

# Lakeland ALM®



Lakeland ALM® aluminised garments offer high quality protection against convective, radiant and contact heat for workers in industries such as foundries, steel processing, glass and ceramics manufacture and many others.

Using superior Gentex “Dual Mirror”® technology the pure aluminium mirrored outer surface reflects 95% or more of heat radiation\*. This means less of the radiated heat penetrates through the fabric, allowing operators in heat-critical environments to work for longer and to maintain safety at the highest level.

Available in three fabric choices and a range of standard and bespoke garments, Lakeland ALM® offers the choices to ensure workers remain safe in a variety of applications.

\* Aluminium has a reflectivity in the infra-red spectrum of 93 to 97%.



EN 11612



EN 11611

## Industrial Heat Protective Clothing and Accessories

### Buyer's Guide

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**The primary purpose of aluminised garments is to protect workers from the radiant heat present in some common industrial environments.**

Burns result when skin absorbs heat energy; the more rapid the temperature rise the greater the damage. ALM® garments work by minimising the heat energy that penetrates through to the skin beneath.

The pure aluminium surface of Lakeland ALM® garments means up to 95% of heat energy radiation is reflected away from the wearer. This is why in CE heat testing all three ALM® fabric options achieve the highest class against radiant heat – so workers stay safe and can work for longer periods and in greater comfort.

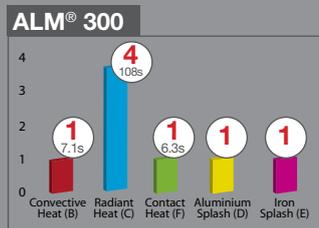
### ALM® Fabric Choices

Lakeland ALM® garments consist of up to three fabric layers offering the mirrored reflective finish, a moisture barrier and additional thermal protection in the ALM® 700.

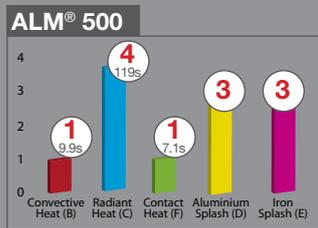
**Heat Performance Classes and Results**

Lakeland ALM® garments feature superior reflective performance because of the pure aluminised surface.

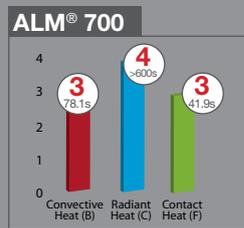
*Large figures in red are performance classes. Smaller figures are actual results. Compare the actual results with the performance class limits on page 2.*



Fabric: Single layer of Gentex "Dual Mirror" reflective aluminised fibreglass



Fabric: Outer layer of Gentex "Dual Mirror" aluminised fibreglass with inner neoprene moisture barrier



Fabric: Outer layer of Gentex "Dual Mirror" aluminised fibreglass; inner neoprene moisture barrier with fibreglass/aluminium thermal barrier between.

Heat performance tests use a heat sensor to measure the time to reach a specific rise in temperature (ie "HTI" - Heat Transfer Index) behind the fabric from a heat source:

- B: Convective heat: 24°C**
- C: Radiant heat: 24°C**
- F: Contact heat: 10°C**

The testing therefore indicates the degree to which the fabric protects the wearer from heat energy, the longer to reach the specified temperature rise, the more effective the protection.

Some manufacturers make claims such as "suitable for protection against radiant heat sources up to 1000°C" However, CE heat testing does not provide such information and there is no test method to support such a claim. Such statements are misleading because they appear specific but in fact are extremely vague; protection will relate to many factors other than the temperature of the heat source... such as proximity to it and the duration of exposure. Any such statement without this information is meaningless.

For this reason Lakeland make no such claims. Users should assess the required protection through understanding and interpretation of the CE heat test results and through a suitable risk assessment incorporating other factors in the application.

The CE tests to measure protection against splashes of molten aluminium and iron (D and E) measure the volume in grams required to damage a skin stimulant behind the test fabric when the molten metal is poured onto it at a 45° angle. As no specific result is required in this test only the result classes are shown.



