Western Technology™

Home of KICK-IT TOUGH™ LED Safety Lights

EXPLOSION PROOF – WET LOCATION – CONFINED SPACE – LOW VOLTAGE

JUNE 2014

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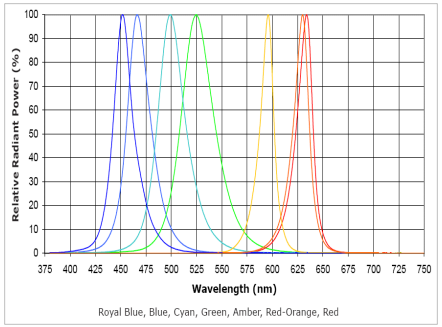
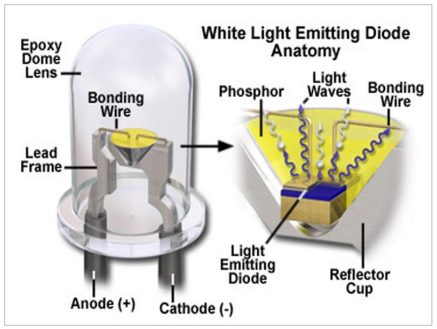
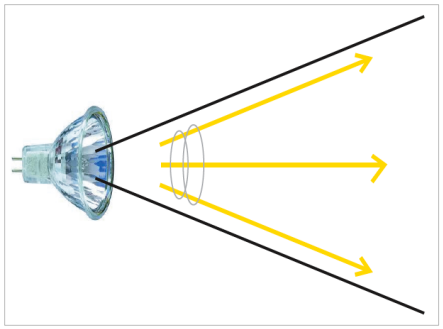


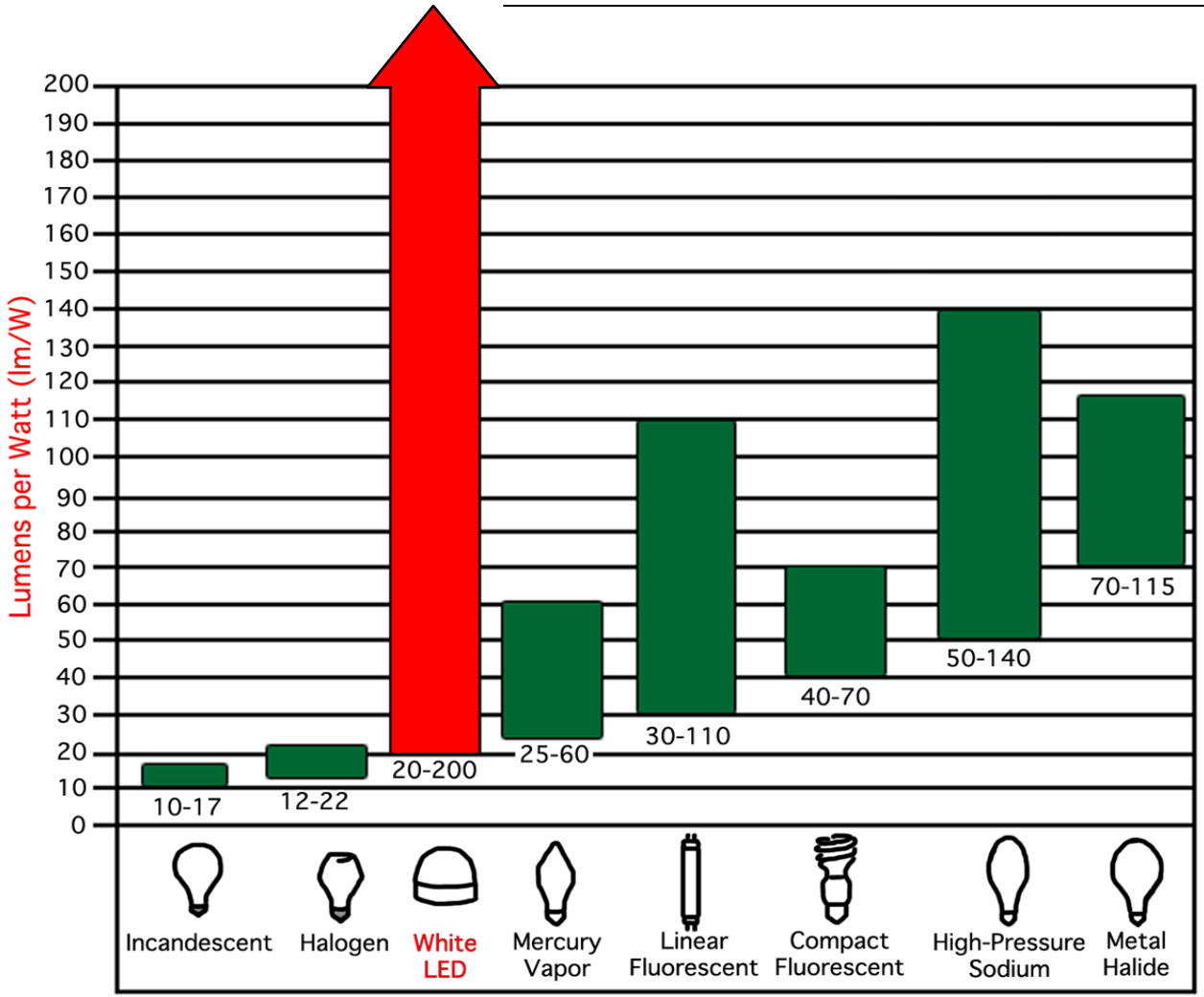




UNDERSTANDING LIGHT

SECTION ONE

WHY LEDs: LUMENS PER WATT COMPARISON



Light Emitting Diode (LED) technology has rapidly advanced in just the last two years.

When compared to all other lighting technologies, LEDs offer the greatest amount of lumens per watt (lm/W) – they're very efficient.

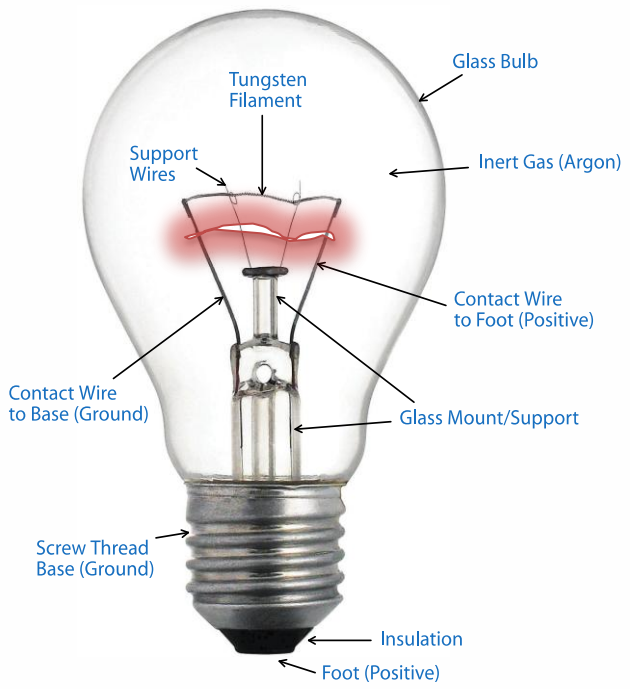
WHAT IT MEANS: LIGHT TERMS

Term	Definition	Units	How to Interpret
Color Temperature *(page 8)*	Color of Light	Kelvin (K)	Lower Kelvins (1500°K) -Light shifted toward Red Higher Kelvins (9000°K) - Light shifted toward Blue
Color Rendering Index (CRI)	Light's effect on color	Scale of 0 to 100 with sunlight at 100	The closer the number to a value of 100, the more "true" the color will look in that light
Brightness – Luminous Flux *(page 9)*	The total brightness of the light source	Lumens (lm)	Higher lumens = brighter light
Illuminance *(pages 9 & 10)*	The total brightness or intensity of the incident light at a surface	Lux (lx) 1 lx = 1 lm/m^2	Higher lux = brighter light incident (per unit area/at a surface)
Power	Amount of electrical energy consumed	Watts (W)	Lower watts = less energy consumption
Efficacy	The efficiency of the bulb to convert electricity into light	Lumens per Watt (lm/W)	More efficient bulbs provide more light using less energy

HOW IT WORKS: MAKING LIGHT

Incandescence and Photo-Luminescence

Incandescent bulbs produce light by heating a filament wire to a high temperature until it glows brightly.



