NHTSA Report No. 108-CCITL-06-09

HS 638500

LAMPS, REFLECTIVE DEVICES AND ASSOCIATED EQUIPMENT FMVSS-108

TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps for 2006 Toyota Camry XLE/LE

CALCOAST – ITL
Lighting Technology
4072 Watts Street
Emeryville, CA 94608

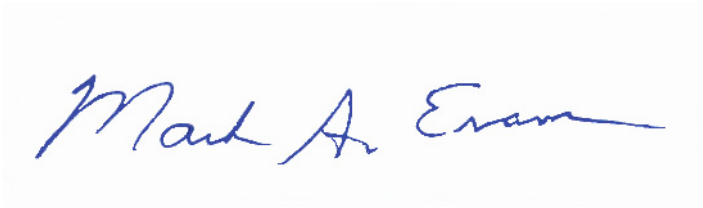
23 August 2006

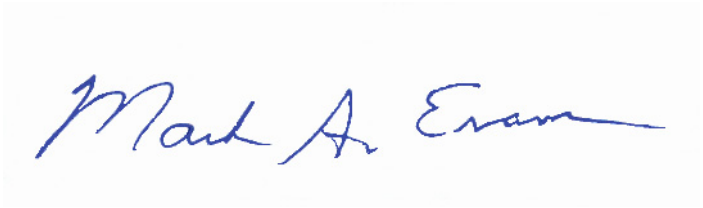
FINAL REPORT

PREPARED FOR

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

NHTSA Report No. 108-CCITL-06-09

Prepared By: 

Approved By: 

Approval Date: 23 August 2006

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By:  _____

Acceptance Date:08-24-06 _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 108-CCITL-06-09	**2. Government Accession No.** N/A	**3. Recipient's Catalog No.** N/A	
4. Title and Subtitle Test Series TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps for 2006 Toyota Camry XLE/LE		**5. Report Date** 23 August 2006 **6. Performing Organization Code** N/A	
7. Author(s) Mark A. Evans Photometric Engineer		**8. Performing Organization Report No.** 060822-02H	
9. Performing Organization Name and Address Calcoast - ITL 4072 Watts Street Emeryville, CA 94608		**10. Work Unit No.** N/A **11. Contract or Grant No.**	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 400 7th Street, S.W., Room 6111(NVS 222) Washington, D.C. 20590		**13. Type of Report and Period Covered** **14. Sponsoring Agency Code**	
15. Supplementary Notes			
16. Abstract The scope of this testing was limited to certain photometry and color tests as indicated. Test failures identified were as follows: 8 of 8 lower beam photometry failed.			
17. Key Words Federal Motor Vehicle Safety Standard 108 Lamps, Reflective Devices and Associated Equipment		**18. Distribution Statement** Unlimited	
19. Security Classif. (of this report) Unclassified	**20. Security Classif. (of this report)** Unclassified	**21. No. of Pages** 29	**22. Price** N/A

Report No. 060822-02H

TEST REPORT

Report Date: 23 August 2006

Test Component: TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps for 2006 Toyota Camry XLE/LE

Manufactured By: TYC

Submitted By: CCITL purchased for NHTSA

NHTSA Report No.: 108-CCITL-06-09

Test Laboratory: Calcoast – ITL
Emeryville, CA 94608

Devices Tested: Four (4) Pair

SUMMARY

Specifications: FMVSS 108

Photometric Tests – Replaceable Bulb Headlamp
Figure 17-2 Lower Beam ..... 8 of 8 FAILED
Figure 17-2 Upper Beam ..... 8 of 8 PASSED

Color Tests – SAE J578c FEB77 ..... 8 of 8 PASSED

Signature of Responsible Laboratory Official:

Mark A. Evans
Photometric Engineer

DESCRIPTION SHEET

Test Component: TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps for 2006 Toyota Camry XLE/LE

GENERAL DESCRIPTION:

MARKINGS: LENS: "L" or "R", "TYC", "20-6575" or "20-6576" ,"DOT", "SAE AHRI5Y2 02 DRL", "HB4", "HB3", "VOR"

HOUSING: "20-6575B" or "20-6576B", "12V", "R" or "L", "HB3", "HB4", material markings, additional bulb markings See photometry data sheets for production markings

LENS: MATERIAL: Polycarbonate (Clear)
COATING: Unknown
METHOD OF ATTACHMENT: Clips and Glue

HOUSING: MATERIAL: Plastic
METHOD OF MOUNTING: Boss and Two (2) Bolts

BULBS USED:

FUNCTION	QUANTITY	TRADE NO.	VOLTS
Upper Beam	One	HB3	12.80V
Lower Beam & Upper Beam	One	HB4	12.80V

NOTE: HB3/HB4 bulbs supplied with the lamps were seasoned for 1.5/3.0 hours at design voltage prior to photometry and color testing.

TEST DATA SHEET

Test Component: TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps for 2006 Toyota Camry XLE/LE

COLOR TEST: SAE J578c

Test Method: Tristimulus Method using Minolta CL100

Test Performed by: Mark Evans Date: 8/22-23/2006

Lamp Voltage: 12.80V

Test Distance: 50 Feet

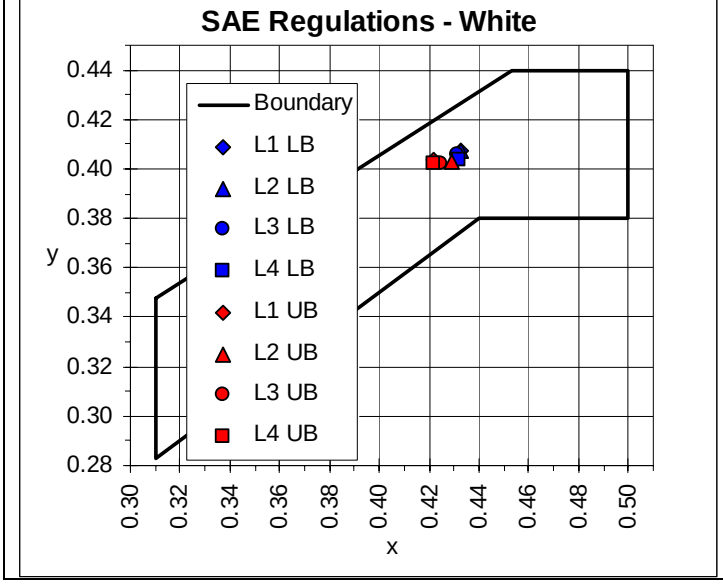
Measured average xy chromaticity coordinate values:

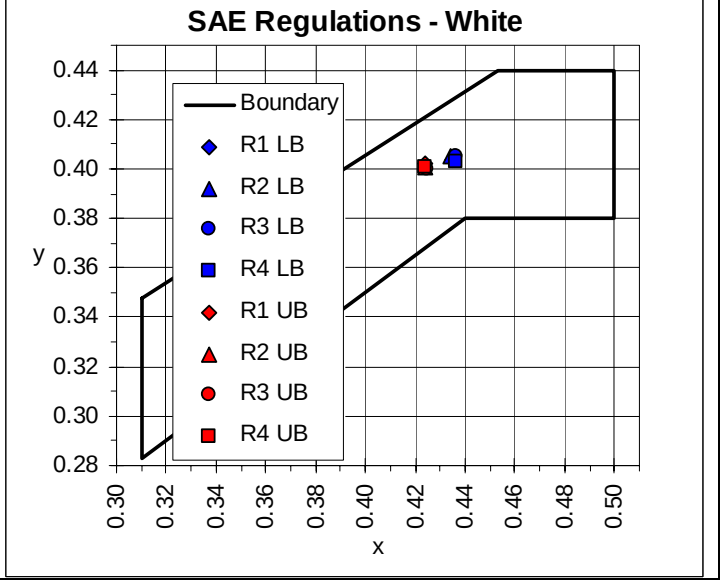
White

Lower Beam at 1.5D/2R				Upper Beam @ HV			
L1	L2	L3	L4	L1	L2	L3	L4
x=0.433 y=0.407	x=0.433 y=0.407	x=0.431 y=0.406	x=0.432 y=0.404	x=0.422 y=0.404	x=0.429 y=0.403	x=0.425 y=0.402	x=0.422 y=0.402

Lower Beam at 1.5D/2R				Upper Beam @ HV			
R1	R2	R3	R4	R1	R2	R3	R4
x=0.435 y=0.404	x=0.434 y=0.405	x=0.436 y=0.405	x=0.436 y=0.403	x=0.424 y=0.402	x=0.424 y=0.401	x=0.425 y=0.400	x=0.424 y=0.401

xy Chromaticity Coordinate Boundaries:





Devices comply with all color requirements.

