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

NIOEC SP

NIOEC SPECIFICATION
FOR

LARGE WELDED LOW PRESSURE STORAGE TANKS

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-G-ME-110 (Dec. 2013) 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 Standards.

The requirements given herein supplement and modify those of API Standard 620 "Large Welded Low-pressure Storage Tanks" eleventh edition, February 2008, Appendix Q "Low-pressure Storage Tanks for liquefied hydrocarbon gases and Appendix R "Low-pressure Storage Tanks for Refrigerated Products" of the said Standard. For ease of reference, API clause and paragraph numbers of the items supplemented are mentioned at the beginning of each clause or paragraph.

For the purpose of this specification, the following definitions shall hold:

Sub. (Substitution)	: The API Std. Clause is deleted and replaced by a new clause.
Del. (Deletion)	: The API Std. Clause is deleted without any replacement.
Add. (Addition)	: A new clause with a new number is added.
Mod. (Modification)	: Part of the API Std. Clause is modified, and/or a new description and/or condition is added to that clause.

1. SCOPE

- 1.1. This Specification covers the design of vertical cylindrical above ground single-wall and double wall storage tanks with cone and dome roofs.
- 1.2. This Specification is intended for use in design of large, welded low-pressure storage tanks to be used in oil refineries, chemical plants, marketing installations, gas plants, and where applicable, in exploration, production and new ventures.
- 1.3. Deviations from this specification will only be permitted on obtaining written approval from NIOEC.
- 1.4. 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.

2. REFERENCES

The following standards, codes, and specification, to the extent specified hereinafter, shall constitute a part of this NIOEC Specification. Latest edition of the undated referenced document 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.

API (AMERICAN PETROLEUM INSTITUTE)

API 620	"Large Welded Low Pressure Storage Tanks"
API 650	"Welded Steel Tanks for Oil Storage"

IPS (IRANIAN PETROLEUM STANDARD)

IPS-G-ME-110	"General Standard for Large Welded Low Pressure Storage Tanks"
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NIOEC-SP (NIOEC SPECIFICATIONS)

NIOEC-SP-00-10	“NIOEC Specification for Units”
NIOEC-SP-41-01	“NIOEC Specification for Storage Tanks Field Erected”

3. UNITS

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

**GENERAL STANDARD
FOR
LARGE WELDED LOW PRESSURE
STORAGE TANKS**

FIRST EDITION

OCTOBER 2005

This standard specification is reviewed and updated by the relevant technical committee on Dec. 2013. The approved modifications are included in the present issue of IPS.

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.17, Street14, North kheradmand

Karimkhan Avenue, Tehran, Iran.

Postal Code- 1585886851

Tel: 021-88810459-60 & 021-66153055

Fax: 021-88810462

Email: Standards@nioc.ir

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, National Petrochemical Company and National Iranian Oil Refinery And Distribution Company.

PURCHASER:

Means the "Company" where this standard is a 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.

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0. INTRODUCTION

This standard specification gives the amendments and supplements to API Standard 620, Eleventh Edition, February 2008 and Addendum 1: March 2009, Addendum 2: August 2010 and Addendum 3: March 2012 "Design and Construction of Large, Welded, Low-Pressure Storage Tanks".

It is intended that API standard together with this Standard shall be used for "large welded low pressure storage tank" for use in oil refineries, chemical plants, gas plants and where applicable, in exploration and production and new ventures.

For ease of reference, the clause or section numbering of API standard 620 has been used throughout this Standard.

All clauses in API standard 620 that are not mentioned here in this Standard remain unaltered and shall be considered as part of this Standard.

Note 1:

This Standard is a revised version and combination of three previous standards IPS-C-ME-110(0), IPS-E-ME-110(0), and IPS-M-ME-110(0). The original (0) edition of three standards is now withdrawn.

Note 2:

This standard specification is reviewed and updated by the relevant technical committee on Dec. 2013. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 408 on Dec. 2013. These modifications are included in the present issue of IPS.

Guidance for use of this Standard:

The following annotations as specified here under, 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 reference standards.

Sub. (Substitution): The API standard clause is deleted and replaced by a new clause.

Del. (Deletion): The API standard clause is deleted without any replacement.

Add. (Addition): A new clause with a new number is added.

