

규 격 서

Commodity Description

ITEM NO. (품목번호)	DESCRIPTION (품목 및 규격서)	Q'TY (수량)	UNIT (단위)
4	고출력 LED엔진 열제어 플랫폼 연동 광학측정 시스템 구축 (thermal control platform measurement system for high power LED engine)	1	set

A. General Description

- 본 장비는 ZHAGA LED 엔진 및 모듈에 대한 법규 및 광특성 측정을 목적으로 활용될 장비임
- 시스템을 구성하는 모든 요소는 ZHAGA 규격에서 요구하는 모든 조건을 만족해야 하며, 아래의 시험이 이루어질 수 있어야 한다. (시험실 환경 제외)
 - ZHAGA Book 1을 기본으로 Book 2에서 Book 11까지 해당되는 제품의 Photometric Interface에서 요구하는 모든 시험
 - 광속, 광 효율, 색좌표, 상관색 온도, 연색 지수, SDCM, 주파장, 반치폭, 전기적 특성 등 시험과 관련하여 CIE 및 LM-79에서 요구하는 사항들을 완벽히 충족

B. General Specification

※ 아래 사양과 동등 또는 그 이상의 성능을 보유한 장비

ITEM	Specification	Quantity
Integrating Sphere System	<p>Equipped with a spectroradiometer, it can be used for spectral, colorimetric, and photometric measurements of light sources, typically for ZHAGA modules and engines.</p> <p>Integrating Sphere</p> <ol style="list-style-type: none"> Integrating sphere with 1 m diameter; for measuring luminous and radiant flux of lamps, LEDs and LED clusters Interior Sphere Coating Reflectance: barium sulphate coating The certificate of spectral reflectivity $\rho(\lambda)$ will be provided. The integrating sphere is capable of performing 4π and 2π geometry measurements. <ul style="list-style-type: none"> 4π geometry test JIG should be removed from sphere while measuring 2π test. The side opening port should be $\Phi 300\text{mm}$ for 2π measurement. Side port construction: Temperature controller shall be installed the side port of sphere 90 deg rotatable version to use the measurement port inside or top 	1set

	<p>position</p> <ul style="list-style-type: none"> - Spectral Range : 280 - 1350nm - Spectrometer connection : Via fiber Bundle - internal temperature sensor - Adapter flange for the 300 mm measurement port; reduction of the openingsize to 200, 150, 100 and 50 mm diameter via exchangeable aperture plates - Adapter plate for the 300 mm measurement port; includesflange for LED test sockets with 50 mm diameter and baffle with 25 mm aperture <p>4) Aux lamp, auxiliary lamp socket and its barrier used for self absorption correction should be equipped.</p> <p>5) Cable feed-through with quick-release electrical connectors</p> <p>Temperature Control Platform</p> <ol style="list-style-type: none"> 1) Arroyo 286 TEC MOUNT (similar or better specification) 2) Large cold plate with solid copper, hard nickel plated, M3 holes : customized mounting plates available 3) Variety of different LED adapters for each ZHAGA Books 4) Temperature control range : 15 °C - 150 °C Auto Control 5) Thermal Capacity : 100W at 25°C Bi-polar output (heat & cool) 6) Measurement & display : temperature(set, actual), current, voltage 7) ensors: RTD <p>Temperature probe and monitor</p> <ol style="list-style-type: none"> 1) Temperature probe input terminal on the back side of the Integrating Sphere 2) Temperature accuracy: ±0.5 °C 3) Integrating sphere temperature display on the software 	
Spectroradio measurement System	<ol style="list-style-type: none"> 1) Detector <ul style="list-style-type: none"> - Integration Time : 10ms ~ 60s - Cooling Temperature : -10°C - Linearity : ±0.5% 2) Spectroradiometry <ul style="list-style-type: none"> - Signal sensitivity at 1s integration time : 6-10E-7 W/m2nm - Spectroradiometric accuracy : ±3.5% 3) Spectrophotometry <ul style="list-style-type: none"> - Photometric transmission accuracy : ±0.5% T or ±0.02A at 1A - Baseline noise : ±60counts or ±0.4% 4) Spectrograph <ul style="list-style-type: none"> - Spectral rage: 360 - 830nm - Spectral resolution : 2.2nm - Datapoint Interval : 0.5nm - Wavelength accuracy : ±0.3nm 	1set

