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Technical Bulletin

March 2025

Assigned Protection Factors (APF) for 3M™ Hoods and Helmets

Description

On November 22, 2006, U.S. Occupational Safety and Health Administration (OSHA) final rule regarding Assigned Protection Factors (APFs) became effective. The revisions OSHA made to its regulation for respiratory protection (29 CFR 1910.134) included the addition of definitions and requirements for Assigned Protection Factors (APFs) and Maximum Use Concentrations (MUCs). The revisions also supersede many of the APF requirements established in substance specific standards. The final rule defines APFs and MUCs as:

Assigned Protection Factor (APF) means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by this section [meaning 29 CFR 1910.134].

Maximum Use Concentration (MUC) means the maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the assigned protection factor of the res- pirator or class of respirators and the exposure limit of the hazardous substance. The MUC can be determined mathematically by multi- plying the assigned protection factor specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit, or ceiling limit. When no OSHA exposure limit is available for a hazardous substance, an employer must determine a MUC on the basis of relevant available information and informed professional judgment.

Table A of 29 CFR 1910.134 lists the APFs the employer must use. Footnote 4 of Table A states: “The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1000 or greater to receive an APF of 1000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.”

The definitions of WPF (workplace protection factor) and SWPF (simulated workplace protection factor) are provided in the Federal Register August 24, 2006, Vol. 71 Number 164.

To satisfy this requirement, 3M has conducted either WPF or SWPF studies to support APF 1000 claims for specific hoods and helmets when used in approved 3M respiratory configurations. For WPF studies, 3M has conducted these per the Federal Register requirements, and citations for these studies are listed in the ‘references’ section of this document. The current SWPF method consists of 3M performing small particle (NaCl) quantitative performance testing on a NIOSH Bivariate Fit Test Panel. While wearing the respirator configuration the test subjects are required to perform a series of exercises outlined in NIOSH TEB-CBRN-APR-STP-0553 protocol (2021) or TEB-APR-STP-0005, 0005a, and 0006 protocol (2023), including:

- Normal Breathing
- Deep Breathing
- Head movements
- Stair climbing
- Callisthenic arm movements
- Reading the rainbow passage
- Turning head side to side while on hands and knees
- Tire pumping
- Normal breathing

To establish an APF 1000 claim, 95% or more of the test subjects must achieve a fit factor greater than 10,000 for the study. For any configuration where 3M has listed an APF 1000, all criteria for the WPF or SWPF study above were met.

Purpose

This Technical Bulletin outlines the objective data used to support an APF of 1000, for the 3M hoods and helmets (respiratory inlet coverings) listed in Table B when used in their NIOSH approved configurations. The APF is independent of whether the hood or helmet is used in a powered air or supplied air mode.

Assigned Protection Factors

IMPORTANT

Table A and notes are from OSHA's Respiratory Protection Standard: 29 CFR 1910.134.

Table 1: Table A. Assigned Protection Factors[5]

Type of Respirator1,2	Quarter Mask	Half Mask	Full Facepiece	Helmet/ Hood	Loose- Fitting Facepiece
1. Air-Purifying Respirator	5	10_3	50	—	—
2. Powered Air-Purifying Respirator (PAPR)	—	50	1,000	$25/1{,}000_4$	25
3. Supplied-Air Purifying Respirator (SAR) or Airline Respirator					
Demand mode	—	10	50	—	—
Continuous flow mode	—	50	1,000	$25/1{,}000_4$	25
Pressure-demand or other positive-pressure mode	—	50	1,000	—	—
4. Self-Contained Breathing Apparatus (SCBA)					
Demand Mode	—	10	50	50	—
Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	—	—	10,000	10,000	—

1. Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.
2. The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.
3. This APF category includes filtering facepieces, and half masks with elastomeric facepieces.
4. The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respira tors, and receive an APF of 25.
5. These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

Table 2: Table B. 3M Hoods and Helmets with APF of 1000

Hood or Helmet Part Number	NIOSH Approved Air Sources	Test Method	APF
BE-10	• Breathe Easy™ • Air-Mate™ • TR-300 • TR-600	SWPF[1]	1,000
BE-10BR	• Breathe Easy™	SWPF[2]	1,000
H-410/H-411/H-412	• TR-300 • TR-600 • GVP • V-100 • V-200 • V-300 • V-400	SWPF[4] WPF[9]	1,000
H-420/H-421/H-422	• TR-300 • TR-600 • GVP • V-100 • V-200 • V-300 • V-400	WPF[3]	1,000
H-610/H-611/H-612	• TR-300 • TR-600 • GVP • V-100 • V-200 • V-300 • V-400	SWPF[4]	1,000
L-901 **L-905**	• TR-300 • GVP • V-100 • V-200 • V-300 • V-400	WPF[6]	1,000
L-901SG **L-905SG**	• TR-300 • TR-600 • GVP • Adflo™ • V-100 • V-200 • V-300 • V-400	SWPF[10]	1,000

