

Operating Manual

CHEMPION ELITE S

Chemical Protective Suit Type 1a EN 943-2:2002

Limited Use



D3020049/05

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1. Safety Regulations

1.1 Correct Use

The chemical protective suit CHEMPION ELITE S (hereinafter referred to as protective suit) is particularly intended to protect the wearer's skin from danger caused by toxic agents as well as oxygen deficiency. As total encapsulating protective clothing it is worn over working clothes and the protective breathing apparatus. It offers excellent protection in emergencies, decontamination work, securing leaks or similar.

The protective suit does not provide protection against heat or cold and is not itself a complete breathing protection apparatus. It must be worn in conjunction with a compressed air breathing apparatus:

- | | |
|------------|------------------|
| ▪ BD N | ▪ BD AE |
| ▪ BD 283 | ▪ BD ESA |
| ▪ BD 296 N | ▪ BD AutoMaXX AS |
| ▪ DA 300 | ▪ BD 88/96 AS |
| ▪ DA 300-2 | ▪ BD AirMaXX |
| | ▪ BD AirGo |



The following combinations of protective equipment have been tested and approved. Other combinations are not tested and approved. For non-approved combinations, the user must independently determine whether such combination is appropriate.

The protective suit meets all requirements for type 1a EN 943-2. The protective suit described in this operating manual comply with the European Directives 89/686/EEC. The EC type examination was carried out by the DEKRA EXAM GmbH (Dinnendahlstr. 9; D-44809 Bochum).

- Reference number of the organisation concerned: 0158
- EC certificate No.: 3981A/00/85 PSA, Revision 01

Surveillance acc. Article 11B : DEKRA EXAM GmbH, Zertifizierungsstelle, Dinnendahlstr. 9, 44809 Bochum



Attention!

Wearing a protective suit and a compressed air breathing apparatus will put a physical strain on the wearer. Wearing the protective suit for extended periods can cause heat stress. The wearer must, therefore, be suited to wearing the protective suit (good health, possibly carry out a preventive medical examination first). Moreover, when in use, regional guidelines and accident prevention regulations must be observed.

The operating time must be limited in accordance with specific national regulations.

During application proper safety measures must be taken and observed.



Attention!

The protective suit must not be used in intense heat or if sparks or flames from igniting chemicals can be expected.

It is imperative that this operating manual be read and observed when using the protective suit. In particular, the safety instructions, as well as the information for the use and operation of the apparatus, must be carefully read and observed. Furthermore, the national regulations applicable in the user's country must be taken into account for a safe use.



Danger!

This product is supporting life and health. Inappropriate use, maintenance or servicing may affect the function of the device and thereby seriously compromise the user's life.

Before use the product operability must be verified. The product must not be used, if the function test is unsuccessful, it is damaged, a competent servicing/maintenance has not been made, genuine MSA spare parts have not been used.

Alternative use, or use outside these specifications will be considered as non-compliance. This also applies especially to unauthorised alterations to the product and to commissioning work that has not been carried out by MSA or authorised persons.

1.2 Liability Information

MSA accepts no liability in cases where the product has been used inappropriately or not as intended. The selection and use of the product are the exclusive responsibility of the individual operator.

Product liability claims, warranties also as guarantees made by MSA with respect to the product are voided, if it is not used, serviced or maintained in accordance with the instructions in this manual.

2. Design of the Protective Suit

2.1 Design

The one-piece suit is made of a composite multilayer material bonded to a microfiber synthetic substrate. It has a replaceable lens with antimist coating, solidly attached and replaceable gloves and boots, a gastight zipper and two suit valves.

The back part is prepared for wearing a compressed air breathing apparatus under the protective suit. The head part in the protective suit is spacious enough to allow a protective helmet to be worn under the protective suit. The zip runs vertically on the front from the right leg up to the head section.

2.2 Operation

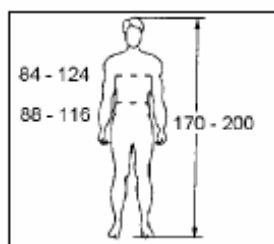
Breathable air is supplied from the compressed air breathing apparatus that is worn on the back. The exhalation air passes through the exhalation valve of the facepiece into the inside of the suit and then through the suit valves to the ambient atmosphere.

