

PFAS restriction dossier

Brussels – 1st of August 2023

Q7. Rough calculation on the missed energy savings that would result from banning H(C)FOs in sprayed/poured PU foam

Average annual energy savings from an envelope insulated with closed-cell sprayed/poured PU foam:

From the [2014 Environmental product declaration \(EPD\) for PU \(PUR/PIR\) in-situ foam \(spray foam\) and energy saving potential](#) (PU Europe factsheet # 13/2), third party verified research led to energy savings of 162 KWh/m² year. This number was assuming that closed-cell spray PU foam had a thermal conductivity of 28mW/(mK) and a thickness of 130mm (thermal resistance of the insulation layer at 5m²K/W). However, the climatic conditions were based on Heating Degree Days of 3,700 while 3,200 is now the [European arithmetic average across 42 years of data](#) (worth noting that this number keeps decreasing but cooling degree days are rising in parallel).

- ➔ Therefore, updated energy savings would be 13.5% lesser than what is calculated in the PU Europe factsheet 13/2, i.e. 140 KWh/m² year

Calculating the annual area on which closed-cell spray/poured polyurethane foam is applied:

The in-situ spray/poured PU closed-cell foam market is about 5% of the overall rigid PUR/PIR insulation market, which amounts to 2 million tons of product in Europe (including the UK and EEA):

- ➔ That would translate into 100,000 tons of closed-cell HFO/HCFO blown product
- ➔ Using an average density of 40kg/m³, a volume of 2,500,000 m³ is found
- ➔ Taking an average thickness of 12.5 cm, we arrive to a surface of 20,000,000 m² (note: this thickness is not aligned with the 13cm of the factsheet in which a thermal conductivity of 28mW/(mK) is used. But today products put on the market have better performance - ranging from 26 up to 28mW/(mK))

Annual energy savings from closed-cell spray/poured polyurethane foam using HFO:

- ➔ 226.6 GWh/year,

Impact of moving from closed-cell to open-cell spray/poured polyurethane foam:

Using the 2014 [PU Europe factsheet #22 "Closed- and Open-Cell Spray Polyurethane \(PU\) Foam"](#), the average lambda performance of closed cell spray foam is 27 while for open-cell SPF it is 38.5mw/(mK) (energy saving penalty of 42.6%)

- ➔ Taking a more conservative figure of 40%, the untapped energy saving potential is **90.6 GWh/year**, equivalent to the 2021 household electricity consumption of 54,242 Europeans (see [Electricity and heat statistics](#))
- ➔ Those untapped energy savings should be multiplied by the lifetime of the applications where they are used: 30 to 50 years, **then amounting to 2.7 TWh - 4.5 TWh**

Reminder: the key reasons why closed-cell PU foam are chosen relate to end-use conditions: space constraints (think of renovation of cavity wall, floor, crawl space...), demanding mechanical properties, non-flammable character, etc. If we look outside the polyurethane product family (beyond open-cell spray/poured PU foam), most would not meet the on-site requirements.

PU Europe is the European Federation of manufacturers of thermal insulation products (from construction products manufacturers in factories to in-situ formed PU foam).

The superior performance of our insulation products is due to the presence of a blowing agent trapped in a closed cell polymeric matrix. When produced in factories, the most commonly used blowing agent is pentane (hydrocarbon), either as a pure isomer or as mixes of its isomers. In certain discontinuous production lines and for in-situ foam formulations, the blowing agent must not be flammable under normal application conditions and HFC-365mfc or HFC-245fa have been employed. In advance of the F Gas regulation timeline (2023 as the cutoff date set in annex I for their usage in polyurethane foam), those substances are now being replaced by HFO-1336mzz-Z and HCFO-1233zd-E listed under annex II. Those former substances have 99% lower Global Warming Potential (GWP) vs. their predecessors and also exhibit a better thermal conductivity.

PU Europe is the European voice of the polyurethane (PUR / PIR) insulation industry. The 110 manufacturing sites and more than 20,000 direct jobs in the PU rigid foam sector contribute to tackling the carbon footprint of the buildings stock responsible for around 36% of the CO₂ emissions of the European Union (more information about us via www.pu-europe.eu and lobbying transparency register ID number 27993486325-38).