

Fenix Implements ANSI Standard

(Refers to ANSI/NEMA FL-1 Standard)

Fenixlight Limited

ANSI/NEMA FL-1 standard

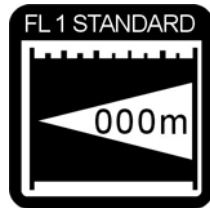
ANSI/NEMA FL-1 Standard



OUTPUT



RUNTIME



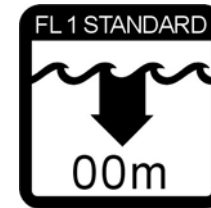
DISTANCE



INTENSITY



IMPACT
RESISTANT



WATER
RESISTANT

ANSI/NEMA FL-1 standard

Catalogue

I .The brief introduction of ANSI/NEMA FL1-2009 Standard

II .Why was it created?

III.Who approved the standard?

IV .What does it mean to consumers and distributors?

V .The descriptions of the contents and the icons

VI.How will Fenix use it?

I .The brief introduction to the ANSI/NEMA FL 1-2009 Standard

- American National Standards Institute (ANSI for short) is established in 1918. It is a non-profit non governmental standards institute.
- ANSI is one of the five permanent members in International Standardization Organization (ISO for short) as well as one of the four permanent members in International Electrotechnical Commission (IEC for short). It takes part in 79% activities of ISO/TC and 89% activities of IEC/TC. ANSI is the member of COPANT and PASC respectively.
- ANSI is the potential national standards institute. And actually it has turned into the national standards center. Various standardizing activities have connections with it. In the meanwhile, the ANSI Standard is voluntarily adopted.

ANSI/NEMA FL-1 standard

II .Why was it created?

- © For a long time, there have been no standardized tests or uniform rating systems for consumers to judge the flashlight performance.
- © Without any uniform rating systems, it frustrates the manufacturers who work hard to make high quality lighting tools.
- © The establishment of ANSI/NEMA FL 1-2009 Standard can help consumers to compare the flashlight performance.
- © The standard will provide a hand for consumers to rate and compare the claims on the packages for each manufacturer's products.
- © Distributors and consumers are more informed. Therefore, it is much easier for them to make the best choices for their needs.

ANSI/NEMA FL-1 standard

III. Who approved the standard?

- © American National Standards Institute (ANSI for short)
- © National Electrical Manufacturers Association (NEMA for short)
- © Representatives from 14 illuminating companies, such as Princeton, Surefire, Petzl, Streamlight, Black Diamond and Duracell, etc.
- © Representatives from flashlight users and flashaholics

IV. What does it mean to consumers and distributors?

- ◎ The ANSI Standard can help the consumers know about the technical parameters of flashlights rapidly which are beneficial for the consumers to make a comprehensive comparison to various flashlights.
- ◎ It can provide a hand for distributors and end users to know more about the products and make the best choices for their needs.
- ◎ It evens the playing field for those manufacturers that participate.
- ◎ It's important to know that adherence to these standards and reporting results is strictly voluntary.
- ◎ Many leading flashlight manufacturers are adopting the standard.

ANSI/NEMA FL-1 standard

V .The descriptions of test contents and icons

The testing contents of ANSI Standard include light output, runtime, beam distance, peak beam intensity, impact resistance and water resistance.



ANSI/NEMA FL-1 standard

1.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 result is reported in lumen.

© Purpose: To provide a procedure for the measurement of the quantity of overall light energy emitted by the device.

© Power resource: 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 light output 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.

© Procedures:

Devices are to be mounted or held against an external port adapter or placed inside the sphere. Exposure should be set to produce test equipment manufacturer's detector saturation level.

© Results:

Light output is the average lumen value of the 3 samples.

V .The descriptions of testing contents and icons



2.Runtime:

© 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.

