



divVALI

LED LIGHTING & DESIGN

Plug-and-play **74VDC PAR56** Headlight/Ditchlight. All-in-one single SKU unit also works with existing flasher, oscillating control boxes. Custom versions available that work on **24V**, **32V**, and **110V** electrical systems.



A NEW GENERATION OF SUPERIOR LIGHTING

DIVVALI LED HEADLIGHTS
PAR56

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LOCOMOTIVE LED HEADLIGHT & DITCHLIGHT

With millions of LED locomotive lamps in service, Divvali is the world leader in this specialized market. We are proud to introduce a revolutionary product that will benefit many departments within the railroad while producing a return on investment of 6 months to 1 year.

- Crews will see better
- Operations - will have far less failures and service interruptions
- Safety - will eliminate cut and burn injuries
- Mechanical - will have far fewer headlight burn outs and locomotive batteries to replace
- Procurement - will save on fuel while reducing their total cost of ownership

Save time and money while improving your rail operations today and make the switch to the Divvali PAR56 LED headlight.

November 2020, the AAR has implemented S-5516, the new standard for LED headlights and auxiliary lights for locomotives that work on interchange in North America

DIRECT QUOTE FROM AAR FIELD TEST ON LED HEADLIGHTS FOR FREIGHT LOCOMOTIVES – MAY 2018

“Compared to halogen samples, all LED samples seem to exhibit a more “targeted” and uniform spread of illumination along the tracks. Halogen samples exhibit, in contrast, a wider spread of illuminance coverage away from the centerline of the locomotive, similar to the illumination produced by floodlights. The LED sample with the closest behavior to a floodlight was shown by the Divvali lamps, but in a more uniform and controlled fashion.”

FEATURES / SPECIFICATIONS

DIV-PAR56-75V-3000KW



WORKS WITH 3RD PARTY CONTROLLER BOXES



ALL-IN-ONE LOCOMOTIVE LED HEADLIGHT / DITCH / AUXILIARY LAMP

MEETS: AAR STANDARD S-5516 (2020),
FRA 49 CFR 229.125

Benefits:

- Lowers maintenance, fuel, battery, warehousing and labor expenses
- Reduces parasitic load by 85.7%
- Eliminates cut and burn injuries while staying warm enough to melt snow and ice
- Dramatically improves lighting for your crews
- Realizes enormous fuel savings

Features:

- PATENTED forward sitting housing design deflects snow from building up
- Similar color (3000K) to halogens with superior beam and 15X the life
- Works in both headlight and ditch light locations
- No tethering (like the competition) simplifies installation and maintenance
- Patented heat sink provides the longest run time on the market
- Reverse polarity protected

Specifications:

Volts	74vdc
Watts	High: 50 / Low: 8
Waterproof Ratings	IP66
Color Temp.	3000K (Warm as per S-5516) Also available in 5000K (Cool)
Housing Material	Cast Alluminum
Lens Material	Tempered Glass
Lifespan	60,000 hours
FRA	Aproved
AAR	Aproved
Warranty	3 year
Shock and Vibration Certified to AAR Standard S-5702 "Railroad electronics environmental requirements" for Vehicle Exterior Body Mounted" equipment	



Safety / Reliability:

Our PAR 56 Smart Lamp will strobe for 5 minutes upon power up, if and when the lamp determines that it is operating below regulatory requirements of 200,000 candela for luminance. This provides a visual indication of failure and required maintenance. Additionally, this allows for continuation of the current mission.

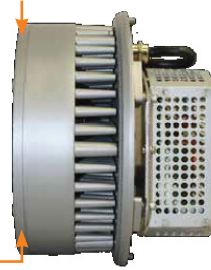


* Custom voltages available

ANATOMY OF THE PERFECT PAR56 LED

1

Pull the heat source as far forward as possible. This has several benefits:
a) Cooler operation = longer LED & driver life
b) Deflects snow and ice from building up. This design is better than recessed or flush LED and halogen designs which jeopardize performance by allowing snow to compact and accumulate more easily.



2

Tempered glass face enhances wind deflection and greatly reduces potential snow and debris build-up.

3

Utilize military grade LEDs that can operate far above boiling temps (212F) and underdrive them to extend longevity to 60,000 hrs.

4

Unique, proprietary lensing that most closely mimics halogens- yet delivers more uniform and usable light to engineers and conductors.



5

External fanless cooling (patented) keeps the LED and driver cool.

