



COVID-19 PERSONAL PROTECTIVE EQUIPMENT AND SUPPLIES PERFORMANCE STANDARDS AND GUIDELINES

The purpose of this document is to assist departments during the personal protective equipment (PPE) procurement process and serves as a guide to determine if PPE meets minimum performance standards. This helps ensure PPE will provide adequate protection to prevent COVID-19 transmission. Check references for additional requirements for specific types of work.

DISINFECTANTS AND SANITIZERS

Item	Example	Description	Performance Standard
Hand Sanitizer	Pump Auto dispenser Wall-mount manual dispenser	Hand sanitizer acts by killing certain germs on the skin. Alcohol-based hand sanitizers can quickly reduce the number of germs in many situations such as when handwashing is not available.	Must contain at least 60% ethyl alcohol or 70% isopropyl alcohol CDC Guidelines Avoid hand sanitizers containing methanol.
Surface Disinfectants	Ready-to-use Concentrated Dilution systems with dispensers	Products used to disinfect surfaces against SARS-CoV-2. Disinfection describes a process that eliminates most or all pathogenic microorganisms, except bacterial spores, on inanimate objects.	Be on EPA Disinfectants for Use Against SARS-CoV-2 or ACC CBC Novel Coronavirus (COVID-19)—Fighting Products lists Pre-approved UW list: UW EH&S COVID-19 Chemical Disinfectant Safety Information Ready-to-use products preferred over concentrated. Closed dilution dispenser systems also preferred.
ACC	American Chemical Society		
CBC	Center for Biocide Chemistries		
CDC	Centers for Disease Prevention and Control		
EPA	Environmental Protection Agency		

DISPOSABLE GLOVES, GOWNS, COVERALLS, LAB COATS

Item	Example	Description	Performance Standard
Disposable gloves, thin-gauge (3 - 8 mil thickness typical) 1 mil = 0.001 inch	Disposable nitrile gloves 	Some chemical resistance – consult manufacturer glove resistance chart, incidental chemical contact only	ASTM FDA Medical Glove Guidance Strategies for Optimizing the Supply of Disposable Medical Gloves : Use of gloves conforming to U.S. and international standards. Note Avoid powdered gloves - banned in medical use, possible inflammation and allergic reactions.
	Disposable vinyl gloves 	Economical Thinner, looser fit than nitrile. Less durable, less chemical resistance. Medical, industrial, general purpose grades (2 - 6 mil typical).	

(see insert below)

Disposable nitrile gloves			
Mil	Duty	Characteristics	Examples
3 - 4	light	↑ Comfort, dexterity, flexibility, tactile sensitivity	Medical grade (at least 4 mil typical) : Hospital, chemotherapy, clinic, lab, dental office, clean room Industrial grade : food service, janitorial
5 - 6	medium	General purpose	General purpose, household, medical and industrial grade uses
7 - 8	heavy	↓ Resistance to wear, tear, puncture, cut, greater chemical resistance	Industrial grade : janitorial, automotive, shop, chemical lab, medium chemical handling

ENVIRONMENTAL HEALTH & SAFETY

UNIVERSITY of WASHINGTON

Disposable gowns



Provides clothing and skin protection; manufactured from variety of materials depending upon needed application.

Non-surgical gowns are Class I devices (exempt from premarket review) intended to protect the wearer from the transfer of microorganisms and body fluids in low or minimal risk patient isolation situations. Non-surgical gowns are not worn during surgical procedures, invasive procedures, or when there is a medium to high risk of contamination.

[FDA Medical Gowns](#)

[AAMI PB70:2012](#) Liquid Barrier Performance And Classification Of Protective Apparel And Drapes In Health Care Facilities

[ASTM](#)

[NFPA 1999 Standard on Protective Clothing and Ensembles for Emergency Medical Operations](#)

Tyvek gown/coveralls



Provides clothing and skin protection; tear resistant; protection from particulates.

Some Tyvek clothing is coated for chemical resistance.

[Strategies for Optimizing the Supply of Isolation Gowns:](#) Use of coveralls may be used in healthcare settings as an alternative to gowns.

[NFPA 1999 Standard on Protective Clothing and Ensembles for Emergency Medical Operations](#)

Disposable lab coat








Provides limited clothing and skin protection; tear resistant; protection from particulates.

