

규격서

Commodity Description

ITEM NO. (품목번호)	DESCRIPTION (품목 및 규격서)	Q'TY (수량)	UNIT (단위)
5	열적제어가 가능한 LED엔진 및 모듈 배광측정시스템: Type C (Thermal controlled fan equipped near-field goniometer system for LED engine and module)	1	set

A. General Description

1. 본 장비는 ZHAGA LED 엔진 및 모듈에 대한 기준 및 광특성 측정을 목적으로 활용될 장비임
2. 시스템을 구성하는 모든 요소는 ZHAGA 규격에서 요구하는 모든 조건을 만족해야 하며, 아래의 시험이 이루어질 수 있어야 한다. (장비 height 는 3m 이내로 제한, 시험실 환경 제외)
 - ZHAGA Book 1을 기본으로 Book 2에서 Book 11까지 해당되는 제품의 Photometric Interface에서 요구하는 모든 시험
 - 배광, DUT 온도제어, Luminance 특성, 광속, 광 효율, 색좌표, 상관색 온도, 연색 지수, SDCM, 반치폭, 전기적 특성 등 시험과 관련하여 CIE S025 및 IES LM-79에서 요구하는 사항들을 완벽히 충족

B. General Specification

※ 아래 사양과 동등 또는 그 이상의 성능을 보유한 장비

ITEM	Specification	Quantity
Goniometric System	1.1 Goniometric System <ul style="list-style-type: none"> - Automatic goniophotometric far-field system Type C using a C/γ - Coordinate System in accordance with IES LM-79-08 and CIE S025 - Test sample Max. load 50 Kg - Test sample Max. Dia. 2000mm - Variety of different Zhaga adapters for each Books - Reproducibility C axis : $\leq 0.1^\circ$ (at nominal sample load) $\leq 0.2^\circ$ (at maximum sample load) - Reproducibility γ axis : $\leq 0.1^\circ$ (at nominal sample load) $\leq 0.1^\circ$ (at maximum sample load) 1.2 Motor driver : Synchronous servo motors with angle encoders 1.3 C, γ axis motor controlled movement (minimum range, resolution, velocity)	1set

	<table border="1" data-bbox="416 159 1307 259"> <thead> <tr> <th>Axis</th> <th>Movement Range</th> <th>Resolution</th> <th>Velocity</th> </tr> </thead> <tbody> <tr> <td>C</td> <td>-90 - +270°</td> <td>0.01°</td> <td>3.1°/s up to 50°/s</td> </tr> <tr> <td>γ</td> <td>>±165°</td> <td>0.01°</td> <td>1.8°/s up to 30°/s</td> </tr> </tbody> </table> <p>1.4 Laser</p> <ul style="list-style-type: none"> - Integrated in the center of rotation of the γ axis - Integrated in the center of rotation of the C axis <p>1.5 Sample plate</p> <ul style="list-style-type: none"> - TEC Mount <ul style="list-style-type: none"> : Large cold plate with solid copper, hard nickel plated, M3 holes customized mounting plates available : Thermal capacity : 100W @ 25°C : Temperature Range (°C) : +15 to +85 (Active Cooling) - Variety of different adapters for each Books - Thermal sensor(thermocouple, Thermistor, RTD etc) of Tr point (Zhaga Book requested) - Real time Temp. Monitoring & Controlling using S/W <p>1.6 Connection of the AC Power Supply & power meter with the sample supply terminal at the goniometer</p> <p>1.7 Gonio control Units</p> <ul style="list-style-type: none"> - Driving the synchronous servo motors of the goniometer - display of the angle positions - display of measured values for use of the photometer <p>1.8 Remote Controller for driving the synchronous servo motors of the goniometer (ex. display of the angle positions)</p> <p>1.9 Control cabinet for goniometer control unit and power supply units</p> <p>1.10 Emergency Stop switch on the goniometer</p> <p>1.11 Integrated & adjustable laser safety system</p> <p>1.12 PC interface Standard : RS-232</p>	Axis	Movement Range	Resolution	Velocity	C	-90 - +270°	0.01°	3.1°/s up to 50°/s	γ	>±165°	0.01°	1.8°/s up to 30°/s	
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Photometric System	<p>2.1 Photometer Total characteristics</p> <ul style="list-style-type: none"> - 8 measurement ranges - Display range 0.1 mlx (last digit) to 50,000 lx - Graphical LCD display: full textual display of value and measurement unit (lx, cd, cd/m²) and other information (e.g., in conjunction with goniometer) - Adaptive auto-ranging - Sampling rate (single points): 5 ms - Sampling rate (scan mode): < 200 ms (up to 5000 measurements/s in scan mode with goniometer) - Display refresh time: < 0.8 s - Rated voltage: 90 - 250 V - Power consumption: < 50 VA - Rated frequency: 45 Hz to 65 Hz - Operating temperature: 10 to 50 °C 	1set												

