

▶ Disposable garments & Personal Protective Equipment





Chapter 2

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Disposable and reusable protective goggles can be found in Part 1, Chapter 1.4!





Definition of disposable cleanroom garments

Disposable garments are often used as supplements to reusable cleanroom garments. Both serve as product protection and as personal protective equipment.

Attention should be paid that disposable garments do not become additional particle sources. Meaningful application, e.g. with reusable garments, can achieve a contamination reduction.

A comparative study of disposable garments vs. reusable garments showed very interesting differences on the subject of "self-contamination" (see Chapter 2.6).

Depending on the requirements, different designs and properties have to be considered, for example antistatic behaviour, tear resistance, protection against toxic substances etc.

Due to application-specific requirements in the cleanroom world, the topic of "personal protection/personal protective equipment in the cleanroom" has become one of the focal points, in addition to product protection. Both aspects should complement each other in a meaningful way.

Due to the lack of unified standards or norms which could be used to designate a disposable article e.g. as Class ISO 5 compliant, the following Internet pages should help you to find the right item for your individual requirements.

We will be happy to advise you on your selection and will also provide you with samples for testing purposes.

Disposable garments



Head protection

- ▶ non-woven hoods/
bouffant caps
- ▶ full protective hoods

Face protection

- ▶ protective goggles
- ▶ face masks
- ▶ beard cover masks

Body protection

- ▶ coveralls / overalls
- ▶ lab coats
- ▶ jacket / trousers combination
- ▶ aprons / sleeve protectors
- ▶ gloves

Feet protection

- ▶ overboots
- ▶ overshoes
- ▶ anti-slip versions
- ▶ antistatic versions
- ▶ socks





Acrylic dispenser system with 4 compartments
Art. No. 28090

Necessary basic requirements for cleanroom compatible disposable garments depending on the respective application:

- ▶ particle retention capacity and barrier properties
- ▶ sterility on demand
- ▶ antistatic finish with lowest possible particle emission
- ▶ cleanliness at delivery and cleanroom suitable packaging (polybag)
- ▶ article is latex-free
- ▶ current documentation, model specifications, technical data sheet for the used materials, sterility/irradiation certificate
- ▶ permeation measurements in the case of natural and synthetic substances
- ▶ (EU) PPE Regulation, if required
- ▶ for safety goggles:
 - coatings (anti-fog and /or scratch resistance)
 - tested number of autoclave cycles
 - no visual impairment



For suitable dispenser systems,
see chapter 11.

Disposable hoods and caps



Full protective hood with shoulder cover
Art. No. 4055001



MediCap AstroEco (astro hood)
Art. No. 4053100



Disposable non-woven bouffant cap
Art. No. 40500



DISPOSABLE GARMENTS & PPE

| Description | sterile | Size | Colour | PU | Art. No. |
|--|---------|---|--------|--|----------|
| Disposable bouffant cap non-woven fabric, stacked flat-packed, (type bouffant cap) | no | S (approx. 46 cm/18") M (approx. 54 cm/21") L (approx. 60 cm/24") | ○ ● ● | 1,000 pieces 10 PE bags of 100 pieces | 40500 |
| Full protective hood with shoulder cover non-woven fabric, antistatic treated | no | universal | ○ | 1,000 pieces 20 PE bags of 50 pieces | 4055001 |
| MediCap AstroEco Astro hood, with straps, front sweatstrip | no | universal | ● | 1,000 pieces 10 PE bags of 100 pieces | 4053100 |
| Full protective hood Kimtech™ A5 decontaminated, gamma irradiated | yes | universal | ○ | 100 pieces individually packed in PE bag | 4055002S |
| Full protective hood with integrated face mask Kimtech™ A5 decontaminated, gamma irradiated | yes | universal | ○ | 75 pieces individually packed in PE bag | 4055202S |
| Disposable bouffant cap Tyvek® IsoClean® (IC729SWHMS), processed under cleanroom conditions, gamma sterilised | yes | universal | ○ | 250 pieces individually packed in PE bag | 40500201 |
| Full protective hood Tyvek® IsoClean® (IC668B Option MS), with shoulder cover, decontaminated, gamma sterilised | yes | universal | ○ | 100 pieces individually packed in PE bag | 40520-S |

○ white ◌ transparent ● blue ● green

PU = purchase unit

Disposable face masks



Quite often 18 cm wide face masks are too small and do not cover the complete face area on the sides!

► CONCLUSION

The fit influences the wearing comfort as well as its effectiveness. Therefore, coordinate your face mask with the rest of your garment concept, especially with the hood!

Disposable face mask to tie

Overview of different face mask materials

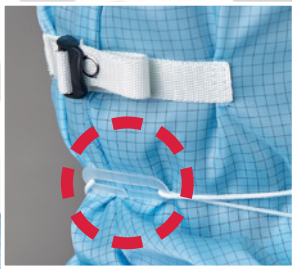
Disposable face masks, so called medical face masks, are often used to protect the product or process, but also to protect the worker (PPE). In addition to the most important criterion, filtration efficiency (BFE = Bacterial Filtration Efficiency and PFE = Particle Filtration Efficiency), the wearing comfort properties, such as breathing resistance (= Delta Δ), fit and skin compatibility, also play very important roles.

The protective effect respectively the filtration efficiency depends largely on the choice of materials. Face masks made of materials containing paper/cellulose are not suitable for use in cleanrooms, as the risk of contamination is too high due to the low abrasion resistance and increased inherent particle emission. Experience has shown that synthetic materials such as non-woven fabrics made of polypropylene, polyethylene and polyester filaments are most suitable.

When defining a disposable face mask, its width is also a criterion that should not be neglected. It should cover the entire width of the face and neck, so that skin and beard hairs are completely covered.



Product specific characteristics, see overview matrix page 34–35.



Fastening clip
for masks with
elastic ear loops
Art. No. 44455



Disposable face mask with ear loops,
rear fastening clip
Art. No. 42310



Disposable face mask
with elastic headbands
Art. No. 41630



Disposable face mask, extra wide
with elastic ear loops
Art. No. 45420



DISPOSABLE GARMENTS & PPE

| Description | sterile | Size | Colour | PU | Art. No. |
|---|---------|-----------|--------|--|------------|
| Disposable beard cover extra large version, approx. 230 x 160 mm | no | universal | ○ | 1,000 pieces 10 PE bags of 100 pieces | 40450 |
| Disposable face mask with ties, packed in stacks | no | 18 cm | ○ | 1,000 pieces 20 bags of 50 pieces | 41600-bulk |
| Disposable face mask with elastic ear loops, individually packed | no | 18 cm | ○ | 1,000 pieces 20 bags of 50 pieces | 41610 |
| Disposable face mask with elastic ear loops, packed in stacks | no | 18 cm | ○ | 1,000 pieces 20 bags of 50 pieces | 41610-bulk |
| Disposable face mask with elastic headbands, packed in stacks | no | 18 cm | ○ | 1,000 pieces 20 bags of 50 pieces | 41630 |
| Disposable face mask Kimtech™ M3 Certified Pleat-Style Face Mask with elastic ear loops, packed in stacks | no | 18 cm | ○ | 500 pieces 10 bags of 50 pieces | 43410 |
| Disposable face mask Kimtech™ M3 Certified Pleat-Style Face Mask with soft ties, stacked | no | 18 cm | ○ | 500 pieces 10 bags of 50 pieces | 43420 |
| Disposable face mask with ties, packed in stacks | no | 21 cm | ○ | 1,000 pieces 20 bags of 50 pieces | 42600-bulk |
| Disposable face mask with elastic ear loops, individually packed | no | 21 cm | ○ | 1,000 pieces 20 bags of 50 pieces | 42610 |
| Disposable face mask with elastic ear loops, packed in stacks | no | 21 cm | ○ | 1,000 pieces 20 bags of 50 pieces | 42310 |

Kimtech™ M3: 3-layer non-woven made of PE/filter material PP (non-sterile version)

Disposable face mask



**Disposable face mask
with elastic headbands**
Art. No. 42630-23



**Kimtech™ M7 disposable face veil
with press studs**
Art. No. 43520

| Description | sterile | Size | Colour | PU | Art. No. |
|---|---------|--------------------------|--------|--------------------------------------|----------|
| Disposable face mask with elastic headbands, packed in stacks | no | 23 cm | ○ | 1,000 pieces 20 bags of 50 pieces | 42630-23 |
| Disposable face mask Kimtech™ M3 Certified Pleat-Style Face Mask (pleated design) with elastic ear loops, packed in stacks | no | 23 cm | ○ | 500 pieces 10 bags of 50 pieces | 43415 |
| Disposable face mask Kimtech™ M3 Certified Pleat-Style Face Mask (pleated design) with soft ties, stacked packed | no | 23 cm | ○ | 500 pieces 10 bags of 50 pieces | 43425 |
| Disposable face mask M-PMEC143 with elastic ear loops, stacked packed | no | 23 cm | ○ | 1,000 pieces 20 bags of 50 pieces | 45420 |
| Disposable face mask M-PMEC143-25 shortened elastic ear loops, aluminium nose-piece, stacked packed | no | 23 cm | ○ | 1,000 pieces 20 bags of 50 pieces | 45425 |
| Disposable face mask Kimtech™ M3 Certified Pouch-Style Face Mask duckbill-shape, gap guard, headbands, packed in stacks | no | 25 cm | ○ | 300 pieces 6 bags of 50 pieces | 43910 |
| Disposable face veil Kimtech™ M7 two press studs each for adjustment, packed in stacks | no | 33 x 38 cm (W x L) | ⊘ | 150 pieces 3 bags of 50 pieces | 43520 |
| Disposable face veil Kimtech™ M7 with elastic knitted headband, packed in stacks | no | 33 x 38 cm (W x L) | ⊘ | 150 pieces 3 bags of 50 pieces | 43530 |



Kimtech™ M7 disposable face veil with knitted headband
Art. No. 43530



Disposable face mask pouch shaped (duckbill) with knitted headbands
Art. No. 44910 / Art. No. 43910

▶ HINT

Face masks type M3 as well as articles 45420 and 45425 offer a high degree of comfort and are particularly cleanroom suitable!



