Valutek Launderable Garment Set
Polyester Coveralls

NanoTek
ISO 3-4 (Class 1-10)

Part Number: VTEPCVRL

Valutek's launderable polyester coveralls are designed for use in a wide range of controlled environments with varying cleanliness and static requirements.

Constructed from **NanoTek 2.5 fabric**, a blend of **94% polyester** and **6% carbon**, the 2.5x2.5 grid pattern is designed for the most critical ESD requirements. The polyester material's weave, seam design, and stitch count effectively encapsulate operator-generated particles, and the fabric is tested for filtration efficiency and particle release.

All Valutek launderable garments are manufactured **without PFAS** chemical treatments, which are commonly used to enhance stain and liquid resistance in cleanroom garments. Valutek garments undergo independent "target analysis" testing for PFAS chemicals according to US EPA Method 1633. Test data and certificates are available upon request.

This coverall is compatible with Valutek's launderable hood (**Part Number: VTEPHOOD**) and boot cover (**Part Number: VTEPBTCV**) for a complete washable garment set.

All Valutek garments are manufactured in ISO-certified facilities, under Valutek's strict process control to meet quality standards and product specifications.

Features

- **NanoTek 2.5 Fabric:** 94% polyester filament yarn, 6% conductive yarn
- **No PFAS Added:** For operator safety; compliant with thresholds outlined in US EPA Method 1633.
- **Size Range:** Sizes XS-3X; other sizes available by special order
- **Secure Fastening:** Zipper and snaps, compatible with Valutek hood and boots
- **Cleanroom Compatibility:** Suitable for use in ISO 4 to ISO 8 environments
- **Washing Standards:** Meets IEST Helmke Drum specifications for Category 1 garments when properly washed

Application

As part of the **Valutek NanoTek** product family, these launderable coveralls are recommended for stringent cleanroom or controlled environments across many life science and advanced material applications.

When properly washed and packaged, the garment is suitable for the most critical cleanroom environments that require high levels of particle cleanliness and static control.

Packaging

- 1 ea/bag, 25 bags/case, 25 ea/case.
- Flat packed with a carton liner.
- Critical environment compatible.
- Part numbered and lot number traceable.

Please Note:

- **All garments require initial laundry before first use.**
- Proper washing techniques are vital to ISO cleanroom environment compatibility. Please consult a specialty cleanroom laundry provider for confirmation on washing protocols.

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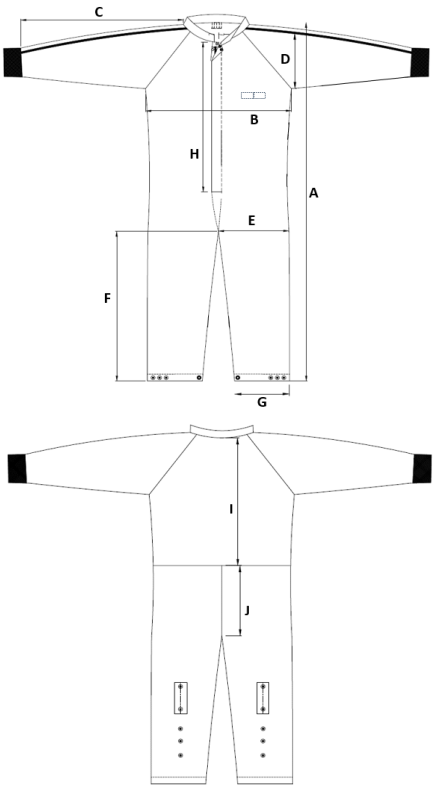
VTEPCVRL Sizes & Measurements (cm)

Part Number	Size	Total Length (A)	Chest Width (B)	Total Length (C)	Sleeve Width (D)	Hip Width (E)	Leg Inseam (F)	Ankle Opening (G)	Zipper Length (H)	Torso (I)	Crotch to Torso (J)
VTEPCVRL-XS	XS	150	102	83	23	78	70	27	58	27	44
VTEPCVRL-SM	SM	155	112	84	25	81	72	27	61	27	45
VTEPCVRL-MD	MD	160	122	85	27	84	74	28	64	28	46
VTEPCVRL-LG	LG	165	132	86	29	87	76	28	67	28	47
VTEPCVRL-XL	XL	170	142	87	31	90	78	30	70	30	48
VTEPCVRL-2XL	2XL	175	152	88	33	93	80	31	73	31	49
VTEPCVRL-3XL	3XL	180	162	89	35	96	82	31	76	31	50