	<ul style="list-style-type: none"> - V(λ) approximation according to DIN 5032.7, class L, CIE 69 - Thermostatic stabilization 35° or dark current compensation - Calibration, traceable to PTB standard, with calibration certificate - Individual test report for V(λ) approximation class L acc. to DIN 5032 part 7 and acc. to DIN EN-13032-1 - 19" housing, three height units, prepared for integration into control racks - Control of the manual measuring system independently from PC via front panel keys or directly via PC-program <p>The bidder shall supply with the bid a certificate issued by an accredited test institute for the f1 quality characteristic and the spectral mismatch error f2 of the type of photometer heads proposed. The certificate shall confirm fulfillment of these requirements</p>	
Spectroradio measurement System	<p>3.1 Tristimulus colorimeter for testing of ZHAGA module and engine</p> <p>3.2 Detector</p> <ul style="list-style-type: none"> - Integration Time : 10ms ~ 60s - Cooling Temperature : -10°C - Linearity : $\pm 0.5\%$ <p>3.3 Spectroradiometry</p> <ul style="list-style-type: none"> - Signal sensitivity at 1s integration time : $6-10E-7$ W/m²nm - Spectroradiometric accuracy : $\pm 3.5\%$ <p>3.4 Spectrophotometry</p> <ul style="list-style-type: none"> - Photometric transmission accuracy : $\pm 0.5\%$ T or $\pm 0.02A$ at 1A - Baseline noise : ± 60counts or $\pm 0.4\%$ <p>3.5 Spectrograph</p> <ul style="list-style-type: none"> - Spectral rage: 360 - 830nm - Spectral resolution : 2.2nm - Datapoint Interval : 0.5nm - Wavelength accuracy : ± 0.3nm <p>3.6 Electrical data</p> <ul style="list-style-type: none"> - AD-converter : 15 Bit resolution - PC interface : USB 2.0 Standard <p>3.7 Sensitivity for LED measurement</p> <ul style="list-style-type: none"> - Luminous intensity : 0.003mcd - 15kcd - Luminous flux : 0.06mlm - 300klm <p>3.8 Accuracy for LED measurement</p> <ul style="list-style-type: none"> - Luminous intensity : $\pm 4\%$ - Luminous flux : $\pm 4\%$ - Dominant wavelength : ± 0.5nm - Chromaticity (x,y) : ± 0.0015 <p>3.9 ID Key for identifying the attached accessory and storage of</p>	1set

	<p>calibration data</p> <p>3.10 Fixed mounting of colorimeter sensor/straylight tubes to ensure long time stability of laboratory geometries</p>	
Luminance Measurement System	<p>4.1 Computer controlled measurement equipment to measure the Luminance Properties in combination with the goniometer. Each test results should automatically measured in Software in accordance with ZHAGA Books</p> <ul style="list-style-type: none"> - Luminance Rotational Symmetry - Luminance center balance - Luminous Uniformity <p>4.2 Luminance Measurement</p> <ul style="list-style-type: none"> - 6-Filter Imaging Photometer and Colorimeter - Measurement range : 0.0001 cd/m² to 100,000 cd/m² ; higher values with optional density filters - Uniformity : ± 1.0 % (average of 10 x 10 pixel) - Uniformity for x,y : ± 0.001 (average of 10 x 10 pixel) - Linearity : +/-0.5 % - Luminance accuracy for standard illuminant A : +/-4 % - Luminance accuracy for LED color light : +/-2 % - Accuracy color coordinates for color light : +/-0.003 - Accuracy color coordinates for LED color light : +/-0.005 <p>4.3 Effective pixels</p> <ul style="list-style-type: none"> - Pixel resolution : 1370 (H) x 1020 (V) effective pixels - Refresh rate in live mode : Up to 17 images per sec at 60 ms exposure time - Signal dynamic range : 4600:1 in single shot ;up to 6,000,000:1 in multi-exposure mode <p>4.4 Individual test report for V(λ)-approximation Calibration traceable to NMI standard with calibration certificate</p>	1set
Power Source for Test Samples	<p>5.1 Power Source for Test Samples</p> <ul style="list-style-type: none"> - Power sources integrated into goniophotometer hardware 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>5.2 DC power supply</p> <ul style="list-style-type: none"> - 0 ~ 100 V (display 0 ~ 100.00V) - 0 ~ 5 A (display 0 ~ 5.000A) - IEEE 488/16 bit interface - Resolution by computer controlled operation 	1set

