



SE-shield

Personal protective ensemble

Tychem F[®] Single-Use
Suit and Hood



User instructions

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User instructions for SE-shield ensemble

Tychem F[®] Single-Use Suit S-TYVF

Tychem F[®] Single-Use Hood H-TYVF

SE-shield is a range of SEA personal protective ensembles for use in hazardous environments.

Each SE-shield ensemble consists of a pressurised protective suit integrated with an S.E.A. FPBR (fan-supplied positive-pressure breath-responsive respirator). By directing a small amount of filtered air from the respirator into the suit via a special SE-shield breathing hose, positive pressure is maintained inside the suit. This provides added body protection and perceived cooling without reducing the respirator's high level of breathing protection.

WARNING! Tychem F[®] material is not flame-resistant and should not be used around heat, flame, sparks, or in potentially flammable or explosive environments.

WARNING! All Tychem[®] materials cause electrostatic discharge under some conditions. Do not use in explosive atmospheres or in atmospheres containing hydrogen or enriched oxygen. For more information contact SEA.

WARNING! Tychem F[®] sock booties are not slip-resistant. Outer footwear with anti-slip soles should always be worn.

IMPORTANT! SE-shield suits should be used only by trained personnel and in accordance with these user instructions.

IMPORTANT! SE-shield suits should always be used with SE-shield pressurisation breathing hose and dual batteries.

Note: Refer to the SE400 User Instructions for proper use of the respirators.

Note (USA only): SE-shield suits for 2-filter SE400s are approved by NIOSH as accessories. SE-shield suits are not approved as protective suits in the USA and have not been tested or approved by NIOSH as protection against any contaminants which may penetrate the suit and/or attack the skin.

SE-shield Tychem F[®]

- Disposable, light-weight, single-use suit
- Chemically impermeable Du Pont Tychem F[®] material
- Integrated, barrier film polymer gloves
- Integrated sock booties in Tychem F[®] material
- Elasticised cuffs around demand valve and visor
- Protects against particles and gases
- Recommended by SEA for domestic preparedness applications, with high permeation resistance to war agents such as mustard gas and Sarin
- Optional disposable, single-use outer hood for even greater protection

Suit sizes

The suits are available in the following sizes to suit the wearer:

Suit size	Wearer height cm (feet/inches)	Chest/bust cm (inches)
L	170–182 (5'7" –6'0")	88–96 (35" –38")
XL	182–194 (6'0" –6'4")	96–104 (38" –41")
XXL	188–200 (6'2" –6'7")	100–108 (40" –43")
XXXL	200–212 (6'7" –6'11")	104–116 (41" –46")

Note: Where a wearer's height and chest/bust dimensions give different suit sizes, use the larger suit size.

Unpacking

Each suit is vacuum packed with the following items:

- SE-shield disposable suit
- Cotton inner gloves for comfort
- User instructions

Note: When breaking the packaging, take care not to puncture the suit.

Storage

Store the suit and hood in a cool, dry place. Avoid direct sunlight.
Avoid storing near sharp objects.

When stored correctly and with packaging seal unbroken, storage life of 5 to 10 years can be expected.

Donning the suit

Donning the suit is easier if you have a chair available.

Notes:

- *When donning the suit and hood it is essential to have an assistant.*
- *To ensure maximum protection, taping should be done in accordance with these instructions. Use SEA SE-shield Tape S-T1 or other 50 mm PVC “duct” tape.*
- *Use SEA rubber over-gloves S-G1 (optional) or other gloves to provide mechanical protection for the integrated suit gloves. Over-gloves should be secured with tape.*

Preparing the suit and respirator

1. Fully assemble the respirator with SE-shield pressurisation breathing hose, backpack, SE-Talk, dual battery adaptor (not shown) and two fully charged batteries, but with mask disconnected (see respirator user instructions). Position the fan unit on the back pack with the filter ports pointing downwards.



2. Undo the threaded nuts on the fan unit filter panel. Check that the seal is in place under each nut.



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3. Insert the filter ports through the corresponding holes in the back of the suit. Refit the nuts and tighten firmly.



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4. Screw in the filters and tighten firmly. Fit pre-filters and pre-filter holders.



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5. Feed the SE-shield breathing hose through the hose sleeve on the suit.



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6. Tape the hose sleeve to the end of the hose, keeping the tape and sleeve well away from the membrane and the attachment surfaces of the hose connection.



If you have an optional outer hood (H-TYVF):

*(If you **don't** have an outer hood, please go to **step 37**)*

7. Starting at the top of the demand valve, pass the valve through the elasticised opening in the hood.



8. Gently ease the opening around the entire circumference of the demand valve.



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9. Keep pulling the elastic all around towards the base of the demand valve.



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10. When finished, the elastic should sit snugly in the groove at the base of the valve.



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11. Pull the visor hole of the hood into the groove around the visor of the mask.



12. The hood should now be securely sealed around both the demand valve and the visor.



13. Attach the breathing hose to the face piece.



14. Pull the hood inside-out over the face piece and demand valve.



15. The face piece is now ready to be put on.



16. Put on the inner gloves. Climb into the suit. Do not wear shoes.



17. Put on the backpack. Fasten the waist belt and the chest strap.



18. Roll up the protective aprons on the legs of the suit.



19. Put on the outer boots and fold the protective aprons back down over the bootlegs.



20. Put your arms through the sleeves of the suit. Make sure your hands fit all the way into the inner gloves.



21. Sling the neck strap around your head.



22. Put on the face piece.



23. Tighten the head harness.
As your vision is obstructed by the hood, it may be best to have an assistant help with the next steps.



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24. To increase comfort and minimise visor fogging, turn on the fan unit by pressing either the control button on the speaker unit or the power switch on the fan unit.



