

 **GEBERIT**

# Life Cycle Assessment Geberit Duofix WC Element

Geberit Installation Systems





# Framework of the Life Cycle Assessment

The Geberit concealed cisterns are the core products within installation systems. They have been continuously improved and optimized for many years. The object of investigation, the Geberit Duofix WC element, is one of Geberit's major sales drivers. The question how this WC element is to be evaluated from an ecological point of view may be answered by the life cycle assessment.

## Object of investigation

The Geberit Duofix WC element with concealed cistern and dual flush (6/3 liters), including the Samba flush actuator in white and mat chromium-plated respectively, was assessed. The following components were analyzed in detail: frame, cistern, filling and flush valve, flush actuator and other parts (rest).

## Functional unit

The complete cistern with a lifetime of 25 years was assessed as a functional unit.

## Scope

The assessment covers all phases of the lifecycle, from the extraction of raw materials and energy carriers to the production and utilization of the cistern (water consumption) to disposal. The assembly, the use of panels and tiles as well as the removal are not taken into account.

## Assumptions production

Most components are produced internally by Geberit. All important production processes are included in the assessment: injection molding, blow molding, polystyrene foaming, sheet metal working and powder-coating. Third-party chromium-plating of the flush actuators is also included in the evaluation. Purchased parts (e.g. angle valves) are assessed with the aid of existing eco-inventories.

## Assumptions utilization

Utilization assumptions are based on a family of four requiring four small flush volumes (3 liters) and one large (6 liters) flush volume per person and day. This results in an average water consumption of 18 liters per person and day.

Water consumption takes into account the water supply as well as the disposal of unpolluted waste water.

A future scenario was based on a 1-liter flush for "small" and "big business". Water consumption is thus reduced by more than 70% from 18 to 5 liters per day and person.

## Assumptions disposal

It was assumed that the cardboard packaging will be recycled. All metal components, such as the steel frame and angle valve, will also be recycled.

It was further assumed that plastic components will be disposed of at a waste incineration plant.

The disposal of the entire cistern at a waste incineration plant or landfill is the subject of a sensitivity analysis.

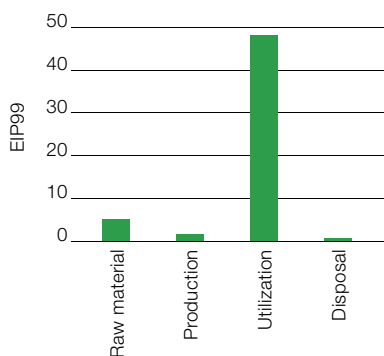


## Result of the Life Cycle Assessment

The highest environmental impact of the Geberit Duofix WC element is clearly that of the usage-related water consumption. Of the individual components, the steel frame, cistern and remaining components make the most important contributions to the overall environmental impact. The white flush actuator has markedly better results than the mat chromium-plated type.

### Analysis of result

In the evaluation according to the Dutch impact assessment method (EIP99), the utilization phase results in an environmental impact that is almost 10 times higher than that of all other phases taken as a whole.



This shows the importance of water-saving WC flushing systems. Approximately 40% of the environmental impact of the utilization phase relates to water supply (mainly infrastructure and pump energy) and 60% to waste water disposal (mainly infrastructure). On the basis of polluted waste water, the utilization impact is multiplied by 2.5.

With respect to the individual cistern components, a major contribution to the overall environmental impact relates to the steel frame due to the extensive metal production process and its substantial share (approx. 60%) in the product's total weight.

The white flush actuator has almost 40% better results than the mat chromium-plated type. The higher environmental impact results from the chromium-plating process and the production of the necessary metals.

Based on the assumptions made, the disposal process is of minor importance. However, the environmental impact increases significantly if the steel is also disposed of at a waste incineration plant or landfill.

The future scenario of the 1-liter flush shows that saving water pays off and that the environmental impact can be markedly reduced. However, this requires an entirely new flushing technology.

An assessment of the cistern according to the Swiss method of ecological scarcity (UBP97) generally results in the same findings.

### Recommendations

The dual flush system should be installed and – where already in place – also be used.

Old concealed cisterns should be adapted to the dual flush technology with the aid of the Geberit water-saving conversion set.

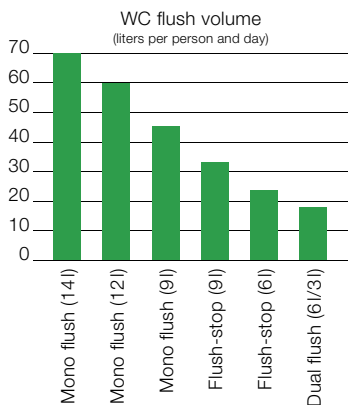
The use of rainwater or grey water as an alternative to drinking water should be considered.

In case of disposal, the steel frame should be separated and recycled.



# Responsibility for water

Water is not only the most valuable asset on earth but also increasingly becoming one of the most expensive goods. That is reason enough to think about a responsible use of water. For example, on the average, about 125 liters of water are used every day in private households in Germany on a per-capita basis. Approximately one quarter to one third of such water consumption results from WC flushing. Geberit realized and included the water-saving potential in its product development at an early stage. Since 1970, the flushing process may



be individually adjusted with the flush-stop actuator. The dual flush technology, which was introduced in 1996, permits to further reduce the flush volume to 6 or 3 liters. Thus up to 60 % of the amount of water may be saved compared to the still widespread 9-liter full flush. In the case of a family of four, this corresponds to approximately 40'000 liters of water or 200 full bathtubs per year and an annual cost reduction between 100 and 300 Euros, depending on the price of water.

## History of the Geberit cisterns

The production of the first Geberit cisterns dates far back into the past. In 1905, the first visible cisterns were made of wood with lead coatings on the inside. In the 1950s, Geberit for the first time produced visible cisterns made of plastic. The first concealed cisterns were manufactured in 1964. Simultaneously, flush volumes were reduced continuously. The Geberit Duofix WC element assessed is currently produced and sold each year by the million.

## Detailed report

At your request, we will be happy to provide you with the detailed report on the life cycle assessment (as of January 2005, only available in German). Please contact your local distribution company or the Environmental and Sustainability Division of the Geberit Group.

More details on the subject of sustainability are available in the Sustainability Report of the Geberit Group or on the Internet.

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