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

NIOEC SP

NIOEC SPECIFICATION
FOR
STORAGE TANKS FIELD ERECTED

FIRST EDITION

FEBRUARY, 2007

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

REVISION INDEX

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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. SCOPE

1.1 This NIOEC Specification covers the design, materials, fabrication, erection, inspection and testing of welded steel storage tanks in accordance with API standard 650.

1.2 Specification sheets describing individual tanks and appurtenances form part of this Specification.

1.3 Tanks will be erected at the site proposed by NIOEC.

1.4 Tanks will be erected on asphaltic concrete pads designed and built in accordance with [NIOEC-SP-00-04](#).

1.5 Process requirements will be given on the Data Sheet by the Purchaser and shall be complied by the Vendor. A blanked one is attached in Appendix I.

1.6 Order of Precedence

In the event of a conflict among the various documents, the order of precedence shall be as follows:

- The purchase order (including attachments) and variations thereon.
- The Data Sheets and drawings.
- This Specification.
- API 650 "Welding steel tanks for oil storage".

If conflict is discovered between the items listed, it shall be the responsibility of the Vendor to call attention to the conflict.

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-650 "Welded steel tanks for oil storage"

API-2000 "venting Atmospheric & low pressure storage tanks".

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERS)

ASME Sec. VIII Div. I "Rules for construction of pressure vessels"

NIOEC-SP (NIOEC SPECIFICATIONS)

NIOEC-SP-00-01	“NIOEC Specification for Civil Design Criteria”
NIOEC-SP-00-04	“NIOEC Specification for Foundation for Tanks”
NIOEC-SP-00-10	“NIOEC Specification for Units”
NIOEC-SP-00-11	“NIOEC Specification for Site Conditions”
NIOEC-SP-00-50	“NIOEC Specification for Design criteria for process & mechanics”
NIOEC-SP-41-06	“NIOEC Specification for Large Welded Low Pressure Storage Tanks”
NIOEC-SP-50-04	“NIOEC Specification for Piping Material Specification”
NIOEC-SP-80-02	“NIOEC Specification for Painting”

UBC (UNIFORM BUILDING CODE)

Edition 1997

3. UNITS

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

4. DEFINITIONS & TERMINOLOGY

- 4.1** “Employer” means: “National Iranian Oil Engineering & Construction Company”. (NIOEC)
- 4.2** “Purchaser” means: “National Iranian Oil Engineering & Construction Company”. When quoted in this Specification as part of a direct purchase order by NIOEC and “Contractor” where this Specification is part of contract documents.
- 4.3** “Vendor” means: The manufacturer from which the equipment is to be purchased.
- 4.4** “Fabricator” means: The Company which is responsible for the fabrication of the tank at site.
- 4.5** “Erector” means: The Company which is responsible for the erection of the tank at site.
- 4.6** “Contractor” means: The person, firm, company or consortium whose tender has been accepted by the Employer or legal successors in title to such person.

5. DESIGN**5.1 Design Data****5.1.1 Design wind load:**

- Earthquake load shall be in accordance with clause 4.1.9 of civil design criteria [NIOEC-SP-00-01](#) & API 650.

- Wind load shall be in accordance with Chapter 16 of U.B.C. as following:

- 1) Basic wind speed & exposure coefficient at site as per [NIOEC-SP-00-11](#) & API 650.
- 2) Design wind pressure shall be in accordance with the chapter 16 of UBC Vol. 2, Division III.

5.1.2 Design rainfall intensity:

The Vendor shall design the tanks for the rainfall intensity as specified on site condition except for open top floating roofs.

For this type of roof, with the deck at its low position at operating level with drain valve(s) closed and, assuming no pontoon compartment is punctured, the deck support legs shall be designed to support the greater of the following loads:

1. Rainfall of 250mm of water uniformly distributed all over deck
2. A live load of 1200N/m²

5.1.3 The snow load shall be considered as per [NIOEC-SP-00-11](#) "Site Conditions".

5.1.4 Maximum allowable soil bearing pressure shall be specified for the site.

5.2 Low pressure storage tanks such as those in utility service shall be designed in accordance with [NIOEC-SP-41-06](#).

5.3 Capacities given for individual tanks include allowance for freeboard vapor space and inaccessible bottom and no further allowance is required in establishing tank size. Capacity of floating roof tanks is the net volume to under side of the roof deck with seals in full operation. Any deviations from this Specification or from API 650 and its appendices shall be clearly stated and shall receive the written approval of NIOEC.

5.4 The design metal temperature shall be the lower of the lowest one day mean ambient temperature plus 8°C and the minimum temperature of the contents. The mean temperature is defined as one half of the sum of maximum temperature and minimum temperature.

5.5 Tank overall height and diameter shall be specified. Tank height shall be 14.63m (48 feet) for tanks 4,800 m³ and larger nominal capacity shall be defined by overall dimensions.

5.6 For tanks specified with conical roofs, Vendor may quote an alternate for supplying a self-supporting dome or umbrella roof where feasible and a cost saving can be made.

5.7 Vendor shall submit initial calculations, materials, sizes, weights, preliminary sketches and thicknesses for all tanks with his quotation.

5.8 When calculating for vacuum conditions during lowering of tank product in fixed roof tanks maximum gravity transfer conditions should also be considered.