DUPONT™ TYVEK® ISOCLEAN®

TECHNICAL DATA SHEET

CAT I

Option MS

ISO-11137



PRODUCT INFORMATION

DuPont™ Tyvek® IsoClean® bouffant, model IC 729 S WH MS. Clean-processed and gamma-sterilized. Elastic headband. White.

ATTRIBUTES

Full Part Number	IC729SWHMS
Fabric /Materials	Tyvek® IsoClean® DS-MS
Design	Bouffant with elastic headband
Seam	Stitched
Color	White
Sizes	0
Quantity /Box	250 per box, individually packed. Subgrouped by 50 in an outer bag. 2 polyethylene liners. Cardboard box.

FEATURES

DuPont™ Tyvek® IsoClean® bouffant, IC 729 S WH MS. Available in white and in one size. Clean-processed and gamma-sterilized. Elastic headband.
Tyvek® IsoClean® delivers an ideal balance of protection, durability and comfort. Made of high density polyethylene using a patented flash spinning process Tyvek® IsoClean® provides an inherent barrier to particles, microorganisms and non-hazardous light liquid splash.
Tyvek® IsoClean® (option codes DS and MS) garments and accessories have been clean-processed to maximize cleanliness and have been sterilized by gamma- irradiation. They are folded to aid aseptic donning and packaged in an ISO class 4 cleanroom. All DuPont™ Tyvek® IsoClean® clean-processed and sterile accessories (option code MS) are packed in a dual barrier packaging system, consisting of an inner and outer easy tear cleanroom bag. The packaging system serves a key element for contamination risk reduction when transferring apparel into clean areas. The accessories are individually packed and grouped together in an outer bag.
Garments and accessories made of Tyvek® IsoClean® are typically used in cleanrooms within the biotech, pharmaceutical, medical device manufacturing, food processing, cosmetics industry as well as in other critical or controlled environments.

- Clean-processed and sterilised by gamma-irradiation to SAL of 10^{-6} (ISO 11137-1)
- Full traceability on all sterilized apparel with certificates of sterility available
- Suitable for use in GMP class A/B (ISO Class 5) clean rooms*
- PPE Category I

PHYSICAL PROPERTIES

Data relating to mechanical performance of the fabrics used in DuPont chemical protective clothing, listed for the selected garment according to the test methods and relevant European standard, if applicable. Such properties, including abrasion and flex-cracking resistance, tensile strength and puncture resistance can help in the assessment of protective performance.

PROPERTY	TEST METHOD	TYPICAL RESULT	EN
Abrasion Resistance [7]	EN 530 Method 2	>10 cycles	N/A
Basis Weight	DIN EN ISO 536	45 g/m^2	N/A
Flex Cracking Resistance [7]	EN ISO 7854 Method B	>100000 cycles	N/A
Puncture Resistance	EN 863	>5 N	N/A
Resistance to water penetration	DIN EN 20811	8 kPa	N/A
Tensile Strength (MD)	DIN EN ISO 13934-1	>30 N	N/A
Tensile Strength (XD)	DIN EN ISO 13934-1	>30 N	N/A

PROPERTY	TEST METHOD	TYPICAL RESULT	EN
Trapezoidal Tear Resistance (MD)	EN ISO 9073-4	>10 N	N/A
Trapezoidal Tear Resistance (XD)	EN ISO 9073-4	>10 N	N/A

1 According to EN 14325 | 2 According to EN 14126 | 3 According to EN 1073-2 | 4 According to EN 14116 | 12 According to EN 11612 | 5 Front Tyvek ® / Back | 6 Based on test according to ASTM D-572 | 7 See Instructions for Use for further information, limitations and warnings | > Larger than | < Smaller than | N/A Not Applicable | STD DEV Standard Deviation |

GARMENT PERFORMANCE



Information relating to the protective performance of a garment according to European standards where applicable. Includes important characteristics such as protection against radioactive contamination, seam strength and shelf life. Inward leakage and resistance to penetration by liquids, according to the relevant Type classification, are also detailed.