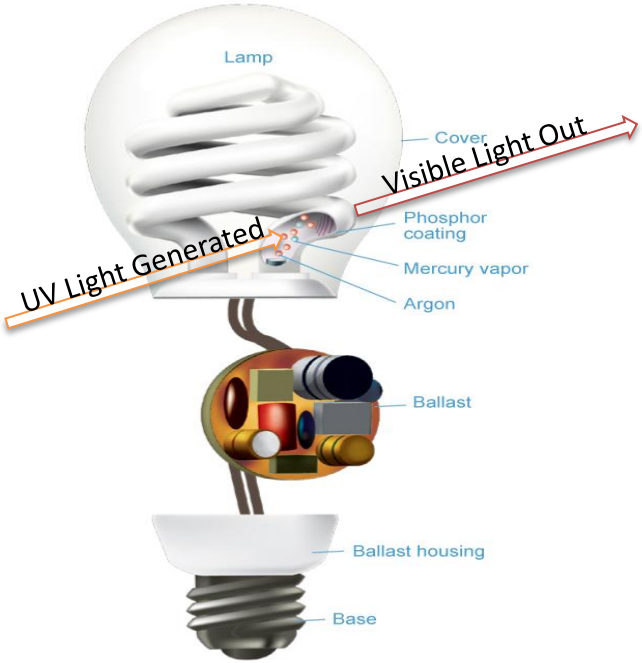


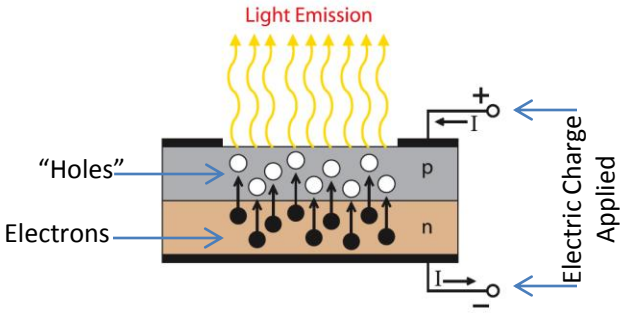
Photo-luminescent bulbs (such as CFLs) generate and absorb UV light and then re-radiate it as visible light using a phosphor coating.

HOW IT WORKS: MAKING LIGHT - LEDs

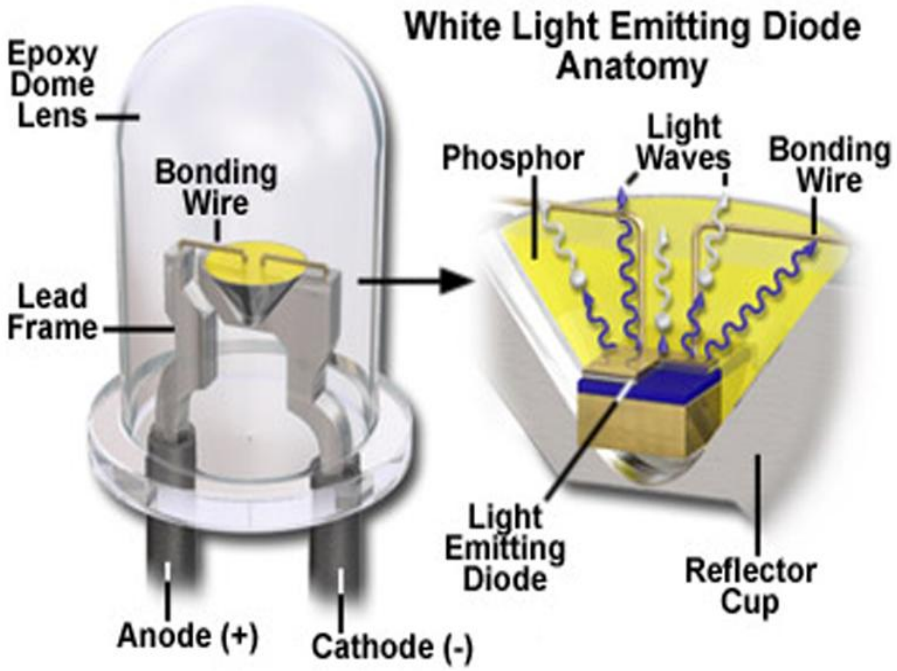
Electro-luminescence: Light Emission Resulting from Flow of Electric Current

A semi-conductor has both negative (n) and positively (p) charged sections. n-sections are full of electrons; p-sections are full of "holes".

Applying an electric charge to a semi-conductor causes electrons to move from n-sections to p-sections.

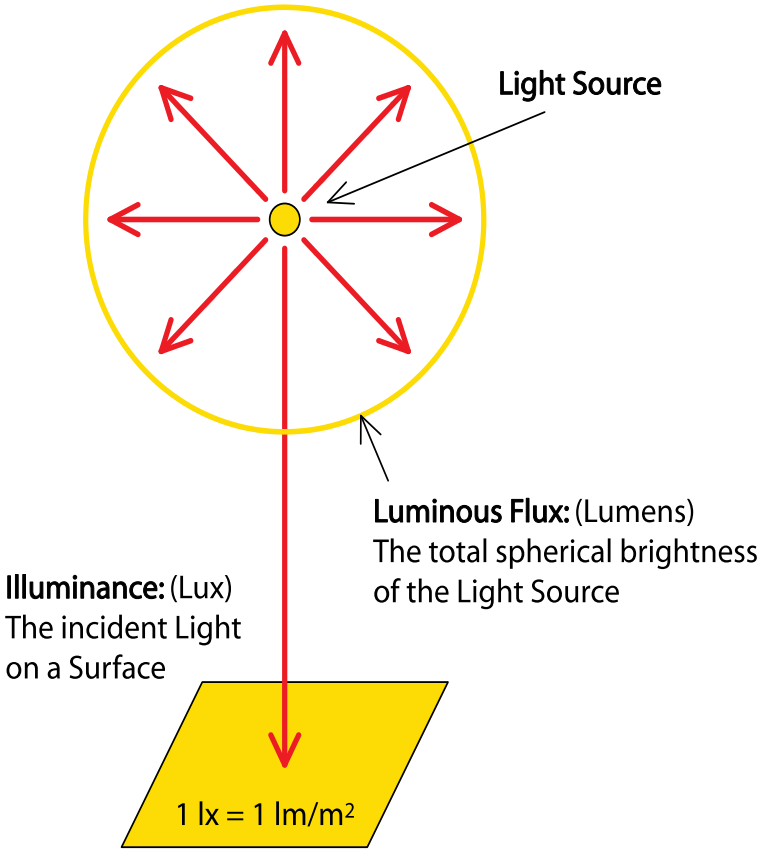


When a charge is applied to an LED (a type of semi-conductor), **electro-luminescent UV light** is emitted as a bi-product of electrons moving from n-sections to p-sections.



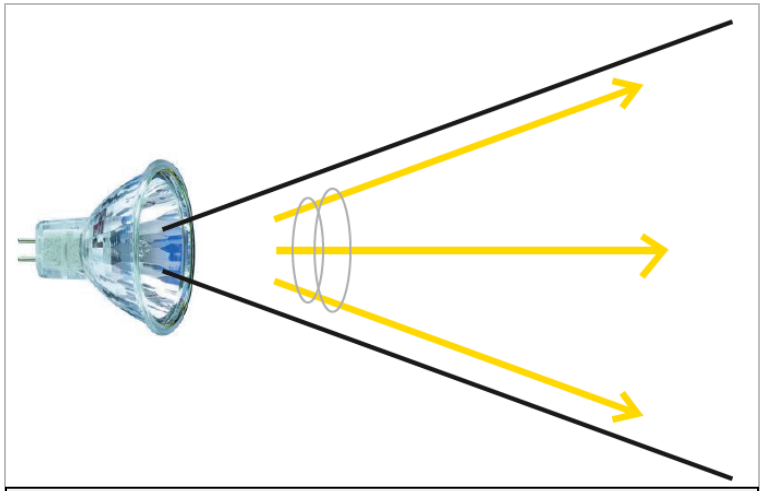
A phosphor coating is used in the LED's reflector cup to convert the electro-luminescent UV light into white, visible light.

