MATERIAL & EQUIPMENT STANDARD

FOR

ELECTRICAL LIGHTING COLUMNS

ORIGINAL EDITION

NOVEMBER 1993

This standard specification is reviewed and updated by the relevant technical committee on May 2012. The approved modifications are included in the present issue of IPS.

FOREWORD

The Iranian Petroleum Standards (IPS) reflect the views of the Iranian Ministry of Petroleum and are intended for use in the oil and gas production facilities, oil refineries, chemical and petrochemical plants, gas handling and processing installations and other such facilities.

IPS are based on internationally acceptable standards and include selections from the items stipulated in the referenced standards. They are also supplemented by additional requirements and/or modifications based on the experience acquired by the Iranian Petroleum Industry and the local market availability. The options which are not specified in the text of the standards are itemized in data sheet/s, so that, the user can select his appropriate preferences therein.

The IPS standards are therefore expected to be sufficiently flexible so that the users can adapt these standards to their requirements. However, they may not cover every requirement of each project. For such cases, an addendum to IPS Standard shall be prepared by the user which elaborates the particular requirements of the user. This addendum together with the relevant IPS shall form the job specification for the specific project or work.

The IPS is reviewed and up-dated approximately every five years. Each standards are subject to amendment or withdrawal, if required, thus the latest edition of IPS shall be applicable

The users of IPS are therefore requested to send their views and comments, including any addendum prepared for particular cases to the following address. These comments and recommendations will be reviewed by the relevant technical committee and in case of approval will be incorporated in the next revision of the standard.

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GENERAL DEFINITIONS

Throughout this Standard the following definitions shall apply.

COMPANY :

Refers to one of the related and/or affiliated companies of the Iranian Ministry of Petroleum such as National Iranian Oil Company, National Iranian Gas Company, National Petrochemical Company and National Iranian Oil Refinery And Distribution Company.

PURCHASER :

Means the “Company" where this standard is a part of direct purchaser order by the “Company”, and the “Contractor” where this Standard is a part of contract document.

VENDOR AND SUPPLIER:

Refers to firm or person who will supply and/or fabricate the equipment or material.

CONTRACTOR:

Refers to the persons, firm or company whose tender has been accepted by the company.

EXECUTOR :

Executor is the party which carries out all or part of construction and/or commissioning for the project.

INSPECTOR :

The Inspector referred to in this Standard is a person/persons or a body appointed in writing by the company for the inspection of fabrication and installation work.

SHALL:

Is used where a provision is mandatory.

SHOULD:

Is used where a provision is advisory only.

WILL:

Is normally used in connection with the action by the “Company” rather than by a contractor, supplier or vendor.

MAY:

Is used where a provision is completely discretionary.

CONTENTS : PAGE No.

*** Notes:**

1) For Attachments see the end of this Standard Specification.

2) Attachments number 4, 6.3, 6.4, 7, 9, 12 and 13 are not applicable to this Standard.

1. SCOPE

This Standard Specification describes the minimum requirements for steel, aluminum and concrete lighting columns with due reference to base compartments, cableway, corrosion prevention and test of columns.

Only the general requirements of individual lighting columns are given in this Standard Specification; the specific requirements of different types of lighting columns will be given in pertinent data sheet.

Note:

This standard specification is reviewed and updated by the relevant technical committee on May 2012. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No 346 on May 2012. These modifications are included in the present issue of IPS.

2. REFERENCES

Throughout this Standard the following dated and undated standards/codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this standard. For dated references, the edition cited applies. The applicability of changes in dated references that occur after the cited date shall be mutually agreed upon by the Company and the Vendor. For undated references, the latest edition of the referenced documents (including any supplements and amendments) applies.

EN (EUROPEAN NORMS)

BS EN 40	"Parts 1 to 6 Lighting Columns".

