TEST REPORT

Applicant:	SHENZHEN NOBLE OPTO CO., LTD.
Address:	Building 5F, Mingjinhai Industry Park, Shiyan Town, Bao'an District, Shenzhen, China, 518108
Report Number:	POCE18010302VRS
Total Page:	12 Pages

Report on the submitted sample said to be:

Sample name:	200mm High Power Traffic Light
Trade Name:	N/A
Specimen Model:	NBVB213HP, NBAL213HP-V12, NBPS212HP-V12, NBVB212HP-V12, NBPS200HP-V12, NBAL200HP-V12, NBVB200HP-R, NBVB200HP-A, NBVB200HP-G
Manufacturer:	SHENZHEN NOBLE OPTO CO., LTD.
Address:	Building 5F, Mingjinhai Industry Park, Shiyan Town, Bao'an District, Shenzhen, China, 518108
Date EUT received:	Jan. 03, 2018
Date test effected:	Jan. 03, 2018- Jan. 08, 2018
Types of Test:	Photometric and colorimetric characterisation

****** FOR FURTHER DETAILS, PLEASE REFER TO THE FOLLOWING PAGE(S) ******

Signed for and on behalf of
POCE Ltd

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Approvedr(Manager) : Michael Mo

SUMMARY

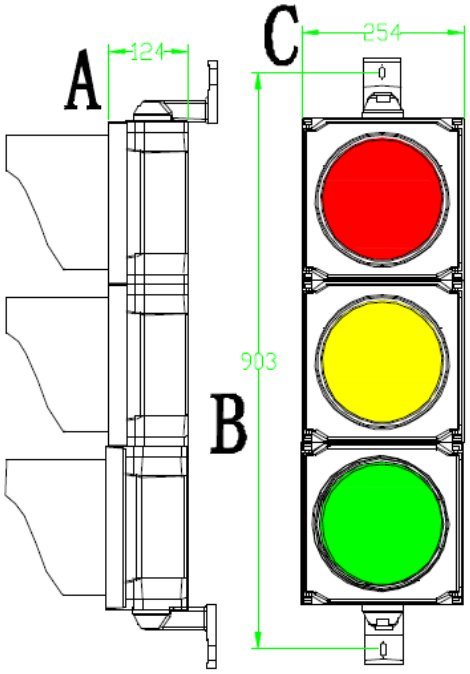
1. Specimen description

The 200 mm diameter traffic lights samples sampled by Shenzhen POCE technology Co., Ltd. in Jan. 03, 2018 and delivered to the laboratories. Are composed of ablack polycarbonate support, inside which a luminous matrix made by LEDS is mounted. The front part has a closing door on which a transparent lens in polycarbonate is mounted. The colour of the lantern is detemined by LED light emission. The door is provided with support for mounting the visor. The main technical characteristics are sated in the following table

Signal head	Sign	Color	No. of LEDS	Voltage	Outside Dimensions
NBVB213HP	Full Ball	Red	3	85-275Vac	903 x 254 x 124 mm
		Yellow	3		
		Green	3		

Signal head NBVB213HP -LEDs characterisitics

Color	Manufacture/ Trademark	Frequency (Hz)	Voltage[V]	Power[W]
Red	SHENZHEN NOBLE OPTO CO., LTD.	45-65Hz	85-275Vac	>8 W
Yellow	SHENZHEN NOBLE OPTO CO., LTD.	45-65Hz	85-275Vac	>8 W
Green	SHENZHEN NOBLE OPTO CO., LTD.	45-65Hz	85-275Vac	>8 W



mm	A	B	C
2 lights	124	649	254
3 lights	124	903	254

Traffic Signal Light drawings of model NBVB213HP

2.Reference documents

The test was carried out in accordance with the requirements of the following documents:
*European EN 12368: 2015 “Traffic control equipment- Signal head”;
*CIE publication No. 15(E-1.3.1)71”Colorimetry” with supplements 1 and 2.

3. Enviromental conditions

Temperature: 23±3℃

Realative humidity: 50±10%

4. Test apparatus

- Instrument systems Gmbb”Spectro 320” spectroadiometer coupled to “EOP” probe;
- Minolta “T-10M” illuminance meter;
- LMT”SF100”flash meter;
- Minolta”CS-100A” luminance meter;
- Goniometer with fixed horizontal axis and adjustable vertical axis(type 1 of CIE publication No. 701987)

- Clay paky “Shadow QS-LT HMI 1200”minaire;
- Fuke”87 multimeter.