6

Keep the driver away from the heat and make it replaceable to extend usable life of LEDs and improve value even further.

7

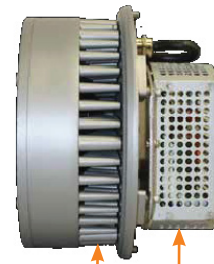
Going beyond the requirements- the Divvali PAR56 LED passes AAR standard S-5702 (shock & vibration).

8

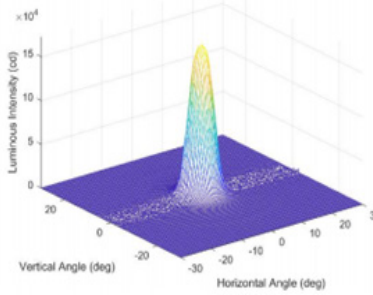
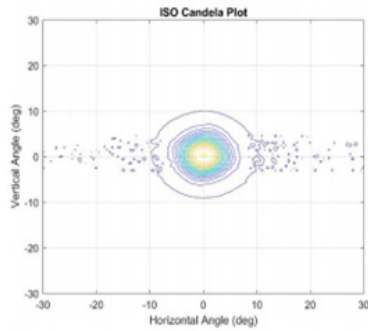
Return on Investment (ROI) of 6 months to 1 year.

9

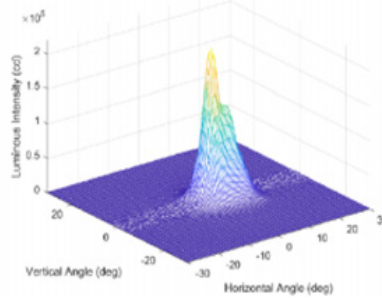
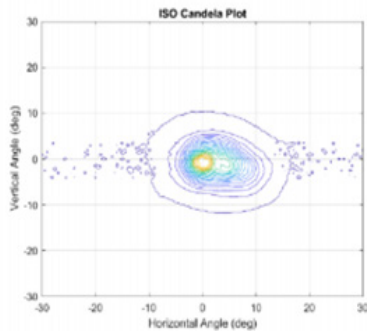
3 year warranty .



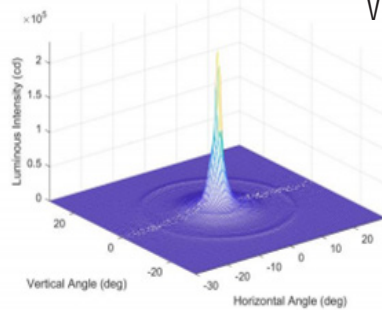
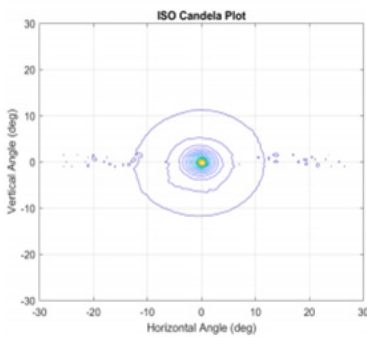
LIGHT PATTERN COMPARISON



DIVALI LED BEAM PATTERN -
"FLOODS THE AREA IN A UNIFORM AND
CONTROLLED FASHION."
-AAR FIELD TEST



HALOGEN BEAM PATTERN -
UNEVEN WITH HOT SPOTS



LED COMPETITOR - COMPLIANT BUT
VERY THIN BEAM PATTERN / DOES NOT
FLOOD THE AREA

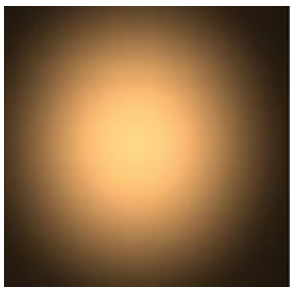
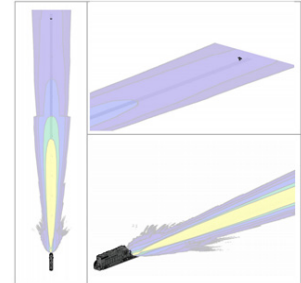
Divali PAR56 warm LED Headlight outperforms halogens by providing consistent, uniform, and controlled illumination along the tracks.