**CE Certification**

Lakeland ALM® garments are certified to EC product standards:

		ALM® 300	ALM® 500	ALM® 700
EN 11612		✓	✓	✓
Protective clothing for protection against heat and flame				
EN 11611		✓	✓	N/A
Protective clothing for welding and allied processes				
		<b>ALM® 300</b>	<b>ALM® 500</b>	<b>ALM® 700</b>
Outer layer		545gsm Gentex "dual mirror" aluminised fibreglass with pure aluminium surface		
Middle layer		None	None	160gsm fibreglass liner with aluminium foil
Inner layer		None	182gsm nylon taffeta with neoprene steam/moisture barrier	

**ALM® Glove Certification**

ALM® gloves come in two styles; code 344 gloves (for ALM® 300 and 500) and code 740 mitts (for ALM® 700). These are certified to specific glove standards EN 407 for heat protection and EN 388 for mechanical resistance.

**EN 407 : Heat Hazards**



Test	300/500 Gloves	700 Mitts
Burning behaviour	4	4
Contact heat	1	3
Convective heat	3	4
Radiant heat	4	4

**EN 388 : Mechanical Hazards**



Test	300/500 Gloves	700 Mitts
Abrasion resistance	4	3
Blade cut	2	5
Tear resistance	2	4
Puncture resistance	3	3

## ALM® Style Choices

Lakeland ALM® garments are available to purchase as complete EN 11612 ensembles or as individual components.



Code 20 / 20BA	Code 30	Code 22 / 22BA
Jacket (without/with BA accommodation)	Pants (with braces)	Coverall (without/with BA accommodation)



Code 10 / 10BA	Code 55	Code 44
Hood with gold reflective faceshield (without/with BA accommodation)	Boots with leather soles	Gloves with leather palms

Individual items are available separately, EN 11612 flame and heat protection requires full body protection so individual items do not provide certified protection unless worn as part of a full ensemble.

A full EN 11612 ensemble consists of a jacket & pants or a coverall combined with a hood, gloves and boots. Both jacket and coverall feature the option of a rear pouch for BA accommodation.

Jackets and coveralls are available with and without BA accommodation.

ALM® gloves are separately certified to EN 407: 2004 : protective gloves against thermal risks

A range of styles and accessories such as sleeves, aprons and smocks as well as aluminised curtains and covers are also available.



