HARBOR FREIGHT TOOLS
Quality Tools at Ridiculously Low Prices

Legal Department
26541 Agoura Road, Calabasas, CA 91302
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JLaForte@harborfreight.com

Via Electronic Mail

February 23, 2021

Administrator
United States Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE
Washington, DC 20590

Re: Inconsequentiality Petition for Recall 21E-010

To Whom It May Concern:

Harbor Freight Tools ("HFT") submits this petition for inconsequential noncompliance pursuant to the Vehicle Safety Act, 49 U.S.C. § 30118(d) and 49 U.S.C. § 30120(h), and the related regulations at 49 C.F.R. 556. HFT is a corporation headquartered in California and with its principal place of business at 26541 Agoura Road Calabasas, California 91302. HFT requests that the agency grant its petition exempting it from the notice and remedy requirements of the Vehicle Safety Act on the ground that the noncompliance described below is inconsequential to motor vehicle safety.

Background

On February 4, 2021, HFT determined that a particular production batch of the HaulMaster LED Trailer Light Kit, did not fully comply with certain photometry requirements of FMVSS 108. The noncompliance exists only in certain units where candela values for the turn signal lamp and stop lamp requirements were slightly above the maximum photometric intensity output parameter within one specific production batch.[1] In late 2018, NHTSA notified HFT that

[1] Because it is not possible to trace the individual noncompliant units within each production batch, HFT included the entire batch of products produced within the affected date range in the recall population. Not all units within each of the batches actually do not comply with the requirements of FMVSS 108. HFT also included the subsequent

the agency had commissioned Calcoast to conduct FMVSS 108 compliance testing. The testing was carried out on samples from a specific batch of the Haulmaster LED Trailer Light Kit which were all produced in calendar week 25 of 2017. The test reports indicate that the samples were tested for stabilization value at 30 minutes and 60 minutes and then a multiplier calculation was applied to achieve T=1 minute maximums, and T=10 minute calculations for the stop/ turn lamps. Calcoast's test findings were documented in two test reports dated December 20, 2018 and are included at Attachments 2 and 3.

HFT submits this petition on the basis that the noncompliance identified in the tested samples is inconsequential to motor vehicle safety in that the exceedance is minimal and would not even be perceptible to the human eye in nearly all circumstances. A spreadsheet indicating the overall photometry results for each of the tested samples is included at Attachment 8 and indicates that, except in two isolated points, the exceedance falls within the 25% threshold that NHTSA has previously indicated as the point at which the human eye can detect a difference in photometric output. In the two isolated points, the results were all under 29% of the Standard maximum. In all cases, the apparent test deviations affect only the absolute maximums within the beam patterns at single test points on the lamp. All other angles within the beam pattern have a photometric value that falls within the FMVSS 108 provisions.[2]

HFT and the factory had conducted confirmatory compliance testing at various intervals – before the lamps were sourced from the supplier and random samples were taken from the factory and HFT's distribution centers for evaluation during the production phase, and through accredited U.S. test labs prior to import, and at various stages in the production cycle, with comprehensive compliance testing across the array of FMVSS 108 requirements, included at Attachments 4, 5, 6 and 7. These tests were carried out by Calcoast and Intertek, both reputable third-party facilities based in the United States. NHTSA has previously been provided copies of these test reports and all of HFT's prior testing of this Haulmaster product have concluded that the products well exceeded the minimum photometric and other applicable FMVSS 108 requirements. HFT's testing included batches before and after this production week and didn't find any anomalies. HFT is not aware of any reports from consumers that have taken issue with the Haulmaster lamps being overly bright. HFT submitted a Noncompliance Information Report on February 12, 2021. *See NHTSA Recall 21E-010, at Attachment 1*.

calendar week of shipment in the recall population to ensure that, if customer notification is required, parts that were produced in the affected calendar week, but later shipped would also be addressed.

[2] HFT understands that there is not currently a provision within FMVSS 108 that specifies how LED lamps, like the Haulmaster lamps, should be tested for purposes of evaluating compliance with the photometric requirements. The test reports indicate that the samples were tested for stabilization value at 30 minutes and 60 minutes and then a multiplier calculation was applied to achieve T=1 minute maximums, and T=10 minute calculations for the stop/ turn lamps, but it is unclear where in FMVSS 108 this test procedure appears.

Analysis

Manufacturers may be exempted from the notification and remedy provisions of the Safety Act if NHTSA determines that the noncompliance is inconsequential to motor vehicle safety. *See 49 U.S.C. §§ 30118(d), 30120(h).* The basis upon which NHTSA evaluates an inconsequentiality petition is "whether the occupant who is affected by the noncompliance is likely to be exposed to a significantly greater risk than an occupant in a compliant vehicle." *See 69 Fed. Reg. 19897, 19900 (April 14, 2004*). This matter is appropriate for a decision that the noncompliance is inconsequential to motor vehicle safety as it does not present any increased risk to vehicle occupants.

While some of the trailer light kits at issue in this petition do not fully comply with certain maximum photometric requirements of FMVSS 108 for stop and rear turn signal lamps, they deviate only by small margins at the maximum value within the beam pattern and not by a degree that is sufficient enough to be noticeable to other road users or create an increased safety risk.

The trailer light kits are combination lamps with turn signal, stop lamp and tail lamp functions and that use a light emitting diode (LED) as their light source. The minimum and maximum photometry values for these functions are set out at FMVSS 108, Table VII and Table IX. In certain individual units, portions of the LEDs used in a specific production batch have candela values that were slightly above the luminous intensity output provided for in FMVSS 108. The deviation from the photometry requirements is slight and all but two instances fall within 25% of the required output. Thus, the actual performance of HFT's lamps compared to compliant lamps would not be perceptible to the human eye and therefore would not create an enhanced risk to safety.

HFT's Haulmaster LED Trailer Light Kit,[3] consists of a pair of replacement trailer lamps to be used on trailers less than 80 inches in overall width. In this case, a total of eight tests were conducted twice on eight samples from the same production batch produced in calendar week 25 of 2017. The test reports indicate that the samples were tested for NHTSA, once in October 2018 for a stabilization value at 30 minutes with 3% change in 15 minutes, and again in December 2018 for a stabilization value at 60 minutes with 1% change in 5 minutes. A multiplier calculation was applied to achieve T=1 minute maximums, and T=10 minute values. In each test case, on both testing dates, all 19 points tested passed, and all 5 zones tested passed, with the only issues found just slightly above the beam pattern requirements. In the December 2018 re-test, 3 out of 8 units passed all elements of the testing and were found to be fully compliant. The reports show that only the maximum candela values within the beam pattern were not met in certain instances; and that the lamps met the luminosity requirements for minimums and

[3] HFT no longer offers for sale the Haulmaster light kits at issue and stopped sourcing from the particular supplier, for reasons unrelated to this petition, in 2017.

maximums for each of the specific test points, and all testing zones, meeting all other requirements of FMVSS 108 to which they were tested.

HFT's Position

Historically, NHTSA has granted inconsequentiality petitions when the noncompliance is imperceptible or nearly imperceptible to vehicle occupants or surrounding traffic. When the photometric intensity level is within 25% above or below the boundary limit, the difference in the light being emitted is typically not perceptible to other drivers. This objective metric has been applied to various types of lighting sources, including turn signal lighting. *See Huey, R., Dekker, D. and Lyons, R. (1994); Driver perception of just-noticeable differences of automotive signal lamp intensities (Report No. DOT HS 808 209).* NHTSA has also applied this reasoning to non-compliances with particular zones, not just individual test points, as is the case with the Haulmaster lamps. *See Grant of Petition of General Motors, 61 Fed. Reg. 1663 (January 22, 1996).* In all but two of the samples described above, the deviation is within 25% of the required values. The plot diagram at Attachment 8 provides a visual depiction of the relationship between the two outlier values to the 420 cd maximum for the value within the beam pattern test results for the trailer light kits tested by Calcoast.

An alternative basis on which to grant the petition is the universal compliance with the photometric requirements in the test points and zones for every lamp Calcoast tested. HFT and its fabricating manufacturer previously conducted confirmatory compliance testing at various intervals before the lamps were sourced from the supplier and during production, through accredited U.S. test labs prior to import. The lamps were tested for compliance across the array of FMVSS 108 requirements. *See reports at Attachments 4, 5, 6 and 7.* These tests were carried out by Calcoast and Intertek, both reputable third-party facilities based in the United States. The reports demonstrate that the same Haulmaster product meet all of the FMVSS 108 requirements to which they were tested. HFT's testing included batches before and after this production week and did not find any test anomalies.

For the trailer light kits, there is no increased risk of glare to oncoming motorists because the photometric exceedances are minimal and in most cases, below the threshold metric of 25% so that the differences are not perceptible to other drivers. *See Grant of Petition of Hella, Inc., 55 Fed. Reg. 37601 (September 21, 1990)* (granting petition where taillamps exceeded the maximum candlepower upwards of 20% at certain test points and did not meet the 25% change in value to be perceived by the human eye).

Separately, NHTSA has recognized the inherent challenges to manufacture all lamps so that each and every test point within the lamp meets the minimum criteria. That is the case here. When HFT commissioned Calcoast to review and confirm the performance of these lighting products, every test passed. This indicates that the LED lamps were in fact designed to comply with FMVSS 108 and that the results of the monitoring testing indicate an isolated number of

random failures in one batch, not a systemic lapse in production processes. *See 83 Fed. Reg. 51766, 51876* ("On a number of occasions since [the implementation of FMVSS 108], NHTSA has stated that it will not consider a lamp to be noncompliant if its failure to meet a test point is random and occasional. Thus, historically, there has never been an absolute requirement that every motor vehicle lighting device meet every single photometric test point to comply with Standard No. 108").

Finally, HFT has reviewed its systems and has not received any reports or complaints about the levels of brightness for these trailer lighting kits. The lack of reports or indications that the subject trailer lights are either too bright or too dim supports the conclusion that the condition is undetectable to road users such as drivers following a vehicle equipped with either of the lighting products.

Conclusion

Based on the above, the data demonstrates that there is no greater risk presented to an occupant or to following traffic that is exposed to the noncompliant trailer light under these circumstances than to a set of lamps that meets all of the photometric criteria. With the consideration of the above information, Harbor Freight Tools requests that that the agency exempt it from the notification and remedy provisions under the Safety Act.

Sincerely,

Jonathan LaForte
Automotive Compliance Manager
Harbor Freight Tools

safercar.gov
U.S. Department of Transportation

Harbor Freight Tools

Equipment Report

NHTSA ID: 21E010 Transaction ID: 21-0011621-25577-10 (Original Report)

Required fields indicated with *

Manufacturer: Harbor Freight Tools

26541 Agoura Road
Calabasas CA 91302

Jonathan LaForte Automotive Compliance Manager
818 307 0005,

This is a Noncompliance Report. Filing a petition pursuant to 49 CFR 556

Equipment Information

HaulMaster LED Trailer Light Kit 62488

* **Brand/Trade:** HaulMaster
* **Model:** LED Trailer Light Kit

Production Dates Begin: 06/18/2017
End: 06/24/2017

* **Part No.:** 62488
Size: 12 Volt

Function:
Trailer lamps,

Descriptive Information:
In certain 12v LED Trailer Light Kits manufactured by Changzhou Nanxiashu Tool Company, the light emitting diodes (LEDs) used in a specific production batch of the lamps had candela values within the beam pattern that were slightly above the maximum photometric intensity output provided for in FMVSS 108. Other units in these and other production batches tested at an accredited third party U.S. laboratory met all requirements of FMVSS 108 to which they were tested. The 573 report and the Petition for Inconsequentiality Determination cover the entire production batch where the minor deviations were found, even though it is not apparent that all units in the single c/w 25 batch are affected by the noncompliance. Also, HFT would also include in the number of potentially involved units additional units produced in c/w 25 that may have been shipped in c/w 26 to ensure that all units produced in c/w 25 would be captured in the recall.

Number potentially involved: 10944 **Estimated percentage of involved with defect:** 62%

Defect / Noncompliance Description

For this Defect/Noncompliance:

* **Describe the defect or noncompliance:**
For certain units, the light emitting diodes (LEDs) used in a specific batch of the lamps were slightly higher within the beam pattern than the maximum levels of brightness required by FMVSS 108.

If a noncompliance, provide the applicable FMVSS:
108 - Lamps, reflective devices, and assoc. Equipment

If applicable, provide any further FMVSS affected:

Describe the cause:

* **Describe the safety risk:**
None. Despite the slight variation in candela absolute maximum values for LED lamps in specific production batches, there is no adverse effect on a driver following a trailer. HFT intends to submit an inconsequentiality petition.

Identify any warning which can precede or occur:
No warning can precede or occur.

This Recall affects all vehicles.

If applicable, identify the manufacturer of the defective or noncompliant component. If the manufacturer of the component is unknown, provide the information for the company that supplied the subject component.

Component manufacturer

Company Information

Company Name: Changzhou Nanxiashu Tool Company
Country: China
Address 1: Fengshuqiao, South Suburb of Changzhou
Address 2:
City: Wujin City
State: FOREIGN STATES
Zip/Postal Code: 213166

Company Contact Information

First Name: Company no longer in business
Last Name:
Position:
Email:
Phone:

Involved Components

If the defect or noncompliance involves a specific component(s), identify that component(s) below.

Purchaser Information

Chronology of Defect / Noncompliance Determination

Provide the chronology of events leading up to the defect decision or test data for the noncompliance decision.:
In late 2018, NHTSA notified HFT they were investigating a specific batch of the Haulmaster LED Trailer Light Kit, tested by Calcoast on behalf of NHTSA. Specific units tested had candela values slightly above the max photometric intensity output per FMVSS 108. The testing was carried out on samples pulled from a single batch of lamps, produced c/w 25 of 2017. HFT had conducted confirmatory testing of the lamps, multiple times, through accredited U.S. test labs prior to import, and at various stages in the production cycle. HFT's testing included batches before and after this production week and didn't find any anomalies. In 8/19, NHTSA advised HFT their testing from 2018 had been completed and resulted in apparent noncompliance with the photometry provisions. HFT responded to the agency's request for information. In 9/20, the agency requested HFT resend its prior response because the materials could not be accessed at the agency, and HFT complied. In 1/21, the agency responded and took the position the tested lamps from c/w 25 of 2017 did not conform to certain photometry requirements of FMVSS 108 and asked HFT how it intended to proceed. HFT initiated a detailed review of the apparent findings, further considered the effect of the deviation in use, whether there would be the potential for actual adverse consequences in use and confirmed no customer claims existed. To the extent there is an apparent noncompliance with the photometry provisions, HFT believes the issue is limited to this single production batch as all of its other testing indicates the Haulmaster product fully complies with FMVSS 108. On 2/4/21, HFT decided a non-compliance of the above listed specific lamp SKUs exists, for the specific batch tested by NHTSA. Since the manufacturer went out of business, HFT would also include in the recall population additional units produced in c/w 25 that may have been shipped in c/w 26 to ensure everything produced in c/w 25 is captured in the recall.

Identify the Remedy

Describe the defect/noncompliance remedy program, including the manufacturer's plan for reimbursement.
HFT intends to submit a petition for inconsequential noncompliance because the condition does not present an increased risk to motor vehicle safety.

Describe what distinguishes the remedy component from the recalled component.
Harbor Freight Tools will submit a Petition for Inconsequentiality Determination.

Identify and describe how and when the recall condition was corrected in production.
The last batch of Haulmaster trailer lamps was delivered to HFT in December 2017. HFT no longer has any of these lamp kits remaining in stores or its Distribution Centers. The manufacturing company has ceased operation.

Identify the Recall Schedule

Describe the recall schedule for notifications.:
TBD

Planned Dealer Notification Begin Date:

Planned Dealer Notification End Date:

Planned Owner Notification Begin Date:

Planned Owner Notification End Date:

Manufacturer's identification code for this recall (if applicable): TBD

Please be reminded that owner notification letters must be mailed no more than 60 days from submission of this report.

Manufacturer Comments to NHTSA Staff

Harbor Freight Tools intends to submit a petition for inconsequential noncompliance as the isolated instances of deviation from the photometric requirements do not pose an increased safety risk.

Document Upload

There are 0 documents associated with this report.

NHTSA Report No. 108-CAN-18-007-1%

LAMPS, REFLECTIVE DEVICES AND ASSOCIATED EQUIPMENT FMVSS-108

Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

CALCOAST – ITL
Lighting Technology
683 Thornton Street
San Leandro, CA 94577

20 December 2018

FINAL REPORT

PREPARED FOR

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE
Washington, D.C. 20590

NHTSA Report No. 108-CAN-18-007-1%

Prepared By: 

Approved By: 

Approval Date: 20 December 2018

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

Acceptance Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
108-CAN-18-007-1%	N/A	N/A

4. Title and Subtitle	5. Report Date
Test Series Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide	20 December 2018
	6. Performing Organization Code N/A

7. Author(s)	8. Performing Organization Report No.
Mark Evans Laboratory Director	171102-02D-1%

9. Performing Organization Name and Address	10. Work Unit No.
Calcoast - ITL 683 Thornton Street San Leandro, CA 94577	N/A
	11. Contract or Grant No. DTNH22-14-D-00370L

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 1200 New Jersey Avenue SE West Building – 4th Floor – NVS222 Washington, D.C. 20590	**14. Sponsoring Agency Code**

15. Supplementary Notes

16. Abstract

The scope of this testing was limited to certain photometry, color, visibility and EPLLA tests as indicated.

Test failures identified were as follows: 5 of 8 Stop/Turn photometry.

17. Key Words	18. Distribution Statement
Federal Motor Vehicle Safety Standard 108 Lamps, Reflective Devices and Associated Equipment	Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this report)	21. No. of Pages	22. Price
Unclassified	Unclassified	57	N/A

Report No.: 171102-02D-1%

TEST REPORT

Report Date: 20 December 2018

Project Name: Haul Master 62488 Trailer Light Kit
for Vehicles <2032 mm Wide
(SAE AIST AP2 L)

Submitted by: Purchased by CCITL for NHTSA
from Harbor Freight Tools (HFT)

Test Laboratory: Calcoast – ITL
San Leandro, CA 94577

Samples Submitted: Four (4) 62488 Kits purchased 31 October 2017

SUMMARY

TESTS (FMVSS-108)

Photometric Tests – Combination Lamp System (3-lighted section device)

Red Turn Signal Lamp - S7.1.2.13 / Table VII	3 Passed / 5 **Failed**
Tail Lamp - S7.2.13 / Table VII	Passed
Stop Lamp - S7.3.13 / Table IX	3 Passed / 5 **Failed**
Red Sidemarker Lamp - S7.4.13 / Table X	Passed
Amber Sidemarker Lamp - S7.4.13 / Table X	Passed
License Plate Lamp - S7.7.13	Not Tested
Red Reflex Reflector, Rear - S8.1.11 / Table XVI	Passed
Red Reflex Reflector, Side - S8.1.11 / Table XVI	Passed
Amber Reflex Reflector, Side - S8.1.11 / Table XVI	Passed

Lens Area Tests (EPLLA) – Table IV-a	Passed
Visibility Tests – Table V-b, Lens Area Method	Passed
Bulb Socket Test- S14.2	Not Applicable
Color Tests – S14.4.1	Passed
Plastic Optical Material Tests – S14.4.2	Unknown
Physical (Mechanical) Tests – S14.5	Not Tested

Written and Approved by:

Mark A. Evans
Laboratory Director

DESCRIPTION SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

DESCRIPTION:
The trailer kit has LH/RH rear mounted combination lamps (RCLs) with Stop, Tail, Turn Signal, Side Marker, Rear Reflex, Side Reflex and License (LH Only) functions. The kits also have two (2) side mounted amber sidemarker with reflex.
The system uses LED light sources for all functions except the red sidemarker which utilizes a 194 incandescent bulb.

MARKINGS:

RCL:	
REAR LENS:	"TOP", "NT223", "SAE (3)S(3)I(3)TLP2A07", "DOT", "SAE (3)S(3)I(3)TLP2A07", "DOT"
SIDE LENS:	"NT223", "SAE-P2-A-07"
L.P. LENS:	None
HOUSING:	"STOP&TURN (YELLOW)" or "STOP&TURN (GREEN)", "TAIL (BROWN)", " ↑ TOP", "L.H." or "R.H.", "ROAD SIDE" or "CURB SIDE", "MADE IN CHINA" On Sticker – "17-06" possible date code On-Sticker (LH Lamps Only) – "ITEM 62488", "Serial: 353261725"
AP2 Lamp:	
LENS:	"NT223", "SAE-P2-A-07" On Sticker – "17-06" possible date code

LENS:

MATERIAL:	
RCL:	PMMA (Red or Clear)
AP2 Lamp:	PMMA (Amber) *Lens material formulation, pigment, and coating must comply with FMVSS 108 S14.4.2 Plastic optical materials 3 year weathering requirements.*
GASKET:	Foam

HOUSING:

MATERIAL:	Plastic
METHOD OF MOUNTING:	Two (2) bolts or screws to vehicle
GASKET:	None

BULB USED:	FUNCTION	QUANTITY	TRADE NO.	VOLTAGE	POWER	FLUX
	SI	12	LED	13.5V	27W	-
	T			13.5V	-	-
	Red P2	1	194	14.0V	5W	2 MSCd
	L	4	LED	13.5V	-	-
	Amber P2	Unknown	LED	13.5V	0.6W	-

Note: No material description provided by the manufacturer.

Report No.: 171102-02D-1%

PHOTOMETRY SUMMARY SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

PHOTOMETRIC TESTS

Specification(s): FMVSS 108
Tests performed by: Mark Evans Date: 9/26/2018-10/10/2018

SUMMARY OF PHOTOMETRIC TESTS

Samples meet requirements at all points for:

S7.1.2.13 / Table VII	Rear Turn Signal Lamps – only 3 of 8 passed
S7.3.13 / Table IX	Stop Lamps – only 3 of 8 passed
S7.2.13 / Table VII	Tail Lamps
S7.4.13 / Table X	Sidemarker Lamps (Red)
S7.4.13 / Table X	Sidemarker Lamps (Amber)
S8.1.11 / Table XVI	Reflex Reflectors (Red Side)
S8.1.11 / Table XVI	Reflex Reflectors (Red Rear)
S8.1.11 / Table XVI	Reflex Reflectors (Amber Side)

Samples mounted on ITL universal fixture with mounting surface perpendicular to the detector axis at HV.

Reference detector control number: NIST P181-2

Test distance: 100 feet

Samples tested using accurate rated 194 bulbs at design flux or 13.5V for LED functions.
The LED functions were allowed to operate for 60 minutes or until stabilized with less than 1% change in 5 minutes.

LED Function Intensity vs Voltage

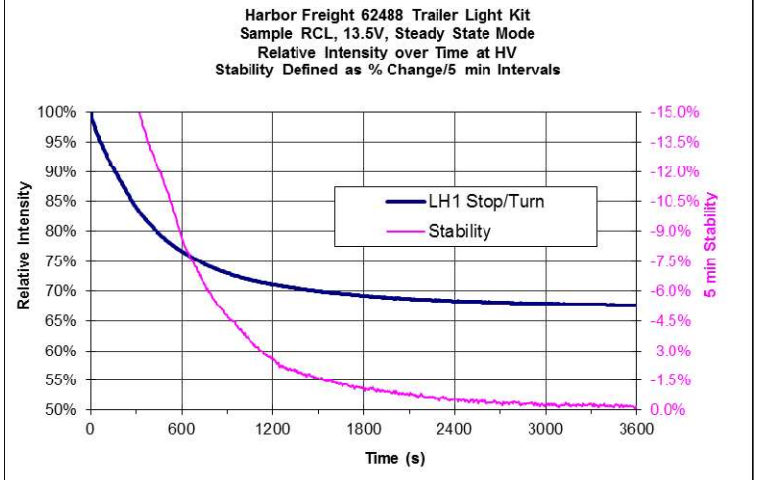
	12.0V	12.8V	13.5V	14.0V
Tail	76	89	100	109
Stop	80	92	100	107
Marker	83	92	100	106

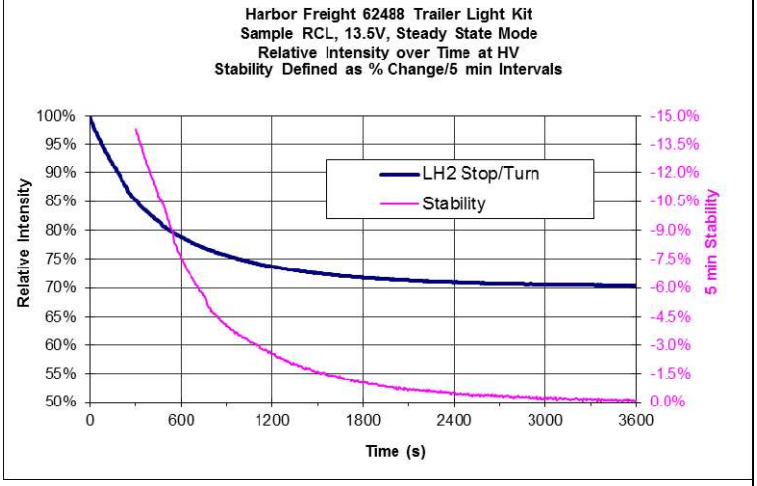
PHOTOMETRIC TEST DATA SHEET

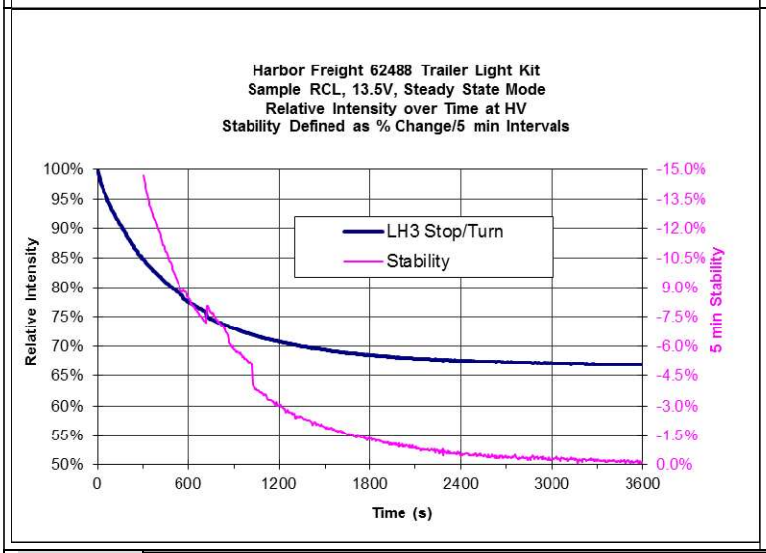
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

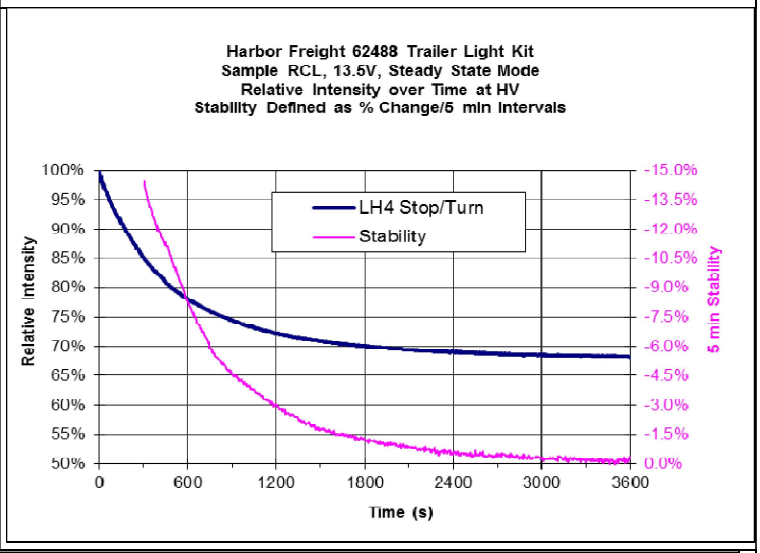
TIMELOGS

LH Stop/Turn Function









	LH1 Stop/Turn	LH2 Stop/Turn	LH3 Stop/Turn	LH4 Stop/Turn
Max:	216.1	261.8	295.0	256.4
Ratios				
1min/10min	1.242	1.217	1.230	1.225
10min/60min	1.133	1.120	1.160	1.143
1min/60min	1.407	1.363	1.427	1.400

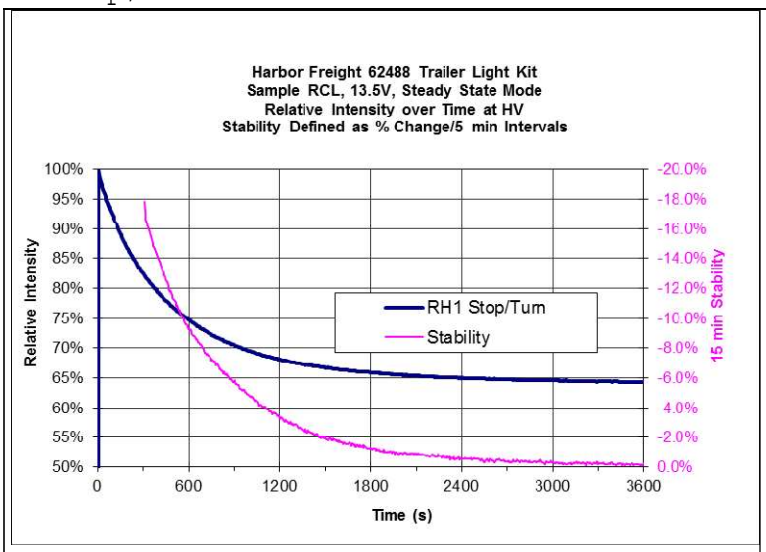
Stop/Turn functions reached 1%/5 min stability within 45 minutes.

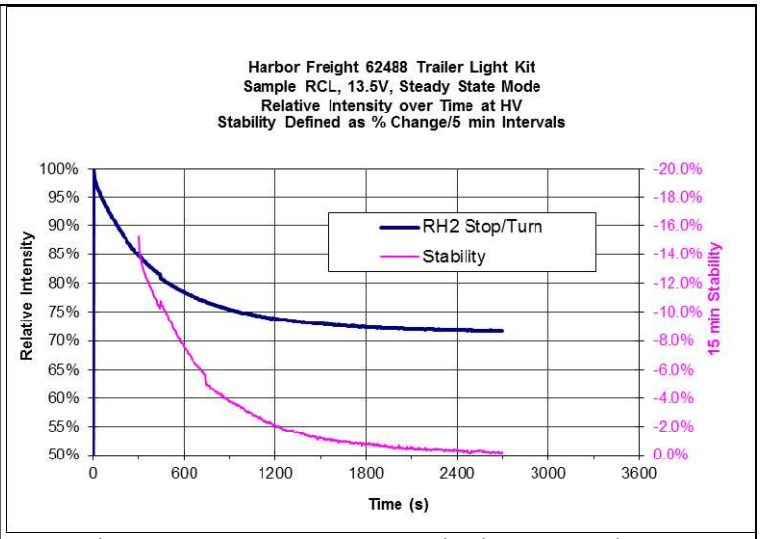
PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

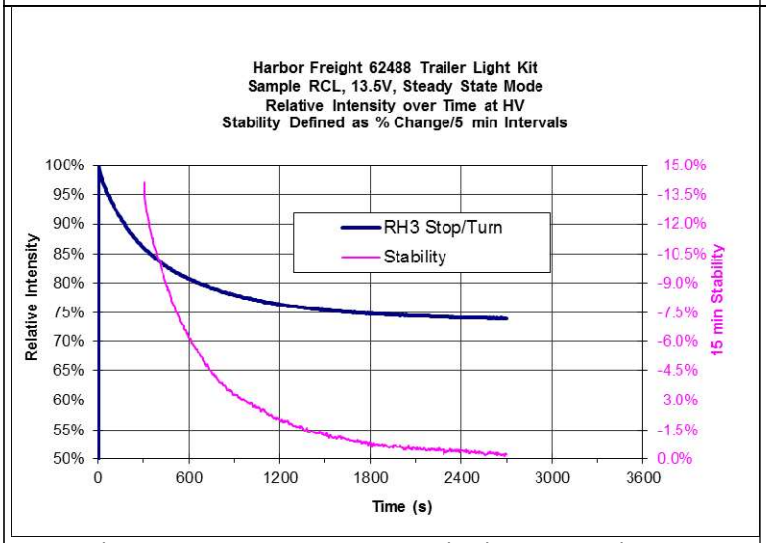
TIMELOGS

RH Stop/Turn Function

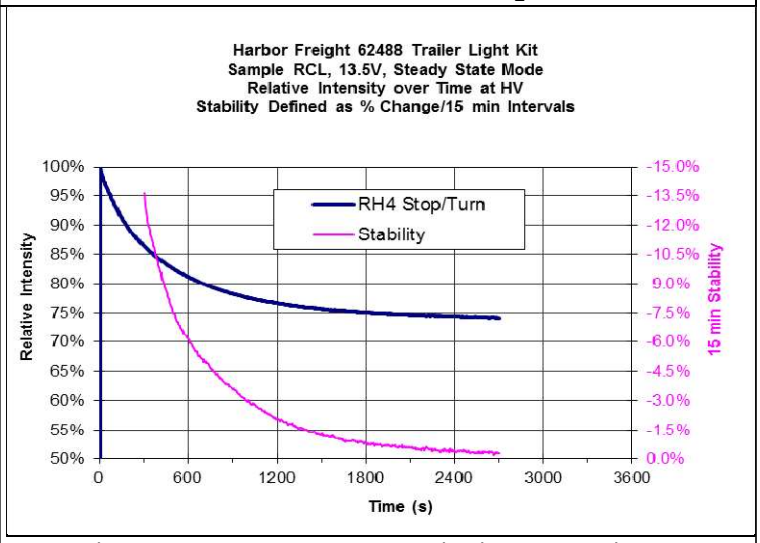




Terminated due to stability achieved



Terminated due to stability achieved



Terminated due to stability achieved

	RH1 Stop/Turn	RH2 Stop/Turn	RH3 Stop/Turn	RH4 Stop/Turn
Max:	276.7	243.4	258.2	267.3
Ratios				
1min/10min	1.265	1.209	1.182	1.179
10min/60min	1.163	1.094 * terminated at 45min	1.091 * terminated at 45min	1.094 * terminated at 45min
1min/60min	1.471	1.323 * terminated at 45min	1.289 * terminated at 45min	1.290 * terminated at 45min

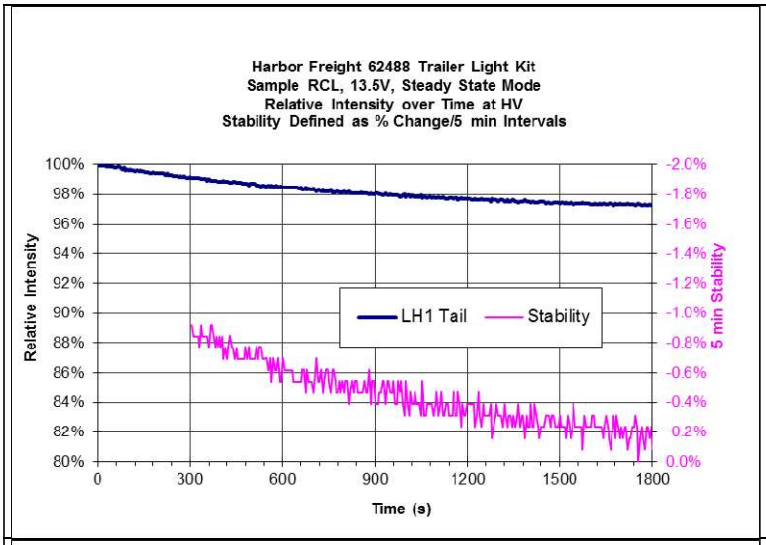
Stop/Turn functions reached 1%/5 min stability within 45 minutes.

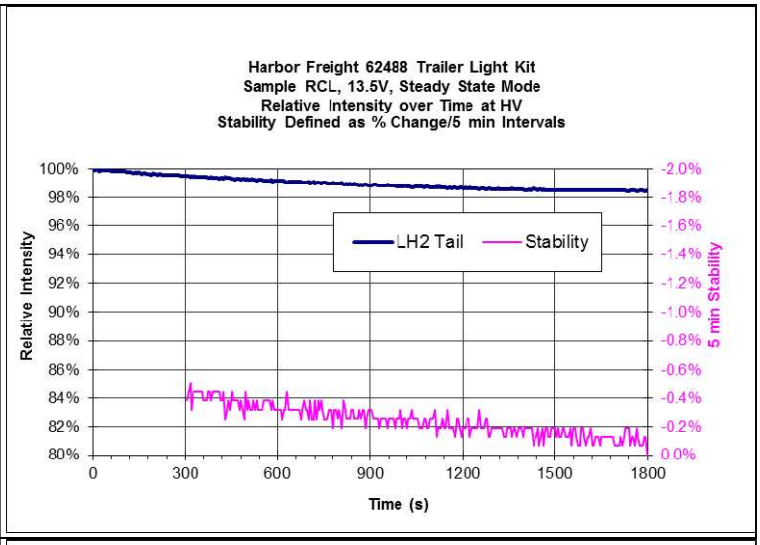
PHOTOMETRIC TEST DATA SHEET

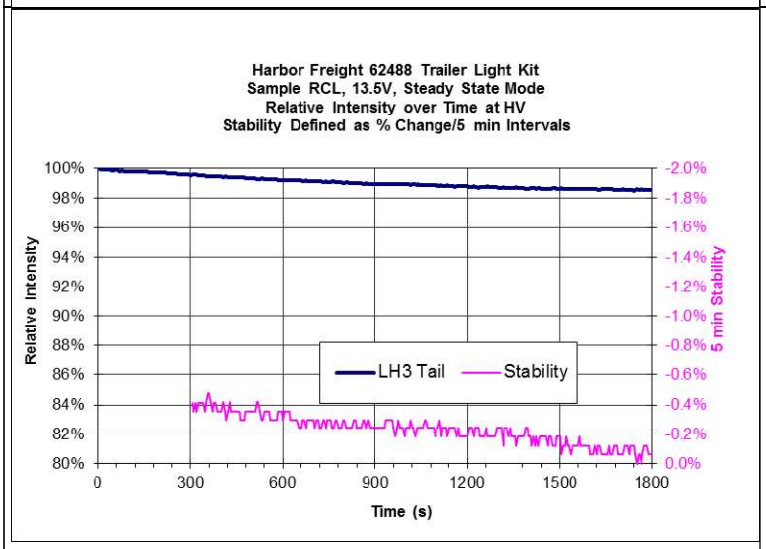
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

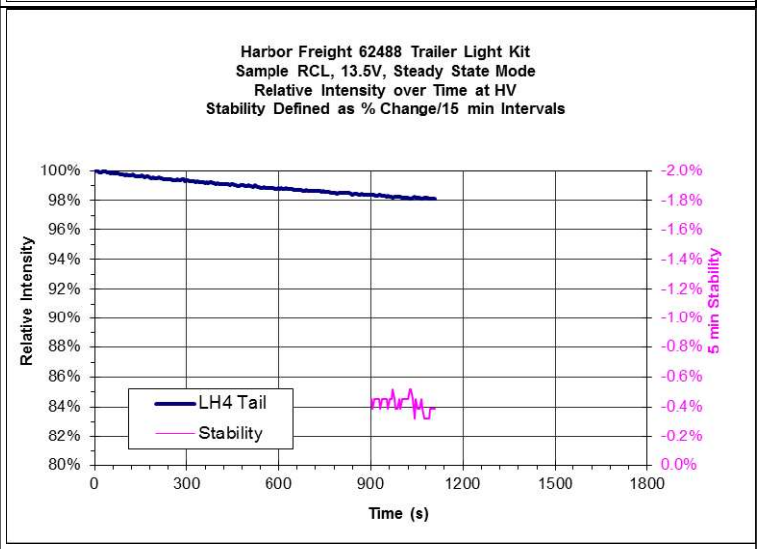
TIMELOGS

LH Tail Function









Terminated due to stability achieved

	LH1 Tail	LH2 Tail	LH3 Tail	LH4 Tail
Max:	13.1	15.8	16.8	15.7
Ratios				
1min/10min	1.013	1.006	1.007	1.010
10min/30min	1.012	1.007	1.007	1.005 (10min/15min)
1min/30min	1.025	1.014	1.014	1.014 (1min/15min)

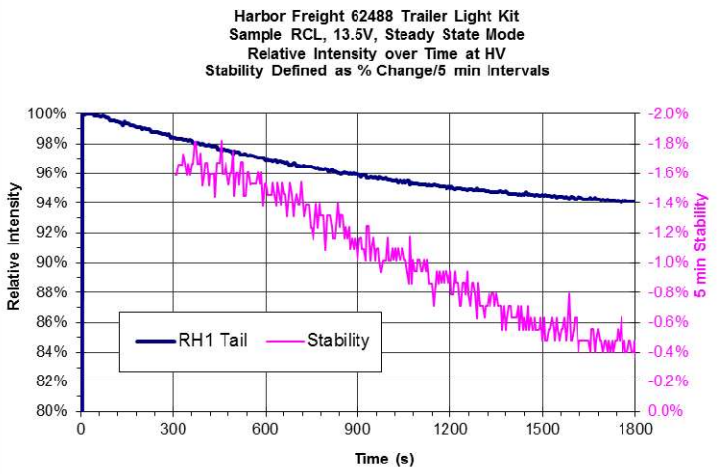
Tail function reached 1%/5 min stability within 15 minutes.

PHOTOMETRIC TEST DATA SHEET

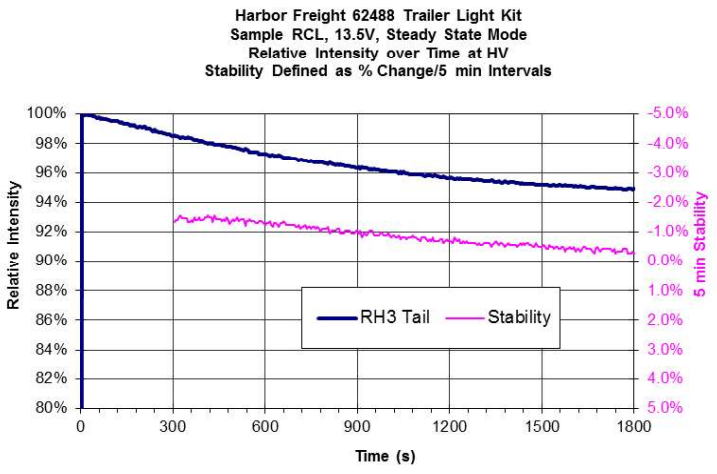
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

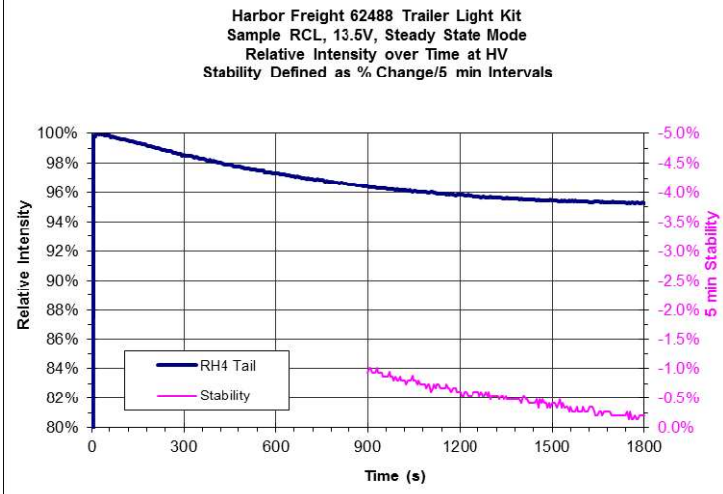
TIMELOGS

RH Tail Function



Not Recorded –
Sidemarker was being analyzed





	RH1 Tail	RH2 Tail	RH3 Tail	RH4 Tail
Max:	13.3	0.0	14.9	15.3
Ratios				
1min/10min	1.030	#DIV/0!	1.026	1.026
10min/30min	1.030	#DIV/0!	1.025	1.022
1min/30min	1.061	#DIV/0!	1.052	1.049

Tail function reached 1%/5 min stability within 15 minutes.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH1 RCL

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		70.10		22	420
10.0U 5.0R		69.49		22	420
5.0U 20.0L		28.13		15	420
5.0U 10.0L		75.37		40	420
5.0U V		128.53		95	420
5.0U 10.0R		77.35		40	420
5.0U 20.0R		30.23		15	420
H 10.0L		93.75		55	420
H 5.0L		128.84		110	420
H V		164.77		110	420
H 5.0R		148.45		110	420
H 10.0R		98.30		55	420
5.0D 20.0L		34.50		15	420
5.0D 10.0L		89.05		40	420
5.0D V		277.07		95	420
5.0D 10.0R		96.00		40	420
5.0D 20.0R		36.59		15	420
10.0D 5.0L		104.20		22	420
10.0D 5.0R		109.94		22	420
MAXIMUM	3.4D 0.8R	430.25 (534.4 Cd @ t = 1 min)*		-	420
Zone 1		236.92		70	-
Zone 2		258.16		135	-
Zone 3		847.66		520	-
Zone 4		271.65		135	-
Zone 5		246.24		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 489.0 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 241mA after 60 minutes stabilization warmup
Measured Values multiplied by 1.133 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.242 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH2 RCL

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		61.09		22	420
10.0U 5.0R		61.55		22	420
5.0U 20.0L		34.18		15	420
5.0U 10.0L		65.41		40	420
5.0U V		165.48		95	420
5.0U 10.0R		68.27		40	420
5.0U 20.0R		33.75		15	420
H 10.0L		88.93		55	420
H 5.0L		184.48		110	420
H V		206.09		110	420
H 5.0R		191.36		110	420
H 10.0R		88.33		55	420
5.0D 20.0L		36.23		15	420
5.0D 10.0L		81.61		40	420
5.0D V		224.41		95	420
5.0D 10.0R		84.31		40	420
5.0D 20.0R		35.96		15	420
10.0D 5.0L		100.79		22	420
10.0D 5.0R		99.21		22	420
MAXIMUM	2.2D 0.3R	388.04	(472.2 Cd @ t = 1 min)*	-	420
Zone 1		232.29		70	-
Zone 2		235.94		135	-
Zone 3		971.83		520	-
Zone 4		240.91		135	-
Zone 5		230.47		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 432.1 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 235mA after 60 minutes stabilization warmup
Measured Values multiplied by 1.120 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.217 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH3 RCL

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		65.85		22	420
10.0U 5.0R		63.99		22	420
5.0U 20.0L		35.53		15	420
5.0U 10.0L		69.07		40	420
5.0U V		166.73		95	420
5.0U 10.0R		69.71		40	420
5.0U 20.0R		35.73		15	420
H 10.0L		92.05		55	420
H 5.0L		196.77		110	420
H V		227.68		110	420
H 5.0R		216.61		110	420
H 10.0R		88.22		55	420
5.0D 20.0L		37.45		15	420
5.0D 10.0L		83.61		40	420
5.0D V		274.08		95	420
5.0D 10.0R		83.43		40	420
5.0D 20.0R		37.88		15	420
10.0D 5.0L		99.47		22	420
10.0D 5.0R		95.25		22	420
MAXIMUM	2.2D 0.2R	434.41	(534.3 Cd @ t = 1 min)*	-	420
Zone 1		238.30		70	-
Zone 2		244.73		135	-
Zone 3		1081.87		520	-
Zone 4		241.36		135	-
Zone 5		232.84		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 488.9 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 246mA after 60 minutes stabilization warmup
Measured Values multiplied by 1.160 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.230 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH4 RCL

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		64.42		22	420
10.0U 5.0R		63.28		22	420
5.0U 20.0L		34.30		15	420
5.0U 10.0L		68.62		40	420
5.0U V		144.47		95	420
5.0U 10.0R		67.71		40	420
5.0U 20.0R		32.04		15	420
H 10.0L		91.80		55	420
H 5.0L		180.15		110	420
H V		200.90		110	420
H 5.0R		156.03		110	420
H 10.0R		87.07		55	420
5.0D 20.0L		36.27		15	420
5.0D 10.0L		82.59		40	420
5.0D V		246.68		95	420
5.0D 10.0R		81.32		40	420
5.0D 20.0R		34.88		15	420
10.0D 5.0L		98.12		22	420
10.0D 5.0R		95.15		22	420
MAXIMUM	2.5D 0.4L	384.11 (477.9 Cd @ t = 1 min)*		-	420
Zone 1		233.11		70	-
Zone 2		243.01		135	-
Zone 3		928.22		520	-
Zone 4		236.11		135	-
Zone 5		225.36		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 437.3 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 236mA after 60 minutes stabilization warmup
Measured Values multiplied by 1.143 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.225 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH1 RCL

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		78.51		22	420
10.0U 5.0R		77.49		22	420
5.0U 20.0L		38.32		15	420
5.0U 10.0L		83.53		40	420
5.0U V		189.12		95	420
5.0U 10.0R		83.80		40	420
5.0U 20.0R		37.86		15	420
H 10.0L		112.53		55	420
H 5.0L		180.08		110	420
H V		206.22		110	420
H 5.0R		205.03		110	420
H 10.0R		109.31		55	420
5.0D 20.0L		41.98		15	420
5.0D 10.0L		104.74		40	420
5.0D V		189.78		95	420
5.0D 10.0R		105.17		40	420
5.0D 20.0R		41.46		15	420
10.0D 5.0L		126.47		22	420
10.0D 5.0R		124.14		22	420
MAXIMUM	1.5D 0.3R	322.47	(407.9 Cd @ t = 1 min)	-	420
Zone 1		285.28		70	-
Zone 2		300.79		135	-
Zone 3		970.24		520	-
Zone 4		298.27		135	-
Zone 5		280.96		70	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 292mA after 60 minutes stabilization warmup
Measured Values multiplied by 1.163 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.265 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH2 RCL

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		68.28		22	420
10.0U 5.0R		67.10		22	420
5.0U 20.0L		34.84		15	420
5.0U 10.0L		73.08		40	420
5.0U V		137.85		95	420
5.0U 10.0R		74.35		40	420
5.0U 20.0R		33.20		15	420
H 10.0L		96.72		55	420
H 5.0L		164.47		110	420
H V		189.70		110	420
H 5.0R		145.85		110	420
H 10.0R		98.01		55	420
5.0D 20.0L		37.68		15	420
5.0D 10.0L		87.23		40	420
5.0D V		217.96		95	420
5.0D 10.0R		89.14		40	420
5.0D 20.0R		36.69		15	420
10.0D 5.0L		102.77		22	420
10.0D 5.0R		101.34		22	420
MAXIMUM	2.3D 0.1L	338.40	(409.1 Cd @ t = 1 min)	-	420
Zone 1		243.57		70	-
Zone 2		257.03		135	-
Zone 3		855.82		520	-
Zone 4		261.50		135	-
Zone 5		238.33		70	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 243mA after 45 minutes stabilization warmup
Measured Values multiplied by 1.095 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.209 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH3 RCL

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		64.56		22	420
10.0U 5.0R		64.35		22	420
5.0U 20.0L		35.15		15	420
5.0U 10.0L		68.70		40	420
5.0U V		162.47		95	420
5.0U 10.0R		69.64		40	420
5.0U 20.0R		34.07		15	420
H 10.0L		87.99		55	420
H 5.0L		182.26		110	420
H V		209.10		110	420
H 5.0R		170.90		110	420
H 10.0R		86.14		55	420
5.0D 20.0L		36.88		15	420
5.0D 10.0L		80.95		40	420
5.0D V		273.83		95	420
5.0D 10.0R		79.78		40	420
5.0D 20.0R		35.97		15	420
10.0D 5.0L		94.29		22	420
10.0D 5.0R		92.56		22	420
MAXIMUM	2.5D V	428.66	(506.7 Cd @ t = 1 min)*	-	420
Zone 1		230.88		70	-
Zone 2		237.64		135	-
Zone 3		998.56		520	-
Zone 4		235.56		135	-
Zone 5		226.95		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 463.6 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 244mA after 45 minutes stabilization warmup
Measured Values multiplied by 1.092 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.182 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH4 RCL

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		62.28		22	420
10.0U 5.0R		63.02		22	420
5.0U 20.0L		33.33		15	420
5.0U 10.0L		65.18		40	420
5.0U V		164.65		95	420
5.0U 10.0R		68.80		40	420
5.0U 20.0R		33.76		15	420
H 10.0L		84.95		55	420
H 5.0L		180.37		110	420
H V		216.86		110	420
H 5.0R		184.03		110	420
H 10.0R		87.57		55	420
5.0D 20.0L		35.21		15	420
5.0D 10.0L		76.89		40	420
5.0D V		210.20		95	420
5.0D 10.0R		81.82		40	420
5.0D 20.0R		35.01		15	420
10.0D 5.0L		91.45		22	420
10.0D 5.0R		93.54		22	420
MAXIMUM	1.4D 0.3L	344.69	(406.4 Cd @ t = 1 min)	-	420
Zone 1		222.27		70	-
Zone 2		227.02		135	-
Zone 3		956.10		520	-
Zone 4		238.20		135	-
Zone 5		225.32		70	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 245mA after 45 minutes stabilization warmup
Measured Values multiplied by 1.096 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.179 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH1 RCL, Tail

