

DRAFT GUIDELINES FOR SAFE WORKING PRACTICES & CONDITIONS IN IRON & STEEL INDUSTRY		
MINISTRY OF STEEL, GOVT. OF INDIA	<b>ILLUMINATION AT WORKPLACE</b>	Doc. No: SC/05
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## 1.0 OBJECTIVE

The guideline provides basic information for ensuring 'Illumination or lighting at Workplace'. Proper illumination at workplace is important to ensure safe working by the employees. The quicker and easier it is to see a hazard, the more easily it can be avoided. The types of hazard present at work therefore determine the lighting requirements for safe operation. Hazards of poor lighting are eye strain / discomfort, mis-judgment of position/ shape, human fatigue, poor health etc.

## 2.0 SCOPE

The guidelines are applicable to all the areas/ shops in the steel industry.

## 3.0 PROCEDURE

### 3.1 DEFINITIONS

**Lux:** unit for measurement of Illuminance. It is the luminous flux that strikes a unit area. 1 Lux = 1 Lumen/ Sq. Metre

Foot Candle: 1 Foot Candle = 1 Lumen/ Sq. Ft = 10.752 Lux

**Maintenance Factor (MF):** the ratio of the average illuminance on the working plane after a certain period of use of a lighting installation to the initial average illuminance obtained under the same conditions for the installation. It takes account of all losses including lamp lumen maintenance.

### 3.2 ASSESSING LIGHTING AT THE WORKPLACE

It is important that lighting in the workplace:

- i) Allows people to notice hazards and assess risks.
- ii) Is suitable for the environment and the type of work (for example, it is not located against surfaces or materials that may be flammable).
- iii) Provides sufficient light (illuminance on the task).
- iv) Allows people to see properly and discriminate between colours, to promote safety.
- v) Does not cause glare, flicker or stroboscopic effects.

- vi) Avoids the effects of veiling reflections.
- vii) Does not result in excessive differences in illuminance within an area or between adjacent areas.
- viii) Is suitable to meet the special needs of individuals.
- ix) Does not pose a health and safety risk itself.
- x) Is suitably positioned so that it may be properly maintained or replaced, and disposed of to ensure safety.
- xi) Includes, when necessary, suitable and safe emergency lighting.

### 3.3 ILLUMINATION LEVELS AT DIFFERENT AREAS OF THE WORKPLACE

The lighting system inside and outside plant units are designed based on the desired illumination levels recommended by IS and the practices followed in industries, architectural arrangement, building dimensions including mounting height, environmental considerations, ease of maintenance and reliability of the lighting distribution network.

The illumination system shall be designed as per IS:3646-1992. The level of illumination, type of fittings, maintenance factor to be considered is as given below:

Area	Lux level	Type of Light Fittings& Lamps	MF
Control rooms	300	Decorative mirror optic luminaire for recessed mounting with energy efficient CFL 2x36W of Philips type FBS 450/236 M2 HF (with MASTER PL-L 36W/840/4P ICT lamp) OR equivalent.	0.75
Electrical rooms having PCC, PDB, CMCC without false ceiling	200	Surface mounted / Suspended luminaires suitable for T5 lamps 2x28 W of Philips type TPS 814/228 D8 HF/ TPH 824/228 I HF (with MASTER high efficiency TL5-28W/840 lamp) OR equivalent.	0.7
Electrical rooms having IMCC, VFD panels, PLC with false ceiling	200	Decorative mirror optic luminaire for recessed mounting with energy efficient T5 lamps 2x28W of Philips type TBS 669/228 D6 HF (with MASTER high efficiency TL5-28W/840 lamp) OR equivalent.	0.7
Offices, Conference rooms without false ceiling	300	General purpose batten luminaire with energy efficient T5 lamps 2x28W of Philips type TMS 122/228 E HF with GMS 122/228 Reflector (with MASTER high efficiency TL5-28W/840 lamp) OR equivalent.	0.75