PROPERTY	TEST METHOD	TYPICAL RESULT	EN
Seam Strength	EN ISO 13935-2	>30 N	N/A

1 According to EN 14325 | 3 According to EN 1073-2 | 12 According to EN 11612 | 13 According to EN 11611 | 5 Front Tyvek ® / Back | 6 Based on test according to ASTM D-572 | 7 See Instructions for Use for further information, limitations and warnings | 11 Based on the average of 10 suits, 3 activities, 3 probes | > Larger than | < Smaller than | N/A Not Applicable | * Based on lowest single value |

COMFORT



The comfort of a protective garment during use is largely determined by its weight, its permeability to vapour and air (breathability) and insulating properties. Data on these attributes is provided according to test method and, as with other data, can be compared by garment.

PROPERTY	TEST METHOD	TYPICAL RESULT	EN
Air Permeability (Gurley method)	ISO 5636-5	10 s	N/A

2 According to EN 14126 | 5 Front Tyvek ® / Back | > Larger than | < Smaller than | N/A Not Applicable |

PENETRATION AND REPELLENCY



A specific test method, EN ISO 6530, is used to measure the indexes of penetration, absorption and repellency of protective clothing material exposed to liquid chemicals. Results listed here reflect the penetration resistance and repellency of DuPont fabrics to 30% sulphuric acid and 10% sodium hydroxide.

PROPERTY	TEST METHOD	TYPICAL RESULT	EN
Repellency to Liquids, Sodium Hydroxide (10%)	EN ISO 6530	>90 %	N/A
Repellency to Liquids, Sulphuric Acid (30%)	EN ISO 6530	>95 %	N/A
Resistance to Penetration by Liquids, Sodium Hydroxide (10%)	EN ISO 6530	<5 %	N/A
Resistance to Penetration by Liquids, Sulphuric Acid (30%)	EN ISO 6530	<1 %	N/A

1 According to EN 14325 | > Larger than | < Smaller than |

BIOLOGICAL BARRIER



Detailed information on the protective performance (resistance to penetration) of DuPont clothing when exposed to biologically contaminated aerosols, liquids and dusts as well as blood, body fluids and blood-borne pathogens. Sorted by relevant European standard.

PROPERTY	TEST METHOD	TYPICAL RESULT	EN
Resistance to Penetration by Biologically Contaminated Aerosols	ISO/DIS 22611	Pass	N/A
Resistance to Penetration by Blood and Body Fluids using Synthetic Blood	ISO 16603	1.75 kPa	N/A
Resistance to Penetration by Blood-borne Pathogens using Bacteriophage Phi-X174	ISO 16604 Procedure C	No classification	N/A
Resistance to Penetration by Contaminated Liquids	EN ISO 22610	< 15 min	N/A
Resistance to Penetration by Contaminated Solid Particles	ISO 22612	Pass	N/A

1 According to EN 14325 | > Larger than | < Smaller than |

CLEANLINESS



Particle Shedding (Helmke Drum) and Bacterial Filtration Efficiency Data

PROPERTY	TEST METHOD	TYPICAL RESULT	EN
Bacterial Filtration Efficiency (3 µm)	ASTM F2101	98.4 % ± 0.9 % STD DEV	N/A
Particle Shedding (Helmke Drum)	IEST-RP-CC003.4	Category I	N/A

5 Front Tyvek ® / Back | > Larger than | < Smaller than | N/A Not Applicable | STD DEV Standard Deviation |

PERMEATION DATA FOR DUPONT™ TYVEK® ISOCLEAN®



Permeation is the process by which a solid, liquid or gaseouses chemical moves through a protective clothing fabric at a molecular level. Permeation data assist in the selection of the most appropriate protective garment for a particular application and in the estimation of how long it can be safely worn. Standardised test methods are used to determine the resistance of DuPont materials to permeation, the results of which can be selected according to a specific chemical, chemical class or fabric.