Disposable and reusable protective goggles can be found in Part 1, Chapter 1.4!



| Description | sterile | Size | Colour | PU | Art. No. |
|---|---------|----------------|--------|------------------------------------|----------|
| Disposable face mask Kimtech™ M3 Certified Pleat-Style Face Mask (pleated design) with elastic ear loops, individually packed | yes | 18 cm | ○ | 200 pieces 10 bags of 20 pieces | 44810 |
| Disposable face mask Kimtech™ M3 Certified Pleat-Style Face Mask (pleated design) with soft ties, individually packed | yes | 23 cm | ○ | 200 pieces 10 bags of 20 pieces | 44830 |
| Disposable face mask Kimtech™ M3 duckbill-shape, gap guard, with knitted headbands, individually packed | yes | 25 x 10 cm | ○ | 200 pieces 10 bags of 20 pieces | 44910 |
| Disposable face mask BDBS-G pouch-style, neck guard, with knitted headbands, individually packed | yes | 30,5 x 10,5 cm | ○ | 200 pieces 10 bags of 20 pieces | 44911 |

Kimtech™ M3: 3-layer non-woven PE/filter material PP (sterile version)

For fastening the loops of face masks to the back of the head – for a better wearing comfort

| Description | sterile | Size | Colour | PU | Art. No. |
|--|---------|-----------|--------|---------------------------------------|----------|
| Fastening clip for face masks with ear loops | no | universal | ⌚ | 5,000 pieces 50 bags of 100 pieces | 44455 |



Overview of different materials

Disposable garments for the body is used for the protection of the employee (PPE), but also for the product and process. For the manufacturing of disposable garment, spunbond fabrics are used nearly exclusively, which are then compacted with heat and pressure.

Some examples are non-woven fabrics, so called SMS (Spunbond-Meltblown-Spunbond) which have good breathability; fabrics with an additional applied microporous finish (high barrier affectivity against particles, but only minor resistance against mechanical influences) or Tyvek®, the patented PE-HD fabric from DuPont™. This fabric has high durability, low particle emission and very good barrier features.

Usually, disposable garments are manufactured in not controlled industrial ambient conditions. All contaminations falling and sticking on the disposable clothing during the manufacturing process are thus not removed, and will be brought therefore into the cleanroom areas. For this reason we recommend – wherever possible – to use subsequently washed (decontaminated) disposable garment.





FACT

Disposable garments are not usually decontaminated after the end of production. Contamination can thus enter the controlled areas unhindered!

Necessary basic requirements for cleanroom compatible disposable garments depending on the respective application:

- ▶ particle retention capacity and barrier properties
- ▶ sterility on demand
- ▶ antistatic finish with lowest possible particle emission
- ▶ cleanliness at delivery and cleanroom suitable packaging (polybag)
- ▶ latex-free at the elastic sleeve and trouser ends
- ▶ current documentation, model specifications, technical data sheet for the used materials, sterility/irradiation certificate
- ▶ permeation measurements in the case of natural and synthetic substances
- ▶ (EU) PPE Regulation, if required

Disposable lab coats



Disposable lab coat, Tyvek® 500 with **press studs** in front
Art. No. 40030



Disposable lab coat, Tyvek® 500 with **zipper** in front
Art. No. 40032



The protection function can be improved with an additional apron!

| Description | sterile | Size | Colour | PU | Art. No. |
|---|---------|---------------|--------|---|----------|
| Disposable lab coat PP non-woven approx. 50 g/m ² , collar, 5 press studs in front, 2 hip pockets, elasticated cuffs | no | L – XXXL | ○ | 50 pieces per carton individually packed | 40060 |
| Disposable lab coat PP non-woven approx. 40 g/m ² , collar, zipper in front, breast pocket outside left, elasticated cuffs | no | M – 4XL | ○ | 50 pieces per carton individually packed | 40061 |
| Disposable lab coat PP non-woven approx. 40 g/m ² , collar, 4 vinyl press studs in front, no pockets | no | L – XXL | ○ | 50 pieces per carton individually packed | 40062 |
| Disposable lab coat PP non-woven approx. 30 g/m ² , Eco version, collar, 4 press studs in front, no pockets, elasticated cuffs | no | L and XXL | ○ ● | 100 pieces per carton individually packed | 40063 |
| Disposable lab coat Tyvek® 500 (PL30) press studs in front, 3 pockets | no | M – XXL | ○ | 50 pieces per carton of 10 pieces per bag | 40030 |
| Disposable lab coat Tyvek® 500 (PL30NP) press studs in front, no pockets | no | M – XXL | ○ | 50 pieces per carton of 10 pieces per bag | 40031 |
| Disposable lab coat Tyvek® 500 (PL309) zipper, 2 pockets, stand-up collar, antistatic | no | S – XXL | ○ | 50 pieces per carton of 10 pieces per bag | 40032 |
| Disposable lab coat Chemsplash® microporous PP/PE laminate, collar, zipper in front, knitted cuffs, antistatic | no | S – XXXL | ○ | 25 pieces per carton individually packed | 40096 |
| Disposable lab coat Tychem® 2000 C (TC 0290) shin-length, rear closure, knitted cuff with double cuff system, mandarin collar | no | S/M and L/XXL | ● | 25 pieces per carton individually packed | 407570 |

Disposable overalls / coveralls

| Description | sterile | Size | Colour | PU | Art. No. |
|--|---------|----------|--------|--|----------|
| Disposable coverall PP non-woven 50 g/m ² ; integrated hood (elastic band), elasticated sleeve/trouser leg ends/waistband, covered zipper | no | M – XXXL | ● ● | 50 pieces per carton individually packed | 40100 |
| Disposable overall PP non-woven 40 g/m ² , without hood, elasticated sleeve/trouser leg ends/waistband, covered zipper, stand-up collar | no | M – XXL | ○ | 100 pieces per carton individually packed | 40105 |
| Disposable overall Tyvek® 500 Industry (CCF5) without hood, elasticated sleeve/trouser leg ends and waistband, covered zipper | no | S – XXXL | ○ | 50 pieces per carton individually packed | 40010 |
| Disposable coverall Tyvek® 500 Xpert (CHF5) integrated hood, elasticated sleeve/trouser leg ends and waistband, covered zipper | no | S – XXXL | ○ | 50 pieces per carton individually packed | 40040 |
| Disposable coverall Tyvek® 600 Plus (CHA5 T WH 00), integrated hood, thumb loops, elasticated sleeve/trouser leg ends and waistband, covered zipper, over-taped seams | no | S – XXXL | ○ | 50 pieces per carton individually packed | 40041 |
| Disposable coverall Tyvek® 600 Plus (CHA5 T WH 16) integrated hood, thumb loops, elasticated sleeve and waistband, covered zipper, over-taped seams, incorporated ankle socks | no | M – XXL | ○ | 80 pieces per carton individually packed | 40015 |
| Disposable coverall WeePro® microporous PE laminate on PP laminate, 65 g/m ² , integrated elasticated hood (three parts for more mobility), elasticated trouser leg ends, knitted cuffs, two-way-zipper with flap, antistatic | no | M – XXXL | ○ | 50 pieces per carton individually packed | 400710 |
| Disposable coverall Chemsplash® Pro 63 microporous PE laminate on PP laminate, 63 g/m ² , integrated hood with elastic band, elasticated sleeve/trouser leg ends, covered two-way-zip, antistatic | no | S – XXXL | ○ | 25 pieces per carton individually packed | 400840 |
| Disposable coverall Chemsplash® Xtreme SMS 50 AS , SMS fabric, integrated hood with elastic band, elasticated sleeve/trouser leg ends, covered two-way-zipper, antistatic | no | M – XXXL | ● ● | 25 pieces per carton individually packed | 400841 |
| Disposable coverall Tychem® 2000 C (CHA5TYL 00) integrated hood with elastic band, thumb loops, elasticated sleeve/trouser leg ends and waistband, both-sided covered zipper, over-taped seams | no | S – XXXL | ● | 25 pieces per carton individually packed | 40042 |

○ white ● blue ● green ● yellow

PP = Polypropylene PE-HD = High Density Polypropylene SMS = Spunbond-Meltblown-Spunbond fabric



Tychem® 2000 C offers a high chemical protection, because always remember: Personal protection comes before product protection!

Besides Tychem®, we are of course offering the complete Tychem® F product range in our delivery programme!



Product specific characteristics, see overview matrix page 36 – 37.



