

Materials & Coatings

Mono 100 IP



Base Material & Nano-Ceramic Coating Properties



Housings for Mono 100 IP Outdoor series luminaires are formed from Aluminium Alloy **AlSi12 / EN AC 44300**. This specific alloy may only contain a copper content in the range of 0% - 0.1% and is an ultra high grade of aluminium for use in high pressure die casting and in marine environments.

Property	Composition
Aluminium (Al)	84.3% - 89.5%
Silicon (Si)	10.5% - 13.5%
Iron (Fe)	0% - 1.0%
Manganese (Mn)	0% - 0.55%
Titanium (Ti)	0% - 0.15%
Zinc (Zn)	0% - 0.15%
Copper (Cu)	0% - 0.1%
Residuals	0% - 0.25%

Aluminium owes its excellent corrosion resistance to the presence on the metal of a permanent film of natural oxide that consists of alumina (Al_2O_3) and makes the metal "passive" to the environment. Although it is extremely thin, between 5 and 10 nanometres (i), the oxide film forms a protective barrier between the metal and the surrounding environment as soon as the metal comes into contact with an oxidising medium such as atmospheric oxygen or water. The film forms within about one thousandth of a second and can even form under oxygen pressures as low as 1 millibar.

The physical-chemical stability of the oxide film is therefore key to aluminium's resistance to corrosion, and depends on the characteristics of the environment, such as its pH, and on the composition of the alloy itself.

Some alloying elements of aluminium alloys actually reinforce the protective character of the natural oxide film while others weaken it. The former include magnesium whose oxide (magnesia) combines with the alumina to enhance the protective properties of the natural oxide film. Copper on the other hand is one of the elements that weaken the protection provided by the oxide film, and it is the extremely low copper content of this alloy that makes it suitable for use in marine environments.

Robust, long lasting finishes for IILUS exterior luminaires are engineered through the use of a 9 stage treatment process prior to powdercoating. This multi-phase process is implemented prior to conversion coating to guarantee that there is no deviation in the surface quality of the base material.

IILUS employs environmentally friendly and hazard free Zirconium (Zr) conversion coating. A nano scale ceramic film (20~50nm) is formed on the aluminum surface from a ceramic agent based on Zirconium salt. As there are no heavy metals, phosphates or organic volatile components involved in the process, almost no sediment will be present during the film-forming reaction. During the ceramic film forming process parameters such as purity, pH value and temperature are regularly monitored and recorded in each stage, so as to guarantee quality assurance.

Strong weather resistance and mechanical properties are standardised in all outdoor powder coat material. Normally a thickness of 60-90µm of powder will be applied followed by chamber curing at around 200°C. This coating standard has acquired QUALICOAT Class I certification and is a recognised component (UL approved) for non-metallic finishes. During the process parameters such as temperature and thickness are regularly monitored so as to guarantee that all of our products meet minimum quality requirements. A harsh 3000 hour Filiform test has been undertaken to evaluate the quality of IILUS products under severe corrosive environments.

	Longest Filament	Average Length of Filaments	Number of Filaments
Standard	≤ 4mm	≤ 2mm	≤ 20
IILUS	≤ 2mm	≤ 1.5mm	≤ 2

Nano-Ceramic Film Forming Process

- 1 - Acidic Pre-Cleaning
- 2 - Water Rinse
- 3 - Alkaline Degreasing
- 4 - Water Rinse
- 5 - Etching
- 6 - Water Rinse
- 7 - Nano-Ceramic Coating
- 8 - Water Rinse
- 9 - Dry Off

(i) 1 nanometre = one thousand millionth of a metre 10^{-9}

