



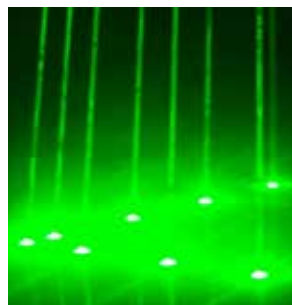
Derek Box

Nightstick Marketing Manager, Industrial Division

EXPERT CONTENT SERIES

COMMON INTRINSICALLY SAFE QUESTIONS ANSWERED

- SOLUTIONS TO HIDDEN EXPLOSIVE ENVIRONMENT DANGERS
- ATEX ZONES EXPLAINED
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- WATERPROOF VS. WATER-RESISTANT
- POLYMER VS. METAL ENCLOSURES IN HAZARDOUS ENVIRONMENTS
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SOLUTIONS TO HIDDEN EXPLOSIVE ENVIRONMENT DANGERS

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Nightstick Marketing Manager, Industrial Division

The dangers of explosive environments are obvious in the petroleum and chemical processing industries, but many other industries can create explosive atmospheres that are not as obvious but still represent a serious danger.

Examples illustrating this are facilities that process grains, sugar, metal powders, and wood products. In 2018 grain handling facilities in Nebraska and eastern France were destroyed or seriously damaged by grain dust explosions. In 2008 an explosion wrecked a sugar refinery in Georgia, killing



2008 Georgia sugar refinery explosion

14 people and injuring another 40. Five workers were fatally injured in an iron dust fire in Tennessee in 2011. It is essential to understand the conditions that can create explosive environments and the proper equipment required to enter them safely.

The equipment you are using must meet or exceed the standards for the most explosive environment you could face under known or unknown situations. In the United States, Intrinsically Safe (IS) products are tested to the UL 913 5th or 8th edition standards with the UL 913 8th edition being harmonized to the EN/IEC 60079 -01/-11 standard for European Union ATEX certifications and the remaining countries IECEx certifications.

For an explosion to occur, five components must be in place: oxygen, confined space, ignition source, dispersion, and a fuel source. These elements make up the explosion pentagon. The three elements needed for a fire — fuel source, oxygen, and an ignition source — can create a flash fire within a confined space, resulting in the ingredients for an explosion. Eliminating one of these five elements will prevent an explosion, but eliminating these hazards is not a simple process. Oxygen in confined spaces typically cannot be eliminated. Therefore, managing fuel sources and the use of properly rated equipment to prevent ignition is essential.

As an example, using the ATEX classification system, a Zone 2 environment could

“The ideal situation would be to purchase all of your IS products from a single manufacturer rather than mixing and matching products from several companies.”

quickly become a Zone 1 or even a Zone 0 environment, and your equipment must be rated appropriately as you may not be aware that the environment has changed until it is too late. If you are unsure, analyze the work environment, determine the worst-case scenario, and equip your workers based on that.

The quality of your equipment is vital in explosive environments. You must ensure it is manufactured by a reputable company with documented experience in creating intrinsically safe products. The ideal



situation would be to purchase all of your IS products from a single manufacturer rather than mixing and matching products from several companies. A single source manufacturer ensures consistent quality and safety across the entire product line. Because of the knowledge, time, and expense required to engineer and produce IS products, a very limited number of companies can achieve this.

Nightstick, a global manufacturer of intrinsically safe, professional, portable LED lighting products that exceed industry standards in performance, quality, and user-safety, has over fifty IS products. They have an IS product to meet your needs, from pocket-sized penlights to wide-area floodlights, for use above ground or below ground. You need to be able to focus on completing your job with confidence, knowing your equipment was designed and rated for the highest levels of safety when your life depends on light. Find the certification level you need at www.nightstick.com or locate a dealer near you at nightstick.com



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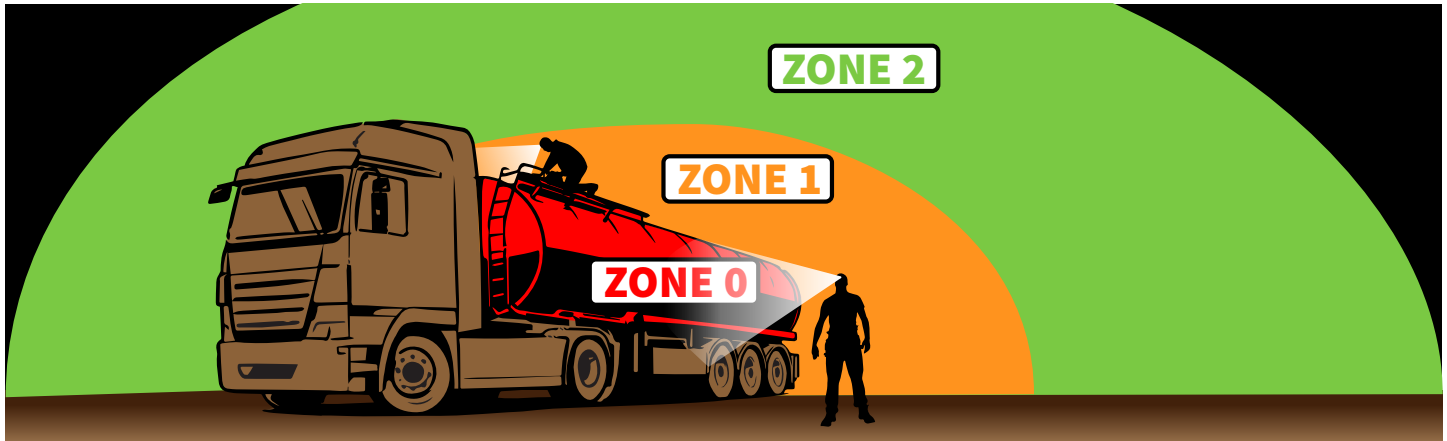
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ATEX ZONES EXPLAINED



