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

NIOEC SP

NIOEC SPECIFICATION
FOR

AC UNINTERRUPTIBLE POWER SYSTEM

SECOND EDITION

JUNE, 2017

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 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.

REVISION INDEX

REV. PAGE	1	2	3	4	5	REV. PAGE	1	2	3	4	5	REV. PAGE	1	2	3	4	5	REV. PAGE	1	2	3	4	5
1	X					26						51						76					
2	X					27						52						77					
3	X					28						53						78					
4	X					29						54						79					
5	X					30						55						80					
6	X					31						56						81					
7	X					32						57						82					
8	X					33						58						83					
9	X					34						59						84					
10	X					35						60						85					
11	X					36						61						86					
12	X					37						62						87					
13	X					38						63						88					
14	X					39						64						89					
15	X					40						65						90					
16	X					41						66						91					
17						42						67						92					
18						43						68						93					
19						44						69						94					
20						45						70						95					
21						46						71						96					
22						47						72						97					
23						48						73						98					
24						49						74						99					
25						50						75						100					

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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CONTENTS:	PAGE NO.
1. SCOPE	2
2. REFERENCES.....	2
3. UNITS	3
4. GENERAL REQUIREMENTS.....	3
5. CONFIGURATION AND OPERATION.....	4
6. PERFORMANCE REQUIREMENTS	5
6.1. Electrical Requirements	5
6.2. Noise Limit.....	6
6.3. Electro Magnetic Compatibility (EMC)	6
7. BASIC CONSTRUCTION.....	7
7.1. GENERAL.....	7
7.2. Rectifier Units.....	8
7.3. Battery	9
7.4. Inverter Units	10
7.5. Bypass Circuit	11
8. TESTS AND INSPECTIONS	12
9. SPARE PARTS	12
10. DOCUMENTATION.....	12
11. PACKING AND SHIPMENT.....	13
12. GUARANTEES.....	13
APPENDIX A: AC UPS DATA SHEET.....	14
APPENDIX B: ARRANGEMENT OF UPS SYSTEM.....	16

1. SCOPE

This Specification covers the minimum technical requirements for the design, manufacture, quality control and testing of AC Uninterruptible Power Systems.

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 standards, shall be made through written consent and approval of NIOEC.

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 60051-2	Direct Acting Indicating Analogue Electrical Measuring Instruments
IEC 60076	Power Transformers
IEC 60146	Semiconductor Converters
IEC 60300	Dependability management
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 61000	Electro Magnetic Compatibility (EMC)
IEC 62040	Uninterruptible Power System (UPS)

IEEE (INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS)

IEEE 485	Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications
IEEE 1115	Recommended Practice for Sizing Nickel-Cadmium Batteries for Stationary Applications

ISO (INTERNATIONAL ORGANIZATION FOR STANDARDIZATION)

ISO 3746	Determination of sound power levels and sound energy levels of noise sources using sound pressure
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NIOEC-SP (NIOEC SPECIFICATIONS)

NIOEC-SP-00-10	NIOEC Specification for Units
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NIOEC-SP-00-11

NIOEC Specification for Site Conditions

NIOEC-SIP (NIOEC SHOP INSPECTION PROCEDURE)

NIOEC-SIP-60-00

Shop Inspection Procedure for Electrical Equipment

3. UNITS

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

4. GENERAL REQUIREMENTS

- 4.1.** The UPS shall be suitable for the NIOEC Specification for Site Conditions. (NIOEC-SP-00-11)
- 4.2.** AC UPS is normally installed in conditioned rooms but shall be designed for 40°C at least unless a higher temperature specified in datasheet.
- 4.3.** 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.
- 4.4.** The UPS shall consist of separate parts (rectifier, inverter, etc.) allowing easy maintenance, and shall be electronically regulated type.
- 4.5.** The UPS components viz. rectifier, inverter, static transfer switch and bypass manual switch shall be designed for continuous and reliable operation.
- 4.6.** To ensure minimum down time, The following criteria shall be complied as minimum:
- The mean time between failures (MTBF) for individual components shall be more than 200000 hours.
 - The mean time to repair (MTTR) of the UPS components shall not exceed one hour.
 - The availability of the overall system shall be greater than 99.99%.
- 4.7.** The manufacturer shall state in its bid the Availability, Reliability, MTBF and MTTR data for similar units in service. Availability calculations shall be based on IEC 60300.
- 4.8.** Reliability of equipment to perform continuously is essential. Prototype or unproven equipment not having a well-established operating record will not be considered.
- 4.9.** The design and selection of equipment and components shall be based on achieving 20 years minimum lifetime.