	<p style="text-align: center;">BHARAT HEAVY ELECTRICALS LIMITED RAMACHANDRAPURAM:: HYDERABAD – 502 032</p>
	<p style="text-align: right;">Ref: HY/EM&HE&F/AM/SPECS/LEDI Rev: 00 Dt:10/08/2015 Page: 1 of 8</p>
<p>SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP</p>	

PROCUREMENT OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

- 1. OBJECTIVE:**
To procure high bay LED luminaries for 02 Shop.
- 2. BRIEF DESCRIPTION:**
 - 2.1 LED High Bay Luminaries for 02 & 06 Shop, fixed at height 17 meters, to be used for lighting purpose which should provide min 150 LUX at one meter above the floor level.
 - 2.2 *Existing roof lighting details are as under.*
High bay metal halide 400w luminaire closed version spaced at 4meter X 6meters on rectangular pitch at 15 meter height.

Specifications	Vender to Note/Specify / Confirm	Supplier's confirmation	Deviations if any /Remarks
3.0 SCOPE OF MATERIAL SUPPLY			
3.1 LED high bay roof lighting luminaries consisting of in built electronic control gear, Die cast aluminum housing with elegantly designed heat sink for efficient heat dissipation, wiring up to terminals	CONFIRM		
3.2 A: In 02 Shop Vendor shall design as per the existing spacing of luminaries with bay size 204m(length)X30m(width)X1.5m(Existing luminaire height) with minimum 150 Lux at 1 meter above floor level (as per attached roof lighting layout	NOTE		




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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

	<p>3RS-9243) using a maximum of 99 lights. B: In 06 Shop vendor shall supply LED luminaires as per above size and lux level but they shall be placed at scattered location as per requirement.</p>			
3.3	<p>LED luminaries shall be protected from Ingression of water, dust, vermin, vibrations and smoke. Material used for making these luminaire shall be weather resistant type. As per IP 65.</p>	CONFIRM		
3.4	<p>All equipment shall be tropicalized and suitable for operation in shop floor conditions, where temperature variation is between 10° to 45°C</p>	CONFIRM		
3.5	<p>Input Voltage range shall be 1 phase, 180-250 Volts AC, 50 Hz.</p>	CONFIRM		
3.6	<p>LED Driver shall be protected from Over voltage, Short circuit and Over Temperature. As per IEC 61547</p>	CONFIRM		
3.7	<p>Colour Rendering Index (CRI) shall be greater than 70 and a test report shall be produced for same.</p>	CONFIRM		
3.8	<p>Power factor shall be greater than 0.95</p>	CONFIRM		
3.9	<p>Overall wattage of each LED luminaire shall not exceed 175 watts.</p>	CONFIRM		
3.10	<p>Safety shall comply with IEC 61347-2-13.</p>	CONFIRM		
3.11	<p>Performance shall comply with IEC 62384 and BIS</p>	CONFIRM		



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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

3.12	10322 LM 79, LM 80 whichever is higher. Lumens per watt for the LEDs shall be greater than 130 and Lumens per watt for the Luminaire shall be greater than 85. Test certificate may be produced for the same	CONFIRM		
3.13	Life of the luminaire shall be minimum 50,000 working hours maintaining at least 70 % of initial lumens. Vendor to consider and compensate the lumens based on 5 year warranty period.	CONFIRM		
3.14	Size of each LED Luminaire shall be less than 750mmX750mmX800mm (height).	CONFIRM		
3.15	LED mounting shall be of rounded hook type with 'S' shaped hook.	CONFIRM		
3.16	Supplier shall be the Original Manufacturer of LED luminaires.	CONFIRM		
3.17	Supplier shall confirm five years free maintenance of LED luminaire including materials and LUX as per L70 at one meter above floor level even at 5 th year.	CONFIRM		
3.18	Supplier shall confirm availability of spares and their replace-ability for the independent parts of the luminaire for the purpose of repair or replacing the luminaire in case of any fault within	CONFIRM		



SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

	<p>48 hours of complaint during 5 years warranty duration. Vendor to provide service contact mobile no./land line no. after placement of purchase order.</p>			
<p>3.19</p>	<p>Supplier must visit BHEL/EM shop for better understanding of the requirement before quote. For this purpose contact Engineer/Shop Maint/EM</p>	<p>CONFIRM</p>		
<p>3.20</p>	<p>After opening Technical bid, Vendor shall perform sample testing in our shop with minimum 4 luminaires for qualifying technically. These samples are to be brought within two weeks and the testing is to be completed within one week. No extension shall be provided.</p> <ol style="list-style-type: none"> 1. Vendor and BHEL team shall record the details of each luminaire like make, model no, wattage, Input voltage etc. 2. Vendor shall replace our existing four MH fittings with his own electrical team and replace it with the sample 4 LED luminaire to prove the lux level min 150 lux, at One meter from ground for min of 4 days. 3. Vender representative in coordination with EM shop M&S shall record the Lux level in 	<p>CONFIRM</p>		

