

Computer Models For Fire and Smoke

- Model Name:* DETACT-QS (DETECTOR ACTuation – Quasi Steady)
- Very Short Description:* A program for calculating the actuation time of thermal devices below unconfined ceilings for fires with arbitrary heat release rates.
- Modeler:* D.D. Evans, Building and Fire Research Laboratory, National Institute of Standards and Technology.
- References:* Evans, D.D. and Stroup, D.W., “Methods to Calculate the Response Time of Heat and Smoke Detectors Installed Below Large Unobstructed Ceilings,” *Fire Technology*, vol. 22, 54-65, 1986.
- Availability:* Source code and executable program available on the National Institute of Standards and Technology Fire Research Computer Bulletin Board at no cost.
- Hardware:* The executable program will run on an IBM PC or compatible computer. The source code will compile on a computer that supports BASIC.
- Language:* An executable program is available for IBM PC and compatible computers. Source Code is in BASIC.
- Size:* 64K free memory for DOS version

Detailed Description:

DETECT-QS is a program for calculating the actuation time of thermal devices below unconfined ceilings. It can be used to predict the actuation time of fixed temperature heat detectors and sprinkler heads subject to a user specified fire. DETECT-QS assumes that the thermal device is located in a relatively large area, that is only the fire ceiling flow heats the device and there is no heating from the accumulated hot gases in the room. The required program inputs are the height of the ceiling above the fuel, the distance of the thermal device from the axis of the fire, the actuation temperature of the thermal device, the response time index (RTI) for the device, and the rate of heat release of the fire. The program outputs

are the ceiling gas temperature and the device temperature both as a function of time and the time required for device actuation.