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

NIOEC SP

NIOEC SPECIFICATION FOR UNINTERRUPTIBLE POWER SUPPLY (UPS)

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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1.0 SCOPE

- 1.1** This Specification describes the requirements for uninterruptible power supply systems (UPS).
- 1.2** This Specification covers only the general requirements. The specific requirements of each UPS (Item No., Rating, etc.) will be shown on Data Sheets and/or Drawings which will be part of the Request for Quotation and/or Purchase Order.
- 1.3** All UPS systems must be intelligent. They shall have an internal self testing & suitable diagnostic possible for maintenance. Also they shall be a suitable part for transmission of emergency alarms to the DCS/PLC and a suitable feedback from the DCS/PLC to sense the link. The vender shall submit his proposal for the purchaser's review and approval.

2.0 REFERENCES

Throughout this standard the following dated or undated standards/codes are referred to. These referenced standards shall, to the extent specified herein, form a part of this standard. For undated references, the latest edition of referenced document (including any supplement or 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 VENDOR/CONTRACTOR.

IEC (INTERNATIONAL ELECTROTECHNICAL COMMISSION)

IEC 60051-2	Direct Acting Indicating Analogue Electrical Measuring Instruments
IEC 60076	Power Transformers
IEC 60146	Semiconductor Converters
IEC 60289	Reactors
IEC 60445	Basic and safety Principles for Man-Machine Interface, Marking and Identification – Identification of Equipment and of Terminations of Certain Designated Conductors.
IEC 60529	Degrees of Protection Provided by Enclosures (IP Codes)
IEC 62040-3	Uninterruptible Power System (UPS) – part 3: Method of Specifying the Performance and Test Requirements

NIOEC-SP (NIOEC SPECIFICATIONS)

[NIOEC-SP-00-10](#) "NIOEC Specification for units"

3.0 UNITS

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

4.0 STANDARDS AND CODES

- 4.1** The uninterruptible power supply system (UPS) shall be constructed, wired and tested in accordance with all applicable sections of the latest edition of International Electrotechnical Commission (IEC).
- 4.2** Where reference is made to any other standard and code, it is understood that equivalent IEC will also be acceptable.
- 4.3** Any deviation from the above mentioned standards and this Specification shall be clearly mentioned in the vendor's proposal.

5.0 SERVICE CONDITIONS

Unless otherwise specified, in the data sheet the equipment under this Specification will be installed inside ventilated room/s with following conditions:

- maximum air temperature 40°C
- minimum air temperature 5°C
- relative humidity 90%

6.0 OPERATING PRINCIPLE

- 6.1** Each UPS unit shall consist of a rectifier/charger, an inverter, batteries, a static transfer switch, a maintenance bypass switch, a bypass transformer.
- 6.2** During normal operation, a source of alternating current will supply energy to the UPS unit. A rectifier converts incoming AC power to DC which supplies the inverter and charges the battery. The inverter changes the DC to AC power which supplies electrical energy to the critical loads through the static transfer switch.
- 6.3** The output of the rectifier shall continuously supply the power requirements of the load, through the inverter, while simultaneously maintaining the battery in the float charge mode.
- 6.4** In the event of an interruption or depression in the AC mains voltage, the battery shall supply the power requirements of the load via the inverter.
- 6.5** Upon restoration of the AC mains voltage, the rectifier shall supply the power requirements of the load via the inverter, while simultaneously recharging the battery.
- 6.6** The UPS unit shall be equipped with a static transfer switch and a bypass transformer. The output voltage and frequency of the inverter shall be kept synchronized with the bypass supply.
- 6.7** In case where the inverter voltage and frequency deviates from the specified tolerances, the static switch initiates uninterrupted transfer of the load to the bypass supply.
- 6.8** Upon restoration of the inverter output voltage and frequency, the load shall be transferred back to the inverter which resumes synchronous operation with the bypass supply.