

QUALITAIR

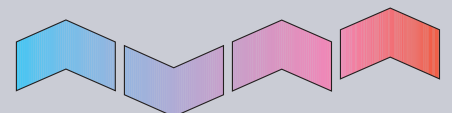
(OUTDOOR)
INVICTA
CONDENSING
UNITS
2.4-19.5 kW
Nominal Duty

Standard Features:

- Weatherproof painted cabinet with draw through fan assembly.
- Access door to compressor and controls compartment on the front of unit.
- Factory fitted LP and HP switch, fan speed control and winter start kit.
- Charged with R407c refrigerant for up to 5 metres pipe run.
- Up to 100 metres pipe run.
- Low starting current and noise levels.
- Scroll compressor (rotary fitted on ICU30 and ICU40 models).
- Supplied with flared connections and shut-off valves.
- Hot Gas bypass stub fitted for installer use.

Options & Accessories:

- Heat Pump Units (please telephone sales for information).
- Electrical Isolator.
- Wall Mounting Kit.



INVICTA CONDENSING UNIT (ICU)

The Invicta Condensing Unit (ICU) range are weatherproof outdoor air cooled units which can operate efficiently all year round. They offer the specifier and installer a compact, small footprint design with numerous factory fitted features as standard.

High efficiency compressors are used throughout the range consisting of rotary designs on the ICU30 and ICU40 and scroll designs on the remainder.

Units are supplied with factory fitted LP and HP switches, winter start kit and fan speed control as well as all usual control circuits and fuses. Refrigerant lines of up to 100 metres can be accommodated thus maximising positioning options.

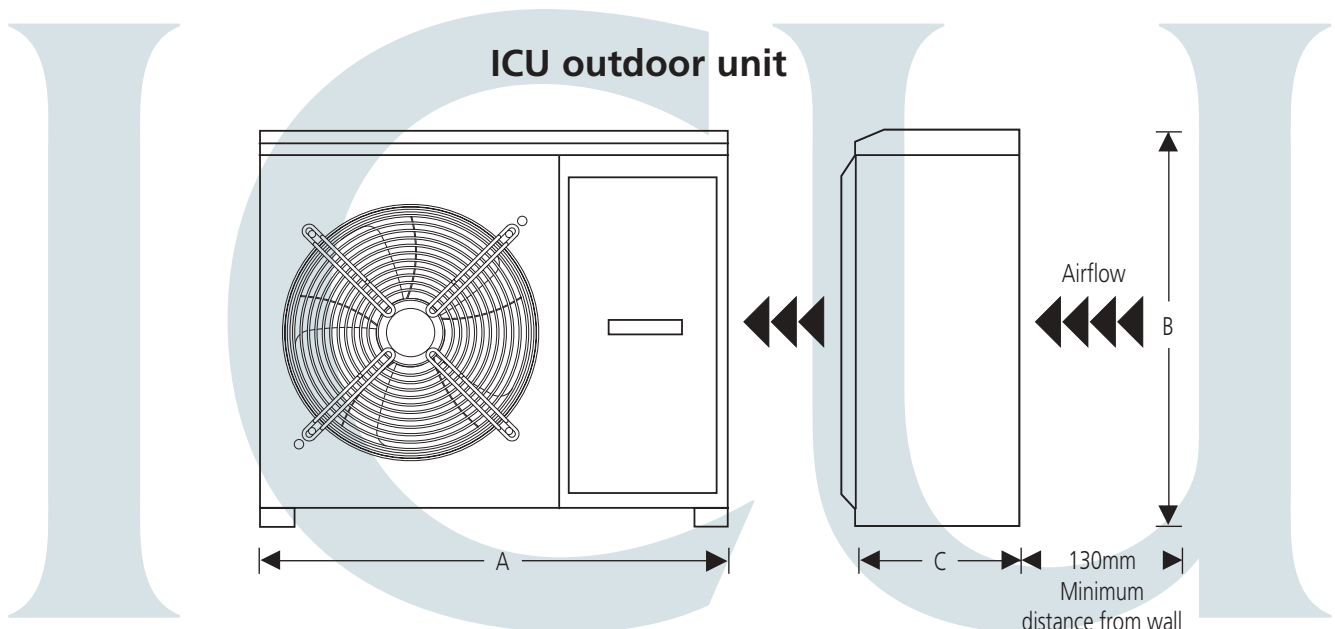
All ICU's operate and are pre-charged with environmentally friendly R407c refrigerant, for the equivalent of up to 5 metres of pipe run. Each circuit is fitted with pipe connections (flared) and shut-off valves on the side of the case.

