HiRad-100PLS Gen III®

100 Watt Rad-Hard Underwater LED Luminaire

Product flyer, Preliminary, Version 0.8, Rev A, June 2018

Generation III Underwater Rad-Hard LED Luminaire.

HiRad-100PLS Gen III® is a member of extremely high radiation, high temperature resistant series of LED products, proudly created and made by DITO Lighting, Slovenia, EU.

HiRad-100PLS Gen III® is nuclear grade underwater LED Luminaire, designed to be used inside the nuclear reactor pool. Beside the nuclear reactor, the system can be used inside the spent fuel pools and inside the cobalt irradiation facilities, where the source is stored in the water.

HiRad-100PLS Gen III® is tested for TID of **500 kGy** gamma, combined with **5×10^{14} n/cm^2 1 MeV (Si)** equivalent neutron fluence.

The Luminaire is available in stainless Steel housing only. The Correlated Colour Temperature (CCT) of the Luminaire is 6000 K. The absorption of the light in the water is strongly dependent of the wavelength of the light. Our underwater lighting technology therefore uses light source in blue spectrum. LEDs with CCT of 6000 K with least absorption in the water, are used.

HiRad-100PLS Gen III® is small, light, extremely efficient 100 W LED Luminaire, designed for simple one-to-one replacement of the existing mature lighting technologies. LEDs are protected with soft, high temperature, 100 % shatter proof, browning proof, silicone optics.

Proprietary electronics is based on full discrete design without integrated circuits, electrolytic capacitors and opto couplers. Predicted lifetime is more than 20 years at confidence level of 95 %. Mission profile 24/7 at 50 ^{0}C ambient temperature.

The product has no trapped air inside. The electronics inside is fully potted with high performance, soft, high thermal conductive, high temperature and before all, high radiation resistant silicone based potting compound. The potting protects the built-in electronics against water and other chemicals.

For latest, up to date information please visit:

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Specifications:

Nominal power:	100 W
Nominal voltage:	230 V AC or DC
Power factor:	> 0.95
Luminous flux:	> 16.000 lm
CCT:	6000 K
CRI:	> 70
Overall Luminaire efficacy:	> 160 lm/W / in air
Electronics efficiency:	> 90.0 %
Housing:	Stainless Steel
Optics protection:	Silicone
Ingress protection:	IP 68
Water temperature:	5 °C to +50 °C
Weight	4.0 kg / in air
Dimensions:	dia 320 × 125 mm
Warranty:	5 years

In compliance with (partial list):

MIL-STD-883, Method 1017 neutrons
MIL-STD-883, Method 1019 gamma
ESA ESCC No. 22900 gamma
IEEE 344 -2013
IEC 60980
EN 55015, EN 61547
IEC/EN 60598-1, IEC/EN 60598-2-1
IEC/EN 61347-1, IEC/EN 61347-2-13

Radiation tolerance:

Gamma:	5×10^5 Gy
Neutrons 1MeV (Si):	5×10^{14} n/cm^2

Reliability (environment: GB @ 50 °C):

Calculation method:	MIL-217F N2
MTBF:	3.758.857 h
Predicted lifetime:	> 22 years
Confidence level:	95 %

Notes:

- Irradiation tests performed inside the core of the TRIGA MkII research reactor with the representative NPP spectrum.
- The product is also available with US input voltage 120 V AC 60 Hz or 120 V DC.
- The Luminaire is designed for continuous submersion in the water. However, the Luminaire can be used in the air if ambient temperature is below 50 °C. But note, HiRad-100PLS is not DBA and LOCA compatible. It can not survive temperatures of the ambient of 200 °C. For in-air LOCA compatible applications HiRad-100HBS should be used instead.

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