Hood or Helmet Part Number	NIOSH Approved Air Sources	Test Method	APF
W-8100	• V-100 • V-200 • V-300 • V-400	WPF[1, 5] SWPF[7]	1,000
M-405 **M-407** **M-407SG** **M-409SG**	• TR-300 • TR-300+ • TR-600 • TR-800 • GVP • Breathe Easy™ • V-100 • V-200 • V-300 • V-400 • Adflo™	SWPF[11]	1,000
G5-01 ***With optional 1000 APF kit**	• TR-300 • TR-300+ • TR-600 • Adflo™ • V-100 • V-200 • V-300 • V-400	SWPF[11]	1,000
G5-03 ***With optional 1000 APF kit**	• TR-300 • TR-300+ • TR-600 • Adflo™ • V-100 • V-200 • V-300 • V-400	SWPF[14]	1,000
9100 MP ****With optional shroud**	• TR-300 • TR-300+ • TR-600 • Adflo™ • V-100 • V-200 • V-300 • V-400	SWPF[11]	1,000

Hood or Helmet Part Number	NIOSH Approved Air Sources	Test Method	APF
S-403	• TR-300 • TR-300+ • TR-600 • TR-800 • GVP • V-100 • V-200 • V-300 • V-400 • Breathe Easy™	SWPF[12]	1,000
S-433 **S-533**	• TR-300 • TR-300+ • TR-600 • TR-800 • GVP • V-100 • V-200 • V-300 • V-400 • Breathe Easy™	SWPF[13]	1,000
S-605/S-655 **S-607/S-657** **S-707/S-757**	• TR-300 • TR-300+ • TR-600 • TR-800 • GVP • V-100 • V-200 • V-300 • V-400	SWPF[10]	1,000
S-805/S-855 **S-807/S-857**	• TR-300 • TR-300+ • TR-600 • TR-800 • GVP • V-100 • V-200 • V-300 • V-400 • Breathe Easy™	SWPF[10]	1,000
S-605/S-665 **S-707/S-767**	• TR-300 • TR-300+ • TR-600 • TR-800 • V-100 • V-200 • V-300 • V-400	SWPF[14]	1,000

Hood or Helmet Part Number	NIOSH Approved Air Sources	Test Method	APF
S-807/S-867	• TR-300 • TR-300+ • TR-600 • TR-800 • V-100 • V-200 • V-300 • V-400	SWPF[14]	1,000

*G5-01 in use with 1000 APF Kit 46-1000-00 will give APF of 1000

*G5-03 in use with 1000 APF Kit 46-1000-00 will give APF of 1000

**9100 MP in use with Speedglas™ Complete Neck Coverage 27-0099-87 will give APF of 1000

References

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12. Small Particle (NaCl) Quantitative Performance Testing Performed by 3M OH&ESD Division. 29 member NIOSH Bivariate Fit Test Panel. Exercises selected from NIOSH CET-PAPR-STP CBRN-0553 and NIOSH PAPR or RTC-APR-STP- 00005- 5a-06 protocols 2008.
13. 13. Small Particle (NaCl) Quantitative Performance Testing Performed by 3M OH&ESD Division. 29 member Los Alamos Grid Panel. Exercises selected from NIOSH CET-PAPR-STP CBRN-0553 and NIOSH PAPR or RTC-APR-STP- 00005-5a-06 protocols 2008.
14. Small Particle (NaCl) Quantitative Performance Testing Performed by 3M Personal Safety Division (formerly OH&ESD). 25 member NIOSH Bivariate Fit Test Panel. Exercises selected from NIOSH TEB-CBRN-APR-STP-0553 protocol (2021) or TEB-APR-STP-0005, 0005a, and 0006 protocol (2023).

Personal Safety Division
3M Center, Building 235-2W-70
St. Paul, MN 55144-1000

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3M Canada
P.O. Box 5757
London, Ontario
N6A 4T1

In United States of America
Technical Service 1-800-243-4630
Customer Service 1-800-328-1667
3M.com/workersafety

In Canada
Technical Service 1-800-267-4414
Customer Service 1-800-364-3577
3M.ca/Safety