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

NIOEC SP

NIOEC SPECIFICATION FOR MEDIUM AND HIGHVOLTAGE INDUCTION MOTORS

FIRST EDITION

JULY, 2005

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IN THE NAME OF GOD**FOREWORD**

By their very nature, technical 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 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 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 ongoing projects.

In response to the initiative of the Design and Engineering 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 and Engineering 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 and Engineering Director of NIOEC for evaluation and approval.

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NOTES:

- 1) THIS SHEET IS A RECORD OF ALL REVISIONS TO THIS SPECIFICATION.
- 2) WHEN APPROVED EACH REVISION SHALL BE CONSIDERED AS A PART OF THE ORIGINAL DOCUMENT.
- 3) NUMBER OF PAGES EXCLUDES THIS SHEET AND THE COVER SHEET.

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INTRODUCTION

To satisfy the requirements of this NIOEC Specification, Iranian Petroleum Standard IPS-M-EL-132(2), revised on December 2009, with the modifications as specified herein after shall be strictly followed.

Articles 1 through 3 of this document replace entirely the related articles in the referenced IPS Standard.

In case of conflict between Farsi and English languages in IPS-M-EL-132(2), English language shall govern.

1. SCOPE

This specification defines NIOEC's minimum requirements for the design, manufacture, test and inspection of medium voltage cage induction motors.

Deviations from this specification will only be permitted on obtaining written approval from NIOEC.

Resolution on cases not explicitly stipulated in this Specification, or on cases where conflicts may arise among the requirements of the referenced IPS and the international standards, shall be made through written consent and approval of NIOEC.

The motors will be installed in refineries/oil plants, distribution depots, pump stations and pipelines under the environmental and service conditions specified herein.

The general requirements are given in this Specification; the specific requirements of individual cases will be given in request for quotation and/or purchase order.

2. REFERENCES

The following standards, codes, and specifications, to the extent specified hereinafter, shall constitute a part of this NIOEC Specification. Latest edition of the undated referenced documents and the cited edition of the dated references shall apply. The applicability of changes made to the dated references , after the cited date shall be mutually agreed upon between NIOEC and the Vendor /Contractor.

IEC (INTERNATIONAL ELECTROTECHNICAL COMMISSION)

IEC 60034-1	Rotating Electrical Machines Rating and Performance
IEC 60034-2	Methods for Determining Losses and Efficiency of Rotating Electrical Machinery from Tests
IEC 60034-5	Degrees of Protection Provided by the Integral Design of Rotating Electrical Machines (IP Code)
IEC 60034-6	Methods of Cooling (IC Code)
IEC 60034-7	Classification of Types of Construction, Mounting Arrangements and Terminal Box Position (IM Code)
IEC 60034-8	Terminal Markings and Direction of Rotation
IEC 60034-9	Noise.Limits

IEC 60034-14	Mechanical Vibration of Certain Machines with Shaft Heights 56 mm and Higher. Measurement, Evaluation and Limits of Vibration
IEC 60034-15	Impulse Voltage Withstand Levels of Rotating A.C Machines with Form-Wound Stator Coils
IEC 60034-18	Functional Evaluation of Insulation Systems for Rotating Electrical Machines.
IEC 60072-1	Dimensions and Output Series for Rotating Electrical Machines Part 1: Frame Numbers 56 to 400 and Flange Numbers 55 to 1080
IEC 60072-2	Dimensions and Output Series for Rotating Electrical Machines Part 2: Frame Numbers 355 to 1000 and Flange Numbers 1180 to 2360.
IEC 60079-0	Electrical Apparatus for Explosive Gas Atmospheres, General Requirements
IEC 60079-1	Electrical Apparatus for Explosive Gas Atmospheres, Flameproof Enclosures “d”
IEC 60079-4	Electrical Apparatus for Explosive Gas Atmospheres, Method of Test for ignition temperature
IEC 60079-7	Electrical Apparatus for Explosive Gas Atmospheres, type of Protection “e”
IEC 60079-10-1	Explosive Atmospheres part 10-1 :, Classification of Areas – Explosive Gas Atmospheres.
IEC 60079-10-2	Explosive Atmospheres- part 10-2 : Classification of Areas – Combustible Dust Atmospheres.
IEC 6079-15	Electrical Apparatus for Explosive Gas Atmospheres, Type of Protection “n”
IEC 60085	Thermal Evaluation and Classification of Electrical Insulation
IEC 60423	Conduits for Electrical Purposes-Outside Diameters of Conduits for Electrical Installations and Threads for Conduits and Fittings
IEC 60445	Identification of Equipment Terminals
IEC 60751	Industrial Platinum Resistance Thermometer Sensor

API (AMERICAN PETROLEUM INSTITUTE)

API RP505	Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as class 1, zone 0, zone 1 and zone 2
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API 670	Vibrations, Axial Position, and Bearing Temperature Monitoring Systems
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ISO (INTERNATIONAL ORGANIZATION FOR STANDARDIZATION)

ISO 15	"Rolling Bearings-Radial Bearings-Boundary Dimensions- General Plan."
ISO 1132	"Rolling Bearings-Tolerances-Definitions".

