



# Fire Fighting Protective Clothing - EN 1486:2007 Introduction



Competent and engaged in questions of heat protection ALWIT has been busy from the outset with technical requirements, testing and standardizing of heat protecting materials. Therefore ALWIT obviously took part also to European Standardizing works especially to develop the test methods and minimal requirements for such materials.

Personal Protective Equipment (PPE) for thermal risks of more than 100°C belongs to category III of EC - Directive 89/686 (also called Directive for manufacturers).

Therefore each model (type approval) has to be tested by a notified body and manufactured under a certified system for quality safety and control (e.g. ISO 9001); otherwise the type approval has to be renewed annual.

EN 1486:2007 contains the requirements for heat protective clothing for firefighters that are partially reproduced hereafter:

4 General requirements		
Performance	Test method	Requirement
<b>4.1 Clothing ensemble</b>  shall consist of:  a) garment(s) b) hood (may be integrated or not) c) Gloves d) Overboots	Tests according to par. 4-8  and  visual testing	Fire fighters' protective clothing covered by this European Standard shall provide protection against intense radiant heat and flame lick to the full body, <b>including the head, hands, and feet</b> , as specified in Clauses 4 to 8. ----- All items shall remain in place ----- All items shall have an overlap so no part of the body becomes uncovered ----- breathing apparatus may be worn either inside or outside



ALWIT GmbH  
P.O.Box 31 60  
D-46434 Emmerich

Phone  
+49-2828 / 91 46 - 0

Fax  
+49-2828 / 91 46 46

email  
[info@alwit.com](mailto:info@alwit.com)

Internet  
[www.alwit.de](http://www.alwit.de)


<b>Fire fighting PPE</b>	<b>EN 1486</b>
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Performance	Test method	Requirement
<b>4.2 Clothing</b>		
<b>4.2.1 General</b> Fire fighters' protective clothing covered by this European Standard shall consist of either:	Visual testing	a) a single garment, or b) a clothing ensemble, or c) a clothing assembly.
<b>4.2.2 Pockets</b>	By measuring and visual test	If external pockets are present they shall be constructed entirely from the outer material, and secured by flaps which shall be at least 2,5 cm on each side wider than the pocket. Pockets shall have means for drainage of water.
<b>4.2.3 Sizes</b>		EN 340
<b>4.3 Head protection</b>		
<b>4.3.1 General</b>	Tests according to par. 4-8 and visual testing	The hood shall meet the requirements of Clauses 6, 7 and 8. Screens used with hoods shall meet the requirements of 4.3.2 and 6.5. Compatible with one or more helmets conforming to EN 443, EN 397 or EN 14052 The hood shall be fixed to the designated helmet so it will follow all the movements of the head and not unduly restrict movement or vision.

Performance	Test method	Requirement
<b>4.3.2 Screen</b>		
4.3.2.1 General	Visual testing	the screen will maintain in place
4.3.2.2 Field of vision	EN 166:2001, 7.1.1	
4.3.2.3 Spherical, astigmatic and prismatic refractive powers	EN 166:2001, 7.1.2.1.2	Optical class 2
4.3.2.4 Variation in transmittance	EN 166:2001, 7.1.2.2.3.1	
4.3.2.5 Diffusion of light	EN 166:2001, 7.1.2.3	
4.3.2.6 Quality of material and surface	EN 166:2001, 7.1.3	
4.3.2.7 Robustness	EN 166:2001, 7.1.4.2.2	
4.3.2.8 Resistance against high speed particles	EN 166:2001, 7.2.2, with a speed of 120 m/s	
4.3.2.9 Resistance against molten metal and hot solids	EN 166:2001, 7.2.3 e) and g)	
4.3.2.10 IR-transmission and transmittance to Vis	EN 171:2002, par 4	4 - 2,5 and 4 - 5
4.3.2.11 Flammability	EN 136:1998, 8.5.2	
4.3.2.12 Marking	EN 166:2001, 9.2	
<b>4.4 Hand protection</b>	Tests according to par. 4-8	par 6 – 8 of this standard
Dexterity	EN 420:2003, 5.2	Level 1 minimum
Minimum length	EN 420:2003	350 mm
<b>4.5 Overboots</b>	Tests according to par. 4-8	par 6 – 8 of this standard
	Visual testing	designed to be worn over designated footwear providing additional protection in accordance with EN 15090 and EN ISO 20345
<b>5 Sampling, pre-treatment, ageing</b>		