Disposable overalls / coveralls



Extra security due to additional over-taped seams



| Description | sterile | Size | Colour | PU | Art. No. |
|--|---------|----------|--------|---|-----------|
| Disposable overall Kimtech™ A5 without hood, elasticated sleeve/trouser leg ends and waistband, covered zipper, thumb loops. Decontaminated, triple packed under cleanroom conditions, gamma irradiated (≥ 25 kGy). | yes | S – 4XL | ○ | 25 pieces per carton individually packed | 40010S |
| Disposable coverall IsoClean® (IC 193) integrated hood with straps (compatible with medical masks), tunnelled elastication at wrists, thumb loop, elasticated waist at back, integrated anti-slip overboots, covered zip. Decontaminated under cleanroom conditions, individually double packed, gamma sterilised (SAL 10^{-6}). | yes | M – XXXL | ○ | 20 pieces per carton individually packed | 40040S-CE |



Sterile disposable garments, Kimtech™ A5, Art. No. 400105, amongst others

| Description | sterile | Size | Colour | PU | Art. No. |
|---|---------|----------|--------|---|----------|
| Disposable overall Tyvek® IsoClean® (IC 183) without hood, bound internal seams, covered zipper, tunnelled elastication at wrists and ankles, decontaminated | yes | M – XXXL | ○ | 25 pieces per carton individually packed | 40013-S |
| Disposable overall BioClean-D™ S-BDCCT (CleanTough™) without hood, with collar, piped seams, covered zipper | yes | XS – XXL | ○ | 20 pieces per carton individually packed | 40011S |
| Disposable coverall BioClean-D™ S-BDHCT (CleanTough™) integrated hood, piped seams, covered zipper | yes | XS – XXL | ○ | 20 pieces per carton individually packed | 40044S |
| Disposable coverall BioClean-D™ S-BDSH (CleanTough™) integrated hood, piped seams, covered zipper in the inner leg area | yes | XS – 4XL | ○ | 20 pieces per carton individually packed | 400441S |

CleanTough™ Non-woven polypropylene fabric with laminated polyethylene film with chemical protection. Protection options against: chemicals, antistatic discharges.
Tyvek® IsoClean® A Tyvek® non-woven fabric (made of PE-HD continuous fibre threads) produced by flash spinning, protecting people, processes and products in controlled environments.

| Dress size* | Chest girth (approx.) | Body size (approx.) |
|-------------|-----------------------|---------------------|
| XS | 76 – 84 cm | 158 – 164 cm |
| S | 84 – 92 cm | 164 – 170 cm |
| M | 92 – 100 cm | 170 – 176 cm |
| L | 100 – 108 cm | 176 – 182 cm |
| XL | 108 – 116 cm | 182 – 188 cm |
| XXL | 108 – 116 cm | 188 – 194 cm |
| XXXL | 124 – 132 cm | 194 – 200 cm |
| 4XL | 132 – 140 cm | 200 – 206 cm |

* manufacturer's information



Product specific characteristics, see overview matrix page 36 – 37.

Art. No. 40041



Art. No. 40121



Art. No. 40040 (lateral view)



Art. No. 40040 (rear view)



Art. No. 40031



| Description | sterile | Size | Colour | PU | Art. No. |
|---|---------|---------------------|--------|--|----------|
| Disposable jacket Tyvek® 500 (PP33) with zipper and stitched on hood | no | M – XXL | ○ | 50 pieces per carton loosely packed | 40121 |
| Disposable trousers Tyvek® 500 (PT31) no pockets, rear elastic band, trouser leg ends without elastic bands | no | M - XXL | ○ | 50 pieces per carton loosely packed | 40050 |
| Disposable trousers PP non-woven 50 g/m ² , trouser leg ends without elastic bands, no pockets | no | L, XL, XXL | ○ | 100 pieces per carton of 10 pieces per bag | 40052 |
| Disposable trousers PP non-woven 40 g/m ² , rear elastic band and elasticated leg ends, fabric with antistatic finish | no | L and XL | ○ | 50 pieces per carton of 10 pieces per bag | 40053 |
| Disposable apron Tyvek® 500 (PA30) tie-tapes at rear, 108 cm long | no | 70 × 108 cm (W × L) | ○ | 100 pieces per carton loosely packed | 40750 |
| Disposable apron BioClean-C™ BCDA (CleanTough™) to tie, 164–176 cm long | no | S, M, L | ● | 50 pieces per carton individually packed | 40751 |
| Disposable apron with sleeves BioClean-C™ BCAS (CleanTough™) to tie, adjustable neck/waist, elasticated wristbands | no | S, M, L | ● | 40 pieces per carton individually packed | 407587 |
| Disposable apron Tyvek® 500 (PA30L0 gamma irradiated) tie-tapes at rear | yes | 70 × 108 cm (W × L) | ○ | 100 pieces per carton individually packed | 40750-S |
| Disposable apron with sleeves BioClean-C™ S-BCAS (CleanTough™) to tie, adjustable neck/waist, elasticated wristbands | yes | S, M, L | ● | 40 pieces per carton individually packed | 407585 |

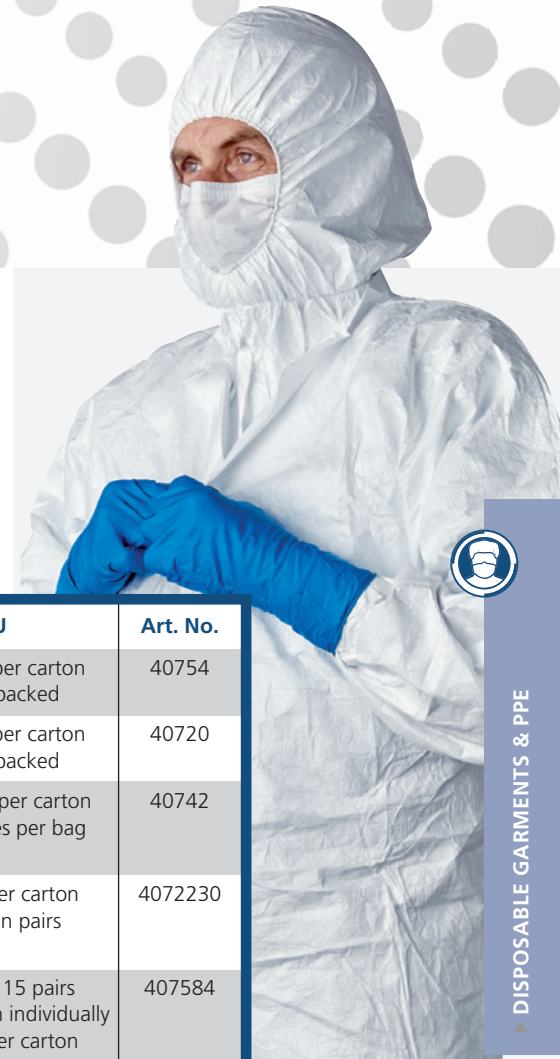
Art. No. 40320



Art. No. 40520-S



Art. No. 4072230



| Description | sterile | Size | Colour | PU | Art. No. |
|---|---------|-----------|--------|---|----------|
| Disposable sleeve protector Tychem® 2000 C (PS3200) 50 cm long, elasticated on both sides | no | universal | ● | 50 pieces per carton loosely packed | 40754 |
| Disposable sleeve protector Tyvek® 500 (PS32LA) 50 cm long, elasticated on both sides | no | universal | ○ | 50 pieces per carton loosely packed | 40720 |
| Disposable sleeve protector microporous non-woven fabric, 45 cm long, elastic band and wristband, antistatic finishing | no | universal | ○ | 300 pieces per carton of 50 pieces per bag | 40742 |
| Disposable sleeve protector Tyvek® IsoClean® (501 B Option MS) 45 cm long, elastic band on both sides | yes | universal | ○ | 50 pairs per carton packed in pairs | 4072230 |
| Disposable sleeve protector BioClean-C™ S-BCSC (CleanTough™) 40 cm long, elasticated PE cuffs | yes | universal | ● | 6 bags of 15 pairs (90 pairs each individually packed) per carton | 407584 |
| Disposable sleeve protector BioClean-D™ S-BDSC-L (CleanTough™) 50 cm long, elasticated on both sides | yes | universal | ○ | 6 bags of 15 pairs (90 pairs each individually packed) per carton | 40760S |
| Disposable sleeve protector Kimtech™ A5 SMS in PP, 45 cm long, elasticated on both sides, thumb loops, decontaminated | yes | universal | ○ | 100 pairs per carton packed in pairs | 40770S |

○ white ● blue ● yellow

CleanTough™ Non-woven polypropylene fabric with laminated polyethylene film with chemical protection. Protection options against: chemicals, antistatic discharges.

Tyvek® IsoClean® A Tyvek® non-woven fabric (made of PE-HD continuous fibre threads) produced by flash spinning, protecting people, processes and products in controlled environments.

Tyvek® 500 A Tyvek® non-woven fabric that protects against chemical particles and water-based splashes.

Tychem 2000® C Spunbonded PE-HD non-woven fabric coated with polymers that protect against concentrated inorganic chemicals.



Product specific characteristics, see overview matrix page 38 – 39.

Necessary basic requirements for cleanroom compatible disposable garments depending on the respective application:

- ▶ particle retention capacity and barrier properties
- ▶ sterility on demand
- ▶ antistatic finish with lowest possible particle emission
- ▶ cleanliness at delivery and cleanroom suitable packaging (polybag)
- ▶ latex-free
- ▶ current documentation, model specifications, technical data sheet for the used materials, sterility/irradiation certificate
- ▶ disinfectability, e.g. sleeve protectors
- ▶ permeation measurements in the case of natural and synthetic substances
- ▶ (EU) PPE Regulation, if required

Disposables for the foot area

Versions and colour options

Disposable overshoes made of CPE, blue, Art. No. 40300

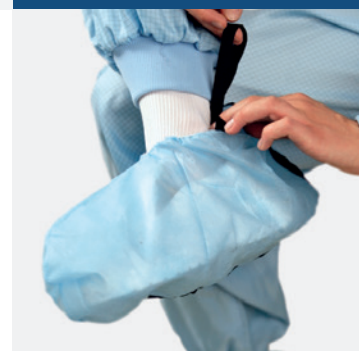


▶ FACT

Disposable overshoes are generally not decontaminated after manufacturing. Contaminations can therefore be introduced in controlled environments unhindered!

