How strong is a toilet?

➜ Interactive application: geberit.com/annualreport > Competences > Statics

Solid as a rock

A full-grown Kodiak bear and a well-equipped Harley-Davidson can each tip the scales at 400 kilogrammes. The Geberit installation elements for wall-hung WCs are designed to handle such a weight.

Wall-hung WC and bidet ceramic appliances have to be designed so that they can withstand loads of up to 400 kilogrammes. This is a European standard specification. As a matter of consistency, Geberit also designs the installation elements for drywall or solid construction to be able to cope with such a load. "When a toilet in front of a drywall is exposed to maximum loaded, the load-bearing installation element is only permitted to deform slightly," explains Oliver Wolff, Head of Building Physics at Geberit International. "If the degree of deformation exceeds our defined limit values, cracks can appear in the wall tiles or other damage can occur, which we of course want to avoid at all costs."

Realistic load test

The Geberit installation elements for wall-hung WCs and bidets are statically designed to be able to bear a load of up to 400 kilogrammes. The maximum load for washbasins and urinals is 150 kilogrammes, and 100 kilogrammes for support handles. For the statics tests in the building technology and acoustics laboratory, the installation elements are built in exactly as they would be at a normal building site. The only difference to real construction situations is that a steel support frame for the test weights – and not a washbasin or WC ceramic appliance – is screwed into the installation elements. This is mainly done for safety reasons.

Narrow tolerances

To be able to precisely measure drops and deformations, the installation elements are equipped with measuring rods at specifically defined points. Laser crosshairs provide the relevant reference points. The drop at the front end of the support frame and the deformation of the installation element are measured before, during and after the test. If they exceed the narrow tolerances defined by Geberit, the design of the installation element has to be revised and improved.

René Gmür, statics specialist at Geberit, lowers eight steel plates with a total weight of 400 kilogrammes onto a support frame that is attached to a Duofix element in the very same way as a WC ceramic appliance. The degree of deformation of the Duofix element is precisely measured by means of laser light.

Testing galore

As a provider of comprehensive installation systems for drywall and solid construction, Geberit possesses extensive know-how in structural analysis. In a building technology and acoustics laboratory that is indeed unique in Europe, Geberit's experienced building physicists carry out several hundred statics tests each year. Thanks to these tests, the product developers can access an extensive database with the results of over 2,500 statics tests. They are also supported in their work by experts who carry out complex statics calculations using powerful simulation programmes.