HAZARD / CHEMICAL NAME	PHYSICAL STATE	CAS	BT ACT	BT 0.1	BT 1.0	EN	SSPR	MDPR	CUM 480	TIME 150	ISO
Carboplatin (10 mg/ml)	Liquid	41575-94-4	nm	>240	>240	5	<0.01	0.005			
Carmustine (3.3 mg/ml, 10 % Ethanol)	Liquid	154-93-8	nm	imm	>10	1	na	0.005			
Cisplatin (1 mg/ml)	Liquid	15663-27-1	nm	>240	>240	5	<0.01	0.005			
Cyclo phosphamide (20 mg/ml)	Liquid	50-18-0	nm	imm	imm		na	0.005			
Doxorubicin HCl (2 mg/ml)	Liquid	25136-40-9	nm	>10	>240	5	na	0.005			
Etoposide (Toposar®, Teva) (20 mg/ml, 33.2 % (v/v) Ethanol)	Liquid	33419-42-0	nm	imm	imm		na	0.005			
Fluorouracil, 5- (50 mg/ml)	Liquid	51-21-8	nm	imm	>30	2	na	0.005			
Ganciclovir (3 mg/ml)	Liquid	82410-32-0	nm	>240	>240	5	<0.01	0.005			
Gemcitabine (38 mg/ml)	Liquid	95058-81-4	nm	>60	>240	5	na	0.005			
Ifosfamide (50 mg/ml)	Liquid	3778-73-2	nm	imm	imm		na	0.005			
Irinotecan (20 mg/ml)	Liquid	100286-90-6	nm	>120	>120	4	na	0.005			

HAZARD / CHEMICAL NAME	PHYSICAL STATE	CAS	BT ACT	BT 0.1	BT 1.0	EN	SSPR	MDPR	CUM 480	TIME 150	ISO
Methotrexate (25 mg/ml, 0.1 N NaOH)	Liquid	59-05-2	nm	>240	>240	5	<0.01	0.005			
Mitomycin (0.5 mg/ml)	Liquid	50-07-7	nm	>240	>240	5	<0.01	0.005			
Oxaliplatin (5 mg/ml)	Liquid	63121-00-6	nm	imm	imm		na	0.005			
Paclitaxel (Hospira) (6 mg /ml, 49.7 % (v/v) Ethanol)	Liquid	33069-62-4	nm	imm	imm		na	0.005			
Thiotepa (10 mg/ml)	Liquid	52-24-4	nm	imm	imm		na	0.005			
Vincristine sulfate (1 mg /ml)	Liquid	2068-78-2	nm	>240	>240	5	<0.01	0.005			
Vinorelbine (0.1 mg/ml)	Liquid	71486-22-1	nm	>240	>240	5	na	0.005			

BTAct (Actual) Breakthrough time at MDPR [mins] | BT0.1 Normalized breakthrough time at 0.1 µg/cm²/min [mins] |

BT1.0 Normalized breakthrough time at 1.0 µg/cm²/min [mins] | EN Classification according to EN 14325 | SSPR Steady state permeation rate [µg/cm²/min] |

MDPR Minimum detectable permeation rate [µg/cm²/min] | CUM480 Cumulative permeation mass after 480 mins [µg/cm²] |

Time150 Time to reach cumulative permeation mass of 150 µg/cm² [mins] | ISO Classification according to ISO 16602 |

CAS Chemical abstracts service registry number | min Minute | > Larger than | < Smaller than | imm Immediate (< 10 min) | nm Not tested |

sat Saturated solution | N/A Not Applicable | na Not attained | GPR grade General purpose reagent grade | * Based on lowest single value |

8 Actual breakthrough time; normalized breakthrough time is not available | DOT5 Degradation after 5 min | DOT30 Degradation after 30 min |

