Cooling a Data Center Pod with Its Own Waste Heat: A 100 kW Ejector Design Study

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https://www.infinityturbine.com/data-center-100kwh-waste-heat-into-ejector-cooling-by-infinity-turbine.html

Ejector refrigeration uses waste heat, not shaft work, to move a refrigerant from evaporator pressure up to condenser pressure. A generator (boiler) uses the waste heat to vaporize a working fluid at high pressure; that vapor accelerates through a supersonic nozzle inside the ejector, and the resulting low-pressure jet entrains a second stream of vapor from the evaporator, the stream that actually produces the cooling effect. The two streams mix, then recompress in a diffuser and condense together. No compressor, no moving parts.

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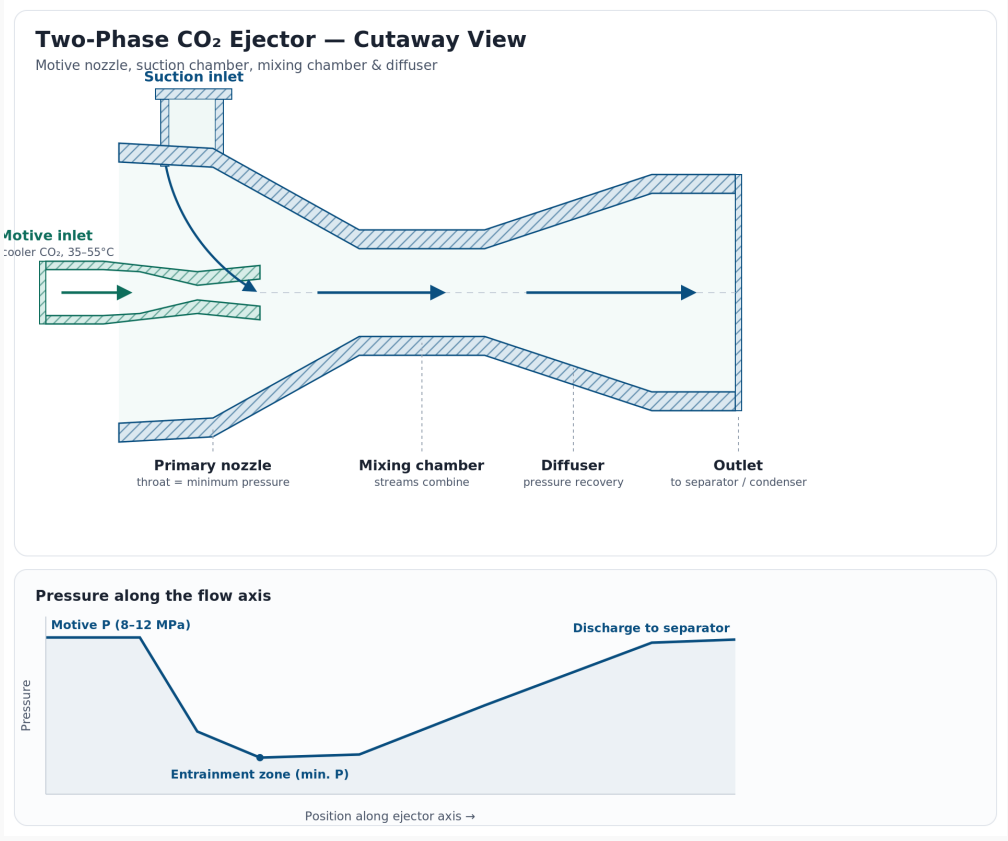
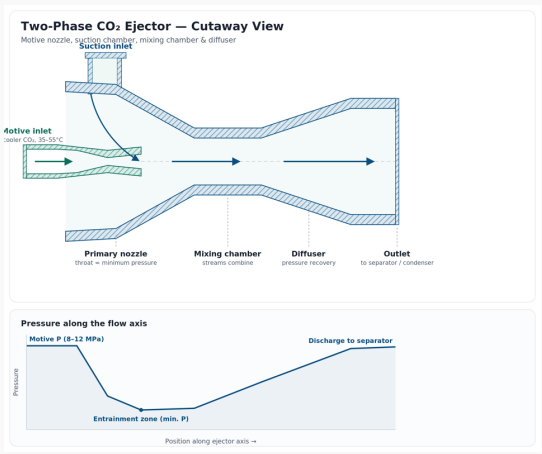

Two-Phase CO₂ Ejector — Cutaway View
Motive nozzle, suction chamber, mixing chamber & diffuser
Suction inlet
Motive inlet
cooler CO₂, 35–55°C
Primary nozzle
throat = minimum pressure
Mixing chamber
streams combine
Diffuser
pressure recovery
Outlet
to separator / condenser
Pressure along the flow axis
Motive P (8–12 MPa)
Discharge to separator
Entrainment zone (min. P)
Pressure
Position along ejector axis →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