

Standard Update:

Fire Resistant Clothing

Phil Briggs from West Yorkshire Testing Materials explains the implications of the new FR standards for protective clothing

The table below shows the increase in testing that is required:

EN 14116	EN 533
Flame spread	Flame spread
Tensile strength	
Tear strength	
Seam strength	

EN 11611	EN 470-1
Tensile strength	Tensile strength
Tear strength	Tear strength
Burst strength	Dimensional change
Seam strength	Limited flame spread
Dimensional change	Small drops of molten metal
Requirements of leather	
Limited flame spread	
Molten droplets	
Heat transfer (radiation)	
Electrical resistance	

EN 11612	EN 531
Heat resistance	Dimensional change
Limited flame spread	Limited flame spread (A)
Dimensional change	Convective heat (B)
Tensile strength	Radiant heat (C)
Tear strength	Molten aluminium splash (D)
Burst strength	Molten iron splash (E)
Seam strength	
Convective heat (B)	
Radiant heat (C)	
Molten aluminium splash (D)	
Molten iron splash (E)	
Contact heat (F)	

The last two years have seen the withdrawal and replacement of three well-known Fire Resistant (FR) workwear standards for clothing:

- EN 470-1 is now EN ISO 11611:2007 Welders clothing
- EN 533 is now EN ISO 14116:2008 Limited flame spread materials
- EN 531 is now EN ISO 11612 Clothing for heat and flame

All three standards are similar in terms of their FR protection but quite different to their predecessors concerning the amount of testing required. Additionally, the standards are targeted at testing complete garments, whereas before most were fabric tests only with clothing design aspects.

So what does this mean for garment and fabric manufacturers? Simply, it means the amount of testing has increased, so that not only does the fabric have to comply with the new specifications but garment aspects such as seams do, too.

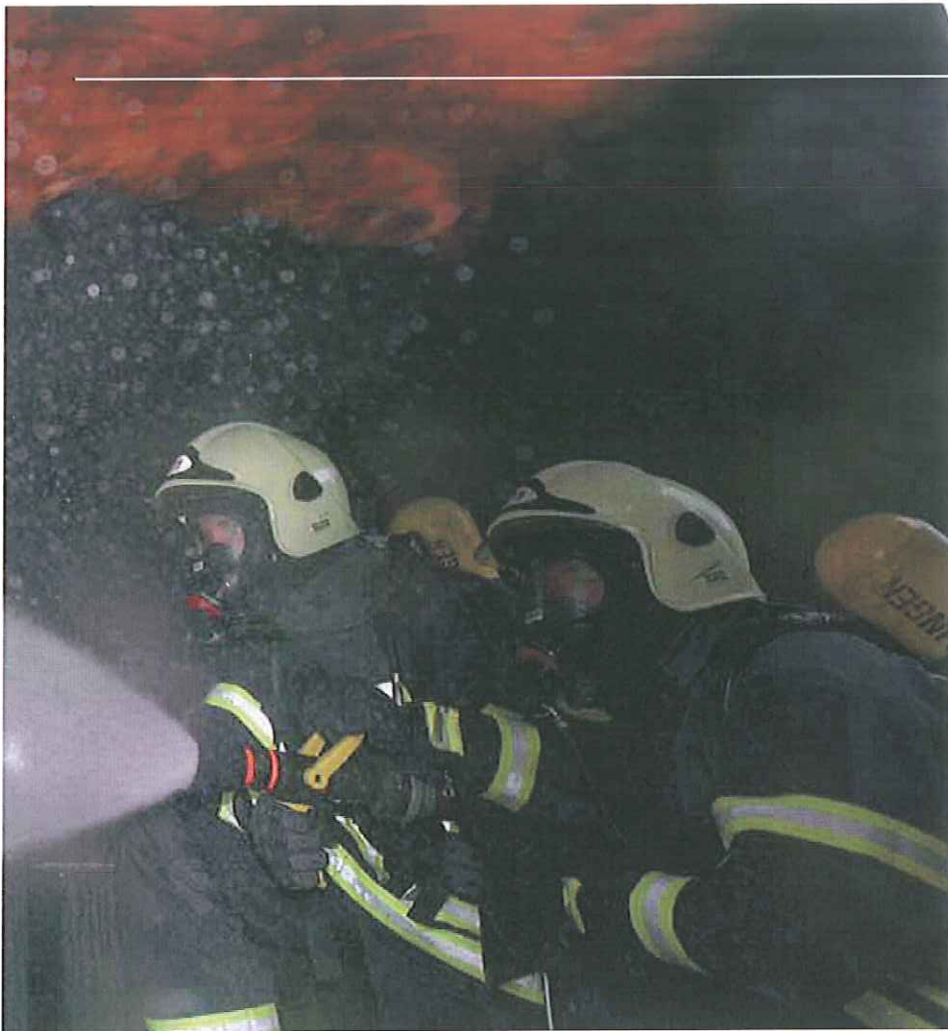
The table illustrates how new testing factors have been introduced that examine fit-for-purpose tests like tear and tensile strength. EN 11612 now

includes an F code for contact heat and EN 11611 has a vertical antistatic test. What's more is the seam aspect: seams strength is a new test in all three standards, plus seams have to be tested for flame spread and for the anti-static test in EN 11611.

In addition to increased testing parameters, there is also a key issue in all three standards with flame spread - this test must be conducted after the maximum number of laundry cycles a garment manufacturer states. So, if a garment is tested for flame spread after five wash cycles, that garment can only be claimed to be a five-wash garment, and this must be stated on the care label. Therefore, we are commonly seeing flame spread tested to a greater number of wash cycles - quite frequently, we are seeing testing for flame spread after 50 wash cycles.

Furthermore, flame spread for EN 11612 and EN 14116 is tested both before and after laundry. EN 11611 and EN 11612 both have the option of testing for flame spread edge ignition (A2). This is an optional requirement but again demonstrates the increased testing parameters associated with the new specifications.

Another factor with laundering is that all tests are now conducted after treatment. For EN 531, only flame spread was tested after five cycles, but



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now with EN 11612 all tests must be made after five laundry cycles. The standards have also updated the laundry specifications, too: now, each wash cycle is a wash followed by drying. Therefore 50 wash cycles is 50 washes and 50 dries. This has implications as this process now takes longer to complete as before the fabrics were only dried after the final wash.

A further question raised with the new standards is when people should move existing products from the old specs to the new ones. There is no hard and set rule for this as EC type certificates last for the lifetime of the product. However, at West Yorkshire Materials Testing Service (WYMTS), we advise any new garment should be type approved for CE marking to the new specifications. In fact, many notified bodies will not conduct type approval to withdrawn standards and we would not recommend this. Companies should move towards updating their garments to the new standards.

The new standards are a big change, and it takes time to understand how this affects a garment and the procedure to obtaining a garment that complies. West Yorkshire Materials Testing has the facilities for full UKAS testing to all three standards and we are a notified body able to conduct EC type examinations for CE marking. ■

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