

# TEST REPORT

**Test Report No. : 3186013B.50QS**  
**Project no. : 3186013**

Client : Mid Ocean Brands B.V.  
Unit 201, 2/F., Laford Centre, 838 Lai Chi Kok Road,  
Cheung Sha Wan, Kowloon, Hong Kong.

Date sample received : 2016.04.13 / 2016.05.04

Product : 5 LED LIGHT

Product description : Please refer to next page(s).

Model : MO8110

Test Requested : Test of RoHS conformity (2011/65/EU)

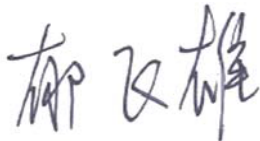
Test Method : Please refer to next page(s).

Result : Please refer to next page(s).

Conclusion : Requirement passed

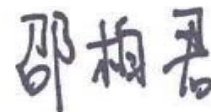
Testing Period : 2016.04.13—2016.05.06

Signed for and on behalf of  
**DEKRA Testing and Certification (Shanghai) Ltd**



Yu Feixiong (郁飞雄)

Project Manager



Shao Baijun (邵柏君)

Test Engineer

**Picture of the product:**



## TEST RESULTS

sample -no.	sample designation	Pb (%)	Cd (%)	Hg (%)	Cr VI (%)	PBB (%)	PBDE (%)
001	white plastic(bulb)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
002	red metal(shell)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
003	silver-gray metal(block)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
004	red metal(fixed ring)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
005	white semitransparent plastic(battery case)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
006	black rubber(sealed ring)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
007	black plastic(insultive piece)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
008	white plastic(bracket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
009	silvery metal(spring-1)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
010	silvery metal(spring-2)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
011	silvery metal(spring-3)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
012	silvery metal(soldering tin)(spring)	< 0.1 <sup>1</sup>	< 0.01 <sup>2</sup>	< 0.1 <sup>3</sup>	< 0.1 <sup>4</sup>	N/A	N/A
013	beige PCB(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1 <sup>5</sup>	< 0.1 <sup>5</sup>
014	black IC(body)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
015	black chip diode(body)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1 <sup>5</sup>	< 0.1 <sup>5</sup>
016	black chip audion(body)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1 <sup>5</sup>	< 0.1 <sup>5</sup>
017	black chip resistor(body)(PCB)	< 0.1 <sup>1</sup>	< 0.01 <sup>2</sup>	< 0.1 <sup>3</sup>	< 0.1 <sup>4</sup>	< 0.1	< 0.1
018	brown chip capacitor(body)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1 <sup>5</sup>	< 0.1 <sup>5</sup>
019	yellow LED(body)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
020	black plastic(sheath)(sensor)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
021	blue plastic(shell)(sensor)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
022	black plastic(stopper)(sensor)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
023	copper-colored metal(loop)(sensor)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
024	silvery metal(shell)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
025	black metal(shell)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
026	blue metal(shell)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A

1) The analysis by X-ray fluorescence spectrometry showed a detection for Pb. The verification and quantification of Pb was performed by ICP-OES.

2) The analysis by X-ray fluorescence spectrometry showed a detection for Cd. The verification and quantification of Cd was performed by ICP-OES.

3) The analysis by X-ray fluorescence spectrometry showed a detection for Hg. The verification and quantification of Hg was performed by ICP-OES.

4) The analysis by X-ray fluorescence spectrometry showed a detection for Cr. The verification and quantification of Cr (VI) was performed by photometric analysis.

5) The analysis by X-ray fluorescence spectrometry showed a detection for Br. The verification and quantification of PBB/PBDE was performed by GC-MS.

N/A: Not applicable

**Description of the analysis procedure (brief version):**

***Test of RoHS conformity***

The measurements are performed according to IEC 62321-3-1 : 2013, “Electrotechnical products - Determination of levels of six regulated substances”.

The product is divided in single material samples. The materials are analysed on different parameters of the RoHS-directive to assure that the complete product is RoHS-conform or not. At first a XRF (X-ray fluorescence spectrometry) screening is performed. For every sample following statements can be made.

Table: Screening limits in mg/kg for regulated elements in various matrices

Element	Polymers	Metals	Composite Material
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
Pb	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Br	$BL \leq (300-3\sigma) < X$		$BL \leq (250-3\sigma) < X$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$

Below limit (**BL**): the tested material complies to the RoHS directive.

Inconclusive (**X**): If the level of the measurement is around the maximum allowed, or if the level for Chrome or Bromine is too high, other more accurate methods are needed to determine the exact level or the composition of Chrome and Bromine.

Over limit (**OL**): If the level of lead, mercury or cadmium is well above the maximum allowed levels (the XRF uncertainty is taken into account), the tested material does not comply with the RoHS directive.

In case of **inconclusive** XRF results, following analysis procedures are applied:

In order to examine the material samples for the heavy metals cadmium, lead and mercury they are digested in acid and the solutions are used to carry out the analysis for the heavy metals by ICP-OES or atomic-absorption spectroscopy.

Hexavalent chromium is checked by extracting the sample with water at 100 °C (determination of Cr VI in colorless and colored chromate coating on metals) respectively with alkaline extraction at 90-95 °C (determination of Cr VI in polymers and electronic components) followed by photometric analysis.