	<p>5.3 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 - power 1000VA <p>5.4 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>5.5 Supplementary cabling in goniometer chassis for AC feed to a connection panel for connecting AC powered samples at test sample table</p> <p>5.6 System integration</p> <ul style="list-style-type: none"> - Integration of all control and display units, power sources in a electronics rack. 	
Software	<p>6.1 Complete software system for control of hardware, data acquisition, flexible test routines, data evaluation</p> <p>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 perform type test as well as for mass production samples. It should contain extra programmable modules for other special required tests.</p> <p>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.)</p> <p>The test control software should be user-friendly, easy to understand and operate.</p> <p>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.</p> <p>6.2 The measured data obtained should be exported in IES and EULUMDAT format for use in simulation programs.</p> <p>6.3 The measured data should be contained Fidelity(Ra), Gamut Index(Rf) and Color Vector Graphics in accordance with</p>	1set

	<p>TM-30-15</p> <p>6.4 Software should be contained specification for chromaticity of ANSI C78.377-2015</p> <p>6.5 Software should be calculated automatically CIE ZONAL FLUX ZONE requested by ZHAGA Standards</p> <p>6.6 Software should be have a fuction of TEC auto controlling requested by ZHAGA Standards</p> <p>6.7 Software should be calculated automatically Spatial non-uniformity of chromaticity according to LM-79-08</p>	
Computer System	<p>7.1 CPU: Intel Core i5</p> <p>7.2 RAM: 16GB DDR4</p> <p>7.3 1st HDD 512 GB SSD SATA</p> <p>7.4 2nd HDD 2TB SATA 7200RPM</p> <p>7.5 External HDD 2TB*3EA</p> <p>7.6 Window 10 (Korean)</p> <p>7.7 Graphic NVIDIA GTX 960</p> <p>7.8 Main board ASUS Z170 (PCI-EXPRESS 3.0 x 16)</p> <p>7.9 27' Dual monitor 2EA</p> <p>7.10 Wireless Mouse, Key Board & Speaker</p> <p>7.11 Laserjet Color Printer</p> <p>7.12 Workstation Table & Chair</p> <p>7.13 Additional License Key (s/w) + Portable control system (Intel/Core M/Skylake/12inch)</p>	1set
Accessory	<p>8.1 TEST JIG and Stand for LED Module, Engine, Lamp and Luminaire (e.g. E27, Gu10, and holders)</p> <p>8.2 Temperature Recorder for Ta</p> <p>8.2 Standard Calibration Lamp (50W) 1ea</p>	
Certificates to be delivered with system	<p>9.1. Certificate attesting angular accuracy of goniometer positioning</p> <p>9.2 Certificate attesting alignment of system including all hardware to be issued at installation</p> <p>9.3 Certificate of calibration of photometric measurement system including Certificates on the relative spectral sensitivity $V(\lambda)$ match of the photometer heads including determination of</p> <ul style="list-style-type: none"> - the fl'quality index for $V-\lambda$ adaption $< 1.5\%$ - the spectral mismatch correction indices $< 1\%$ for all conventional light sources and typical LEDs accodance with CIE 127:2007 Fig2 <p>9.4 Certificate of calibration of the Luminance system including Certificate of relative spectral responsivities of color matching functions</p> <p>9.5 Certificate of calibration of power supplies for test objects, issued by manufacturers</p>	1set

	Remark: Calibration certificates are traceable to standards, calibrated by a accredited institute with MRA and ISO 17025 status	
Mounting, Instructions, Training	10.1 Mounting, installation, adjustment, calibration, and performance tests at place of installation 10.2 Training in use of the system over 3 days.	1set
Delivery	within 4 months after purchase order	

C. Remarks

1. 보증기간 : 설치 검수 완료일로부터 2년
2. 매뉴얼 : 영문, 국문 각 3부
3. 광학표준기기 및 기타 기기(전력분석기, 전압공급기 등 교정대상 모든 장비)는 공인시험 및 교정기관의 인증서(Certificate)를 제출
4. 입찰시 최근 3년간 동일 시스템을 국외 NCB 또는 NVLAP 공인시험기관에 납품한 실적 3건 이상 증빙서류(동일시스템에 대한 구매계약서, 납품확인서, 세금계산서 사본 등 객관적으로 검증 가능한 자료 제출)
5. 제품공급자에 의한 설치 및 교육 실시
 - 1) 보증기간 내 2회 이상 현장 방문 교육 무상 제공 (설치 후 교육 제외)
6. 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.
7. 제품공급자는 제품전달시 아래사항을 준수
 - 1) 실험 장치에서 구동프로그램이 있는 경우, 시스템 및 교육용 소스를 모두 제공할 것
 - 2) 사용자가 지정한 장소까지 운송/이동 및 설치하여 줄 것
(이동 및 설치에 필요한 비용 및 도비는 전액 공급자가 부담)
 - 3) 사용자에게 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.)