Derek Box

Nightstick Marketing Manager, Industrial Division



Three components are necessary to create an explosion;

- 1. Flammable material –**
A gas, vapor, or mist.
- 2. Oxygen –**
Regular breathable air, is sufficient.
- 3. Ignition Source –**
Extreme heat or a spark.



In a flammable atmosphere environment, special precautions must be taken to prevent catastrophic explosions. All portable lighting must be specifically engineered to avoid a spark from occurring and igniting any flammable vapors or explosive mists. In some cases, these vapors and mists can be colorless and odorless, making them especially dangerous.

Commercial worksites have different hazardous areas classified at a specific level called a “Zone.” All equipment safety ratings must be carefully selected based on the most dangerous Zone it may encounter; therefore, it is critical to identify the Zone in which you will be working.

Let’s take a look at the specific characteristics of each Zone.

Zone 0

An area in which an explosive atmosphere is always present.

Zone 1

An area in which explosive atmospheres are likely to occur during regular operation. This may be due to leakage, scheduled maintenance, or emergency repairs.

Zone 2

An area in which an explosive atmosphere does not occur during normal operation, or for a short period of time only. This is usually the result of an accident or other unusual operating conditions.



The Nightstick XPP-5422GMX is the definition of an intrinsically safe product. This ATEX safety certified Dual-Light™ Flashlight light is not capable of releasing enough electrical or thermal energy under normal or abnormal circumstances to cause ignition, even in a Zone 0 environment. The light is rated IP-67 dust/waterproof and puts out 285 lumens with an impressive beam distance of 170 meters. Additionally, the torch includes both a flashlight and downward floodlight, which can be turned on separately or simultaneously.

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LUX VS LUMENS, WHAT DOES IT MEAN?

Derek Box

Nightstick Marketing Manager, Industrial Division



The most common brightness measurements used in portable lighting are Lux and Lumens, but what does that mean? Lux's definition is the amount of light cast on a surface, and the meaning of Lumens is the total output of visible light from a light source. They sound very similar, but there are some significant differences.

Lux is a measurement of how much light falls on a surface, while Lumens measures the total light emitted by a single source. The closer the light source is to the surface, the higher the Lux rating will be. Without knowing that distance, the Lux rating is meaningless. For example, a 10 lumen light on a surface area of 0.0001 m² is 100,000 Lux. Sounds impressive but useless to a person working in a dark room.

Lumens is the amount of light emitted by a single source in all directions and then measured collectively. With the application

of a reflector, all the light can be directed in a specific direction, and as Lumens increases, so does brightness.

To combat confusing and deceptive reported product specifications, the PLATO organization (Portable Lights American Trade Association) was formed in 2010 to develop a standardization known as the ANSI/PLATO FL 1 (See example ANSI panel on the right).

You should avoid buying non-rated products for use in a professional environment, where proper measuring and reporting according to ANSI standards is critical.

Nightstick is a global brand of professional portable LED lighting products that adheres to the ANSI/PLATO FL 1 standards. Our intrinsically safe products are UL 913 certified for Class I DIV 1; most also carry a Zone 0 IIC ATEX and IECEx



certification with T3 and T4 temperature ratings, making Nightstick a truly globally intrinsically safe lighting company. Nightstick leads with over 50 safety rated LED lighting products.

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WATERPROOF VS. WATER-RESISTANT

Derek Box

Nightstick Marketing Manager, Industrial Division



A common misconception is that waterproof and water-resistant have the same meaning, but this is far from true. Even though some companies use them interchangeably, they do not mean the same thing, and not knowing the difference can ruin your device.

You can tell precisely how waterproof something is if you know its IP rating. The IP rating scale is a standard set by the International Electrotechnical Commission. It specifies how resistant a device is to freshwater, dirt, dust, or sand and typically appears on the product's packaging or in the instruction manual specifications.

IP RATINGS FROM LOWEST TO HIGHEST.

IPX0: No protection

IPX1: Protected against vertically dripping water for a short amount of time at normal orientation.

IPX2: Protected against vertically dripping water when tilted up to 15° from normal orientation.

IPX3: Protected against water spray rotated up to 60° from normal orientation.