BS (BRITISH STANDARDS)

BS EN ISO 18273	"Welding Consumables. Wire electrodes, wires and rods for Welding of aluminum and aluminum alloys"
BS 3019 Part 1	"Tig Welding".
BS 4872 Part 2	"Tig or MIG Welding of Aluminum Alloys"
BS EN 1011-4	“MIG Welding Specification for MIG Welding of Aluminum and Aluminum Alloys”

ISO (INTERNATIONAL STANDARDIZATION ORGANIZATION)

ISO 1459-1973	"Metallic Coating-Protection Against Corrosion by Hot Dip Galvanizing Guiding Principles"
ISO 1460-1973	"Metallic Coatings Hot Dip Galvanized Coating on Ferrous Materials. Determination of the Mass Per Unit Area-Gravimetric Method"
ISO 1461-1973	"Metallic Coatings-Hot Deep Galvanized Coatings on Fabricated Ferrous Products- Requirements"
ISO 2063	"Metallic Coatings-Protection of Iron and Steel Against Corrosion-Metal Spraying of Zinc and Aluminum"

IEC (INTERNATIONAL ELECTROTECHNICAL COMMISSION)

IEC 60529	"Classification of Degrees of Protection Provided by Enclosure"

IPS (IRANIAN PETROLUME STANDARDS)

IPS-M-EL-161	"Material and Equipment standard for General Electrical Items"
IPS-E-EL-100	"Engineering Standard for Electrical System Design (Industrial & Non-Industrial)"

Notes:

1) When standards other than EN are used manufacturer/supplier shall submit pertinent deviations from EN standards

2) Whenever standards other than IEC are used, it is understood that IEC standards are accepted.

3. UNITS

This Standard is based on International System of Units (SI), as per IPS-E-GN-100 except where otherwise specified.

4. SERVICE CONDITION

See Attachment No. 1.

5. COLUMNS

5.1 Steel Lighting Column

Steel lighting columns shall be made of steel and shall be hot deep galvanized. The steel shall be equivalent to or better than Euro norm 25-72 grade Fe 360B.

5.2 Aluminum Alloy Lighting Columns

The aluminum alloy used shall be equivalent to or better than aluminum alloys specified in ISO / R 164. ISO / R209, ISO / TR 2136 and ISO / R827. It shall be corrosion resistant. When special site corrosion problems are known, the actual alloy used shall be agreed between the purchaser and the supplier.

5.3 Concrete Lighting Columns

The materials used in concrete columns shall comply with requirement of EN 40 part 4.

5.4 Foundation Bolts

The steel used for foundation bolt shall be equivalent to or better than Euro norm 25-72 grade Fe 360 B.

5.5 Welding

5.5.1 Steel lighting columns-metal arc welding shall comply with BS EN 1011.

5.5.2 Aluminum lighting column

Filler rods or wire used for gas shielded arc welding of aluminum or aluminum alloys shall be in accordance with BS 2901 part 4.

The preparation for and execution of arc welding shall be in accordance with BS 3019 part 1 for tungsten inert gas welding, or with BS 3571 part 1 for metal inert gas welding and shall be appropriate to the type of joints required by the application.

Welding personnel shall have achieved a level of competence appropriate to the types of joint required which shall be measured by the approval testing procedure set out in BS 4872, part 2.

6. BASE COMPARTMENT AND CABLEWAYS

6.1 Compartment Dimensions

When a base compartment is supplied its free space height width and depth dimensions shall be stated by the manufacturer.

6.2 Compartment Door

The door shall be made from materials specified in En 40 part 3 and shall be corrosion resistant or corrosion protected.

On metal columns the door shall be protected to an equivalent degree of protection to that provided on the column. It shall resist unauthorized entry and damage by vandals which might cause an electrically unsafe situation.

The door shall be fitted in a manner that complies with the protection category IP 23 according to IEC 60529.

6.3 Attachment of Electrical Equipment

The compartment shall be provided with means of attaching electrical equipment. This attachment shall accord with the national practice of the country in which the column is to be installed. Where a metal tray is used, it shall be of corrosion resistant material or be protected against corrosion. Where a baseboard is used, it shall be manufactured from material which is substantially non-hygroscopic and rot resistant.

6.4 Electrical Cableways

Cableways from the base compartment to the lantern connection shall be a minimum of 18 mm containing diameter unless otherwise agreed between purchaser and supplier.

Cableways from the cable entry slot to the base compartment shall be a minimum of 50 mm containing diameter. All cableways shall be smooth and free from obstruction with no sharp edges, flashes, burrs and the like which might cause abrasion of the cables.

7. PROTECTION CATEGORY

Parts of the column above ground level shall comply with the protection category IP 23 in IEC Publication 529 when assembled in accordance with the manufacturer’s instructions.

8. EARTHING TERMINALS

Metallic lighting poles shall be provided with earthing terminal.

Where columns are to be earthed by means of an earthing terminal on the column or baseboard, the following requirements shall apply:

The earthing terminal provided shall be corrosion resistant, shall have substantial contact surfaces for the attachment of an earthing conductor and shall be readily accessible.

