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 COVID-19.

Coronaviruses affect the respiratory system, typically resulting in severe acute respiratory illness displaying symptoms of fever, malaise, cough, and shortness of breath.

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 secretions through respiratory droplets, 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?

European Centre for Disease Prevention and Control (ECDC), The Centers for Disease Control (CDC), World Health Organization (WHO), ministries and other authorized institutes provide direction on infection prevention and control procedures related to SARS-CoV, MERS-CoV, and other coronaviruses. They 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. It is suggested to use 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.

DuPont™ Tyvek® and DuPont™ Tychem® garments are available in disposable coverall and apron 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 international standards for protection against viral and other biohazards.

During high-contact patient activities, especially cleaning, disinfecting, and decontaminating, where exposure to moderate to large volumes of bodily fluids is anticipated, a taped seam Tyvek® 600 Plus or Tychem® 2000 C 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 EN 14126. Although certain DuPont protective garments have passed the recognized ISO test methods, they have not been tested against specific coronaviruses. Continue to consult the ECDC for guidance on suitable PPE for protection from coronaviruses.

References

ECDC (European Centre for Disease Prevention and Control)
https://www.ecdc.europa.eu/en

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

DuPont™ SafeSPEC™
www.safespec.dupont.co.uk

DuPont options		Biohazard protection			Fluid & particle protection
		ISO 16603	ISO 16604	ISO 22610 ISO/DIS 22611 ISO 22612	
	Tyvek® 500 Xpert Protects against light liquid aerosols and airborne solid particles	✓		✓	Category III, Type 5-B and 6-B
	Tyvek® 600 Plus Offers chemical permeation barrier to low-concentration water-based inorganic chemicals including infective agents and bodily fluids	✓		✓	Category III, Type 4-B, 5-B and 6-B
	Tyvek® 800 J Liquid-tight garment that protects against low-concentration, water-based, inorganic chemicals under pressure	✓	✓	✓	Category III, Type 3-B, 4-B, 5-B and 6-B
	Tyvek® 500 Boot covers Knee-length overboot available with slip-retardant sole. Can help offer enhanced protection against light liquid aerosols and airborne solid particles, when used together with the proper body protection	✓		✓	Category III, Type PB [6-B]
	Tychem® 2000 C Can help reduce the risk of cross-contamination in pandemic preparedness activities when paired with masks and gloves	✓	✓	✓	Category III, Type 3-B, 4-B, 5-B and 6-B

ISO 16603 - Resistance to penetration by blood and body fluids using synthetic blood: The synthetic blood used for this test is a mixture of cellulose, colouring, buffer solution and stabilising agents. This is referred to as a "screening-test" and is used to predict the pressure at which the subsequent test, using bacteriophage contaminated media, can be expected to penetrate through the material.

ISO 16604 - Resistance penetration by blood-borne pathogens using a bacteriophage ("virus" penetration simulation): The "virus" test runs along the same lines as ISO 16603, the only difference being that contaminant used is a bacteriophage (Phi-X-174) instead of synthetic blood. A bacteriophage is a virus that infects and replicates within a bacterium. The bacteriophage (Phi-X-174) serves as a surrogate to simulate viruses that are pathogenic to humans. Inference for protection from other pathogens must however be assessed by experts on a case-by-case basis.

ISO 22610 - Resistance to penetration by biologically contaminated liquids (wet bacterial penetration): This standard sets out the procedure for testing a material's resistance to wet bacterial penetration. The test method involves superimposing the bacterial-contaminated donor material onto the test material and subjecting it to mechanical rubbing.

ISO/DIS 22611 - Resistance to penetration by biologically contaminated liquid aerosols: When testing the barrier effect against biologically contaminated aerosols, a bacterium solution (Staphylococcus Aureus) suspended in an aerosol is sprayed onto both an unprotected cellulosenitrate membrane and one covered with the test material (the pore size of the membrane is approx. 0.45 µm). Both membranes are subsequently analyzed to establish their bacterial load.

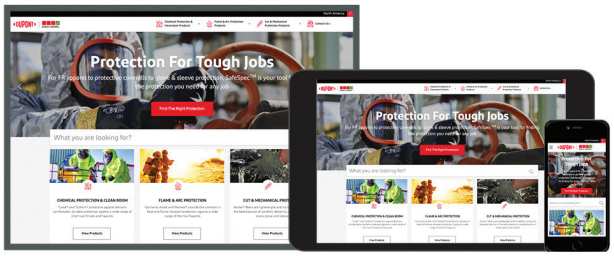
ISO 22612 - Resistance to penetration by biologically contaminated solid particles (dry microbial penetration): For the barrier test against biologically contaminated solid particles, a pre-sterilised material specimen is fixed in the test apparatus and administered with contaminated (Bacillus Subtilis) talcum powder. An agar plate is placed underneath. During the test, this test assembly is shaken. The particles which penetrate the material are analyzed after incubation of the agar plate, whereby a non-contaminated test specimen is run as a control.

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		Biohazard protection		Fluid & particle protection
		ISO 16603	ISO 16604	
	Tychem® NT420 Chemical splash and oil protection; designed for jobs requiring barrier protection, while keeping tactile discrimination	✓	✓	Category III EN ISO 374-1:2016
	Tychem® NT430 Lightweight with "second skin" feel; resistant to oils, hydrocarbons, and greases; lint-free, dust-free cuff prevents dirt from entering the glove	✓	✓	Category III EN ISO 374-1:2016
	Tychem® NT470 Bisque finish allows secure handling in wet and dry conditions; unlined, with an ergonomic design to maximize comfort	✓	✓	Category III EN ISO 374-1:2016
	Tychem® NT480 Resistant to a range of solvents, animal fats, and other chemicals	✓	✓	Category III EN ISO 374-1:2016

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.
safespec.dupont.co.uk



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