

The fire resistance time of the same structure may differ by 10 min when tested for about an hour in two different furnaces according to ISO 834. The same structure may get a 25% longer fire resistance when tested according to ISO in comparison with ASTM.

The heat transfer to a test specimen in a fire test furnace is primarily depending on radiant flux and not so much on convection. Instruments for controlling the heating should therefore respond to this type of heating in a similar way as test specimens. They should therefore have a large area. On the other hand they must have a quick thermal response. The Plate Thermometer is designed to have these properties. It consists of a thin plate 10 mm by 10 mm and 0.7 mm thick. A thermocouple is welded to the middle of the plate. The Plate Thermometer shall be placed in front of the specimen with the side facing the specimen insulated. It will then receive the same radiant heat flux as the specimen.

This report contains a description of the Plate Thermometer and a basic theoretical analysis of the heat transfer conditions in furnaces. A computer code is listed for simple analyses of influences of various parameters. Measurements with the Plate Thermometer in several furnaces are plotted.