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

NIOEC SP

NIOEC SPECIFICATION FOR BIDIRECTIONAL METER PROVERS

FIRST EDITION

JULY, 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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1. SCOPE

2.1 This specification defines NIOEC's requirements for the design, test and shipment of bidirectional meter provers to be used for calibration of Turbine or Positive Displacement Meters.

2.2 The completed meter prover shall comply with this specification. Any exceptions taken shall be specified by the vendor.

Deviations from this specification will only be permitted on obtaining written approval from NIOEC.

2. REFERENCE

Throughout this specification the following dated and undated standards and 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 the dated references that occur after the cited date shall be mutually agreed upon by NIOEC and the vendor /contractor.

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERS)

ASME B31.3 "Process Piping"

ASME Section IX "Welding Qualifications"

API (AMERICAN PETROLEUM INSTITUTE)

API Manual of Petroleum Measurement Standards Chapter 4 "Proving Systems"

API Manual of Petroleum Measurement Standards Chapter 5 "Liquid Metering"

API Manual of Petroleum Measurement Standards Chapter 8
" Sampling"

ASTM (AMERICAN SOCIETY FOR TESTING OF MATERIALS)

ASTM A53, Grade B or API 5L, Grade B "For Pipe Design"

ASTM A 105-71 and/or A181-68 Grade I or II "For Flanges"

ASTM A234-WPB "For Fittings"

ASTM A193 Grade B7 "For Bolts"

ASTM A194 Grade 2H "For Nuts"

AWS (AMERICAN WELDING SOCIETY)

BASEEFA (BRITISH APPROVALS SERVICE FOR ELECTRICAL EQUIPMENT IN FLAMMABLE ATMOSPHERES)

CENELEC (COMITÉ EUROPÉEN DE NORMALISATION ELECTROTECHNIQUE)

CSA	(CANADIAN STANDARD ASSOCIATION)
FM	(FACTORY MUTUAL)
IEC	(INTERNATIONAL ELECTRO-TECHNICAL COMMISSION) IEC 60079 “Electrical Apparatus for explosive gas Atmosphere” IEC 60529 “Degrees of protection provided by enclosures”
NIOEC-SP	(NIOEC SPECIFICATIONS) NIOEC-SP-00-10 “Specification for Units” NIOEC-SP-00-55 “Specification for Piping & Instrumentation Diagrams (P & IDs)”
UL	(UNDERWRITERS' LABORATORIES)

3. UNITS

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

4. DEFINITIONS

In cases where this specification is part of a direct order, Purchaser shall mean National Iranian Oil Engineering and Construction Company. Where this specification forms part of contract documents, Purchaser shall mean Contractor. In references to inspection by Purchaser, when this specification forms part of contract documents this shall be construed to mean that NIOEC shall also have the right of inspection.

5. DESIGN-GENERAL

5.1 The meter prover shall be “U” type or “Straight” type bidirectional designed for a minimum volume between detector switches of 0.5% of the maximum hourly flow rate of the largest meter being proved.

5.2 The 'k' factor of the meters and the volume between switches in the prover shall be sufficiently high to generate a minimum of 10,000 pulses between switches for one-way trip.

5.3 The number of pulses generated for one-way trip shall be stated in vendor's proposal.

5.4 Internal configuration shall be designed to allow complete drainage to facilitate change-over of liquid from one type of product to another type.

5.5 A removable spool piece shall be provided at the inlet and outlet of the 4-way valve with the spectacle blind flanges and connection flanges to allow flushing of the prover before re-calibration of the prover utilizing the test measure cans or master meter. Pressure and temperature gauges shall be located close to prover inlet/outlet to ensure realistic measurements during re-calibration test.

5.6 The diameter of the prover ends (chambers) shall be sufficient to facilitate easy insertion and retraction of the ball and inclined from the horizontal at least 60°.