

NIOEC-SP-44-05(0)							
DOCUMENT CODE							NO. OF PAGES: 17
PLAN/PRJ/SUB	UNIT	PHASE	DISCIPLINE	DOCUMENT TYPE	SERIAL NO.	REV. NO.	DATE
NIOEC	000	EG	ME	SP	4405	A0	JUNE, 2015



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

NIOEC SP

NIOEC SPECIFICATION
FOR

PLATE AND FRAME HEAT EXCHANGERS

FIRST EDITION

JUNE, 2015

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						26						51						76					
2						27						52						77					
3						28						53						78					
4						29						54						79					
5						30						55						80					
6						31						56						81					
7						32						57						82					
8						33						58						83					
9						34						59						84					
10						35						60						85					
11						36						61						86					
12						37						62						87					
13						38						63						88					
14						39						64						89					
15						40						65						90					
16						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.

5					
4					
3					
2					
1					
0	JUNE, 2015	M.MIR AHADI	G.ANVARY	M.R.FARZAM	A.ARMAN MOGHADAM
REV.	DATE	PREPARED	CHECKED	APPROVED	AUTHORIZED

CONTENTS:	PAGE NO.
1. SCOPE	2
2. REFERENCES.....	2
3. UNITS	3
4. DEFINITIONS & TERMINOLOGY	3
5. ABBREVIATIONS	3
6. DESIGN	4
6.1. Thermal Design	4
6.2. Mechanical Design	5
7. FABRICATION	9
7.1. Welding – General	9
7.2. Welding Procedure and Welder’s Performance Qualifications	10
7.3. Acceptable Welding Processes	10
7.4. Filler Metal Requirements	10
7.5. Joint Preparation	11
7.6. Alloy Linings	11
7.7. Cleaning Requirements	12
7.8. Weld Contour	12
7.9. Stress relieving Requirements	12
7.10. Weld Visual Inspection.....	13
7.11. Radiography	13
7.12. Liquid Penetration Examination.....	13
7.13. Ultrasonic Examination.....	13
7.14. Testing Welds in Sour Service	13
7.15. Tolerances.....	14
8. INSPECTION AND TEST.....	14
9. SPECIAL REQUIREMENTS FOR HEAT EXCHANGERS ON HYDROGEN SERVICE (PARTIAL PRESSURE OF H ₂ 5 bar(A) or GREATER)	15
10. PREPARATION FOR SHIPMENT	15
11. SPARE PARTS & TOOLS	16
12. ADDITIONAL INFORMATION TO BE SUPPLIED AGAINST PURCHASE ORDER	16
APPENDIX I: STANDARD DRAWINGS.....	17

1. SCOPE

This Specification defines NIOEC's minimum requirements for design, fabrication, test and inspection of Plate and Frame Heat Exchanger.

- 1.1. Any deviation from this Specification shall be explicitly indicated by the Vendor for the employer's review and acceptance.
- 1.2. Approval of Vendors' drawings shall not relieve the Vendor from responsibility with regard to performance of the equipment specified therein.
- 1.3. Process requirements for each heat exchanger will be given on the "Process Data Sheet" which will be compiled by the Purchaser and submitted to the Vendor. Process Data Sheet shall conform to API662/ISO15547.
- 1.4. The design, fabrication, test & inspection of Plate & Frame type heat exchangers shall conform to API 662/ISO15547, & section VIII, Div.1 of ASME.

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 IPS and the international 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.

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERS)

Sec VIII Div.1	"ASME Boiler and Pressure Vessel Code"
Section II	"Materials"
Section V	"Nondestructive Examination"
Section IX	"Welding & Brazing Qualifications"
ASME B.1.1	"Unified Screw Thread"
ASME B.1.20.1	"Pipe Thread"
ASME B.16.5	"Steel Pipe Flanges and Flanged Fittings"
ASME B.16.20	"Metallic Gaskets for Pipe Flanges"
ASME B.16.47	"Large Diameter Steel Flanges"
ASME B18.2.1	"Square and Hex Bolts and Screw"
ASME B18.2.2	"Square and Hex Nuts"
ASME B36.10	"Welded and Seamless Wrought Steel Pipe"
ASME B46.1	"Surface Texture, Surface Roughness, Waviness and Lay"

API (AMERICAN PETROLEUM INSTITUTE)

API 662/ISO15547	"Plate Heat Exchangers for General Refinery Services"
API RP-521	"Guide for Pressure-Relieving & Depressuring Systems"

ASTM (AMERICAN STANDARDS FOR TESTING AND MATERIALS)**NACE (NATIONAL ASSOCIATION OF CORROSION ENGINEERING)**

MR-0103

MR-0175

NIOEC SP (NIOEC SPECIFICATION)

NIOEC-SP-80-02	“NIOEC Specification for Painting”
NIOEC-SP-50-04	“NIOEC Specification for Piping Material Specification”
NIOEC-SP-90-02	“NIOEC Specification for Welding Shop and/or Field Fabricated Piping”
NIOEC-SP-00-50	“NIOEC Specification for Design Criteria for Process & Mechanic”
NIOEC-SP-00-01	“NIOEC Specification for Civil Design Criteria”
NIOEC-SP-00-10	“NIOEC Specification for Units”
NIOEC-SP-00-11	“NIOEC Specification for Site Conditions”

Standard Drawings

Applicable Standard Drawings as compiled in the list of Appendix I.

3. UNITS

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

4. DEFINITIONS & TERMINOLOGY

This section contains definitions for the terms as they are used in this document.

Employer: “National Iranian Oil Engineering & Construction Company”. (NIOEC)

Purchaser: “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.

Vendor: The manufacturer's from which the equipment is to be purchased.

Contractor: The party which carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility.

Inspector: The inspector or engineer by the Purchaser and acting as the Purchaser's representative, the inspector's or engineer's respective assistants properly authorized and limited to the particular duties assigned to them, or the Purchaser acting as the inspector.

5. ABBREVIATIONS

A.W.S.: American Welding Society