WATER-RESISTANT

IPX4: Protected against a splash of water from any direction.

IPX5: Protected against a stream of water from any direction.

IPX6: Protected against strong stream of water from any direction.

WATERPROOF

IPX7: Protected when submerged up to a 1-meter depth. (Often listed with a specific time duration.)

IPX8: Object suitable for continuous immersion in water at a depth of more than 1 meter. (Often listed with a time duration.)

Nightstick's new MagMate™ charging technology provides users with a waterproof method to recharge their portable LED lighting. Simply hold the magnetic connector close to the hermetically sealed charging port; the coupler will automatically snap into place. With no port to open or rubber cap to get torn off, the possibility of water entering the product while recharging has been eliminated. Nightstick



Ready to charge



Waterproof Charging

has over 50 waterproof intrinsically safe portable lighting products. Find out more at www.nightstick.com

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POLYMER VS. METAL ENCLOSURES IN HAZARDOUS ENVIRONMENTS

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Ever wonder why are Intrinsically Safe (IS) ATEX Zone 0 rated portable lights almost always made of engineered polymer instead of metal? This is due to restrictions in IEC 60079 regulations limiting the percentage of certain metals allowed in the external housing of Zone 0 rated devices. Currently, the limit is 10% or less for aluminum, titanium, zirconium and magnesium. This includes not only the housing, but clips, fasteners and accessories directly attached to the device.

There are also practical reasons for not using metal housings. Metal conducts electricity, so the risk of accidentally completing a circuit and creating a spark exists, as do sparks generated by dropping the device. Additionally, metal could potentially react chemically with some gases present in a hazardous environment producing potentially catastrophic results.

Currently, there are no restrictions on

engineered polymers in IEC 60079 regulations, making them ideal for Zone 0 rated products. When combined with special additives, polymers can now have very low surface resistance that virtually eliminates static charge build-up per standards requirements. Polymers do not corrode or chemically react with the class IIC gases found in most hazardous environments. In addition to being lightweight, unlike metal, polymers cannot complete a circuit or create a spark if dropped.



Rather than mixing and matching products

from several companies, a single source manufacturer ensures consistent quality and safety across an entire product line. Because of the knowledge, time, and expense required to engineer and produce IS certified products, a very limited number of companies can achieve this.

Nightstick, a global manufacturer of over 50+ intrinsically safe professional, portable LED lighting products exceeds industry standards in performance, quality and user-safety. Find the certification level you need or locate a dealer near you at www.nightstick.com

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WHY DOES MY TORCH HAVE THAT LITTLE SCREW?

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Nightstick Marketing Manager, Industrial Division



The little screw is referred to as a special fastener and is a safety feature required for a Class/Division, ATEX, and MSHA certification.

The use of a special fastener is required for certification of lighting products used in hazardous locations. Commonly referred to as a “set screw” or “locking screw,” this special fastener is typically found on the battery compartment enclosure.

Manufacturers of products intended for use in hazardous locations must meet the specialty fastener requirements set forth by both North American and international safety committees.

UL 913 Eighth Edition Section 5.5
MSHA ACR12001 Section 9.3.10.2.2 and 9.3.14.3
EN/IEC 60079-0 Section 9.2 Special Fasteners
EN/IEC 60079-11 Section 7.4.8 (a, b & c)

This special fastener/tool requirement is intended to prevent the exchange of

batteries using common items such as coins or fingernails while working in a hazardous atmosphere. Therefore, battery replacement for Intrinsically Safe (IS) products is only performed in an area known to be non-hazardous.

The quality of your lighting equipment is vital in potentially explosive environments. You must ensure your lighting has been manufactured by a reputable company with documented experience in creating IS products. The ideal situation would be to purchase all of your IS lighting products from a single manufacturer rather than mixing and matching products from several companies. A single source manufacturer ensures consistent quality and safety across the entire product line. Because of the knowledge, time, and expense required to engineer and produce IS products, a very limited number of companies can achieve this.

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intrinsically safe, professional, portable LED lighting products that exceed industry standards in performance, quality, and user safety, has over fifty IS products to meet your needs. From pocket-sized penlights to wide-area floodlights, for use above ground or below ground, Nightstick has you covered. You can focus on completing your job with confidence, knowing your equipment was designed and rated for the highest safety levels when your Life Depends on Light, choose Nightstick!

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GUIDE TO CERTIFICATIONS

Derek Box

Nightstick Marketing Manager, Industrial Division

Environments where flammable gas, vapors, combustible dusts or fibers are present increase the risk of explosion. Equipment manufacturers are responsible for designing and obtaining certification for equipment to meet safety standards in these high-risk areas.

Multiple systems exist for safety standards around the world. All systems cover Gas, Dust, and Fibers but each is classified slightly different and there is some overlap. Europe has standards set by IECEx/ATEX but many countries throughout the world participate in the IECEx scheme. North America and Canada are covered by NEC and CEC standards.

Testing Laboratories

Most countries require equipment intended for use in hazardous locations be certified by a nationally recognized testing laboratory. Below are several common examples of testing laboratories and standards.

