

CORONAVIRUS 2019-nCoV

Fact Sheet and Protective Clothing Guide



Coronavirus 2019-nCoV is the latest variant of a series of similar viruses under the ‘corona’ name – so-called because of its structure which gives the appearance of the corona of a star. This is the same family of virus that cause the common cold along with the SARS and MERS epidemics that previously resulted in widespread infection and multiple deaths.

This document summarises current known facts about the virus at the time of publication (January 28 2020) along with Lakeland recommendations for protective clothing for front line healthcare workers involved in the care of infected patients.

A key factor of Coronavirus 2019-nCoV is that it appears to transmit very easily – probably more easily than the previous SARS and MERS variants. It also, however, appears less dangerous with similar though less critical symptoms (the symptoms of a standard cold – fever, cough, runny nose, restricted breathing etc). It also appears less dangerous; the primary risk is to those with existing health problems or weakened immune systems and many of those infected will develop symptoms no worse than a common cold.

This, and the fact that the latest information suggests it can be transmitted during its incubation period (1 to 2 weeks), means that:

1. The current identified number of confirmed cases is likely to be much LOWER than the actual number of cases – simply because many of those infected will never present themselves at a hospital as the symptoms are relatively mild. They can however spread the disease.
2. There is a high likelihood of the virus becoming widespread and it will be very difficult to prevent this.

For these reasons cases in Europe and other parts of the world are highly likely so health services need to prepare. As a leading manufacturer of protective clothing for industrial and medical use, Lakeland are well placed to advise on selecting protective clothing.

How does it transmit?

Like any other cold virus the disease will transmit via the following:-

- Transmission in contaminated airborne droplets resulting from coughs and sneezes
- Close personal contact (this could include touching of skin as a result of shaking hands etc)
- Touching an object (such as a door handle) that has the virus on it
- Faecal contamination (rare – but obviously a possible issue in healthcare of the worst affected patients)

For more detail and updates on Coronavirus 2019-nCoV and other protective clothing issues read our blog at <https://blog.lakeland.com/europe>

Selection of protective clothing for health workers

The latest WHO essential guidelines for protection against Coronavirus can be found here:-

[https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-\(ncov\)-infection-is-suspected-20200125](https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125)

However, whilst these provide good general guidelines on management of care areas information on specific garment type recommendations is very limited. So here we provide more detailed suggestions for recommended garment choice.

Two factors for selection of protective clothing should be addressed:

1. Fabric type: will the fabric used resist penetration of the virus?
2. Will the garment design minimise the risk of penetration through seams and closures.

Fabric Choice

Choice of fabric for protective garments, whether a gown (as suggested by the WHO guidelines) or a coverall should relate to the EN standard for protection against infectious agents EN 14126. This defines four tests to assess resistance against different types of contact with contaminated mediums.

These tests and classifications are shown below:-

TEST - EN 14126		
Test Number	Description	Classifications
ISO 16604	Protection against contaminated liquids under pressure	Class 1 to 6 (6 is highest)
EN 14126: Annex A	Protection against penetration by infective agents due to mechanical contact with substances containing contaminated aerosols	Class 1 to 6 (6 is highest)
EN 22611	Penetration by contaminated liquid aerosols	Class 1 to 3 (3 is highest)
EN 22612	Penetration by contaminated solid particles	Class 1 to 3 (3 is highest)



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Fabric Choice (continued)

Given the routes of contamination the Coronavirus might take, we suggest that fabric **should at least achieve a high class in the tests ISO 16604, EN 14126: Annex A and ISO 22611.**

Of these the ISO 16604 test uses a bacteriophage to assess penetration. The bacteriophage used has a much smaller size than the Coronavirus.

Average size of bacteriophage used in ISO 16604 0.027 microns
Average size of Coronavirus 2019-nCoV 0.125 microns

Thus a high classification in the ISO 16604 test is a good indicator that a fabric is unlikely to allow the Coronavirus to penetrate, regardless of whether in a liquid, airborne aerosol or on a contaminated surface.

Garment Design Choice

Effectiveness of resistance of finished garments against penetration by liquids is defined in EN standards EN 13034 (Type 6) and EN 14605 (Types 3 and 4).

Although the latest WHO guidelines suggest that a gown with long sleeves may be sufficient, given the nature of this virus, the ease with which it transmits and the high likelihood of widespread infection we would go further and suggest in many healthcare applications a coverall may be more suitable.

Furthermore, Type 6 coveralls feature stitched seams and open zip, so a liquid or particle can easily penetrate through the holes or gaps in the teeth and backing of the zip.

Type 4 garments however require sealed seams and a sealable zip flap, minimising the likelihood of penetration. **For this reason we recommend at least a Type 4 garment construction.**

Spray cabin testing for liquid chemical protective coveralls Type 3, 4 and 6.

	Type 6 Aerosol spray	
	Type 4 'Shower' spray	
	Type 3 'Jet' spray	

The finished garment spray tests for Type 3, 4 & 6 garments provide a good indication of the level of protection offered by each.

Lakeland Fabric / Garment Choice

Thus the essential requirements for any garment selected should be:-

1. The fabric should achieve a high class in the EN 14126 tests ISO 16604, EN 14126; Annex A and ISO 22611. A high class in ISO 16604 is desirable.
2. A minimum Type 4 design, or a design featuring sealed seams and sealable zip flap.

Based on these requirements Lakeland recommends the following options:

MicroMAX® TS

Not available in North America

- Microporous film laminate achieving the highest class in all four tests in EN 14126.
- Lightweight and flexible fabric for maximum comfort.
- Sealed, stitched and taped seams and sealable zip flap.
- Lightweight and more comfortable garment for lower risk applications.



ChemMAX® 1 EB

Not available in North America

- ChemMAX® 1 variant originally developed and used widely for the Ebola relief effort in Sierra Leone.
- Barrier film achieving the highest class in all four tests in EN 14126.
- Sealed, stitched and taped seams and single sealable zip flap.
- ChemMAX® 1 might be selected for higher risk areas as the fabric is more robust than MicroMAX® TS.



ChemMAX® 1

Various coverall styles available. Contact your local Lakeland regional office for details.

- Barrier film achieving the highest class in all four tests in EN 14126.
- Sealed, stitched and taped seams.
- ChemMAX® 1 might be selected for higher risk areas as the fabric is more robust than MicroMAX® TS.



ChemMAX® 2 and 3

Contact your local Lakeland regional office for details.

- ChemMAX® 2 and 3 are Type 3 & 4 protective coveralls in the same design as ChemMAX® 1. Made with a more robust, tougher fabric; they both achieve the highest class in each of the EN 14126 tests.
- These garments may be suitable in more demanding applications and environments or where MicroMAX® TS or ChemMAX® 1 are not available.

