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**TECHNICAL JOB  
SPECIFICATION**

**700/3**

**REVISION 0**

**DATE 29/06/2011**

## **LNG PLANT**

# **ELECTRICAL MATERIAL SUPPLIED WITH PACKAGED UNITS**

**QUALITY ASSURANCE PAGE**

**CHANGES LOG**

**REVISIONS LOG**

<b>0</b>	<b>29-06-2011</b>	<b>FIRST ISSUE</b>	<b>PQ DPT.</b>	<b>V.G.</b>
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**REFERENCE DOCUMENTS**

Job Spec. No. 700/1

[General Notes for Electrical Equipment and Materials]

ELOT EN 60079-10

[Electrical apparatus for explosive gas atmospheres - Part 10: Classification of hazardous areas]

ELOT EN 60529

[Degrees of protection provided by enclosures (IP code)]

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**1.0** **GENERAL**

This specification for requirements for electrical machinery, equipment and materials forming part of electrical or non-electrical package units (PU).

This specification is to be complied with by Vendor/Manufacturer, when submitting quotation for package equipment including any type of electrical materials.

This specification shall be an integral part of the inquiry and of purchase order, which include the Material Requisition (MR) and appropriate specifications, drawings etc., and shall be read in conjunction with the "General Notes for Electrical Equipment and Materials" **Job Spec. No. 700/1**.

Bids and/or order confirmations issued by Manufacturer/Vendor of packaged equipment (PU) shall bear the following statement, referring to the electrical equipment.

THIS BID/ORDER CONFIRMATION IS FULLY IN ACCORDANCE WITH THE DOCUMENTS ISSUED BY CONSULTANT/OWNER, EXCEPT WHAT SPECIFIED UNDER THE HEADING:

**EXCEPTIONS**

IN THE ABSENCE OF THIS STATEMENT, IT SHALL BE ASSUMED THAT QUOTATION AND/OR ORDER CONFIRMATION IS STRICTLY IN ACCORDANCE WITH CONSULTANT'S/OWNER'S DOCUMENTS.

THE SAME STATEMENT APPLIES ALSO TO THE REQUIRED DELIVERY CONDITIONS OF DRAWINGS AND DOCUMENTS.

**2.0** **SCOPE**

This specification shall apply to electrical machinery equipment and materials supplied by equipment Vendors/Manufacturers as part of packaged units, (i.e., compressor equipment, special pump equipment, boilers, fired heaters, refrigeration units, and in general skid-mounted, prefabricated and preassembled units).

Electrical materials for PU may comprise motors, stop/start units, supply distribution units, electrical instrument panels and instrument devices, (i.e.: level switches, pressure switches, temperature switches, cabling and connections), lighting fixtures and circuits etc.

**3.0** **CODES AND STANDARDS**

The design and installation of materials shall conform to the requirements of the latest edition of the standards called for in the MR and documents attached to it.

Standards considered in general for the project are listed on **Table "B" (\*)**.

(\*) *Tables "A" to "F" mentioned in this specification form part of the Job Spec. No 700/1.*

**4.0 CLASSIFICATION OF ENVIRONMENTS AND HAZARDOUS-LOCATIONS**

In general, unless otherwise specified in the MR and attached documents the following classification shall apply.

The environmental conditions shall be classified as follows: outdoor installation, protected outdoor installation, indoor installation in dry location, pressurized rooms and non-pressurized rooms.

The hazardous locations shall be classified as per ELOT EN 60079-10.

**5.0 SELECTION OF MATERIAL, EQUIPMENT AND MACHINERY IN RELATION TO THE CLASSIFICATION OF ENVIRONMENT AND OF HAZARDOUS LOCATION**

Technical documents will specify the environmental conditions and the classification of the location in which equipment is to operate.

It is Manufacturer/Vendor's responsibility to ensure that all electrical materials and installation within their supply conform to the conditions in which the equipment is to operate.

When operating in a hazardous location the electrical equipment shall also be certified by an internationally or nationally recognized testing institute, as specified in TABLE "B"(\*).

Enclosures and type of protection of materials and type of installation shall be selected in accordance with ELOT EN 60529.

Requirements of TABLE "G" are the minimum.

Other solutions may be considered by Manufacturer/Vendor, provided Contractor's approval is obtained.

**6.0 DESIGN**

Unless otherwise specified in the MR and in attached documents, the following information shall be considered for the design.

**6.1 DESIGN AMBIENT TEMPERATURE FOR ELECTRICAL EQUIPMENT**

Site conditions and design temperature are indicated on TABLE "C"(\*).

**6.2 SYSTEM VOLTAGES**

System voltages are as shown on TABLE "A"(\*).

**6.3 SHORT CIRCUIT LEVELS**

Manufacturer/Vendor shall consider that at the supply point the short circuit levels specified on TABLE "A"(\*) exist in the plant (symmetrical initial values).

If equipment supplied by Manufacturer/Vendor is not suitable, adequate protection shall be provided by Manufacturer/Vendor.

Method of protection to be stated by Manufacturer/Vendor.