PHOTOMETRIC TEST SUMMARY SHEET

Test Component: TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps for 2006 Toyota Camry XLE/LE

SUMMARY OF PHOTOMETRIC TESTS

Tests performed by: Mark Evans Date: 22-23 August 2006

Reference calibration detector number: NIST P181-2

Test distance: 100 feet

Aim: Samples aimed using VOR methodology.

Test	**Equipment**
Photometry	Custom Goniometer (Aerotech Rotary Tables, Stepper Motors, Driver) Hoffman TSP-7501 Detector IOTech DaqBoard/2000 16-bit, 200kHz DAC HP 6652A Power Supply Data Precision 2480R DMM (Current) Keithley 197A DMM (Voltage) Kepco 15-12M Power Supply Fluke 23 DMM (Voltage) Keithley 197A (Current)

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

VOR Aim

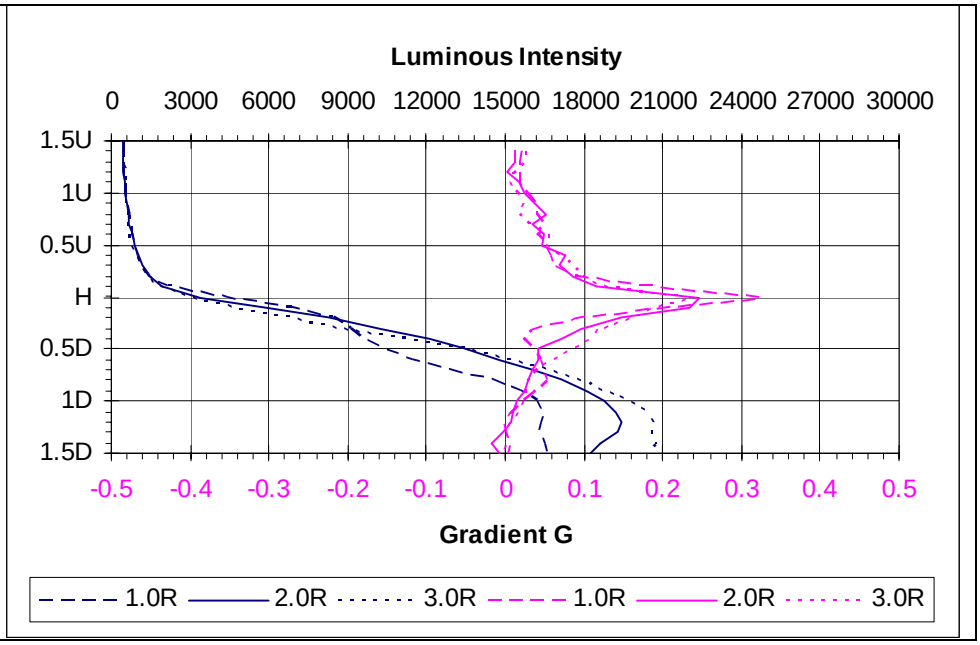
RH1

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.324	-
H/2.0R	0.247	> 0.13
H/3 0R	0.229	-

Horizontal width of cutoff is greater than 2° centered at 2.0R.

Maximum inclination of cutoff is within ±0.2°.



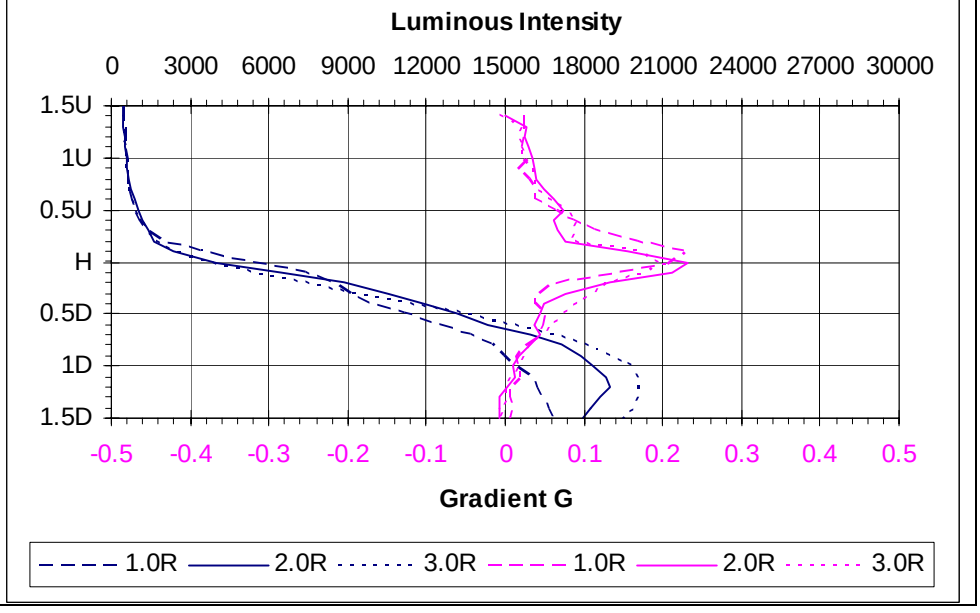
RH2

Maximum Vertical Gradient

Location	Value	Required
0.1U/1.0R	0.226	-
H/2.0R	0.232	> 0.13
H/3.0R	0.194	-

Horizontal width of cutoff is greater than 2° centered at 2.0R.

Maximum inclination of cutoff is within ±0.2°.



PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

VOR Aim

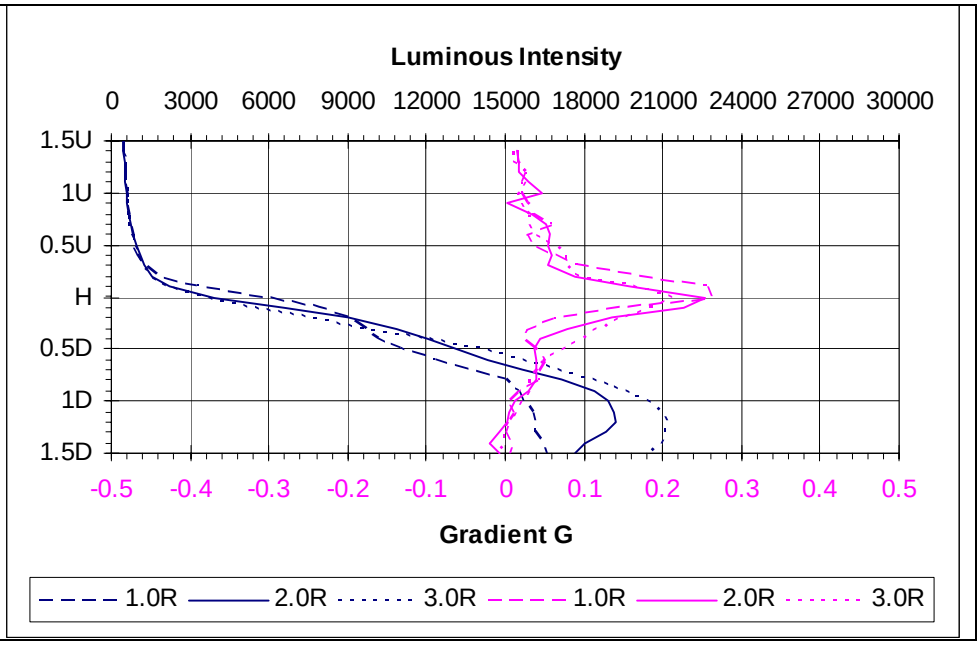
RH3

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.262	-
H/2.0R	0.253	> 0.13
H/3 0R	0.212	-

Horizontal width of cutoff is greater than 2° centered at 2.0R.

Maximum inclination of cutoff is within ±0.2°.



