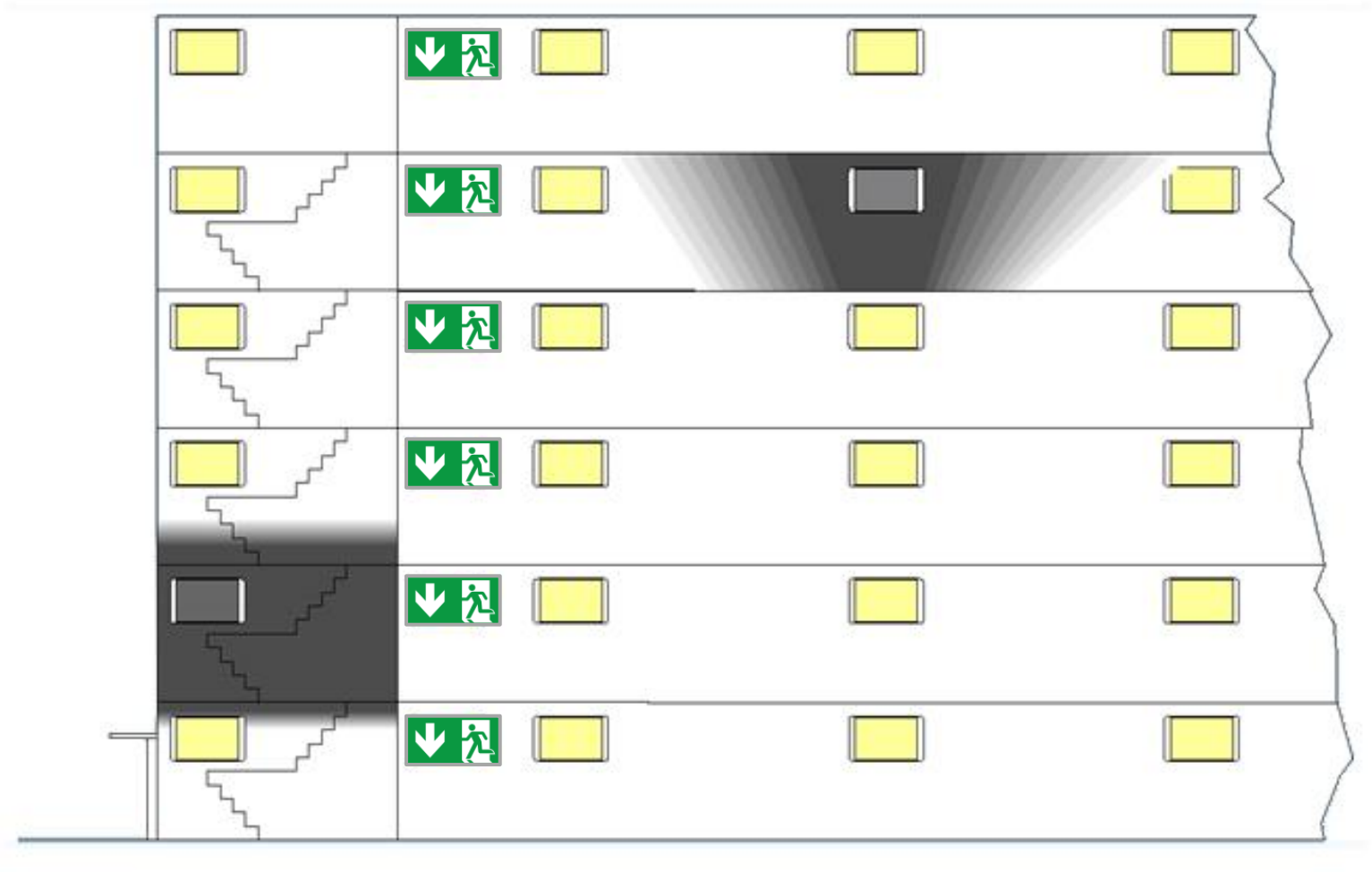
Inspection and Maintenance of Emergency Lighting Systems

Eaton´s CEAG Emergency Lighting Business

Powering Business Worldwide

Every safety luminaire is important, protecting life and health.



Workplaces Ordinance

Special requirements for operation § 4 (3)

- The employer has safety devices to prevent or eliminate hazards, especially security lighting, fire fighting equipment, signal systems, emergency systems and emergency switches, as well as air conditioning systems, that must be properly inspected on a regular basis and checked that they are still able to function.

Operation, maintenance and testing ASR A3.4/3 Pkt. 6 (3)

- The test periods results from the risk assessment and must take the manufacturer‘s instructions into account. Defects must be reported immediately to be removed properly.

