-2456(86)90046-2)
2. JCGM 100:2008. Evaluation of measurement data – Guide to the expression of uncertainty in measurement. Joint Committee for Guides in Metrology (JCGM); 2008. <https://doi.org/10.59161/JCGM100-2008E>
3. Sipkens TA, Mehri R, Perez Calderon R, Green RG, Oldershaw A, Smallwood G. Interlaboratory comparison of particle filtration efficiency testing equipment. *J Occup Environ Hyg*. 2025: 1-15. <https://doi.org/10.1080/15459624.2024.2447321>

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This material information sheet is only valid if the corresponding material was obtained directly from the NRC or an authorized reseller. Users should ensure that the material information sheet they have is current. For updates, please refer to [10.4224/crm.2025.mask-1](https://doi.org/10.4224/crm.2025.mask-1).

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