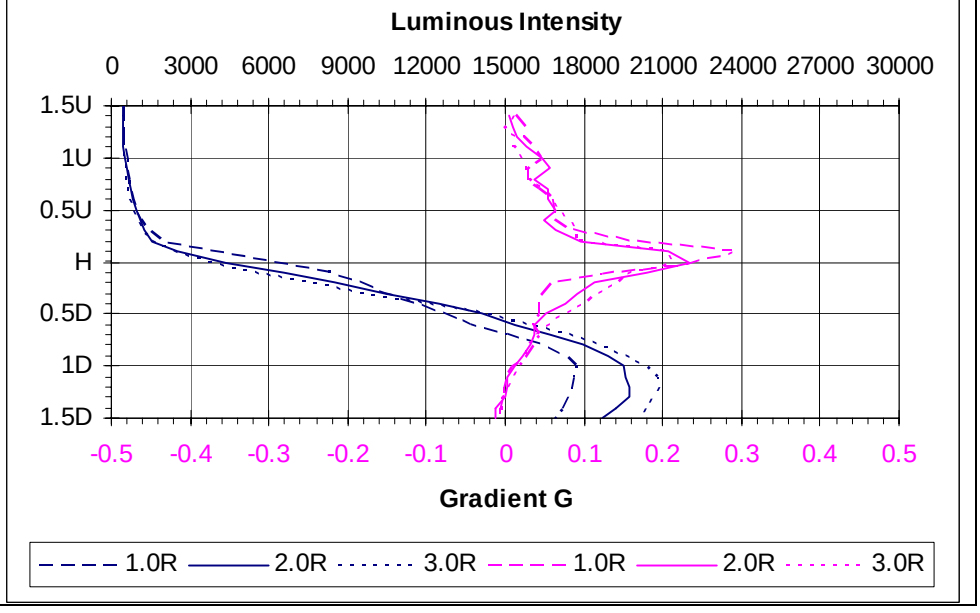
RH4

Maximum Vertical Gradient

Location	Value	Required
0.1U/1.0R	0.287	-
H/2.0R	0.233	> 0.13
H/3.0R	0.210	-

Horizontal width of cutoff is greater than 2° centered at 2.0R.

Maximum inclination of cutoff is within ±0.2°.



PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: RH1, 20-6575-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Lower Beam
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
H V		2379.50		-	-
4.0U 8.0L		218.07		64	-
4.0U 8.0R		313.15		64	-
2.0U 4.0L		279.88		135	-
1.5U 1.0R TO 3.0R	1.2R	435.27		200	-
1.5U 1.0R TO R	6.2R	547.59		-	1400
1.0U 1.5L TO L	1.5L	306.71		-	700
0.5U 1.5L TO L	2.6L	356.71		-	1000
0.5U 1.0R TO 3.0R	3.0R	749.70		500	-
0.5U 1.0R TO 3.0R	1.4R	907.73		-	2700
H 8.0L		326.97		64	-
H 4.0L		521.16		135	-
H V		1755.18		-	-
0.6D 1.3R		12359.33		10000	-
0.9D 3.5L		4855.07		1800	12000
0.9D V		8238.77		4500	-
1.5D 2.0R		18223.18		15000	-
2.0D 15.0L		1553.38		1000	-
2.0D 9.0L		5231.51		1250	-
2.0D 9.0R		8087.58		1250	-
2.0D 15.0R		3461.10		1000	-
4.0D 20.0L		563.84		300	-
4.0D V		8203.45		-	-
4.0D 4.0R		9059.86		-	12500
4.0D 20.0R		2653.12		300	-
MAXIMUM	1.4D 3.1R	20720.49		-	-
MX(10U-90U/90L-90R)	29.7U 46.5L	173.65*	(same range as RH4)	-	125
H V		1772.95		-	-

*** - Denotes Failure.**

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.296A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim). MaxG = 0.247
Note: Cutoff step approximately at V-V line.

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: RH1, 20-6575-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Upper Beam
Luminous Intensity, Candela

Test	Point	Location	Measured	Reaim	Minimum	Maximum
H	V		69334.20		40000	75000
2.0U	V		17484.82		1500	-
1.0U	3.0L		19906.41		5000	-
1.0U	3.0R		35695.16		5000	-
H	12.0L		3163.23		1500	-
H	9.0L		6396.20		3000	-
H	6.0L		10089.37		5000	-
H	3.0L		19637.58		15000	-
H	V		66201.07		40000	75000
H	3.0R		45201.05		15000	-
H	6.0R		13742.02		5000	-
H	9.0R		9834.97		3000	-
H	12.0R		6402.36		1500	-
1.5D	9.0L		8200.39		2000	-
1.5D	V		32352.58		5000	-
1.5D	9.0R		13867.69		2000	-
2.5D	12.0L		5275.96		1000	-
2.5D	V		23050.86		2500	-
2.5D	12.0R		9851.44		1000	-
4.0D	V		10525.16		-	12000
MAXIMUM		0.2D 1.2R	76669.60		-	-
H	V		68950.35		40000	75000

Sample meets test requirements at all points.

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.295A / Flux not measured / Filament not measured
Philips HB3 supplied with lamp (seasoned 1.5 hours)
12.80V / 5.160A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim).

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: RH2, 20-6575-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Lower Beam
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
H V		2339.31		-	-
4.0U 8.0L		208.82		64	-
4.0U 8.0R		416.74		64	-
2.0U 4.0L		265.54		135	-
1.5U 1.0R TO 3.0R	1.6R	417.52		200	-
1.5U 1.0R TO R	7.4R	472.62		-	1400
1.0U 1.5L TO L	1.5L	279.23		-	700
0.5U 1.5L TO L	1.5L	317.35		-	1000
0.5U 1.0R TO 3.0R	1.0R	845.23		500	-
0.5U 1.0R TO 3.0R	2.0R	990.22		-	2700
H 8.0L		337.35		64	-
H 4.0L		521.96		135	-
H V		1876.12		-	-
0.6D 1.3R		13134.49		10000	-
0.9D 3.5L		5126.95		1800	12000
0.9D V		8689.59		4500	-
1.5D 2.0R		18328.11		15000	-
2.0D 15.0L		1536.65		1000	-
2.0D 9.0L		4827.52		1250	-
2.0D 9.0R		8149.89		1250	-
2.0D 15.0R		3220.16		1000	-
4.0D 20.0L		542.16		300	-
4.0D V		8086.27		-	-
4.0D 4.0R		9059.66		-	12500
4.0D 20.0R		2597.21		300	-
MAXIMUM	1.4D 3.0R	20574.54		-	-
MX(10U-90U/90L-90R)	27.6U 47.8L	195.51* (same range as RH4)		-	125
H V		1882.75		-	-

*** - Denotes Failure.**

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.283A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim). MaxG = 0.232
Note: Cutoff step approximately at V-V line.

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: RH2, 20-6575-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Upper Beam
Luminous Intensity, Candela

Test	Point	Location	Measured	Reaim	Minimum	Maximum
H	V		58764.97		40000	75000
2.0U	V		26526.00		1500	-
1.0U	3.0L		19207.93		5000	-
1.0U	3.0R		40608.40		5000	-
H	12.0L		3262.24		1500	-
H	9.0L		6656.50		3000	-
H	6.0L		10553.35		5000	-
H	3.0L		17439.06		15000	-
H	V		56328.89		40000	75000
H	3.0R		46871.94		15000	-
H	6.0R		13477.21		5000	-
H	9.0R		9791.33		3000	-
H	12.0R		6790.03		1500	-
1.5D	9.0L		7775.83		2000	-
1.5D	V		29776.42		5000	-
1.5D	9.0R		13298.50		2000	-
2.5D	12.0L		5015.51		1000	-
2.5D	V		20327.72		2500	-
2.5D	12.0R		9579.21		1000	-
4.0D	V		10189.54		-	12000
MAXIMUM		0.1U 0.9R	75651.48		-	-
H	V		59067.38		40000	75000

Sample meets test requirements at all points.

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.283A / Flux not measured / Filament not measured
Philips HB3 supplied with lamp (seasoned 1.5 hours)
12.80V / 5.165A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim).

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: RH3, 20-6575-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Lower Beam
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
H V		2742.93		-	-
4.0U 8.0L		194.63		64	-
4.0U 8.0R		305.29		64	-
2.0U 4.0L		284.49		135	-
1.5U 1.0R TO 3.0R	1.4R	439.50		200	-
1.5U 1.0R TO R	7.1R	549.97		-	1400
1.0U 1.5L TO L	1.5L	320.53		-	700
0.5U 1.5L TO L	1.5L	356.90		-	1000
0.5U 1.0R TO 3.0R	3.0R	844.22		500	-
0.5U 1.0R TO 3.0R	2.0R	959.97		-	2700
H 8.0L		371.01		64	-
H 4.0L		523.82		135	-
H V		2054.65		-	-
0.6D 1.3R		13043.66		10000	-
0.9D 3.5L		5627.01		1800	12000
0.9D V		8928.48		4500	-
1.5D 2.0R		17799.05		15000	-
2.0D 15.0L		1622.31		1000	-
2.0D 9.0L		5258.42		1250	-
2.0D 9.0R		7955.62		1250	-
2.0D 15.0R		3215.36		1000	-
4.0D 20.0L		487.09		300	-
4.0D V		7735.30		-	-
4.0D 4.0R		8403.10		-	12500
4.0D 20.0R		2583.11		300	-
MAXIMUM	1.3D 3.0R	21580.87		-	-
MX(10U-90U/90L-90R)	26.3U 47.8L	284.18* (same range as RH4)		-	125
H V		2181.28		-	-

*** - Denotes Failure.**

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.295A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim). MaxG = 0.253
Note: Cutoff step approximately at V-V line.