© Conditions:

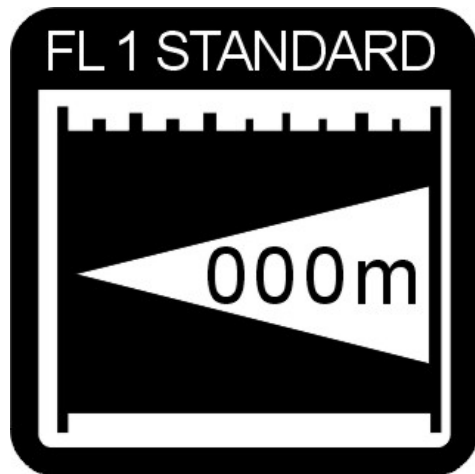
If the device offers multiple output levels, the runtime will be measured at the maximum level or as otherwise identified.

© Procedures:

The initial reading is taken at 30s of continuous operation when using a luxmeter, ensure that the light is operated continuously without any off time.

ANSI/NEMA FL-1 standard

V .The descriptions of test contents and icons



ANSI/NEMA FL-1 standard

3.Beam Distance:

©The distance from device at which the light beam is 0.25 lux.

Results are reported in meters.

©Purpose:

To provide a procedure to determine the maximum distance at which the devices is capable of producing 0.25 lux of light within 30s to 2 min of operation.

© Procedure:

Place the luxmeter at a test distance of either 2 or 10 or 30 meters from the lens of the device to be tested. Use the luxmeter to identify the brightest point of the beam pattern and record the highest indicated value.

V. The descriptions of test contents and icons

© Final calculation:

To determine the beam distance, the Inverse Square Law formula is used:

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

ANSI/NEMA FL-1 standard

V .The descriptions of test contents and icons



4.Peak Beam Intensity:

◎ Peak beam intensity is the maximum luminous intensity typically along the central axis of a cone of light. The value is reported in candela and does not change with distance.

◎ Purpose:

To provide a procedure to determine the peak beam intensity, reported in units of candela, of the device's beam pattern within 30s to 2 min of operation.

◎Procedure:

Place the luxmeter at a test distance of either 2 or 10 or 30 meters from the lens of the device to be tested. Use the luxmeter to identify the brightest point of the beam pattern and record the highest indicated value. Results are reported in candela.

Measurements shall be taken 30s to 2 min of turning on the device.

◎Final Calculations:

Surface light intensity (lux) x distance (m)² = peak beam intensity (cd)

ANSI/NEMA FL-1 standard

V .The descriptions of test contents and icons



ANSI/NEMA FL-1 standard

5.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.

©Purpose:

To ensure the structural integrity of hand-held/portable lighting devices under specified impact conditions. The test procedure provide specifications and methods that will ensure products meet a minimum standards of reliability as a result of impact testing. Drop test should be priority to any other reliabilities tests.

©Drop Test:

Products are dropped with all intended additions: batteries ,elastic, tethers, hand straps, etc. Drop height for product samples shall be 1m minimum. When measured, all the requirements listed below must be passed:

© Each sample is dropped 6 times using impact orientations that approximated cube. Samples must be marked prior to the drop test in a manner that can assure that all 6 drop orientations are tested. Each sample must be released on each orientation of the approximated cube. Samples should be in the “off” position with batteries in place.

© Passing Criteria:

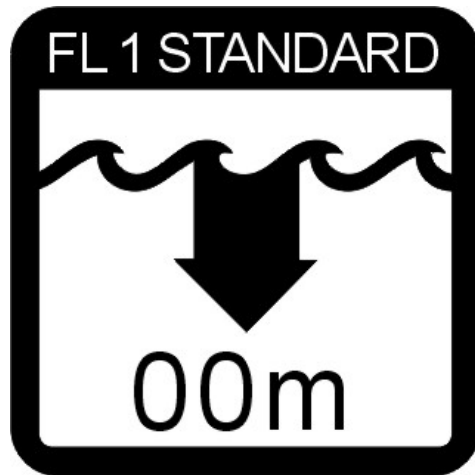
Dropped samples must not exhibit any cracks or breaks visible with normal vision. The product must remain fully functional. Some reassembly is allowed provided that is done without any tool or replacement components. Cosmetic defects such as scuffs, scratches, rubs, abrasion will not be considered reasons for failure.

© Impact Resistance Rating:

Test samples must pass a drop test from a minimum of 1m in order for the impact resistance claim to be made. Rating in excess of 1m shall be reported with values rounded down to the nearest whole meter.

