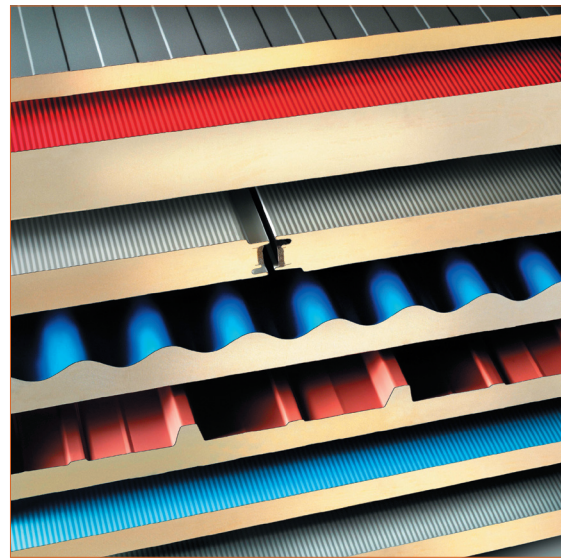


## PU Europe FIRE SAFETY HANDBOOK

# SUSTAINABLE CONSTRUCTION WITH RIGID POLYURETHANE INSULATION

Rigid polyurethane (PU – PUR/PIR) is widely used in all kinds of applications. One of its main uses is as a high-performance thermal insulation material in both residential and non-residential buildings. The term PU is used to denote both PUR (polyurethane) and PIR (polyisocyanurate) building insulation products (a definition of each is given in the European product standard EN 13165). PIR was developed to give inherently higher fire performance demanded by certain applications. Actual fire performance test data should be obtained where required for each specific product and application. PU insulation products take many different forms without facings or with a variety of facings from steel to thin foils suited to their end use application. Key characteristics of PU include its versatility for use in a wide range of applications, durability and, above all, its outstanding thermal insulation capacity.

The need to cut carbon emissions through the provision of energy efficient buildings has led to an increased demand for PU insulation which can deliver very high levels of performance without excessive thickness or weight, minimising any impact on the overall building structure. Quantification of overall environmental performance and economic costs of using PU insulation in low energy buildings has proven that material selection for sustainability cannot



be disconnected from the building context [1]. Knock-on effects of insulation product choices and resulting component thicknesses and fixing systems can become significant in terms of environmental and cost efficiency performance.

Next to energy efficiency, it is clearly important to understand the other aspects that need to be considered in the design and specification of sustainable buildings, such as fire safety.

Fire safety regulations remain the responsibility of Member States. However, fire test standards and classification systems on which the regulations are based have been harmonised

<sup>1</sup> PU Europe factsheet n° 15: *Life Cycle Environmental and Economic analysis of Polyurethane Insulation in Low Energy Buildings*, (2014)

## WHAT IS PU?

PU insulation stands for a group of insulation products based on PUR (polyurethane) or PIR (polyisocyanurate). Their closed cell structure and high cross-linking density leads to characteristics such as excellent thermal performance, good dimensional stability and high compressive strength. PU insulation has a very low thermal conductivity, starting from as low as 0.019 W/mK, making it one of the most effective insulants available today for a wide range of applications.

As PU shows very low emission levels it is also widely used in applications outside the construction industry. This includes clothes, footwear, furniture and mattresses, car parts, fridges and even medical devices.

throughout the EU with the introduction of the Construction Products Directive (CPD) and the follow-up legislation the Construction Products Regulation (CPR) (305/2011/EU). Individual Member States, public and private sector procurers are free to set their own requirements on the performance of buildings and construction works and therefore the performance levels of products. The CPR is relied on by the previously mentioned stakeholders to set the building performance itself or its parts, via various European classification systems which are applicable to the construction product as placed on the market, e.g. for reaction to fire. Interpretation (national/local building codes) is almost in every case necessary to make the link between the construction product and the building performance. With regards to fire safety performance, interestingly the CPR and country legislations also allow, in some cases, the application of fire safety engineering (FSE) principles and system or application related testing to ensure that the most suitable insulation product to achieve optimum overall performance can be specified.

PU insulation products meet a wide range of requirements of both national fire regulations and insurance backed standards.