Offices, Conference rooms with false ceiling	300	Decorative mirror optic luminaire for recessed mounting with energy efficient T5 lamps 2x28W of Philips type TBS 669/228 D6 HF (with MASTER high efficiency TL5-28W/840 lamp) OR equivalent.	0.75
Battery Room	100	General purpose batten luminaire with energy efficient T5 lamps 2x28W of Philips type TMS 122/228 E HF with GMS 122/228 Reflector (with MASTER high efficiency TL5-28W/840 lamp) OR equivalent.	0.6
Transformer Room	100	General purpose batten luminaire with energy efficient T5 lamps 2x28W of Philips type TMS 122/228 E HF with GMS 122/228 Reflector (with MASTER high efficiency TL5-28W/840 lamp) OR equivalent.	0.6
Civil Staircases of plant buildings	100	General purpose batten luminaire with energy efficient T5 lamps 2x28W of Philips type TMS 122/228 E HF (with MASTER high efficiency TL5-28W/840 lamp) OR equivalent.	0.6
Staircases (steel) of plant complex and cable tunnels / cellars/ Overhead cable galleries	70	Industrial well-glass integral type luminaire suitable for 70W HPSV lamps of Philips type HPK 105 1XSON – I 70 W OR equivalent.	0.6
Pump house	200	Industrial well-glass integral type luminaire suitable for 70W HPSV lamps of Philips type HPK 105 1XSON – I 70 W OR equivalent.	0.6
Flood lighting	70	Weather proof non integral type (integral type in case of high mast) flood light fittings suitable for 1x250/400W HPSV lamps of Philips type SNF 114 250/400W wide beam /narrow beam as per requirement OR equivalent.	0.5
Main Technological/ Operational areas like Casting Bays, Fan buildings, Sinter Machine platforms, BF Cast House etc.	200	High bay/Medium bay integral type light fittings suitable for 400W /250W HPSV lamps of Philips type HPK 225 SON 250/400W wide beam /narrow beam as per requirement OR equivalent.	0.6
Platforms near technological	150	Industrial well-glass integral type luminaire suitable for 70W HPSV lamps,	

structures like Stoves, BF platforms, MND area, screens, crushers, weigh feeder platforms, wind boxes etc.		of Philips type HPK 105 1XSON – I 70 W OR equivalent.	
Conveyor Houses / conveyor gantries / junction houses	100	Industrial well-glass integral type luminaire suitable for 70W HPSV lamps, of Philips type HPK 105 1XSON – I 70 W OR equivalent.	0.6
Toilets	100	General purpose batten luminaire with energy efficient T5 lamps 1x28W of Philips type TMS 122/128 HF (with MASTER high efficiency TL5-28W/840 lamp) OR equivalent.	0.6
Street light Fittings	As per table below	Street light luminaire suitable for 150/250 W HPSV lamps of Philips type SGP 401/SON T 150/250 W OR equivalent.	
Areas having acid vapours	As required	Vapour proof light fittings	0.6

### 3.4 Area Lighting

Classification	Type of road	Av. Lux level	Type of illumination	MF
Group - A1	Important traffic road carrying fast traffic	30	Cut off / semi cut off	0.6
Group - A2	Main road carrying mixed traffic	15	Cut off / semi cut off	0.6
Group - B1	Secondary road with considerable traffic	8	Cut off / semi cut off or non cut off	0.6
Group - B2	Secondary road with light traffic	4	Cut off / semi cut off or non cut off	0.6

### 3.5 PORTABLE ELECTRIC LIGHT

For lighting inside a chamber, tank etc., no lamp or light other than **flame proof** construction be used in case any flammable gas, fume, dust is likely to be present. No portable electric light or electric appliances of voltage exceeding **24 volts** shall be permitted for use inside the chamber, Tank etc.

### 3.6 REGULAR MONITORING & MAINTENANCE

Monitoring of illumination level at different locations of the workplace should be done at regular intervals. Maintenance should include:

- i) Cleaning lamp/ luminaires.
- ii) Repairing and replacing damaged or ineffective lamps/ luminaires.
- iii) Maintaining emergency lighting (proper cleaning, repairing, replacing and disposal).
- iv) Disposing of lamps/ luminaires safely.

## **REFERENCES**

1. IS 3646 (Part 2): 1992 'code of practice for Interior illumination'
  2. CIBSE (Chartered Institution of Building Services Engineers, London) Code for lighting.
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