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.84		1.0	25.0
10.0U 5.0R		4.70		1.0	25.0
5.0U 20.0L		2.08		0.7	25.0
5.0U 10.0L		5.33		2.0	25.0
5.0U V		9.73		4.5	25.0
5.0U 10.0R		5.21		2.0	25.0
5.0U 20.0R		2.23		0.7	25.0
H 10.0L		6.54		2.0	25.0
H 5.0L		9.66		5.0	25.0
H V		12.65		5.0	25.0
H 5.0R		11.77		5.0	25.0
H 10.0R		6.83		2.0	25.0
5.0D 20.0L		2.56		0.7	-
5.0D 10.0L		6.07		2.0	-
5.0D V		20.00		4.5	-
5.0D 10.0R		6.63		2.0	-
5.0D 20.0R		2.63		0.7	-
10.0D 5.0L		7.32		1.0	-
10.0D 5.0R		7.84		1.0	-
MX(H-90U/45L-45R)	H 1.4R	13.30	(13.63Cd @ t = 1min)	-	25.0
MAXIMUM	3.1D 0.9R	33.28		-	-
Zone 1		16.80		3.5	-
Zone 2		17.94		6.0	-
Zone 3		63.81		24.0	-
Zone 4		18.67		6.0	-
Zone 5		17.40		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 54mA after 30 minutes stabilization warmup
Current includes license plate lamp function.
MX(H-90U/45L-45R) multiplied by 1.025 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH2 RCL, Tail

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.29		1.0	25.0
10.0U 5.0R		4.32		1.0	25.0
5.0U 20.0L		2.45		0.7	25.0
5.0U 10.0L		4.59		2.0	25.0
5.0U V		11.34		4.5	25.0
5.0U 10.0R		4.78		2.0	25.0
5.0U 20.0R		2.41		0.7	25.0
H 10.0L		6.20		2.0	25.0
H 5.0L		14.22		5.0	25.0
H V		15.46		5.0	25.0
H 5.0R		13.89		5.0	25.0
H 10.0R		6.20		2.0	25.0
5.0D 20.0L		2.58		0.7	-
5.0D 10.0L		5.73		2.0	-
5.0D V		17.38		4.5	-
5.0D 10.0R		5.91		2.0	-
5.0D 20.0R		2.58		0.7	-
10.0D 5.0L		7.08		1.0	-
10.0D 5.0R		6.93		1.0	-
MX(H-90U/45L-45R)	H 1.2R	15.78	(16.00Cd @ t = 1min)	-	25.0
MAXIMUM	2.1D 0.2L	29.42		-	-
Zone 1		16.40		3.5	-
Zone 2		16.52		6.0	-
Zone 3		72.30		24.0	-
Zone 4		16.89		6.0	-
Zone 5		16.23		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 54mA after 30 minutes stabilization warmup
Current includes license plate lamp function.
MX(H-90U/45L-45R) multiplied by 1.014 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH3 RCL, Tail

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.34		1.0	25.0
10.0U 5.0R		4.29		1.0	25.0
5.0U 20.0L		2.42		0.7	25.0
5.0U 10.0L		4.65		2.0	25.0
5.0U V		10.77		4.5	25.0
5.0U 10.0R		4.65		2.0	25.0
5.0U 20.0R		2.44		0.7	25.0
H 10.0L		6.11		2.0	25.0
H 5.0L		14.37		5.0	25.0
H V		16.57		5.0	25.0
H 5.0R		14.86		5.0	25.0
H 10.0R		6.02		2.0	25.0
5.0D 20.0L		2.55		0.7	-
5.0D 10.0L		5.63		2.0	-
5.0D V		20.75		4.5	-
5.0D 10.0R		5.73		2.0	-
5.0D 20.0R		2.60		0.7	-
10.0D 5.0L		6.68		1.0	-
10.0D 5.0R		6.55		1.0	-
MX(H-90U/45L-45R)	H 0.7R	16.76	(16.99Cd @ t = 1min)	-	25.0
MAXIMUM	2.3D 0.4R	31.50		-	-
Zone 1		15.99		3.5	-
Zone 2		16.39		6.0	-
Zone 3		77.33		24.0	-
Zone 4		16.40		6.0	-
Zone 5		15.87		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 54mA after 30 minutes stabilization warmup
Current includes license plate lamp function.
MX(H-90U/45L-45R) multiplied by 1.014 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH4 RCL, Tail

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.57		1.0	25.0
10.0U 5.0R		4.49		1.0	25.0
5.0U 20.0L		2.50		0.7	25.0
5.0U 10.0L		4.90		2.0	25.0
5.0U V		10.74		4.5	25.0
5.0U 10.0R		4.83		2.0	25.0
5.0U 20.0R		2.37		0.7	25.0
H 10.0L		6.55		2.0	25.0
H 5.0L		13.76		5.0	25.0
H V		15.36		5.0	25.0
H 5.0R		11.40		5.0	25.0
H 10.0R		6.16		2.0	25.0
5.0D 20.0L		2.64		0.7	-
5.0D 10.0L		5.94		2.0	-
5.0D V		19.32		4.5	-
5.0D 10.0R		5.82		2.0	-
5.0D 20.0R		2.53		0.7	-
10.0D 5.0L		7.07		1.0	-
10.0D 5.0R		6.82		1.0	-
MX(H-90U/45L-45R)	H 0.3L	15.36	(15.60Cd @ t = 1min)	-	25.0
MAXIMUM	2.4D 0.2L	29.43		-	-
Zone 1		16.78		3.5	-
Zone 2		17.38		6.0	-
Zone 3		70.58		24.0	-
Zone 4		16.82		6.0	-
Zone 5		16.21		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 54mA after 30 minutes stabilization warmup
Current includes license plate lamp function.
MX(H-90U/45L-45R) multiplied by 1.014 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH1 RCL, Tail

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.26		1.0	25.0
10.0U 5.0R		4.22		1.0	25.0
5.0U 20.0L		2.14		0.7	25.0
5.0U 10.0L		4.55		2.0	25.0
5.0U V		10.55		4.5	25.0
5.0U 10.0R		4.54		2.0	25.0
5.0U 20.0R		2.15		0.7	25.0
H 10.0L		6.16		2.0	25.0
H 5.0L		10.38		5.0	25.0
H V		12.37		5.0	25.0
H 5.0R		12.12		5.0	25.0
H 10.0R		5.99		2.0	25.0
5.0D 20.0L		2.33		0.7	-
5.0D 10.0L		5.70		2.0	-
5.0D V		11.27		4.5	-
5.0D 10.0R		5.80		2.0	-
5.0D 20.0R		2.32		0.7	-
10.0D 5.0L		6.96		1.0	-
10.0D 5.0R		6.78		1.0	-
MX(H-90U/45L-45R)	H 0.6R	12.42	(13.18Cd @ t = 1min)	-	25.0
MAXIMUM	1.4D 0.5R	19.17		-	-
Zone 1		15.68		3.5	-
Zone 2		16.41		6.0	-
Zone 3		56.69		24.0	-
Zone 4		16.33		6.0	-
Zone 5		15.47		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 0.231A after >60 minutes stabilization warmup
Note: Current includes sidemarker. Sidemarker masked during testing.
MX(H-90U/45L-45R) multiplied by 1.061 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH2 RCL, Tail

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.19		1.0	25.0
10.0U 5.0R		4.17		1.0	25.0
5.0U 20.0L		2.19		0.7	25.0
5.0U 10.0L		4.51		2.0	25.0
5.0U V		9.27		4.5	25.0
5.0U 10.0R		4.66		2.0	25.0
5.0U 20.0R		2.14		0.7	25.0
H 10.0L		5.90		2.0	25.0
H 5.0L		10.63		5.0	25.0
H V		12.55		5.0	25.0
H 5.0R		9.93		5.0	25.0
H 10.0R		5.97		2.0	25.0
5.0D 20.0L		2.33		0.7	-
5.0D 10.0L		5.47		2.0	-
5.0D V		14.56		4.5	-
5.0D 10.0R		5.53		2.0	-
5.0D 20.0R		2.31		0.7	-
10.0D 5.0L		6.47		1.0	-
10.0D 5.0R		6.35		1.0	-
MX(H-90U/45L-45R)	H 0.7R	12.62	(13.50Cd @ t = 1min)	-	25.0
MAXIMUM	2.4D 0.3L	22.71		-	-
Zone 1		15.19		3.5	-
Zone 2		15.88		6.0	-
Zone 3		56.94		24.0	-
Zone 4		16.16		6.0	-
Zone 5		14.97		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 0.220A after 60 minutes stabilization warmup
Note: Current includes sidemarker. Sidemarker masked during testing.
MX(H-90U/45L-45R) multiplied by 1.070 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH3 RCL, Tail

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.12		1.0	25.0
10.0U 5.0R		4.10		1.0	25.0
5.0U 20.0L		2.27		0.7	25.0
5.0U 10.0L		4.37		2.0	25.0
5.0U V		10.94		4.5	25.0
5.0U 10.0R		4.49		2.0	25.0
5.0U 20.0R		2.22		0.7	25.0
H 10.0L		5.62		2.0	25.0
H 5.0L		12.60		5.0	25.0
H V		13.83		5.0	25.0
H 5.0R		11.48		5.0	25.0
H 10.0R		5.49		2.0	25.0
5.0D 20.0L		2.40		0.7	-
5.0D 10.0L		5.25		2.0	-
5.0D V		18.96		4.5	-
5.0D 10.0R		5.17		2.0	-
5.0D 20.0R		2.33		0.7	-
10.0D 5.0L		6.15		1.0	-
10.0D 5.0R		6.02		1.0	-
MX(H-90U/45L-45R)	H 0.3L	13.85	(14.57Cd @ t = 1min)	-	25.0
MAXIMUM	2.3D 0.6L	29.01		-	-
Zone 1		14.94		3.5	-
Zone 2		15.25		6.0	-
Zone 3		67.81		24.0	-
Zone 4		15.16		6.0	-
Zone 5		14.67		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 0.221A after 60 minutes stabilization warmup
Note: Current includes sidemarker. Sidemarker masked during testing.
MX(H-90U/45L-45R) multiplied by 1.052 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH4 RCL, Tail

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.02		1.0	25.0
10.0U 5.0R		4.04		1.0	25.0
5.0U 20.0L		2.20		0.7	25.0
5.0U 10.0L		4.22		2.0	25.0
5.0U V		10.28		4.5	25.0
5.0U 10.0R		4.46		2.0	25.0
5.0U 20.0R		2.20		0.7	25.0
H 10.0L		5.54		2.0	25.0
H 5.0L		12.12		5.0	25.0
H V		14.45		5.0	25.0
H 5.0R		12.02		5.0	25.0
H 10.0R		5.69		2.0	25.0
5.0D 20.0L		2.29		0.7	-
5.0D 10.0L		5.00		2.0	-
5.0D V		14.64		4.5	-
5.0D 10.0R		5.31		2.0	-
5.0D 20.0R		2.31		0.7	-
10.0D 5.0L		5.98		1.0	-
10.0D 5.0R		6.11		1.0	-
MX(H-90U/45L-45R)	H V	14.63	(15.33Cd @ t = 1min)	-	25.0
MAXIMUM	2.0D 0.1R	23.94		-	-
Zone 1		14.47		3.5	-
Zone 2		14.76		6.0	-
Zone 3		63.50		24.0	-
Zone 4		15.47		6.0	-
Zone 5		14.65		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 0.241A after 60 minutes stabilization warmup
Note: Current includes sidemarker. Sidemarker masked during testing.
MX(H-90U/45L-45R) multiplied by 1.049 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

Report No.: 171102-02D-1%

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH (All)

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp Stop/Tail Ratio and Turn/Tail Ratio

	Tail				Stop/Turn				SI/T Ratio				
	LH1	LH2	LH3	LH4	LH1	LH2	LH3	LH4	LH1	LH2	LH3	LH4	Required
10.0U 5.0L	4.8	4.3	4.3	4.6	70.1	61.1	65.9	64.4	14.5	14.2	15.2	14.1	3
10.0U 5.0R	4.7	4.3	4.3	4.5	69.5	61.6	64.0	63.3	14.8	14.2	14.9	14.1	3
5.0U 20.0L	2.1	2.5	2.4	2.5	28.1	34.2	35.5	34.3	13.5	14.0	14.7	13.7	3
5.0U 10.0L	5.3	4.6	4.7	4.9	75.4	65.4	69.1	68.6	14.1	14.3	14.9	14.0	3
5.0U V	9.7	11.3	10.8	10.7	128.5	165.5	166.7	144.5	13.2	14.6	15.5	13.5	5
5.0U 10.0R	5.2	4.8	4.7	4.8	77.4	68.3	69.7	67.7	14.8	14.3	15.0	14.0	3
5.0U 20.0R	2.2	2.4	2.4	2.4	30.2	33.8	35.7	32.0	13.6	14.0	14.6	13.5	3
H 10.0L	6.5	6.2	6.1	6.6	93.8	88.9	92.1	91.8	14.3	14.3	15.1	14.0	3
H 5.0L	9.7	14.2	14.4	13.8	128.8	184.5	196.8	180.2	13.3	13.0	13.7	13.1	5
H V	12.7	15.5	16.6	15.4	164.8	206.1	227.7	200.9	13.0	13.3	13.7	13.1	5
H 5.0R	11.8	13.9	14.9	11.4	148.5	191.4	216.6	156.0	12.6	13.8	14.6	13.7	5
H 10.0R	6.8	6.2	6.0	6.2	98.3	88.3	88.2	87.1	14.4	14.2	14.7	14.1	3
5.0D 20.0L	2.6	2.6	2.6	2.6	34.5	36.2	37.5	36.3	13.5	14.0	14.7	13.7	3
5.0D 10.0L	6.1	5.7	5.6	5.9	89.1	81.6	83.6	82.6	14.7	14.2	14.9	13.9	3
5.0D V	20.0	17.4	20.8	19.3	277.1	224.4	274.1	246.7	13.9	12.9	13.2	12.8	3
5.0D 10.0R	6.6	5.9	5.7	5.8	96.0	84.3	83.4	81.3	14.5	14.3	14.6	14.0	3
5.0D 20.0R	2.6	2.6	2.6	2.5	36.6	36.0	37.9	34.9	13.9	13.9	14.6	13.8	3
10.0D 5.0L	7.3	7.1	6.7	7.1	104.2	100.8	99.5	98.1	14.2	14.2	14.9	13.9	3
10.0D 5.0R	7.8	6.9	6.6	6.8	109.9	99.2	95.3	95.2	14.0	14.3	14.5	14.0	3

Samples meet test requirements at all points.

Aim: Lamp mounted with seating plane perpendicular to HV. Filament at COR/COT.

Report No.: 171102-02D-1%

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH (All)

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp Stop/Tail Ratio and Turn/Tail Ratio

	Tail				Stop/Turn				SI/T Ratio				
	RH1	RH2	RH3	RH4	RH1	RH2	RH3	RH4	RH1	RH2	RH3	RH4	Required
10.0U 5.0L	4.3	4.2	4.1	4.0	78.5	68.3	64.6	62.3	18.4	16.3	15.7	15.5	3
10.0U 5.0R	4.2	4.2	4.1	4.0	77.5	67.1	64.4	63.0	18.4	16.1	15.7	15.6	3
5.0U 20.0L	2.1	2.2	2.3	2.2	38.3	34.8	35.2	33.3	17.9	15.9	15.5	15.2	3
5.0U 10.0L	4.6	4.5	4.4	4.2	83.5	73.1	68.7	65.2	18.4	16.2	15.7	15.4	3
5.0U V	10.6	9.3	10.9	10.3	189.1	137.9	162.5	164.7	17.9	14.9	14.9	16.0	5
5.0U 10.0R	4.5	4.7	4.5	4.5	83.8	74.4	69.6	68.8	18.5	16.0	15.5	15.4	3
5.0U 20.0R	2.2	2.1	2.2	2.2	37.9	33.2	34.1	33.8	17.6	15.5	15.3	15.3	3
H 10.0L	6.2	5.9	5.6	5.5	112.5	96.7	88.0	85.0	18.3	16.4	15.7	15.3	3
H 5.0L	10.4	10.6	12.6	12.1	180.1	164.5	182.3	180.4	17.3	15.5	14.5	14.9	5
H V	12.4	12.6	13.8	14.5	206.2	189.7	209.1	216.9	16.7	15.1	15.1	15.0	5
H 5.0R	12.1	9.9	11.5	12.0	205.0	145.9	170.9	184.0	16.9	14.7	14.9	15.3	5
H 10.0R	6.0	6.0	5.5	5.7	109.3	98.0	86.1	87.6	18.2	16.4	15.7	15.4	3
5.0D 20.0L	2.3	2.3	2.4	2.3	42.0	37.7	36.9	35.2	18.0	16.2	15.4	15.4	3
5.0D 10.0L	5.7	5.5	5.3	5.0	104.7	87.2	81.0	76.9	18.4	15.9	15.4	15.4	3
5.0D V	11.3	14.6	19.0	14.6	189.8	218.0	273.8	210.2	16.8	15.0	14.4	14.4	3
5.0D 10.0R	5.8	5.5	5.2	5.3	105.2	89.1	79.8	81.8	18.1	16.1	15.4	15.4	3
5.0D 20.0R	2.3	2.3	2.3	2.3	41.5	36.7	36.0	35.0	17.9	15.9	15.4	15.2	3
10.0D 5.0L	7.0	6.5	6.2	6.0	126.5	102.8	94.3	91.5	18.2	15.9	15.3	15.3	3
10.0D 5.0R	6.8	6.4	6.0	6.1	124.1	101.3	92.6	93.5	18.3	16.0	15.4	15.3	3

Samples meet test requirements at all points.

Aim: Lamp mounted with seating plane perpendicular to HV. Filament at COR/COT.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH1 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.53		0.25	-
10.0U V		0.63		0.25	-
10.0U 45.0R		0.42		0.25	-
10.0U 45.0L TO 45.0R	45.0R	0.42		0.25	-
5.0U 45.0L TO 45.0R	45.0R	0.44		0.25	-
H 45.0L		0.47		0.25	-
H V		0.56		0.25	-
H 45.0R		0.55		0.25	-
H 45.0L TO 45.0R	43.7L	0.45		0.25	-
5.0D 45.0L TO 45.0R	42.5L	0.41		0.25	-
10.0D 45.0L		0.34		0.25	-
10.0D V		0.58		0.25	-
10.0D 45.0R		0.51		0.25	-
10.0D 45.0L TO 45.0R	44.6L	0.34		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+L+P2 current @ 0.316A
LED T+L functions active and could not be disabled. L+T masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH2 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.42		0.25	-
10.0U V		0.62		0.25	-
10.0U 45.0R		0.59		0.25	-
10.0U 45.0L TO 45.0R	44.8L	0.42		0.25	-
5.0U 45.0L TO 45.0R	44.9L	0.48		0.25	-
H 45.0L		0.46		0.25	-
H V		0.57		0.25	-
H 45.0R		0.52		0.25	-
H 45.0L TO 45.0R	45.0L	0.46		0.25	-
5.0D 45.0L TO 45.0R	45.0R	0.46		0.25	-
10.0D 45.0L		0.48		0.25	-
10.0D V		0.59		0.25	-
10.0D 45.0R		0.46		0.25	-
10.0D 45.0L TO 45.0R	43.8R	0.46		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+L+P2 current @ 0.315A
LED T+L functions active and could not be disabled. L+T masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH3 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.49		0.25	-
10.0U V		0.66		0.25	-
10.0U 45.0R		0.46		0.25	-
10.0U 45.0L TO 45.0R	44.4R	0.45		0.25	-
5.0U 45.0L TO 45.0R	45.0L	0.44		0.25	-
H 45.0L		0.45		0.25	-
H V		0.63		0.25	-
H 45.0R		0.53		0.25	-
H 45.0L TO 45.0R	43.7L	0.43		0.25	-
5.0D 45.0L TO 45.0R	43.7L	0.44		0.25	-
10.0D 45.0L		0.38		0.25	-
10.0D V		0.66		0.25	-
10.0D 45.0R		0.56		0.25	-
10.0D 45.0L TO 45.0R	44.6L	0.38		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+L+P2 current @ 0.315A
LED T+L functions active and could not be disabled. L+T masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH4 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.41		0.25	-
10.0U V		0.61		0.25	-
10.0U 45.0R		0.64		0.25	-
10.0U 45.0L TO 45.0R	43.4L	0.40		0.25	-
5.0U 45.0L TO 45.0R	41.8L	0.48		0.25	-
H 45.0L		0.54		0.25	-
H V		0.57		0.25	-
H 45.0R		0.51		0.25	-
H 45.0L TO 45.0R	41.1L	0.49		0.25	-
5.0D 45.0L TO 45.0R	45.0R	0.46		0.25	-
10.0D 45.0L		0.50		0.25	-
10.0D V		0.58		0.25	-
10.0D 45.0R		0.47		0.25	-
10.0D 45.0L TO 45.0R	45.0R	0.47		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+L+P2 current @ 0.318A
LED T+L functions active and could not be disabled. L+T masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH1 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.46		0.25	-
10.0U V		0.59		0.25	-
10.0U 45.0R		0.49		0.25	-
10.0U 45.0L TO 45.0R	45.0L	0.46		0.25	-
5.0U 45.0L TO 45.0R	43.3R	0.42		0.25	-
H 45.0L		0.48		0.25	-
H V		0.56		0.25	-
H 45.0R		0.44		0.25	-
H 45.0L TO 45.0R	45.0R	0.44		0.25	-
5.0D 45.0L TO 45.0R	45.0R	0.40		0.25	-
10.0D 45.0L		0.59		0.25	-
10.0D V		0.58		0.25	-
10.0D 45.0R		0.40		0.25	-
10.0D 45.0L TO 45.0R	45.0R	0.40		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+P2 current @ 0.271A
LED Tail function active and could not be disabled. Tail masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH2 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.50		0.25	-
10.0U V		0.57		0.25	-
10.0U 45.0R		0.38		0.25	-
10.0U 45.0L TO 45.0R	44.3R	0.36		0.25	-
5.0U 45.0L TO 45.0R	41.2R	0.40		0.25	-
H 45.0L		0.47		0.25	-
H V		0.58		0.25	-
H 45.0R		0.45		0.25	-
H 45.0L TO 45.0R	40.7R	0.41		0.25	-
5.0D 45.0L TO 45.0R	45.0L	0.42		0.25	-
10.0D 45.0L		0.42		0.25	-
10.0D V		0.55		0.25	-
10.0D 45.0R		0.50		0.25	-
10.0D 45.0L TO 45.0R	43.8L	0.39		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+P2 current @ 0.270A
LED Tail function active and could not be disabled. Tail masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH3 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.48		0.25	-
10.0U V		0.56		0.25	-
10.0U 45.0R		0.32		0.25	-
10.0U 45.0L TO 45.0R	45.0R	0.30		0.25	-
5.0U 45.0L TO 45.0R	45.0R	0.34		0.25	-
H 45.0L		0.43		0.25	-
H V		0.53		0.25	-
H 45.0R		0.41		0.25	-
H 45.0L TO 45.0R	40.8R	0.39		0.25	-
5.0D 45.0L TO 45.0R	42.8L	0.37		0.25	-
10.0D 45.0L		0.39		0.25	-
10.0D V		0.63		0.25	-
10.0D 45.0R		0.43		0.25	-
10.0D 45.0L TO 45.0R	44.9L	0.40		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+P2 current @ 0.267A
LED Tail function active and could not be disabled. Tail masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH4 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.47		0.25	-
10.0U V		0.57		0.25	-
10.0U 45.0R		0.40		0.25	-
10.0U 45.0L TO 45.0R	44.6R	0.39		0.25	-
5.0U 45.0L TO 45.0R	44.2R	0.44		0.25	-
H 45.0L		0.66		0.25	-
H V		0.57		0.25	-
H 45.0R		0.40		0.25	-
H 45.0L TO 45.0R	44.6R	0.38		0.25	-
5.0D 45.0L TO 45.0R	43.5R	0.38		0.25	-
10.0D 45.0L		0.46		0.25	-
10.0D V		0.57		0.25	-
10.0D 45.0R		0.44		0.25	-
10.0D 45.0L TO 45.0R	44.2R	0.44		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+P2 current @ 0.269A
LED Tail function active and could not be disabled. Tail masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH1 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	11.894	3.00	0.232	0.05
H 20.0L	8.549	1.50	0.173	0.03
H V	15.300	4.50	0.311	0.07
H 20.0R	8.484	1.50	0.164	0.03
10.0D V	13.805	3.00	0.272	0.05
Side				
10.0U V	6.418	3.00	0.146	0.05
H 20.0L	5.525	1.50	0.127	0.03
H V	7.696	4.50	0.297	0.07
H 20.0R	3.959	1.50	0.165	0.03
10.0D V	6.794	3.00	0.182	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH2 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	6.621	3.00	0.218	0.05
H 20.0L	5.006	1.50	0.142	0.03
H V	9.217	4.50	0.238	0.07
H 20.0R	4.672	1.50	0.139	0.03
10.0D V	8.557	3.00	0.233	0.05
Side				
10.0U V	7.113	3.00	0.148	0.05
H 20.0L	5.495	1.50	0.100	0.03
H V	9.739	4.50	0.196	0.07
H 20.0R	4.294	1.50	0.108	0.03
10.0D V	7.420	3.00	0.173	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH3 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	6.547	3.00	0.213	0.05
H 20.0L	4.760	1.50	0.131	0.03
H V	9.212	4.50	0.237	0.07
H 20.0R	4.867	1.50	0.137	0.03
10.0D V	8.558	3.00	0.233	0.05
Side				
10.0U V	6.751	3.00	0.146	0.05
H 20.0L	5.228	1.50	0.117	0.03
H V	8.156	4.50	0.266	0.07
H 20.0R	4.900	1.50	0.135	0.03
10.0D V	7.183	3.00	0.184	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH4 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	7.714	3.00	0.229	0.05
H 20.0L	5.218	1.50	0.143	0.03
H V	11.355	4.50	0.376	0.07
H 20.0R	5.245	1.50	0.153	0.03
10.0D V	8.879	3.00	0.248	0.05
Side				
10.0U V	7.363	3.00	0.155	0.05
H 20.0L	4.853	1.50	0.080	0.03
H V	9.875	4.50	0.212	0.07
H 20.0R	5.466	1.50	0.118	0.03
10.0D V	7.606	3.00	0.169	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH1 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	7.525	3.00	0.219	0.05
H 20.0L	5.578	1.50	0.146	0.03
H V	11.179	4.50	0.373	0.07
H 20.0R	5.071	1.50	0.138	0.03
10.0D V	8.961	3.00	0.236	0.05
Side				
10.0U V	7.455	3.00	0.133	0.05
H 20.0L	5.396	1.50	0.111	0.03
H V	9.904	4.50	0.339	0.07
H 20.0R	5.136	1.50	0.076	0.03
10.0D V	7.515	3.00	0.161	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH2 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	7.077	3.00	0.215	0.05
H 20.0L	5.493	1.50	0.143	0.03
H V	10.989	4.50	0.360	0.07
H 20.0R	4.953	1.50	0.133	0.03
10.0D V	8.816	3.00	0.230	0.05
Side				
10.0U V	6.777	3.00	0.151	0.05
H 20.0L	4.626	1.50	0.126	0.03
H V	7.871	4.50	0.409	0.07
H 20.0R	5.091	1.50	0.117	0.03
10.0D V	6.781	3.00	0.164	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH3 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	7.537	3.00	0.208	0.05
H 20.0L	5.426	1.50	0.139	0.03
H V	10.132	4.50	0.252	0.07
H 20.0R	5.087	1.50	0.134	0.03
10.0D V	8.816	3.00	0.228	0.05
Side				
10.0U V	7.039	3.00	0.164	0.05
H 20.0L	4.613	1.50	0.140	0.03
H V	8.081	4.50	0.371	0.07
H 20.0R	5.507	1.50	0.132	0.03
10.0D V	6.935	3.00	0.175	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH4 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	7.101	3.00	0.202	0.05
H 20.0L	5.458	1.50	0.136	0.03
H V	9.493	4.50	0.240	0.07
H 20.0R	4.237	1.50	0.114	0.03
10.0D V	8.374	3.00	0.215	0.05
Side				
10.0U V	7.586	3.00	0.166	0.05
H 20.0L	5.983	1.50	0.120	0.03
H V	9.851	4.50	0.205	0.07
H 20.0R	4.488	1.50	0.088	0.03
10.0D V	7.616	3.00	0.150	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #1A & #1B

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Yellow
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
Sample Number: #1A					
10.0U 45.0L		3.84		0.62	-
10.0U V		4.38		0.62	-
10.0U 45.0R		4.77		0.62	-
10.0U 45.0L TO 45.0R	41.9L	3.74		0.62	-
5.0U 45.0L TO 45.0R	44.9L	3.79		0.62	-
H 45.0L		4.44		0.62	-
H V		4.48		0.62	-
H 45.0R		3.92		0.62	-
H 45.0L TO 45.0R	45.0R	3.93		0.62	-
5.0D 45.0L TO 45.0R	42.7R	3.93		0.62	-
10.0D 45.0L		4.74		0.62	-
10.0D V		4.47		0.62	-
10.0D 45.0R		3.63		0.62	-
10.0D 45.0L TO 45.0R	45.0R	3.63		0.62	-
Applied Voltage: 13.50V / 45mA after 30 min stabilization (<1%/5 min)					
Sample Number: #1B					
10.0U 45.0L		5.33		0.62	-
10.0U V		4.21		0.62	-
10.0U 45.0R		3.55		0.62	-
10.0U 45.0L TO 45.0R	45.0R	3.55		0.62	-
5.0U 45.0L TO 45.0R	45.0R	3.87		0.62	-
H 45.0L		3.97		0.62	-
H V		4.28		0.62	-
H 45.0R		3.97		0.62	-
H 45.0L TO 45.0R	45.0R	3.96		0.62	-
5.0D 45.0L TO 45.0R	45.0L	4.03		0.62	-
10.0D 45.0L		3.58		0.62	-
10.0D V		4.18		0.62	-
10.0D 45.0R		4.60		0.62	-
10.0D 45.0L TO 45.0R	45.0L	3.58		0.62	-
Applied Voltage: 13.50V / 44mA after 20 min stabilization (<1%/5 min)					

Samples meet test requirements at all points.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #2A & #2B

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Yellow
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
Sample Number: #2A					
10.0U 45.0L		3.77		0.62	-
10.0U V		4.43		0.62	-
10.0U 45.0R		4.72		0.62	-
10.0U 45.0L TO 45.0R	45.0L	3.77		0.62	-
5.0U 45.0L TO 45.0R	44.8L	3.72		0.62	-
H 45.0L		4.37		0.62	-
H V		4.54		0.62	-
H 45.0R		4.26		0.62	-
H 45.0L TO 45.0R	45.0R	4.26		0.62	-
5.0D 45.0L TO 45.0R	45.0R	3.87		0.62	-
10.0D 45.0L		4.61		0.62	-
10.0D V		4.52		0.62	-
10.0D 45.0R		3.72		0.62	-
10.0D 45.0L TO 45.0R	45.0R	3.72		0.62	-
Applied Voltage: 13.50V / 45mA after 15 min stabilization (<1%/5 min)					
Sample Number: #2B					
10.0U 45.0L		4.02		0.62	-
10.0U V		4.39		0.62	-
10.0U 45.0R		4.65		0.62	-
10.0U 45.0L TO 45.0R	39.7L	3.78		0.62	-
5.0U 45.0L TO 45.0R	45.0L	3.88		0.62	-
H 45.0L		4.06		0.62	-
H V		4.54		0.62	-
H 45.0R		3.72		0.62	-
H 45.0L TO 45.0R	45.0R	3.72		0.62	-
5.0D 45.0L TO 45.0R	45.0R	3.96		0.62	-
10.0D 45.0L		4.93		0.62	-
10.0D V		4.48		0.62	-
10.0D 45.0R		3.46		0.62	-
10.0D 45.0L TO 45.0R	45.0R	3.45		0.62	-
Applied Voltage: 13.50V / 45mA after 15 min stabilization (<1%/5 min)					

Samples meet test requirements at all points.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #3A & #3B

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Yellow
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
Sample Number: #3A					
10.0U 45.0L		4.06		0.62	-
10.0U V		4.34		0.62	-
10.0U 45.0R		4.82		0.62	-
10.0U 45.0L TO 45.0R	39.5L	3.79		0.62	-
5.0U 45.0L TO 45.0R	45.0L	3.82		0.62	-
H 45.0L		4.25		0.62	-
H V		4.50		0.62	-
H 45.0R		3.79		0.62	-
H 45.0L TO 45.0R	45.0R	3.79		0.62	-
5.0D 45.0L TO 45.0R	40.9R	4.05		0.62	-
10.0D 45.0L		4.91		0.62	-
10.0D V		4.50		0.62	-
10.0D 45.0R		3.62		0.62	-
10.0D 45.0L TO 45.0R	45.0R	3.62		0.62	-
Applied Voltage: 13.50V / 44mA after 15 min stabilization (<1%/5 min)					
Sample Number: #3B					
10.0U 45.0L		4.66		0.62	-
10.0U V		4.21		0.62	-
10.0U 45.0R		3.43		0.62	-
10.0U 45.0L TO 45.0R	45.0R	3.42		0.62	-
5.0U 45.0L TO 45.0R	45.0R	3.82		0.62	-
H 45.0L		3.90		0.62	-
H V		4.26		0.62	-
H 45.0R		3.92		0.62	-
H 45.0L TO 45.0R	45.0L	3.90		0.62	-
5.0D 45.0L TO 45.0R	44.9L	3.82		0.62	-
10.0D 45.0L		3.73		0.62	-
10.0D V		4.15		0.62	-
10.0D 45.0R		5.25		0.62	-
10.0D 45.0L TO 45.0R	41.9L	3.69		0.62	-
Applied Voltage: 13.50V / 45mA after 15 min stabilization (<1%/5 min)					

Samples meet test requirements at all points.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #4A & #4B

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Yellow
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
Sample Number: #4A					
10.0U 45.0L		3.56		0.62	-
10.0U V		4.36		0.62	-
10.0U 45.0R		4.42		0.62	-
10.0U 45.0L TO 45.0R	45.0L	3.56		0.62	-
5.0U 45.0L TO 45.0R	44.9L	3.85		0.62	-
H 45.0L		4.21		0.62	-
H V		4.48		0.62	-
H 45.0R		3.63		0.62	-
H 45.0L TO 45.0R	45.0R	3.62		0.62	-
5.0D 45.0L TO 45.0R	41.4R	3.90		0.62	-
10.0D 45.0L		4.72		0.62	-
10.0D V		4.42		0.62	-
10.0D 45.0R		3.61		0.62	-
10.0D 45.0L TO 45.0R	39.3R	3.58		0.62	-
Applied Voltage: 13.50V / 44mA after 15 min stabilization (<1%/5 min)					
Sample Number: #4B					
10.0U 45.0L		4.18		0.62	-
10.0U V		3.61		0.62	-
10.0U 45.0R		2.99		0.62	-
10.0U 45.0L TO 45.0R	45.0R	2.98		0.62	-
5.0U 45.0L TO 45.0R	45.0R	3.27		0.62	-
H 45.0L		3.40		0.62	-
H V		3.66		0.62	-
H 45.0R		3.35		0.62	-
H 45.0L TO 45.0R	45.0R	3.35		0.62	-
5.0D 45.0L TO 45.0R	44.6L	3.34		0.62	-
10.0D 45.0L		3.24		0.62	-
10.0D V		3.57		0.62	-
10.0D 45.0R		4.58		0.62	-
10.0D 45.0L TO 45.0R	43.3L	3.19		0.62	-
Applied Voltage: 13.50V / 45mA after 15 min stabilization (<1%/5 min)					

Samples meet test requirements at all points.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #s 1

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Yellow
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
1A				
10.0U V	18.411	7.50	0.402	0.13
H 20.0L	13.597	3.75	0.288	0.08
H V	20.575	11.25	0.554	0.18
H 20.0R	13.356	3.75	0.303	0.08
10.0D V	17.791	7.50	0.404	0.13
1B				
10.0U V	19.940	7.50	0.430	0.13
H 20.0L	12.746	3.75	0.328	0.08
H V	23.732	11.25	0.538	0.18
H 20.0R	12.947	3.75	0.339	0.08
10.0D V	18.741	7.50	0.401	0.13

Incident Illumination upon sample: 0.953 fc (10.26 Lux)

Samples meet test requirements at all points.

Aim: Lamps mounted horizontally with fixture seating plane perpendicular to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #s 2

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Yellow
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
2A				
10.0U V	20.624	7.50	0.387	0.13
H 20.0L	15.630	3.75	0.269	0.08
H V	23.736	11.25	0.526	0.18
H 20.0R	15.177	3.75	0.286	0.08
10.0D V	20.450	7.50	0.380	0.13
2B				
10.0U V	19.115	7.50	0.402	0.13
H 20.0L	14.368	3.75	0.285	0.08
H V	21.473	11.25	0.552	0.18
H 20.0R	13.933	3.75	0.300	0.08
10.0D V	18.639	7.50	0.404	0.13

Incident Illumination upon sample: 0.953 fc (10.26 Lux)

Samples meet test requirements at all points.

Aim: Lamps mounted horizontally with fixture seating plane perpendicular to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #s 3

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Yellow
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
3A				
10.0U V	18.924	7.50	0.405	0.13
H 20.0L	14.297	3.75	0.288	0.08
H V	21.300	11.25	0.546	0.18
H 20.0R	13.700	3.75	0.301	0.08
10.0D V	18.507	7.50	0.407	0.13
3B				
10.0U V	18.529	7.50	0.422	0.13
H 20.0L	11.898	3.75	0.330	0.08
H V	21.356	11.25	0.549	0.18
H 20.0R	11.944	3.75	0.341	0.08
10.0D V	16.919	7.50	0.408	0.13

Incident Illumination upon sample: 0.953 fc (10.26 Lux)

Samples meet test requirements at all points.

Aim: Lamps mounted horizontally with fixture seating plane perpendicular to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #s 4

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Yellow
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
4A				
10.0U V	17.285	7.50	0.436	0.13
H 20.0L	12.570	3.75	0.306	0.08
H V	19.234	11.25	0.565	0.18
H 20.0R	12.262	3.75	0.309	0.08
10.0D V	16.228	7.50	0.419	0.13
4B				
10.0U V	18.442	7.50	0.444	0.13
H 20.0L	12.326	3.75	0.353	0.08
H V	21.219	11.25	0.652	0.18
H 20.0R	11.408	3.75	0.358	0.08
10.0D V	16.726	7.50	0.436	0.13

Incident Illumination upon sample: 0.953 fc (10.26 Lux)

Samples meet test requirements at all points.

Aim: Lamps mounted horizontally with fixture seating plane perpendicular to projector axis at HV.

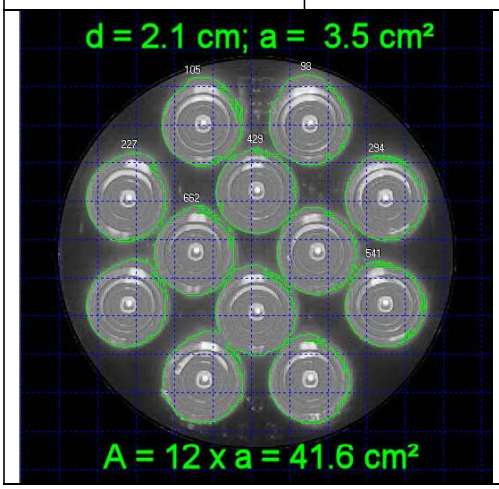
EPLLA TEST DATA SHEET

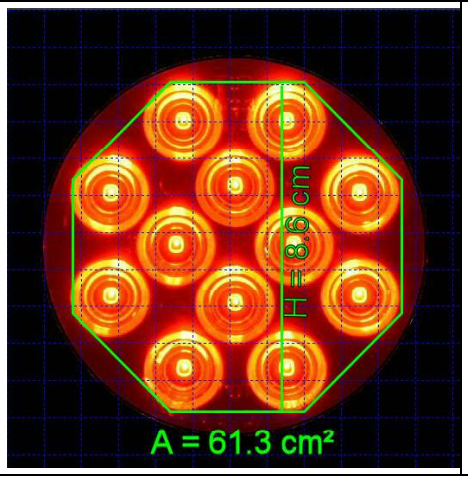
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

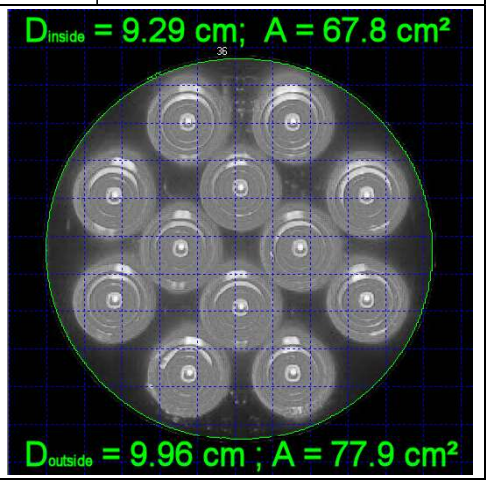
LENS AREA

Requirement: FMVSS 108 Table IV Effective Projected Luminous Lens Area
Test Method: CCITL Camera and image analysis and Geometric Method

Function	Effective Projected Illuminated Area (cm^2)		
	View	Measured	Minimum Required
Stop, Turn Signal	HV	41.6 Sum of the Optics 61.3 Encompassing LEDs 77.9 (lens physical dim.)	50 (vehicle <2032mm wide)







FMVSS 108 S4 Definitions

Effective light-emitting surface means that portion of a lamp that directs light to the photometric test pattern, and does not include transparent lenses, mounting hole bosses, reflex reflector area, beads or rims that may glow or produce small areas of increased intensity as a result of uncontrolled light from an area of ½° radius around a test point.

Effective projected luminous lens area means the area of the orthogonal projection of the effective light-emitting surface of a lamp on a plane perpendicular to a defined direction relative to the axis of reference. Unless otherwise specified, the direction is coincident with the axis of reference.

FMVSS 108 does not define what constitutes "glow" used in the effective light emitting surface definition. FMVSS 108 does not specify how the EPLLA is to be measured nor what characteristics define it. Specifically, FMVSS 108 does not state what luminance value is permitted for EPLLA consideration.

Sample meets EPLLA requirements when using the area encompassing the LEDs or the physical lens area.

VISIBILITY TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

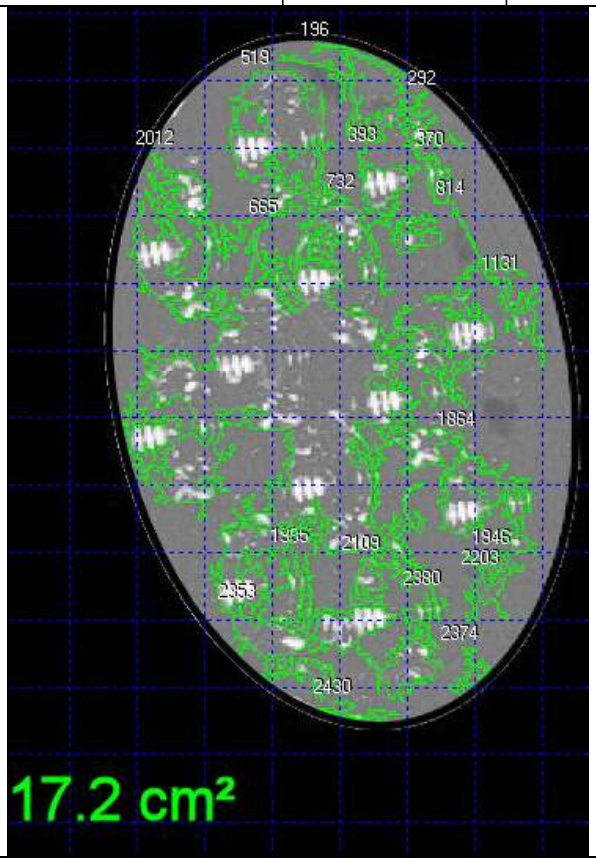
Sample Number: RH1

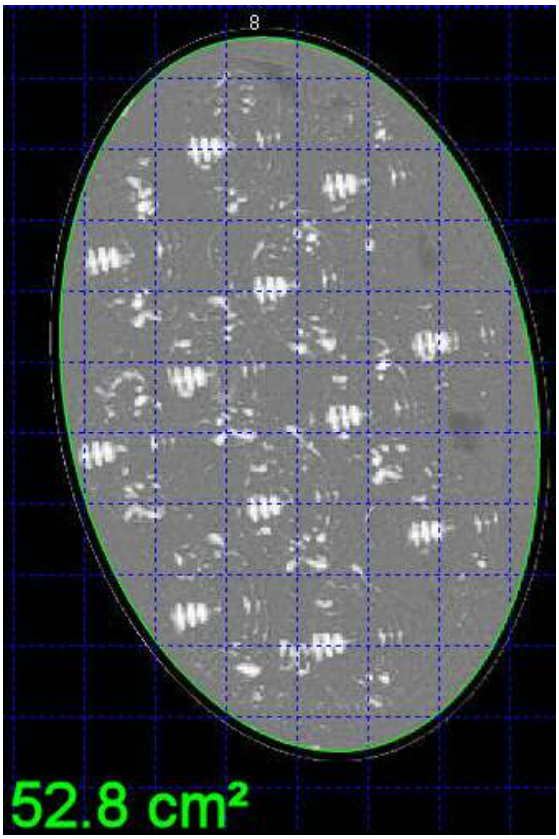
Requirement: FMVSS 108 Table V-b Effective Projected Luminous Lens Area throughout pattern from 15U/45IB to 15D/45OB

Test Method: CCITL Camera Image Analysis

EPLLA is symmetrical throughout beam pattern and the minimum EPLLA will be at any corner point. 15U/45L was arbitrarily chosen to confirm Visibility.

Function	Unobstructed Effective Projected Luminous Area		
	View	Measured	Minimum Required
Stop/Turn Signal Tail	15U/45L	17.2-52.8 cm²	12.5 cm²





Device meets minimum area visibility requirements.

COLOR TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: All RCLs

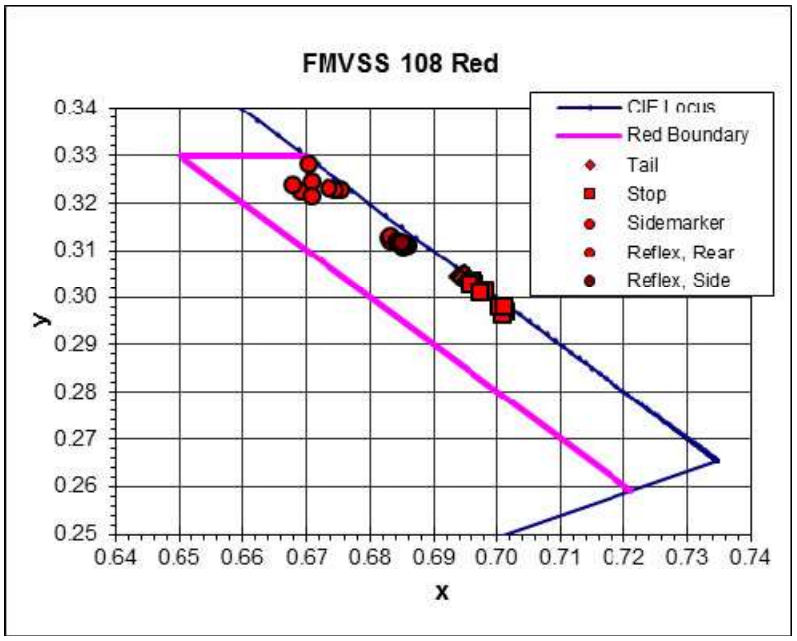
Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method (Average of 3 reads)
Instrument: Photo Research PR-655 Spectroradiometer with SRS-3 Target
Location: HV
Voltage: 13.5V

	Sample	Time	x	y
Tail	LH1	t=0	0.6942	0.3044
		t=stable	0.6948	0.3047
	LH2	t=0	0.6955	0.3042
		t=stable	0.6951	0.3034
	LH3	t=0	0.6947	0.3049
		t=stable	0.6947	0.3044
	LH4	t=0	0.6954	0.304
		t=stable	0.6951	0.3027
	RH1	t=0	0.6937	0.3043
		t=60min	0.6956	0.304
	RH2	t=0	0.6948	0.3048
		t=stable	0.6957	0.3037
	RH3	t=0	0.6944	0.3040
		t=stable	0.6953	0.3035
	RH4	t=0	0.6967	0.3022
		t=stable	0.6951	0.3027
Stop	LH1	t=0	0.6962	0.3031
		t=stable	0.7008	0.2978
	LH2	t=0	0.6965	0.3024
		t=stable	0.7014	0.297
	LH3	t=0	0.6962	0.3031
		t=stable	0.7008	0.2977
	LH4	t=0	0.6965	0.3024
		t=stable	0.7015	0.2967
	RH1	t=0	0.6961	0.3025
		t=60min	0.7010	0.2962
	RH2	t=0	0.6964	0.3033
		t=stable	0.7006	0.2977
	RH3	t=0	0.6958	0.3026
		t=stable	0.7012	0.2977
	RH4	t=0	0.6983	0.3013
		t=stable	0.6975	0.3008

Requirement & Chart

$y \leq 0.33$

$y \geq 0.98 - x$



Samples meet stop, tail, and turn Color requirements.

COLOR TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: All RCLs

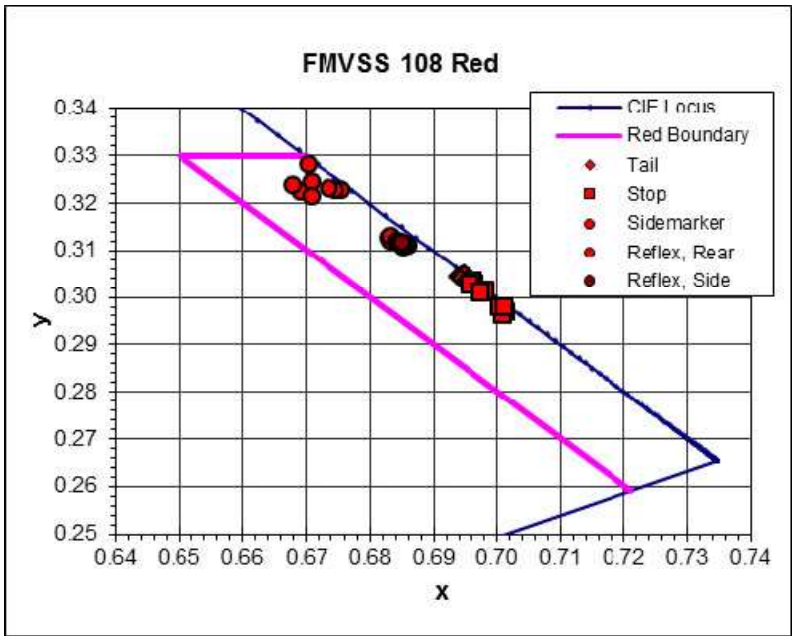
Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method (Average of 3 reads)
Instrument: Photo Research PR-655 Spectroradiometer with SRS-3 Target
Location: HV
Voltage: 14.0V

	Sample	Time	x	y
Red Marker	LH1	t=0	0.6691	0.3223
	LH2	t=0	0.6679	0.3238
	LH3	t=0	0.6710	0.3244
	LH4	t=0	0.6756	0.3227
	RH1	t=0	0.6703	0.3279
	RH2	t=0	0.6747	0.3228
	RH3	t=0	0.6709	0.3214
	RH4	t=0	0.6736	0.3229
Rear Reflex	LH1		0.6830	0.3126
	LH2		0.6842	0.3119
	LH3		0.6834	0.3120
	LH4		0.6834	0.3128
	RH1		0.6850	0.3110
	RH2		0.6844	0.3118
	RH3		0.6849	0.3116
	RH4		0.6851	0.3114
Side Reflex	LH1		0.6860	0.3109
	LH2		0.6849	0.3117
	LH3		0.6855	0.3113
	LH4		0.6852	0.3112
	RH1		0.6850	0.3113
	RH2		0.6853	0.3107
	RH3		0.6852	0.3114
	RH4		0.6851	0.3117

Requirement & Chart

$y \leq 0.33$

$y \geq 0.98 - x$



Samples meet red sidemarker and red reflex Color requirements.