Overview of different materials

Disposable overshoes and overboots are used in different cleanliness zones as complementary components of a garment system. The overshoes, some of which are conductive and relatively strong, are often used as visitor shoes and/or as „overshoes“ when crossing between individual hygiene areas. Materials such as Tyvek®, microporous finishes, SMS, CPE, polyethylene, polypropylene or non-woven fabrics with carbon yarns are used.



| Description | sterile | Size | Colour | PU | Art. No. |
|---|---------|-------------------------|--------|----------------------------|----------|
| Disposable overshoes CPE elasticated ankle-high version | no | universal 41 cm long | ● ● ● | 1,000 pieces per carton | 40300 |
| Disposable overshoes non-woven PP with PE coating , elasticated ankle-high version | no | universal 38 cm long | ○ | 200 pieces per carton | 40350 |
| Disposable overshoes non-woven PP elasticated ankle-high version | no | universal 38 cm long | ● | 240 pieces per carton | 40351 |
| Disposable overshoes non-woven PP with PE coating , extra thick PVC sole, elasticated ankle-high version | no | universal 36 cm long | ○ | 200 pieces per carton | 40362 |
| Disposable overshoes spunbonded non-woven PP , CPE sole, elasticated ankle-high version | no | universal 40 cm long | ● ● ● | 1,000 pieces per carton | 40381 |
| Disposable overshoes non-woven PP conductive strip, elasticated ankles, higher version | no | universal 44 cm long | ● | 500 pieces per carton | 40385 |
| Disposable overshoes non-woven PP conductive strip, elasticated ankles, higher version | no | universal 39 cm long | ● | 500 pieces per carton | 40386 |
| Disposable overshoes non-woven PP fabric elasticated ankle-high version | no | universal 41 cm long | ● | 1,000 pieces per carton | 40387 |

Disposable overshoes PP non-woven, with conductive strip, Art. No. 40385

CPE = chlorinated polyethylene

Disposable overshoes extra strong CPE, blue
Art. No. 40390



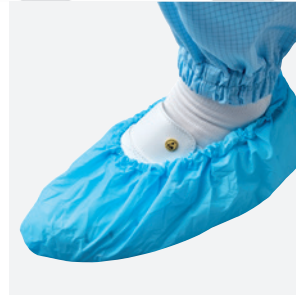
Disposable overshoes non-woven PP fabric, white / blue
Art. No. 40381



Disposable overshoes PP with **conductive strip, white / blue**
Art. No. 40385



Disposable overshoes extra strong CPE, slightly adhesive, light blue
Art. No. 40399



Disposable overshoes PP with PE coating, white
Art. No. 40350



DISPOSABLE GARMENTS & PPE

Disposable overboots, BioClean-D™
Art. No. 40322S

| Description | sterile | Size | Colour | PU | Art. No. |
|--|---------|-------------------------|--------|--------------------------|----------|
| Disposable overshoes extra strong CPE elasticated ankle-high version | no | universal 41 cm long | ○ ● | 500 pieces per carton | 40390 |
| Disposable overshoes extra strong CPE elasticated ankle-high version, slightly adhesive | no | universal 41 cm long | ○ ● | 500 pieces per carton | 40399 |
| Disposable overboots Tyvek® 500 (POBO) high, elastic band, straps to fix, PE sole | no | universal 36 cm long | ○ | 200 pieces per carton | 40320 |
| Disposable overboots Tyvek® 500 (POBA) high, elastic band, straps to fix, anti-slip | no | universal 36 cm long | ○ | 200 pieces per carton | 40323 |
| Disposable overboots BioClean™ BDOB (CleanTough™) high, tie-tapes, anti-slip PU sole | no | universal 40 cm long | ○ | 150 pieces per carton | 403250 |
| Disposable overboots 3M™ 450OVER microporous PE laminate, anti-slip sole, antistatic | no | universal 43 cm long | ○ | 100 Paar per carton | 40376 |
| Disposable overboots extra strong CPE high, elastic band, material with pressed-in pattern | no | universal 40 cm long | ○ ● | 500 pieces per carton | 40395 |
| Disposable overboots BioClean-D™ S-BDOB (CleanTough™), elastic band, tie-tapes, anti-slip PU sole, PP/PE antistatic coating, decontaminated | yes | universal 40 cm long | ○ | 75 Paar per carton | 40322S |
| Disposable overboots Tyvek® IsoClean® (IC 458 B Option MS) elastic band, ankle straps, anti-slip sole, decontaminated | yes | S, M, L, XL | ○ | 100 pieces per carton | 40323-S |
| Disposable overboots Kimtech™ A5 elastic band, straps to tie, vinyl sole, decontaminated | yes | S and universal | ○ | 100 Paar per carton | 4032400S |

○ white ● grey ○ light blue ● blue ○ white/blue ● green

CleanTough™ Non-woven polypropylene fabric with laminated polyethylene film with chemical protection. Protection options against: chemicals, antistatic discharges.
Tyvek® IsoClean® A Tyvek® non-woven fabric (made of PE-HD continuous fibre threads) produced by flash spinning, protecting people, processes and products in controlled environments.
Tyvek® 500 A Tyvek® non-woven fabric that protects against chemical particles and water-based splashes.

Necessary basic requirements for cleanroom compatible disposable overshoes / overboots depending on the respective application:

- ▶ particle retention capacity and barrier properties
- ▶ sterility on demand
- ▶ antistatic finish with lowest possible particle emission
- ▶ tensile strength
- ▶ anti-slip properties
- ▶ cleanliness at delivery and cleanroom suitable packaging (polybag)
- ▶ current documentation, model specifications, technical data sheet for the used materials, sterility/irradiation certificate
- ▶ (EU) PPE Regulation, if required



Product specific characteristics, see overview matrix page 38 – 39.



Art. No. 40390



Art. No. 40500



Art. No. 40845



Art. No. 4053100



Art. No. 40500

Art. No. 40042



Art. No. 40032



Art. No. 40520-S



Art. No. 400410



Art. No. 400840



Art. No. 40324005

Art. No. 4072230

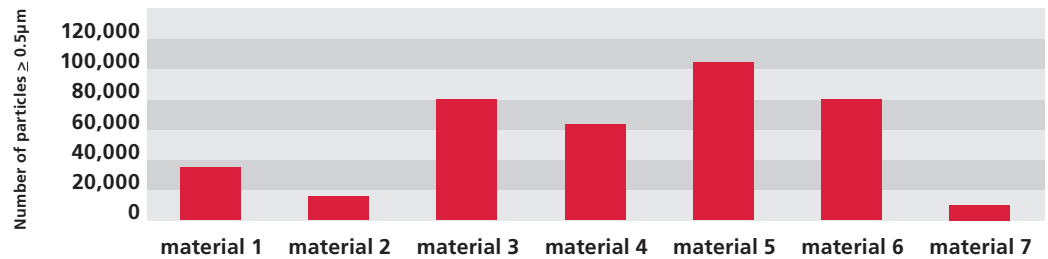




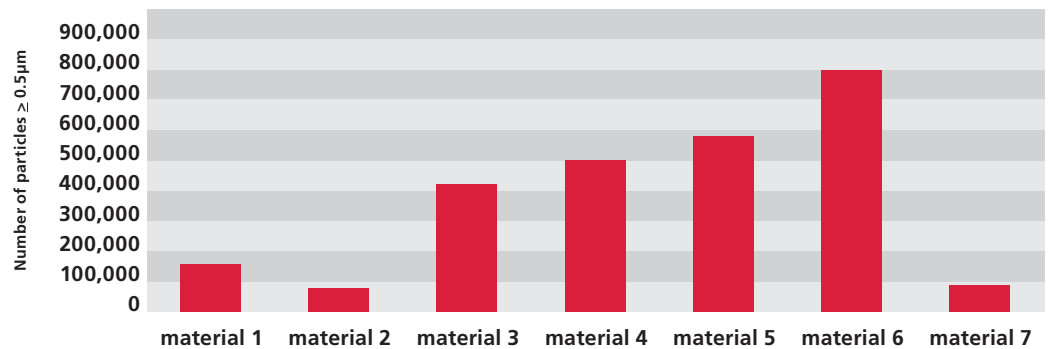
A standard solution on the test bench

In various publications on the subject of "Disposable garments for cleanroom use", the impression has been – and still is – conveyed that there are many technical arguments in favour of using disposable garments from well-known manufacturers without restrictions even in cleanroom class ISO 5 (in accordance with ISO 14644-1). However, anyone who examines this statement, application in classes ISO 5 or 6 more closely, will quickly come across an essential detail that calls into question the unconditional use of disposable garments. In most cases, disposable garments are not decontaminated after production. All impurities from the manufacturing process thus enter the respective cleanrooms one-to-one without hindrance. We took this as an opportunity to check in our own test cleanroom "Body-Box" to what extent disposable garments are generally suitable for cleanroom use, especially with regard to particle emission.