WHAT IT MEANS: EXAMPLES OF ILLUMINANCE



Illuminance	Example
10^{-4} lux	Total starlight, overcast sky
0.002 lux	Moonless clear night sky with airglow
0.01 lux	Quarter moon
0.27 lux	Full moon on a clear night
1 lux	Full moon overhead at tropical latitudes
3.4 lux	Dark limit of civil twilight under a clear sky
50 lux	Family living room
80 lux	Hallway
100 lux	Very dark overcast day
320–500 lux	Office lighting
400 lux	Sunrise or sunset on a clear day.
1,000 lux	Overcast day; typical TV studio lighting
10,000–25,000 lux	Full daylight (not direct sun)
32,000–130,000 lux	Direct sunlight

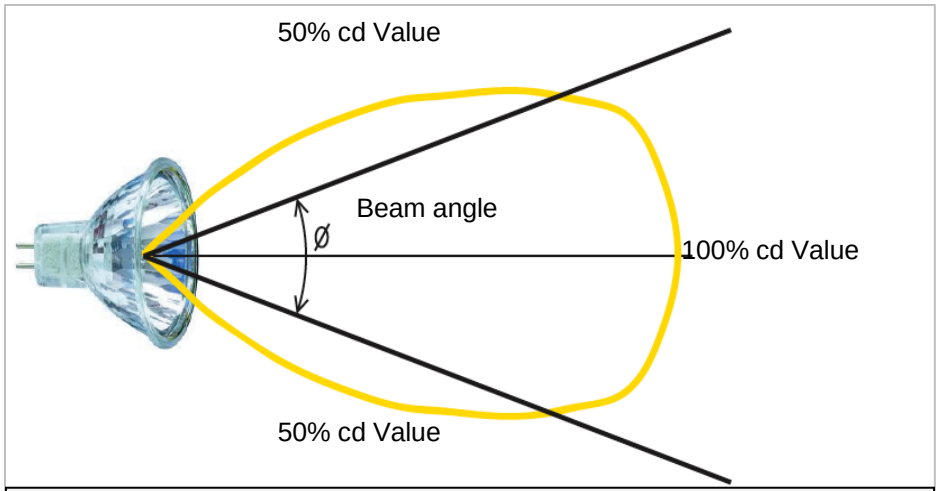
WHAT IT MEANS: LUMINOUS INTENSITY & BEAM ANGLE



Candela (cd) is the international unit of luminous intensity – a measure of emitted light.

The Formula:

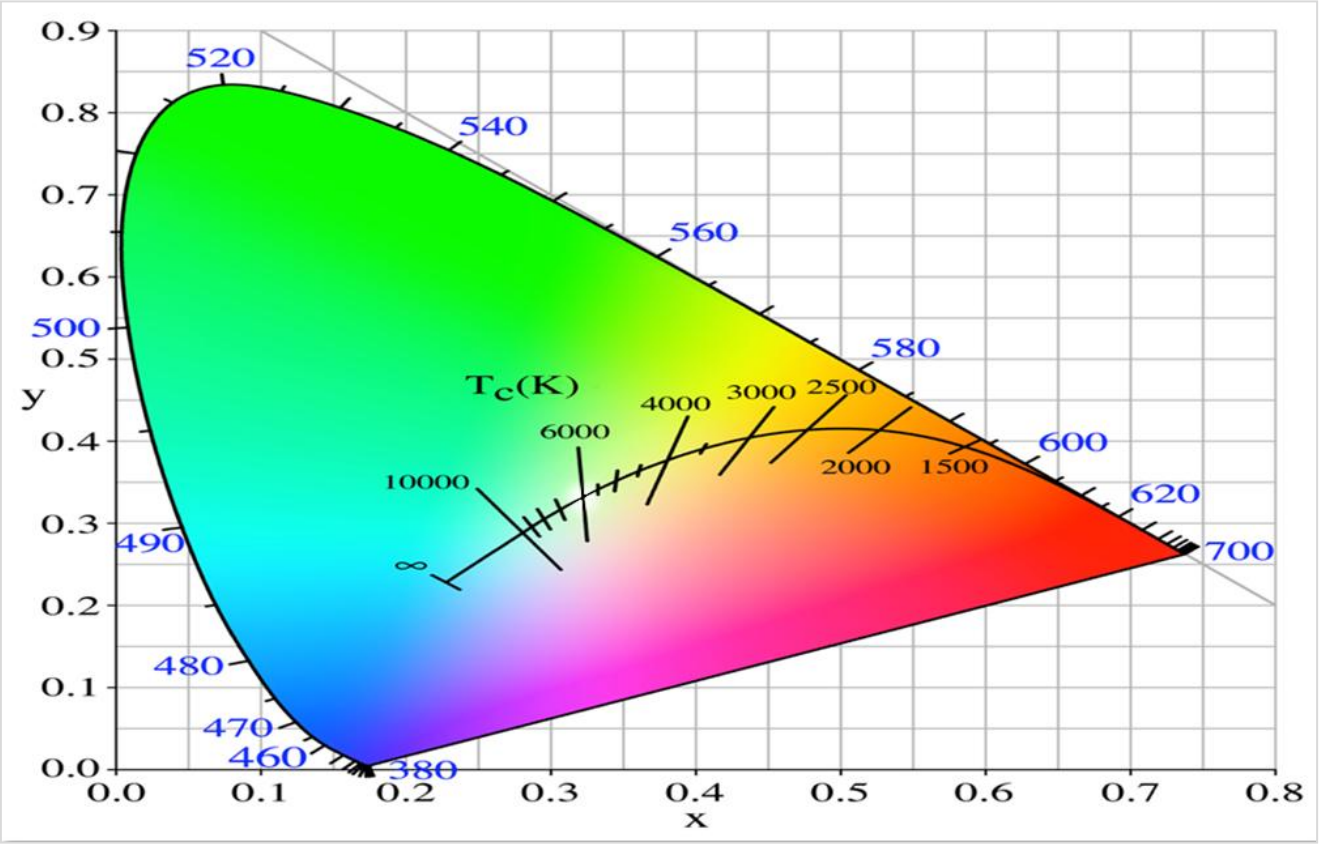
Candela = Lumen/Solid Angle



Beam Angle is the angle capturing 50% of the maximum intensity of the Light.

Beam angle demonstrates the candela distribution.

WHAT IT MEANS: COLOR TEMPERATURE OF LIGHT



LED - Range from UV to IR

CLOUDY ~ 9600ºK	SUNLIGHT ~ 6500ºK	INDIRECT SUN ~ 5500ºK	FLUORESCENT ~ 4000ºK	HALOGEN ~ 3200ºK	INCANDESCENT ~ 2700ºK	HPS ~ 1900ºK	CANDLE ~ 1900ºK

