Vilter 450 XL® Compressor
For Industrial Refrigeration
The versatile VMC 450XL is now even better!

While retaining all of the features that are exclusive to Vilter compressors, we’ve made several design improvements:

- Piston
- Connecting road and bearing insert
- Crankshaft
- Safety head
- Capacity reduction system

Even though we’ve made these specific changes, we’ve retained all of the exclusive Vilter features, including provisions for fast and easy servicing with components that are easy to access.

The 450XL can operate with ammonia, halocarbon and even some hydrocarbon refrigerants. It works in extreme applications with up to a 17.2 bar pressure differential. It can be belt-driven up to 224 kW or direct driven all the way up to 285 kW. And it can run at high compression ratios all the way up to 12:1 with certain halocarbon refrigerants.
Even with all these built-in features, you'll still find the 450XL to be extremely cost-efficient. This compressor has a whopping cylinder displacement of 84.5 m³/h while running at 1200 RPM. And the high isentropic efficiency of the 450XL means its COP is second to none when compared to other compression systems.

The 450XL can be installed almost anywhere, even on an upper floor if necessary, since vibration is kept to a minimum. Noise level is low too, due to the use of quickacting, precise ring plate suction and discharge valves.

Far-Reaching Applications
The 450XL is so versatile it can handle almost any refrigeration system conditions. Up to 24.1 bar maximum discharge, and up to 10.3 bar maximum suction with a maximum 17.2 bar pressure differential. At different compression ratios, too, from 8:1 for ammonia to 14:1 for R404A. In V-belt configurations all the way up to 224 kW, or direct drive setups up to 285 kW. And it’s usable for both 50Hz and 60Hz applications up to 1200 RPM. The graph (Figure 2) on the next page depicts the broad range of applications that the 450XL covers.

Compression and Oil Rings
The 450XL piston ring set consists of three compression rings and a single, special oil scraper ring for keeping oil consumption to an absolute minimum.

Heavy-Duty Crankshaft*
An over-sized crankshaft pin diameter provides years of rugged, dependable duty, while the larger bearing surface allows for higher pressure differential capabilities.

Connecting Rod Bearings*
Vilter’s unique oil circuit drilling arrangement ensures proper hydrodynamic lubrication of insert bearings throughout the entire compression process. Rod bearings are specially designed to supply lubrication to the piston pin bushing at all times.

Double Bellows Shaft Seal
The 450XL shaft seal, designed to specific Vilter specifications, is manufactured from materials strictly used for industrial refrigeration applications. Seal unit assembly consists of two opposed seals – one sealing from the atmosphere and the other from the crankcase. Mating seal surfaces are lubricated and cooled by circulated oil.

Single Casting Frame
The single casting frame incorporates suction and discharge manifolds plus bearing supports. It’s cast to exacting tolerances from a high grade of cast iron to withstand extreme changes in heat and pressure. The castings are notably free from porosity and internal strains, and display excellent wearing qualities.

* Patented Design
Nominal High-Stage Capacities

With its 114 mm bore and stroke, the 450XL provides up to 30% more capacity than similar size compressor units, all while maintaining a favorable COP ratio.

Nominal high-stage ratings for the 450XL are shown in Figure 1 below.

Complete detailed ratings for all 450XL high-stage models, plus ratings for 450XL booster compressors, special high suction pressure compressors, and even integral two-stage compressors, are available for all major refrigerants either from the Vilter Sales Offices.

Figure 1 | High Stage capacities 450XL ratings

These ratings are established under the following conditions:
- 1200 RPM
- Saturated suction
- No subcooling
- No belt losses
- All ratings are based on 60°C condensing temperature
- Ratings are based on a 4-cylinder 450XL (454XL).

For cooling capacity and approximate kW figures of other 450XL models, use a direct proportion to the number of cylinders of the 454XL. For example, use a 3.0 factor for determining the 12-cylinder 450XL cooling capacity and approximate kW figures.
Time-Honored Features
Vilter’s attention to detail shows wherever you look. Over a century of experience in refrigeration compressor design goes into each and every part that comprises the 450XL.

We have designed our component parts to work together, not just fit together. That’s why Vilter guarantees that all Genuine Vilter Parts will match your Vilter compressor dimensionally, metallurgically and thermally for optimum compressor performance.

With Genuine Vilter Parts, you can be assured of getting the engineering design and special construction features that only Vilter can offer. Consider some of the special manufacturing steps that Vilter parts go through:

- Select surfaces are shot-peened for added strength
- Mating faces are lapped for greater compressor efficiency
- Many parts are ultrasonically inspected for maximum reliability
- The steels used are of special alloys for durable performance
- Exacting tolerances are measured in light bands rather than in hundredths of millimetres

The Vilter 450XL Full Two-Year Warranty
The 450XL compressor is fully warranted against defects of materials and workmanship under normal use and service, for a period of two years from date of shipment regardless of startup date. For example, if startup occurs one month from shipping date, the customer will have a full twenty-three (23) months of warranty coverage after startup.

Genuine Vilter Parts
When you need parts for your 450XL compressor – whether for repair work or scheduled maintenance – make sure you specify Genuine Vilter Parts.

Look for the Genuine Vilter Part mark that is either etched or stamped directly on all major Vilter parts. It’s your assurance of Vilter warranty protection. In some cases, where a replacement part does not lend itself to stamping or etching, a blue tag will identify the part as a Genuine Vilter Part. Vilter replacement parts (except those too big to box) are shipped in boxes that have the Genuine Vilter Part mark right on the box itself.

Don’t be misled by look-alike, no-name imitations of Vilter compressor parts that carry vague warranties. Cheap parts can become an expensive mistake. Make sure you insist on using only Genuine Vilter Parts, and that you contact an Authorized Vilter Distributor (or Vilter direct) for all your 450XL parts requirements.

