CP Valve

Durable, efficient valves for small pocket, high speed compressors

HOERBIGER

However you define valve reliability for small pocket, high-speed gas compressors...

To keep investment cost down, gas field and pipeline operators press for increased compressor speed. However, if increased compressor speed is not matched with appropriate valve technology the end user faces reduced compressor efficiency and reliability. As compressor speed increases, standard plate valve technologies reach their physical limits. With recent advancements in material technology and manufacturing processes, HOERBIGER announces a new valve concept that allows equipment manufacturers to reliably extend compressor operating speeds up to 2800 rpm.

Valve failures for this class of valve tend to be caused by:

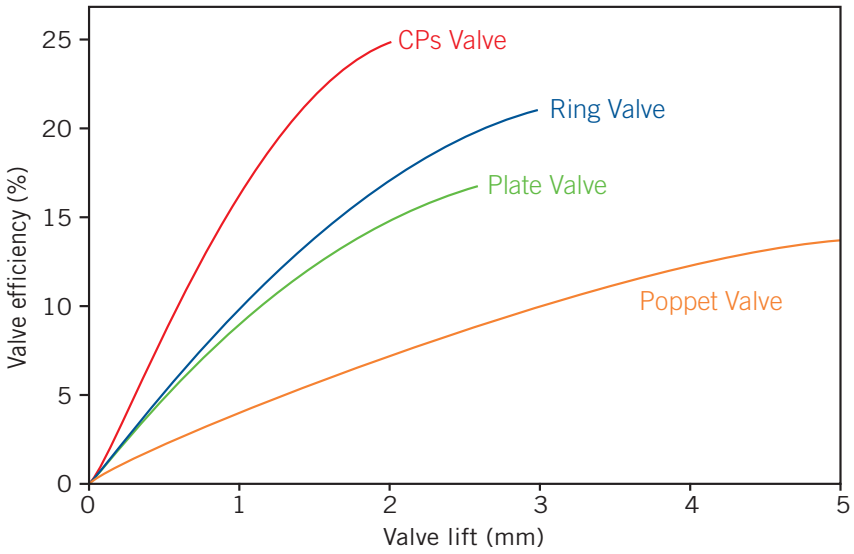
- spring failures
- oil sticktion from higher lubrication rates
- changes in seat land geometry (common with poor seat repair)
- entrained liquids

To increase the reliability for this class of valve, alternative designs should

- offer an alternative spring design
- reduce the effect of sticktion
- increase port size to allow liquids to pass through more easily

Typical valves used in high speed compressors are narrowly spaced plate valves.

Few ring valves are used in small, high-speed natural gas applications. And yet, ring valves are 20% more efficient than plate valves. The reliability challenge with ring valves is synchronizing the ring motion. The CP valve is a hybrid, offering the minimized flow deflections of a ring valve but with the sealing stability of a plate valve.

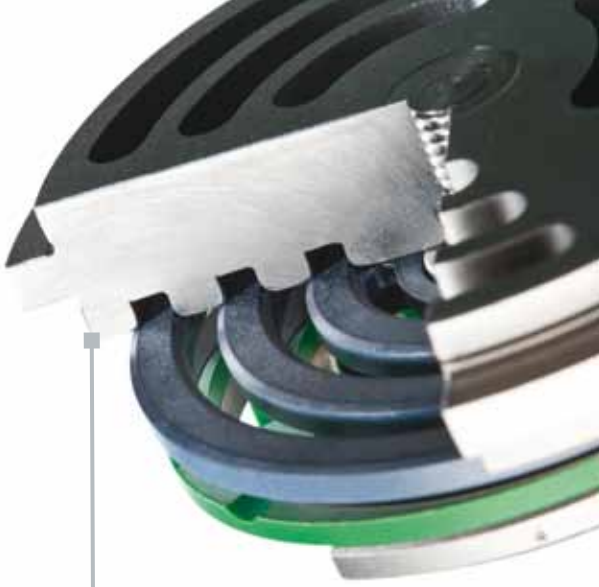


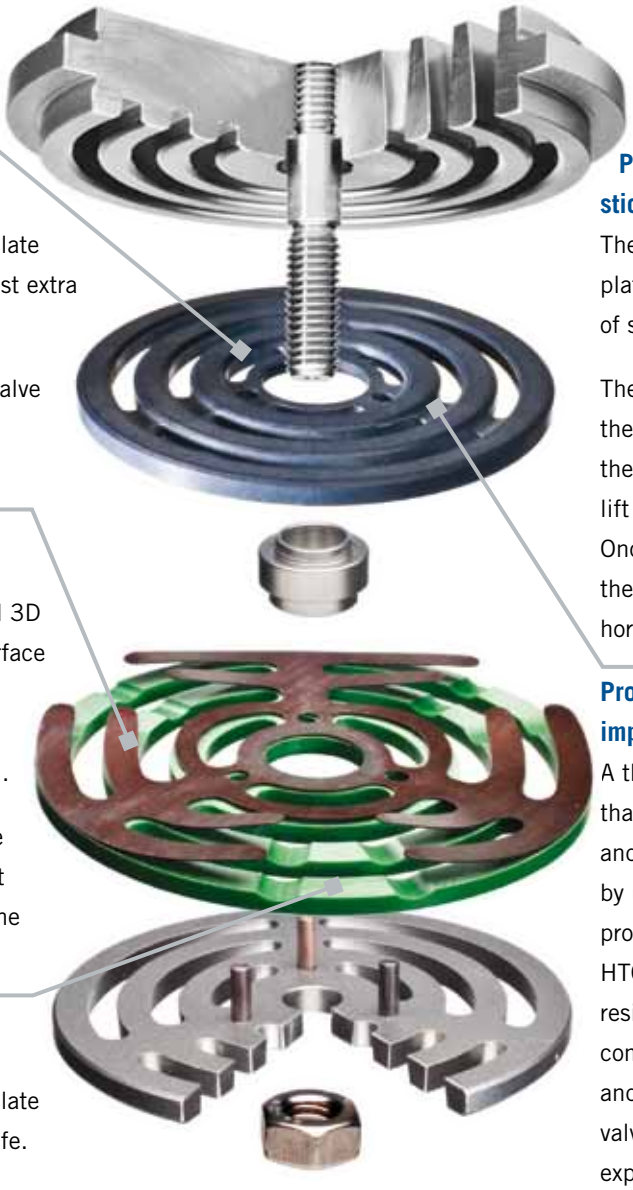
Left: Normalized valve efficiency for different valve types based on valve lift. The centrally-guided profiled plate design (CP) demonstrates its flow efficiency.

