TECHNICAL SPECIFICATION

GENERAL
The supply of materials to be made at Dr. Babasaheb Ambedkar International Airport, Nagpur.

All items shall be new and as per approved makes & it should be handed over at engineering stores to the concerned in-charge with required documents. All Defective / rejected materials to be replaced whereas necessary samples to be supplied as per the instructions of Engineer-in-charge (E.I.C.) or his/her authorized representative. In case of any doubt / discrepancy, the advice should be taken from E.I.C. before supplying the materials and material it should be getting approved before supply from Engineer-in-charge.

Contractor should provide proper persons for opening of sealed boxes, counting/ measuring of items, checking for any breakages or any other short coming and handing over to **MIL** up to the satisfaction of E.I.C.

MIL reserves the right to accept / reject / cancel the tender at any time without assigning any reasons.

SCOPE OF WORK
Items shall be supplied as per schedule of quantities / bill of quantities.

PRICES
The rates quoted shall be inclusive of all duties, works contract tax, packing, insurance, transportation, loading, unloading, handling, incidental charges, local levies etc. however GST will be extra at actual.

PAYMENT TERMS
100% payment on satisfactory completion of work within 30 days except SD & Statutory deductions etc as applicable.

Payment shall be made on item rate basis after deducting the security deposit, statutory deductions like income tax, VAT, liquidated damages, where applicable, other deductions / recoveries & penalties the contractor might become liable as per the terms and conditions of the contract etc.
The security deposit recovered in the running bills will be released subject to recoveries, if any, on completion of defects liability period.

MAKES
Make of the item shall be as per the approved makes specified in the SOQ/BOQ/ approved makes list given in the tender. If any make is specified in the SOQ/BOQ, the same has to be supplied and makes given in the general approved makes list is not applicable. Where ever “equivalent” mentioned in BOQ/SOQ regarding the makes, the equivalence to be explored among the makes indicated in the BOQ / SOQ / approved make list. In all ‘Equivalent’ cases, Suitable evidence shall be produced against ‘equivalency’ and get the prior approval from the Engineer –in-charge. Wherever makes are not mentioned, they shall be of ISI marked/ reputed brands and the same shall be got approved by the EIC before supply. **MIL** reserves the right to accept / reject any make.

DEVIATIONS
30% of contract value.

CONTRACT /COMPLETION PERIOD
The work shall be completed in all respects within **30 (Thirty) days** which shall be reckoned from the date as mentioned in the supply / work order.

COMPENSATION FOR DELAY/ LIQUIDATED DAMAGES (LD)
1% per week subject to a maximum of 10% of contract value.

LD shall be levied if the work is delayed and delay is attributable to the contractor.

ENGINEER-IN-CHARGE
The work shall be approved by the Asst. Manager (Engg.-Elect), MIHAN India Ltd. **On behalf of Sr. APD, Dr. Babasaheb Ambedkar International Airport, Nagpur**, who will be the Engineer-in-Charge for this work. Asst. Manager (Engg-Elect) MIL, Nagpur Airport is his authorized representative.

SECURITY DEPOSIT
10% of the completion cost shall be deducted from the bill as security deposit. The security deposit shall be refunded only after expiry of the defects liability period.

GUARANTEE / DEFECTS LIABILITY
The defects liability period for this work is **12 (Twelve) months** from the certified date of completion.
During D.L.P, the contractor shall replace the defective materials with new ones at free of cost. The Contractor at his/her own cost shall rectify any defect that may appear during this period. **MIL** reserves the right to replace/rectify any defective material/system, during defects liability period, and charge/adjust the expenses incurred against the security deposit of the contractor in case of urgency/ delay by the contractor.

DEDUCTIONS
SD, IT others as applicable.

VALIDITY
The tender shall be valid for **90 days** from the date of opening of tender.

