膜片式往復壓縮機瞬時壓力監測與設計參數探討

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摘要

A performance map and instantaneous pressure measurement were used to study the design parameters on the diaphragm reciprocating compressor. Under the design point, the compression wave in the intake chamber is weak, the expansion wave in the exhaust chamber can built up the pressure during the exhaust stroke to expel the flow. Deviating from the design point, the intake valve and exhaust valve open too early, the compression wave in the intake chamber becomes severe, and the expansion wave in the exhaust chamber can not last toward the top dead center before declining. In this case, the loading on the motor becomes heavy. Several parameters were studied to investigate the effect on the performance of the compressor. The larger the valve hole, the larger the exhaust pressure. However, there is an optimal valve hole to maximize its efficiency. The neck width of the reel valve dominates the timing of valve opening and closing. The efficiency of the compressor is strongly coupled with the neck width of the valve. For the current geometry, the optimal diameter of the valve hole of 8mm and the neck width of the valve of 10mm provide the maximal efficiency.

關鍵字：diaphragm reciprocating compressor, instantaneous pressure wave, diameter of valve holes, neck width of reel valve