COLOR TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: All AP2s

Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method (Average of 3 reads)
Instrument: Photo Research PR-655 Spectroradiometer with SRS-3 Target
Location: HV
Voltage: 14.0V

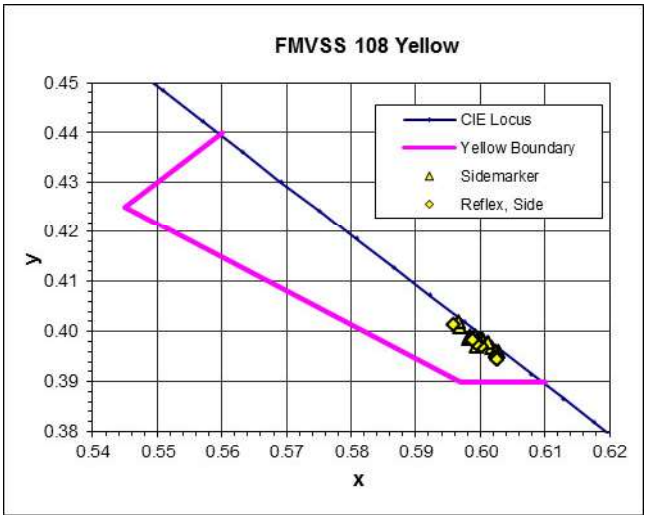
	Sample	Time	x	y
Amber Marker	#1A	t=0	0.6004	0.3982
		t=30min	0.5995	0.397
	#1B	t=0	0.5992	0.3984
		t=stable	0.5988	0.3984
	#2A	t=0	0.5968	0.4007
		t=stable	0.5967	0.4019
	#2B	t=0	0.5985	0.3989
		t=stable	0.5983	0.3985
	#3A	t=0	0.6002	0.3984
		t=stable	0.6005	0.398
	#3B	t=0	0.5992	0.3989
		t=stable	0.5987	0.3986
	#4A	t=0	0.6019	0.3968
		t=stable	0.6013	0.3976
	#4B	t=0	0.6029	0.3959
		t=stable	0.6024	0.3959
Amber Reflex	#1A		0.6003	0.3969
	#1B		0.5994	0.3979
	#2A		0.5959	0.4014
	#2B		0.5995	0.3975
	#3A		0.5989	0.3982
	#3B		0.6024	0.3949
	#4A		0.6027	0.3943
	#4B		0.6026	0.3944

Requirement & Chart

$y \geq 0.39$

$y \geq 0.79 - 0.67x$

$y \leq x - 0.12$



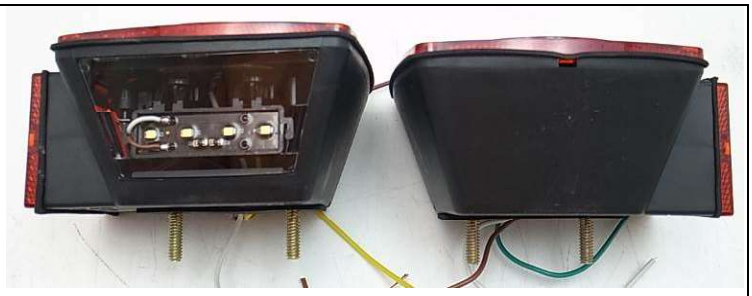
Samples meet amber sidemarker and amber reflex Color requirements.

PHOTOGRAPH SHEET

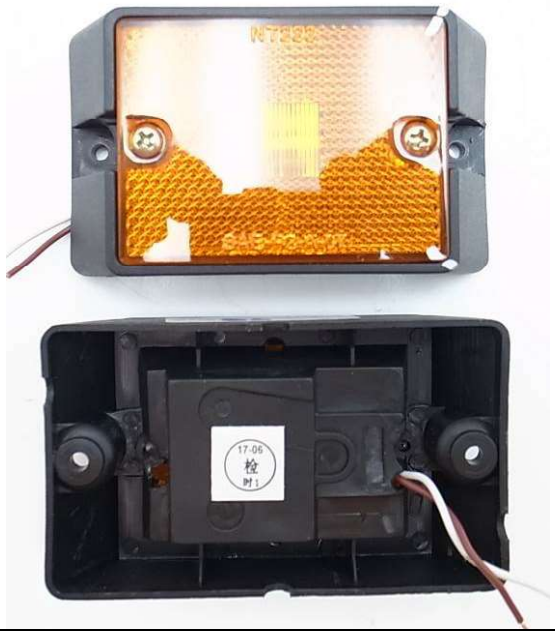
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

PHOTOGRAPH SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide



Date Code?



EQUIPMENT LIST

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

PHOTOMETRY / COLOR — Last Calibrated

Goniometer
ITL Custom with Aerotech ART-330, 320 Stepper Motors .....07 Jan 2015
[resolution 0.001°, accuracy ±0.01°(±0.05%)] .....[due every 5 years]

Luminous Intensity
Hoffman TSP-7501(HG), S/N 1060 .....15 Jan 2018
[0.1 Cd to 600 kCd, ±0.01 Cd, accuracy ±2.0%] ..... [due every 12 months]

Color – Spectroradiometric
Photoresearch PR-655 w/MS-75 lens & SRS-3 target,
S/N 65160706 .....02 Jun 2017
[resolution ±2nm, (x, y) ±0.001, ±4% luminance] ..... [due every 12 months]

Reflex Projector
Hoffman GPS-102, S/N 1006 .....before every test
[~1 fc (10 Lx) at 2856K (Illuminant A)] .....[due as needed]

Accurate Rated Bulbs
ITL-648 (194, 2.0 MSCd) .....15 Mar 2018

ELECTRICAL — Last Calibrated

DC Power Supply
HP6652A, S/N 3347A-01634 .....N/A
[500W, 0-20V, 0-25A] ..... [use DMMs for measurement]

Voltage
Fluke 45 (#1), S/N 7934019 .....15 Jan 2018
[resolution 0.01V, accuracy ±0.02%] ..... [due every 12 months]

Current
Keithley 197A (#1), S/N 741430 .....15 Jan 2018
[resolution 0.001A, accuracy ±0.02%] ..... [due every 12 months]

NHTSA Report No. 108-CAN-18-007-3%

LAMPS, REFLECTIVE DEVICES AND ASSOCIATED EQUIPMENT FMVSS-108

Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

CALCOAST – ITL
Lighting Technology
683 Thornton Street
San Leandro, CA 94577

20 December 2018

FINAL REPORT

PREPARED FOR

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE
Washington, D.C. 20590

NHTSA Report No. 108-CAN-18-007-3%

Prepared By: 

Approved By: 

Approval Date: 20 December 2018

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

Acceptance Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
108-CAN-18-007-3%	N/A	N/A

4. Title and Subtitle	5. Report Date
Test Series Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide	20 December 2018
	6. Performing Organization Code N/A

7. Author(s)	8. Performing Organization Report No.
Mark Evans Laboratory Director	171102-02D-3%

9. Performing Organization Name and Address	10. Work Unit No.
Calcoast - ITL 683 Thornton Street San Leandro, CA 94577	N/A
	11. Contract or Grant No. DTNH22-14-D-00370L

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 1200 New Jersey Avenue SE West Building – 4th Floor – NVS222 Washington, D.C. 20590	**14. Sponsoring Agency Code**

15. Supplementary Notes

16. Abstract

The scope of this testing was limited to certain photometry, color, visibility and EPLLA tests as indicated.

Test failures identified were as follows: 8 of 8 Stop/Turn photometry.

17. Key Words	18. Distribution Statement
Federal Motor Vehicle Safety Standard 108 Lamps, Reflective Devices and Associated Equipment	Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this report)	21. No. of Pages	22. Price
Unclassified	Unclassified	57	N/A

Report No.: 171102-02D-3%

TEST REPORT

Report Date: 15 October 2018

Project Name: Haul Master 62488 Trailer Light Kit
for Vehicles <2032 mm Wide
(SAE AIST AP2 L)

Submitted by: Purchased by CCITL for NHTSA
from Harbor Freight Tools (HFT)

Test Laboratory: Calcoast – ITL
San Leandro, CA 94577

Samples Submitted: Four (4) 62488 Kits purchased 31 October 2017

SUMMARY

TESTS (FMVSS-108)

Photometric Tests – Combination Lamp System (3-lighted section device)

Red Turn Signal Lamp - S7.1.2.13 / Table VII	**Failed**
Tail Lamp - S7.2.13 / Table VII	Passed
Stop Lamp - S7.3.13 / Table IX	**Failed**
Red Sidemarker Lamp - S7.4.13 / Table X	Passed
Amber Sidemarker Lamp - S7.4.13 / Table X	Passed
License Plate Lamp - S7.7.13	Not Tested
Red Reflex Reflector, Rear - S8.1.11 / Table XVI	Passed
Red Reflex Reflector, Side - S8.1.11 / Table XVI	Passed
Amber Reflex Reflector, Side - S8.1.11 / Table XVI	Passed

Lens Area Tests (EPLLA) – Table IV-a	Passed
Visibility Tests – Table V-b, Lens Area Method	Passed
Bulb Socket Test- S14.2	Not Applicable
Color Tests – S14.4.1	Passed
Plastic Optical Material Tests – S14.4.2	Unknown
Physical (Mechanical) Tests – S14.5	Not Tested

Written and Approved by:

Mark A. Evans
Laboratory Director

DESCRIPTION SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

DESCRIPTION:
The trailer kit has LH/RH rear mounted combination lamps (RCLs) with Stop, Tail, Turn Signal, Side Marker, Rear Reflex, Side Reflex and License (LH Only) functions. The kits also have two (2) side mounted amber sidemarker with reflex.
The system uses LED light sources for all functions except the red sidemarker which utilizes a 194 incandescent bulb.

MARKINGS:

RCL:

REAR LENS:	"TOP", "NT223", "SAE (3)S(3)I(3)TLP2A07", "DOT", "SAE (3)S(3)I(3)TLP2A07", "DOT"
SIDE LENS:	"NT223", "SAE-P2-A-07"
L.P. LENS:	None
HOUSING:	"STOP&TURN (YELLOW)" or "STOP&TURN (GREEN)", "TAIL (BROWN)", " ↑ TOP", "L.H." or "R.H.", "ROAD SIDE" or "CURB SIDE", "MADE IN CHINA" On Sticker – "17-06" possible date code On-Sticker (LH Lamps Only) – "ITEM 62488", "Serial: 353261725"

AP2 Lamp:

LENS:	"NT223", "SAE-P2-A-07" On Sticker – "17-06" possible date code

LENS:

MATERIAL:	
RCL:	PMMA (Red or Clear)
AP2 Lamp:	PMMA (Amber) *Lens material formulation, pigment, and coating must comply with FMVSS 108 S14.4.2 Plastic optical materials 3 year weathering requirements.*
GASKET:	Foam

HOUSING:

MATERIAL:	Plastic
METHOD OF MOUNTING:	Two (2) bolts or screws to vehicle
GASKET:	None

BULB USED:	FUNCTION	QUANTITY	TRADE NO.	VOLTAGE	POWER	FLUX
	SI	12	LED	13.5V	27W	-
	T			13.5V	-	-
	Red P2	1	194	14.0V	5W	2 MSCd
	L	4	LED	13.5V	-	-
	Amber P2	Unknown	LED	13.5V	0.6W	-

Note: No material description provided by the manufacturer.

PHOTOMETRY SUMMARY SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

PHOTOMETRIC TESTS

Specification(s): FMVSS 108
Tests performed by: MAE Date: 9/26/2018-10/10/2018, 12/10-11/2018

SUMMARY OF PHOTOMETRIC TESTS

Samples meet requirements at all points for:

S7.2.13 / Table VII	Tail Lamps
S7.4.13 / Table X	Sidemarker Lamps (Red)
S7.4.13 / Table X	Sidemarker Lamps (Amber)
S8.1.11 / Table XVI	Reflex Reflectors (Red Side)
S8.1.11 / Table XVI	Reflex Reflectors (Red Rear)
S8.1.11 / Table XVI	Reflex Reflectors (Amber Side)

Samples **do not** meet requirements at all points for:

S7.1.2.13 / Table VII	Rear Turn Signal Lamps
S7.3.13 / Table IX	Stop Lamps

Samples mounted on ITL universal fixture with mounting surface perpendicular to the detector axis at HV.

Reference detector control number: NIST P181-2

Test distance: 100 feet

Samples tested using accurate rated 194 bulbs at design flux or 13.5V for LED functions.
The LED functions were allowed to operate for 30 minutes or until stabilized with less than 3% change in 15 minutes.

LED Function Intensity vs Voltage

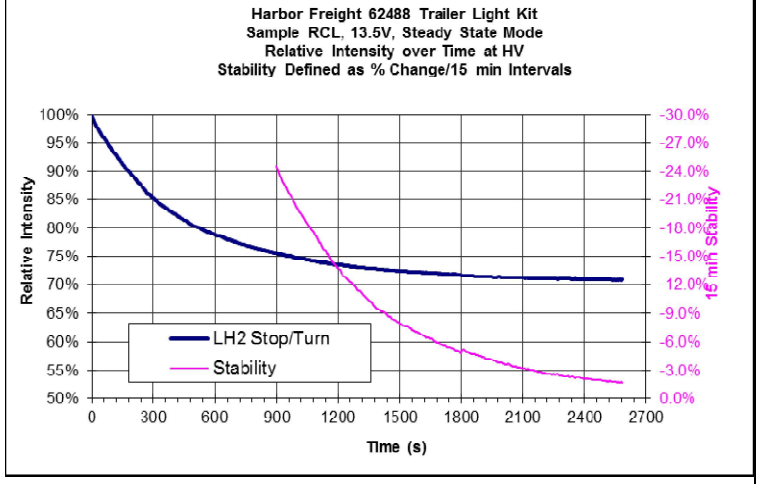
	12.0V	12.8V	13.5V	14.0V
Tail	76	89	100	109
Stop	80	92	100	107
Marker	83	92	100	106

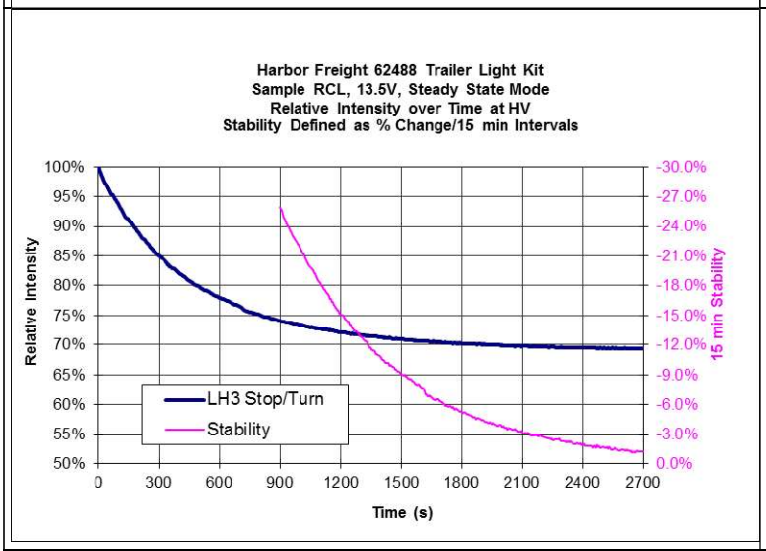
PHOTOMETRIC TEST DATA SHEET

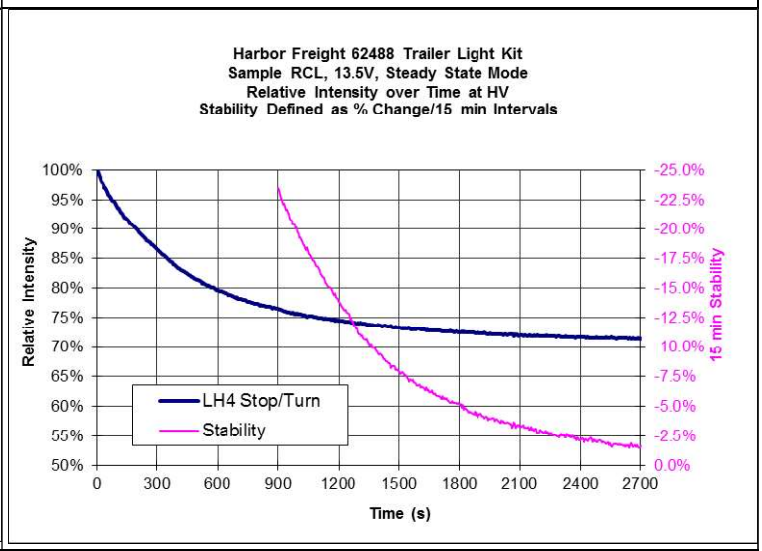
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

TIMELOGS

LH Stop/Turn Function







	LH1 Stop/Turn	LH2 Stop/Turn	LH3 Stop/Turn	LH4 Stop/Turn
Max:	220.6	276.8	304.8	281.1
Ratios				
1min/10min	1.218	1.217	1.229	1.206
10min/Xmin	1.071	1.112	1.127	1.115
1min/Xmin	1.304	1.353	1.385	1.345

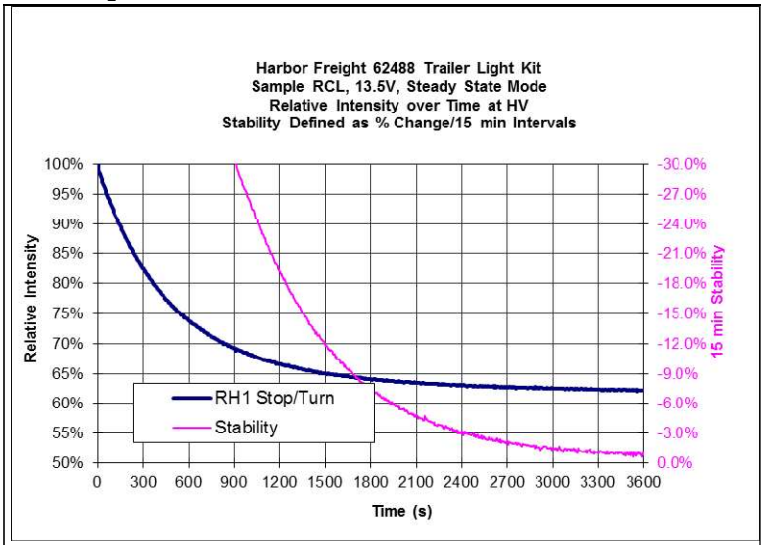
Stop/Turn functions reached 3%/15 min stability between 30-45 minutes.

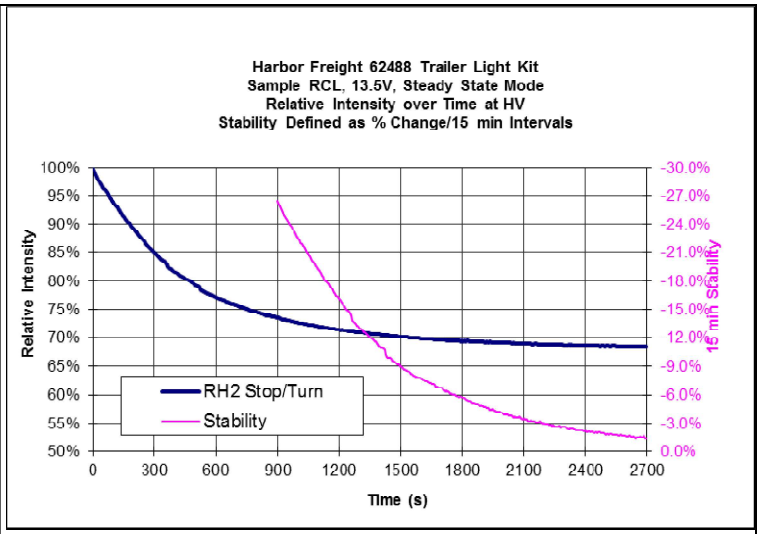
PHOTOMETRIC TEST DATA SHEET

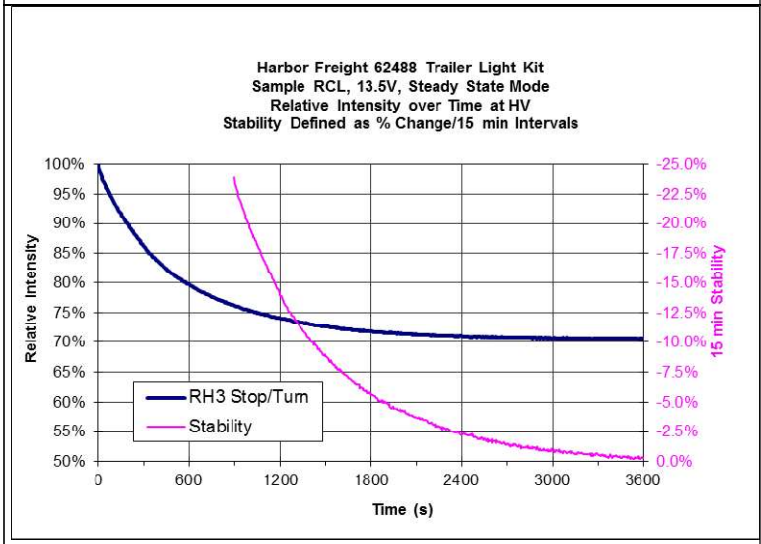
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

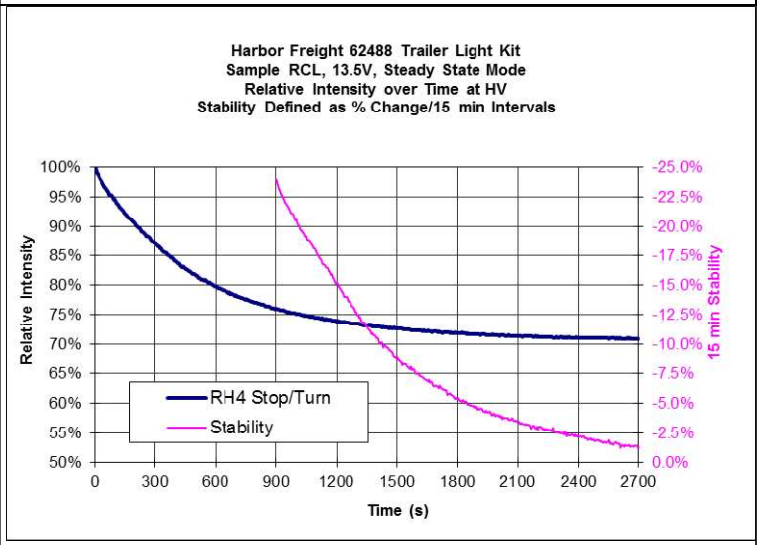
TIMELOGS

RH Stop/Turn Function









	RH1 Stop/Turn	RH2 Stop/Turn	RH3 Stop/Turn	RH4 Stop/Turn
Max:	294.7	258.8	290.9	284.4
Ratios				
1min/10min	1.285	1.246	1.203	1.210
10min/Xmin	1.187	1.127	1.129	1.131
1min/Xmin	1.525	1.403	1.358	1.368

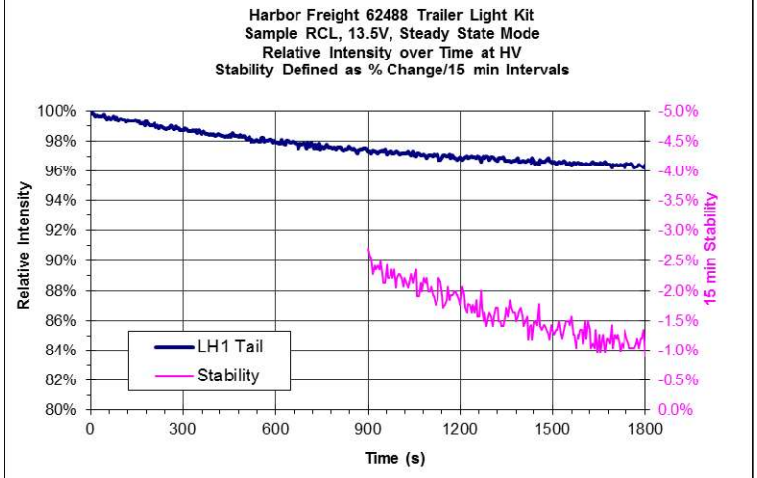
Stop/Turn functions reached 3%/15 min stability within 30-45 minutes.

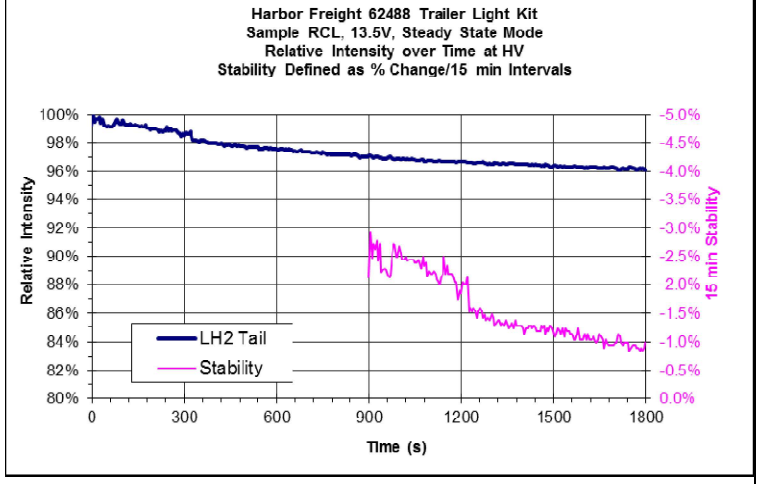
PHOTOMETRIC TEST DATA SHEET

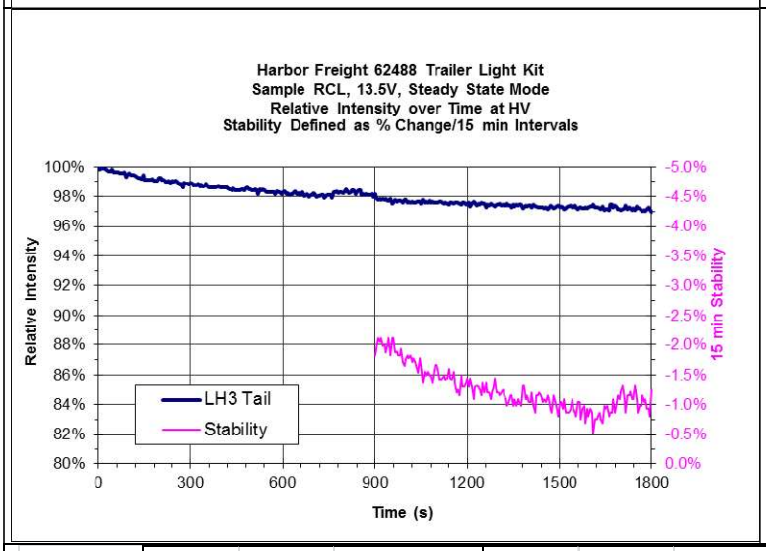
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

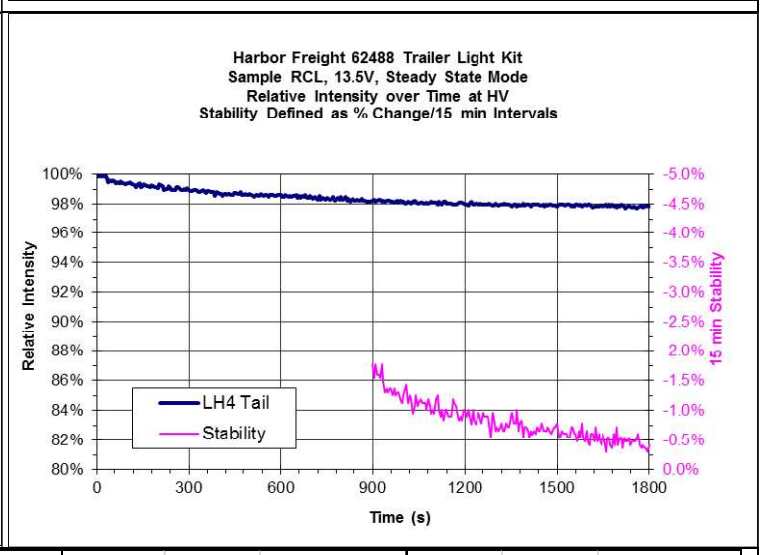
TIMELOGS

LH Tail Function









	LH1 Tail	LH2 Tail	LH3 Tail	LH4 Tail
Max:	13.7	17.2	17.6	17.0
Ratios				
1min/10min	1.017	1.017	1.014	1.010
10min/30min	1.015	1.015	1.014	1.008
1min/30min	1.033	1.031	1.028	1.017

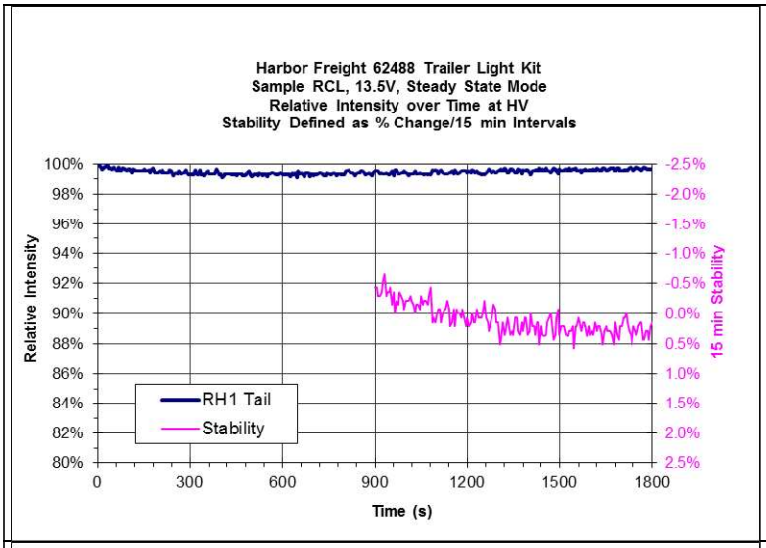
Tail function reached 3%/15 min stability within 15 minutes.

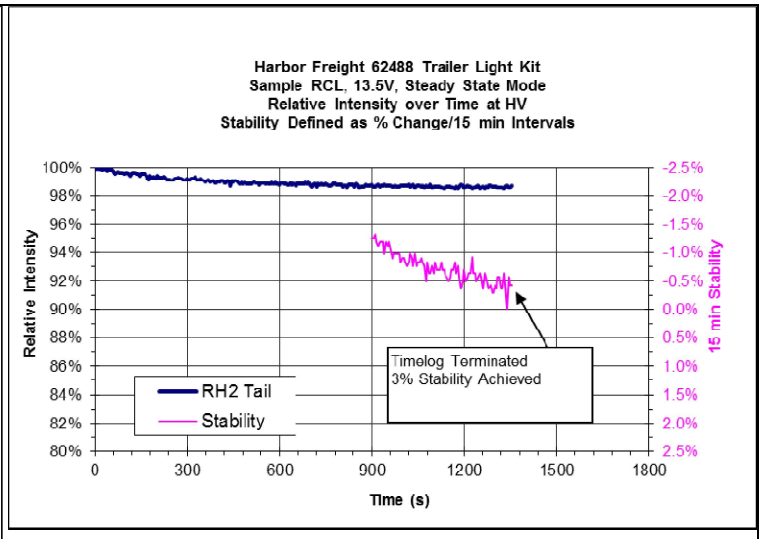
PHOTOMETRIC TEST DATA SHEET

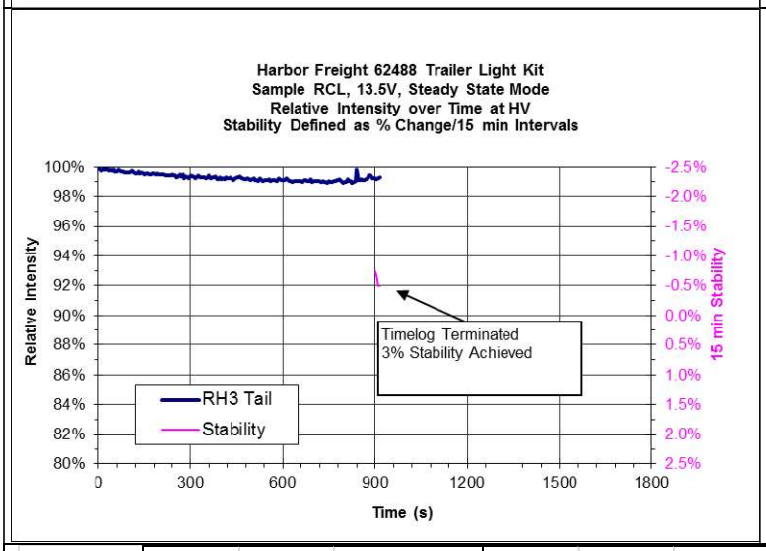
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

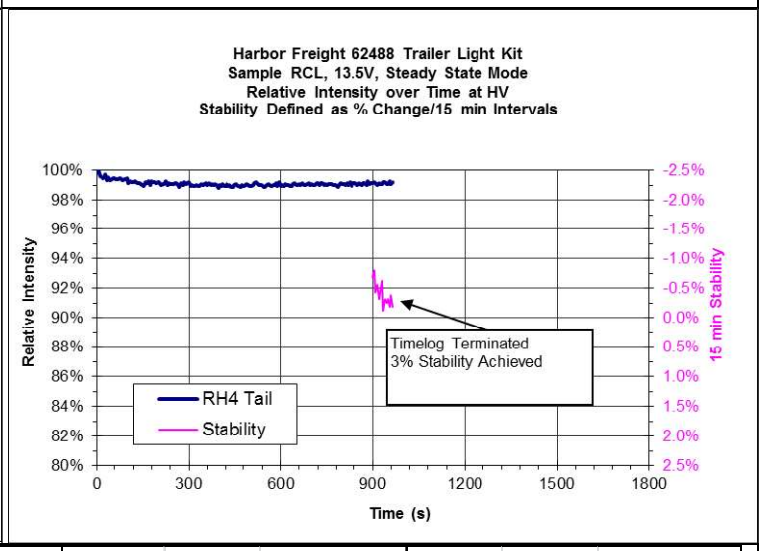
TIMELOGS

RH Tail Function









	RH1 Tail	RH2 Tail	RH3 Tail	RH4 Tail
Max:	13.9	14.4	16.3	16.2
Ratios				
1min/10min	1.003	1.010	1.006	1.005
10min/stable	0.996	#DIV/0!	0.998	0.998
1min/stable	0.999	1.011	1.004	1.002

Tail function reached 3%/15 min stability within 15 minutes.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH1, Post 3% stability warmup

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		72.18		22	420
10.0U 5.0R		72.09		22	420
5.0U 20.0L		28.67		15	420
5.0U 10.0L		77.39		40	420
5.0U V		132.73		95	420
5.0U 10.0R		79.83		40	420
5.0U 20.0R		31.30		15	420
H 10.0L		95.12		55	420
H 5.0L		133.25		110	420
H V		172.34		110	420
H 5.0R		154.84		110	420
H 10.0R		99.77		55	420
5.0D 20.0L		35.01		15	420
5.0D 10.0L		90.05		40	420
5.0D V		277.13		95	420
5.0D 10.0R		98.00		40	420
5.0D 20.0R		37.52		15	420
10.0D 5.0L		104.60		22	420
10.0D 5.0R		112.90		22	420
MAXIMUM	3.2D 0.9R	444.61 (541.5 Cd @ t = 1 min)*		-	420
Zone 1		240.46		70	-
Zone 2		262.56		135	-
Zone 3		870.30		520	-
Zone 4		277.59		135	-
Zone 5		253.82		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 495.5 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 239mA after 30 minutes 3% stabilization warmup
Measured Values multiplied by 1.071 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.218 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH2, Post 3% stability warmup

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		63.88		22	420
10.0U 5.0R		63.94		22	420
5.0U 20.0L		35.81		15	420
5.0U 10.0L		68.50		40	420
5.0U V		171.74		95	420
5.0U 10.0R		70.29		40	420
5.0U 20.0R		34.93		15	420
H 10.0L		92.47		55	420
H 5.0L		191.45		110	420
H V		217.42		110	420
H 5.0R		197.25		110	420
H 10.0R		90.11		55	420
5.0D 20.0L		37.45		15	420
5.0D 10.0L		84.77		40	420
5.0D V		234.65		95	420
5.0D 10.0R		85.98		40	420
5.0D 20.0R		37.16		15	420
10.0D 5.0L		103.09		22	420
10.0D 5.0R		100.81		22	420
MAXIMUM	1.9D 0.3R	392.37	(477.5 Cd @ t = 1 min)*	-	420
Zone 1		240.22		70	-
Zone 2		245.73		135	-
Zone 3		1012.52		520	-
Zone 4		246.38		135	-
Zone 5		236.84		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 436.9 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 234mA after 45 minutes 3% stabilization warmup
Measured Values multiplied by 1.112 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.217 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH3, Post 3% stability warmup

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		67.74		22	420
10.0U 5.0R		66.88		22	420
5.0U 20.0L		36.74		15	420
5.0U 10.0L		71.04		40	420
5.0U V		173.23		95	420
5.0U 10.0R		72.89		40	420
5.0U 20.0R		37.20		15	420
H 10.0L		92.36		55	420
H 5.0L		203.48		110	420
H V		237.40		110	420
H 5.0R		227.19		110	420
H 10.0R		91.99		55	420
5.0D 20.0L		38.44		15	420
5.0D 10.0L		84.59		40	420
5.0D V		281.71		95	420
5.0D 10.0R		86.46		40	420
5.0D 20.0R		39.29		15	420
10.0D 5.0L		98.80		22	420
10.0D 5.0R		97.40		22	420
MAXIMUM	2.2D 0.3R	431.30	(530.0 Cd @ t = 1 min)*	-	420
Zone 1		241.71		70	-
Zone 2		247.98		135	-
Zone 3		1123.02		520	-
Zone 4		251.33		135	-
Zone 5		240.77		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 507.5 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 244mA after 60 minutes 3% stabilization warmup
Measured Values multiplied by 1.127 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.229 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH4, Post 3% stability warmup

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		69.19		22	420
10.0U 5.0R		69.81		22	420
5.0U 20.0L		36.80		15	420
5.0U 10.0L		73.42		40	420
5.0U V		159.52		95	420
5.0U 10.0R		75.50		40	420
5.0U 20.0R		36.32		15	420
H 10.0L		95.74		55	420
H 5.0L		202.41		110	420
H V		222.76		110	420
H 5.0R		174.95		110	420
H 10.0R		97.42		55	420
5.0D 20.0L		39.03		15	420
5.0D 10.0L		86.84		40	420
5.0D V		271.77		95	420
5.0D 10.0R		90.93		40	420
5.0D 20.0R		38.71		15	420
10.0D 5.0L		103.55		22	420
10.0D 5.0R		104.12		22	420
MAXIMUM	2.5D 0.2L	386.55	(466.2 Cd @ t = 1 min)*	-	420
Zone 1		248.57		70	-
Zone 2		256.00		135	-
Zone 3		1031.41		520	-
Zone 4		263.86		135	-
Zone 5		248.95		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 448.6 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 233mA after 60 minutes 3% stabilization warmup
Measured Values multiplied by 1.115 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.206 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH1, Post 3% stability warmup

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		83.52		22	420
10.0U 5.0R		83.71		22	420
5.0U 20.0L		40.33		15	420
5.0U 10.0L		88.39		40	420
5.0U V		200.58		95	420
5.0U 10.0R		91.14		40	420
5.0U 20.0R		41.11		15	420
H 10.0L		118.28		55	420
H 5.0L		187.40		110	420
H V		217.23		110	420
H 5.0R		207.52		110	420
H 10.0R		119.35		55	420
5.0D 20.0L		44.34		15	420
5.0D 10.0L		109.87		40	420
5.0D V		196.88		95	420
5.0D 10.0R		113.43		40	420
5.0D 20.0R		44.53		15	420
10.0D 5.0L		131.46		22	420
10.0D 5.0R		133.11		22	420
MAXIMUM	1.1D 0.1L	330.07	(424.1 Cd @ t = 1 min)*	-	420
Zone 1		299.65		70	-
Zone 2		316.53		135	-
Zone 3		1009.61		520	-
Zone 4		323.92		135	-
Zone 5		302.46		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 388.1 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 291mA after 60 minutes 3% stabilization warmup
Measured Values multiplied by 1.187 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.285 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH2, Post 3% stability warmup

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		71.80		22	420
10.0U 5.0R		69.54		22	420
5.0U 20.0L		37.16		15	420
5.0U 10.0L		77.81		40	420
5.0U V		143.43		95	420
5.0U 10.0R		76.03		40	420
5.0U 20.0R		34.07		15	420
H 10.0L		104.96		55	420
H 5.0L		171.27		110	420
H V		198.71		110	420
H 5.0R		152.57		110	420
H 10.0R		98.14		55	420
5.0D 20.0L		39.76		15	420
5.0D 10.0L		92.92		40	420
5.0D V		224.43		95	420
5.0D 10.0R		89.90		40	420
5.0D 20.0R		37.81		15	420
10.0D 5.0L		107.68		22	420
10.0D 5.0R		103.35		22	420
MAXIMUM	2.2D 0.3L	340.16	(423.8 Cd @ t = 1 min)*	-	420
Zone 1		256.41		70	-
Zone 2		275.70		135	-
Zone 3		890.40		520	-
Zone 4		264.07		135	-
Zone 5		244.77		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 387.8 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 242mA after 45 minutes 3% stabilization warmup
Measured Values multiplied by 1.127 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.246 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH3, Post 3% stability warmup

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		71.10		22	420
10.0U 5.0R		69.80		22	420
5.0U 20.0L		38.53		15	420
5.0U 10.0L		76.47		40	420
5.0U V		176.53		95	420
5.0U 10.0R		74.68		40	420
5.0U 20.0R		36.73		15	420
H 10.0L		98.29		55	420
H 5.0L		200.22		110	420
H V		231.87		110	420
H 5.0R		188.23		110	420
H 10.0R		91.18		55	420
5.0D 20.0L		40.59		15	420
5.0D 10.0L		88.81		40	420
5.0D V		301.17		95	420
5.0D 10.0R		84.10		40	420
5.0D 20.0R		38.72		15	420
10.0D 5.0L		101.41		22	420
10.0D 5.0R		97.74		22	420
MAXIMUM	2.3D 1.0L	436.16	(524.7 Cd @ t = 1 min)*	-	420
Zone 1		251.63		70	-
Zone 2		263.57		135	-
Zone 3		1098.02		520	-
Zone 4		249.97		135	-
Zone 5		242.99		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 480.1 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 243mA after 60 minutes 3% stabilization warmup
Measured Values multiplied by 1.129 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.203 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH4, Post 3% stability warmup

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		66.97		22	420
10.0U 5.0R		67.07		22	420
5.0U 20.0L		36.95		15	420
5.0U 10.0L		71.45		40	420
5.0U V		172.15		95	420
5.0U 10.0R		74.21		40	420
5.0U 20.0R		37.16		15	420
H 10.0L		94.47		55	420
H 5.0L		198.53		110	420
H V		225.17		110	420
H 5.0R		196.54		110	420
H 10.0R		95.34		55	420
5.0D 20.0L		39.34		15	420
5.0D 10.0L		88.01		40	420
5.0D V		228.22		95	420
5.0D 10.0R		90.86		40	420
5.0D 20.0R		38.73		15	420
10.0D 5.0L		106.34		22	420
10.0D 5.0R		108.27		22	420
MAXIMUM	2.0D 0.8L	350.89	(424.6 Cd @ t = 1 min)*	-	420
Zone 1		249.60		70	-
Zone 2		253.93		135	-
Zone 3		1020.62		520	-
Zone 4		260.42		135	-
Zone 5		251.23		70	-

*** - Denotes Failure.**
t = 1 minute maximum @ 12.8V is 388.5 Cd with 0.915 as a 12.8V/13.5V multiplier

Applied Voltage: 13.50V / 242mA after 45 minutes 3% stabilization warmup
Measured Values multiplied by 1.131 to acquire above t = 10 minute values
and MAXIMUM multiplied by 1.210 to acquire above t = 1 minute value.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH1, Post 3% stability warmup

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.91		1.0	25.0
10.0U 5.0R		4.91		1.0	25.0
5.0U 20.0L		2.06		0.7	25.0
5.0U 10.0L		5.40		2.0	25.0
5.0U V		9.98		4.5	25.0
5.0U 10.0R		5.53		2.0	25.0
5.0U 20.0R		2.35		0.7	25.0
H 10.0L		6.60		2.0	25.0
H 5.0L		10.22		5.0	25.0
H V		13.12		5.0	25.0
H 5.0R		12.41		5.0	25.0
H 10.0R		7.20		2.0	25.0
5.0D 20.0L		2.53		0.7	-
5.0D 10.0L		6.14		2.0	-
5.0D V		19.84		4.5	-
5.0D 10.0R		7.02		2.0	-
5.0D 20.0R		2.75		0.7	-
10.0D 5.0L		7.31		1.0	-
10.0D 5.0R		8.11		1.0	-
MX(H-90U/45L-45R)	H 1.5R	13.85	(14.31Cd @ t = 1min)	-	25.0
MAXIMUM	2.9D 0.6R	33.93		-	-
Zone 1		16.81		3.5	-
Zone 2		18.15		6.0	-
Zone 3		65.57		24.0	-
Zone 4		19.74		6.0	-
Zone 5		18.11		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 54mA after 30 minutes stabilization warmup
Current includes license plate lamp function.
MX(H-90U/45L-45R) multiplied by 1.033 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH2, Post 3% stability warmup

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.54		1.0	25.0
10.0U 5.0R		4.55		1.0	25.0
5.0U 20.0L		2.64		0.7	25.0
5.0U 10.0L		4.88		2.0	25.0
5.0U V		11.97		4.5	25.0
5.0U 10.0R		5.00		2.0	25.0
5.0U 20.0R		2.58		0.7	25.0
H 10.0L		6.53		2.0	25.0
H 5.0L		14.91		5.0	25.0
H V		16.52		5.0	25.0
H 5.0R		14.54		5.0	25.0
H 10.0R		6.46		2.0	25.0
5.0D 20.0L		2.73		0.7	-
5.0D 10.0L		5.99		2.0	-
5.0D V		18.39		4.5	-
5.0D 10.0R		6.08		2.0	-
5.0D 20.0R		2.74		0.7	-
10.0D 5.0L		7.27		1.0	-
10.0D 5.0R		7.03		1.0	-
MX(H-90U/45L-45R)	H 1.1R	16.77	(17.29Cd @ t = 1min)	-	25.0
MAXIMUM	2.1D 0.1R	30.86		-	-
Zone 1		17.18		3.5	-
Zone 2		17.41		6.0	-
Zone 3		76.33		24.0	-
Zone 4		17.54		6.0	-
Zone 5		16.90		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 54mA after 30 minutes stabilization warmup
Current includes license plate lamp function.
MX(H-90U/45L-45R) multiplied by 1.031 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH3, Post 3% stability warmup

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.52		1.0	25.0
10.0U 5.0R		4.49		1.0	25.0
5.0U 20.0L		2.47		0.7	25.0
5.0U 10.0L		4.81		2.0	25.0
5.0U V		11.22		4.5	25.0
5.0U 10.0R		4.87		2.0	25.0
5.0U 20.0R		2.57		0.7	25.0
H 10.0L		6.22		2.0	25.0
H 5.0L		14.87		5.0	25.0
H V		17.17		5.0	25.0
H 5.0R		15.58		5.0	25.0
H 10.0R		6.32		2.0	25.0
5.0D 20.0L		2.64		0.7	-
5.0D 10.0L		5.77		2.0	-
5.0D V		21.59		4.5	-
5.0D 10.0R		5.94		2.0	-
5.0D 20.0R		2.72		0.7	-
10.0D 5.0L		6.75		1.0	-
10.0D 5.0R		6.77		1.0	-
MX(H-90U/45L-45R)	H V	17.44	(17.93Cd @ t = 1min)	-	25.0
MAXIMUM	2.2D 0.5R	31.86		-	-
Zone 1		16.38		3.5	-
Zone 2		16.80		6.0	-
Zone 3		80.42		24.0	-
Zone 4		17.13		6.0	-
Zone 5		16.55		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 54mA after 30 minutes stabilization warmup
Current includes license plate lamp function.
MX(H-90U/45L-45R) multiplied by 1.028 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH4, Post 3% stability warmup

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.70		1.0	25.0
10.0U 5.0R		4.74		1.0	25.0
5.0U 20.0L		2.59		0.7	25.0
5.0U 10.0L		5.00		2.0	25.0
5.0U V		11.44		4.5	25.0
5.0U 10.0R		5.20		2.0	25.0
5.0U 20.0R		2.54		0.7	25.0
H 10.0L		6.64		2.0	25.0
H 5.0L		14.79		5.0	25.0
H V		16.59		5.0	25.0
H 5.0R		12.56		5.0	25.0
H 10.0R		6.66		2.0	25.0
5.0D 20.0L		2.72		0.7	-
5.0D 10.0L		6.09		2.0	-
5.0D V		21.08		4.5	-
5.0D 10.0R		6.30		2.0	-
5.0D 20.0R		2.69		0.7	-
10.0D 5.0L		7.26		1.0	-
10.0D 5.0R		7.29		1.0	-
MX(H-90U/45L-45R)	H 0.3R	16.71	(16.99Cd @ t = 1min)	-	25.0
MAXIMUM	2.4D 0.1L	30.12		-	-
Zone 1		17.27		3.5	-
Zone 2		17.73		6.0	-
Zone 3		76.46		24.0	-
Zone 4		18.16		6.0	-
Zone 5		17.26		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 54mA after 30 minutes 3% stabilization warmup
Current includes license plate lamp function.
MX(H-90U/45L-45R) multiplied by 1.017 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH1, Post 3% stability warmup

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.68		1.0	25.0
10.0U 5.0R		4.65		1.0	25.0
5.0U 20.0L		2.39		0.7	25.0
5.0U 10.0L		5.04		2.0	25.0
5.0U V		11.75		4.5	25.0
5.0U 10.0R		5.01		2.0	25.0
5.0U 20.0R		2.39		0.7	25.0
H 10.0L		6.85		2.0	25.0
H 5.0L		11.62		5.0	25.0
H V		13.85		5.0	25.0
H 5.0R		13.60		5.0	25.0
H 10.0R		6.65		2.0	25.0
5.0D 20.0L		2.60		0.7	-
5.0D 10.0L		6.39		2.0	-
5.0D V		12.63		4.5	-
5.0D 10.0R		6.44		2.0	-
5.0D 20.0R		2.57		0.7	-
10.0D 5.0L		7.79		1.0	-
10.0D 5.0R		7.57		1.0	-
MX(H-90U/45L-45R)	H 0.2R	13.89	(13.89Cd @ t = 1min)	-	25.0
MAXIMUM	1.5D 0.5R	21.26		-	-
Zone 1		17.46		3.5	-
Zone 2		18.28		6.0	-
Zone 3		63.44		24.0	-
Zone 4		18.09		6.0	-
Zone 5		17.18		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 13mA after 30 minutes 3% stabilization warmup
MX(H-90U/45L-45R) multiplied by 0.999 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH2, Post 3% stability warmup

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.58		1.0	25.0
10.0U 5.0R		4.50		1.0	25.0
5.0U 20.0L		2.47		0.7	25.0
5.0U 10.0L		5.05		2.0	25.0
5.0U V		10.54		4.5	25.0
5.0U 10.0R		4.89		2.0	25.0
5.0U 20.0R		2.27		0.7	25.0
H 10.0L		6.73		2.0	25.0
H 5.0L		12.10		5.0	25.0
H V		14.21		5.0	25.0
H 5.0R		11.44		5.0	25.0
H 10.0R		6.26		2.0	25.0
5.0D 20.0L		2.62		0.7	-
5.0D 10.0L		6.17		2.0	-
5.0D V		16.44		4.5	-
5.0D 10.0R		5.87		2.0	-
5.0D 20.0R		2.49		0.7	-
10.0D 5.0L		7.23		1.0	-
10.0D 5.0R		6.91		1.0	-
MX(H-90U/45L-45R)	H 0.5R	14.25	(14.41Cd @ t = 1min)	-	25.0
MAXIMUM	2.5D 0.2L	25.63		-	-
Zone 1		16.91		3.5	-
Zone 2		17.95		6.0	-
Zone 3		64.73		24.0	-
Zone 4		17.02		6.0	-
Zone 5		16.18		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 12mA after 30 minutes 3% stabilization warmup
MX(H-90U/45L-45R) multiplied by 1.011 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH3, Post 3% stability warmup

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.73		1.0	25.0
10.0U 5.0R		4.63		1.0	25.0
5.0U 20.0L		2.61		0.7	25.0
5.0U 10.0L		5.07		2.0	25.0
5.0U V		12.60		4.5	25.0
5.0U 10.0R		5.04		2.0	25.0
5.0U 20.0R		2.53		0.7	25.0
H 10.0L		6.57		2.0	25.0
H 5.0L		15.04		5.0	25.0
H V		16.27		5.0	25.0
H 5.0R		13.41		5.0	25.0
H 10.0R		6.12		2.0	25.0
5.0D 20.0L		2.78		0.7	-
5.0D 10.0L		6.05		2.0	-
5.0D V		22.29		4.5	-
5.0D 10.0R		5.71		2.0	-
5.0D 20.0R		2.63		0.7	-
10.0D 5.0L		6.93		1.0	-
10.0D 5.0R		6.62		1.0	-
MX(H-90U/45L-45R)	H 0.4L	16.30	(16.37Cd @ t = 1min)	-	25.0
MAXIMUM	2.5D 0.9L	33.53		-	-
Zone 1		17.04		3.5	-
Zone 2		17.70		6.0	-
Zone 3		79.61		24.0	-
Zone 4		16.87		6.0	-
Zone 5		16.41		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 13mA after 15 minutes 3% stabilization warmup
MX(H-90U/45L-45R) multiplied by 1.004 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH4, Post 3% stability warmup

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs in 4 Series Array)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.42		1.0	25.0
10.0U 5.0R		4.41		1.0	25.0
5.0U 20.0L		2.48		0.7	25.0
5.0U 10.0L		4.77		2.0	25.0
5.0U V		11.16		4.5	25.0
5.0U 10.0R		4.98		2.0	25.0
5.0U 20.0R		2.53		0.7	25.0
H 10.0L		6.37		2.0	25.0
H 5.0L		13.99		5.0	25.0
H V		15.90		5.0	25.0
H 5.0R		13.20		5.0	25.0
H 10.0R		6.36		2.0	25.0
5.0D 20.0L		2.63		0.7	-
5.0D 10.0L		5.86		2.0	-
5.0D V		16.83		4.5	-
5.0D 10.0R		6.04		2.0	-
5.0D 20.0R		2.61		0.7	-
10.0D 5.0L		7.15		1.0	-
10.0D 5.0R		7.21		1.0	-
MX(H-90U/45L-45R)	0.1D 0.4R	16.17	(16.20Cd @ t = 1min)	-	25.0
MAXIMUM	1.6D 0.1R	25.04		-	-
Zone 1		16.69		3.5	-
Zone 2		17.00		6.0	-
Zone 3		71.08		24.0	-
Zone 4		17.38		6.0	-
Zone 5		16.76		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 13mA after 15 minutes 3% stabilization warmup
MX(H-90U/45L-45R) multiplied by 1.002 to acquire above t = 1 minute value

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH (All)

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp Stop/Tail Ratio and Turn/Tail Ratio

	Tail				Stop/Turn				Fender S/T Ratio				
	LH1	LH2	LH3	LH4	LH1	LH2	LH3	LH4	LH1	LH2	LH3	LH4	Required
10.0U 5.0L	4.9	4.5	4.5	4.7	72.2	63.88	67.7	69.2	14.7	14.1	15.0	14.7	3
10.0U 5.0R	4.9	4.6	4.5	4.7	72.1	63.94	66.9	69.8	14.7	14.1	14.9	14.7	3
5.0U 20.0L	2.1	2.6	2.5	2.6	28.7	35.81	36.7	36.8	13.9	13.6	14.9	14.2	3
5.0U 10.0L	5.4	4.9	4.8	5.0	77.4	68.5	71.0	73.4	14.3	14.0	14.8	14.7	3
5.0U V	10.0	12.0	11.2	11.4	132.7	171.7	173.2	159.5	13.3	14.3	15.4	13.9	5
5.0U 10.0R	5.5	5.0	4.9	5.2	79.8	70.29	72.9	75.5	14.4	14.1	15.0	14.5	3
5.0U 20.0R	2.4	2.6	2.6	2.5	31.3	34.93	37.2	36.3	13.3	13.5	14.5	14.3	3
H 10.0L	6.6	6.5	6.2	6.6	95.1	92.47	92.4	95.7	14.4	14.2	14.8	14.4	3
H 5.0L	10.2	14.9	14.9	14.8	133.3	191.5	203.5	202.4	13.0	12.8	13.7	13.7	5
H V	13.1	16.5	17.2	16.6	172.3	217.4	237.4	222.8	13.1	13.2	13.8	13.4	5
H 5.0R	12.4	14.5	15.6	12.6	154.8	197.3	227.2	175.0	12.5	13.6	14.6	13.9	5
H 10.0R	7.2	6.5	6.3	6.7	99.8	90.11	92.0	97.4	13.9	13.9	14.6	14.6	3
5.0D 20.0L	2.5	2.7	2.6	2.7	35.0	37.45	38.4	39.0	13.8	13.7	14.6	14.3	3
5.0D 10.0L	6.1	6.0	5.8	6.1	90.1	84.77	84.6	86.8	14.7	14.2	14.7	14.3	3
5.0D V	19.8	18.4	21.6	21.1	277.1	234.7	281.7	271.8	14.0	12.8	13.0	12.9	3
5.0D 10.0R	7.0	6.1	5.9	6.3	98.0	85.98	86.5	90.9	14.0	14.1	14.6	14.4	3
5.0D 20.0R	2.8	2.7	2.7	2.7	37.5	37.16	39.3	38.7	13.6	13.6	14.4	14.4	3
10.0D 5.0L	7.3	7.3	6.8	7.3	104.6	103.1	98.8	103.6	14.3	14.2	14.6	14.3	3
10.0D 5.0R	8.1	7.0	6.8	7.3	112.9	100.8	97.4	104.1	13.9	14.3	14.4	14.3	3

Samples meet test requirements at all points.