DOCUMENTATION
Supplier / contractor shall submit required documents like bills, invoices, gate passes, challans, guarantee certificates, drawings, technical catalogs, manuals, test certificates, etc as applicable. Contractor should also supply any other document as required by E.I.C./ needed for official records. All the material supplied directly from Manufacturer along with necessary factory test report to Nagpur Airport.

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PARTICULAR SPECIFICATIONS

Name of Work: **Replacement of conventional CFL fittings into LED fittings at Dr. Babasaheb Ambedkar International Airport, Nagpur.**

1. SCOPE OF WORK

Item No. 1) - Supply of LED down light fixture of 24 watt to achieve required lumen output as per mentioned in BOQ.

Item No. 2) - Supply of LED down light fixture of 40 watt to achieve required lumen output as per mentioned in BOQ.

Item No. 3) - Supply of Integral Via duct LED light fixture of 20 watt to achieve required lumen output as per mentioned in BOQ.

2. DETAILED DESCRIPTION OF LUMINAIRIES

2.1 LED TYPE LIGHTS FITTINGS

i. The type of fittings shall be as specified in BOQ of tender documents.

ii. The OEM/Dealer/contractors shall supply the specified model and make of the fittings. The standard constructional features of specified make and model as given in the tender document are acceptable.

2.2 LED TYPE FIXTURES

2.2.1 APPLICABLE STANDARDS

S.No.	Standards	Brief Description
1.	IS 16101:2012	Terminology
2.	IES LM-79-08	Light output, efficacy, colour for LED Products.
3.	IES LM-80-08	Light output over time, temperature for LED Packages.
4.	IES LM -82-12	Light output, efficacy, colour over temperature for light engines (IES files are available)
5.	IES TM-21-11	Extrapolating LM-80 test data to predict LED life.
6.	ANSI/UL 1574:2004 (Sec. 54) UL 8750	Light emitting diode (LED) Components and subassemblies integral to lighting track or a luminaire assembly covered by UL 1574, shall comply for use in lighting Products UL 8750 refer clause no 1.7.
7.	DIN EN 62031; DIN EN 62471-1; IEC PAS62717	LED Module
8.	DIN EN 60598-1; IEC PAS 62722-2-1; EN55015; EN 61547; EN 62493; LM 79; LM80; ANSI C78.377-2008	LED Fixtures
9.	BIS 16101	LEDs and LED modules; Terms and Definitions
10.	BIS 16103 (Part 1 & 2)	Led Modules for General Lighting Safety and performance requirements
11.	BIS 15885 ; BIS 16104	For Control gear
12.	BIS 16105	Based on IEC LM 80
13.	BIS 16106	Based on IEC LM 79
14.	BIS 16107 (part 1&2) (IEC PAS 62722-2-1)	Luminaires performance
15.	BIS 16108 / (IEC 62741)	Luminaires performance

3.0 SPECIFICATION FOR LED LIGHT LUMINAIRE

- Supply of LED light luminaries having LED Array as light source where individual LED source should be provided with multi-layer symmetric distribution lens, which should ensure that the uniform light distribution of the luminaries and suitable for outdoor lighting applications as applicable.
- Luminaries housing, optics, diffuser shall be as per SOQ.
- Heat dissipation should be managed through adequate heat sink with proper thermal management.
- The fixture should be impact resistant with suitable protection for driver and LED's.
- For safer operations the power driver unit should be provided with Surge protection, Short circuit & Overload protection.
- Guarantee: The manufacturing companies should provide **minimum TWO years** guarantee on LED Luminaries of the complete fitting including all accessories.
- Also records of all type tests and routine tests conducted as applicable standards at manufacturer's works/NABL approved labs etc shall be submitted along with the material with Guarantee Card during supply.
- Pressure die cast aluminum housing with IP 66 Protection Cradle with mounting angles for lighting arrangement for Item no. 3.
- System efficacy should be Greater than 100 Lu/Watt system efficacy.
- Separate compartment required for LED and Driver helps in easy maintenance, Secondary Lens provided for each LED.
- Manufacturer shall submit Photo biological Safety report for the LED's as per IED -62471 and assessment of blue light as per IEC/TR 62778.
- BIS approved driver with R number certificate to be submitted.
- High power bright white LED's with wattage shall be greater than 1W and less than 3W. Manufacturer shall submit LM-80 test report of Tier1 LED used in the proposed luminaries.

