

Computer Models For Fire and Smoke

Model Name: SFIRE-4

Very Short Description: Post flashover compartment fires

Modeler, Organization: Department of Fire Safety Engineering, Lund University, Sweden

References: Magnusson, S.E., and Thelandersson, S., Temperature-Time curves for the Complete Process of Fire Development. A Theoretical Study of Wood Fuel Fires in Enclosed Spaces, Acta Polytechnica Scandinavica. Civil Engineering and Building Construction Series, No. 65, CIB/CTF/72/46, Stockholm 1970.

Availability: A floppy disk containing the computer program is available from the department

Hardware: IBM-compatible PC

Language: FORTRAN 77

Size: Requires 640 K RAM

Detailed Description:

The model is based on mass and energy balance equations. The fire itself is not being modeled: combustion energy release curves are provided as input. An oxygen balance equation provides the upper limit for combustion inside the compartment. Incomplete mixing between incoming air and produced pyrolysis gases is described by an input parameter. Energy and mass balance equations take into consideration the amount of water discharged by sprinkler, etc. The bounding structures of the enclosure can be composed of up to three different wall constructions or systems.

Main output are the time curves for gas temperature, wall construction temperatures, air flow, fire energy release rate.

The computer program was thoroughly revised and checked in 1985 and has been used since then in our fire dynamics courses.