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NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL ENGINEERING
& CONSTRUCTION COMPANY

NIOEC SP

NIOEC SPECIFICATION FOR SPECIAL PURPOSE STEAM TURBINES

FIRST EDITION

JULY, 2005

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IN THE NAME OF GOD**FOREWORD**

By their very nature, technical standard specifications are continuously subject to modifications and revisions. To strengthen their merit and usefulness, continuous improvements, addendum, deletion of disparate information and consequently provision of updated revisions are to be made in order to ascertain that such standard specifications meet the current requirements, inclusive of Iranian Petroleum Standards (IPS) and the recognized and acceptable national and international standards, as well as the optimal codes and practices based on the accumulated in-house know-how and plant knowledge and experiences.

However, in reality, due to several reasons, not to mention the complexity of the matter, the ultimate goal of continuous direct embedment of the required changes on the relevant standard specifications may be far reaching. Therefore, in the interim periods between the officially issued revisions, the required changes will appear in other documents related to the engineering and design work of the on going projects.

In response to the initiative of the Design Division of the Engineering and Construction Directorate, and considering that the task of the execution of several important and mega projects for the realization of the new oil refineries, pipelines and oil terminals as well as improvements of the existing facilities, has been assigned to NIOEC, it was decided to update the NIOEC Specifications and to issue new official revisions.

The Design Division of the Engineering and Construction Directorate was itself entrusted to carry out this important task, and as such by forming several special technical committees, working in close co-operation and cohesion and sharing their expertise and knowledge, the updated and revised NIOEC Specifications were successfully prepared and complied.

These Specifications are intended to be used for Oil Refineries, Distribution Depots, Oil Terminals, Pipelines and Pump Stations within NIOEC's projects, and have been proven to be of high value for such purposes. It must however be appreciated that these Specifications represent the minimum requirements and should in no way be interpreted as a restriction on the use of better procedures, engineering and design practices or materials.

We encourage and highly appreciate the users and other clear sighted and experts to send their comments on the Specifications to the Design Deputy of the Engineering and Construction Director of NIOEC for evaluation and consideration.

S. R. KASAEIZADEH


EXECUTIVE DIRECTOR

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NOTES:

- 1) THIS SHEET IS A RECORD OF ALL REVISIONS TO THIS SPECIFICATION.
- 2) REMARKS RELATED TO EACH REVISION SHOW A BRIEF DESCRIPTION. THESE REMARKS SHALL BE INTERPRETED IN CONJUNCTION WITH THE REVISED TEXT MARKED BY REVISION NUMBERS.
- 3) WHEN APPROVED EACH REVISION SHALL BE CONSIDERED AS A PART OF THE ORIGINAL DOCUMENT.
- 4) NUMBER OF PAGES EXCLUDES THIS SHEET AND THE COVER SHEET.

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0. INTRODUCTION

To satisfy the requirements of this NIOEC Specification, API 612 with the modifications as specified herein after shall be strictly followed.

The following annotations, as specified hereunder, have been used at the bottom right hand side of each clause or paragraph to indicate the type of change made to the equivalent clause or paragraph of API.

Substitution: The clause in API shall be deleted and replaced by the new clause in this Standard.

Addition: The new clause with the new number shall be added to the relevant section of API.

Modification: Part of the clause or paragraph in API shall be modified and/or the new description

1. SCOPE

- 1.1 This Specification covers the general requirements for special purpose steam turbines which shall conform to the American petroleum institute standard 612 fifth edition.
- 1.2 This Specification supplements Specification sheets for each individual turbine on which the operating conditions and special requirements are listed in detail. Whenever the data included on the individual Specification sheet conflicts with the provisions of this general Specification, the former shall govern.
- 1.3 Compliance with the provision of this Specification dose not relieve the manufacturer/contractor of the responsibility of furnishing turbines of proper design, mechanically suited to meet operating guarantees at the specified service conditions.
- 1.4 Unless specific exception accompanied by a description of the proposed substitute is recorded under the heading "Exception" in the manufacturer's proposal, it shall be mutually understood that the proposal is based on equipment which complies-strictly with the requirements of these Specifications.

2. REFERENCES

Throughout this Specification the following data and undated standards / codes are referred to. These referenced documents shall, to the extent specified herein, from a part of this Specification. For under references, the latest edition of the referenced document (including any supplements and amendments) applies. For data references, the edition cited applies. The applicability of changes in dated references that occur after the cited date, shall mutually be agreed upon by NIOEC and the Vendor / Contractor.

API 612	" Special purpose steam turbines."-5 th edition - 1995
API 614	"Lubrication Shaft-Sealing and Control-Oil Systems for Special-Purpose Applications"
API 671	"Special-Purpose Couplings for Petroleum, Chemical, and Gas Industry Services"
API 613	" Special Purpose Gear Units for Petroleum, Chemical and Gas Industry Services"

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERS.)

