

# Computer Models For Fire and Smoke

*Model Name:* RADISM

*Very Short Description:* A zone model incorporating an immersed ceiling jet within the buoyant layer, sprinklers and vents

*Modeler, Organization:* P.L. Hinckley; colt International, associated with the Fire Research Station

*References:*  
1. P.L. Hinckley: Fire Safety Journal 11(3) 1987, 211-225  
2. P.L. Hinckley: Fire Safety Journal 14(4) 1989, 221-240

*Availability:* Restricted to FRS and Colt – although the algorithm has been openly published (see above references)

*Hardware:* Hewlett-Packard HP216, Sinclair QL, IBM PC, or similar

*Language:* BASIC

*Size:* 8k

*Detailed Description:*

*Inputs:*

Fire growth rate, heat output per unit area, ceiling height, compartment radius, sprinkler operating temperature and thermal time constant, overall vent areas, sprinkler grid size, sprinkler water flow rates.

*Outputs:*

Operating times of successive rings of sprinklers, radial profile of ceiling temperature, layer depth as a function of time.

*Assumptions:*

The fire plume is described by a large-fire equation. Venting has only an effect on the layer via an even extract rate, i.e., the ceiling is evenly porous. Spray cooling of the layer can be described by a simple equation drawn from other work.

*Limitations:*

The model is not yet fully validated. The spray-cooling formula is known to be excessively approximate (this should be improved soon). The model is radially symmetrical – all rooms are round! The effects of finite-sized vents are not described. There is no feedback into burning rate or extinction (although any fire behavior can be specified as input).