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

NIOEC SP

NIOEC SPECIFICATION FOR GENERAL PIPING – PROCESS & UTILITY FABRICATION AND FIELD INSTALLATION

FIRST EDITION

FEBRUARY, 2008

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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 on going 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-C-PI-240](#)(2), dated Nov. 2008 with the considerations as specified herein after shall be strictly followed.

Articles 1 through 4 of this document replace entirely the related articles in the referenced IPS Standard.

1. SCOPE

All shop or field fabrication, assembly and installation of process and utility piping system in petroleum plants shall be performed according to relevant sections of ASME B.31.1 and B.31.3 as applicable.

Additional requirements are specified in this Specification. In case of conflict between this Specification and above mentioned ASME standards, the requirements of this Specification shall govern.

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

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 B.1.20.1 "Pipe Threads, General Purpose"

ASME B.31.1 "Power Piping"

ASME B.31.3 "Process Piping"

IPS (IRANIAN PETROLEUM STANDARD)

IPS-C-TP-352 "lining"

NIOEC-SP (NIOEC SPECIFICATIONS)

[NIOEC-SP-00-10](#) "NIOEC Specification for Units"

[NIOEC-SP-50-01](#) "NIOEC Specification for General Piping, Process and Utility

	Design Equipment Layout and drawing procedure”
NIOEC-SP-50-04	“NIOEC Specification for Piping Material”
NIOEC-SP-50-05	“NIOEC Specification for Field Pressure Testing”
NIOEC-SP-50-07	“NIOEC Specification for Cleaning and Protection of Piping”
NIOEC-SP-50-08	“NIOEC Specification for Winterizing and Heat Conservation”
NIOEC-SP-50-17	“NIOEC Specification for Protection of Underground steel pipe”
NIOEC-SP-50-23	“NIOEC Specification for Pipe Support Element”
NIOEC-SP-70-07	“NIOEC Specification for Instrument and Control System Calibration Inspection and Test”
NIOEC-SP-80-01	“NIOEC Specification for Insulation”
NIOEC-SP-80-02	“NIOEC Specification for Painting”
NIOEC-SP-90-02	“NIOEC Specification for Welding of Plant Piping System”

NIOEC-SD (NIOEC STANDARD DRAWINGS)

NIOEC-SD-5001-A1	"Steam Tracing Details"
NIOEC-SD-5006-A3	“Standard Pipe Support”
NIOEC-SD-5025-A0	“Symbols Valves, Fitting & Misc’ Components for Piping Drawings”
NIOEC-SD-5030-A1	“Liquid Level Controllers and Level Glasses Hydrocarbon Service”
NIOEC-SD-7002-A3	“Installation and Assemblies of Knife Edge Tube Skin Thermocouple”
NIOEC-SD-7003-A3	“Flanged Thermo well Detail Selection Chart for Thermocouples, RTD, BI Metallic Thermometers & Test Wells Instruments Installation Standard”

2.1 Equivalent to IPS Standard

Substitute the following IPS Standards as referred to throughout [IPS-C-PI-240](#) to relevant NIOEC's Specifications as follows:

<u>IPS Standard</u>	<u>Relevant NIOEC Specification</u>
IPS-C-PI-290	NIOEC-SP-90-02
IPS-C-PI-350	NIOEC-SP-50-05
IPS-G-PI-280	NIOEC-SP-50-23
IPS-C-TP-101	NIOEC-SP-80-02
IPS-C-TP-102	NIOEC-SP-80-02
IPS-C-TP-274	NIOEC-SP-50-17

IPS-C-TP-352	-
IPS-C-TP-701	NIOEC-SP-80-02
IPS-E-TP-100	NIOEC-SP-80-01
IPS-C-PI-410	NIOEC-SP-50-07
IPS-C-PI-240	NIOEC-SP-50-02
IPS-E-PI-240	NIOEC-SP-50-01
IPS-E-PR-420	NIOEC-SP-50-08
IPS-C-IN-100	NIOEC-SP-70-07
IPS-D-PI-126	NIOEC-SD-5001-A1

3. UNITS

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

4. DEFINITIONS AND TERMINOLOGY

4.7. "BOM" denotes "Bill of Material"

4.8. "FW" denotes "Field weld". All field welds located by dimension shall be held to dimensions as noted. Additional field welds, other than those indicated on the spool, which may be required to suit handling shall be added by the contractor.

4.9. "FFW" denotes "Field weld for field fit-up". With an addition 75mm plus material on the spool length, flame cut end, no bevel, for field fit-up.

4.10. "F.S" denotes "Field support".

4.11. "P.U" denotes "Field pick up".

4.12. "QA" denotes "Quality Assurance"

4.13. "QC" denotes "Quality Control"

4.14. "NDT" denotes "Non-Destructive Testing".