2.3 Technical Data

Protective suit, complete, but without compressed air breathing apparatus and full facepiece:

Weight: approx. 6,5 kg

Size according to EN 340: universal size



Gloves: Size 10

Safety high boots:
Size 11½ [46/47]



If the suit was contaminated, it must not be reused. The chemical protective suit must not be used if it has been damaged or torn.

2.3.1 Mechanical Performance of the Suit Material according to EN 943-1

Performance Requirement	Classification
Abrasion Resistance EN 530	6
Stability to Heat (Blocking Resistance) ISO 5978	2
Flex Cracking ISO 7854	1
Flex Cracking at -30 °C	2
Trapezoidal Tear Resistance ISO 9073-4	6
Burst Resistance ISO 2960	4
Puncture Resistance EN 863	4
Resistance to Ignition EN 1146	1
Seam Strength ISO 5082 A2	6

2.3.2 Resistance to Permeation by Chemicals according to EN 943-2

Chemical Substance	Suit-material Classification	Seam Classification	Inner Gloves Classification	Visor Classification	Boots Classification	ZIP Classification
Acetone	5	5	4	5	3	1 ⁾
Acetonitrile	5	5	6	5	4	3
Ammonia (gas)	5	5	6	5	6	6
Chlorine (gas)	5	5	6	5	6	6
Hydrogen Chloride (gas)	6	6	6	6	6	6
1,2-Dichloromethane	4	4	2	4	2	2
Diethyl Amine	3	3	1 ⁾	3	5	2
Ethyl Acetate	5	5	2	5	4	1 ⁾
n - Heptane	5	5	6	5	6	6
Carbon Disulphide	5	5	6	5	3	4
Methanol	5	5	6	5	6	6
Sodium Hydroxide 40 %	6	6	6	6	6	6
Sulfuric Acid 96 %	5	5	6	4	6	6
Tetrahydrofurane	5	5	1 ⁾	5	4	1 ⁾
Toluene	5	5	6	5	5	1 ⁾

⁾ **Note:** Not suitable for use with these chemicals under continuous exposure.

Manufacturer recommendation: using in accordance with the scope of delivery with over glove results in class 2 of the glove components for both chemicals after tests. Without impairing the tightness with regard to the tested chemicals it can lead to material changes depending on the operating conditions.

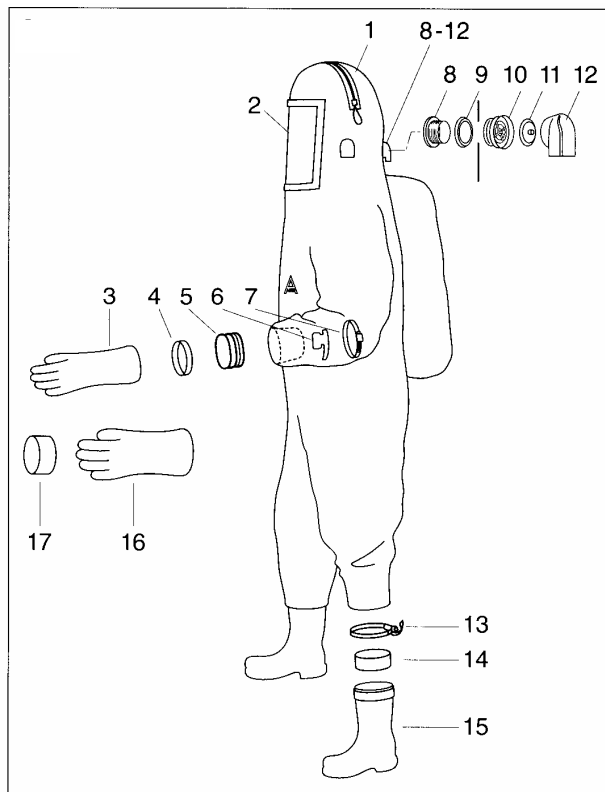


Fig. 1 Design of the protective suit

1. Suit shell
2. Lens
3. Inner gloves
4. Rubber ring
5. Tube piece
6. Clamp protection
7. Screw and nut clamp
- 8.-12. Suit valve
 8. Threaded ring
 9. Slide ring
 10. Valve housing
 11. Valve disc
 12. Valve cover
13. Clamp
14. Tube
15. Boot
16. Outer glove
17. Cuff tube

3. Use

Prior to donning, assure that equipment is complete, e.g. suit valves. To keep the mask lens fog-free treat the outside with an antimist agent.

