Refrigeration Capacity Converter (TR, kW, Btu/h, kcal/h)

Convert chiller and air-conditioning capacity between tons of refrigeration, kW, Btu/h and kcal/h, with the chilled-water flow for a temperature drop.

Method: Unit definitions per NIST SP 811 and the SI Brochure (exact where defined); Chilled-water flow from Q = ρ c_p V ΔT

Input parameters

Unit system: SI

Parameter	Value	Unit
Cooling capacity (choose its unit)	100.00	TR
Chilled-water temperature difference	5.0000	K

Calculated results

Parameter	Value	Unit
Capacity in tons of refrigeration	100.00	TR
Capacity in kW	351.69	kW
Capacity in Btu/h	1,200,000	Btu/h
Capacity in kcal/h	302,395	kcal/h
Chilled-water flow for the temperature difference	60.600	m³/h

Notes for this case

• One ton of refrigeration is 12,000 Btu/h, the heat absorbed by melting one short ton of ice in a day: 3.517 kW or 3,024 kcal/h. The chilled-water flow is Q/(ρ c_p ΔT) with water at about 20 °C (998.2 kg/m³, 4.186 kJ/kg·K): about 0.6 m³/h per TR at 5 K.

Formula and method

$$1\ \mathrm{TR} = 12\,000\ \mathrm{Btu/h} = 3.517\ \mathrm{kW}, \quad \dot{V} = \frac{Q}{\rho c_p \Delta T}$$

Variables

Q	Cooling capacity (choose its unit)	W
ΔT	Chilled-water temperature difference	K
$\dot{V}$	Chilled-water flow for the temperature difference	m³/s

Method and standards

Refrigeration units.

Assumptions and limits

- Water properties at about 20 °C for the flow.

References

Unit definitions per NIST SP 811 and the SI Brochure (exact where defined), Chilled-water flow from Q = ρ c_p V ΔT

Report details

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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/general/unit-conversions/refrigeration-capacity-converter

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.