Sample Test-Regulation

Application Area § 1

- Shopping facilities
- Congregational areas
- Hospitals and care-homes
- Accommodation
- Skyscrapers
- Car parking facilities
- General educational and vocational schools

Testing § 2 (1)

- Technical systems must be test by a Specialist for effectiveness and reliability. This includes emergency power supplies.

Sample Test-Regulation

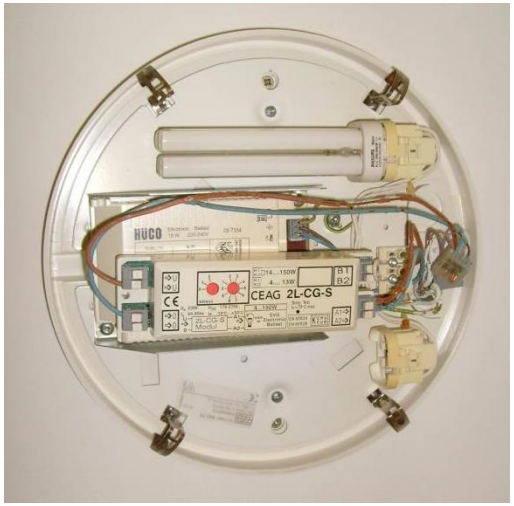
Testing § 2 (2 - 4)

- Tests are required:
  - Before first use
  - Immediately after a technical change in the physical structure
  - Immediately after a significant change in the technical system
  - Within a period of 3 years (recurring tests)
- The tests are to be undertaken by the owner or operator.
- The owner or operator is required to keep records of periodic inspections for a minimum of 5 years.

VOB Part B

Defect claims § 13 (Section. 4)

- For parts of mechanical and electrical/electronic systems, where maintenance has an influence on the safety and functionality, the period of limitation for defect claims is two years unless agreed otherwise, providing the contracting authority has decided for this, the contractor maintenance is not undertaken for the duration of the limitation period.



DIN VDE 0100-718

Installation of low voltage electrical installations

- Requirements for special installations or locations –

With the introduction of DIN VDE 0100-560, most sections of the DIN VDE 0100-718, which have been associated with safety lighting, have been replaced.
The following sections of DIN VDE 0100-718 are however still to be considered for safety lighting.

DIN VDE 0100-718

Initial tests (718.61)

- The following additional tests are to be performed in addition to the DIN VDE 0100-600 (Installation of low-voltage systems Part 6: Testing):

Inspect (718.61.1)

- Compliance to operational norms?
- Ventilation in battery areas, in accordance with EN 50272-2
- Ventilation in areas with internal combustion engines
- Exhaust systems of internal combustions engines
- Capacity or rather fuel supply from generators

  The static load is taken into account, as well as other possible operating state (recurring motor starting, harmonic currents etc.)
- Selectivity

DIN VDE 0100-718

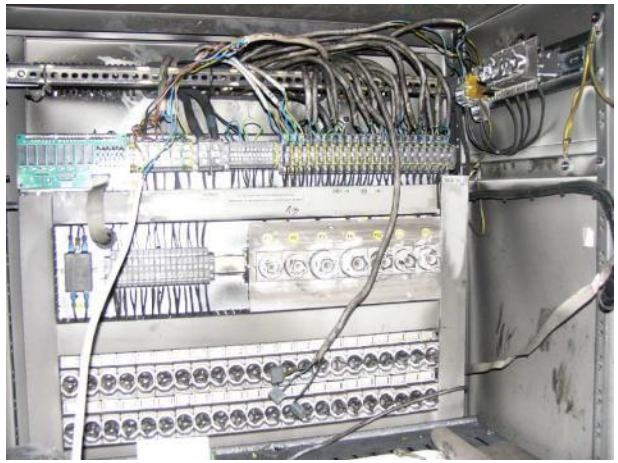
Testing and Measurement (718.61.2)

- Measuring the changeover behavior of power generation units
- Inspecting the switching, control and monitoring functions
- Assessing the starting and switching time during a power failure

Recurring Tests (718.62)

Inspection(718.62.2.1)

- Annual test:
  Settings of protective devices
- Annual test :
  Connected performance regarding
  Capacity of power source.



DIN VDE 0100-718

Testing and Measurement (718.61.2.2)

- Annual Test: Function switching set-up
- Monthly Test: Function of combustion engines

  Minimum 1h with at least 50% rated power of power source
- Annual Test: Capacity of battery system
- Bi-annual Test: Insulation monitoring system

Test Reports (718.62.3.1)

- Logbooks must be retained for minimum 4 years
- Logbooks are also electronic logbooks from the automatic test system, if the test results can be displayed and printed.

