

GENERAL DESCRIPTION

Blackmer compressors are quite specialized among the many types of compressors offered in the market place. They are a positive displacement, vertical reciprocating design and are available in single or two-stage models. All models have two cylinders and some are available with either air-cooling or water-cooling. Most models have single-acting cylinders, although the largest have double-acting cylinders. Oil-free ductile iron cylinders with PTFE piston rings are standard. Blackmer compressors are not limited to atmospheric pressure - they can handle both vacuum and pressurized suction applications.

In general, Blackmer compressors may be used on those applications with pressures in the range of 3 to 765 psia (0.2 to 52.7 bar) and 2 to 50 BHP (1.5 to 37 KW). Liquefied gas transfer compressors are available for transfer rates of approximately 40 to 675 GPM (9 to 153 m³/hr).

Positive Displacement:

A broad class of compressors that compress gas by physically capturing a fixed volume, compressing that volume, then pushing it into the discharge line. The other major class of compressors are referred to as 'dynamic'. Centrifugal compressors are 'dynamic'.

Reciprocating:

A piston type positive displacement compressor. Other positive displacement compressor types are screw, sliding vane, wobble plate, diaphragm or lobe.

Vertical:

The cylinders are placed in vertical orientation, resulting in a machine requiring a minimum amount of floor space. Horizontal, 'V' or 'W' configurations are also on the market.

Single-Stage, Two-Stage:

A single-stage compressor draws gas from the suction line into the cylinder(s), compresses it and discharge it into the discharge line. Only one stage of compression is involved.

A two-stage compressor draws gas from the suction line into the first stage cylinder, compresses it and discharges the gas. At this point (called the interstage), the gas pressure is higher than suction pressure but lower than discharge pressure. The gas is then drawn into the second stage cylinder, compressed further and pushed into the discharge line. The gas is thus

compressed twice, raising it to a higher pressure than can be done with a single-stage compressor.

Two Cylinder:

On single-stage models each cylinder is identical and they operate in parallel. On two-stage models, the first-stage cylinder is larger than the second-stage cylinder and they operate in series.

Air-Cooled, Water-Cooled:

The act of compressing a gas causes its temperature to increase. Cylinder cooling to dissipate some of the heat will increase piston ring and valve life. Air-Cooled models have fins to increase the available cooling surface area and offer the greatest simplicity. Water-Cooled models have water jackets on both the head and cylinders to provide much greater heat removal ability at the cost of greater complexity due to the addition of the coolant handling system.

Single-Acting, Double-Acting:

Single-Acting cylinders have valves on only one side of the piston (the upper side on Blackmer compressors). Only the upward stroke of the piston results in a compression cycle.

Double-Acting cylinders have valves on both sides of the piston enabling the piston to provide a compression cycle on both the upward stroke and downward stroke. In general, a double-acting cylinder design will provide longer life since the compression load is more evenly distributed throughout the crankshaft's rotation.

Oil-Free:

Blackmer compressors do not require lubrication of the cylinder walls. In fact considerable effort is made to prevent crankcase oil from reaching the cylinders. This allows the compressor to handle a wide variety of gases without contamination problems. The discharge gas stream is essentially as clean as that entering the compressor.

Ductile Iron:

All Blackmer compressors are constructed of Ductile Iron. Compared to cast iron, ductile offers superior thermal shock resistance, vastly increased ductility (resistance to cracking), and greater strength.