

Testing concrete
without interim transport from
deep-freezing to water immersion

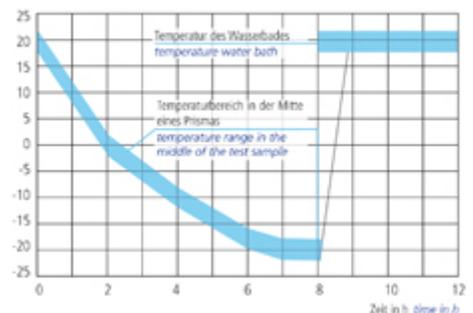


Testing concrete parts for frost resistance in a temperature test chamber

Only a few materials other than the construction material concrete can withstand such loads: In order to be eventually categorised as frost-resistant, concrete components have to undergo hours-long warm and cold baths alternating between -20°C and $+20^{\circ}\text{C}$ 56 times.

With a tailor-made **test assembly** by the company LABOSTRUCT from Guntramsdorf, Austria, **the freeze-thaw resistance** of the **construction material concrete** has been tested in the accredited Versuchsanstalt für Bautechnik Wiener Neustadt since the end of 2009 more economically and with absolutely **standard-compliant temperature** cycles in a Memmert TTC temperature test chamber.

A special solution for testing concrete



Quality testing in the concrete industry: standard-compliant test assembly for the frost resistance of concrete mixes



cost-effectively

It's all about the right mixture! Even though the **construction material concrete** mainly consists of grains of stone such as sand or gravel, water and **cement**, there are in practise a wide range of **concrete mixes**, depending on static, physical and chemical loads, aesthetic requirements and areas of application.

DIN EN 206-1 specifies exposition classes for concrete

The effects of various environmental influences and pollution are classified in Europe in **DIN EN 206-1** and each of these so-called **exposition classes** in turn is expanded into a more detailed international and national set of regulations, for example on production, areas of application or **quality testing**. In Austria, the **ÖNORM B 3303** describes the exact procedure in **the freeze-thaw resistance** test, which is undertaken by accredited **laboratories** such as the Versuchsanstalt für Bautechnik Wiener Neustadt on behalf of the **concrete industry** for the testing of new formulas for **frost resistance**.

Absolutely standard-compliant temperature cycles

Concrete samples are frozen a total of 56 times to a defined temperature drop ramp to $-20\text{ }^{\circ}\text{C}$ and after two to four hours, heated up again to $20\text{ }^{\circ}\text{C}$. At the end of the test cycles the loss of mass in the samples through weathering is determined along with structural change, using ultrasound examinations. To date the **freeze-thaw resistance** test has been a long and expensive procedure. Again and again samples had to be brought from the freezer chest to a waterbath in which warm water at a constant 20°C has to rinse the **concrete components** during the 8-hour thawing phases.

2 in 1! Testing Concrete without interim transport from deep-freezing to water immersion



Testing freeze-thaw resistance in a tailor made **test assembly: Memmert temperature test chamber** with water-filled basin inside

Humidity has (no) impact on paper

LABOSTRUCT developed a **test assembly** for the Versuchsanstalt für Bautechnik Wiener Neustadt that allows samples to be left in one place during the entire test procedure, that is, in a water-filled basin during the thawing phases. A side feed-through for the supply and drain hoses was fitted to a **Memmert TTC temperature test chamber**, so that with the aid of a circulating pump and a thermostat-controlled water heater, water can flow continuously between the supply tank outside and the inner basin.

The temperature ramps can be conveniently set via the Celsius software or stored on MEMory Cards. Additionally, programmed contacts take over electronic control of the watering procedures, i.e. the synchronisation of the watering with the thawing phase, as well as the draining of water prior to the start of the frost phase. Of special importance to those responsible at the Research Centre was the comprehensive logging and documentation of the entire **testing** process, including, and apart from the time cycles, the verification that all temperature ramps are exactly **standard-compliant**.

Photo credits: Istockphoto/OliverChilds

An overview of focus topics

- Concrete industry
- Construction Material
- Concrete
- Concrete construction
- Quality testing
- Concrete mix
- Expositionsclassen Beton
- Frost resistance
- Temperature test chamber
- Freeze-thaw test

Picture credit: Istockphoto/OliverChilds

Autor: Memmert GmbH + Co.KG

At the Labelexpo 2009 in Brussels, visitors experienced live, through the glass doors of a **constant climate chamber**, how a new, environmentally-friendly backing stayed **dimension-stable**, even at different levels of humidity...

[more information](#)

Laboratory ovens for materials science

Constant climate chamber HPP

Climatic and temperature test chamber CTC/TTC

Universal drying Oven U

Humidity Chamber HCP

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