

Coldroom Panels, Polyurethane Foam & Fire Ratings: An Update

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LPS 1181 & the future of coldrooms

What you need to know

The Situation

Recently, the introduction of a revised version of the Loss Prevention Standard, LPS 1181, has caused confusion in the industry over fire ratings, and therefore the insurance risk, of various types of coldroom and coldstore.

LPS 1181 is supplied as a guidance document by the ABI (Association of British Insurers) for insurance companies in understanding fire risk issues. The Standard recommends the requirements that a possible fire risk should meet, and provides a guide for calculating possible fire risk when setting insurance premiums.

Issues such as whether coldrooms panels would be covered by the revised standard, and if so, which types of panel insulation would be acceptable under that standard, have meant that there have been questions asked regarding fire risks, and therefore the insurance ratings, of coldroom panels.

The Issue

The vast majority of coldroom panel manufacturers use PUR (Polyurethane) insulation, which has been the industry standard for 30 years. Other options, such as polystyrene, PIR (Polyisocyanurate), Rockwool and MPHEN (modified phenolic) are also available on the market, with varying costs, fire ratings and insulating efficiency. The issue has been that, if LPS 1181 were to apply to coldrooms, which of these products would be acceptable under the new fire standard?

The revisions to LPS 1181 have been driven by the ABI due to a significant number of fires in the mid-nineties involving **polystyrene-cored** sandwich panels, as the insurance industry has justifiably targeted high-risk areas for particularly high premiums. One of these has been **food-processing factories** in the UK, where approximately 500 fires have occurred in the last decade.

These food processing factories have been recognised as high fire risk situations due to the "hot processes" used on-site, for example, fat frying, radio frequency ovens and defrosting equipment, combined with the high level of flammable packaging used. Unfortunately, it became customary to use polystyrene cored insulated panels in the construction of these factories in the UK. Due to the thermoplastic nature (melting at low temperatures) of polystyrene, the fires which broke out in these factories often led rapidly to fully developed fires within the entire building.

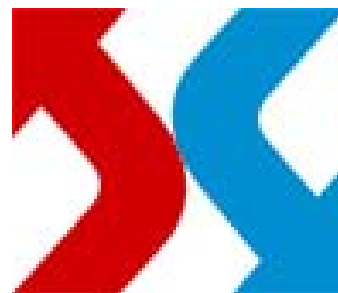
Insurance companies therefore have, over the last two years, discriminated against existing food processing factories containing polystyrene panels, and their inadequate fire rating is now quite established. The ABI's aim under the revised LPS 1181 is to minimise liability. Insurance companies sustained large losses as a result of these fires, including one fire at Sun Valley Poultry in 1993 in which two fire fighters lost their lives.

But what about PUR (Polyurethane) panels?

Similar fires in food processing factories outside of the UK have not occurred and it is significant that in these factories polyurethane panels, rather than polystyrene, have been used. In the UK, polyurethane cored panels have been used in stand-alone cold

stores and cold rooms since 1958 with an unblemished record. The requirements for PUR foam used in refrigerator cabinets, walk-in cold rooms and stand-alone cold stores was incorporated into a British Standard in 1973 (BS 476). British Standards are recognised as conferring fitness for purpose. This now provides more than 30 years of satisfactory experience for products complying with the standard.

At no time has there been any evidence (fire data or insurance claims) to suggest that such panels are in any way a fire hazard. The same kind of evidence has supported the use of these products in building envelopes the world over for more than 35 years, again with an unblemished record.



According to BRUFMA, the representative body of PUR manufacturers, there has to date not been a single fire attributable to the use of PUR in coldroom insulation.

BRUFMA states "It cannot be over-emphasised that there is no reason for either Regulators, Fire Authorities, Insurers, Architects, Specifiers and users in general to be apprehensive regarding the use of polyurethane cored panel systems in construction, provided these are properly incorporated in accordance with the current Building Regulations and EU legislation. These panel systems have been used world wide in construction and stand-alone cold store fabrication for the past 30 years with an unblemished record. Their acceptability is not in doubt."

So why the confusion?

This has occurred simply because, with respect to building construction with insulated panel systems, the insurance companies were unable to understand the technical differences between the risk perception of the various applications for insulated panels and their differing fire performances. They have requested that the LPC (Loss Prevention Council) advise them. The LPC has addressed this by devising test procedures based on their original LPS 1181 test for internal lining products. Currently there are five proposed variations of this LPS 1181 test linked to different construction applications, but it now appears that the new LPS 1181 standard will only cover coldrooms which exceed an external cladding size of 2,000 m², or internal cladding of 1,000 m².

In other words, only extremely large manufacturing size coldstores, on the same scale as the fated Sun Valley structure are covered by the new standard. It will NOT therefore apply to everyday foodservice coldstores and walk-in coldrooms.

Buildings and building contents

Insurance companies' attempt to treat all insulated panel buildings on the same premium basis has not only caused confusion, but also does not take into account that many insulated panel products are not features of the building fabric but **are properly categorised as building contents**. For example, domestic refrigerators, deep freezers, walk-in cold rooms etc. are not permanent features of buildings and are often removed or replaced according to the use to which the building is put.