"The ideal situation would be to purchase all of your IS products from a single manufacturer rather than mixing and matching products from several companies."



ETL - United States and Canada

The ETL Listed Mark is proof of product compliance (electrical, gas and other safety standards) to North American safety standards, including UL, ANSI, CSA, ASTM and NFPA standards.



ATEX Directive - International

The European based ATEX directive defines the equipment and work environment that is allowed to function in an explosive atmosphere. The regulations apply to all equipment intended for use in explosive atmospheres, either electrical or mechanical, including protective systems.



CE - European Union

CE mark is required by the European Community for products that will be sold or put into service. The product fulfills all essential safety and environmental requirements for the product's intended use, as they are defined in the European Directives, primarily ISO Standards.



IECEx - International

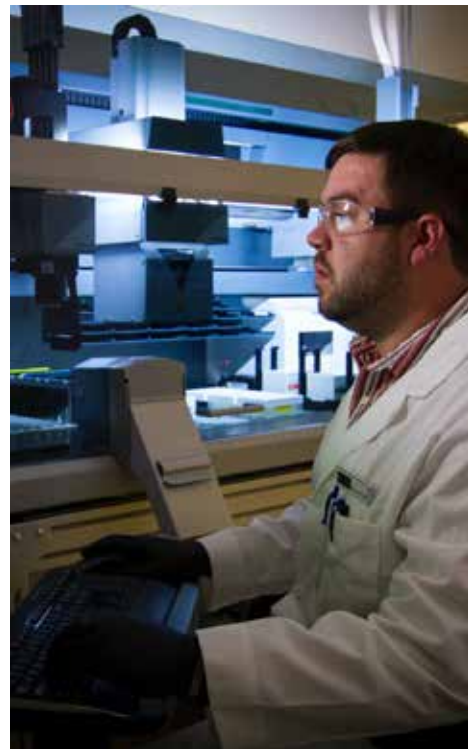
IECEx is the International Electrotechnical Commission system for the certification to standards for electrical equipment for explosive atmospheres.



MSHA - United States

Mine Safety and Health Administration requires that portable battery-operated lighting be designed and tested to not pose an explosion hazard in mining operations.

The quality of your lighting equipment is vital in potentially explosive environments. You must ensure your lighting is manufactured by a reputable company with documented experience in creating intrinsically safe products. The ideal situation would be to purchase all of your IS lighting products from a single manufacturer rather than mixing and matching products from several companies. A single source manufacturer ensures consistent quality and safety across the entire product line. Because of the knowledge, time, and expense required to engineer and produce IS products, a very limited number of companies can achieve this.



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INTRINSICALLY SAFE PRODUCT MARKING FILES EXPLAINED

Derek Box

Nightstick Marketing Manager, Industrial Division

Permissible XPP-5410 Flashlight Assembly

MSHA

APPROVAL No. 20-A140006-0

TESTED FOR INTRINSIC SAFETY IN METHANE-AIR MIXTURES ONLY

WARNINGS: The Model XPP-5410 is MSHA approved for use with Energizer (Type E92), two Energizer (Type EN92), and Duracell (Type MX2400), Duracell (PC2400), and Duracell (EN92) batteries only. Replace the batteries in fresh air only and replace all batteries at the same time. Do not mix batteries from different manufacturers or of different types. The Model XPP-5410 must not be opened in area where permissibility required.



Intertek
ID 4003544


INTRINSICALLY SAFE
SECURITE INTRINSEQUE

CLASS I DIV 1 GRPS A-D T3
CLASS II & III DIV 1 GRPS E-G T135C
CLASS I ZONE 0 AEx ia IIC T3 Ga
CLASS I ZONE 0 Ex ia IIC T3 Ga

⚡ I M 1 Ex ia op is I Ma
⚡ II 1 G Ex ia op is IIC T3 Ga

Ex ia op is I Ma
Ex ia op is IIC T3 Ga
Intertek ITS 13 ATEX27839X
IECEX ITS 14.0036X


-20°C ≤ Tamb ≤ +40°C
1.5V/Cell AAA Alkaline



2575


**UK
CA**

0359



Conforms to:
ANSI/UL STD 913, ANSI/UL 60079-0, ANSI/UL 60079-11
ANSI/ISA 60079-26

Certified to:
CAN/CSA STD C22.2 No 157
CAN/CSA STD C22.2 No 60079-0
CAN/CSA STD C22.2 No 60079-11
CSA STD C22.2 No 25

 **SEE INSTRUCTION MANUAL**
VOIR MANUEL

MFG MM-YY

Nationally recognized testing laboratory that tested the product

Manufacturer ID assigned by the test laboratory

Listing of standards and certifications used for rating

Country or regional Specific markings required for sale in that market.

