

SE-EVI SERIES

SE-EVI-46U

Enhanced vapour injection heat pump for cold climates — rated hot water to 60 °C with the ambient as low as -20 °C. R410A scroll circuit, three-phase.

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HEATING CAPACITY

46.3 kW

At T1 · A20 °C / W55 °C

PEAK COP

3.8

At T1 · A20 °C / W55 °C

MAX WATER TEMP

60 °C

Rated outlet 55 °C

HOT WATER OUTPUT

995 LPH

At T1 · A20 °C / W55 °C

Performance

Rated output at each test condition

T1 A20 °C / W55 °C

Heating capacity	46.3 kW
Power input	12.1 kW
COP	3.8
Hot water output	995 LPH

T3 A0 °C / W55 °C

Heating capacity	31 kW
Power input	11.9 kW
COP	2.6
Hot water output	580 LPH

T5 A-20 °C / W55 °C

Heating capacity	23 kW
Power input	14.8 kW
COP	1.6
Hot water output	430 LPH

Technical specifications

SE-EVI-46U

ELECTRICAL SUPPLY

Power supply	—	380-415 V / 50 Hz / 3 Ph
Rated current	A	20.8
Maximum current	A	29.5
Required MCB	—	63 A × 4 pole
Required cable	—	4 core × 10 sq.mm copper cable + earthing

REFRIGERATION CIRCUIT

Compressor	—	Scroll (Copeland / Panasonic)
Number of compressors	Nos	2
Refrigerant	—	R410A
Heat exchanger (condenser)	—	Tube-in-shell / Brazed plate heat exchanger
Evaporator	—	Blue finned evaporator coil
Throttling device	—	Thermostatic / Electronic expansion valve
Fan quantity	Nos	2
Operating ambient range	°C	-25 to 43

WATER CIRCUIT

Rated water temperature	°C	55
Maximum water temperature	°C	60
Water flow	m ³ /hr	7.9
Water pressure drop	kPa	≤ 52
Water pipe size	inch	R1-1/2"

UNIT & ACOUSTICS

Dimensions (L × W × H)	mm	1470 × 750 × 1085
Net weight	kg	275
Noise at 1 metre	dB(A)	≤ 56

TEST CONDITIONS

T1 — Ambient 20/15 °C (DB/WB), E.T. 10 °C, C.T. 60 °C
T2 — Ambient 10 °C (DB), E.T. 0 °C, C.T. 60 °C
T3 — Ambient 0/-2 °C (DB/WB), E.T. -20 °C, C.T. 60 °C
T4 — Ambient -10/-10 °C (DB/WB), E.T. -20 °C, C.T. 60 °C
T5 — Ambient -20/-20 °C (DB/WB), E.T. -30 °C, C.T. 60 °C

INSTALLATION REQUIREMENT

Dedicated **63 A × 4 pole** MCB required at the unit.
Supply cable **4 core × 10 sq.mm** copper, with separate earthing.
Maintain water flow of **7.9 m³/hr**; pressure drop across the unit **≤ 52 kPa**.

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Manufacturer & exporter of heat pumps since 2012

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Premises CHS, New Link Road, Goregaon West, Mumbai