From an insurance standpoint therefore, walk-in cold rooms in particular, should not be subject to special premiums which may be relating to the building fabric as a result. Accordingly, customers or potential customers using walk-in coldrooms and chiller rooms should strongly resist such items being the basis of any attempted increase in premium simply because they may be constructed of polyurethane cored composite panels.

Coldroom panels WILL however remain subject to the existing British Standard 476 Parts 6,7 and 22. As all existing current methods of panel insulation meet at least one of these requirements, this is more than sufficient to meet fire ratings. A new harmonised European standard will come into effect in mainland Europe in early 2005, and in the UK around 2006. This new European standard, EN 13823, will standardise requirements throughout Europe; we will keep you updated as more information becomes available.



Coldroom Panels: the future

As BRUFMA, the LPC and the Fire Brigade have agreed, PUR is more than acceptable. What all of these bodies also agree on, is that it is not the insulation material that is at issue, it is the fire risk that they create when used in certain circumstances.

So what are the alternatives available?

Rockwool

Rockwool, the trade name for mineral wool, has an excellent level of fire resistance, but is a very poor insulator, and is therefore of little or no use in coldroom panels.

PUR

PUR panels give consistent thermal performance, are lightweight and quick to build, and can be supplied at a reasonable price; ideal for the catering industry, and more than acceptable under current fire regulations. Most reputable coldroom manufacturers, including Foster, already supply an alternative to PUR for very high-risk areas.

In very high risk areas, the alternatives are PIR and MPHEN. The use of both these products has cost and manufacturing implications, and as it appears that fire-boarded PUR panels will meet the EN tests, their use may prove to be unnecessary.

PIR

Polyisocyanurate (PIR) has been raised as an alternative to PUR as certain types of PIR have enhanced fire properties. PIR is a very high-density product, making it more costly per panel, and it also has restrictive processing characteristics due to its poor flow, minimum press temperature of 60°C, and 24 hour curing time, as well as having lower Zero ODP options than PUR.

MPHEN

MHEN (modified phenolic), is a relatively new development. Where panels are to be used as fire doors in very high risk areas, or in close proximity to cooking equipment, most reputable coldroom manufacturers, including Foster, already use an MPHEN panel rather the standard PUR. MPHEN is however significantly more costly by around 70-80%.

Summary of the options

Product Name	What is it?	Fire Rating	Insulating efficiency	Cost
EPS	Expanded Polystyrene	Poor	Fair	Cheap
XPS	Extruded polystyrene	Poor	Fair	Cheap
PUR	Polyurethane	Good	Good	Current industry standard
MWRF	Rockwool	Good	Poor	Very labour intensive and costly. Not suitable for coldrooms due to poor thermal properties.
PIR	Polysocyanurate	Good	Good	20-40% more expensive
MPHEN	Modified Phenolic	Good	Good	70-80% more expensive

Conclusion

The new LPC tests are currently under development and there is at present no proven correlation between these suggested new tests and real application experience. In fact it has yet to be clarified whether coldrooms may not even be covered by LPS 1181 due to their size or due to the fact that they are covered by Contents Insurance.

It is therefore suggested that for walk-in cold rooms, users should rely on products that comply with requirements of the current British Standard BS 476 since the 30 years experience of such products has demonstrated that there is no undue fire hazard associated with them. This clearly seems a much more reliable basis on which to make risk assessments than the suggested performance of new and unproven tests based on LPS 1181. The required performance to comply with LPS 1181 for building envelopes vastly exceeds the proven requirements that are dictated by the 35 years unblemished performance for polyurethane products that have been used the world over. It should therefore be stressed that products complying with BS 476 are "fit for purpose" and this should be the basis for the end of the confusion.

There will always be a risk of fire, but this risk needs to be properly managed. The new standard may not even outlaw the use of polystyrene, but will probably restrict its use to low-risk areas.

The position of PUR as the leading panel insulator is very unlikely to change. It is the most environmentally friendly, cost-effective, thermally efficient insulator, and has the support of the LPC, BRUFMA and the Fire Brigade.

What must change, however, is risk management. The key issue that has become apparent from BRUFMA is that the key to meeting future criteria is that proper and effective risk assessment and risk management will be required. Risk Labelling schemes and Site Fire Safety Plans are likely to play a much more important part in the future of coldrooms. And it looks like PUR will be playing a large part in that future.

For more information regarding the above issues, please contact...

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Key to Acronyms

ABI: Association of British Insurers
 BRUFMA: British Rigid Urethane Foam Manufacturers Association, the representative body for the PUR Industry.
 LPC: Loss Prevention Council

Other Foster Blue papers include:

The ECA Scheme
 The Safe Way to Blast Chill Freeze and Thaw
 Food Hygiene and Staff Training
 Hydrocarbons in Refrigeration - What caterers need to know
 The Climate Change Levy
 Food Temperature Laws
 Inspection by Environmental Health Officers
 Food Safety and E. Coli
 HACCP- Hazard Analysis Critical Control Points
 Handling and Serving Ice
 CFC's, Refrigeration and the Caterer
 Safe Food Storage
 Plan for a Catering Crisis

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