

	GOLGOHAR STEEL PROJECT		
	Technical Specification for Lighting		
	Barsoo Document No.: 157TEGU5010101		
REV: 00	Document No.: S-GR02-B-DSR-GEN-SPC-EL-001		Page 1 of 10

Technical Specification for Lighting System

00	ISSUED FOR CONSTRUCTION	A.M	F.NIKNAM	A.MONFARED	1404/10/28
Rev.	DESCRIPTION	REVISED BY	CHECKED BY	APPROVED	APP DATE

	GOLGOHAR STEEL PROJECT	
	Technical Specification for Lighting System	
REV: 00	Barsoo Document No.: 157TEGU5010101	Page 2 of 10

TABULATION REVISED PAGES									
SHEET	Rev.00	Rev.01	Rev.02	Rev.03	SHEET	Rev.00	Rev.01	Rev.02	Rev.03
01	X				51				
02	X				52				
03	X				53				
04	X				54				
05	X				55				
06	X				56				
07	X				57				
08	X				58				
09	X				59				
10	X				60				
11					61				
12					62				
13					63				
14					64				
15					65				
16					66				
17					67				
18					68				
19					69				
20					70				
21					71				
22					72				
23					73				
24					74				
25					75				
26					76				
27					77				
28					78				
29					79				
30					80				
31					81				
32					82				
33					83				
34					84				
35					85				
36					86				
37					87				
38					88				
39					89				
40					90				
41					91				
42					92				
43					93				
44					94				
45					95				
46					96				
47					97				
48					98				
49					99				
50					100				

	GOLGOHAR STEEL PROJECT	
	Technical Specification for Lighting	
	Barsoo Document No.: 157TEGU5010101	
REV: 00	Document No.: S-GR02-B-DSR-GEN-SPC-EL-001	Page 3 of 10

TABLE OF CONTENTS

1.0	GENERAL.....	4
2.0	SITE CONDITIONS.....	4
3.0	STANDARDS AND CODES.....	5
4.0	LIGHTING CALCULATION CRITERIA.....	5
5.0	LIGHTING DISTRIBUTION	8
6.0	FLOOD LIGHT	8
7.0	STREET LIGHTING.....	8
8.0	ASTRONOMICAL RELAY CLOCK (TIMER) FOR OUTDOOR LIGHTING	9
9.0	JUNCTION BOXES.....	10
10.0	PACKING.....	10
11.0	MANUFACTURER’S RESPONSIBILITY AND GUARANTEES	10
12.0	VENDOR DOCUMENTS	10

	GOLGOHAR STEEL PROJECT	
	Technical Specification for Lighting System	
REV: 00	Barsoo Document No.: 157TEGU5010101	Page 4 of 10

1.0 GENERAL

1.1 Scope

This specification covers minimum design requirement characteristics which suppliers should observe for the luminaries and lighting fixtures.

1.2 Document Priority

In case of conflict between documents, the order of precedence shall be:

- This Specification,
- Drawings and other technical documents,
- I.E.C. standards,
- Other standard and codes when I.E.C. publications have not yet been issued.

1.3 Conditions of Operation

All of the Electrical Equipment & Systems will be suitable for 24 hours, 7 days/week, and 365 days/year operation.

2.0 SITE CONDITIONS

- Plant Location

The Site is located at Gol-E-Gohar Iron Ore Complex, situated in Sirjan, Province of Kerman in southern part of Islamic Republic of IRAN, approximately 285 km southwest of Kerman city and 335 km north of Bandar Abbas port, in a semi-desertic high plateau terrain, 1750 m above sea level, and flanked by mountains over 2500 m high trending northwest to southwest.

- Meteorological

Ambient Temperature

Max. Temperature:	+40 deg. C (Recorded)
	+50 deg. C (Design)
Min. temperature:	-12 deg. C (Recorded)
	-10 deg. C (Design)

	GOLGOHAR STEEL PROJECT	
	Technical Specification for Lighting	
	Barsoo Document No.: 157TEGU5010101	
REV: 00	Document No.: S-GR02-B-DSR-GEN-SPC-EL-001	Page 5 of 10

Average temperature: +15.9 deg. C (Design)

Wet bulb design temperature (summer): +25 deg C

Relative Humidity: Max. 70%

Wind Velocity

According to National Iranian Code (6th revision):

Basic speed data: 130 Km/h

Basic pressure data: 0.845 KN/m²

Correction factor:

0 - 10 m: 2

10 - 20 m: 2.2

20 - 100 m: 2.4

Rainfall

Yearly 120 mm (average)

Monthly rainfall 260mm (Max)

Barometric Pressure

820 milliards

Geological Conditions

This data is belongs to the existing palletizing plant location. For the engineering the contractor shall be study geotechnical conditions for the essential location according to the project plan.