FACTORY

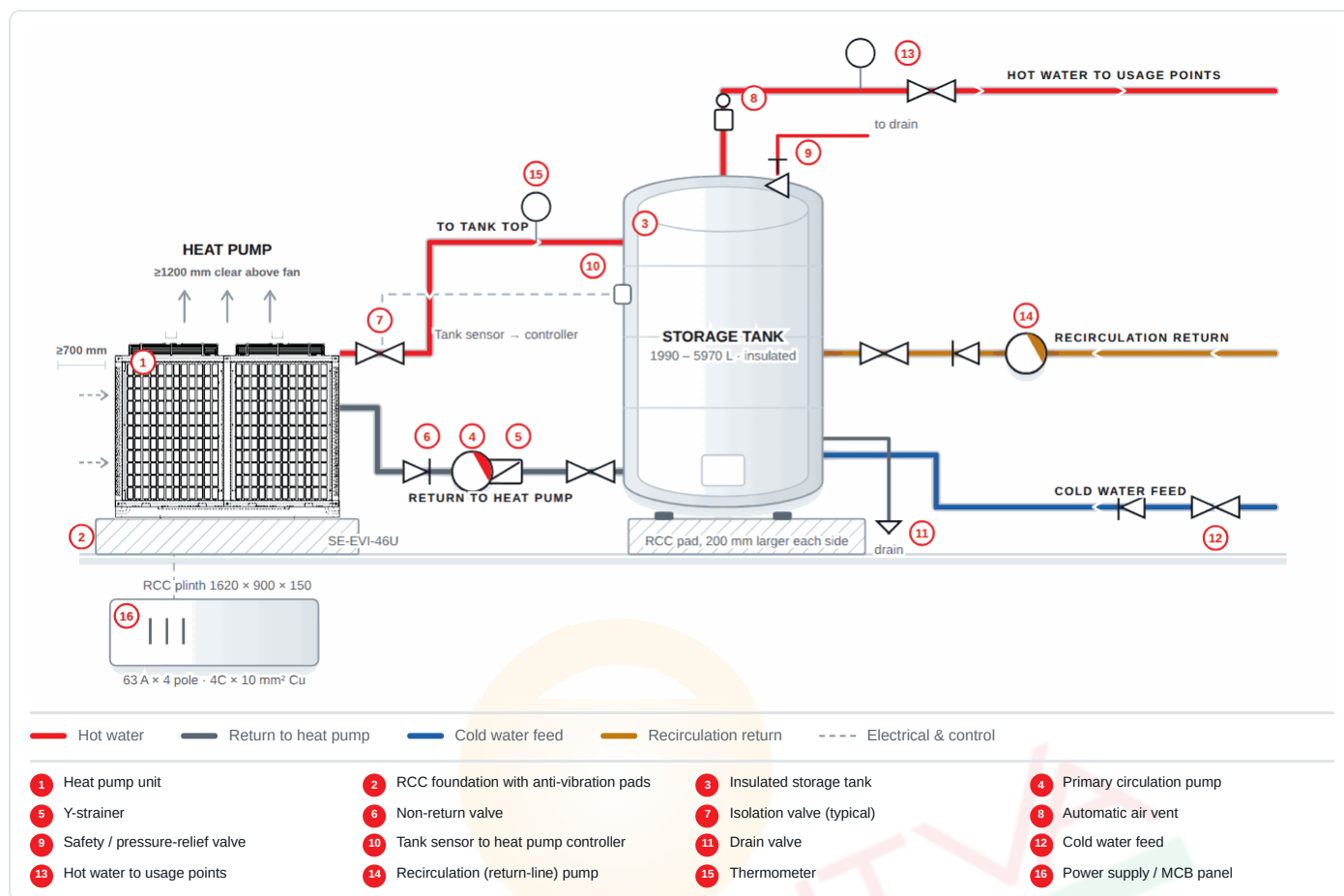
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Site installation schematic

How the unit connects to the tank, pumps and piping on site



Indicative hookup only. Static head, draw pattern and local code may call for additional components — confirm the final scheme with Sunniva before ordering.

Selection & site preparation

Recommended sizing derived from this model's rated data

SYSTEM SIZING		CIVIL & ELECTRICAL	
Storage tank volume	1990 – 5970 L	Unit footprint & dry weight	1470 × 750 mm · 275 kg
Tank sizing rule	Hot water output × 2 to 6 LPH measured at 20 °C ambient. Indicative range — stay inside it so the tank is neither undersized nor oversized.	Heat pump plinth	1620 × 900 × 150 mm RCC, M20
Primary circulation pump	8.5 m ³ /hr @ 10 – 12 m head	Plinth level	100 mm above finished floor, ± 3 mm/m
Recirculation (return) pump	0.9 – 1.2 m ³ /hr @ 6 – 8 m head	Tank pad (1990 L)	150 mm RCC, 200 mm larger each side ≈ 2288 kg filled
Primary pipe size	25 mm (R1-1/2") to 10 m run; 32 mm beyond	Clearances	700 mm air-on · 1200 mm above fan · 800 mm service side
Line insulation	25 mm closed-cell, every line above 45 °C	Electrical	63 A × 4 pole MCB · 4 core × 10 sq.mm copper cable + earthing

