MFPA Leipzig GmbH

Leipzig Institute for Materials Research and Testing

Testing, Inspection and Certification Authority for Construction Products and Constructions Types

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ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-11021-01-00

Testing laboratory accredited by DAkkS GmbH according to DIN EN ISO/IEC 17025. The certificate can be seen on www.mfpa-leipzig.de

Test Report No. PB 2.1/23-056

22 August 2023
No. Copy 1

Subject: Testing the resistance to ball-impacts of LED luminaire "GAME 150M" in accordance with DIN 18032-3:2018-11 and DIN VDE 0710-13:1981-05, respectively

Customer: MODUS spol. s r.o.
Žižkova 273
252 25 Jinočany
Czech Republic

Testing engineer: Sebastian Musiol, M.Sc.

The test report in hand consists of 4 pages and 1 enclosure.

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1. Task

The MFPA Leipzig GmbH was commissioned to test the resistance to ball-impacts of the LED luminaire "GAME 150M" in accordance with DIN 18032-3:2018-11 and DIN VDE 0710-13:1981-05, respectively.

For the usage in gymnasiums the resistance to ball-impacts should be verified experimentally by tests with a handball. The luminaire was delivered by MODUS spol. s r.o. and tested on 28 June 2023 in the testing laboratory of MFPA Leipzig GmbH.

2. Test object and test execution

The test specimen was a LED luminaire "GAME 150M" with the outer dimensions 1,165 x 213 x 42 mm and a weight of 5.2 kg. For further details see Enclosure 1.

The test of ball-throwing-safety according to DIN VDE 0710-13:1981-05 consists of two parts. At first the mechanical test with the actual ball-throwing which is identical to DIN 18032-3:2018-11. Altogether there are 36 shots:

- 12 vertical shots
- 12 angular shots at 60 °
- 12 angular shots at 60 ° from a perpendicular direction

Secondly there is the electrotechnical test to make sure that one cannot get an electric shock if the LED luminaire is damaged (voltage test).

For the test the LED luminaire was mounted to the ceiling with chains with the length of 2 m (suspended mounting) and lockable carabiners.

On 28 June 2023 the LED luminaire "GAME 150M" was shot at with a handball (internal pressure $p = 1.2$ bar, distance $a = 2.00$ m, impact velocity $v = 23.5 \pm 1.2$ m/s) with a calibrated ball-gun. The temperature in the test laboratory was 24 °C.

3. Results

The LED luminaire "GAME 150M" did show minimal visible damage after the test; see Figures 2 and 3. In addition it passed the electrotechnical tests after the initial ball-throwing.

The test results are summarized in Table 1.

Table 1: GAME 150M

Type of ball	Number of shots	Angle of impact	Assessment according to eye inspection/ remark
handball	12	90 °	- small crack in the transparent cover - slight deformation of the end cap
	12	45 ° from the left	- no further visible damage or impairments
	12	45 ° from the right	- no further visible damage or impairments



Figure 1: " GAME 150M ", test setup 90 °



Figure 2: Small crack of the cover

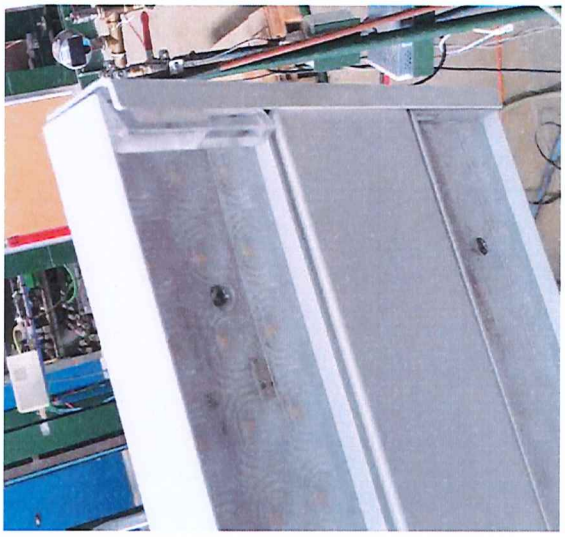


Figure 3: Slight deformation of the end cap

The LED luminaire "GAME 150M" for gymnasiums is classified *ball-impact-resistant* according to DIN 18032-3:2018-11 and DIN VDE 0710-13:1981-05, respectively.

The results of the tests exclusively relate to the items tested. This document does not replace a certificate of conformity or suitability according to national and European building codes. The sampling stage/test item production has not been carried out by the laboratory. The results of the test apply to the sample as received.