**(\*) Tables "A" to "F" mentioned in this specification form part of the Job Spec. No. 700/1.**

**6.4 MOTORS**

Supply voltage of motors shall be as indicated in **Table "A"(\*)**.

**6.5 MOTOR STARTERS AND CONTROL EQUIPMENT**

Motors starter (i.e.) circuit breakers or contactors shall be generally provided by Owner and are not included in Manufacturer/Vendor's supply.

Exceptions with Consultant's, Owner's approval.

All devices on the PU for motor control (i.e. push buttons, selector switches, and auxiliary devices) shall be provided by Manufacturer/Vendor.

**6.6 WIRING**

All electrical equipment shall be wired to terminal boxes placed in easily accessible positions. All wiring shall be always mechanically protected.

**6.7 EARTHING**

Electrical equipment shall be provided with suitable terminal studs for earthing, suitable sized for thermal and mechanical stresses.

Earthing of metallic masses and bonding shall also be provided.

**6.8 LIGHTING**

No general lighting shall be included in PU by the Manufacturer/Vendor. Any specific area requiring illumination by Owner shall be stated by the Manufacturer/Vendor.

**6.9. WEATHERPROOFING**

Electrical equipment located outdoor shall be with the required degree of protection (see **TABLE "G"**).

If necessary, adequate covers, in form of fabricated shelters against rain and solar radiation, shall be provided.

**6.10 INTERCONNECTING WIRING AND ASSOCIATED GLANDS**

Interconnecting wiring between individual units and the terminal boxes, see **para 6.6**, shall be supplied by Manufacturer/Vendor.

For connection external to the terminal boxes, Manufacturer/Vendor shall specify type and size of cables to be used.

Manufacturer/Vendor shall provide suitable cable trays or cable conduits to permit the interconnecting wiring of the single electric apparatus mounted on PU up to the side agreed with Consultant's / Owner, for the approach with the electrical substation or with other plant.

**6.11 CONTROL CRITERIA**

Unless otherwise specified, the control criteria of the entire PU shall be such as to prevent automatic reenergization after voltage recovery following a voltage failure: Failure to safety scheme shall be adopted. Exceptions may be accepted only with Consultant's/Owner approval.

**(\*) Tables "A" to "F" mentioned in this specification form part of the Job Specification No 700/1.**

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**7.0 STANDARDIZATION OF EQUIPMENT AND MATERIALS**

Unless otherwise specified in the Material Requisition, it is recommended that equipment and materials not manufactured by Manufacturer/Vendor, for uniformity reasons and for spare parts problems, shall be of the same type and manufacture for the whole supply.

A list of Sub-Vendors shall be submitted for Consultant's / Owner approval.

**Use of Asbestos or of any asbestos-containing product is absolutely prohibited.**

**8.0 MOUNTING AND ERECTION**

Electrical PU shall be furnished by the PU Manufacturer/Vendor completely mounted, assembled and wired.

Manufacturer/Vendor shall inform if parts or components of the PU will be furnished loose or will required erection work at job site.

The PU layout shall be submitted to Consultant's / Owner's for approval, to define the exact location for the electrical power auxiliary, lighting and earthing conductors approach from the electrical substation or other plant.

**9.0 BATTERY LIMITS**

If the PU is furnished skid-mounted, each single skid shall have on one side, a suitable terminal box for the connection of the electrical wires to the adjacent skid (see also **para 6.6**).

For the earthing system, copper bars suitable to connect the skid earthing system to the adjacent skid, shall be mounted on the two opposite sides (see also **para 6.7**).

For motors, the battery limit shall be the terminal box.



TABLE "G"

SELECTION OF ENCLOSURES AND TYPE FO PROTECTION

CLASSIFICATION OF ENVIRONMENTS	Rotating Machines	Sparking Equipment	Lighting Fixtures	Wiring Fittings	Canalization type
Outdoor	IP 55	IP 55	IP 55	IP 55	Armoured cables underground or in trays or ladders.
Protected Outdoor	IP 55	IP 55	IP 55	IP 55	Armoured cables underground or in trays or ladders.
Indoor Installation	IP 55	Low Voltage IP 3 1 High Voltage IPH 3	IP 31	IP 31	Armoured cables underground or in trays or ladders.
CLASSIFICATION OF HAZARDOUS LOCATIONS					
Class 1, Division 0	—	—	—	—	Armoured cables underground or in trays or ladders.
Class 1, Division 1	EEx-d or EEx-e or EEx-p	EEx-d or EEx-ib or EEx-p	EEx-d or EEx-e	EEx-d or EEx-e	Armoured cables underground or in trays or ladders.
Class 1, Division 2	EEx-n or EEx-e	EEx-d or EEx-ib or EEx-p	EEx-d or EEx-e or EEx-n	EEx-d or EEx-e	Armoured cables underground or in trays or ladders.
Special non-hazardous	IP 55	Low Voltage IP 3 1 High Voltage IPH 3	IP 31	IP 31	Armoured cables underground or in trays or ladders.
Naturally non-hazardous	Enclosures in relation to the Environment				