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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP



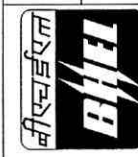
	<p>Illumination measurement sheet (Annexure D) & input power at late hours inside the factory.</p> <p>4. Suitable calibrated meters (Lux meters) are to be brought by the vendor for testing.</p> <p>5. After due recording, the sample LED luminaires are to be removed and the MH lamps are to be replaced in the same previous position. The vender shall get qualified electrician to work at heights and suitable safety permission shall be taken. ✓</p>	CONFIRM	
3.21	The vendor shall stand disqualified if the Vendor does not supply the samples - minimum four numbers, within the specified two weeks after the opening of technical bid or if the lux level is not met as per the requirement, the vendor shall stand disqualified. This shall be viewed very strictly.	CONFIRM	
3.20	Vendor shall confirm Pre-dispatch inspection with proper instrumentation at their works.	CONFIRM	
3.21	Vendor to supply one lux meter of reputed make with proper calibration reports valid as per IS	SPECIFY THE MAKE AND MODEL	
3.22	After PO placement an approval shall be taken from BHEL/EM/M&S department to supply,	CONFIRM	

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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP



3.23	CONFIRM		removal of existing MH luminaires and handing over them to EM/M&S, fixing new LED luminaries and Prove out. The supplier is required to study the requirement, the scope of supply and certify the completeness of the scope in order to execute the work. In case of any discrepancies in the scope of supply the supplier is required to highlight the same to BHEL before acceptance of the order.
3.24	FURNISH ADDRESS AND CONTACT DETAILS OF MINIMUM TWO NO'S		Vendor to Submit, along with offer, reference list of at least two customers where he has supplied LED High bay luminaires, installed at a height > or = 10 meters. And performance certificate.
3.25	CONFIRM		Following documents shall be furnished by the supplier along with his offer : a) Certificate for power factor measurement b) Certificate for over voltage cut off c) Certificate for operating voltage range d) Certificate for Luminous efficacy e) Certificate for CRI f) Deviations, if any from these specifications In the absence of the above information, the offer will not be considered.



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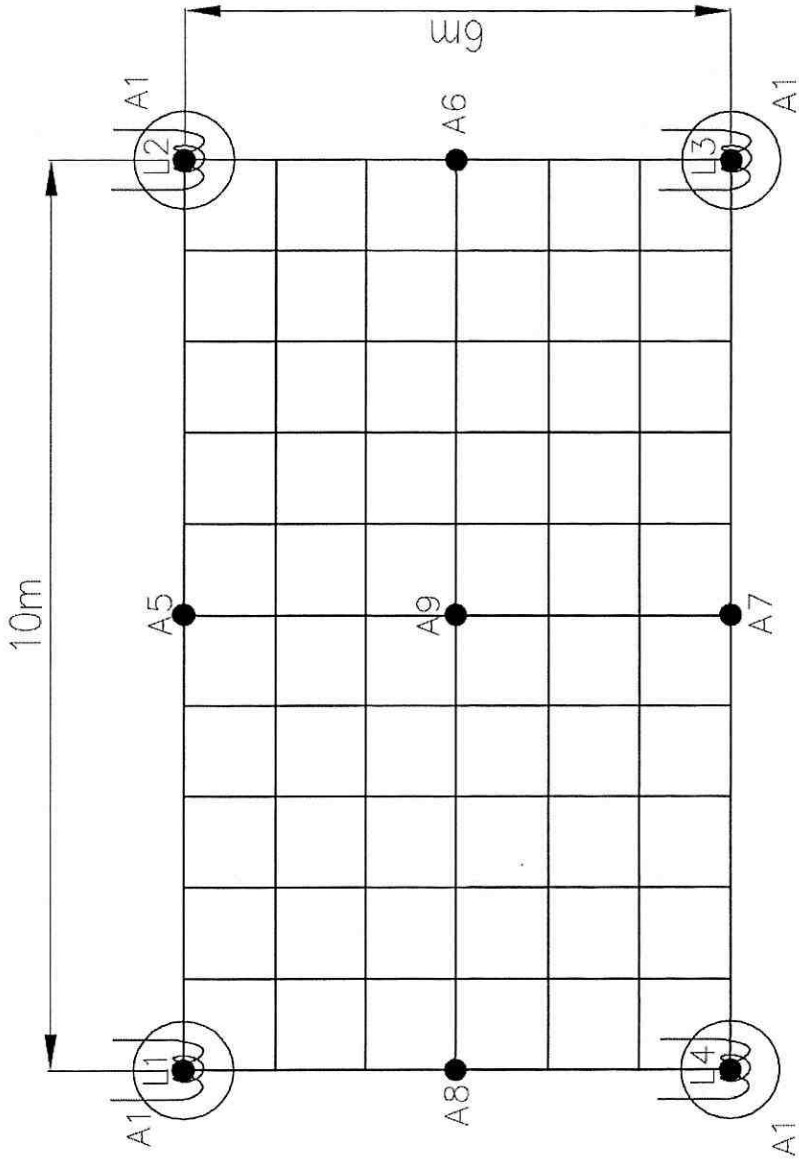
SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