3.1 Clothing

The following clothing is recommended to be worn underneath the protective suit:

- cotton underwear and socks
- coverall with legs and sleeves that can be closed tightly or firefighter's uniform
- protective helmet (e.g. firefighter's helmet)



When the protective suit is worn in cold ambient temperatures, additional thermal clothing is recommended.

3.2 Donning the Protective Suit

When donning the protective equipment assistance from a second person is recommended.

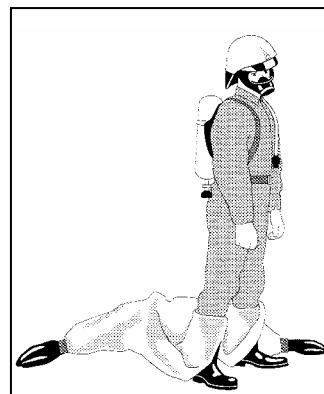


Fig. 2: Don compressed air breathing apparatus and full face mask according to respective Instructions for Use and completely open cylinder valves.
Put on helmet.
Step into legs of suit.

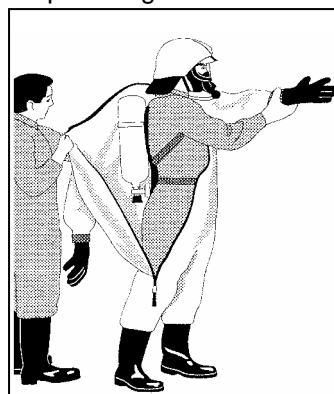


Fig. 3: Pull up suit.
Slip into left sleeve.
Pull back of suit over compressed air breathing apparatus.
Slip into right sleeve.

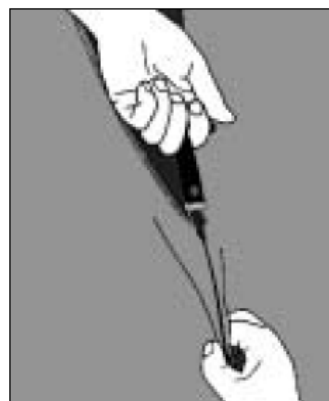


Fig. 4: Pull up zipper without unnecessary force, a section at a time, stretching the zipper with one hand while slowly pulling up the fastener with the other. Close the zip cover.



Attention!

Never force the two zipper halves together through stronger pulling. A forcible closing may permanently damage the zipper which could cause it to break open during use.

In case when closing the zipper the slider requires excessive force or is blocked, check whether the zipper is sufficiently lubricated or whether it is blocked by a foreign object. In this case pull the zipper back a little, remove the cause of the obstacle and slowly close the zipper.

3.3 Removing the Protective Suit

If the suit is heavily soiled, a preliminary cleaning should be done while it is still on the man. This is done with water and, if necessary, with detergent additives. Care must be taken that any assistant is wearing proper personal protective equipment, for example, protective gloves, respiratory protection, protective clothing.

When removing the protective suit, avoid contact with the soiled outside of the suit.

3.4 Disposal of Contaminated suits

The protective clothing itself does not require any special handling with regard to disposal. However, the disposal of contaminated protective suits is carried out in accordance with local legislation depending on the extent of the contamination through toxic waste.

4. Care and Maintenance

4.1 Cleaning

In case the protective suit has come into contact with chemicals and if these cannot be removed or have damaged the suit, the suit must be properly disposed of, together with the other materials. After wearer trials, the protective suit can be washed at 30 °C with water containing a mild detergent. (No washing machine!). Prior to washing, remove valve discs, boots, back reinforcement, and if necessary, gloves. Reassemble after drying.

In case other detergents or processes are to be used, their suitability must be confirmed by the detergent manufacturer.

Afterwards the opened suit is hung up by the boots. The protective suit and the removed parts must not be dried in radiant heat (sun-light, radiator). When using a drying cabinet the temperature must not exceed +40 °C. After the protective suit has been cleaned, the zipper must be cleaned separately with water and a brush or paintbrush removing all foreign objects like bristles, hairs, threads etc. Never scratch clean with hard or sharp objects.