Except for doors there shall be reliable electrical contact between all exposed metal parts of the column and bracket where fitted, and the earthing terminal (this does not include the metal reinforcement in concrete columns). Whether or not this contact includes the door shall accord with the national practice of the country in which the column is to be installed.

The attachment of the fixed part of the terminal shall be designed and executed so as to prevent it from being rotated when the clamping part is moved.

If the fixed part of the terminal consists of a bolt, its dimensions shall not be less than M8.

The clamping part shall be designed so as to avoid any damage to the earth conductor or its insulation during tightening or loosening.

The earthing terminal, or the column or baseboard adjacent to the terminal, shall be distinctly and durably marked with the symbol  .

9. CORROSION PROTECTION

For methods of corrosion protection of lighting columns after fabrication, reference shall be made to EN 40 part 4.

10. TEST REPORT

A test report shall describe the method of testing in detail and give at least the information listed in EN 40.

The age of concrete column at the time of testing shall be at the discretion of the manufacturer but shall not exceed 35 days.

The test shall comply with the requirements of EN 40.

11. INFORMATION FOR MANUFACTURER / SUPPLIER

See data sheet in Appendix A.

12. DOCUMENTATION TO BE SUPPLIED BY MANUFACTURER

The following documents shall be supplied by the manufacturer/ supplier:

1) Design and test moments and resulting deflection

2) Report on type testing as specified in EN 40

3) Certificate for the type test specified in EN 40

APPENDICES

APPENDIX A
DATA SHEET

- TYPE OF COLUMNS:

. Steel: .....

. Aluminum: .....

. Concrete: .....

- SHAPE OF COLUMN:

. Circular uniform: ..... Circular tapered .....

.Polygonal uniform:…… ..... Polygonal tapered.....

- DIMENSION OF COLUMN:

. Height: ..... m .....

. Width of projection: ..... m .....

- NUMBER REQUIRED: .....

- FABRICATION:

. Welded: .....

. Seamless: .....

- **COLUMN FOUNDATION:**

. Base plate: .....

. Flange plate: .....

- **LANTERN:**

. Weight: ..... kg

. Connection dimension of lantern:

. Length diameter: ..... mm

- DOOR OPENING IN METAL LIGHTING COLUMN:

. Dimension: .....mm

. reinforced: .....

. unreinforced: .....

. fixing point for fuse box: .

(to be continued)

APPENDIX A (continued)

- BASE COMPARTMENT:

. Description of fuse box: ……..……

. Dimensions: height.....mm width..... mm depth.....mm

. Incoming cable gland: .....

. Outgoing cable gland: .....

- SHAPE AND DIMENSION OF CABLE ENTRY SLOT: .....

- EARTHING TERMINAL: .....

- INGRESS PROTECTION:

. Column: .....

. Base compartment: .....

APPENDIX B

1. DEFINITIONS

1.1 Lighting Column

Support intended to hold one or more lanterns, consisting of one or more parts: a post, possibly an extension piece and, if necessary, a bracket. It does not include columns for catenary lighting.

1.2 Nominal Height

The distance between the center line of the point of entry of the lantern and the intended ground level, for a column planted in the ground, or the bottom of the flange plate, for a column with a flange plate.

1.3 Post Top Column

A straight column without bracket to support the lantern (post top lantern) directly.

1.4 Column with Bracket

A column to support a lantern or lanterns (side entry lanterns) by means of one or more brackets which are integral with, or demountable from, the column.

1.5 Bracket

A component used to support a lantern at a definite distance from the axis of the lower straight portion of a column, of single, double or multiple form and integral with, or demountable from, the column.

1.6 Bracket Projection

Horizontal distance from the point of entry to the lantern to a vertical line passing through the center of the cross section of the column at the ground level.

1.7 Bracket Fixing

The connecting part on a column for securing a separate bracket. It may be of the same size or a different cross section from the column.

1.8 Lantern Fixing

The connecting part on the end of a post top column or of a bracket for securing a lantern. It may be the end of the column or the bracket itself or an additional part having the same or a different cross section from the column or bracket.

1.9 Lantern Fixing Angle

Angle between the axis of the lantern fixing and the horizontal.

1.10 Door Opening

Opening in the column for access to electrical equipment.

1.11 Cable Entry Slot

Opening in the column below ground for the cable entry.

1.12 Planting Depth

The length of the column below the intended ground level.

