

NIOEC-SP-50-50(0)							
DOCUMENT CODE							NO. OF PAGES: 16
PLAN/PRJ/SUB	UNIT	PHASE	DISCIPLINE	DOCUMENT TYPE	SERIAL NO.	REV. NO.	DATE
NIOEC	000	EG	PL	SP	5050	A0	OCT., 2005



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

NIOEC SP

NIOEC SPECIFICATION FOR PIPELINE DESIGN CRITERIA

FIRST EDITION

OCT., 2005

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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	OCT., 2005	M.R.HABIBZADEH	G.R.KHOSHROO	M.R.FARZAM	M.A.A.SAJEDI
REV.	DATE	PREPARED	CHECKED	APPROVED	AUTHORIZED

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1. SCOPE

- 1.1** This design criterion covers the general requirements to be implemented in the design of pipeline transportation systems for liquid hydrocarbons and other liquids.
- 1.2** Included in the scope are the following installations:
- Tie-in connections at river & road crossing separators.
 - Pumping and / or scraper trap station.
 - Terminals
 - Any intermediate sectional and isolating valves and other installations directly associated with the pipelines, such as vent & drain valves.
- 1.3** The engineering and design requirements which have not been mentioned in this specification, shall be referred to [NIOEC-SP-50-63](#).

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 5L Specification for Line Pipe

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERS)

ASME B16.5 Steel pipe flanges and flanged fittings

ASME B31.4 Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids

MSS (MANUFACTURERS STANDARDIZATION SOCIETY)

MSS-SP-44 "Steel Pipeline Flanges"

NIOEC-SP (NIOEC SPECIFICATIONS)

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

[NIOEC-SP-50-62](#) NIOEC Specification for Transportation Pipeline (Onshore) Pressure Testing

[NIOEC-SP-50-63](#) NIOEC Specification for Pipeline Engineering

[NIOEC-SP-60-24](#) NIOEC Specification for Cathodic Protection System

[NIOEC-SP-80-01](#) NIOEC Specification for Insulation

[NIOEC-SP-80-51](#) NIOEC Specification for Three Layers Polyethylene Coating System

[NIOEC-SP-90-51](#) NIOEC Specification for Welding of Transportation Pipeline

3. UNITS

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

4. DEFINITION OF PIPELINE

- 4.1** Main oil trunk line defined as the piping, valves, and fittings between the main block valve on the pumping station outlet line and the main block valve on terminal inlet line, but excluding piping, valve, and fittings corresponding to main-line block valves and / or other intermediate station facilities piping.

5. PROCESS DESIGN

- 5.1** The effects of surge in main product pipeline shall be checked using an appropriate method of calculations.
- 5.2** Hydraulic design of pipeline shall include summer and winter conditions.
- 5.3** Velocity limitation and pressure drop calculations shall be in accordance with [NIOEC-SP-50-63](#).

6. MECHANICAL DESIGN

6.1 General

- 6.1.1** Facilities shall be provided on all pipelines to enable the lines to be pigged before commissioning and on "main oil lines" during operation.
- 6.1.2** Adequate means of isolation must be provided to enable all sections of pipelines and associated piping to be hydrostatically tested.
- 6.1.3** Vent and drain connections shall be provided where necessary for satisfactory commissioning and operation.

NOTE

Drain connection shall be seen only at on-plot piping.

- 6.1.4** Insulating joints shall be provided where necessary in cathodically protected lines and where the pipeline enters into the pumping stations, etc. Particularly to isolate unprotected installations from protected Installations. In lieu of insulating joint on small river overcrossings, the pipeline may be insulated from all supports and unprotected facilities.

6.2 Pipeline Wall Thickness

- 6.2.1** Liquid pipelines shall be designed to operate at maximum expected operating pressure in steady state conditions at a maximum hoop stress in the pipe wall of 72% of the specified minimum yield strength of the pipe steel, in accordance with ASME code B31.4.
- 6.2.2** The calculated effects of transient surge due to sudden closure of valves or stoppage of pumps, etc., shall not increase the maximum hoop stress to more than 79.2% of the specified minimum yield strength of the pipe steel when operating at maximum pressures and flow rates.
- 6.2.3** Pipeline wall thickness shall be sufficient to satisfy the above mentioned design conditions, subject to the pressure / temperature limitations given in ASME codes