DIN EN 50172

Emergency Lighting Systems

As well as

- Preliminary Standard-
DIN V VDE V 0108-100

Emergency Lighting Systems

DIN V VDE V 0108-100

General: Maintenance and Testing (7.1)

- For automatic test equipment, the test results must be recorded monthly in the log book.
- For all other systems, the tests are to be carried out under 7.3 and the results must be logged.
- The operator of the building must designate a competent person to observe the maintenance of the system.

Initial Testing(7.2)

- Measurement of photometric values acc. DIN 5035-6 and EN 1838
- Initial testing in line with DIN VDE 0100-600 and following the norm DIN VDE 0100-560:1995-07

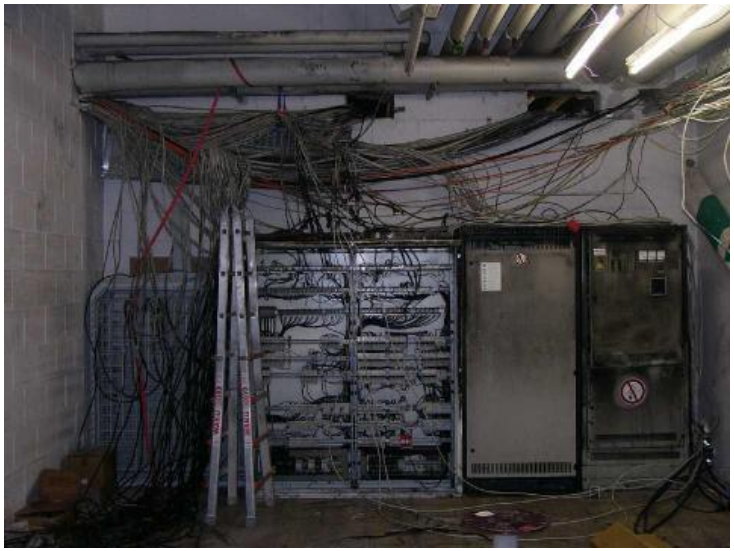
DIN V VDE V 0108-100

Recurring visual inspections and tests (7.3)

- Where labour law or national technical rules are not otherwise determined, the following requirements must be met:

General (7.3.1)

- Tests of longer duration may only be undertaken during periods of low risk.



DIN V VDE V 0108-100

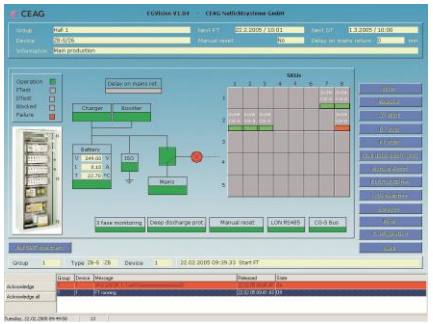
Daily Tests (7.3.2)

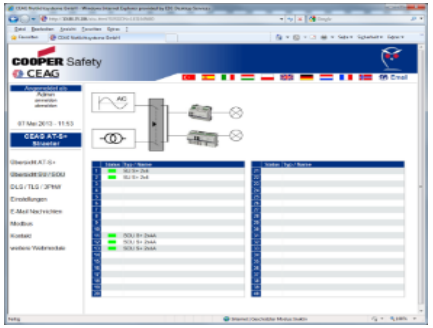
- Visual inspection: Correct function (only for non-maintained operation - no function test) of the display of the main power supply. The date of the test and its results must be included in the system logbook.
- This can be achieved with a central signalling device that displays the system status of the central power supply system (System non-maintained, feed from the power source for safety purposes/battery operation, system interrupted), while the required operating time is continuously monitored .
- This does not apply to self-contained systems.

DIN V VDE V 0108-100

Weekly Tests (7.3.3)

- The function of the emergency lighting by switching on the power source for safety purposes, provided this is a battery-supported system. The function of all luminaires must be tested.
- Automatic test equipment must adhere to DIN EN 62034
- The date of the test and its results must be retained in the system logbook.





DIN V VDE V 0108-100

Monthly Tests (7.3.4)

- The switching of every emergency lighting luminaire to battery-/SV-operation by simulating a failure in the supply of general lighting for a duration of sufficient length to ensure that every luminaire lights up.
- For central battery systems, the monitoring function must also be tested.
- The additional requirements of ISO 8528-12 and DIN 6280-13 are valid for generator sets.
- The date of the test and its results must be retained in the system logbook.

