



Sprinkler Types & Selection

NFPA 13 Quick Guide

Based on NFPA 13 (2022 ed.): orientation, response, K-factor, temperature & hazard
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1 Sprinkler Types by Orientation · Ch. 9 / 10

PENDENT



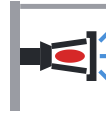
Hangs **below** the branch line; usual choice under finished ceilings. Deflector **1–12 in (25–300 mm)** below an unobstructed ceiling.

UPRIGHT



Sits **above** the pipe, spraying up onto the deflector. For exposed pipework (plant rooms, warehouses). Same 1–12 in rule.

SIDEWALL



Throws water out from the wall. **Light hazard**, smooth flat ceilings; ordinary hazard **only if listed**. Deflector **4–6 in (100–150 mm)** below ceiling.

CONCEALED



Pendent hidden by a cover plate that drops off **before** the sprinkler operates, e.g. 135°F (57°C) plate on a 155°F (68°C) sprinkler, as the listing requires.

2 Thermal Response & K-Factor · Definitions · Table 7.2.2.1

STANDARD

RTI ≥ 80 (m·s)^½

QUICK RESPONSE

RTI ≤ 50 (m·s)^½ (fast-response)

- **Light hazard:** quick-response sprinklers required (limited exceptions)
- Lower RTI = faster operation. Residential and ESFR also use fast-response elements
- **Q = K√P**. Minimum **7 psi (0.5 bar)** at any sprinkler. K-5.6 at 7 psi ≈ **14.8 gpm**
- Sprinklers are painted at the factory only. Never paint one on site

Nominal K gpm/psi ^½	Metric K L/min/bar ^½	% of K-5.6 discharge	Inlet thread
5.6	80	100	½ in NPT
8.0	115	140	¾ or ½ in NPT
11.2	160	200	½ or ¾ in NPT
14.0	200	250	¾ in NPT
16.8	240	300	¾ in NPT
25.2	360	450	1 in NPT

3 Temperature Ratings & Colour Codes · Table 7.2.4.1

Classification	Sprinkler rating	Max. ceiling temp.	Glass bulb colour	Frame arm colour
Ordinary	135–170°F (57–77°C)	100°F (38°C)	Orange or red	Uncoloured or black
Intermediate	175–225°F (79–107°C)	150°F (66°C)	Yellow or green	White
High	250–300°F (121–149°C)	225°F (107°C)	Blue	Blue
Extra high	325–375°F (163–191°C)	300°F (149°C)	Purple	Red
Very extra high	400–475°F (204–246°C)	375°F (191°C)	Black	Green
Ultra high	500–575°F (260–302°C) · 650°F (343°C)	475°F (246°C) · 625°F (329°C)	Black	Orange

Common bulbs: 135°F/57°C orange · 155°F/68°C red · 175°F/79°C yellow · 200°F/93°C green. Go higher only near heat sources or hot ceilings.

4 Hazard Classification & Design Basis · Ch. 4 · Table 19.2.3.1.1 · Ch. 10

Hazard	Example occupancies (Annex A)	Density / design area	Max. area/sprinkler · spacing*	Hose stream	Duration
Light	Offices, churches, hospitals, restaurant seating areas	0.10 gpm/ft² / 1500 ft² 4.1 mm/min / 140 m²	225 ft² (20.9 m²) · 15 ft (4.6 m)	100 gpm 380 L/min	30 min
Ordinary 1	Laundries, restaurant service areas	0.15 / 1500 6.1 / 140	130 ft² (12.1 m²) · 15 ft (4.6 m)	250 gpm 950 L/min	60–90 min
Ordinary 2	Dry cleaners, library stack areas	0.20 / 1500 8.1 / 140	130 ft² (12.1 m²) · 15 ft (4.6 m)	250 gpm 950 L/min	60–90 min
Extra 1	Aircraft hangars	0.30 / 2500 12.2 / 230	100 ft² (9.3 m²) · 12 ft (3.7 m)	500 gpm 1900 L/min	90–120 min
Extra 2	Flammable liquid spraying	0.40 / 2500 16.3 / 230	100 ft² (9.3 m²) · 12 ft (3.7 m)	500 gpm 1900 L/min	90–120 min

*Standard pendent/upright spray sprinklers, hydraulically calculated. Keep sprinklers at least 6 ft (1.8 m) apart, at least 4 in (100 mm) from walls, and no more than ½ the allowable spacing from walls. NFPA 13 (2022) uses single-point density/area values for new systems.