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: RH3, 20-6575-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Upper Beam
Luminous Intensity, Candela

Test	Point	Location	Measured	Reaim	Minimum	Maximum
H	V		60002.99		40000	75000
2.0U	V		22255.42		1500	-
1.0U	3.0L		18005.70		5000	-
1.0U	3.0R		38403.17		5000	-
H	12.0L		2769.61		1500	-
H	9.0L		5886.43		3000	-
H	6.0L		9863.04		5000	-
H	3.0L		17777.40		15000	-
H	V		54568.65		40000	75000
H	3.0R		52162.31		15000	-
H	6.0R		13869.88		5000	-
H	9.0R		9833.11		3000	-
H	12.0R		6958.62		1500	-
1.5D	9.0L		8101.55		2000	-
1.5D	V		35460.64		5000	-
1.5D	9.0R		13924.86		2000	-
2.5D	12.0L		4927.37		1000	-
2.5D	V		23578.31		2500	-
2.5D	12.0R		10066.97		1000	-
4.0D	V		10150.09		-	12000
MAXIMUM		0.1D 1.3R	78612.90		-	-
H	V		59966.47		40000	75000

Sample meets test requirements at all points.

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.294A / Flux not measured / Filament not measured
Philips HB3 supplied with lamp (seasoned 1.5 hours)
12.80V / 5.143A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim).

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: RH4, 20-6575-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Lower Beam
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
H V		5188.52		-	-
4.0U 8.0L		246.87		64	-
4.0U 8.0R		335.46		64	-
2.0U 4.0L		259.96		135	-
1.5U 1.0R TO 3.0R	2.2R	404.13		200	-
1.5U 1.0R TO R	6.8R	544.18		-	1400
1.0U 1.5L TO L	1.5L	282.68		-	700
0.5U 1.5L TO L	1.5L	375.14		-	1000
0.5U 1.0R TO 3.0R	3.0R	840.41		500	-
0.5U 1.0R TO 3.0R	1.6R	1010.50		-	2700
H 8.0L		463.06		64	-
H 4.0L		655.39		135	-
H V		4307.85		-	-
0.6D 1.3R		14713.00		10000	-
0.9D 3.5L		7217.33		1800	12000
0.9D V		12382.68		4500	-
1.5D 2.0R		18310.76		15000	-
2.0D 15.0L		1960.08		1000	-
2.0D 9.0L		5857.03		1250	-
2.0D 9.0R		8051.48		1250	-
2.0D 15.0R		3262.07		1000	-
4.0D 20.0L		536.71		300	-
4.0D V		7694.99		-	-
4.0D 4.0R		8490.27		-	12500
4.0D 20.0R		2466.79		300	-
MAXIMUM	1.0D 2.5R	20569.75		-	-
MX(10U-90U/90L-90R)	26.7U 47.8L	150.46*	(see chart for failure range)		125
H V		4362.82		-	-

*** - Denotes Failure.**

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.291A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim). MaxG = 0.233
Note: Cutoff step approximately at V-V line.

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: RH4, 20-6575-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Upper Beam
Luminous Intensity, Candela

Test	Point	Location	Measured	Reaim	Minimum	Maximum
H	V		71842.61		40000	75000
2.0U	V		17969.24		1500	-
1.0U	3.0L		22438.54		5000	-
1.0U	3.0R		33753.94		5000	-
H	12.0L		3893.72		1500	-
H	9.0L		7525.91		3000	-
H	6.0L		10986.78		5000	-
H	3.0L		21204.49		15000	-
H	V		70543.67		40000	75000
H	3.0R		40246.37		15000	-
H	6.0R		12514.67		5000	-
H	9.0R		9389.84		3000	-
H	12.0R		6042.11		1500	-
1.5D	9.0L		9642.73		2000	-
1.5D	V		30864.07		5000	-
1.5D	9.0R		13906.03		2000	-
2.5D	12.0L		5819.52		1000	-
2.5D	V		20677.28		2500	-
2.5D	12.0R		9865.74		1000	-
4.0D	V		10160.53		-	12000
MAXIMUM		0.1D 0.7R	80054.05		-	-
H	V		72990.24		40000	75000

Sample meets test requirements at all points.

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.312A / Flux not measured / Filament not measured
Philips HB3 supplied with lamp (seasoned 1.5 hours)
12.80V / 5.124A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim).

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

VOR Aim

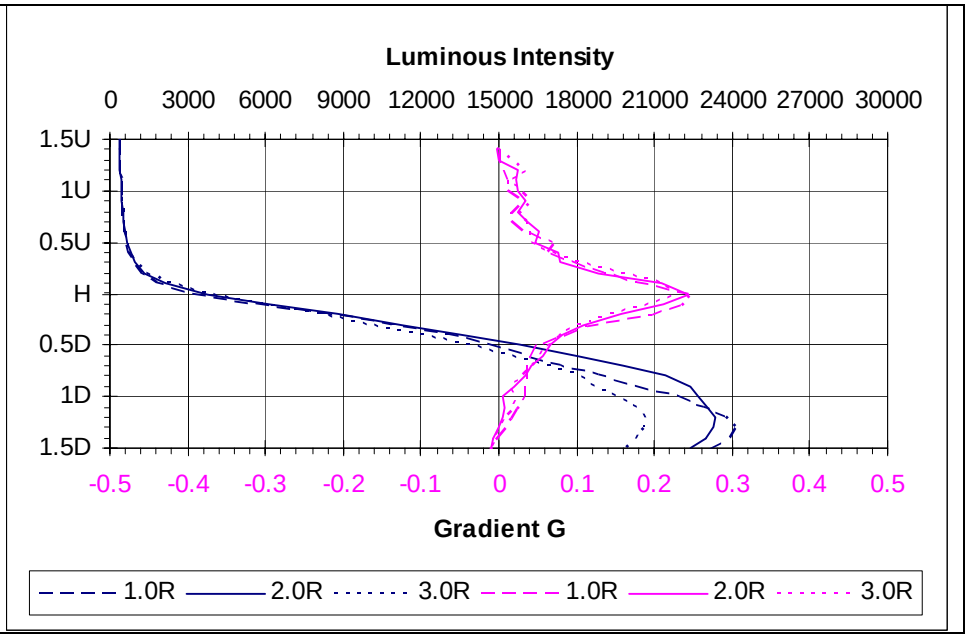
LH1

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.243	-
H/2.0R	0.244	> 0.13
H/3 0R	0.224	-

Horizontal width of cutoff is greater than 2° centered at 2.0R.

Maximum inclination of cutoff is within ±0.2°.



LH2

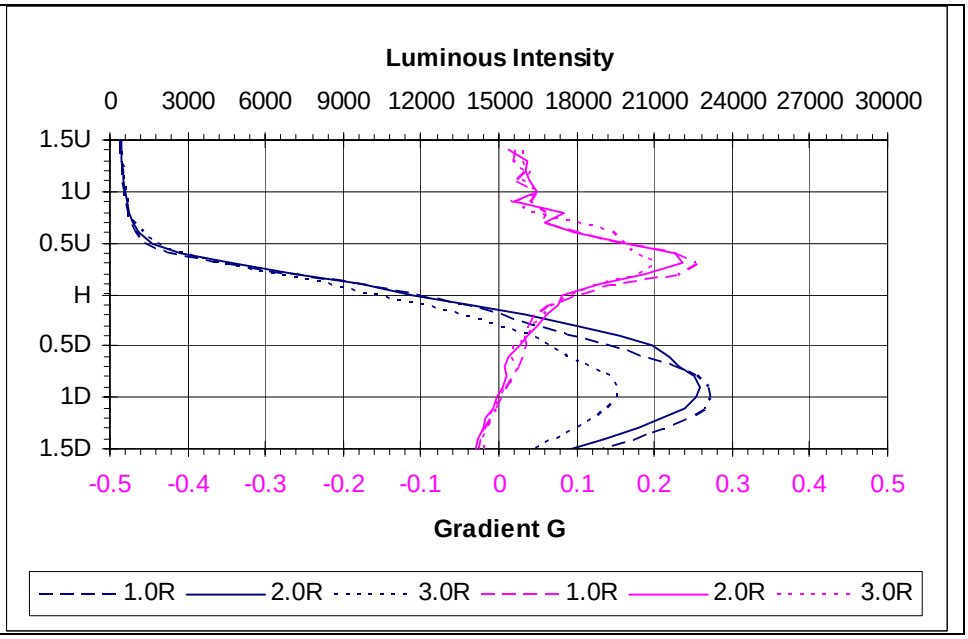
Maximum Vertical Gradient

Location	Value	Required
0.3U/1.0R	0.255	-
0.3U/2.0R	0.237	> 0.13
0.3U/3.0R	0.203	-

Horizontal width of cutoff is greater than 2° centered at 2.0R.