Special instructions on how to ensure the intrinsically safe rating is maintained

North American Certification

ATEX Certification

IECEX Certification

ATEX & IECEX Certification Document Numbers

Product operational temperature ranges

Power source specifications

Month & year the product was manufactured

If you look at any intrinsically safe (IS) portable LED lighting product, you'll notice it has a printed or raised section of text on it. This safety requirement lets users see if the product they plan to use is safe to take into a potentially hazardous environment. Let's take a look at one example of a marking file and explain what it means. This example shows a very high safety rating for a global market and thus has a very complex marking file.

If you are unsure what safety requirements you need, consult with a reputable manufacturer or distributor of IS LED products. Ideally, you should purchase all IS LED

lighting from a single manufacturer to ensure safety and quality across the entire product line. Because of the knowledge and expense required to engineer and produce IS products, a very limited number of companies can provide this.

Nightstick has over fifty IS products to meet all your needs, from pocket-sized penlights to wide-area floodlights; for use above ground or below, Nightstick has you covered. Focus on your job with confidence, knowing your equipment has the highest safety levels. When your Life Depends on Light, choose Nightstick!

Find the certification level you require at nightstick.com equipment has the highest safety levels. When your Life Depends on Light, choose Nightstick!

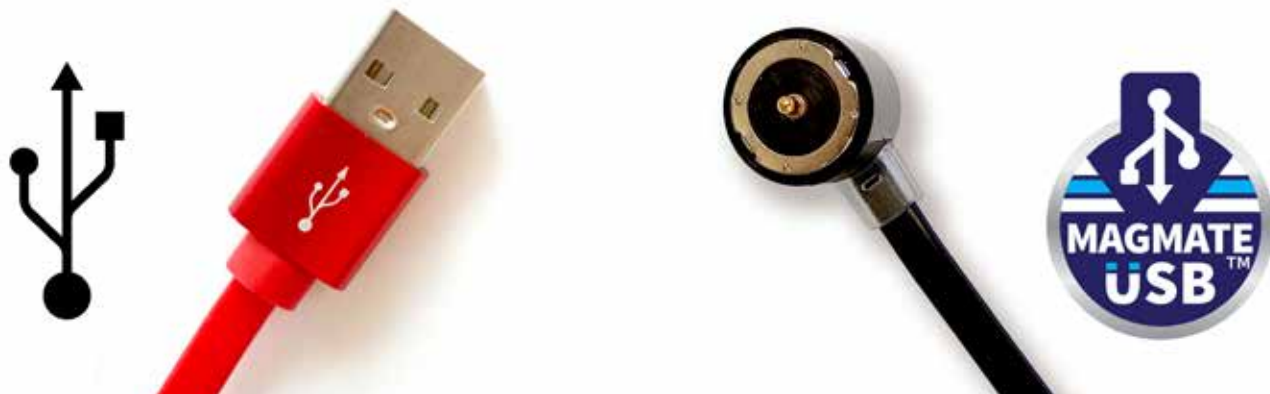
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USB VS. MAGNETIC COUPLED CHARGING

Derek Box

Nightstick Marketing Manager, Industrial Division



Rechargeable devices manufactured in the last five to ten years now offer the option to use a USB connector to charge the device. As USB connectors made their way into the commercial industry, specifically the hazardous environment industries, limitations of USB charging have become apparent. In a hazardous or Intrinsically Safe (IS) environment, certified electronic



devices are required to be sealed to prevent flammable gases and dust from entering the device. This requirement reveals the convenience of USB as a potentially dangerous liability when not designed to strict engineering guidelines. To solve this, manufacturers have added rubber caps or plugs into the exposed USB port to prevent exposure to outside contaminants. These caps serve as an adequate solution if they remain in place and are not torn off or damaged. However, the rubber cap solution exposes new limitations due to the

rugged nature of working in IS hazardous environments. When you consider the expense of replacing or servicing a safety-certified device due to an inexpensive rubber cap being torn off and invalidating its safety rating, it became evident that a permanent solution was needed.

The solution engineers sought to create was a hermetically sealed IS device with a new connector that did not compromise the products exterior. Traditional USB connectors are designed to be pushed through a hole in the product and use the compression friction of the dongle pressing against the port to keep the cord connected. A magnetic coupler overcomes this weakness by placing a magnet in the charging cord head and a ferrous alloy metal disk inside the product. When held in proximity to each other, the magnet automatically snaps into place and seamlessly completes the charging circuit without allowing dust, gases, or liquids into the IS rated device. When charging is complete, the user can be confident that they can now reenter a hazardous environment with their safety rating intact. A sealed solution saves money on equipment service costs while boosting worker confidence and protection.

Because of the knowledge and expense required to engineer IS-certified magnetic coupled products, a limited number of companies can achieve this. Nightstick has developed a unique line-up of trademarked

Magmate™ portable LED products with ATEX Zone 0 and Class I Division 1 ratings.

Nightstick, a global manufacturer of over 50+ Intrinsically Safe professional, portable LED lighting products, exceeds industry performance, quality, and safety standards. Locate a dealer near you at www.nightstick.com



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THE ADVANTAGES OF GREEN LASERS OVER RED LASERS

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Red lasers are near the edge of the visible light spectrum at 700 nanometers, and green lasers are in the center of the visible light spectrum at 550 nanometers, making them much easier for human eyes to detect. Green lasers are up to 4 times brighter than red lasers and are visible in daylight as far as 650' (198 m) away with the naked eye and up to 1,000' (305 m) with a detector. They also produce a clean, sharp line with less scatter over long distances than red lasers.

