Technical data

CHEMICAL PROTECTION

The intelligent chemical protective suits

Every product of the TESIMAX® brand provides maximum safety, reliability and quality.

Our chemical protective suits, such as the VS 20 SILVERFLASH®, are considered state of the art throughout the world and provide the highest available protection level – products you can rely on to keep you safe in extreme situations.

Chemical protective clothing – types

For all activities in the field of NBC (nuclear, biological, chemical) requiring special (chemical) protective clothing, we offer special solutions with a modular design:

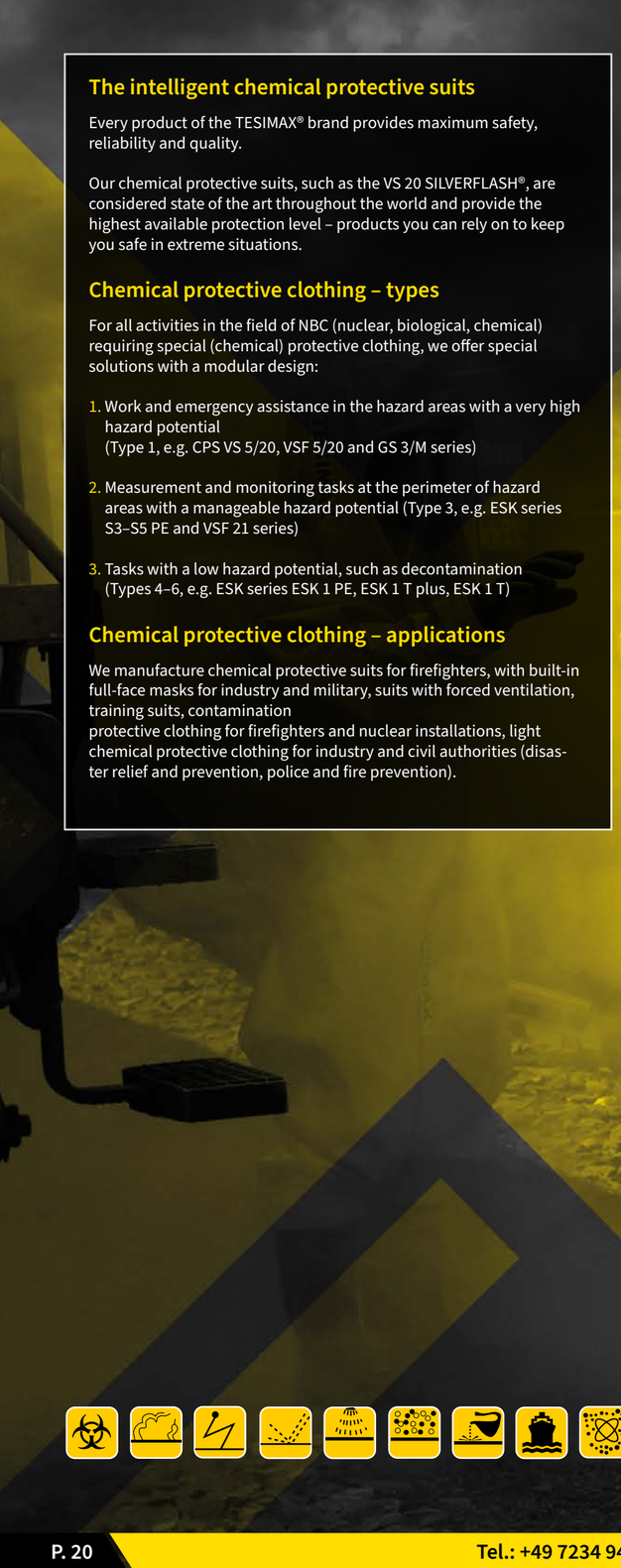
1. Work and emergency assistance in the hazard areas with a very high hazard potential
   (Type 1, e.g. CPS VS 5/20, VSF 5/20 and GS 3/M series)

2. Measurement and monitoring tasks at the perimeter of hazard areas with a manageable hazard potential (Type 3, e.g. ESK series S3–S5 PE and VSF 21 series)

3. Tasks with a low hazard potential, such as decontamination
   (Types 4–6, e.g. ESK series ESK 1 PE, ESK 1 T plus, ESK 1 T)

Chemical protective clothing – applications

We manufacture chemical protective suits for firefighters, with built-in full-face masks for industry and military, suits with forced ventilation, training suits, contamination
protective clothing for firefighters and nuclear installations, light chemical protective clothing for industry and civil authorities (disaster relief and prevention, police and fire prevention).



Industry

Military
Civil defence

Chemistry
Pharmaceuticals

Shipping

Clinics

Power utilities

Fire services

PARA-ARAMID

High Performance Elastomer

High Performance Plastics

REAL REUSABLE

The PPE* EN standards (*PPE = Personal Protective Equipment)

Classification of personal protective clothing according to European PPE Directive 89/686/EEC (PPE Regulation (EU) 2016/425)

Types 1a, 1b and 1c (ET) – gas-tight protective suits

EN 943-1:2019-06 (CPS/protective suits permissible for industry/works fire brigades in Europe)
Protective clothing against dangerous solid, liquid and gaseous chemicals, including liquid and solid aerosols - Part 1:
Performance requirements for Type 1 (gas-tight) chemical protective clothing, including supplementary standards:
- EN ISO 13688:2013: Protective clothing - General requirements (ISO 13688:2013)
- EN 388: Protective gloves against mechanical risks
- EN 14325:2018 Protective clothing against chemicals - Test methods and performance classification of chemical protective clothing materials, seams, joins and assemblages
- EN 1073-1:2016+A1:2018: Protective clothing against solid airborne particles including radioactive contamination - Part 1: Requirements and test methods for compressed air line ventilated protective clothing, protecting the body and the respiratory tract
- EN standards for breathing apparatus: EN 132, EN 136, EN 12021, EN 13274, EN 14593, EN 14594

EN 943-2:2019-06 (CPS/protective suits permissible for voluntary and professional firefighters in Europe)
Protective clothing against dangerous solid, liquid and gaseous chemicals, including liquid and solid aerosols - Part 2:
Performance requirements for Type 1 (gas-tight) chemical protective clothing for emergency teams (ET), including supplementary standards:
- EN 943-1:2015+A1:2019 and its supplementary standards
- EN 15090:2012, Footwear for firefighters
- ISO 17491-1: Protective clothing against dangerous solid, liquid and gaseous chemicals, including liquid and solid aerosols.
  - Test method: Determination of leak tightness of gas-tight protective suits (internal pressure test)

EN 943: INFO IDENTIFICATION IN ACCORDANCE WITH STANDARD (product label/user manual)
Code 1a, b and c = type classification (according to EN 943-1:2019-06)
1a = internal SCBA/totally encapsulated suit, gas-tight
1b = external SCBA/totally encapsulated suit, gas-tight
1c = without SCBA, with compressed/external air/
totally encapsulated suit, gas-tight (only for industry)

"ET" stands for Emergency Teams and includes approval for firefighting (according to EN 943-2:2019-06)

EN 943: Worldwide acceptance
- EN 943 for protective clothing has been the European standard since 2002 and is recognised and used throughout the world and applied in Asia, the Middle East, South America and Australia.
- Protective suits for the US economic area, where the NFPA Regulation applies, are excluded. The US NFPA regulations cannot be compared in detail with the European standards. The aim of protecting the wearer/end user (gas-tightness, heat and chemical resistance) is guaranteed independently by both standards (EN/USA). However, a protective suit can only be used with the correct approval (i.e. either EN (EU) or NFPA (USA)) in the respective economic area. A combination of standards for a protective suit is misleading for the end user and irrelevant for the respective economic area.
- ISO 17723-1:2019-08
  PPE ensembles for firefighters undertaking hazardous materials response activities - Part 1: Gas-tight, vapour-protective ensembles for emergency response teams ("type 1"). Protective suits according to EN 943 Parts 1 and 2 comply with ISO 17723-1:2019.

EN ISO: WARNINGS
- Only the EN standards apply Europe – without additional requirements or directives (inadmissible).
- Only EN 943-1:2019 (industry)/EN 943-2:2019 (firefighting) including their tested supplementary standards (see above) guarantee the maximum (gas-tight) protection for the end user and insurance coverage according to European law.
- Any national supplementary regulations are not legally sound and do not comply with the law.
- Any additional national guidelines cannot form a basis for insurance, as they "bypass" EN ISO standards and are therefore misleading.

- Protective suits that are advertised as "gas- and air-tight" but do not comply with the EU minimum requirements (chemical, mechanical, gas-tight) of EN 943 (for industry/fire brigades) are not permitted. TESIMAX defines these as "FAKE SUITS"!

- Always observe the manufacturer's label of the CPS (Types 1–6, ET, standard, pictogram, CE mark, test number, notified body).
- Observe the validity of the product certificate (only with unique identifier/type declaration according to EN standards).
- Observe the validity of the necessary QM system (ISO, Module C, Module B, MED, etc.).

Type 3 – Liquid-tight protective suits
EN 14605:2009-08
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])

Type 4 – Spray-tight protective suits
EN 14605:2009-08
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])

Type 5 – Particle-tight protective suits
EN ISO 13982-1:2011-02
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) (ISO 13982-1:2004 + Amd. 1:2010)

EN ISO 13982-2:2005-03
Protective clothing for use against solid particulates - Part 2: Test method of determination of inward leakage of aerosols of fine particles into suits (ISO 13982-2:2004)

Type 6 – Protective suits with limited spray-tightness
EN 13034:2009-08
Protective clothing against liquid chemicals - Performance requirements for chemical protective clothing offering limited protective performance against liquid chemicals (Type 6 and Type PB [6] impregnation)

Extended standards, specifications, material tests:

Protective clothing against infective agents
EN 14126:2004-01
Protective clothing - Performance requirements and test methods for protective clothing against infective agents
EN 14126 corrigenda 1:2005-02
Corrigenda to EN 14126:2004-01

Protective clothing tested according to EN 14126 guarantees resistance to the penetration of biologically contaminated liquids (germ penetration when wet). The special requirements for protective clothing materials against infective agents guarantee the protection of the skin and the wearer against possible contact with biological substances and help to prevent the spread of germs. Protective suits certified according to EN 14126 can be recognised by the pictogram for biological hazards and by the suffix "B" in the label/designation (e.g. type 3-B).
The EN 14126 standard stipulates the following tests for the material of protective clothing:
Penetration test with artificial blood (ISO/FDIS 11603)
Resistance to viruses (ISO/FDIS 16604)
Resistance to bacteria (ISO/DIS 22610)
Resistance to bio aerosols (ISO/DIS 22611)
Resistance to contaminated dust (ISO/DIS 22612

NOTE: Letter "B" in the product label (B = biological)

Protective suits with antistatic properties
Observe explosion protection (EN 1149-1) for working in explosion risk areas (Zones 0–22). The static inhibitor is effective only when the relative humidity lies above 30 percent. Note that only the clothing fabric is dissipative. To avoid sparks generation, make sure that protective clothing and wearer are properly earthed and use static inhibitor.

