

Proximity suit for specialised firefighting acc. to EN 1486 / ISO 15538

PRODUCT INFORMATION

These product information bases on the EN 1486 / ISO 15538 for reflective protective clothing for firefighting and the rules of ISO 2081.

Selection

The first requirement for the selection of suitable protective clothing is a risk assessment considering the specific working environment. Thereby shall be involved consideration not only of the level and time of possible exposure to specific hazards but also the probability of exposure

On principal reflective clothing provides protection against intense radiant heat and flame lick and is worn for short periods only. Protective clothing according to EN 1486 enable the user to enter specific high-risk firefighting and fire rescue situations such as air craft fires, bulk flammable gas and bulk flammable liquid fires or boat fires.

The selection of appropriate protective clothing requires the establishment of a relationship between the risk analysis and the classification of the clothing.

Contrary to ISO 15538 where two levels are defined, the full body protection acc. to EN 1486 knows only one level of which requirements on heat protection correspond to the higher level 2 of ISO 15538.

Personal Protective Equipment (PPE) that meets the requirements of EN 1486 usually encloses the complete body, and includes head, hand and foot protection.

It may consist of a single garment (1-piece-suit) or of several garments (2- or more pieces). It is worn with breathing apparatus, over other protective clothing, and together with further protective equipment.



Good protection is also provided at the interface areas of different garments by overlap of sufficient dimensions. Additional protection against entry of burning debris or liquids might be provided by double cuffs at sleeves and legs.

Whether to select a single garment or clothing made of different garments depends of the priority the user wants to fix.

1-piece suits are more suitable to prevent from flame, heat and vapour entry or from the frequently raised chimney effect. But even if the proportions and design are well made user will need more time to put on the clothing and to take it off. There is also no possibility to replace single garments (jacket or trousers).

Heat, flame, and vapour may enter easier with 2- and more-pieces clothing though there are sufficient overlaps. But there are two advantages: Easy donning, and replacement of single garments.

PPE according to EN 1486 is used to approach to intense radiant heat but may allow fire entry for a short period.

The limits shall be found out by training.

The level of heat protection is partly obtained from the insulating effect of the air gap between the different layers of a multilayer component assembly. The protection is reduced in areas where the clothing is in close contact with the body or is compressed by additional equipment. Protection is also reduced if the clothing shrinks; for that reason clothing from ALWIT is made of materials that nearly do not shrink.

Of course protection can be improved by more layers of material. But such higher protection is limited by the total weight of the equipment that would additionally stress the wearer.

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Therefore a 3-layers lightweight material assembly might provide sufficient protection for a longer period than a 5-layers material assembly that would rise the physiological stress significantly and therefore cannot be worn over such a long period.

Flame protection will be drastically reduced in the presence of gaseous or liquid oxygen.

Though some models, e.g. such with a vapour barrier, provide a certain minor protection against chemicals, clothing according to EN 1486 is not intended to protect against chemical hazards.

Even the construction of PPE might be excellent, and requirements on design and other ergonomical aspects are considered, user should convince himself of the faultless condition of the PPE by practical test.

The informative Annex D of EN 1486 contains some proposals that are partially given below:

„This annex informs how some basic ergonomic features can be checked for many types of protective clothing in a pragmatic way. In general carrying out ergonomic assessments can help to improve protective clothing and detect major deficiencies.

Some of the relevant questions that might be asked are set out below and it is desirable that responses given should be positive.

The test clothing of a suitable size should be put on together with such normal clothing as is intended to be worn, and some ergonomic features relating to the practical performance of the protective clothing should be checked.”



Question: *Is the protective clothing free from any sharp or hard edges, rough surfaces or other items on the inner or outer surface of the clothing that are likely to cause harm to the user?*

Question: *Is it possible to put on and take off the protective clothing without difficulty with or without assistant?*

Question: *The clothing is not too tight for comfort and deep breathing is not restricted and there is nowhere any blood flow restriction?*

Question: *Clothing design features at e.g. armholes and crotch are appropriately proportioned and positioned?*

Question: *Can the closures, adjusters and restraint systems be operated without difficulty?*

Do the closures, adjusters and restraint systems withstand the forces they are likely to be exposed to during body movements?

Is the range of adjustments adequate?

Question: *Can the following movements be carried out without difficulty?*

Standing, sitting, walking and stair climbing,

Raising both hands above the head,

Bending over and reaching the ground with both hands.