GENERAL BEAM APPEARANCE TO THE EYE AND IN THE FIELD



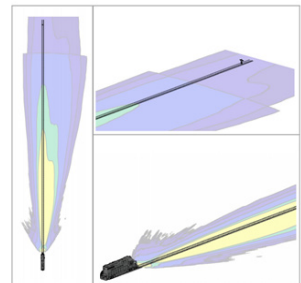
DIVVALI PAR 56 LED HEADLIGHT

- Better targeted and uniform spread of illumination for the operators forward view.
- Divvali's solid-state PAR56 lamps do not suffer unpredictable beam pattern changes unlike their halogen counterparts.
- Performs better melting snow than Halogen lamp but does not heat up enough to burn workers if touched.
- Produces the closest light pattern and color to halogens while increasing visibility for crews.



VARIOUS HALOGEN PAR56 LAMP EXAMPLES IN SERVICE TODAY

- Halogen lamps have less targeted, non-uniform beam spread compared to the Divvali LED PAR56 (as shown in the snapshots to the right).
- Manufacturing inconsistencies of halogen lamps as well as shock and vibration degradation of their internal structure can produce off-center light output and hotspots (like the field example to the right).
- Halogen lamps operate at over 284°F/ 140°C and are an EXTREME BURN HAZARD.



“The LED sample with the closest behavior to a floodlight was shown by Divvali lamps, but in a more uniform and controlled fashion.”

****Pictures above from DOT/FRA Final Report Map 2018***

EXECUTIVE SUMMARY



Our lamp illuminates the track and surroundings in a superior way to halogen and other LED options, giving clear and smooth light across the required area, more distance perception, all without hotspots in the field of view for the engineer or conductor.



Works as an AUXILIARY/ DITCHLIGHT and flashes when needed / works with ditch light control boxes.



Patented forward sitting housing design maximizes benefits in the blazing heat of summer or in snowy winters. In the summer, the heat is properly managed by utilizing cooling heat sink fins directly behind the LEDs. In snowy winters, the flat forward sitting facia deflects snow and ice better than recessed or flush LEDs and halogens. These designs by contrast, jeopardize performance by allowing snow and ice to compact and accumulate far more easily.



Some LED lamps are compliant, but give a very thin beam and less illumination than traditional halogens.



THE SCIENCE / THE SAVINGS

THE SCIENCE

The way in which a locomotive engine converts diesel fuel into electrical power. (Provided by a Class I Railway Electrical Engineer). One liter of #2 diesel fuel has a total energy content of 9 kwh, and that "9" needs to be modified by the efficiency of the diesel-alternator set to get liters per kwh of electricity.

1 liter per kwh for locomotive auxiliary power would be accurate using the generally accepted rule of thumb of conversion at approximately 11% efficiency. Therefore: 1 liter of diesel fuel = 1 kilowatt hour of locomotive auxiliary electrical power or 0.2641 US gallons.

THE SAVINGS

Energy / Diesel fuel savings per **LED headlight** based on 10 hours per day use 365 days per year:

Each 50 watt LED headlight that replaces a 350 watt halogen headlight reduces power consumption by 300 watts. Each headlight used 10 hours per day saves 1095 kilowatt hours of energy per year. On a diesel locomotive, this translates into approximately 289 gallons or 1095 liters of diesel fuel per year.

At 10 hours runtime per day over each 24-hour period, the **ROI / return on investment on our lamps is under 6 months**. Longer runtime per day will speed up the ROI proportionately. We base our ROI using a diesel fuel price of \$3.03 per US gallon or \$0.80 USD per liter.

\$875.76 USD annual FUEL savings per DIVVALI PAR56 LED HEADLIGHT in use.

\$5,254.02 USD annual FUEL savings per LOCOMOTIVE (assuming 6 lamps per locomotive).

\$15,768.00 USD in FUEL savings over the 3-year warranty.

Please Note - significant additional savings on locomotive battery and halogen bulb maintenance, purchasing and warehousing are realized but not quantified in the calculations above.

