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## Week's Topic: Thermal Load: the Six Components

### Thermal Load: the Six Components

A poorly sized chamber cannot be fixed with more refrigerant. It falls short in summer, cycles excessively or freezes the evaporator. The cause is usually in the load calculation. These are the six components you need to add up.

### 1. Heat Transmission through Walls, Roof and Floor

This is the heat that enters through the insulation. It depends on the surface area, thickness and thermal conductivity of the panel, and the temperature difference with the outside. Typical error: forgetting that a wall in the sun or next to a warm chamber does not experience the ambient temperature. And the floor also counts.

### 2. Product

This is usually one of the largest items. It includes:

- **Sensible heat** to lower the product to storage temperature.
- **Latent heat** of freezing, if the product is frozen.
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- **Respiration heat** in fruit and vegetables.
- **Packaging and pallets**, which also need to be cooled.

Ask the customer how much enters per day and at what temperature it arrives. Without that data, the calculation is just an assumption.

3. Air Infiltration and Renewal

Every time the door opens, warm humid air enters. It must be cooled and dehumidified. The door size, frequency of opening and whether there is a curtain or antechamber matter. In freezer chambers, that humidity ends up as frost on the evaporator.

4. Personnel

Each operator contributes sensible and latent heat. It depends on how many work inside and for how long. In a storage chamber it is small. In a cutting or preparation room it becomes significant.

5. Lighting

All the electrical power of the luminaires ends up as heat inside the chamber. With LED it drops a lot, but it is not zero. Also count the actual operating hours, not just the installed power.

6. Fans and Defrosting

The evaporator motors dissipate their power inside the enclosure. If defrosting is electric, the resistors add load and force temperature recovery afterwards. This item depends on the evaporator chosen, so the calculation is iterated: load, evaporator, corrected load.

After Adding Up: from Calculation to Selection

- Apply a reasonable safety margin, but without inflating each item separately.
- Distribute the load over the actual operating hours of the equipment, not over the 24 hours of the day.
- Check the evaporator capacity under the manufacturer's test conditions (EN 328) and correct it to your working point.

- Verify the compressor with its capacity polynomials (AHRI 540), at your evaporation and condensation temperature.

If it is a retrofit, recalculate the capacity with the new gas. According to Systcold's theoretical calculation, switching from R-402A to R-448A in the same compressor means about −8 % capacity in medium temperature and between −13 and −14 % in low temperature. A chamber that was running tight may no longer comply. And no HFC or HFO is "drop-in" without reviewing valve, oil and superheat.

Do the thermal load calculation with the **Systcold JDC thermal load tool**. Then, select unit, evaporator and valve with manufacturer data in the same environment.

Industry Developments

- **Danfoss begins shipping training benches**. The first refrigeration training benches from the Danfoss Next Generation Installers initiative shipped from the Nordborg headquarters, Denmark, bound for technical schools around the world. This program trains technicians in modern refrigeration systems. **coolingpost.com · 2026-11-13**
- **Wiesbaden supermarket is all CO2**. A recently reopened supermarket in Wiesbaden, Germany, claims to be the first to use CO2 refrigerant throughout its commercial refrigeration, heating and air conditioning. The project demonstrates the viability of R744 in comprehensive commercial applications. **coolingpost.com · 2026-10-17**

Systcold JDC technical summary from 14/11/2026 to 15/11/2026. All figures come from manufacturer catalogues loaded in the database.

The Database Today

- 15,594 condensing unit from 20 manufacturers
- 6,821 compressor from 16 manufacturers
- 3,026 evaporators from 7 manufacturers
- 2,390 thermostatic expansion valves from 4 manufacturers
- 937 evaporator from 3 manufacturers

- 820 electronic expansion valves from 4 manufacturers

New or Updated Technical Datasheets

- **FRASCOLD D SERIES 2 CILINDROS**
- **FRASCOLD Q V SERIES 4 6 CIL**
- **GEA BOCK HAX FX HGX SERIES SEMI**
- **R 402A**
- **R 402B**

Gas of the Month: R-32

HFC (Difluoromethane) · ASHRAE A2L · GWP 675 · ODP 0.

Direct replacements: —.

With adjustment: R-410A (similar pressures).

Regulations: Approved; low GWP; slight flammability A2L.

Complete R-32 datasheet

Featured Compressor: MANEUROP (Danfoss) MPT / MPTS Series (Tandem)

32 models in the database. Manufacturer oil: **POE ISO 68** (100 % of models). Gases: R-507A, R-404A. Power: 3/8–2/3 HP.

Complete datasheet

Complete and free technical catalogue: **systcoldjdc.com/gases** · Datasheets: **systcoldjdc.com/gases/fichas**

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