Maximum inclination of cutoff is within ±0.2°.

AIM GEAR FAILED – BEAM PLACED AS FAR DOWN AS POSSIBLE



PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

VOR Aim

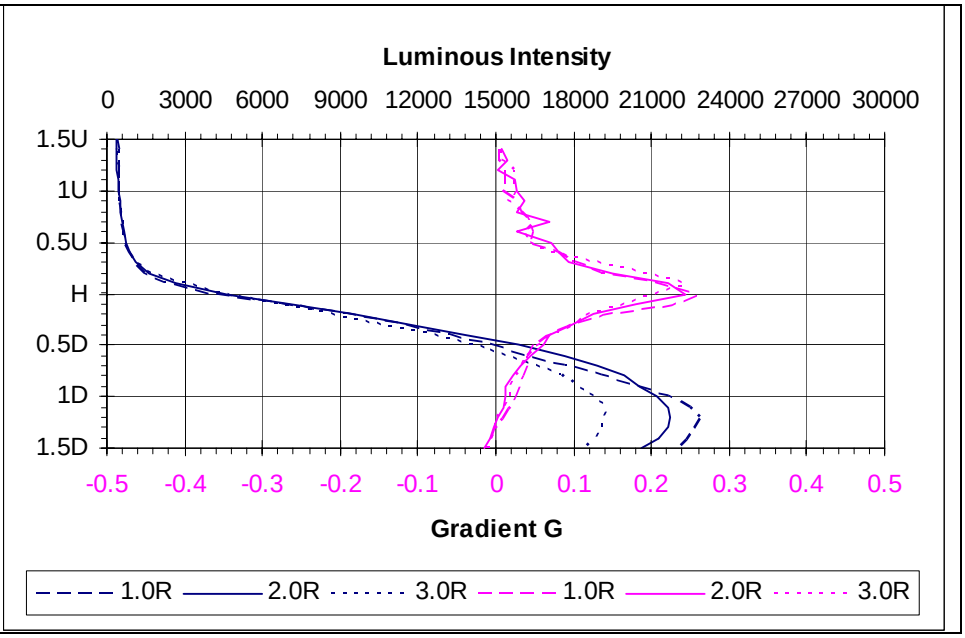
LH3

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.259	-
H/2.0R	0.243	> 0.13
0.1U/3 0R	0.243	-

Horizontal width of cutoff is greater than 2° centered at 2.0R.

Maximum inclination of cutoff is within ±0.2°.



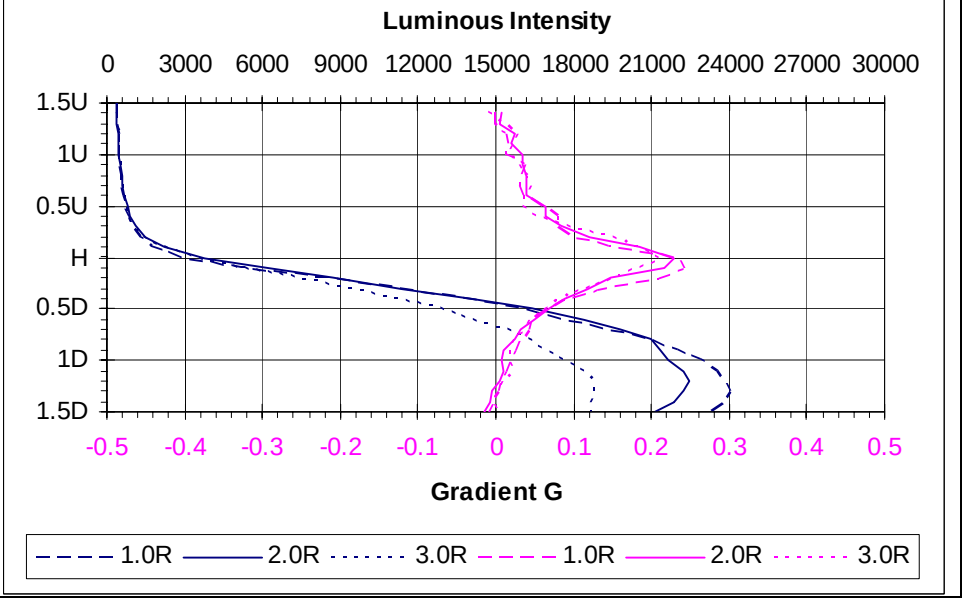
LH4

Maximum Vertical Gradient

Location	Value	Required
0.1D/1.0R	0.241	-
H/2.0R	0.230	> 0.13
H/3.0R	0.212	-

Horizontal width of cutoff is greater than 2° centered at 2.0R.

Maximum inclination of cutoff is within ±0.2°.



PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: LH1, 20-6576-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Lower Beam
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
H V		2602.82		-	-
4.0U 8.0L		271.10		64	-
4.0U 8.0R		422.44		64	-
2.0U 4.0L		272.84		135	-
1.5U 1.0R TO 3.0R	3.0R	354.95		200	-
1.5U 1.0R TO R	1.0R	405.87		-	1400
1.0U 1.5L TO L	1.5L	364.30		-	700
0.5U 1.5L TO L	1.5L	477.22		-	1000
0.5U 1.0R TO 3.0R	1.0R	573.34		500	-
0.5U 1.0R TO 3.0R	2.6R	706.06		-	2700
H 8.0L		513.07		64	-
H 4.0L		683.34		135	-
H V		2452.51		-	-
0.6D 1.3R		16398.72		10000	-
0.9D 3.5L		9320.95		1800	12000
0.9D V		16243.33		4500	-
1.5D 2.0R		22824.49		15000	-
2.0D 15.0L		3948.97		1000	-
2.0D 9.0L		7864.39		1250	-
2.0D 9.0R		4426.88		1250	-
2.0D 15.0R		1535.01		1000	-
4.0D 20.0L		2649.02		300	-
4.0D V		7925.80		-	-
4.0D 4.0R		7427.99		-	12500
4.0D 20.0R		464.09		300	-
MAXIMUM	1.3D 1.4R	24721.40		-	-
MX(10U-90U/90L-90R)	38.4U 41.6R	274.74* (see chart for failure range)			125
H V		2488.55		-	-

*** - Denotes Failure.**

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.314A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim). MaxG = 0.244

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: LH1, 20-6576-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Upper Beam
Luminous Intensity, Candela

Test	Point	Location	Measured	Reaim	Minimum	Maximum
H	V		64421.09		40000	75000
2.0U	V		30389.90		1500	-
1.0U	3.0L		37377.55		5000	-
1.0U	3.0R		23732.14		5000	-
H	12.0L		5813.27		1500	-
H	9.0L		8810.72		3000	-
H	6.0L		11914.49		5000	-
H	3.0L		37782.42		15000	-
H	V		69357.56		40000	75000
H	3.0R		24551.40		15000	-
H	6.0R		12827.82		5000	-
H	9.0R		8033.86		3000	-
H	12.0R		4139.61		1500	-
1.5D	9.0L		11707.04		2000	-
1.5D	V		33534.30		5000	-
1.5D	9.0R		7977.32		2000	-
2.5D	12.0L		9845.14		1000	-
2.5D	V		21757.42		2500	-
2.5D	12.0R		4970.51		1000	-
4.0D	V		10055.49		-	12000
MAXIMUM		0.3U 0.6L	81042.86		-	-
H	V		68939.57		40000	75000

Sample meets test requirements at all points.

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.315A / Flux not measured / Filament not measured
Philips HB3 supplied with lamp (seasoned 1.5 hours)
12.80V / 5.130A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim).

