CONTRIBUTION OF EPS PANEL SYSTEM TO A BUILDING FIRE

Version 1.0

IPCA Ltd.
Insulated Panel Council
Australasia Ltd

Formerly EPSA Inc. PMG

CODE DISCLAIMER AND WARNING

It should be noted that the solutions in this voluntary Code of Practice (CODE) cannot guarantee safety or outcomes for occupants, fire fighters, or owners of buildings in the event of a fire due to the unpredictable nature and behaviour of fire, and the many variables that affect fire behaviour which are outside the control or influence of the recommendations of this CODE.

It is not the intention of EPSA Inc. or the EPSA Inc. Panel Manufacturers Group that this voluntary CODE be used as a guarantee of the products produced or workmanship of the members and final jurisdiction and responsibility for fire performance rests with the relevant authorities and Code Compliant Companies' manufacturers and installers.

The accuracy and reliability of the content and recommendations should be independently confirmed by the reader.

Failure to implement proper risk management may result in loss, damage or injury and this voluntary CODE does not claim to cover every precaution that is required to prevent the risk of fire in Insulated Panel Structures built in accordance with the CODE.

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1.0 OVERVIEW

The difference between the performance of the various types of construction and testing methods is exploited by those who have done so much damage in confusing this issue to further the sale of their own products. This is the reason that insurance companies and others express concerns based on this misinformation and many unfortunately have been lead to believe it is fact that EPS Insulation is a high risk.

*"Plastic insulation **used** to be associated with increased fire risk."*

EPS Insulation in Insulated Panels fills the space inside the Panel or structure and is not the primary material exposed to the flame in a properly designed building. Insulation material is very light and has a relatively low calorific value. This is clearly the case with Insulated Panel Systems.

Well researched and scientifically backed papers on this topic conclude that:

"Well designed and constructed building insulation of all compositions have a negligible contribution to fire safety. The presence of fire retardant additives leads to a better fire behavior. The fire retardant SE (FR) grades are more difficult to ignite and considerably reduce the rate of spread of flame during a fire. The additives cause flame quenching so that when the ignition source is removed the EPS will not continue to burn."

2.0 HEAT RELEASE

"Compared to other insulation materials, EPS has a lower calorific value per unit of thermal insulation. However, the calorific value of EPS (40MJ/kg) is about twice that of timber (18.6 MJ/kg). However, as for many insulation materials, the mass of EPS is low (98% air to 2% polystyrene) and so the amount of heat release is also low in the event of a fire. Taking into account the comparative densities, the calorific value by volume of EPS is about 540 MJ/m^3 to 1250 MJ/m^3 compared to 7150 MJ/m^3 to 10400 MJ/m^3 for cellulosic products such as fibre, insulating board or timber."

*"**As an illustration:** a 200mm thick layer of EPS with a density of 20 kg/m^3 represents the same amount of energy as 17mm thick pine wood. In general, the heat content and potential heat release of other building materials is far more significant than that of insulation in determining the fire risk."*

*"**Insulation has low density and a low relative calorific value:** in a typical composite roof the insulation material amounts to only about 10% of the total calorific value and the differences between various insulation materials are small. Most important however in the majority of cases is not the static fire load of the basic structure but the variable fire load, i.e. the contents of the building. In most cases the variable far outweighs that of the static fire load and further reduces the significance of the insulation material."*

"Since the insulation material fills the space inside structures and is protected, it is not the material exposed to the flames and the heat. The heat release of insulation materials in the event of fire is dependent upon the construction of the building (ventilation, presence of other materials, degree of compartmentalisation, etc.). Within a building the calorific value of the contents usually outweighs that of the structural components."

3.0 COMBUSTABILITY

The following is information on the combustibility of the EPS-FR fire retardant Panel insulation compared with other insulation most often used in insulated Panels from **the recognised authority on this topic.**

As can be seen these are high temperatures steel structures for instance deform and start to collapse at temperatures between 450°C and 600°C. **As can be determined from the following the ignition temperature of EPS is higher than both Polyurethane and also PIR.**

(a) Babrauskas [55] reports the piloted ignition temperature of polystyrene without halogenated fire retardants as 360-370°C and with halogenated fire retardants as 430-445°C.

(i) Babrauskas, V. 2003. Ignition Handbook. Chapter 7 Table 34. Fire Science Publishers. USA.

