

Air-Purifying Respirator Types & Protection Levels Recommended by CDC for COVID-19



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By now most people are familiar with the disposable half-mask respirators commonly called “N95s” in the healthcare setting. But a much broader array of respiratory products are available that meet United States Centers for Disease Control and Prevention (CDC) guidance for protection against COVID-19.

The CDC has specified that reusable National Institute for Occupational Safety and Health (NIOSH)-approved elastomeric respirators are a viable option for use by healthcare workers and the first responder community. This document outlines MSA Safety’s NIOSH-approved respirators and filter configurations that meet CDC’s guidance.

Two key considerations when selecting an air-purifying respirator (APR) for protection against COVID-19 are respirator type and protection level. While there are many types of respiratory protection, CDC recommends NIOSH-approved masks with a protection factor of N95 or higher for certain healthcare workers who may be exposed to COVID-19. Below you will find a comparison of respirator types, including supplied-air respirators; filter classifications regulated by NIOSH that meet CDC recommendations; and in Table 1, a detailed comparison of all respirator types, including supplied-air respirators.

Types of Respirators



Half Mask, Reusable

An elastomeric, reusable mask that covers nose and mouth. The mask includes an inlet receptacle(s) for particulate filters and a one-way exhalation valve. The filters are disposable. The reusable mask can be disinfected.

Filter Classifications: All; N95 and P100 most common



Full Facepiece, Reusable

An elastomeric, reusable mask that covers eyes, nose, and mouth. The mask includes an inlet receptacle(s) for particulate filters and a one-way exhalation valve. The filters are disposable. The reusable mask can be disinfected.

Filter Classifications: All; N95 and P100 most common



Powered Air-Purifying Respirator (PAPR), Mask-Mounted

An elastomeric, reusable mask that covers eyes, nose and mouth. The mask includes an inlet receptacle for a motor/blower with attached particulate filter and a one-way exhalation valve. The motor/blower actively draws air through the particulate filter and delivers breathable air to the respirator inlet. The motor blower is typically powered by a belt-mounted battery. The filters are disposable. The reusable mask/PAPR assembly can be disinfected.

Filter Classifications: All; HEPA/Type HE (similar particulate efficiency to P100)



Powered Air-Purifying Respirator (PAPR), Belt-Mounted

A belt-mounted, battery-powered motor/blower that provides filtered air to a full facepiece or hood. The filters are disposable. The reusable mask/PAPR assembly can be disinfected.

Filter Classifications: All; HEPA/Type HE (similar particulate efficiency to P100)

Filter Classifications (all meet CDC recommendations for COVID-19)

Filter Types	95	99	100
N (NON-OIL PROOF)	N95*	N99	N100
R (OIL-RESISTANT)	R95	R99	R100
P (OIL PROOF)	P95	P99	P100*

* N95 and P100 are the most common and most available filter types. Higher levels of particulate protection are inclusive of all lower levels.

Term	Definition
N	Effective against particulate aerosols free of oil; time use restrictions may apply
R	Effective against all particulate aerosols; time use restrictions may apply
P	Effective against all particulate aerosols
95	95% efficient against 0.3 micron (most penetrating particle size)
99	99% efficient against 0.3 micron (most penetrating particle size)
100	99.97% efficient against 0.3 micron (most penetrating particle size)

Intent for Use in Healthcare Settings During COVID-19 Public Health Emergency

In the United States, in light of the COVID-19 public health emergency, recent determinations by the Secretary of Health and Human Services, and the Emergency Use Authorization issued by the Food and Drug Administration, MSA temporarily intends for its respiratory protection products approved by NIOSH under 42 CFR Part 84 to be used in healthcare settings by healthcare personnel to help protect the wearer from exposure to pathogenic biological airborne particulates during filtering facepiece respirator shortages resulting from the COVID-19 pandemic.

Table 1: Comparative Analysis of Various Forms of Respiratory Protection Provided by MSA Safety