ANSI/NEMA FL-1 standard

V .The descriptions of test contents and icons



ANSI/NEMA FL-1 standard

6. Water Resistance:

© Purpose:

To test whether the flashlight water resistance can satisfy the lowest requirements for the reliability.

© Procedure:

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.

© 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

VI. How will Fenix use it?

1. Fenix will strictly adhere to the ANSI Standard to measure the various fundamental features of its products.

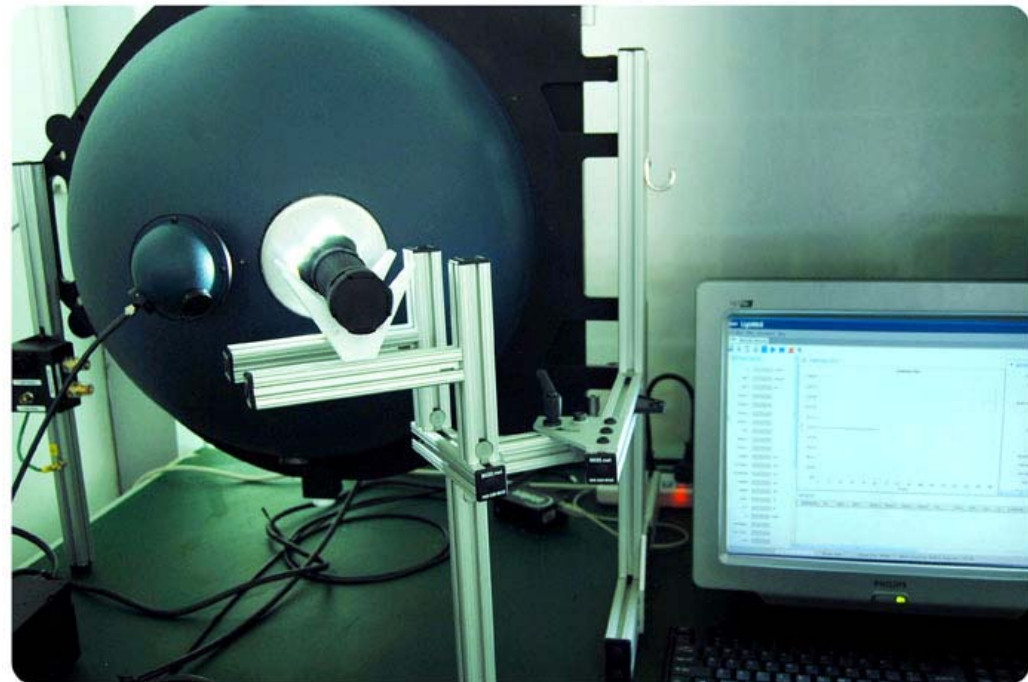
To follow the industrial development tendency, Fenix will spare no efforts to provide more reliable products and perfect services. The consumers can better evaluate, compare and choose their satisfying products provided that they know about the output, beam distance, impact resistance, water resistance and the runtime. In order to meet its target, Fenix is the first one to participate in the ANSI/NEMA FL1-2009 Standard in China. It is going to adhere to the Standard strictly as well as gradually implements the ANSI/NEMA FL1-2009 Standard in its products.

For instance, the ANSI Standard has been introduced to E21, LD25, LD40 and HP20. The later other products will also be line with the ANSI Standard.

ANSI/NEMA FL-1 standard

A. In line with the ANSI Standard, Fenix tests the output and runtime.

Output Test: Devices are to be mounted or held against an external port adapter or placed inside the sphere. Exposure should be set to produce test equipment manufacturer's detector saturation level. Light output is the average lumen value of the 3 samples.