Leipzig, 22 August 2023

Sebastian Musiol, M.Sc.
Testing Engineer

MFPA Leipzig GmbH II
SAC 02
NB 0800

Enclosure 1

Technical drawing of the manufacturer

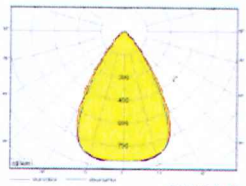
GAME

LED | 220-240V 50 Hz | DIMM | CRI 80 | IP 40 | SDCM 3 | max T_a 45°C | EN 62 471 RG 0 | 80 000 L80B50

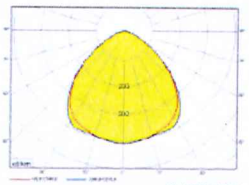
η_{ef} (lm/W) 162–184



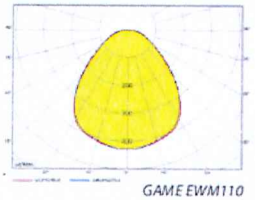
GAME M



GAME N60



GAME W90



GAME EWM110

Industrial LED fittings

Body:
Powder painted non-corressive high-pressure die-cast aluminium with steel endcaps and gear box

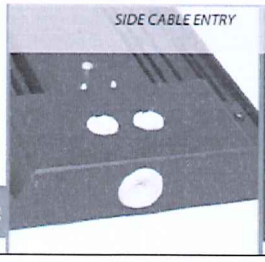
Optic:
EN – extra narrow beam 30°
N – narrow beam 60°
W – wide beam 90°
EWM – extra wide matt 110°
AS – asymetric

Application:
Ceiling installation as standard
Pendant or wall installation using accessories

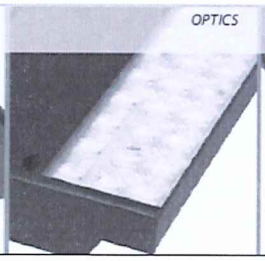
Accessories:
GAME/SD – set of movable wall brackets
GAME/VL – set of holders for installation on a horizontal rope
GAME/HAK – set of hooks for a chain suspensions

2200	2700	3000	4000	5700	6500	MIX	RGB	
×	○	○	●	○	○	○	×	●
ON OFF	1-10V	DALI				INT	EXT	
●	×	○	×	×	○	○	×	×

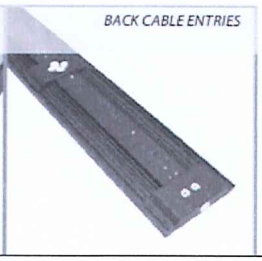
● default ○ optional × not possible



SIDE CABLE ENTRY



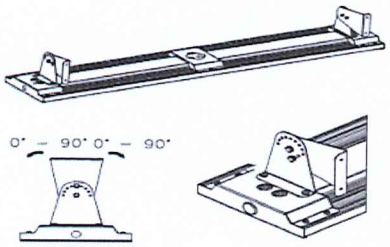
OPTICS



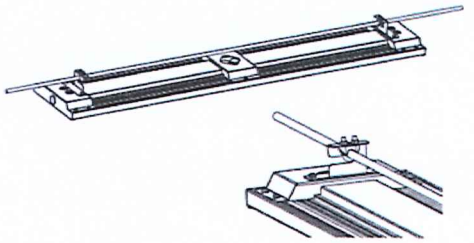
BACK CABLE ENTRIES

Code: GAME 150M8/4W90C/90/P

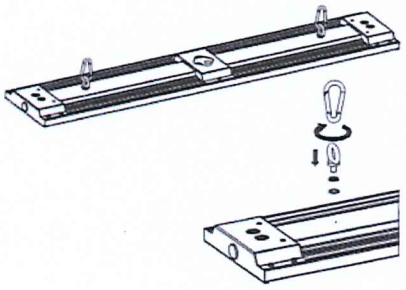
GAME	150	M	8	/4	W90	C	/ND	/P
Luminaire type	Light output	Body S – 585mm M – 1165mm L – 1735mm	Nr of LED modules	Color temperature 3 = 3000K 4 = 4000K 5 = 5700K	Optic: EN – extra narrow beam 30° N – narrow beam 60° W – wide beam 90° EWM – extra wide matt 110° AS – asymetric	Color: C – black S – silver B – white	Driver type: ND – fix output DALI – controlable I	Specifications: /P – through wiring



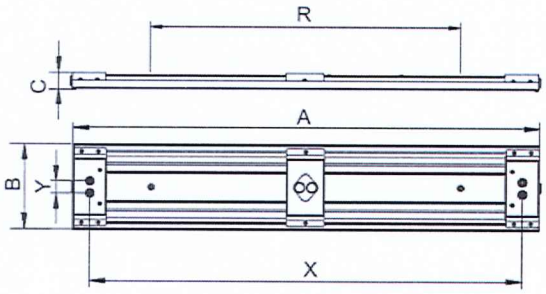
GAME /SD



GAME /VL



GAME /HAK



GAME	W	lm			A	B	C	X	Y	R	kg
		N	W	EWM							
GAME 080S	45	7 500	8 000	7 300	585	213	42	500	30	195	3,5
GAME 150M	85	15 800	15 000	14 800	1165			1180		770	5,2
GAME 250L	130	24 000	22 500	22 200	1735			1650		1345	7,2

lm - luminaire light output

Due to MODUS program of products development a data can be changed without notice. Luminous flux and connected electrical load are subject to an initial tolerance of up to + / - 10%. Color temperature is subject to a tolerance of up to +/-150 K from the nominal value. The failure of 1 LED points causes no functional impairment to the lighting performance of the luminaire and is therefore no reason for complaint.