

OPTIMIZATION OF PARAMETERS EFFECTING THE NOISE IN HERMITICALLY SEALED RECIPROCATING COMPRESSOR USING TAGUCHI TECHNIQUE

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Abstract

Hermetic reciprocating compressors are the most commonly used in the refrigeration industry. The main source of noise in refrigerating and air conditioning machinery is the compressor. Reduction of noise in compressors is a complex criterion. Hence establishment of noise parameters and their optimization is utmost important. In this work, Taguchi's approach to the parameter design that optimizes the noise produced from the compressor. The factors affecting the noise considered are Shell Thickness (ST), Shell Material (SM), Suction Port Area (SPA) and Discharge Port Area (DPA). Assigning these process parameters to L-8 orthogonal array, experiments are conducted and the optimum condition is obtained along with the identification of most influencing parameters using S/N analysis and mean response analysis. ANOVA is also carried out to reaffirm the same. A confirmation test is conducted to ascertain the optimized condition.

Keywords : Reciprocating Compressor, Taguchi, Orthogonal Arrays, S/N analysis, ANOVA.