Copeland Scroll™
ZF*KVE compressors

High efficiency scrolls for low temperature applications

Vapor injection is a versatile method of improving system capacity and efficiency in many commercial refrigeration applications. Traditionally, the only way to enjoy the added benefits of this type of mechanical subcooling was with a large screw compressor or two semi-hermetic reciprocating compressors. Now, the Copeland Scroll™ compressor enables significant performance gains with a single compressor. Injecting vapor in the middle of the compression process boosts capacities and efficiencies significantly.

Scroll compressors in refrigeration

Building on the success of scroll compressors in the refrigeration market world-wide, Emerson includes the ZF*KVE family of high efficiency refrigeration scrolls with vapor injection dedicated to low temperature applications.

The vapor injection scroll range includes four models from 4 to 8 HP and is designed to offer high efficiency levels at low evaporating temperatures with R404A, R507, R448A, R449A, and R407A/F. It is the ideal choice for condensing units, parallel racks and distributed refrigeration systems.

Copeland Scroll with vapor injection

The ZF*KVE scroll compressor cycle is similar to a two-stage cycle with interstage cooling but with one single compressor. The high stage consists of extracting a portion of the condenser liquid and expanding it through an expansion valve into a heat exchanger acting as a subcooler. The superheated vapor is then injected into an intermediate port in the scroll compressor.

The additional subcooling increases evaporator capacity.

EMERSON™

The Solution

Retailers are continuously trying to cut costs and improve efficiency of their refrigeration systems. The ZF*KVE compressor from Emerson is the ideal solution for low temperature applications.

The ZF*KVE scroll compressor has been specifically designed for vapor injection in low temperature applications. The optimized design of ZF*KVE together with subcooling provides a 50% increase in capacity and 20% increase in efficiency on average at the low temperature rating condition. The bigger the pressure ratio between condensing and evaporating pressures, the more significant the performance gains with ZF*KVE compared to any other compressor technology.

Copeland Scroll™ ZF*KVE Model Summary

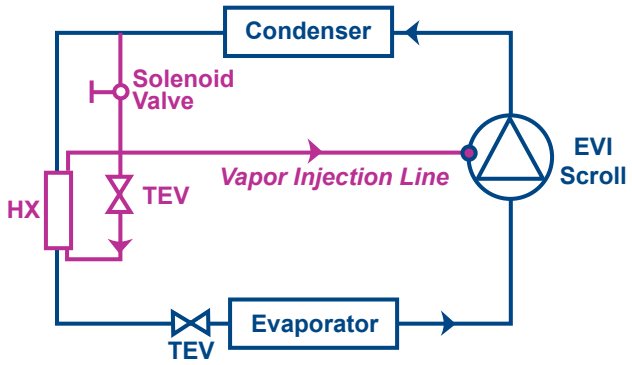
Model	Displacement (CFH)	Cap. @ -25/105 (Btu/hr)	EER (Btu/w-hr)	Lg. (in)	Wd. (in)	Ht. (in)	Wt. (lbs)
ZF13KVE*	498	20,200	5.8	10.12	9.67	17.23	85
ZF18KVE*	727	29,200	5.9	10.12	9.67	17.23	87
ZF25KVE*	911	36,600	6.2	12.12	9.67	17.23	87
ZF28KVE	1071	40,200	5.6	10.37	10.15	18.61	95

Capacity with R404A at -25F/105F/65F Return Gas, Maximum Subcooling
* Digital modulating version also available

The advantages of scroll technology combined with the benefits of vapor injection:

- **Lower initial cost:** increased cooling capacity leads to use of smaller or fewer compressors.
- **Lower operating costs:** efficiency gains enable ZF*KVE to outperform reciprocating compressors and reduce energy consumption significantly.
- **Environmental safeguards:** improved efficiency allows for energy savings and reduced CO_2 emissions.
- **Compactness:** weight and dimensions for refrigeration equipment is reduced with increased capacity per compressor.
- **System stability:** the enhanced vapor injection effect is proportional to the pressure ratio, therefore the delivered capacity consistantly matches the seasonal load associated with both summer and winter.

Vapor injection circuit for low temperature applications



To learn more about Emerson's refrigeration solutions for system manufacturers refer to AE4-1327 or Climate.Emerson.com