Results of measurement (means) $\geq 0.5\mu\text{m}$ of various disposable and reusable garment systems while **standing in the Body-Box with a total measurement time of 10 min.**



Results of measurement (means) $\geq 0.5\mu\text{m}$ of various disposable and reusable garment systems while **walking in the Body-Box with a total measurement time of 10 min.**



Note: materials 1 – 5 = disposable garments
materials 6 – 7 = reusable garments

Certainly there are special areas of application where the use of cleanroom-suitable disposable garments are still useful. It is important, however, that in critical areas (starting with class ISO 6 or better, respectively ISO 4) care should be taken to ensure that disposable garments have been appropriately decontaminated before packing. Only pre-cleaned disposable garments (material 2) are qualitatively, in terms of particle emission, comparable to decontaminated reusable garments (material 7).

There are considerable qualitative differences between the various disposable garment systems on the market with regard to their particle emission, which a user should definitely examine more closely and adjust to his requirements before using them in his cleanroom.

We would be pleased to advise you personally on this topic!





Disposable and reusable protective goggles can be found in Part 1, Chapter 1.4!

very good ****
 good ***
 satisfactory **
 adequate *

HEAD / FACE

| Chap. | Art. No. | Description | Breathable | Material |
|-------|----------|---|------------|----------|
| 2.2 | 40500 | Bouffant cap | **** | PP |
| 2.2 | 40500201 | Bouffant cap, Tyvek® IsoClean® (IC729SWHMS) | ** | PE-HD |
| 2.2 | 4055001 | Full protective hood with shoulder cover | **** | PP |
| 2.2 | 4053100 | MediCap AstroEco (astro hood) | *** | PP |
| 2.2 | 4055002S | Full protective hood Kimtech™ A5 | ** | PP |
| 2.2 | 4055202S | Full protective hood Kimtech™ A5, with integrated face mask | ** | PP |
| 2.2 | 40520-S | Full protective hood Tyvek® IsoClean® (IC668B Option MS) | ** | PE-HD |
| 2.2 | 40450 | Beard cover | **** | PP |

HEAD / FACE

| Chap. | Art. No. | Description | Face mask width | Bacterial filtration efficiency |
|-------|------------|--|-----------------|---------------------------------|
| 2.2 | 41600-bulk | Face mask with ties, packed in stacks | 18 cm | >98% |
| 2.2 | 41610 | Face mask with elastic ear loops | 18 cm | >98% |
| 2.2 | 41610-bulk | Face mask with elastic ear loops, stacked packed | 18 cm | >98% |
| 2.2 | 41630 | Face mask with elastic headbands, stacked packed | 18 cm | >98% |
| 2.2 | 43410 | Face mask Kimtech™ M3, with elastic ear loops, stacked packed | 18 cm | ≥99% bei 0.3 µm |
| 2.2 | 43420 | Face mask Kimtech™ M3, with flat PES headbands to tie, stacked packed | 18 cm | ≥99% bei 0.3 µm |
| 2.2 | 44810 | Face mask Kimtech™ M3, with elastic ear loops | 18 cm | ≥89% bei 0.3 µm |
| 2.2 | 42600-bulk | Face mask with ties, packed in stacks | 21 cm | >98% bei 3.0 µm |
| 2.2 | 42610 | Face mask with elastic ear loops | 21 cm | >98% bei 3.0 µm |
| 2.2 | 42310 | Face mask with elastic ear loops, stacked packed | 21 cm | 99.1% bei 3.0 µm |
| 2.2 | 42630-23 | Face mask with elastic headbands, stacked packed | 23 cm | >98% bei 3.0 µm |
| 2.2 | 43415 | Face mask Kimtech™ M3, with elastic ear loops, stacked packed | 23 cm | ≥89% bei 0.3 µm |
| 2.2 | 43425 | Face mask Kimtech™ M3, with soft ties, stacked packed | 23 cm | ≥89% bei 0.3 µm |
| 2.2 | 45420 | Face mask M-PMEC143, with elastic ear loops, stacked packed | 23 cm | 99.6% bei 3.0 µm |
| 2.2 | 45425 | Face mask M-PMEC143-25, with shortened elastic ear loops, alu nosepiece, stacked | 23 cm | 99.4% bei 3.0 µm |
| 2.2 | 43910 | Face mask Kimtech™ M3, duckbill-shape, gap guard, headbands, stacked packed | 25 cm | ≥98% bei 0.3 µm |
| 2.2 | 44830 | Face mask Kimtech™ M3, pleated design, soft ties | 23 cm | ≥89% bei 0.3 µm |
| 2.2 | 44910 | Face mask Kimtech™ M3, duckbill-shape, gap guard, knitted headbands | 25 cm | 96.8% bei 0.3 µm |
| 2.2 | 44911 | Face mask BDBS-G, pouch-style, neck guard, knitted headbands | 30.5 cm | 97.9% bei 3.0 µm |
| 2.2 | 43520 | Face veil Kimtech™ M7, 2 press studs each for adjustment, stacked packed | 38 cm | - |
| 2.2 | 43530 | Face veil Kimtech™ M7, with elastic knitted headband, stacked packed | 38 cm | - |

| Liquid protection | Chemical protection | PPE Cat. / Type of protection | Packaging | Version | | | | |
|-------------------|---------------------|-------------------------------|-----------|-------------|---------|------------|-----------------------|-----------------------------|
| | | | | non-sterile | sterile | latex-free | electrostatic treated | decontaminated and packed*1 |
| - | - | Cat. I | double PE | ✓ | | ✓ | | |
| ** | ** | Cat. III Type PB [6] | double PE | | ✓ | ✓ | | ✓ |
| - | - | Cat. I | single PE | ✓ | | ✓ | ✓ | |
| - | - | Cat. I | single PE | ✓ | | ✓ | ✓ | |
| * | * | Cat. III Type PB [6] | triple PE | | ✓ | ✓ | | ✓ |
| * | * | Cat. III Type PB [6] | triple PE | | ✓ | ✓ | | ✓ |
| ** | ** | Cat. III Type PB [6] | double PE | | ✓ | ✓ | | ✓ |
| - | - | Cat. I | double PE | ✓ | | ✓ | | |



| Particulate filtration efficiency | Pressure difference delta | PU | Packaging | Version | | | | |
|-----------------------------------|--|------------------------------|-------------------|-------------|---------|------------|-------------|----------|
| | | | | non-sterile | sterile | latex-free | three layer | packed*1 |
| >98% bei 0.1 µm | <4 mm H ₂ O/cm ² | 1,000 (20 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| >98% bei 0.1 µm | <4 mm H ₂ O/cm ² | 1,000 (20 bags of 50 pieces) | single, double PE | ✓ | | ✓ | ✓ | ✓ |
| >98% bei 0.1 µm | <4 mm H ₂ O/cm ² | 1,000 (20 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| >98% bei 0.1 µm | <4 mm H ₂ O/cm ² | 1,000 (20 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| ≥99% bei 0.1 µm | 5 mm H ₂ O/cm ² | 500 (10 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| ≥99% bei 0.1 µm | 5 mm H ₂ O/cm ² | 500 (10 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| ≥84% bei 0.1 µm | ≤2.5 mm H ₂ O/cm ² | 200 (10 bags of 20 pieces) | single, triple PE | | ✓ | ✓ | ✓ | ✓ |
| >98% bei 0.1 µm | <4 mm H ₂ O/cm ² | 1,000 (20 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| >98% bei 0.1 µm | <4 mm H ₂ O/cm ² | 1,000 (20 bags of 50 pieces) | single, double PE | ✓ | | ✓ | ✓ | ✓ |
| 99.2% bei 0.1 µm | 3.1 mm H ₂ O/cm ² | 1,000 (20 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| >98% bei 0.1 µm | <4 mm H ₂ O/cm ² | 1,000 (20 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| ≥84% bei 0.1 µm | <2.5 mm H ₂ O/cm ² | 500 (10 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| ≥84% bei 0.1 µm | <2.5 mm H ₂ O/cm ² | 500 (10 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| 99.4% bei 0.1 µm | 3.54 mm H ₂ O/cm ² | 1,000 (20 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| 99.6% bei 0.1 µm | 3.54 mm H ₂ O/cm ² | 1,000 (20 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| ≥99% bei 0.1 µm | ≤2.5 mm H ₂ O/cm ² | 300 (6 bags of 50 pieces) | double PE | ✓ | | ✓ | ✓ | ✓ |
| ≥84% bei 0.1 µm | ≤2.5 mm H ₂ O/cm ² | 200 (10 bags of 20 pieces) | single, triple PE | | ✓ | ✓ | ✓ | ✓ |
| 91.4% bei 0.1 µm | 2.5 mm H ₂ O/cm ² | 200 (10 bags of 20 pieces) | single, triple PE | | ✓ | ✓ | ✓ | ✓ |
| 98.2% bei 0.3 µm | 3.5 mm H ₂ O/cm ² | 200 (10 bags of 20 pieces) | single, triple PE | | ✓ | ✓ | ✓ | ✓ |
| 13% bei 0.5 µm | 0.1 mm H ₂ O/cm ² | 150 (3 bags of 50 pieces) | double PE | ✓ | | ✓ | | ✓ |
| 13% bei 0.5 µm | 0.1 mm H ₂ O/cm ² | 150 (3 bags of 50 pieces) | double PE | ✓ | | ✓ | | ✓ |