Protective suits for maritime use
(maritime shipping)
Protective suits tested and approved according to the MED (Maritime European Directive) Annex A1. SOLAS 74/88 Chapter II/2 Regulation 19.3.6.1

Protective suits for nuclear protection
EN 1073-1:2018-10
Protective clothing against solid airborne particles including radioactive contamination - Part 1: Requirements and test methods for compressed air line ventilated protective clothing, protecting the body and the respiratory tract

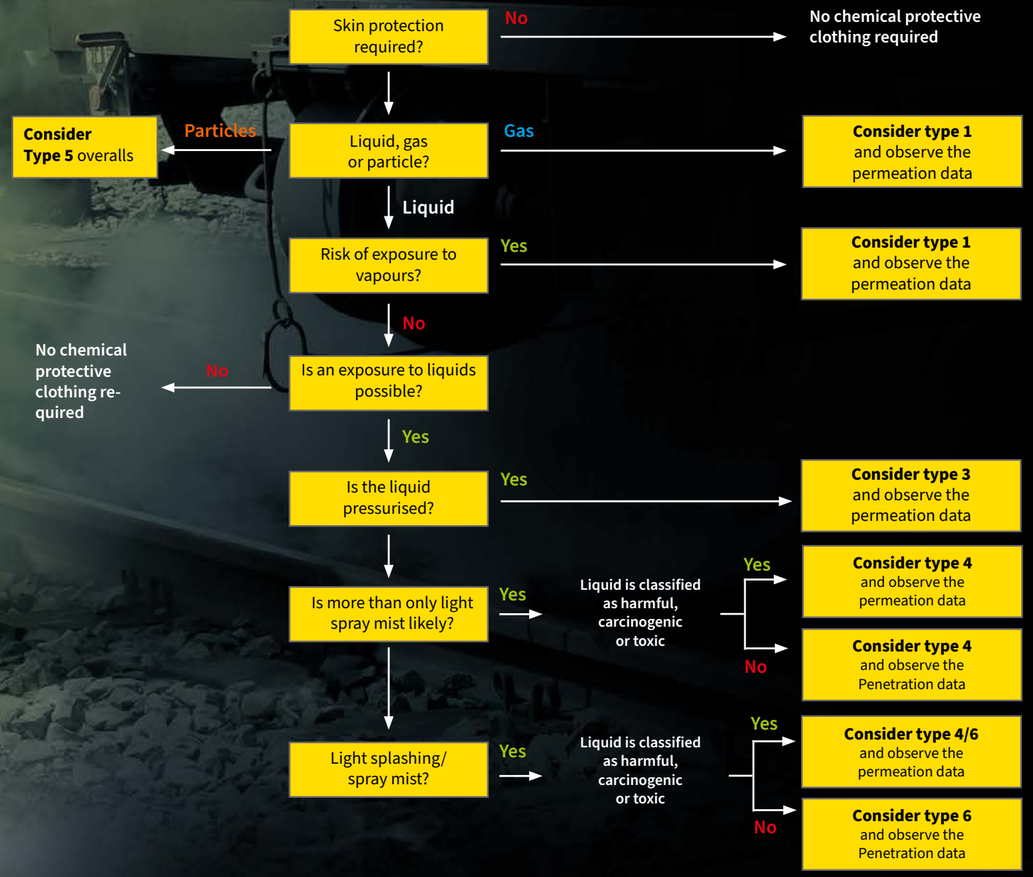
The PPE* EN standards (*PPE = Personal Protective Equipment)

Your guide for the right chemical protective suit (CPS of types 1 to 6 according to EN standards)

Protective suit quick selector by specifications and protection level (Types 1 to 6)

Important note:
This chart is a highly simplified quick selection aid. To determine the right chemical protective clothing for your specific application, a personal consultation with TESIMAX is always necessary. The responsibility for assessing the risks and hazard potential ultimately always lies with the end user, who therefore also has full liability (risk analysis according to national/international regulations). The end user should be a suitably qualified safety specialist.

For further (detailed) information see also:
- The technical Appendix of this catalogue
- The user manual, incl. maintenance videos (separate customer information; please enquire)
- Our website (short CPS presentation videos)
- Contact TESIMAX directly; see www.tesimax.de.



MATERIALS

The base layer made of 100% para-aramid

In extreme situations, take advantage of the safety of TESIMAX para-aramid advanced quality Used in protective suits made of SYKAN® 4 and SILVERFLASH®:

Basic properties:

In extreme situations, take advantage of the safety of TESIMAX protection suits with para-aramid base fabric. Used in protective suits made of SYKAN® 4 and SILVERFLASH® with the following performance characteristics:

- Excellent resistance to decomposition under heat
- Outstanding tensile strength and fatigue resistance: the fibres have five times the strength of steel at the same weight
- Excellent cut and puncture resistance
- Para-aramid fabrics are very lightweight
- Superior resistance against chemicals
- Long-term dimensional stability
- Low weight
- Heat- and low-temperature resistant
  - Up to +180 °C, para-aramid retains its room-temperature properties almost unchanged.
  - Does not melt and is self-extinguishing
  - Its charring point is at +425 °C.
  - No significant embrittlement or strength reduction down to -196 °C.

TESIMAX is known throughout the world for its use of this high-performance material in its SYKAN® 4 and SILVERFLASH® chemical protective suits, having used para-aramid for more than 40 years. Our suits thus protect the suit wearer in extreme conditions – with a proven track record throughout the world.

Available only for models made of SYKAN and SILVERFLASH

PARA-ARAMID

INSIDE/OUTSIDE COATING made of 100% HPE (high-performance elastomer)

In extreme situations, take advantage of the safety of TESIMAX HPE elastomer – Advanced Quality Used in protective suits made of SYKAN® 4 and SILVERFLASH®:

Basic properties:

- Very good resistance to chemicals and gasses (low air permeability)
- Very high mechanical strength
- Self-extinguishing – the flame-retardant materials are incorporated in the fabric's fibres and remain harmless when they decompose (environment-friendly and safe for wearer)
- No fabric softener (environmentally friendly and safe for wearer)
- Electrically insulating (very good protection in hazardous (Ex) areas)
- Excellent ageing resistance (extremely ozone-resistant and long-term colourfast)
- A long service life even under dynamic load and harsh deployment conditions.
- High elasticity and long service life, proven in practice
- Wide temperature range – continuous temperatures of -40 °C to +150 °C and -100 °C to +850 °C
- Excellent abrasion-resistance and mechanical strength
- High reuse potential – low operating costs and fewer non-usage times
- Nano-effect outer skin: very low to zero adhesion to all substances

Available only for models made of SYKAN and SILVERFLASH

High Performance Elastomer

The chemicals resistant HPP protective barrier

In extreme situations, take advantage of the safety of TESIMAX HPP barrier – Advanced Quality Used in protective suits made of SYKAN® 4 and SILVERFLASH®:

Basic properties:

- Outstanding resistance to nearly all chemicals, gasses, particles and liquids.
- Excellent mechanical properties
- Flexible and elastic
- Outstanding electrical properties
- Free from additives – pure fabric of foodstuffs grade 9
- High temperature resistance
- Very low to zero adhesion to all substances

PERFORMANCE TP
Smart derivation of the described HPP technology but with limited chemical protection capabilities (e.g. solvent) and temperature range (-30 to +70 °C)

High Performance Plastics

Performance PLASTICS

Performance TP

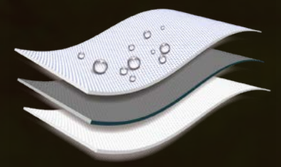
FABRIC SUPERSTRUCTURES

Fabric T/T plus*

The T/T plus fabric is a newly developed spunbonded nonwoven, multi-layer polypropylene fabric with outstanding wearing and protection properties.

- Outstanding abrasion resistance, tear resistance and seam strength for a long service life
- Special protection is offered by the very high impermeability to dust (protection against radioactive dust) and the excellent impermeability index against numerous water-soluble chemicals. Despite these outstanding protection properties the fabric offers an excellent wearing comfort.
- Special feature, T: (Type 5–6, colour: white or blue), breathable, particle-tight, antistatic
- Special feature of T plus: (Type 4–6, colour: white), breathable, particle- and spray-tight, antistatic

T PLUS



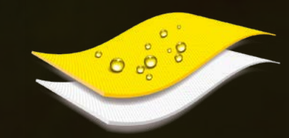
PE-D fabric*

The PE-D fabric (Duoform®) has good electrical properties, carries no electrostatic charge and has a residual potential discharge time that is neither too long nor too short. Protective clothing with seam covering with heat-activated adhesive tape (also Types 4, 5 and 6), with excellent NBC (nuclear, biological and chemical) protection and limited flame-retardance; self-extinguishing (Type 3b, colour: yellow)

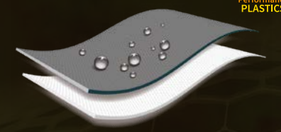
- APPLICATION AREAS: Pest control; emergency operations after incidents with propagation and leakage of hazardous substances; petrochemical industry; metal processing; mining; production; treatment and transport of chemicals; military; waste processing; water treatment; veneering; PCB reconditioning, firefighters

The PE-T material: The Tessaform® PE-T fabric offers increased mechanical as well as biological and high-quality chemical protection and is particle-tight (radioactive particles), liquid-tight and antistatic.

- The fabric offers superior mechanical properties for a limited-use protective suit (Type 3-B, colour: grey).



ESK 1 PE-D



S3/S5 PE-T

CHEMBA® fabric*

The CHEMBA (Eptaform) fabric consists of a highly chemicals-resistant barrier laminate on the inside and outside (double wall construction), with a mechanically robust spun-lace fleece sandwiched between the two layers (dual safety). Provides maximum protection, especially against mechanical impact (puncture resistance class 3 according to EN 943). The unique technology offers the superior, unlimited safety in use. Nevertheless, the VS 5 CHEMBA protective suit is ultra-light and flexible. Bright orange signal colour for increased work safety.

- Excellent chemical protection and gas-tightness tested according to EN 943-2 ET for 15 reference chemicals, tested for over 150 chemicals with up to 8 h resistance
- Outstanding protection against gases, tested against liquid war gases according to Finabel 0.7 C, Nato standard with up to 24 h resistance
- Good protection against contaminated liquids (tested according to EN 14126 B)
- Good dust-tightness (e.g. radioactive particles; tested to EN 1073-2)
- High mechanical stability, including high-quality sewn and thermo-taped seam covers
- Gas-tight zip with cover panel made of suit material
- Good wearing comfort through ultra lightweight design (less than 2 kg for VS 5 CHEMBA!)
- Non-adhering top layers for better decontamination (nano effect)
- Good antistatic and insulating properties (tested to EN 1149 in combination with static inhibitor)
- Semi-rigid, flexible multi-layer barrier visor, antifog for a clear field of vision, excellent chemical resistance corresponding to the suit fabric.

Colour: signal orange

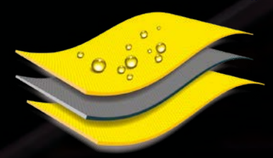
CHEMBA®

POLYRAN®-L-S fabric*

Solid PA base fabric coated on both sides with performance thermoplastic and permanently sealed with a special varnish (silk gloss/fungicidal finish).