Aim: Lamp mounted with seating plane perpendicular to HV. Filament at COR/COT.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH (All)

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp Stop/Tail Ratio and Turn/Tail Ratio

	Tail				Stop/Turn				Fender S/T Ratio				
	RH1	RH2	RH3	RH4	RH1	RH2	RH3	RH4	RH1	RH2	RH3	RH4	Required
10.0U 5.0L	4.7	4.6	4.7	4.4	83.5	71.8	71.1	67.0	17.8	15.7	15.0	15.2	3
10.0U 5.0R	4.7	4.5	4.6	4.4	83.7	69.5	69.8	67.1	18.0	15.5	15.1	15.2	3
5.0U 20.0L	2.4	2.5	2.6	2.5	40.3	37.2	38.5	37.0	16.9	15.0	14.8	14.9	3
5.0U 10.0L	5.0	5.1	5.1	4.8	88.4	77.8	76.5	71.5	17.5	15.4	15.1	15.0	3
5.0U V	11.8	10.5	12.6	11.2	200.6	143.4	176.5	172.2	17.1	13.6	14.0	15.4	5
5.0U 10.0R	5.0	4.9	5.0	5.0	91.1	76.0	74.7	74.2	18.2	15.5	14.8	14.9	3
5.0U 20.0R	2.4	2.3	2.5	2.5	41.1	34.1	36.7	37.2	17.2	15.0	14.5	14.7	3
H 10.0L	6.9	6.7	6.6	6.4	118.3	105.0	98.3	94.5	17.3	15.6	15.0	14.8	3
H 5.0L	11.6	12.1	15.0	14.0	187.4	171.3	200.2	198.5	16.1	14.2	13.3	14.2	5
H V	13.9	14.2	16.3	15.9	217.2	198.7	231.9	225.2	15.7	14.0	14.3	14.2	5
H 5.0R	13.6	11.4	13.4	13.2	207.5	152.6	188.2	196.5	15.3	13.3	14.0	14.9	5
H 10.0R	6.7	6.3	6.1	6.4	119.4	98.1	91.2	95.3	17.9	15.7	14.9	15.0	3
5.0D 20.0L	2.6	2.6	2.8	2.6	44.3	39.8	40.6	39.3	17.1	15.2	14.6	15.0	3
5.0D 10.0L	6.4	6.2	6.1	5.9	109.9	92.9	88.8	88.0	17.2	15.1	14.7	15.0	3
5.0D V	12.6	16.4	22.3	16.8	196.9	224.4	301.2	228.2	15.6	13.7	13.5	13.6	3
5.0D 10.0R	6.4	5.9	5.7	6.0	113.4	89.9	84.1	90.9	17.6	15.3	14.7	15.0	3
5.0D 20.0R	2.6	2.5	2.6	2.6	44.5	37.8	38.7	38.7	17.3	15.2	14.7	14.8	3
10.0D 5.0L	7.8	7.2	6.9	7.2	131.5	107.7	101.4	106.3	16.9	14.9	14.6	14.9	3
10.0D 5.0R	7.6	6.9	6.6	7.2	133.1	103.4	97.7	108.3	17.6	15.0	14.8	15.0	3

Samples meet test requirements at all points.

Aim: Lamp mounted with seating plane perpendicular to HV. Filament at COR/COT.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH1 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.53		0.25	-
10.0U V		0.63		0.25	-
10.0U 45.0R		0.42		0.25	-
10.0U 45.0L TO 45.0R	45.0R	0.42		0.25	-
5.0U 45.0L TO 45.0R	45.0R	0.44		0.25	-
H 45.0L		0.47		0.25	-
H V		0.56		0.25	-
H 45.0R		0.55		0.25	-
H 45.0L TO 45.0R	43.7L	0.45		0.25	-
5.0D 45.0L TO 45.0R	42.5L	0.41		0.25	-
10.0D 45.0L		0.34		0.25	-
10.0D V		0.58		0.25	-
10.0D 45.0R		0.51		0.25	-
10.0D 45.0L TO 45.0R	44.6L	0.34		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+L+P2 current @ 0.316A
LED T+L functions active and could not be disabled. L+T masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH2 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.42		0.25	-
10.0U V		0.62		0.25	-
10.0U 45.0R		0.59		0.25	-
10.0U 45.0L TO 45.0R	44.8L	0.42		0.25	-
5.0U 45.0L TO 45.0R	44.9L	0.48		0.25	-
H 45.0L		0.46		0.25	-
H V		0.57		0.25	-
H 45.0R		0.52		0.25	-
H 45.0L TO 45.0R	45.0L	0.46		0.25	-
5.0D 45.0L TO 45.0R	45.0R	0.46		0.25	-
10.0D 45.0L		0.48		0.25	-
10.0D V		0.59		0.25	-
10.0D 45.0R		0.46		0.25	-
10.0D 45.0L TO 45.0R	43.8R	0.46		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+L+P2 current @ 0.315A
LED T+L functions active and could not be disabled. L+T masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH3 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.49		0.25	-
10.0U V		0.66		0.25	-
10.0U 45.0R		0.46		0.25	-
10.0U 45.0L TO 45.0R	44.4R	0.45		0.25	-
5.0U 45.0L TO 45.0R	45.0L	0.44		0.25	-
H 45.0L		0.45		0.25	-
H V		0.63		0.25	-
H 45.0R		0.53		0.25	-
H 45.0L TO 45.0R	43.7L	0.43		0.25	-
5.0D 45.0L TO 45.0R	43.7L	0.44		0.25	-
10.0D 45.0L		0.38		0.25	-
10.0D V		0.66		0.25	-
10.0D 45.0R		0.56		0.25	-
10.0D 45.0L TO 45.0R	44.6L	0.38		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+L+P2 current @ 0.315A
LED T+L functions active and could not be disabled. L+T masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH4 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.41		0.25	-
10.0U V		0.61		0.25	-
10.0U 45.0R		0.64		0.25	-
10.0U 45.0L TO 45.0R	43.4L	0.40		0.25	-
5.0U 45.0L TO 45.0R	41.8L	0.48		0.25	-
H 45.0L		0.54		0.25	-
H V		0.57		0.25	-
H 45.0R		0.51		0.25	-
H 45.0L TO 45.0R	41.1L	0.49		0.25	-
5.0D 45.0L TO 45.0R	45.0R	0.46		0.25	-
10.0D 45.0L		0.50		0.25	-
10.0D V		0.58		0.25	-
10.0D 45.0R		0.47		0.25	-
10.0D 45.0L TO 45.0R	45.0R	0.47		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+L+P2 current @ 0.318A
LED T+L functions active and could not be disabled. L+T masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH1 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.46		0.25	-
10.0U V		0.59		0.25	-
10.0U 45.0R		0.49		0.25	-
10.0U 45.0L TO 45.0R	45.0L	0.46		0.25	-
5.0U 45.0L TO 45.0R	43.3R	0.42		0.25	-
H 45.0L		0.48		0.25	-
H V		0.56		0.25	-
H 45.0R		0.44		0.25	-
H 45.0L TO 45.0R	45.0R	0.44		0.25	-
5.0D 45.0L TO 45.0R	45.0R	0.40		0.25	-
10.0D 45.0L		0.59		0.25	-
10.0D V		0.58		0.25	-
10.0D 45.0R		0.40		0.25	-
10.0D 45.0L TO 45.0R	45.0R	0.40		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+P2 current @ 0.271A
LED Tail function active and could not be disabled. Tail masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH2 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.50		0.25	-
10.0U V		0.57		0.25	-
10.0U 45.0R		0.38		0.25	-
10.0U 45.0L TO 45.0R	44.3R	0.36		0.25	-
5.0U 45.0L TO 45.0R	41.2R	0.40		0.25	-
H 45.0L		0.47		0.25	-
H V		0.58		0.25	-
H 45.0R		0.45		0.25	-
H 45.0L TO 45.0R	40.7R	0.41		0.25	-
5.0D 45.0L TO 45.0R	45.0L	0.42		0.25	-
10.0D 45.0L		0.42		0.25	-
10.0D V		0.55		0.25	-
10.0D 45.0R		0.50		0.25	-
10.0D 45.0L TO 45.0R	43.8L	0.39		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+P2 current @ 0.270A
LED Tail function active and could not be disabled. Tail masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH3 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.48		0.25	-
10.0U V		0.56		0.25	-
10.0U 45.0R		0.32		0.25	-
10.0U 45.0L TO 45.0R	45.0R	0.30		0.25	-
5.0U 45.0L TO 45.0R	45.0R	0.34		0.25	-
H 45.0L		0.43		0.25	-
H V		0.53		0.25	-
H 45.0R		0.41		0.25	-
H 45.0L TO 45.0R	40.8R	0.39		0.25	-
5.0D 45.0L TO 45.0R	42.8L	0.37		0.25	-
10.0D 45.0L		0.39		0.25	-
10.0D V		0.63		0.25	-
10.0D 45.0R		0.43		0.25	-
10.0D 45.0L TO 45.0R	44.9L	0.40		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+P2 current @ 0.267A
LED Tail function active and could not be disabled. Tail masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH4 RCL

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.47		0.25	-
10.0U V		0.57		0.25	-
10.0U 45.0R		0.40		0.25	-
10.0U 45.0L TO 45.0R	44.6R	0.39		0.25	-
5.0U 45.0L TO 45.0R	44.2R	0.44		0.25	-
H 45.0L		0.66		0.25	-
H V		0.57		0.25	-
H 45.0R		0.40		0.25	-
H 45.0L TO 45.0R	44.6R	0.38		0.25	-
5.0D 45.0L TO 45.0R	43.5R	0.38		0.25	-
10.0D 45.0L		0.46		0.25	-
10.0D V		0.57		0.25	-
10.0D 45.0R		0.44		0.25	-
10.0D 45.0L TO 45.0R	44.2R	0.44		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-648 (194, LCL=0.556in) @ 14.34V, T+P2 current @ 0.269A
LED Tail function active and could not be disabled. Tail masked during testing.
Bulb calibrated to provide 2.0 MSCd at 14.34V / 263mA

Aim: Lamp mounted with fixture seating plane parallel to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH1 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	11.894	3.00	0.232	0.05
H 20.0L	8.549	1.50	0.173	0.03
H V	15.300	4.50	0.311	0.07
H 20.0R	8.484	1.50	0.164	0.03
10.0D V	13.805	3.00	0.272	0.05
Side				
10.0U V	6.418	3.00	0.146	0.05
H 20.0L	5.525	1.50	0.127	0.03
H V	7.696	4.50	0.297	0.07
H 20.0R	3.959	1.50	0.165	0.03
10.0D V	6.794	3.00	0.182	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH2 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	6.621	3.00	0.218	0.05
H 20.0L	5.006	1.50	0.142	0.03
H V	9.217	4.50	0.238	0.07
H 20.0R	4.672	1.50	0.139	0.03
10.0D V	8.557	3.00	0.233	0.05
Side				
10.0U V	7.113	3.00	0.148	0.05
H 20.0L	5.495	1.50	0.100	0.03
H V	9.739	4.50	0.196	0.07
H 20.0R	4.294	1.50	0.108	0.03
10.0D V	7.420	3.00	0.173	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH3 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	6.547	3.00	0.213	0.05
H 20.0L	4.760	1.50	0.131	0.03
H V	9.212	4.50	0.237	0.07
H 20.0R	4.867	1.50	0.137	0.03
10.0D V	8.558	3.00	0.233	0.05
Side				
10.0U V	6.751	3.00	0.146	0.05
H 20.0L	5.228	1.50	0.117	0.03
H V	8.156	4.50	0.266	0.07
H 20.0R	4.900	1.50	0.135	0.03
10.0D V	7.183	3.00	0.184	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: LH4 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	7.714	3.00	0.229	0.05
H 20.0L	5.218	1.50	0.143	0.03
H V	11.355	4.50	0.376	0.07
H 20.0R	5.245	1.50	0.153	0.03
10.0D V	8.879	3.00	0.248	0.05
Side				
10.0U V	7.363	3.00	0.155	0.05
H 20.0L	4.853	1.50	0.080	0.03
H V	9.875	4.50	0.212	0.07
H 20.0R	5.466	1.50	0.118	0.03
10.0D V	7.606	3.00	0.169	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH1 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	7.525	3.00	0.219	0.05
H 20.0L	5.578	1.50	0.146	0.03
H V	11.179	4.50	0.373	0.07
H 20.0R	5.071	1.50	0.138	0.03
10.0D V	8.961	3.00	0.236	0.05
Side				
10.0U V	7.455	3.00	0.133	0.05
H 20.0L	5.396	1.50	0.111	0.03
H V	9.904	4.50	0.339	0.07
H 20.0R	5.136	1.50	0.076	0.03
10.0D V	7.515	3.00	0.161	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH2 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	7.077	3.00	0.215	0.05
H 20.0L	5.493	1.50	0.143	0.03
H V	10.989	4.50	0.360	0.07
H 20.0R	4.953	1.50	0.133	0.03
10.0D V	8.816	3.00	0.230	0.05
Side				
10.0U V	6.777	3.00	0.151	0.05
H 20.0L	4.626	1.50	0.126	0.03
H V	7.871	4.50	0.409	0.07
H 20.0R	5.091	1.50	0.117	0.03
10.0D V	6.781	3.00	0.164	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH3 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	7.537	3.00	0.208	0.05
H 20.0L	5.426	1.50	0.139	0.03
H V	10.132	4.50	0.252	0.07
H 20.0R	5.087	1.50	0.134	0.03
10.0D V	8.816	3.00	0.228	0.05
Side				
10.0U V	7.039	3.00	0.164	0.05
H 20.0L	4.613	1.50	0.140	0.03
H V	8.081	4.50	0.371	0.07
H 20.0R	5.507	1.50	0.132	0.03
10.0D V	6.935	3.00	0.175	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: RH4 RCL

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear				
10.0U V	7.101	3.00	0.202	0.05
H 20.0L	5.458	1.50	0.136	0.03
H V	9.493	4.50	0.240	0.07
H 20.0R	4.237	1.50	0.114	0.03
10.0D V	8.374	3.00	0.215	0.05
Side				
10.0U V	7.586	3.00	0.166	0.05
H 20.0L	5.983	1.50	0.120	0.03
H V	9.851	4.50	0.205	0.07
H 20.0R	4.488	1.50	0.088	0.03
10.0D V	7.616	3.00	0.150	0.05

Incident Illumination upon sample: 0.962 fc (10.35 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted with fixture seating plane perpendicular or parallel to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #1A & #1B

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Yellow
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
Sample Number: #1A					
10.0U 45.0L		3.84		0.62	-
10.0U V		4.38		0.62	-
10.0U 45.0R		4.77		0.62	-
10.0U 45.0L TO 45.0R	41.9L	3.74		0.62	-
5.0U 45.0L TO 45.0R	44.9L	3.79		0.62	-
H 45.0L		4.44		0.62	-
H V		4.48		0.62	-
H 45.0R		3.92		0.62	-
H 45.0L TO 45.0R	45.0R	3.93		0.62	-
5.0D 45.0L TO 45.0R	42.7R	3.93		0.62	-
10.0D 45.0L		4.74		0.62	-
10.0D V		4.47		0.62	-
10.0D 45.0R		3.63		0.62	-
10.0D 45.0L TO 45.0R	45.0R	3.63		0.62	-
Applied Voltage: 13.50V / 45mA after 30 min stabilization (<1%/5 min)					
Sample Number: #1B					
10.0U 45.0L		5.33		0.62	-
10.0U V		4.21		0.62	-
10.0U 45.0R		3.55		0.62	-
10.0U 45.0L TO 45.0R	45.0R	3.55		0.62	-
5.0U 45.0L TO 45.0R	45.0R	3.87		0.62	-
H 45.0L		3.97		0.62	-
H V		4.28		0.62	-
H 45.0R		3.97		0.62	-
H 45.0L TO 45.0R	45.0R	3.96		0.62	-
5.0D 45.0L TO 45.0R	45.0L	4.03		0.62	-
10.0D 45.0L		3.58		0.62	-
10.0D V		4.18		0.62	-
10.0D 45.0R		4.60		0.62	-
10.0D 45.0L TO 45.0R	45.0L	3.58		0.62	-
Applied Voltage: 13.50V / 44mA after 20 min stabilization (<1%/5 min)					

Samples meet test requirements at all points.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #2A & #2B

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Yellow
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
Sample Number: #2A					
10.0U 45.0L		3.77		0.62	-
10.0U V		4.43		0.62	-
10.0U 45.0R		4.72		0.62	-
10.0U 45.0L TO 45.0R	45.0L	3.77		0.62	-
5.0U 45.0L TO 45.0R	44.8L	3.72		0.62	-
H 45.0L		4.37		0.62	-
H V		4.54		0.62	-
H 45.0R		4.26		0.62	-
H 45.0L TO 45.0R	45.0R	4.26		0.62	-
5.0D 45.0L TO 45.0R	45.0R	3.87		0.62	-
10.0D 45.0L		4.61		0.62	-
10.0D V		4.52		0.62	-
10.0D 45.0R		3.72		0.62	-
10.0D 45.0L TO 45.0R	45.0R	3.72		0.62	-
Applied Voltage: 13.50V / 45mA after 15 min stabilization (<1%/5 min)					
Sample Number: #2B					
10.0U 45.0L		4.02		0.62	-
10.0U V		4.39		0.62	-
10.0U 45.0R		4.65		0.62	-
10.0U 45.0L TO 45.0R	39.7L	3.78		0.62	-
5.0U 45.0L TO 45.0R	45.0L	3.88		0.62	-
H 45.0L		4.06		0.62	-
H V		4.54		0.62	-
H 45.0R		3.72		0.62	-
H 45.0L TO 45.0R	45.0R	3.72		0.62	-
5.0D 45.0L TO 45.0R	45.0R	3.96		0.62	-
10.0D 45.0L		4.93		0.62	-
10.0D V		4.48		0.62	-
10.0D 45.0R		3.46		0.62	-
10.0D 45.0L TO 45.0R	45.0R	3.45		0.62	-

Applied Voltage: 13.50V / 45mA after 15 min stabilization (<1%/5 min)
Samples meet test requirements at all points.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #3A & #3B

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Yellow
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
Sample Number: #3A					
10.0U 45.0L		4.06		0.62	-
10.0U V		4.34		0.62	-
10.0U 45.0R		4.82		0.62	-
10.0U 45.0L TO 45.0R	39.5L	3.79		0.62	-
5.0U 45.0L TO 45.0R	45.0L	3.82		0.62	-
H 45.0L		4.25		0.62	-
H V		4.50		0.62	-
H 45.0R		3.79		0.62	-
H 45.0L TO 45.0R	45.0R	3.79		0.62	-
5.0D 45.0L TO 45.0R	40.9R	4.05		0.62	-
10.0D 45.0L		4.91		0.62	-
10.0D V		4.50		0.62	-
10.0D 45.0R		3.62		0.62	-
10.0D 45.0L TO 45.0R	45.0R	3.62		0.62	-
Applied Voltage: 13.50V / 44mA after 15 min stabilization (<1%/5 min)					
Sample Number: #3B					
10.0U 45.0L		4.66		0.62	-
10.0U V		4.21		0.62	-
10.0U 45.0R		3.43		0.62	-
10.0U 45.0L TO 45.0R	45.0R	3.42		0.62	-
5.0U 45.0L TO 45.0R	45.0R	3.82		0.62	-
H 45.0L		3.90		0.62	-
H V		4.26		0.62	-
H 45.0R		3.92		0.62	-
H 45.0L TO 45.0R	45.0L	3.90		0.62	-
5.0D 45.0L TO 45.0R	44.9L	3.82		0.62	-
10.0D 45.0L		3.73		0.62	-
10.0D V		4.15		0.62	-
10.0D 45.0R		5.25		0.62	-
10.0D 45.0L TO 45.0R	41.9L	3.69		0.62	-
Applied Voltage: 13.50V / 45mA after 15 min stabilization (<1%/5 min)					

Samples meet test requirements at all points.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #4A & #4B

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Yellow
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
Sample Number: #4A					
10.0U 45.0L		3.56		0.62	-
10.0U V		4.36		0.62	-
10.0U 45.0R		4.42		0.62	-
10.0U 45.0L TO 45.0R	45.0L	3.56		0.62	-
5.0U 45.0L TO 45.0R	44.9L	3.85		0.62	-
H 45.0L		4.21		0.62	-
H V		4.48		0.62	-
H 45.0R		3.63		0.62	-
H 45.0L TO 45.0R	45.0R	3.62		0.62	-
5.0D 45.0L TO 45.0R	41.4R	3.90		0.62	-
10.0D 45.0L		4.72		0.62	-
10.0D V		4.42		0.62	-
10.0D 45.0R		3.61		0.62	-
10.0D 45.0L TO 45.0R	39.3R	3.58		0.62	-
Applied Voltage: 13.50V / 44mA after 15 min stabilization (<1%/5 min)					
Sample Number: #4B					
10.0U 45.0L		4.18		0.62	-
10.0U V		3.61		0.62	-
10.0U 45.0R		2.99		0.62	-
10.0U 45.0L TO 45.0R	45.0R	2.98		0.62	-
5.0U 45.0L TO 45.0R	45.0R	3.27		0.62	-
H 45.0L		3.40		0.62	-
H V		3.66		0.62	-
H 45.0R		3.35		0.62	-
H 45.0L TO 45.0R	45.0R	3.35		0.62	-
5.0D 45.0L TO 45.0R	44.6L	3.34		0.62	-
10.0D 45.0L		3.24		0.62	-
10.0D V		3.57		0.62	-
10.0D 45.0R		4.58		0.62	-
10.0D 45.0L TO 45.0R	43.3L	3.19		0.62	-
Applied Voltage: 13.50V / 45mA after 15 min stabilization (<1%/5 min)					

Samples meet test requirements at all points.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #s 1

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Yellow
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
1A				
10.0U V	18.411	7.50	0.402	0.13
H 20.0L	13.597	3.75	0.288	0.08
H V	20.575	11.25	0.554	0.18
H 20.0R	13.356	3.75	0.303	0.08
10.0D V	17.791	7.50	0.404	0.13
1B				
10.0U V	19.940	7.50	0.430	0.13
H 20.0L	12.746	3.75	0.328	0.08
H V	23.732	11.25	0.538	0.18
H 20.0R	12.947	3.75	0.339	0.08
10.0D V	18.741	7.50	0.401	0.13

Incident Illumination upon sample: 0.953 fc (10.26 Lux)

Samples meet test requirements at all points.

Aim: Lamps mounted horizontally with fixture seating plane perpendicular to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #s 2

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Yellow
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
2A				
10.0U V	20.624	7.50	0.387	0.13
H 20.0L	15.630	3.75	0.269	0.08
H V	23.736	11.25	0.526	0.18
H 20.0R	15.177	3.75	0.286	0.08
10.0D V	20.450	7.50	0.380	0.13
2B				
10.0U V	19.115	7.50	0.402	0.13
H 20.0L	14.368	3.75	0.285	0.08
H V	21.473	11.25	0.552	0.18
H 20.0R	13.933	3.75	0.300	0.08
10.0D V	18.639	7.50	0.404	0.13

Incident Illumination upon sample: 0.953 fc (10.26 Lux)

Samples meet test requirements at all points.

Aim: Lamps mounted horizontally with fixture seating plane perpendicular to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #s 3

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Yellow
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
3A				
10.0U V	18.924	7.50	0.405	0.13
H 20.0L	14.297	3.75	0.288	0.08
H V	21.300	11.25	0.546	0.18
H 20.0R	13.700	3.75	0.301	0.08
10.0D V	18.507	7.50	0.407	0.13
3B				
10.0U V	18.529	7.50	0.422	0.13
H 20.0L	11.898	3.75	0.330	0.08
H V	21.356	11.25	0.549	0.18
H 20.0R	11.944	3.75	0.341	0.08
10.0D V	16.919	7.50	0.408	0.13

Incident Illumination upon sample: 0.953 fc (10.26 Lux)

Samples meet test requirements at all points.

Aim: Lamps mounted horizontally with fixture seating plane perpendicular to projector axis at HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: Amber AP2 Lamps, #s 4

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Yellow
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
4A				
10.0U V	17.285	7.50	0.436	0.13
H 20.0L	12.570	3.75	0.306	0.08
H V	19.234	11.25	0.565	0.18
H 20.0R	12.262	3.75	0.309	0.08
10.0D V	16.228	7.50	0.419	0.13
4B				
10.0U V	18.442	7.50	0.444	0.13
H 20.0L	12.326	3.75	0.353	0.08
H V	21.219	11.25	0.652	0.18
H 20.0R	11.408	3.75	0.358	0.08
10.0D V	16.726	7.50	0.436	0.13

Incident Illumination upon sample: 0.953 fc (10.26 Lux)

Samples meet test requirements at all points.

Aim: Lamps mounted horizontally with fixture seating plane perpendicular to projector axis at HV.

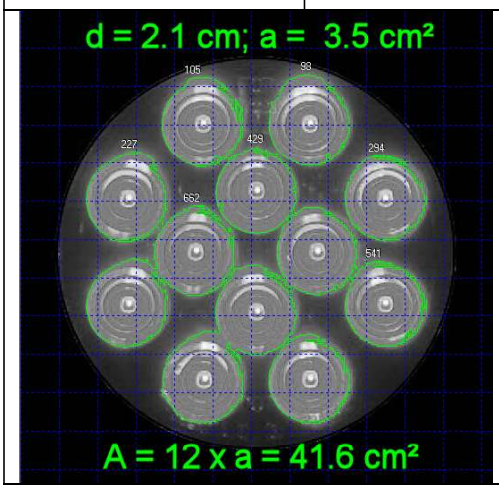
EPLLA TEST DATA SHEET

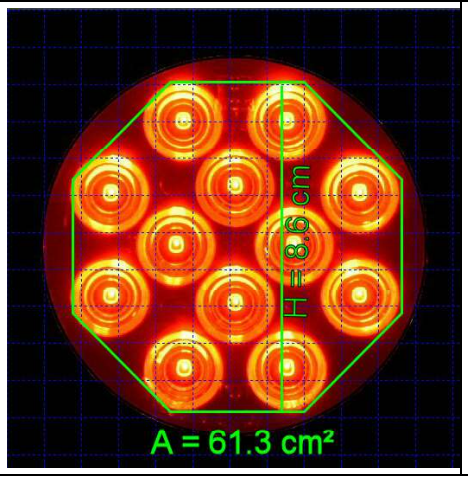
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

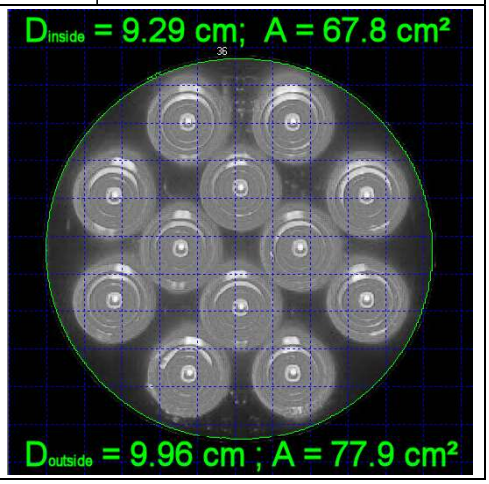
LENS AREA

Requirement: FMVSS 108 Table IV Effective Projected Luminous Lens Area
Test Method: CCITL Camera and image analysis and Geometric Method

Function	Effective Projected Illuminated Area (cm^2)		
	View	Measured	Minimum Required
Stop, Turn Signal	HV	41.6 Sum of the Optics 61.3 Encompassing LEDs 77.9 (lens physical dim.)	50 (vehicle <2032mm wide)







FMVSS 108 S4 Definitions

Effective light-emitting surface means that portion of a lamp that directs light to the photometric test pattern, and does not include transparent lenses, mounting hole bosses, reflex reflector area, beads or rims that may glow or produce small areas of increased intensity as a result of uncontrolled light from an area of ½° radius around a test point.

Effective projected luminous lens area means the area of the orthogonal projection of the effective light-emitting surface of a lamp on a plane perpendicular to a defined direction relative to the axis of reference. Unless otherwise specified, the direction is coincident with the axis of reference.

FMVSS 108 does not define what constitutes "glow" used in the effective light emitting surface definition. FMVSS 108 does not specify how the EPLLA is to be measured nor what characteristics define it. Specifically, FMVSS 108 does not state what luminance value is permitted for EPLLA consideration.

Sample meets EPLLA requirements when using the area encompassing the LEDs or the physical lens area.

VISIBILITY TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

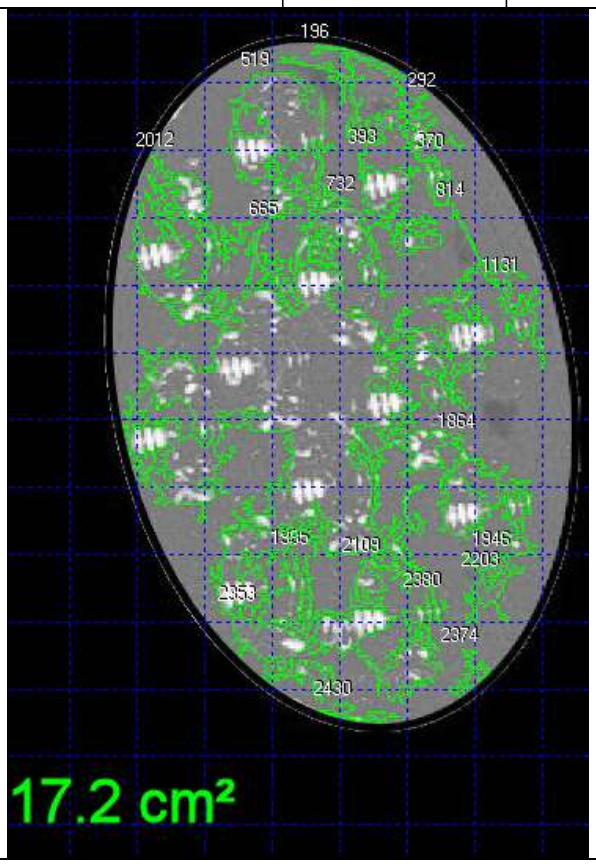
Sample Number: RH1

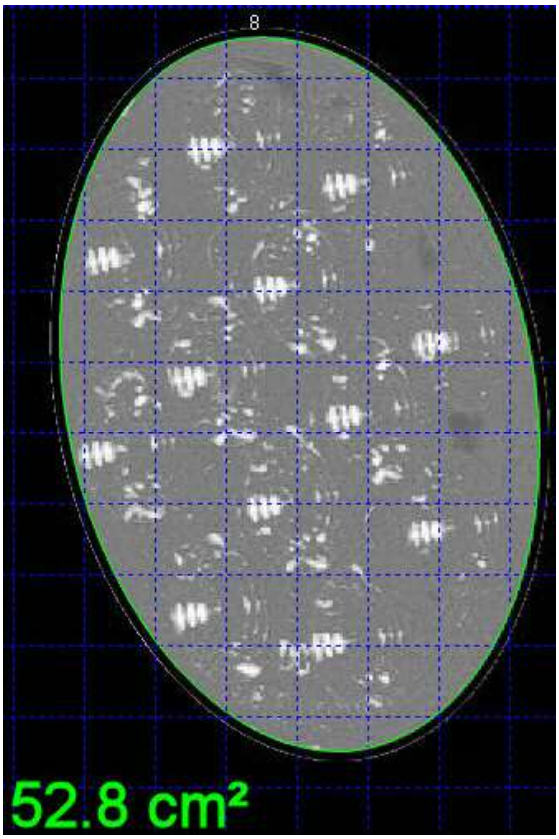
Requirement: FMVSS 108 Table V-b Effective Projected Luminous Lens Area throughout pattern from 15U/45IB to 15D/45OB

Test Method: CCITL Camera Image Analysis

EPLLA is symmetrical throughout beam pattern and the minimum EPLLA will be at any corner point. 15U/45L was arbitrarily chosen to confirm Visibility.

Function	Unobstructed Effective Projected Luminous Area		
	View	Measured	Minimum Required
Stop/Turn Signal Tail	15U/45L	17.2-52.8 cm²	12.5 cm²





Device meets minimum area visibility requirements.

COLOR TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: All RCLs

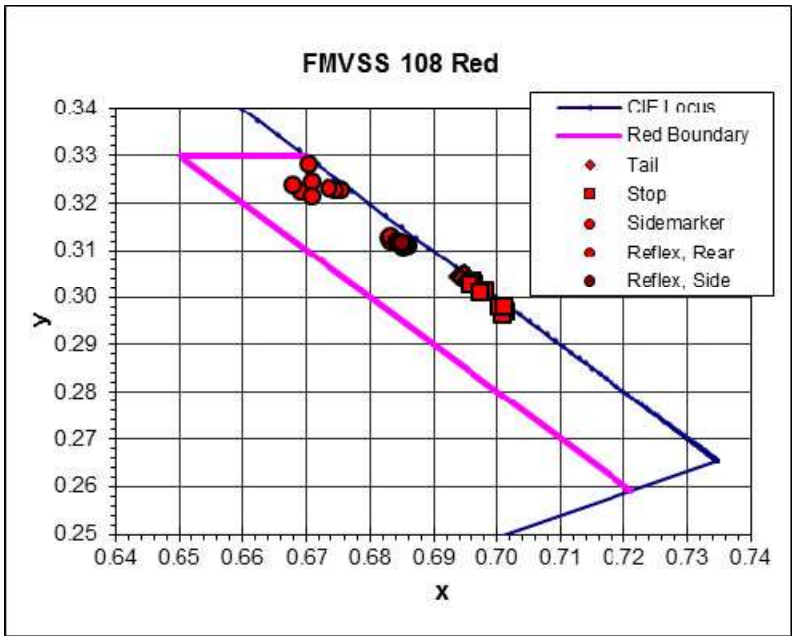
Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method (Average of 3 reads)
Instrument: Photo Research PR-655 Spectroradiometer with SRS-3 Target
Location: HV
Voltage: 13.5V

	Sample	Time	x	y
Tail	LH1	t=0	0.6942	0.3044
		t=stable	0.6948	0.3047
	LH2	t=0	0.6955	0.3042
		t=stable	0.6951	0.3034
	LH3	t=0	0.6947	0.3049
		t=stable	0.6947	0.3044
	LH4	t=0	0.6954	0.304
		t=stable	0.6951	0.3027
	RH1	t=0	0.6937	0.3043
		t=60min	0.6956	0.304
	RH2	t=0	0.6948	0.3048
		t=stable	0.6957	0.3037
	RH3	t=0	0.6944	0.3040
		t=stable	0.6953	0.3035
	RH4	t=0	0.6967	0.3022
		t=stable	0.6951	0.3027
Stop	LH1	t=0	0.6962	0.3031
		t=stable	0.7008	0.2978
	LH2	t=0	0.6965	0.3024
		t=stable	0.7014	0.297
	LH3	t=0	0.6962	0.3031
		t=stable	0.7008	0.2977
	LH4	t=0	0.6965	0.3024
		t=stable	0.7015	0.2967
	RH1	t=0	0.6961	0.3025
		t=60min	0.7010	0.2962
	RH2	t=0	0.6964	0.3033
		t=stable	0.7006	0.2977
	RH3	t=0	0.6958	0.3026
		t=stable	0.7012	0.2977
	RH4	t=0	0.6983	0.3013
		t=stable	0.6975	0.3008

Requirement & Chart

$y \leq 0.33$

$y \geq 0.98 - x$



Samples meet stop, tail, and turn Color requirements.

COLOR TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: All RCLs

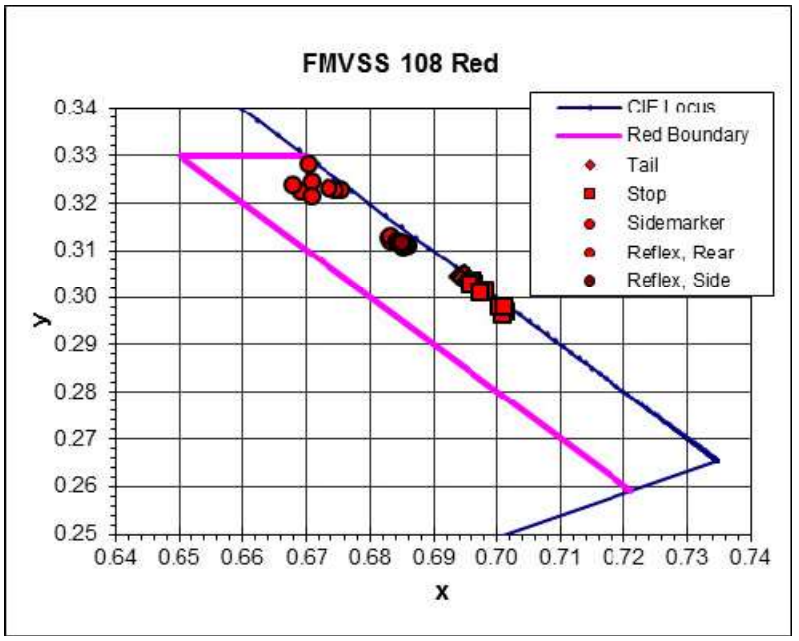
Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method (Average of 3 reads)
Instrument: Photo Research PR-655 Spectroradiometer with SRS-3 Target
Location: HV
Voltage: 14.0V

	Sample	Time	x	y
Red Marker	LH1	t=0	0.6691	0.3223
	LH2	t=0	0.6679	0.3238
	LH3	t=0	0.6710	0.3244
	LH4	t=0	0.6756	0.3227
	RH1	t=0	0.6703	0.3279
	RH2	t=0	0.6747	0.3228
	RH3	t=0	0.6709	0.3214
	RH4	t=0	0.6736	0.3229
Rear Reflex	LH1		0.6830	0.3126
	LH2		0.6842	0.3119
	LH3		0.6834	0.3120
	LH4		0.6834	0.3128
	RH1		0.6850	0.3110
	RH2		0.6844	0.3118
	RH3		0.6849	0.3116
	RH4		0.6851	0.3114
Side Reflex	LH1		0.6860	0.3109
	LH2		0.6849	0.3117
	LH3		0.6855	0.3113
	LH4		0.6852	0.3112
	RH1		0.6850	0.3113
	RH2		0.6853	0.3107
	RH3		0.6852	0.3114
	RH4		0.6851	0.3117

Requirement & Chart

$y \leq 0.33$

$y \geq 0.98 - x$



Samples meet red sidemarker and red reflex Color requirements.

COLOR TEST DATA SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

Sample Number: All AP2s

Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method (Average of 3 reads)
Instrument: Photo Research PR-655 Spectroradiometer with SRS-3 Target
Location: HV
Voltage: 14.0V

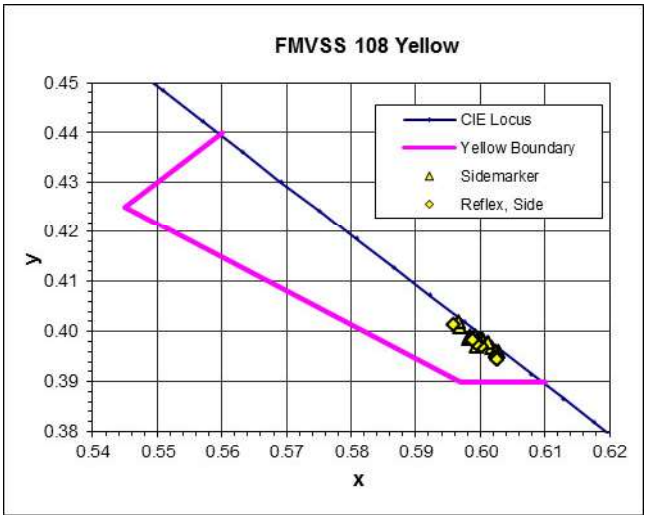
	Sample	Time	x	y
Amber Marker	#1A	t=0	0.6004	0.3982
		t=30min	0.5995	0.397
	#1B	t=0	0.5992	0.3984
		t=stable	0.5988	0.3984
	#2A	t=0	0.5968	0.4007
		t=stable	0.5967	0.4019
	#2B	t=0	0.5985	0.3989
		t=stable	0.5983	0.3985
	#3A	t=0	0.6002	0.3984
		t=stable	0.6005	0.398
	#3B	t=0	0.5992	0.3989
		t=stable	0.5987	0.3986
	#4A	t=0	0.6019	0.3968
		t=stable	0.6013	0.3976
	#4B	t=0	0.6029	0.3959
		t=stable	0.6024	0.3959
Amber Reflex	#1A		0.6003	0.3969
	#1B		0.5994	0.3979
	#2A		0.5959	0.4014
	#2B		0.5995	0.3975
	#3A		0.5989	0.3982
	#3B		0.6024	0.3949
	#4A		0.6027	0.3943
	#4B		0.6026	0.3944

Requirement & Chart

$y \geq 0.39$

$y \geq 0.79 - 0.67x$

$y \leq x - 0.12$



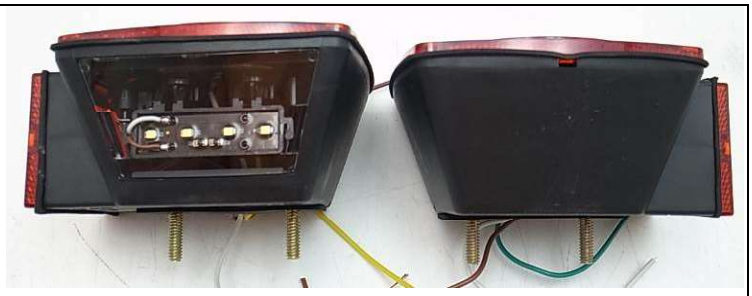
Samples meet amber sidemarker and amber reflex Color requirements.

PHOTOGRAPH SHEET

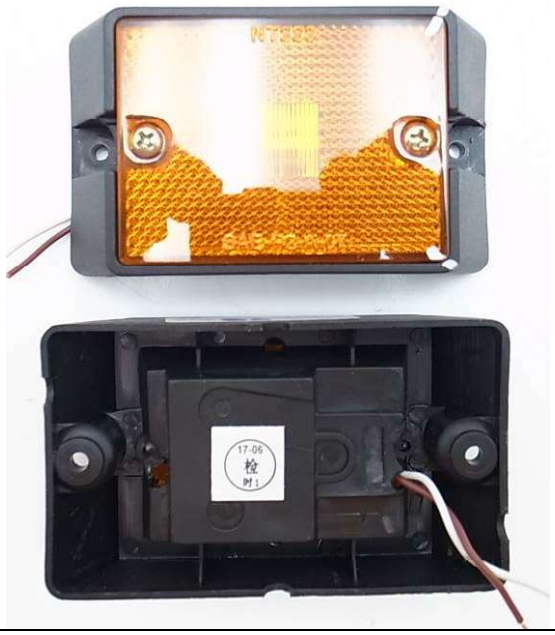
Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

PHOTOGRAPH SHEET

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide



Date Code?



EQUIPMENT LIST

Project Name: Haul Master 62488 Trailer Light Kit for Vehicles <2032 mm Wide

PHOTOMETRY / COLOR — Last Calibrated

Goniometer
ITL Custom with Aerotech ART-330, 320 Stepper Motors .....07 Jan 2015
[resolution 0.001°, accuracy ±0.01°(±0.05%)] .....[due every 5 years]

Luminous Intensity
Hoffman TSP-7501(HG), S/N 1060 .....15 Jan 2018
[0.1 Cd to 600 kCd, ±0.01 Cd, accuracy ±2.0%] ..... [due every 12 months]

Color – Spectroradiometric
Photoresearch PR-655 w/MS-75 lens & SRS-3 target,
S/N 65160706 .....02 Jun 2017
[resolution ±2nm, (x, y) ±0.001, ±4% luminance] ..... [due every 12 months]

Reflex Projector
Hoffman GPS-102, S/N 1006 .....before every test
[~1 fc (10 Lx) at 2856K (Illuminant A)] .....[due as needed]

Accurate Rated Bulbs
ITL-648 (194, 2.0 MSCd) .....15 Mar 2018

ELECTRICAL — Last Calibrated

DC Power Supply
HP6652A, S/N 3347A-01634 .....N/A
[500W, 0-20V, 0-25A] ..... [use DMMs for measurement]

Voltage
Fluke 45 (#1), S/N 7934019 .....15 Jan 2018
[resolution 0.01V, accuracy ±0.02%] ..... [due every 12 months]

Current
Keithley 197A (#1), S/N 741430 .....15 Jan 2018
[resolution 0.001A, accuracy ±0.02%] ..... [due every 12 months]

Report No. 160921-01B

TEST REPORT

Report Date: 21 September 2016

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Submitted by: Harbor Freight Tools
Calabasas, CA 91302

Test Laboratory: Calcoast - ITL
San Leandro, CA 94577

Samples Submitted: Two (2) kits submitted 21 September 2016 each consisting of:
One (1) pair (LH + RH) NT223 Rear Combination Lamp
Two (2) NT223 Amber Combination Sidemarker/Reflex Lamps

SUMMARY

TESTS (FMVSS 108)

Photometric Tests - Rear Combination Lamp (3-lighted section device)
- Turn Signal Lamp - S7.1.2.13 / Table VII (Red) .....Passed
- Tail Lamp - S7.2.13 / Table VII .....Passed
- Stop Lamp - S7.3.13 / Table IX .....Passed
- Sidemarker Lamp - S7.4.13 / Table X (Red) .....Passed
- License Plate Lamp - S7.7.13 .....Passed
- Red Reflex Reflector, Rear - S8.1.11 / Table XVI (Red) .....Passed
- Red Reflex Reflector, Side - S8.1.11 / Table XVI (Red) .....Passed

Photometric Tests - Combination Side Lamp
- Sidemarker Lamp - S7.4.13 / Table X (Yellow) .....Passed
- Reflex Reflector, Side - S8.1.11 / Table XVI (Yellow) .....Passed

Lens Area Tests (EPLLA) - Table IV-a.....Not Tested
Visibility Tests - Table V-c, Luminous Intensity Method.....Not Tested
Bulb Socket Test- S14.2.....Not Applicable
Color Tests - S14.4.1..... Passed
Plastic Optical Material Tests - S14.4.2.....Not Tested
Physical (Mechanical) Tests - S14.5.....Not Tested

Written by:

Douglas G. Cummins
Photometric Engineer

Approved by:

Mark A. Evans
Laboratory Director

Report No. 160921-01B

DESCRIPTION SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Kit contains a lamp system consisting of one (1) pair of rear mounted combination lamps (RCLs) with Stop, Tail, Turn Signal, Sidemarker, Rear Reflex, Side Reflex and License functions and one (1) pair of side mounted lamps with Yellow Side Marker and Side Reflex functions (AP2).
The RCLs use LEDs for Tail, Stop/Turn Signal, and License Plate functions and an incandescent 12V 3W for Sidemarker. The Yellow AP2 uses LEDs for Sidemarker function.

MARKINGS:

LENS: RCL IS: "TOP", "NT222", "DOT" (x2), "SAE (3)S(3)I(3)TLP2A07" (x2)
RCL AP2: "NT223", "SAE -P2-A-07"
RCL L: none
Yellow AP2: "NT222", "SAE-P2-A-05"

HOUSING: RCL IS: "↑ TOP", "TAIL (BROWN)", "STOP&TURN (YELLOW)" or "STOP&TURN (GREEN)", "L.H." or "R.H.", "ROAD SIDE" or "CURB SIDE", "MADE IN CHINA"

MATERIAL:

LENS: RCL AIST Lens: Plastic, Red
RCL AP2 Side Lens: Plastic, Red
RCL License Lens: Plastic, Clear
Yellow AP2 Side Lens: Plastic, Yellow
Lens material formulation, pigment, and coating must comply with FMVSS 108 S14.4.2 Plastic optical materials 3 year weathering requirements.

HOUSING: Plastic, Black

MOUNTING: RCL: Two (2) carriage bolts to vehicle
Yellow AP2: Two (2) screws to vehicle

Note: Material information not disclosed.