Question: *Does the protective clothing cover the body area to be protected during movements ?*

Question: *Is the protective clothing compatible with other items of PPE?*

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Use

Par. 10 of EN 1486 provides that the head protection has to be completed by a safety helmet according to EN 443, EN 397 or EN 14052. Foot protection (overboots) have to be worn over safety boots according to EN 15090 or EN ISO 20346. Gloves are part of EN 1486 and therefore no undergloves are needed. Here described protective clothing can only be used with adequate breathing apparatus.

As the reflecting outershell material (and a possible vapour barrier) prevents sufficient heat exchange the mission period should be as short as possible to avoid heat stress.

It is not possible to set up principles because the period of work depends of the specific conditions, the fitness of the wearer, stress of the wearer by previous activity, training with the clothing under work conditions etc.

The conditions may suddenly alter, too, and therefore a decision on continuing the activities may be needed.

Clothing for protection against intense radiant heat should preferably be put on immediately before required and removed or opened immediately after use in order to reduce heat stress.

EN 1486 as well ISO 15538 strictly avoid the definition of fire entry suits. There is no definition of fire entry suit in any standard, and there are not any requirements on such type of PPE.

Of course there may be situations, e.g. in rescue conditions, where flame engulfment is inevitable. Sudden alteration of weather or fire conditions may cause flame engulfment, too. Here described proximity suits also have been approved at convective heat and therefore allow flame entry for a short period.

The duration of flame engulfment, however, cannot be determined because firefighting is always taking place under different conditions. In this connexion the warning for flame engulfment in Annexes B of both standards, EN 1486 and ISO 15538, should be mentioned that is partially given below:

“It is recommended that persons wearing EN 1486 garments who are exposed to flame engulfment for a limited period should withdraw as soon as possible and carefully remove this clothing in a location a safe distance from the incident. If considered necessary Medical advice should be sought after such exposure and the garments that have been exposed to limited flame engulfment should be carefully examined. If after examination, compliance to the requirements of this Standard cannot be assured, the clothing should be removed from service.

If, after a Risk Assessment, it is decided that there is absolutely no alternative to working in conditions of short term or prolonged flame engulfment the most comprehensive Safety procedures should be adopted –

including having suitable rescue and medical personnel and equipment available in the event of the break down of the safety systems and/or procedures.

The flame/heat hazard of continuous flame engulfment is more convective than radiative and so clothing with a reflective outer surface should not be used as most of these types of material have high heat capacities and therefore there is a high risk of heat transfer to the inner layers of the garment.”

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Wearer should train putting on and taking off the protective clothing regularly. Training should include defined co-operation in teamwork.

An assistant should be employed to put on or take off the full body protective clothing.

Beyond a second person dressed in equivalent protective clothing should always be ready to assist and save the operator in case of unforeseen situations.

Training

Working in a high heat risk environment is highly stressful. The mental and physical health of the user of clothing for protection against heat and flame is therefore an important consideration.

Therefore users of protective clothing working in high heat risk situations should receive regular training. This has several objectives, the most important of which are:

- a) to acquire a routine for the selection and putting on and taking off of appropriate clothing and special equipment,
- b) to accustom the operator to the properties and limiting factors of the clothing which he is to wear,
- c) to accustom the operator to working in the clothing,
- d) to allow the operator to recognise his physiological limit of endurance, so that he can retreat from hazard before the point of danger,
- e) communication and cooperation in teamwork, and
- f) to check that the user has understood the instructions for use and knows the meaning of the classes of marking.

Storage

Reflective clothing should be stored dry, free of dust and not exposed to intense light.

If possible reflective clothing should also be stored in a hanging or extending way to avoid cracking.

In order to receive a short donning time it is recommended to save the suit with zippers in opened position.

Care

Clothing for protection against heat and flame should be used and maintained in accordance with these instructions. Specific responsibility should be assigned for a regular inspection and maintenance programme. Records should be maintained of inspections and repairs.

Is there any doubt that the clothing still meets the standard it should be replaced.

Keep the protective clothing clean !

Excessive incorporated dirt and grease may reduce level of protection. Aluminised clothing cannot be washed or dry cleaned. The label in the clothing contains the care symbols.

The reflecting outer shell material should be dusted by a soft moistened sponge or cloth with some mild detergent or soap but without much effort.

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Hygienic reasons may require a more thorough cleaning. That could be possible but for lining layers of specific quality only and just in case of detachable lining versions. Those detachable linings are labelled separately.

Cracking may reduce drastically the level of protection. Inspection personnel therefore should pay special attention to areas where the clothing usually is bended. Fabrics, especially those made of fibreglass, and aluminisation like to crack in these areas. Reflective clothing with appearing cracks shall be removed and replaced.

Oxidation of zipp fasteners can be avoided by regularly waxing, e.g. with candle tallow.