Installation steps

Follow in order; commission before start-up

- Cast the RCC plinth 1620 × 900 × 150 mm in M20 concrete, 100 mm above finished floor. Let it cure and check it is level within 3 mm per metre.
- Set the unit down on anti-vibration pads. Keep 700 mm clear at the finned coil faces and 1200 mm above the fan — the unit must breathe or capacity drops.
- Place the tank on its own level pad, as close to the heat pump as the site allows. Short pipes lose less heat.
- Pipe tank bottom → isolation valve → Y-strainer → primary pump → heat pump inlet, in that order. Fit the non-return valve after the pump.
- Pipe the heat pump outlet → tank top inlet. Fit an isolation valve at each end so the unit can be serviced without draining the tank.
- Fit the automatic air vent and the safety valve on the tank top. Pipe the safety valve discharge to an open drain — never cap it.
- Bring the cold water feed into the tank bottom through an isolation valve and a non-return valve.
- Fit the tank sensor into the tank pocket and run its cable back to the heat pump controller. Do not run it alongside the power cable.
- Insulate every hot line with 25 mm closed-cell insulation, pump body included.
- Power the unit from a dedicated 63 A × 4 pole MCB using 4 core × 10 sq.mm copper cable + earthing.
- Fill and vent the system fully. Confirm the flow switch stops the unit when the pump is off, then start.

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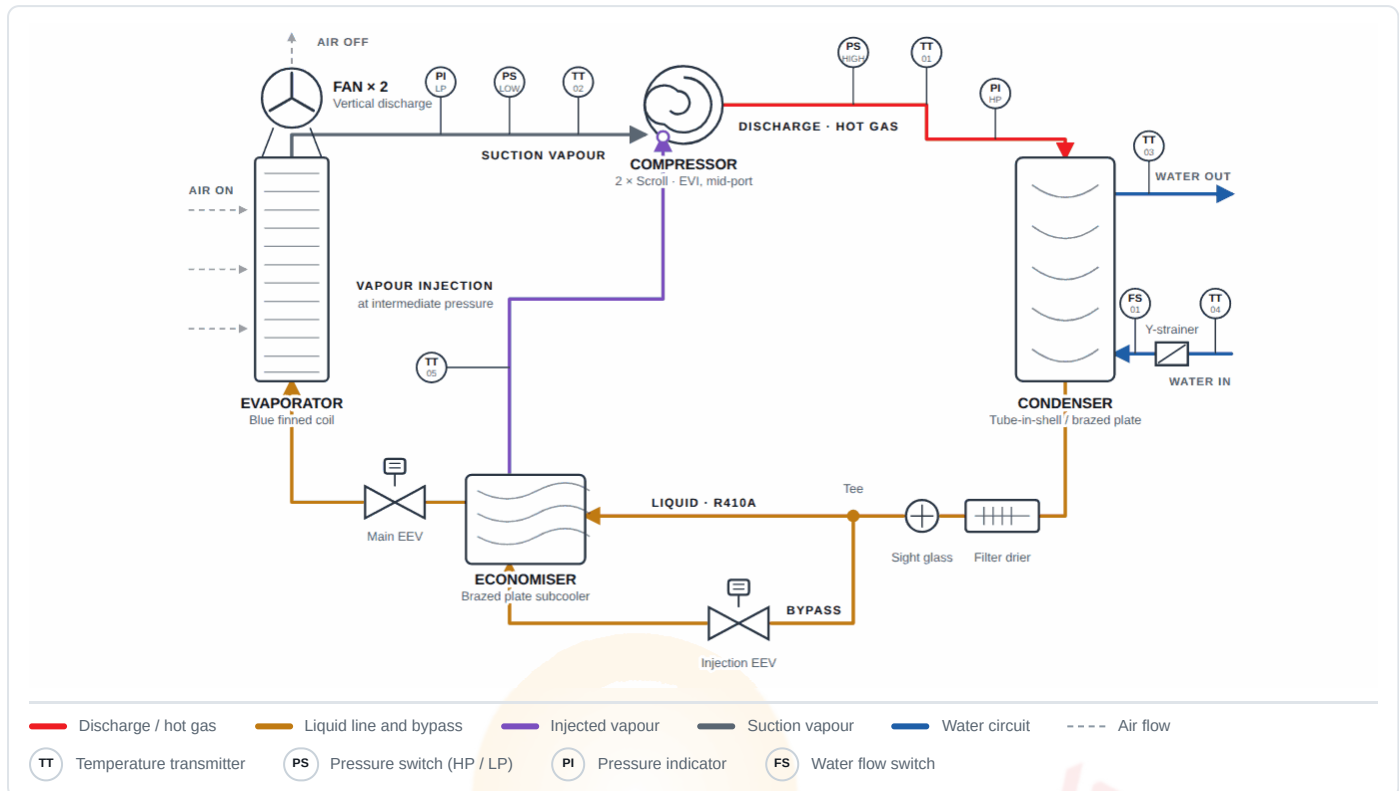
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Process & instrumentation diagram