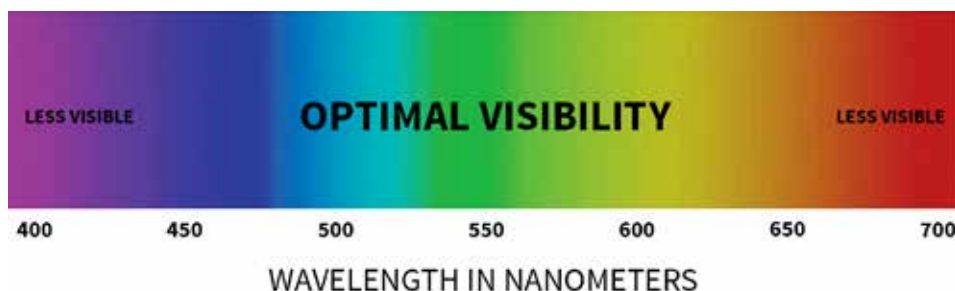
The work environment plays a significant role in the type of laser that is the most appropriate for you. If you are working in a small, dark area, a red laser may be adequate but not all-encompassing. If you are working at a massive oil refinery, a large enclosed manufacturing facility, or an outdoor environment, you will need the more powerful green laser. In either case, you must ensure that your laser is

rated to operate in the environment you plan to use it. A typical laser pointer is not rated for use in a hazardous work environment, no matter which color.

Historically green lasers have been significantly more expensive than red because of the outdated laser color conversion technology they used. This resulted in inferior lost-cost red lasers being substituted for the much more visible green variants. With the advent of actual green laser diodes, the cost of producing them has been dramatically reduced. As this cost continues to come down, the number of green laser products in intrinsically safe work environments will increase.

Because of the knowledge and expense required to engineer intrinsically safe green laser products, a limited number of

companies can achieve this. Nightstick, a global manufacturer of over 50+ intrinsically safe professional, portable LED lighting products, has developed a new ETLus listed intrinsically safe Class I Division 1 flashlight with an integrated 3R green laser pointer built-in combining two tools into one compact package.



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ADVANTAGES OF LITHIUM-ION OVER NICKEL-METAL HYDRIDE AND NICKEL CADMIUM BATTERIES

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Nightstick Marketing Manager, Industrial Division



Nickel Cadmium (Nicad) is the oldest type of rechargeable battery and is known for being durable. If correctly used it technically has a longer life cycle than other battery types. Its primary disadvantage is the charging problem commonly referred to as the “memory effect.” This occurs from partially discharging and recharging the battery, limiting it to the highest charge level of the last cycle. This effect drastically shortens the lifespan of the battery.

Lithium-Ion (Li-ion) are the preferred type of battery in modern devices because of their high energy density. They do not suffer from memory effect or weak-cell syndrome, but come with an extra cost in engineering. Without properly designed safety circuitry they can experience “thermal runaway” causing a fire. This is the worst possible situation for a product designed for use in explosive environments. The protective features of the safety circuitry

a global manufacturer of portable LED lighting products, has 50+ products rated for use in explosive environments.



Nickel Metal Hydride (NiMH) batteries offer a higher energy density than Nicad, but this comes at the cost of increased weight. NiMH batteries are nearly twice as heavy as Nicad, but they do not suffer from the memory effect. Instead, they sometimes have a condition called “weak-cell syndrome” where some of the cells can no longer hold power and appear to be charged but die almost immediately when used.

must protect against all types of short circuit, excess temperature, and electrolyte leakage. The circuit is designed to immediately shut down if any of these faults occur in the system.

Because of the knowledge, expense, and time required to engineer explosive environment products, a limited number of companies achieve this. Nightstick,



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MINING LAMP SAFETY IMPROVEMENTS SINCE THE DAVY LAMP

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Mining in the early 20th century was a very dangerous occupation. Recorded figures for the 10-year period between 1870 and 1880 over 2,700 men and boys lost their lives in mining explosions and fires. The 1907 Monongah explosion in mines number 6 and 8 killed 362 miners. Another 259 died in the Illinois Cherry Mine fire in 1909. In Dawson, New Mexico the Stag Canon Mine number 2 claimed the lives of 263 miners in 1910.



These three disasters prompted the creation of the U.S. Bureau of Mines in 1913. A focus on new electric lamp technology by the Bureau was aimed at limiting accidents and improving lighting through the elimination of flame powered cap lamps. A flameless Electric Miners Cap Lamp was approved in 1915 which led to a steady decrease in mining accidents. Over 100 years later miners cap lamps have reached an incredible level of safety and reliability.

The next great improvement in mining cap safety is Dual-Light technology. This works by combining the narrow long-distance view of a spotlight with the wide area illumination of a soft floodlight. Being able to see where you are going while being able to see what is on the ground in front of you dramatically reduces trip and fall injuries so common in the dark environment of underground mining.

