Tons of Refrigeration, kW/TR, COP and EER

Converts refrigeration capacity between TR, kW and Btu/h, and gives kW per TR, COP and EER from the compressor or chiller power input.

Method: NIST SP 811 (ton of refrigeration = 12 000 Btu/h)

Input parameters

Unit system: SI

Parameter	Value	Unit
Refrigeration capacity	300.00	TR
Electrical power input	195.00	kW

Calculated results

Parameter	Value	Unit
Capacity in kW	1,055.1	kW
Capacity in TR	300.00	TR
Capacity in Btu/h	3,600,000	Btu/h
Power per ton of refrigeration (kW/TR)	0.65000	
Coefficient of performance	5.4105	
Energy efficiency ratio (Btu/h per W)	18.462	

Notes for this case

- 1 TR = 12 000 Btu/h = 3.517 kW (the US ton: 2000 lb of ice melted in 24 h).

Formula and method

$$\dot{Q}_e[\mathrm{TR}] = \frac{\dot{Q}_e}{3516.85} \qquad \mathrm{kW/TR} = \frac{\dot{W}/1000}{\dot{Q}_e[\mathrm{TR}]} \qquad COP = \frac{\dot{Q}_e}{\dot{W}} \qquad EER = \frac{\dot{Q}_e[\mathrm{Btu/h}]}{\dot{W}}$$

Variables

$\dot{Q}_e$	refrigeration capacity	W
$\dot{W}$	electrical power input	W
$\mathrm{kW/TR}$	power per ton of refrigeration	kW/TR
COP	coefficient of performance	–
EER	energy efficiency ratio	Btu/(h·W)

Method and standards

Definitions; 1 TR = 12 000 Btu/h with the International Table Btu (NIST SP 811).

Assumptions and limits

- The US (12 000 Btu/h) ton.

References

- NIST SP 811 (ton of refrigeration = 12 000 Btu/h)

Report details

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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/hvac/refrigeration/tons-of-refrigeration

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.