Polyurethane Core Vs EPS Core

In SIP Panels

The biggest differences between Polyurethane and EPS Structural Insulated Panels (SIPs) are the manufacturing processes, thermal and fire protection performances.

PU Injection Panel

EPS Panel Drying Press

RGBP Group has the privilege to work with and supply our ResCom® engineered fit for purpose panels to some of the very best innovative SIP Builder companies around the world and we are consistently asked which of the systems offer the best solution as a core when applying our products as the primary internal and external skins.

Generally, both systems are the same and when it comes to the end use of the products in building and construction they use the same or similar materials as skins to cover both sides of the foam core.

Traditionally OSB, FC and Drywall has been used for skins, but with the consumer and building industry seeking greater levels of protection from fire, water, mould, and the effects of extreme weather events MgO Corp is seeing more SIP manufactures moving towards our ResCom® panels because they deliver superior all-round protection against water, mould, impact, vermin and fire, but here is where the similarity ends.

Let's Get Technical:
In the bonding of the foam to the skins polyurethane itself is the champion of the panelised systems with Polyurethane being well known as one of the best glues used in the industry today. The use of polyurethane as the core also delivers both an excellent R-value and a strongest bond to the skins.

EPS panels use a simpler glue spreaders system to apply beads of adhesive on both sides of the chosen skins, and then the skins are match together with the EPS, and mechanically held in place and under pressure until the glue is dried.

Today there are substantially more SIP manufacturing facilities using the traditional EPS lick, stick and press technology to that of the innovative preformed PU injection systems. This is understandable as there is a significate variation in cost between the EPS and PU manufacturing systems and the core material.

Yet one could argue that the EPS systems are not cheaper based on industry evidence that shows the additional benefits gained from the PU core combined with the ResCom® panels and that these benefits would well outweigh the additional cost of the PU system over the lifecycle of a project in both sustainability, cost of utilities and added protection.

CHEMICAL RESTANCE

- Polyurethane is resistant to most counter chemicals.
- EPS reacts violently to petroleum-based products.
- PL 400 and liquid nail will literally burn thru EPS.

DENSITY
The density of a product will determine the strength of it.

- EPS has a density of 1 lb.
- The polyurethane that we use has a density of 2.2lb.

Fire Resistance
The polyurethane that we use is a UL Class 1 rated foam. This means that our polyurethane is not a source for fire.
On its own, polyurethane will not burn and will extinguish itself.

- A Class 1 rating is the highest rating a building product can obtain.
- Polyurethane is a thermal-set plastic. This means, that it will not melt.

- Polyurethane is not affected until temperatures reach 1000 degrees and at that time it will only char.

EPS on the other hand is not a thermal-set plastic and will begin to soften at temperatures of 88deg Celsius and melt at temperatures of 150deg Celsius.

Moisture Resistance

With all the problems of mould and mildew, moisture resistance is today a very important factor.
Polyurethane has one of the lowest moisture permeability ratings of any product manufactured for the building industry today.

- The permeance rating on our polyurethane is 1.2.
- The permeance rating on EPS is 2.0 to 5.0
  This difference in a high humidity area would warrant another moisture barrier for EPS panels.
- In calculating R-values, some EPS manufactures use these additional moisture barriers in their calculations.

Summary:

It is great to see that the Structural Insulated Panel (SIP) Industry is evolving, and that the consumer has two (2) proven and tested options that deliver equal construction benefits in time and money.

As the world struggles to come together and agree on a holistic building system that delivers in spades greater sustainability and performances in all sectors of building and construction it is clear that the use of high quality tested and certified structural insulated panels (SIP's) are the shining light regardless of which of the above two systems you may choose.

At present the cost of SIP building is by far the most affordable and advanced in America, Canada and the UK this is because builders and trades are more educated and willing to take on the panelised building systems. Areas that are in great need of panelised construction such as Australia and New Zealand, but these areas are somewhat suppressed by the reluctance to change in the building industry and the higher cost of construction imposed on the so-called new systems.

RGBP Group is proud to supply our ResCom® building products to the building and construction industry and we can guarantee the highest level of quality and accreditation under International 3rd Party Certification. Our company and products are monitored by 3rd party independently auditors to assure compliance for use in building and construction.

Kind Regards
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