	<p>5) Electrical data</p> <ul style="list-style-type: none"> - AD-converter : 15 Bit resolution - PC interface : USB 2.0 Standard <p>6) Sensitivity for LED measurement</p> <ul style="list-style-type: none"> - Luminous intensity : 0.003mcd - 15kcd - Luminous flux : 0.06mlm - 300klm <p>7) Accuracy for LED measurement</p> <ul style="list-style-type: none"> - Luminous intensity : $\pm 4\%$ - Luminous flux : $\pm 4\%$ - Dominant wavelength : $\pm 0.5\text{nm}$ - Chromaticity (x,y) : ± 0.0015 <p>8) Windows Based Operating Software</p> <p>9) Measurement Data Output</p> <ul style="list-style-type: none"> - Total luminous Flux (lumens) - Radiant Flux (Watts) - Chromaticity x, y, u, v and u', v' CIE coordinates - Center Wavelength (nm) - Dominant Wavelength (nm) - Excitation Purity (%) - Peak Wavelength (nm) - Full Width Half Max Bandwidth (nm) - Luminous Efficacy (lm/W) - Standard deviation of color matching (SDCM); - Correlated Color Temperature (deg. K) - ANSI C78.377:2015 - Color Rendering Index (CRI) : Ra, R1 to R15 - Rf, Rg : IES TM-30-15 - Measured DUT Current (A) / Voltage (V) - Automatic binning function according to the settable quantities such as voltage, current, luminous flux, wavelength and color temperature 	
<p>Standard (Calibration) Lamp</p>	<p>The color temperature (spectral power distribution) and luminous flux of the calibration lamp can be traceable to NMI. The accredited certificate should be provided. The total spectral radiant flux of the standard lamp can be traceable to NMI. Calibration certificate for total spectral radiant flux shall be issued by an accredited institute. Calibration certificate for luminous flux shall be issued by a accredited institute</p> <p>1) Standard lamp</p> <ul style="list-style-type: none"> - Electrical rating: > 50W - Lamp type: tungsten halogen lamp - Wave length/calibration range: 360-1100nm - Radiant flux: more 1,000lm - Life time: 2000h <p>2) Absorption lamp</p>	<p>1set</p>

	<ul style="list-style-type: none"> - Electircal rating: 20-23V, 4A - lamp type: tungsten halogen lamp - Baffle/barrier - life time: 2000h 	
Power Source for Test Samples	<p>1) Power Source for Test Samples</p> <ul style="list-style-type: none"> - Power sources integrated into rack and software system for powering ZHAGA Module and Engine. - Connection-unit with jumper type connections for connecting AC and DC power supplies to test samples. - Multiplexer, mounted to goniometer sample mounting table for power connection of up to AC & DC power supply - Connection of external (additional) power supplies possible <p>2) DC power supply</p> <ul style="list-style-type: none"> - 0 ~ 100 V (display 0 ~ 100.00V) - 0 ~ 5 A (display 0 ~ 5.00A) - IEEE 488/16 bit interface - Resolution by computer controlled operation <p>3) AC power Source</p> <ul style="list-style-type: none"> - Programmable AC Power Source - IEEE/GPIB and RS 232 Interface - voltage range 0 ~ 500 V (Maximum Current 6A) - frequency range 1 - 500 Hz - resolution : 1mA - power 1000VA <p>4) Temperature Recorder</p> <ul style="list-style-type: none"> - YOKOGAWA GP10 (similar or better specification) - 5.7" TFT LCD - Input channel : 3 (max. 30) - Accuracy <ul style="list-style-type: none"> :DCV 20 mV; $\pm (0.01\% \text{ of reading} + 5 \mu\text{V})$ 6V (1-5V) $\pm (0.01\% \text{ of reading} + 2 \text{ mV})$:RTD Pt100 $\pm (0.02\% \text{ of reading} + 0.2 \text{ }^{\circ}\text{C})$ Pt100(high resolution) $\pm (0.02\% \text{ of reading} + 0.16^{\circ}\text{C})$ <p>5) Wattmeter</p> <ul style="list-style-type: none"> - YOKOGAWA WT310 (similar or better specification) - Interface IEEE-488.2 - Auto & Manual control - system integration, connection cables - THD measurement included <p>6) Temperature Controller</p> <ul style="list-style-type: none"> - Arroyo 5310 (similar or better specification) - Current 10A / Voltage 12V - RTD 4-wire - PC Interface USB & RS-232 <p>7) Supplementary cabling in goniometer chassis for AC feed to a</p>	1set