*1 under controlled conditions

Overview matrix

very good ****
 good ***
 satisfactory **
 adequate *

BODY

| Chap. | Art. No. | Description | Breathable | Material |
|-------|-----------|---|------------|--------------------|
| 2.3 | 40060 | Lab coat, PP non-woven, 50 g/m ² , 5 press studs in front | **** | PP |
| 2.3 | 40061 | Lab coat, PP non-woven, 40 g/m ² , zipper in front | **** | PP |
| 2.3 | 40062 | Lab coat, PP non-woven, 40 g/m ² , 4 press studs in front, no pockets | **** | PP |
| 2.3 | 40063 | Lab coat, PP non-woven, 30 g/m ² , 4 press studs in front, no pockets | **** | PP |
| 2.3 | 40030 | Lab coat Tyvek® 500 (PL30), 5 press studs in front, 3 pockets | ** | PE-HD |
| 2.3 | 40031 | Lab coat Tyvek® 500 (PL30NP), 5 press studs in front, no pockets | ** | PE-HD |
| 2.3 | 40032 | Lab coat Tyvek® 500 (PL309), with zipper, 2 pockets | ** | PE-HD |
| 2.3 | 40096 | Lab coat Chemsplash®, zipper in front, antistatic | ** | PE / PP |
| 2.3 | 407570 | Lab coat Tychem® 2000 C (TC 0290), shin-length, rear closure | * | PE-HD |
| 2.3 | 40100 | Coverall, PP non-woven, 50 g/m ² , with integrated hood (elastic band) | **** | PP |
| 2.3 | 40105 | Overall, PP non-woven, 40 g/m ² , without hood | **** | PP |
| 2.3 | 40010 | Overall Tyvek® 500 Industry (CCF5), without hood | ** | PE-HD |
| 2.3 | 40040 | Coverall Tyvek® 500 Xpert (CHF5), with integrated hood | ** | PE-HD |
| 2.3 | 40041 | Coverall Tyvek® 600 Plus (CHA5 T WH 00), with integrated hood | ** | PE-HD |
| 2.3 | 40015 | Coverall Tyvek® 600 Plus (CHA5 T WH 16), incorporated ankle socks | ** | PE-HD |
| 2.3 | 400710 | Coverall WeePro®, with integrated hood (three parts), antistatic | ** | PE / PP |
| 2.3 | 400840 | Coverall Chemsplash® Pro 63, with integrated hood, antistatic | ** | PE / PP |
| 2.3 | 400841 | Coverall Chemsplash® Xtreme SMS 50 AS, integrated hood, antistatic | *** | PP |
| 2.3 | 40042 | Coverall Tychem® 2000 C (CHA5TYL 00), integrated hood (elastic band) | * | PE-HD |
| 2.3 | 40040S-CE | Coverall Tyvek® IsoClean® (IC 193), with integrated hood and overshoes | ** | PE-HD |
| 2.3 | 40010S | Overall Kimtech™ A5, without hood, with thumb loops | *** | PP |
| 2.3 | 40013-S | Overall Tyvek® IsoClean® (IC 183), without hood | ** | PE-HD |
| 2.3 | 40011S | Overall BioClean-D™ S-BDCCT, without hood | *** | PP with PE coating |
| 2.3 | 40044S | Coverall BioClean-D™ S-BDHCT, with integrated hood | *** | PP with PE coating |
| 2.3 | 400441S | Coverall BioClean-D™ S-BDSH, integrated hood, zipper (inner leg area) | *** | PP with PE coating |

CleanTough™ Non-woven polypropylene fabric with laminated polyethylene film with chemical protection. Protection options against: chemicals, antistatic discharges.
 Tyvek® IsoClean® A Tyvek® non-woven fabric (made of PE-HD continuous fibre threads) produced by flash spinning, protecting people, processes and products in controlled environments.
 Tyvek® 500 A Tyvek® non-woven fabric that protects against chemical particles and water-based splashes.
 Tychem 2000® C Spunbonded PE-HD non-woven fabric coated with polymers that protect against concentrated inorganic chemicals.

| Abrasion resistant | Chemical protection | PPE Cat. / Type of protection | Packaging | Version | | | | |
|--------------------|---------------------|-----------------------------------|-----------|-------------|---------|------------|-----------------------|----------------|
| | | | | non-sterile | sterile | latex-free | electrostatic treated | decontaminated |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| *** | *** | Cat. III Type PB [6] | single PE | ✓ | | ✓ | | |
| *** | *** | Cat. III Type PB [6] | single PE | ✓ | | ✓ | | |
| *** | *** | Cat. III Type PB [6] | single PE | ✓ | | ✓ | | |
| ** | ** | Cat. I Type PB [5], Type PB [6] | single PE | ✓ | | ✓ | ✓ | |
| *** | **** | Cat. III Type PB [3] | single PE | ✓ | | ✓ | ✓ | |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| *** | *** | Cat. III Type 5, Type 6 | single PE | ✓ | | ✓ | ✓ | |
| *** | *** | Cat. III Type PB [5], Type PB [6] | single PE | ✓ | | ✓ | ✓ | |
| *** | **** | Cat. III Types PB [4, 5, 6] | single PE | ✓ | | ✓ | ✓ | |
| *** | **** | Cat. III Types PB [4, 5, 6] | single PE | ✓ | | ✓ | ✓ | |
| ** | ** | Cat. III Type PB [5], Type PB [6] | single PE | ✓ | | ✓ | ✓ | |
| ** | ** | Cat. III Type PB [5], Type PB [6] | single PE | ✓ | | ✓ | ✓ | |
| ** | ** | Cat. III Type 5, Type 6 | single PE | ✓ | | ✓ | ✓ | |
| *** | **** | Cat. III Types PB [3 – 6] | single PE | ✓ | | ✓ | ✓ | |
| *** | *** | Cat. III Type 5-B, Type 6-B | double PE | | ✓ | ✓ | | ✓ |
| ** | ** | Cat. III Type 5, Type 6 | triple PE | | ✓ | ✓ | | ✓ |
| *** | *** | Cat. III Type PB [5], Type PB [6] | double PE | | ✓ | ✓ | | ✓ |
| ** | ** | Cat. III Type 5, Type 6 | double PE | | ✓ | ✓ | ✓ | |
| ** | ** | Cat. III Type 5, Type 6 | double PE | | ✓ | ✓ | ✓ | |
| ** | ** | Cat. III Type 5, Type 6 | double PE | | ✓ | ✓ | ✓ | |

n. a. = not applicable



Chemical protective clothing

Regulation (EU) 2016/425 on Personal Protective Equipment



EN 14605:2005+A1:2009

Protective clothing against liquid chemicals – Performance requirements for clothing with liquid-tight (Type 3) or spray-tight (Type 4) connections, including items providing protection to parts of the body only (Types PB [3] and PB [4])



EN ISO 13982-1:2004+A1:2010

Protective clothing for use against solid particulates – Part 1: Performance requirements for chemical protective clothing providing protection to the full body against airborne solid particulates (type 5 clothing)



EN 13034:2005+A1:2009 Type 6 / PB [6]

Protective clothing against liquid chemicals – Performance requirements for chemical protective clothing offering limited protective performance against liquid chemicals

Further relevant standards



EN 1149-5:2018-11

Protective clothing – Electrostatic properties – Part 5: Material performance and design requirements

Note: The antistatic finish on DuPont protective clothing is only effective in environments with >25% relative humidity and when the clothing is properly grounded.



EN 14126:2003

Protective clothing – Performance requirements and test methods for protective clothing against infective agents



EN 1073-2:2002

Protective clothing against radioactive contamination – Part 2:

Requirements and test methods for non-ventilated protective clothing against particulate radioactive contamination

Note: Does not protect against radioactive radiation.



Overview matrix

ACCESSORIES

| Chap. | Art. No. | Description | Breathable | Material |
|-------|----------|--|------------|-------------------------|
| 2.4 | 40121 | Jacket Tyvek® 500 (PP33), with zipper and stitched on hood | ** | PE-HD |
| 2.4 | 40050 | Trousers Tyvek® 500 (PT31), rear elastic band, leg ends without bands, no pockets | ** | PE-HD |
| 2.4 | 40052 | Trousers PP non-woven, 50 g/m², leg ends without elastic bands, no pockets | **** | PP |
| 2.4 | 40053 | Trousers PP non-woven, 40 g/m², rear elastic band, antistatic finish | **** | PP |
| 2.4 | 40750 | Apron Tyvek® 500 (PA30), tie-tapes at rear, 108 cm long | ** | PE-HD |
| 2.4 | 40751 | Apron BioClean-C™ BCDA, CleanTough™, to tie, 164 – 176 cm long | ** | PP with PE coating |
| 2.4 | 40754 | Sleeve protector Tychem® 2000 C (PS3200) | * | PE-HD coating |
| 2.4 | 40720 | Sleeve protector Tyvek® 500 (PS32LA) | ** | PE-HD |
| 2.4 | 40742 | Sleeve protector, microporous non-woven fabric, elastic band/wristband, antistatic | ** | Microporous PE laminate |
| 2.4 | 40750-S | Apron Tyvek® 500 (PA30L0 gamma irradiated), tie-tapes at rear | ** | PE-HD |
| 2.4 | 407585 | Apron with sleeves BioClean-C™ S-BCAS, CleanTough™, to tie | ** | PP with PE coating |
| 2.4 | 407587 | Apron with sleeves BioClean-C™ BCAS, CleanTough™, to tie | ** | PP with PE coating |
| 2.4 | 4072230 | Sleeve protector Tyvek® IsoClean® (501 B Option MS), elastic band on both sides | ** | PE-HD |
| 2.4 | 407584 | Sleeve protector BioClean-C™ S-BCSC, CleanTough™, elasticated PE cuffs | ** | PP with PE coating |
| 2.4 | 40760S | Sleeve protector BioClean-D™ S-BDSC-L, CleanTough™, elasticated on both sides | *** | PP with PE coating |
| 2.4 | 40770S | Sleeve protector Kimtech™ A5, elasticated on both sides, thumb loops | *** | PP |

very good ****
 good ***
 satisfactory **
 adequate *

CleanTough™ Non-woven polypropylene fabric with laminated polyethylene film with chemical protection. Protection options against: chemicals, antistatic discharges.
 Tyvek® IsoClean® A Tyvek® non-woven fabric (made of PE-HD continuous fibre threads) produced by flash spinning, protecting people, processes and products in controlled environments.
 Tyvek® 500 A Tyvek® non-woven fabric that protects against chemical particles and water-based splashes.
 Tychem 2000® C Spunbonded PE-HD non-woven fabric coated with polymers that protect against concentrated inorganic chemicals.