Characteristics
- Extremely light-weight and flexible
- Reusable, washable, very good mechanical properties (wear-, tear- and puncture-resistant)
- Excellent chemical resistance to most acids and alkalis
- Low gas permeability (single war gas test)
- Applications: In (maritime) industry, pharmaceutics, clinics or as training suit for firefighters and for decontamination measures
- Colour: yellow (L), red (S) or Nato olive (s)

TP
POLYRAN®-L/-S



SYKAN® 1 fabric

The gas- and liquid-tight, chemical resistant fabric structure consists of five layers.
The fabric has a robust high-performance base fabric (HPA) coated on both sides with chemically resistant, abrasion-resistant high-performance elastomers (HPE). The outside has a signal colour, the inside is grey. In addition, the fabric structure features a unique chemical barrier (HPP film), facing outwards, above the base fabric and one under the fabric. This means:

- Outstanding chemical resistance; gas and liquid-tight (biological agents).
- Protection against all aerosols (viruses, bacteria) and particles (solids).
- Reinforced robust design (tensile and tear resistant, bending and abrasion resistant, puncture resistant, excellent seam strength)
- Superior flexibility, ultra-low weight
- Thermally stable at high and cryogenic temperatures
- Flame retardant with integrated protection against deflagration (flash fire tested at approx. +850 °C)
- Decontamination-resistant, washable, reusable, sustainable
- Good ageing, weathering and ozone resistance, simple storage
- With antistatic coating

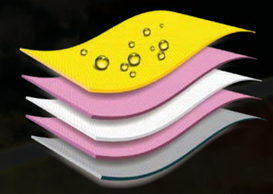
- Exterior colour: Signal colour yellow or orange for increased occupational safety
  Nato-olive for protection and defence

- Applications: Pharmaceuticals, clinics, military and civil defence, industry, maritime and fire brigades (unlimited)

Together with the patented Ultra seam, superior suit components and innovative extras, TESIMAX suits offer the ultimate CBRN protection for the wearer – a world first. Safe in use. Reusable. Chemicals and thermally resistant, reinforced robust design.

For further information, see the material sample card and the technical data.

SYKAN® 1



High Performance Elastomer
High Performance Plastics

* For further information, see the material sample card and the technical data.

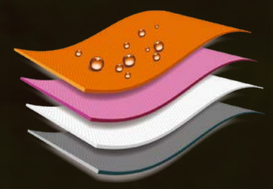
FABRIC SUPERSTRUCTURES

SYKAN® 2 fabric

The gas- and liquid-tight, chemical resistant fabric structure consists of four layers.
The fabric has a robust high-performance base fabric (HPA) coated on both sides with chemically resistant, abrasion-resistant high-performance elastomers (HPE). The outside has a signal colour, the inside is grey. In addition, the fabric structure features a unique chemical barrier (HPP film), facing outwards, above the base fabric. This means:

- Outstanding chemical resistance; gas and liquid-tight (biological agents).
- Protection against all aerosols (viruses, bacteria) and particles (solids).
- Reinforced robust design (tensile and tear resistant, bending and abrasion resistant, puncture resistant, excellent seam strength)
- Maximum flexibility, low noise, low weight
- Thermally stable at high and cryogenic temperatures
- Flame retardant with integrated protection against deflagration (flash fire tested at approx. +850 °C)
- Decontamination-resistant, washable, reusable, sustainable
- Good ageing, weathering and ozone resistance, simple storage
- With antistatic coating

SYKAN® 2



High Performance Elastomer

High Performance Plastics

- Exterior colour: Signal colour orange for increased occupational safety
  Nato-olive for protection and defence

- Applications: Pharmaceuticals, clinics, military and civil defence, industry, maritime and fire brigades (unlimited)

Together with the patented Ultra seam, superior suit components and innovative extras, TESIMAX suits offer the ultimate CBRN protection for the wearer – a world first. Safe in use. Reusable. Chemicals and thermally resistant, reinforced robust design.

SYKAN® 4 fabric

The gas- and liquid-tight, chemical resistant fabric structure consists of four layers.
The fabric has a robust high-performance base fabric (HP para-aramid) coated on both sides with chemically resistant, abrasion-resistant high-performance elastomers (HPE). The outside has a signal colour, the inside is grey. In addition, the fabric structure features a unique chemical barrier (HPP film), facing outwards, above the base fabric. This means:

- Outstanding chemical resistance; gas and liquid-tight (biological agents).
- Protection against all aerosols (viruses, bacteria) and particles (solids).
- Reinforced robust design (tensile and tear resistant, bending and abrasion resistant, puncture resistant, excellent seam strength)
- Maximum flexibility, low noise, low weight
- Thermally stable at high and cryogenic temperatures:
  - Permanently stable at temperatures from -30 to +60 °C
  - Short-term stable at temperatures from -100 to +100 °C in active use
  - Short-term contact up to -178 °C (liquid nitrogen, hydrogen, nitrogen)
  - Hot steam temperatures: material tested at approx. 350 °C for up to 30 s, full contact at approx. 6 bar steam pressure
  - Flame retardant with integrated protection against deflagration (flash fire tested, short-term approx. +850 °C)
  - -> Original Shield or Max FR functional wear/undersuits from TESIMAX recommended
- Decontamination-resistant, washable, reusable, sustainable
- Good ageing, weathering and ozone resistance, simple storage
- With antistatic coating

SYKAN® 4

High Performance Elastomer

High Performance Plastics

PARA-ARAMID

- Exterior colour: Signal colour yellow for increased occupational safety
  Nato-olive for protection and defence

- Applications: Pharmaceuticals, clinics, military and civil defence, industry, maritime and fire brigades (unlimited)

Together with the patented Ultra seam, superior suit components and innovative extras, TESIMAX suits offer the ultimate CBRN protection for the wearer – a world first. Safe in use. Reusable. Chemicals and thermally resistant, reinforced robust design. For further information, see the material sample card and the technical data.

SILVERFLASH® fabric*

The gas- and liquid-tight, chemical resistant fabric structure consists of five layers.
The outer fabric is a permanently antistatic heat and radiation shield combined with internal and external chemical barriers (HPP film). The fabric has a robust high-performance base fabric (HP para-aramid) and is coated on the inside with HPE elastomers (red).

SILVERFLASH®

High Performance Elastomer

High Performance Plastics

PARA-ARAMID

The unique features:

- Outstanding chemical resistance; gas and liquid-tight (biological agents).
- Protection against all aerosols (viruses, bacteria) and particles (solids).
- Reinforced robust design (tensile and tear resistant, bending and abrasion resistant, puncture resistant, excellent seam strength)
- Superior flexibility, ultra-low weight
- Thermally stable at high and cryogenic temperatures:
  - Permanently stable at temperatures from -30 to +60 °C
  - Short-term stable at temperatures from -100 to +100 °C in active use
  - Short-term contact up to -178 °C (liquid nitrogen, hydrogen, nitrogen)
  - Hot steam temperatures: material tested at approx. 350 °C for up to 30 s, full contact at approx. 6 bar steam pressure
  - Flame retardant with integrated protection against deflagration (flash fire tested, short-term approx. +850 °C)
  - -> Original Shield or Max FR functional wear/undersuits from TESIMAX recommended
- Blocks radiant heat, tested at approx. 1000 °C wall of flame in a closed/open space
- Decontamination-resistant, washable, reusable, sustainable
- Good ageing, weathering and ozone resistance, simple storage
- Permanently antistatic

Exterior colour: Silver reflective for increased occupational safety

- Applications: Pharmaceuticals, clinics, military and civil defence, industry, maritime and fire brigades (unlimited)

Together with the patented Ultra seam, superior suit components and innovative extras, TESIMAX suits offer the ultimate CBRN protection for the wearer – a world first. Safe in use. Reusable. Chemicals and thermally resistant, reinforced robust design.

* For further information, see the material sample card and the technical data.

SEAM TECHNOLOGY

High-performance seam technology

On normal protective suits, the seam is often the weak point. The TESIMAX-developed seam technology, which his used on all of our protective suits, is superior to conventional seams:

The TOP seam, for:

- **The TESIMAX limited-use protective suits (made of SMS50/Puntiform, Duoform, Tessaform or Eptaform/CHEMBA)**
- **The TESIMAX industry and training protective suits as well as environmental protection products (made of POLYRAN-L/-S)**
- Here the high-strength seams are sealed with seam covers made of the same material.
- This process fuses the materials together to form a homogeneous, 100 % impermeable fabric
- Exceptionally resilient against liquids, gasses, particles and chemicals, while retaining outstanding elasticity

The ULTRA seam with thermo-tape for secure seam coverage for TESIAMX protective suits made of SYKAN and SILVERFLASH

- High quality sewn with chemically and thermally resistant para-aramid thread.
- External seam cover with a welded high-performance elastomer tape (HPE), i.e. thermo-welded to the fabric.
- The tape has a unique, integrated chemical barrier (HPP film) similar to the protective suit fabric. This is necessary for the tape to offer the same resistance as the protective suit fabric, especially against diffusion-prone aggressive solvents and gases.
- The outer tape of the SILVERFLASH suit is additionally aluminised and is applied using a special process.
- Additional, internal HPE welded tape for increased safety

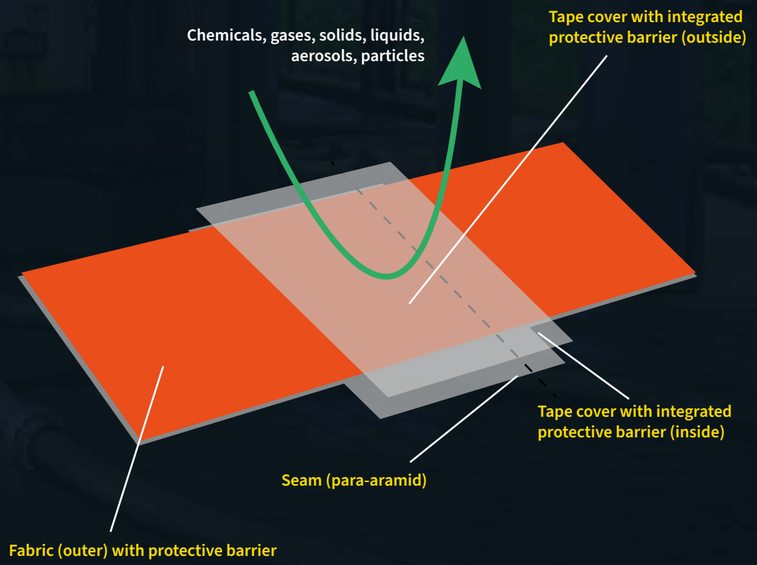
Advantages

- Outer protective barrier that is exceptionally resilient against high and low temperatures, gasses, particles and aggressive chemicals, while retaining outstanding elasticity.
- Facilitates repairs – REAL REUSABLE
- Safety sewing thread made of para-aramid used in all protective suits – thermally stable and chemical resistant.

The TOP/ULTRA seam provides this protective layer already on the outside and not just on the inside.

- This also optimises repairability – REAL REUSABLE.
- The SILVERFLASH features the ULTRA (inner) seam together with a high-performance combination of a seal and a barrier film that also offers mechanical and chemical protection (outer).

POWER PERFORMANCE SEAM TECHNOLOGIES



The ULTRA seam cover

Outside: Seam covered with HPE welded tape with unique, integrated chemical barrier (HPP film)

Middle: Protective suit base fabric

Inside: Protective suit fabric
Seams covered with HPE welded tape

REAL-REUSABLE

Chemical resistance

Material tables: Chemical permeation values according to EN 943 and EN 14325
Note: For further (chemical) data, please enquire (see TESIMAX permeation list)

GENERAL INFORMATION FOR ALL CHEM TABLES:

EN 943 – TESIMAX PERFORMANCE LEVEL

Classification of the chemical resistance performance according to EN 943. Fifteen reference chemicals incl. resistance to war gases as well as further permeation data per material. The reference chemicals specified in EN 943 are usually the least harmful of their kind (see reason, EN 943-2)

Use against chemical, biological and nuclear risks
An important measure of safety is the permeation time. To determine how long a fabric withstands permeation by a particular chemical, the breakthrough time – the time it takes for the chemical at a specific concentration to reach the inner side of the fabric – is timed. This permeation time is one of the most important measures for the possible deployment duration of a chemical protective suit.

- Gas-tight protective suits with a good performance, e.g. (Class 6, x > 8.0 h) usually also have a good general chemical permeation resistance. -> The higher the permeation time, the safer and more suitable is the protective suit or fabric for active operations.

