

Verification of the extrapolation rules in DIN EN 15254 Part 5 for the fire resistance of walls made of self-supporting sandwich panels

- Synopsis -

In the context of the research project "Verification of the extrapolation rules in DIN EN 15254 Part 5 for the fire resistance of walls made of self-supporting sandwich panels", 10 fire resistance tests according to DIN EN 1364-1:2015-09, in conjunction with DIN EN 1363-1:2012-10, with different span widths and element thicknesses were carried out to verify the extrapolation rules in DIN EN 15254-5:2018-06 for non-load-bearing walls made of sandwich panels with a core of mineral wool and steel faces. The parameters of the fire resistance tests were chosen in such a way that the limits of the extrapolation rules could be tested. The tests showed that fire-resistant walls up to a span of 9.7 m can be realized with suitable sandwich panels. The sandwich walls mainly "failed" by exceeding the permissible temperature increase of 180K at one measuring point. This impermissible temperature increase was usually accompanied by a joint opening. In one case, flame impingement was terminated after 181 min at an increase of the surface layer temperatures on the side facing away from the fire of maximum 95K in order not to damage the test furnace. In the case of three wall constructions with vertical installation of the sandwich panels, the escaping flue gases ignited at a joint on the outside of the test furnace (side facing away from the fire) for more than 10 seconds, resulting in a temperature increase of more than 180K at the respective adjacent measuring point and, in one case, a significant opening of the joint. Comparing the fire resistance classes determined by the tests with the fire resistance classes determined by extrapolation according to DIN EN 15254-5:2018-06, it becomes clear that the fire resistance durations determined according to the extrapolation rules in DIN EN 15254-5:2018-06 are partly higher at larger supporting spans than the test values and thus lie on the uncertain side. It was also found that the fire resistance times determined by the tests for walls made of vertically installed sandwich panels are significantly lower than the fire resistance times for walls made of horizontally installed sandwich panels.