

Errata

ASCE/SFPE 29-99 Standard Calculation Methods for Structural Fire Protection

5.2.2 Spray-Applied Materials: The fire resistance rating of structural steel columns protected with spray-applied fire protection materials, as illustrated in Figure 5.4, shall be determined in accordance with the following expressions:

$$R = \left(C_1 \frac{W}{D} + C_2 \right) h \quad (\text{wide-flange columns}) \quad (5.3)$$

In SI units:

$$R = \left(C_3 \frac{W}{D} + C_4 \right) h \quad (\text{pipe and tubular columns}) \quad (5.4)$$

$$R = C'_1 (A/P)h + C'_2 \quad (\text{pipe and tubular columns}) \quad (5.4)$$

In SI units:

$$R = C'_3 (A/P)h + C'_4 \quad (\text{pipe and tubular columns})$$

Where:

R	=	fire resistance in hours,
h	=	thickness of spray-applied fire protection material in inches (millimeters),
D	=	heated perimeter of the structural steel column in inches (millimeters),
W	=	average weight of the steel column in pounds per linear foot (kilograms per meter),
C₁ and C₂, C₃, and C₄	=	material-dependent constants for wide-flange columns, and
C₃ and C₄	=	material-dependent constants for pipe and tubular columns.
<u>P</u>	<u>≡</u>	<u>heated perimeter of the structural steel column in inches (mm)</u>
<u>A</u>	<u>≡</u>	<u>cross-sectional area of the steel column in square inches (mm)</u>
<u>C'₁, C'₂, C'₃, and C'₄</u>	<u>≡</u>	<u>material-dependent constants for pipe and tubular columns</u>

The material-dependent constants shall be determined for specific fire-protection materials on the basis of standard fire endurance tests conducted in accordance with ASTM E119.

Unless approved by the authority having jurisdiction, based on evidence substantiating a broader application, the use of these equations shall be limited by all of the following conditions:

- 1) Columns with weight-to-heated-perimeter ratios (W/D) that are equal to or greater than the smallest tested column.
- 2) Columns with weight-to-heated-perimeter ratios (W/D) that are equal to or less than the largest tested column.
- 3) Thicknesses of protection which are equal to or greater than the minimum tested thickness.
- 4) Thicknesses of protection which are equal to or less than the maximum tested thickness.
- 5) Ratings which are equal to or greater than the minimum fire resistance time for the applicable test

series.

- 6) Ratings which are equal to or less than the maximum fire resistance time for the applicable test series.
- 7) The use of the wide-flange equation for other column geometries with open cross-sections (i.e., channels, angles, and structural tees) shall be permitted. The use of the wide-flange equation shall not be permitted for columns with closed cross-sections (i.e., pipe and tubular columns).
- 8) The use of the pipe and tubular equation shall be permitted for other column geometries with either open or closed cross-sections.

Shown below is Section with the errata incorporated

5.2.2 Spray-Applied Materials: The fire resistance rating of structural steel columns protected with spray-applied fire protection materials, as illustrated in Figure 5.4, shall be determined in accordance with the following expressions:

$$R = \left(C_1 \frac{W}{D} + C_2 \right) h \quad (\text{wide-flange columns}) \quad (5.3)$$

In SI units:

$$R = \left(C_3 \frac{W}{D} + C_4 \right) h \quad (\text{wide-flange columns})$$

$$R = C'_1 (A/P)h + C'_2 \quad (\text{pipe and tubular columns}) \quad (5.4)$$

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Where:

R	=	fire resistance in hours,
h	=	thickness of spray-applied fire protection material in inches (millimeters),
D	=	heated perimeter of the structural steel column in inches (millimeters),
W	=	average weight of the steel column in pounds per linear foot (kilograms per meter),
$C_1, C_2, C_3,$ and C_4	=	material-dependent constants for wide-flange columns,
P	=	heated perimeter of the structural steel column in inches (mm)
A	=	cross-sectional area of the steel column in square inches (mm)
$C'_1, C'_2, C'_3,$ and C'_4	=	material-dependent constants for pipe and tubular columns

The material-dependent constants shall be determined for specific fire-protection materials on the basis of standard fire endurance tests conducted in accordance with ASTM E119.

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- 1) Columns with weight-to-heated-perimeter ratios (W/D) that are equal to or greater than the smallest tested column.
- 2) Columns with weight-to-heated-perimeter ratios (W/D) that are equal to or less than the largest

- tested column.
- 3) Thicknesses of protection which are equal to or greater than the minimum tested thickness.
 - 4) Thicknesses of protection which are equal to or less than the maximum tested thickness.
 - 5) Ratings which are equal to or greater than the minimum fire resistance time for the applicable test series.
 - 6) Ratings which are equal to or less than the maximum fire resistance time for the applicable test series.
 - 7) The use of the wide-flange equation for other column geometries with open cross-sections (i.e., channels, angles, and structural tees) shall be permitted. The use of the wide-flange equation shall not be permitted for columns with closed cross-sections (i.e., pipe and tubular columns).
 - 8) The use of the pipe and tubular equation shall be permitted for other column geometries with either open or closed cross-sections.