

Life-Cycle Assessment

Conica AG Sports Flooring Systems

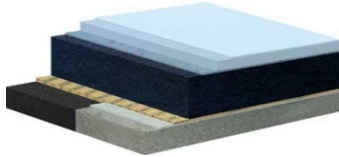
Conipur HG pure and Conipur HG protect+



PUR (Polyurethane)

Conipur Flooring Systems HG pure and HG protect+ are PUR based flooring systems. PUR comprises resins, hardener components as well as fillers. PUR flooring systems are applied seamlessly. Conipur HG pure and HG protect+ are used for applications in sports halls, gymnastic halls, school sports halls, and multipurpose halls. Conipur HG pure is approved by the International Handball Federation (IHF Certificate), the International Basketball Federation (FIBA Certificate) and the Badminton World Federation (BWF Certificate).

Composition and Layers



Conipur flooring systems are basically made of 6 layers (primer, glue, elastic mat, pore sealer, self levelling coating, and top coat). Coating and top coat consist of about 60% of PUR components, 30% of fillers and 10% of other materials. The weight of the initial application of coating and top coat is about 4.4 to 6.8 kg/m² (without the elastic layer).

Life-time of PUR Systems and Renewal

An important advantage of PUR based flooring systems is the possibility to renew the base coat and the top coat without a complete removal of the flooring system – a process called “retopping”. The top coat is partially removed (grinded) and body coat and top coat are renewed typically every 20 years. The life-time of the base layers (primer, adhesive, sealer, and elastic mat) is up to 60 years. Other flooring systems have to be removed and replaced completely when reaching the end of their life time. Also, compared to other systems the life-time of PUR flooring systems is long. This has been documented by the durability of indoor and outdoor sports flooring applications.

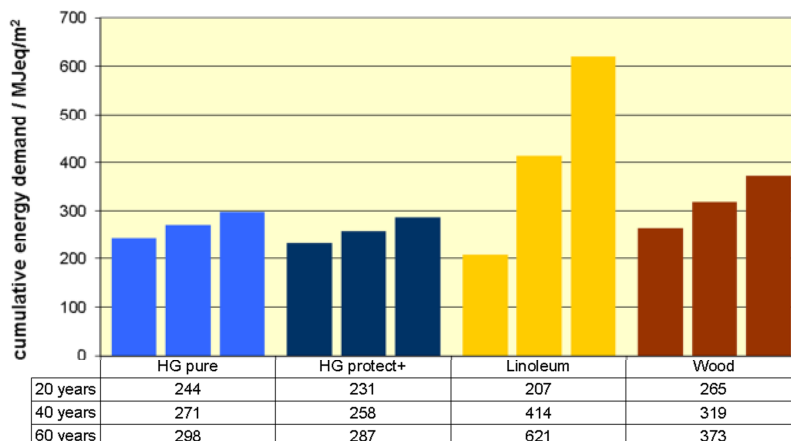
Conipur Flooring Systems compared with other Flooring Systems

Comparison of Conipur systems with other flooring systems has been carried out on the basis of the life-cycle analysis data. For reason of comparability, the subfloor components of all systems (elastic mat and adhesives for the Conipur systems and the linoleum, the wooden substructure for wooden flooring systems) have been neglected. Cleaning was assumed to be identical for all three types of flooring.

The cumulative energy demand of a product is defined as the sum of all primary energy resources used for raw material production plus all other energy consumption during transport, production and life-time of a product. For all flooring systems the main contribution is due to the production of the materials.

Conipur flooring systems are especially advantageous in case of long term usages of 40 years and more. Linoleum flooring has to be removed and refitted within this time span (typical lifetime of 25 years), and the wooden flooring is more demanding in terms of maintenance (yearly coating).

