MIPAL intense

TECNOLOGIA E CONFIANÇA

INTENSE

Finned Coils

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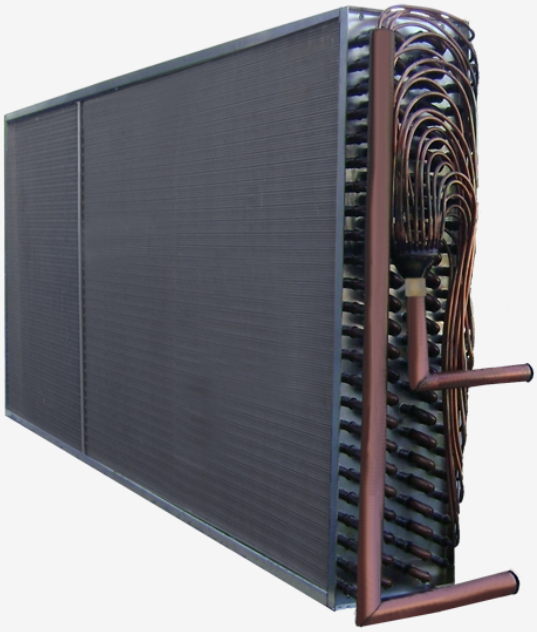


Coils cooled by halogenated refrigerants, ice water or glycol solutiom, air heating using hot water, oil cooling

Commercial Line

december/2020

Finned Coils

INTENSE
Finned Coils

Benefits

•Built in with high quality materials, ensuring long durability

•Corrugated finns, causing continuous air turbulence, ensuring greater heat exchange and high performance

•Non aligned tubes, increasing performance, by changing the air direction, avoiding "dead areas" on the fins

•Proper circuitry, minimizing internal pressure losses

•Possibility of customizable coils measures, meeting the most diverse requirements and needs

•Every piece is submited to a pneumatic test process (30Kgf/cm²), washing and final pressurization with nitrogen to ensure the absence of humidity as well as solid and liquid impurities removal at levels compatible with refrigeration systems

•Flat copper 3/8", ½" or 5/8" tubes with grooved option for 3/8" e 1/2"

•Corrugated aluminum fins

•For 3/8" tubes, the arrangement is 25,4 x 22mm and spacing 1,6 to 5,5mm

•For ½" tubes the arrangement is 31,75 x 27,5mm and the spacing 2 to 10mm

•For 5/8" tubes the arrangement is 38,1 x 37,5mm and the spacing 2,1 to 3,2mm

•For 5/8" tubes the arrangement is 50 x 48,99mm and the spacing 2 to 10mm.

•Aluminum headboard or galvanized sheet

• Copper colectors

•Bronze Niples for cold water

•When the coil is used with halogenated refrigerant in direct expansion, a liquid distributor will be installed at the inlet

Applications

•Fancoil, coils cooled by halogenated refrigerants, ice water or glycol solution

•Air heating using hot water

•Oil cooling

Selection

•To select the coil, it's necessary previous knowledge of:
- Sensitive heat (Qs)
- Total heat (Qt).

•Desired room temperature – air inlet temperature in the coil (tear).

• Fan air flow (V).

•Input temperature of the cooling element in the coil (te resf.).

•Output temperature of the cooling element in the coil (ts resf.).

Determination of the heat exchange area (S)

General formulas

QI = QII = Qs = Sensitive heat (kcal/h)

$$QI = \frac{V}{v} \times Cp \times Dt \qquad QII = U \times S \times Dtm$$

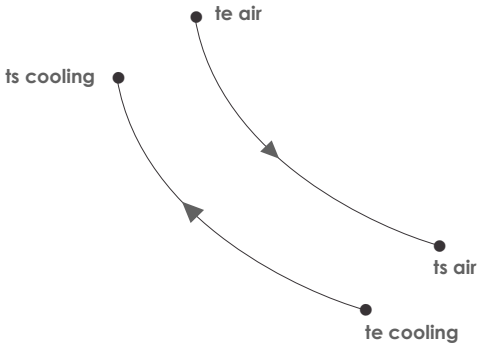
$$S = \frac{Qs}{U \times Dtm} \ (m^2)$$

V • Insufflation air flow in m³/h
v • Specific air volume = in m³/kg (temperature function)
Cp • Specific air heat = 0,24 kcal/h x kg x °C
Dt • Temperature differential between air inlet and outlet, in the coil, in °C (tear - tsar)
S • Heat exchange area in m²
U • Global heat transfer coefficient, kcal/h x m² x °C
Dtm • Differential logarithm between air and cooling element temperatures, in °C

For the calculation of Dtm

A = Input air temperature (tear) - output temperature of the cooling element (ts resf.)
B = output air temperature (ts ar) - input temperature of the cooling element (te resf.)

$$Dtm = \frac{A - B}{\ln \frac{A}{B}}$$



For the calculation of U

Summary Formula:

$$\frac{1}{U} = \frac{1}{he} + \frac{M \times r}{hi}, \text{ where}$$

he = Air side film coefficient. For face speed approximately 2,50m/s 50 kcal/h x m² x °C

hi = Film coefficient on the side of the cooling element. For ice water with speed between 0,7 e 1,3m/s - hi = 2000kcal/h x m² x °C.
For halogenated refrigerants, for evaporation 0°C - hi = 1000 kcal/h x m² x °C

M = Multiplier factor

$$= \frac{Qt}{Qs} = \frac{\text{Total Heat}}{\text{Sensitive Heat}}$$

r	Finns/in		
	8	10	12
3/8"	11,70	14,63	17,55
1/2"	13,80	17,25	20,70
5/8"	18,20	22,75	27,30

With this values, can be cauculated the radiant area - S, in m², and then determine the dimensions of the Mipal coil.

Face Area Determination - Af (finned length and height), for face speed of 2,5m/s:

$$Af = \frac{V}{2,5} \ (m^2)$$

•Determining the number of fins

$$n° \text{ of finns} = \frac{\text{Finned length (mm)}}{\text{fin spacing}}$$

•Determination of fin depth and number of rows (ROWS)

$$\text{Depth} = \frac{S}{n° \text{ finns} \times \text{height} \times 2} \ (m)$$

•For Ø ½" tubes each row corresponds to 27,5mm of depht.

•For Ø 3/8" tubes each row corresponds to 22mm of depht.

•For Ø 5/8" tubes each row corresponds to 37,5mm of depht.

Therefore, the n° of rows ≥ $\frac{\text{depth}}{27,5 \text{ or } 22 \text{ or } 37,5}$

Obs: Mipal has fins (tb 3/8" and tb 1/2") with praise (shutter) - provide up to 25% increase in the overall heat transmission coefficient.

Important precautions for coil calculations:

•Check if psychometric conditions are met, for the desired cooling.
•The speed of the water in the pipes must be 0,7 to 1,3m/s, to obtain maximum thermal transfer, without high pressure drop in the water.
•The air speed must be between 2 to 3m/s. Usually it is used 2,5m/s. Higher speeds cause water drag.

Since 1956 Mipal are writing the history of refrigeration. With a complete line of condensers, evaporators and finns for the most varied commercial and industrial applications, stands out in the market by the high quality and efficiency in our products.

That's why it's growing in large scale it's presence in other countries.

This is the result of dedication for innovation and attention to our customers. That's why the Mipal brand it's too strong, becoming a synonym of technology and reliability.

INTENSE

Mipal developed the Intense system with electronic motor fans and the concept of intense thermal exchange, improving the efficiency in finned equipments. This represents one more innovation from Mipal, aligned with world trends for maximum performance and low energy consumption.

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