The Invicta Condensing Unit is competitively priced and is available from our national wholesalers.

Model	Nominal Duty kW	Type	Compressor Fuse A	Phase	Noise Level NR	Width (A) mm	Height (B) mm	Depth (C) mm	Weight kg	Line Connections *	
										Suction	Liquid
ICU30	2.5	Rotary	10	1Ph	51	720	610	250	40	3/8"	1/4"
ICU40	3.7	Rotary	10	1Ph	48	720	610	250	40	1/2"	1/4"
ICU55	5.3	Scroll	16	1Ph	47	800	765	320	60	1/2"	3/8"
ICU80	8.2	Scroll	20	1Ph	53	800	765	320	61	5/8"	3/8"
ICU80	8.2	Scroll	10	3Ph	53	800	765	320	61	5/8"	3/8"
ICU100	11.4	Scroll	30	1Ph	54	1050	765	320	88	5/8"	1/2"
ICU100	11.4	Scroll	16	3Ph	54	1050	765	320	88	5/8"	1/2"
ICU135	14.4	Scroll	16	3Ph	64	1050	765	320	90	3/4"	1/2"
ICU170	18.9	Scroll	20	3Ph	64	1400	765	320	97	3/4"	1/2"

Conditions: Evaporation Temperature: 7 °C. Ambient Temperature: 30 °C.

* Line connections for 5 m length (refer to Tables A and B for other lengths).



ICU — APPLICATIONS

The Qualitair Invicta Condensing Units can be used with products from our extensive range, such as the Invicta Cellar Cooler, QLC Low Temperature Cassette, LKF Air Handling units and with other manufacturers' indoor DX units.



Qualitair ICU Production Line.



Invicta Condensing Unit (ICU).

Invicta Cellar Cooler (ICC).



Qualitair Low Temperature Cassette (QLC) for food preparation and storage areas.

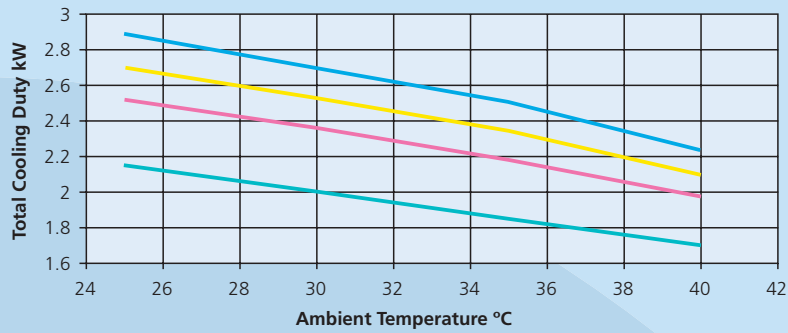


Bottle cooling with Invicta Cellar Coolers.