BULBS:

DEVICE	FUNCTION	QUANTITY	TYPE	VOLTAGE	POWER	FLUX
RCL	IS	Twelve (12)	LEDs	12.8		N/A
	T	Twelve (12)	LEDs	12.8		N/A
	L	Four (4)	LEDs	12.8		N/A
	P2	One(1)	194	14	0.27A/4W	2 MSCd
Yellow AP2	P2	Four (4)	LEDs	12.8		N/A

BULB SOCKET REQUIRMENTS – SAE J567b

Not Applicable
Device does not use sockets that conform to S14.2.1.6.2 / SAE J567b.

Report No. 160921-01B

PHOTOMETRIC TEST SUMMARY SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

SUMMARY OF PHOTOMETRIC TESTS

Tests performed by: Douglas Cummins Date: 21 September 2016

Meets requirements at all points for:

S7.1.2.13 / Table VII	Rear Turn Signal Lamps, 3 Lighted Sections
S7.2.13 / Table VIII	Tail Lamps, 3 Lighted Sections
S7.3.13 / Table IX	Stop Lamps, 3 Lighted Sections
S7.4.13 / Table X	Sidemarker Lamps
S7.7.13	License Plate Lamps
S8.1.11 / Table XVI	Reflex Reflectors

Note: Excessive sealing glue prevents RCL samples from sitting flush directly to the test fixture mounting surface. Standoffs were used to try and maintain the parallel between the lamp seating surface and the test fixture mounting surface.

Reference detector control number: NIST P181-2
Projector: Hoffman GPS-101 - 30" Diameter Beam, Illuminant A, 1.0 Fc
Test distance: 100 feet

Samples tested using LEDs at designated voltage (12.8V). In the case of the incandescent Sidemarker function, a calibrated, accurate-rated bulb at design luminous flux was used. Samples mounted on CCITL universal fixture with function source located at goniometer center of rotation and tilt.

LED functions tested after output stabilized. Stop/Turn Signal functions were then multiplied by a factor to achieve the performance at 10 minutes (SAE J1889 methodology). After testing, the intensities at HV were measured through a voltage range and the ratios compared to design voltage tabulated below:.

Intensity vs. Voltage

RCL	LH	RH	AP#1
Voltage	IS	T	P2
12.0V	183 mA / 88.5%	10 mA / 86.5%	35 mA / 91.1%
12.8V	212 mA / 100.0%	11 mA / 100.0%	39 mA / 100.0%
13.5V	237 mA / 110.1%	13 mA / 112.6%	43 mA / 108.4%
14.0V	256 mA / 115.9%	14 mA / 121.7%	45 mA / 113.9%

Samples meet requirements in a voltage range from 12.0V to 14.0V.

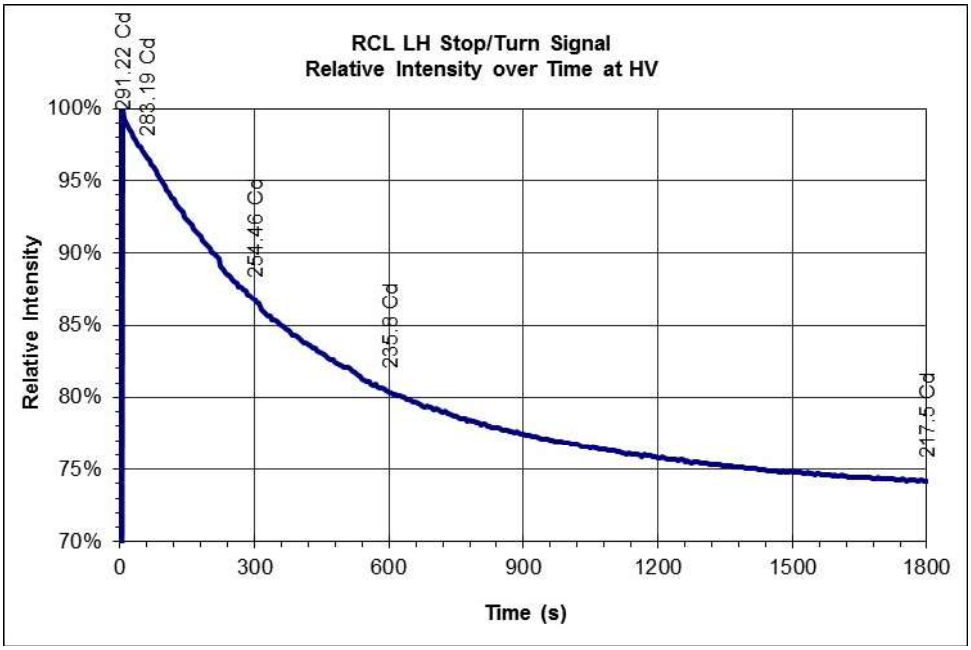
Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

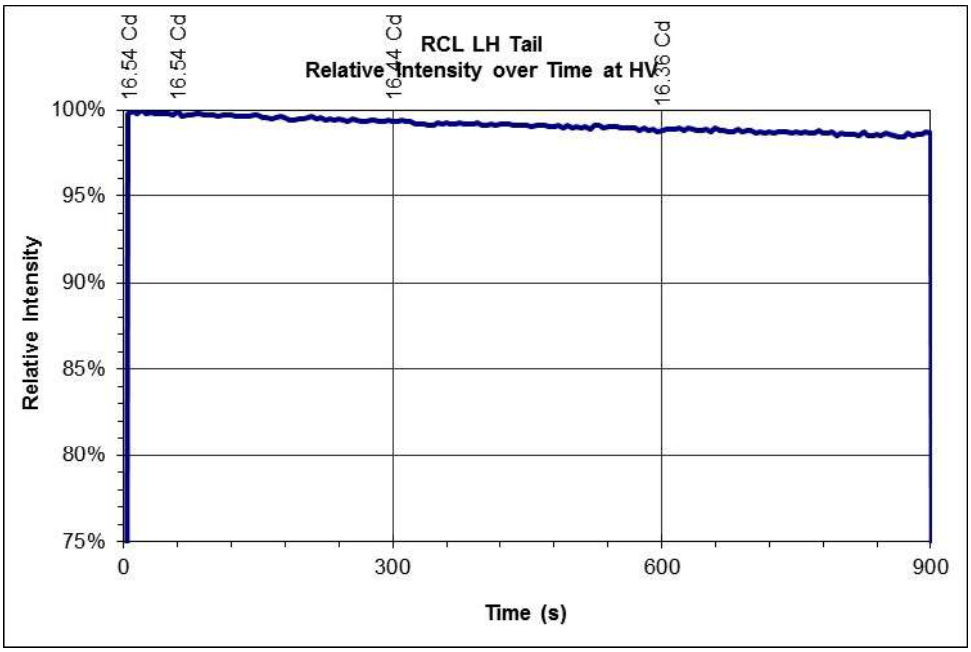
Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: Set A

Time Logs



Ratio: $I_{t=1\ min}/I_{t=10\ min}$ = 1.201
$I_{t=10min}/I_{t=30\ min}$ = 1.084



Ratio: $I_{t=1\ min}/I_{t=15\ min}$ = 1.013
Function is stable after 15 minutes

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 LH Rear Combination Lamp - Set A

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LED)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		70.61		22	420
10.0U 5.0R		74.08		22	420
5.0U 20.0L		30.10		15	420
5.0U 10.0L		67.41		40	420
5.0U V		111.75		95	420
5.0U 10.0R		74.83		40	420
5.0U 20.0R		31.13		15	420
H 10.0L		79.39		55	420
H 5.0L		152.08		110	420
H V		225.81		110	420
H 5.0R		137.46		110	420
H 10.0R		92.80		55	420
5.0D 20.0L		30.59		15	420
5.0D 10.0L		67.58		40	420
5.0D V		174.45		95	420
5.0D 10.0R		75.75		40	420
5.0D 20.0R		31.85		15	420
10.0D 5.0L		69.70		22	420
10.0D 5.0R		74.03		22	420
MAXIMUM	0.5D 0.4R	256.35	[307.88 @ 1 min]	-	420
Zone 1		201.00		70	-
Zone 2		214.39		135	-
Zone 3		801.54		520	-
Zone 4		243.38		135	-
Zone 5		211.09		70	-

Sample meets test requirements at all points.
Measured Values multiplied by 1.084 to achieve performance at t = 10 min

Applied Voltage: 12.80V / 0.212A after 30 min warmup per SAE J1889

Aim: Lamp mounted on CCITL universal fixture with center of LEDs located at goniometer center of rotation and tilt with lens first surface laser-aimed normal to detector axis at HV.

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 RH Rear Combination Lamp - Set A

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LED)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		80.34		22	420
10.0U 5.0R		76.78		22	420
5.0U 20.0L		30.41		15	420
5.0U 10.0L		74.97		40	420
5.0U V		120.66		95	420
5.0U 10.0R		73.06		40	420
5.0U 20.0R		27.28		15	420
H 10.0L		86.91		55	420
H 5.0L		162.40		110	420
H V		200.92		110	420
H 5.0R		106.76+		110	420
H 10.0R		85.19		55	420
5.0D 20.0L		29.63		15	420
5.0D 10.0L		68.04		40	420
5.0D V		125.16		95	420
5.0D 10.0R		68.25		40	420
5.0D 20.0R		26.19		15	420
10.0D 5.0L		67.13		22	420
10.0D 5.0R		66.59		22	420
MAXIMUM	0.8U 0.5L	230.76		-	420
Zone 1		207.51		70	-
Zone 2		229.92		135	-
Zone 3		715.91		520	-
Zone 4		226.51		135	-
Zone 5		196.85		70	-

+ Test point meets 60% of specified intensity
Sample meets test requirements at all points.

Applied Voltage: 12.80V / 0.206A after 10 min warmup per SAE J1889
Lamp previously tested in Tail and operated with Tail steady burning and Stop/Turn flashing at 1.2Hz/50% D.C. during the warmup period.

Aim: Lamp mounted on CCITL universal fixture with center of LEDs located at goniometer center of rotation and tilt with lens first surface laser-aimed normal to detector axis at HV.

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 LH Rear Combination Lamp - Set A

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LED)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.46		1.0	25.0
10.0U 5.0R		4.72		1.0	25.0
5.0U 20.0L		1.95		0.7	25.0
5.0U 10.0L		4.22		2.0	25.0
5.0U V		7.67		4.5	25.0
5.0U 10.0R		4.73		2.0	25.0
5.0U 20.0R		2.03		0.7	25.0
H 10.0L		5.01		2.0	25.0
H 5.0L		10.26		5.0	25.0
H V		15.63		5.0	25.0
H 5.0R		9.41		5.0	25.0
H 10.0R		5.76		2.0	25.0
5.0D 20.0L		1.97		0.7	-
5.0D 10.0L		4.25		2.0	-
5.0D V		11.88		4.5	-
5.0D 10.0R		4.79		2.0	-
5.0D 20.0R		2.07		0.7	-
10.0D 5.0L		4.42		1.0	-
10.0D 5.0R		4.70		1.0	-
MX(H-90U/45L-45R)	H 0.5R	16.56		-	25.0
MAXIMUM	0.5D 0.6R	17.38		-	-
Zone 1		12.80		3.5	-
Zone 2		13.48		6.0	-
Zone 3		54.86		24.0	-
Zone 4		15.28		6.0	-
Zone 5		13.51		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 12.80V / 48mA after 15 min warmup per SAE J1889

Aim: Lamp mounted on CCITL universal fixture with center of LEDs located at goniometer center of rotation and tilt with lens first surface laser-aimed normal to detector axis at HV.

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 RH Rear Combination Lamp - Set A

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 1 Lighted Section
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		5.08		0.4	18.0
10.0U 5.0R		4.81		0.4	18.0
5.0U 20.0L		1.93		0.3	18.0
5.0U 10.0L		4.71		0.8	18.0
5.0U V		7.84		1.8	18.0
5.0U 10.0R		4.60		0.8	18.0
5.0U 20.0R		1.75		0.3	18.0
H 10.0L		5.46		0.8	18.0
H 5.0L		10.44		2.0	18.0
H V		13.22		2.0	18.0
H 5.0R		6.96		2.0	18.0
H 10.0R		5.35		0.8	18.0
5.0D 20.0L		1.88		0.3	-
5.0D 10.0L		4.29		0.8	-
5.0D V		8.35		1.8	-
5.0D 10.0R		4.30		0.8	-
5.0D 20.0R		1.70		0.3	-
10.0D 5.0L		4.22		0.3	-
10.0D 5.0R		4.22		0.3	-
MX(H-90U/45L-45R)	0.7U 0.5L	15.22		-	18.0
MAXIMUM	0.8U 0.2L	15.26		-	-
Zone 1		13.12		1.4	-
Zone 2		14.47		2.4	-
Zone 3		46.81		9.6	-
Zone 4		14.26		2.4	-
Zone 5		12.48		1.4	-

Sample meets test requirements at all points.

Applied Voltage: 12.80V / 11mA after 30 min warmup per SAE J1889
Lamp previously operated with Tail steady burning and
Stop/Turn flashing at 1.2Hz/50% D.C. during the warmup period.

Aim: Lamp mounted on CCITL universal fixture with center of LEDs located at goniometer center of rotation and tilt with lens first surface laser-aimed normal to detector axis at HV.

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 LH Rear Combination Lamp - Set A

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.56		0.25	-
10.0U V		0.79		0.25	-
10.0U 45.0R		0.63		0.25	-
10.0U 45.0L TO 45.0R	44.8L	0.56		0.25	-
5.0U 45.0L TO 45.0R	44.9L	0.61		0.25	-
H 45.0L		0.68		0.25	-
H V		0.77		0.25	-
H 45.0R		0.67		0.25	-
H 45.0L TO 45.0R	45.0R	0.67		0.25	-
5.0D 45.0L TO 45.0R	44.8R	0.56		0.25	-
10.0D 45.0L		0.72		0.25	-
10.0D V		0.80		0.25	-
10.0D 45.0R		0.59		0.25	-
10.0D 45.0L TO 45.0R	45.0R	0.59		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-617 (194, LCL=0.564in) @ 15.50V / 0.332A / 2.0MSCd
0.332A = 0.266A rated luminous flux + 66mA for LED T + L functions

Aim: Lamp mounted on CCITL universal fixture with 194 filament located at goniometer center of rotation and tilt with rear mounting surface laser-aimed parallel to detector axis at HV.

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 RH Rear Combination Lamp - Set A

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		0.73		0.25	-
10.0U V		0.87		0.25	-
10.0U 45.0R		0.55		0.25	-
10.0U 45.0L TO 45.0R	45.0R	0.55		0.25	-
5.0U 45.0L TO 45.0R	44.0R	0.64		0.25	-
H 45.0L		0.76		0.25	-
H V		0.89		0.25	-
H 45.0R		0.80		0.25	-
H 45.0L TO 45.0R	42.7L	0.66		0.25	-
5.0D 45.0L TO 45.0R	44.7R	0.64		0.25	-
10.0D 45.0L		0.59		0.25	-
10.0D V		0.89		0.25	-
10.0D 45.0R		0.67		0.25	-
10.0D 45.0L TO 45.0R	45.0L	0.59		0.25	-

Sample meets test requirements at all points.

Calibrated Bulb: ITL-617 (194, LCL=0.564in) @ 15.60V / 0.282A / 2.0MSCd
0.282A = 0.266A rated luminous flux + 16mA for LED T + L functions

Aim: Lamp mounted on CCITL universal fixture with 194 filament located at goniometer center of rotation and tilt with rear mounting surface laser-aimed parallel to detector axis at HV.

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 RH Rear Combination Lamp - Set A

Specification: S7.7.13 License Plate Lamps

Test Station	Illuminance (fc)	
	Measured	Required Minimum
1	6.04	0.75
2	53.5	
3	51.8	
4	6.52	
5	3.97	
6	8.23	
7	7.62	
8	4.01	

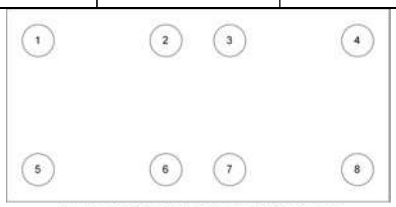
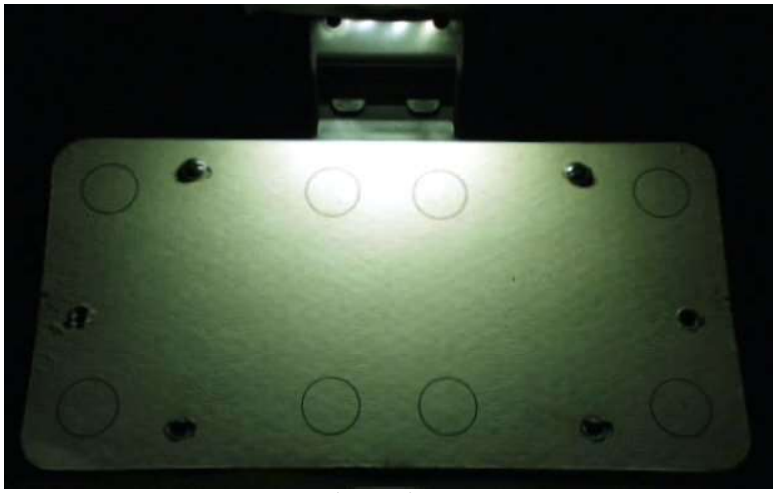


Figure 1. Test Plate for Vehicles other than Motorcycles and Motor Driven Cycles

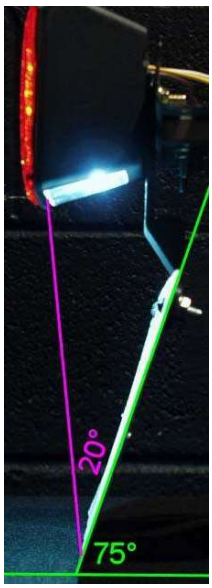

[Photo of illuminated plate]

Ratio of Max / Min

Max Stations	Min Stations	Ratio	Required Maximum
2 + 3	5 + 8	13.2	20

Geometry

Item	Measured	Required
Incident Light Angle	20°	≥ 8°
Cutoff Distance	55+ mm	≥ 25 mm
Plate Angle Relative to Horizontal	75°	90° ± 15°



License test plate mounted on license plate bracket furnished in kit (no P/N specified)

LED applied voltage: 12.8V / 48 mA

Samples meet license plate illumination requirements at all points.

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 LH Rear Combination Lamp - Set A

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear Reflex				
10.0U V	5.281	3.00	0.217	0.05
H 20.0L	3.043	1.50	0.142	0.03
H V	8.220	4.50	0.749	0.07
H 20.0R	3.550	1.50	0.137	0.03
10.0D V	5.135	3.00	0.226	0.05
Side Reflex				
10.0U V	8.644	3.00	0.144	0.05
H 20.0L	5.804	1.50	0.087	0.03
H V	10.917	4.50	0.302	0.07
H 20.0R	5.702	1.50	0.095	0.03
10.0D V	8.527	3.00	0.151	0.05

Incident Illumination upon sample: 0.993 fc (10.68 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted on CCITL universal fixture with reflex center located at goniometer center of rotation and tilt with rear mounting surface laser-aimed normal to projector axis at HV.

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 RH Rear Combination Lamp - Set A

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Rear Reflex				
10.0U V	6.356	3.00	0.202	0.05
H 20.0L	3.968	1.50	0.131	0.03
H V	8.454	4.50	0.640	0.07
H 20.0R	4.001	1.50	0.130	0.03
10.0D V	6.482	3.00	0.217	0.05
Side Reflex				
10.0U V	8.007	3.00	0.169	0.05
H 20.0L	5.643	1.50	0.118	0.03
H V	8.931	4.50	0.355	0.07
H 20.0R	5.261	1.50	0.135	0.03
10.0D V	7.497	3.00	0.169	0.05

Incident Illumination upon sample: 0.995 fc (10.71 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted on CCITL universal fixture with reflex center located at goniometer center of rotation and tilt with rear mounting surface laser-aimed normal to projector axis at HV.

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 AP2 - Set A #1

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Yellow
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		3.96		0.62	-
10.0U V		3.57		0.62	-
10.0U 45.0R		2.89		0.62	-
10.0U 45.0L TO 45.0R	44.6R	2.87		0.62	-
5.0U 45.0L TO 45.0R	45.0R	2.99		0.62	-
H 45.0L		3.83		0.62	-
H V		3.62		0.62	-
H 45.0R		3.09		0.62	-
H 45.0L TO 45.0R	45.0R	3.07		0.62	-
5.0D 45.0L TO 45.0R	44.9L	3.30		0.62	-
10.0D 45.0L		3.30		0.62	-
10.0D V		3.48		0.62	-
10.0D 45.0R		4.25		0.62	-
10.0D 45.0L TO 45.0R	42.4L	3.23		0.62	-

Sample meets test requirements at all points.

Applied Voltage: 12.80V / 39mA after 30+ min warmup per SAE J1889

Aim: Lamp mounted on CCITL universal fixture with LED center located at goniometer center of rotation and tilt with rear mounting surface laser-aimed normal to detector axis at HV.

Report No: 160921-01B

PHOTOMETRIC TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: NT 223 AP2 - Set A #1

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Yellow
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
10.0U V	19.148	7.50	0.342	0.13
H 20.0L	12.133	3.75	0.239	0.08
H V	23.211	11.25	0.421	0.18
H 20.0R	12.569	3.75	0.250	0.08
10.0D V	18.464	7.50	0.356	0.13

Incident Illumination upon sample: 0.990 fc (10.66 Lux)

Sample meets test requirements at all points.

Aim: Lamp mounted on CCITL universal fixture with reflex center located at goniometer center of rotation and tilt with rear mounting surface laser-aimed normal to projector axis at HV.

Report No: 160921-01B

EPLLA TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: -

Requirement: FMVSS 108 Table IV Effective Projected Luminous Lens Area
Test Method: CCITL Camera and image analysis

Function	Effective Projected Luminous Lens Area			Specification
	View	Measured	Minimum Required	
Stop/ Turn Signal	HV	cm^2	50 cm^2 (vehicles ≤80" wide)	FMVSS 108 Table IV-a

EPPLA and Visibility tests not performed per submitter request.

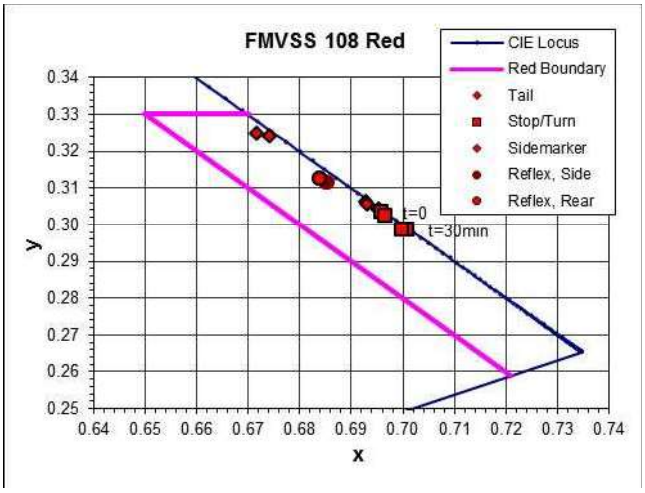
Report No. 160921-01B

COLORIMETRY TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: Set A

Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method
Average of 3 reads using supplied bulb at design voltage
Instrument: Photo Research PR-655 Spectroradiometer with SRS-3 Target
Location: HV, 2 ft (Tail, Stop/Turn, Sidemarker);
5D/V (Reflex - Ill. A, 2° Observer, +5°/0.33° Geometry at 10 ft)
Voltage: 12.8V (Tail, Stop/Turn, Sidemarker)

Measured (x, y)	Required	Chart
Tail RCL LH (t=0): (0.6928, 0.3061) (t=15): (0.6932, 0.3055) RCL RH (t=0): (0.6953, 0.3041) (t=30): (0.6953, 0.3041) Stop /Turn Signal RCL LH (t=0): (0.6958, 0.3034) (t=30): (0.7008, 0.2984) RCL RH (t=0): (0.6966, 0.3024) (t=15): (0.6999, 0.2986) RCL Sidemarker LH: (0.6742, 0.3241) RH: (0.6718, 0.3249) RCL Reflex, Side LH: (0.6855, 0.3115) RH: (0.6851, 0.3115) RCL Reflex, Rear LH: (0.6839, 0.3125) RH: (0.6838, 0.3126)	$y \leq 0.33$ $y \geq 0.98 - x$	

Samples meet Color requirements.

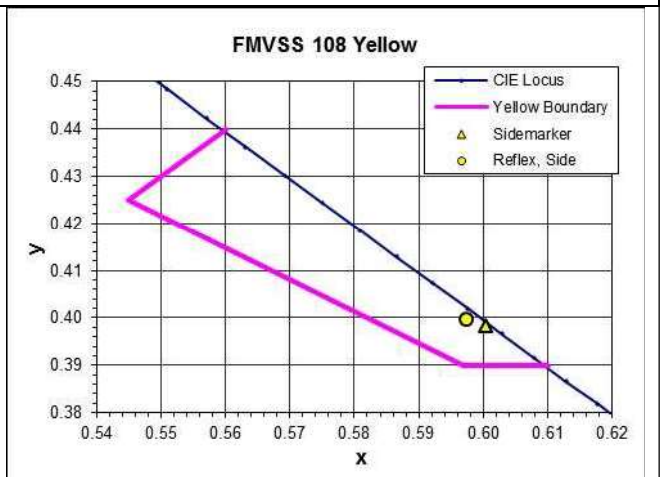
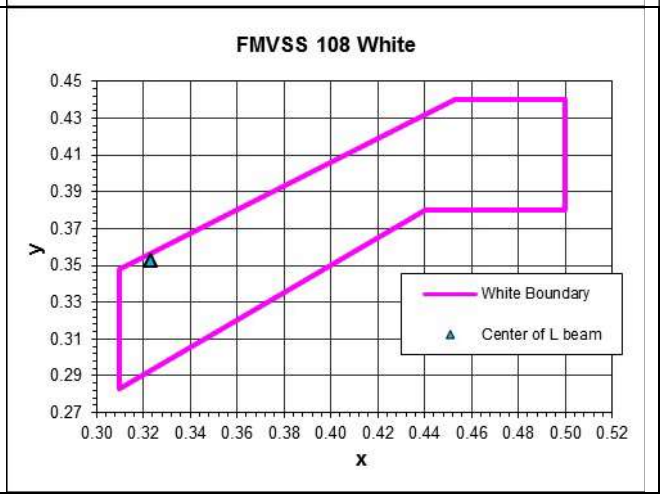
Report No. 160921-01B

COLORIMETRY TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Sample Number: Set A

Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method
Average of 3 reads
Instrument: Photo Research PR-655 Spectroradiometer with SRS-3 Target
Location: HV, 2 ft (Sidemarker);
5D/V (Reflex - Ill. A, 2° Observer, +5°/0.33° Geometry at 10 ft);
center of beam pattern (License)
Voltage: 12.8V (License, Sidemarker)

Measured (x, y)	Required	Chart
Sidemarker #1: (0.6005, 0.3982) Reflex, Side #1:(0.5974, 0.3996)	$y \geq 0.39$ $y \geq 0.79 - 0.67x$ $y \leq x - 0.12$	
License LH: (0.3234, 0.3522)	$0.31 \leq x \leq 0.50$ $0.38 \leq y \leq 0.44$ $y \geq 0.75x + 0.05$ $y \leq 0.64x + 0.15$	

Samples meet Color requirements.

MECHANICAL TEST DATA SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Requirement: FMVSS 108 S14.5 Physical (Mechanical) Tests

S14.5.1 Vibration Test: .....Not Tested
Sample Numbers: -

~~Samples vibrated on FMVSS 108 Figure 21 vibration machine for 1 hour.~~

~~There was no evidence of material physical weakness, lens or reflector rotation, displacement or rupture of parts (except possibly bulb failure).~~

S14.5.2 Moisture Test: .....Not Tested
Sample Numbers: -

~~Samples subjected to a solid cone of precipitation of 0.1 in/min at a delivery angle of 45° while rotating about their vertical axis at a rate of 4 rpm for 12 hours. After a 1 hour drain period, samples were examined for moisture accumulation.~~

~~There was 0.0 cc of moisture accumulation inside the samples. No moisture visible in the sealed reflex units. Accumulation of moisture in excess of 2 cc or any visible moisture in a sealed reflex unit constitutes a failure.~~

S14.5.3 Dust Test: .....Not Tested
Sample Numbers: -

~~Samples mounted in dust chamber and subjected to Portland Cement powder agitated by a 2 second period projected blast of compressed air every 15 minutes for 5 hours. Exterior surface of samples then cleaned and maximum intensities measured.~~

~~No dust was observed on the interior surfaces of the samples. The percent change of maximum intensity must be within 10% of pre-Dust Test value.~~

Sample	Function % Change					
	I	S	T(O/S)		P2	

S14.5.4 Corrosion Test: .....Not Tested
Sample Numbers: -

~~Sample subjected to a 5% NaCl fog solution per ASTM B117 for a period of 50 hours consisting of two periods of 24 hour exposure followed by 1 hour drying time.~~

~~There was no evidence of excessive corrosion which would affect the proper functioning of the samples.~~

~~Samples comply with Physical (Mechanical) Test requirements.~~

PHOTOGRAPH SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

PHOTOGRAPH SHEET

Project Name: Haul Master 62488 LED Trailer Lamp Kits

Report Number: 170719-01C Rev1

TEST REPORT

Report Date: 19 September 2017
Revision Date: 22 September 2017 [*added markings photographs*]

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit w/ Rear Combination Lamps (SAE STIA L AP2) & Amber Sidemarkers/Reflex (SAE AP2) for Vehicles < 2032 mm Wide Only

Submitted by: Changzhou Nanxiashu Tool Co., Ltd.
Fengshuqiao, China

Test Laboratory: Calcoast – ITL
San Leandro, CA 94577

Samples Submitted: Three (3) Kits submitted 19 July 2017
Two (2) modified sidemarkers submitted 13 Sept 2017

SUMMARY

TESTS (FMVSS 108/CMVSS 108)

Photometric Tests – Rear Combination Lamp
- Turn Signal Lamp - S7.1.2.13 / Table VII (Red), 3-lighted section ..Passed
- Tail Lamp - S7.2.13 / Table VIII, 3-lighted section .....Passed
- Stop Lamp - S7.3.13 / Table IX, 3-lighted section .....Passed
- Sidemarker Lamp - S7.4.13 / Table X (Red) .....Passed
- License Plate Lamp - S7.7.13 (*LP holder upper mounting holes only*) ....Passed
- Reflex Reflector, Rear - S8.1.11 / Table XVI (Red) .....Passed
- Reflex Reflector, Side - S8.1.11 / Table XVI (Red) .....Passed

Photometric Tests – Side Marker Lamp
- Sidemarker Lamp - S7.4.13 / Table X (Amber) .....Passed
- Reflex Reflector, Side - S8.1.11 / Table XVI (Amber) .....Passed

Lens Area Tests (EPLLA) – Table IV-a.....Passed
Visibility Tests – Table V-c, Luminous Intensity Method.....Passed
Color Tests – S14.4.1.....Passed
Plastic Optical Material Tests – S14.4.2 † .....Passed
Physical (Mechanical) Tests – S14.5.....passed

† *See AMECA for list of acceptable plastics*

Written and Approved by:

Mark A. Evans
Laboratory Director

DESCRIPTION SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Rear combination lamps (RCL) consisting of Stop, Tail, Turn Signal, Sidemarker, Rear Reflex, Side Reflex and License functions (LH only).
Amber marker lamps consisting of Sidemarker and Side Reflex.

MARKINGS:

LENS:

RCL Rear: "TOP", "NT223", "DOT", "SAE (3)S(3)I(3)TLP2A07", "DOT", "SAE (3)S(3)I(3)TLP2A07"

RCL Side: "NT223A", "SAEP2A07"

RCL L.P.: None

SM Side: "NT223A", "SAEP2A07"

HOUSING:

RCL: "TOP ↑", "STOP/TURN (YELLOW)" or "STOP/TURN (GREEN), "TAIL (BROWN)", "MADE IN CHINA", "L.H." or "R.H.", "ROAD SIDE" or "CURB SIDE"

L.P. Holder: None

DESCRIPTION SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

MATERIAL:

LENS: Rear Lens: Chimei ACRYREX CM-205 PMMA (R-001 Red Pigment)
Side Lens: Chimei ACRYREX CM-205 PMMA (R-001 Red Pigment)
L.P. Lens: Chimei ACRYREX CM-205 PMMA (N-000 Clear)
Side Lens: Chimei ACRYREX CM-205 PMMA (A-001 Amber Pigment)
Lens material formulation and pigments are listed in AMECA List of Acceptable Plastics indicating compliance with FMVSS 108 S14.4.2 Plastic optical materials 3 year weathering requirements.

HOUSING: ABS, Black

MOUNTING:
RCL: Two (2) studs to vehicle
SM: Two (2) screws to vehicle

BULBS:

DEVICE	FUNCTION	QUANTITY	TYPE	VOLTAGE	POWER	FLUX
RCL	IS	12	LED	13.5V	3W	N/A
	T				1.4W	N/A
	L	4	LED	13.5V		N/A
	P2	4	LED	13.5V		N/A
SM	P2	4	LED	13.5V	0.6W	N/A

BULB SOCKET REQUIRMENTS – SAE J567b
Not Applicable
Device does not use sockets that need to conform to S14.2.1.6.2 / SAE J567b.

A second version of amber Sidemarker and Side Reflex were submitted 13 September 2017 with cutouts in the housing to permit water drainage (weep holes) and wire threading.

Modified Lamps

The lamps were subjected to water spray and dust resistance tests.

PHOTOMETRIC TEST SUMMARY SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

SUMMARY OF PHOTOMETRIC TESTS

Tests performed by: MAE Date: 15-16, 22 August 2017

Meets requirements at all points for:
- Turn Signal Lamp - S7.1.2.13 / Table VII (Red), 3-lighted section
- Tail Lamp - S7.2.13 / Table VIII, 3-lighted section
- Stop Lamp - S7.3.13 / Table IX, 3-lighted section
- Sidemarker Lamp - S7.4.13 / Table X (Red)
- License Plate Lamp - S7.7.13
- Red Reflex Reflector, Rear - S8.1.11 / Table XVI (Red)
- Red Reflex Reflector, Side - S8.1.11 / Table XVI (Red)
- Sidemarker Lamp - S7.4.13 / Table X (Amber)
- Reflex Reflector, Side - S8.1.11 / Table XVI (Amber)

Note: License plate lamp complies only when the license plate holder is mounted to the lamp using the upper hole pair (see photo page).

Reference detector control number: NIST P181-2
Projector: Hoffman GPS-101 - 30" Diameter Beam, Illuminant A, 1.0 Fc
Test distance: 100 feet

Samples tested using LEDs at designated voltage (13.5V). Sample mounted on CCITL universal fixtures with function source located at goniometer center of rotation and tilt and seating plane perpendicular to HV.

LED functions tested after output stabilized. Stop/Turn Signal functions were then multiplied by a factor to achieve the performance at 10 minutes (SAE J1889 methodology). After testing, the intensities at HV were measured through a voltage range and the ratios compared to design voltage tabulated below:.

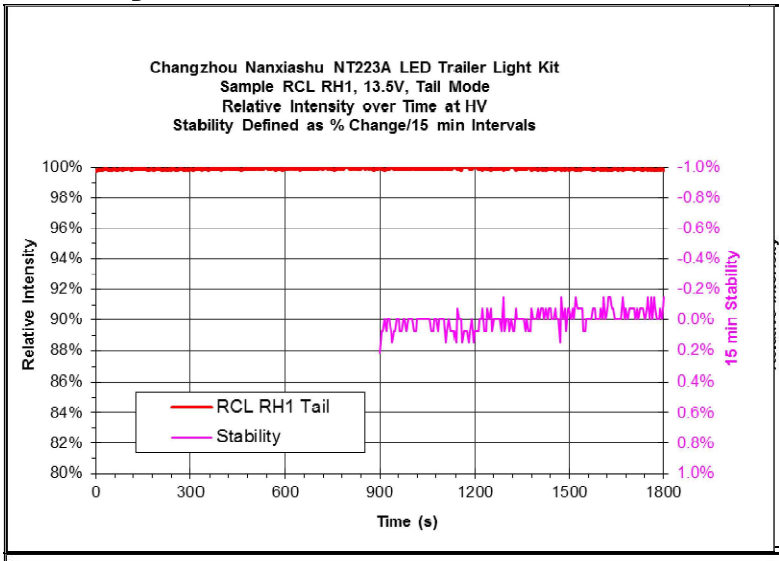
Intensity vs. Voltage

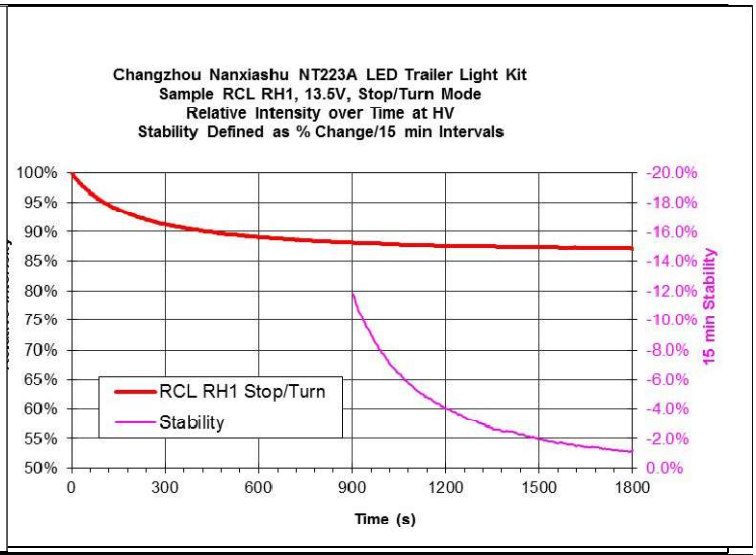
	12.0V	12.8V	13.5V	14.0V
Tail	76%	89%	100%	108%
Stop/Turn	79%	81%	100%	107%
Sidemarker	85%	94%	100%	105%
Amber Sidemarker	83%	92%	100%	106%

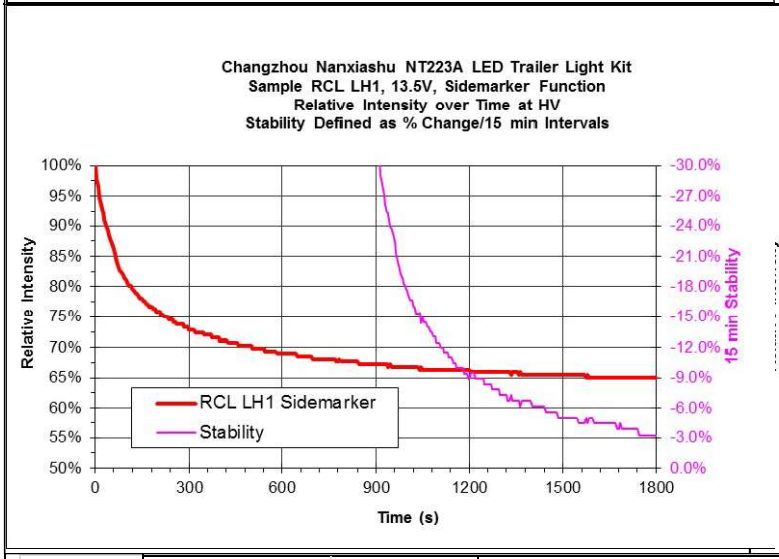
PHOTOMETRIC TEST DATA SHEET

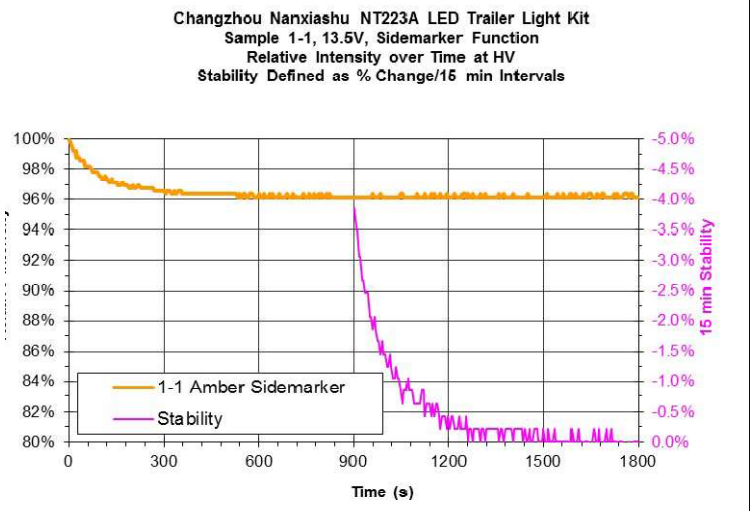
Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Time Logs









	RCL RH1 Tail	RCL RH1 Stop/Turn	RCL LH1 Sidemarker	1-1 Amber Sidemarker
Max:	13.8	337.0	2.3	4.9
Ratios				
1min/10min	1.000	1.085	1.250	1.019
10min/30min	1.001	1.023	1.060	1.002
1min/30min	1.001	1.110	1.325	1.021

All functions stabilized (<3%/15 min) prior to testing per SAE J1889.

Report No: 170719-01C Rev1

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL, LH1

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs arranged in multiple series)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		107.84		22	420
10.0U 5.0R		99.61		22	420
5.0U 20.0L		41.59		15	420
5.0U 10.0L		100.28		40	420
5.0U V		207.40		95	420
5.0U 10.0R		90.37		40	420
5.0U 20.0R		38.63		15	420
H 10.0L		119.71		55	420
H 5.0L		210.43		110	420
H V		262.63		110	420
H 5.0R		199.54		110	420
H 10.0R		101.50		55	420
5.0D 20.0L		40.54		15	420
5.0D 10.0L		89.13		40	420
5.0D V		198.01		95	420
5.0D 10.0R		80.90		40	420
5.0D 20.0R		37.38		15	420
10.0D 5.0L		82.00		22	420
10.0D 5.0R		77.64		22	420
MAXIMUM	1.1U 0.6L	311.71	(338.9 Cd @ t = 1 min)	-	420
Zone 1		271.96		70	-
Zone 2		309.12		135	-
Zone 3		1078.01		520	-
Zone 4		272.78		135	-
Zone 5		253.26		70	-

Sample meets test requirements at all points (including stop&turn/tail ratios).

Applied Voltage: 13.50V / 239mA after 30 minute warmup per SAE J1889
Measured Values multiplied by 1.025 to acquire t = 10 minute values.

Aim: Lamp mounted with seating plane perpendicular to HV.

Report No: 170719-01C Rev1

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL, RH1

Specification: FMVSS 108 Table IX: Stop Lamp; Table VII: Rear Turn Signal Lamp
Color: Red, 3 Lighted Sections (LEDs arranged in multiple series)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		87.39		22	420
10.0U 5.0R		84.52		22	420
5.0U 20.0L		39.92		15	420
5.0U 10.0L		87.81		40	420
5.0U V		192.92		95	420
5.0U 10.0R		85.09		40	420
5.0U 20.0R		37.79		15	420
H 10.0L		110.98		55	420
H 5.0L		212.93		110	420
H V		300.02		110	420
H 5.0R		186.49		110	420
H 10.0R		104.84		55	420
5.0D 20.0L		40.26		15	420
5.0D 10.0L		91.68		40	420
5.0D V		192.97		95	420
5.0D 10.0R		88.70		40	420
5.0D 20.0R		37.88		15	420
10.0D 5.0L		96.38		22	420
10.0D 5.0R		91.73		22	420
MAXIMUM	0.1U 0.2L	305.25	(331.2 Cd @ t = 1 min)	-	420
Zone 1		263.95		70	-
Zone 2		290.47		135	-
Zone 3		1085.33		520	-
Zone 4		278.64		135	-
Zone 5		251.92		70	-

Sample meets test requirements at all points (including stop&turn/tail ratios).

Applied Voltage: 13.50V / 241mA after 30 minute warmup per SAE J1889
Measured Values multiplied by 1.023 to acquire t = 10 minute values.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL, LH1

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs arranged in multiple series)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.82		1.0	25.0
10.0U 5.0R		4.45		1.0	25.0
5.0U 20.0L		1.88		0.7	25.0
5.0U 10.0L		4.51		2.0	25.0
5.0U V		9.26		4.5	25.0
5.0U 10.0R		4.06		2.0	25.0
5.0U 20.0R		1.76		0.7	25.0
H 10.0L		5.43		2.0	25.0
H 5.0L		9.44		5.0	25.0
H V		11.98		5.0	25.0
H 5.0R		8.96		5.0	25.0
H 10.0R		4.58		2.0	25.0
5.0D 20.0L		1.85		0.7	-
5.0D 10.0L		4.04		2.0	-
5.0D V		8.88		4.5	-
5.0D 10.0R		3.65		2.0	-
5.0D 20.0R		1.70		0.7	-
10.0D 5.0L		3.74		1.0	-
10.0D 5.0R		3.53		1.0	-
MX(H-90U/45L-45R)	1.0U 0.5L	13.96		-	25.0
MAXIMUM	0.9U 0.4L	13.86		-	-
Zone 1		12.30		3.5	-
Zone 2		13.99		6.0	-
Zone 3		48.52		24.0	-
Zone 4		12.28		6.0	-
Zone 5		11.43		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 100mA after 30 minute warmup per SAE J1889
Current includes sidemarker and license plate lamp function.

Aim: Lamp mounted with seating plane perpendicular to HV.
Note: Sidemarker masked off during testing.

Report No: 170719-01C Rev1

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL, RH1

Specification: FMVSS 108 Table VIII: Tail Lamp
Color: Red, 3 Lighted Sections (LEDs arranged in multiple series)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 5.0L		4.14		1.0	25.0
10.0U 5.0R		4.02		1.0	25.0
5.0U 20.0L		1.89		0.7	25.0
5.0U 10.0L		4.20		2.0	25.0
5.0U V		9.00		4.5	25.0
5.0U 10.0R		4.07		2.0	25.0
5.0U 20.0R		1.94		0.7	25.0
H 10.0L		5.34		2.0	25.0
H 5.0L		9.82		5.0	25.0
H V		13.76		5.0	25.0
H 5.0R		8.68		5.0	25.0
H 10.0R		5.01		2.0	25.0
5.0D 20.0L		1.91		0.7	-
5.0D 10.0L		4.40		2.0	-
5.0D V		8.93		4.5	-
5.0D 10.0R		4.25		2.0	-
5.0D 20.0R		1.94		0.7	-
10.0D 5.0L		4.59		1.0	-
10.0D 5.0R		4.39		1.0	-
MX(H-90U/45L-45R)	H 0.6L	14.10		-	25.0
MAXIMUM	H 0.4L	14.11		-	-
Zone 1		12.54		3.5	-
Zone 2		13.94		6.0	-
Zone 3		50.20		24.0	-
Zone 4		13.33		6.0	-
Zone 5		12.29		3.5	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 59mA after 30 minute warmup per SAE J1889
Current includes sidemarker function.

Aim: Lamp mounted with seating plane perpendicular to HV.
Note: Sidemarker masked off during testing.

Report No: 170719-01C Rev1

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL, LH1

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		1.04		0.25	-
10.0U V		1.67		0.25	-
10.0U 45.0R		1.13		0.25	-
10.0U 45.0L TO 45.0R	45.0L	1.04		0.25	-
5.0U 45.0L TO 45.0R	45.0L	0.90		0.25	-
H 45.0L		0.76		0.25	-
H V		1.51		0.25	-
H 45.0R		0.82		0.25	-
H 45.0L TO 45.0R	44.5L	0.76		0.25	-
5.0D 45.0L TO 45.0R	44.8L	0.94		0.25	-
10.0D 45.0L		1.25		0.25	-
10.0D V		1.78		0.25	-
10.0D 45.0R		1.22		0.25	-
10.0D 45.0L TO 45.0R	45.0R	1.22		0.25	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 100mA after 30 minute warmup per SAE J1889
Current includes tail and license plate lamp function.

Aim: Lamp mounted with seating plane perpendicular to HV.

Note: Tail lamp masked off during testing.

Report No: 170719-01C Rev1

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL, RH1

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Red
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		1.21		0.25	-
10.0U V		1.60		0.25	-
10.0U 45.0R		1.15		0.25	-
10.0U 45.0L TO 45.0R	44.7R	1.14		0.25	-
5.0U 45.0L TO 45.0R	44.6R	0.91		0.25	-
H 45.0L		0.79		0.25	-
H V		1.52		0.25	-
H 45.0R		0.77		0.25	-
H 45.0L TO 45.0R	44.8R	0.76		0.25	-
5.0D 45.0L TO 45.0R	45.0R	0.92		0.25	-
10.0D 45.0L		1.28		0.25	-
10.0D V		1.48		0.25	-
10.0D 45.0R		1.18		0.25	-
10.0D 45.0L TO 45.0R	45.0R	1.18		0.25	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 59mA after 30 minute warmup per SAE J1889
Current includes tail function.

Aim: Lamp mounted with seating plane perpendicular to HV.

Note: Tail lamp masked off during testing.

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: LH1

Specification: S7.7.13 License Plate Lamps

Test Station	Illuminance (fc)	
	Measured	Required Minimum
1	5.70	0.75
2	64.81	
3	66.48	
4	5.43	
5	4.45	
6	8.97	
7	8.75	
8	4.81	

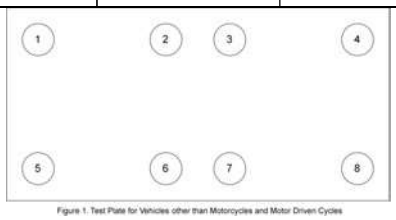
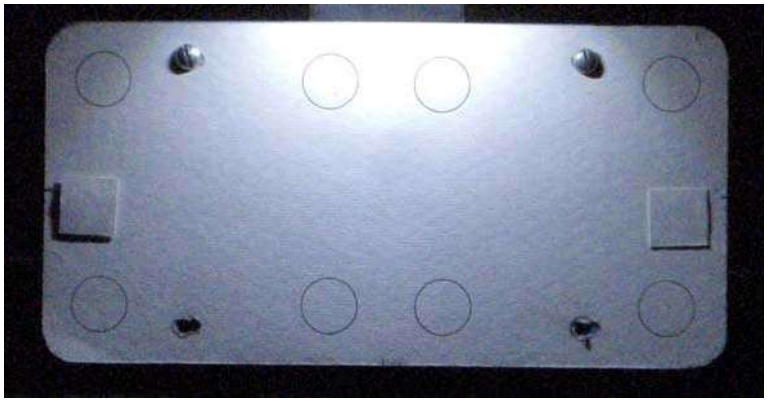


Figure 1. Test Plate for Vehicles other than Motorcycles and Motor Driven Cycles

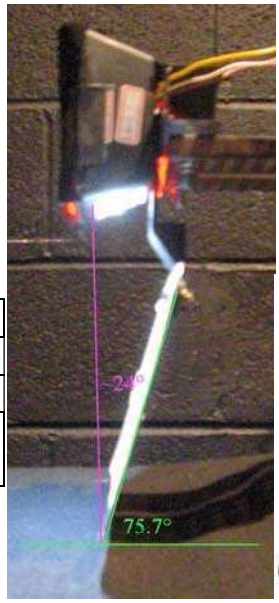

[Photo of illuminated plate]

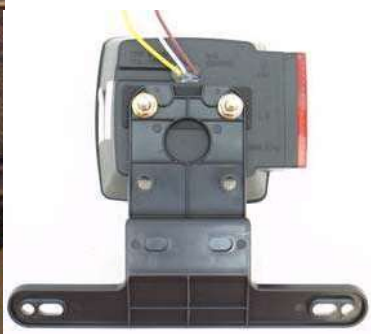
Ratio of Max / Min

Max Stations	Min Stations	Ratio	Required Maximum
2 + 3	5 + 8	14.2	20

Geometry

Item	Measured	Required
Incident Light Angle	~24°	≥ 8°
Cutoff Distance	>30 mm	≥ 25 mm
Plate Angle Relative to Horizontal	75.7°	90° ± 15°





License test plate mounted on license plate bracket furnished (no P/N). License plate holder must be mounted to the lamp using the top hole pair (see photo). Mounting using the lower holes brings the plate too close to the lamp and causes a max/min ratio failure.

LED applied voltage: 13.5V / 100 mA (includes tail and sidemarker currents)

Sample meets license plate illumination requirements at all points.

Report No: 170719-01C Rev1

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL LH1 and RCL RH1

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Red
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Sample Number: RCL LH1				
Rear Reflex				
10.0U V	7.887	3.00	0.139	0.05
H 20.0L	4.495	1.50	0.082	0.03
H V	9.956	4.50	0.187	0.07
H 20.0R	3.098	1.50	0.068	0.03
10.0D V	8.267	3.00	0.171	0.05
Side Reflex				
10.0U V	3.754	3.00	0.102	0.05
H 20.0L	2.974	1.50	0.083	0.03
H V	4.840	4.50	0.166	0.07
H 20.0R	2.686	1.50	0.106	0.03
10.0D V	3.712	3.00	0.118	0.05
Sample Number: RCL RH1				
Rear Reflex				
10.0U V	7.092	3.00	0.145	0.05
H 20.0L	3.880	1.50	0.075	0.03
H V	10.511	4.50	0.239	0.07
H 20.0R	3.626	1.50	0.085	0.03
10.0D V	7.988	3.00	0.179	0.05
Side Reflex				
10.0U V	3.810	3.00	0.108	0.05
H 20.0L	3.115	1.50	0.153	0.03
H V	5.108	4.50	0.208	0.07
H 20.0R	2.838	1.50	0.107	0.03
10.0D V	3.997	3.00	0.134	0.05

Samples meet test requirements at all points.

