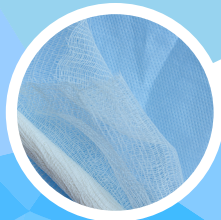




UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

DIY SOLUTIONS FOR MEDICAL PROTECTIVE CLOTHING AND MASKS



Whatever the virus, be it SARS or Novel Coronavirus Pneumonia, Medical Protective Clothing plays a vital role in reducing the spread. The quality of Medical Protective Clothing is always improving as production technology advances. This article comprehensively explains what Medical Protective Clothing is, how it is produced, and the quality requirements it should meet.



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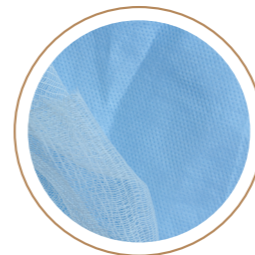
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Basic Introduction to Medical Protective Clothing

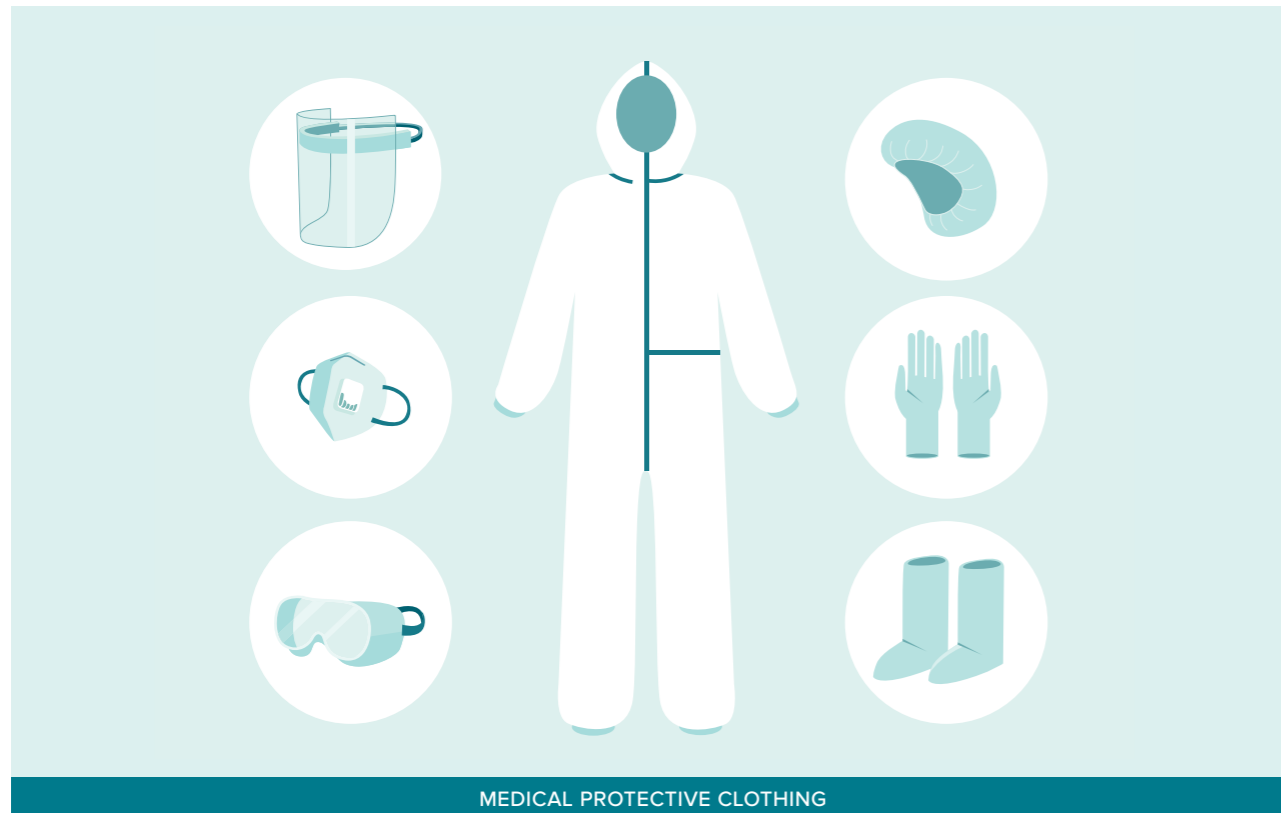
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Medical Protective Clothing: Definition and Application

Medical Protective Clothing can also be known as medical protective suits, disposable protective coveralls, or antivirus suits. These terms refer to the protective clothing used by medical personnel (doctors, nurses, public health personnel, cleaners, etc.) and people entering specific health areas (such as patients, hospital visitors, persons entering an infected area, etc.).