ICU — SELECTION GRAPHS

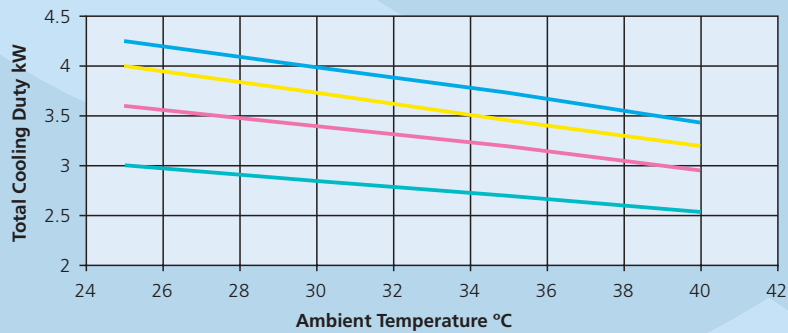
ICU30 Cooling

kW Duty to Ambient with R407c



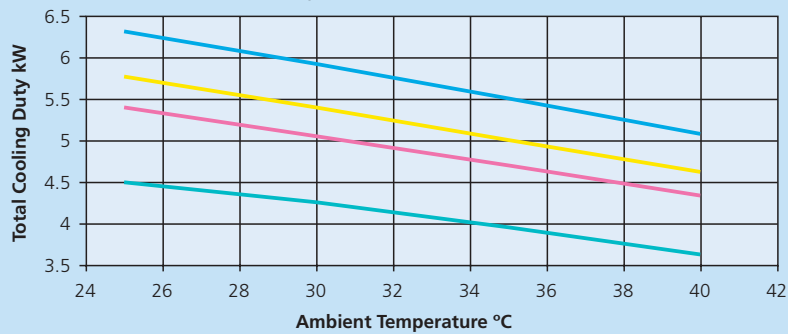
ICU40 Cooling

kW Duty to Ambient with R407c



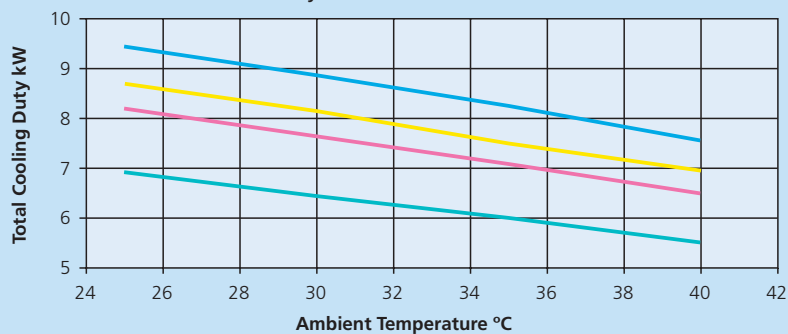
ICU55 Cooling

kW Duty to Ambient with R407c



ICU80 Cooling

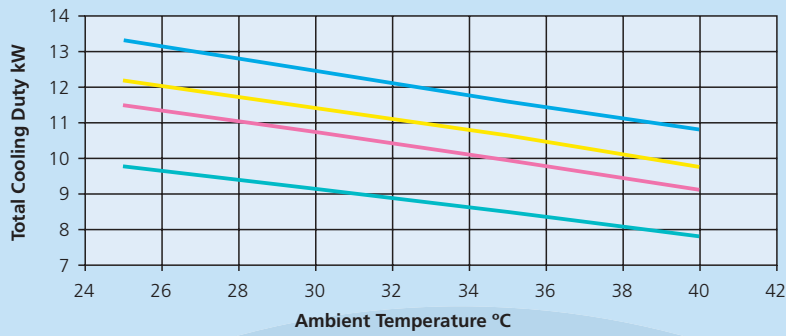
kW Duty to Ambient with R407c



ICU — SELECTION GRAPHS

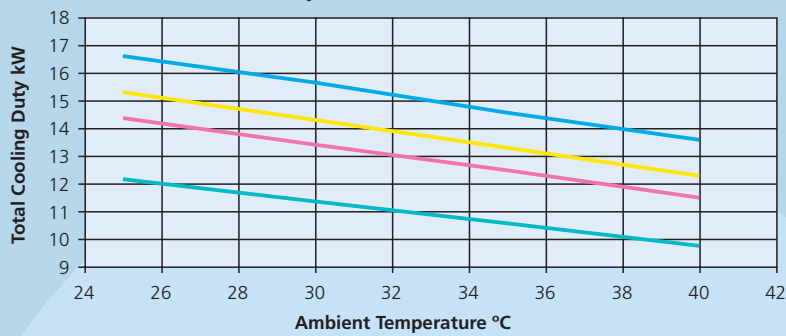
ICU100 Cooling

kW Duty to Ambient with R407c



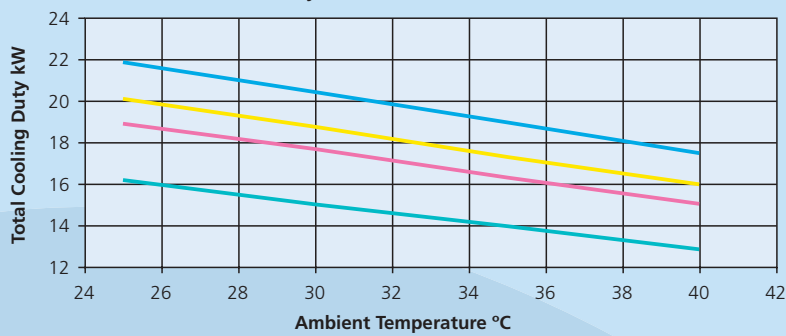
ICU135 Cooling

kW Duty to Ambient with R407c



ICU170 Cooling

kW Duty to Ambient with R407c



Evaporation Temperatures

Key 10°C ■ 7°C ■ 5°C ■ 0°C ■

For alternative conditions please contact our sales department.

ICU — RECOMMENDED PIPE LINE SIZES

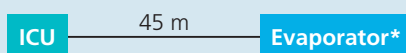
Table A — Horizontal or Downflow Application (Suction Line)
Based on 5 psi (0.35 bar) Pressure Drop

Model		Line Length (m)																	
		5	10	15	20	25	30	35	40	45	50	60	70	80	90	100			
ICU30	Suction	3/8"	1/2"				5/8"				Pipe lines not to be extended into this area								
	Liquid	1/4"																	
ICU40	Suction	1/2"			5/8"			3/4"									Pipe lines not to be extended into this area		
	Liquid	1/4"																	
ICU55	Suction	1/2"	5/8"				3/4"				7/8"				Pipe lines not to be extended into this area				
	Liquid	3/8"																	
ICU80	Suction	5/8"		3/4"			7/8"			1 1/8"									
	Liquid	3/8"					1/2"												