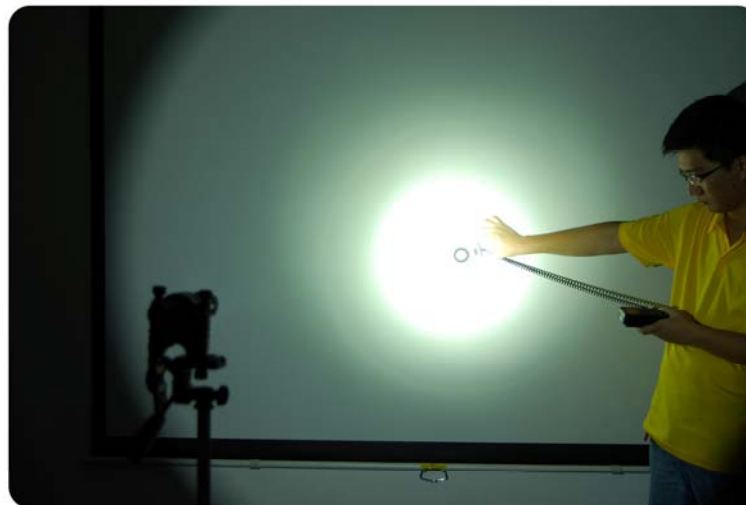


Runtime Test: The duration of time from the initial output value (that's 30 seconds after the light is turned on with fresh batteries) until the light output drops to 10% of the initial value.

Ensure that the light is operated continuously without any off time.

ANSI/NEMA FL-1 standard

B. According to the ANSI Standard, Fenix tests the beam distance.



Using the luxmeter to test the beam distance

Beam Distance Test: To place the luxmeter at a test distance of either 2 or 10 or 30 meters from the lens of the device to be tested. Use the luxmeter to identify the brightest point of the beam pattern and record the highest indicated in value.

To determine the beam distance, the Inverse Square Law formula is used:

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

ANSI/NEMA FL-1 standard

C. Fenix tests the peak beam intensity, abiding by the ANSI Standard.



Using the luxmeter to test the peak beam intensity

Peak Beam Intensity test: Place the luxmeter at a test distance of either 2 or 10 or 30 meters from the lens of the device to be tested. Use the luxmeter to identify the brightest point of the beam pattern and record the highest indicated value. Results are reported in candela.

Measurements shall be taken 30s to 2 min of turning on the device.

ANSI/NEMA FL-1 standard

D. Fenix tests the impact resistance according to the ANSI Standard.



Impact Resistance Test:

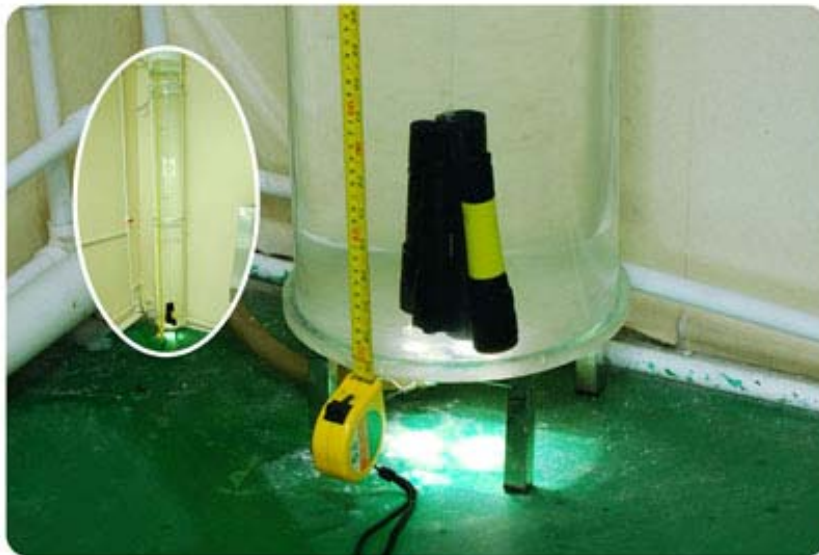
Samples should be in the “off” position with batteries in place. Each sample is dropped 6 times using impact orientations that approximate a cube. Each sample must be released on each orientation of the approximated cube.

Test samples must pass a drop test from a minimum of 1m in order for the impact resistance claim to be made.

Dropped samples must not exhibit any cracks or breaks visible with normal vision. Cosmetic defects such as scuffs, scratches, burs, abrasion will not be considered reasons for failure.