Refrigeration circuit, instrumentation and water connections



Schematic representation of the standard circuit — not to scale. Component arrangement may vary with build option.

Instrument schedule

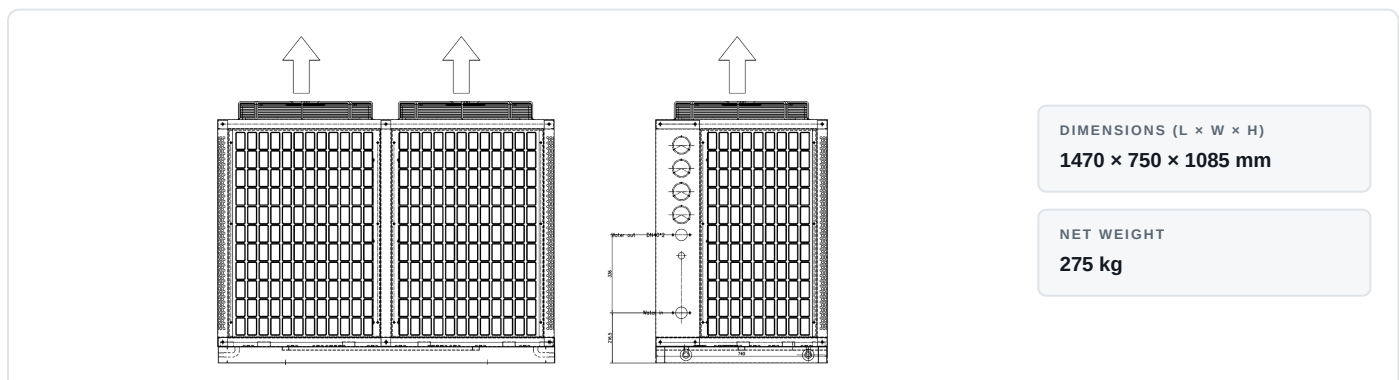
Tags as marked on the diagram above

TAG	DEVICE	FUNCTION
TT 01	Compressor discharge temperature	Discharge superheat & high-temperature cut-out
TT 02	Compressor suction temperature	Suction superheat monitoring
TT 03	Water outlet temperature	Set-point control
TT 04	Water inlet temperature	Return water sensing, ΔT calculation
TT 05	Economiser injection temperature	Superheat on the injected vapour — the controller modulates the injection valve against it
PS HIGH	High-pressure switch	Discharge over-pressure cut-out

TAG	DEVICE	FUNCTION
PS LOW	Low-pressure switch	Loss-of-charge / low-suction cut-out
PI HP	High-side pressure gauge	Discharge pressure indication
PI LP	Low-side pressure gauge	Suction pressure indication
FS 01	Water flow switch	Interlock — no-flow lockout

Cabinet reference drawing

Typical general arrangement — this model's own dimensions alongside



Reference arrangement only — Twin-compressor cabinet, vertical discharge. Dimensions printed on the drawing are indicative; the figures above and in the specification table are the ones that apply to this model.

