

## SMOKE EXHAUST RATE FOR TYPICAL APARTMENT CORRIDOR CALCULATION

Date:                      **30/07/2010**

Simple Plume Equation (NFPA 92B)

$$\dot{m} = C_1 Q_c^{1/3} z^{5/3} + C_2 Q_c$$

where

$Q_c$      =   convective heat release rate, kW;

$\dot{m}$      =   mass flow rate at height  $z$ , kg/s;

$z$      =   clear height above the top of the fuel, m;

$C_1$      =   0.071; and

$C_2$      =   0.0018.

$Q_c$      =            563,000 BTH/hr

          =            166 kW

$Z$      =            2.4 m.

Then

$\dot{m}$      =            1.98 kg/s

$$\dot{V} = \frac{\dot{m}}{\rho_p}$$

where

$\dot{V}$      =   volumetric flow of exhaust gases, m<sup>3</sup>/s;

$\rho_p$      =   density of exhaust gases, kg/m<sup>3</sup>.

Exhaust air Temperature                      105 °C

Specific Volume                                      1.06 m<sup>3</sup>/kg

Exhaust air rate                                      2.10 m<sup>3</sup>/s

    2,096 L/s

### Fan Selection

Ventilation fan                      1        Sets

Fan Number                      32SMV-01

Fan Capacity                      2100 L/s