Medical Protective Clothing should have good moisture permeability and work as a barrier that resists the penetration of alcohol, blood, bodily fluids, air and dust particles as well as bacteria and viruses, thus providing effective protection to the wearer.






Structure and Common Categories of Medical Protective Clothing

Medical Protective Clothing comprises a combination of hats, tops and trousers. There are two kinds of Medical Protective Clothing: Isolation Gowns and Protective Clothing. Protective Clothing is more

durable with a higher protection grade and better protection performance than an Isolation Gown. The purpose and protection principles of these two types of clothing are given in the table below.

Source: <https://www.testex.com>

		
Difference	 Protective Clothing	 Isolation Gowns
Areas of use	 Refers to the clothing worn by personnel in particular areas such as medical emergency areas, infectious disease areas and electromagnetic radiation areas.	 Refers to the clothing worn by medical staff and family members, to visit patients.
Purpose of clothing	 To prevent infection of medical personnel. This is known as one-way isolation.	 To prevent infection of both the medical staff and the patient. This is known as a two-way isolation.

Production of Medical Protective Clothing



2.1	Common Raw Materials and Performance Capabilities of Medical Protective Clothing	10
2.2	Manufacture of Medical Protective Clothing	11



Common Raw Materials and Performance Capabilities of Medical Protective Clothing

The materials most commonly used in the fabrication of disposable Medical Protective Clothing are polypropylene textile adhesive fabric, new polyester fiber, polymer coated fabric, SMS nonwovens and polyethylene breath-able film/nonwoven composite. At present, most manufacturers

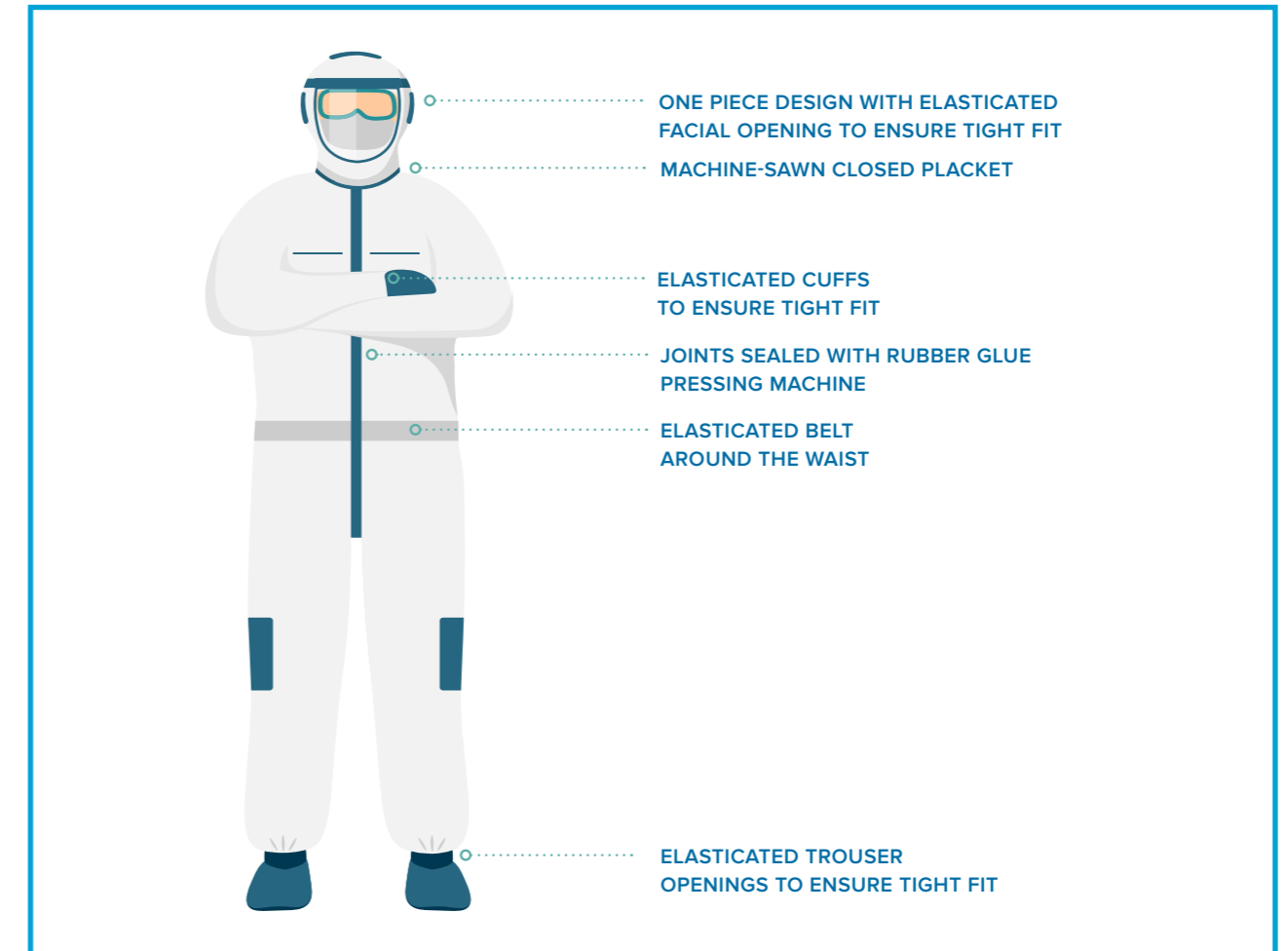
use polytetrafluoroethylene (PTFE) material to make Medical Protective clothing. PTFE is a high performance polymer, which can not only resist water pressure but can also release water vapor through micropores. The related properties of these materials are as follows:

