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

NIOEC SP

NIOEC SPECIFICATION
FOR
SUPPLEMENTARY REQUIREMENT FOR HEAVY
WALL PRESSURE VESSELS
FOR HYDROTREATING AND HYDROCRACKING
SERVICES

FIRST EDITION

JULY, 2005

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

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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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0	JULY, 2005	M.A.MIRAHADI	M.H.ZAKER	M.R.FARZAM	M.A.A.SAJEDI
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1. SCOPE

This NIOEC Specification covers supplementary minimum requirements for design, fabrication, installation and testing of heavy wall pressure vessels built for Hydro treating and Hydro cracking services.

1.1 In addition to these requirements, General pertinent requirement, as outlined in [NIOEC-SP-41-03](#), in particular paragraph 11, shall also be considered.

1.2 The design, fabrication, test and inspection of unfired pressure vessels shall conform to ASME Code Sect. VIII, Div. 2, "ASME Boiler and Pressure Vessel Code".
All requirements of Division 2, shall be followed plus those noted in this Specification.

1.3 These requirements constitute in part the design Specification as required and defined in Paragraph A-301 of Division 2.
Other parts of this Project Specification define the operating and/or design conditions, dimensions, materials to be used in fabrication, the method of vessel support and other pertinent information.

1.4 The manufacturer who fabricates the vessel has the responsibility of complying to the requirements of Paragraph A-302 of Division 2. It will be his responsibility, in case of any conflicts between these Specifications, drawings and other pertinent documents, to satisfy the discrepancy with the appropriate party, along with approval by NIOEC.

1.5 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.
- ASME Code Section VIII, Div. 2 "Alternative Rules".

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.

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERS)

ASME Code Sect. VIII, Div. 2	“Boiler & Pressure Vessel Code, Alternative Rules”
ASME Code Sect. II	“Materials”
ASME Code Sect. V	“Nondestructive Examination”
ASME Code Sect. IX	“Welding & Brazing Qualifications”

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)**UBC (UNIFORM BUILDING CODE)**

Edition 1997

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERS)

B1.1	“Unified Screw Thread”	Edition 1989
B1.20.1	“Pipe Thread”	Edition 1983
B16.5	“Steel Pipe Flanges and Flanges Fitting”	Edition 1996
B18.2.1	“Square and Hex Bolts and Screw”	Edition 1996
B18.2.2	“Square and Hex Nuts”	Edition 1987
B36.10	“Welded and Seamless Wrought Steel Pipe”	Edition 2000

NIOEC-SP (NIOEC SPECIFICATIONS)

NIOEC-SP-20-01	“NIOEC Specification for Structural Steel Specification”
NIOEC-SP-80-02	“NIOEC Specification for Painting”
NIOEC-SP-00-50	“NIOEC Specification for Design Criteria”
NIOEC-SP-00-01	“NIOEC Specification for Civil Design Criteria”
NIOEC-SP-50-04	“NIOEC Specification for Piping Material Specification”
NIOEC-SP-00-11	“NIOEC Specification for Site Conditions”
NIOEC-SP-00-10	“NIOEC Specification for Units”

NIOEC-SD (NIOEC STANDARD DRAWINGS)

Applicable standard drawings shall be those shown in Appendix I of this Specification.

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 “Erector” means: The Company which is responsible for the erection of the vessel at site.

4.5 “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. GENERAL

5.1 The Contractor, Purchaser or user shall supplement this document with the required additional design information necessary for the fabrication of the vessel(s). The complete package shall be supplied to the vessel fabricator as the User’s Design Specification per Paragraph A-301 of Division 2.

5.2 Code Stamp

ASME U-Stamp is required, unless otherwise specified. In any case the manufacturer shall be internationally reputable for manufacturing such equipment and shall hold valid authorization to use ASME U-Stamp.

6. DESIGN

6.1 Design Pressure and Temperature

6.1.1 Design pressure and temperature shall be as per clause 5.1 of [NIOEC-SP-00-50](#) “Design Criteria”.

6.2 Minimum Diameter

6.2.1 The normal minimum diameter shall be 914mm (36”) ID for vessels requiring removal of internals, except where internals can be removed as one unit or vessel is flanged in short sections.

6.2.2 Special approval by NIOEC is required for vessels with internals with an absolute minimum diameter of 760 mm (30”) where provision for removal of trays through man way below trays shall be provided.

6.3 Loading Conditions

6.3.1 All combinations of loads shall be considered to determine the maximum design stress conditions for design as follows:

- a)** Hydrostatic test loads shall be considered simultaneous with 20% of wind load, and not coincident with snow and earthquake loads.
- b)** Earthquake loads shall not be considered, simultaneous with wind loads.

6.3.2 Specified loads due to earthquake, and climatic conditions shall be specified. Should other loads such as listed below be of significance for the purposes of vessel design those shall also be specified.

- a)** Erection loads: The loading to cover loads during construction.
- b)** Overhaul loads: The maximum maintenance loading conditions including