Refrigerant Line Velocity and Size Check

Velocity of refrigerant in a suction, discharge or liquid line from mass flow, line bore and refrigerant density, with the bore for a target velocity.

Method: Continuity v = ṁ/(ρA)

Input parameters

Unit system: SI

Parameter	Value	Unit
Refrigerant mass flow	900.00	kg/h
Refrigerant density in the line From the refrigerant's property tables at the line conditions.	20.000	kg/m³
Inside diameter	35.000	mm
Target velocity Your design guide's range for the line and refrigerant (suction lines must still return oil).	10.000	m/s

Calculated results

Parameter	Value	Unit
Velocity	12.992	m/s
Volume flow	45.000	m³/h
Bore for the target velocity	39.894	mm

Formula and method

$$v = \frac{\dot{m}}{\rho \pi D^2/4}, \quad D_t = \sqrt{\frac{4\dot{m}}{\pi \rho v_t}}$$

Variables

$\dot{m}$	Refrigerant mass flow	kg/s
ρ	Refrigerant density in the line	kg/m³
D	Inside diameter	m
v_t	Target velocity	m/s
v	Velocity	m/s
$\dot{V}$	Volume flow	m³/s
D_t	Bore for the target velocity	m

Method and standards

Continuity.

Assumptions and limits

- Single phase in the line.

References

- Continuity v = ṁ/(ρA)

Report details

Report reference	FCC-Y7YK-WM1F (the same inputs always give the same reference)
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Calculator	Refrigerant Line Velocity and Size Check
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Software release	FireCAD Calc, release of 17 November 2026
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/refrigeration/refrigerant-line-velocity

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.