Mod. (Modification): Part of the API standard clause is modified and/or a new description and/or condition are added to that clause. **(Add.)**

SECTION 1-SCOPE

1.1 GENERAL

1.1.1 This Standard covers the minimum requirements for design, material, construction, inspection and testing of vertical above ground single wall and double wall storage tanks with cone and dome roofs. Moreover it includes also general requirements about quotation, secrecy, packaging, shipment and guarantee of such equipments. **(Add.)**

1.4 Conflicting Requirements

In case of conflict between documents relating to the inquiry or purchase order the following priority of Documents, shall apply.

- First priority: purchase order (including attachments) and variations thereto
- Second priority: data-requisition sheets and drawings
- Third priority: this specification

All conflicting requirements shall be referred to the purchaser in writing. The purchaser will issue conforming documentation if needed for clarification. **(Add.)**

1.5 Units

International system of unit (SI) in accordance with [IPS-E-GN-100](#) and APPENDICES ZX & ZY shall be used wherever reference is made to API/ASME or shall be substituted by any other standard equivalent SI unit system for dimensions, fasteners and flanges. For pipe size the international nomenclature "diameter nominal" written as DN 1, 25, 40, 50 etc., has been used in accordance with ISO 6708-1995, ASME B16.5-2009 and ASME B31.3-2010. Also for pipe flanges pressure temperature ratings "pressure nominal" written as PN 20, 50, 64, etc., has been used in accordance with said standards. **(Add.)**

SECTION 2- REFERENCES

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

BSI (BRITISH STANDARD INSTITUTION)

BS EN 14620-1	"Design and Manufacture of Site Built, Vertical, Cylindrical, Flat-Bottomed Steel Tanks for the Storage of Refrigerated, Liquefied Gases with Operating Temperatures between 0°C and -165°C – Part 1: General"
BS EN 14620-2	"Design and Manufacture of Site Built, Vertical, Cylindrical, Flat-Bottomed Steel Tanks for the Storage of Refrigerated, Liquefied Gases with Operating Temperatures between 0°C and -165°C – Part 2: Metallic components"
BS EN 14620-3	"Design and Manufacture of Site Built, Vertical, Cylindrical, Flat-Bottomed Steel Tanks for the Storage of Refrigerated, Liquefied Gases with Operating Temperatures between 0°C and -165°C – Part 3: Concrete components"

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERS)

ASME B1.1	"Unified Inch Screw Threads (UN and UNR Thread form)"
ASME B31.3: 2010	"Process Piping"
ASME B16.5: 2009	"Pipe Flanges and Flanged Fittings"

ANSI (AMERICAN NATIONAL STANDARD INSTITUTE)

ANSI-ASC A14.3	"American National Standard for Ladders-Fixed Safety Requirements"
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ISO (INTERNATIONAL ORGANIZATION FOR STANDARDIZATION)

ISO 6708: 1995	"Pipework Components – Definition and Selection of DN (Nominal Size)"
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IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-GN-100	"Engineering Standard for Units"	
IPS-E-CE-500	"Engineering Standard for Loads"	
IPS-E-SF-140	"Engineering Standard for Foam Generating and Proportioning System"	
IPS-E-TP-100	"General Requirements for Paints"	
IPS-E-CE-120	"General Requirements for Foundations"	(Mod.)

SECTION 3 – DEFINITIONS**3.5.1 Manufacturer**

The party that manufactures or produces tank and / or component covered by this Standard. (Mod.)

3.5.2 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. (Sub.)

3.5.4 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. (Mod.)

3.5.5 Construction equipment

Means all tools, lifting and other equipment, transport, other construction plant, marine craft, temporary buildings, and other appliances or things of whatever nature require by contractor for the performance of the works but does not include materials or other things intended to form or forming part of the permanent works.

(Add.)

3.5.6 Contractor

Means the company, firm or consortium that has signed, and entered into the Contract, and is responsible to perform his duties according to the Contract Documents.

(Add.)

3.5.7 Technical specification

Means the requisition(s) and drawing together with all other specifications, procedures and technical requirements of the contract.

(Add.)

3.5.8 Materials

Means any materials, equipment, supplies and other items incorporated in or intended to be incorporated in the permanent works which are supplied by the contractor.

(Add.)

3.5.9 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.

(Add.)

3.5.10 Vendor and supplier

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

(Add.)