DIN V VDE V 0108-100

Annual Tests (7.3.5)

- When using automatic test equipment, the results of the rated duration test must be recorded.
- The annual test is not allowed to be triggered automatically.
- For all other systems, tests must be undertaken annually in line with 7.3.4 and the following tests performed:
- Each luminaire and each backlit sign must be tested in line with 7.3.4 over the entirety of the required operating period.
- During this duration, all luminaires and signs must be tested to ensure that they are present, clean and function properly.

DIN V VDE V 0108-100

Annual Tests (7.3.5)

- Inspection of each indicator lamp and signalling device
- Inspection of the charging device
- For generator sets, the following requirements are also applicable ISO 8528-12 und DIN 6280-13
- Testing of the batteries in line with DIN EN 50272-2 (VDE 0510-2).
- The date of the test and is results must be entered into the system‘s logbook.

Every 3 years minimum (7.3.5)

- Measurement of illuminance of emergency lighting in line with DIN EN 1838

DIN EN 50171

Central power supply systems

DIN EN 50171

Automatic Test facility (6.11.4)

- If automatic test equipment with means of recording the state of the system is used in place of a manual test, the test apparatus is required to have the following features:

a) Continuous monitoring of charging; if the monitoring is done periodically, then the frequency should be less than 5m.

b) Cyclic monitoring of the switching and functionality of the connected consumer load for the emergency power supply (e.g. Luminaires).
Test-cycle: at least once every week;
Test period: between 10 secs and 5 mins, for less than 10 mins per week.

DIN EN 50171

Automatic Test facility (6.11.4)

c) Registration of all errors in the central battery power supply system and all errors in the test facility or central monitoring area

d) Fault indication that includes errors during transmission to the central monitoring area

e) The means for undertaking a manual test of the central battery power supply or central monitoring device

CGVision

DIN EN 50171

Installation of Batteries and Measures for maintenance (6.13)

- The installation of batteries and measures for their maintenance must be carried out according to EN 50272-2 and in line with the manufacturers recommendation

Manufacturers Instructions (bi-annual/ annual)

- The testing and adjusting of the charging voltage depending on the battery room temperature
- Measuring the battery room temperature (the temperature should not exceed 20°C, otherwise the service life is significantly reduced)
- Testing the screw connections with a torque wrench
- Function test of the insulation monitoring
- Measurement of the battery voltage under load
- Measurement of the individual block voltages

DIN EN 50171

When do batteries need to be replaced?

- The following applies to systems installed before 08 / 2003:

Replacing the batteries with less than 2/3 rated operating time (VDE 0108 10 /89 Part 1 Paragraph 9.3.1)

- The following applies to systems installed after 08 / 2003

Replacing the batteries with less than 100% rated operating time (EN 50171)

DIN EN 50272 - 2

Safety requirements for
batteries and battery systems
Part 2: Static Batteries

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DIN EN 50272-2

Inspection and Monitoring (14)

- Batteries and their operating conditions must be checked for proper function and safety. In accordance with the requirements of the manufacturers, an inspections is designed to check:
- Voltage settings of the charger
- Voltage of the cells or monobloc batteries
- Electrolyte density and electrolyte level (if applicable)
- Cleanliness, tightness
- Tight fit of the connector, if required
- Ventilation
- Plugs or valves
- Battery temperature

Monitoring methods for Luminaires

Monitoring methods for Luminaires

Circuit monitoring

Automatic circuit monitoring:

Circuit monitoring

Influencing factors:

- Fluctuating battery voltage (186 - 275 V)
- Ageing lamps
- Fluctuations in ambient temperature
- Mixed configuration (large and small power)

