



# Coronaviruses, including SARS and MERS

## Technical bulletin

### What are coronaviruses?

Coronaviruses are a large family of viruses that can cause diseases ranging from the common cold to more severe illnesses such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS). The SARS-associated coronavirus (SARS-CoV) was recognized in China as early as November 2002. The 2019 disease outbreak in China has been attributed to a coronavirus referred to as 2019-nCoV.

Coronaviruses affect the respiratory system, typically resulting in severe acute respiratory illness displaying symptoms of fever, malaise, cough, and shortness of breath. About 30%-40% of patients reported with MERS have died during previous outbreaks of the disease<sup>1</sup>.

Currently, no vaccine or specific treatment is available to prevent or cure coronavirus infections. Treatment for infected individuals is supportive and based on the patient's clinical condition.

### How are coronaviruses spread?

Animals, including camels, cats, and bats, are suspected to be reservoir hosts for coronaviruses and sources of coronavirus infections in humans; however, the exact role of animal transmission of these viruses to humans and the exact route(s) of transmission are unknown.

The majority of human cases of coronavirus illness have been attributed to human-to-human infections. Coronaviruses are believed to spread from an infected person's respiratory secretions, although the specific ways the virus spreads are not currently well understood. These viruses spread from sick people to others through close contact, such as unprotected caring for or living with an infected person. Infected people also are known to have spread coronaviruses to others in healthcare settings.

### Who needs to be protected?

As a general precaution, individuals visiting farms, markets, barns, or other places where animals are present should practice general hygiene measures, including regular hand washing before and after touching animals. Additionally, contact with sick animals should be avoided.

Based on experience with SARS and MERS outbreaks, transmission of coronaviruses has occurred in healthcare facilities in the United States and other countries, including from patients to healthcare providers and between patients in a healthcare setting before the virus was diagnosed. The symptoms and other clinical features of coronavirus illness are non-specific, making it difficult to identify infected patients early or without testing. Infection prevention and control measures are critical to prevent the spread of coronavirus illness in healthcare facilities or other workplaces, such as airports, where infected, but undetected, people may be present. Healthcare and other at-risk workers should be educated and trained in infection prevention and control and be diligent in practicing these safety measures.

### What protective apparel is available?

The Centers for Disease Control (CDC) and World Health Organization (WHO) provide direction on infection prevention and control procedures related to SARS-CoV, MERS-CoV, and other coronaviruses. Both provide guidance to healthcare professionals for the use of personal protective equipment (PPE) for contact with patients with known or suspected cases of coronavirus infections. Both suggest the use of clean, disposable, long-sleeved gowns.

DuPont Personal Protection provides a wide range of protective garments and accessories that address a broad range of PPE needs.

<sup>1</sup> CDC Fact Sheet, "Information about Middle East Respiratory Syndrome (MERS)"

DuPont™ Tyvek®, DuPont™ Tychem®, DuPont™ ProShield® and DuPont™ ProClean® garments are available in disposable coverall, apron, and gown designs, as well as boot covers. Additionally, Tychem® gloves offer hand protection that along with a hooded coverall and attached socks can provide full body coverage.

Refer to the table on the following pages for some of the DuPont apparel options that meet the requirements of either North American or international standards for protection against viral and other biohazards.

Tychem® 2000 and other Tychem® fabrics with taped seams have been tested and have passed the requirements of ASTM Standards F1670<sup>2</sup> and ASTM F1671<sup>3</sup>, the recognized blood and viral penetration test methods in North America, respectively. ProShield® 80 also passes the requirements of both of these ASTM test standards.

During high-contact patient activities, especially cleaning, disinfecting, and decontaminating, where exposure to moderate to large volumes of bodily fluids is anticipated, a ProShield® 80 or taped seam Tychem® 2000 garment may be appropriate to reduce the risk of bodily fluid contact.

Refer to DuPont™ SafeSPEC™ for a full list of garments that have been tested and have passed the requirements of ASTM Standards F1670<sup>2</sup> and ASTM F1671<sup>3</sup>. Although certain DuPont protective garments have passed the recognized ASTM blood and viral penetration test methods in North America, they have not been tested against specific coronaviruses. Continue to consult the CDC for guidance on suitable PPE for protection from coronaviruses.