In the case of metallic components with a surface coating containing hexavalent Chromium (passivation) the concentration is expressed in mg of Chromium VI per component. In order to obtain further information about the concentration on the surface coating it is necessary to know the weight per unit area of the coating and the surface area of the component. Information about surface coatings is to be provided by the client.

The examination for bromine-based flame retardant products is carried out by gas chromatography-mass spectrometry after extraction by solvents; this involves the individual analysis and quantification of the substances specified in the RoHS. The current valid regulations relating to exceptions in respect of the analysed substances are to be taken into account by the client.

The following Polybrominated Biphenyls (PBBs) and Polybrominated Diphenyl Ethers (PBDEs) are analyzed:

2-Bromobiphenyl PBB2, Dibromobiphenyl PBB15, Tribromobiphenyl PBB30, Tetrabromobiphenyl PBB52, Pentabromobiphenyl PBB103, Hexabromobiphenyl PBB153, Heptabromobiphenyl PBB250, Octabromobiphenyl PBB250, Nonabromobiphenyl PBB250, Decabromobiphenyl PBB209, Bromodiphenylether BDE2, Dibromodiphenylether BDE15, Tribromodiphenylether BDE30, Tetrabromodiphenylether BDE62, Pentabromodiphenylether BDE99, Hexabromodiphenylether BDE153, Heptabromodiphenylether BDE183, Octabromodiphenylether BDE203, Nonabromodiphenylether BDE206, Decabromodiphenylether BDE209.

**Limits according to RoHS (2011/65/EU) / Test methods (additional chemical analysis):**

Parameter	Limits according to RoHS	Test method
Cadmium	0,01 % (100 mg/kg or 0,1 g/kg)	IEC62321-5:2013
Lead	0,1 % (1000 mg/kg or 1 g/kg)	IEC62321-5:2013
Hexavalent Chromium	0,1 % (1000 mg/kg or 1 g/kg)	Metal: IEC62321-7-1:2015 Non-metal: IEC62321:2008
Mercury	0,1 % (1000 mg/kg or 1 g/kg)	IEC62321-4:2013
PBB and PBDE	0,1 % (1000 mg/kg or 1 g/kg)	IEC62321-6:2015

### Sample Photos

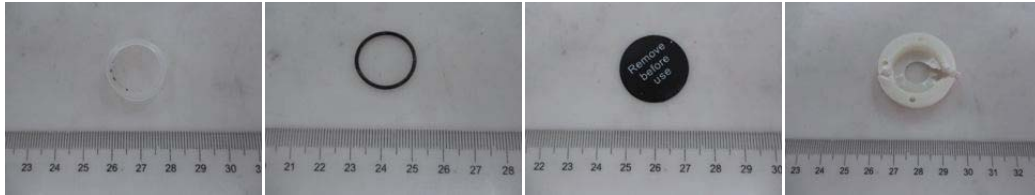


Test item1

Test item2

Test item3

Test item4

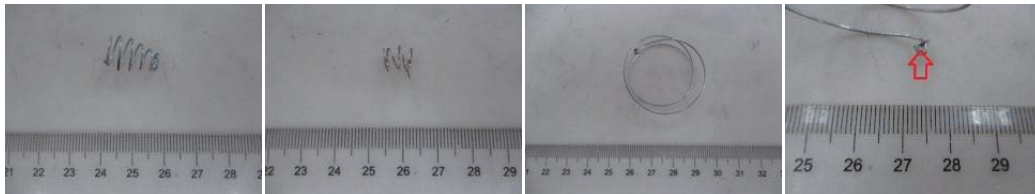


Test item5

Test item6

Test item7

Test item8

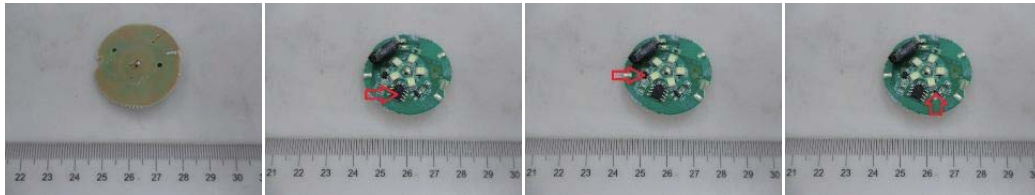


Test item9

Test item10

Test item11

Test item12



Test item13

Test item14

Test item15

Test item16

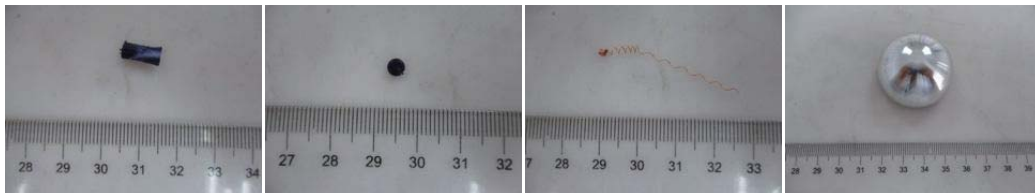


Test item17

Test item18

Test item19

Test item20



Test item21

Test item22

Test item23

Test item24



Test item25

Test item26

---End of Report---

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