- Based on their permeation times, chemical protective suits are categorised into six classes according to the test procedure specified in EN ISO 6529 (see table Classification by minutes above). Protective suits to EN 943 must have a permeation resistance of at least Class 2 (TESIMAX LEVEL: x > Class 3 (permeation time x > 60 minutes) for 15 reference chemicals. This is the (chemical) minimum requirement for use by emergency teams (ET) or firefighting.

- EN 14325:2018-08 specifies that, in addition to the permeation time (TESIMAX permeation list), the end user/CPS wearer must be informed about the time that a specified amount of chemical takes to penetrate through a known area of material. For further information on conversion, see the TESIMAX user manual. Since the classification of the TESIMAX permeation resistance is based on an evaluation of the permeation time at a rate of 0.1 µg/cm²/min or a permeation time x ≥480 min, neither a review nor a reanalysis of existing data is necessary.

- The performance bar is based on the chemical minimum requirements of EN 943 (see above) and provides a summary for each fabric or protective suit.

EN 943 – TEST METHODS

The most important test methods for determining permeation times and permeation rates:

1) EN 374-3 defines a standardised permeation rate of 1.0 µm/cm²/min
2) ISO 6529:2001 defines the determination of results with the normalised permeation rates of 1.0 µm/cm²/min or 0.1 µm/cm²/min (->TESIMAX REAL REUSABLE TEST STANDARD up to x ≥ 480 minutes)
3) ASTM F739 specifies that the results must be recorded as permeation time at 0.1 µm/cm²/min.
4. EN 14325:2018 Protective clothing against chemicals – Test methods and performance classification of chemical protective clothing materials, seams, joins and assemblages
5. EN ISO 6530 Protective clothing - Protection against liquid chemicals - Test method for resistance of materials to penetration by liquids (ISO 6530:2005); German version EN ISO 6530:2005

EN 943/EN14325 – CLASSIFICATION

TESIMAX CHEM SPECIFICATIONS ACCORDING TO EN 943 always apply to “the entire protective suit per material/type”, i.e.:

- Permanently integrated protective gloves (WIPAN B+/C/CK/CK+/overglove) and boots (HPE versions 1–4), footlets made of suit material and their assemblages (exchange system or permanently integrated)

- Pressure relief valves (covered with protective material and angle prechamber) and forced air feedthrough (F-AU series)

- Closures (zip, covered with protective suit material): HPE-ULTRA (ET version)/P-L/-S (industrial version)

- Seams (TOP/ULTRA seam)

- Visors VS 5/VS 20/VSF 20/VSF 5/VSF 21 (type 1a – ET/type 1c)

- Face seals (HPE elastomer) with respiratory mask (GS 3/GS 3M type 1b – ET).

Cross-references/details about permeation data for reusable protective suit tables:

*/1 = Class 1/2 not reached: This chemical protective suit is not suitable for prolonged exposure to this substance.

** = the permeation resistance to ingress/diffusion of the reference chemicals/substances according to EN 943 is increased through the additional suit-material zip cover
Cover made of suit fabric (for values see column 1, Material). A possible ingress of gaseous materials can further be reduced with a higher internal suit pressure, provided the protective cover is intact. The zip cover made of suit fabric is resistant to solid, aerosol and liquid warfare agents (see Finabel Conv.0.7.C material report).

*** If the protective suit has footlets with drip cuffs made of suit fabric, also observe the safety instructions in the usage and care instructions (“Putting on the protective suit”). An approved protective boot is required.

**** Suitable safety gloves must be selected through risk assessment by the end user (for mechanical and chemical values, please enquire). TESIMAX always recommends the tested safety protective gloves (see Details per material table or accessories catalogue or enquire).
The optional MECH Blue overglove improves mechanical and chemical protection.

***** For further permeation times/values, CHEMICALS/WAR GASSES (CWA/CWS), see the TESIMAX chemicals permeation list (please enquire).

Classification in minutes

Class 1	Class 2	Class 3	Class 4	Class 5	Class 6
> 10 minutes	> 30 minutes	> 60 minutes	> 120 minutes	> 240 minutes	> 480 minutes

SAFETY NOTE:

If the protective suit has been contaminated or exposed to thermal or mechanical strain, it must be serviced and tested before reuse. Otherwise it presents a risk of death. If necessary, have the protective suit disposed of following testing by a specialist service centre or by TESIMAX. If in doubt, contact your TESIMAX Servicepool contact (see TESIMAX Servicepool leaflet). Further information on safe testing and reusability, see the TESIMAX user manual.

Chemical resistance

Overview of permeation resistance against chemicals, gasses and warfare agents for TESIMAX protective suits according to EN 943 Parts 1 and 2 (ET)

Chemical	Protective suit fabric	Chemical	protective suit fabric	Chemical	
• Dichloromethane	(1) - 6	• Toluene	(1) - 6	• Mustard gas (HD)	x > 17 h
• n-heptane/n-hexane	(1) - 6	• Methanol	(1) - 6	• Lewisite (L)	x > 1.5 h
• Acetone	(1) - 6	• Ethyl acetate	(1) - 6	• Soman (GD)	x > 2.0 h
• Acetonitrile	(1) - 6	• Tetrahydrofuran	(1) - 6	• Sarin (GB)	x > 2.0 h
• Diethylamine	(1) - 6	• Carbon disulphide	(1) - 6	• Tabun (GA)	x > 6.0 h
• NaOH-sol40%	(1) - 6	• Sulphuric acid 96%	(1) - 6	• VX	x > 6.0 h
• Ammonia	(1) - 6	• Chlorine	(1) - 6		
• Hydrogen chloride gas	(1) - 6				

* Breakthrough times according to EN 943 Parts 1 and 2 (ET); for individual values see test certificate
The chart gives the reference values for the materials/seams Class 6 according to EN 943 Part 2 (ET). For other tested values, see the respective user manual or the Technical data appendix in the catalogue.
** Permeation times according to Finabel 0.7.L (given are minimum values for SILVERFLASH and SYKAN); the following are also CWA-tested: seam, visor (respiratory mask), protective gloves (WIPAN B+/C/CK/CK+/overglove), protective boots (HPE versions 1–4) and the zip with cover/assemblages.

Note: Further information and performance characteristics, see the corresponding user manual and the TESIMAX Chem Data list. For further information please enquire.

Correlation of classification and time

Class 1	Class 2	Class 3	Class 4	Class 5	Class 6
< 10 min	> 30 min	> 60 min	> 120 min	> 240 min	> 480 min

PERFORMANCE LEVEL
Classification of Chemical Resistance rating to EN 943

15 reference chemicals, including war gasses, and further permeation data by fabric. The reference chemicals specified in EN 943 are usually the least harmful of their kind (for the reason, see EN 943-2 D Appendix A and for further information, the TESIMAX Chemguide). Gas-tight protective suits with a good performance, e.g. (Class 6, x > 8.0 h) usually also have a good general chemical permeation resistance.

The normalised permeation time (permeation resistance in minutes) of the reference chemicals according to EN 943 for TESIMAX protective suits are mostly >480 minutes (maximum, for the criterion 0.1 µg/min/cm²; see TESIMAX chem data list).

These suits therefore offer outstanding protection for the end user.

The performance bar is based on the chemical minimum requirements of EN 943 (see above) and provides a summary for each fabric or protective suit.

Chemical resistance:

0% 100%

The most important test methods for determining permeation times and permeation rates:

1. EN 374-3 defines a standardised permeation rate of 1.0 µm/cm²/min
2. ISO 6529:2001 defines the determination of results with the normalised permeation rates of 1.0 µm/cm²/min or 0.1 µm/cm²/min (->TESIMAX REAL REUSABLE TEST)
3. ASTM F739 specifies that the results must be recorded as permeation time at 0.1 µm/cm²/min.
4. EN 14325:2018
   EN 14325:2018: Protective clothing against chemicals – Test methods and performance classification of chemical protective clothing materials, seams, joins and assemblages
5. EN ISO 6530
   Protective clothing - Protection against liquid chemicals - Test method for resistance of materials to penetration by liquids (ISO 6530:2005)

Chemical resistance

Choosing the right protective suit/fabric for chemical, biological and radiation risks

An important measure of safety is the permeation time.
To determine how long a fabric withstands permeation by a particular chemical, the breakthrough time – the time it takes for the chemical at a specific concentration to reach the inner side of the fabric – is timed.

This permeation time is one of the most important measures for the possible deployment duration of a chemical protective suit. The higher the permeation time, the safer and more suitable is the protective suit or fabric for active operations.

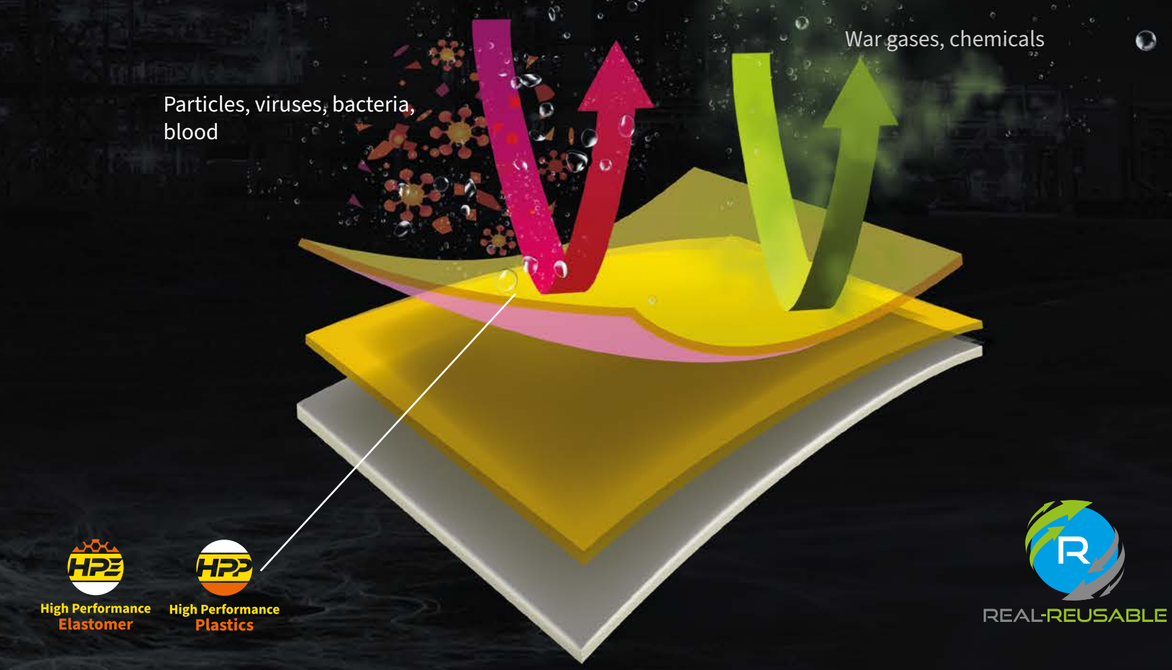
Based on their permeation times, chemical protective suits are categorised into six classes according to the test procedure specified in EN ISO 6529 (see table Classification by minutes above).

Protective suits to EN 943 must have a permeation resistance of at least Class 2 (permeation time x > 30 minutes) for 15 reference chemicals. This is the (chemical) minimum requirement for use by emergency teams (ET) or firefighting.

For further information please enquire.

Protective suits made of SYKAN or SILVERFLASH fabric have the following key advantage over all other protective suits in the world:

Only protective suits with an outer chemically resistant, gas and liquid tight barrier film (protective barrier) provide maximum safety and reusability. It is crucial that the protective barrier lies outside the base fabric. -> This is the only way of guaranteeing that no gas or chemical attacks the base fabric through contamination and the mechanical properties (puncture, tensile, tear and tear propagation strengths) remain permanently intact.



