Chiller Energy over a Year from Part-Load kW/TR

Yearly chiller electricity and cost from the rated capacity and four part-load bins of hours and kW/TR, with the weighted average kW/TR.

Method: Bin method E = Σ TR × kW/TR × hours

Input parameters

Unit system: SI

Parameter	Value	Unit
Rated capacity	500.00	TR
Bin 1: load share	100.00	%
Bin 1: hours	500.00	h
Bin 1: kW/TR	0.62000	
Bin 2: load share	75.000	%
Bin 2: hours	2,000.0	h
Bin 2: kW/TR	0.55000	
Bin 3: load share	50.000	%
Bin 3: hours	2,500.0	h
Bin 3: kW/TR	0.50000	
Bin 4: load share	25.000	%
Bin 4: hours	1,000.0	h
Bin 4: kW/TR	0.60000	
Electricity price per kWh	8.0000	

Calculated results

Parameter	Value	Unit
Cooling delivered	1,750,000	TR·h
Electricity	955,000	kWh
Average kW/TR	0.54571	
Cost	7,640,000	

Notes for this case

- Use kW/TR from the maker's part-load data at your condenser water temperatures, and include pumps and tower fans separately.

Formula and method

$$E = \sum_i \frac{x_i \dot{Q}_r}{TR} e_i t_i$$

Variables

$\dot{Q}_r$	Rated capacity	W
x_1	Bin 1: load share	-
t_1	Bin 1: hours	s
e_1	Bin 1: kW/TR	-
x_2	Bin 2: load share	-

t_2	Bin 2: hours	s
e_2	Bin 2: kW/TR	-
x_3	Bin 3: load share	-
t_3	Bin 3: hours	s
e_3	Bin 3: kW/TR	-
x_4	Bin 4: load share	-
t_4	Bin 4: hours	s
e_4	Bin 4: kW/TR	-
C	Electricity price per kWh	-
Q	Cooling delivered	J
E	Electricity	J
$\bar{e}$	Average kW/TR	-
C	Cost	-

Method and standards

Bin method.

Assumptions and limits

- Constant efficiency within each bin.
- Bin hours adding up to more than a year are flagged.

References

- Bin method E = Σ TR × kW/TR × hours

Report details

Report reference	FCC-TRFR-BW9S (the same inputs always give the same reference)
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Calculator	Chiller Energy over a Year from Part-Load kW/TR
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Release checks	2 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/hvac/chillers/chiller-part-load-energy

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.