Incident Illumination upon sample: 0.977 fc (10.52 Lux)

Aim: Lamp mounted with seating plane perpendicular to HV.

Note: Entire lamp masked off during testing excluding reflex under test.

Report No: 170719-01C Rev1

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: Amber Sidemarker, 1-1

Specification: FMVSS 108 Table X: Sidemarker Lamp
Color: Yellow
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
10.0U 45.0L		3.03		0.62	-
10.0U V		4.28		0.62	-
10.0U 45.0R		2.95		0.62	-
10.0U 45.0L TO 45.0R	45.0R	2.95		0.62	-
5.0U 45.0L TO 45.0R	43.6R	2.78		0.62	-
H 45.0L		2.69		0.62	-
H V		4.72		0.62	-
H 45.0R		2.76		0.62	-
H 45.0L TO 45.0R	45.0L	2.69		0.62	-
5.0D 45.0L TO 45.0R	45.0R	2.59		0.62	-
10.0D 45.0L		3.41		0.62	-
10.0D V		4.44		0.62	-
10.0D 45.0R		3.05		0.62	-
10.0D 45.0L TO 45.0R	45.0R	3.04		0.62	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 45mA after 30 minute warmup per SAE J1889

Aim: Lamp mounted with seating plane perpendicular to HV.

Note: Tail lamp masked off during testing.

Report No: 170719-01C Rev1

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: Amber Sidemarker/Reflex, 1-1 and Set #2

Specification: FMVSS 108 Table XVI-a: Reflex Reflector
Color: Yellow
Specific Intensity, Candela / Footcandle

Test Point	Measured 0.2°	Required Minimum	Measured 1.5°	Required Minimum
Sample 1-1				
10.0U V	22.843	7.50	0.370	0.13
H 20.0L	14.591	3.75	0.331	0.08
H V	28.643	11.25	0.911	0.18
H 20.0R	11.525	3.75	0.268	0.08
10.0D V	21.931	7.50	0.618	0.13
Sample 2-1				
10.0U V	12.666	7.50	0.609	0.13
H 20.0L	8.093	3.75	0.448	0.08
H V	15.785	11.25	1.131	0.18
H 20.0R	7.173	3.75	0.328	0.08
10.0D V	12.421	7.50	0.809	0.13
Sample 2-2				
10.0U V	12.808	7.50	0.498	0.13
H 20.0L	8.144	3.75	0.452	0.08
H V	16.077	11.25	1.124	0.18
H 20.0R	7.502	3.75	0.330	0.08
10.0D V	12.843	7.50	0.792	0.13

Sample meets test requirements at all points.

Incident Illumination upon sample: 0.977 fc (10.52 Lux)

Aim: Lamp mounted with seating plane perpendicular to HV.

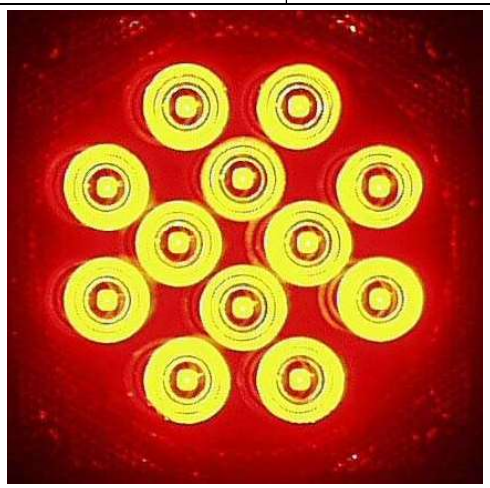
EPLLA TEST DATA SHEET

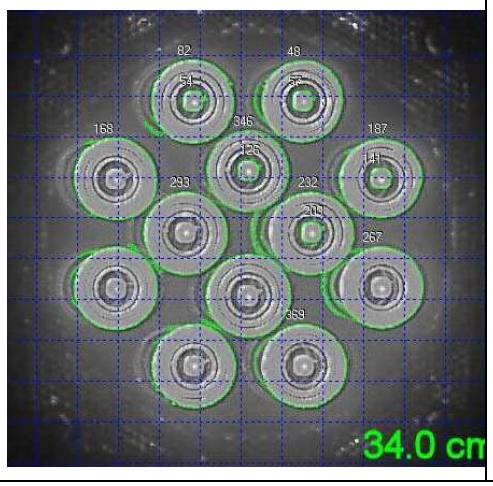
Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

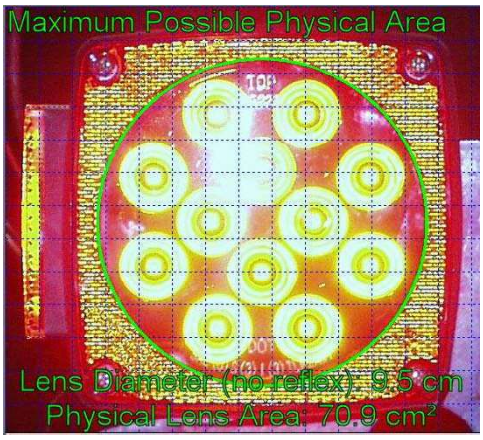
Sample Number: LH1

Requirement: FMVSS 108 Table IV Effective Projected Luminous Lens Area
Test Method: CCITL Camera and image analysis

Function	Effective Projected Luminous Lens Area			Specification
	View	Measured	Minimum Required	
Stop/ Turn Signal	HV	34.0-70.9 Depending on Methodology	50 cm² (vehicles ≤80" wide	FMVSS 108 Table IV-a







FMVSS 108 S4 Definitions
Effective light-emitting surface means that portion of a lamp that directs light to the photometric test pattern, and does not include transparent lenses, mounting hole bosses, reflex reflector area, beads or rims that may glow or produce small areas of increased intensity as a result of uncontrolled light from an area of ½° radius around a test point.
Effective projected luminous lens area means the area of the orthogonal projection of the effective light-emitting surface of a lamp on a plane perpendicular to a defined direction relative to the axis of reference. Unless otherwise specified, the direction is coincident with the axis of reference.

NHTSA has not defined what constitutes "glow" used in the effective light emitting surface definition.
NHTSA has not specified how the EPLLA is to be measured nor what characteristics define it. Specifically, NHTSA has not stated what luminance value is permitted for EPLLA consideration.

Sample meets EPLLA requirements when using the physical area.

Report No: 170719-01C Rev1

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL, LH1

Specification: FMVSS 108 Table V-c: Visibility - Luminous Intensity Option
Color: Red, Rear Turn Signal (LH) and Stop Lamp
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
15.0U 45.0L		2.68		0.30	-
15.0U 80.0R		0.72		0.30	-
15.0U 45.0L TO 80.0R	80.0R	0.72		0.30	-
10.0U 45.0L		2.81		0.30	-
10.0U 80.0R		0.78		0.30	-
10.0U 45.0L TO 80.0R	80.0R	0.79		0.30	-
5.0U 45.0L		2.79		0.30	-
5.0U 80.0R		0.77		0.30	-
5.0U 45.0L TO 80.0R	80.0R	0.77		0.30	-
H 45.0L		2.77		0.30	-
H 80.0R		0.78		0.30	-
H 45.0L TO 80.0R	80.0R	0.78		0.30	-
5.0D 45.0L		2.78		0.30	-
5.0D 80.0R		0.80		0.30	-
5.0D 45.0L TO 80.0R	80.0R	0.80		0.30	-
10.0D 45.0L		2.68		0.30	-
10.0D 80.0R		0.76		0.30	-
10.0D 45.0L TO 80.0R	80.0R	0.76		0.30	-
15.0D 45.0L		2.55		0.30	-
15.0D 80.0R		0.69		0.30	-
15.0D 45.0L TO 80.0R	80.0R	0.69		0.30	-
15.0U TO 15.0D 45.0L 15.0D		2.55		0.30	-
15.0U TO 15.0D 80.0R 15.0D		0.69		0.30	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 239mA after 30 minute warmup per SAE J1889
Measured Values multiplied by 1.025 to acquire t = 10 minute values.

Aim: Lamp mounted with seating plane perpendicular to HV.

Report No: 170719-01C Rev1

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL, RH1

Specification: FMVSS 108 Table V-c: Visibility - Luminous Intensity Option
Color: Red, Rear Turn Signal (RH) and Stop Lamp
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
15.0U 80.0L		0.69		0.30	-
15.0U 45.0R		2.76		0.30	-
15.0U 80.0L TO 45.0R	80.0L	0.70		0.30	-
10.0U 80.0L		0.81		0.30	-
10.0U 45.0R		2.89		0.30	-
10.0U 80.0L TO 45.0R	79.8L	0.81		0.30	-
5.0U 80.0L		0.79		0.30	-
5.0U 45.0R		2.91		0.30	-
5.0U 80.0L TO 45.0R	80.0L	0.79		0.30	-
H 80.0L		0.75		0.30	-
H 45.0R		2.96		0.30	-
H 80.0L TO 45.0R	80.0L	0.75		0.30	-
5.0D 80.0L		0.81		0.30	-
5.0D 45.0R		2.99		0.30	-
5.0D 80.0L TO 45.0R	80.0L	0.81		0.30	-
10.0D 80.0L		0.74		0.30	-
10.0D 45.0R		2.85		0.30	-
10.0D 80.0L TO 45.0R	80.0L	0.74		0.30	-
15.0D 80.0L		0.67		0.30	-
15.0D 45.0R		2.85		0.30	-
15.0D 80.0L TO 45.0R	80.0L	0.67		0.30	-
15.0U TO 15.0D 80.0L 15.0D		0.66		0.30	-
15.0U TO 15.0D 45.0R 15.0D		2.76		0.30	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 241mA after 30 minute warmup per SAE J1889
Measured Values multiplied by 1.023 to acquire t = 10 minute values.

Aim: Lamp mounted with seating plane perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL, LH1 (sidemarker not masked off)

Specification: FMVSS 108 Table V-c: Visibility - Luminous Intensity Option
Color: Red, Tail (LH)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
15.0U 45.0L		0.21		0.05	-
15.0U 80.0R		1.46		0.05	-
15.0U 45.0L TO 80.0R	44.8L	0.20		0.05	-
10.0U 45.0L		0.20		0.05	-
10.0U 80.0R		1.39		0.05	-
10.0U 45.0L TO 80.0R	44.8L	0.20		0.05	-
5.0U 45.0L		0.20		0.05	-
5.0U 80.0R		1.32		0.05	-
5.0U 45.0L TO 80.0R	45.0L	0.20		0.05	-
H 45.0L		0.20		0.05	-
H 80.0R		1.31		0.05	-
H 45.0L TO 80.0R	45.0L	0.20		0.05	-
5.0D 45.0L		0.21		0.05	-
5.0D 80.0R		1.45		0.05	-
5.0D 45.0L TO 80.0R	45.0L	0.21		0.05	-
10.0D 45.0L		0.27		0.05	-
10.0D 80.0R		1.44		0.05	-
10.0D 45.0L TO 80.0R	44.1L	0.27		0.05	-
15.0D 45.0L		0.24		0.05	-
15.0D 80.0R		1.57		0.05	-
15.0D 45.0L TO 80.0R	44.8L	0.24		0.05	-
15.0U TO 15.0D 45.0L	10.7U	0.20		0.05	-
15.0U TO 15.0D 80.0R	0.9U	1.28		0.05	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 100mA after 30 minute warmup per SAE J1889
Current includes sidemarker and license plate lamp function.

Note: Sidemarker not masked off during testing. Without the sidemarker the lamp would need to be certified as visible using the lens area method at the extreme corner view (15°U/D & 45°L/R) which is ~0.68 * EPLLA (HV).

PHOTOMETRIC TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: RCL, RH1 (sidemarker not masked off)

Specification: FMVSS 108 Table V-c: Visibility - Luminous Intensity Option
Color: Red, Tail (RH)
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
15.0U 80.0L		1.65		0.05	-
15.0U 45.0R		0.19		0.05	-
15.0U 80.0L TO 45.0R	45.0R	0.19		0.05	-
10.0U 80.0L		1.74		0.05	-
10.0U 45.0R		0.20		0.05	-
10.0U 80.0L TO 45.0R	45.0R	0.20		0.05	-
5.0U 80.0L		1.84		0.05	-
5.0U 45.0R		0.21		0.05	-
5.0U 80.0L TO 45.0R	45.0R	0.20		0.05	-
H 80.0L		1.43		0.05	-
H 45.0R		0.19		0.05	-
H 80.0L TO 45.0R	45.0R	0.19		0.05	-
5.0D 80.0L		1.46		0.05	-
5.0D 45.0R		0.19		0.05	-
5.0D 80.0L TO 45.0R	45.0R	0.19		0.05	-
10.0D 80.0L		1.48		0.05	-
10.0D 45.0R		0.19		0.05	-
10.0D 80.0L TO 45.0R	45.0R	0.18		0.05	-
15.0D 80.0L		1.60		0.05	-
15.0D 45.0R		0.19		0.05	-
15.0D 80.0L TO 45.0R	45.0R	0.19		0.05	-
15.0U TO 15.0D 80.0L	0.5D	1.34		0.05	-
15.0U TO 15.0D 45.0R	10.9D	0.18		0.05	-

Sample meets test requirements at all points.

Applied Voltage: 13.50V / 59mA after 30 minute warmup per SAE J1889
Current includes sidemarker function.

Note: Sidemarker not masked off during testing. Without the sidemarker the lamp would need to be certified as visible using the lens area method at the extreme corner view (15°U/D & 45°L/R) which is ~0.68 * EPLLA (HV).

COLORIMETRY TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

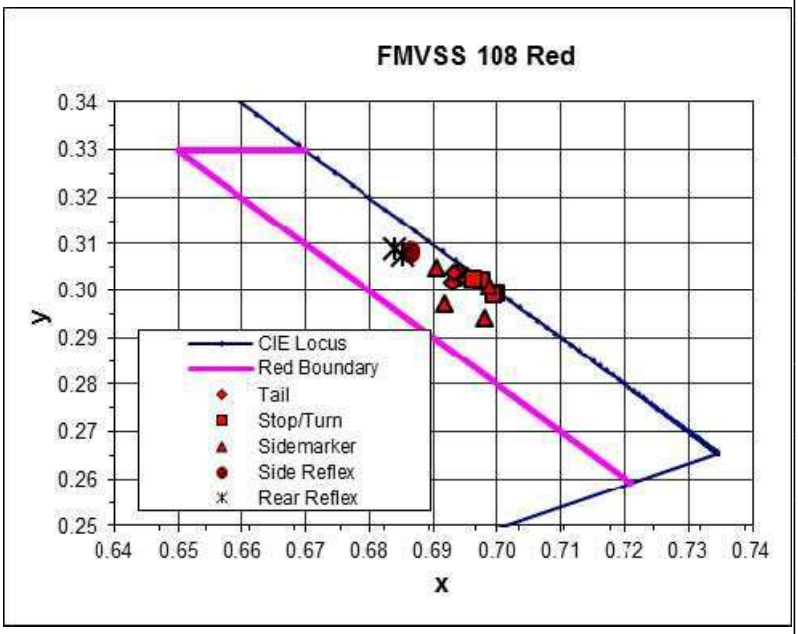
Sample Number: LH1 & RH1

Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method
Average of 3 reads using supplied bulb at design voltage
Instrument: Photo Research PR-655 Spectroradiometer with SRS-3 Target
Location: HV, 2 ft (Tail, Stop/Turn, Sidemarker);
5D/V (Reflex - Ill. A, 2° Observer, +5°/0.33° Geometry at 10 ft)
Voltage: 13.5V

Measured (x, y)				
			x	y
Tail	LH1	t=0	0.6943	0.3026
		t=30	0.6931	0.3016
	RH1	t=0	0.6941	0.3041
		t=30	0.6933	0.3036
Stop/Turn	LH1	t=0	0.6974	0.3021
		t=30	0.7001	0.2992
	RH1	t=0	0.6963	0.3024
		t=30	0.6996	0.2989
Sidemarker	LH1	t=0	0.6919	0.2971
		t=30	0.6981	0.2939
	RH1	t=0	0.6905	0.3048
		t=30	0.6987	0.3007
Reflex, Side	LH1		0.6865	0.3077
	RH1		0.6865	0.3083
Reflex, Rear	LH1		0.6840	0.3087
	RH1		0.6854	0.3075

Requirement & Chart

Required (Red)
$y \leq 0.33$
$y \geq 0.98 - x$



Samples meet Red Color requirements.

Report No.: 170719-01C Rev1

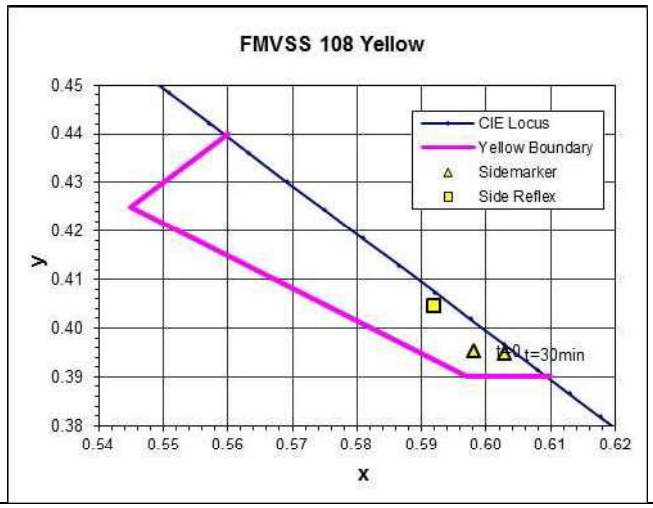
COLORIMETRY TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: LH1 & RH1

Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method
Average of 3 reads using supplied bulb at design voltage
Instrument: Photo Research PR-655 Spectroradiometer with SRS-3 Target
Location: HV, 2 ft (Tail, Stop/Turn, Sidemarker);
5D/V (Reflex - Ill. A, 2° Observer, +5°/0.33° Geometry at 10 ft)
Voltage: 13.5V

Measured (x, y)					Requirement & Chart
			x	y	Required (Yellow / Amber) y ≥ 0.39 y ≥ 0.79 - 0.67x y ≤ x - 0.12
Marker	1-1	t=0	0.5982	0.3953	
	1-1	t=30	0.6028	0.3946	
Reflex, Side	1-1		0.5919	0.4045	



Sample meets Yellow/Amber Color requirements.

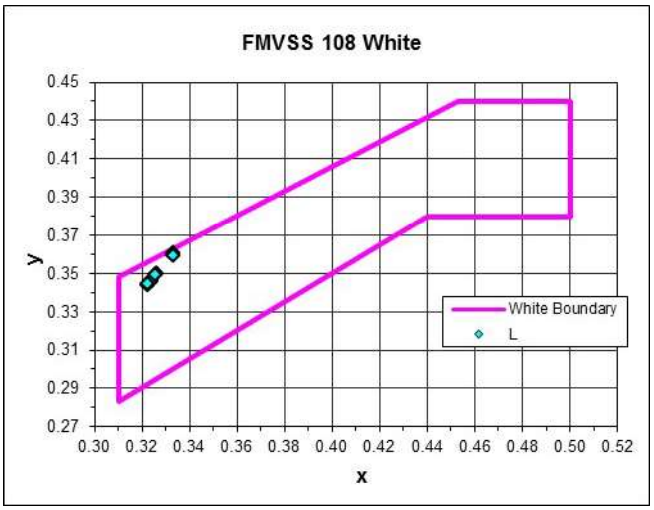
COLORIMETRY TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

Sample Number: LH1

Requirement: FMVSS 108 S14.4.1 Color Test
Test Method: FMVSS 108 S14.4.1.4 Tristimulus Method
Average of 3 reads
Instrument: Photo Research PR-655 Spectroradiometer
Location: center of individual test points on test plate (License)
Voltage: 13.5V

Measured (x, y)			Chart
Station	x	y	Required (White) 0.31 ≤ x ≤ 0.50 0.38 ≤ y ≤ 0.44 y ≥ 0.75x + 0.05 y ≤ 0.64x + 0.15
1	0.3334	0.3608	
2	0.3241	0.3460	
3	0.3242	0.3467	
4	0.3329	0.3590	
5	0.3262	0.3501	
6	0.3221	0.3439	
7	0.3223	0.3445	
8	0.3254	0.3495	



Sample meets White Color requirements.

MECHANICAL TEST DATA SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only

MECHANICAL TESTS (FMVSS 108 S14.5)
Tests performed by: MAE/DGC Date: 8/18-23/2017

S14.5.1 Vibration Test (SAE J2139 4.1): ..... Passed
Sample Numbers: Kit #2

Samples vibrated on FMVSS 108 Figure 21 (SAE J577) vibration machine for 1 hour.

There was evidence of material physical weakness, lens or reflector rotation, displacement or rupture of parts.

S14.5.2 Moisture Test (SAE J2139 4.2): ..... Passed
Sample Numbers: Kit #2 and Modified Amber P2

Samples subjected to a solid cone of precipitation of 0.1 in/min at a delivery angle of 45° while rotating about their vertical axis at a rate of 4 rpm for 12 hours. After a 1 hour drain period, samples were examined for moisture accumulation.

There was 0.0 cc of moisture accumulation inside the samples. Accumulation of moisture in excess of 2 cc constitutes a failure.

S14.5.3 Dust Test (SAE J2139 4.3): ..... Passed
Sample Numbers: Kit #2 and Modified Amber P2

Samples mounted in dust chamber and subjected to Portland Cement powder agitated by a 2 second period projected blast of compressed air every 15 minutes for 5 hours. Exterior surface of samples then cleaned and maximum intensities measured.

No dust was observed on the interior surfaces of the samples. The percent change of maximum intensity must be within 10% of pre-Dust Test value.

Sample	Function / % Change				
	SI	T	P2	Amber P2	Modified AP2
LH2	-3.4%	-3.3%	-1.9%	+1.1%	-0.8%
RH2	+3.7%	-0.7%	+0.5%	+0.9%	+1.9%

S14.5.4 Corrosion Test (SAE J2139 4.4): ..... Passed
Sample Numbers: Kit #3

Sample subjected to a 5% NaCl fog solution per ASTM B117 for a period of 50 hours consisting of two periods of 24 hour exposure followed by 1 hour drying time.

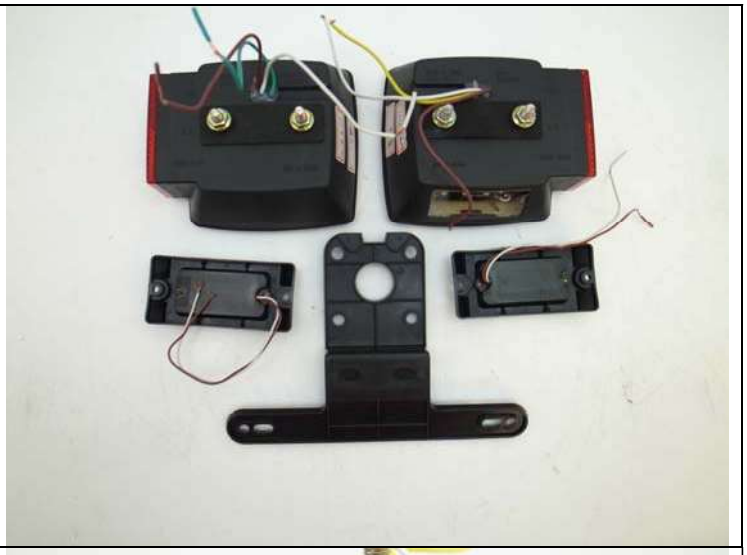
Sample then subjected to a 5% NaCl fog solution per ASTM B117 for a period of 240 hours (i.e. 8 additional days.

There was no evidence of excessive corrosion which would affect the proper functioning of the samples.

Samples comply with Physical (Mechanical) Test requirements.

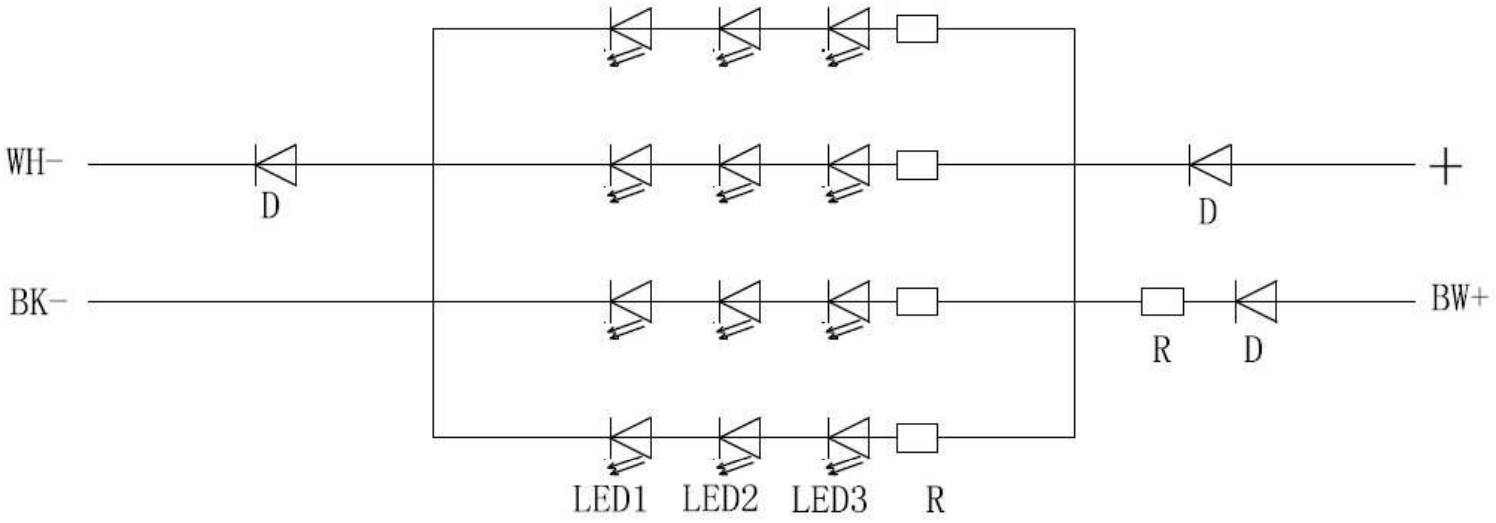
PHOTOGRAPH SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only



PHOTOGRAPH SHEET

Project Name: Changzhou Nanxiashu NT223A LED Trailer Light Kit
Rear Combination Lamps (SAE STIA L AP2) & Sidemarkers (SAE AP2)
for Vehicles < 2032 mm Wide Only



刹车灯板

stop/tail/turn lamp panel

Wiring Diagram Submitted by Manufacturer

NHTSA has interpreted LED lamps as having a single light source if all the LEDs are in series and as having multiple light sources if all the LEDs are not in series. Each parallel series of LEDs is considered a separate light source. Each light source is then considered a "lighted section".

FMVSS 108 has multiple lighted section requirements for rear turn signal lamps for vehicle less than 2032 mm wide (see S7.1.2.11.2 and Table VII).

FMVSS 108 has multiple lighted section requirements for tail lamps for vehicle less than 2032 mm wide (see S7.2.11.2 and Table VIII).

FMVSS 108 has multiple lighted section requirements for stop lamps for vehicle less than 2032 mm wide (see S7.3.11.2 and Table IX).

HARBOR FREIGHT TOOLS
26541 AGOURA RD.
CALABASAS, CA 91302
TELEPHONE: 818-836-5000

BUYER: SRIKANTH KANCHIBHOTLA
TELEPHONE: 385-5100

Test Report 159652-A
SKU 60521 62488

SKU 60521: LED TRAILER LIGHT KIT

TEST REPORT RATING: **Pass**

TEST REPORT: 159652-A
TEST DATE: 06/19/2014
SUPPLIER:
BUYER: Srikanth Kanchibhotla
SUPPLIER ACCT: N/A
COUNTRY:
STOCK NUMBER:
MODEL:
TEST METHOD: 310 AUTOMOTIVE: TOWING LIGHT - MAGNETIC

BUYER COMMENTS

Comments:

APPROVAL COMMENTS

REQUIRED CORRECTIONS

TEST RESULTS

One set sample was received and tested.

Major issues:
None.

Minor issues:
None.

PACKAGING

GROSS WEIGHT: 2.55 lbs **NET WEIGHT:** 2.21 lbs
PACKAGE DIMENSIONS: L:12.5 W:11.0 H:3.5 IN
ITEM DIMENSIONS: N/A
PACKAGE DESCRIPTION: Sample was received in a clear blister with a card listed item number, description, and specifications.
RECOMMENDATIONS:

SAMPLE ACCESSORIES AND COMPONENTS

MANUAL EXISTS: Yes **PARTS LIST EXISTS:** No **WIRING LIST EXISTS:** Yes

REF. NO.	QTY	DESCRIPTION	SAMPLE	SKU	COMMENTS
	1	4 pins connector with 5 pcs 22feet long wire harness			

1	4 pins connector with 4 pcs 4 feet long wire harness	
6	snap and lock connector	
6	wire nuts	
6	wire clips	
1	License plate bracket	Black molded plastic

APPEARANCE AND CONSTRUCTION

Black thermoplastic plastic housing. Red light lens and opposite side black cover. 12 pcs double power LED was assembled on PCB, and the PCB and all solder point were sealed by glue. Yellow/green/brown/white wire harness.

ASSEMBLY

Connect wire harness to Lights before it was used.

ASSEMBLED PER MANUAL: No **MATCHES MANUAL INSTRUCTIONS:** No

PRODUCT WARNINGS

None.

SAFETY AND CONSUMER WARNINGS

None

SPECIFICATIONS

(*) TYPE	Towing light kit 12V LED.
(*) PRODUCT LISTING (UL/CSA/ETL)	None.
(*) COLOR/FINISH	Black thermoplastic plastic housing. Red light lens. Yellow/green/white/2pcs brown wire harness.
(*) CONTENT	Tail light with License plate light.(left) Tail light (right) Side light (2pcs) Harness wire. license bracket. Mounting accessories.

(*) LENS DIMENSION	Tail light: 4-9/16"L x 4-9/16" W (LED area: 3-7/8"dia.); side: 2-7/8"L x 2"W Side light: 2-13/16"L x 2"W
(*) LENS MATERIAL	Tail light: Red clear plastic. Side light: Yellow clear plastic. License plate: Clear molded plastic.
(*) FUNCTION (RUNNING / BRAKING / TURNING / HAZARD)	1. Stop lamp(red) 2. Tail lamp(red) 3. Turn signal lamp (red or amber) 4. License plate lamp(white) 5. Rear reflex reflector(red) 6. Rear side reflex reflector(red) 7. Rear side marker lamp(red) 8. Front side reflex reflector(amber) 9. Front side marker lamp(amber)
(*) BULB TYPE / WATTAGE / STYLE #	Bulb type: Double power LED (Stop and Turn signal). Else: LED Wattage: Not listed. LED qty: Stop and Turn signal: 12pcs Side: 4pcs License plate: 4pcs
(*) BULB REPLACEABLE (Y/N)	No. All the LED were soldered on PCB, and sealed by glue.
(*) LIGHT OUTPUT @ 1M (LUX)	Not listed. Tested @1 meter distance: Running: 37Lux, Brake and Turning: 195Lux.
(*) MAXIMUM DISTANCE BETWEEN LIGHTS	Two lights were separately.
(*) WIRE HARNESS LENGTH	23 feet with 4-way flat trailer connector (female) 4 feet with 4-way flat trailer connector (male)
(*) OVERALL DIMENSIONS	5"L x 4-1/2"W x 2-5/8"T(Tail light). 4"L x 2-3/8"W x 1"T (Side light)
(*) WIRE CONNECTOR TYPE	6 pcs snap lock connectors 6 wire clips 6 wire nuts
(*) DOT APPROVAL (Y/N)	Yes. Marked on the item. Tail light: SAE AP299 DOT Side light: SAE AP 299 DOT

(*) NET WEIGHT Measured:2.21 lbs

(*) Inspection Point

TESTER'S CHECKLIST

1. Packaging and artwork (for production samples only -Section 1.1-1.7)
1.1. Packaging matches referenced PO instructions.
1.2. Carton/item markings match PO instructions.
1.3. Bar code matches PO instructions and scans.
1.4. Color box matches supplied artwork.
1.5. Manual – confirm approved/supplied manual is included. Check that the pictures, item number and description match the product.
1.6. Labels – confirm warning and specification labels are on product and match supplied artwork.
1.7. Check that the pictures, item number, description, and specifications match on the manual, packaging, product labels, web ad and product.

Pass.

2. Visual Inspections
2.1. Check that product has all components and accessories.
2.2. Check for country of manufacture and date code; see TI-009.
2.3 Check for visible Defects that could affect Performance, Durability and Safety; this includes Cuts, Nicks, Chips, Cracks, Scratches, Marred or Discolored Surfaces, Rust/Corrosion, Peeling of Paint/Labels, Open Gaps between Molded Housings, Exposed Wire or Sharp Edges that could result in a Cut Hazard.

2.1. Pass. Sample has all components.
2.2. Pass. Country of origin and date code listed on the sample.
2.3. Pass. No visible defect on the sample.

3. Ensure the wire harness length is not less than stated.

Listed: 23feet and 4feet.
The measured length was 23 feet and 4 feet color coded trunk harness.

4. Ensure the bulb type and wattage matches stated. If the tail lamp is combined with the turn signal or stop lamp, the signal or stop lamp intensity shall not be less than three times the luminous intensity of the tail lamp at any point during the test.

Pass. Tested bulb intensity@1 meter distance:
Running: 37Lux, Brake and Turning: 195Lux.

5. The bulb shall have an indexing base.(Except LED light)

Not applicable. LED were soldered on PCB.

6. Water proof test: See TI-025.

Pass. After the test, there was no water found on PCB or LED. The sample worked properly.

7. Splices or Pins must pass a pull test (applied to wire) of 5Lb (22N) for 1 Minute without separation.

Pass. The splices connected two cable properly.

---

8. Function test:
a) Connect the white wire to negative side of 12VDC.
b) Connect the brown wire to positive side of 12VDC; both lights shall have power.
c) Connect the yellow wire to 12VDC; the left light shall illuminate.
d) Connect the green wire to 12VDC; the right light shall illuminate.
e) With all lights powered, connect lights to vibrating table (to simulate road conditions) for 24 hours. Lights must stay illuminated throughout the test – no flickering.

Pass. All features operated properly. All wires were positioned correctly.

---

9. Life test:
a) Tail light life test: Connect the brown wire with DC power supply (13.6V). Power on continuously. Requirement: total cycle ≥ 24 h (pass)
b) Turning life test: Connect the yellow and green wire with DC power supply (13.6V). a) Power on: 0.5s, b) Power off: 0.5s. Requirement: total cycle ≥ 24 h (pass)
c) Brake light life test: Connect the yellow and green wire with DC power supply (13.6V) (a) Power on: 10 sec, b) Power off: 1 sec. Requirement: total cycle ≥ 24 h (pass)
After the test, the sample shall still work and there shall be no visible deformation, melting, or looseness.

Pass. After the test, the sample worked properly and there was no visible deformation, melting, or looseness.

Photos

Sample main image

* * * * END OF TEST REPORT * * * *

4700 Broadmoor SE, Suite 200
Kentwood, MI 49512

Telephone: 616-656-7401
Facsimile: 616-656-2022
www.intertek-etlsemko.com

Test Report For:

HARBOR FREIGHT TOOLS

FMVSS No. 108 (JUL 2014)

Model #60521 (OLD SKU) / 62488 (NEW SKU) Trailer Light Kit

Nathan Danks
Project Engineer

Jim Mason
Reviewer

Ms. Yvette Soria
Harbor Freight
26850 Agoura Rd.
Calabasas, CA 91302
Phone: (818) 836-5494
Email: ysoria@harborfreight.com

DATES RECEIVED: 07/16/14 & 10/03/14
DATES TESTED: 07/16/14 – 07/17/14 & 10/03/14

DESCRIPTION OF SAMPLES:

Product Description:	LED Trailer Light Kit Model #60521 (OLD SKU) / 62488 (NEW SKU) Trailer Light Kit
Material Submitted:	One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker One (1) LED Trailer Light Kit Containing Samples CC-L, CC-R, CC-1, and CC-2
Condition of Test Samples:	Production
Test Specification:	FMVSS No. 108 (JUL 2014)

WORK REQUESTED / APPLICABLE DOCUMENTS:

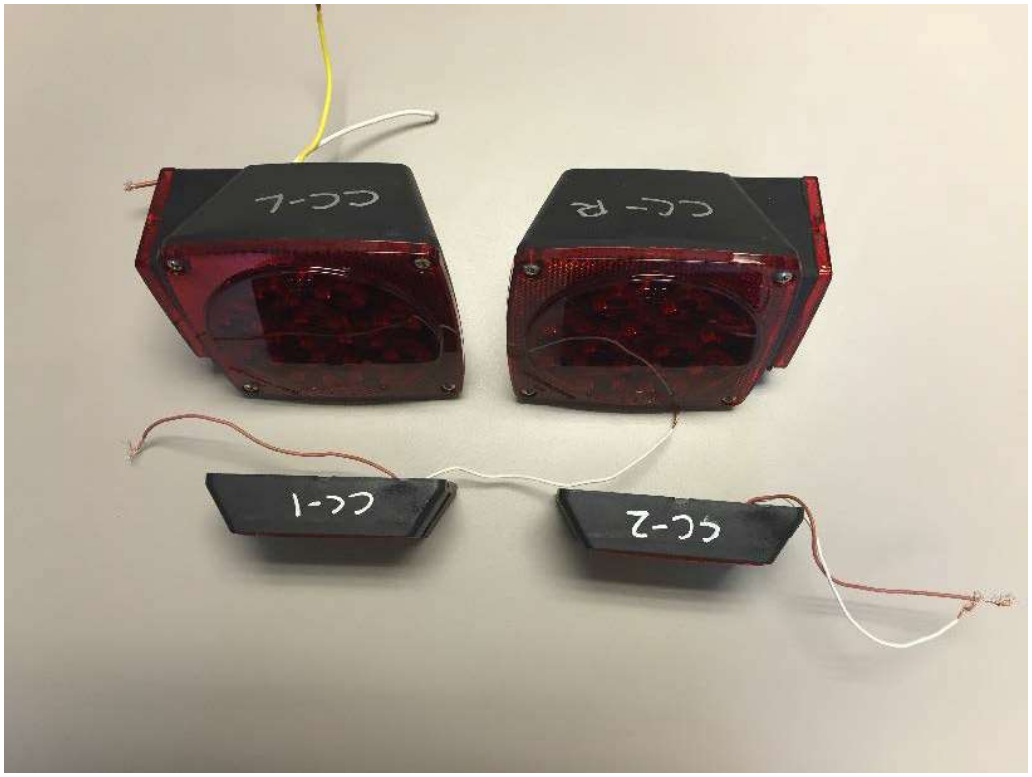
FMVSS S7.1.2.13 Photometry	FMVSS No. 108 (JUL 2014) S7.1.2.13 Photometry
FMVSS S7.2.13 Photometry	FMVSS No. 108 (JUL 2014) S7.2.13 Photometry
FMVSS S7.3.13 Photometry	FMVSS No. 108 (JUL 2014) S7.3.13 Photometry
FMVSS S7.4.13 Photometry	FMVSS No. 108 (JUL 2014) S7.4.13 Photometry
FMVSS S7.7.13 Photometry	FMVSS No. 108 (JUL 2014) S7.7.13 Photometry
FMVSS S8.1.11 Photometry	FMVSS No. 108 (JUL 2014) S8.1.11 Photometry
FMVSS S14.4.1 Color	FMVSS No. 108 (JUL 2014) S14.4.1 Color

CONCLUSIONS:

FMVSS S7.1.2.13 Photometry	Conforming
FMVSS S7.2.13 Photometry	Conforming
FMVSS S7.3.13 Photometry	Conforming
FMVSS S7.4.13 Photometry	Conforming
FMVSS S7.7.13 Photometry	Conforming
FMVSS S8.1.11 Photometry	Conforming
FMVSS S14.4.1 Color	Conforming

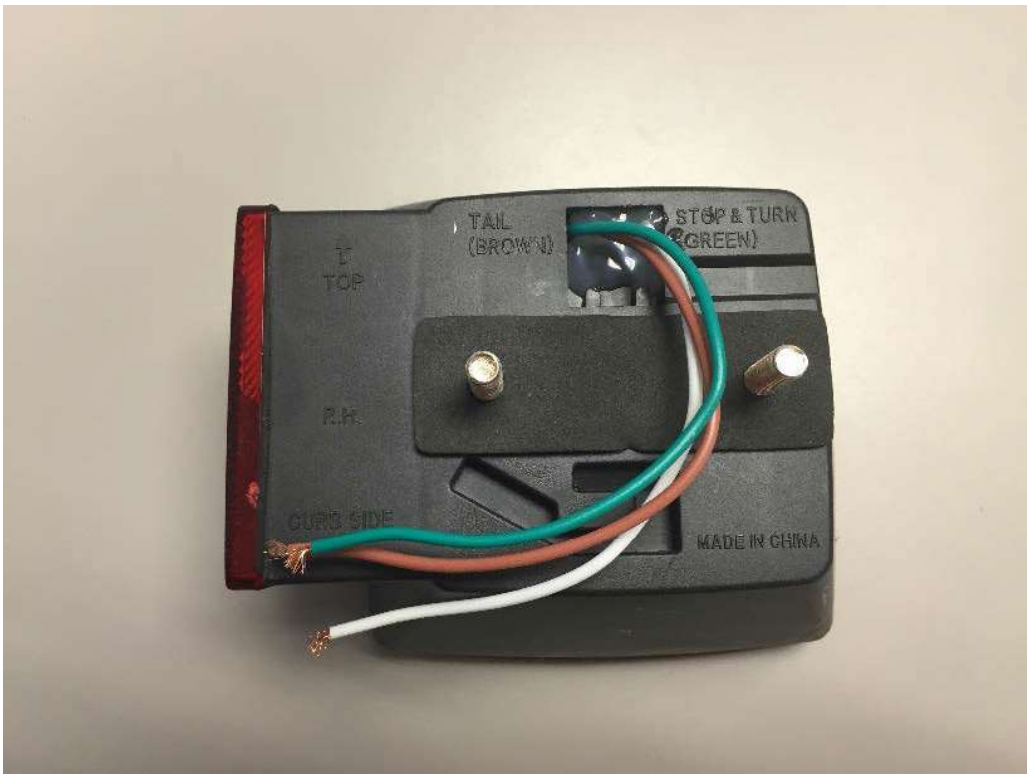
Pictures:

Model #60521 (OLD SKU) / 62488 (NEW SKU) (Typical, Front)

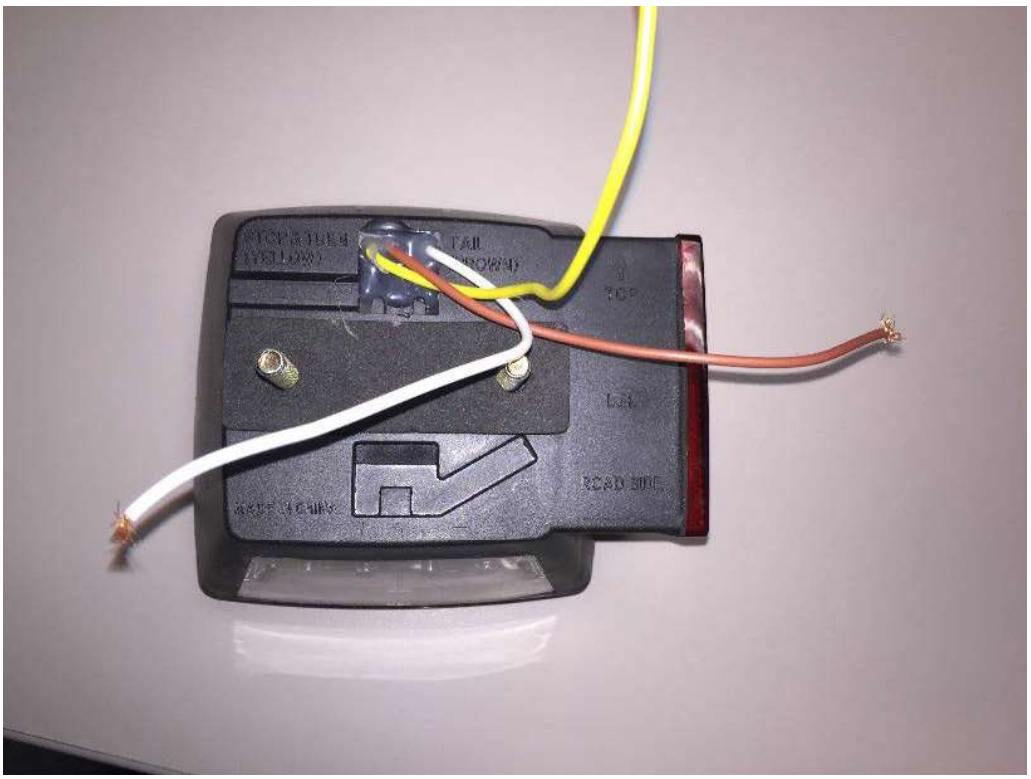


Model #60521 (OLD SKU) / 62488 (NEW SKU) (Typical, Top)

Pictures (Continued):

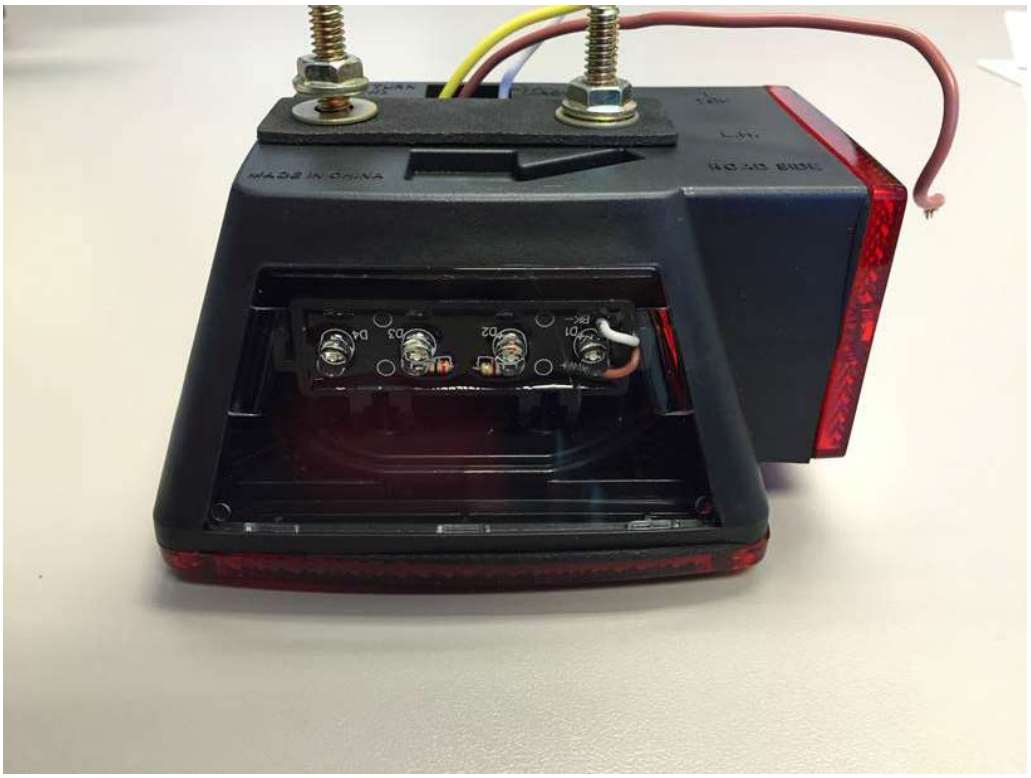


Model #60521 (OLD SKU) / 62488 (NEW SKU) (Typical, RH Tail Light, Back)



Model #60521 (OLD SKU) / 62488 (NEW SKU) (Typical, LH Tail Light Back)

Pictures (Continued):



Model #60521 (OLD SKU) / 62488 (NEW SKU) (Typical, LH Tail Light, Bottom)

FMVSS S7.1.2.13 Photometry Procedure:

Date Received: 07/16/15
Dates Tested: 07/16/14 - 07/17/14

Description of Samples:

Product Description: LED Trailer Light Kit
Model #60521 (OLD SKU) / 62488 (NEW SKU) Trailer Light Kit

Material Submitted: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker
One (1) LED Trailer Light Kit Containing Samples CC-L, CC-R, CC-1, and CC-2

Condition of Test Samples: Production

Test Specification: FMVSS No. 108 (JUL 2014)

Test Procedure:

Test Method: FMVSS 108 (JUL 2014) S7.1.2.13 Photometry

Function: Rear Turn Signal

Bulbs Used: Samples F1L and F1R (Rear Combination Lights) Used sealed in LEDs operated at design voltage (12.8Vdc per Jiaxing Hifine.)

Notes: Requirements used are for vehicles under 2032mm overall width.

Number of Samples Tested: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker

Acceptance Criteria:

Each rear turn signal lamp must be designed to conform to the photometry requirements of Table VII, when tested according to the procedure of S14.2.1, for the number of lamp compartments or individual lamps, the type of vehicle it is installed on, and the lamp color as specified by this section.

Results:

Sample #	No. Lighted Sections	Color	Points Failed	Zones Failed	Disposition
F1L	3	Red	0	0	Conforming
F1R	3	Red	0	0	Conforming

Refer to the following pages for technical data.

FMVSS S7.1.2.13 Photometry Data:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
133027	GONIOPHOTOMETER	HOFFMAN ENGINEERING	AGS-1100	N/A	VBU	VBU
133027s	SOFTWARE FOR GONIOMETER	HOFFMAN ENGINEERING	HGS-1100	V2.07.35	VBU	VBU
133027.1	PC	HOFFMAN ENGINEERING	IPC-6908BP	X12-51822	10/27/2008	VBU
133031	DETECTOR .2deg.	HOFFMAN ENGINEERING	TSP-1101	HEC-4187	10/27/2008	VBU
133009	ALIGNMENT LASER	MELLES GRIOT	05-LHR-141	9261BI	VBU	VBU
133011	HOFFMAN POWER SUPPLY	HEWLETT PACKARD	6038A	US36510144	VBU	VBU
133010	REFLEX PROJECTOR	HOFFMAN ENGINEERING	GPS-102-001	1045	9/28/2005	VBU
133032	DECTOR 1.5deg.	HOFFMAN ENGINEERING	TSP-1101	HEC-4187	10/27/2008	VBU
133028	DETECTOR 10'	HOFFMAN ENGINEERING	TSP-1104	HEC-4247	10/27/2008	VBU
133003	HOFFMAN STANDARD LAMP #2	HOFFMAN ENGINEERING	S80-17F	98662	09/07/2012	09/07/2014
133004	HOFFMAN STANDARD LAMP #3	HOFFMAN ENGINEERING	S80-17F	98663	08/07/2013	08/07/2015
133021	STANDARD LAMP	HOFFMAN ENGINEERING	S80-17F	HEC-3207	04/16/2014	04/16/2016
133065	6.5 Digit Multimeter	KEITHLEY	2000 Scan	4044413	04/17/2014	04/17/2015
133063	20A 400mV Current Shunt	EMPRO	20A400mV	6079	06/24/2014	06/24/2017
	133027, 133031, 133032, 133028 Verified by 133003, 133004, and 133021.					
	133009 and 133010 Verified by Design					
	133011 Verified by 133065 and 133063					

Equipment Used

FMVSS S7.1.2.13 Photometry Data (Continued):

TABLE VII: REAR TURN SIGNAL LAMP PHOTOMETRY REQUIREMENTS

GROUP NUMBER	TEST POINT (degrees)		TEST POINTS APPLICABLE TO DOUBLE FACED LAMPS[6]		MINIMUM PHOTOMETRIC INTENSITY RATIO WHERE COMBINED WITH A TAIL LAMP OR CLEARANCE LAMP[7][8]	MINIMUM PHOTOMETRIC INTENSITY[1][2] (cd) RED LAMPS			GROUP MINIMUM PHOTOMETRIC INTENSITY (cd) RED LAMPS			MINIMUM PHOTOMETRIC INTENSITY[1][2] (cd) AMBER LAMPS			GROUP MINIMUM PHOTOMETRIC INTENSITY (cd) AMBER LAMPS		
			LEFT SIDE LAMP	RIGHT SIDE LAMP		Lighted Sections			Lighted Sections			Lighted Sections			Lighted Sections		
						1	2	3	1	2	3	1[5]	2	3	1[5]	2	3
1	20L	5U	NO	YES	3	10	12	15	50	60	70	15	20	25	80/84	100	120
		5D	NO	YES	3	10	12	15				15	20	25			
	5L	10U	NO	YES	3	16	19	22				26/27	30	35			
		10D[3]	NO	YES	3	16	19	22				26/27	30	35			
2	10L	5U	NO	YES	3	30	35	40	100	115	135	50	55	65	165	185	220
		H	NO	YES	3	40	47	55				65	75	90			
		5D	NO	YES	3	30	35	40				50	55	65			
3	V	5U	YES	YES	5	70	82	95	380	445	520	110	130	150	610/590	710	825
	5L	H	NO	YES	5	80	95	110				130/120	150	175			
	V		YES	YES	5	80	95	110				130	150	175			
	5R		YES	NO	5	80	95	110				130/120	150	175			
	V	5D	YES	YES	3	70	82	95				110	130	150			
4	10R	5U	YES	NO	3	30	35	40	100	115	135	50	55	65	165	185	220
		H	YES	NO	3	40	47	55				65	75	90			
		5D	YES	NO	3	30	35	40				50	55	65			
5	5R	10U	YES	NO	3	16	19	22	50	60	70	26/27	30	35	80/84	100	120
		10D[3]	YES	NO	3	16	19	22				26/27	30	35			
	20R	5U	YES	NO	3	10	12	15				15	20	25			
		5D	YES	NO	3	10	12	15				15	20	25			
MAXIMUM PHOTOMETRIC INTENSITY[4]						300	360	420				750	900	900			

[1] The measured values at each test point must not be less than 60% of the minimum value.
[2] The photometric intensity values between test points must not be less than the lower specified minimum value of the two closest adjacent test points on a horizontal or vertical line.
[3] Where turn signal lamps are mounted with their axis of reference less than 750 mm above the road surface, photometry requirements below 5° down may be met at 5° down rather than at the required downward angle.
[4] The maximum photometric intensity must not occur over any area larger than that generated by a 0.5° radius within a solid angle defined by the test point range
[5] Values preceded by a slash (/) apply only to multipurpose passenger vehicles, trucks, trailers, and buses of 2032 mm or more in overall width.
[6] A double faced turn signal lamp installed as described in S6.1.1.3 on a truck tractor need only meet the photometric requirements for a left side lamp where the lamp is mounted on the left side of the vehicle, and for a right side lamp where the lamp is mounted on the right side of the vehicle.
[7] Required only when combined turn signal lamp and clearance lamp is installed on a vehicle 2032 mm or more in overall width.
[8] When a taillamp (or clearance lamp on a vehicle 2032 mm or more in overall width) is combined with a rear turn signal lamp and the maximum luminous intensity of the taillamp (or clearance lamp) is located below horizontal and within an area generated by a 0.5° radius around a test point (1.0° radius on lamps installed on a vehicle 2032 mm or more in overall width), the ratio for the test point may be computed by using the lowest value of the taillamp (or clearance lamp) luminous intensity within the generated area.