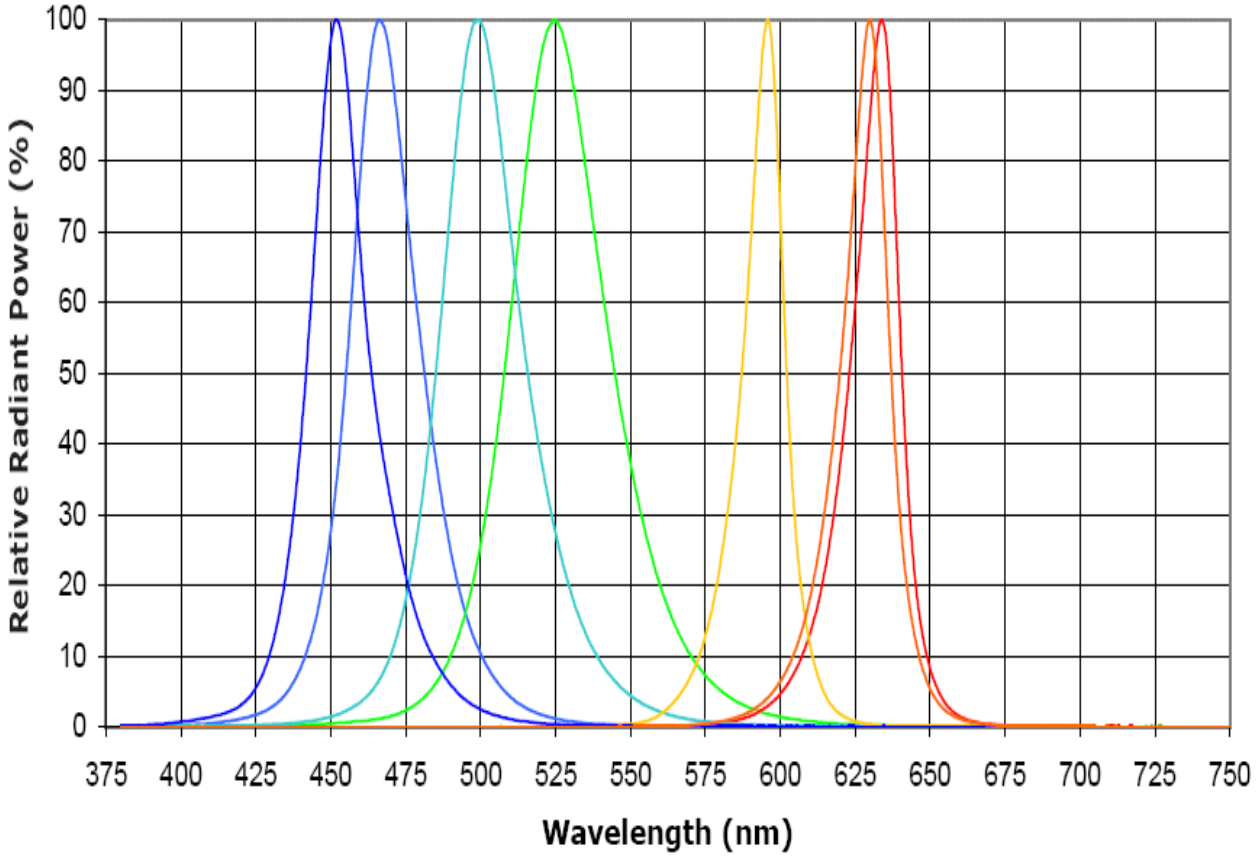
WESTERN TECHNOLOGY'S WHITE LEDs

Spectral Output

Western Technology uses cutting edge High Bright LEDs in all of our LED lighting systems.

We select LEDs which have very low variation in color temperature (Kelvin) and illuminance in order to ensure we meet product uniformity and light stability standards.

Western Technology Bright White LEDs have a color temperature of 6000ºK, which is composed of an even color frequency blend, allowing for color filtration and diffusion capabilities with our lighting systems.



Royal Blue, Blue, Cyan, Green, Amber, Red-Orange, Red

WESTERN TECHNOLOGY'S LED LIGHTING PRODUCTS

SECTION TWO

Proudly made in the USA

WESTERN TECHNOLOGY LED LIGHTS

Construction

All HazLoc LED lighting systems manufactured by Western Technology are built:

- To be **durable**, **efficient**, and **user-friendly**;
- Kick-It Tough$_{TM}$ with **rugged**, fully-machined construction for the most demanding worksite environments;
- For **safety** and sealed against dangerous environments, meeting HazLoc:
  - Class I, Division 1 & 2, Groups C, D, & E
  - Class II, Division 1 & 2, Groups E, F, & G
  - CSA Zones 1, & 2; Zones 20, 21, & 22
- Water tight and certified for **wet location** usage (we have tested our lights up to 100 psi so you can operate them with confidence in wet environments);
- For **flexibility** - each system of lights has versatile magnetic/mechanical mounting options, including: light shielding, light projection, light diffusion, color temperature control, and thermal monitoring;
- For **protection** of your workspace, having polyurethane bumpers wrapping the lights and optional safety straps.

Government Contractor:
"I've heard nothing but positive feedback regarding your participation in the meeting and the products you demonstrated."

Our light systems are **customizable** to meet your workplace requirements. Just ask! We will strive to meet your requests.

Please Note: Equipment specifications subject to change.

Feature	The BRICK™
Approved for Hazardous Locations:	- Class I, Div. 1 & 2, Groups C, D, & E - Class II, Div. 1 & 2, Groups E, F, & G - CSA Zones 1 & 2; Zones 20, 21, & 22
Approved for Wet Location Usage:	Yes
Temperature Rating:	T5/T4
LED Color:	~ 6000ºK CRI >70
Rated with Optics:	50,000 Lux at 1' >11,500 Lumens
Reflective Optic Beam Angle:	60º Standard
Light Head Power:	36VDC, 2-3A (Model #9610 A, #9610C) 110-24VAC, 2.2-1.2A (Model #9610B)
Bumper Protection:	Yes
Secondary Lens Options:	- Safety & Anti-Glare Shields - Light Filters - Light Diffusers
Variable Magnetic and Fixed Mounting Options:	Yes (*see pages 15-16*)
Weight:	10 lbs
Dimensions:	10"L x 5"W x 4"H
Certified Portable Luminary:	Yes

Please Note: Equipment specifications subject to change.

BRICK™

Overview

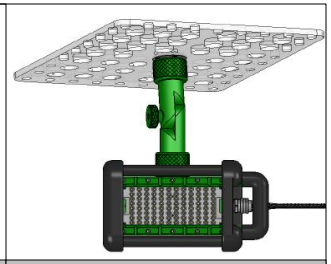
Mounting Options

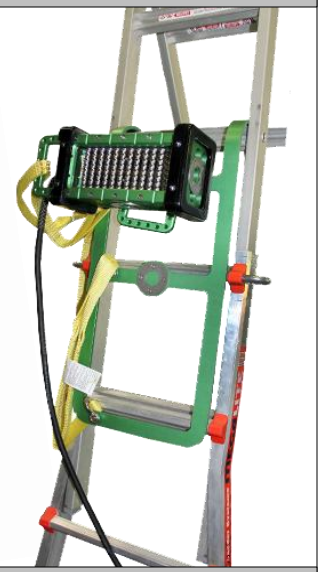
Knuckle					
Adaptor					
		Handcart + two adaptors + two knuckles	Stake Mount + Knuckle	Tripod + Knuckle	Quadpod + Knuckle

Please Note: Equipment specifications subject to change.

Mounting Options

Puck Magnet				 A-Frame Mount
Pipe Mount		Demonstration of Pipe Mount	Demonstration of Puck Magnet	 Ladder Mount

 Zip-Tie Mount

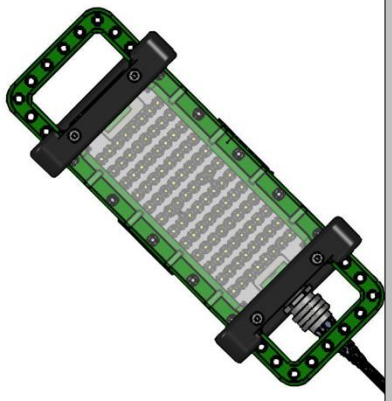


Please Note: Equipment specifications subject to change.

Blast/Safety Shields and Diffusers

Blast Shield

Roll-Top Anti-Glare



Other Options: Double-Handle

Contractor:
"Yes, the light was awesome ! It made a huge difference with the job and Safety. We truly appreciate your effort to help make it happen. I am hoping to place an order for the magnetic stand and make it even more versatile."

Contractor:
"The Brick lights worked well in our application and we are very satisfied with their performance. We will use them in the future for this job."

Please Note: Equipment specifications subject to change.