## References

Centers for Disease Control (CDC)

<https://www.cdc.gov/coronavirus/2019-ncov/index.html>

World Health Organization (WHO)

<https://www.who.int/health-topics/coronavirus>

For details, the standard test methods are available for purchase at:

ASTM F1670

<http://www.astm.org/Standards/F1670.htm>

ASTM F1671

<http://www.astm.org/Standards/F1671.htm>

AATCC TM127-2017, Water Resistance: Hydrostatic Pressure Test

<https://members.aatcc.org/store/tm127/535/>

ISO 16603:2004 Clothing for protection against contact with blood and body fluids — Determination of the resistance of protective clothing materials to penetration by blood and body fluids — Test method using synthetic blood

<https://www.iso.org/standard/32247.html>

ISO 16604:2004 Clothing for protection against contact with blood and body fluids — Determination of resistance of protective clothing materials to penetration by blood-borne pathogens — Test method using Phi-X 174 bacteriophage





<https://www.iso.org/standard/32248.html>

<sup>2</sup>ASTM F1670 – Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Synthetic Blood

<sup>3</sup>ASTM F1671 – Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Blood-borne Pathogens Using Phi-X174 Bacteriophage Penetration

DuPont options for North America		Blood & viral protection		Fluid & particle protection	Isolation
		ASTM F1670 & ASTM F1671	ISO 16603 & ISO 16604	AATCC 127	ANSI/AAMI PB70 Level 3
	<b>ProClean® 3</b> Non-hazardous liquid and dry particulate barrier protection for cleanroom applications				✓
	<b>ProShield® 70</b> Protection against non-hazardous liquid splash with excellent skid resistance	✓			
	<b>ProShield® 80</b> Lightweight and breathable garment that provides a barrier against bloodborne pathogens	✓			
	<b>Tyvek® 400</b> Protection from particulates and light liquid splash			✓	
	<b>Tyvek® 500</b> Protects against light liquid aerosols and airborne solid particles		✓		
	<b>Tyvek® 600</b> Offers chemical permeation barrier to low-concentration water-based inorganic chemicals including infective agents and bodily fluids		✓		
	<b>Tyvek® 800</b> Liquid-tight garment that protects against low-concentration, water-based, inorganic chemicals under pressure		✓		
	<b>Tychem® 2000</b> Can help reduce the risk of cross-contamination in pandemic preparedness activities when paired with masks and gloves	✓			

The selection of appropriate PPE (including respiratory, eye, head, foot, and hand protection) is the responsibility of the end user and must be made following a thorough hazard assessment of the work tasks and the environment.

DuPont options for North America	Blood & viral protection		Fluid & particle protection	Isolation
	ASTM F1670 & ASTM F1671	ISO 16603 & ISO 16604	AATCC 127	ANSI/AAMI PB70 Level 3
 <p><b>Tychem® NT420</b> Chemical splash and oil protection; designed for jobs requiring barrier protection, while keeping tactile discrimination</p>		✓		
 <p><b>Tychem® NT430</b> Lightweight with “second-skin” feel; resistant to oils, hydrocarbons, and greases; lint-free, dust-free cuff prevents dirt from entering the glove</p>		✓		
 <p><b>Tychem® NT470</b> Bisque finish allows secure handling in wet and dry conditions; unlined, with an ergonomic design to maximize comfort</p>		✓		
 <p><b>Tychem® NT480</b> Resistant to a range of solvents, animal fats, and other chemicals</p>		✓		

## Customer support—we’re here to help



### DuPont™ SafeSPEC™

Our powerful web-based tool can assist you with finding the appropriate DuPont garments for chemical, controlled environment, thermal, and mechanical hazards. The SafeSPEC™ App is also available for mobile use.

### Certified Industrial Hygienist team

A DuPont Certified Industrial Hygienist can conduct a job hazard assessment to help you determine the best DuPont garment for a specific hazard.

This information is based upon technical data that DuPont believes to be reliable. It is subject to revision as additional knowledge and experience are gained. DuPont makes no guarantee of results and assumes no obligations or liability in connection with this information. It is the user’s responsibility to determine the level of toxicity and the proper personal protective equipment needed. The information set forth herein reflects laboratory performance of fabrics, not complete garments, under controlled conditions. It is intended for information use by persons having technical skill for evaluation under their specific end-use conditions, at their own discretion and risk.



**DuPont Personal Protection**  
**Customer service 1 800 931 3456**  
**safespec.dupont.com**  
**personalprotection.dupont.com**

Anyone intending to use this information should first verify that the garment selected is suitable for the intended use. In many cases, seams and closures have shorter breakthrough times and higher permeation rates than the fabric. If fabric becomes torn, abraded or punctured, end user should discontinue use of garment to avoid compromising the barrier protection. **SINCE CONDITIONS OF USE ARE OUTSIDE OUR CONTROL, WE MAKE NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION, NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE AND ASSUME NO LIABILITY IN CONNECTION WITH ANY USE OF THIS INFORMATION.** This information is not intended as a license to operate under or a recommendation to infringe any patent, trademark or technical information of DuPont or others covering any material or its use. DuPont™, the DuPont Oval Logo, and all trademarks and service marks denoted with ™, SM or ® are owned by affiliates of DuPont de Nemours, Inc. unless otherwise noted. © 2020 DuPont. (02/20)