Physical Properties

Physical Properties	Parameters	Test Method
Composition	94% Polyester filament yarn and 6% Conductive yarn	ASTM-D-629
Basis Weight	109 ± 3 g/m^2	ASTM-D-629
Conducttive Grid With	2.5 mm x 2.5 mm	ASTM-D-629
Thickness	0.17 ± 0.02 mm	ASTM-D-629
Cuff Material	95% Polyester yarn and 5% Conductive yarn	ASTM-D-629
Cuff Fiber Thickness	Single layer 0.1 mm ± 0.03 mm	ASTM-D-629
Yarn	100D	-
Friction Voltage	< 100V	SJT10694-2006
Surface Resisstance	10^5 ~ 10^9 ohm	ANSI/ESD - STM2.1-2018
Ground Resisstance	10^5 ~ 10^9 ohm	ANSI/ESD - STM2.1-2018
Breaking Strength		
	Warp > 490 N Zonal > 390 N	GB3923
Snap Button Composition	65% Copper and 35% Zinc	-



Cleanliness Characteristics

Parameter	Test Method	U/M	Limit
Particles (Airborne) ≥0.3µm	IEST-RP-CC003.4 (Helmke Drum)	particles/min	< 1700< 1700
Particles (Airborne) ≥0.5µm	IEST-RP-CC003.4 (Helmke Drum)	particles/min	< 1000< 1000
Particle Filtration Efficiency >0.5 µm	IEST-RP-CC003.4	% retention	> 25
Particle Filtration Efficiency >5.0 µm	EST-RP-CC003.4	% retention	> 85

* Cleanliness specifications are based on proper garment laundering according to defined **IEST Recommended Practice (RP-CC-003.4)**. Particle counts and particle filtration efficiency are subject to proper washing techniques to remove particles and maintain fabric integrity.

* **Note:** Technical data listed reflects upper/lower limits. Certificates of Analysis available upon request for actual lot-to-lot test data. 36 month lot trend analysis available upon request.

APPENDIX: LAUNDRY REQUIREMENTS

Part Numbers: VTEPCVRL, VTEPHOOD and VTEPBTCV

*Cleanroom Coverall, Hood and Boot washing and drying requirements per **IEST-RP-CC003.4, section 6.1.10** (Laundering Procedures).*

Washing Requirements:*

- **Water Quality:** Use deionized (DI) water with a resistivity of at least 18 megaohms (MΩ) to prevent contamination and ensure thorough cleaning. Water should be filtrated to at least 0.2-microm (µm).
- **Detergent:** Use a mild, non-ionic, low-suds, and non-residue foaming detergent to avoid leaving residues that could interfere with the cleanroom environment. Improper detergent may lead to contamination and fabric degradation.
- **Load Capacity:** Do not exceed 80% of the washing machine's load capacity. Overloading can lead to inadequate cleaning and increased wear on the garments. Washing at a capacity of 30% to 50% reduces physical stress on the fabric and extends its lifespan.
- **Washing Temperature:** Maintain water temperature between 30°C and 60°C (90°F to 140°F). This range effectively removes contaminants while protecting the integrity of the garment fabric.
- **Washing Cycle Duration:** Ensure that each wash cycle includes sufficient rinsing stages to remove all traces of detergent and contaminants. The exact duration may vary based on garment type and contamination level, but a typical wash cycle should last at least 20 minutes and include multiple rinsing stages.

***all garments require initial laundry before first use**

Drying Requirements:

- **Drying Temperature:** Dry garments at a temperature below 60°C (140°F) to prevent fabric damage and maintain the integrity of ESD properties. A heat control module must be used to ensure temperatures do not exceed this limit. Depending on the heat source (steam, gas, or electric), effective heat control is essential to avoid premature fabric degradation.
- **Drying Method:** Use a cleanroom-compatible dryer to prevent the reintroduction of contaminants during the drying process. The dryer should be equipped with HEPA filters to capture particles effectively.
- **Drying Duration:** The drying duration should be adequate to remove all moisture from the garments without overheating. This will vary based on the fabric type, thickness, and load size. After tumble drying at a moderate temperature, the cycle should gradually cool to prevent fabric shock.

General Requirements:

- **Inspection:** After washing and drying, inspect garments for signs of damage, wear, or residual contamination. Packaging should occur in a controlled environment that meets cleanroom facility requirements.
- **Documentation:** Maintain detailed records of the washing and drying cycles, including parameters such as water quality, detergent type, temperature settings, and duration. This ensures traceability and compliance with the necessary cleanroom class standards.

By adhering to these requirements, cleanroom operators can ensure that garments effectively control contamination, ESD, and protect cleanroom environments for up to 100 wash cycles. Failure to follow these guidelines may result in premature material degradation and a significantly reduced lifecycle.