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

# NIOEC SP

## NIOEC SPECIFICATION FOR CENTRIFUGAL COMPRESSORS IN GENERAL REFINERY SERVICES

FIRST EDITION

JULY, 2005

THIS SPECIFICATION IS THE PROPERTY OF NATIONAL IRANIAN OIL ENGINEERING & CONSTRUCTION COMPANY. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED TO THE OWNER. NEITHER WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE DISCLOSED TO ANY THIRD PARTY, REPRODUCED, STORED IN ANY RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE PRIOR WRITTEN CONSENT OF THE NATIONAL IRANIAN OIL ENGINEERING & CONSTRUCTION COMPANY.

**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 617 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 centrifugal compressors in general refinery service to be supplied for NIOEC installations.
- 1.2 This specification supplements the specification sheets for each individual compressor on which the operating conditions and special requirements are listed in detail.
- 1.3 The equipment and accessories shall be of proper design mechanically suited to meet operating conditions at the specified service conditions.
- 1.4 Compressors supplied shall have been proven elsewhere to have given satisfactory service under similar operating conditions to those specified.
- 1.5 Any of the options, as indicated by bullet (●) in API Standard and not stated in this specification will be covered by the data sheet.
- 1.6 The centrifugal compressors shall be furnished in accordance with API Standard 617 "Axial and Centrifugal Compressors and Expander-compressors for Petroleum, Chemical and Gas Industry Services" July 2002, seventh Edition, with the following additions, modifications and exceptions.

## 2. REFERENCES

Throughout this Specification the following dated and undated standards/ codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this Specification.

For undated references, the latest edition of the referenced document (including any supplements and amendments) applies. For dated 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 (AMERICAN PETROLEUM INSTITUTE)

API 617 " Axial, centrifugal and expander compressors. 7<sup>th</sup> edition -2002

API 612 "Petroleum, Petrochemical and Natural Gas Industries - Steam Turbines -  
Special-purpose Applications"

IEC (INTERNATIONAL ELECTROTECHNICAL COMMISSION)

NIOEC (NIOEC SPECIFICATION)

|                                |                                                                                                          |
|--------------------------------|----------------------------------------------------------------------------------------------------------|
| <a href="#">NIOEC-SP-00-10</a> | "NIOEC specification for units"                                                                          |
| <a href="#">NIOEC-SP-47-10</a> | "NIOEC Specification For Noise Control And Vibration"                                                    |
| <a href="#">NIOEC-SP-46-06</a> | "NIOEC Specification For Special Purpose For Steam Turbines"                                             |
| <a href="#">NIOEC-SP-46-02</a> | "Specification for general purpose steam turbines for Centrifugal pump driver"                           |
| <a href="#">NIOEC-SP-46-00</a> | "NIOEC Specification For Pumps, Drivers And Auxiliary Equipment"                                         |
| <a href="#">NIOEC-SP-60-02</a> | "General Specification for Motors"                                                                       |
| <a href="#">NIOEC-SP-70-01</a> | "NIOEC Specification For Instrumentation"                                                                |
| <a href="#">NIOEC-SP-70-02</a> | "NIOEC Specification For Instrument Installation"                                                        |
| <a href="#">NIOEC-SP-46-07</a> | "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. MODIFICATIONS TO API

The paragraph numbering follows API Standard 617, seventh Edition, July 2002 and each paragraph denotes an addition, modification or substitution.

### CH-1

#### 1.1 (Mod.)

Expander-compressors are not included in this specification.

### CH-1

#### 1.3 (Add.)

Any exceptions to this specification shall be listed separately under the heading “Exceptions and Modifications”, and submitted with the proposal for Employer’s review. 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 specification.

### CH-1

#### 1.6.4 (Mod.)

API Standard 612 to be replaced by Two [NIOEC-SP-46-06](#), and [NIOEC-SP-46-02](#).

### CH-1

#### 2.1.5 (Add.)

See data sheets for site cooling water conditions.  
Diaphragm cooling is not acceptable.

### CH-1

#### 2.1.8 (Mod.)

Compressor and all its auxiliary equipment shall be suitable for outdoor installation, exposed to dusty atmosphere, and as otherwise specified in the job specification.

### CH-1

#### 2.1.9 (Mod.)

For control of sound level refer to [NIOEC- SP-46-00](#) and [NIOEC-SP-47-10](#).

### CH-1

#### 2.1.12 (Add.)

Compressors with variable speed drives shall be suitable for continuous full load operation at any speed from and including the specified minimum speed, up to and including 105% of the rated speed.

### CH-1

#### 2.1.13 (Mod.)

Many factors, such as heavy piping loads, misalignment, operating conditions, improper supporting structure, mishandling during shipment, and improper handling and assembly at site, may adversely affect site performance. In order to minimize the influence of these factors, the vendor shall review and comment on the purchaser’s piping and foundation drawings, if requested. In addition, the vendor’s erection supervisor shall be present during