Electrical engineering and Electronics

Laboratory testing

3F Filippi has an internal IMQ (Italian Quality Mark)-certified test laboratory to guarantee its Customers solid products certified to the toughest standards; this lab is able to perform the following tests:

Temperature test

Serves to measure the temperatures reached by the electrical or electronic components or the thermal limits of the materials used for the luminaires.

Resistance to salt spray test

This is an accelerated corrosion test to provide a qualitative assessment of the corrosion resistance of a material or the corrosion protection provided by a coating.

Liquid-proof test

Serves to determine the level of protection of a product against the entry of liquids into the product body. The results obtained determine the IP rating of a product.

Dust-proof test

Serves to determine the level of protection of a product against the entry of solid bodies. The results obtained determine the IP rating of a product.

To carry out these tests, 3F Filippi uses IMQ-approved equipment and facilities that have been granted the **IMQ-078/CTF2-A** certificate (this can be downloaded from our website).

All this allows us to perform product certification tests autonomously, speeding up product development significantly, all to the customer's advantage and guaranteeing the safety, quality and duration of products.

All our products are manufactured in compliance with the current Italian CEI 34-21, European EN 60598-1 and international IEC 60598-1 standards.

Electrical engineering and electronics

Marks and standards

The single European mark ENEC (European Norms Electrical Certification) certifies that a luminaire conforms to EN European standards. IMQ is one of the European certification bodies belonging to ENEC. Luminaires approved by IMQ on the basis of European standards are therefore ENEC-certified.

All 3F Filippi luminaires bear the CE marking. This marking attests to be fact that the luminaires conform to the requirements set out in Community Directives for electrical materials and that they may be freely marketed throughout the European Union.
Directives applicable to lighting products are:
- the 2006/95/EC low-voltage directive
- the 2004/108/EC electromagnetic compatibility directive
- the Ecodesign directive 2009/125/EC
- the RoHS 2011/65/EU directive

The acronym EN refers to the European standards issued by CENELEC (European Committee for Electro-technical Standardisation). These must be adopted by all EU member states by means of national regulatory bodies (in Italy, the CEI).
For luminaires, the reference standards are IEC EN 60598-1 (CEI 34-21) and IEC EN 60598-2-22 (CEI 34-22, luminaires for emergency lighting).
Compliance with these standards ensures that the luminaires are properly manufactured and can be used to build electrical systems that conform to the requirements stipulated by the applicable legislation (for example, Italian Decree Law no. 37 of 22 January 2008).

Protection against electric shock
Standard IEC EN 60598-1 (CEI 34-21).
Luminaires are divided into four classes according to the type of protection provided against electric shock.

	Main features of the material	Safety precautions voltage	Symbols
Class 0	No earthing protection device	Environment without earth	
Class I	Earthing protection device provided	Connection to protective earth	
Class II	Additional insulation but no earthing protection device	No precaution necessary	
Class III	Intended for very low safety voltage	Connection to very low safety voltage	

Electrical engineering and electronics

Electronic wiring

The wiring of our LED luminaires uses the highest quality electronic drivers which guarantee the highest levels of reliability and efficiency.

The main technical specifications of the typical LED drivers:
- 230Vac, 50-60Hz power supply, with tolerance+/- 10% of line voltage.
- 230Vdc power supply, with tolerance +/- 10%.
- Power factor greater than 0.95 (in general, with exceptions).
- Efficiency > 90%.
- Suitable for centralised emergency lighting pursuant to EN 50172 and EN 60598-2-22.
- ENEC certification.
- Thermal and short-circuit protection against overloads and voltage surges.
- Protection against excess temperatures.
- Suitable for environments with temperatures from -20°C to +30°C.
- Suitable for environments with max RH 85% (driver + LED).
- Protection class I; on request, we can check if it is possible to manufacture the luminaires with protection class II.
- Constant current LED power supply.
- Very low FLICKER value <4%: this value is not consciously perceivable to humans and does not interfere with video filming.

LED driver types:
3F Filippi uses two constant current driver types, depending on the type of luminaire:

- SELV 

Safety Extra Low Voltage output, below 60Vdc.
  SELV devices can be used in total safety.
- NON SELV without output voltages greater than 60Vdc, which may represent a hazard if touched.
  NON SELV luminaires may only be opened by a qualified electrician with special tools.

