

Certificate: Dr. Günther Kast GmbH & Co – EQ GRID System

The EQ Grid system is a mortar embedded multi-axial fibre grid system suitable for the strengthening of masonry walls that was developed over 10 years at the Karlsruhe Institute of Technology (KIT) in Germany with the collaboration of the Dr. Günther Kast GmbH & Co company. The textile component of this strengthening system is a hybrid multi-axial mesh made of AR (alkali resistant) glass and high elastic synthetic (polypropylene) fibres, while the matrix is a natural hydraulic lime mortar (NHL). For durability reasons, the multi-axial mesh is made of alkali-resistant glass fibres and is protected by an additional latex coating. For the mortar, a pH-value of 12.2 is detected in the fresh state. In the cured and dried state, no interference by the alkalinity of the mortar is expected.

The Institute of Reinforced Concrete and Building Materials, Department Reinforced Concrete at the Karlsruhe Institute of Technology, tested the EQ GRID system to determine its suitability as a subsequent masonry reinforcement in earthquake load case. The strengthened effect was evaluated through cyclic lateral shear tests on masonry panels (1.25m x 1.25m x 0.24m) under a constant vertical load of 120kN. The tested masonry units were hollow clay and calcium-silicate bricks. The hollow clay brick masonry reinforced on one side showed an average increase of horizontal ultimate drift of about 10% (value in unreinforced state 0.54%, 0.6% in the reinforced condition). For the calcium-silicate brick masonry reinforced on one side the increase of horizontal ultimate drift was about 20% (value in unreinforced state 0.51%, 0.62% in the reinforced condition), while the load bearing capacity improved by 40% (load in unreinforced state 133.3kN, 192.4kN load in the reinforced condition). Both strengthened specimens were only slightly damaged.

Moreover, the masonry in calcium-silicate brick reinforced on both sides had an improvement of shear load bearing and horizontal displacement capacity of about 80% until slight structural damage occurred (load in unreinforced state 133.3kN, 240.1kN load in reinforced condition; ultimate drift value in unreinforced state 0.5%, 0.9% in the reinforced condition).

For hollow clay brick masonry walls reinforced both sides the increase was 38% for the load bearing capacity (load in unreinforced state 178.4kN, 246.5kN load in the reinforced condition) and for the displacement capacity the improvement was 70% (ultimate drift in unreinforced state 0.54%, 0.9% in the reinforced condition). At these values, the specimens presented only a slight damage.

The product is certificated the suitability for the reinforcement of brick masonry in the earthquake load case.

Univ.-Prof. Dr.-Ing. Lothar Stempniewski

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