 Protective Clothing Material	 Related Performance
Polypropylene fabric	This material can go through both antibacterial and antistatic treatments. However, the hydrostatic pressure resistance is relatively low and the virus particle blocking efficiency is poor. As such, this material can only be used as sterile disposable surgical clothing, material for disinfection bags, and other general protective articles.
New polyester fiber	This material has similar properties to traditional textiles and can receive both antistatic and antibacterial treatments. However, the hydrostatic pressure resistance is relatively low, and virus particle blocking efficiency is poor.
Polymer coated fabric	There are many kinds of coatings for protective fabrics, such as PVC, polyethylene and so on. Polymer coated fabrics provide a barrier against water and bacteria and they are also reusable. However, moisture permeability is poor, and they can be uncomfortable to wear. At the high-end of laminated fabrics is PTFE, which is not only incredibly waterproof but is also a moisture-permeable composite fabric.
SMS nonwovens	The fine fiber diameter of this material results in a soft, fleecy material which hangs well. The filter resistance is good, as is the hydrostatic pressure resistance. However, it has low strength and the wear resistance is poor.
Polyethylene breathable film	This nonwoven composite material works well in blocking the penetration of both bacteria and liquids. It has good tensile strength, good air permeability, and is comfortable to wear.

Manufacture of Medical Protective Clothing

Medical Protective Clothing usually consists of a hat, top, and trousers. The main processes required to fabricate the clothing are cutting, stitching, provision of elastic fittings to ensure tightness at the openings,

and adhesive pressing tape for sealing joints. The main pieces of equipment required to fabricate these items are the sewing machine and the glue pressing machine.



Quality Requirements for Medical Protective Clothing



3.1 What are the common quality standards?

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In response to the large number of medical workers infected while at work, the World Health Organization (WHO) has stated that appropriate protective equipment should be selected to control the spread of the highly contagious virus. In order to comply with WHO regulations, Medical Protective Clothing should block the passage of microorganisms, particulate matter and fluids, while being able to withstand disinfection treatment, be durable, wear- and tear-resistant, and puncture-proof as well as resistant to fiber strain. The fabric used for such clothing should not include any toxic ingredients and should be cost effective, comfortable, and safe.



What are the Common Quality Standards?

 Standard	 Test Content
EN 14126	Protective clothing. Performance requirements and tests methods for protective clothing against infective agents.
EN 13795	Surgical drapes, gowns, and clean-air suits, used as medical devices, for patients, clinical staff and equipment. General requirements for manufacturers, processors and products, test methods, performance requirements, and performance levels.
NFPA 1999	Standard on protective clothing and ensembles for emergency medical operations.
ISO 16603	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.
ISO 16604	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-X174 bacteriophage.