Installation notes:
For correct choice of the protective circuit breakers, check the inrush current and instructions provided by the manufacturers of the LED drivers. To assist in this task, when requested 3F Filippi will provide the technical data sheets for the drivers used and specify the quantity for each luminaire. These indications relate to the bill of materials at the time of communication and thus may be subject to changes due to technical developments and/or provisioning and production requirements; data should therefore be checked before proceeding with the order.

For use at low temperatures (down to -30°C) and/or high humidity environments, we recommend use of ICE series luminaires which provide protection against RH of up to 95% for the entire wiring system (driver + LED).

For applications in environments in which disturbances on the power network may be present and/or involve use at low temperatures, surge protection devices should be fitted on the power supply and any causes of undervoltages eliminated.

For further information on use in harsh conditions, for instance with the presence of corrosive chemicals, extreme temperatures, high humidity (e.g. composting systems, cold stores, mushroom beds, greenhouses, swimming pools, saunas, spas etc.), contact our Technical department.

Dimmable electronic wiring

Dimmable electronic drivers allow manually or automatically controlled “dynamic light systems” to be designed, in which the light level can be adapted to the visual task and/or to variation of natural light entering from the outside (see chapter on “Light Management”).
In addition to the advantages of electronic wiring, dimmable drivers allow the light level to be adjusted over an extremely wide range (1% to 100%), optimising the lighting system for energy savings and visual comfort.
The lamps are dimmed by a control signal carried by wires directly to the ballast from devices such as potentiometers, buttons, light and/or presence sensors, used individually or managed by control units.
Dimmable electronic wiring can be implemented with:
- Drivers with 1-10V interface, with dimming by means of an analogue signal ranging from 1V DC (minimum light) to 10V (maximum light).
- Drivers with DALI interface, with digital dimming according to the new standard Digital Addressable Lighting Interface protocol.

Dimmable electronic wiring, particularly DALI type, also allows creation of appropriate lighting systems for applications in plants managed by intelligent (Bus) systems.
For further information on use in harsh conditions, for instance with the presence of corrosive chemicals, extreme temperatures, high humidity (e.g. composting systems, cold stores, mushroom beds, greenhouses, swimming pools, saunas, spas etc.), contact our Technical department.

General information for luminaires with DALI drivers

Luminaires with DALI drivers used in installations without regulation systems (centralised and/or stand-alone) may have operating faults (turning on/off, driver “blocked”, etc.) and/or limited light output (not set to the maximum level).
To operate correctly, luminaires with DALI drivers must be correctly connected to the perfectly completed and programmed regulation system.
3F Filippi shall therefore bear no responsibility for any “malfunctions” of DALI luminaires installed in systems without a regulation system, or with a poorly programmed one.
Assessing compatibility between regulation systems and drivers, as well as finding the technical data required for lighting design, are the sole responsibility of the designer of the electrical system.
To assist in this task, when requested 3F Filippi will provide the technical data sheets for the drivers used and specify the quantity for each luminaire. These indications relate to the bill of materials at the time of communication and thus may be subject to changes due to technical developments and/or provisioning and production requirements; data should therefore be checked before proceeding with the order.

Luminaires powered by a centralised safety source.

Luminaires equipped with EN 50171 and/or EN60598-2-22 compliant, and/or EL marked drivers, are compliant with EN 60598-1 "Luminaires . General requirements and tests" and EN 60598-2-22 "Luminaires. Particular requirements. Luminaires for emergency lighting", and as such can be powered by a centralised emergency system not contained within the luminaire (e.g. auxiliary power units).

Centralised 230Vdc power supply
When the centralised source is direct current, 230Vdc (nominal), the following operation will occur in emergency mode:
- Luminaires equipped with DALI drivers will reduce their power and thus their output flux by 15%.
- Luminaires equipped with NON-DIMMABLE drivers will maintain their power and thus their output flux at maximum level.
- For the 3F LEM range of luminaires, contact our sales or technical department.

Centralised 230Vac power supply
When the centralised source is 230Vdc alternating current, the following operation will occur in emergency mode:
- Luminaires equipped with DALI drivers will increase (when the DALI system is offline), by default, their power and thus their output flux to the maximum level (100%).
- Luminaires equipped with NON-DIMMABLE drivers will maintain their power and thus their output flux at maximum level.

Assessing compatibility between the centralised source and the drivers, as well as that the communication times between the normal power supply and the emergency one and the duration, are the sole responsibility of the designer of the electrical system.