Code 26  
Long jacket



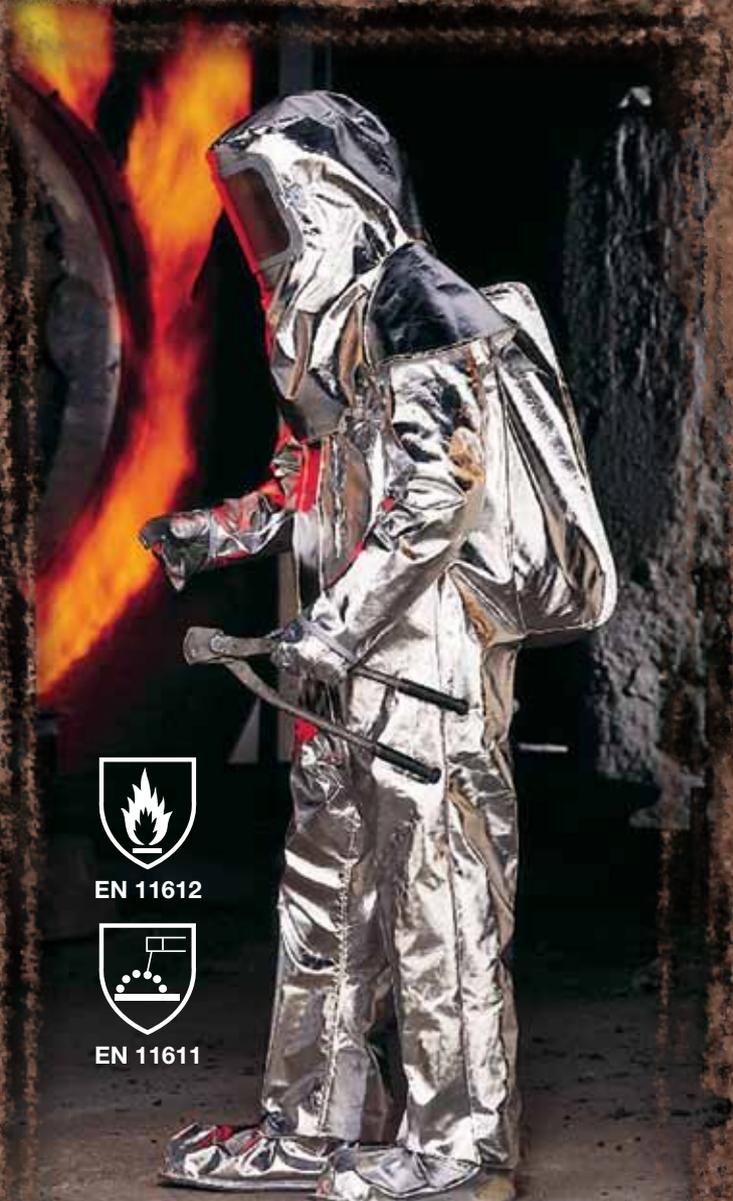
Code 25  
Long apron/smock



Code 36  
Sleeves



Code 40 / 44  
Gloves and mitts



EN 11612



EN 11611

## Heat Types and CE Tests

The EN 11612 standard for flame and heat protection includes optional (only 1 is compulsory) tests against various heat types. Those most relevant for Lakeland ALM® garments are the radiant (Code C), Convective (Code b) and Contact (Code E) These tests assess the time to record a rise in temperature (24°C in B and C, 10°C in F) in a heat sensor held behind the fabric.

ALM® 300 and 500 have also been tested against splashes of molten aluminium (Code D) and molten iron (Code E). These tests measure the volume in grams of molten metal required to cause damage to skin simulant behind the fabric.

<b>CONVECTIVE HEAT ISO 9051</b>	Time to temp Increase 24°C Code Letter B	Transfer of heat energy through the movement of fluid or gas.	<b>Classes</b> Class B1 Class B2 Class B3	<b>Performance (seconds)</b> 4s - 10s 10s - 20s >20s
<b>RADIANT HEAT ISO 6942</b>	Time to temp Increase 24°C Code Letter C	Transfer of heat from a heat source due to the radiation of electromagnetic waves.	<b>Classes</b> Class C1 Class C3	<b>Performance (seconds)</b> 7s - 20s 50s - 95s Class C2 20s - 50s Class C4 >95s
<b>CONTACT HEAT ISO 12127</b>	Time to temp Increase 10°C Code Letter F	Transfer of heat through direct contact. Also referred to as conductive heat.	<b>Classes</b> Class F1 Class F2 Class F3	<b>Performance (seconds)</b> 5s - 10s 10s - 15s >15s
<b>ALUMINIUM SPLASH ISO 12127</b>	Volume required to damage skin simulant Code Letter D	Transfer of heat resulting from contact with molten aluminium.	<b>Classes</b> Class D1 Class D2 Class D3	<b>Performance (grammes)</b> 100 < 200 200 < 350 <350
<b>IRON SPLASH ISO 9185</b>	Volume required to damage skin simulant Code Letter E	Transfer of heat resulting from contact with molten iron.	<b>Classes</b> Class E1 Class E2 Class E3	<b>Performance (grammes)</b> 60 < 120 120 < 200 <200

## ALM® 700 High Performance Heat Protection

Not only does ALM® 700 achieve the highest class in all three heat tests, it far exceeds them. Compare the actual results to the performance class limits:-

Heat Type	Max. Performance Class	ALM® 700 Results
Convective	B3 : .20s	71.8s
Radiant	C4 : >95s	>600s
Contact	F3 : >15s	41.9s

ALM® 700 offers heat protection well beyond the CE performance classes. These tests measure the time to reach a specific temperature rise behind the fabric.

The ALM® 700 test results show the product offers an exceptionally high level of protection - keeping users cooler and more comfortable for longer.



### WARNING:

Lakeland ALM® suits are designed to protect wearers from convective, radiant and contact heat sources. They are not designed for nor should be used for fire entry.

CE heat tests provide an effective method of comparing fabric performance. However, in isolation they do not indicate any duration of safe use or indicate suitability for any specific application as there are other factors to consider. Selection of appropriate garments is the

users responsibility and should result from a suitable risk analysis conducted by qualified personnel.

Aluminised garments rely primarily on reflectivity for their protective properties. Damaged or dirty garments may not perform adequately and it is vital that garments are kept clean. Contact Lakeland for advice on cleaning and maintenance.

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