

Air-Purifying Respirator Types & Protection Levels

Recommended by CDC or ECDC for COVID-19



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By now most people are familiar with the disposable half-mask respirators commonly called “N95s” or “FFP2” 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) and European Centre for Disease Prevention and Control (ECDC) 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 EN-approved respirators and filter configurations that meet CDC and ECDC’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 and ECDC recommends EN-approved masks with a protection factor of FFP2 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) or EN (that meet ECDC 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 or P2 and P100 or P3 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 or P2 and P100 or P3 most common



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 (only P2 and P3 meet ECDC recommendations for COVID-19)

EN143:2000 Filtering Class	Maximum Filter Penetration	
	Solid particles (NaCl)	Liquid particles (Paraffin oil)
P1	20%	20%
P2	6%	6%
P3	0,05%	0,05%

Term	Definition
NR	Non Reusable — filter classified as single shift use only
R	Reusable — filter intended to be used for more than a single shift
D	Dolomite dust tested (clogging in high dust environment)
P1	80% efficient against 0.3 micron (most penetrating particle size)
P2	94% efficient against 0.3 micron (most penetrating particle size)
P3	99.95% efficient against 0.3 micron (most penetrating particle size)

Filter Replacement Guidance for Reusable Respiratory Protection

Disposable filters for use in reusable respiratory protection should be discarded and replaced at least daily or more frequently as circumstances warrant according to CDC guidance. CDC and ECDC guidance on COVID-19 is rapidly evolving. Always consult the CDC and/or ECDC website for the latest recommendations.

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 200LS • Advantage 410 	<ul style="list-style-type: none"> • Advantage 3100 • Advantage 3200 • 3S • 3S Basic Plus • G1 Mask with APR Adapter 	<ul style="list-style-type: none"> • OptimAir 3000 A • OptimAir 3000 EX 	<ul style="list-style-type: none"> • OptimAir 3000 • OptimAir 3000 EX 	<ul style="list-style-type: none"> • M1 SCBA • AirGo SCBA • AirMaXX SCBA • G1 SCBA
COMPATIBLE PARTICULATE FILTER TYPES	<ul style="list-style-type: none"> • Particle filter P3 PlexTec • Twin bayonet P3 cartridge • Twin bayonet P3 with chemical cartridge 	<ul style="list-style-type: none"> • Particle filter P3 PlexTec • Combined filter (P2+ gas filter) • Combined filter (P3 + gas filter connection) • Twin bayonet P3 cartridge • Twin bayonet P3 with chemical cartridge 	<ul style="list-style-type: none"> • OptimAir 3000 P3 Filters 	<ul style="list-style-type: none"> • OptimAir 3000 P3 Filters 	<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	<ul style="list-style-type: none"> • Respiratory 	<ul style="list-style-type: none"> • Respiratory • Eye • Face 	<ul style="list-style-type: none"> • Respiratory • Eye • Face 	<ul style="list-style-type: none"> • Respiratory • Eye • Face 	<ul style="list-style-type: none"> • 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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COMPATIBLE PARTICULATE FILTER TYPES	<ul style="list-style-type: none"> • Particle filter P3 PlexTec • Twin bayonet P3 cartridge • Twin bayonet P3 with chemical cartridge 	<ul style="list-style-type: none"> • Particle filter P3 PlexTec • Combined filter (P2+ gas filter) • Combined filter (P3 + gas filter connection) • Twin bayonet P3 cartridge • Twin bayonet P3 with chemical cartridge 	<ul style="list-style-type: none"> • OptimAir 3000 P3 Filters 	<ul style="list-style-type: none"> • OptimAir 3000 P3 Filters 	<ul style="list-style-type: none"> • Supplied Air
MEETS CDC GUIDANCE FOR COVID-19	✓	✓	✓	✓	✓
Government Certification and Performance					
GOVERNMENT CERTIFICATION(S)	EN 140	EN 136	EN 12942	EN 12941	EN 137
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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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

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.

Please note 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:

ECDC	https://www.ecdc.europa.eu/en/coronavirus
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

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