ANSI/NEMA FL-1 standard

E. With the ANSI Standard , Fenix tests the water resistance.



Water Resistance Test:

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.

ANSI/NEMA FL-1 standard

2. Fenix carries out other tests.

Besides the ANSI Standard, according to the consumers' various real using conditions, Fenix performs other tests set by itself, such as the salt spray test, bending test, vibration test, ultraviolet radiation test, etc. Only the products which completely meet the ANSI Standard and its internal standards can be the qualified Fenix products.

ANSI/NEMA FL-1 standard

A. Shakeout Test



Shakeout test: To provide a procedure to determine the scratch-resistant and wear-resistant abilities of the surface of flashlight.

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B. Bending Test



Bending test: mainly use to test the bending degree and the strength of wires.

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C. Salty Spray Test



Salty spray test: mainly use to test the corrosion-resistant ability.

ANSI/NEMA FL-1 standard

D. Ultraviolet Radiation Test



Ultraviolet radiation test: mainly use to test the changes of flashlight after it goes through the ultraviolet test.

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E. Environmental Test



The environmental test includes the high temperature test and low temperature test, which are used to test the high-temperature-resistant and the low-temperature-resistant abilities respectively.

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F. Vibration Test



Vibration test: To provide a procedure to determine the anti-vibration ability.

ANSI/NEMA FL-1 standard

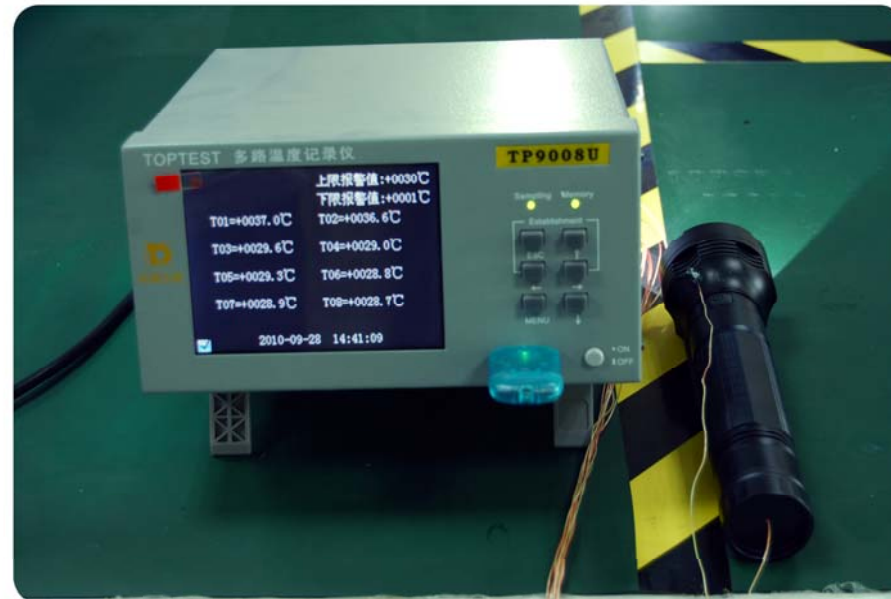
G. Switch Test



Switch test: To provide a procedure to determine the lifespan of the switch and the resistivity.