Cost Savings to Operate BRICK™

Conventional Fixtures:			Western Technology 9610 Brick LED:		
Fixture Type:	Watts:	Lamp Life (hrs):	Watts:	LED Life (hrs):	LED Energy Savings:
250W Metal Halide/ Mercury Vapor	289	20,000	68	60,000	76%
400W Metal Halide/ Mercury Vapor	450	20,000	68	60,000	85%
54W 4 Lamp T5HO Fluorescent	250	30,000	68	60,000	73%

Fixture Type:	LED Energy Savings:	Re-Lamp & Maint. Savings:	LED kWh Saved:
250W Metal Halide/ Mercury Vapor	$193	$560	1,929
400W Metal Halide/ Mercury Vapor	$334	$560	3,334
54W 4 Lamp T5HO Fluorescent	$341	$277	3,405

Fixture Type:	CO_2 Savings (lbs):	LED kWh Saved:	Mercury Reduced:
250W Metal Halide/ Mercury Vapor	3,307	1,929	27 mg
400W Metal Halide/ Mercury Vapor	5,719	3,334	35 mg
54W 4 Lamp T5HO Fluorescent	5,839	3,405	18 mg

Assuming $0.10 per kWh, $75 labor rate, operating 24 hrs/day

Please Note: Equipment specifications subject to change.

BRICKETTE™

Overview

Feature	The BRICKETTE™
Approved for Hazardous Locations:	*To Be Approved For:* - Class I, Div. 1 & 2, Groups C, D, & E - Class II, Div. 1 & 2, Groups E, F, & G - CSA Zones 1 & 2; Zones 20, 21, & 22
Approved for Wet Location Usage:	Yes
Temperature Rating:	T5/T4
LED Color:	~ 6000ºK CRI >70
Rated with Optics:	26,000 Lux at 1' >2,500 Lumens
Reflective Optic Beam Angle:	60º
Light Head Power:	21VDC, 800mA
Bumper Protection:	Yes
Secondary Lens Options:	- Safety & Anti-Glare Shields - Light Filters - Light Diffusers
Variable Magnetic and Fixed Mounting Options:	Yes (*see page 19*)
Weight:	2.8 lbs
Dimensions:	6"L x 2.9"W x 2.3"H

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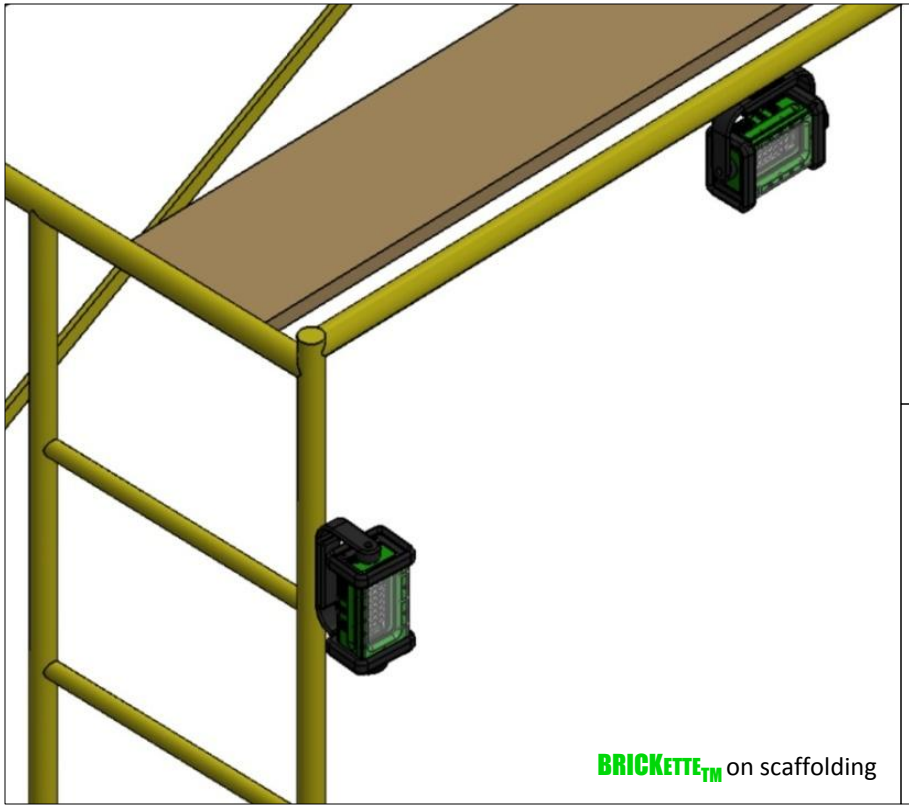
Please Note: Equipment specifications subject to change.

Options



BRICKETTE™ on scaffolding

BRICKETTE™ on tripod with knuckle

Two BRICKETTES™ with one conversion box

Please Note: Equipment specifications subject to change.

BRICK™ TO BRICKETTE™

Comparison

Please Note: Equipment specifications subject to change.

VARIABLE LIGHT CONTROL

Western Technology Lights are offered with *Variable Light Control* to facilitate adjustment for optimum field usage conditions.

Options include:

- **Variable Light Intensity** – tune from low to maximum light output
- **Variable Light Color** – tune from low Kelvin temperature (e.g. 4000ºK) to high Kelvin temperature (e.g. 7000ºK)
- **Variable Spectral Emission** – switch between visible, infrared, or ultraviolet light output
- **Blended Spectral Emissions** – adjust spectral emission for specific utility, such as usage in different atmospheres or illumination of varying substrate color

Please Note: Equipment specifications subject to change.

Feature	The STRIKER™
Approved for Hazardous Locations:	- Class I, Div. 1 & 2, Groups C, D, & E - Class II, Div. 1 & 2, Groups E, F, & G - CSA Zones 1 & 2; Zones 20, 21, & 22
Suitable for Wet Location Usage:	Yes
Temperature Rating:	T5 in -40°C to +40°C T4 in -40°C to +100°C
LED Color:	~ 6000ºK CRI >70
Standard (Rated with Optics):	50º collimating (refractive) optic measuring: - 69,000 Lux at 1 foot - >2,100 Lumens
Optional Reflective Optic:	30º, 45º, 60º
Light Head Power:	21VDC, 800mA (Model 8100A & 8100C) 120VAC (Model B)
Bumper Protection:	Yes
Secondary Lens Options:	- Blast Lens - Safety & Anti-Glare Shields - Light Filters & Diffusers
Variable Mounting Options:	Yes (Mechanical mount with hook, high or low stanchions)
Weight (Light Head Only):	Less than 3 lbs (*Short Handle*) Less than 4 lbs (*Long Handle*)
Dimensions:	8.5”L x 3”D (*Short Handle*) 13.5”L x 3”D (*Long Handle*)

Please Note: Equipment specifications subject to change.

STRIKER™

Long Handle

Short Handle (shown with optional diffuser)

Proudly made in the USA

Feature	The SPOTTER™
Run Time:	2 Hours
Rated with Optics:	220 Lumens
Projection Distance:	300m
Battery Charger:	Comes with both AC/DC Charger
Battery Type:	4.8V – 700mAh Ni-CD Rechargable Battery (*one battery included*)
Light Body:	Aircraft Grade Anodized Aluminum, Weather Resistant
Lens:	Polycarbonate (*Extremely Durable*)
Optional Accessories:	Belt-Mounted Holster
Additional Features:	- Push Button On/Off - Screw Locking Port Cover (*Protects Rechargeable Port*)

Shown with optional holster

Distributor:
"I wanted to thank you so much for coming down and helping (us) present your great product line. I have not seen a product so full of features and benefits in a very long time. I have at least 9 quotes out…and have been given orders all ready for 20 rechargeable flashlights. I am sure I will have some orders for some Bricks with in days. What a pleasure you were to work with, again thank you very much."

Please Note: Equipment specifications subject to change.

Feature	The INSPECTOR™
Compliant for Hazardous Locations:	- Class I, Div. 1 & 2; - Class II, Div. 1 & 2 - Groups A-F (*all gases & dust, except grain*)
Temperature Rating:	T4A
Color:	HID 20W Metal Halide
Rated with Optics:	1,200 Lumens
Reflective Optic Beam Angle:	12º
Projection Distance:	2,500’
Battery Charger Power:	Comes with AC Charger
LED Indicator Power:	12/24 VDC
Bumper Protection:	No
Optional Accessories:	- Black Light UVA Lens (*can be used for NDT/NDI inspections using the UVA lens*) - DC Charger
Light Body:	Hard Anodized Aircraft-Grade Aluminum
Additional Features:	- Push Button On/Off - High-Intensity - Rechargeable

Please Note: Equipment specifications subject to change.