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25. Pull the integral hood of the suit over the head and fit it around the visor of the face piece.



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26. Zip up the suit all the way.



27. Tape the flap from under the chin all the way down as far as it goes.



28. Pull the hood back over the head.



29. Even out the hood around the chest, shoulders and back.



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30. Tilt head backwards. Tape the front edge of the hood to the chest part of the suit.



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31. Tilt head forwards. Tape the rear edge of the hood to the back of the suit.



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32. Tilt head towards one side. Tape the hood to the opposite shoulder of the suit. Repeat with the other side.



33. Finish sealing all edges that have not already been taped.



34. The suit should now be completely sealed.



35. Fit outer gloves and pull the gauntlets around the cuff rings of the suit.



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36. Tape the glove gauntlets to the cuff rings.



If you don't have the optional outer hood:

37. Attach the breathing hose to the face piece.



38. Put on the inner gloves.
Climb into the suit. Do not wear shoes.



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39. Put on the backpack. Fasten the waist belt and the chest strap.



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40. Roll up the protective aprons on the legs of the suit.



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41. Put on the outer boots and fold the protective aprons back down over the bootlegs.



42. Put your arms through the sleeves of the suit. Make sure your hands fit all the way into the inner gloves.



43. Sling the neck strap around your head.



44. Put on the face piece.



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45. To increase comfort and minimise visor fogging, turn on the fan unit by pressing either the control button on the speaker unit or the power switch on the fan unit.



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46. Pull the hood of the suit over the head and fit it around the visor of the face piece.



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47. Zip up the suit.



48. Make sure the zipper is pulled up as far as it goes.



49. Peel off the adhesive tape strip along the protective flap and stick the flap over the zipper all the way.



50. Tape the flap from under the chin all the way down as far as it goes.



51. The suit is now completely sealed.



52. Fit outer gloves and pull the gauntlets around the cuff rings of the suit.



53. Tape the glove gauntlets to the cuff rings.



Note: After donning, inspect the suit. If the suit is punctured, its level of protection will be reduced and it should be discarded.

Body Protection

When fitted and used in accordance with the instructions, the SE-shield suit maintains a slight positive internal pressure. Under most conditions of use, including vigorous movements, the suit remains inflated, minimising inward leakage of particulate and gaseous contaminants.

Under some conditions – particularly when standing suddenly after resting in a seated position, or standing from a squatting position – a temporary negative pressure can occur inside the suit. It is recommended that the hood H-TYVF be fitted to minimise inward leakage during such events.

Independent tests have shown that following a negative pressure event the SE-shield rapidly reinflates and purges the suit of contaminants, restoring protection factors in excess of 1000¹ (without the hood fitted).

¹ *Domestic Preparedness: Protection Factor Testing of the SE-shield Suit with SE400 Powered Air Purifying Respirator (PAPR)*, Sieple, A. D. and Pappas, A. G, Soldier and Biological Chemical Command, AMSSB, Aberdeen Proving Ground, MD 21010-5424, April 2003.

Permeation data for Tychem F[®] material

Compound	S-TYVF suit material breakthrough time (min) ¹	Barrier film gloves breakthrough time (min.) ²
Chemical War Agents		
Mustard (HD) liquid	>720 ³	>480 ⁷
Lewisite (L) liquid	360 ³	not tested
Tabun (GA) liquid	>720 ⁴	not tested
Sarin (GB) liquid	>720 ⁴	>480 ⁸
Soman (GD) liquid	>720 ⁴	not tested
VX liquid	>720 ⁴	not tested

Compound	S-TYVF suit material breakthrough time (min)¹	Barrier film gloves breakthrough time (min.)²
<i>Industrial chemicals</i>		
Acetone	>480	>1440
Ammonia	79	>240 ⁵
Carbon disulfide	>480	>1440
Chlorine	>480	>240
Dichloromethane	5	>480 ⁶
Diethylamine	>480	>60
Ethyl acetate	>480	>1440
Ethylene glycol	>480	>240
Ethylene oxide	65	>240
Formaldehyde liquid (formalin solution)	>480	>240
Hexane	>480	>1440
Hydrochloric acid, 37%	>480	>240
Hydrogen chloride	>480	not tested
Hydrogen fluoride	immediate	not tested
Methanol	77	>480
Methyl chloride	>480	not tested
Monoethanolamine	>480	not tested
NaOH concentrate	>480	>480
Fuming nitric acid	14	180
Sulphur dioxide	38	not tested
Sulphuric acid 93%	>480	>1440
Tetrachloroethylene	>480	>1440
Toluene	>480	>1440
Xylene	>480	>1440

¹ Tested per ASTM F739, breakthrough criterion 0,1 µg/min/cm², 25°C, test duration 8 hours.

² Tested per ASTM F739, breakthrough criterion 0,1 µg/min/cm², 21°C.

³ MIL-STD-282, Method T-209

⁴ MIL-STD-282, Method T-208

⁵ Ammonia water 25%

⁶ Dichloromethane 90%, Isopropyl alcohol 10%

⁷ MIL-STD-282, Method 204.1.2

⁸ MIL-STD-282, Method 206.1.3

For further information please contact SEA.

Decontamination and doffing

The SE-shield suits are disposable. Where decontamination is necessary, follow a decontamination procedure appropriate to the contaminant(s). The user should continue to wear the respirator during decontamination.

Use blunt-ended scissors to cut the suit away from the respirator, with the motor running and the mask fitted. First cut a hole in the suit around the filter ports, then continue cutting along the full length of the breathing hose cover, taking care not to puncture the breathing hose. The suit can now be removed and discarded without removing the respirator.



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