ANSI/NEMA FL-1 standard

H. Temperature Test

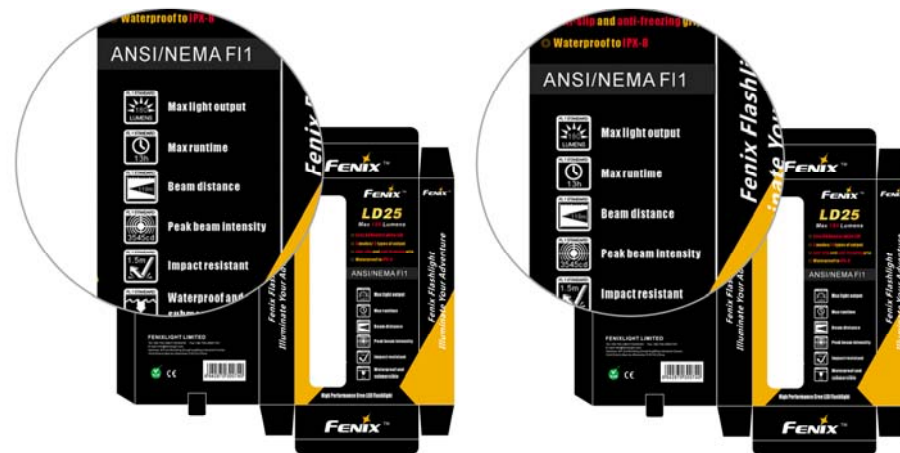


Temperature test: To provide a procedure to determine the conditions of the heat generation and the heat dissipation and the relevant temperatures, etc.

ANSI/NEMA FL-1 standard

3. Fenix has introduced the ANSI Standard to its product packages.

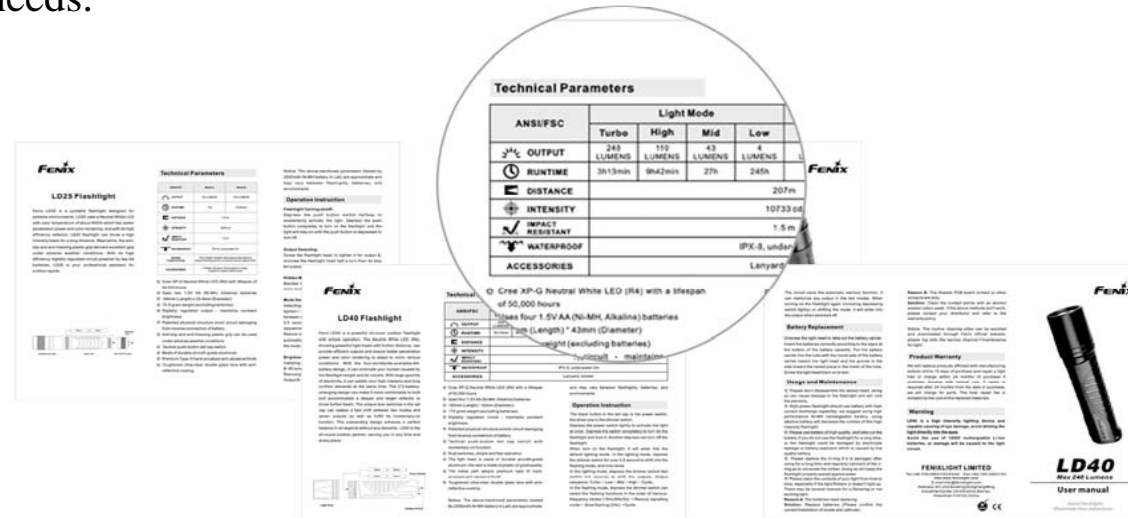
Fenix has introduced the ANSI Standard to its new products. All technical parameters of the products, such as E21, LD25, LD40 and HP20, are in line with the ANSI Standard. The output and the runtime become much more accurate and scientific. The later products will be in line with the standard gradually and meet the international needs.



ANSI/NEMA FL-1 standard

4. Fenix has introduced the standard to the product manuals.

Fenix has made some modifications to the new product manuals. E21, LD25, LD40 and HP20 are in line with the standard. The modifications help the consumers much easier to identify, compare and rate the flashlights. Fenix will gradually introduce the ANSI Standard to its later products to meet the international needs.



5. The description of the flashlight test

- © 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.
- © Peak beam intensity and beam distance are both measured by the same test.
- © To provide a procedure to determine the peak beam intensity, reported in units of candela, of the device at which the light beam is 0.25 lux within 30 seconds to 2 minutes of operation.
- © Batteries used for testing and claim substantiation shall be of the same type and/or brand as those offered for sale with the product.

ANSI/NEMA FL-1 standard

- © 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.
- © Lab conditions shall be a controlled temperature of $21 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 40\%$. The lab environment must minimize any redirecting of light that would affect the measurement outcome.
- © If the device offers multiple focusing or adjustable beam angle, the peak beam intensity will be measured at the maximum level or as otherwise identified.

ANSI/NEMA FL-1 standard