

Packaged Reciprocating Compressors

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Introduction

It is necessary that users of this standard be aware that further or differing requirements can be necessary for individual applications. This standard is not intended to inhibit a vendor from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This can be particularly appropriate where there is innovative or developing technology. Where an alternative is offered, it is necessary that the vendor identify any variations from this standard and provide details.

Unlike previous editions, which used a bullet (●) at the beginning of a section or subsection to indicate that either a decision is required, or the purchaser is required to provide further information, bullets are not included in this Third Edition. Instead, the comprehensive datasheets include provisions for all optional or purchaser specified choices to be indicated.

This standard uses SI units as primary and includes U.S. Customary units in parenthesis.

This document includes significant content originally published in the *GMRC High-Speed Compressor Package Guideline for Field Gas Applications*^[42] under permission granted by the Gas Machinery Research Council (GMRC).

This specification includes a set of datasheets. However, these datasheets vary considerably from the prior edition. Prior datasheets were used by the purchaser to specify site conditions and required performance and by the packager to communicate the performance details of the offered equipment. They were also capable of being used as a permanent record of the package details. In the decades since the Second Edition, much of the numerical information previously filled in manually is now included on outputs from computer applications. These Third Edition datasheets make no attempt to duplicate the details available in equipment performance program outputs. In this era of 3D models and digital twins, there is also no intent for these datasheets to be used as a permanent record. These datasheets are intended to support clear communication of what the purchaser desires and what the packager proposes. The specification sets out minimum standards for scope and calls on the purchaser to specify upgrades or additional scope. At each location in the specification where a purchaser needs to supply information or make a scope decision, that language is extracted and duplicated on the datasheet with the paragraph reference. Space is provided for the purchaser to supply the information or describe the scope preference. Separate space is provided for the packager to confirm compliance, comment, or take exception.

This document includes “Informative” annexes that provide tutorial information, guidelines, and best practices for reference in the selection; project management; design; fabrication; site preparation; and placement, handling, and operation of reciprocating compressor packages.

Annex A contains information on typical project management responsibilities.

Annex B contains information on project sequence and schedule considerations.

Annex C contains guidelines for bid evaluation.

Annex D contains recommended vendor drawing and data.

Annex E contains guidelines for torsional vibration analysis data and testing.

Annex F contains guidelines for preliminary pulsation suppression bottle sizing.

Annex G contains guidelines for compressor package vibration screening and baseline testing.

Annex H contains guidelines for sour and corrosive gases.

Annex I contains guidelines and best practices for enclosed cold weather packages.

Annex J contains best practices for distance piece vents and drains.

Annex K contains guidelines for compressor safety, accessibility, and maintainability.

Annex L contains guidelines and best practices for compressor package design and fabrication.

Annex M contains information on compressor package noise avoidance and control.

Annex N contains information on package physical location considerations.

Annex O contains information on package loading, shipping, and unloading considerations.

Annex P includes information on package installation and connection considerations.

Annex Q includes information on package start-up and commissioning considerations.

Annex R includes information on compressor capacity control and automation design.

Annex S includes guidelines and best practices for air-cooled heat exchangers.

Packaged Reciprocating Compressors

1 Scope

This standard covers the minimum requirements for packaged reciprocating compressors for oil and gas production services. Compressors covered by this standard are horizontal separable balanced opposed reciprocating compressors suitable for direct coupling to a prime mover. These compressors have pressurized crankcase lubrication; crossheads; and double-acting, steerable, or tandem cylinders with injected lubrication.

Packages covered by this standard include the compressor; coupling; spark-ignited, natural-gas-fueled internal combustion engine or two-bearing electric motor prime mover; process and auxiliary coolers; process piping; pressure vessels; and auxiliary systems mounted on a fabricated steel base. Packages may also include control panels, isolation valves, and capacity control systems.

The standard defines responsibilities for manufacturers of compressors, prime movers, and other components; packagers who select components, design and fabricate packages; and purchasers who define site and operational requirements as well as applicability of other specifications.

It is not the intent of the standard writers to exclude other types of compressors or prime movers, additions or deletions of scope, additional parties, or different assignments of responsibilities. The intent is to cover the largest part of the industry. Where other compressor types, prime mover types, different allocations of responsibility, or different scopes of supply are considered, it behooves the parties to communicate between themselves what parts of this standard apply, what parts will not apply, and what other standards, specifications, or mutual agreement will supplement this standard.

Alternative types of compressors that are not addressed in this standard include:

- a) screw or scroll compressors;
- b) labyrinth compressors;
- c) diaphragm compressors;
- d) vertical, "Y," or "W" cylinder arrangements;
- e) single-acting cylinders with combined pistons and crossheads;
- f) pressurized crankcases;
- g) splash-lubricated crankcases;
- h) non-lubricated cylinders.

Alternate types of drivers that are not addressed in this standard include:

- a) integral engines—combined prime mover and compressor frame;
- b) gas turbines, steam turbines, speed-reducing or -increasing gears, clutches;
- c) diesel engines, dual-fuel engines;
- d) dual drive with both an engine and an electric motor.