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Gas turbines — Procurement —

Part 5: Applications for petroleum and natural gas industries

Turbines à gaz — Spécifications pour l'acquisition —

Partie 5: Applications pour les industries du pétrole et du gaz naturel

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 3977 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 3977-5 was prepared by Technical Committee ISO/TC 192, *Gas turbines*, in collaboration with Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum and natural gas industries*, Subcommittee SC 6, *Processing equipment and systems*. Documents taken into account in the development of ISO 3977 include API STD 616, API RP 11PGT and the ASME B133 series of documents.

ISO 3977 consists of the following parts, under the general title *Gas turbines — Procurement*:

— *Part 1: General introduction and definitions*

— *Part 2: Standard reference conditions and ratings*

— *Part 3: Design requirements*

— *Part 4: Fuels and environment*

— *Part 5: Applications for petroleum and natural gas industries*

— *Part 6: Combined cycles*

— *Part 7: Technical information*

— *Part 8: Inspection, testing, installation and commissioning*

— *Part 9: Reliability, availability, maintainability and safety*

Introduction

Users of this part of ISO 3977 should be aware that further or differing requirements may be needed for individual applications. This part of ISO 3977 is not intended to inhibit a packager from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This may be particularly applicable where there is innovative or developing technology. Where an alternative is offered, the packager should identify any variations from this part of ISO 3977 and provide details.

Gas turbines — Procurement —

Part 5:
Applications for petroleum and natural gas industries

1 Scope

This part of ISO 3977 specifies requirements and gives recommendations for the design, materials, fabrication, inspection, testing and preparation for shipment of packaged gas turbines for use in drilling, production, refining and the transport by pipelines of petroleum and natural gas. It is applicable to the procurement of gas turbines and gas turbine systems, including gas turbines for combined cycle systems, and their auxiliaries by a purchaser from a packager.

This part of ISO 3977 is not intended to deal with local or national legislative requirements to which the installation may be required to conform.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 3977. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 3977 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3977-1, *Gas turbines — Procurement — Part 1: General introduction and definitions*

ISO 3977-2, *Gas turbines — Procurement — Part 2: Standard reference conditions and ratings*

ISO 3977-3, *Gas turbines — Procurement — Part 3: Design requirements*

ISO 3977-4, *Gas turbines — Procurement — Part 4: Fuels and environment*

ISO 3977-7, *Gas turbines — Procurement — Part 7: Technical information*

ISO 3977-8, *Gas turbines — Procurement — Part 8: Inspection, testing, installation and commissioning*

ISO 3977-9, *Gas turbines — Procurement — Part 9: Reliability, availability, maintainability and safety*

ISO 11086, *Gas turbines — Vocabulary*

3 Terms and definitions

For the purposes of this part of ISO 3977, the terms and definitions given in ISO 11086, ISO 3977-1, ISO 3977-3, ISO 3977-4, ISO 3977-8 and ISO 3977-9 apply.

4 Requirements for gas turbines for the petroleum and natural gas industries

4.1 Reference conditions and ratings

Standard reference conditions for gas turbines shall be as defined in ISO 3977-2.

The packager shall declare standard ratings associated with the operational modes defined in ISO 3977-2. The packager shall also declare the site power rating as specified in ISO 3977-2, for the specified site conditions of the installation and operating modes under which the plant is intended to run in service.

4.2 Design requirements

4.2.1 Basic requirements

The minimum basic requirements for the procurement of gas turbines and gas turbine systems are specified in ISO 3977-3. ISO 3977-3 also provides assistance and technical information to be used in the procurement.

The purchaser shall provide site condition data and shall specify the package site specific operating point(s) on data sheets in accordance with ISO 3977-3.

The packager shall review and comment the purchaser's piping, ducting and foundation drawings as specified in ISO 3977-3.

Operational requirements shall be in accordance with ISO 3977-3.

Service requirements shall be in accordance with ISO 3977-3.

Rotating equipment requirements shall be in accordance with ISO 3977-3.

Other equipment requirements shall be in accordance with ISO 3977-3.

Vibrations and dynamics shall be in accordance with ISO 3977-3.

4.2.2 Packaging and auxiliary equipment

Packaging and auxiliary equipment shall be in accordance with ISO 3977-3.

The packager shall provide, as a minimum, the equipment in ISO 3977-3 listed as the minimum to be provided as the package. Any other equipment required shall be as specified by the purchaser and shall be included in the packager's scope of supply. This equipment shall be assembled (packaged) to the maximum extent practical.

Auxiliary equipment may include

a) starting systems,

b) mounting systems,

c) enclosure and fire protection,

d) air inlet systems,

e) piping,

f) oil systems,

g) fuel system,

h) electrical systems,

i) exhaust system,

j) driven equipment (compressor, pump, generator), and

k) seal system for the above.

4.2.3 Control and instrumentation

Control and protection systems, and associated instrumentation, shall be in accordance with ISO 3977-3. Consideration shall be given to starting, loading and shutdown.

Provisions for ventilation and purging shall be in accordance with ISO 3977-3.

Fuel control, governing and limiting, and emission control shall be in accordance with ISO 3977-3.

Overspeed protection and protection systems shall be in accordance with ISO 3977-3.

Compressor wash systems shall be in accordance with ISO 3977-3.

Considerations for the control system shall be in accordance with ISO 3977-3.

Control panel installation shall be in accordance with ISO 3977-3.

Operability and diagnostics shall be in accordance with ISO 3977-3.

Data communications shall be in accordance with ISO 3977-3.

4.3 Fuels and environment

The responsibilities of the purchaser and of the packager with respect to the fuels and the relationship to the procurement of a gas turbine system shall be in accordance with ISO 3977-4.

4.4 Technical information

The information to be submitted during the proposal and contract stages of a project covering the packager's scope of supply is defined in ISO 3977-7.

The purchaser shall complete the data sheets and Packager Documentation Requirements from ISO 3977-7. The purchaser shall specify the performance data needed for the specific application in accordance with ISO 3977-7.

The packager shall provide the Proposal and the Contract Documentation in accordance with ISO 3977-7.

4.5 Inspection, testing, installation and commissioning

Inspection, testing, installation and commissioning shall be in accordance with ISO 3977-8. ISO 3977-8 states the principles for systems and procedures to assure the integrity of the packager's products and services, and also outlines the responsibilities between the purchaser and the packager.

Preparation for storage and shipment shall be in accordance with ISO 3977-8.

4.6 Reliability, availability, maintainability and safety

Exchange of information about reliability, availability, maintainability and safety between gas turbine manufacturers, packagers, purchasers, users, consultants, regulatory bodies and others shall be in accordance with ISO 3977-9.

Bibliography

[1] API STD 616, *Gas Turbines for the Petroleum, Chemical and Gas Industry Services*

[2] API RP 11PGT, *Packaged Combustion Gas Turbines*

[3] ASME B133, *Series on gas turbines*

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