Heating Boiler Size for a Building

Boiler capacity for a building from design heat loss, hot-water load, distribution losses and a pick-up margin, and the size of each boiler for duty-sharing or N+1.

Method: Load summation with margins (CIBSE Guide B1 approach)

Input parameters

Unit system: SI

Parameter	Value	Unit
Design space heat loss	150.00	kW
Domestic hot water load (simultaneous)	30.000	kW
Distribution losses	5.0000	%
Pick-up (warm-up) margin	15.000	%
Number of boilers	2.0000	
Arrangement	Load shared by all	

Calculated results

Parameter	Value	Unit
Total boiler capacity	217.35	kW
Capacity of each boiler	108.67	kW
Installed capacity	217.35	kW

Notes for this case

- Where a DHW store has priority, the DHW load can often be left out of the peak. Oversizing beyond this costs efficiency through cycling; modulating condensing boilers suit part load.

Formula and method

$$Q_b = (Q_h + Q_{dhw})(1 + f_d)(1 + f_p), \quad Q_1 = \frac{Q_b}{n} \text{ or } \frac{Q_b}{n-1}$$

Variables

Q_h	Design space heat loss	W
Q_{dhw}	Domestic hot water load (simultaneous)	W
f_d	Distribution losses	-
f_p	Pick-up (warm-up) margin	-
n	Number of boilers	-
$\mathrm{arrangement}$	Arrangement	-
Q_b	Total boiler capacity	W
Q_1	Capacity of each boiler	W
Q_{inst}	Installed capacity	W

Method and standards

Load summation.

Assumptions and limits

- Peak loads coincident.
- The distribution and pick-up margins are compounded (multiplied), (1 + f_d)(1 + f_p), which is slightly larger than adding them.

References

- Load summation with margins (CIBSE Guide B1 approach)

Report details

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

This calculator online

https://calc.firecad.com/hvac/loads/heating-boiler-sizing

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.