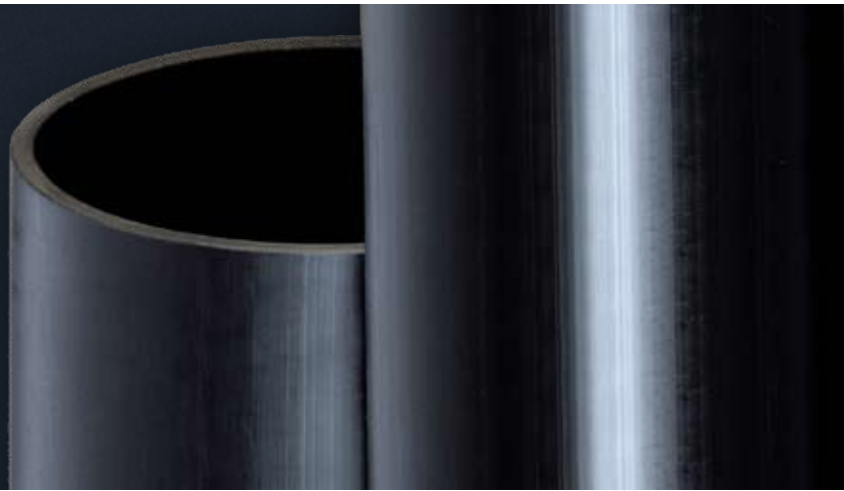




Life Cycle Assessment
Drainage pipes for buildings





Framework of the Life Cycle Assessment

Different drainage pipes are used in buildings. They vary by pipe and fitting material and type of installation. The main areas of application are building services and industry. The environmental impact of the pipes is evaluated and the pipes are compared with each other using a Life Cycle Assessment (LCA).

Objects of investigation

The following drainage pipes were assessed:

- PVC pipe
- PP pipe
- Geberit Silent-PP pipe¹⁾
- Geberit PE-HD pipe
- Geberit Silent-db20 pipe¹⁾
- Cast-iron pipe¹⁾

Functional unit

A one-meter pipe with an inner diameter of 100 mm was assessed as a functional unit. The service life of all pipes was assumed to be at least 50 years.

Scope

The assessment covers the extraction of raw materials and energy sources, the production of pipes

and, finally, the disposal of used pipes. The assembly, assembly materials, fittings and supplies as well as the usage and removal of pipes were not taken into account.

Assumptions plastic pipes

All plastic pipes are produced from 100 % new material. The Silent-PP pipe is a 3-layer pipe with an inner layer of white polypropylene (PP), a middle layer of talcum-reinforced PP, and an outer layer of black PP. The Silent-db20 consists of barium sulfate-reinforced polyethylene (PE). Both pipes are especially well suited for increased acoustic requirements. Used plastic pipes may be recycled as homogeneous material. This recycling material is of a lesser quality than new material and thus, as a rule, may only be used for less sophisticated products.

It was assumed that 100 % of used pipes are disposed of at an incineration plant.

Assumptions cast-iron pipe

The production of cast-iron pipes using a cupola furnace and subsequent centrifugal casting was depicted. A 95 % scrap portion was assumed.

It was assumed that cast-iron pipes are 100 % recycled. Therefore, no environmental impact is attributed to the disposal of the pipes.

¹⁾ for increased acoustic requirements

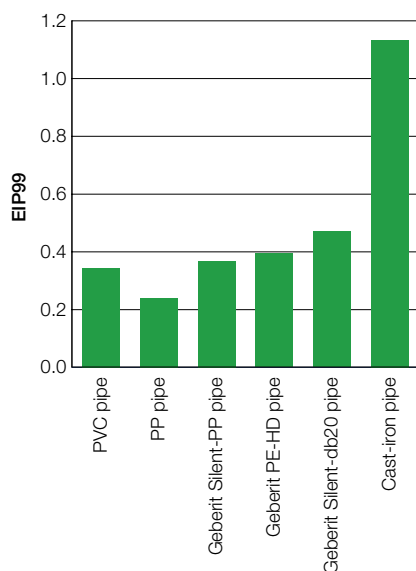


Result of the Life Cycle Assessment

Among drainage pipes, pure plastic pipes (PVC, PP, PE-HD) and plastic pipes with acoustic insulation (Silent-PP, Silent-db20) perform significantly better from an ecological point of view than cast-iron pipes.

Analysis of results

The chart shows the environmental impact of the various pipes in Eco-indicator points (EIP99), according to the Dutch impact assessment method.



Pure plastic pipes (PVC, PP, PE-HD) and plastic pipes with acoustic insulation (Silent-PP, Silent-db20) perform significantly better from an ecological point of view than cast-iron pipes.

The smelting of scrap in a cupola furnace (temperatures of more than 1,000 °C) and the markedly higher weight of the material make a crucial contribution to the environmental impact of cast-iron pipes. The scrap portion in the raw material of cast-iron pipes has only a relatively low influence on the overall environmental impact.

An assessment of the environmental impact of the pipes by life cycle phases arrives at the following results: With respect to all types of pipes except cast-iron pipes, the extraction of raw materials has the greatest environmental impact, while the actual pipe-manufacturing process is of minor importance.

Disposing of plastic pipes at incineration plants has a low environmental impact. Recycling 100% can reduce the environmental impact further. If plastic pipes are disposed of at a landfill, the environmental impact increases by approximately 10%.

If drainage pipes are assessed according to the Swiss method of ecological scarcity, the findings are essentially the same except for disposal.

Recommendations

Used plastic pipes should be collected and recycled separately, if possible. The European Plastic Pipes and Fittings Association (www.teppfa.com) offers an appropriate collection system. If no recycling is possible, pipes should be disposed of at an incineration plant or their energy should be recovered as an alternative combustible at a cement plant.

Cast-iron pipes should be collected and recycled separately.

Geberit Silent pipes should be used for increased acoustic requirements.

Geberit and Sustainability

Geberit is a market leader in the sanitary industry, has been active in environmental protection for many years and is among the pioneers in the environmental sector.

One of the core competencies has been the preparation of Life Cycle Assessments (LCA) for Geberit production sites and products since 1993. LCAs help Geberit make safely based decisions for the development of environmentally friendly products which are distinguished, among other things, by their longevity, unproblematic materials, good reusability and minor environmental impact during their life cycle. In addition, Geberit has been integrating the sustainability principle into its corporate strategy for many years.

More details are available in the Geberit Group's Sustainability Report or on the Internet.

Impact assessment methods

The environmental impact of a product over its entire life cycle is summed up and weighted in the LCAs – from the extraction of raw materials to disposal.

In the process, Geberit uses two recognized impact assessment methods:

- Swiss method of ecological scarcity – 2006.
unit of measurement: Eco-points (UBP06)
- Dutch Eco-indicator – 1999.
unit of measurement: Eco-indicator points (EIP99)

Both methods permit the full aggregation of the result, i.e. the environmental impact is expressed in a single score.

The lower the number of points, the lower the environmental impact. Environmental-impact scores for one product must differ from another by a factor of two or more to be clearly better from an ecological point of view.

Detailed report

We will be happy to provide you with the detailed LCA report (as of December 2008, only available in German) on request. Please contact your local sales company or the Environment and Sustainability Department of the Geberit Group.

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