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

NIOEC SP

NIOEC SPECIFICATION FOR PROTECTION OF PLANT UNDERGROUND STEEL PIPES

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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0	JULY,2005	M.TAVARI	S.PAKDEL	M.R.FARZAM	M.A.A.SAJEDI
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1. SCOPE

- 1.1 This Specification covers the minimum requirements for initial construction of coating of underground steel lines in Refineries and other process plant services.
- 1.2 This specification is intended for use for installation of material, and is supplemented by manufacturer's specific instructions for storage, handling and use of the material.
- 1.3 Any conflicts between this specification and manufacturers application instructions shall be resolved prior to award of purchase order.
- 1.4 The work shall be performed at the site designated by National Iranian Oil Engineering & Construction Company.
- 1.5 Three basic systems of coat and wrap systems are described in this specification, as follows:
- a) Hot applied coal tar enamel
 - b) Cold applied tape system
 - c) Fusion-bonded epoxy coating (FBE)

The job specification or alternatively contractor's offer shall state which system is to be applied. A combination may also be offered for hot applied coal tar enamel with field joints protected with cold applied tape system as herein described.

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)

SPEC 5L "Specification for Line Pipe"

AWWA (AMERICAN WATER WORKS ASSOCIATION)

AWWA C 203(2002) "Coal Tar Protective Coatings and Lining for Pipelines- Enamel and Tape-Hot Applied"

AWWA C 210(1997) "Liquid Epoxy Coating Systems For The Interior And Exterior Of Steel Water Pipelines"

AWWA C 209(2000) "Cold Applied Tape Coating for the Exterior at Special Sections"

AWWA C 213(2001) "Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines"

AWWA C 214(2000) "Tape Coating Systems for the Exterior of Steel Water Pipeline"

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-C-PI-140	"Onshore Transportation Pipelines"
IPS-E-TP-270	"Protective Coatings"
IPS-M-TP-105	"Asphalt Mastic (cold applied)"
IPS-M-TP-275	"Fast Drying Synthetic Primer".
IPS-M-TP-280	"Coal Tar Primer (Cold Applied)"
IPS-M-TP-290	"Coal Tar Enamel (Hot Applied)"
IPS-M-TP-300	"Glass Fiber Mat for Inner Wrap"
IPS-M-TP-305	"Coal Tar Impregnated Glass Fiber Mat for Outer Wrap"
IPS-M-TP-310	"Cold Applied Laminated Plastic Tape for Inner Layer"
IPS-M-TP-311	"Cold Applied Laminated Plastic Tape for Outer Layer"
IPS-M-TP-313	"Hand Applied Laminated Tape Suitable for Cold Applied Coating Systems"
IPS-M-TP-317	"Hand Applied Petrolatum Tape And Primer"
IPS-M-TP-321	"Primer for Use with Cold Applied Plastic Tape"
IPS-M-TP-322	"Primer for Use with Hand Applied Laminated Tape Suitable for Cold Applied Coating Systems"

ISO (INTERNATIONAL ORGANIZATION FOR STANDARDIZATION)

8501-1(1988)	"Rust Levels of Steel Structure and Quality Levels for Preparation of Steel Surfaces for Rust Protecting Surfaces"
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NIOEC-SP(NIOEC.SPECIFICATION)

NIOEC-SP-00-10	"NIOEC Specification For Units"
NIOEC-SP-50-02	"NIOEC Specification For General Piping Process And Utility Fabrication And Field Installation."

3. UNITS

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

4. GENERAL REQUIREMENTS**4.1 General Condition for Application**

- 4.1.1** Weather is an externally important condition that must be taken into consideration during any coating application. The temperature and humidity limits for each coating shall be considered.

4.1.2 The coating shall not be applied under windy conditions.

4.1.3 The coating shall not be applied where the temperature is less than 3°C above the dew point.

4.1.4 The coating shall not be applied on wet or damp surface, as adhesion will be affected.

4.1.5 The coating shall not be applied when the ambient temperature is less than 4°C.

4.2 Coating Materials

4.2.1 Only coating system which comply with this specification shall be used.

4.2.2 When the Contractor supplies coating materials, the materials shall be certified by the NIOEC ensuring that all coating materials comply with all of the provisions contained in the relevant IPS Material Standards for coating, originally and prior to application and contractor may make any investigations necessary, by way of testing or other means to satisfy itself of compliance by the NIOEC.

4.2.3 When the contractor is responsible for coating materials supply, the coating materials supplied shall be certified by the manufacturer in accordance with the requirements cited in the relevant IPS-M-TP Standards for coating. The contractor shall obtain and retain all certificates and manufacturer's data sheets. These data sheets shall be made available for examination by the NIOEC on request. The NIOEC may make any investigation necessary, by way of testing, batch sampling, manufacturing and factory inspection, to satisfy itself of compliance by the contractor.

4.3 Materials Handling and Storage

4.3.1 The materials shall be stored in the manufacturer's original packaging under ventilated conditions and away from direct sunlight. Where required and applicable air-conditioned storage shall be observed.

4.3.2 The materials shall be handled in such a way that they do not suffer any damage.

4.3.3 All coating materials consigned to the coating site shall be properly stored in accordance with the manufacturer instructions at all times to prevent damage and deterioration prior to use. Materials shall be used in the order in which they are delivered.

4.4 Identification of Coating Materials

All materials supplied for coating operations shall be suitably marked giving the following information:

4.4.1 The manufacturer's name and address.

4.4.2 The material and order number.

4.4.3 The batch number.

4.4.4 Date of manufacture and stable working shelf life (including storage condition limits).

4.4.5 Directions for mixing and/or thinning with solvents as required.

4.4.6 Directions for handling and storing of the coating materials.

4.4.7 Safety data sheet.

4.5 Pipe Identification

4.5.1 All identification marking, whether internal or external to the pipes, shall be carefully recorded before surface preparation begins.

4.5.2 The date of coating finish and the coating factory markings including pipe identification shall be legibly marked on coating surface of each pipe.

4.6 Protection of Weld End Preparation

4.6.1 Weld end preparations shall be protected from mechanical damage during handling, storage, surface preparation and the coating processes. The methods used shall also ensure that no damage occurs to the internal surface of the pipe. Protection during handling and storage shall be in accordance with 11.1.

4.6.2 Weld end preparations shall be protected from coating during coating application process by a method approved by NIOEC.

4.6.3 For technical welding reasons the ends of the pipes shall be free of any coating layer (cut back) over a length of 100 mm up to size DN 500 mm (20 in.) inclusive and over a length of 150 mm for sizes over DN 500 mm, unless specified otherwise by the NIOEC.

4.6.4 The uncoated ends of pipes shall not exceed 150 mm unless specified otherwise by the NIOEC.

4.6.5 The uncoated ends of pipes shall be temporarily protected against atmospheric corrosion by a temporary paint or primer easily removable by brushing.

4.7 Surface Preparation

4.7.1 The method of surface cleaning and surface preparation shall be specified by the contractor as part of the coating procedure qualification and shall take into account the requirements specified in 4.7.1 to 4.7.5 inclusive. In preparation for the application of the coating, the surface preparation shall be performed in accordance with the requirements 4.7.2 to 4.7.7 inclusive.

4.7.2 Where oil, grease or other contaminants are present they shall be removed, without spreading them over the surface, with a suitable solvent. For pipes which have been subjected to contamination, the contaminant shall be removed by washing either with potable water or an approved chemical cleaner. If a chemical cleaner is used, subsequent washing with potable water will be necessary. The pipe shall be dried before blast cleaning.