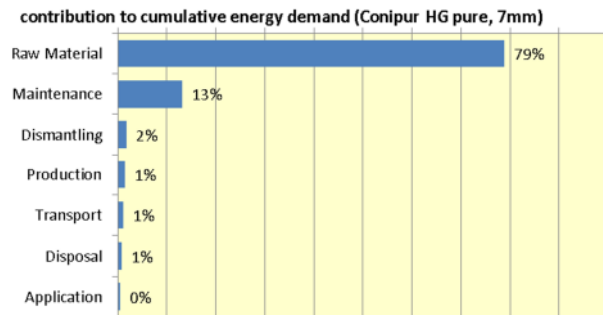
Retopping of the Conipur flooring systems increases the cumulative energy demand by roughly 10% for each retopping cycle, which is much less than the complete removal and replacement of the compared systems. This effect pays off for a usage of more than 40 years.



Graph: Comparison of the cumulative energy demand of the entire life cycle systems with Conipur HG pure and Conipur HG protect+. Calculation for 20, 40 and 60 years of product use. Linoleum floorings will be replaced after 20 years. The same cleaning cycles and cleaning intensity were applied to all systems.

Life-Cycle Assessment of Conipur HG pure and Conipur HG protect+

For both Conipur flooring systems the relevance in terms of the cumulative energy demand for each life-cycle step is about as follows (60 years of product use):



Two life-cycle steps define more than 90% of the total cumulative energy demand:

- Production of raw materials (including the amount used for retopping)
- Maintenance (including the energy used for retopping)

Conclusions

Conipur flooring systems are ecologically advantageous when used for long periods. Compared to Linoleum, where life-times of only 20 to 25 years are achieved, the coating of Conipur flooring systems can be reworked to extend the life time of the system to more than 40 years. Due to this reduced raw material demand during the life time of Conipur systems also the cumulative energy demand is much lower.

By its seamless nature PUR flooring system can be efficiently cleaned. This also can reduce the environmental burden throughout the life time of the flooring system.

Advantageous Properties of PUR Flooring Systems are

- seamless application allows for efficient cleaning
- easy to repair, occasional damage can be repaired without removal of large areas of the flooring
- retopping – even with differently coloured top coater – allows for cost- and environmentally friendly renovations
- retopping also guarantees for a floor which looks like new throughout the extended life-time
- low VOC-emissions in use phase due to immediate evaporation of VOC in application phase

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Frame of the Conipur Study

What is a life-cycle assessment?

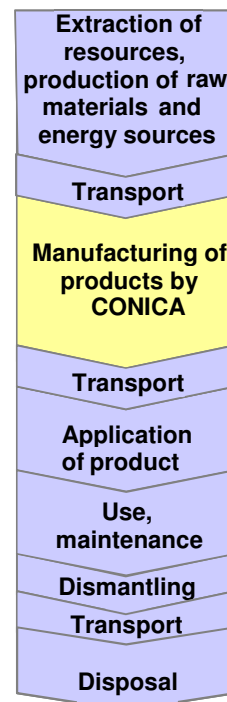
A life-cycle assessment provides information on the environmental impact of a product over the entire life-cycle from the extraction of resources to the disposal of the product.

Goal

The goal of the study was to identify the relevant environmental impacts of PUR flooring systems in order to identify improvement potentials and to compare PUR with other flooring systems.

Life-cycle steps

The study comprises of the following life-cycle steps:



Manufacturing

Production of raw chemicals and final product

Transports

transport by lorry, train or ship

Use, Maintenance

cleaning, retopping for PUR based systems

Dismantling

Complete removal of PUR Systems (including milling)

Disposal

All used flooring system are disposed of in an municipal incineration plant

All life cycle steps include packaging materials

Functional unit and valuation methods

A functional unit is an entity that is used to compare the life-cycle assessment of different products. In this study 1 m²/use phase (in years) of the flooring systems has been used. Applied valuation methods: cumulative energy demand (CED). CED is defined as the total energy consumption during the life time of a product including primary energy resources and energy used to manufacture, maintain and dispose of the product.

Data sources

- Production of raw materials and energy sources: ecoinvent 2.2 database.
- Production, application, maintenance, transport: manufacturer, partners and suppliers.

Comparison with other studies

For the comparison with linoleum and wood literature data has been used. All compared flooring systems include the raw material production, the application (usage of adhesives was estimated, since no data was available), maintenance (including wet cleaning every other week and coating once a year) and disposal.