1.13 Base Plate

Plate below ground level fixed to a planted column to prevent the column sinking into the ground and to help prevent the column overturning.

1.14 Flange Plate

A plate, with an opening for cable entry, attached rigidly to a column entry, which is surface-mounted, to allow it to be secured to a concrete foundation or to other structures. .....

ATTACHMENTS

GENERAL

ATTACHMENT 1

ENVIRONMENTAL CONDITIONS

1.1 Site elevation: ---------- meters above sea level.

1.2 Maximum ambient air temperature: ---------- degree centigrade. (Bare metal directly exposed to the sun reach a surface temperature of ---------- degree centigrade).

1.3 Minimum air temperature: ---------- degree centigrade.

1.4 Relative humidity: ---------- percent.

1.5 Atmosphere: saliferrous, dusty corrosive and subject to dust storms with concentration of 70 - 1412 mg/cubic meter, H_2S may be present.

1.6 Earthquake Zone

1.7 Maximum Wind Velocity …… m/Sec.

Note:

Blanks to be filled by client

ATTACHMENT 2

INSPECTION / QUALITY CONTROL, AND QUALITY RECORDS

2.1 Inspection / Quality Control

2.1.1 The purchaser's inspector, or his authorized representative shall have free access to the manufacturing plant engaged in the manufacture of the equipment, to carry out necessary inspection at any stage of work.

2.1.2 Inspection may include the visit to quality control laboratories, work shops, testing bay etc.

2.1.3 The supplier shall make available technical data, test pieces and samples that the purchaser's representative may require for verification in conjunction with pertinent equipment.

2.1.4 The equipment under this specification shall be factory tested. Certified copies of test reports and/or certificates shall be submitted to the purchaser. The numbers of certified copies required will be specified by the purchaser in the purchase order.

2.1.5 The purchaser's inspectors shall be granted the right for inspection at any stage of manufacture and testing.

2.1.6 Purchaser will require the presence of his nominated representative to witness the final inspection and performance tests. For such purpose a type test on an identical machine is acceptable. The supplier shall inform the date of such tests at least four weeks in advance.

2.2 Quality Records

2.2.1 The supplier shall maintain appropriate inspection and test records to substantiate conformance with specified requirements.

2.2.2 Quality record shall be legible and relevant to the product involved.

2.2.3 Quality records that substantiate conformance with the specified requirements shall be retained by manufacturer and made available on request by purchaser.

2.2.4 The supplier shall establish and maintain procedure for identification collection, indexing, filing, storage, maintenance and disposition of quality records.

2.2.5 Supplier shall submit to purchaser: reports, test schedules, and test certificates (in ----- copies) on completion of tests.

Note:

Blanks to be filled by client

2.3 Tests and Certification

2.3.1 Test procedure as proposed by the supplier shall be agreed upon, and approved by the purchaser before any test is carried out.

2.3.2 Purchaser may require witnessed tests to be carried out in the presence of his nominated representative who should be informed at least ----- weeks in advance of the date of the tests and confirmed ----- weeks before the tests.

2.3.3 Test certificates and test reports shall refer to the serial No. of the equipment tested and must bear the purchaser's name, order No. and manufacturer's name and seal.

The certificates shall be approved by the purchaser before shipment instruction is given.

2.3.4 Approval by the purchaser's inspector or representative shall not relieve the vendor of his commitments under the terms of this specification or any associated order.

2.3.5 The equipment may be rejected if measurement and inspection reveal any discrepancies between quoted figures resulting in purchase order and those measured actually.

2.3.6 Any charges incurred by the tests quoted under heading of specific requirements for tests to be quoted as a separate item and are not to be included in the cost of the equipment.

Note:

Blanks to be filled by client

ATTACHMENT 3

GUARANTEE

3.1 Clearance of Defects

The supplier shall guarantee his equipment during commissioning and for one year operation, starting from the completion of seven days continuous service test in site at full load against the following defects:

- All operational defects
- All material defects
- All constructional and design defects

3.2 Replacement of Defective Parts

All defective parts shall be replaced by the supplier in the shortest possible time free of charge including dismantling reassembling at site and all transportation cost. The above mentioned period shall not however be longer than 18 months from the date of dispatch from the manufacturer's works.

ATTACHMENT 4

LANGUAGE

4.1 All correspondence drawings, documents, certificates, including testing operation and maintenance manuals and spare part lists etc. shall be in English.

4.2 Offers in other languages will not be considered.