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: LH2, 20-6576-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Lower Beam
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
H V		10627.57		-	-
4.0U 8.0L		258.61		64	-
4.0U 8.0R		482.99		64	-
2.0U 4.0L		310.02		135	-
1.5U 1.0R TO 3.0R	1.0R	391.98		200	-
1.5U 1.0R TO R	3.7R	419.26		-	1400
1.0U 1.5L TO L	1.5L	475.49		-	700
0.5U 1.5L TO L	1.5L	816.57		-	1000
0.5U 1.0R TO 3.0R	1.2R	1581.30		500	-
0.5U 1.0R TO 3.0R	2.5R	2157.06		-	2700
H 8.0L		1392.04		64	-
H 4.0L		4301.81		135	-
H V		10451.14		-	-
0.6D 1.3R		22133.07		10000	-
0.9D 3.5L		13005.50	10559.08	1800	12000
0.9D V		20195.26		4500	-
1.5D 2.0R		17440.69		15000	-
2.0D 15.0L		4845.93		1000	-
2.0D 9.0L		8750.50		1250	-
2.0D 9.0R		5907.50		1250	-
2.0D 15.0R		1915.30		1000	-
4.0D 20.0L		2385.02		300	-
4.0D V		7033.03		-	-
4.0D 4.0R		6807.77		-	12500
4.0D 20.0R		374.24		300	-
MAXIMUM	1.0D 1.2R	23677.89		-	-
MX(10U-90U/90L-90R)	36.6U 45.1R	309.22* (same range as LH1)		-	125
H V		11005.50		-	-

*** - Denotes Failure.**

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.311A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted as far down as possible. Aim gear would not permit the beam to adjust beyond Max Gradient located at 0.3U/2R.
MaxG = 0.237

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: LH2, 20-6576-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Upper Beam
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
H V		44294.80		40000	75000
2.0U V		55520.64		1500	-
1.0U 3.0L		29615.30		5000	-
1.0U 3.0R		26304.81		5000	-
H 12.0L		4870.67		1500	-
H 9.0L		8497.96		3000	-
H 6.0L		12434.00		5000	-
H 3.0L		33910.24		15000	-
H V		45834.32		40000	75000
H 3.0R		30548.74		15000	-
H 6.0R		13376.85		5000	-
H 9.0R		8178.34		3000	-
H 12.0R		4514.37		1500	-
1.5D 9.0L		12133.69		2000	-
1.5D V		26364.40		5000	-
1.5D 9.0R		8784.75		2000	-
2.5D 12.0L		9079.62		1000	-
2.5D V		16918.74		2500	-
2.5D 12.0R		5665.72		1000	-
4.0D V		8488.96		-	12000
MAXIMUM	0.9U 0.3L	76702.13		-	-
H V		45919.06		40000	75000

Sample meets test requirements at all points.

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.310A / Flux not measured / Filament not measured
Philips HB3 supplied with lamp (seasoned 1.5 hours)
12.80V / 5.131A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted as far down as possible. Aim gear would not permit
the beam to adjust beyond Max Gradient located at 0.3U/2R.

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: LH3, 20-6576-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Lower Beam
Luminous Intensity, Candela

Test	Point	Location	Measured	Reaim	Minimum	Maximum
H	V		3100.34		-	-
4.0U	8.0L		277.98		64	-
4.0U	8.0R		366.14		64	-
2.0U	4.0L		322.07		135	-
1.5U	1.0R TO 3.0R	2.2R	373.74		200	-
1.5U	1.0R TO R	3.7R	402.18		-	1400
1.0U	1.5L TO L	1.5L	386.09		-	700
0.5U	1.5L TO L	1.5L	519.30		-	1000
0.5U	1.0R TO 3.0R	1.0R	647.27		500	-
0.5U	1.0R TO 3.0R	2.4R	742.60		-	2700
H	8.0L		541.36		64	-
H	4.0L		915.86		135	-
H	V		2821.97		-	-
0.6D	1.3R		16705.51		10000	-
0.9D	3.5L		9904.26		1800	12000
0.9D	V		15607.68		4500	-
1.5D	2.0R		20989.22		15000	-
2.0D	15.0L		4072.86		1000	-
2.0D	9.0L		8132.51		1250	-
2.0D	9.0R		5348.43		1250	-
2.0D	15.0R		1511.78		1000	-
4.0D	20.0L		2275.32		300	-
4.0D	V		7373.74		-	-
4.0D	4.0R		7339.20		-	12500
4.0D	20.0R		414.81		300	-
MAXIMUM		1.3D 0.9R	23314.39		-	-
MX(10U-90U/90L-90R)		37.9U 42.4R	264.11*	(same range as LH1)	-	125
H	V		2821.33		-	-

*** - Denotes Failure.**

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.305A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim). MaxG = 0.243

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: LH3, 20-6576-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Upper Beam
Luminous Intensity, Candela

Test	Point	Location	Measured	Reaim	Minimum	Maximum
H	V		64980.49		40000	75000
2.0U	V		26549.98		1500	-
1.0U	3.0L		33541.96		5000	-
1.0U	3.0R		24091.94		5000	-
H	12.0L		5301.56		1500	-
H	9.0L		8450.91		3000	-
H	6.0L		11548.41		5000	-
H	3.0L		34762.75		15000	-
H	V		65335.55		40000	75000
H	3.0R		24430.52		15000	-
H	6.0R		12648.32		5000	-
H	9.0R		7768.91		3000	-
H	12.0R		3981.35		1500	-
1.5D	9.0L		11905.68		2000	-
1.5D	V		29688.47		5000	-
1.5D	9.0R		8633.76		2000	-
2.5D	12.0L		9371.46		1000	-
2.5D	V		19900.46		2500	-
2.5D	12.0R		5375.06		1000	-
4.0D	V		9612.34		-	12000
MAXIMUM		0.7U 0.5L	75075.32		-	-
H	V		65370.05		40000	75000

Sample meets test requirements at all points.

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.304A / Flux not measured / Filament not measured
Philips HB3 supplied with lamp (seasoned 1.5 hours)
12.80V / 5.110A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim).

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: LH4, 20-6576-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Lower Beam
Luminous Intensity, Candela

Test Point	Location	Measured	Reaim	Minimum	Maximum
H V		2551.39		-	-
4.0U 8.0L		264.70		64	-
4.0U 8.0R		377.45		64	-
2.0U 4.0L		305.33		135	-
1.5U 1.0R TO 3.0R	1.7R	379.08		200	-
1.5U 1.0R TO R	3.3R	420.63		-	1400
1.0U 1.5L TO L	1.5L	393.79		-	700
0.5U 1.5L TO L	1.5L	564.78		-	1000
0.5U 1.0R TO 3.0R	1.1R	691.76		500	-
0.5U 1.0R TO 3.0R	2.3R	806.17		-	2700
H 8.0L		503.18		64	-
H 4.0L		763.71		135	-
H V		2352.50		-	-
0.6D 1.3R		18286.26		10000	-
0.9D 3.5L		9832.24		1800	12000
0.9D V		17541.00		4500	-
1.5D 2.0R		21333.58		15000	-
2.0D 15.0L		3869.36		1000	-
2.0D 9.0L		7732.70		1250	-
2.0D 9.0R		5160.53		1250	-
2.0D 15.0R		1618.76		1000	-
4.0D 20.0L		2452.69		300	-
4.0D V		8149.95		-	-
4.0D 4.0R		7407.51		-	12500
4.0D 20.0R		357.06		300	-
MAXIMUM	1.3D 0.8R	24364.88		-	-
MX(10U-90U/90L-90R)	37.6U 42.3R	236.39* (same range as LH1)		-	125
H V		2347.11		-	-

*** - Denotes Failure.**

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.301A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim). MaxG = 0.230

PHOTOMETRIC TEST DATA SHEET

Project Name: TYC 20-6575/20-6576 RBHL for 2006 Toyota Camry XLE/LE

Sample Number: LH4, 20-6576-00

Production Markings: "12230515" stamped onto housing

Specification: FMVSS108 Figure 17-2 (Replaceable Bulb VO Headlamp)
Color: White, Upper Beam
Luminous Intensity, Candela

Test	Point	Location	Measured	Reaim	Minimum	Maximum
H	V		67029.12		40000	75000
2.0U	V		25078.77		1500	-
1.0U	3.0L		38021.88		5000	-
1.0U	3.0R		21979.70		5000	-
H	12.0L		6159.37		1500	-
H	9.0L		9167.01		3000	-
H	6.0L		12523.17		5000	-
H	3.0L		40273.11		15000	-
H	V		68055.88		40000	75000
H	3.0R		23874.42		15000	-
H	6.0R		12393.92		5000	-
H	9.0R		7623.83		3000	-
H	12.0R		4005.37		1500	-
1.5D	9.0L		12626.14		2000	-
1.5D	V		35383.05		5000	-
1.5D	9.0R		8810.91		2000	-
2.5D	12.0L		10132.19		1000	-
2.5D	V		21579.40		2500	-
2.5D	12.0R		5804.99		1000	-
4.0D	V		10421.95		-	12000
MAXIMUM		0.2U 0.7L	77758.00		-	-
H	V		67713.67		40000	75000

Sample meets test requirements at all points.