No reliable information on functional ability

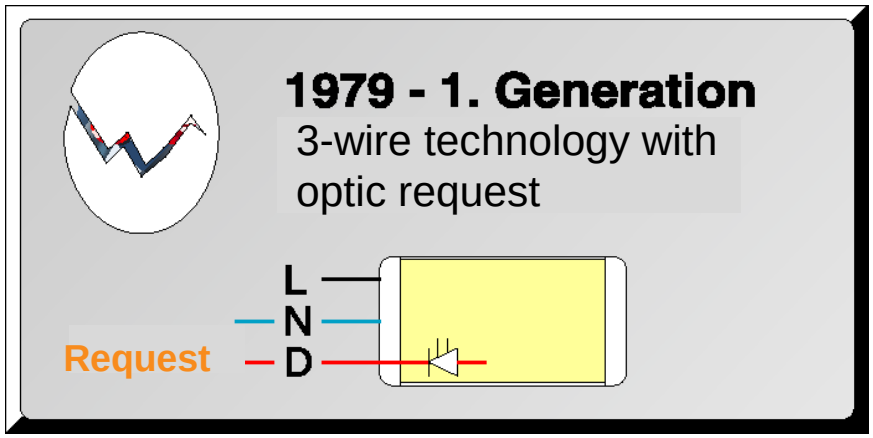
Monitoring methods for Luminaires

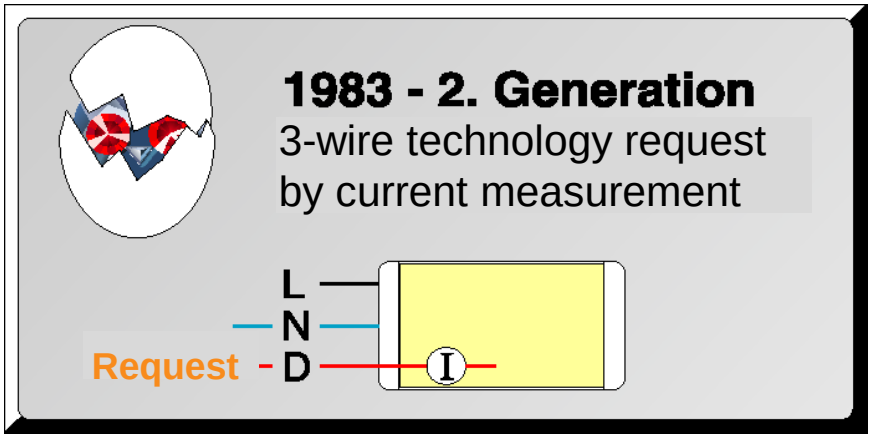
Automatic monitoring of single luminaires

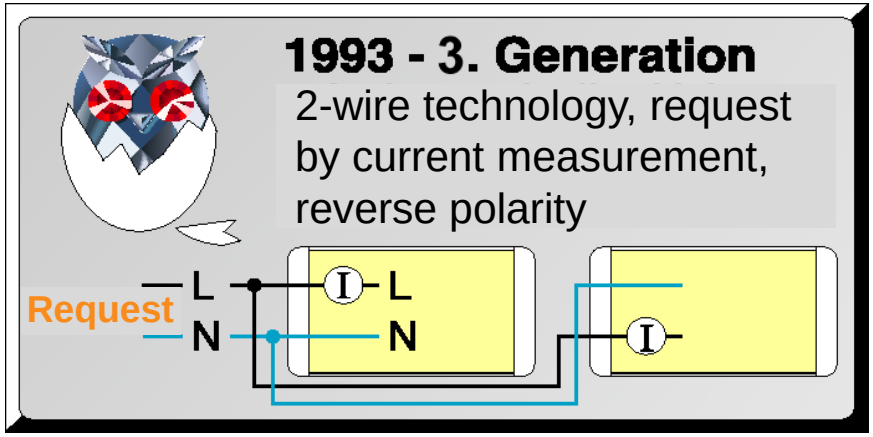
Automatic monitoring of single luminaires:
The only option of a secure conclusion over the entire system.

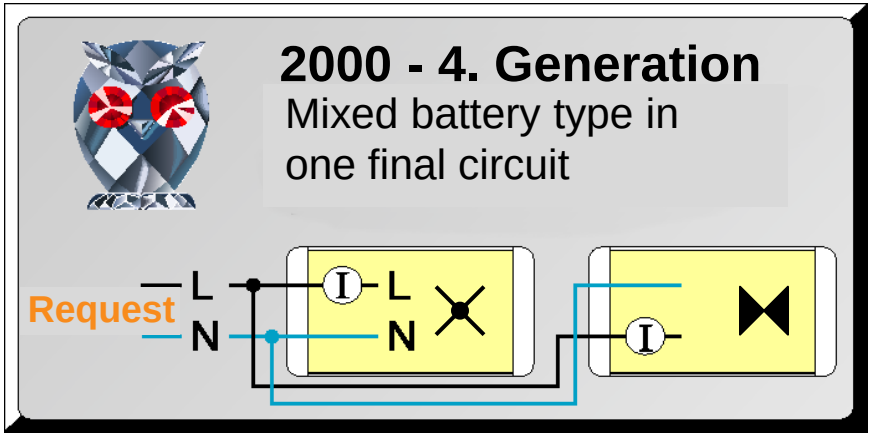
When considering testing costs, a return on investment is achieved from between 2-3 years, compared to standard systems.

CEWA GUARD Technology









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