ICU100	Suction	5/8"	3/4"		7/8"			1 1/8"											
	Liquid	1/2"						5/8"											
ICU135	Suction	3/4"		7/8"			1 1/8"												
	Liquid	1/2"						5/8"											
ICU170	Suction	3/4"	7/8"	1 1/8"				1 3/8"											
	Liquid	1/2"					5/8"												

Based on 2 psi (0.14 bar) Pressure Drop

Model		Line Length (m)																
		5	10	15	20	25	30	35	40	45	50	60	70	80	90	100		
ICU30	Suction	1/2"		5/8"				Pipe lines not to be extended into this area										
	Liquid	1/4"																
ICU40	Suction	1/2"	5/8"				3/4"									Pipe lines not to be extended into this area		
	Liquid	1/4"																
ICU55	Suction	5/8"		3/4"			7/8"				Pipe lines not to be extended into this area							
	Liquid	3/8"						1/2"										
ICU80	Suction	5/8"	3/4"		7/8"			1 1/8"										
	Liquid	3/8"					1/2"											
ICU100	Suction	3/4"	7/8"		1 1/8"			1 3/8"										
	Liquid	1/2"						5/8"										
ICU135	Suction	3/4"	7/8"	1 1/8"				1 3/8"										
	Liquid	1/2"						5/8"										
ICU170	Suction	7/8"	1 1/8"			1 3/8"				1 5/8"								
	Liquid	1/2"					5/8"											

Example — ICU100 with a Horizontal, Downflow or Upflow 45 m Run

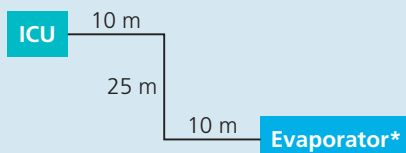


From Table A: Horizontal Suction to be 1 1/8"
Horizontal Liquid to be 5/8"

Table B: Not Applicable

Added Oil: None Required

Added Gas: 175 g × 40 m

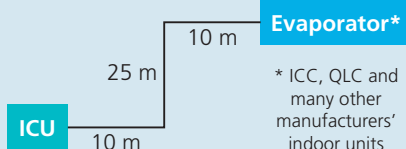


From Table A: Horizontal Suction to be 1 1/8"
Horizontal Liquid to be 5/8"

Table B: Vertical Suction 3/4"
Vertical Liquid 5/8"