The Nightstick XPR-5560G Intrinsically Safe Permissible Cap Lamp not only features Dual-Light technology but produces a “shift long” consistent lumen output. Some cap lamps begin with a “high” lumen value, but the lumen value slowly diminishes over time. The advanced on-board circuit in the XPR-5560G ensures that the lumen output stays consistent for

full shift, which can last up to 15 hours. In low mode it can run up to 22 hours and in an emergency, it can run for an astonishing **ONE HUNDRED and SEVENTY** hours in Survival Mode.

The lamp is powered by a rechargeable Li-ion battery, IP-67 dust and waterproof and is MSHA certified Intrinsically Safe Permissible.



XPR-5560G

XPR-5561G



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WHEN CAN A ZONE 1 RATED PRODUCT BE SAFER THAN ZONE 0 RATED PRODUCT?

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Nightstick Marketing Manager, Industrial Division



This scenario seems impossible, but it is a real-life or death possibility. This is because Zone ratings are measured independently from temperature codes and gas group types defined within the ATEX (EN 60079-11) and IECEx (IEC 60079-11) classification systems.

Zone 0 is defined as an area where an explosive atmosphere is always present or continuously present for long periods of time. Zone 1 is defined as a place in which an explosive atmosphere consisting of a mixture of air and flammable substances in the form of gas, vapor, or mist is likely to occur during normal operation. This can be due to scheduled maintenance, repairs, leakage, or accidents. These zones should not be confused with zones 20, 21, and 22, which refer to combustible dusts and flyings.

Temperature codes refer to the maximum surface temperature of any device component that can be exposed to a hazardous environment during normal or fault conditions. Temperature ratings (T codes) go from highest to lowest, starting with a T1 rating that can be up to 450°C (842° F), all the way down to a T6 rating at a mere 85°C (185°F). These significant differences between temperature codes often go unnoticed unless examined closely.

Likewise, gas group ratings require careful scrutiny. These start with the most dangerous and volatile gases being Group A type gas, such as Acetylene. Next down are

Group B type gas with gases like Hydrogen and Ethylene Oxide continuing down to Group C, and finally, Group D types gas which contain less volatile gases like Propane and Gasoline vapors. Considering Gasoline vapors are some of the least flammable in this list is a sobering reminder of how dangerous these gases can be. These critical differences can often go unnoticed by safety professionals who mistakenly rely solely on a Zone rating for guidance.

Without a complete understanding of these T codes and gas ratings, it is not hard to imagine a scenario where someone might unknowingly believe that any device rated for Zone 0 would be safe in a Zone 1 environment which is not true.

Here is a couple of product marking files to illustrate this point.

II 1 G Ex ia IIA T1 Ga

This is a Zone 0 product

II 2 G Ex ia IIC T4 Gb

This is a Zone 1 product

In these examples, this Zone 0 device with a T1 code and a rating for Group D type gases would NOT be safe for use in a Zone 1 environment that requires a T4 code and a rating for Group B type gases. Thus, this Zone 0 product would not be safe for use in this particular Zone 1 environment.

All equipment safety ratings must be based on the potentially hazardous environment it may encounter in regular use as well as unexpected situations since the current environment may quickly change. If you are working in a Zone 1 environment containing Group A type gases and your portable lighting is not rated for a Zone 0 environment, an accident or malfunction that causes you to drop your equipment while rushing to safety could have disastrous consequences. If you are unsure, analyze the work environment, determine the worst-case scenario, and equip your teams accordingly.

When your team needs to focus on completing their job with confidence, knowing their equipment was properly designed and correctly rated for the environments they will be or might be working in, trust Nightstick.

Nightstick is a global manufacturer of over fifty intrinsically safe professional, portable LED lighting products that exceed industry performance, quality, and user safety standards. When your life depends on light, trust Nightstick.

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HANDS-FREE LIGHTING SOLUTIONS FOR OPTIMAL SAFETY AND PERFORMANCE

Derek Box

Nightstick Marketing Manager, Industrial Division



Firefighting is one of the jobs in which holding a light in your hand interferes with your work. When firefighters are on the scene, they need their hands free to pull hoses, swing axes, climb ladders, operate extraction equipment, and do many other time-critical tasks.

As most firefighters know, structure fires and vehicle-related accidents happen much more often during the evening hours, where lighting becomes an essential tool. Firefighters need a pair of lights for maximum flexibility: an angle light on their jacket and another on their helmet. These lights need to be purpose-built specifically for firefighters to maximize efficiency, utility, and safety.

A critical piece of this pair would be an angle light with a tight smoke-cutting beam that illuminates distant objects with a second floodlight that illuminates the ground in front of them. Ideally, both lights should have the ability to turn on independently or run simultaneously in a dual-light mode. This allows the firefighter to see where they are going while avoiding trip hazards and ground-level obstacles. A professional quality angle light should also be able to rotate the head 90° and quickly turn it into a traditional handheld torch if the situation requires it. In this example, the angle light now does the work of three lights with one tool.

