

# **Influence of Ettringite and Thaumascite formation on the load bearing behaviour of autoclaved aerated concrete masonry**

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## **1. Introduction**

In the recent years cracks in walls made of autoclaved aerated concrete masonry units with thin layer mortar have reoccurred. The cracks have been caused by the volume expansion of the thin layer mortar. As a result of the investigation of the liability cases it was found that the cracks splitted the masonry and may have influence on the load bearing behaviour.

## **2. Investigation program**

For the investigation two sorts of masonry units from three different manufacturers were used. With these masonry units and two different thin layer mortars from two manufacturers the necessary specimen for the planned tests were made. From each manufacturer a special thin layer mortar for the use with autoclaved aerated concrete masonry units was chosen as well as a normal thin layer mortar which can be used with calcium silicate, concrete and clay masonry units.

The first step was to measure the expansion as well as the shear strength and the tensile adhesion strength after storage for 180 days in a climate with 20 °C and 65 % RH compared to a storage for the same time in a climate with 5 °C and high RH (80-90 %).

With the measurement of the expansion the most inappropriate combination of masonry unit and thin layer mortar should be identified. With this combination small masonry specimen were made to investigate the compressive strength of the masonry after storage for 140 days in a climate with 20 °C and 65 % RH compared to a storage of this masonry for the same time in a climate with 5 °C and high RH (80-90 %).

## **3. Test results**

The results of the tests performed in this investigation it was shown that the compressive strength of masonry made of autoclaved aerated concrete masonry units with thin layer mortar was not negatively influenced even when an inappropriate combination of mortar and masonry unit together with bad climate condition was chosen. But the shear strength and the tensile adhesion strength of such masonry can deteriorate with time depending on the boundary conditions. Surprisingly this can even happen with combinations of autoclaved aerated concrete masonry units with special thin layer mortar for this kind of masonry unit.