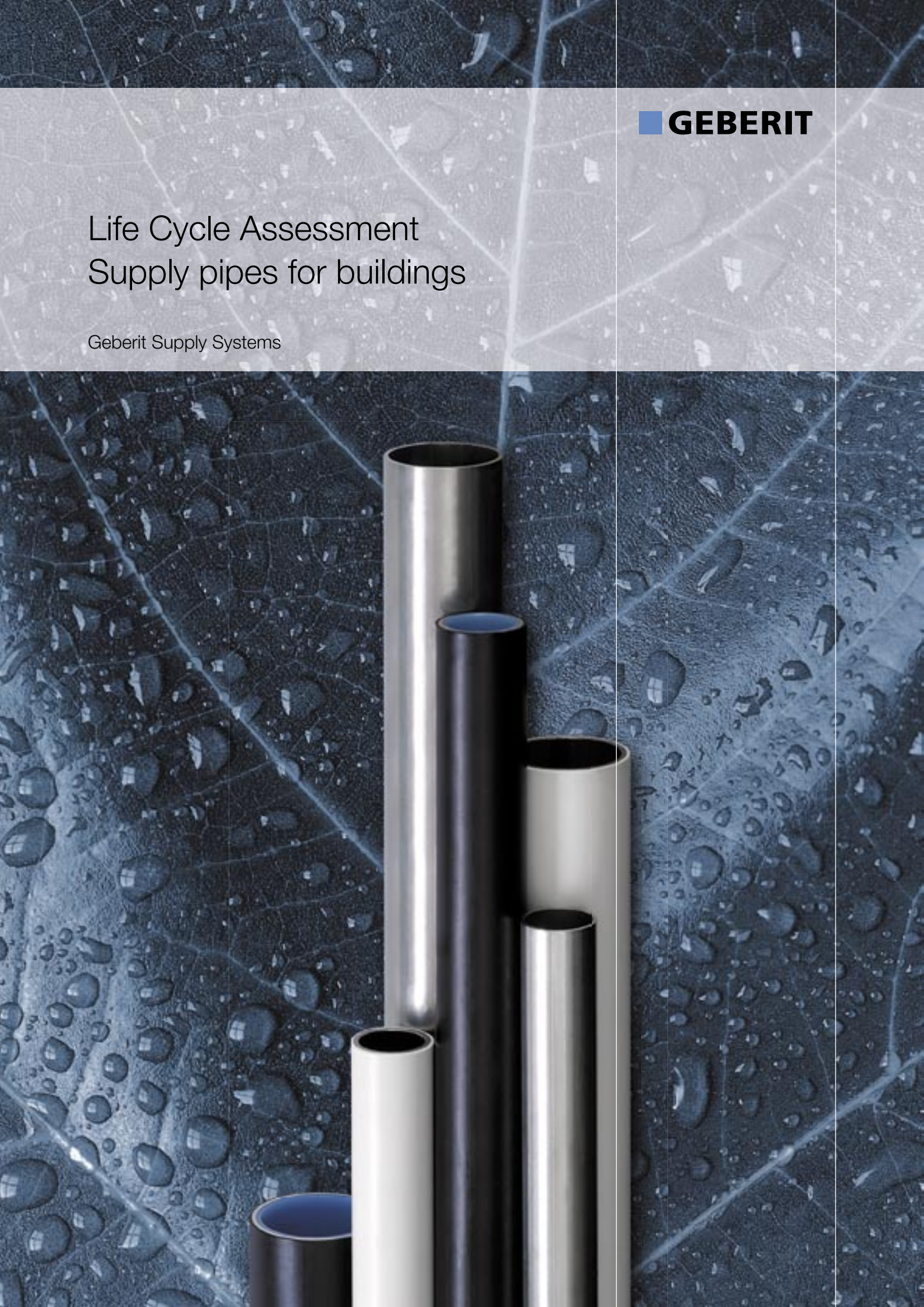
GEBERIT

Life Cycle Assessment
Supply pipes for buildings

Geberit Supply Systems



Framework of the Life Cycle Assessment

Different supply pipes are used in buildings. They vary by pipe and fitting material and type of installation. The main areas of application are sanitary applications (drinking water) and heating/cooling. The environmental impact of the pipes is evaluated and the pipes are compared with each other in the Life Cycle Assessment (LCA).

Objects of investigation
The following supply pipes were assessed:

– PE-X pipe
– plastic-aluminium pipe (Geberit Mepla)
– copper pipe
– stainless steel pipe (Geberit Mapress stainless steel)
– iron pipe, galvanized
– C-steel pipe, unalloyed, black
– C-steel pipe with PP coating (Geberit Mapress C-steel)

Functional unit
A one-meter pipe with an inner diameter of 20 mm was assessed as a functional unit. It is assumed that the lifetime of all pipes is identical (at least 50 years).

