Furnace Heat Release Rate (Volume, Area, Plan)

Furnace volumetric heat release, heat release per unit of effective projected radiant surface and per unit of plan area, from the firing rate and furnace size.

Method: Definitions of furnace heat loading (heat input per volume and per area)

Input parameters

Unit system: SI

Parameter	Value	Unit
Heat input from fuel (GCV or NCV: quote the same basis as the limit)	80.000	MW
Furnace volume	600.00	m³
Effective projected radiant surface	700.00	m²
Furnace plan (cross-section) area	50.000	m²

Calculated results

Parameter	Value	Unit
Volumetric heat release	133.33	kW/m³
Heat release per EPRS	114.29	kW/m²
Heat release per plan area	1.6000	MW/m²

Notes for this case

- Compare with the design limits for your fuel and firing system from the boiler maker or your design standard.

Formula and method

$$q_V = \frac{\dot{Q}}{V} \qquad q_A = \frac{\dot{Q}}{A_{EPRS}} \qquad q_P = \frac{\dot{Q}}{A_p}$$

Variables

$\dot{Q}$	heat input from fuel	W
V	furnace volume	m³
A_{EPRS}	effective projected radiant surface	m²
A_p	furnace plan area	m²
q_V	volumetric heat release	W/m³
q_A	heat release per EPRS	W/m²
q_P	heat release per plan area	W/m²

Method and standards

Definitions of furnace heat loading. Allowable values depend on fuel and firing system and come from the boiler maker or design standard; none are built in.

Assumptions and limits

- Uniform definitions; the boundary of volume and EPRS as you measure it.
- The results are on the calorific basis of the heat input you enter; compare them only with limits on the same basis.

References

- Definitions of furnace heat loading (heat input per volume and per area)

Report details

Report reference	FCC-96KE-MHRZ (the same inputs always give the same reference)
Generated	17 November 2026, 19:50 UTC
Calculator	Furnace Heat Release Rate (Volume, Area, Plan)
Method last reviewed	11 November 2026
Software release	FireCAD Calc, release of 17 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/boilers-power-plant/furnace-heating-surfaces/furnace-heat-release-rate

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.