Mechanical resistance

Laboratory-determined permeation data does not always reflect real-life conditions. Variables such as temperature, pressure and mechanical loads can influence the permeation times. When selecting chemical protective clothing, these physical properties must therefore also be tested. European standard EN 943 provides the best basis for comparing the physical properties of chemical protective suits (CPS). Even the best barrier fabric has no effect if it is torn, cut, punctured or otherwise damaged.

For limited-use and reusable CPS, observe the following performance characteristics according to EN 943 and EN 14325:

Requirement	Limited-use	Reusable
Abrasion resistance	Class 4	Class 6**
Flex cracking resistance	Class 1	Class 4**
Flex cracking resistance at low temperatures (-30 °C)	Class 2	Class 2**
Tear propagation strength (trapeziom method)	Class 3	Class 3**
Tensile strength	Class 4	Class 6**
Puncture resistance	Class 2	Class 3**
Ignition resistance	Class 1	Class 3**
Seam strength:	Class 5	Class 5

Further classes:
TENSILE FORCE TESTING to EN 943
Class 1 (lowest) to Class 6 (highest)

***NOTE ACCORDING TO EN 943-2**
The difference between normal durability (limited-use) and increased durability (TESIMAX REAL REUSABLE) protective suits lies in the strength and durability of the fabric or the suit design or both. Increased durability is provided for those tasks where the suits are expected to be exposed to high mechanical stress or will be repeatedly reused.

-> The EN 943 standard clearly states that only reusable protective suits (TESIMAX REAL REUSABLE made of POLYRAN, SYKAN and SILVERFLASH) must be used in the front line under all types of risk without limitation.

**Note:
- For performance characteristics, see the respective user manual.
- Protective suits to 943 Part 1 have lower performance levels.

What mechanical performance criteria must a protective suit for my application fulfil?

Basic rule:
Light-duty use: Limited use with standard durability
Heavy-duty use: Reusable suit with increased durability

REAL-REUSABLE

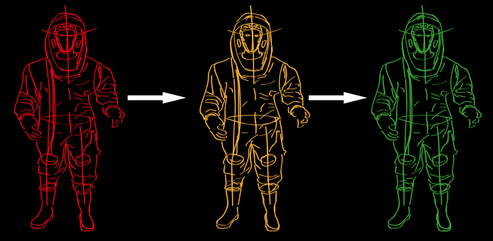
"REAL REUSABLE" protective suits must exceed the more stringent mechanical minimum requirements for reusable suits according to EN 943.

These minimum requirements are necessary for uses in which the suits are likely to be exposed to high mechanical stresses or if the suit will be used multiple times.

These suits also have a higher resistance to chemicals (see Chemical performance).

They are therefore the first choice for maximising the safety of emergency teams that are faced with unknown hazards.

For further information please enquire.

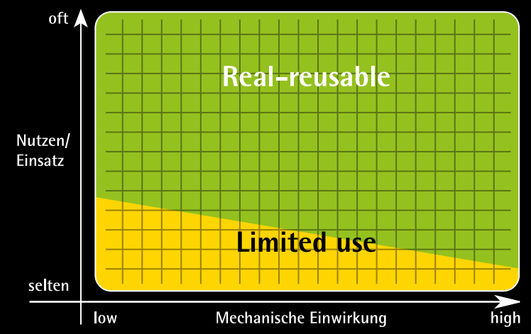


PERFORMANCE LEVEL: Classification of fabric performance properties (Table 3):

The performance bar is based on the mechanical minimum requirements of EN 943/EN 14325 (see above) and provides a summary for each fabric or protective suit.

Mechanical resistance:

0% 100%



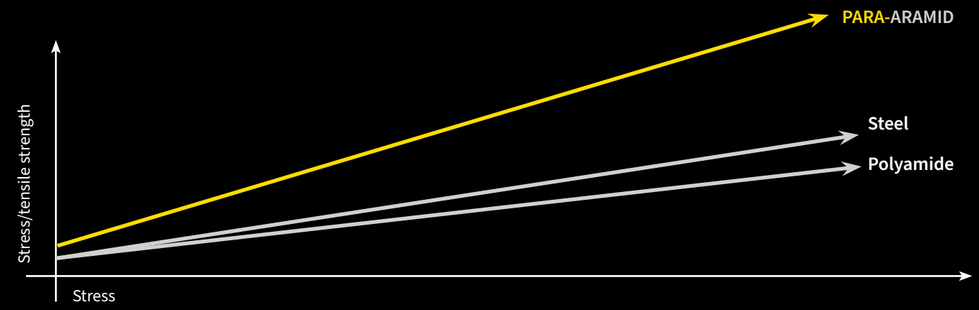
Further TESIMAX facts on mechanical resistance:

In extreme situations, take advantage of the safety of TESIMAX protection suits with para-aramid base fabric. Used in protective suits made of SYKAN® 4 and SILVERFLASH® with the following performance characteristics:

- Excellent resistance to decomposition under heat
- Outstanding tensile strength and fatigue resistance: the fibres have five times the strength of steel at the same weight
- Excellent cut and puncture resistance
- Para-aramid fabrics are very lightweight
- Superior resistance against chemicals
- Long-term dimensional stability
- Low weight
- Heat- and low-temperature resistant
  - Up to +180 °C, para-aramid retains its room-temperature properties almost unchanged.
  - Does not melt and is self-extinguishing
  - Its charring point is at +425 °C.
  - No significant embrittlement or strength reduction down to -196 °C.

TESIMAX is known throughout the world for its use of this high-performance material in its SYKAN® 4 and SILVERFLASH® chemical protective suits, having used para-aramid for more than 40 years. Our suits thus protect the suit wearer in extreme conditions – with a proven track record throughout the world.

FOCUS: Mechanical resistance



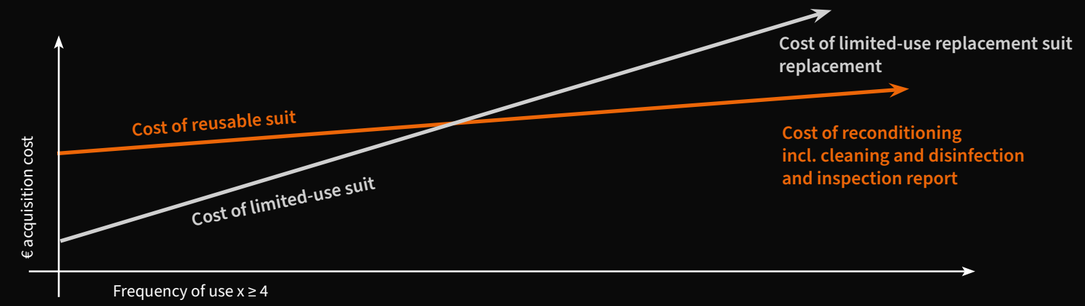
Economic viability of the TESIMAX REAL REUSABLE protective suits:

If suit will be used, for example, more than four times within 15 years, we recommend reusable protective suits.
These offer a higher protection level and are more cost-effective in the long term than limited-use protective suits, which must be replaced with new ones after each use.

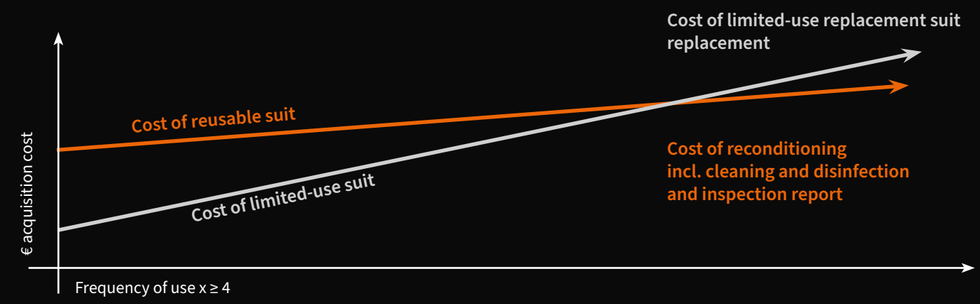
More than 90 % of reusable protective suits can be reconditioned (see also our Servicepool leaflet).

LIMITED-USE VS. REUSABLE

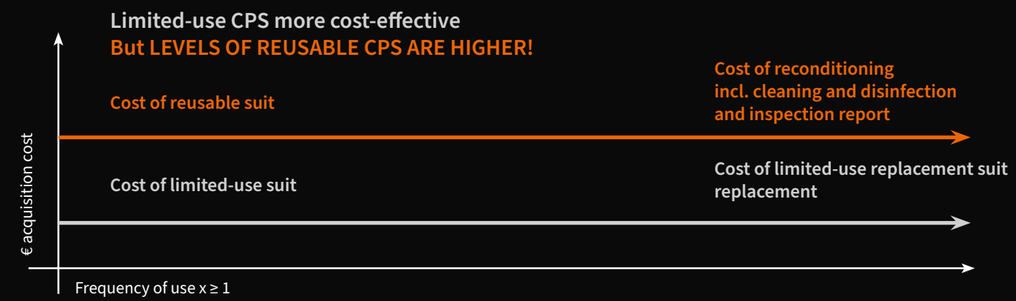
Economic efficiency for use under mechanical strain: reusable CPS more cost-effective in 90% of cases



Economic efficiency for use under light/moderate contamination: REUSABLE CPS more cost-effective in 90% of cases



Economic efficiency in case of severe contamination: DISPOSABLE CPS more cost-effective in 90% of cases



Thermal resistance

PERFORMANCE LEVEL Classification of fabric performance properties	0% 100%
The performance bar is based on the thermal minimum requirements (see above) and provides a summary for each fabric or protective suit.	
Heat: **Contact heat at approx. 850 ± 50 °C** (approx. 5 seconds, then still gas-tight) according to EN 13274-4	
Contact heat at approx. 850 ± 50 °C (approx. 10 seconds, then still gas-tight) according to EN 13274-4 2 (double):	
*** Superheated steam at approx. 350 ± 25 °C** (approx. 30 seconds, then still gas-tight/reusable) at up to 10 bar pressure/ full contact	
***/** Flashover Test at approx. 850 ± 50 °C** (approx. 8 seconds, then still gas-tight) according to ISO 13506:2008	
***/** Radiant heat at approx. 1000 °C** Distance approx. 2–3 m (approx. 1–3 minutes, then still gas-tight) plus EN ISO 11612	
Cold: **Contact cold* at -30 °C according to EN 943** (for up to 4 minutes, then still gas-tight/ reusable) e.g. ambient temperatures in winter	
Contact cold* at -80 °C according to EN 943 (for up to 30 minutes, then still gas-tight/reusable), e.g. ammonia	
Contact cold* at -100 °C according to EN 943 (for up to 30 minutes, then still gas-tight/reusable), e.g. liquid nitrogen	

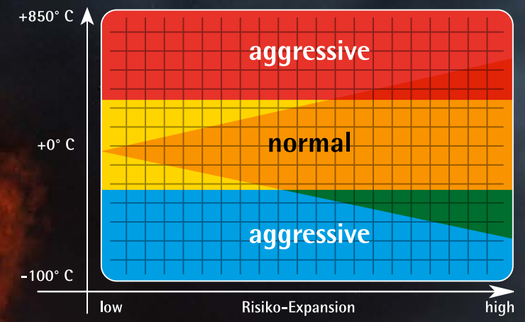
*in combination with TESIMAX FR underclothing
**Only with appropriate TESIMAX real-time training (RTT) with CPS: VS 20 SILVERFLASH

EXPANSION RISK

At high (up to 850 °C at 8 seconds full contact) or low temperatures (-196 °C at 10 seconds full contact or -80 to -100 °C at up to 30 minutes full contact), the risk of, for example, mechanical material fatigue increases, which can result in tearing or leakage of the protective fabric.