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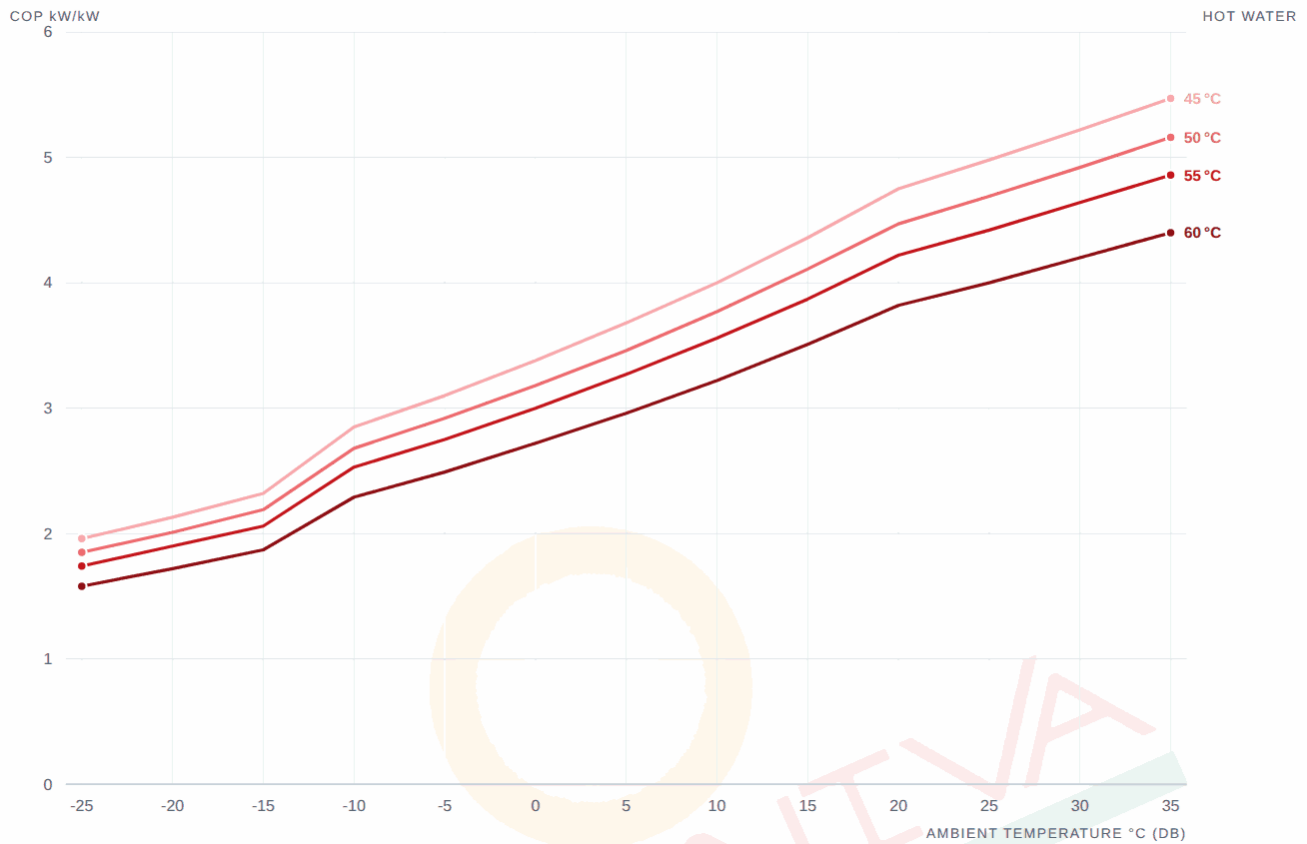
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COP characteristic

Full performance map across the operating envelope

COP · heating duty

COP against ambient temperature, one curve per hot-water outlet temperature



COP · HOT WATER : / AMBIENT °C →	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
45 °C	1.96	2.13	2.32	2.85	3.10	3.38	3.68	4.00	4.36	4.75	4.98	5.22	5.47
50 °C	1.85	2.01	2.19	2.68	2.92	3.18	3.46	3.77	4.11	4.47	4.69	4.92	5.16
55 °C	1.74	1.90	2.06	2.53	2.75	3.00	3.27	3.56	3.87	4.22	4.42	4.64	4.86
60 °C	1.58	1.72	1.87	2.29	2.49	2.72	2.96	3.22	3.51	3.82	4.00	4.20	4.40

HOW TO READ THIS

Performance map for the R410A EVI circuit, covering ambients down to -25 °C. Rated figures at the certified test conditions are on page 1.