	<p>connection panel for connecting AC powered samples at test sample table</p> <p>8) System integration</p> <ul style="list-style-type: none"> - Integration of all control and display units, power sources in a electronics rack. 	
Software	<ol style="list-style-type: none"> 1) Complete software system for control of hardware, data acquisition, flexible test routines, data evaluation 2) The software for test, with English user interface, should perform test fulfilling relevant standards ZHAGA regarding measuring lighting device. The software should be able to control all of functions automatically. (input current, input voltage, TEC etc) 3) The test report generated by the software should have the format according relevant standards. The title of the report should be editable (including information such as, name of test sample, type, test item, status of the sample etc.) 4) The test control software should be user-friendly, easy to understand and operate. 5) The software should be able to archive all test report with the search function that user could search for any test report by its name and test date. 6) The measured data obtained should be exported in excel and pdf format for use in simulation programs. 7) The measured data should be contained Fidelity(Ra), Gamut Index(Rf) and Color Vector Graphics in accordance with IES TM-30-15 8) Software should be contained specification for chromaticity of ANSI C78.377-2015 9) Software should be have a fucntion of auto controlling TEC requested by ZHAGA Standards 	1set
Computer System	<ol style="list-style-type: none"> 1) CPU: Intel Core i5 2) RAM: 16GB DDR4 3) 1st HDD 512 GB SSD SATA 4) 2nd HDD 2TB SATA 7200RPM 5) External HDD 2TB*3EA 6) Window 10 (Korean) 7) Graphic 8GB NVIDIA GTX 960 8) Main board ASUS Z170 (PCI-EXPRESS 3.0 x 16) 9) monitor dual (2ea) : 27'' 10) Wireless Mouse, Key Board & Speaker 11) Laserjet Color Printer 12) Workstation Table & Chair 13) Additional License Key (s/w) + Portable control system (Intel/Core M/Skylake/12inch) 	1set

Certificates to be delivered with system	1) Certificate attesting alignment of system including all hardware to be issued at installation 2) Certificate of calibration of photometric measurement system including Certificates on the relative spectral sensitivity $V(\lambda)$ match of the photometer heads including determination of <ul style="list-style-type: none"> - the $f1'$ quality index for V-λ adaption $< 0.8\%$ - the spectral mismatch correction indices $< 1.5\%$ for all conventional light sources and typical LEDs accordance with CIE 127:2007 Fig2 3) Certificate of calibration of the colorimeter including Certificate of relative spectral responsivities of color matching functions 4) Certificate of calibration of power supplies for test objects, issued by manufacturers Remark: Calibration certificates are traceable to standards, calibrated by a accredited institute with MRA and ISO 17025 status	1set
Mounting, Instructions, Training	1) Mounting, installation, adjustment, calibration, and performance tests at place of installation 2) Training in use of the system over 3 days.	1set
Delivery	within 4 months after purchase order	

C. Remarks

- 보증기간 : 설치 검수 완료일로부터 2년
- 매뉴얼 : 영문, 국문 각 3부
- 측정기기(교정대상 모든 부속품)의 공인시험 및 교정기관의 인증서(Certificate)를 제출
- 입찰시 최근 3년간 동일 시스템(동등사양 유사장비 포함)을 국외 NCB 또는 NVLAP 공인시험기관에 납품한 실적 3건 이상 증빙서류(동일시스템에 대한 구매계약서, 납품확인서, 세금계산서 사본 등 객관적으로 검증 가능한 자료 제출)
- 제품공급자에 의한 설치 및 교육 실시
 - 보증기간 내 2회 이상 현장 방문 교육 무상 제공 (설치 후 교육 제외)
- 제품의 품질 보증 및 A/S의 원활한 지원을 위해 장비에 문제가 발생하였을 경우 문제 접수 후, 24시간 이내에 대처하며, 해결이 지연되는 경우 7일 이내에 동일 사양의 Back up 장비를 무상 제공하는 A/S 시스템을 지원하여야 한다.
- 제품공급자는 제품전달시 아래사항을 준수
 - 실험 장치에서 구동프로그램이 있는 경우, 시스템 및 교육용 소스를 모두 제공할 것
 - 사용자가 지정한 장소까지 운송/이동 및 설치하여 줄 것
(이동 및 설치에 필요한 비용 및 도비는 전액 공급자가 부담)
 - 사용자에 의한 최종 검수 보고서 발행 시까지 납품을 완료 할 것

8. 외주 방지

- 1) 제작을 직접 하지 않는 것이 밝혀질 경우 발주를 취소하고 손해배상을 청구한다.
(향후 한국조명연구원 모든 입찰 배제)

- 2) 제작과정을 수시로 제출

(사진, 메일, 팩스 등 제작 과정이 순조롭게 진행되는 것을 확인 할 수 있도록 할 것)

9. 장비 입고에 대한 세부 일정 작성

- 1) 일정에 맞춰 방문 점검(주요 자재 입고 및 장비 조립 시)

10. 장비 설치 완료일 : 11월 11일 이내

(검수과정에서 물품에 이상이 발견될 경우 지체일수에 산입하며, 규격서에서 요구하는 사양을 만족하지 못할 경우 계약을 취소하고 손해배상을 청구한다.)