



# **Reciprocating Compressor Valve Plate Life and Performance Analysis**

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## **Abstract:**

The operation of a reciprocating compressor is closely linked to the performance of its valves, in terms of both life and efficiency. To better understand the factors that affect reciprocating compressor valve performance and life, a Gas Machinery Research Council (GMRC) program has been initiated to systematically investigate the physical behavior of valve plates during compressor operation. A reciprocating compressor's valve plate life is generally considered to be a function of the plate's cyclic kinematics, transient stresses, and material properties. Thus, the valve research program aims to incorporate these fundamental factors into an analysis model that accurately predicts valve life for a given application, geometry, and plate material. The research will benefit users within the gas industry by providing a basis for improvements in applications engineering and operational decision-making related to reciprocating compressor valves. The analysis model developed by the research program is based on results from plate single impact tests, finite element (FE) calculations, optical valve plate 3-D motion measurements, and material high cycle fatigue testing. Some of the experimental and analytical results are discussed herein.