



# ANSI/PLATO FL 1 Standard

# ANSI/PLATO FL1 Standard

- Why was it created?
- Who approved the standard?
- How will manufacturers use it?
- What does it mean to you?



# Why was it created?

- Prior to its creation, there was not any standardized testing or any uniform way of rating flashlight features.
- This led to confusion for consumers and frustration for those companies committed to manufacturing quality lights, and publishing accurate performance claims.

- The standard was created to help end users compare flashlight performance.
- It helps end users rate and compare the claims that each manufacturer presents on packages.
- A more informed distributor and end-user will choose the best flashlight for their needs.

# Who decided the standard?

- The standard was developed with the guidance of:
  - The American National Standards Institute
  - The National Electrical Manufacturers Assoc.
  - Portable Lights Trade Organization (PLATO)
  - Representatives from 14 companies in the portable lighting industry

# How do manufacturer's use it?

- Each manufacturer can decide what claims they choose to make on packages and the ANSI/PLATO FL1 standard test(s) they complete for each of their portable lighting tools.
- Every flashlight company that participates in this rating system can conduct their own tests, adhering to very specific guidelines, or use an outside test agency.
- If the standard icon is shown on the packaging, it means the flashlight performance claim must comply with the ANSI/PLATO FL1 standard.
- If one flashlight claim is based on ANSI/PLATO FL1 standard, then all claims presented on the package must adhere to it as well.



# What does it mean to you?

- It evens the playing field for those manufacturers that participate.
- A more informed distributor and end-user will choose the best flashlight for their needs.
- Please note that adherence to these standards and reporting results is strictly voluntary.
- Many leading flashlight manufacturers have adopted the standard.

- The standard helps end users compare the flashlight performance claims made and to rate and compare the most important features of the lighting tools.
- By reviewing the icons and ratings on the packages, you can compare the claims for brightness, beam distance, impact resistance, run time, and water resistance.





- Peak Beam Intensity and Beam Distance are both measured by the same test.
- The light being tested is aimed at a target that is placed 2, 10 or 30 meters away. The light output is measured by a candela meter that is connected to a light sensor on the target

# Peak Beam Intensity

- The maximum luminous intensity typically along the central axis of a cone of light.
- This measures the brightest part of the beam. The value is reported in candela and does not change with distance.



*To determine Peak Beam Intensity:*

*Surface light intensity x (distance)<sup>2</sup> = peak beam intensity*

*(Surface light intensity times distance squared equals Peak Beam Intensity.)*

# Beam Distance



- The distance from the device at which the light beam is 0.25 lux. Results are reported in meters.
- The Inverse Square Law is used to calculate the beam distance to .25 lux.
- 0.25 lux is approximately the equivalent of the light emitted from the full moon “on a clear night in an open field.”

*To determine the beam distance, Inverse square law formula is used:*

*$\sqrt{(\text{peak beam intensity} / 0.25 \text{ lux})} = \text{Max Beam Distance (m)}$*



**Purpose:** To provide a procedure to determine the peak beam intensity, reported in units of candela, of the device's beam within 30 seconds to 2 minutes of operation.

**Power Source:** *All tests are conducted with fresh batteries or fully charged batteries/energy storage devices. 12V DC devices that are only tethered shall be powered with 13.8V DC using a power supply. Batteries used for testing and claim substantiation shall be of the same type and/or brand as those offered for sale with the product. If the product is sold without batteries and a peak beam intensity claim is made, a specific battery type and chemistry shall be recommended with the package. The batteries recommended by the manufacturer are to be used for testing.*





## Conditions:

Tests will be conducted at lab conditions, in a dark environment where the ambient conditions are determined to be less than 1 lux in the entire test area prior to the test.

If the device offers multiple output levels, the peak beam intensity will be measured at the maximum level or as otherwise identified.

If the device has variable focusing or adjustable beam angle, the peak beam intensity will be measured.

# Impact Resistance

- The degree to which a portable light resists damage when dropped on a solid surface.
- Dropped samples must not exhibit any cracks or breaks, and must remain fully functional in order to pass the Impact Resistance test.





Height: 18 feet



## Impact Resistance

Products are dropped onto a concrete surface with all their intended parts and additions, including batteries, hand straps, etc. Minimum drop height is one meter.

# Impact Resistance

- Higher drop heights can be used for testing and product claims; however, any product claiming a drop height different than 1 m must meet all passing requirements listed below:
  - Each sample is dropped 6 times using impact orientations that approximate a cube.
  - Each sample must be released on each orientation of the approximated cube.
  - Samples must be marked prior to the drop test in a manner that can assure that all 6 drop orientations are tested.
  - Samples shall be in the “off” position with batteries in place.
  - The test sample is held in the desired orientation with its lowest part at the correct height. Drop the sample onto the impact surface.
  - No additional impetus shall be given to the sample other than the acceleration due to gravity.
  - The sample shall be allowed to come to rest after each drop.