5. Test method

Before checking their optical characteristic, the signal heads passed all tests foreseen in the standard EN 12368: 2015, At the end of the temperature test, the signal heads show no physical problems of upon note upon visual inspection and have passed the final operational tests.

Derermiantion of luminous intensity

Luminous intensity was determined using the flash meter by considering the distance between flash meter and test specimen. Positioned at a distance of approx.9m form the test light source, the flash meter converts the illuminace measured in lux to a voltage reading whose trend is then displayed by the flash meter software. The measurement in lux, used for the luminous intensity calculation, is obtained from the known voltage value and the conversion factor set in the flash meter.

The luminous intersity measurement was carried out after achieving suitable stabilization.

Luminous intensity distribution, luminous uniformity and phantom signal

Luminous intensity distribution was intensity by varying the signal head tilt angles using the goniometer with fixed horizontal axis onto which the signal head itself has been positioned.

Luminance uniformity is measured using a luminance meter mounted on a stand capable of moving the instrument in both directions (top-bottom, right-left) at right angles to the reference axis(instrument-centre of signal head). This allows scanning of the signal head surface in order to detect the minium and maximum luminance

As requested by the standard, the phantom signal was measured without hood fitted.

In addition, since it was not possible to realise illuminance of 40000 1x, the luminous intensity of the phantom light was calculated from the corresponding lower luminous intensity as specified in 8.4 of standard UNI EN 12368. The chromaticity coordinates of the combined signal (mixed light from real signal and phantom signal) were calculated using the expression specified under 8.6 therein and from the color measurements obtained with the reflected signal alone, i.e. with the projector is switched on and the signal light switched off.

Calculation of colorimetric parameters

The chromaticity coordinates of the signal heads' real colour are supplied directly by the spectroradiometer that calculates them on the basis the measure spectrum and the instructions provided by CIE publication No.15.

Signal lights with symbols

Symbols shall only be placed on roundels of signal lights which demonstrate compliance with 6.3 to 6.7 of standard EN 12368.The optical performance for symbols is derived by using the performance of full roundel. Only luminous intensity on reference axis was determined using the procedure described above.

Classification requested by the customer

Performance parameters	Classification
Luminous intensity	Performance level 2 class 1(2/1)
Luminous intensity Distribution	Type W and Type N of category B for level 2/1
Luminance uniformity	Type W(≥1:10) ,Type N(≥1:15)
Maximum phantom signal ratio	Class 5
Colour of signal lights for real	Signal head-each signal head fails within the colour boundaries of table 7
Colour of signal lights for combined signal*	No request
Symbols	S1

(*) the color of the mixed signal shall be within the recommended regions, unless there are no requirements for combined colors.

Requirements specified by normative references on the basis of the customer requested classification

Luminous intensity	Level 2/1: I min = 200 cd; I max = 800 cd.
Luminous intensity distribution	Minimum lurninous intensity vlues for category B are calculated as a percentage of the value I_{min} for the luminous intensity class and as an absolute value for the level 2/1(I_{min}=200cd)
Luminance uniformity	Type W(≥1:10) ,Type N(≥1:15)
Maximum phantom signal	Red, yellow I_i/I_{ph}>16 Green I_s/I_{ph}> 16

Note: all limits values stated in the table above are referred to the reference axes.

	Minimum luminous intensity values for type W distribution for level B2/1 [% of minimum value required for a class on the reference axis]								
Vertical angles	Horizontal angles α_{horiz}								
	-30°	-20°	-10°	-5°	0°	+5°	+10°	+20°	+30°
0	1	3	55	85	100	85	55	3	1
-1.5	-	-	-	-	-	-	-	-	-
-3	-	-	-	75	80	75	-	-	-
-5	-	-	35	-	60	-	35	-	-
-10	-	8	-	-	30	-	-	8	-
-20	2	-	-	-	2	-	-	-	2

	Minimum luminous intensity values for type N distribution for level B2/1 [cd]								
Vertical angles	Horizontal angles α_{horiz}								
	-30°	-15°	-10°	-5°	0°	+5°	+10°	+15°	+30°
0	*	1.5	15	65	100	65	15	1.5	*
-1.5	*	-	-	-	95	-	-	-	*
-3	*	-	-	45	70	45	-	-	*
-5	*	-	10	-	40	-	10	-	*
-10	*	5	-	-	6	-	-	5	*
-20	*	-	-	-	-	-	-	-	*

The values stated the tables above are vlalid even for a signal head with type W & type N luminous intensity of category B for level 2/2(I_{min}=200cd, I_{max}=2000cd).