4.15. "PTFE" denotes "Polytetrafluoroethylene".

4.16. "WPQTR" denotes "Welder and Welding Operator Performance Qualification Test Record"

4.17. "WPQR" denotes "Welding Procedure Qualification Record"

5. CHANGE THE FOLLOWING ARTICLES IN IPS-C-PI-240(2)

This addendum revises the below listed articles of the referenced standard as follows:

ARTICLE: 7.1.1. (Substitution)

All material included in the finished piping system shall be new, undamaged & fully in accordance with the piping material indicated on Isometric/Piping plan Drawing and in accordance with Piping Material Engineering Standard [NIOEC-SP-50-04](#).

To be added ARTICLES 7.5.5. to 7.5.10. as follows:

7.5.5. Screwed pipe joints shall be seal welded when called for in standard specification for piping material [NIOEC-SP-50-04](#) or as indicated on the piping Isometric/ drawings except normally for control valves, gauge glasses, level controllers and alarms, thermo wells, pressure gauge, union nuts, drain valve, outlet plugs or caps, vent plugs or caps, steam traps, screwed relief valves.

7.5.6. All screwed joints to be seal welded shall be made up dry. Sealing compound shall not be used where seal welding shall be applied. Seal tape shall be entirely removed from any screwed joint to be seal welded prior to the welding.

7.5.7. Minimum joint make-up shall be based on the following "Normal Engagement"(N.E) table:

NPS	1/8	1/4	3/8	1/2	3/4	1	1¼	1½	2
N.E	6mm	10mm	10mm	13mm	14mm	17mm	17mm	17mm	19mm

7.5.8. Screwed pipe joints must be made up with care. When compounds are required, the correct compound shall be used in accordance with Piping Material Engineering [NIOEC-SP-50-04](#).

7.5.9. Seal welding shall cover the exposed pipe threads at screwed fittings but shall not exceed 10 mm fillet.

7.5.10. Temporary vent plugs which have been temporary utilized for pressure test and/or cleaning/blowing of piping shall be seal welded after completion of relevant work.

ARTICLE: 7.7. (Substitution)

Branch connection shall be in accordance with standard specification for piping material NIOEC-SP-50-04.

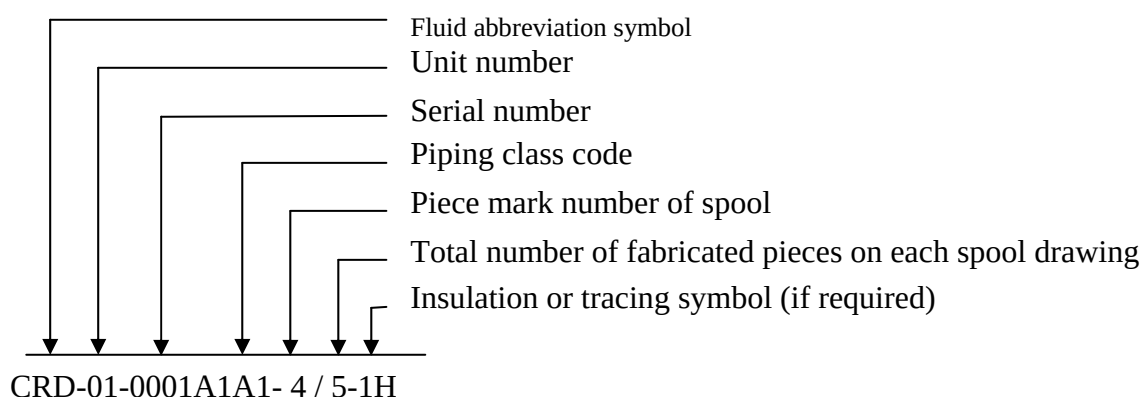
ARTICLE: 7.12. (Additions)

7.12.1. Spool drawing numbers are same as the line numbers.

Example: Line number CRD-01-0001A1A1-4/5-IH is shown on spool drawing number CRD-01-0001 A1A1

7.12.2. Each fabricated spool piece shall have a mark number painted adjacent to 50mm wide color bands running completely around the pipe, except that for austenitic chrome nickel, nickel, or high nickel alloy, the painted mark number shall be replaced by a metal tag securely attached to the pipe with metal straps.

Example:



Note: Metal tags shall follow the same pattern as painted Numbers and contain the same information.

7.12.3. Piece mark numbers and field welds for shop/field fabricated pipe spool pieces are indicated on spool drawings. Pieces are to be sectionalized dimensions suitable for transportation and erection. In case of sea transportation and inland transportation, the case size, for packing shall be as per separate procedure for transportation.