DOT60 Degradation after 60 min | DOT240 Degradation after 240 min | BT1383 Normalized breakthrough time at 0.1 µg/cm²/min [mins] acc. ASTM F1383 |

Important Note

The permeation data published have been generated for DuPont by independent accredited testing laboratories according to the test method applicable at tha time (EN ISO 6529 (method A and B), ASTM F739, ASTM F1383, ASTM D6978, EN369, EN 374-3) The data is typically the average of three fabrics samples tested. All chemicals have been tested at an assay of greater than 95 (w/w) % unless otherwise stated. The tests were performed between 20 °C and 27 °C and at environmental pressure unless otherwise stated. A different temperature may have significant influence on the breakthrough time. Permeation typically increases with temperature. Cumulative permeation data have been measured or have been calculated based on minimum detectable permeation rate. Cytostatic drugs testing has been performed at a test temperature of 27°C according to ASTM D6978 or ISO 6529 with the additional requirement of reporting a normalized breakthrough time at 0.01 µg/cm²/min. Chemical warfare agents (Lewisite, Sarin, Soman, Mustard, Tabun and VX Nerve Agent) have been tested according to MIL-STD-282 at 22°C or according to FINABEL 0.7 at 37°C. Permeation data for Tyvek® is applicable to white Tyvek® 500 and Tyvek® 600 only and i not applicable for other Tyvek® styles or colours. Permeation data are usually measured for single chemicals. The permeation characteristics of mixtures can often deviate considerably from the behaviour of the individual chemicals. The permeation data for gloves published have been generated according to ASTM F739 and to ASTM F1383. The degradation data for gloves published have been generated based on a gravimetric method. This degradation testing exposes one side of the glove material to the test chemical for four hours. The percent weight change after exposure is measured at four time intervals: 5, 30, 60 and 240 minutes.

The information provided herein corresponds to our knowledge on the subject at the date of its publication. This information may be subject to revision as new knowledge and experience becomes available. The data provided fall within the normal range of product properties and relate only to the specific material designated; these data may not be valid for such material used in combination with any other materials or additives or in any process, unless expressly indicate otherwise. The data provided should not be used to establish specification limits or used alone as the basis of design; they are not intended to substitute for any testing you may need to conduct to determine for yourself the suitability of a specific material for your particular purposes. Since DuPont cannot anticipate all variations in actual end-use conditions DuPont makes no warranties and assumes no liability in connection with any use of this information. Nothing in this publication is to be considered as a license to operate under or a recommendation to infringe any patent rights.

Degradation Ratings:

- E: EXCELLENT (0-10% Weight Change)
- G: GOOD (11-20% Weight Change)
- F: FAIR (21-30% Weight Change)
- P: POOR (31-50% Weight Change)
- NR: NOT RECOMMENDED (Above 50% Weight Change)
- NT: NOT TESTED

Degradation is the physical change in a material after chemical exposure. Typical observable effects may be swelling, wrinkling, deterioration, or delamination. Strength loss may also occur.

Please use the permeation data provided as a part of the risk assessment to assist with the selection of a protective fabric, garment, glove or accessory suitable for your application. Breakthrough time is not the same as safe wear time. Breakthrough times are indicative of the barrier performance, but results can vary between the test methods and laboratories. Breakthrough time alone is insufficient to determine how long a garment may be worn once the garment has been contaminated. Safe user wear time may be longer orshorter than the breakthrough time depending on the permeation behaviour of the substance, the toxicity of the substance, working conditions and the exposure conditions (e.g. temperature, pressure, concentration, physical state).

Latest Update Permeation Data: 10/24/2022

WARNING

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The intended use for Tyvek® IsoClean Accessories, that are not CE certified or certified as PPE Category I, does not include applications that may cause very serious consequences such as irreversible damage to health or death. The user should make the risk assessment to determine the protection required.

DuPont™ SafeSPEC™ - We're here to help

Our powerful web-based tool can assist you with finding the appropriate DuPont garments for chemical, controlled environment, thermal and mechanical hazards.



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