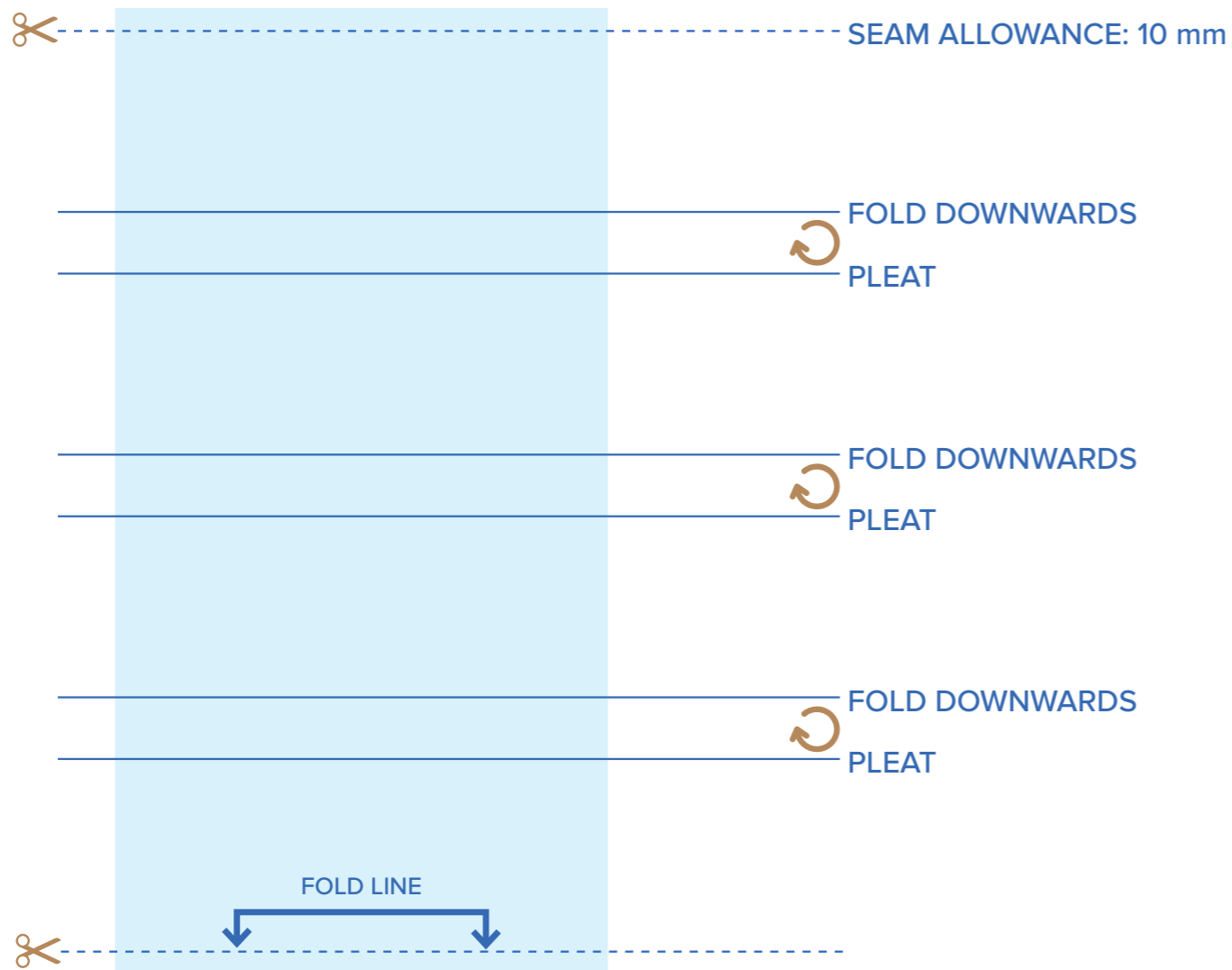
NFPA 1999: Pay attention to the overall protective performance of protective clothing, liquid barrier performance testing use over the Liquid Integrity method of ASTM F1359, and the specimen seam is required to have a certain strength and resistance to microbial penetration.

ISO 16603, ISO 16604: The performance requirements for disposable protective clothing materials are similar, and the same detection methods are adopted in the synthetic blood penetration test and microbial penetration test.

EN 13795: Pay attention to the protective performance test of disposable surgical clothing under both dry and wet conditions.

Mask Template





SIMPLE SURGICAL STYLE 3 PLEATS Face Mask, 2 Layers, Teenage/Adult Mask

Elastic: 2 X 23 cm

Fabric: Width 21 cm x Length 41 cm

NOTE: Illustrations are not to scale. Measurements given on illustrations are in mm (millimeters). 1 cm (10 mm) seam allowance is included in the measurement. Masks should be cut from one piece of fabric. To fabricate binding for the mask edges, cut two rectangles 4 cm wide and just over 2 cm longer than the side of the mask after it has been pleated.

Recommended Fabrics

Gore-Tex is both a breathable and a water repellent/waterproof fabric.

Some Micro-Fiber *Taffeta* fabrics are also breathable and water repellent/waterproof. Please check the manufacturer's guidelines. It is advisable to test the breathability of the fabrics prior to buying/cutting.

Spraying fabric with waterproofing spray is not recommended due to the close proximity of the chemicals to the respiratory system.

Inner and lining fabrics such as cotton, double gauze, and fabrics with absorbing properties are recommended. They must be sufficiently permeable to allow the wearer to breathe comfortably.

Additional layers can be added to improve protection. The outer fabric should ideally be water repellent or waterproof. The inner layer, should you choose to include one, should be a filter-like material.

Source: <https://www.shanniemakes.com>



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