<p>3.26</p>	<p>Following should be specified by the supplier in the technical bid:</p> <ol style="list-style-type: none"> 1) Rated input power (in W) 2) Rated luminous flux (in lm) 3) LED luminaire efficacy (in lm/W) 4) Luminous intensity distribution 5) Photometric code 5a) Correlated Colour Temperature (CCT in K) 5b) Rated Colour Rendering Index (CRI) 5c) Rated chromaticity co-ordinate values (initial and maintained) 5d) Maintained luminous flux 6) Rated life (in h) of the LED module and the associated rated lumen maintenance (Lx) 7) Failure fraction (Fy), corresponding to the rated life of the LED module in the luminaire 8) Ambient temperature (ta) for a luminaire 9) Power Factor 10) Intensity Distribution 11) Drive Current 12) Optical Risk
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ANNEXURE-I (ILLUMINATION MEASUREMENT SHEET)(attached)

Vendor Name	
Name of Service Engineer	
Model No. of luminaire	
No. of luminaires	
Date of measurement	
Name of BHEL Executive	
Lux at source	
Input Voltage	
Input current	
Input power	
Overall dimensions	
Spacing Details	



Illumination Grid of size 2X2 meters is shown below:

The LED lights are placed at 6X10 meter spacing

Note:

L1, L2, L3, L4 are luminaires
 A1, A2, A3, A4, A5, A6, A7, A8, A9 are
 LUX measurement points.

$$LUX_{Avg} = (A1+A2+A3+A4)/16 + (A5+A6+A7+A8)/8 + (A9/4)$$

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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

PROCUREMENT OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

- 1. OBJECTIVE:**
 To procure high bay LED luminaries for 02 Shop.
- 2. BRIEF DESCRIPTION:**
- 2.1 LED High Bay Luminaries for 02 & 06 Shop, fixed at height 17 meters, to be used for lighting purpose which should provide min 150 LUX at one meter above the floor level.
- 2.2 Existing roof lighting details are as under.
 High bay metal halide 400w luminaire closed version spaced at 4meter X 6meters on rectangular pitch at 1.5 meter height.

Specifications	Vender to Note/Specify / Confirm	Supplier's confirmation	Deviations if any /Remarks
3.0 SCOPE OF MATERIAL SUPPLY			
3.1 LED high bay roof lighting luminaries consisting of in built electronic control gear, Die cast aluminum housing with elegantly designed heat sink for efficient heat dissipation, wiring up to terminals	CONFIRM		
3.2 A: In 02 Shop Vendor shall design as per the existing spacing of luminaries with bay size 204m(length)X30m(width)X15m(Existing luminaire height) with minimum 150 Lux at 1 meter above floor level (as per attached roof lighting layout	NOTE		

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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

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	3RS-9243) using a maximum of 99 lights. B: In 06 Shop vendor shall supply LED luminaires as per above size and lux level but they shall be placed at scattered location as per requirement.		
3.3	LED luminaries shall be protected from Ingression of water, dust, vermin, vibrations and smoke. Material used for making these luminaire shall be weather resistant type. As per IP 65.	CONFIRM	
3.4	All equipment shall be tropicalized and suitable for operation in shop floor conditions, where temperature variation is between 10° to 45°C	CONFIRM	
3.5	Input Voltage range shall be 1 phase, 180-250 Volts AC, 50 Hz.	CONFIRM	
3.6	LED Driver shall be protected from Over voltage, Short circuit and Over Temperature. As per IEC 61547	CONFIRM	
3.7	Colour Rendering Index (CRI) shall be greater than 70 and a test report shall be produced for same.	CONFIRM	
3.8	Power factor shall be greater than 0.95	CONFIRM	
3.9	Overall wattage of each LED luminaire shall not exceed 175 watts.	CONFIRM	
3.10	Safety shall comply with IEC 61347-2-13.	CONFIRM	
3.11	Performance shall comply with IEC 62384 and BIS	CONFIRM	