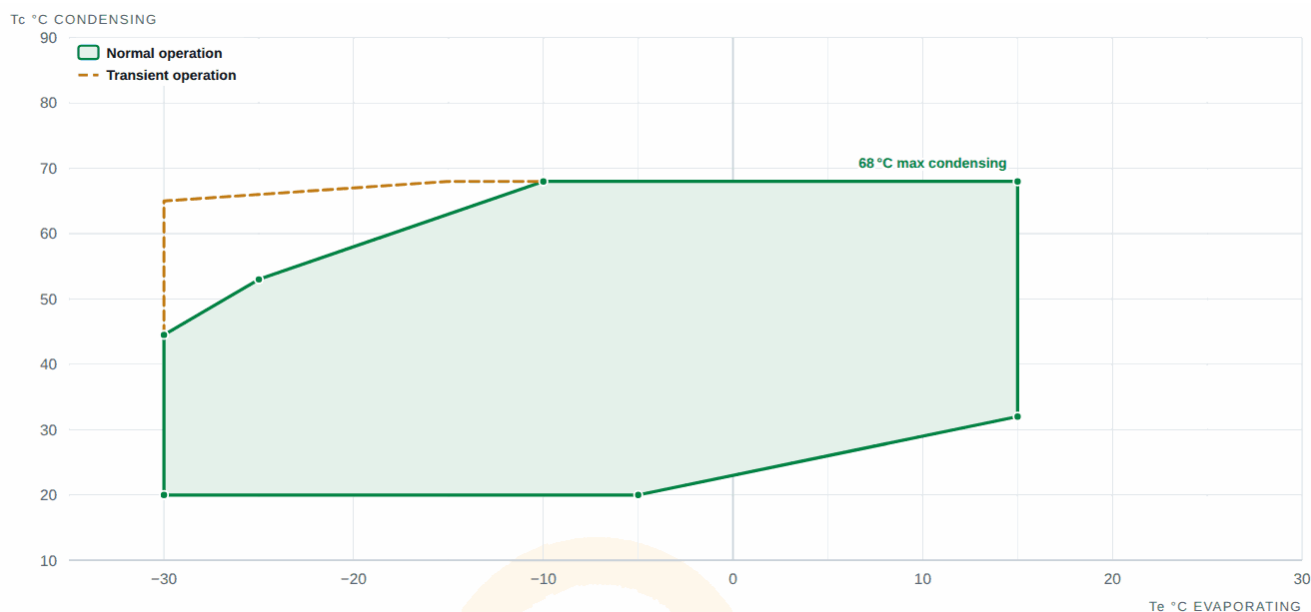
Where a figure on this map differs from the rated point on page 1, **the map governs** — it is measured across the full operating envelope, while the rated point is a single certified test condition.

Operating envelope

The compressor's permitted window, in refrigeration terms

Operating envelope · R410A EVI circuit

Condensing against evaporating temperature — the compressor's permitted operating window



ENVELOPE LIMITS

Evaporating temperature T_e	-30 °C to 15 °C
Condensing temperature T_c	20 °C to 68 °C
Peak condensing	68 °C highest hot-water temperature the circuit can reach
Transient operation	Down to -30 °C T_e permitted on start-up and defrost recovery, not continuously

READING THE ENVELOPE

T_e (evaporating) follows the source the unit draws heat from — the colder the air or source water, the lower T_e sits.

T_c (condensing) follows the water leaving the unit — asking for 80 °C hot water puts T_c near the top of the envelope.

A duty is valid only **inside the shaded area**. A cold source combined with very hot water pushes the point towards the top-left, which is exactly where the envelope closes in — that corner is the real limit on winter performance.

Representative envelope for the R410A EVI circuit, redrawn from Panasonic compressor data (Operating envelop.xlsx, sheet "R410a EVI"). Envelope limits are broadly similar across compressor makes, so treat this as a representation of the circuit's operating window. Where a duty sits close to a boundary, confirm against the compressor fitted to the unit before finalising the design.

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