

Pre-evacuation Best Practices & Pump Quantification

Best Practices

The importance of adequate pre-evacuation in refrigeration systems cannot be stressed enough. We have, in previous articles, discussed in detail pumpdown time and sizing vacuum pumps (see our [VTech Technical Resources](#) section for these articles). Before we take a look at determining the number of pumps that are required to meet your productivity levels, it is helpful to take a look at a “Best Practice” list for evacuation, which primarily concerns components usually supplied to refrigeration manufacturers by outside vendors. None of this may be new to you but it can’t hurt to review:

- Compressor should be dried to a moisture content below 80 ppm and is pre-charged with nitrogen to keep it protected from outside moisture.
- The lubricating oil for the compressor is purified and degassed to reduce water content to 25 ppm.
- The filter drier is new, pre-treated and sealed.
- The evaporator, condenser and expansion capillary tube must be clean and dry (normally heated in an oven with an internal circulation of dry, hot air prior to being sealed by the manufacturer).
- The refrigerant is supplied in cylinders by quality manufacturers with low admissible moisture content (e.g. 0.001 ppm for R134a compared to 10ppm for R12).
- Components should be unsealed only just prior to brazing, exposed to the air no more than 10 minutes.

Vacuum pump Quantification: How many do you need?

The chart below shows an estimate of the number of pumps needed to maintain certain productivity levels. It is assumed that each system is evacuated individually with a single pump (as opposed to a manifold type system). Longer times are recommended when the quality condition of the components, as given above, is in doubt and for lower temperature applications such as deep freezers. It is also advisable to add 1 or 2 pumps as backups on the carousel due to routine maintenance procedures.

Productivity in units/hour	Qty. of pumps based on evacuation time		
	10'	15'	20'
200	33	50	~66
150	25	~37	50
100	~16	25	~33
80	~13	20	~26
60	10	15	20
50	~8	~12	~16
40	~6	10	~13
30	5	~7	10
20	~3	5	~6