6 Thermal requirements		
Performance	Test method	Requirement
<b>6.1 Limited flame spread</b>	EN ISO 15025 A	
After flame time [s]		≤ 2
Afterglow time [s]		≤ 2
Hole formation		Not allowed
Flaming or molten debris		Not allowed
<b>6.2 Heat transfer (radiant heat)</b>		
Radiant Heat Transfer Index (RHTI) = Time to rise the temperature at 24°C (RHTI <sub>24</sub> ) [s]	EN ISO 6942; heat flux density 40 kW / m <sup>2</sup>	≥ 120
<b>6.3 Heat transfer (convective heat)</b>		
Heat Transfer Index (HTI) = Time to rise the temperature at 24°C (HTI <sub>24</sub> ) [s]	EN 367; heat flux density 80 kW / m <sup>2</sup>	≥ 21
<b>6.4 Contact heat</b>		
Threshold time = time to rise the temperature at 10°C [s]	EN 702; at 300°C contact temperature	≥ 15
<b>6.5 Heat resistance</b>	ISO 17493; at 255°C for 5 min	
Ignition		Not allowed
Melting		Not allowed
Hole formation		Not allowed
Dripping		Not allowed
Shrinkage machine [%]		5
Shrinkage cross [%]		5

7 Mechanical requirements		
Performance	Test method	Requirement
<b>7.1 Dimensional change</b>		
Machine [%]	EN 25077	≤ 3
Cross [%]		≤ 3
<b>7.2 Tensile strength</b>		
Metallised outer material	EN ISO 1421:1998, method 1	≥ 600 N
Innermost lining	EN ISO 13934-1:1999	≥ 350 N
<b>7.3 Burst strength</b>		
Metallised outer material	EN ISO 13938-1:1999	≥ 600 N
Innermost lining	EN ISO 13938-1:1999	≥ 350 N
<b>7.4 Tear strength</b>		
	EN ISO 4674:2003, method B	≥ 25 N
<b>7.5 Seam strength</b>		
Main seams of outer metallised material	EN ISO 13934-2 at a speed of 300 mm/min	≥ 300 N
Main seams of outer metallised material (knitted)	EN ISO 13938-1	≥ 300 kPa
Main seams of innerlayers	EN ISO 13934-2 at a speed of 300 mm/min	≥ 180 N
Main seams of innerlayers (knitted)	EN ISO 13938-1	≥ 180 kPa
All other seams		≥ 90 N
<b>8 Other requirements</b>		
<b>8.1 Surface wetting</b>		
	EN 24920 at 20 °C	≥ 4
<b>8.2 Whole garment testing (optional) —</b>		
Testing of the whole clothing or component assembly on an instrumented manikin	ISO 13506:2008	Information according to Annex E of EN 1486:2007

Performance	Test method	Requirement
<p><b>9 Marking</b></p> <p>ALWIT provides label not only in the garment(s) but also on the packing</p>	<p>Visual testing</p>	<p>EN 340</p> <p>Logo, name and adress of ALWIT</p> <p>Type, product number</p> <p>Size</p> <p>CE-mark with code number of Notified Body</p> <p>Pictogram</p> <div style="text-align: center;">  <p>EN 1486:2007</p> </div> <p>CE 0121</p> <p>Care symbols</p> <p>Order number</p>
<p>To print the order number is more than EN 1486 and EN 340 require but needed to re-examine the way of product under quality safety management.</p>		
<p><b>10 Information supplied by the manufacturer</b></p>	<p>EN 340</p>	<p>See info 30-2999</p>

This information given by the ALWIT team is based on our actual knowledge and is not entitled to be complete.

Technical datas are based on test results of laboratories and may not be transferred right off to the application in practice.

If there would be any further questions, please do not hesitate to contact our experts.