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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

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10322 LM 79, LM 80 whichever is higher.			
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3.14 Size of each LED Luminaire shall be less than 750mmX750mmX800mm (height).	CONFIRM		
3.15 LED mounting shall be of rounded hook type with 'S' shaped hook.	CONFIRM		
3.16 Supplier shall be the Original Manufacturer of LED luminaires.	CONFIRM		
3.17 Supplier shall confirm five years free maintenance of LED luminaire including materials and LUX as per L70 at one meter above floor level even at 5 th year.	CONFIRM		
3.18 Supplier shall confirm availability of spares and their replace-ability for the independent parts of the luminaire for the purpose of repair or replacing the luminaire in case of any fault within	CONFIRM		

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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

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	48 hours of complaint during 5 years warranty duration. Vendor shall repair the luminaries INSITU. Vendor to provide service contact mobile no./land line no. after placement of purchase order.			
3.19	Supplier must visit BHEL/EM shop for better understanding of the requirement before quote. For this purpose contact Engineer/Shop Maint/EM	CONFIRM		
3.20	After opening Technical bid, Vendor shall perform sample testing in our shop with minimum 4 luminaires for qualifying technically. These samples are to be brought within two weeks and the testing is to be completed within one week. No extension shall be provided. <ol style="list-style-type: none">1. Vendor and BHEL team shall record the details of each luminaire like make, model no, wattage, Input voltage etc.2. Vendor shall replace our existing four MH fittings with his own electrical team and replace it with the sample 4 LED luminaire to prove the lux level min 150 lux, at One meter from ground for min of 4 days.3. Vender representative in coordination with	CONFIRM		


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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

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	<p>Illumination measurement sheet (Annexure D) & input power at late hours inside the factory.</p> <p>4. Suitable calibrated meters (Lux meters) are to be brought by the vendor for testing.</p> <p>5. After due recording, the sample LED luminaires are to be removed and the MH lamps are to be replaced in the same previous position. The vender shall get qualified electrician to work at heights and suitable safety permission shall be taken.</p>			
3-21	<p>The vendor shall stand disqualified if the Vendor does not supply the samples - minimum four numbers, within the specified two weeks after the opening of technical bid or if the lux level is not met as per the requirement, the vendor shall stand disqualified. This shall be viewed very strictly.</p>	CONFIRM		
3-20	<p>Vendor shall confirm Pre-dispatch inspection with proper instrumentation at their works.</p>	CONFIRM		
3-21	<p>Vendor to supply one lux meter of reputed make with proper calibration reports valid as per IS</p>	SPECIFY THE MAKE AND MODEL		
3-22	<p>After PO placement an approval shall be taken from BHEL/EM/M&S department to supply.</p>	CONFIRM		

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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

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	removal of existing MH luminaires and handing over them to EM/M&S, fixing new LED luminaries and Prove out.			
3.23	The supplier is required to study the requirement, the scope of supply and certify the completeness of the scope in order to execute the work. In case of any discrepancies in the scope of supply the supplier is required to highlight the same to BHEL before acceptance of the order.	CONFIRM		
3.24	Vendor to Submit, along with offer, reference list of at least two customers where he has supplied LED High bay luminaires, installed at a height > or = 10 meters. And performance certificate.	FURNISH ADDRESS AND CONTACT DETAILS OF MINIMUM TWO NO'S		
3.25	Following documents shall be furnished by the supplier along with his offer : a) Certificate for power factor measurement b) Certificate for over voltage cut off c) Certificate for operating voltage range d) Certificate for Luminous efficacy e) Certificate for CRI f) Deviations, if any from these specifications In the absence of the above information, the offer will not be considered.	CONFIRM		

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SPECIFICATIONS OF LED HIGH BAY LUMINARIES FOR 02 & 06 SHOP

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3.26 Following should be specified by the supplier in

the technical bid:

- 1) Rated input power (in W)
- 2) Rated luminous flux (in lm)
- 3) LED luminaire efficacy (in lm/W)
- 4) Luminous intensity distribution
- 5) Photometric code
- 5a) Correlated Colour Temperature (CCT in K)
- 5b) Rated Colour Rendering Index (CRI)
- 5c) Rated chromaticity co-ordinate values (initial and maintained)
- 5d) Maintained luminous flux
- 6) Rated life (in h) of the LED module and the associated rated lumen maintenance (Lx)
- 7) Failure fraction (Fy), corresponding to the rated life of the LED module in the luminaire
- 8) Ambient temperature (ta) for a luminaire
- 9) Power Factor
- 10) Intensity Distribution
- 11) Drive Current
- 12) Optical Risk

शरथ मिरदडी

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SPECIFICATIONS OF LED HIGH BAY LUMINAIRES FOR 02 & 06 SHOP

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ANNEXURE: I (ILLUMINATION MEASUREMENT SHEET)(attached)

Vendor Name	
Name of Service Engineer	
Model No. of luminaire	
No. of luminaires	
Date of measurement	
Name of BHEL Executive	
Lux at source	
Input Voltage	
Input current	
Input power	
Overall dimensions	
Spacing Details	

Illumination Grid of size 2X2 meters is shown below:

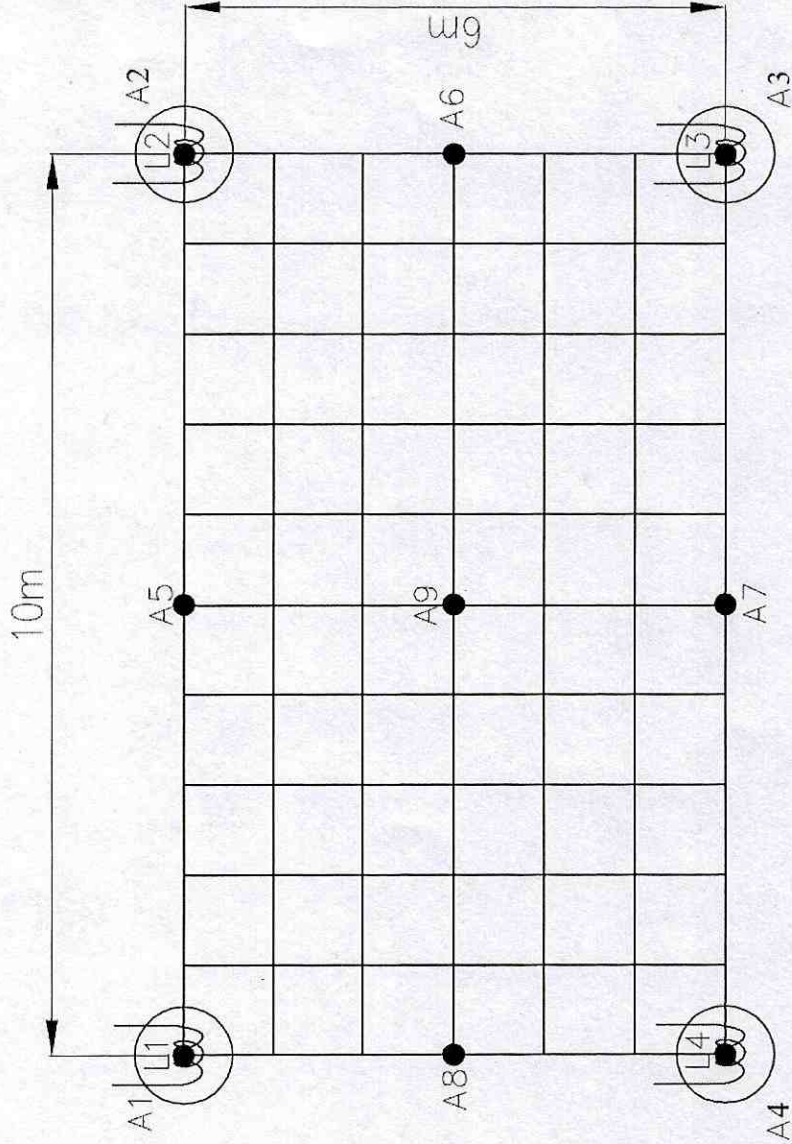
The LED lights are placed at 6X10 meter spacing

Note:

L1, L2, L3, L4 are luminaires

A1, A2, A3, A4, A5, A6, A7, A8, A9 are

LUX measurement points.



$$LUX_{Avg} = (A1+A2+A3+A4)/16 + (A5+A6+A7+A8)/8 + (A9/4)$$

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