



Fire Safety FAQ Guide

Insulated Wall Panel Systems

A Comparison of Kingspan Insurer Certified Panels vs. EPS Panels



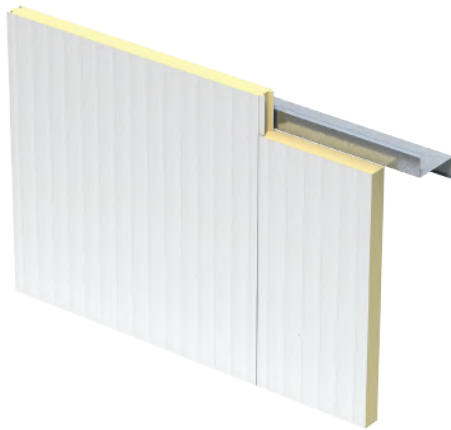
Fire protection of your crop and assets starts with your building envelope.

This guide is intended to provide you with an understanding of the key differences in fire performance characteristics between various insulating foam core materials of insulated metal panels (IMPs) – products which are used extensively in wall construction of indoor horticulture grow facilities for both new constructions and internal retrofits.

What are IMPs?

Insulated Metal Panels (IMPs), sometimes called sandwich panels, are lightweight composite wall and roof panels with metal skins and an insulating foam core. These panels have in-built insulating properties, and their outstanding spanning capabilities and one-pass installation makes them quick to install, saving costs compared to other wall assemblies.

IMPs are available in a range of insulating foam cores.



What types of insulating foam cores are available for IMPs?

There are two broad categories of insulating foam cores.

Thermoplastic

Eg. Expanded polystyrene (EPS)

Thermosetting

Eg. Polyurethane (PU),
Polyisocyanurate (PIR),
Kingspan QuadCore™
Technology

How do these foam types behave when exposed to an ignition source?

They behave very differently due to the polymer chain structure of the material.

Thermoplastic

Softens and melts forming an ignitable liquid, which can drip and spread quickly, further propagating a fire.



Expanded Polystyrene (EPS)

Thermosetting

Hardens and chars; the char layer helps to protect the remaining foam material and helps prevent further propagation of the fire.



Kingspan QuadCore™

"EPS will melt at temperatures lower than 400°F, forming an ignitable liquid. The peak rate of polystyrene decomposition and volatilization occurs at 687°F. At this temperature the vapor release will cause rapid flame spread across the exposed surface. Automatic sprinklers are not always effective in confining the fire to a small area. EPS does not tend to smolder or char."

FM Global, Property Loss Prevention Data Sheets, "Plastics in Construction", 3.1.2, January 2018.

Does this affect the structural integrity of the IMP in a fire situation?

Yes. In IMPs insulated with EPS, once the EPS foam core ignites the fire will spread rapidly through the interior of the panel. Once the EPS core melts, the panel will tend to bend and buckle compromising the building envelope.

In contrast, insulating foam cores of Insurer Certified PIR or Kingspan QuadCore™ Technology will not melt, but rather will char helping to protect the remaining foam and preventing further propagation of the fire.



EPS panels at a poultry processing facility fire in Australia, January 2010.



Kingspan Insurer Certified PIR panels at a car dealership in Belgium, October 2014.

For more details on these case studies and more, visit www.kingspanpanels.us or www.kingspanpanels.ca and click on "Fire Performance".



What about smoke?

When EPS burns it tends to emit significantly more smoke than PIR or QuadCore™ Technology. This is an important fire safety consideration, particularly when protecting the value of internal goods.

"Burning EPS emits a very dense black smoke containing oily, sooty particulate matter. Thus, a relatively small fire involving EPS in food warehouses, freezers, or electronic equipment areas can result in contamination of the entire area."

FM Global, Property Loss Prevention Data Sheets, "Plastics in Construction", 3.1.2, January 2018.

Does the type of IMP used in a building affect insurance rates?

Typically, yes, please verify with your insurer. Many insurance companies will charge higher premiums for buildings containing EPS as a building element. Some may not offer a policy at all.

What should I look for in selecting an IMP for my project?

Ask for FM Approval, considered the insurance industry's highest level of fire performance certification for building products.



Factory Mutual (FM) Global is an international property insurance and loss prevention engineering firm operating in over 100 countries. Recognized and respected across the globe, FM Global's FM Approval third-party certification assures building owners a product has been objectively tested and conforms to the highest national and international fire standards.

"...FM Approved PU insulated sandwich panels allows the properly formulated foam core to char when exposed to an ignition source. This charring helps protect the remaining foam and keeps fire propagation to within acceptable limits."

FM Global, Property Loss Prevention Data Sheets, "Plastics in Construction", 3.1.1, January 2018.

Product Comparison

Category	Procedure	Description	IMP Foam Core		
			EPS	Kingspan PIR (KS Series)	Kingspan QuadCore™ Technology (KS Series)
Thermal	ASTM C518	Thermal resistance @ 75°F	R-3.85 – R-4.35 per inch	R-7.2 per inch	R-8.0 per inch
Fire	FM 4880	Class 1 Fire Rating of Insulated Wall or Wall and Roof / Ceiling Panels, Interior Finish Materials or Coatings, and Exterior Wall Systems	–	Pass	Pass
	FM 4882	Class 1 Interior Wall and Ceiling Materials or Systems for Smoke Sensitive Occupancies	–	–	Pass
	ASTM E84	Flame Spread	?	25	25
		Smoke Developed	?	250	50
	ASTM E119	Standard Test Methods for Fire Tests of Building Construction and Materials. One hour fire rating (8")	–	–	Pass
	ASTM D1929	Standard Test Method for Determining Ignition Temperature of Plastics	?	878°F	968°F
	ULC-S101	Standard Methods of Fire Endurance Tests of Building Construction and Materials	?	Pass	Pass
	ULC-S102	Standard Method of Test for Surface Building Characteristics of Building Materials and Assemblies	?	Pass	Pass
	ULC-S127	Standard Corner Wall Method of Test for Flammability Characteristics of Non-Melting Building Materials	?	Pass	Pass
	UBC26-4 / NFPA 285	Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components	?	Pass	Pass
	NFPA 259	Standard Test Method for Potential Heat of Building Materials	?	Pass	Pass

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For the product offering in other markets please contact your local sales representative or visit www.kingspanpanels.com

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