



Polyurethane (PUR) is one of the most versatile materials ever created, present in the cars, under the carpets, as packaging material, cushioning material in almost all furniture and bedding. The European PUR foam sector has 50.000 companies that employ over 1.6 million people.

Manufacture of PUR foam requires certain amount of free isocyanate in order to fully react the polyurethane mixture. Isocyanate component represents a potential risk to workers during manufacture of the PUR foams. Isocyanate is included in the 2003 European schedule of occupational diseases, and it has been established that ten to twenty percent of asthma cases recorded in EU are due to isocyanates.

The aim of FREEFOAM is to reduce health risk of workers during foam manufacturing by lowering the concentration of free isocyanate and reducing the emission of the same to the atmosphere.

We propose a unique, homogeneous reactive mixture for PUR foaming purposes where reactants are physically separated by using functionalised microcapsules of isocyanate conveniently dispersed on polyol mixture component. The reactive system will allow increasing the mixture reactivity due to the performed compatibility and hence, homogeneity between isocyanate and polyol components while decreasing the exposure of workers to harmful emissions by lowering the residual monomer content on the foam, avoiding the emissions and migration of such components from foams. In addition, the used solution will allow decreasing the generated waste due to bad cell homogeneity and product density as consequence of bad mixing process.

The project commenced in May 2013 and has a planned duration of 3 years.

Expected results:

- New Method for Isocyanate Encapsulation
- New PUR foam formulation based on polyols and microencapsulated isocyanate
- New foaming method for PUR foaming manufacture

FreeFOAM

Novel PUR foaming manufacturing process with reduced toxic isocyanate content

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CONSORTIUM:



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