Bulb: Philips HB4 supplied with lamp (seasoned 3 hours)
12.80V / 4.300A / Flux not measured / Filament not measured
Philips HB3 supplied with lamp (seasoned 1.5 hours)
12.80V / 5.147A / Flux not measured / Filament not measured

Aim: Lamp mounted on NAL test fixture.
Fixture placed on level goniometer with HB4 filament at center.
Sample aim screw adjusted until Lower Beam Max Gradient located at H/2R and verified level from H/1R to H/3R (VOR aim).

CHART SHEET

Device Name: TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps
for 2006 Toyota Camry XLE/LE

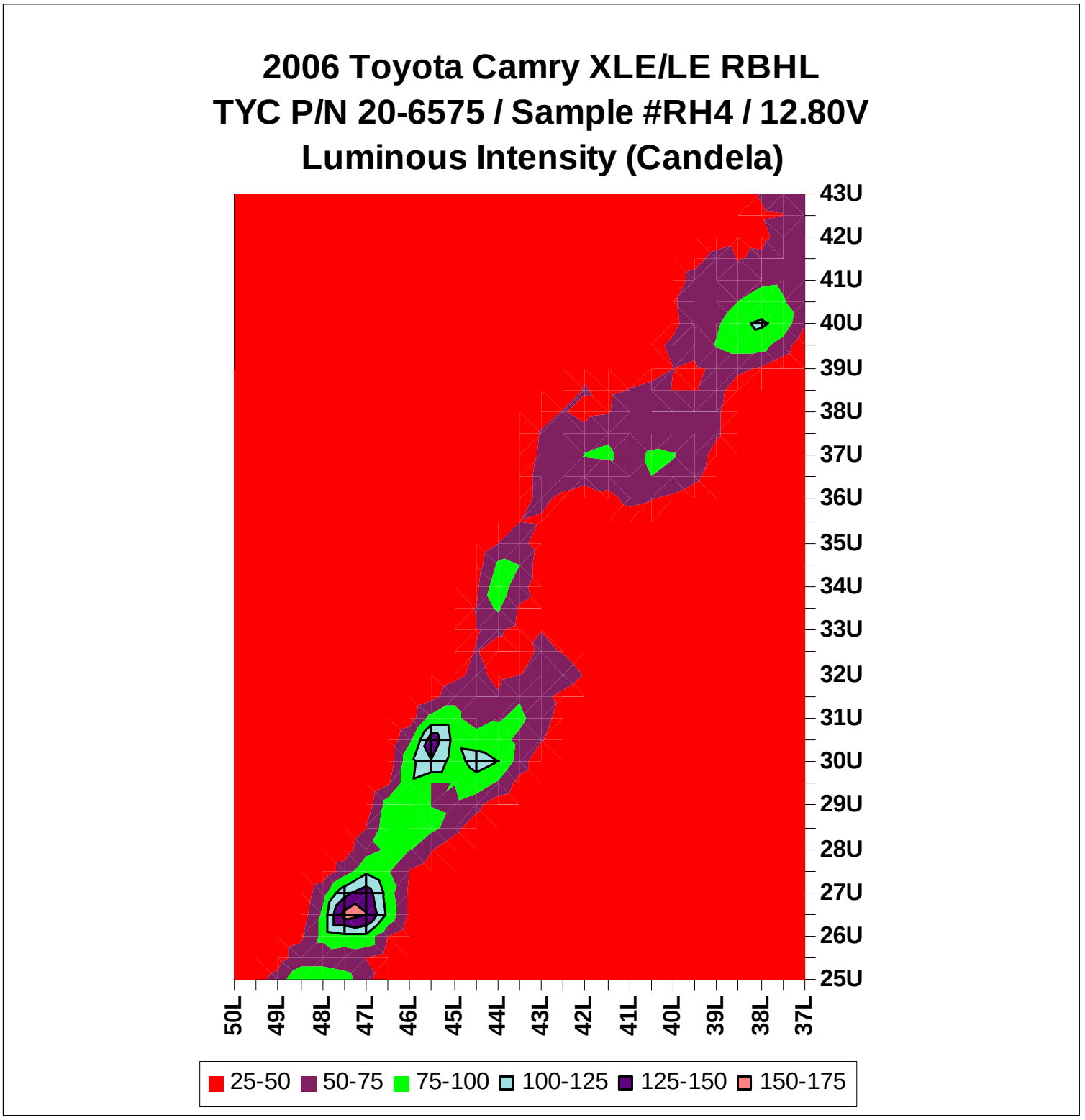
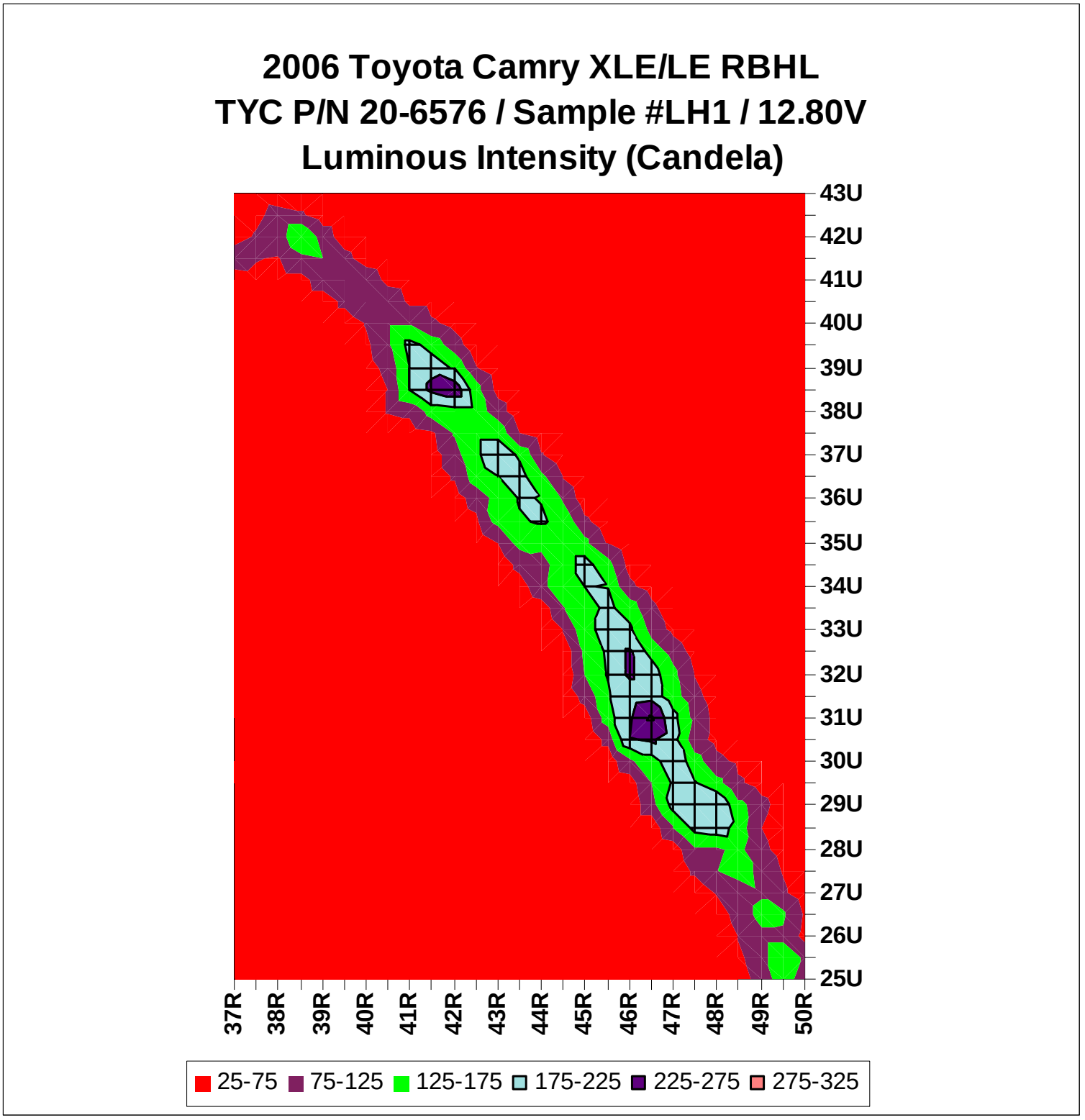