Added Oil: None Required

Added Gas: 175 g × 40 m



From Table A: Horizontal Suction to be 1 1/8"
Horizontal Liquid to be 5/8"

Table B: Not Applicable

Added Oil: None Required

Added Gas: 175 g × 40 m

* ICC, QLC and many other manufacturers' indoor units

ICU — RECOMMENDED PIPE LINE SIZES

**Table B — Vertical Application
Upflow (Suction Line)**

Model	Suction Maximum Size	Lift Maximum (m)	Additional Oil (For Lines Greater Than 5 m)	Additional Charge kg (R407c) (For Lines Greater Than 5 m)
ICU30	3/8"	5	If using 1/2" suction add 10 ml/m If using 5/8" suction add 20 ml/m	If using 1/4" liquid add 25 g/m
ICU40	1/2"	15	If using 5/8" suction add 20 ml/m	If using 1/4" liquid add 25 g/m
ICU55	1/2"	8	None Required	If using 3/8" liquid add 40 g/m If using 1/2" liquid add 105 g/m
ICU80	3/4"	30	None Required	If using 3/8" liquid add 40 g/m If using 1/2" liquid add 105 g/m
ICU100	7/8"	35	None Required	If using 1/2" liquid add 105 g/m If using 5/8" liquid add 175 g/m
ICU135	7/8"	24	None Required	If using 1/2" liquid add 105 g/m If using 5/8" liquid add 175 g/m
ICU170	1 1/8"	50	None Required	If using 1/2" liquid add 105 g/m If using 5/8" liquid add 175 g/m

Model	Suction Maximum Size	Lift Maximum (m)	Additional Oil (For Lines Greater Than 5 m)	Additional Charge kg (R407c) (For Lines Greater Than 5 m)
ICU30	3/8"	2	If using 1/2" suction add 10 ml/m If using 5/8" suction add 20 ml/m	If using 1/4" liquid add 25 g/m
ICU40	1/2"	6	If using 5/8" suction add 20 ml/m	If using 1/4" liquid add 25 g/m
ICU55	1/2"	3	None Required	If using 3/8" liquid add 40 g/m If using 1/2" liquid add 105 g/m
ICU80	3/4"	11	None Required	If using 3/8" liquid add 40 g/m If using 1/2" liquid add 105 g/m
ICU100	7/8"	13	None Required	If using 1/2" liquid add 105 g/m If using 5/8" liquid add 175 g/m
ICU135	7/8"	9	None Required	If using 1/2" liquid add 105 g/m If using 5/8" liquid add 175 g/m
ICU170	1 1/8"	20	None Required	If using 1/2" liquid add 105 g/m If using 5/8" liquid add 175 g/m

Table C — Fitting Losses

Fitting	Pipe Size					
	3/8"	1/2"	5/8"	3/4"	7/8"	1 1/8"
45° Bend	0.12	0.15	0.18	0.21	0.24	0.30
90° Bend (Short Radius)	0.37	0.43	0.49	0.55	0.61	0.79
90° Bend (Long Radius)	0.24	0.27	0.30	0.37	0.43	0.52
180° Bend (Short Radius)	0.73	0.91	1.10	1.28	1.46	1.83
180° Bend (Long Radius)	0.46	0.55	0.64	0.76	0.85	1.07
90° Elbow	0.67	0.85	1.04	1.25	1.46	1.89

Notes:

1. Crankcase heaters are required where system charge exceeds 4.5 kg and does not contain an accumulator.
2. Maximum pipe run stated in Table A must include the reduction allowance (equivalent length) for vertical lifts and fittings indicated in Tables B and C.
3. Additional Oil and Refrigerant charge is per linear length of pipe run.
4. For trapping details please refer to Installation Manual.
5. Installation should be carried out by a qualified refrigeration contractor.



Eaton-Williams Air Conditioning

Station Road, Edenbridge

Kent TN8 6EG, England

Telephone: +44 (0)1732 866066

Facsimile: +44 (0)1732 867937

www.eaton-williams.com

We reserve the right to alter specifications without notice and products will sometimes be supplied with modifications which do not strictly comply with the descriptions and illustrations in this publication.