

DuPont™ Tyvek® IsoClean™

Protection and Comfort in Critical Environments

DuPont™ Tyvek® delivers the best balance of protection, durability and comfort. Made using a patented flash spinning process, Tyvek® features an inherent barrier. So, unlike other protective apparel fabrics that have either a film or coating that can be easily scratched or worn away, Tyvek® provides barrier through the entire fabric.

The limited-use apparel from DuPont™ Tyvek® IsoClean™ provides an excellent barrier to dry particulates, non-hazardous liquids and microorganisms. Tyvek® IsoClean™ apparel is comfortable, lightweight and durable.

Key Benefits

- Excellent barrier to dry particulates, non-hazardous liquids and microorganisms
- Chemically and biologically inert
- Low linting
- Anti-static
- Recyclable
- Serged or bound seams with tunneled elastic options

DuPont offers state-of-the-art apparel manufacturing when sterility and cleanliness are critical. From our ISO registered facility to clean-processing, packaging and sterilization, DuPont products stand for the highest quality.

All Tyvek® IsoClean™ apparel that is clean-processed and polybagged is done so in a certified Class1/ISO Class 3 cleanroom laundry. For sterilization, each piece of apparel receives a "Certificate of Irradiation and Sterility" for full traceability.

Wide Range of Applications

Garments made of Tyvek® IsoClean™ are used in the biotech, pharmaceutical, medical packaging and electronics industries, as well as in other critical or controlled environments requiring clean or sterile apparel. With a wide range of proven, science-based solutions, DuPont products help ensure superior protection for all your business critical systems, equipment and sterile production processes.

Garment Styles to Meet Your Needs

Tyvek® IsoClean™ is available in a wide variety of garment and accessory styles, such as coveralls, frocks, lab coats, shoe and boot covers and sleeve protectors.



The miracles of science™

DuPont™ Tyvek® IsoClean™

Physical Properties, Typical

PROPERTY	UNITS	IsoCLEAN™	STANDARD
Basis Weight	oz/yd ²	1.2	ASTM D751-00
Thickness	mils	5.4	ASTM D1777-96
Particle Filtration Efficiency (≥0.5 micron)	%	99.5	IEST-RP-CC003.2
Particle Filtration Efficiency (≥5.0 micron)	%	99.5	IEST-RP-CC003.2
Tongue Tear, MD	lbf	2.2	ASTM D2261-83
Tongue Tear, CD	lbf	2.3	ASTM D2261-83
Strip Tensile, MD	lbf/in	7.9	ASTM D5035-95
Strip Tensile, CD	lbf/in	8.7	ASTM D5035-95
Mullenburst	psi	50.0	ASTM D774/D774M-97
Hydrostatic Head	in H ₂ O	40.0	AATCC 127-1998
Static—Log R (Surface Resistivity)	log ohms	<9.8	ASTM D257-99
Static Decay	sec	<0.1	NFPA 99
Flammability		Class 1	16 CFR 1610
Particle Shedding Results* (≥0.3 micron)		Class II	IEST-RP-CC003.3

INDEX OF CODES:

< = less than, > = greater than,
≥ = greater than or equal to

These results are measured using the most current industry accepted standard test methods. A true test of performance is in use.

*Helmke garment cleanliness classification based on particle emission rates for a size medium coverall.

These results are measured using the latest industry accepted test methods. Results will vary due to the changes in test methods. A true test of performance is in use. 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 obligation 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.

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.

IT IS THE RESPONSIBILITY OF THE USER TO:

Get trained in the proper use, handling, storage, maintenance, and disposal of this garment; Review and understand available information about the appropriate use of this garment; Verify that the garment is appropriate for the user's specific application; Verify that the garment meets all specified government and industry standards for user's specific application; Carefully inspect the garment for damage before and after use, including all fabric, seams and closures.

WARNINGS:

1) Tyvek® is not flame-resistant and should not be used around heat, flame, sparks or in potentially flammable or explosive environments. **2)** Garments made of Tyvek® should have slip-resistant or antislip materials on the outer surface of boots, shoe covers or other garment surfaces in conditions where slipping could occur. **3)** If fabric becomes torn, scratched, or punctured, user should immediately discontinue use of garment to avoid serious injury, including potentially deadly chemical exposure(s). Seams and closures require special care and attention because they may provide less protection from chemical exposure than the fabric during use.