7.12.4. Pieces of any one line number shall be marked consecutively in the direction of flow.

To be added Articles 7.4.8 and 7.4.9 and 7.4 as follows:

7.4.8. Reinforcing pads shall not be installed except where called for on spool drawings. Basic material shall be the same as the pipe material unless otherwise approved in writing. Fabrication details shall be in accordance with ASME code. Drawings will specify diameter and pad thickness. It is preferable to have padded shapes the same but pad size may be altered provided equivalent cross-sectional area is maintained and code requirements are met.

7.4.9. Insulation shoes, anchors, guides, support clips, insulation anti lip bars, miscellaneous brackets and welded attachments shall be welded on all heat treated

alloy or stress-relieved carbon steel pipe before heat treatment. Fabrication of insulation shoes shall be per drawing SD-5006-A3.

To be added Articles 8.1.4 to 8.1.8 as follows:

- 8.1.4.** Spool drawings to show each line complete with all items attached, welded, or required or assembly, except for insulation shoes on non-stress relieved carbon steel lines.
- 8.1.5.** Spool Bill of material supplied to include piping materials and conform to the piping material specifications [NIOEC-SP-50-04](#) and inline instrument items which includes relief valves, control valves and steam traps.
- 8.1.6.** The lengths of welded piping shown on Spool Bill of material to be total net, only, but surplus material for piping shall be defined as per line size from summary Total Bill of Material.
- 8.1.7.** Flanges and fittings which differ from the line material specifications are so noted on the spool drawings.
- 8.1.8.** Reducers are concentric unless otherwise noted.

ARTICLE: 8.6.5 (Addition)

Valve requiring special trim and/or packing will be so noted in Piping and Instrument Diagrams / Isometric and contractor shall take care to install this type of valve only.

ARTICLE: 8.12 Pipe Supports (Modification)

To be added Articles 8.12.1 to 8.12.3 as follows:

- 8.12.1.** All piping shall be adequately supported, anchored, guided or strutted to prevent undue vibration, deflection stress or strain on any piping or equipment, in accordance with NIOEC-SP-50-23 and Standard Drawings NIOEC-SD-5006-A3, 5018, 5019 or as detailed on piping drawing.
- 8.12.2.** All piping shall be completely installed from origin to terminus before anchoring. Expansion joints shall be cold set. Shipping bars shall only be removed after the expansion joint(s) is installed.
- 8.12.3.** Spring hangers for support of lines or equipment are located and identified on piping drawings. Adjustment to correct setting shall be made in the field after each lines has searched operating temperature. Details of all hangers shall be submitted and also setting and details, marked on individual hangers.

ARTICLE: 8.13 (Substitution)

8.13.1. Steam tracing shall be installed as per [NIOEC-SP-50-08](#) and related detail drawings.

8.13.2. Spool drawing and/or piping plan drawings for steam tracing lines from the first block valve next to steam supply or condensate return headers up to main line (to be steam traced) shall be provided by construction contractor.

ARTICLE:8.14 Internal Cleaning (Modification)

To be added Articles 8.14.3 to 8.14.7 as follows:

8.14.3. Flushing through control valves, plug valves, safety valves, other special valves, instrumentation devices, pumps, compressors and any equipment (which should not be flushed) is not permitted.

8.14.4. Construction contractor shall provide facilities to allow for ample volumes and sufficient pressure and velocities of flushing fluid, this must be maintained for sufficient time to clean pipe lines, prior to issue notification of completion.

8.14.5. All equipment that should not be flushed shall be blocked off, blended or disconnected.

8.14.6. Spool pieces shall be installed in place of Positive Displacement (P.D.) meters and strainers during line flushing. Orifice plates shall be removed during flushing.

8.14.7. All pre-fabricated pipe spools, fittings, etc. shall be cleaned internally and externally before erection.

ARTICLE: 11 (Substitution)

Lines to be insulated will be so noted on spool and/or piping plan drawings and shall be insulated in accordance with [NIOEC-SP-80-01](#).

3" and large hot insulated lines shall be elevated on shoes to provide continuous insulation at supports. Care should be taken in matching face of shoe to pipe and to omit any weld undercut. On sleeper way omit insulation shoes on carbon steel lines if the maximum operating temperature is 345°C or less, except as follows: Lines 18" and over must be checked to determine the need for support point wear plates. Vacuum lines are excluded and special design required.



IRANIAN PETROLEUM STANDARDS

استانداردهای نفت ایران

IPS

IPS-C-PI-240 (2)

CONSTRUCTION STANDARD
FOR
PLANT PIPING SYSTEM

SECOND REVISION
NOVEMBER 2008

استاندارد اجرایی
برای
سیستم لوله کشی داخل کارخانه

ویرایش دوم
آبان ۱۳۸۷