Records

A technical file should be maintained for each class of clothing for protection against heat and flame, containing these product informations.

A detailed record should be maintained of inspections and repairs for each garment, giving the following informations:

- a) Name and address of manufacturer / supplier
- b) Date of purchase
- c) Classification (data sheet)
- d) Dates of inspections
- e) Dates and details of repairs including the name of the repairer.

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Donning

Protective clothing according to EN 1486 shall be worn over the usual firefighters clothing e.g. station uniform, flameproof clothing, e.g. according to EN ISO 11612 level A B1 C1.

Putting on the clothing should be regularly trained in order to get readiness for action early.

One-piece-suit (mod. 30-1001) (without double cuffs)

1. To put on the suit an assistant is needed.
2. Open zip fasteners on overboots and coverall if not already done before storage.
3. Inspect the correct position of the screen in the hood (see info 12.5).
4. Put on overboots, close zip fastener.
5. Put on breathing apparatus and mask.
6. Put on helmet and fix it.
7. Put on gloves.
8. Enter the suit at first with the right leg and right arm.
9. Pull the bag over the BA.
10. Enter the suit now with the left leg and left arm.
11. Control the correct fit of the hood.
12. Close the coverall.

Taking off the clothing should be done just in reverse turn.

Of course the user of protective suits develops his own special way of putting on the clothing by training.

Based on the design features of the protective clothing following steps are recommended:

One-piece-suit (with double cuffs)

1. To put on the suit an assistant is needed.
2. Open all zip fasteners on overboots and coverall if not already done before storage.
3. Turn up the outer cuffs.
4. Inspect the correct position of the screen in the hood (see info 12.5).
5. Put on breathing apparatus and mask.
6. Enter the suit at first with the right leg and right arm.
7. Pull the bag over the BA.
8. Enter the suit now with the left leg and left arm.
9. Put on overboots (covering the inner cuff), close zip fasteners of overboots.
10. Turn down the outer leg cuffs, and close zip fasteners of the cuffs.
11. Put on mask.
12. Put on helmet and fix it.
13. Put on gloves covering the inner arm cuff.
14. Turn down the outer arm cuffs, and close zip fasteners of the cuffs.
15. Control the correct fit of the hood.
16. Close the coverall.

Taking off the clothing should be done just in reverse turn.

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PRODUCT INFORMATION

Donning

Protective clothing according to EN 1486 shall be worn over the usual firefighters clothing e.g. station uniform, flameproof clothing, e.g. according to EN ISO 11612 level A B1 C1.

Putting on the clothing should be regularly trained in order to get readiness for action early.

2-piece-suit (mod. 30-2001) (without double cuffs)

1. To put on the suit an assistant is needed.
2. Open zip fasteners on overboots and jacket if not already done before storage.
3. Inspect the correct position of the screen in the hood (see info 12.5).
4. Put on overboots, close zip fastener.
5. Put on bib trousers, adjust suspenders.
6. Put on breathing apparatus and mask.
7. Put on helmet and fix it.
8. Put on gloves.
9. Pull the jacket and integrated hood over the head.
10. Slip on the arms.
11. Control the correct fit of the hood.
12. Close zip fasteners of the jacket.

Taking off the clothing should be done just in reverse turn.

Of course the user of protective suits develops his own special way of putting on the clothing by training.

Based on the design features of the protective clothing following steps are recommended:

2-piece-suit (with double cuffs)



1. To put on the suit an assistant is needed.
2. Open zip fasteners on overboots and jacket if not already done before storage.
3. Turn up outer cuffs.
4. Inspect the correct position of the screen in the hood (see info 12.5).
5. Put on bib trousers, adjust suspenders.
6. Put on overboots (covering the inner cuff), close zip fasteners of overboots.
7. Turn down the outer leg cuffs, and close zip fasteners of the cuffs.
8. Put on breathing apparatus.
9. Put on mask.
10. Put on helmet and fix it.
11. Pull the jacket and integrated hood over the head.
12. Slip on the arms.
13. Put on gloves covering the inner arm cuff.
14. Turn down the outer arm cuffs, and close zip fasteners of the cuffs.
15. Control the correct fit of the hood.
16. Close zip fasteners of the jacket.

Taking off the clothing should be done just in reverse turn.