GEN2™ BLAST / UTILITY LIGHT

Feature	GEN2™ BLAST / UTILITY LIGHT
Wet Location Usage:	Can be used safely for water washing / hydro-blasting
LED Color:	~ 6000ºK CRI >70
Rated with Optics:	>40,000 Lux at 1' >700 Lumens
Refractive Optic Design (with collimating focus) Beam Angle:	25º
Weight:	2.3 lbs
Light Head Power:	21VDC, 500mA
Variable Mounting Options:	- Blast Hose - Hand-Held - Hook
Light Body:	All Polyurethane and Delrin Construction (*for extreme durability and light weight*)
Additional Features:	- Replaceable Blast Lens - Option to power directly from 12VDC source

Contractor:
"I am currently using multiple 3400LED series blast lights I've had about two years… they are the finest lights I have used in over twenty years in the business!"

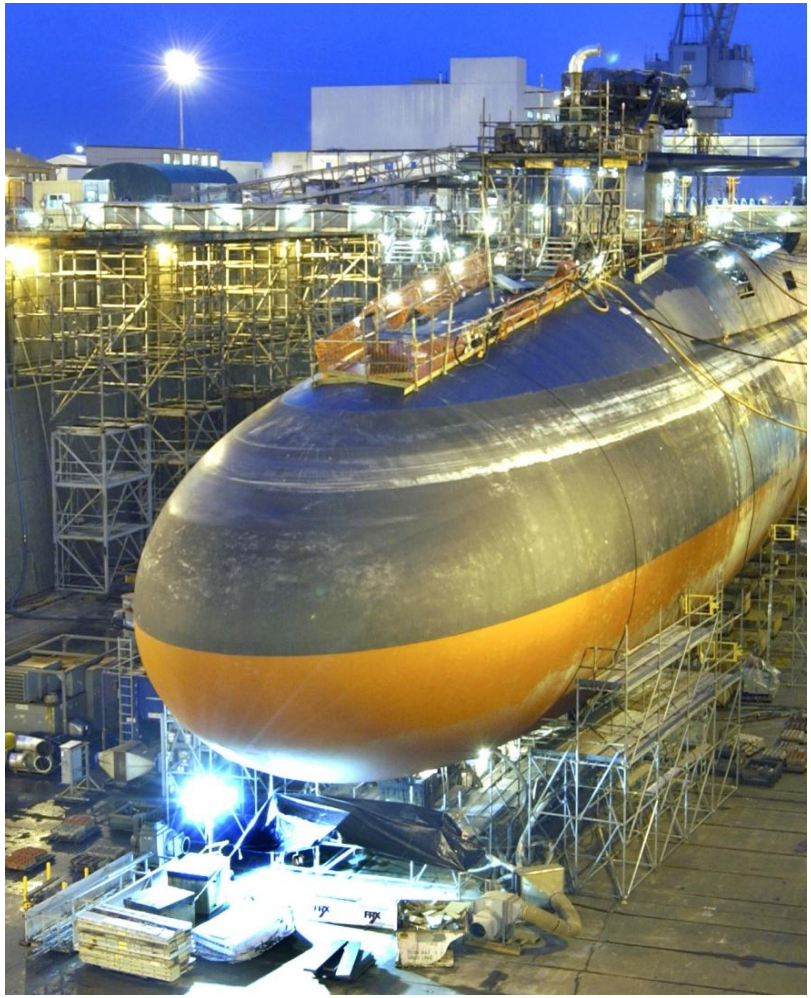
Proudly made in the USA

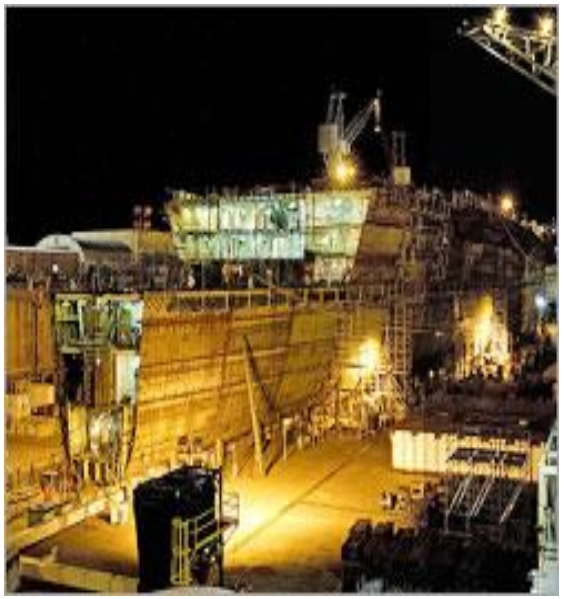
Please Note: Equipment specifications subject to change.

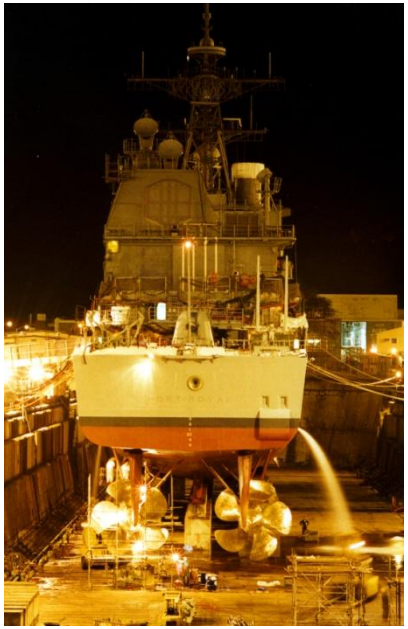
PHOTO GALLERY

SECTION THREE

MARINE

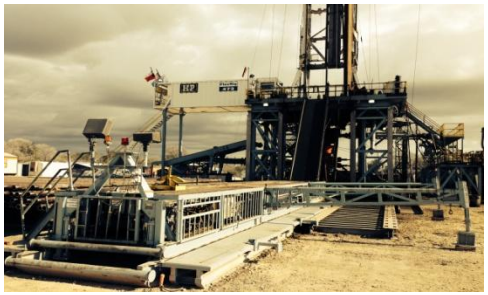






OIL RIGS

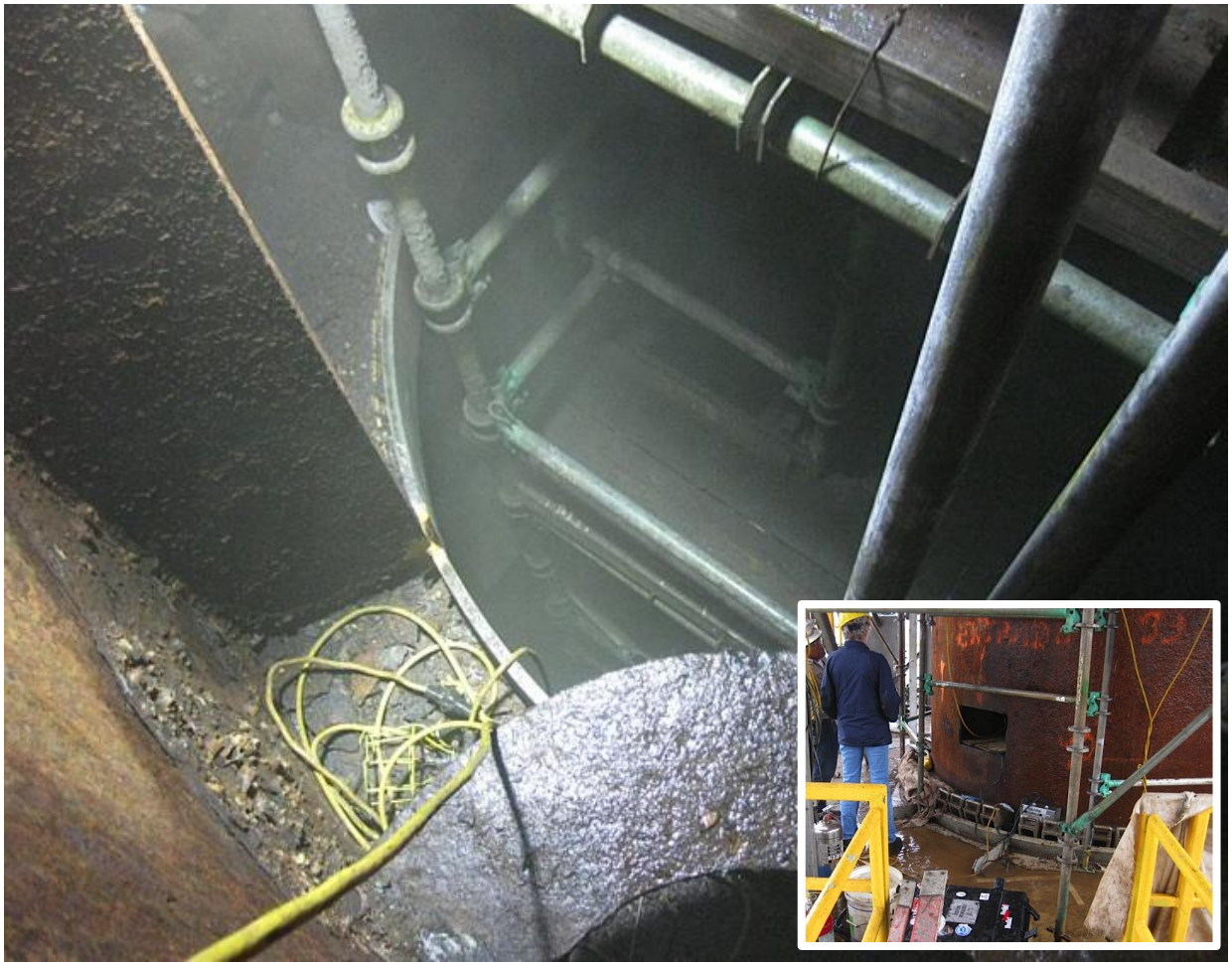
Exploration, Production, and Maintenance