SINCE CONDITIONS OF USE ARE OUTSIDE DUPONT'S CONTROL, DUPONT MAKES NO FURTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE. THE SOLE AND EXCLUSIVE REMEDY FOR ALL PURCHASERS AND/OR END USERS FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES OF ANY KIND RELATING TO OR ARISING FROM DUPONT CONTAMINATION CONTROL (DCC) GARMENTS AND ACCESSORIES, SHALL BE THE REFUND OF THE PURCHASE PRICE OR THE REPLACEMENT OR REPAIR OF ANY GARMENT OR ACCESSORY FOUND TO CONTAIN A MANUFACTURING DEFECT UPON INSPECTION BY DCC. ONLY DCC SHALL DETERMINE THE FORM OF REMEDY (REPAIR, REPLACEMENT, OR REFUND) FOR ITEMS CONTAINING A MANUFACTURING DEFECT. NO WARRANTY CLAIM SHALL BE HONORED UNLESS RECEIVED BY DCC. WITHIN 90 DAYS OF THE DATE THE GARMENT OR ACCESSORY WAS SHIPPED TO THE PURCHASER AND/OR END USER; OR FOR ALL GAS TIGHT GARMENTS — WITHIN 1 YEAR FROM THE DATE OF SHIPMENT TO THE PURCHASER AND/OR END USER. IN NO EVENT SHALL DCC BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT, PUNITIVE OR CONSEQUENTIAL DAMAGES, WHETHER ARISING FROM CONTRACT, TORT, WARRANTY, REPRESENTATION, INSTRUCTION, DESIGN OR MANUFACTURING DEFECTS, OR ANY OTHER CAUSE OR THEORY.

For more information:

visit our website at
www.PersonalProtection.DuPont.com

or call
1-800-931-3456

DuPont Contamination Control



The miracles of science™

DUPONT™ TYVEK® ISOCLEAN®

FREQUENTLY ASKED QUESTIONS

What is Tyvek®?

Tyvek® is a flashspun high-density polyethylene fabric only made by DuPont. Tyvek® fabric offers an inherent, breathable barrier that cannot easily be worn or abraded away. This inherent barrier of Tyvek® is not dependent on a thin film or a thin layer of small fibers—with Tyvek®, every part of the fabric provides barrier. This delivers an effective breathable barrier to particles due to the torturous path created by this unique fabric structure.

What class cleanrooms are Tyvek® IsoClean® garments suitable for?

Tyvek® IsoClean® garments are suitable for ISO Classes 5–8 (former Federal Standard 209E classes 100–100,000) cleanrooms, depending on the garment design and processing, as well as the needs of specific applications. Clean processed and bound seam garments offer the highest level of contamination control and should be used in more critical applications. Sterile garments are available if required. It is the end-user's responsibility to determine the appropriate garment for a given application.

How are garments for controlled environments processed and packaged?

Non-Sterile garments are available in:

- **Bulk (option code 0B or 00):** Case quantities are packed in a cardboard case with two polyethylene liners.
- **Individually Packaged (option code PI):** Garments are individually packaged in an ISO Class 5 cleanroom. The case quantity is packaged in a cardboard case with two polyethylene liners.
- **Clean-Processed (0C option):** Garments are specially processed to minimize particle shedding and individually packaged in an ISO Class 4 cleanroom. The case quantity is packaged in a cardboard case with two polyethylene liners.

Sterile Garments are available in:

- **Sterile (Option code 0S):** Garments are folded to aid aseptic donning and individually packaged. The case quantity is packaged in a cardboard case with two polyethylene liners. Some sterile items are folded and individually packaged in an ISO Class 5 cleanroom (see garment data sheet). Sterility is achieved by gamma irradiation. Irradiation dosage is validated in accordance with ISO 11137 for a sterility assurance level (SAL) of 10⁻⁶.
- **Clean-Processed and Sterile (Option code CS):** Garments are specially processed to minimize particle shedding, then folded to aid aseptic donning and individually packaged in

an ISO Class 4 cleanroom. The case quantity is packaged in a cardboard case with two polyethylene liners. Sterility is achieved by gamma irradiation. Irradiation dosage is validated in accordance with ISO 11137 for a sterility assurance level (SAL) of 10⁻⁶.

What is the expiration date of sterile garments?

Sterile items are generally considered to remain sterile as long as the package integrity has not been compromised (no breach of package or seals). Aging studies indicate that Tyvek® IsoClean® garments have a sterility expiration date of at least 5 years when stored in original packaging under proper storage conditions. For sterile Tyvek® IsoClean® production lots that do not show an expiration date on the case or bag label, the product expiration date can be calculated as 5 years from the Product Release Date on the Certificate of Sterility. DuPont suggests that non-sterile Tyvek® IsoClean® garments be used within 5 years of receipt.

Are certificates of sterility available for Tyvek® IsoClean® garments?

A certificate of sterility is provided with each case of sterile garments. Copies of certificates of sterility are available at www.safespeccleanroom.dupont.com.

Why do Tyvek® IsoClean® garments have an odor after gamma sterilization?

Tyvek® IsoClean® garments that have been sterilized using gamma radiation will sometimes exhibit an odor, particularly when the packaging is first opened. This odor is expected and very normal.

Are Tyvek® IsoClean® garments anti-static or static dissipative?

