# Flare Thermal Radiation by the Point-Source Method

Radiant flux at a receptor from a flare by the point-source model, from flared mass rate, heating value, radiant fraction and geometry, and the safe distance.

**Method:** Point-source radiation model

## Input parameters

Unit system: SI

| Parameter | Value | Unit |
|---|---|---|
| Flared gas mass rate | 72,000 | kg/h |
| Lower heating value | 46.000 | MJ/kg |
| Fraction of heat radiated | 25.000 | % |
| Atmospheric transmissivity | 90.000 | % |
| Height of flame centre above the receptor | 60.000 | m |
| Horizontal distance to the receptor | 60.000 | m |
| Allowable flux at the receptor | 4.7300 | kW/m² |

## Calculated results

| Parameter | Value | Unit |
|---|---|---|
| Heat release | 920.00 | MW |
| Distance from flame centre | 84.853 | m |
| Radiant flux at the receptor | 2.2879 | kW/m² |
| Distance for the allowable flux | 59.013 | m |
| Horizontal distance for the allowable flux | 0 | m |

**Notes for this case**

• Point source: q = τFQ/(4πD²), D from the flame centre (stack tip plus about half the flame length, tilted by wind) to the receptor. F depends on the gas and flare type (roughly 0.1–0.3). Common limits: about 1.6 kW/m² for continuous exposure of people, 4.7 kW/m² for short emergency actions, 6.3 kW/m² for a few seconds; the user's design basis governs. A zero horizontal distance means the flame centre is above the allowable distance.

## Formula and method

$$q = \frac{\tau F \dot{m} LHV}{4\pi D^2}, \quad D_a = \sqrt{\frac{\tau F \dot{Q}}{4\pi q_a}}$$

### Variables

| | | |
|---|---|---|
| $\dot{m}$ | Flared gas mass rate | kg/s |
| $LHV$ | Lower heating value | J/kg |
| $F$ | Fraction of heat radiated | - |
| $\tau$ | Atmospheric transmissivity | - |
| $H_c$ | Height of flame centre above the receptor | m |
| $x$ | Horizontal distance to the receptor | m |
| $q_a$ | Allowable flux at the receptor | W/m² |
| $\dot{Q}$ | Heat release | W |
| $D$ | Distance from flame centre | m |
| $q$ | Radiant flux at the receptor | W/m² |

| | | |
|---|---|---|
| $D_a$ | Distance for the allowable flux | m |
| $x_a$ | Horizontal distance for the allowable flux | m |

### Method and standards

Flare radiation.

### Assumptions and limits

- Point source at the flame centre; isotropic radiation.

### References

Point-source radiation model

## Report details

| | |
|---|---|
| Report reference | FCC-1SH3-WG3F (the same inputs always give the same reference) |
| Generated | 23 November 2026, 17:42 UTC |
| Calculator | Flare Thermal Radiation by the Point-Source Method |
| Method last reviewed | 17 November 2026 |
| Software release | FireCAD Calc, release of 22 November 2026 |
| Release checks | 3 reference cases of this calculator, computed independently, are checked on every release |

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

### This calculator online

https://calc.firecad.com/chemical/oil-gas/flare-radiation-point-source

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.