- **THE BIDDER SHALL FULFILL THE FITTING SPECIFICATIONS TABULATED BELOW FOR THE LED LIGHT FIXTURE TO BE SUPPLIED AGAINST THE SOQ ITEMS AND GET IT APPROVED BY THE ENGINEER –INCHARGE FOR SUPPLYING THE SAME BEFORE SUBMITTING THE BID AND WHO CAN MEET OUT OUR SPECIFICATIONS SHALL BE ELIGIBLE FOR OPENING OF HIS FINANCIAL BID.**

Schedule Item No. 1:-

S.No.	Description	Fitting Specification
1.	Model & Make of Fixture	As per SOQ
2.	Total Power Consumption	24 Watt
3.	Efficiency of LED light fitting (efficacy)	Not less than 100 Lumens / Watt
4.	System Lumen Output	Minimum 2700 Lumen
5.	Housing	Aluminium Die-Cast with well design thermal management system including company name or logo should be embossed on housing finished with white powder coated.
6.	Diffuser	High translucent polycarbonate, Glare free, Smooth light distribution.
7.	Protector	Gasket
8.	Suitability	Indoor type
9.	Operating Voltage range	150V-270 V AC
10.	Minimum Colour Rendering Index (CRI)	80%
11.	Driver efficiency	>85%
12.	IP category	IP 20
13.	Surge Protection	2KV Internal
14.	Operating Frequency range	50 Hz. ($\pm$ 3 Hz)
15.	Power factor	$\geq$ 0.95 OR Unity
16.	Colour temperature (CCT)	5700K +/-300K
17.	Lumen Depreciation	Depreciates 30% after life (50000 Hours)
18.	Life of LED fitting	50000 burning hours (min.) @L70
19.	Life of control driver of LED fitting	50000 hours
20.	Operating Temperature range	-10 Deg. C to + 50 Deg C.
21.	Make of LED	Nichia / Cree/ Osram/ Philips/ Sharp
22.	Secondary beam angle lens	NA
23.	Test Reports / Certificates & Documents during execution in case of award.	Type Test Certificates from NABL accredited Labs only.
		LM 79 Test Report
		LM 80 Test Report
		Lumen depreciation Curve of LEDs used.
24.	Guarantee certificate from OEM	TWO Years from the actual date of completion of work on whole light fitting including Driver (Guarantee certificate from OEM to be submitted in case of award) & all accessories etc.
25.	Cut out size	Overall Fixture size is Not less than 215 mm & not be greater than 220mm
26.	Shape	Round

