An algorithm and associated computer subroutine is presented for calculating the effects on two-layer compartment fire environments of the quasisteady flow through a horizontal vent connecting two spaces.

The two spaces can be either two inside rooms of a multiroom facility or one inside room and the outside ambient environment local to the vent. The description of the flow through the vent is determined by combining considerations of

1) the unidirectional-type of flow driven by a crossvent pressure difference and, when appropriate,

2) the exchange-type of flow induced when the fluid configuration across the vent is unstable, i.e., when a relatively cool, dense gas in the upper space overlays a less dense gas in the lower space.

In the algorithm, calculation of the rates of flow exchange between the two spaces is based on the previously developed theory presented in reference (1).

Characteristics of the geometry and the instantaneous environments of the two spaces are assumed to be known and specified as inputs. The outputs calculated by the algorithm/subroutine are the rates and the properties of the vent flow at the elevation of the vent as it enters the top space from the bottom space and/or as it enters the bottom space from the top space. Rates of mass, enthalpy, and products of combustion extracted by the vent flows from upper and lower layers of inside room environments and from outside ambient spaces are determined explicitly.

The algortihm/subroutine is called VENTCF. The computer subroutine is written in FORTRAN 77. The subroutine is completely modular, and it is suitable for general use in twolayer, multi-room, zone-type fire model computer codes.

It has been tested over a wide range of input variables and these tests are described.