(b) All combustible core materials will burn at temperatures below that of a fully developed fire, (Albeit Polyisocyanurate (PIR) with its ignition temperature of 420°C, 100°C above Polyurethane (PU), may resist ignition for a few minutes more).

(ii) International Fire Consultants. Sun Valley Fire – Revisited. Report undertaken for the British Plastics Federation.

At this stage there would be a fire in the contents which out weigh the structure in fire load.

"EPS is protected from fire by surrounding materials and will only ignite when the whole of the building is ablaze. In these cases EPS, and other insulation materials, will not contribute to the propagation of the fire and the building is already beyond the point of rescue."

4.0 INSURANCE PERSPECTIVE

It is of concern that insurance companies and there staff unwittingly are happy to accept lesser performing systems of construction and will readily insure them.

"Historically, national authorities have introduced building regulations, standards and authorisation procedures with which engineers must comply when designing and erecting buildings. From an insurer's perspective, the primary driver is to contain the fire thus minimising the damage and subsequent financial claim whilst optimising insurance premiums. Insurers have introduced their own tests in order to cover these interests. Their needs and those of the fire services and national authorities are not always compatible and make the fire testing requirements complicated and costly."

"There has been in the past much discussion amongst the technical experts about the appropriate fire tests for building materials."

The political process has agreed testing conditions suitable for testing fire behaviour and no further tests should be required."

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5.0 CONCLUSION

(a) *"EPS, or any plastic based insulation material, used correctly is not a fire risk. Major, well publicized fires that in the first instance have been attributed to EPS have later been shown to be independent of the insulation."*

(b) *"There is no scientifically validated data about the relationship between EPS, the risk of fire and the extent of fire damage."*

(c) *"We in EUMEPS" (and also IPCA Ltd.) believe that the use of plastic insulation materials, in particular EPS, which has demonstrated best in class insulation efficiency is compatible with fire safety in buildings. The facts are there, we have to extend the message and belief to those responsible for the specification, design, construction and care of our buildings."*

1. *A Burning Issue – Changing Perspectives on the Fire Performance of Buildings Stephen Long, EUMEPS material in quotation marks.*
2. *International Fire Consultants Ltd. "Are Fire Tests for Insulating Panels Adequate?" June 2006*
3. *IACSC, "Summary of the fire testing methods and evidence appropriate to buildings incorporating insulated Panels." September 2003*

Extracted from presentations noted above by Ron Lawson CEO IPCA Ltd.

6.0 CODE OF PRACTICE IPCA Ltd 002:2011 ADDITIONAL INFORMATION

Our industry has in collaboration with Emergency Services developed a Code of Practice to address much publicised fires in Food Processing Buildings were Insurance Companies have suffered considerable losses from claims.

The CODE was developed to address concerns and issues related to fire performance of Insulated Panel Systems and particularly the safety of fire officers many of which are unique to those types of buildings.

Clearly these fires have been as a result of unmanaged occupancy and process risks not the construction systems or materials used.

The knowledge gained from this work and research is being applied across other applications where applicable to further improve fire performance and we are confident as an industry that **EPS Insulated Panels and systems are here to stay.**

EPS has been identified in studies by Mc Kinsey's for the International Council of Chemical Associations as one of the two products that can when used in building insulation have the greatest impact on reducing global warming and increasing energy efficiency in the most cost effective and efficient manner. This benefit is over all other products produced within the Chemical Industry in any application.

The application of EPS in Insulated Panel to achieve this can be done without compromise to fire safety as the real improvements in safety come from a combination of engineering and chemistry.

Use of Insulated Panels in construction will increase into the future and can be done safely not increasing fire risk and improving on many currently accepted and readily insured construction methods.

7.0 MEETING BUILDING REGULATION REQUIREMENTS

EPS Insulated Panel Systems when tested to the requirements of the BCA AS/ISO 9705 are capable of achieving the best possible result Group 1.

Certificates and test available.

For any concerned by so called test material on You Tube and from other unofficial unverified sources comparative test video of products tested by independent certified laboratories can be viewed in presentations we will gladly conduct to support our position and commitment to *"Facts not Fear."*

It should be noted that it is a fact PIR Panel when tested to AS/ISO 9705 obtains a Group 2 Classification a lesser performance than EPS a fact not often understood, for the reasons why we are available to explain this and what impact it may or may not have.

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