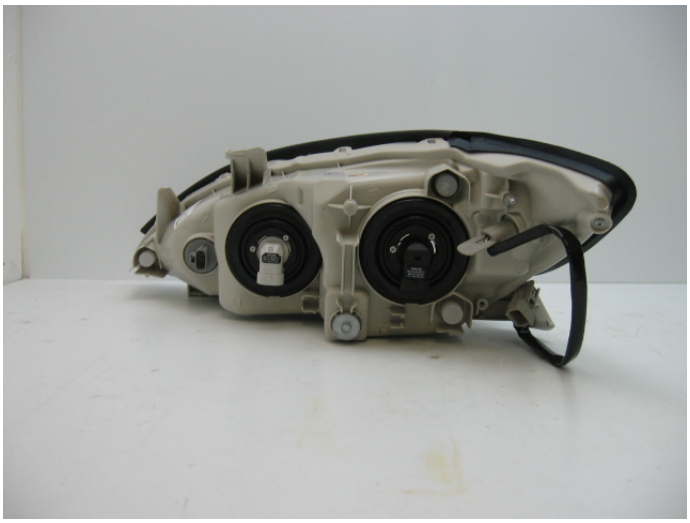
CHART SHEET

Device Name: TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps
for 2006 Toyota Camry XLE/LE



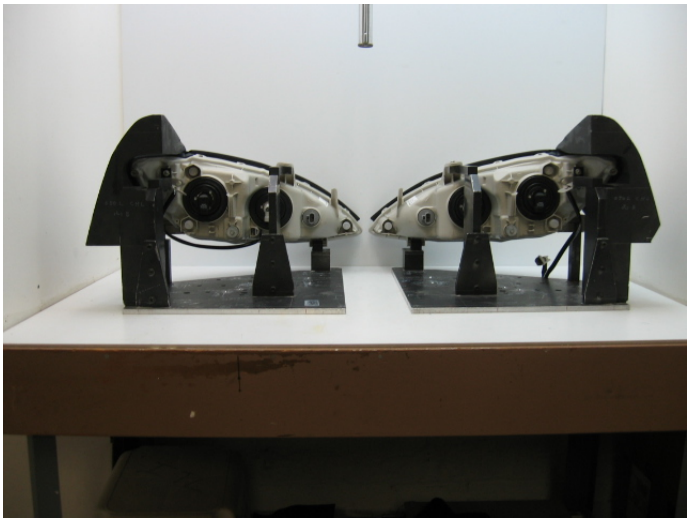
PHOTOGRAPH SHEET

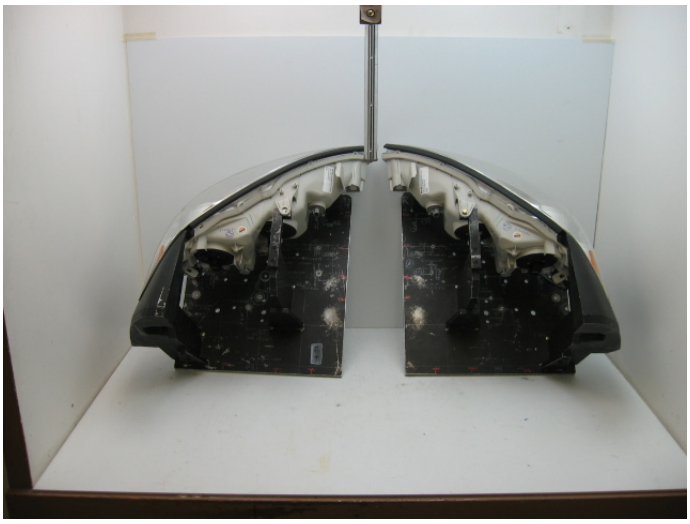
Device Name: TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps for 2006 Toyota Camry XLE/LE



PHOTOGRAPH SHEET

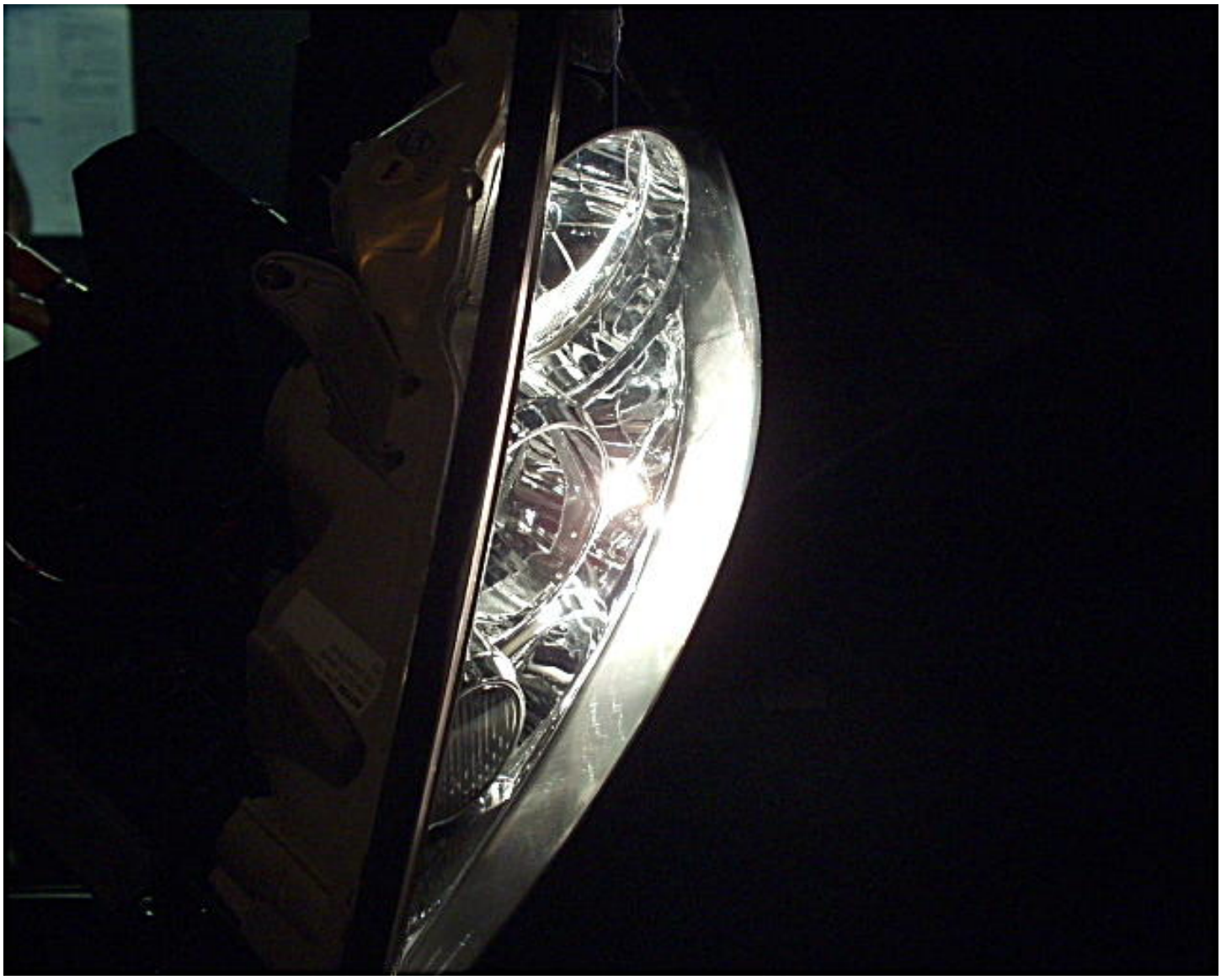
Device Name: TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps for 2006 Toyota Camry XLE/LE





PHOTOGRAPH SHEET

Device Name: TYC 20-6575/20-6576 Replaceable Bulb (HB3/HB4) Headlamps for 2006 Toyota Camry XLE/LE



LH1 Viewed from 38U/42R