Requirements - Table VII Rear Turn Signal

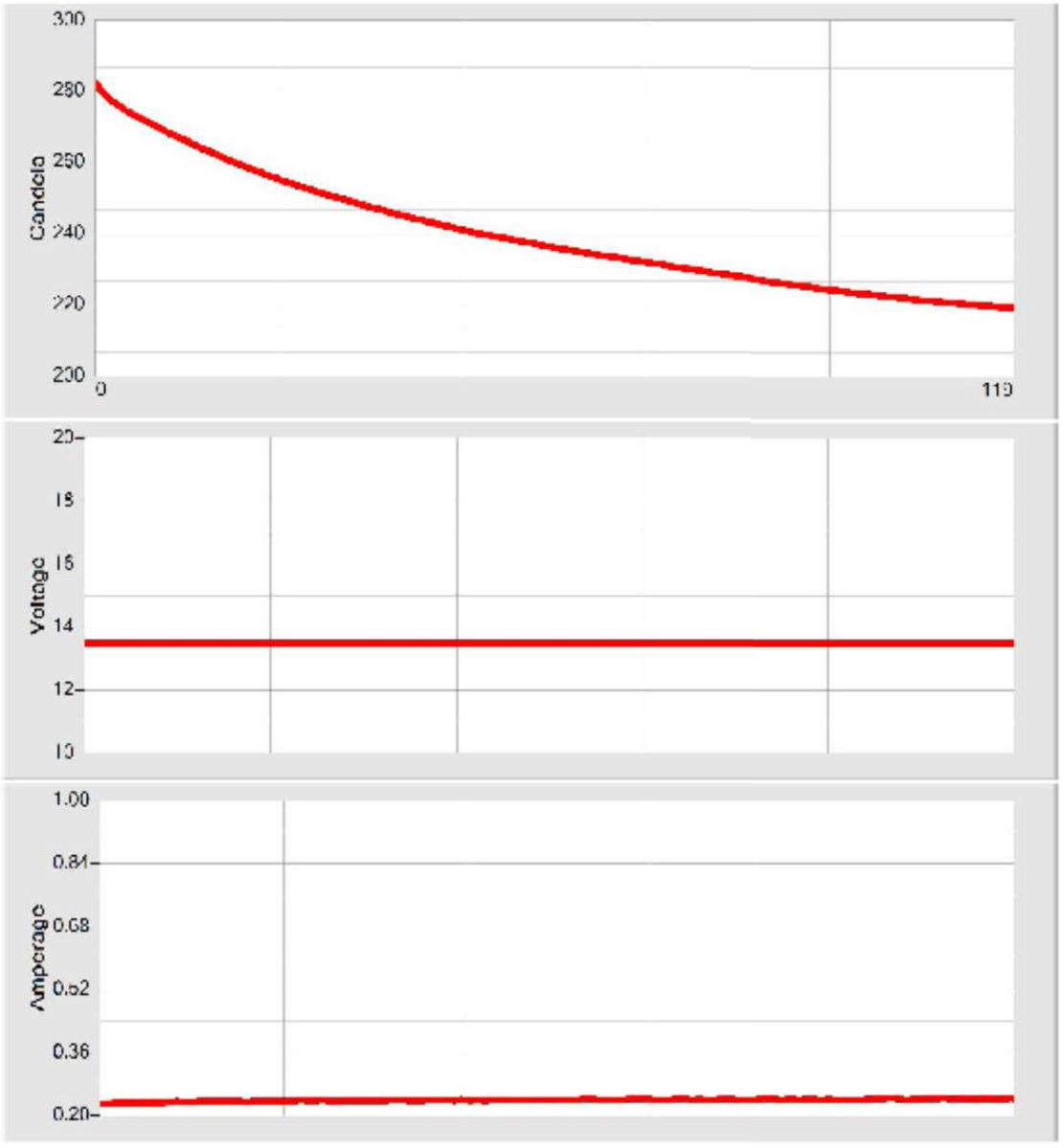
FMVSS S7.1.2.13 Photometry Data (Continued):

Intertek, Grand Rapid - Photometric Lab — *Equipment: Hoffman Engineering AGS-1140UG-007*

Bulb	LED,13.5 MAJOR
Power	13.50v 1.000a
Run Data [ID#]	07/16/2014 03:45 PM [008204-35]

P/N N1223 — Markings SAE(3)S(3)I(3)11
JOB #: G1017221130 — Quota #:500537058
Total time 29 mins 45 sec

Sample F 1L



F1L Rear Turn Warmup

FMVSS S7.1.2.13 Photometry Data (Continued):

Run Date	7/16/2014 0:00	Technician	Mark V.
Run #	008204-09	Client	Harbor Freight
Project #	G101722130	Sample #	F1L
Quote #	500537058		
Function	Rear Turn; 3 Lighted Section; Red		
Markings			
1 Minute Reading	275.9		
10 Minute Reading	245.4		
30 Minute Reading	219.2		

Position			30 Minutes	10 Minutes	1 Minute	Required Intensity (Cd)			Disposition		
U/D	L/R	Zone	Measured Intensity (Cd)	Calculated Intensity (Cd)	Calculated Intensity (Cd)	REQ. Min	Rec. Min	Max	30 Minutes	10 Minutes	1 Minute
5	-20	1	40.06	44.85	50.42	9	15	420	C	C	C
-5	-20	1	41.88	46.89	52.71	9	15	420	C	C	C
10	-5	1	58.94	65.98	74.19	13.2	22	420	C	C	C
-10	-5	1	76.86	86.05	96.74	13.2	22	420	C	C	C
5	-10	2	64.71	72.44	81.45	24	40	420	C	C	C
0	-10	2	79.11	88.57	99.57	33	55	420	C	C	C
-5	-10	2	73.73	82.54	92.80	24	40	420	C	C	C
5	0	3	135.40	151.58	170.42	57	95	420	C	C	C
0	-5	3	147.50	165.13	185.65	66	110	420	C	C	C
0	0	3	215.90	241.71	271.75	66	110	420	C	C	C
0	5	3	152.30	170.50	191.70	66	110	420	C	C	C
-5	0	3	200.80	224.80	252.74	57	95	420	C	C	C
5	10	4	59.24	66.32	74.56	24	40	420	C	C	C
0	10	4	67.67	75.76	85.17	33	55	420	C	C	C
-5	10	4	65.05	72.83	81.88	24	40	420	C	C	C
10	5	5	56.99	63.80	71.73	13.2	22	420	C	C	C
-10	5	5	70.51	78.94	88.75	13.2	22	420	C	C	C
5	20	5	35.80	40.08	45.06	9	15	420	C	C	C
-5	20	5	36.28	40.62	45.66	9	15	420	C	C	C
Maximum			321.2	359.59	404.28			420	C	C	C
Zone 1			217.74	243.77	274.06	70			C	C	C
Zone 2			217.55	243.55	273.82	135			C	C	C
Zone 3			851.9	953.72	1072.26	520			C	C	C
Zone 4			191.96	214.90	241.61	135			C	C	C
Zone 5			199.58	223.43	251.20	70			C	C	C

F1L Rear Turn Photometrics

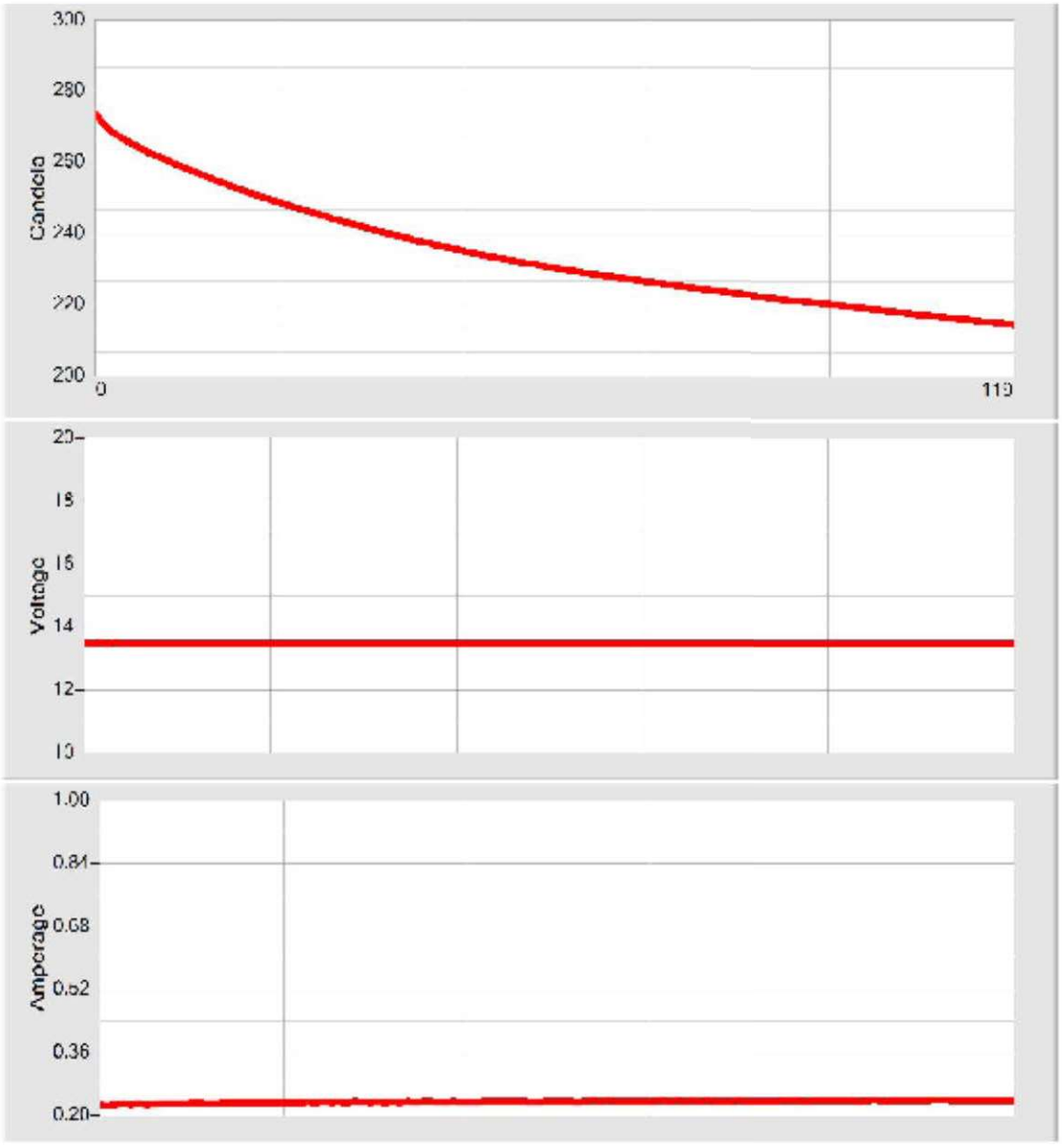
FMVSS S7.1.2.13 Photometry Data (Continued):

Intertek, Grand Rapid - Photometric Lab — *Equipment: Hoffman Engineering AGS-1140UG-007*

Bulb	LED,13.5 MAJOR
Power	13.50v 1.000a
Run Data [ID#]	07/17/2014 09:15 AM [008210-35]

P/N N1223 — Markings SAE(3)S(3)I(3)11
JOB #:G1017221130 — Quota #:500537058
Total time 29 mins 45 sec

Sample F1R



F1R Rear Turn Warmup

FMVSS S7.1.2.13 Photometry Data (Continued):

Run Date	7/17/2014 0:00	Technician	Mark V.
Run #	008210-09	Client	Harbor Freight
Project #	G101722130	Sample #	F1R
Quote #	Q500537058		
Function	Rear Turn; 3 Lighted Section; Red		
Markings			

1 Minute Reading	267.3
10 Minute Reading	239.4
30 Minute Reading	214.6

Position			30 Minutes	10 Minutes	1 Minute	Required Intensity (Cd)			Disposition		
U/D	L/R	Zone	Measured Intensity (Cd)	Calculated Intensity (Cd)	Calculated Intensity (Cd)	REQ. Min	Rec. Min	Max	30 Minutes	10 Minutes	1 Minute
5	-20	1	38.79	43.27	48.32	9	15	420	C	C	C
-5	-20	1	39.18	43.71	48.80	9	15	420	C	C	C
10	-5	1	59.09	65.92	73.60	13.2	22	420	C	C	C
-10	-5	1	73.87	82.41	92.01	13.2	22	420	C	C	C
5	-10	2	64.65	72.12	80.53	24	40	420	C	C	C
0	-10	2	79.36	88.53	98.85	33	55	420	C	C	C
-5	-10	2	70.64	78.80	87.99	24	40	420	C	C	C
5	0	3	141.30	157.63	176.00	57	95	420	C	C	C
0	-5	3	172.40	192.32	214.74	66	110	420	C	C	C
0	0	3	209.30	233.49	260.70	66	110	420	C	C	C
0	5	3	131.20	146.36	163.42	66	110	420	C	C	C
-5	0	3	177.60	198.12	221.21	57	95	420	C	C	C
5	10	4	58.21	64.94	72.50	24	40	420	C	C	C
0	10	4	62.37	69.58	77.69	33	55	420	C	C	C
-5	10	4	60.06	67.00	74.81	24	40	420	C	C	C
10	5	5	56.19	62.68	69.99	13.2	22	420	C	C	C
-10	5	5	65.82	73.43	81.98	13.2	22	420	C	C	C
5	20	5	33.96	37.88	42.30	9	15	420	C	C	C
-5	20	5	33.79	37.69	42.09	9	15	420	C	C	C
Maximum			284.9	317.82	354.86			420	C	C	C
Zone 1			210.93	235.31	262.73	70			C	C	C
Zone 2			214.65	239.46	267.36	135			C	C	C
Zone 3			831.8	927.93	1036.07	520			C	C	C
Zone 4			180.64	201.52	225.00	135			C	C	C
Zone 5			189.76	211.69	236.36	70			C	C	C

F1R Rear Turn Photometrics

FMVSS S7.2.13 Photometry Procedure:

Date Received: 07/16/15
Date Tested: 07/16/14 - 07/17/14

Description of Samples:

Product Description: LED Trailer Light Kit
Model #60521 (OLD SKU) / 62488 (NEW SKU) Trailer Light Kit
Material Submitted: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker
One (1) LED Trailer Light Kit Containing Samples CC-L, CC-R, CC-1, and CC-2
Condition of Test Samples: Production
Test Specification: FMVSS No. 108 (JUL 2014)

Test Procedure:

Test Method: FMVSS No. 108 (JUL 2014) S7.2.13 Photometry
Function: Taillamp
Notes: Requirements used are for vehicles under 2032mm overall width.
Number of Samples Tested: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker

Acceptance Criteria:

Each taillamp must be designed to conform to the photometry requirements of Table VIII, when tested according to the procedure of S14.2.1, for the number of lamp compartments or individual lamps and the type of vehicle it is installed on.

Results:

Sample #	No. Lighted Sections	Points Failed	Zones Failed	Disposition
F1L	3	0	0	Conforming
F1R	3	0	0	Conforming

Refer to the following pages for technical data.

FMVSS S7.2.13 Photometry Data:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
133027	GONIOPHOTOMETER	HOFFMAN ENGINEERING	AGS-1100	N/A	VBU	VBU
133027s	SOFTWARE FOR GONIOMETER	HOFFMAN ENGINEERING	HGS-1100	V2.07.35	VBU	VBU
133027.1	PC	HOFFMAN ENGINEERING	IPC-6908BP	X12-51822	10/27/2008	VBU
133031	DETECTOR .2deg.	HOFFMAN ENGINEERING	TSP-1101	HEC-4187	10/27/2008	VBU
133009	ALIGNMENT LASER	MELLES GRIOT	05-LHR-141	9261BI	VBU	VBU
133011	HOFFMAN POWER SUPPLY	HEWLETT PACKARD	6038A	US36510144	VBU	VBU
133010	REFLEX PROJECTOR	HOFFMAN ENGINEERING	GPS-102-001	1045	9/28/2005	VBU
133032	DECTOR 1.5deg.	HOFFMAN ENGINEERING	TSP-1101	HEC-4187	10/27/2008	VBU
133028	DETECTOR 10'	HOFFMAN ENGINEERING	TSP-1104	HEC-4247	10/27/2008	VBU
133003	HOFFMAN STANDARD LAMP #2	HOFFMAN ENGINEERING	S80-17F	98662	09/07/2012	09/07/2014
133004	HOFFMAN STANDARD LAMP #3	HOFFMAN ENGINEERING	S80-17F	98663	08/07/2013	08/07/2015
133021	STANDARD LAMP	HOFFMAN ENGINEERING	S80-17F	HEC-3207	04/16/2014	04/16/2016
133065	6.5 Digit Multimeter	KEITHLEY	2000 Scan	4044413	04/17/2014	04/17/2015
133063	20A 400mV Current Shunt	EMPRO	20A400mV	6079	06/24/2014	06/24/2017
	133027, 133031, 133032, 133028 Verified by 133003, 133004, and 133021.					
	133009 and 133010 Verified by Design					
	133011 Verified by 133065 and 133063					

Equipment Used

FMVSS S7.2.13 Photometry Data (Continued):

TABLE VIII: TAILLAMP PHOTOMETRY REQUIREMENTS

GROUP NUMBER	TEST POINT (degrees)		PHOTOMETRIC INTENSITY[1][2][4] (cd)						GROUP MINIMUM PHOTOMETRIC INTENSITY[1][2] (cd)		
			Lighted Sections						Lighted Sections		
			1		2		3		1	2	3
			MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM			
1	20L	5U	0.3	18	0.5	20	0.7	25	1.4	2.4	3.5
		5D	0.3	-	0.5	-	0.7	-			
	5L	10U	0.4	18	0.7	20	1.0	25			
		10D[3]	0.4	-	0.7	-	1.0	-			
2	10L	5U	0.8	18	1.4	20	2.0	25	2.4	4.2	6.0
		H	0.8	18	1.4	20	2.0	25			
		5D	0.8	-	1.4	-	2.0	-			
3	V	5U	1.8	18	3.1	20	4.5	25	9.6	16.8	24.0
	5L	H	2.0	18	3.5	20	5.0	25			
	V		2.0	18	3.5	20	5.0	25			
	5R		2.0	18	3.5	20	5.0	25			
	V	5D	1.8	-	3.1	-	4.5	-			
4	10R	5U	0.8	18	1.4	20	2.0	25	2.4	4.2	6.0
		H	0.8	18	1.4	20	2.0	25			
		5D	0.8	-	1.4	-	2.0	-			
5	5R	10U	0.4	18	0.7	20	1.0	25	1.4	2.4	3.5
		10D[3]	0.4	-	0.7	-	1.0	-			
	20R	5U	0.3	18	0.5	20	0.7	25			
		5D	0.3	-	0.5	-	0.7	-			

(1) The photometric intensity values between test points must not be less than the lower specified minimum value of the two closest adjacent test points on a horizontal or vertical line.

(2) If the sum of intensity values for all points in the group is not less than the specified total value for the group, the measured intensity value for each individual test point is not required to meet the minimum value.

(3) Where taillamps are mounted with their axis of reference less than 750 mm above the road surface, photometry requirements below 5° down may be met at 5° down rather than at the specified required downward angle.

(4) A taillamp shall not exceed the maximum intensity at H or above.

Requirements - Table VIII Taillamp

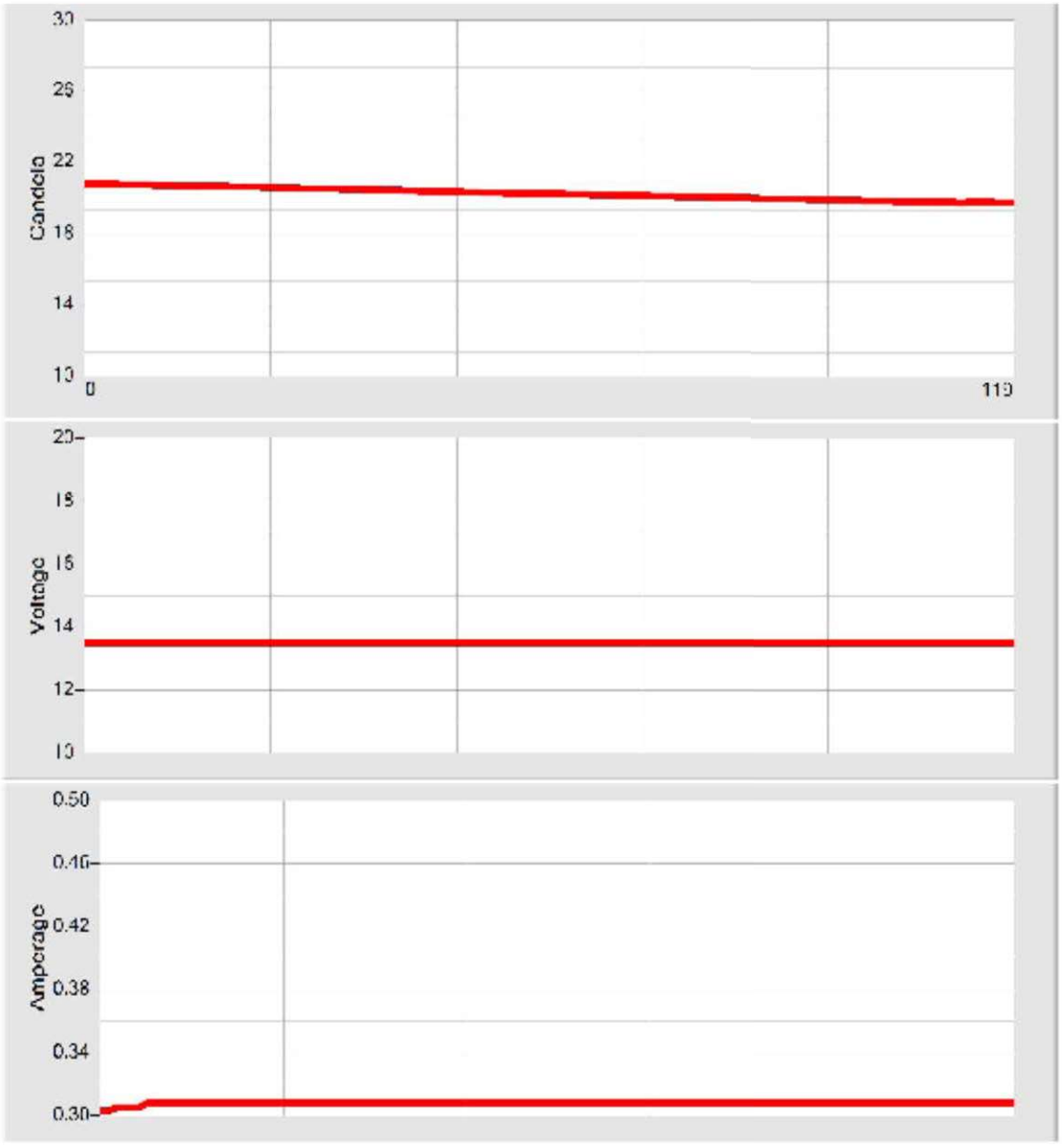
FMVSS S7.2.13 Photometry Data (Continued):

Intertek, Grand Rapid - Photometric Lab — *Equipment: Hoffman Engineering AGS-1140UG-007*

Bulb	LED,13.5 MINOR
Power	13.50v 0.500a
Run Data [ID#]	07/16/2014 03:34 PM [008204-01]

P/N N1223 — Markings SAE(3)S(3)I(3)11
JOB #:G1017221130 — Quota #:500537058
Total time 29 mins 45 sec

Sample F 1L



F1L Tail Warmup

FMVSS S7.2.13 Photometry Data (Continued):

Run Date	7/16/2014 0:00	Technician	Mark V.
Run #	008201-03	Client	Harbor Freight
Project #	G101722130	Sample #	F1L
Quote #	Q500537058		
Function	Taillamp; 3 Lighted Section		
Markings			

1 Minute Reading	20.77
10 Minute Reading	20.43
30 Minute Reading	19.77

Position			30 Minutes	10 Minutes	1 Minute	Required Intensity (Cd)			Disposition		
U/D	L/R	Zone	Measured Intensity (Cd)	Calculated Intensity (Cd)	Calculated Intensity (Cd)	REQ. Min	Rec. Min	Max	30 Minutes	10 Minutes	1 Minute
5	-20	1	3.98	4.11	4.18	0.42	0.7	25	C	C	C
-5	-20	1	4.31	4.45	4.53	0.42	0.7	-	C	C	C
10	-5	1	5.45	5.63	5.73	0.6	1	25	C	C	C
-10	-5	1	7.20	7.44	7.56	0.6	1	-	C	C	C
5	-10	2	5.94	6.14	6.24	1.2	2	25	C	C	C
0	-10	2	7.13	7.37	7.49	1.2	2	25	C	C	C
-5	-10	2	6.78	7.01	7.12	1.2	2	-	C	C	C
5	0	3	11.58	11.97	12.17	2.7	4.5	25	C	C	C
0	-5	3	13.48	13.93	14.16	3	5	25	C	C	C
0	0	3	19.70	20.36	20.70	3	5	25	C	C	C
0	5	3	13.16	13.60	13.83	3	5	25	C	C	C
-5	0	3	18.20	18.81	19.12	2.7	4.5	-	C	C	C
5	10	4	5.78	5.97	6.07	1.2	2	25	C	C	C
0	10	4	6.47	6.69	6.80	1.2	2	25	C	C	C
-5	10	4	6.53	6.75	6.86	1.2	2	-	C	C	C
10	5	5	5.27	5.45	5.54	0.6	1	25	C	C	C
-10	5	5	6.83	7.06	7.18	0.6	1	-	C	C	C
5	20	5	3.63	3.75	3.81	0.42	0.7	25	C	C	C
-5	20	5	3.89	4.02	4.09	0.42	0.7	-	C	C	C
Max (H and Above)			19.54	20.19	20.53			25	C	C	C
Max (Below H)			28.58	29.53	30.03				-	-	-
Zone 1			20.94	21.64	22.00	3.5			C	C	C
Zone 2			19.85	20.51	20.85	6			C	C	C
Zone 3			76.12	78.66	79.97	24			C	C	C
Zone 4			18.78	19.41	19.73	6			C	C	C
Zone 5			19.62	20.27	20.61	3.5			C	C	C

F1L Tail Photometrics

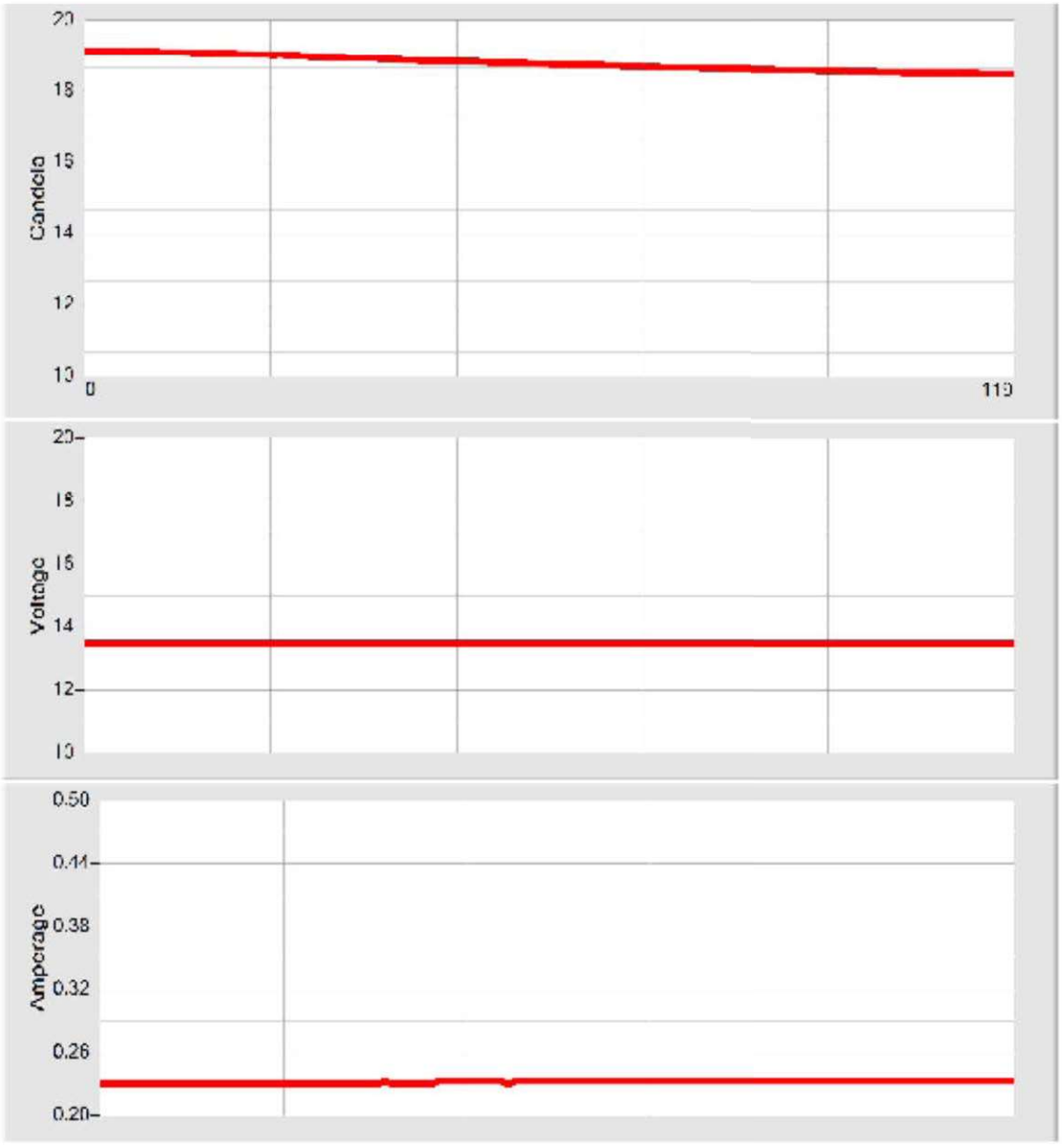
FMVSS S7.2.13 Photometry Data (Continued):

Intertek, Grand Rapid - Photometric Lab — *Equipment: Hoffman Engineering AGS-1140UG-007*

Bulb	LED,13.5 MINOR
Power	13.50v 0.500a
Run Data [ID#]	07/17/2014 08:34 AM [008210-01]

P/N N1223 — Markings SAE(3)S(3)I(3)11
JOB #: G1017221130 — Quota #:500537058
Total time 29 mins 45 sec

Sample F1R



F1R Tail Warmup

FMVSS S7.2.13 Photometry Data (Continued):

Run Date	7/17/2014 0:00	Technician	Mark V.
Run #	008896-02	Client	Harbor Freight
Project #	G101722130	Sample #	F1R
Quote #	Q500537058		
Function	Taillamp; 3 Lighted Section		
Markings			

1 Minute Reading	19.13
10 Minute Reading	18.9
30 Minute Reading	18.5

Position			30 Minutes	10 Minutes	1 Minute	Required Intensity (Cd)			Disposition		
U/D	L/R	Zone	Measured Intensity (Cd)	Calculated Intensity (Cd)	Calculated Intensity (Cd)	REQ. Min	Rec. Min	Max	30 Minutes	10 Minutes	1 Minute
5	-20	1	3.324	3.40	3.44	0.42	0.7	25	C	C	C
-5	-20	1	3.333	3.41	3.45	0.42	0.7	-	C	C	C
10	-5	1	5.046	5.16	5.22	0.6	1	25	C	C	C
-10	-5	1	6.209	6.34	6.42	0.6	1	-	C	C	C
5	-10	2	5.742	5.87	5.94	1.2	2	25	C	C	C
0	-10	2	6.881	7.03	7.12	1.2	2	25	C	C	C
-5	-10	2	6.234	6.37	6.45	1.2	2	-	C	C	C
5	0	3	11.89	12.15	12.29	2.7	4.5	25	C	C	C
0	-5	3	15.16	15.49	15.68	3	5	25	C	C	C
0	0	3	18.48	18.88	19.11	3	5	25	C	C	C
0	5	3	11.08	11.32	11.46	3	5	25	C	C	C
-5	0	3	15.91	16.25	16.45	2.7	4.5	-	C	C	C
5	10	4	4.925	5.03	5.09	1.2	2	25	C	C	C
0	10	4	5.219	5.33	5.40	1.2	2	25	C	C	C
-5	10	4	5.039	5.15	5.21	1.2	2	-	C	C	C
10	5	5	4.76	4.86	4.92	0.6	1	25	C	C	C
-10	5	5	5.591	5.71	5.78	0.6	1	-	C	C	C
5	20	5	2.936	3.00	3.04	0.42	0.7	25	C	C	C
-5	20	5	2.889	2.95	2.99	0.42	0.7	-	C	C	C
Max (H and Above)			17.1	17.47	17.68			25	C	C	C
Max (Below H)			17.7	18.08	18.30				-	-	-
Zone 1			17.912	18.30	18.52	3.5			C	C	C
Zone 2			18.857	19.26	19.50	6			C	C	C
Zone 3			72.52	74.09	74.99	24			C	C	C
Zone 4			15.183	15.51	15.70	6			C	C	C
Zone 5			16.176	16.53	16.73	3.5			C	C	C

F1R Tail Photometrics

FMVSS S7.3.13 Photometry Procedure:

Date Received: 07/16/15
Dates Tested: 07/16/14 - 07/17/14

Description of Samples:

Product Description: LED Trailer Light Kit
Model #60521 (OLD SKU) / 62488 (NEW SKU) Trailer Light Kit

Material Submitted: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker
One (1) LED Trailer Light Kit Containing Samples CC-L, CC-R, CC-1, and CC-2

Condition of Test Samples: Production

Test Specification: FMVSS No. 108 (JUL 2014)

Test Procedure:

Test Method: FMVSS 108 (JUL 2014) S7.3.13 Photometry

Function: Stop

Notes: Requirements used are for vehicles under 2032mm overall width.

Number of Samples Tested: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker

Acceptance Criteria:

Each stop lamp must be designed to conform to the photometry requirements of Table IX, when tested according to the procedure of S14.2.1, for the number of lamp compartments or individual lamps and the type of vehicle it is installed on.

Results:

Sample #	No. Lighted Sections	Points Failed	Zones Failed	Disposition
F1L	3	0	0	Conforming
F1R	3	0	0	Conforming

Refer to the following pages for technical data.

FMVSS S7.3.13 Photometry Data:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
133027	GONIOPHOTOMETER	HOFFMAN ENGINEERING	AGS-1100	N/A	VBU	VBU
133027s	SOFTWARE FOR GONIOMETER	HOFFMAN ENGINEERING	HGS-1100	V2.07.35	VBU	VBU
133027.1	PC	HOFFMAN ENGINEERING	IPC-6908BP	X12-51822	10/27/2008	VBU
133031	DETECTOR .2deg.	HOFFMAN ENGINEERING	TSP-1101	HEC-4187	10/27/2008	VBU
133009	ALIGNMENT LASER	MELLES GRIOT	05-LHR-141	9261BI	VBU	VBU
133011	HOFFMAN POWER SUPPLY	HEWLETT PACKARD	6038A	US36510144	VBU	VBU
133010	REFLEX PROJECTOR	HOFFMAN ENGINEERING	GPS-102-001	1045	9/28/2005	VBU
133032	DECTOR 1.5deg.	HOFFMAN ENGINEERING	TSP-1101	HEC-4187	10/27/2008	VBU
133028	DETECTOR 10'	HOFFMAN ENGINEERING	TSP-1104	HEC-4247	10/27/2008	VBU
133003	HOFFMAN STANDARD LAMP #2	HOFFMAN ENGINEERING	S80-17F	98662	09/07/2012	09/07/2014
133004	HOFFMAN STANDARD LAMP #3	HOFFMAN ENGINEERING	S80-17F	98663	08/07/2013	08/07/2015
133021	STANDARD LAMP	HOFFMAN ENGINEERING	S80-17F	HEC-3207	04/16/2014	04/16/2016
133065	6.5 Digit Multimeter	KEITHLEY	2000 Scan	4044413	04/17/2014	04/17/2015
133063	20A 400mV Current Shunt	EMPRO	20A400mV	6079	06/24/2014	06/24/2017
	133027, 133031, 133032, 133028 Verified by 133003, 133004, and 133021.					
	133009 and 133010 Verified by Design					
	133011 Verified by 133065 and 133063					

Equipment Used

FMVSS S7.3.13 Photometry Data (Continued):

TABLE IX: STOP LAMP PHOTOMETRY REQUIREMENTS

GROUP NUMBER	TEST POINT (degrees)		MINIMUM PHOTOMETRIC INTENSITY RATIO WHERE COMBINED WITH A TAIL LAMP[5]	MINIMUM PHOTOMETRIC INTENSITY[1][2] (cd) Lighted Sections			GROUP MINIMUM PHOTOMETRIC INTENSITY (cd) Lighted Sections		
				1	2	3	1	2	3
1	20L	5U	3	10	12	15	50	60	70
		5D	3	10	12	15			
	5L	10U	3	16	19	22			
		10D[4]	3	16	19	22			
2	10L	5U	3	30	35	40	100	115	135
		H	3	40	47	55			
		5D	3	30	35	40			
3	V	5U	5	70	82	95	380	445	520
	5L	H	3/5[6]	80	95	110			
	V		5	80	95	110			
	5R		5	80	95	110			
	V	5D	3	70	82	95			
4	10R	5U	3	30	35	40	100	115	135
		H	3	40	47	55			
		5D	3	30	35	40			
5	5R	10U	3	16	19	22	50	60	70
		10D[4]	3	16	19	22			
	20R	5U	3	10	12	15			
		5D	3	10	12	15			
MAXIMUM PHOTOMETRIC INTENSITY[3]				300	360	420			

[1] The measured values at each test point must not be less than 60% of the minimum value.
[2] The photometric intensity values between test points must not be less than the lower specified minimum value of the two closest adjacent test points on a horizontal or vertical line.
[3] The maximum photometric intensity must not occur over any area larger than that generated by a 0.5° radius within a solid angle defined by the test point range
[4] Where stop lamps are mounted with their axis of reference less than 750 mm above the road surface, photometry requirements below 5° down may be met at 5° down rather than at the specified required downward angle.
[5] When a taillamp is combined with a stop lamp and the maximum luminous intensity of the taillamp is located below horizontal and within an area generated by a 0.5° radius around a test point (1.0° radius on lamps installed on a vehicle 2032 mm or more in overall width), the ratio for the test point may be computed by using the lowest value of the taillamp luminous intensity within the generated area.
[6] Values followed by a slash (/) apply only to lamps installed on multipurpose passenger vehicles, trucks, trailers, and buses of 2032 mm or more in overall width.

Requirements - Table IX Stop

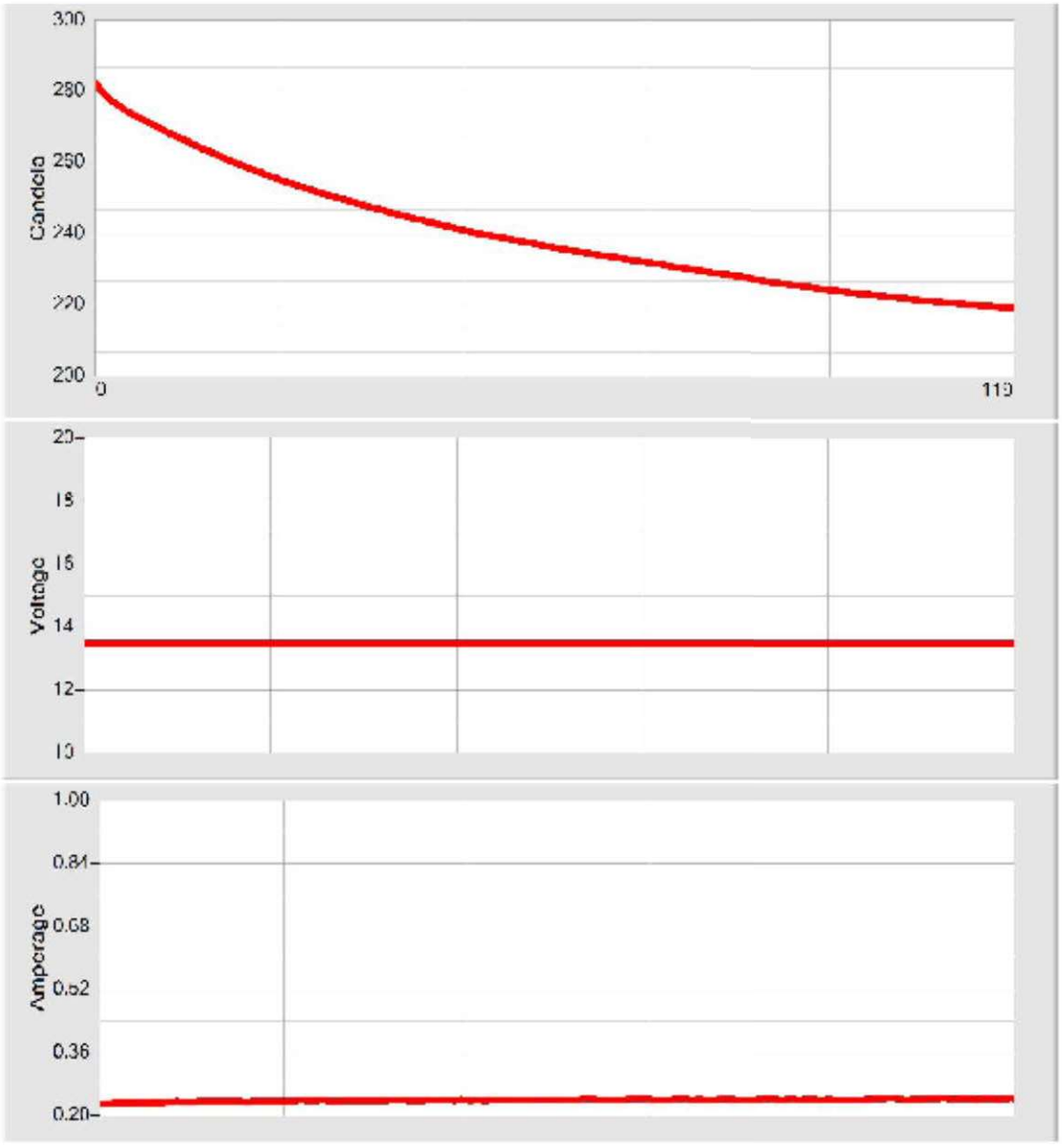
FMVSS S7.3.13 Photometry Data (Continued):

Intertek, Grand Rapid - Photometric Lab — *Equipment: Hoffman Engineering AGS-1140UG-007*

Bulb	LED,13.5 MAJOR
Power	13.50v 1.000a
Run Data [ID#]	07/16/2014 03:45 PM [008204-35]

P/N N1223 — Markings SAE(3)S(3)I(3)11
JOB #:G1017221130 — Quota #:500537058
Total time 29 mins 45 sec

Sample F1L



F1L Stop Warmup

FMVSS S7.3.13 Photometry Data (Continued):

Run Date	7/16/2014 0:00	Technician	Mark V.
Run #	8204-07	Client	Harbor Freight
Project #	G101722130	Sample #	F1L
Quote #	Q500537058		
Function	Stop; 3 Lighted Section;		
Notes:			

1 Minute Reading	275.9
10 Minute Reading	245.4
30 Minute Reading	219.2

Position			30 Minutes	10 Minutes	1 Minute	Required Intensity (Cd)			Disposition		
U/D	L/R	Zone	Measured Intensity (Cd)	Calculated Intensity (Cd)	Calculated Intensity (Cd)	REQ. Min	Rec. Min	Max	30 Minutes	10 Minutes	1 Minute
5	-20	1	40.26	45.07	50.67	9	15	420	C	C	C
-5	-20	1	42.09	47.12	52.98	9	15	420	C	C	C
10	-5	1	59.31	66.40	74.65	13.2	22	420	C	C	C
-10	-5	1	77.3	86.54	97.30	13.2	22	420	C	C	C
5	-10	2	65.01	72.78	81.83	24	40	420	C	C	C
0	-10	2	79.35	88.83	99.88	33	55	420	C	C	C
-5	-10	2	73.99	82.83	93.13	24	40	420	C	C	C
5	0	3	135.5	151.70	170.55	57	95	420	C	C	C
0	-5	3	148.5	166.25	186.91	66	110	420	C	C	C
0	0	3	217.5	243.50	273.76	66	110	420	C	C	C
0	5	3	153.1	171.40	192.70	66	110	420	C	C	C
-5	0	3	202.2	226.37	254.50	57	95	420	C	C	C
5	10	4	59.55	66.67	74.95	24	40	420	C	C	C
0	10	4	68.12	76.26	85.74	33	55	420	C	C	C
-5	10	4	65.47	73.30	82.40	24	40	420	C	C	C
10	5	5	57.44	64.31	72.30	13.2	22	420	C	C	C
-10	5	5	70.81	79.27	89.13	13.2	22	420	C	C	C
5	20	5	35.93	40.22	45.22	9	15	420	C	C	C
-5	20	5	36.42	40.77	45.84	9	15	420	C	C	C
Maximum			321.2	359.59	404.28			420	C	C	C
Zone 1			218.96	245.13	275.60	70			C	C	C
Zone 2			218.35	244.45	274.83	135			C	C	C
Zone 3			856.8	959.21	1078.43	520			C	C	C
Zone 4			193.14	216.23	243.10	135			C	C	C
Zone 5			200.6	224.58	252.49	70			C	C	C

F1L Stop Photometrics

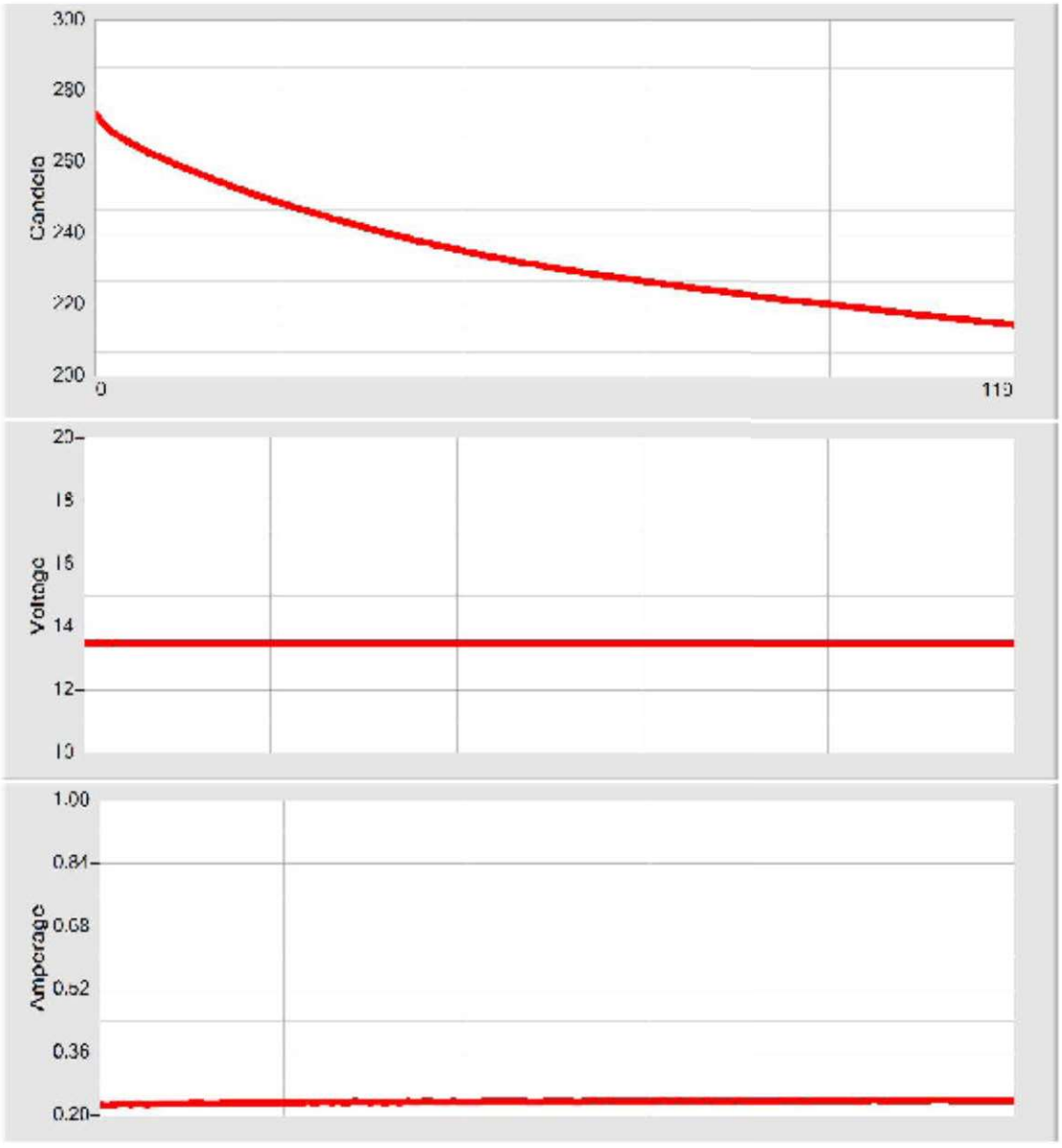
FMVSS S7.3.13 Photometry Data (Continued):

Intertek, Grand Rapid - Photometric Lab — *Equipment: Hoffman Engineering AGS-1140UG-007*

Bulb	LED,13.5 MAJOR
Power	13.50v 1.000a
Run Data [ID#]	07/17/2014 09:15 AM [008210-35]

P/N N1223 — Markings SAE(3)S(3)I(3)11
JOB #: G1017221130 — Quota #:500537058
Total time 29 mins 45 sec

Sample 1 1R



F1R Stop Warmup

FMVSS S7.3.13 Photometry Data (Continued):

Run Date	7/17/2014 0:00	Technician	Mark V.
Run #	008210-07	Client	Harbor Freight
Project #	G101722130	Sample #	F1R
Quote #	Q500537058		
Function	Stop; 3 Lighted Section;		
Notes:			

1 Minute Reading	267.3
10 Minute Reading	239.4
30 Minute Reading	214.6

Position			30 Minutes	10 Minutes	1 Minute	Required Intensity (Cd)			Disposition		
U/D	L/R	Zone	Measured Intensity (Cd)	Calculated Intensity (Cd)	Calculated Intensity (Cd)	REQ. Min	Rec. Min	Max	30 Minutes	10 Minutes	1 Minute
5	-20	1	39.06	43.57	48.65	9	15	420	C	C	C
-5	-20	1	39.4	43.95	49.08	9	15	420	C	C	C
10	-5	1	59.41	66.28	74.00	13.2	22	420	C	C	C
-10	-5	1	73.84	82.37	91.97	13.2	22	420	C	C	C
5	-10	2	64.98	72.49	80.94	24	40	420	C	C	C
0	-10	2	79.46	88.64	98.97	33	55	420	C	C	C
-5	-10	2	70.9	79.09	88.31	24	40	420	C	C	C
5	0	3	142.9	159.41	177.99	57	95	420	C	C	C
0	-5	3	173.9	194.00	216.61	66	110	420	C	C	C
0	0	3	211.4	235.83	263.31	66	110	420	C	C	C
0	5	3	132.2	147.48	164.66	66	110	420	C	C	C
-5	0	3	179.3	200.02	223.33	57	95	420	C	C	C
5	10	4	58.5	65.26	72.87	24	40	420	C	C	C
0	10	4	62.63	69.87	78.01	33	55	420	C	C	C
-5	10	4	60.37	67.35	75.20	24	40	420	C	C	C
10	5	5	56.54	63.07	70.42	13.2	22	420	C	C	C
-10	5	5	66.16	73.81	82.41	13.2	22	420	C	C	C
5	20	5	34.21	38.16	42.61	9	15	420	C	C	C
-5	20	5	34.04	37.97	42.40	9	15	420	C	C	C
Maximum			284.9	317.82	354.86			420	C	C	C
Zone 1			211.71	236.18	263.70	70			C	C	C
Zone 2			215.34	240.23	268.22	135			C	C	C
Zone 3			839.7	936.74	1045.91	520			C	C	C
Zone 4			181.5	202.47	226.07	135			C	C	C
Zone 5			190.95	213.02	237.84	70			C	C	C

F1R Stop Photometrics

FMVSS S7.4.13 Photometry Procedure:

Date Received: 07/16/15
Date Tested: 07/16/14 - 07/17/14

Description of Samples:

Product Description: LED Trailer Light Kit
Model #60521 (OLD SKU) / 62488 (NEW SKU) Trailer Light Kit

Material Submitted: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker
One (1) LED Trailer Light Kit Containing Samples CC-L, CC-R, CC-1, and CC-2

Condition of Test Samples: Production
Test Specification: FMVSS No. 108 (JUL 2014)

Test Procedure:

Test Method: FMVSS 108 (JUL 2014) S7.4.13 Photometry
Function: Sidemarker
Number of Samples Tested: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker

Acceptance Criteria:

Each side marker lamp must be designed to conform to the photometry requirements of Table X, when tested according to the procedure of S14.2.1, for the lamp color as specified by this section.