NEMA (NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION)

NIOEC-SP (NIOEC SPECIFICATION)

NIOEC-SP-00-10	" NIOEC Specification for unit "
NIOEC-SP-47-10	"NIOEC Specification For Noise Control And Vibration"
NIOEC-SP-46-00	"NIOEC Specification For Pumps,Drivers And Auxiliary Equipment"
NIOEC-SP-46-07	"NIOEC Specification For Lubrication, Shaft Sealing, Control Oil System For Special Purpose Application"

3. UNITS

International system of units (SI) shall be used in accordance with NIOEC-SP-00-10, unless otherwise specified

4. DEFINITION & TERMINOLOGY

Employer: National Iranian Oil Engineering and Construction Company (NIOEC).

Contractor: The person, firm, Company or consortium whose tender has been accepted by the Employer or legal successors in title to such person.

Purchaser: National Iranian Oil Engineering & Construction Company in cases where this Specification is part of a direct purchase by National Iranian Oil Engineering & Construction

Company: In cases where this Specification is part of Contract Documents, "Purchaser" means the Contractor.

Vendor: The manufacturer's from which the equipment is to be purchased.

5. MODIFICATION TO API 612:

The paragraph numbering follows API Standard 612 fifth edition April. 2003 and each paragraph denotes an addition, modification, substitution or employer's choice. Those optional sections not covered in the text are included in the Specification data sheets.

1. SCOPE (Mod.)

This standard specifies requirements and gives recommendations for the design, materials, fabrication, inspection, testing and preparation for shipment and Guarantee and Warranty for steam turbines in special-purpose services for use by NIOEC in Refineries.

4. DIMENSIONS(Add.)

SI units shall be used. Component parts may be fabricated to other dimensional standards when this does not conflict with the intent of the design features included in the referenced American Specifications. However, all external connections (either flanges or tapped openings) intended for the attachment of external piping and any external piping material of whatever kind furnished by the vendor incidental to the equipment shall without exception conform to the dimensional requirements of the applicable American Standard Association Specifications.

5. STATUTORY REQUIREMENTS (Add.)

“A vendor may offer an alternate of manufacturer's design. All deviations in the manufacturer's standard design from the requirements specified herein shall be described fully in the proposal. The Employer will determine if the alternate is acceptable or not. However, a turbine which completely meets these Specifications shall be selected.”

6. BASIC DESIGN

6.1 General

6.1.5 (Mod.)

On multistage condensing type turbines care should be exercised in the design to eliminate the possibility of interstage silicate deposit build-up on turbine blading and to minimize erosion on the last stages of turbine blading.

6.1.6 (Mod.)

b) The manufacturer shall specify the limits of variation from rated steam conditions which the turbine can accept.

If this point is not specified on the data sheet by the purchaser, the vendor of the driven equipment shall provide this data to the turbine vendor.

6.1.6 (Add.)

i) Turbines will be washed at normal speed and reduced load. The turbine vendor shall confirm suitability of its turbine for the following procedure in its proposal, and recommend any special precautions required to protect the equipment:

Method of washing:

Washing of a steam turbine down to about 8°C of superheat, holding the temperature at this near saturation value for a definite period of time and then gradually restoring the temperature to its initial value.

Facility requirements:

Desuperheating shall be by the injection of high pressure, high purity water such as condensate or polished demineralized water. The desuperheated steam shall pass through a steam temperature during washing shall be automatically controlled such that the temperature shall not vary by more than 1°C per minute.

6.1.8 (Sub.)

The turbine and accessories shall perform on the test stand and when installed on the permanent foundation, within the specified acceptance criteria.

The combined performance of the turbine and its driven equipment after installation shall be the responsibility of the vendor, who has been nominated as being responsible for the complete unit.

6.1.10 (Mod.)

The arrangement of turbine and driven equipment installation, including auxiliaries and platforms shall be developed jointly by purchaser and vendor to provide adequate clearance area and safe access for operation and maintenance and to be submitted for Employer's approval. In the case of outdoor installation, the turbines condenser shall not be located beneath the turbine.

6.1.15 (Mod.)

Noise level shall normally be limited to the requirements of NIOEC-SP-47-10 and NIOEC-SP-46-00 whichever lower, however if under different operating conditions exhaust steam flow is anticipated to have higher noise levels; supply of proper silencer shall be the responsibility of the steam turbine supplier.

6.1.17 (Mod.)

The turbine and all its auxiliary equipment shall be suitable for outdoor installation exposed to dusty and refinery atmosphere. Refer to unit data sheets for ambient conditions and area classifications.

Minimum ambient dry bulb temperature is based on local condition.

6.1.20 (Add.)

Non condensing capabilities of the condensing steam turbines shall also be specified by the steam turbine supplier in the proposal.

6.1.21 (Add.)

The steam strainer shall be a separate. Y-type strainer with monel screen and openings of approximately 1/8 in., and in addition, strainer basket with 1/16 inch openings shall be supplied for temporary use during start-up.