Hecu Sistema - SUCTION PIPE SIZING (multi-split configuration)

CAREL

The following tables provide the suction pipe sizing based on the evaporator maximum cooling capacity in a multi-split configuration. Each single evaporator must be then connected to the condensing unit via a single suction pipe.

The pipe diameter is calculated considering:
- a refrigerant velocity high enough to allow a proper oil return to the compressor;
- acceptable pressure drops across the suction lines (average 0.08°C/meter).

Suggested type of copper pipes:
- Up to 1/2" (or 12 mm): pre-insulated soft copper pipes with flare connections;
- 5/8" (or 15 mm): any choice is equivalent;
- Over 5/8" (or 15 mm): rigid copper pipes with soldered connections.

Notes:
- velocity is calculated at the MINIMUM cooling load for each evaporator, the worst condition for oil return;
- pressure drops are calculated at the MAXIMUM cooling load for each evaporator, the worst condition for pressure drops;
- cooling load ratio (min/max) is 40% for MT evaporators and 60% for LT evaporators according to statistics known in literature (Walker, Baxter, 2003).

R410A MEDIUM temperature application (-10°C nominal evaporation temperature)

Metric System

	Evaporator maximum cooling capacity															
condensing temperature	1,0kW	1,5kW	2,0kW	2,5kW	3,0kW	3,5kW	4,0kW	4,5kW	5,0kW	5,5kW	6,0kW	6,5kW	7,0kW	7,5kW	8,0kW	8,5kW
40°C	8 mm	10 mm	10 mm	12 mm	12 mm	12 mm	15 mm	15 mm	15 mm	15 mm	15 mm	18 mm	18 mm	18 mm	18 mm	18 mm
45°C	8 mm	10 mm	12 mm	12 mm	12 mm	12 mm	15 mm	15 mm	15 mm	15 mm	15 mm	18 mm	18 mm	18 mm	18 mm	18 mm
50°C	8 mm	10 mm	12 mm	12 mm	12 mm	15 mm	15 mm	15 mm	15 mm	15 mm	18 mm	18 mm	18 mm	18 mm	18 mm	18 mm
55°C	8 mm	10 mm	12 mm	12 mm	12 mm	15 mm	15 mm	15 mm	15 mm	18 mm	18 mm	18 mm	18 mm	18 mm	18 mm	18 mm

Imperial System

	Evaporator maximum cooling capacity															
condensing temperature	1,0kW	1,5kW	2,0kW	2,5kWz	3,0kW	3,5kW	4,0kW	4,5kW	5,0kW	5,5kW	6,0kW	6,5kW	7,0kW	7,5kW	8,0kW	8,5kW
40°C	5/16"	3/8"	3/8"	1/2"	1/2"	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"
45°C	5/16"	3/8"	3/8"	1/2"	1/2"	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"
50°C	5/16"	3/8"	3/8"	1/2"	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	3/4"
55°C	3/8"	3/8"	3/8"	1/2"	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	3/4"	3/4"

R410A LOW temperature application (-30°C nominal evaporation temperature)

Metric System

	Evaporator maximum cooling capacity															
condensing temperature	1,0kW	1,5kW	2,0kW	2,5kW	3,0kW	3,5kW	4,0kW	4,5kW	5,0kW	5,5kW	6,0kW	6,5kW	7,0kW	7,5kW	8,0kW	8,5kW
40°C	12 mm	12 mm	15 mm	15 mm	18 mm	18 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm
45°C	12 mm	12 mm	15 mm	15 mm	18 mm	18 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm
50°C	12 mm	15 mm	15 mm	15 mm	18 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	28 mm
55°C	12 mm	15 mm	15 mm	18 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	28 mm	28 mm

Imperial System

	Evaporator maximum cooling capacity															
condensing temperature	1,0kW	1,5kW	2,0kW	2,5kW	3,0kW	3,5kW	4,0kW	4,5kW	5,0kW	5,5kW	6,0kW	6,5kW	7,0kW	7,5kW	8,0kW	8,5kW
40°C	3/8"	1/2"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	7/8"	7/8"	7/8"	7/8"	1"	1"	1"	1"
45°C	3/8"	1/2"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	7/8"	7/8"	7/8"	7/8"	1"	1"	1"	1"
50°C	1/2"	1/2"	5/8"	5/8"	3/4"	3/4"	3/4"	7/8"	7/8"	7/8"	7/8"	1"	1"	1"	1"	11/8"
55°C	1/2"	1/2"	5/8"	5/8"	3/4"	3/4"	3/4"	7/8"	7/8"	7/8"	1"	1"	1"	1"	11/8"	11/8"

R404A MEDIUM temperature application (-10°C nominal evaporation temperature)

Metric System

	Evaporator maximum cooling capacity															
condensing temperature	1,0kW	1,5kW	2,0kW	2,5kW	3,0kW	3,5kW	4,0kW	4,5kW	5,0kW	5,5kW	6,0kW	6,5kW	7,0kW	7,5kW	8,0kW	8,5kW
40°C	10 mm	12 mm	12 mm	15 mm	15 mm	15 mm	18 mm	18 mm	18 mm	18 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm
45°C	10 mm	12 mm	12 mm	15 mm	15 mm	15 mm	18 mm	18 mm	18 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm	22 mm
50°C	10 mm	12 mm	12 mm	15 mm	15 mm	18 mm	18 mm	18 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm
55°C	10 mm	12 mm	15 mm	15 mm	15 mm	18 mm	18 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm

Imperial System

	Evaporator maximum cooling capacity															
condensing temperature	1,0kW	1,5kW	2,0kW	2,5kW	3,0kW	3,5kW	4,0kW	4,5kW	5,0kW	5,5kW	6,0kW	6,5kW	7,0kW	7,5kW	8,0kW	8,5kW
40°C	3/8"	3/8"	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	3/4"	7/8"	7/8"	7/8"	7/8"
45°C	3/8"	1/2"	1/2"	1/2"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	3/4"	7/8"	7/8"	7/8"	7/8"	7/8"
50°C	3/8"	1/2"	1/2"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	3/4"	7/8"	7/8"	7/8"	7/8"	7/8"	1"
55°C	3/8"	1/2"	1/2"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	7/8"	7/8"	7/8"	7/8"	7/8"	1"	1"

R404A LOW temperature application (-30°C nominal evaporation temperature)

Metric System

	Evaporator maximum cooling capacity															
condensing temperature	1,0kW	1,5kW	2,0kW	2,5kW	3,0kW	3,5kW	4,0kW	4,5kW	5,0kW	5,5kW	6,0kW	6,5kW	7,0kW	7,5kW	8,0kW	8,5kW
40°C	15 mm	15 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm	22 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm
45°C	15 mm	15 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm	22 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm
50°C	15 mm	15 mm	18 mm	22 mm	22 mm	22 mm	22 mm	22 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	35 mm
55°C	15 mm	18 mm	18 mm	22 mm	22 mm	22 mm	22 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	35 mm	35 mm	35 mm

Imperial System

	Evaporator maximum cooling capacity															
condensing temperature	1,0kW	1,5kW	2,0kW	2,5kW	3,0kW	3,5kW	4,0kW	4,5kW	5,0kW	5,5kW	6,0kW	6,5kW	7,0kW	7,5kW	8,0kW	8,5kW
40°C	1/2″	5/8″	3/4″	3/4″	7/8″	7/8″	7/8″	1″	1″	1″	11/8″	11/8″	11/8″	11/8″	11/8″	11/8″
45°C	1/2″	5/8″	3/4″	3/4″	7/8″	7/8″	1″	1″	1″	11/8″	11/8″	11/8″	11/8″	11/8″	11/8″	11/8″
50°C	5/8″	5/8″	3/4″	7/8″	7/8″	7/8″	1″	1″	11/8″	11/8″	11/8″	11/8″	11/8″	11/8″	11/8″	13/8″
55°C	5/8″	5/8″	3/4″	7/8″	7/8″	1″	1″	11/8″	11/8″	11/8″	11/8″	11/8″	11/8″	11/8″	13/8″	13/8″

R744 MEDIUM temperature application (-10°C nominal evaporation temperature)

Metric System

	Evaporator maximum cooling capacity															
Receiver Pressure	1,0 kW	1,5 kW	2,0 kW	2,5 kW	3,0 kW	3,5 kW	4,0 kW	4,5 kW	5,0 kW	5,5 kW	6,0 kW	6,5 kW	7,0 kW	7,5 kW	8,0 kW	8,5 kW
35 barg	6 mm	6 mm	6 mm	8 mm	8 mm	8 mm	8 mm	10 mm	10 mm	10 mm	10 mm	10 mm	12 mm	12 mm	12 mm	12 mm
40 barg	6 mm	6 mm	6 mm	8 mm	8 mm	8 mm	10 mm	10 mm	10 mm	10 mm	10 mm	12 mm	12 mm	12 mm	12 mm	12 mm
45 barg	6 mm	6 mm	8 mm	8 mm	8 mm	8 mm	10 mm	10 mm	10 mm	10 mm	10 mm	12 mm	12 mm	12 mm	12 mm	12 mm

Imperial System

	Evaporator maximum cooling capacity															
Receiver Pressure	1,0 kW	1,5 kW	2,0 kW	2,5 kW	3,0 kW	3,5 kW	4,0 kW	4,5 kW	5,0 kW	5,5 kW	6,0 kW	6,5 kW	7,0 kW	7,5 kW	8,0 kW	8,5 kW
35 barg	1/4"	1/4"	1/4"	5/16"	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"
40 barg	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"
45 barg	1/4"	1/4"	5/16"	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"	1/2"

R744 LOW temperature application (-30°C nominal evaporation temperature)

Metric System

	Evaporator maximum cooling capacity															
Receiver Pressure	1,0 kW	1,5 kW	2,0 kW	2,5 kW	3,0 kW	3,5 kW	4,0 kW	4,5 kW	5,0 kW	5,5 kW	6,0 kW	6,5 kW	7,0 kW	7,5 kW	8,0 kW	8,5 kW
35 barg	6 mm	8 mm	8 mm	10 mm	10 mm	12 mm	12 mm	12 mm	12 mm	12 mm	12 mm	15 mm	15 mm	15 mm	15 mm	15 mm
40 barg	8 mm	8 mm	10 mm	10 mm	10 mm	12 mm	12 mm	12 mm	12 mm	12 mm	15 mm	15 mm	15 mm	15 mm	15 mm	15 mm
45 barg	8 mm	8 mm	10 mm	10 mm	10 mm	12 mm	12 mm	12 mm	12 mm	12 mm	15 mm	15 mm	15 mm	15 mm	15 mm	15 mm

Imperial System

	Evaporator maximum cooling capacity															
Receiver Pressure	1,0 kW	1,5 kW	2,0 kW	2,5 kW	3,0 kW	3,5 kW	4,0 kW	4,5 kW	5,0 kW	5,5 kW	6,0 kW	6,5 kW	7,0 kW	7,5 kW	8,0 kW	8,5 kW
35 barg	1/4"	5/16"	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	5/8"	5/8"	5/8"
40 barg	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"
45 barg	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"	1/2"	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"	5/8"

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