The fabric used to make Tyvek® IsoClean® garments is treated with a topical antistatic agent to help minimize static buildup and reduce nuisance garment cling. The topical antistat is water soluble, so antistatic performance is reduced in clean-processed garments. Sterilization may also impact anti-static performance.

In situations where static dissipation level is a critical performance property, end-users should evaluate the performance of their entire ensemble, as worn, including outer garments, inner garments, footwear and other personal protective equipment (PPE). In order for any garment system to be static dissipative, it must be able to drain a charge buildup through proper grounding devices, such as, but not limited to, workstation grounding clips or static-dissipative floors.

Under certain conditions, such as cold and dry weather, it is possible that garments might build and discharge static electricity. Discharges are not normally dangerous except in situations where the generation of an electrical spark could ignite a flammable atmosphere or startle the wearer. When operating around flammable chemicals, take steps to eliminate potential static discharges. In these situations, suggested steps include, but are not limited to, water spray, the use of an overcover, raising humidity level of the work area, use of a commercial anti-static application coating, grounding straps on equipment and personnel, inherently static-dissipating under- and over-garments, and testing of the worker's static dissipation before entry into the classified area.

However, in the case of explosive or flammable atmospheres, even if steps are taken to manage static formation and dissipate static charge, the risk of severe injury remains if an uncontrolled or accidental ignition occurs. Do not wear Tyvek® protective garments in potentially flammable or explosive atmospheres. Do not knowingly enter an environment in which the concentration of flammable gas is within flammable or explosive limits while wearing a Tyvek® garment. If you determine that you are in a potentially flammable or explosive environment, retreat immediately.

How should Tyvek® IsoClean® garments be stored?

Store Tyvek® IsoClean® garments in a cool, dark, dry location free of dirt and insects. Sunlight, ozone, high temperatures (>120 °F; 49 °C), vehicle exhaust fumes, compression under heavy weights, and sharp edges or projections are some conditions known to degrade the materials in these garments. These factors should be considered when evaluating the long term life of storage of Tyvek® and Tyvek® IsoClean® garments.

Are Tyvek® IsoClean® garments offered in any other colors than traditional white?

Currently DuPont offers the Tyvek® IsoClean® brand of cleanroom garments only in white. Tyvek® Micro-Clean® 2-1-2 is offered in blue.

At what temperatures would Tyvek® melt?

Tyvek® fabric melts at 275 °F (135 °C). Tyvek® and Tyvek® IsoClean® garments are not flame resistant or flame retardant. Garments should not be used around heat, flame, sparks, or in potentially flammable or explosive environments.

Are Tyvek® IsoClean® garments water repellent?

Tyvek® IsoClean® brand garments offer limited splash protection, resist water penetration, are nonabsorbent, and have equal strength wet or dry. Tyvek® IsoClean® garments are not recommended for protection from liquid hazardous chemicals; if protection from liquid hazardous chemicals is needed, consider the DuPont™ Tychem® products available at www.safespec.dupont.com.

How can Tyvek® garments be disposed of?

Tyvek® garments, if not contaminated, may be landfilled or incinerated in accordance with local regulations. Uncontaminated chemical protective garments may be incinerated in a facility that is capable of handling mixtures containing plastics. Likewise, an uncontaminated chemical protective garment may be buried in a facility that accepts plastic materials.

Contaminated garments that cannot be handled safely without protective equipment must be disposed of with other hazardous wastes, either through incineration or landfill, per local regulations.

Can garments made of Tyvek® be recycled?

Yes, non-contaminated garments used in cleanroom operations can be recycled for non-hazardous applications. Contact DuPont Protective Apparel Customer Service at **1-800-931-3456** for information on the **Tyvek® Garment Recycling Program**.

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 obligation or liability in connection with this information. It is the user's responsibility to determine the nature and level of hazards 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. 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 penetration rates than the fabric. Please contact DuPont for specific data. These garments are intended for limited use and should be disposed of after single use. If fabric becomes torn, abraded or punctured, or if seams or closures fail, or if attached gloves, visors, etc. are damaged, end user should discontinue use of garment to avoid potential exposure.

Copyright © 2014 DuPont. The DuPont Oval Logo, DuPont®, The miracles of science™, IsoClean®, Micro-Clean®, SafeSPEC™, and Tyvek® are registered trademarks or trademarks of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

K-24358-1 (06/14)

DuPont Personal Protection

Customer Service:

United States 1-800-931-3456

Canada 1-800-387-9326



DuPont™ SafeSPEC™ 2.0

www.SafespecCleanroom.DuPont.com



The miracles of science™

LUV MEDICAL

Controlled Environment | Cleanroom | Laboratory

We offer a wide range of products to meet your laboratory and critical environment needs. Through our strategic partnerships with various manufacturers, LuvMedical offers a comprehensive selection of laboratory and critical environment products, and make them available through an expansive nationwide distribution network.

Contact Us: (888) 856-2681 or visit our **Website:** www.LuvMedical.com