



PROJECT No: 52-6589/2005

CERTIFICATE OF TESTS and MEASUREMENTS



of SOLAR POWERED RETROREFLECTIVE ROAD STUDS .

**EXPERTISE on ACTIVE
(intelligent) CAT EYES**

Product design and development—INFINITY INC.- KOREA

The body is cast Aluminium with one or two retroreflective panels (white and yellow) each panel contains 3 emitting diodes – leds.

Specimen 1 : Model YH-DD (1)

Specimen 2 : Model YH-DD (2)

- The original test report is in Hebrew.
- This certificate is not an exact translation of the report number 52-6589/2004 dated December 2004. Nevertheless the report includes all paragraphs of the above mentioned documents.
- This document includes full details of testing requirements.
- This report refers only to the specimens tested.

This certificate is authorized by Georgee Birnbaum C.E., M.Sc.

The expertise was requested by Moon Solar Light .

June 2005





The tests were made for the Ministry of Transportation the Committee of Warning Devices and Safety

1. GENERAL

The road studs (active cat eyes) are optical horizontal guiding and warning devices that reflects incident light by means of retroreflectors in order to warn, guide and inform the road users.

1.1. Model YY-DD (1) rounded yellow panel and rounded white panel (uni directional and bi directional)

1.2 Model YY-DD (2) - rectangular white panel (bi directional and uni directional)

The above specimens (1 and 2) were tested.

1.3. The tests were made according to the following standards and specifications. At this time there is no available Israel standard. The specimens were tested according to the following standards:

- EN 1463-1 European Standard 1997- Road marking materials- Retroreflecting road studs. Part 1. Initial Performance Requirements.
- C.I.E. Commission Internationale de l' eclairage- Recommendation for Surface Colours for Visual Signalling Publication C.I.E. No 39-2 1983 (2nd ed.)
- CEN 60529 1991 . Degrees of Protection Provided by Enclosures (IP code) .
- C.I.E. Publication No 54 1982 Retroreflection Definition and Measurement.
- C.I.E. Technical Com. Report No 72 . Guide to the Properties and Uses of Retroreflectors at Night.
- CEN/TC 226 Road Equipment pr EN 12352 Road vertical signs – Variable Message Signs

2. Mechanical and physical data.

The following values are related to specimen 1 and specimen 2.

2.1 YH-DD (1) Diameter 140 mm, Weight: 950 g.

2.2. YY-DD (2) 111mm x 85 mm, Weight: 700 g.

2.3. High intensity emitting diodes:

2.3.1 **Specimen 1.** Colour –white,

2.3.2 **Specimen 2.** Colour –white and yellow

2.3.3.. Quantity of leds on each panel –3 pcs. 10 mm diameter

2.4.. Output/led (luminous intensity) 10000 mcd.

25. Material of the road stud Aluminum Alloy.

3. TESTS and MEASUREMENTS PERFORMED

3.1 .Coefficient of retroreflection :mcd/lux/m² (after CEN 12899-1) white

Observation angle→ Incident angle↓	03°	0.33°	2.0°
5°	81		
10°		51	
15°			5

3.2 .Coefficient of retroreflection:mcd/lux/m² (after CEN 12899-1)yellow

Observation angle→ Incident angle↓	03°	0.33°	2.0°
5°	60		
10°		36	
15°			3

The test results fulfill the requirements.

3.3 The results of chromaticity coordinates of the white elements

x	y
0.4240	0.4181

3.4. The results of chromaticity coordinates of the yellow elements

x	y
0.560	0.4430

The requirements of the chromaticity coordinates (corner coordinates) having x and y values are given in table 9 in CEN standard.

4 .Photometric performance of the flashing panels after corrosion and impact tests

4.1 Luminance of the flashing panel at peak of flash :yellow **100 mcd/m² and white 140 mcd /m²**

4.2.. Luminance of the flashing panels at peak flash after immersion in salt water during 1 hour: **yellow 90 mcd/m² and white 130 mcd/m²**

4.3.. Luminance of the flashing panels at peak flash after 4 days immersion in salt water: **yellow 80 mcd/m² and white 110 mcd/m²**



The test were performed with the Minolta luminance meter .

SATISFACTORY TO STANDARD

4.4. Corrosion resistance

The testing carried out included immersion of studs in natrium chloride solution during 30 days .

No corrosion was observed . High degree of protection. Good resistance to weathering.

4.5. Colours of the light signals: yellow and white

The tests were performed with Minolta chromameter.

SATISFACTORY TO STANDARD

4.6. . Impact test with solid steel ball mounted on pendulum:

4.7.. Impact test: free fall of flashing road stud (actively flashing) from a height of 1.0 m to concrete floor--- good structural performance- unbreakable.

SATISFACTORY for the visual and mechanical function of active road studs
(Cat eyes.)

4.8.. The external surface of the solar road studs was completely weatherproof .

4.9.. Universal mounting system

4.10 Viewing distance: on straight road : 1000 m

4.11. Ambient illumination level for start of flashing: 90 lux.

5. SUMMARY

THE TESTED ROAD STUDS of all the specimens ARE FULLY COMPLIANT WITH STANDARDS.

Georgee Birnbaum C.E. M.Sc

