

# Screw Compressors: Selection Considerations for Efficient Operation

Douglas T. Reindl, Associate Professor and Director<sup>1</sup> (dreindl@wisc.edu)  
Todd B. Jekel, Research Scientist (tbjekel@wisc.edu)  
Industrial Refrigeration Consortium  
University of Wisconsin-Madison  
949 East Washington Ave. Suite 2  
Madison, WI 53703-2937 USA

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## Abstract

More interest and attention is being paid to the design and operation of industrial refrigeration systems for energy efficient operation. Within refrigeration systems, compressors are the single largest consumer of primary energy (usually electricity); therefore, they often become a focal point for energy efficiency improvement strategies. Although a number of alternative compressor technologies are available including: reciprocating and rotary vane, many refrigeration end-users are gravitating toward specification and installation of screw compressors.

Screw compressors have several attributes that make their performance characteristics unique. Designers must understand the operational characteristics of this technology to select the appropriate compressor to allow efficient operation. Staff responsible for operating equipment must also understand the design intent and operational characteristics of a screw compressor at both full and part-load to realize efficient operation.

This paper discusses the unique characteristics of screw compressors and criteria for selection to yield energy efficient operation when integrated into a built-up industrial refrigeration system. The paper begins with a brief overview of screw compressor technologies, methods of capacity control, and volume ratio concepts. Then, energy efficiency aspects of screw compressor technologies are discussed for both fixed and variable volume ratio configurations. Finally, guidelines for screw compressor selection are outlined.

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<sup>1</sup> Corresponding author