FEET

| Chap. | Art. No. | Description | Breathable | Material |
|-------|----------|---|------------|-------------------------|
| 2.5 | 40300 | Overshoes, CPE | ** | CPE |
| 2.5 | 40350 | Overshoes, non-woven PP, with PE coating | ** | PP/PE |
| 2.5 | 40351 | Overshoes, non-woven PP | **** | PP |
| 2.5 | 40362 | Overshoes, non-woven PP, with PE coating, extra thick PVC sole | ** | PP/PE PVC |
| 2.5 | 40381 | Overshoes, spunbonded non-woven PP, CPE sole | ** | PP/CPE |
| 2.5 | 40385 | Overshoes, non-woven PP, conductive strip, elasticated ankles, higher version | **** | PP |
| 2.5 | 40386 | Overshoes, non-woven PP, conductive strip, elasticated ankles, higher version | **** | PP |
| 2.5 | 40387 | Overshoes, non-woven PP fabric, elasticated ankle-high version | **** | PP |
| 2.5 | 40390 | Overshoes, extra strong CPE, elasticated ankle-high version | ** | CPE |
| 2.5 | 40399 | Overshoes, extra strong CPE, elasticated ankle-high version, slightly adhesive | ** | CPE |
| 2.5 | 40320 | Overboots Tyvek® 500 (POB0), elastic band, straps to fix, PE sole | ** | PE-HD |
| 2.5 | 40323 | Overboots Tyvek® 500 (POBA), elastic band, straps to fix, anti-slip | ** | PE-HD |
| 2.5 | 403250 | Overboots BioClean-D™ BDOB, CleanTough™, tie-tapes, anti-slip PU sole | *** | PP with PE coating |
| 2.5 | 40376 | Overboots 3M™ 450OVER, microporous PE laminate, anti-slip sole, antistatic | ** | Microporous PE laminate |
| 2.5 | 40395 | Overboots, extra strong CPE, elastic band, material with pressed-in pattern | ** | CPE |
| 2.5 | 40322S | Overboots BioClean™ S-BDOB, CleanTough™, elastic band, tie-tapes, anti-slip | *** | PP with PE coating |
| 2.5 | 40323-S | Overboots Tyvek® IsoClean® (458 B Option MS), elastic band, ankle straps, anti-slip | ** | PE-HD/Vinyl |
| 2.5 | 4032400S | Overboots Kimtech™ A5, elastic band, straps to tie, vinyl sole | *** | Polyolefin/Vinyl |

| Abrasion resistant | Chemical protection | PPE Cat. / Type of protection | Packaging | Version | | | | |
|--------------------|---------------------|-------------------------------|-----------|-------------|---------|------------|-----------------------|----------------|
| | | | | non-sterile | sterile | latex-free | electrostatic treated | decontaminated |
| *** | *** | Cat. III Type PB [6] | single PE | ✓ | | ✓ | | |
| *** | *** | Cat. III Type PB [6] | single PE | ✓ | | ✓ | | |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| *** | *** | Cat. III Type PB [6] | single PE | ✓ | | ✓ | ✓ | |
| ** | *** | Cat. III Type PB [6] | single PE | ✓ | | ✓ | | |
| *** | **** | Cat. III Type PB [3] | single PE | ✓ | | ✓ | | |
| *** | *** | Cat. III Type PB [6] | single PE | ✓ | | ✓ | ✓ | |
| ** | ** | Cat. I | single PE | ✓ | | ✓ | ✓ | |
| *** | *** | Cat. III Type PB [6] | double PE | | ✓ | ✓ | | |
| ** | *** | Cat. III Type PB [6] | double PE | | ✓ | ✓ | | |
| ** | *** | Cat. III Type PB [6] | double PE | ✓ | | ✓ | | |
| *** | *** | Cat. III Type PB [6] | double PE | | ✓ | ✓ | | ✓ |
| ** | *** | Cat. III Type PB [6] | double PE | | ✓ | ✓ | | |
| ** | ** | Cat. III Type PB [6] | double PE | | ✓ | ✓ | | |
| ** | ** | Cat. I | double PE | | ✓ | ✓ | | ✓ |



| Abrasion resistant | Chemical protection | PPE Cat. / Type of protection | Packaging | Version | | | | |
|--------------------|---------------------|-----------------------------------|-----------|-------------|---------|------------|-----------------------|----------------|
| | | | | non-sterile | sterile | latex-free | electrostatic treated | decontaminated |
| ** | * | Cat. I | single PE | ✓ | | ✓ | | |
| ** | * | Cat. III Type PB [5], Type PB [6] | single PE | ✓ | | ✓ | | |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| ** | * | Cat. III Type PB [5], Type PB [6] | single PE | ✓ | | ✓ | | |
| ** | * | Cat. I | single PE | ✓ | | ✓ | | |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| * | * | Cat. I | single PE | ✓ | | ✓ | | |
| ** | * | Cat. I | single PE | ✓ | | ✓ | | |
| ** | * | Cat. I | single PE | ✓ | | ✓ | | |
| *** | *** | Cat. III Type PB [6] | single PE | ✓ | | ✓ | ✓ | |
| *** | *** | Cat. III Type PB [6] | single PE | ✓ | | ✓ | ✓ | |
| ** | ** | Cat. III Type PB [6] | double PE | ✓ | | ✓ | ✓ | |
| *** | ** | n. a. | single PE | ✓ | | ✓ | ✓ | |
| *** | * | Cat. I | single PE | ✓ | | ✓ | | |
| ** | ** | Cat. III Type PB [6] | triple PE | | ✓ | ✓ | ✓ | ✓ |
| *** | *** | Cat. III Type PB [6] | double PE | | ✓ | ✓ | | ✓ |
| ** | ** | Cat. I | triple PE | | ✓ | ✓ | | ✓ |

n. a. = not applicable

Product recommendations referring to cleanroom classes

Recommendations (*)

| | | Cleanrooms and associated controlled environments – Part 1 Classification of air cleanliness by particle concentration EN ISO 14644-1 | | | | | | |
|--------------|--|--|---|---|---|---|---|---|
| | | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| HEAD/FACE | Art. No. | Description | | | | | | |
| | 40500 | Bouffant cap | | | | | | |
| | 40500201 | Bouffant cap, Tyvek® IsoClean® (IC729SWHMS), sterile | | | | | | |
| | 4055001 | Full protective hood with shoulder cover | | | | | | |
| | 4053100 | MediCap AstroEco (astro hood) | | | | | | |
| | 40450 | Beard cover | | | | | | |
| | 41600-bulk | Face mask (18 cm), to tie | | | | | | |
| | 41610 | Face mask (18 cm), with elastic ear loops | | | | | | |
| | 41610-bulk | Face mask (18 cm), with elastic ear loops | | | | | | |
| | 41630 | Face mask (18 cm), with elastic headbands | | | | | | |
| | 43410 | Face mask Kimtech™ M3 (18 cm), with elastic ear loops | | | | | | |
| | 43420 | Face mask Kimtech™ M3 (18 cm), with flat PES headbands to tie | | | | | | |
| | 42600-bulk | Face mask (21 cm), with ties | | | | | | |
| | 42610 | Face mask (21 cm), with elastic ear loops | | | | | | |
| | 42310 | Face mask (21 cm), with elastic ear loops | | | | | | |
| | 42630-23 | Face mask (23 cm), with elastic headbands | | | | | | |
| | 43415 | Face mask Kimtech™ M3 (23 cm), pleated design, with elastic ear loops | | | | | | |
| | 43425 | Face mask Kimtech™ M3 (23 cm), pleated design, with soft ties | | | | | | |
| | 45420 | Face mask M-PMEC143 (23 cm), with elastic ear loops | | | | | | |
| | 45425 | Face mask M-PMEC143-25 (23 cm), with shortened elastic ear loops, alu noseband | | | | | | |
| | 43910 | Face mask Kimtech™ M3, duckbill-shape, gap guard, knitted headbands | | | | | | |
| | 43520 | Face veil Kimtech™ M7, 2 press studs each for adjustment | | | | | | |
| | 43530 | Face veil Kimtech™ M7, with elastic headband | | | | | | |
| | 4055002S | Full protective hood Kimtech™ A5, sterile | | | | | | |
| | 4055202S | Full protective hood Kimtech™ A5, with integrated face mask, sterile | | | | | | |
| | 40520-S | Full protective hood Tyvek® IsoClean® (IC668B Option MS), sterile | | | | | | |
| | 44810 | Face mask Kimtech™ M3 (18 cm), with elastic ear loops, sterile | | | | | | |
| | 44830 | Face mask Kimtech™ M3 (23 cm), soft ties, pleated design, sterile | | | | | | |
| 44910 | Face mask Kimtech™ M3, duckbill-shape, gap guard, knitted headbands, sterile | | | | | | | |
| 44911 | Face mask BDBS-G, pouch-style, neck guard, knitted headbands, sterile | | | | | | | |