Results:

Sample #	Color	Points Failed	Disposition
F1L	Red	0	Conforming
F1R	Red	0	Conforming
F1L Sidemarker	Amber	0	Conforming

Refer to the following pages for technical data.

FMVSS S7.4.13 Photometry Data:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
133027	GONIOPHOTOMETER	HOFFMAN ENGINEERING	AGS-1100	N/A	VBU	VBU
133027s	SOFTWARE FOR GONIOMETER	HOFFMAN ENGINEERING	HGS-1100	V2.07.35	VBU	VBU
133027.1	PC	HOFFMAN ENGINEERING	IPC-6908BP	X12-51822	10/27/2008	VBU
133031	DETECTOR .2deg.	HOFFMAN ENGINEERING	TSP-1101	HEC-4187	10/27/2008	VBU
133009	ALIGNMENT LASER	MELLES GRIOT	05-LHR-141	9261BI	VBU	VBU
133011	HOFFMAN POWER SUPPLY	HEWLETT PACKARD	6038A	US36510144	VBU	VBU
133010	REFLEX PROJECTOR	HOFFMAN ENGINEERING	GPS-102-001	1045	9/28/2005	VBU
133032	DECTOR 1.5deg.	HOFFMAN ENGINEERING	TSP-1101	HEC-4187	10/27/2008	VBU
133028	DETECTOR 10'	HOFFMAN ENGINEERING	TSP-1104	HEC-4247	10/27/2008	VBU
133003	HOFFMAN STANDARD LAMP #2	HOFFMAN ENGINEERING	S80-17F	98662	09/07/2012	09/07/2014
133004	HOFFMAN STANDARD LAMP #3	HOFFMAN ENGINEERING	S80-17F	98663	08/07/2013	08/07/2015
133021	STANDARD LAMP	HOFFMAN ENGINEERING	S80-17F	HEC-3207	04/16/2014	04/16/2016
133065	6.5 Digit Multimeter	KEITHLEY	2000 Scan	4044413	04/17/2014	04/17/2015
133063	20A 400mV Current Shunt	EMPRO	20A400mV	6079	06/24/2014	06/24/2017
	133027, 133031, 133032, 133028 Verified by 133003, 133004, and 133021.					
	133009 and 133010 Verified by Design					
	133011 Verified by 133065 and 133063					

Equipment Used

FMVSS S7.4.13 Photometry Data (Continued):

TABLE X—SIDE MARKER LAMP PHOTOMETRY REQUIREMENTS

Test point (degrees)	Minimum photometric intensity (cd)[2] red lamps	Minimum photometric intensity (cd)[2] amber lamps
10U:		
45L[1]	0.25	0.62
V	0.25	0.62
45R[1]	0.25	0.62
H:		
45L[1]	0.25	0.62
V	0.25	0.62
45R[1]	0.25	0.62
10D:[3]		
45L[1]	0.25	0.62
V	0.25	0.62
45R[1]	0.25	0.62

[1]Where a side marker lamp installed on a motor vehicle less than 30 feet in overall length and less than 80 inches (2 m) in overall width has the lateral angle nearest the other required side marker lamp on the same side of the vehicle reduced from 45° by design as specified by S7.4.13.2, the photometric intensity measurement may be met at the lesser angle.

[2]The photometric intensity values between test points must not be less than the lower specified minimum value of the two closest adjacent test points on a horizontal or vertical line.

[3]Where side marker lamps are mounted with their axis of reference less than 750 mm above the road surface, photometry requirements below 5° down may be met at 5° down rather than at the specified required downward angle

Requirements - Table X Sidemarker

FMVSS S7.4.13 Photometry Data (Continued):

Device	Harbor Freight LED Tail Lamp	Operator	Run Date/Time
Test	#SMa, RED, 108/SAE J592	EC	07/16/2014 04:38:41 PM

Results	Required TestPts	House TestPts	Required Zones	House Zones	Offset
Passed/Total	9 / 9	9 / 9	---	---	H - V

P/N:	NT223
Markings:	SAE(3)S(3)I(3)TLP2A07
JOB #:	G101722130
Quote #:	500537058
Function:	Sidemarker
Customer Name	Harbor Freight
Sample F1L	

P.S. #	Bulb Name	Spec. Volts	Meas. Volts	Spec. Amps	Meas. Amps	Spec. Watts	Meas. Watts
1	194 Production	13.50*	13.50	1.500	0.308	20.250	4.157

Location	Measured Cd	Fail	Required Min Cd	Required Max Cd	House Min Cd	House Max Cd	Reaim/Max/Min Location	Original Cd
10.00U - 45.00L	0.7523		0.25	---	0	---		
10.00U - V	0.8665		0.25	---	0	---		
10.00U - 45.00R	0.6510		0.25	---	0	---		
H - 45.00R	0.6609		0.25	---	0	---		
H - V	0.7891		0.25	---	0	---		
H - 45.00L	0.8491		0.25	---	0	---		
10.00D - 45.00L	0.6204		0.25	---	0	---		
10.00D - V	0.8844		0.25	---	0	---		
10.00D - 45.00R	0.7901		0.25	---	0	---		

F1L Rear Sidemarker Photometrics

FMVSS S7.4.13 Photometry Data (Continued):

Device	Harbor Freight LED Tail Lamp	Operator	Run Date/Time
Test	#SMa, RED, 108/SAE J592	MV	07/17/2014 10:13:54 AM

Results	Required TestPts	House TestPts	Required Zones	House Zones	Offset
Passed/Total	9 / 9	9 / 9	---	---	H - V

P/N:	NT223
Markings:	SAE(3)S(3)I(3)TLP2A07
JOB #:	G101722130
Quote #:	500537058
Function:	Sidemarker
Customer Name	Harbor Freight
Sample F1R	

P.S. #	Bulb Name	Spec. Volts	Meas. Volts	Spec. Amps	Meas. Amps	Spec. Watts	Meas. Watts
1	194 Production	13.50*	13.50	1.500	0.230	20.250	3.104

Location	Measured Cd	Fail	Required Min Cd	Required Max Cd	House Min Cd	House Max Cd	Reaim/Max/Min Location	Original Cd
10.00U - 45.00L	0.4973		0.25	---	0	---		
10.00U - V	0.6948		0.25	---	0	---		
10.00U - 45.00R	0.5442		0.25	---	0	---		
H - 45.00R	0.6514		0.25	---	0	---		
H - V	0.6673		0.25	---	0	---		
H - 45.00L	0.4359		0.25	---	0	---		
10.00D - 45.00L	0.4558		0.25	---	0	---		
10.00D - V	0.7320		0.25	---	0	---		
10.00D - 45.00R	0.6054		0.25	---	0	---		

F1R Rear Sidemarker Photometrics

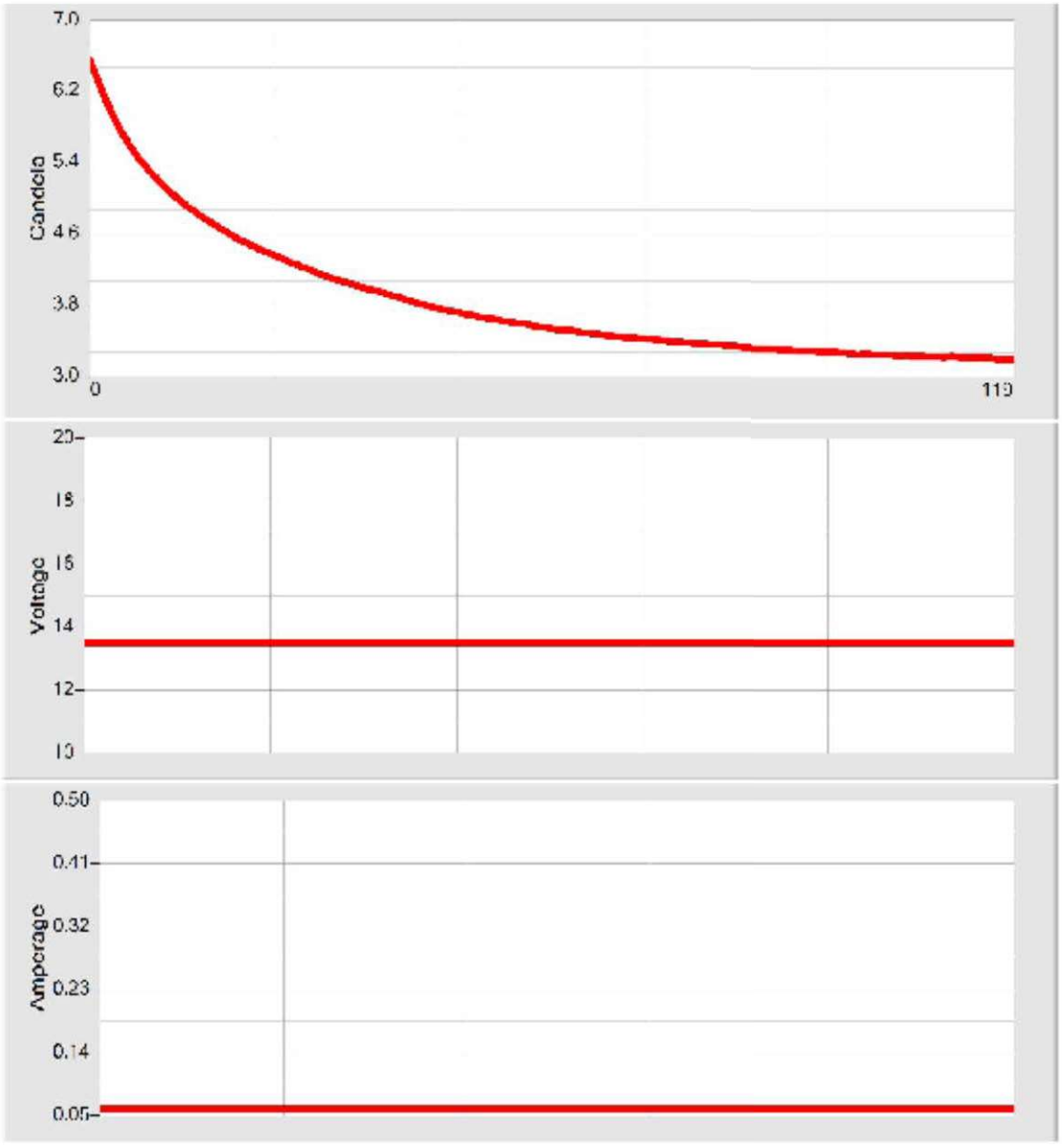
FMVSS S7.4.13 Photometry Data (Continued):

Intertek, Grand Rapid - Photometric Lab — *Equipment: Hoffman Engineering AGS-1140UG-007*

Bulb	LED,13.5 MINOR
Power	13.50v 0.500a
Run Data [ID#]	7/17/2014 2:41 PM [008216-01]

P/N — Markings
JOB #: G1017221130 — Quota #:5005370058
Total time 29 mins 45 sec

Sample F 1L



F1L Front Sidemarker Warmup

FMVSS S7.4.13 Photometry Data (Continued):

Run Date	7/17/2014 0:00	Technician	Nathan Danks
Run #	008216-02	Client	Harbor Freight
Project #	G101722130	Sample #	F1L Sidemarker
Quote #	Q5005370058		
Function	Sidemarker; Amber; LH		
Markings			

1 Minute Reading	5.913	Inboard Angle:	
10 Minute Reading	3.896		
30 Minute Reading	3.199		

Position			30 Minutes	10 Minutes	1 Minute	Required Intensity (Cd)			Disposition		
U/D	L/R	Zone	Measured Intensity (Cd)	Calculated Intensity (Cd)	Calculated Intensity (Cd)	REQ. Min	Rec. Min	Max	30 Minutes	10 Minutes	1 Minute
10	-45	N/A	1.726	2.10	3.19	0.62	0.62	-	C	C	C
10	0	N/A	2.407	2.93	4.45	0.62	0.62	-	C	C	C
10	45	N/A	1.408	1.71	2.60	0.62	0.62	-	C	C	C
0	-45	N/A	2.294	2.79	4.24	0.62	0.62	-	C	C	C
0	0	N/A	3.183	3.88	5.88	0.62	0.62	-	C	C	C
0	45	N/A	1.976	2.41	3.65	0.62	0.62	-	C	C	C
-10	-45	N/A	1.41	1.72	2.61	0.62	0.62	-	C	C	C
-10	0	N/A	2.908	3.54	5.38	0.62	0.62	-	C	C	C
-10	45	N/A	1.623	1.98	3.00	0.62	0.62	-	C	C	C

F1L Front Sidemarker Photometrics

FMVSS S7.7.13 Photometry Procedure:

Date Received: 10/03/14
Date Tested: 10/06/14

Description of Samples:

Product Description: LED Trailer Light Kit
Model #60521 (OLD SKU) / 62488 (NEW SKU) Trailer Light Kit

Material Submitted: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker
One (1) LED Trailer Light Kit Containing Samples CC-L, CC-R, CC-1, and CC-2

Condition of Test Samples: Production

Test Specification: FMVSS No. 108 (JUL 2014)

Test Procedure:

Test Method: FMVSS 108 (JUL 2014) S7.7.13 Photometry

Notes: Test Plate made of white blotting paper was placed 2 mm in front of the designed position of the license plate with respect to the license plate lamps. The luminance (L, cd/m^2) was measured using a spot luminance meter at each of the eight test stations. The Illumination (I, lux) at each of those test stations was then calculated assuming that $I = \pi L$

Function: License Plate Lamp

Number of Samples Tested: One (1) LED Trailer Light Kit Containing Samples CC-L, CC-R, CC-1, and CC-2

Acceptance Criteria:

Each license plate lamp must be designed to conform to the photometry requirements of this section when tested according to the procedure of S14.2.2.
An illumination value of no less than 8 lx [0.75 fc] must be met at each test station target location shown in Figure 19.
The ratio of the average of the two highest illumination values divided by the average of the two lowest illumination values must not exceed 20:1 for vehicles other than motorcycles and motor driven cycles.
The ratio of the highest illumination value divided by the average of the two lowest illumination values must not exceed 15:1 for motorcycles and motor driven cycles.

Results:

Sample #	Minimum Luminance Measured (cd/m^2)	Minimum Illumination Calculated (lux)	Ratio Measured	Disposition
CC-L	12.06	38	17.9	Conforming

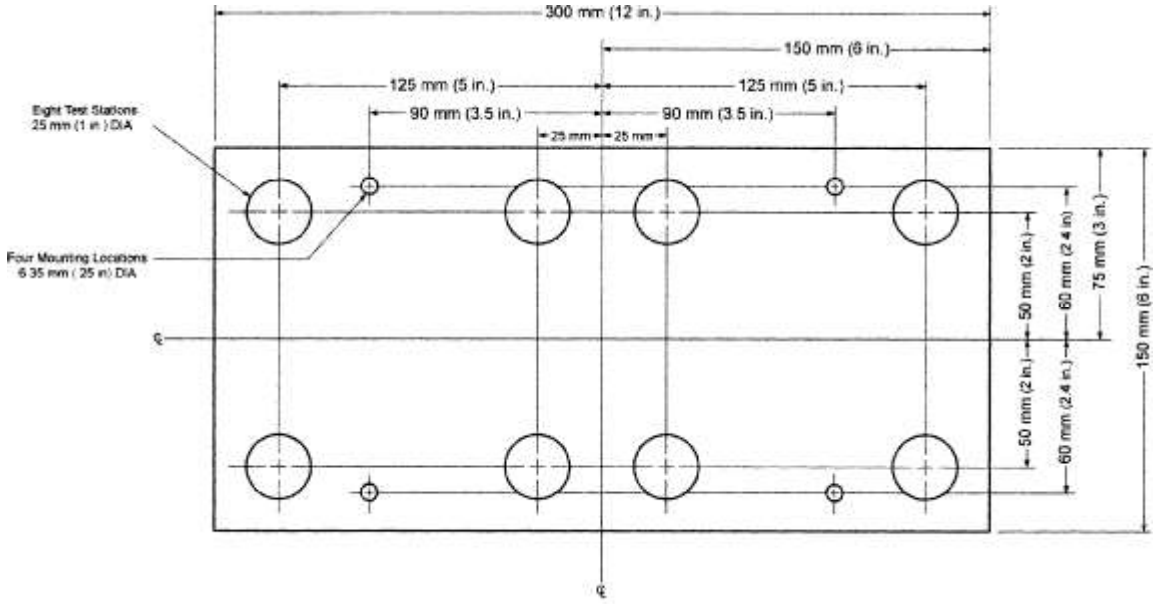
Refer to the following pages for technical data.

FMVSS S7.7.13 Photometry Data:

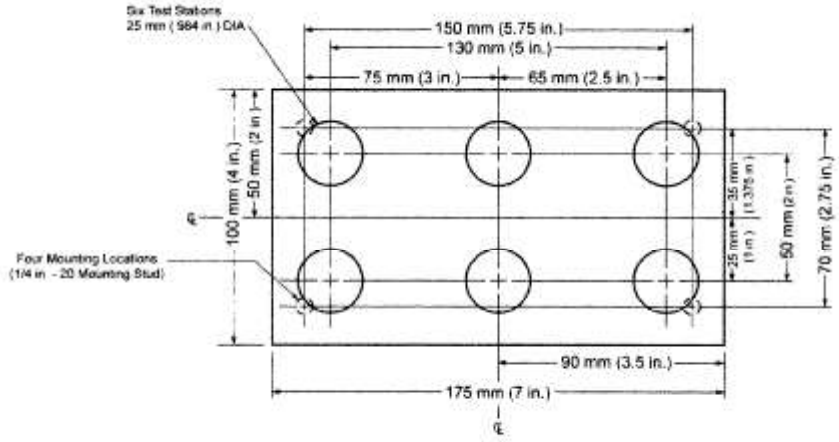
Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
133012	RADIANCE COLORIMETER	TOPCON	BM-7-232/AL-6	01156021/1365	01/29/2014	01/29/2015

Equipment Used

FMVSS S7.7.13 Photometry Data (Continued):



Test Plate for Vehicles other than Motorcycles and Motor Driven Cycles



Test Plate for Motorcycles and Motor Driven Cycles

LICENSE PLATE LAMP TARGET LOCATIONS

FIGURE 19

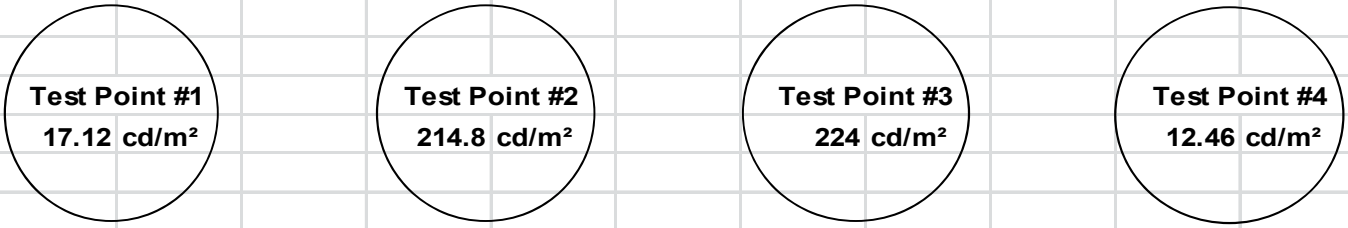
Requirements – Figure 19 – License Plate Target Locations

FMVSS S7.7.13 Photometry Data (Continued):

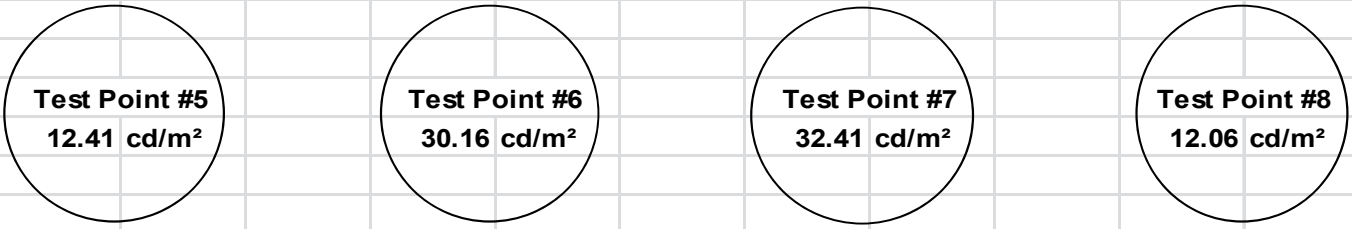
FMVSS 108 Rear Registration Plate Photometric Testing Data, 8 Test Stations

Date:	10/6/2014
Client:	Harbor Freight
Model Number:	CC-L
Serial Number:	
Operator:	MV
Voltage/Current:	13.5
Comments:	LED

Notes:
1) Units in cd/m²
2) Circular area 25 mm in diameter
3) Ratio Requirement = 20:1
4) Min. Level Requirement ≥ 2.5 cd/m²



Minimum Luminance (Cd/m^2) = 12.1
Minimum Illumination(Lux) = 38
Ratio Measured = 17.93
Disposition = Conforming



F1L License Plate Lamp Photometrics

FMVSS S8.1.11 Photometry Procedure:

Date Received: 07/16/14
Date Tested: 07/16/14 – 07/17/14

Description of Samples:

Product Description: LED Trailer Light Kit
Model #60521 (OLD SKU) / 62488 (NEW SKU) Trailer Light Kit
Material Submitted: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker
One (1) LED Trailer Light Kit Containing Samples CC-L, CC-R, CC-1, and CC-2
Condition of Test Samples: Production
Test Specification: FMVSS No. 108 (JUL 2014)

Test Procedure:

Test Method: FMVSS 108 (JUL 2014) S8.1.11 Photometry
Function: Reflex Reflector
Number of Samples Tested: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker

Acceptance Criteria:

Each reflex reflector must be designed to conform to the photometry requirements of Table XVI-a when tested according to the procedure of S14.2.3 for the reflex reflector color as specified by this section.

Results:

Sample #	Color	Points Failed	Disposition
F1R Rear	Red	0	Conforming
F1R Side (Rear)	Red	0	Conforming
F1L Rear	Red	0	Conforming
F1L Side (Rear)	Red	0	Conforming
F1L Sidemarker Side (Front)	Amber	0	Conforming

Refer to the following pages for technical data.

FMVSS S8.1.11 Photometry Data:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
133027	GONIOPHOTOMETER	HOFFMAN ENGINEERING	AGS-1100	N/A	VBU	VBU
133027s	SOFTWARE FOR GONIOMETER	HOFFMAN ENGINEERING	HGS-1100	V2.07.35	VBU	VBU
133027.1	PC	HOFFMAN ENGINEERING	IPC-6908BP	X12-51822	10/27/2008	VBU
133031	DETECTOR .2deg.	HOFFMAN ENGINEERING	TSP-1101	HEC-4187	10/27/2008	VBU
133009	ALIGNMENT LASER	MELLES GRIOT	05-LHR-141	9261BI	VBU	VBU
133011	HOFFMAN POWER SUPPLY	HEWLETT PACKARD	6038A	US36510144	VBU	VBU
133010	REFLEX PROJECTOR	HOFFMAN ENGINEERING	GPS-102-001	1045	9/28/2005	VBU
133032	DECTOR 1.5deg.	HOFFMAN ENGINEERING	TSP-1101	HEC-4187	10/27/2008	VBU
133028	DETECTOR 10'	HOFFMAN ENGINEERING	TSP-1104	HEC-4247	10/27/2008	VBU
133003	HOFFMAN STANDARD LAMP #2	HOFFMAN ENGINEERING	S80-17F	98662	09/09/2014	09/09/2016
133004	HOFFMAN STANDARD LAMP #3	HOFFMAN ENGINEERING	S80-17F	98663	09/09/2014	09/09/2015
133021	STANDARD LAMP	HOFFMAN ENGINEERING	S80-17F	HEC-3207	04/16/2014	04/16/2016
133065	6.5 Digit Multimeter	KEITHLEY	2000 Scan	4044413	04/17/2014	04/17/2015
133063	20A 400mV Current Shunt	EMPRO	20A400mV	6079	06/24/2014	06/24/2017
	133027, 133031, 133032, 133028 Verified by 133003, 133004, and 133021.					
	133009 and 133010 Verified by Design					
	133011 Verified by 133065 and 133063					

Equipment Used

FMVSS S8.1.11 Photometry Data (Continued):

TABLE XVI-A—REFLEX REFLECTOR PHOTOMETRY REQUIREMENTS

Observation angle (degrees)	Entrance angle (degrees)	Minimum performance					
		Red reflectors		Amber reflectors		White reflectors	
		(cd/incident ft-c)	(mcd/lux)	(cd/incident ft-c)	(mcd/lux)	(cd/incident ft-c)	(mcd/lux)
0.2	0	4.5	420	11.25	1050	18	1680
	10U	3.0	280	7.5	700	12	1120
	10D[(1)]	3.0	280	7.5	700	12	1120
	20L	1.5	140	3.75	350	6	560
	20R	1.5	140	3.75	350	6	560
1.5	0	0.07	6	0.175	15	0.28	24
	10U	0.05	5	0.125	12.5	0.2	20
	10D[(1)]	0.05	5	0.125	12.5	0.2	20
	20L	0.03	3	0.075	7.5	0.12	12
	20R	0.03	3	0.075	7.5	0.12	12

[(1)]Where reflex reflectors are mounted with their axis of reference less than 750 mm above the road surface, photometry requirements below 5° down may be met at 5° down rather than at the required specified downward angle.

Requirements - Table XVI-A Reflex Reflector

FMVSS S8.1.11 Photometry Data (Continued):

Device	Harbor Freight LED Tail Lamp	Operator	Run Date/Time
Test	Reflex-Red	EC	07/16/2014 04:29:06 PM

Results	Required TestPts	House TestPts	Required Zones	House Zones	Offset
Passed/Total	10 / 10	10 / 10	---	---	H - V

P/N:	NT223
Markings:	SAE(3)S(3)I(3)TLP2A07
JOB #:	G101722130
Quote #:	500537058
Function:	Rear Reflex
Customer Name	Harbor Freight
Sample F1L	

P.S. #	Bulb Name	Spec. Volts	Meas. Volts	Spec. Amps	Meas. Amps	Spec. Watts	Meas. Watts
1	PROJECTOR	13.44	9.02	8.333*	8.330	111.996	75.117

Location	Measured Cd/fc	Fail	Required Min Cd/fc	Required Max Cd/fc	House Min Cd/fc	House Max Cd/fc	Reaim/Max/Min Location	Original Cd/fc
H-V	7.257		4.50	300.00	4.50	300.00		
10U-V	5.280		3.00	300.00	3.00	300.00		
10D-V	6.268		3.00	300.00	3.00	300.00		
H-20R	3.752		1.50	300.00	1.50	300.00		
H-20L	4.077		1.50	300.00	1.50	300.00		
H-V 1.5 DEG	0.3054		0.07	300.00	0.07	300.00		
10U-V 1.5 DEG	0.2244		0.05	300.00	0.05	300.00		
10D-V 1.5 DEG	0.2459		0.05	300.00	0.05	300.00		
H-20L 1.5 DEG	0.1443		0.04	300.00	0.04	300.00		
H-20R 1.5 DEG	0.1376		0.04	300.00	0.04	300.00		

F1L Rear Reflex Reflector Photometrics

FMVSS S8.1.11 Photometry Data (Continued):

Device	Harbor Freight LED Tail Lamp	Operator	Run Date/Time
Test	Reflex-Red	EC	07/16/2014 04:33:17 PM

Results	Required TestPts	House TestPts	Required Zones	House Zones	Offset
Passed/Total	10 / 10	10 / 10	---	---	H - V

P/N:	NT223
Markings:	SAE(3)S(3)I(3)TLP2A07
JOB #:	G101722130
Quote #:	500537058
Function:	Side Reflex
Customer Name	Harbor Freight
Sample F1L	

P.S. #	Bulb Name	Spec. Volts	Meas. Volts	Spec. Amps	Meas. Amps	Spec. Watts	Meas. Watts
1	PROJECTOR	13.44	9.03	8.333*	8.330	111.996	75.235

Location	Measured Cd/fc	Fail	Required Min Cd/fc	Required Max Cd/fc	House Min Cd/fc	House Max Cd/fc	Reaim/Max/Min Location	Original Cd/fc
H-V	7.133		4.50	300.00	4.50	300.00		
10U-V	5.828		3.00	300.00	3.00	300.00		
10D-V	6.246		3.00	300.00	3.00	300.00		
H-20R	4.591		1.50	300.00	1.50	300.00		
H-20L	3.377		1.50	300.00	1.50	300.00		
H-V 1.5 DEG	0.2673		0.07	300.00	0.07	300.00		
10U-V 1.5 DEG	0.1492		0.05	300.00	0.05	300.00		
10D-V 1.5 DEG	0.1824		0.05	300.00	0.05	300.00		
H-20L 1.5 DEG	0.1011		0.04	300.00	0.04	300.00		
H-20R 1.5 DEG	0.1281		0.04	300.00	0.04	300.00		

F1L Side (Rear) Reflex Reflector Photometrics

FMVSS S8.1.11 Photometry Data (Continued):

Device	Harbor Freight LED Tail Lamp	Operator	Run Date/Time
Test	Reflex-Red	MV	07/17/2014 10:00:02 AM

Results	Required TestPts	House TestPts	Required Zones	House Zones	Offset
Passed/Total	10 / 10	10 / 10	---	---	H - V

P/N:	NT223
Markings:	SAE(3)S(3)I(3)TLP2A07
JOB #:	G101722130
Quote #:	500537058
Function:	Rear Reflex
Customer Name	Harbor Freight
Sample F1R	

P.S. #	Bulb Name	Spec. Volts	Meas. Volts	Spec. Amps	Meas. Amps	Spec. Watts	Meas. Watts
1	PROJECTOR	13.44	9.02	8.333*	8.330	111.996	75.173

Location	Measured Cd/fc	Fail	Required Min Cd/fc	Required Max Cd/fc	House Min Cd/fc	House Max Cd/fc	Reaim/Max/Min Location	Original Cd/fc
H-V	7.491		4.50	300.00	4.50	300.00		
10U-V	5.567		3.00	300.00	3.00	300.00		
10D-V	6.197		3.00	300.00	3.00	300.00		
H-20R	3.691		1.50	300.00	1.50	300.00		
H-20L	4.139		1.50	300.00	1.50	300.00		
H-V 1.5 DEG	0.4190		0.07	300.00	0.07	300.00		
10U-V 1.5 DEG	0.2473		0.05	300.00	0.05	300.00		
10D-V 1.5 DEG	0.2549		0.05	300.00	0.05	300.00		
H-20L 1.5 DEG	0.1521		0.04	300.00	0.04	300.00		
H-20R 1.5 DEG	0.1415		0.04	300.00	0.04	300.00		

F1R Rear Reflex Reflector Photometrics

FMVSS S8.1.11 Photometry Data (Continued):

Device	Harbor Freight LED Tail Lamp	Operator	Run Date/Time
Test	Reflex-Red	MV	07/17/2014 10:04:36 AM

Results	Required TestPts	House TestPts	Required Zones	House Zones	Offset
Passed/Total	10 / 10	10 / 10	---	---	H - V

P/N:	NT223
Markings:	SAE(3)S(3)I(3)TLP2A07
JOB #:	G101722130
Quote #:	500537058
Function:	Side Reflex
Customer Name	Harbor Freight
Sample F1R	

P.S. #	Bulb Name	Spec. Volts	Meas. Volts	Spec. Amps	Meas. Amps	Spec. Watts	Meas. Watts
1	PROJECTOR	13.44	9.05	8.333*	8.330	111.996	75.346

Location	Measured Cd/fc	Fail	Required Min Cd/fc	Required Max Cd/fc	House Min Cd/fc	House Max Cd/fc	Reaim/Max/Min Location	Original Cd/fc
H-V	7.611		4.50	300.00	4.50	300.00		
10U-V	6.313		3.00	300.00	3.00	300.00		
10D-V	6.080		3.00	300.00	3.00	300.00		
H-20R	4.046		1.50	300.00	1.50	300.00		
H-20L	4.484		1.50	300.00	1.50	300.00		
H-V 1.5 DEG	0.3688		0.07	300.00	0.07	300.00		
10U-V 1.5 DEG	0.1740		0.05	300.00	0.05	300.00		
10D-V 1.5 DEG	0.1744		0.05	300.00	0.05	300.00		
H-20L 1.5 DEG	0.1276		0.04	300.00	0.04	300.00		
H-20R 1.5 DEG	0.1228		0.04	300.00	0.04	300.00		

F1R Side (Rear) Reflex Reflector Photometrics

FMVSS S8.1.11 Photometry Data (Continued):

Device	Specify	Operator	Run Date/Time
Test	Reflex-Amber	MV	07/17/2014 03:16:41 PM

Results	Required TestPts	House TestPts	Required Zones	House Zones	Offset
Passed/Total	10 / 10	10 / 10	---	---	H - V

P/N:	
Markings:	
JOB #:	G101722130
Quote #:	5005370058
Function:	Sidemarker
Customer Name	Harbor Freight
Sample F1L	

P.S. #	Bulb Name	Spec. Volts	Meas. Volts	Spec. Amps	Meas. Amps	Spec. Watts	Meas. Watts
1	PROJECTOR	13.44	9.02	8.333*	8.330	111.996	75.123

Location	Measured Cd/fc	Fail	Required Min Cd/fc	Required Max Cd/fc	House Min Cd/fc	House Max Cd/fc	Reaim/Max/Min Location	Original Cd/fc
H-V	18.78		11.25	300.00	11.25	300.00		
10U-V	15.13		7.50	300.00	7.50	300.00		
10D-V	15.40		7.50	300.00	7.50	300.00		
H-20L	9.696		3.75	300.00	3.75	300.00		
H-20R	10.203		3.75	300.00	3.75	300.00		
H-V 1.5 Degree	0.7308		0.17	300.00	0.18	300.00		
10U-V 1.5 Degree	0.5014		0.12	300.00	0.13	300.00		
10D-V 1.5 Degree	0.5120		0.12	300.00	0.13	300.00		
H-20L 1.5 Degree	0.2451		0.07	300.00	0.08	300.00		
H-20R 1.5 Degree	0.2691		0.07	300.00	0.08	300.00		

F1L Sidemarker (Front) Reflex Reflector Photometrics

FMVSS S14.4.1 Color Procedure

Date Received: 10/03/14
Date Tested: 10/06/14

Description of Samples:

Product Description: LED Trailer Light Kit
Model #60521 (OLD SKU) / 62488 (NEW SKU) Trailer Light Kit

Material Submitted: One (1) LED Trailer Light Kit Containing Samples F1L, F1R, F1L Sidemarker, and F1R Sidemarker
One (1) LED Trailer Light Kit Containing Samples CC-L, CC-R, CC-1, and CC-2

Condition of Test Samples: Production

Test Specification: FMVSS No. 108 (JUL 2014)

Test Procedure

Test Method: FMVSS 108 ((JUL 2014) S14.4.1

Number of Samples Tested: One (1) LED Trailer Light Kit Containing Samples CC-L, CC-R, CC-1, and CC-2

Acceptance Criteria:

Red. The color of light emitted must fall within the following boundaries:

y = 0.33 (yellow boundary)
y = 0.98 − x (purple boundary)

Yellow (Amber). The color of light emitted must fall within the following boundaries:

y = 0.39 (red boundary)
y = 0.79 − 0.67x (white boundary)
y = x − 0.12 (green boundary)

White (achromatic). The color of light emitted must fall within the following boundaries:

x = 0.31 (blue boundary)
y = 0.44 (green boundary)
x = 0.50 (yellow boundary)
y = 0.15 + 0.64x (green boundary)
y = 0.38 (red boundary)
y = 0.05 + 0.75x (purple boundary)

…Results continued on next page…

FMVSS S14.4.1 Color Results:

Sample #	Function	Color	Chromaticity Coordinates		Disposition
			x	y	
CC-L	Tail	Red	0.697	0.299	Conforming
CC-L	Sidemarker (Rear)	Red	0.677	0.320	Conforming
CC-L	License	Red	0.313	0.330	Conforming
CC-L	Stop/Turn	Red	0.703	0.293	Conforming
CC-L	Reflex (Rear)	White	0.684	0.310	Conforming
CC-L	Reflex (Side, Rear)	Red	0.685	0.312	Conforming
CC-R	Tail	Red	0.697	0.299	Conforming
CC-R	Sidemarker (Rear)	Red	0.677	0.321	Conforming
CC-R	Stop/Turn	Red	0.703	0.293	Conforming
CC-R	Reflex (Rear)	Red	0.676	0.314	Conforming
CC-R	Reflex (Side, Rear)	Red	0.685	0.313	Conforming
CC-1	Reflex (Side, Rear)	Amber	0.582	0.409	Conforming
CC-1	Reflex (Side, Front)	Amber	0.597	0.400	Conforming
CC-2	Sidemarker (Front)	Amber	0.594	0.401	Conforming
CC-2	Reflex (Side, Front)	Amber	0.593	0.401	Conforming

Refer to the following pages for technical data.

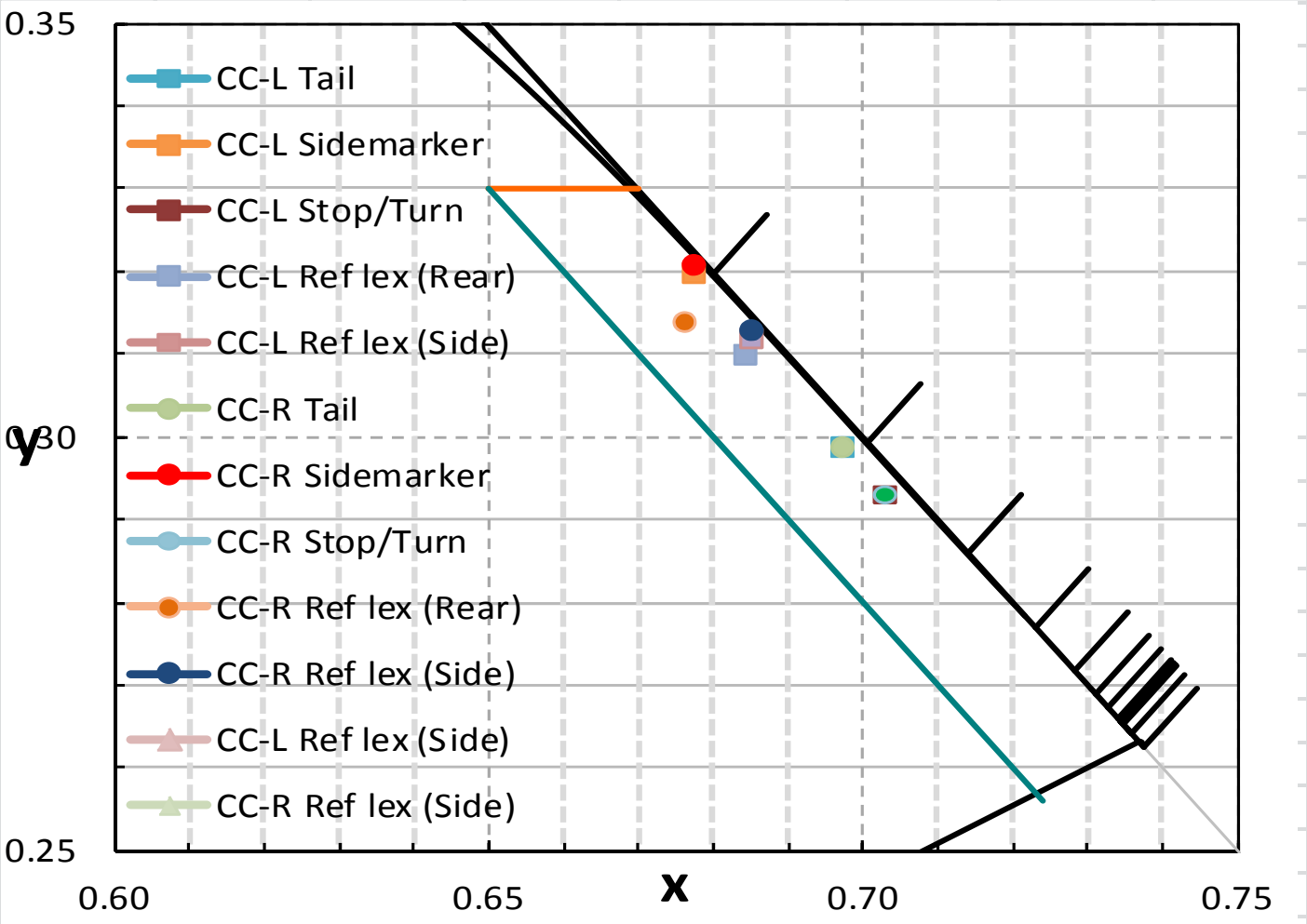
FMVSS S14.4.1 Color Data:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
133054	RADIOMETER 350 - 1000nm	HOFFMAN ENGINEERING	SMS-1000	HEC-10767	09/11/2014	09/11/2015

Equipment Used

FMVSS S14.4.1 Color Data (Continued):

Client:	Harbor Freight	Test Description:	FMVSS Color
Project:	G101834023	Quote:	500552831
Date:	10/6/2014	Comments:	None
Tech:	Mark V.		

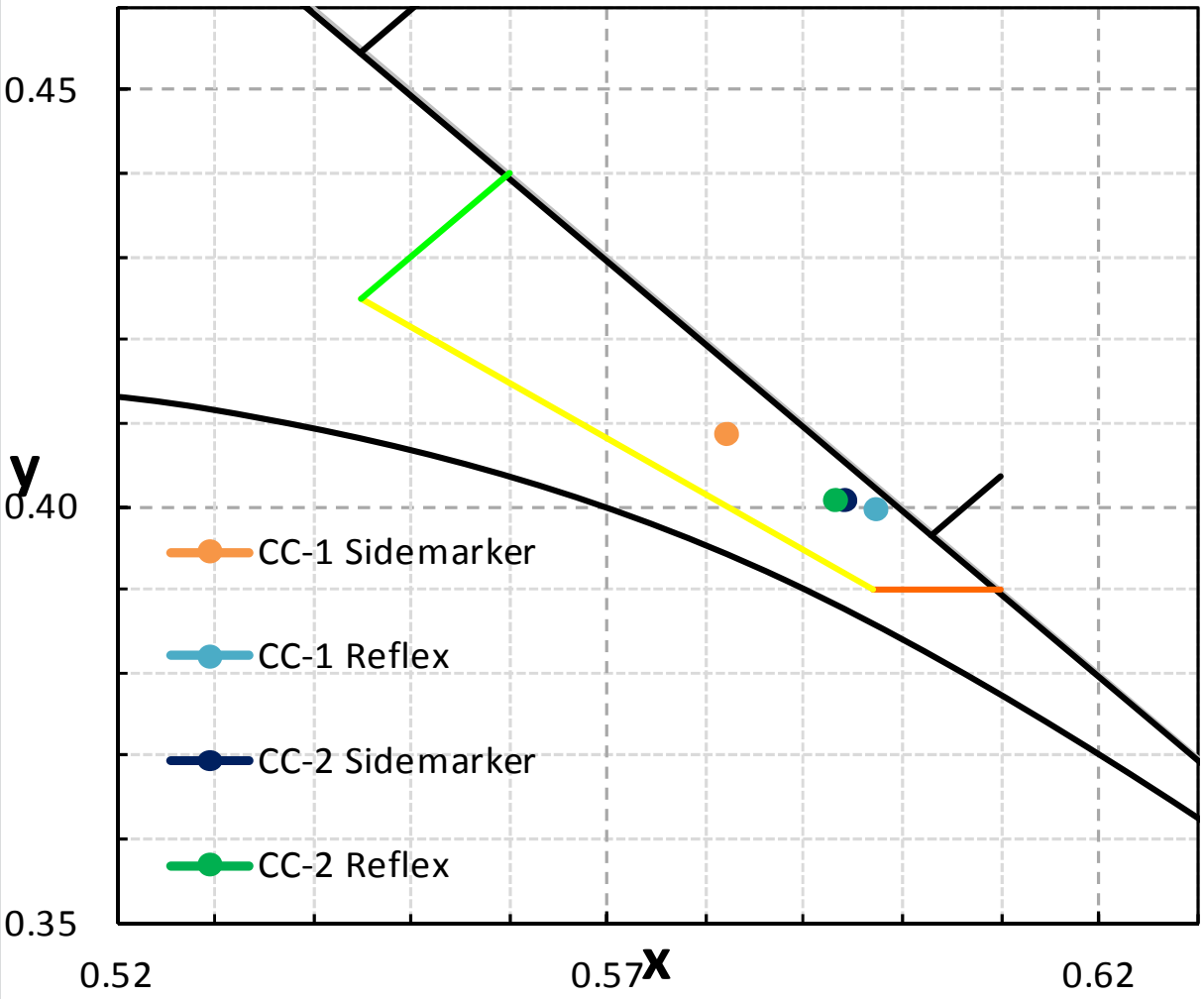


Sample #	x	y	Sample #	x	y
CC-L Tail	0.697	0.299	CC-R Tail	0.697	0.299
CC-L Sidemarker	0.677	0.320	CC-R Sidemarker	0.677	0.321
CC-L Stop/Turn	0.703	0.293	CC-R Stop/Turn	0.703	0.293
CC-L Ref lex (Rear)	0.684	0.310	CC-R Ref lex (Rear)	0.676	0.314
CC-L Ref lex (Side)	0.685	0.312	CC-R Ref lex (Side)	0.685	0.313

Color Plot - Red

FMVSS S14.4.1 Color Data (Continued):

Client:	Harbor Freight	Test Description:	FMVSS Color
Project:	G101834023	Quote:	500552831
Date:	10/6/2014	Comments:	None
Tech:	Mark V.		

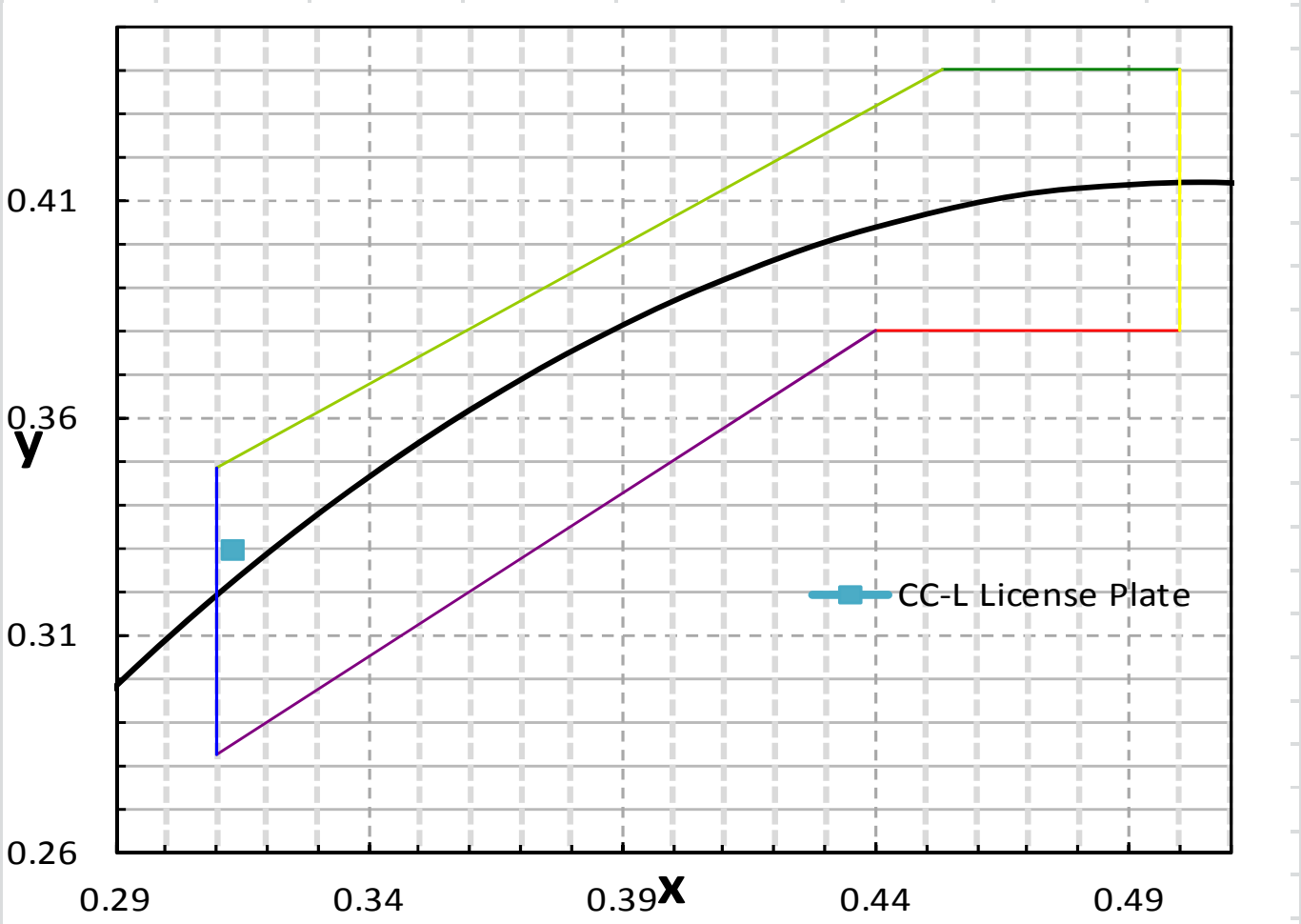


Sample #	x	y			
CC-1 Sidemarker	0.582	0.409	CC-2 Sidemarker	0.594	0.401
CC-1 Reflex	0.597	0.400	CC-2 Reflex	0.593	0.401

Color Plot – Amber

FMVSS S14.4.1 Color Data (Continued):

Client:	Harbor Freight	Test Description:	FMVSS Color
Project:	G101834023	Quote:	500552831
Date:	10/6/2014	Comments:	None
Tech:	Mark V.		



Sample #	x	y	Sample #	x	y
CC-L License Plate	0.3130	0.3300			

Color Plot - White