4.2 Disinfection

After cleaning, the suit is to be disinfected using e.g. "AUER 90" disinfectant (see Ordering Information). Observe the Instructions for Use of the disinfectant.

4.3 Maintenance

After each application or after 6 months, a pressure/tightness test of the suit, the mask and the suit valves must be made with the MSA AUER suit test kit and 3 S test kit and the valve test connector. For further maintenance work see section 5.

4.4 Tightness Test of the Protective Suit

After each cleaning / disinfection, after each maintenance / repair or on a half-yearly basis, a tightness test of the protective suit must be performed. In order to do so use the MSA suit tightness tester kit with the valve leak test adapter. The valves can be tested using a mask testing instrument in conjunction with the valve leak test adapter and the compensation container.

The test instruments can be ordered separately at MSA.



Only inflate the protective suit with clean oil-free compressed air (breathable air quality in accordance with EN 12021) to ensure that after the tightness test there are no residues left in the suit



In order to avoid erroneous measurement perform the test in a draught-free room.

4.4.1 Test according to EN 464

- (1) Remove the valve discs and angled prechambers, close the valve bodies with the valve closing cap (this can act simultaneously as a test and/or filling connection).
- (2) Inflate the suit to 18 mbar positive pressure. Whilst doing so the pressure must be held for 10 minutes at 17.0 ± 0.5 mbar.
- (3) Reduce positive pressure to 16.5 ± 0.3 mbar (test pressure). The maximum permitted pressure drop in 6 min: 3 mbar.
- (4) At the end of the test, reassemble the valve discs and the angled prechambers.
- (5) Then perform a valve tightness test.

4.4.2 In practice the following maintenance test has divergently been tried and tested

- (1) Remove the valve discs and angled prechambers, close the valve bodies with the valve closing cap (this can act simultaneously as a test and/or filling connection).
- (2) Inflate protective suit 18 ± 0.5 mbar positive pressure.
- (3) Stabilising time approx. 3 min.
- (4) Reduce positive pressure to 16 ± 0.5 mbar (test pressure). The maximum permitted pressure drop is in 3 min: 2 mbar.
- (5) At the end of the test reassemble the valve discs and angled prechambers.
- (6) Then perform a valve tightness test.
In the event of doubt, check in accordance with EN 464 (see above).

4.4.3 Checks in case of leaks

If leaks are detected during the tightness test it must be checked whether

- the test instrument is tightly connected to the valve,
- the zip is fully closed and tight,
- the valves are properly assembled.

4.5 Visual Checks

Visual slight abrasions as well as slight discolorations on the outside of the suit do not reduce its protective performance against chemicals.

The emergence of age resistors during storage does not reduce the quality of the boots.

4.6 Maintenance Intervals

Work to be performed	Intervals			
	Prior to each use	After each use	Semi-annually	Every two years
Maintenance		X	X	
Function and leak test		X	X	
Valve disc replacement				X
Gasket replacement (exhalation valve)				X
Check by user	X			
Zipper maintenance (Sect. 6.2)		X	X	

4.7 Repairs

Repair of suit material and seams as well as replacement of the zipper may only be performed by the manufacturer or by authorized service centers.

Only original MSA AUER spare parts may be used for repairs.

5. Maintenance Work

5.1 Suit Valves

After each repair or cleaning a tightness test of the suit valves is to be done with the mask tightness tester in combination with valve test adapter and compensation container:

- create a negative pressure of 10 mbar
- max. pressure change within one minute must not exceed 1,0 mbar

In case of a leak either the valve disc or the entire valve assembly must be replaced. To do this, the threaded ring is unscrewed from the inside of the suit using the special tool (see Ordering Information). Regardless of the above measures, it is recommended to replace the valve discs every two years (Fig.1).

5.2 Zipper

The zipper needs to be treated with the grease pencil or zipper spray in such a way that only a thin lubricant film covers the metal links. See following figure for area to be lubricated:



Fig. 5

5.3 Replacing the Lens

The lens can be replaced by especially trained persons following the respective instructions.

