Systematic Approach for Designing and Sizing of Compressors in Gas Application

Mohammed Ali AL-Barashdi

Abstract

This project report provides a comprehensive look at industrial compressors in gas application. It provides a method for the selection of the most appropriate type of compressors for the given application. In addition, it provides sizing experience for the design engineer with better insight into different design factors. The work fills the gap between academic textbooks and real world experience in the selection and sizing of compressors in gas applications.

Selection methods are generated throughout latest technology and solid fields experience along with research studies in order to guide the rotating equipment engineer to select compressor type for gas application. Then, sizing compressor requires many data calculations and design limitations and constraints interconnecting to design the compression system such as; system configuration, compressor design and prediction of vendor data sheet.

This research does not only give design data required from the vendors, but also can predict vendor inputs to the design data sheet. This gives a valuable knowledge and needed information to rotating equipment engineer for a good communication with the compressor vendor. The sizing results give vital data to the engineer such as; inlet/discharge conditions, polytrophic head, impellers number, shaft speed, system configuration and power requirements for the compression system.

This document contains intensive information about compressors used in oil and gas industry in terms of selection procedures, sizing calculation steps, sizing algorithm and driver rating for compressors. Finally, it is recommended that this research be continued and converted into a design software to select and model the compression process which can use correction factors and reduce result errors to an acceptable level in very high pressure application. This work does not intend to add or modify the existing well-established theoretical works for compressors design or compression facility design but it produces simplified algorithm methods for compressor selection and sizing in gas application.