Art. No. 43910 / 44910



Art. No. 40500



Art. No. 40450

Product recommendations referring to cleanroom classes

Recommendations (*)

| | | Cleanrooms and associated controlled environments – Part 1 Classification of air cleanliness by particle concentration EN ISO 14644-1 | | | | | | |
|-----------|---|--|---|---|---|---|---|---|
| Art. No. | Description | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 40060 | Lab coat, PP non-woven, 50 g/m ² , 5 press studs in front | | | | | | | ■ |
| 40061 | Lab coat, PP non-woven, 40 g/m ² , zipper in front | | | | | | | ■ |
| 40062 | Lab coat aus PP non-woven, 40 g/m ² , 4 press studs in front, no pockets | | | | | | | ■ |
| 40063 | Lab coat aus PP non-woven, 30 g/m ² , 4 press studs in front, no pockets | | | | | | | ■ |
| 40030 | Lab coat Tyvek® 500 (PL30), 5 press studs in front, 3 pockets | | | | | ■ | ■ | ■ |
| 40031 | Lab coat Tyvek® 500 (PL30NP), , 5 press studs in front, no pockets | | | | | ■ | ■ | ■ |
| 40032 | Lab coat Tyvek® 500 (PL309), with zipper, 2 pockets | | | | | ■ | ■ | ■ |
| 40096 | Lab coat Chemsplash®, zipper in front, antistatic | | | | | | ■ | ■ |
| 407570 | Lab coat Tychem® 2000 C (TC 0290), shin-length, rear closure | | | | | ■ | ■ | |
| 40100 | Coverall, PP non-woven, 50 g/m ² , with integrated hood (elastic band) | | | | | | ■ | ■ |
| 40105 | Overall, PP non-woven, 40 g/m ² , without hood | | | | | | ■ | ■ |
| 40010 | Overall Tyvek® 500 Industry (CCF5), without hood | | | | | ■ | ■ | ■ |
| 40040 | Overall Tyvek® 500 Xpert (CHF5), without hood | | | | | ■ | ■ | ■ |
| 40041 | Coverall Tyvek® 600 Plus (CHA5 T WH 00), with integrated hood | | | | ■ | ■ | ■ | ■ |
| 40015 | Coverall Tyvek® 600 Plus (CHA5 T WH 16), incorporated ankle socks | | | | ■ | ■ | ■ | ■ |
| 400710 | Coverall WeePro®, with integrated hood (three parts), antistatic | | | | | ■ | ■ | ■ |
| 400840 | Coverall Chemsplash® Pro 63, with integrated hood, antistatic | | | | | ■ | ■ | ■ |
| 400841 | Coverall Chemsplash® Xtreme SMS 50 AS, integrated hood, antistatic | | | | | | ■ | ■ |
| 40042 | Coverall Tychem® 2000 C (CHA5TYL 00), with integrated hood (elastic band) | | | | | ■ | ■ | |
| 400105 | Overall Kimtech™ A5, without hood, with thumb loops, sterile | | | | | | | |
| 40013-S | Overall Tyvek® IsoClean® (IC 183), without hood, sterile | | | | | | | |
| 400405-CE | Coverall Tyvek® IsoClean® (IC 193), with integrated hood and overshoes, sterile | | | | | | | |
| 400115 | OverallBioClean-D™ S-BDCCT, without hood, sterile | | | | | | | |
| 400445 | Coverall BioClean-D™ S-BDHCT, with integrated hood, sterile | | | | | | | |
| 400441S | Coverall BioClean-D™ S-BDSH, with integrated hood, zipper (inner leg area), sterile | | | | | | | |

BODY



Disposable overall Tyvek® 500 Industry, Art. No. 40010



Disposable lab coat made of Tyvek® 500, press studs in front, Art. No. 40030



Sterile disposable garments, Kimtech™ A5, e.g. Art. No. 400105

| low dust | Hygiene zones (microbiological controlled areas) according to GMP | | | | |
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DISPOSABLE GARMENTS & PPE

(*)
 A one-to-one classification of disposable garments to a cleanroom class according to EN ISO 14644-1 is not possible.
 Recommendations can only be made based on specific, from cleanroom viewpoint relevant properties, e.g. abrasion resistance or particle emission and, to some extent, filtration efficiency. In the VDI guidance 2083 Part 9.2, the user can find additional information.

Product recommendations referring to cleanroom classes

Recommendations (*)

Cleanrooms and associated controlled environments – Part 1 Classification of air cleanliness by particle concentration EN ISO 14644-1

| | | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-------------|---|---|---|---|---|---|---|---|
| ACCESSORIES | Art. No. | Description | | | | | | |
| | 40121 | Jacket Tyvek® 500 (PP33), with zipper and stitched on hood | | | | | | |
| | 40050 | Trousers Tyvek® 500 (PT31), rear elastic band, leg ends without bands, no pockets | | | | | | |
| | 40052 | Trousers PP non-woven, 50 g/m ² , leg ends without elastic bands, no pockets | | | | | | |
| | 40053 | Trousers PP non-woven, 40 g/m ² , rear elastic band, antistatic finish | | | | | | |
| | 40750 | Apron Tyvek® 500 (PA30), tie-tapes at rear, 108 cm long | | | | | | |
| | 40751 | Apron BioClean-C™ BCDA, CleanTough™, to tie, 164 – 176 cm long | | | | | | |
| | 40754 | Sleeve protector Tychem® 2000 C (PS3200) | | | | | | |
| | 40720 | Disposable sleeve protector Tyvek® 500 (PS32LA) | | | | | | |
| | 40742 | Sleeve protector, microporous non-woven fabric, elastic band/wristband, antistatic | | | | | | |
| | 40750-S | Apron Tyvek® 500 (PA30L0 gamma irradiated), tie-tapes at rear, sterile | | | | | | |
| | 407585 | Apron with sleeves BioClean-C™ S-BCAS, CleanTough™, to tie, sterile | | | | | | |
| | 407587 | Apron with sleeves BioClean-C™ BCAS, CleanTough™, to tie | | | | | | |
| | 4072230 | Sleeve protector Tyvek® IsoClean® (501B Option MS), elastic band/both sides, sterile | | | | | | |
| | 407584 | Sleeve protector BioClean-C™ S-BCSC, CleanTough™, elasticated PE cuffs, sterile | | | | | | |
| 407605 | Sleeve protector BioClean-D™ S-BDSC-L, CleanTough™, elasticated, sterile | | | | | | | |
| 407705 | Sleeve protector Kimtech™ A5, elasticated on both sides, thumb loops, sterile | | | | | | | |
| FEET | 40300 | Overshoes, CPE | | | | | | |
| | 40350 | Overshoes, non-woven PP, with PE coating | | | | | | |
| | 40351 | Overshoes, non-woven PP | | | | | | |
| | 40362 | Overshoes, non-woven PP, with PE coating, extra thick PVC sole | | | | | | |
| | 40381 | Overshoes, spunbonded non-woven PP, CPE sole | | | | | | |
| | 40385 | Overshoes, non-woven PP, conductive strip, elasticated ankles, higher version | | | | | | |
| | 40386 | Overshoes, non-woven PP, conductive strip, elasticated ankles, higher version | | | | | | |
| | 40387 | Overshoes, non-woven PP fabric, elasticated ankle-high version | | | | | | |
| | 40390 | Overshoes, extra strong CPE, elasticated ankle-high version | | | | | | |
| | 40399 | Overshoes, extra strong CPE, elasticated ankle-high version, slightly adhesive | | | | | | |
| | 40320 | Overboots Tyvek® 500 (POB0), elastic band, straps to fix, PE sole | | | | | | |
| | 40323 | Overboots Tyvek® 500 (POBA), elastic band, straps to fix, anti-slip | | | | | | |
| | 403250 | Overboots BioClean-D™ BDOB, CleanTough™, tie-tapes, anti-slip PU sole | | | | | | |
| | 40376 | Overboots 3M™ 4500OVER, microporous PE laminate, anti-slip sole, antistatic | | | | | | |
| | 40395 | Overboots, extra strong CPE, elastic band, material with pressed-in pattern | | | | | | |
| | 403225 | Overboots BioClean™ S-BDOB, CleanTough™, elastic band, tie-tapes, sterile | | | | | | |
| | 40323-S | Overboots Tyvek® IsoClean® (458 B Option MS), elastic band, ankle straps, sterile | | | | | | |
| | 40324005 | Overboots Kimtech™ A5, elastic band, straps to tie, vinyl sole, sterile | | | | | | |

CleanTough™ Non-woven polypropylene fabric with laminated polyethylene film with chemical protection. Protection options against: chemicals, antistatic discharges.

Tyvek® IsoClean® A Tyvek® non-woven fabric (made of PE-HD continuous fibre threads) produced by flash spinning, protecting people, processes and products in controlled environments.

Tyvek® 500 A Tyvek® non-woven fabric that protects against chemical particles and water-based splashes.

Tychem 2000® C Spunbonded PE-HD non-woven fabric coated with polymers that protect against concentrated inorganic chemicals.

| low dust | Hygiene zones (microbiological controlled areas) according to GMP | | | | |
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(*)
 A one-to-one classification of disposable garments to a cleanroom class according to EN ISO 14644-1 is not possible. Recommendations can only be made based on specific, from cleanroom viewpoint relevant properties, e.g. abrasion resistance or particle emission and, to some extent, filtration efficiency. In the VDI guidance 2083 Part 9.2, the user can find additional information.