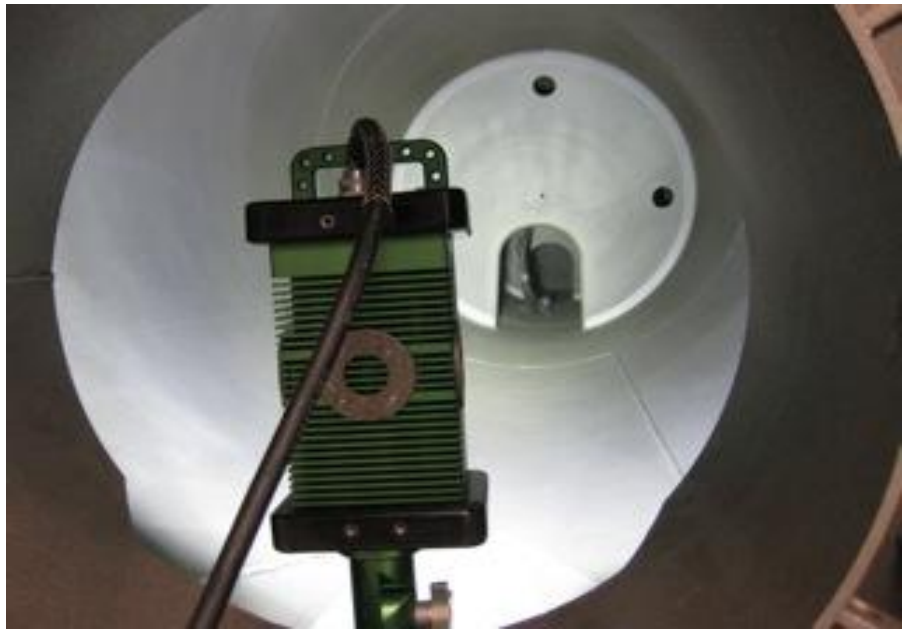
OFFSHORE DRILLING RIGS

Maintenance

BRICK™ Illuminating Interior of Enclosure

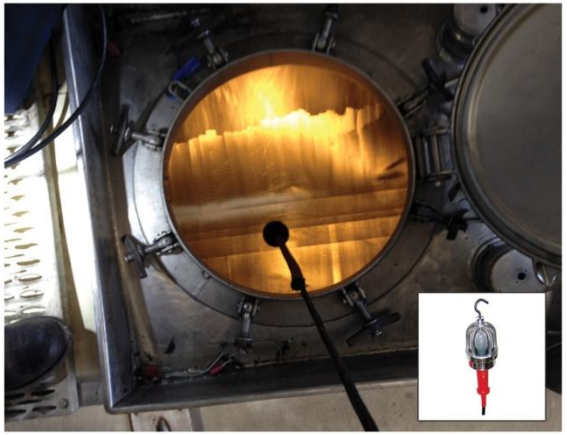


TRAILERS USED IN OIL DRILLING / FRACKING



RAIL TANK CAR & CHEMICAL TANK CLEANING

High-Pressure Washing & Inspection



REFINERIES

Maintenance

Refinery Customer:
"…We utilized the 9610C - Explosion Proof LED Lighthead (The Brick). I have included some pictures…from inside our Hot Lime Softener & Line Cleaning, Flare Knockout Drum & Flowsplitter. We had excellent feedback on the Brick Light, everyone who used it was very impressed with the illumination & portability. We are going to use them again in the upcoming Plant Shutdown May 2014. Stay tuned for more feedback!!"

BRICK™ Inside Flow Splitter

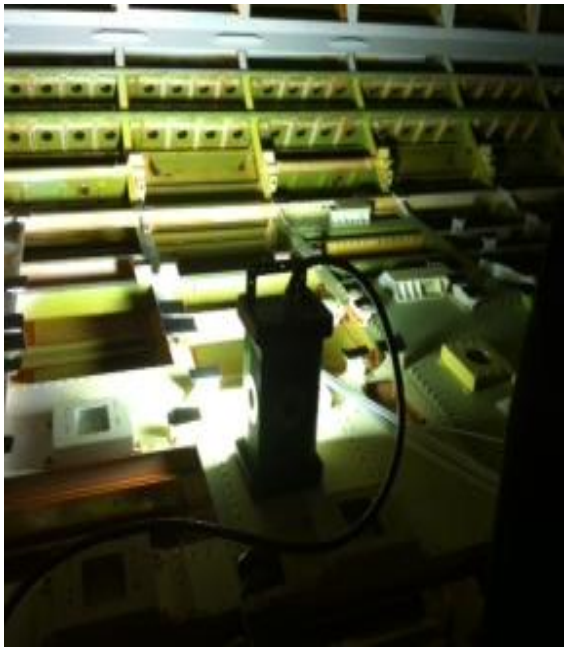
BRICK™ Lighting Hot Lime Softener & Line