IPS (IRANIAN PETROLEUM STANDARD)

IPS-G-SF-900	"General Standard for Noise Control and Vibration"
IPS-M-EL-131(2)	"Material and Equipment Standard for Low Voltage Induction Motors"

NIOEC-SP (NIOEC SPECIFICATIONS)

NIOEC-SP-00-10	NIOEC Specification for units
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NIOEC SIP (NIOEC SHOP INSPECTION PROCEDURE)

NIOEC-SIP-60-00	Shop inspection procedure and scope of inspection for electrical equipment
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2.1. Standards and Codes

- 2.1.1.** The medium and high voltage induction motors shall be designed, manufactured, inspected and tested in accordance with the applicable sections of the latest edition of International Electrotechnical Commission "IEC" standards.
- 2.1.2.** Where standards other than IEC are specified, it is understood that the equivalent IEC standard is acceptable.

3. UNITS

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

4. ADDENDUM TO IPS-M-EL-132(2)

This addendum revises the below listed articles of the referenced standard as follows:

6.5. (Substitution):

The electrical Motors for use in hazardous areas shall be certified by recognized international or national certifying authorities who are among the following: Ex Certification Bodies of IEC (IECEx) or the Notified Bodies for ATEX.

The required mandatory Ex. certificate of conformity documents indicating the certifying authority shall be submitted by the vendors at quotation stage (before purchase order stage) as follows:

A) As per ATEX (directive 94/9/EC)

- I. EC Declaration of Conformity
- II. EC Type Examination Certification
- III. Quality Assurance Notification

Or

B) As per IECEX

- I. Certificate of Conformity (CoC)
- II. EX Test Report (EXTR)
- III. Quality Assessment Report (QAR)

7.1.7. (Modification):

The voltage variation of $\pm 5\%$ shall be replaced with $\pm 10\%$.



IRANIAN PETROLEUM STANDARDS

استانداردهای نفت ایران

IPS

IPS-M-EL-132 (2)

MATERIAL AND EQUIPMENT STANDARD
FOR
MEDIUM AND HIGH VOLTAGE
INDUCTION MOTORS

SECOND REVISION
DECEMBER 2009

استاندارد کالا و تجهیزات
برای
موتورهای القایی ولتاژ متوسط و قوی

ویرایش دوم
دی ۱۳۸۸

DEPUTY MINISTER
OF
ENGINEERING & LOCAL MANUFACTURING
RESEARCH & STANDARDS

معاونت مهندسی و ساخت داخل



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پیش گفتار

استانداردهای نفت ایران (IPS) منعکس کننده دیدگاههای وزارت نفت ایران است و برای استفاده در تأسیسات تولید نفت و گاز، پالایشگاههای نفت، واحدهای شیمیایی و پتروشیمی، تأسیسات انتقال و فراورش گاز و سایر تأسیسات مشابه تهیه شده است.

استانداردهای نفت، براساس استانداردهای قابل قبول بین‌المللی تهیه شده و شامل گزیده‌هایی از استانداردهای مرجع در هر مورد می‌باشد. همچنین براساس تجربیات صنعت نفت کشور و قابلیت تأمین کالا از بازار داخلی و نیز برحسب نیاز، مواردی بطور تکمیلی و یا اصلاحی در این استاندارد لحاظ شده است. مواردی از گزینه‌های فنی که در متن استانداردها آورده نشده است در داده برگ‌ها بصورت شماره گذاری شده برای استفاده مناسب کاربران آورده شده است.

استانداردهای نفت، بشکلی کاملاً انعطاف پذیر تدوین شده است تا کاربران بتوانند نیازهای خود را با آنها منطبق نمایند. با این حال ممکن است تمام نیازمندی‌های پروژه‌ها را پوشش ندهند. در این گونه موارد باید الحاقیه‌ای که نیازهای خاص آنها را تأمین می‌نماید تهیه و پیوست نمایند. این الحاقیه همراه با استاندارد مربوطه، مشخصات فنی آن پروژه و یا کار خاص را تشکیل خواهند داد.

استانداردهای نفت تقریباً هر پنج سال یکبار مورد بررسی قرار گرفته و روزآمد می‌گردند. در این بررسی‌ها ممکن است استانداردی حذف و یا الحاقیه‌ای به آن اضافه شود و بنابراین همواره آخرین ویرایش آنها ملاک عمل می‌باشد.

از کاربران استاندارد، درخواست می‌شود نقطه نظرها و پیشنهادات اصلاحی و یا هرگونه الحاقیه‌ای که برای موارد خاص تهیه نموده‌اند، به نشانی زیر ارسال نمایند. نظرات و پیشنهادات دریافتی در کمیته‌های فنی مربوطه بررسی و در صورت تصویب در تجدید نظرهای بعدی استاندارد منعکس خواهد شد.

