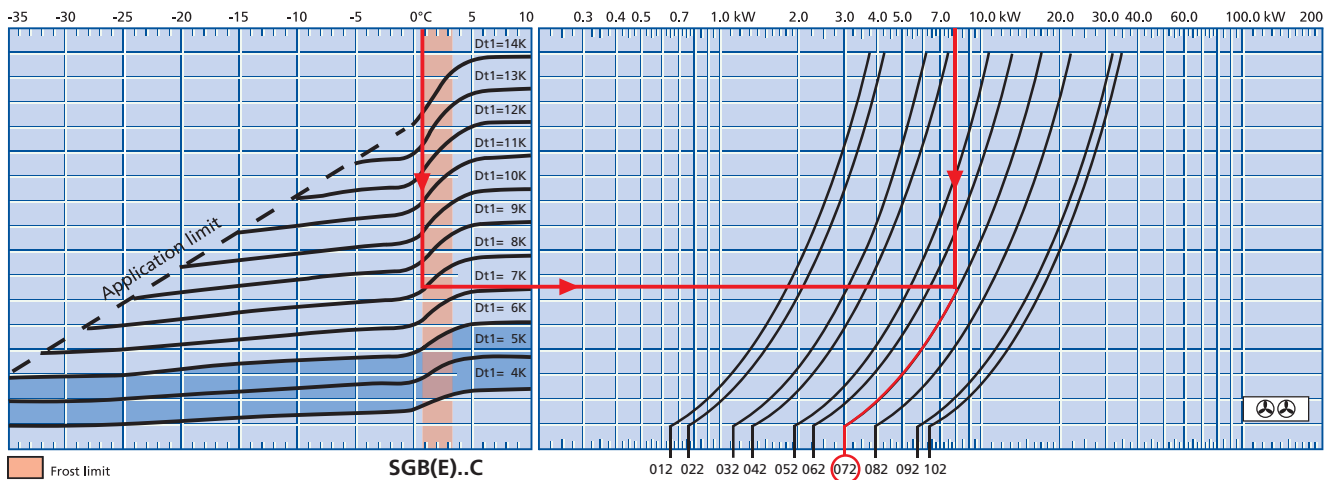



**Explanation of Q<sub>v</sub> charts (R404A)**



For practical assistance during selection, we have created Q<sub>v</sub> charts which also includes the catalogue comparison value for standard conditions 2 and 3 (incl. latent capacity). In accordance with EN 328, the performance specifications are based on the air inlet temperature t<sub>L1</sub> at the air cooler and the difference DT1 between the air inlet temperature t<sub>L1</sub> and the evaporating temperature t<sub>0</sub> at the coil outlet.

To obtain ratings close to practice values we multiplied the capacity measured for a dry surface by the Eurovent factors for latent capacity. In this way we also take the latent heat due to precipitation at the frost limit into consideration, given an air cooler surface that is ice-free or has very little frost cover.

All ratings are effective when relative humidity is between 85% and 95% and the higher humidity values correspond with low DT1 values. In our Q<sub>v</sub> charts, the change in the k-value is factored in with t<sub>L1</sub>.

 The „humid“ capacity cannot be used to calculate how much the air is cooled.

$$V_L = \frac{Q_0 \text{ dry}}{\rho \times c_p L \times DTL} \quad \text{where } DTL = t_{L1} - t_{L2}$$

Because the Q<sub>v</sub> charts cannot consider all possible operating conditions, particularly when coolants are used, we recommend using our selection software Küba Select with its HELP program. Capacity measurements were performed with R507.

- **Given:** t<sub>L1</sub> = 1 °C, DT1 = 8 K, Q<sub>0</sub> = 8 kW;  
**for reasons of operational safety at least two fans;**
- **Appropriate product line:** e.g. SGBE.C  
 (= SG commercial with fin spacing of 7 mm and electrical defrosting). Fin spacing of 7 mm or more is best for evaporating temperatures below -2 °C because the greater fin spacing achieves longer operating periods before defrosting again. During operation, this yields lower costs and better system availability.
- **Refrigerant:** R404A
- **To determine: model size**
- **Solution:** In the Q<sub>v</sub> chart follow the DT1 = 8 K curve to the intersection with vertical lines for t<sub>L1</sub> = +1 °C, then draw a horizontal line to the vertical line for Q<sub>0</sub> = 8 kW. The **air cooler model SGBE 072C** can be found underneath.

In general, the following applies: If the intersection is located between two model curves, the smaller cooler model is sufficient if a lower evaporating temperature is acceptable and the compressor can run for a longer period. However, this means higher operating costs. For this reason, Küba recommends choosing the larger air cooler in order to achieve higher evaporating temperatures which lead to lower operating costs because the compressor does not run for longer periods and the air cooler's service life is longer. A modification of DT1 to ΔDT1 = 1 K yields a change in capacity by approx 10% for DT1 = 10 K. Automatic defrosting (electric heaters, hot gas, cold gas) is recommended if the intersection DT1 / t<sub>L1</sub> is below the frost limit.

**Application example:**