The second element of this pair would be a helmet light mounted on the front of the helmet that has a focused spotlight for seeing at a distance and a mode that allows for a soft floodlight to cover the immediate areas where they are working without the blinding glare of a spotlight bouncing back. Again, both the spotlight and floodlight should have a dual-light mode allowing them to turn on independently or simultaneously as the envi-

ronment dictates; more functions give more options, more options give more time. Having more time can mean the difference between life and death in a critical situation. Finally, this helmet light should be an ultra-low profile design to allow the clearance of visors and face protectors when cutting tools or chain-saws are required.

A well-equipped firefighter should have additional lighting options, such as secondary helmet lighting and portable lanterns.

Secondary helmet lights should have an adjustable mount and a tight, focused beam that attaches to the side of the helmet that can be easily positioned to light up a specific area not covered by the angle light or center-mounted helmet light. Professional quality secondary helmets light should also have a dual-light feature to provide extra illumination at the ground level.

The size and battery power of angle and helmet lights limit the amount of light they can provide over large areas or distances, and sometimes a portable lantern is needed to properly survey and evaluate a large space or structure. Additional features should include a rapid-release shoulder strap in case the firefighter becomes entangled and must escape quickly. Green “follow me” lights on the rear of the lantern to help the teams rapidly locate each other and a flat base with a sturdy ergonomic handle for crawling along the floor. Most importantly, it must be very bright and have a long runtime for extended calls. In some cases, the addition of a downward-facing floodlight with the ability to run in dual-light mode can also be helpful.

A fully-equipped firefighter will also have portable area lights at their disposal. These

can be set up to illuminate important areas such as ingress and egress routes and regions that need extra attention, such as large holes or overhead obstacles like power lines and other dangerous obstructions. Professional-grade lighting will be cordless and have features such as powerful rare-earth magnetic bases to attach firmly to any ferrous metal, airtight housings, and stands that allow them to be elevated for maximum visibility.

Another overlooked aspect of firefighter lighting is safety ratings. Everyone always assumes the fire department only shows up when something is on fire, but in some cases, they are called out to investigate a potential fire hazard before it ignites. In these instances, it is essential to have intrinsically safe lighting to prevent a spark that could cause a fire or explosion. A professional firefighter needs lighting that has modern features and also has the appropriate safety rating for the environment it may or may not be used in. Exploring a potential gas leak or other hazardous environments with an un-rated flash-light can lead to disastrous results.

The final thought to consider is the product manufacturers. For many years, only a handful of companies created products for the firefighting market, and their dominance created a lack of innovation, leading to a “this is what we’ve always used” mindset with many agencies. As other established lighting companies began to focus on the firefighting industry to improve the safety and options available to firefighters, groundbreaking technologies like dual-light and rotating heads started to appear.

NIGHTSTICK®
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THE ADVANTAGES OF DUAL-LIGHT FLASHLIGHTS

Derek Box

Nightstick Marketing Manager, Industrial Division



The human eye allows you to visualize the world by receiving light energy and then processing that information to create images your brain can understand. The iris controls the amount of light entering the eye, which contracts and expands depending on the



ambient light conditions. When a traditional flashlight (called torches in many countries) is activated, the sudden increase in available light causes the pupil to contract as it adjusts. This sudden constriction reduces your peripheral vision and decreases your awareness of objects around you. The pupils will expand somewhat as the eye adjusts to the new light levels, but as you continue looking in the direction of the beam, it will remain constricted. This magnifies the odds of a slip or trip occurring in a rugged work environment with sharp tools, pipes, hoses, and other trip hazards scattered along a user's path. According to the National Safety Council (NSC), which has been collecting safety data for 100 years, the third leading

cause of nonfatal work-related injuries is the category referred to as "falls, slips, and trips."

In early 2000 the owner of Nightstick LED lighting, Bijan Bayat, solved this problem with the invention of the dual-light flashlight. One of the key advantages of a dual light flashlight is that in addition to the traditional forward-facing flashlight beam that illuminates distant objects, a secondary soft area floodlight was added to help users regain the lost peripheral vision caused by pupil constriction. This downward-facing floodlight allows users to see the immediate area in front of them and to their sides as they navigate to their project or workspace. A secondary advantage of the floodlight is to provide a soft area light that allows users to work on equipment, take readings, or perform other tasks without having the blinding glare of a traditional focused beam bouncing back and blinding them. Anyone who has used a high lumen flashlight to focus on an object near them knows how uncomfortable



this can be. When it comes to purchasing professional lighting products rather than mixing and matching products from several companies, a single source manufacturer ensures consistent quality and safety across an entire product line. This is especially important when purchasing intrinsically safe lighting, often called explosion-proof or safety lighting.

Nightstick, the original creator of the dual light flashlight, a global manufacturer of over 50+ intrinsically safe professional, portable LED lighting products, exceeds industry standards in performance, quality, and user safety. Find the certification level you need or locate a dealer near you at www.nightstick.com.

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