6. Test results

Conditions during the tests

Signal head	Sign	Colour	Voltage [Vac]	Current [mA]
NBVB213HP	Full Ball	Red	230	68.2
		Yellow	230	68.6
		Green	230	55.9

Luminous internsity in the reference axis

Signal head	Sign	Colour	ICON	Luminous intensity [cd]
NBVB213HP	Full Ball	Red		597
		Yellow		458
		Green		1385

Luminous intensity distribution

Red	“NBVB213HP” Signal head luminous intensity angular distribution [cd]								
Vertical angles A_{Vert}	Horizontal angles a_{horiz}								
	30	20	10	5	0	5	10	20	30
0	24	42	515	576	597	548	404	35	21
-3°	-	-	-	599	566	593	-	-	-
-5°	-	-	502	-	577	-	343	-	-
-10°	-	44	-	-	474	-	-	40	-
-20°	32	-	-	-	60	-	-	-	30

Yellow	" NBVB213HP"Signal head luminous intensity angular distribution [cd]								
Vertical angles A_{Vert}	Horizontal angles a_{horiz}								
	30	20	10	-5	0	5	10	20	30
0	21	34	301	455	458	452	305	34	20
-3°	-	-	-	444	449	438	-	-	-
-5°	-	-	304	-	454	-	286	-	-
-10°	-	36	-	-	332	-	-	35	-
-20°	27	-	-	-	52	-	-	-	26

Green	"NBVB213HP"Signal head luminous intensity angular distribution [cd]								
Vertical angles A_{Vert}	Horizontal angles a_{horiz}								
	30	20	10	5	0	5	10	20	30
0	28	167	813	1146	1385	635	1222	138	27
-3°	-	-	-	1167	1344	1191	-	-	-
-5°	-	-	846	-	1294	-	801	-	-
-10°	-	146	-	-	1033	-	-	133	-
-20°	38	-	-	-	293	-	-	-	39

Luminance uniformity: L_{min}/L_{max} ratio

NBVB213HP Signal head		L_{min}/L_{max}
Red		0,20
Yellow		0,29
Green		0,26

Phantom signal: I_p/I_{ph} ratio

NBVB213HP Signal head		I_p/I_{ph}
Red		16.5
Yellow		16.3
Green		16.2

Chromaticity coordinates of real and combined signal

NBVB213HP		Signal type	Chromaticity coordinates	
Red		Real	0,701	0,299
		Combined	0,642	0,325
Yellow		Real	0,571	0,429
		Combined	0,528	0,420
Green		Real	0,072	0,616
		Combined	0,158	0,569

7. Findings

The classification for the signal heads under test in accordance with standard EN 12368 is given in the following tables

NBVB213HP Signal head	
Performance parameters	Classification
Luminous intensity	Performance level 2/1
Luminous intensiy distribution	Type W and Type N of category B for level 2/1
Luminance uniformity	Type W(≥1:10) Type N(≥1:15)
Maximum phantom signal ratio	Class 5: compliant
Colour of signal lights for real	Each signal head falls within the colour boundaries of Table 7 for its colour: compliant
Colour of signal lights for combined signal	Only green signal head falls within the colour boundaries of Table 7 for its colour not compliant

Photos

Photo 1 View: [√] front [ ] rear [ ] right side [ ] left side [ ] top [ ] bottom [ ] internal	
Photo 2 View: [√] front [ ] rear [ ] right side [ ] left side [ ] top [ ] bottom [ ] internal	

Photo 3 View: [ ] front [ ] rear [ ] right side [ ] left side [√] top [ ] bottom [ ] internal	
Photo 4 View: [ ] front [√] rear [ ] right side [ ] left side [ ] top [ ] bottom [ ] internal	

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