Right: Flow between the contoured seat lands and profiled valve plate.

...the CP valve redefines it.

An innovative material, HTCX+ and manufacturing process allows us to introduce a new valve that is so robust, we rate it for speeds as high as 2800 rpm.





Wide ports resist liquids

The spring plate design and mechanical strength of the valve plate provides superior robustness against extra loads like liquid slugs.

The effective flow area of the CP valve is typically 30 to 60% larger than standard plate type valves.

Spring plate resists permanent deformation

The spring plate concept, uses full 3D FEM calculations and includes surface and heat treatment to virtually eliminate permanent deformation even when completely compressed.

The spring plate and cushion plate are pinned to the guard and do not move. The flexed fingers provide the closing force.

MT cushion plate

A cushion plate prevents steel-to-steel contact between the spring plate and guard which prolongs spring life.

Point-to-Tangent contact reduces sticktion

The point-to-tangent contact between the plate and the seat reduces the tendency of sticktion in the presence of liquids.

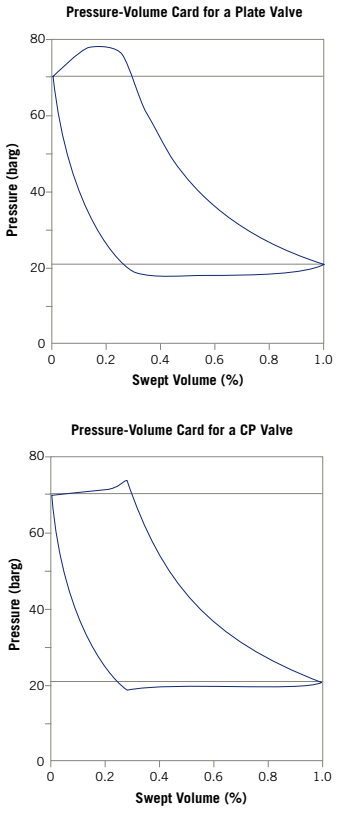
The point-to-tangent contact also lowers the differential pressure required to open the valve meaning the valve gets to full lift area earlier than with plate valves. Once open, the optimized flow around the profiled plate further reduces the horsepower required to operate the valve.

Profiled valve plate with extreme impact resistance

A thermally-stable, profiled plate valve that combines the advantages of a ring and a plate valve, is only made possible by using an innovative material and processing method. Our proprietary HTCX+ material has greater impact resistance than PEEK. The HTCX+ combined with our proprietary molding and machining processes result in a valve plate that has the same thermal expansion properties of steel.

CP valve benefits

- point-to-tangent sealing contact reduces effects of sticktion making it a durable valve for wet gases and high lubrication rates
- the plate profile reduces valve losses by up to 50% on average over all stages significantly reducing horsepower consumption
- spring plate design minimizes clearance volume which maximizes volumetric efficiency
- profiled plate design optimizes gas flow characteristics providing 30 to 50 % higher efficiency compared to R-type valves
- wide ports and robust sealing element material handles unexpected liquids and contaminates
- unique spring cushing prevents permanent spring deformation which increases valve life expectancy
- provides the industry with the opportunity to operate compressors at up to 2800 rpm



The CP valve (bottom) reduces valve losses by up to 50% on average over all stages compared to a standard plate valve (top).

Specifications		
Sizing & Lift	**(mm)**	**(in)**
diameter (min)	54	2.13
diameter (max)	90	3.54
lift (min)	0.75	0.029
lift (max)	2.5	0.098
Pressures	**(bar)**	**(psi)**
pressure (max)	300	4350
differential pressure (max)	200	2900
Operating Conditions		
speed (max)	2800 rpm	
service	lubricated and non-lubricated	

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because performance counts

The HOERBIGER Group

HOERBIGER Compression Technology is a business unit of HOERBIGER Holding AG, Zug / Switzerland. HOERBIGER is active throughout the world as a leading player in the fields of compression technology, automation technology and drive technology. Its 6,500 employees achieves sales of around 1 billion Euro annually. The focal points of its business activities include key components and services for compressors, engines and turbomachines, hydraulic systems and piezo technology for vehicles and machine tools, as well as components and systems for shift and clutch operations in vehicle drive trains of all kinds. Through innovations in attractive technological niche markets, the HOERBIGER Group sets standards and delivers cutting-edge solutions for the benefit of its customers.

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