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KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	OFF SHORE ELECTRICAL DESIGN CRITERIA TYPICAL WELL PLATFORM (PROJECT STANDARDS AND SPECIFICATIONS)	

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SCOPE

This Project Standard and Specification specifies the minimum technical requirement for electrical system associated with Oil and Gas packages. The specified design criteria cover technical requirements, calculation methods, functional requirements, margins and any other minimum requirements.

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.

1. IEC International Electro Technical Commission
2. NEMA National Electrical Manufactures Association (USA)
3. ASTM American Society for Testing and Material (USA)
4. NFPA National Fire Protection Agency (USA)
5. IALA International Association of Light house Authority
6. BSI British Standards Institution
7. ANSI American National Standards Institute
8. API American Petroleum Institute (USA)
9. NEC National Electric Code (USA)
10. SOLAS Convention on safety of life at sea
11. NESC National Electric Safety Code (USA)
12. BIS Bureau of Indian Standards
13. DNV Dets Norske Veritas
14. NACE National Association of Corrosion Engineer (USA)
15. MARPOL Marine Pollution Act
16. CENELEC European Standards published by CENELEC

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DEFINITIONS AND TERMINOLOGY

Nominal power - Name plate rating of motors or load absorbed by non motor load.

Efficiency (%) - It is the output divided by input. For motors it shall be as per vendor data and complying with the IEC standard.

Load classifications - Electrical load are to be classified as Normal, Emergency and Essential.

- Normal : Loads in service for full process/production application.
- Essential : The load required for life support and occupancy purpose.
- Emergency : Necessary for personnel safety / safe shut down and abandonment purpose.

Loads shall be divided into three classes according to use.

- Continuous load : which draw power at continuous rate.
- Intermittent load : which draw power as per duty cycle for small time.
- Stand by load : which are connected with power supply and ready to act when required.

UNITS

All quantities and dimensions shall be expressed in metric units. All information, manuals, certificate data and inscriptions shall be in English language.

GENERAL REQUIREMENT

Safety

General

The electrical system shall employ safety margins to ensure that plant is safe under all operating conditions, including those associated with the start up and shut down of equipment and through out intervening shut down periods. The emphasis in equipment specification will be on operability, prevention of accident/fault and functionality for the design life.

All insulating materials specified for the equipment elsewhere in document shall be non toxic.

All cable penetrations through firewalls, blast walls, through switchgear room walls and between safe and hazardous area shall be sealed using multi cable

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transits to maintain the integrity of system and prevent gas migration. The sealed transit shall ensure that the fire integrity of the wall is maintained.

Materials Workmanship & Suitability

All work shall be of the highest quality craftsmanship and shall conform to the applicable standards and best applicable engineering practices in order to achieve a neat, safe, substantial and functional installation.

All the materials utilized in the construction of electrical equipment shall be as per the latest standards and specification. The materials and equipment used shall be new, unused and of current manufacture. Should any material prove unsatisfactory it will be rejected notwithstanding any previous satisfactory examination or test of similar material or of completed cables and equipment.

Design Life

The electrical system shall be designed for specified operating life of platform. Therefore equipment shall be specified by contractor for the design life considering maintenance requirement wherever applicable.

ELECTRICAL SYSTEM DESIGN

Electrical Loads

Load Assessment

An Electrical load shall be developed by the contractor based on the guide line described in the table. The maximum load developed shall be used to specify maximum power requirement, feeder cable sizing, switch gear sizing and MCC general arrangement etc.

The equipment utilization category and load assessment is tabulated as below.

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Sr. No.	Utilization category	Load Assessment
1	Continuously operating equipment	100% of operating load.
2	Intermittently operating equipment	50% of the total intermittent load or the largest intermittent load which ever is greater.
3	Standby - equipment	10% of total 'standby' load or the largest 'standby by' load, whichever is greater.
4	Margin for future load growth	10% of sum of load at Sr. No. 1,2&3
5	Total load	It shall be Sum of load at 1,2,3, and 4.

Calculation Methods

1. Cable Sizing

During detailed engineering all power cables shall be identified and sized according to the requirement of Indian and International standards. All the cables for AC/DC loads shall be sized individually satisfying all the following criteria:

- Current carrying capacity.
- Voltage drop steady state.
- Voltage drop limit during starting of motor.
- Shortcircuit temp rise.

Where ever possible main power cables should be run with sufficient spacing in cable tray to minimize de rating due to grouping.

For incoming feeders, branch circuits and feeders for motors and lighting power, conductor current rating shall be established on the basis of 125% of design load current at an ambient temperature of 40 degree centigrade and de-rated for grouping and method of installation. The voltage grade of LV power and control cables shall be 1100 volt AC.

2. Voltage Drop

The system nominal utilization voltage level shall be 24 /12 volt DC.

The maximum allowable voltage drop in any feeder under steady state conditions shall be maintained as below.

- Switch Board/Distribution Boards/ Lighting power panel 1%
- Lighting Points 2%

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- DC system

3%

Earthing

Plant earthing shall be as per API- RP-14F. All electrical equipment shall be earthed via earthing conductor within power cable and where mechanical equipment contains electrical apparatus earth bonding shall be required.

The minimum size of earth bonding conductors on local control station enclosures shall be 16 mm². The minimum size of earth conductors for electrical panels shall be 16 mm².

Vessels, tanks, and mechanical packages not directly welded to the structure shall be bonded to a structural earth pad or boss using at least two independent 70 mm² conductors.

Metallic cable trays shall be suitably earthed.

Items such as pipes and duct work that have insulating material (i. e. gasket) between connected sections shall be made electrically continuous by bonding with a 6 mm² earthing cable or equivalent earthing strip.

All electrical panels shall be provided with a tinned copper earth bar.

Lightning Protection

As the method of construction shall incorporate bonded metal structure, no specific lightning protection shall be needed.

Plant Layout

Electric room (Switch gear room) shall be located in safe, non-hazardous and well-ventilated area.

- All equipment such as solar power controllers, lighting, DC power 25/24/12 volts & miscellaneous distribution boards Gas detection panels etc shall be located in closed electrical room and shall be designed considering inadequate ventilation in the room.
- All batteries shall be located in closed battery room .The room will be located in safe area. Batteries shall be designed considering inadequate ventilation in the room.

All electrical equipments shall be installed in a neat workman like manner for ease of operation and maintenance and from safety viewpoint.

The Contractor shall prepare single line and schematic wiring diagram of all type of DC Power distribution panel and submit to company for approval.