Piston, Pin and Ring Assembly
- A shrink-fit wrist pin is used to increase bearing load capacity.
- Hardened steel wrist pins are ground and polished to size.
- Three cast iron compression rings and one oil ring provide a positive seal while wiping oil back to the crankcase.

Connecting Rod, Bearing and Bushing
- Replaceable insert bearing improves lubrication and load carrying capacity.
- Forged connecting rods back the precision-made, steel-backed Rabbitt insert bearing.
- Grooved wrist pin bushings are fed with pressurized lubricating oil.

Ductile Iron Crankshaft
- Designed with a bigger crankpin diameter for greater load bearing and bearing surface.
- All crankshafts are statically and dynamically balanced for reduced vibration.
- Precision drilled crankshaft ensures proper lubrication through the compression cycle.
- The 6, 8, 12, and 16-cylinder crankshafts are shot-peened for greater strength.

Capacity Reduction System
- A piston operated unloading mechanism lifts the suction valve plate to unload the cylinders for reduced capacity or unloaded starts.
- Simplified unloading piston allows easy removal for seal servicing.
General Specifications
The complete line of 450XL compressors is comprised of six models ranging from a nominal 88 kW cooling capacity 2-cylinder machine all the way to the high end of the scale – a nominal 704 kW cooling capacity 16-cylinder model. In-between are the 4, 6, 8 and 12-cylinder mid-size units. All 450XL compressors run at a maximum of 1200 RPM, and all are provided with built-in capacity reduction steps for economical operation at reduced loads. V-belt and direct-connected motor operation are also available throughout the entire range of 450XL models.

We have tried to make every centimetre count in designing the 450XL to fit into even the tightest space requirements. The 450XL is a machine that provides displacement of 84.5 m³/h per cylinder, giving you maximum capacity in a minimum amount of space. There’s sure to be a 450XL model that’s a perfect match to your refrigeration application.

Engineering Specifications
The compressor shall have double shaft seal, double tapered, roller main shaft bearings.

Tri-Micro® oil filter and oil strainer that removes 95% of contaminants as small as 3 microns in size; dynamically and statically balanced heavy duty crankshaft of ductile iron, also shot-peened on 6, 8, 12 and 16-cylinder models; spring safety heads; die-forged, steel connecting rods with replaceable bearing halves; aluminum type heat treated pistons with three compression rings and one oil ring; piston operated suction valve lifters to unload the compressor for starting and to provide capacity control. The piston and connecting rods shall be assembled with a shrink-fit wrist pin for higher load carrying capabilities and superior wearing qualities.

The compressor shall come complete with structural steel base and be equipped with the additional following standard equipments: crankcase oil thermometer and heater; oil filter pressure gauge with manual 3-way valve; oil failure switch; high and low pressure cutout; capacity control switches and unloader solenoid valves based on the number of steps of capacity reduction; water or refrigerant cooled oil cooler; suction, discharge, and oil pressure gauges complete with Stedy-Mounts® and shut-off valves; (water or refrigerant) cooled cylinder covers following your need.

The parameters for the motors selection shall be:
- Required power (kW)
- Frequency (Hz) and Rotational speed (RPM)
- Voltage (Volt) and phasing
- Direct coupling or V-belt drive

The compressor minimal cooling capacity (kW) shall be defined for given:
- Suction temperature (°C) or pressure (barg)
- Condensing temperature (°C) or pressure (barg)

Compressors are to be manufactured by Vilter Manufacturing Corporation, Cudahy, Wisconsin, or equal as approved.
### General Dimensions

The dimensions shown above are approximate, and should not be used for construction. Vilter issues certified prints for construction purposes. These dimensions are provided in millimeters. Space needed to remove flywheel 178mm. Space needed to remove crankshaft, from wall to centerline of compressor 1067mm for 2-8 cylinder models, and 2134mm for 12-16 cylinder models.

### 2 & 4 Cylinder Units
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<th>C</th>
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<th>Cyl.</th>
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<th>Cyl.</th>
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### 12 & 16 Cylinder Units
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### V-Belt Drive Ammonia

### Direct Drive Ammonia

### V-Belt Drive Halocarbon

### Direct Drive Halocarbon

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General Dimensions – The dimensions shown above are approximate, and should not be used for construction. Vilter issues certified prints for construction purposes. These dimensions are provided in millimeters. Space needed to remove flywheel 178mm. Space needed to remove crankshaft, from wall to centerline of compressor 1067mm for 2-8 cylinder models, and 2134mm for 12-16 cylinder models.
### General Dimensions

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<tr>
<th></th>
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<td>8</td>
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<td>Maximum RPM</td>
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<tr>
<td>Bore &amp; Stroke (mm)</td>
<td>114 x 114</td>
<td>114 x 114</td>
<td>114 x 114</td>
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<tr>
<td>CFM @ Maximum RPM (m³/h)</td>
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<td>336</td>
<td>507</td>
<td>676</td>
<td>1014</td>
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<td>Refrigeration Capacity at -12°C/+35°C, R-717 (kW)</td>
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<td>172</td>
<td>257</td>
<td>341</td>
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<td>686</td>
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<td>Suction Connection (inch)</td>
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<td>Discharge Connection (inch)</td>
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<td>Oil Charge (l)</td>
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<td>27</td>
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<td>Option 1 Steps of Unloading (%)</td>
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<td>25/50/75/100</td>
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<td>Maximum Discharge Temperature (°C)</td>
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<td>Crankcase Oil Temperature Range (°C)</td>
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Vilter reserves the right to make changes in design and specifications without notice.

For more details, see www.emersonclimate.eu