5.3.1 Removal

- Cut out old lens with sharp scissors. Leave an edge of approx. 2 cm.



Caution!

Be sure not to damage the suit material!

5.3.2 Installation of new lens

The new lens is supplied with an adhesive tape (inside) and a bonding tape, as well as a cover tape.

- Place head part of suit flat down.
- Beginning at a corner, pull off a few centimetres of protective paper from adhesive tape.
- Position new lens with adhesive tape to the inside onto the remaining edge, starting at a corner, and press together lightly.
- Pull off remaining protective paper in sections of approx. 10 cm, position lens and press together firmly.
- Assure the connection is free from creases!
- Apply cover tape onto suit material and bonding tape with heat sealing equipment all around the lens.



Attention!

When applying the cover tape, place paper between cover tape and heat sealing equipment.

- Afterwards check suit for tightness.

We recommend to have the lens replacement performed by MSA.

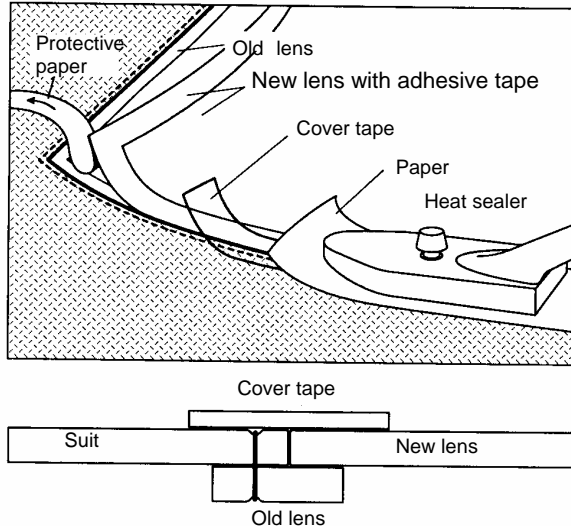


Fig. 6

5.4 Replacing the Gloves

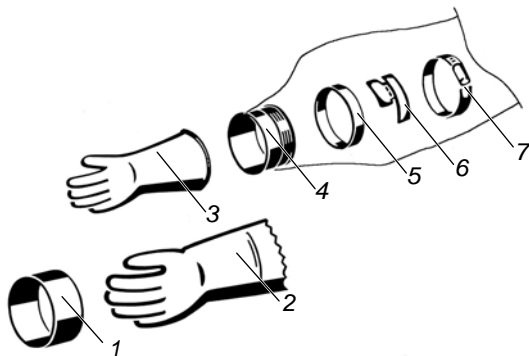


Fig. 7 Gloves

- | | |
|---|-----------------------|
| 1 Cuff tube (protective rubber) for outer glove | 5 Rubber ring |
| 2 Outer glove | 6 Clamp protection |
| 3 Inner glove | 7 Screw and nut clamp |
| 4 Tube piece | |

5.4.1 Disassembling the Outer Gloves

- Pull off cuff tube.
- Pull off outer glove.

5.4.2 Disassembling the Inner Gloves

- Open zip fully.
- Turn the sleeves of the protective suit inside out.
- Loosen screw and nut clamp (SW7).
- Pull out tube piece with glove.
- Pull glove off tube piece.

5.4.3 Reassembling the Inner Gloves



Attention!

In order to guarantee full tightness, check the tightness of the suit after each glove replacement before fitting the outer gloves.

- Insert tube piece into glove cuff.
- Insert tube piece and glove into the sleeve.
- Align glove.
- Fit the screw and nut clamp on.
- Fit clamp protector under clamp.
- Turn clamp lock of the screw clamp on the seam.
- Tighten screw and nut clamp with SW7, tightening torque: 400 ± 30 Ncm.
- Push inner glove to the outside.



Ensure that the clamp lock is on the seam and that the clamp protector covers the clamp lock.

5.4.4 Reassembling the Outer Gloves

- Takes place only after successful tightness test of protective suit.
- Pull the outer glove over the inner glove.
- The inner roll of the outer glove must be fitted into the groove of the tube piece.
- Then assemble the cuff tube.