ELECTRIC POWER PLANTS

LIVE GAS SITUATIONS

BRICK™
Knuckle Mounted To Backhoe

AVIATION



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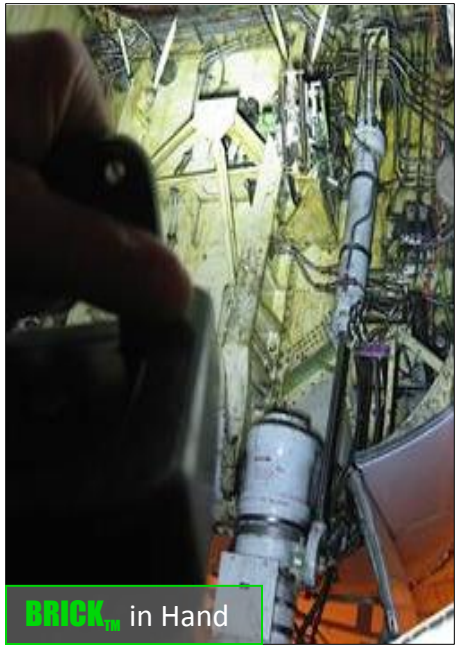
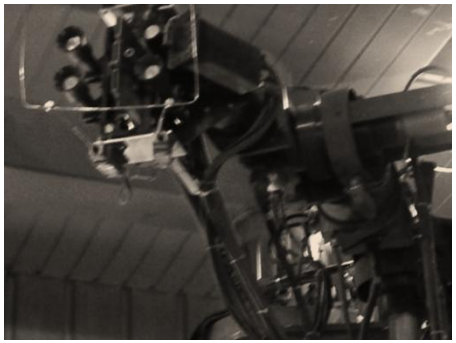
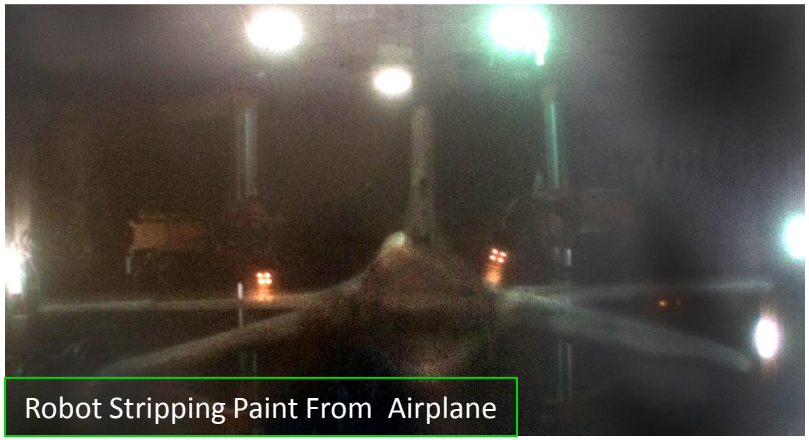


BRICK™ in Hand





Robot Stripping Paint From Airplane

NASA - Sophia

AREA LIGHT

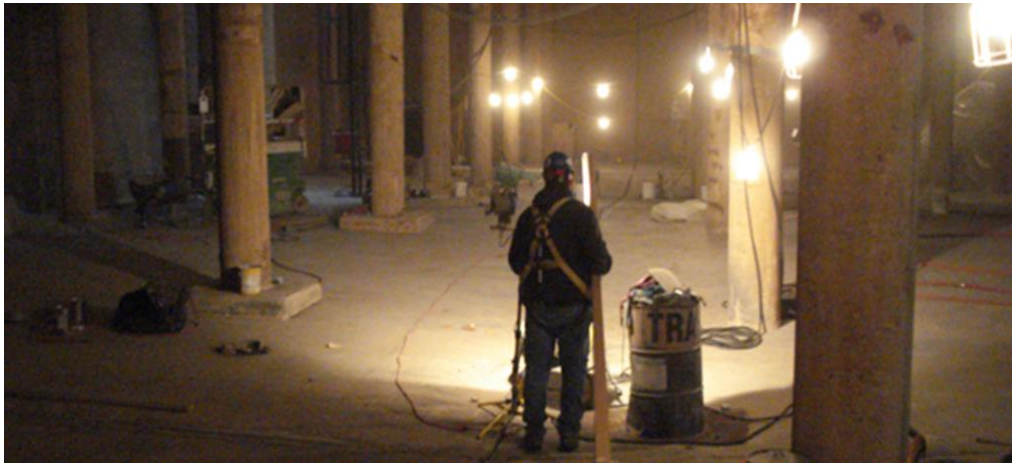
Illumination of Mill at 200 ft.

Before – **BRICK**™ turned off

After – **BRICK**™ turned on

CONTAINMENT

CONTRACTORS



FIRST RESPONDERS

HAZMAT / Arson Investigation

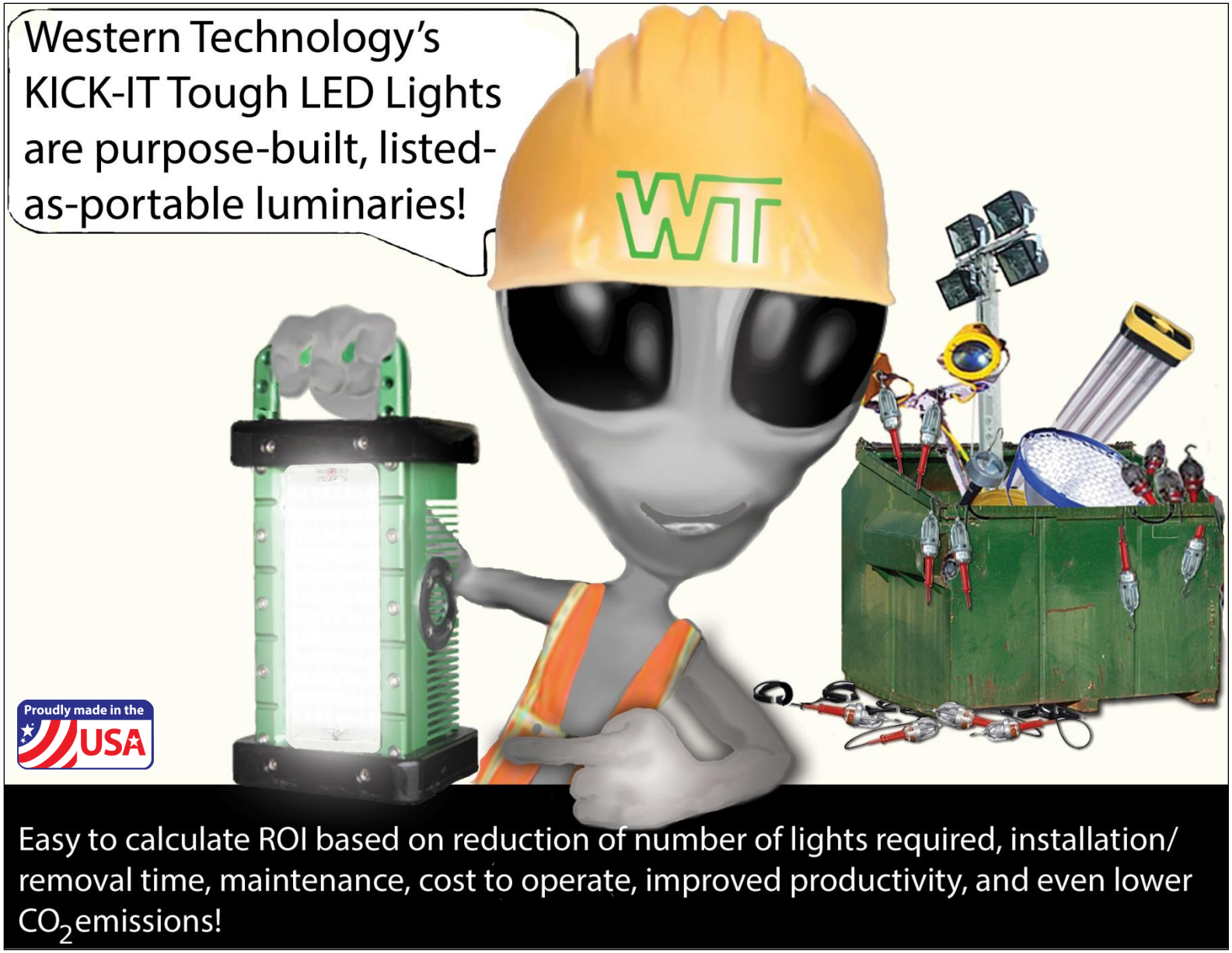
BRICK™ Lighting Arson Investigation Scene

REFINERY CUSTOMERS

This is a partial list of customers who have purchased Western Technology product(s). The product(s) was purchased by a department, division, or group within the larger organization. The use of a logo does not constitute endorsement of any kind by these organizations. Logo use is simply to visually list names of companies or organizations that have chosen Western Technology products as lighting solutions.

GAS CUSTOMERS

This is a partial list of customers who have purchased Western Technology product(s). The product(s) was purchased by a department, division, or group within the larger organization. The use of a logo does not constitute endorsement of any kind by these organizations. Logo use is simply to visually list names of companies or organizations that have chosen Western Technology products as lighting solutions.


Western Technology's KICK-IT Tough LED Lights are purpose-built, listed-as-portable luminaries!
WT
Proudly made in the USA
Easy to calculate ROI based on reduction of number of lights required, installation/ removal time, maintenance, cost to operate, improved productivity, and even lower CO_2 emissions!