Altitude: About 1,750 m above mean sea level

Soil bearing: approx. 20t/m²

Ground water level: approx. 60 m below ground level

Earthquake Load

Equipment in plant will be dimensioned including a safety calculation against earthquake according to the "Iranian Code for Seismic Resistant Design of Buildings

	GOLGOHAR STEEL PROJECT	
	Technical Specification for Lighting System	
REV: 00	Barsoo Document No.: 157TEGU5010101	Page 6 of 10

– Publication No. S253-2nd edition, autumn 1999” (“Iranian Regulations 2800”) and “Minimum

Design Loads for Building and Structures” (Iranian Regulations 519).

- Design base acceleration: 0.3·g
- Classification of Buildings: Group 2
- Soil classification: soil type III-b

3.0 STANDARDS AND CODES

The design of the electrical system for buildings and the electrical components shall comply with the latest edition of the following standards and codes:

IEC 60309	Receptacles for industrial purpose
IEC 60529	Classification of degree of protection provided by enclosures
IEC 60598	Luminaires
IEC 60884	Plugs and socket-outlets for household and similar purposes
IEC 60906	IEC system of plugs and socket-outlets for household and similar purposes
IEC 60906-1	Plugs and socket-outlets 16 A 250 V AC

In the case of conflicts, interference or discrepancies between the listed codes, standards and specifications the company will decide on the procedure to be utilized.

4.0 LIGHTING CALCULATION CRITERIA

The problem of the Architect / Lighting Designer at the functional level is to determine how many lights and where to place them to get the correct level of illumination for a given activity.

The lux (symbol: lx) is the SI unit of illuminance and luminous emittance, measuring luminous flux per unit area. It is used in photometry as a measure of the intensity, as perceived by the human eye, of light that hits or passes through a surface. It is analogous to the radiometric unit watts per square metre, but with the power at each wavelength weighted according to the luminosity function, a standardized model of human visual brightness perception.

	GOLGOHAR STEEL PROJECT	
	Technical Specification for Lighting	
	Barsoo Document No.: 157TEGU5010101	
REV: 00	Document No.: S-GR02-B-DSR-GEN-SPC-EL-001	Page 7 of 10

One lux is equal to one lumen per square meter. In other words:

- LUX = Level of Illumination. or LUX (lx) = Lumens / Sq.m
- Lux level = total light output (lumens) / area (square meters)
- Total Light Output = lumens per fixture * number of fixtures
- Number of Fixtures = (Lux level * area) / lumens per fixtures

Every Lamp has certain Lumens. It will be mentioned in the manufacturer data for light fitting to get the lumens per fixture.

4.1 MAINTENANCE FACTOR (MF)

It is also known as LLF OR Light Loss Factor. This may be due different reasons viz., Time, Temperature, Cleanliness etc., the maintenance factor gives an estimate of how lighting conditions will deteriorate through use. Some factors are:

- Dust and dirt inside luminaries surfaces.
- Aging of light bulbs emitting less light.

4.2 ELECTRICAL FORMULAS:

Demand for Power (kW) = System Input Wattage (W) ÷ 1,000

Energy Consumption (kWh) = System Input Wattage (kW) x Hours of Operation/Year

Hours of Operation / Year = Operating Hours / Day x Operating Days / Week x Operating Weeks / Year

Lighting System Efficacy (Lumens per Watt or LPW) = System Lumen Output ÷ Input Wattage Unit

Power Density (W/ Sq.M.) = Total System Input

4.3 REQUIRED ILLUMINATION LEVELS

The required illumination levels, measured at the working plane in a horizontal plane, are shown in the table below. These values shall be used as a basis for the design of new installations.

Streets

20lux

	GOLGOHAR STEEL PROJECT Technical Specification for Lighting System	
REV: 00	Barsoo Document No.: 157TEGU5010101	Page 8 of 10

Control of the illumination level should be possible by switching-off rows/groups of luminaries.

5.0 LIGHTING DISTRIBUTION

The lighting circuits from distribution board to local main junction boxes will be 3-phase with 5- wires (3-phase + neutral + earth).