Respirator Type	Elastomeric Half-Mask Respirator	Full-Facepiece Respirator	Powered Air-Purifying Respirator, Tight-Fitting Facepiece	Powered Air-Purifying Respirator, Loose-Fitting Hood	Self-Contained Breathing Apparatus
RESPIRATOR NAME	<ul style="list-style-type: none"> • Advantage® 420 • Advantage 290 • Advantage 200LS • Comfo® Classic 	<ul style="list-style-type: none"> • Advantage 1000 • Advantage 3200 • Advantage 4100 • Advantage 4200 • Ultra-Elite • Ultra-Twin/Ultravue • Millennium • G1 Facepiece with APR Adapter 	<ul style="list-style-type: none"> • OptimAir Mask- Mounted • Optimair TL Tight-Fitting Facepiece • Responder PAPP 	<ul style="list-style-type: none"> • OptimAir TL 	<ul style="list-style-type: none"> • G1 SCBA • G1 Industrial
COMPATIBLE PARTICULATE FILTER TYPES	<ul style="list-style-type: none"> • N95 Flexi Filter or prefilter with chemical cartridge • R95 Flexi Filter or prefilter with chemical cartridge • P100 	<ul style="list-style-type: none"> • N95 Flexi Filter or prefilter with chemical cartridge • R95 Flexi Filter or prefilter with chemical cartridge • P100 • Riot control • CBRN 	<ul style="list-style-type: none"> • HEPA • CBRN for Responder PAPP 	<ul style="list-style-type: none"> • HEPA 	<ul style="list-style-type: none"> • Supplied Air
MEETS CDC GUIDANCE FOR COVID-19	✓	✓	✓	✓	✓
Type and Scope of Protection Provided					
DISPOSABLE VS. REUSABLE	Reusable after disinfection, and replacement of filtering element	Reusable after disinfection, and replacement of filtering element	Reusable after disinfection, and replacement of filtering element	Reusable after disinfection, and replacement of filtering element	Reusable after disinfection
ORGANS PROTECTED	• Respiratory	• Respiratory • Eye • Face	• Respiratory • Eye • Face	• Respiratory • Eye • Face	• Respiratory • Eye • Face
COMPATIBLE WITH OTHER FORMS OF PPE	Yes	Yes	Yes	Yes	Yes
DURATION OF USE	Dependent upon use conditions	Dependent upon use conditions	Dependent upon use conditions	Dependent upon use conditions	Dependent upon use conditions
LEVEL OF TRAINING REQUIRED FOR PROPER USE	Moderate	Moderate	High	High	Highest



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Continued

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RESPIRATOR NAME	<ul style="list-style-type: none"> • Advantage® 420 • Advantage 290 • Advantage 200LS • Comfo® Classic 	<ul style="list-style-type: none"> • Advantage 1000 • Advantage 3200 • Advantage 4100 • Advantage 4200 • Ultra-Elite • Ultra-Twin/Ultravue • Millennium • G1 Facepiece with APR Adapter 	<ul style="list-style-type: none"> • OptimAir Mask- Mounted • Optimair TL Tight-Fitting Facepiece • Responder PAPR 	<ul style="list-style-type: none"> • OptimAir TL 	<ul style="list-style-type: none"> • G1 SCBA • G1 Industrial
COMPATIBLE PARTICULATE FILTER TYPES	<ul style="list-style-type: none"> • N95 Flexi Filter or prefilter with chemical cartridge • R95 Flexi Filter or prefilter with chemical cartridge • P100 	<ul style="list-style-type: none"> • N95 Flexi Filter or prefilter with chemical cartridge • R95 Flexi Filter or prefilter with chemical cartridge • P100 • Riot control • CBRN 	<ul style="list-style-type: none"> • HEPA • CBRN for Responder PAPR 	<ul style="list-style-type: none"> • HEPA 	<ul style="list-style-type: none"> • Supplied Air
MEETS CDC GUIDANCE FOR COVID-19	✓	✓	✓	✓	✓
Government Certification and Performance					
GOVERNMENT CERTIFICATION(S)	NIOSH 42 CFR Part 84	NIOSH 42 CFR Part 84	NIOSH 42 CFR Part 84	NIOSH 42 CFR Part 84	NIOSH 42 CFR Part 84, NFPA 1918 (2018) for structural firefighting applications
BREATHING RESISTANCE	Moderate	Moderate	Low	Low	Supplied air
ADAPTABLE TO A RANGE OF ADULT FACE SIZES	<ul style="list-style-type: none"> • Small • Medium • Large 	<ul style="list-style-type: none"> • Small • Medium • Large 	Adaptable to a range of adult face sizes	Adaptable to a range of adult face sizes	Adaptable to a range of adult face sizes
ASSIGNED PROTECTION FACTOR (OSHA)	10	50	1000	1000 SWPF Available	10,000
FIT TESTING REQUIRED	Yes	Yes	Yes	—	Yes