Schedule Item No. 2:-

S.No.	Description	Fitting Specification
1.	Model & Make of Fixture	As per SOQ
2.	Total Power Consumption	40Watt
3.	Efficiency of LED light fitting (efficacy)	Not less than 100 Lumens / Watt
4.	System Lumen Output	Minimum 4000 Lumen
5.	Housing	Aluminium Die-Cast with well design thermal management system including company name or logo should be embossed on housing.
6.	Diffuser	High translucent polycarbonate, Glare free, Smooth light distribution.
7.	Protector	Gasket
8.	Suitability	Extra High ceiling application
9.	Operating Voltage range	150V-270 V AC
10.	Minimum Colour Rendering Index (CRI)	70%
11.	Driver efficiency	>85%
12.	IP category	IP 20
13.	Surge Protection	3KV Internal
14.	Operating Frequency range	50 Hz. ($\pm$ 3 Hz)
15.	Power factor	$\geq$ 0.95 OR Unity
16.	Colour temperature (CCT)	5700K +/-300K
17.	Lumen Depreciation	Depreciates 30% after life (50000 Hours)
18.	Life of LED fitting	50000 burning hours (min.) @L70
19.	Life of control driver of LED fitting	50000 hours
20.	Operating Temperature range	-10 Deg. C to + 50 Deg C.
21.	Make of LED	Nichia / Cree/ Osram/ Philips/ Sharp
22.	Secondary beam angle lens	NA
23.	Test Reports / Certificates & Documents during execution in case of award.	Type Test Certificates from NABL accredited Labs only.
		LM 79 Test Report
		LM 80 Test Report
		Lumen depreciation Curve of LEDs used.
24.	Guarantee certificate from OEM	TWO Years from the actual date of completion of work on whole light fitting including Driver (Guarantee certificate from OEM to be submitted in case of award) & all accessories etc.
25.	Cut out size	As per available size at site
26.	Shape	Round

Schedule Item No. 3:-

S.No.	Description	Fitting Specification
1.	Model & Make of Fixture	As per SOQ
2.	Total Power Consumption	20 Watt
3.	Efficiency of LED light fitting (efficacy)	Not less than 125 Lumens / Watt
4.	System Lumen Output	Minimum 2500 Lumen
5.	Housing	Integral Via-duct Aluminium extrusion housing with well design thermal management system including company name or logo should be embossed on housing.
6.	Diffuser	Toughened Glass UV stabilized with distortion free, clear, heat resistant.
7.	Protector	Silicon Gasket
8.	Suitability	Outdoor
9.	Operating Voltage range	150V-270 V AC
10.	Minimum Colour Rendering Index (CRI)	70%
11.	Total Harmonic Distortion (THD)	$\leq$ 10%
12.	IP category	IP 66
13.	Surge Protection	5KV Internal & 10KV External
14.	Operating Frequency range	50Hz. ($\pm$ 3 Hz)
15.	Power factor	$\geq$ 0.99 OR Unity
16.	Colour temperature (CCT)	5700K
17.	Lumen Depreciation	Depreciates 30% after life (50000 Hours)
18.	Life of LED fitting	50000 burning hours (min.) @L70
19.	Life of control driver of LED fitting	50000 hours
20.	Operating Temperature range	-10 Deg. C to + 50 Deg C.
21.	Make of LED	Nichia / Cree/ Osram/ Philips/ Sharp
22.	Secondary beam angle lens	30^0
23.	Test Reports / Certificates & Documents during execution in case of award.	Type Test Certificates from NABL accredited Labs only.
		LM 79 Test Report
		LM 80 Test Report
		Lumen depreciation Curve of LEDs used.
24.	Guarantee certificate from OEM	TWO Years from the actual date of completion of work on whole light fitting including Driver (Guarantee certificate from OEM to be submitted in case of award) & all accessories etc.
25.	Mounting	Cradle provided for installation
26.	Shape	Dimension should be 320 mm length & 98 mm width for ease of replacement

Note:

1. **MIL** reserves the right to call for samples of that make/model of LED lamp as offered by the tenderer during sample approval phase and test it, if required. However, the cost of the sample and the cost of testing shall be borne by the agency

2. The bidder shall quote their rates, in accordance with the technical specification.

5.0 Lux Level Measurement

Before taking up the work, the contractor shall furnish the typical lux level calculation sheets to be achieved from the proposed LED fixtures in the schedule of work supported from the approved LED light fixture manufactures for approval of the Engineer In charge.

The average illuminance of terminal building of lux level should be at least the following:-

a) Horizontal illuminanace :- 250-300 Lux with a uniformity ratio (average to minimum)

b) Vertical illuminance :- 300-350 Lux at a height of 2 mtr above the relevant directions.

On completion of work the contractor shall demonstrate & furnish the same as final lux level of typical areas and submitted for acceptance of Engineer In charge.

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