The lighting circuits from main junction boxes to lighting fixtures shall be single-phase with 3- wires (1-phase + neutral + earth).

The load distribution of lighting circuits shall be balanced over the 3 phases, as much as possible. Lighting installations shall be designed to avoid stroboscopic effects. The lighting fixtures in hazardous area shall be designed according to the related hazardous area classification drawings, if any.

6.0 FLOOD LIGHT

The degree of protection for outdoor installation flood light in this plant is considered as IP54.

Floodlights should be wide beam with symmetrical pattern of light.

Floodlights should be suitable for 200Watt LED lamps.

Floodlights should be equipped with built-in ignition & control gear.

Floodlights should have wiring with heat resistance flex with silicon insulation and exterior connection box. Ignition unit shall be incorporated in the junction box.

The housing for flood lights shall be stainless steel and anodized aluminum reflector

The painting finish of all parts of the floodlight shall be powder coated and stove enameled white to 70-80 μm .

Other characteristics of the floodlights shall be in accordance with section 4 of this specification as required.

7.0 STREET LIGHTING

Street lighting luminaries for 200W LED lamp equipped on 9m height (at least) Lighting Poles.

Body of pressed aluminum sheet, which is chromate electrostatically and stove enameled.

	GOLGOHAR STEEL PROJECT	
	Technical Specification for Lighting	
	Barsoo Document No.: 157TEGU5010101	
REV: 00	Document No.: S-GR02-B-DSR-GEN-SPC-EL-001	Page 9 of 10

Reflector of anodized 99.9% pure aluminum and bowl of clear glass.

Suitable for pole mounting, on 42-60mm diameter steel pipe angled at 5° to horizontal.

Degree of protection by enclosure at least IP54.

Luminaries shall have a suitable terminal block to allow connection of the internal wiring and incoming supply cable into which standard cross-linked polyethylene cable could be connected.

Lighting poles shall be made of hot dip galvanized steel pipe and suitable to accommodate the LED discharge lamps with accessories & flood lights fitting, type of poles indicated in lighting detail installations drawings.

Bulkhead lighting fitting equipped with bracket shall be suitable for outdoor installation.

The height of pole for street lighting shall be 9m for 200W.

Lighting poles shall be equipped with cutout fuse with use of armored cables, three phase, neutral & ground wire and suitable for circular conductor up to 25mm².

Lighting poles shall be supplied with either two-sealed neoprene grommets or a glanded brass bonding plate for Cu/XLPE/SWA/PVC cables, complete with earthing terminal.

8.0 ASTRONOMICAL RELAY CLOCK (TIMER) FOR OUTDOOR LIGHTING

- Programmable for different zones.
- Calculate Dusk/Dawn for each day with an offset (before or after dusk/dawn)
- Battery Back-up for 5 years
- Up to 15 Amp load
- At least 2 relay outputs

9.0 JUNCTION BOXES

Unless otherwise specified, the junction boxes shall be of metallic construction, hot dipped galvanized, stainless steel or aluminum die-cast, with an ingress protection IP 55 for outdoor and IP 42 for indoor at least. They shall be adequately sized to accommodate the incoming cables.

Separate clamp type terminals shall be provided for each conductor. Bunching of conductors under the terminal is not acceptable.

	GOLGOHAR STEEL PROJECT	
	Technical Specification for Lighting System	
REV: 00	Barsoo Document No.: 157TEGU5010101	Page 10 of 10

All unused entries shall be fitted with approved stopping plugs.

Junction boxes shall be provided with label detailing function and circuit reference. Junction boxes shall be provided with internal and external brass each terminal (min M8, max M10).

10.0 PACKING

The lighting fixtures, flood lights & accessories shall be packed ready for service with all wiring terminals links, label, foundation bolt (if applicable) and earth connector and all other necessary devices assembled and tested.

11.0 MANUFACTURER'S RESPONSIBILITY AND GUARANTEES

The supplier is to take full responsibility for the complete equipment. All components shall be guaranteed for first class material and workmanship throughout and shall be guaranteed to perform satisfactorily in accordance with service conditions as specified.

Any exception or deviations shall be listed separately for company approval.

12.0 VENDOR DOCUMENTS

The supplier shall provide following technical documents such as:

- Overall dimension, weight and installation instructions for all types of lighting equipment.
- Related brochures and catalogue