Scope
The assessment covers the extraction of raw materials and energy carriers, 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 are not taken into account.

Assumptions PE-X pipe
PE-X pipes (PE crosslinked) are produced from 100 % new material. Used pipes may only be reused to a limited extent. Therefore, it is assumed that PE-X pipes are 100 % disposed of at a waste incineration plant.

Assumptions plastic-aluminium pipe
The Geberit Mepla pipe is a three-layer compound pipe. It is composed of an interior coating (PE crosslinked), an aluminium core and an exterior coating (PE). The aluminium has a 25 % scrap portion. Old Mepla pipes may be separated into aluminium and plastic in a strictly mechanical process. 97 % of the aluminium may be recovered in the process. Unfortunately, this disposal method is still rarely used. Therefore, it is assumed that the material will be disposed of at a waste incineration plant.

Assumptions metal pipes
A 50 % scrap portion is assumed with respect to copper pipes.
The calculation for stainless steel pipes (chromium 17 %, nickel 12 % and molybdenum 2 %) is based on a 87 % scrap portion. Galvanized iron pipes and C-steel pipes (unalloyed black or with PP coating) each have a 40 % scrap content.

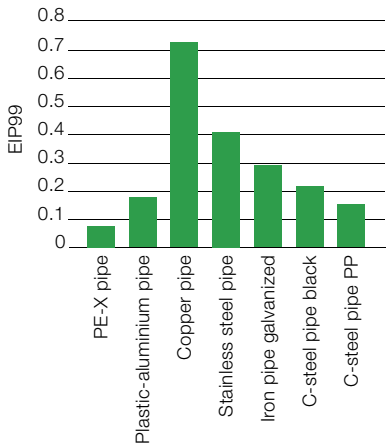
It is assumed that metal pipes are 100 % recycled. Therefore, no environmental impact is attributed to the disposal of the pipes.

Result of the Life Cycle Assessment

From an ecological point of view, drinking water pipes made of plastic and plastic-aluminium (PE-X, Mepla) have markedly better results than metal pipes (copper and stainless steel). In the case of heating/cooling pipes (all types of pipes), the results of the two C-steel pipes are about as good as those of the plastic-aluminium pipes.

Analysis of result

The environmental impact of the various pipes is shown in the form of Eco-indicator points in the diagram (EIP99).



The higher environmental impact of copper and stainless steel pipes may be explained as follows: metal pipes with the same diameter on the average weigh 2 to 3 times more than plastic pipes. Also the extraction of metal from minerals is extensive and involves energy-intensive processing methods.

The environmental impact of the extraction of raw materials is much higher in comparison to the environmental impact of the production and disposal of pipes. This fact applies to all types of pipes in particular to the copper and stainless steel pipe.

The increased portion of the recycled aluminium results in a significantly lesser environmental impact of the plastic-aluminium pipe. Various disposal methods (waste incineration plant, disposal site, recycling) only have a minor effect on the overall result.

The scrap portion plays an important role for all metal pipes. This effect is particularly strong in the case of copper pipes. The environmental impact is almost reduced by half if the scrap portion is increased from 50 % to 100 %. The major part of the overall environmental impact of the manufacture of stainless steel pipes is caused by the production of the alloying elements nickel and chromium which contributes about 80 % to the overall environmental impact in the case presented here.

An assessment of supply pipes according to the UBP97 method generally results in the same findings.

Recommendations

PE-X pipes should be disposed of at a waste incineration plant or, if possible, thermally reused as an alternative combustible at a cement plant.

In most markets, clean Mepla pipe waste may be returned to the Geberit customer service for professional disposal.

Used plastic-aluminium and metal pipes should be collected and recycled separately.

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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 area.
One of the core competences 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 eco-friendly products which are inter alia distinguished by their longevity, unproblematic materials, good reusability and minor environmental impact during their lifecycle. 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 lifecycle 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 – 1997
  Measuring unit: Eco-points (UBP97)
– Dutch Eco-indicator – 1999
  Measuring unit: Eco-indicator points (EIP99)

Both methods permit to fully aggregate the result, i.e. the environmental impact is expressed in a single score. The smaller the number of points, the lesser the environmental impact. The environmental impact scores have to differ by two or more for a product to be clearly better than another from an ecological point of view.

Detailed report
At your request, we will be happy to provide you with the detailed LCA report (as of December 2004, only available in German). Please contact your local distribution company or the Environmental and Sustainability Division of the Geberit Group.

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