For suits that protect against this situation, see the Heat/cold resistance performance bar graph for each suit or fabric.

For further information please enquire.

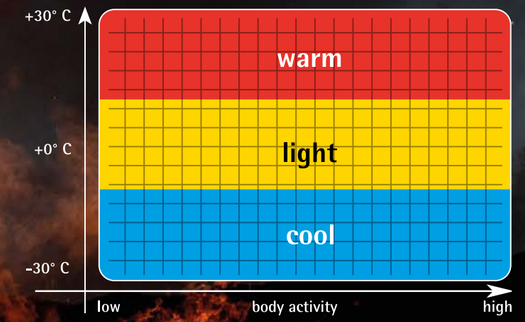


Body activity

Note:
Increase your personal performance by using the right tested functional underwear systems from TESIMAX.

PPE (personal protective equipment) combinations (respiratory protection, functional underwear, helmets, gloves, forced ventilation systems, etc.) are tested and approved for use with TESIMAX protective suits (see user manual).

For further information please enquire.



TESIMAX protective suits - model overview and Performance characteristics

- = not suitable
• = suitable
•• = very suitable
••• = ideal

***Respiratory Protection:**
SCBA = self-contained breathing apparatus
F = filter
O = no optional respiratory protection or integrated (VSF 20)

ET = emergency teams

****Solids/aerosols/liquids**
Infective agents
Radioactive particles
Spray mist
See TESIMAX permeation list

***** Gasses**
Known/
unknown gasses
See TESIMAX per-
meation list

******War gasses**
to Finabel 0.7 protocol
See TESIMAX permeation list

Model	Material	Respiratory protection	Type	Solids**	Aerosols**	Liquids**	Gasses***	War gasses****	Chemical resistance	Mechanical stress	Flameover	Supercooled media	EX	Maritime use	Weight
VS 5	CHEMBA	Inner: PA	Type 1a-ET	•••	•••	•••	•••	-	•••	(low) limited use	•	•	•	•	•••
VS 5	POLYRAN-L/S	Inner: PA	Type 1a	•••	•••	••••	•••	-	•	(high) reusable	•	•	•	•	•
VS 5	SYKAN 1	Inner: PA	Type 1a-ET	•••	•••	•••	•••	•••	•••	(high) reusable	••	••	•	•	•
VS 5	SYKAN 2	Inner: PA	Type 1a-ET	•••	•••	•••	•••	•••	•••	(high) reusable	••	••	•	•	••
VS 5	SYKAN 4	Inner: PA	Type 1a-ET	•••	•••	•••	•••	•••	•••	(high) reusable	•••	•••	•	•	•
VS 20	POLYRAN-L/S	Inner: PA	Type 1a	•••	•••	•••	•••	-	•	(high) reusable	•	•	•	•	•
VS 20	SYKAN 2	Inner: PA	Type 1a-ET	•••	•••	•••	•••	•••	•••	(high) reusable	••	••	•	•	••
VS 20	SYKAN 4	Inner: PA	Type 1a-ET	•••	•••	•••	•••	•••	•••	(high) reusable	•••	•••	•	•	•
VS 20	SILVERFLASH	Inner: PA	Type 1a-ET	•••	•••	•••	•••	•••	•••	(high) reusable	•••	•••	••	•	•
GS 3/GS 3M	POLYRAN-L/S	Outer: PA/F	Type 1b	•••	•••	•••	•••	-	•	(high) reusable	•	•	•	•	•
GS 3/GS 3M	SYKAN 1	Outer: PA/F	Type 1b-ET	•••	•••	•••	•••	•••	•••	(high) reusable	••	••	•	•	•
GS 3/GS 3M	SYKAN 2	Outer: PA/F	Type 1b-ET	•••	•••	•••	•••	•••	•••	(high) reusable	••	••	•	•	••
GS 3/GS 3M	SYKAN 4	Outer: PA/F	Type 1b-ET	•••	•••	•••	•••	•••	•••	(high) reusable	•••	•••	•	•	•
GS 3/GS 3M	SILVERFLASH	Outer: PA/F	Type 1b-ET	•••	•••	•••	•••	•••	•••	(high) reusable	•••	•••	••	-	•
VSF 5	SYKAN 2	Inner: O	Type 1c	•••	•••	•••	•••	•••	•••	(high) reusable	••	••	•	-	••
VSF 20	SYKAN 2	Inner: O	Type 1c	•••	•••	•••	•••	•••	•••	(high) reusable	••	••	•	-	••
VSF 20	SYKAN 4	Inner: O	Type 1c	•••	•••	•••	•••	•••	•••	(high) reusable	•••	•••	•	-	••
VSF 21	POLYRAN-L/S	Inner: F (fan)	Type 1c/3	••	••	••	•	-	•	(high) reusable	•	•	•	-	•
VSF 21	SYKAN 2	Inner: F (fan)	Type 1c/3	•••	•••	•••	•••	•••	•••	(high) reusable	••	••	•	-	••
VSF 21 PE-D / T	Duoform/Tessaform	Inner: F (fan)	Type 3	••	••	••	-	-	••	(low) limited use	-	-	•	-	•••
ESK 3 P-S	POLYRAN-L/S	Outer: O/F/PA	Type 3	••	••	••	-	-	•	(high) reusable	•	•	•	-	•
ESK S5 PE-T	Tessaform	Outer: O/F/PA	Type 3 (1c)	••	••	••	-	-	•••	(high) reusable	•••	•••	•	-	•
ESK S3 PE-T+/++	Tessaform	Outer: O/F/PA	Type 3	••	••	••	-	-	•••	(low) limited use	-	-	•	-	•••
ESK 1PE +/++	Duoform	Outer: O/F/PA	Type 3	••	••	••	-	-	••	(low) limited use	-	-	•	•	•••
ESK 1T+	Puntiform	Outer: O/F/PA	Type 4	•	•	-	-	-	•	(low) limited use	-	-	•	-	•••
ESK 1 T	SMS 50	Outer: O/F/PA	Type 5–6	•	-	-	-	-	•	(low) limited use	-	-	•	-	•••


VS 20 SILVERFLASH


VS 20 series


VS 5 series


VSF 5 series


GS 3 series


VSF 21 series


ESK 3 series


ESK 1 series

Table 0: CHEMICAL PROTECTIVE SUITS – OVERVIEW OF FEATURES

		POLYRAN-L/S/	SYKAN 1	SYKAN 2	SYKAN 4	SILVERFLASH
Types/series/info						
ESK: Light-duty protective clothing (particle/liquid-tight, according to EN Types 3–6, B) ESK 1, ESK 3 (-> the higher the ESK number, the higher the protection level)		x			x	
GS 3: Gas-tight protective suit with SCBA outside (gas-tight, according to EN 943 type 1b, B (ET))		x	x	x	x	x
GS 3 M: As GS 3 but with permanently integrated mask (gas-tight according to EN 943 type 1b, B (ET))		x	x	x	x	x
VS 5: Totally encapsulated suits for SCBA (gas-tight, according to EN 943 type 1a, B (ET)) with permanently integrated triple laminated visor; 130 cm gas-tight, fused and covered zip		x	x	x	x	
VS 20: Totally encapsulated suits for SCBA (gas-tight, according to EN 943 type 1a, B (ET)) with triple laminated interchangeable mask window (for ANGEL SENSOR systems); 180 cm gas-tight, fused and covered zip (easier donning and doffing, Smart Handling)		x	x	x	x	x
VSF 21: Totally encapsulated suits with forced ventilation (powered filter units, according to EN 943/EN 1073 type 1c/3B)		x		x		
VSF 5: Totally encapsulated suits with forced ventilation system, steri-filter and flexible air valves, (gas-tight, according to EN 943 Type 1c, B (ET)) with triple laminated interchangeable mask window (for ANGEL SENSOR systems); 130 cm gas-tight zip		x		x		
VSF 20: Totally encapsulated suits with forced ventilation system (gas-tight, according to EN 943 type 1c, B (ET)) with triple laminated interchangeable mask window (for ANGEL SENSOR systems);180 cm gas-tight zip (Smart Handling)		x	x	x	x	
Standards & performance data	Where to find further information					
Basic standards	See standards overview in the catalogue	-	-	-	-	-
Performance according to standards/application	See Table 1 in the technical appendix	-	-	-	-	-
Mechanical protection & performance	See Table 2 in the technical appendix	-	-	-	-	-
Chemical protection & performance	See Table 3 in the technical appendix	-	-	-	-	-
Thermal protection & performance	See Table 4 in the technical appendix	-	-	-	-	-
Approvals & Verifications	See TESIMAX CPS approvals & certificates	-	-	-	-	-
User manual	See TESIMAX CPS instruction manual	-	-	-	-	-
Material & equipment	Where to find further information					
Material description and structure, colour:	See product description in catalogue	Yellow/red /Nato olive/ white	Yellow/ orange Nato olive	Orange/ Nato olive	Yellow/ Nato olive	Silver
Material and weight	See product description in catalogue	x	x	x	x	x
Material and seam description	See CPS, technical appendix	TOP seam	ULTRA seam	ULTRA seam	ULTRA seam	ULTRA seam
Standard & optional features	See product description in catalogue (standard)	x	x	x	x	x
CPS service life	Note					
Storage period and service life	See catalogue, technical appendix and data (certificates, user manual)	15 years	15 years	15 years	15 years	15 years
Storage period and maintenance, CPS	**Without SMART STOCK packaging**	1 x per year				
Storage period and maintenance, CPS	**With SMART STOCK packaging**	5 years maintenance-free				
CPS Service	Note					
PPE and CPS: Service	See service, repair videos, equipment maintenance training courses	See CPS Servicepool leaflet				
PPE and CPS: Training	See Real-time training	See CPS Servicepool leaflet				