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Continued

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RESPIRATOR NAME	<ul style="list-style-type: none"> • Advantage® 420 • Advantage 290 • Advantage 200LS • Comfo® Classic 	<ul style="list-style-type: none"> • Advantage 1000 • Advantage 3200 • Advantage 4100 • Advantage 4200 • Ultra-Elite • Ultra-Twin/Ultravue • Millennium • G1 Facepiece with APR Adapter 	<ul style="list-style-type: none"> • OptimAir Mask- Mounted • Optimair TL Tight-Fitting Facepiece • Responder PAPR 	<ul style="list-style-type: none"> • OptimAir TL 	<ul style="list-style-type: none"> • G1 SCBA • G1 Industrial
COMPATIBLE PARTICULATE FILTER TYPES	<ul style="list-style-type: none"> • N95 Flexi Filter or prefilter with chemical cartridge • R95 Flexi Filter or prefilter with chemical cartridge • P100 	<ul style="list-style-type: none"> • N95 Flexi Filter or prefilter with chemical cartridge • R95 Flexi Filter or prefilter with chemical cartridge • P100 • Riot control • CBRN 	<ul style="list-style-type: none"> • HEPA • CBRN for Responder PAPR 	<ul style="list-style-type: none"> • HEPA 	<ul style="list-style-type: none"> • Supplied Air
MEETS CDC GUIDANCE FOR COVID-19	✓	✓	✓	✓	✓
Design Related Characteristics and Attributes					
COMPOSITION	Synthetic, metallic, and natural materials	Synthetic, metallic, and natural materials	Synthetic, metallic, and natural materials	Synthetic, metallic, and natural materials	Synthetic, metallic, and natural materials
EXTERNAL FORMS OF POWER REQUIRED	No	No	Yes, battery	Yes, battery	Yes, cylinder of breathable air, battery on some models
COST	Moderate	Moderate	High	High	Highest

Filter Replacement Guidance for Reusable Respiratory Protection

CDC has provided guidance for healthcare settings regarding cartridge reuse during the current pandemic:

- Filter cartridges (except for unprotected disc type, i.e., pancake style) may be used for an extended period, if the cartridge is disinfected after each patient interaction provided the disinfectant or cleaning agent does not come in contact with the filter media; and
- Filter cartridges must not be dipped or immersed in a cleaning or disinfection solution because this may damage or render the filter material ineffective. When using a cleaning or disinfectant wipe on the external surface of a filter cartridge, users should avoid contact with the filter media on the inside of the cartridge.

Each healthcare organization should follow their established infection control policy and replace the filter cartridges when:

- It becomes difficult to breathe comfortably (will vary from individual to individual).
- The filter becomes dirty or physical damage occurs.
- The filter is wet or submerged.

Please Note

Personal protective equipment (PPE) provides limited protection and may help to reduce exposure to biological agents and the risk of viral infection but **IMPORTANTLY IT DOES NOT ELIMINATE** the risk of exposure, infection, illness, or death, including with respect to SARS-CoV-2/COVID-19. MSA relies on the expertise and recommendations of CDC, ECDC, and other cited authorities, and MSA does not warrant the efficacy of any of its PPE products, or of the information or products in this Brief, in preventing the spread and/or contraction of coronaviruses. It is your responsibility to determine what PPE is suitable for your intended use and consistent with guidelines from your employer and the relevant health authorities. MSA disclaims liability for any loss or damage arising from any information contained herein, whether direct, indirect, special, incidental or consequential, regardless of the legal or equitable theory asserted, including warranty, contract, negligence or strict liability.

The situation with COVID-19 is rapidly evolving. Organizations like the CDC are providing updated information and guidance as it becomes available.

For the most-up-to date information on COVID-19, you should regularly consult guidance being published by national and international organizations, such as the CDC, the National Institutes of Health (NIH), the World Health Organization (WHO), the European Centre for Disease Prevention and Control (ECDC), and/or your local health authority. Guidance on COVID-19, including information on actions needed to prevent, control, and manage contact with the virus, is available at the following websites:

US CDC	https://www.cdc.gov/coronavirus/index.html https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fhcp%2Finfection-control.html
US NIH	https://www.nih.gov/news-events/news-releases/nih-officials-discuss-novel-coronavirus-recently-emerged-china
WHO	https://www.who.int/health-topics/coronavirus
ECDC	https://www.ecdc.europa.eu/en/coronavirus

Note: This Bulletin contains only a general description of the products shown. While product uses and performance capabilities are generally described, the products shall not, under any circumstances, be used by untrained or unqualified individuals. The products shall not be used until the product instructions/user manual, which contains detailed information concerning the proper use and care of the products, including any warnings or cautions, have been thoroughly read and understood. Specifications are subject to change without prior notice.

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