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PRODUCT INFORMATION

Additional information

Information below is given in accordance with par. 10 of EN 1486

10.1 Sizes (EN 340)

Size	Body height in cm	Chest width in cm Body measured	Waist width in cm	Size of overboots	Corresponding boot size
XS = 0	164 - 170	80 - 88	68 - 76	3	6-8
S = 1	170 - 176	88 - 96	76 - 84	3	6-8
M = 2	176 - 182	96 - 104	84 - 92	4	9-10
L = 3	182 - 188	104 - 112	92 - 100	4	9-10
XL = 4	182 - 188	112 - 120	100 - 108	4	9-10
XXL = 5	188 - 194	120 - 128	108 - 116	5	11-12
XXXL = 6	194 - 200	128 - 136	116 - 124	5	11-12

10.1 Visor

Visors that are part of ALWIT proximity suits are usually be made from polycarbonate, but are also available from safety glass. Both are approved, certificated and marked according to the requirements of par. 4.3.2 of this standard.

10.2 Full body protection

As already mentioned before, the requirements of EN 1486 are complied only, when all parts of the body – including head, hands and feet – are protected on the same level.

10.3 Helmet

When ordered, ALWIT proximity suits are supplied together with a separate safety helmet according to EN 397, incorporating a chin strap.

Since most of the customers prefer the use of their existing fire helmets, our head protection has been fitted with a stretchable inner device that is able to adhere to the helmet shell. Such the helmet is fixed in a manner that the field of vision is not restricted when moving the head.

The shape of the head protection is appropriate for the use of most helmets in the market. Of course we do not and cannot test the compatibility of all types of helmet in the market.

A wider designed head protection for helmets with an integrated breathing mask is available; when needed or when there are doubts if the existing helmet fits to the head protection, customer should indicate in his enquiry or order.

10.4 Boots

Since boots are fitted exactly to the size of the user, our proximity suits however cover at least two sizes, it would be complicated to integrate boots into the ensemble.

When ordered, ALWIT proximity suits are supplied together with a separate pair of safety boots according to EN 20345.

Our overboots are designed to be worn over all types of boots of corresponding size.

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PRODUCT INFORMATION

10.7 Complete garment test (optional)

If desired by the customer, ALWIT would execute the optional test on an instrumented manikin according to par. 8.2 of this standard.

This kind of test seems to be not appropriate to the intended use of proximity suits, because the garments are mainly exposed to flames and less to radiant heat.

10.8 Underwear

The performance tests of this standard are executed on PPE without any underwear that does not correspond to the practical use.

ALWIT therefore recommends to wear underwear and a shirt, made from non-melting materials, e.g. cotton or NOMEX®, together with the station uniform or another one-piece or two-piece suit, that meet the requirements of EN ISO 11612 level A B1 C1.

For comfort reason it is not recommended to use underwear according to EN 469.

10.8 SCBA

Proximity suits may only be worn in combination with a breathing apparatus either over or under the suit.









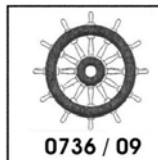

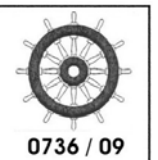
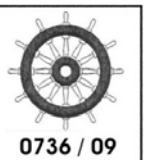




ALWIT proximity suits are designed with a bag of sufficient size, appropriate to wear all types of SCBA under the suit (coverall, jacket).

Info 30-5701 shows a possible solution where the SCBA can be worn over the suit.

Labelling

All parts of the ensemble are single labelled, showing that this garment is part of the whole assembly.

Samples for labelling:

 ... mit Sicherheit Ihr Partner	 ... mit Sicherheit Ihr Partner	 ... mit Sicherheit Ihr Partner	 ... mit Sicherheit Ihr Partner
ALWIT GmbH Kattegatweg 6 D-46446 Emmerich	ALWIT GmbH Kattegatweg 6 D-46446 Emmerich	ALWIT GmbH Kattegatweg 6 D-46446 Emmerich	ALWIT GmbH Kattegatweg 6 D-46446 Emmerich
30-1011.81/833.0 Bestandteil aus/ Spare part of: Mod. 30-1001	30-2011.79/833.0 Bestandteil aus/ Spare part of: Mod. 30-2001	25-1021.73/833.0 Bestandteil aus/ Spare part of: Mod. 30-3021	27-1791.73/833.0 Bestandteil aus/ Spare part of: Mod. 30-3031
Grösse/Size:	Grösse/Size:	Grösse/Size:	Grösse/Size:
 EN 1486:2007 CE 0121	 EN 1486:2007 CE 0121	 EN 1486:2007 CE 0121	 EN 1486:2007 CE 0121
 0736 / 09	 0736 / 09	 0736 / 09	 0736 / 09
 Trocken lagern/ To be stored under dry condition:	 Trocken lagern/ To be stored under dry condition:	 Trocken lagern/ To be stored under dry condition:	 Trocken lagern/ To be stored under dry condition:
Order Nr.	Order Nr.	Order Nr.	Order Nr.