Table 1 – TESIMAX CHEMICAL PROTECTION: Standards

Categorisation by standards	**Note**	POLYRAN-L/S/	SYKAN 1	SYKAN 2	SYKAN 4	SILVER-FLASH
PPE: Quality Management system (QM)	EU 2016/425 (Modules C & D) / QM ISO 9001:2015	PASS	PASS	PASS	PASS	PASS
PPE: Basic requirements of CE protective equipment	EN 13688	PASS	PASS	PASS	PASS	PASS
PPE: CPS CE approval (depending on series/version)	EN 943-1/-2:2019 in conjunction with EN 14325	PASS	PASS	PASS	PASS	PASS
PPE: CPS combination/compatibility with other equipment	EN 943 (F-AU, helmets, SCBA, ...)	PASS	PASS	PASS	PASS	PASS
PPE: CPS maritime approval (depending on product)	Maritime approval (on-board)	PASS	PASS	PASS	PASS	PASS
PPE: CPS CE approval only ESK series/version)	Liquid-tight chemical protective clothing EN 14605:2005	PASS	PASS	PASS	PASS	PASS
PPE: Biological protection (B) - Penetration resistance	EN 14126: Biological protection(labelled “B”)	PASS	PASS	PASS	PASS	PASS
	Penetration test with artificial blood (ISO/FDIS 11603)	PASS	PASS	PASS	PASS	PASS
	Resistance to viruses (ISO/FDIS 16604)	PASS	PASS	PASS	PASS	PASS
	Resistance to bacteria (ISO/DIS 22610)	PASS	PASS	PASS	PASS	PASS
	Resistance to bio aerosols (ISO/DIS 22611)	PASS	PASS	PASS	PASS	PASS
	Resistance to contaminated dust (ISO/DIS 22612)	PASS	PASS	PASS	PASS	PASS
	Disinfection/reuse after explosive ordnance contamination, tested by the Robert Koch Institute (Gran PPE study)	PASS	PASS	PASS	PASS	PASS
PPE against particles including radioactive contamination	EN 1073-1: Protective clothing against solid airborne particles including radioactive contamination - Part 1: Requirements and test methods for compressed air line ventilated protective clothing, protecting the body and the respiratory tract (inward leakage test – partly tested for the VSF 21 series POLYRAN/SYKAN 2 in conjunction with powered filter units and EN 943; inward leakage tested according to EN 943 for CPS types 1a,1b and 1c).	PASS	PASS	PASS	PASS	PASS
PPE: use against particles, radioactive particle protection	EN 1073-2: Blocking behaviour against r. particles Protective clothing against radioactive contamination - Part 2: Requirements and test methods for non-ventilated protective clothing against particulate radioactive contamination (tested blocking behaviour according to EN 1073-2)	PASS	PASS	PASS	PASS	PASS
PPE: use in hazardous areas, antistatic discharge capability	according to EN 1149-5 (in combination with TESIMAX static inhibitor)	PASS	PASS	PASS	PASS	PASS
Comparison of EN 943 minimum requirements with other standards worldwide	EN/NATO standard, further standards & individual tests					
PPE: TESIMAX CHECK* national guidelines	e.g. according to DGUV bgi_guv_i_8671	PASS	PASS	PASS	PASS	PASS
PPE: TESIMAX CHECK* national guidelines	e.g. according to BGR 189-190	PASS	PASS	PASS	PASS	PASS
PPE: TESIMAX CHECK* national guidelines	e.g. according to AMR-14-2 – G26 (BAUA)	PASS	PASS	PASS	PASS	PASS
PPE: TESIMAX CHECK* national guidelines	e.g. according to NFPA (US standard)	PASS	PASS	PASS	PASS	PASS
PPE: TESIMAX CHECK* national guidelines	e.g. according to GOST-R (Russian standard)	PASS	PASS	PASS	PASS	PASS
PPE: TESIMAX CHECK* national guidelines	e.g. according to JIS T8xxxx (Japanese standard)	PASS	PASS	PASS	PASS	PASS
PPE: TESIMAX CHECK* national guidelines	e.g. according to ÖBFV En (Austrian EN standard)	PASS	PASS	PASS	PASS	PASS
PPE: TESIMAX CHECK* national guidelines	e.g. according to GA-GB (Chinese standard)	PASS	PASS	PASS	PASS	PASS
* The comparison (EN 943, national guidelines and worldwide standards) is based on a manufacturer’s assessment.		PASS	PASS	PASS	PASS	PASS
Advanced tests: high performance tests	Manufacturers’ & national/international standards					
Minimum tensile strength requirements	According to EN 943 (for fitted boots, glove exchange system with approx. 1500 N and valves)	PASS	PASS	PASS	PASS	PASS
Combat gases test: material/seam	According to Finabel 0.7 C	PASS (mustard gas)	PASS	PASS	PASS	PASS
Combat gas test: assemblages, closures, components (mask, boot, glove)	According to Finabel 0.7 C	PASS (mustard gas)	PASS	PASS	PASS	PASS
Reuse rate after use with mechanical strain	Up to 100%: fully reusable	PASS	PASS	PASS	PASS	PASS
Reuse rate after use with chemical contamination	Up to 100%: fully reusable	PASS	PASS	PASS	PASS	PASS
Application restriction/recommendation according to EN 943 (DGUV, VFDB)	Unlimited	PASS	PASS	PASS	PASS	PASS

Table 2: MECHANICAL PROTECTION – Classification according to EN 943

				POLRAN-L/S/	SYKAN 1	SYKAN 2	SYKAN 4	SILVERFLASH
			EN standard/approval	EN 943-1	EN 943-2	EN 943-2	EN 943-2	EN 943-2
Mechanical material/seam properties	**Minimum level according to EN 943 in conjunction with EN 14325**			**Mechanical classes**				
See MECH performance rating table	EN 943 Part 1 (Industry)	EN 943 Part 2 (Emergency Teams) – limited use	EN 943 Part 2 (Emergency Team) – reusable	**Real tested values according to EN 943 – EN 14325**				
Abrasion resistance / EN ISO 12947-2	3	4	6	6 (6) *	6 (6) *	6 (6) *	6 (6) *	6 (6) *
Flex cracking resistance / EN ISO 7854	1	1	4	6 (6) *	6 (6) *	6 (6) *	6 (6) *	5 (6) *
Flex cracking resistance at -30 °C / EN ISO 7855 (-30 °C)	2	2	2	6 (6) *	6 (6) *	6 (6) *	6 (6) *	6 (6) *
Tear propagation strength / EN ISO 9073-4	4	3	3	4 (6)	3 (6) *	4 (6) *	5 (6) *	6 (6) *
Tensile strength / EN ISO 13934-1	3	4	6	6 (6)	6 (6) *	6 (6) *	6 (6) *	6 (6) *
Puncture resistance / EN 863	2	2	3	3 (6) *	3 (6) *	3 (6) *	4 (6) *	5 (6) *
Seam strength / EN ISO 13935-2	5	5	5	6 (6) *	6 (6) *	6 (6) *	6 (6) *	6 (6) *
Zip seam strength	3	3	3	6	6	6	6	6
Flame retardance	1	1	3	2	3	3	3	3

Value (value*) = values based on module C 2, each with +/-tolerances due to CIP (*as well as as manufacturer's material performance data)

MECH	Abrasion resistance	Flex cracking resistance	Flex cracking resistance at -30 °C	Tear propagation strength	Puncture resistance	Permeation	Ignition	Seam strength	Permeation classes
Class 6	>2000	>50000	>4000	>150 N	>250 N	>480 min.	Passed*	>500 N	>480 min.
Class 5	>1500	>20000	>2000	>100 N	>150 N	>240 min.	-	>300 N	>240 min.
Class 4	>1000	>8000	>1000	>60 N	>100 N	>120 min.	-	>125 N	>120 min.
Class 3	>500	>3000	>500	>40 N	>50 N	>60 min.	-	>75 N	>60 min.
Class 2	>100	>1250	>200	>20 N	>10 N	>30 min.	-	>50 N	>30 min.
Class 1	>10	>500	>100	>10 N	>5 N	>10 min.	Not passed*	>30 N	>10 min.

MECH	Tensile strength
Class 6	>1000
Class 5	>500
Class 4	>250
Class 3	>100
Class 2	>60
Class 1	>30

Table 3a – CHEMICAL PROTECTION – Chemical permeation according to EN 943 – OVERVIEW 2020

			POLY-RAN-L/S	SYKAN 1	SYKAN 2	SYKAN 4	SILVER-FLASH
			EN 943-1	EN 943-2	EN 943-2	EN 943-2	EN 943-2
Chemical resistance	**Minimum performance class according to EN 943 in conjunction with EN 14325/ISO 6529**		**Chemical classes**				
	EN 943 minimum requirements	TESIMAX HPE requirements					
EN 943-1 Industry (one test chemical)	At least class 3 (for one test chemical)		Pass*/**	Pass*/**	Pass*/**	Pass*/**	Pass*/**
EN 943-2 ET/firefighters (15 test chemicals)	EN 943-1	At least class 2–6 (for 15 reference chemical)	-	Pass*/**	Pass*/**	Pass*/**	Pass*/**

*** For further chemical values, see chemical permeation tables for each material (user manual/certificate) and TESIMAX chem. permeation list (over 1000 substances listed, values for the whole suit, TESIMAX materials with maximum values for up to 8 h according to EN 14325. For permeation list, please enquire.)**

**** SYKAN/SILVERFLASH: Chemical permeation through contamination is effectively stopped already outside the fabric (material/seam with chemical barrier film – REAL REUSABLE)**

Table 3b – CHEMICAL PROTECTION – Chemical permeation according to standard EN 943 – MATERIALS 2020

	SYKAN 1		SYKAN 2		SYKAN 4		SILVERFLASH	
Hazardous material	Material	Seam	Material	Seam	Material	Seam	Material	Seam
Dichloromethane	6	6	6	6	6	6	6	6
Toluene	6	6	6	6	6	6	6	5
n-hexane	6	6	6	6	6	6	6	6
Methanol	6	6	6	6	6	5	6	6
Acetone	6	6	6	6	6	6	6	6
Ethyl acetate	6	6	6	6	6	6	6	6
Acetonitrile	6	6	6	6	6	6	6	6
Tetrahydrofuran	6	5	6	6	6	6	6	5
Diethylamine	6	6	6	6	6	6	6	6
Carbon disulphide	6	5	4	6	6	6	6	6
NaOH sol. 40%	6	6	6	6	6	6	6	6
Sulphuric acid 96%	6	6	6	6	6	6	6	6
Ammonia	6	6	6	6	6	6	6	6
Chlorine	6	6	6	6	6	6	6	6
Hydrogen chloride	6	6	6	6	6	6	6	6

Table 3c: CHEMICAL PROTECTION – Chemical permeation according to standard EN 943 – COMPONENTS 2020

	Visor		Face seal			Gloves	
	VS 5	VS 20	Without mask	With mask	WIPAN CK-PRO	WIPAN C WIPAN CK	WIPAN B+ WIPAN CK+
Dichloromethane	6	6	1	3	3	2	3 / 6
Toluene	6	6	2	3	6	6	6
n-hexane	6	6	1	3	6	6	6
Methanol	6	6	6	6	6	4	6
Acetone	6	6	6	6	4	1	6
Ethyl acetate	6	6	5	6	2	1	6
Acetonitrile	6	6	6	6	2	2	6
Tetrahydrofuran	6	6	2	3	1	1	6
Diethylamine	6	6	1	3	3	3	6
Carbon disulphide	6	6	6	3	5	6	6
NaOH sol. 40%	6	6	6	6	6	6	6
Sulphuric acid 96%	6	6	6	6	6	6	6
Ammonia	6	6	6	6	6	6	6
Chlorine	6	6	6	6	6	6	6
Hydrogen chloride	6	6	6	6	4	6	6
	Without tear-off visor		Must only be used with a mask		Over- and undergloves for special applications please enquire / **P**		

P: see permeation list for further information

Table 3c: CHEMICAL PROTECTION – Chemical permeation according to standard EN 943 – COMPONENTS 2020

	Boots		Footlets made of suit fabric		Zip (HPE-HPP)	
	HPE CHEM	HPE ULTRA CHEM/**P**	Suit fabric	Plus boots	Zip without cover	Zip with cover
Dichloromethane	***	3 / 6	SILVERFLASH and SYKAN models with HPE ULTRA CHEM = Class 6 for all reference chemicals plus boots. For POLYRAN (SUPERLIGHT) and HPE CHEM, the class results from the permeation sum of the material and selected boots according to their properties.		4	6
Toluene	***	6 / 6			6	6
n-hexane	4	6 / 6			6	6
Methanol	***	6 / 6			6	6
Acetone	***	6 / 6			6	6
Ethyl acetate	***	6 / 6			6	6
Acetonitrile	***	6 / 6			6	6
Tetrahydrofuran	***	6 / 6			6	6
Diethylamine	***	6 / 6			6	6
Carbon disulphide	***	6 / 6			4	6
NaOH sol. 40%	6	6 / 6			6	6
Sulphuric acid 96%	6	6 / 6			6	6
Ammonia	6	6 / 6			6	6
Chlorine	6	6 / 6			6	6
Hydrogen chloride	6	6 / 6			6	6
	***For further values, please enquire					