5.5 Replacing the Safety High Boots

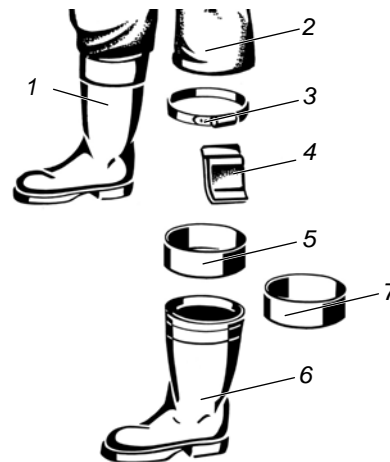


Fig. 8 Safety high boots

- | | |
|-----------------------------|---|
| 1 Safety high boot complete | 5 Tube piece |
| 2 Protective suit leg | 6 Safety high boot |
| 3 Screw and nut clamp | 7 Cap tube (protective rubber) for safety high boot |
| 4 Clamp protection | |

5.5.1 Removing the Safety High Boots

- Remove cap tube from the boot shaft.
- Open protective suit zip fully.
- Turn protective suit legs inside out.
- Loosen and remove screw and nut clamp (SW7).
- Pull out tube piece.
- Remove safety high boot from the protective suit leg.

5.5.2 Reassembling the Safety High Boots



Attention!

In order to guarantee full tightness, check the tightness of the suit after each replacement of the safety high boots before the cap tube is fitted over the shaft of the boot.

- Push safety high boot into the suit leg that was turned inside out.
- Align suit leg and boot.
- Insert tube piece in the boot shaft.
- Fit the screw and nut clamp on.
- Turn clamp lock towards the rear.
- Fit clamp protector under clamp.
- Tighten screw and nut clamp with SW7, tightening torque: 500 ±30 Ncm.
- Clamp protection must cover the clamp lock.
- Push safety high boot to the outside.
- After tightness test, fit cap tube over shaft of boot.

6. Transport and Storage



Attention!

When storing the protective suit on vehicles or containers abrasion through permanent friction with the contact surface has to be avoided.



Attention!

In order to prevent damage to the protective suit, the material, seams, and zip must not be forcibly kinked or folded!

The zip should remain closed during storage.

The suit can, for example, be loosely folded as a large package.

The protective suit is supplied folded and pressure-free. Storage must be in a loosely folded pack in clean and dry conditions in a normal atmosphere free from toxic substances, protected from direct sunlight and temperature changes (according to DIN 7716 and ISO 2230).

The operational life can change as a result of environmental influences, such as UV light, heat, humidity. The storage room must be cool, dry, dust-free and well ventilated.

The storage temperature is between -5°C and +25°C. The optimum storage temperature is between +15°C and +25°C, since in the long-term there could otherwise be a change in the physical properties or a shortening of the service life.

The relative air humidity is best at under 65%.

7. Ordering Information

Description	Part No.
Chemical protection suit	
CHEMPION ELITE S	D3020895
Gloves	
Replacement gloves, inner size 9	10068292
Replacement gloves, inner size 10	10068293
Replacement gloves, inner size 11	D3022721
Replacement gloves, outer size 9	10092112
Replacement gloves, outer size 10	10092113
Replacement gloves, outer size 11	10144803
Replacement gloves, outer size 14	
[K-MEX Gigant N]	10092116
Textile gloves [Packet with 5 pairs]	D3022719
Cuff tube glove [pair]	D008866-SP
Safety high boots	
Boot size 9 [43/44]	10053171
Boot size 10 [45]	10053172
Boot size 11½ [46/47]	D3022705
Cap tube for safety high boot [pair]	D3020063
Spare Parts / Accessories	
Disinfectant AUER 90 (2 l)	D2055765
Disinfectant AUER 90 (6 l)	D2055766
Compensation container	D3022717
Gasket for exhalation valve 40x30x1	D3022076
Valve test connector	D5065989
Protective suit tightness test kit	D3022800
Mask tightness test kit	D6063705
Exhalation Valve Closure 3S mask/CPS	D5135047-SP
Syntheso W zip lubricant spray	D3022180
Antimist agent klar-pilot spray	10032164
Spare lens replacement set	D3022749
Heat sealing equipment	D3022750

See respective order catalogs for further accessories, e.g. full face mask AUER 3 S, compressed air breathing apparatus, etc.