Some Tyvek clothing is coated for chemical resistance.

Biological hazards – ASTM [F1670](#), ASTM [F1671](#)
Liquid or chemical hazards – [AATCC Method 42](#) and ASTM [F903](#)
Physical hazards – NFPA [701](#) or [2112](#)
[NIH Guidance for the Selection of Laboratory Coats](#)



AAMI	Association for the Advancement of Medical Instrumentation
AATCC	American Association of Textile Chemists and Colorists
ASTM	American Society for Testing and Materials (ASTM International)
FDA	Federal Drug Administration
NFPA	National Fire Protection Association
NIH	National Institutes for Health

EYE AND FACE PROTECTION

Item	Example	Description	Performance Standard
Safety glasses		Polycarbonate lens, side shields [Note: Personnel with corrective lenses will need “over-prescription” safety glasses or prescription safety glasses.]	Must meet ANSI Z87.1
Goggles	Indirect vented 	Provides eye protection from splash entry by vents that are hooded or covered	Must meet ANSI Z87.1
	Non-vented 	Provides eye protection against dust, mist, liquid and vapors	Must meet ANSI Z87.1
Disposable medical face shield		Provides protection from splash, spray, spatter or droplets of blood or other potentially infectious materials	[Not ANSI Z87.1 compliant] <ul style="list-style-type: none"> • Extend to ears • Extend below chin • Cover forehead
Face shield		Impact and chemical resistant face shield must be combined with safety glasses or goggles	Must meet ANSI Z87.1


ANSI American National Standards Institute
 CDC Centers for Disease Control and Prevention

FACEMASKS

Item	Example	Description	Minimum Performance Standard
<p>Cloth face covering</p>		<p>Not a respirator, surgical or procedure mask (<i>does not require fit testing</i>); while not PPE, these act as a barrier and may protect persons nearby from wearer’s respiratory droplets (e.g., speaking, coughing, sneezing). May also provide some protection to the wearer through filtration.</p>	<ul style="list-style-type: none"> • Material varies; CDC states tightly woven cotton • Should cover nose and mouth completely • Fit snugly against sides of the face • Secured with ties, ear loops, elastic bands or other equally effective method • Has at least two layers of cloth • Has a nose wire to prevent air from leaking out the top of the mask • Allow for breathing without restriction • Able to be laundered and machine dried without damage or change to shape • Free of holes, tears or valves that have the potential to release respiratory droplets <p>CDC Cloth Face Coverings</p> <p>ASTM F3502-21 Standard Specification for Barrier Face Coverings including added NIOSH criteria for leakage and labeling.</p> <ul style="list-style-type: none"> • Workplace Performance Mask • Workplace Performance Plus Mask
<p>Surgical and medical/procedure masks</p>		<p>Not a respirator (<i>does not require fit testing</i>); provides a liquid barrier and protects the wearer against large droplets, splashes and/or aerosols. Protects persons nearby from the wearer’s respiratory emissions (e.g., speaking, coughing, sneezing).</p> <p>Surgical and medical/procedure masks have different levels of protection:</p>	<p>ASTM F2100-11 (2011)</p> <ul style="list-style-type: none"> • Bacterial Filtration Efficiency • Particulate Filtration Efficiency • Fluid resistance • Pressure differential • ISO 10993-5, 10 Certification <p>FDA Cleared Product Search</p> <p>FDA Manufacturing of Facemasks</p>


ENVIRONMENTAL HEALTH & SAFETY

UNIVERSITY of WASHINGTON

Item	Example	Description	Minimum Performance Standard
Surgical and medical/procedure masks (cont.)		<p>Level 1 (low) barrier: General use for short procedures and exams that don't involve aerosols, spray or fluids.</p> <p>Level 2 (moderate) barrier: For low to moderate levels of aerosols, spray and/or fluids.</p> <p>Level 3 (maximum) barrier: For heavy levels of aerosols, spray and/or fluids.</p>	
Dust mask		Not a respirator; may protect against larger sized dust particles, fumes, mists, and microorganisms (<i>does not require fit testing</i>).	Usually not NIOSH approved.