Table 4: CHEMICAL PROTECTION – thermal properties/tests according to standard

				POLYRAN-L/S	SYKAN 1	SYKAN 2	SYKAN 4	SILVERFLASH
Thermal behaviour: Material/seam properties	**Min. performance class acc. to EN 943**			**Thermal classes**				
STANDARD TEST REUSABLE CPS – contact heat - Short-term contact at up to approx. 850 °C for >5 seconds with gas tightness test	Class 1 (1 seconds)	Class 2 (3 seconds)	Class 3 (5 seconds)	Class 2	Class 3	Class 3	Class 3	Class 3
STANDARD TEST according to Methods of test - Part 4: Flame test; German and English version (pr)EN 13274-4:2019				Pass	Pass	Pass	Pass	Pass
Thermal behaviour: + 4 h conditioning at approx. -30 °C/+20 °C up to approx. +65 °C (according to EN 943/EN ISO 139)				Pass	Pass	Pass	Pass	Pass
Thermal behaviour: + Contact heat (tested by TESIMAX) – short-term contact at up to approx. 850 °C for > 5 seconds				-	Pass	Pass	Pass	Pass
Thermal behaviour: + Contact heat (tested by TESIMAX) – short-term contact at up to approx. 850 °C for > 10 seconds				-	Pass	Pass	Pass	Pass
Thermal behaviour: + Superheated steam (tested by TESIMAX) – at about 350 °C for up to 30 seconds				-	Pass	Pass	Pass	Pass
Thermal behaviour: + Flashover test approx. 850 °C for 8 s (verified by inspection body)				-	-	-	Pass	Pass
Thermal behaviour: – Protective suit for not less than 4 h at a temperature of -30 ±3 °C (according to EN 943)				Pass	Pass	Pass	Pass	Pass
Thermal behaviour: Material tested by TESIMAX, (climatic test), short-term contact at down to -80 °C verified by inspection body				-	Pass	Pass	Pass	Pass
Thermal behaviour: - Material tested by TESIMAX, (climatic test), short-term contact at -80 to approx. -100 °C (verified by inspection body)				-	-	-	Pass	Pass
Thermal behaviour: - Material tested by TESIMAX (liquid nitrogen), short-term contact at approx. -196 °C for >10 s (verified by inspection body)				-	-	-	Pass	Pass
Protective clothing – Clothing for protection against heat and flame – Minimum performance requirements EN ISO 11612:2015)				-	-	-	-	Pass*

*Performance classes: A1, A2, B1, C3, D3, E3, N.A., W11

Size chart, VS 5/VSF 5/VSF 21 and VS 20/VSF 20 series

Suit size	Overall height Stretched	Waist Circumference without backpack	Shoulder or sleeve length to gloves	Crotch to shoulder	Boot size Model: see * Standard: 46	Glove size (standard) Model: see Gloves table
S	Approx. 200 cm	Approx. 138 cm	Approx. 79 cm	Approx. 83 cm	43-48	10
M	Approx. 205 cm	Approx. 144 cm	Approx. 81 cm	Approx. 87 cm	43-48	10
L	Approx. 210 cm	Approx. 150 cm	Approx. 83 cm	Approx. 91 cm	43-48	10
XL (standard)	Approx. 215 cm	Approx. 156 cm	Approx. 85 cm	Approx. 95 cm	43-48	10
XXL	Approx. 220 cm	Approx. 162 cm	Approx. 87 cm	Approx. 99 cm	43-48	10

Body size chart/label

Size	Chest measurement	Height
S	92-98 cm	150-165 cm
M	96-102 cm	160-175 cm
L	100-107 cm	170-185 cm
XL (standard)	105-113 cm	180-190 cm
XXL	110-118 cm	190-200 cm

The following applies to all limited-use protective suits:
For further information on body size, see the respective usage instructions, available on request from TESIMAX.

Size chart, GS 3/GS 3 M series

Suit size	Overall height Stretched	Waist Circumference without backpack	Shoulder or sleeve length to gloves	Crotch to shoulder	Boot size Model: see * Standard: 46	Glove size (standard) Model: see Gloves table
S	Approx. 205 cm	Approx. 105 cm	Approx. 58 cm	Approx. 85 cm	43-48	10
M	Approx. 210 cm	Approx. 110 cm	Approx. 60 cm	Approx. 90 cm	43-48	10
L	Approx. 215 cm	Approx. 115 cm	Approx. 62 cm	Approx. 95 cm	43-48	10
XL (standard)	Approx. 220 cm	Approx. 125 cm	Approx. 65 cm	Approx. 100 cm	43-48	10
XXL	Approx. 225 cm	Approx. 130 cm	Approx. 68 cm	Approx. 105 cm	43-48	10

Body size chart/label

Size	Chest measurement	Height
S	92-98 cm	150-165 cm
M	96-102 cm	160-175 cm
L	100-107 cm	170-185 cm
XL (standard)	105-113 cm	180-190 cm
XXL	110-118 cm	190-200 cm

* Model SYKAN-SV: STANDARD: HPF
Ultra Chem Black SA-BF (alternatively: Ultra Chem Green Hazguard® EN) /
POLYRAN model: HPF Chem Black Acifort® EN

GLOVE MODEL (5-finger protective gloves)	Size	Protective suit	Material
Limited-use protective suits			
NEO NBC elastomer protective glove	7-11 (depending on size)	ESK 1 PE-D+ and VSF 21 PE-D	Duoform
NEO NBC elastomer protective glove	7-11 (depending on size)	S3 PE+	Tessaform
NBC barrier protective glove (over- and undergloves recommended, optional)	7-11 (depending on size)	S3 PE++, S5 PE-T and VSF 21 PE-T	Tessaform
Reusable protective suits (Real Reusable)			
5-finger protective glove MECH-BLUE 351	8-10	VS 5, VS 20, VSF 5/20, GS 3 (M), VSF 21	POLYRAN-L/-S
WIPAN B+ system: CBRN protective glove (IIR) in combination with integrated chemical protection barrier (HPP)/BW underglove	7-11	VS 5, VS 20, VSF 5/20, GS 3 (M), VSF 21	SYKAN/SILVERFLASH/ CHEMBA
WIPAN C system: CBRN protective gloves (HPE elastomer with triple protection) and integrated liner, with replacement system	9-10	VS 5, VS 20, VSF 5/20, GS 3 (M), VSF 21	SYKAN/SILVERFLASH
WIPAN CK system: CBRN protective gloves (HPE elastomer with triple protection) and integrated liner, reinforced with para-aramid	9-10	VS 5, VS 20, VSF 5/20, GS 3 (M), VSF 21	SYKAN/SILVERFLASH
WIPAN CK+ system: CBRN protective gloves (IIR) in combination with integrated chemical protection barrier (HPP) and integrated liner, reinforced with para-aramid	7-11	VS 5, VS 20, VSF 5/20, GS 3 (M), VSF 21	SYKAN/SILVERFLASH
WIPAN CK-PRO system: CBRN protective gloves and integrated liner, reinforced with para-aramid	8-11	VS 5, VS 20, VSF 5/20, GS 3 (M), VSF 21	SYKAN/SILVERFLASH
OVERGLOVES (optional)			
MECH BLUE 351 overgloves (mechanical protection, short cuff)	8-10	All	All
MECH BLACK overglove (mechanical protection, long cuff, own production)	12	All	All
MECH SILVER overglove (mechanical protection, long cuff, own production)	12	All	All
Overglove 1000 V (electrical insulation protection, long cuff)	7-11	All	All
UNDERGLOVES (optional)		All	All
Underglove ESD (for optimisation of electrical discharge, arc fault protection, for all CPS	7-11	All	All
Underglove cotton (for ESK series and WIPAN B+ protective glove system)	6-11	All	All

PERFORMANCE in hazardous areas

What are Ex (explosion risk) areas?
According to the German ordinances on occupational safety and hazardous substances (BetrSichV and GefStoffV), an explosion risk area – also referred to as ex-area, hazardous area or hazardous location (HazLoc) – is an area in which an hazardous explosive mixture of air and flammable gases, vapours or mists is present either continuously, for long periods or frequently.

What is an explosion risk area?
An explosion risk (or hazardous) area is a place where a potentially explosive atmosphere may occur. A potentially explosive atmosphere exists when a mixture of gases, vapours, mists or dusts combines in such a way that it can ignite under certain conditions.

Classification into equipment groups
Equipment is divided into groups I and II, whereby group I covers underground/deep mining and group II all other applications.

Zone classification
Potentially explosive areas are classified into six zones, the classification being based on the likelihood, likely duration and likely frequency of a hazardous explosive atmosphere occurring. A distinction is made between flammable gases, mists, vapours and flammable dusts.

EN 1149-5: Protective clothing - Electrostatic properties - Part 5: Material performance and design requirements: What does this standard cover?
Antistatic clothing prevents electrostatic charges from creating sparks that can cause a fire or explosion.
The pictogram for this standard is a lightning bolt with the standard designation EN 1149-5 below it.
The standard specifies the requirements for electrically conductive protective clothing. This protective clothing is part of a fully earthed system (e.g. in combination with conductive footwear: see FIREMAN SA/BF and TESIMAX FR Safe/Shield clothing and socks) and prevents sparks and thus explosions. Clothing that complies with this standard should always also comply with the standard for flame-retardant clothing (EN 531 or ISO 11612). Areas of application are places where there is a risk of explosion and therefore fire. Protective clothing that complies with the EN 1149-5 standard is often used in companies that have to comply with the ATEX directive.

TESIMAX chemical protective clothing complies with the requirements of EN 1149-5.
The TESIMAX ANGEL SENSOR SYSTEM complies with the ATEX directive. Contact us for further details.

		POLY-RAN-L/S/SU-PERLIGHT	Duoform Tessaform CHEMBA	SYKAN 1/2/4	SILVERFLASH
Zone 0	An area in which an explosive atmosphere consisting of a mixture of air with flammable substances in the form of gas, vapour or mist is present continuously or for long periods.	✓	✓	✓	✓
Zone 1	An area in which an explosive atmosphere consisting of a mixture of air with flammable substances in the form of gas, vapour or mist is likely to occur under normal operating conditions.	✓	✓	✓	✓
Zone 2	An area in which an explosive atmosphere consisting of a mixture of air with flammable substances in the form of gas, vapour or mist could occur under abnormal conditions and is not likely to occur under normal operating conditions.	✓	✓	✓	✓
Zone 20	An area in which an ignitable concentration of dust is present in the air continuously, for long periods or frequently.	✓	✓	✓	✓
Zone 21	An area in which an ignitable concentration of dust in the air is likely to occur occasionally under normal operating conditions.	✓	✓	✓	✓
Zone 22	An area in which an ignitable concentration of dust in the air may occur for brief periods and is not likely to occur under normal operating conditions.	✓	✓	✓	✓

The Ex (explosion risk) zone classification tests were carried out at 23 °C and 30% relative humidity (inside and outside). For an optimal result (for the reusable
protective suits), we use TESIMAX static inhibitor. This is applied to the protective suits at the factory (5-year storage capability with SMART STOCK packaging). The protective suit made of SILVERFLASH fabric is permanently conductive due to its chemical barrier outer layer (colour: silver metallic).

Note that only the clothing fabric is dissipative. Work in explosion risk zones: In your risk assessment, take into account that the integrated socks can have an insulating effect. It may therefore not be possible to earth the protective suit and wearer via the footwear, so that other measures must be taken to earth the suit and wearer. We recommend TESIMAX Safe/Shield or THERMO-FLEECE functional wear and socks treated with static inhibitor.

To avoid sparks generation, make sure that protective clothing and wearer are properly earthed. Note: Work and (TESIMAX) protective clothing must not be changed in explosion risk areas, i.e. donned and doffed, if there is a risk of minimum ignition spark energy.