## **Impact Resistance:**

### **Beyond the ANSI/PLATO FL1 standard**

At Streamlight, we conduct additional tests based on customer requests. Some lights, like the lanterns carried by firefighters, are dropped down metal stairs to test their durability and impact resistance.

# Run Time



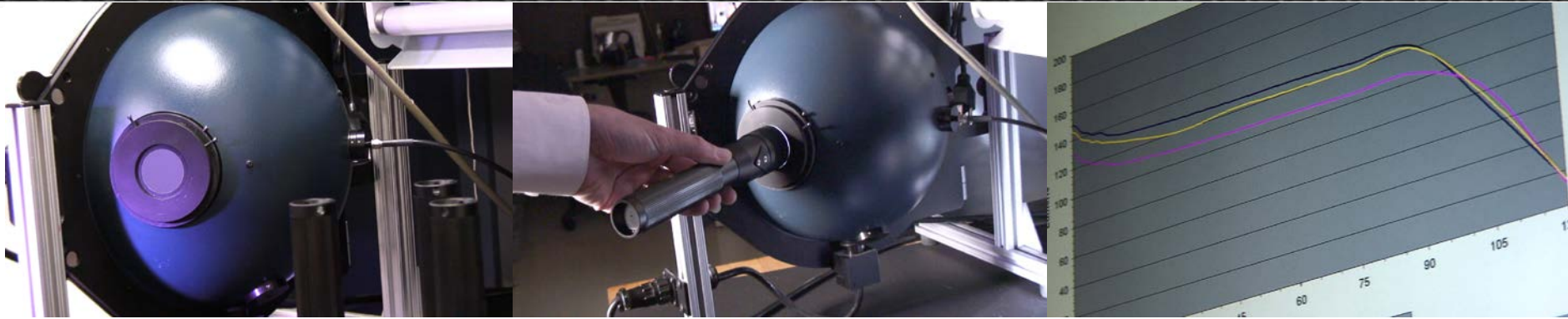
- The duration of time from the initial light output value (that's 30 seconds after the light is turned on with fresh batteries) until the light output drops to 10% of the initial value.
- **Purpose:** To determine the amount of time elapsed (under continuous operation) at which the device's light output reaches a level when users will commonly replace the batteries.



# Light Output



- A measurement of the total quantity of emitted overall light energy as measured by integrating the entire angular output of the portable light source.
- The value is reported in lumens.
- Light Output is the total luminous flux.



## Run Time and Light Output

Run Time and Light Output are both measured by using a spectroradiometer with an integrating sphere system and computing software.

To find the Run Time, the Light Output test is repeated every 15 minutes until the output drops to 10% of its initial value.



# Water Resistance

- There are three tests that measure water resistance:
  - Resistance to Temporary Immersion in Water
  - Resistance to Continuous Immersion in Water
  - Resistance to Splashing Water