DIV-PAR46-2R-LED Marker & DIV-PAR46 Locomotive Headlight LED's

DIV-PAR46-2R-LED RED LOCOMOTIVE LED MARKER LIGHT



Features:

- Our LED replacement uses 4.8W opposed to 60W
- This is a replacement for the typical PAR60/2R



Specifications:

Primary Application	Train, Locomotive
Volts	10-85VDC
Watts	4.8W
Measurements	Typical PAR46 measurements
LED Quantity	72
Base	Screw Terminal
Warranty	3 years

MEETS CFR49 PART221
APPROVED AUGUST 26, 2020

DIV-PAR46 LOCOMOTIVE LED HEADLIGHT



MOUNTING PLATE CAN BE MADE IN ANY SIZE/SHAPE,
TO FIT OR REPLACE EXISTING FIXTURES



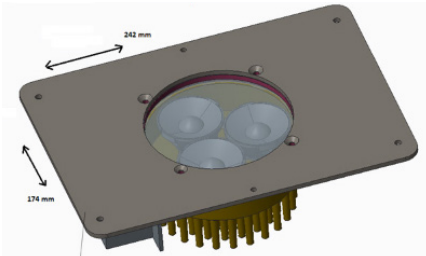
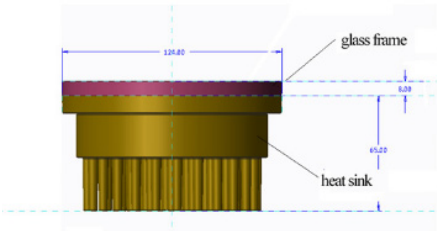
Specifications:

External Driver Required	Yes - Included
Materials	Aluminum / Plate Glass
Lighting Angles	EU compliant
Rated Life	50,000+ hours
Measurements	Ø124 x 73mm (bulb)

Power Configurations:

Power Consumption	15W
LED Configuration	3 LED
Chip Manufacturer	
Colour / Brightness*	60,000 Candela

*OTHER COLOURS AND CUSTOMISATIONS AVAILABLE



DIV-UG-6W-75VD UNIVERSAL GLOBE LOCOMOTIVE LED

Features:

- Indoors / Cabin
- Smaller profile
- Single SKU solution
- Outdoor Step and Ground light
- Number Boards
- IP67 rated - totally watertight
- EMI quiet/ does not cause radio disturbance
- Eliminates cut and burn injuries
- Anti-theft DC circuit (will not work on household power)



Specifications:

Operating Voltage	75VDC (or custom)
Lighting Angles	360-degree Axial
Color	Cool White
Materials	Aluminum / PVC
Brightness	570 lumens
Rated Life	50,000 hours
Operating Temp	-40° C - 70° C
Size D x L	55mm x 100mm
Power Consumption	6W
LED Configuration	SMD
Base	E27, BC22 and BA15D



DIV-3W-NB-75VDC LOCOMOTIVE NUMBER BOARD LED

Features:

- Screw-in & bayonet bases available
- EMI quiet / does not cause radio disturbance
- Eliminates cut and burn injuries
- Outdoor Step and Ground light
- Anti-theft DC circuit (will not work on household power)



Specifications:

Body	PCB, High Test Plastic, Metal base
Size L x D	96mm x 38mm
Volts	75VDC or custom voltages
Watts	3
Life Span	50,000 hours (70% brightness)
Brightness	270 lumens
Color Temp	Cool White
Base	E27/E26, BA15D, BC22
Circuit	Linear (no EMI)



DIV-MCC 3.2 WATT BAYONET LED REPLACEMENT FOR 30 WATT CAB LIGHT

Features:

- EMI quiet / does not cause radio disturbance
- Eliminates cut and burn injuries
- Anti-theft DC circuit (will not work on household power)



Specifications:

Body	Aluminum
Size L x D	55mm or 65mm x 25mm
Volts	75VDC or custom voltages
Watts	3.2
Life Span	50,000 hours (70% brightness)
Lumens	300
Lens	Acrylic
Reverse Polarity	Protected
Circuit	Linear (no EMI)
Base	BA15D



DIV-6V-GLED LOCOMOTIVE CONTROL STAND GAUGE LIGHT LED

Features:

- EMI quiet / does not cause radio disturbance
- Eliminates cut and burn injuries
- Anti-theft DC circuit (will not work on household power)



Specifications:

Body	BA BA9S, Copper- Nickel Plated
Size L x D	1 1/4" x 1/4"
Volts	DC 6.3V or custom voltages
Watts	0.4
Life Span	50,000 hours
Lumens	35
Lens	ABC Plastic
Base	BA9S
Color Temp	6000K-7000K
Base	BA15D





divvali

LED LIGHTING & DESIGN



Improve locomotive lighting and safety by replacing incandescent and halogen lamps with Divvali LEDs and save millions in fuel and maintenance. Several million of our LED lamps have been in service across North America, South America, Australia, Europe, Israel, and Northern Canadian markets. Proven field reliability for over 14 years.

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