ASTM American Society for Testing and Materials (ASTM International),
CDC Centers for Disease Control and Prevention

RESPIRATORY PROTECTION

Item	Example	Description	Performance Standard
N95 respirator		Protects against dusts, fumes, mists, and microorganisms including animal allergens. N95-Particulate Filter (95% filter efficiency level) is effective against particulate aerosols free of oil; time use restrictions may apply. Requires fit testing.	<p>Must be at least 95% efficient in filtering 0.3 micron particles. (P/R95, P/R/N99, and P/R/N100 also acceptable)</p> <p>NIOSH-Approved</p> <p>NIOSH-Approved Surgical N95 Respirators (provides moisture barrier)</p> <p>Strategies for Optimizing the Supply of N95 Respirators during COVID-19 Response: Additional performance standards from other countries may be approved.</p> <p>Notes:</p> <p>Use caution when ordering N95 respirators due to recent issues with quality.</p>



ENVIRONMENTAL HEALTH & SAFETY

UNIVERSITY of WASHINGTON

Item	Example	Description	Performance Standard
<p>N95 respirator (cont.)</p>			<p>NIOSH – Factors to consider when purchasing N95 respirators from another country.</p> <p>N95 with exhalation valve not preferred since exhaled breath passes outwards from person wearing N95. These should only be used in a clinical setting with a surgical mask on top.</p>
<p>KN95 respirator</p>		<p>Protects against dusts, fumes, mists, and microorganisms including animal allergens. KN95-Particulate Filter (95% filter efficiency level) is effective against particulate aerosols free of oil; time use restrictions may apply.</p>	<p>People’s Republic of China – GB 2626-2019</p> <p>Note: Use caution when purchasing KN95 respirators due a large percentage of KN95s that do not meet the requirements that they intended to meet.</p>
<p>KF94 respirator</p>		<p>Protects against dusts, fumes, mists, and microorganisms including animal allergens. KF94-Particulate Filter (94% filter efficiency level) is effective against particulate aerosols free of oil; time use restrictions may apply.</p>	<p>Korea 1st class – KMOEL – 2017-64</p>
<p>Cartridge respirator</p>	<p>Half face air-purifying elastomeric</p> 	<p>Protects against variety of particulates, vapors, dust, mists, fumes, or a combination of these; depends on filter or cartridge used.</p>	<p>Must be NIOSH-Approved</p> <p>Strategies for Optimizing the Supply of N95 Respirators during COVID-19 Response: May be used if N95 filtering-facepiece respirators are not available.</p>


ENVIRONMENTAL HEALTH & SAFETY

UNIVERSITY of WASHINGTON

Item	Example	Description	Performance Standard
		Similar to half-face, but with higher protection factor and greater protection of eyes and face; depends on filter or cartridge used.	Must be NIOSH-Approved Strategies for Optimizing the Supply of N95 Respirators during COVID-19 Response : May be used if N95 filtering-facepiece respirators are not available.
Powered air-purifying respirator (PAPR)		Powered air purifying respirator delivers steady supply of filtered air with loose fitting hood; can be used with HEPA filters and/or chemical cartridges. A variety of hoods/head covers are available for each unit.	Must be NIOSH-Approved Strategies for Optimizing the Supply of N95 Respirators during COVID-19 Response : May be used if N95 filtering-facepiece or elastomeric respirators are not available.



CDC Centers for Disease Control and Prevention
HEPA High Efficiency Particulate Air
NIOSH National Institute for Occupational Safety and Health

THERMOMETERS

Item	Example	Description	Performance Standard
Infrared thermometer		Fever is one of the symptoms of COVID-19. A thermometer is useful in determining temperatures for screening purposes.	A non-contact infrared thermometer is preferred. ASTM E1965-98(2016) Maximum error of ± 0.5 °F

ENVIRONMENTAL HEALTH & SAFETY

UNIVERSITY of WASHINGTON

Item	Example	Description	Performance Standard
Electronic Oral thermometer	 A white electronic oral thermometer with a blue digital display showing '98.6'.	Fever is one of the symptoms of COVID-19. A thermometer is useful in determining temperatures for screening purposes.	ASTM E1112-00(2018) Maximum error of $\pm 0.2-0.5$ °F
Disposable Oral and forehead thermometer strips	 A white disposable oral and forehead thermometer strip with a digital display showing '98.6'.	Fever is one of the symptoms of COVID-19. A thermometer is useful in determining temperatures for screening purposes.	ASTM E825-98 Maximum error of $\pm 0.2-0.4$ °F