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M. Luszczycski

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DYNAMIC INVESTIGATIONS OF SUCTION VALVES
IN A SMALL REFRIGERATING COMPRESSOR

Marian Luszczycski
The Technical University
Cracow, Poland

ABSTRACT

Designers drafting valves, which are the most essential elements of high-speed compressors, are faced with many problems, the solving which goes beyond the limit of theoretical considerations. Therefore it is necessary to carry on comprehensive and penetrating laboratory investigations within this field. Such investigations are the experimental verification of numerous calculation methods and computer simulation programs.

Badly designed valves can be an origin of heavy energy losses. Structures of high-speed compressors, in which energy consumption necessary for overcoming the flow resistance through valves ranges from 20 - 25% of indicated power, are well known.

The valve work can be affected by many factors like: compressor rotary speed, average piston speed, flow velocity in valve sizing, suction and discharge pressure, pressure pulsation in the installation, spring characteristics, lift quantity, mass of the valve movable parts, friction and aerodynamical properties of the valve. Thus it is very difficult to consider all these factors in calculations, especially in the case of changing conditions of the compressor work.

The most unflinching way of the valve structure appreciation can be obtained on the grounds of plotted graphs on the valve plates displacement and records of pressure runs in the cylinder and in valve chambers. A Complete set of charts drafted in normal conditions of the compressor work affords a possibility of many-sided analysis of the valve work.

A structure of the capacitive transducer has been discussed, employed by the author for registering the charts of the valve plates displacement and a measuring system used for this purpose. Charts of displacement of the valve reed type valve plate of the suction valve in a small refrigerating compressor working on freon 12 have been presented. Investigations have been carried out at different compression ratios and a change of lift and the valve plate shape.