ایران، تهران، خیابان کریمخان زند، خردمند شمالی، کوچه چهاردهم، شماره ۱۹
اداره تحقیقات و استانداردها
کدپستی: ۱۵۸۵۸۸۶۸۵۱
تلفن: ۶۰ - ۸۸۸۱۰۴۵۹ و ۶۶۱۵۳۰۵۵
دورنگار: ۸۸۸۱۰۴۶۲
پست الکترونیکی: Standards@nioc.org

FOREWORD

The Iranian Petroleum Standards (IPS) reflect the views of the Iranian Ministry of Petroleum and are intended for use in the oil and gas production facilities, oil refineries, chemical and petrochemical plants, gas handling and processing installations and other such facilities.

IPS is based on internationally acceptable standards and includes selections from the items stipulated in the referenced standards. They are also supplemented by additional requirements and/or modifications based on the experience acquired by the Iranian Petroleum Industry and the local market availability. The options which are not specified in the text of the standards are itemized in data sheet/s, so that, the user can select his appropriate preferences therein.

The IPS standards are therefore expected to be sufficiently flexible so that the users can adapt these standards to their requirements. However, they may not cover every requirement of each project. For such cases, an addendum to IPS Standard shall be prepared by the user which elaborates the particular requirements of the user. This addendum together with the relevant IPS shall form the job specification for the specific project or work.

The IPS is reviewed and up-dated approximately every five years. Each standards are subject to amendment or withdrawal, if required, thus the latest edition of IPS shall be applicable

The users of IPS are therefore requested to send their views and comments, including any addendum prepared for particular cases to the following address. These comments and recommendations will be reviewed by the relevant technical committee and in case of approval will be incorporated in the next revision of the standard.

Standards and Research department
No.19, Street14, North kheradmand
Karimkhan Avenue, Tehran, Iran .
Postal Code- 1585886851
Tel: 021-88810459-60 & 021- 66153055
Fax: 021- 88810462
Email: Standards@nioc.org

General Definitions:

Throughout this Standard the following definitions shall apply.

Company :

Refers to one of the related and/or affiliated companies of the Iranian Ministry of Petroleum such as National Iranian Oil Company, National Iranian Gas Company, and National Petrochemical Company etc.

Purchaser :

Means the "Company" Where this standard is part of direct purchaser order by the "Company", and the "Contractor" where this Standard is a part of contract documents.

Vendor And Supplier:

Refers to firm or person who will supply and/or fabricate the equipment or material.

Contractor:

Refers to the persons, firm or company whose tender has been accepted by the company,

Executor :

Executor is the party which carries out all or part of construction and/or commissioning for the project.

Inspector :

The Inspector referred to in this Standard is a person/persons or a body appointed in writing by the company for the inspection of fabrication and installation work

Shall:

Is used where a provision is mandatory.

Should:

Is used where a provision is advisory only.

Will:

Is normally used in connection with the action by the "Company" rather than by a contractor, supplier or vendor.

May:

Is used where a provision is completely discretionary.

تعاریف عمومی :

در این استاندارد تعاریف زیر به کار می رود.

شرکت :

به شرکت های اصلی و وابسته وزارت نفت مثل شرکت ملی نفت ایران ، شرکت ملی گاز ایران، شرکت ملی صنایع پتروشیمی و غیره اطلاق میشود.

خریدار:

یعنی "شرکتی" که این استاندارد بخشی از مدارک سفارش خرید مستقیم آن "شرکت" میباشد و یا "پیمانکاری" که این استاندارد بخشی از مدارک قرارداد آن است .

فروشنده و تامین کننده:

به موسسه و یا شخصی گفته میشود که تجهیزات و کالاهای مورد لزوم صنعت را تامین مینماید .

پیمانکار:

به شخص ، موسسه ویا شرکتی گفته میشود که پیشنهادش برای مناقصه ویا مزایده پذیرفته شده است.

مجری:

مجری به گروهی اطلاق می شود که تمام یا قسمتی از کارهای اجرایی و یا راه اندازی پروژه را انجام دهد.

بازرس:

در این استاندارد بازرس به فرد یا گروهی اطلاق می شود که کتباً توسط کارفرما برای بازرسی ساخت و نصب تجهیزات معرفی شده باشد.

باید:

برای کاری که انجام آن اجباری است استفاده میشود.

توصیه:

برای کاری که ضرورت انجام آن توصیه میشود.

ترجیح:

معمولاً در جایی استفاده می شود که انجام آن کار براساس نظارت شرکت باشد.

ممکن است :

برای کاری که انجام آن اختیاری میباشد .

**MATERIAL AND EQUIPMENT STANDARD
FOR
MEDIUM AND HIGH VOLTAGE
INDUCTION MOTORS**

**SECOND REVISION
DECEMBER 2009**

**استاندارد کالا و تجهیزات
برای
موتورهای القایی ولتاژ متوسط و قوی
ویرایش دوم
دی ۱۳۸۸**

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این استاندارد متعلق به وزارت نفت ایران است. تمام حقوق آن متعلق به مالک آن بوده و نباید بدون رضایت کتبی وزارت نفت ایران، تمام یا بخشی از این استاندارد، به هر شکل یا وسیله از جمله تکثیر، ذخیره سازی، انتقال، یا روش دیگری در اختیار افراد ثالث قرار گیرد.

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