

Small and medium abattoirs
– refrigeration plant



Small and medium abattoirs typically use R22, R409a, R408a, R404a or/and R134a refrigerants in their commercial refrigeration equipment.

Condensing Units and Air Cooled Condensers

The condenser is the element that rejects the heat and therefore needs a good supply of cooling air.

Do this



Position the condensing unit or air cooled condenser clear of the ground and on the roof.

- Locate condenser on the roof.
- Locate condensers away from other heat sources
- Locate condensers well clear of the ground to prevent entry of dirt.
- Install variable speed drives (VSDs) on fan motors.

Avoid this



Avoid enclosing and placing on the ground.

- Locate condensers or condensing units within enclosed spaces, such as ceiling spaces or subterranean garages. Exceptions are OK if these are very well ventilated to the outside, or otherwise conditioned.
- Locate condensers where they can be fouled, e.g. near kitchen exhaust outlets
- Locate condensers against walls.
- Locate condensers on the leeward side of buildings in windy areas, as this will cause recirculation of the air through the condenser.

Solenoid Valves

Solenoid valves are electrically-controlled valves that control the flow of refrigerant, used for temperature control and many other purposes.

Do this



Install solenoid valve close the expansion valve

Avoid this



Avoid placing solenoid valve on the unit.

Insulation of the Suction Line

Insulation increases system efficiency and reduces wear of the compressor.

Do this



Install solenoid valve close the expansion valve

- Insulate the suction line. An uninsulated suction line creates a higher heat load in the system.
- Clad outdoors suction lines.

Avoid this



Avoid leaving the suction line uninsulated.

- Use damaged insulation.
- Leave outside Armaflex type insulation unclad.

Compressors

Do this



Install fully hermetic unit

- Replace open drive compressors by fully hermetic compressors.
- Install variable speed drives (VSDs) on compressor motors.

Avoid this



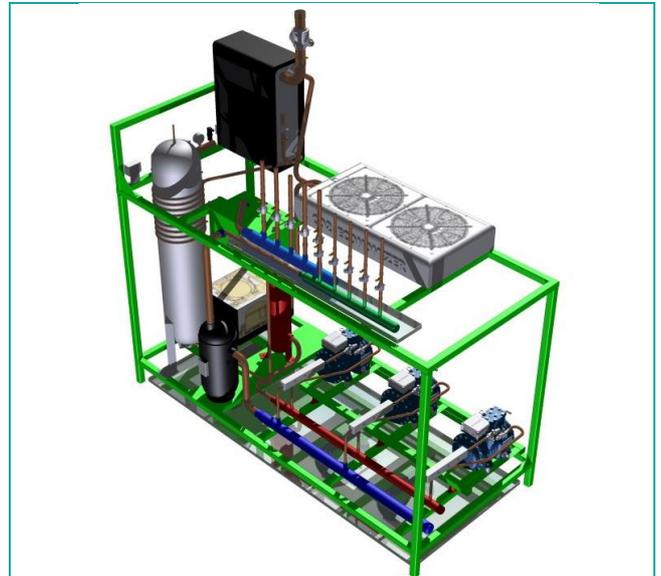
Avoid open drive unit

Overall System

Multiple single units consume more energy and have higher maintenance costs than a larger centralised system.

Well-designed CO₂ and glycol systems offer a reduction of HCFC and HFC refrigerant the system, sometimes even eliminating it completely. They also reduce maintenance costs and leakage risk, and often deliver major energy savings.

Do this



Install CO₂ system

- Replace multiple single units with a centralised CO₂ or glycol system.
- Replace system with an ammonia system.
- Recover heat from centralised system.

Avoid this



Avoid multiple single units

Other Tips

Heat recovery

Small and medium abattoirs often need 4000 L per day of hot water. A heat recovery system can be used to supply the heating energy, but it is only feasible with a centralised system.

Heat Pump

If the recovered heat is not sufficient for the required conditions, it can be supplemented by a water/water heat pump.

Refrigerants

Many commercial refrigeration units are still using refrigerants that will be phased out in 2015 (R22, R123, R408A, R409A, MP39, MP66, HP80 and HP81). These systems should be replaced with a system using R134a, R407F, CO₂ or ammonia.

Reducing fan energy costs

Adding a variable speed drive (VSD) on condenser or evaporator fans can make a big difference to cost: reducing fan speed by 50% typically reduces energy demand by 80%.

Case 1: Fan of 100 Watt running at full speed all the time

% Speed	% Savings	Running Time	Consumption/Day
100%	0%	24hrs/Day	2.4Wh/Day
Annual Consumption			876kkWh/Year
Annual running cost (Based on average power costs of 0.15\$/kWh)			131.4\$/Year

Case 2: Fan of 100 Watt running at 50% of its maximal speed 8h/Day

% Speed	% Savings	Running Time	Consumption/Day
100%	0%	16hrs/Day	1.6kWh/Day
50%	85%	8hrs/Day	0.12kWh/Day
Annual Consumption			627.8kWh/Year
Annual running cost (Based on average power costs of 0.15\$/kWh)			94.17\$/Year