



Calculations for Fire Flow with Examples

Calculations for determining fire flow can be obtained from NFPA 291.

- The formula used to compute the discharge is:

$$Q = (29.84)(c)(d^2)(\sqrt{p})$$

where c = coefficient of discharge; d = diameter of the outlet in inches; p = pitot pressure in psi

- To calculate the fire flow at 20 psi the following formula can be used:

$$Q_f = Q_r((P_s - \text{Fire flow Pressure}) / (P_s - P_r))^{0.54}$$

where Q_f = calculated flow @ 20 psi; Q_r = flow in GPM; P_s = Static Pressure in psi; P_r = residual pressure; Fire flow pressure = 20 psi;

Example:

Flow test readings are as follows:

Static = 98 psi

Residual = 86 psi

Pitot = 23 psi

Hydrant outlet = (1) 2 1/2" outlet, coefficient of discharge used is .90

To calculate discharge you plug the numbers into the following equation:

$$Q = (29.84)(c)(d^2)(\sqrt{p})$$

$$Q = (29.84)(.90)(2.5^2)(\sqrt{23})$$

$$Q = 804 \text{ gpm}$$

To calculate your fire flow at 20 psi, you plug your numbers into the following equation:

$$Q_f = Q_r((P_s - \text{Fire flow Pressure}) / (P_s - P_r))^{0.54}$$

$$Q_f = 804((98 - 20) / (98 - 86))^{0.54}$$

$$Q_f = 2,209 \text{ gpm}$$