# Water Resistance

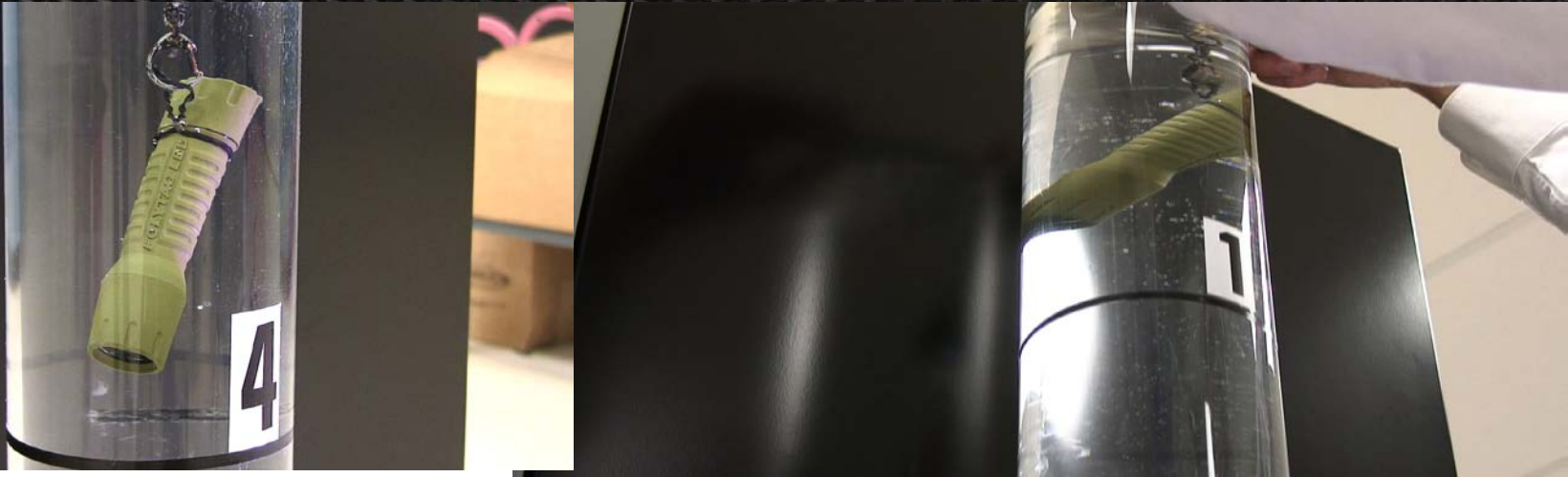


- All test samples shall function normally immediately after the test and 30 min after the test. Water ingress is allowed as long as the above conditions are met.
- Based on the ANSI/IEC 60529 standard, the following enclosure ratings for the devices covered by this standard have been defined:
- Water Resistant—IPX4—Water splashed against the device from any direction shall have no harmful effects.

# Water Proof

- **Water Proof – IPX7:** Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water under standardized conditions of pressure and time.
- **Submersible – IPX8:** Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be stated by the manufacturer, but which are more severe than for IPX7.





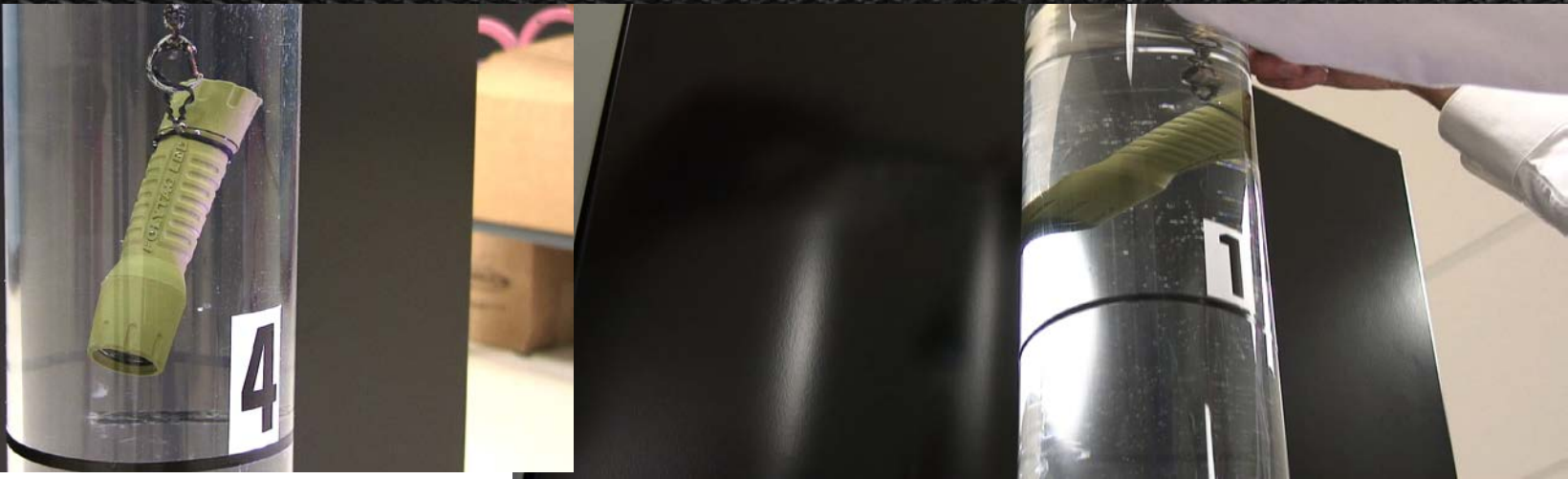
## **Water Proof**

A 1 m deep reservoir sufficient to cover the entire device with water or a water vessel that is pressurized equivalent to 1 m depth.

## **Submersible**

A reservoir at the claimed depth sufficient to cover the entire device with water or a water vessel that is pressurized equivalent to the claim depth as described in ANSI/IEC 60529, Section 14.2.8 for IPX8 evaluation.





## Water Proof and Submersible

All test samples shall function normally immediately after the test and 30 min after the test.

If the sample passes the water proof and submersible test if there is no ingress of water in any functional area that contains unprotected electrical components (contacts, batteries, PCB, wires) or light sources. Protection shall provide exclusion of water from the components above.