NHTSA Report No. 108-CCITL-07-07

HS 638979

LAMPS, REFLECTIVE DEVICES AND ASSOCIATED EQUIPMENT FMVSS-108

Sonar P/N SK3301 61504 (RH) / SK3302 61504 (LH)
VOR Replaceable Bulb (HB4/H1) Headlamps
for 2006 Ford F150

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

16 July 2007

FINAL REPORT

PREPARED FOR

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

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NHTSA Report No. 108-CCITL-07-07

Prepared By:

Approved By:

Approval Date: 16 July 2007

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By:

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4. Title and Subtitle Test Series Sonar P/N SK3301 61504 (RH) / SK3302 61504 (LH) VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150		**5. Report Date** 16 July 2007 **6. Performing Organization Code** N/A
7. Author(s) Douglas G. Cummins Photometric Engineer		**8. Performing Organization Report No.** 070505-01H
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 1200 New Jersey Avenue SE West Building - 4th Floor - NVS222 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: Lower Beam, Upper Beam, Color (Within Lower Beam Cutoff), light source and lens markings		
17. Key Words Federal Motor Vehicle Safety Standard 108 Lamps, Reflective Devices and Associated Equipment		**18. Distribution Statement** Unlimited
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Report No. 070505-01H

TEST REPORT

Report Date: 16 July 2007

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Manufactured By: Sonar

Submitted By: CCITL purchased for NHTSA from streetpros.com (P/N 02-AZ-FF04-PCC-LED-A)

NHTSA Report No.: 108-CCITL-07-07

Test Laboratory: Calcoast - ITL
Emeryville, CA 94608

Devices Tested: Four (4) Pair

SUMMARY

Specification: FMVSS 108

Photometric Tests - Replaceable Bulb Headlamp

S7.8.5.3 Visual/optical aiming	8 of 8 Passed
S7.7(a) Light source marking	8 of 8 **FAILED**
S7.5(g) Lens marking	8 of 8 **FAILED**
Figure 17-2 Lower Beam	8 of 8 **FAILED**
Figure 17-2 Upper Beam	8 of 8 **FAILED**

Color Tests - SAE J578c FEB77 ..... 8 of 8 **FAILED**

Signature of Responsible Laboratory Official:

Douglas G. Cummins
Photometric Engineer

DESCRIPTION SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

GENERAL DESCRIPTION:

Device is a "restyled" replacement part for the 2006 Ford F150 replaceable bulb headlamp. Device uses an HB4 bulb for Lower Beam and a H1-55W bulb for Upper Beam instead of the OE H13 bulb.

MARKINGS:

LENS: "SAE DOT HRI5APP2 05", "SONAR", "SK3301" or "SK3302", "61504", "VOR", "RH" or "LH"

Note:
NO bulb markings on lens - **failure per S7.5(g)**

HOUSING: "SONAR SK3301 61504" or "SONAR SK3302 61504", "MADE IN TAIWAN", "LENS >PC<", "HOUSING >PP-T20<", "HB4", "H1", "12V", "~~24V~~", "LH" or "RH", "3457AK", "NA", "FD29.45", "W5W", "194NA" "D ↔ U"
[sticker on housing]:
"1. HID balb [sic] not allowed",
"2. Lighting ring voltage 12.5±1V"

No production markings on samples

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

HOUSING:
MATERIAL: Plastic
METHOD OF MOUNTING: Three (3) Bolts + One (1) Snap pin slot

BULBS USED:

FUNCTION	QUANTITY	TRADE NO.	VOLTS
Upper Beam	One (1)	H1-55W	12.8V
Lower Beam	One (1)	HB4	12.8V

PHOTOMETRIC TEST SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

SUMMARY OF PHOTOMETRIC TESTS

Tests performed by: Douglas Cummins Date: 27-29 June 2007

Reference calibration detector number: NIST P181-2

Test distance: 100 feet

Aim: Samples mounted on RH or LH test fixture. The test fixtures were provided by second, non-OE source and confirmed to hold the test samples in a similar manner as on vehicle. Rotational aim markings on baseplate established using reference data provided by OE (Ford) fixture drawing 021031-F2058-2.

Fixture mounted on level platform with H13 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim).

Bulbs: Samples tested using furnished bulbs at design voltage.
Lower Beam furnished bulb: Sylvania HB4 (55W, 1000 Lumens)
Upper Beam furnished bulb: ABG H1-55W (55W, 1410 Lumens) **[NO** "DOT" symbol on bulb **- failure per S7.7(a)]**

Notes: Pin over rectangular clip not present. Bottom screw hole not present. Connector adapts OE H13 connection to HB4/H1 bulbs on device, therefore Lower Beam not active with Upper Beam.
Ring light surrounding Lower Beam and Upper Beam cavities adds 0.6 Cd to headlamp intensities. 3 forward facing White LEDs add 1.7 Cd (HV) to 0.9 Cd (15°). Performed tests with supplemental lights not active.
Sidemarker (W5W/194NA) function has no optics and bulb is placed such that inboard angles will most likely fail minimum requirements. Also, W5W bulb would not be appropriate since Sidemarker requires Yellow colored light.

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) HP 6010A Power Supply Fluke 23 DMM (Voltage) Keithley 197A (Current)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

VOR Aim

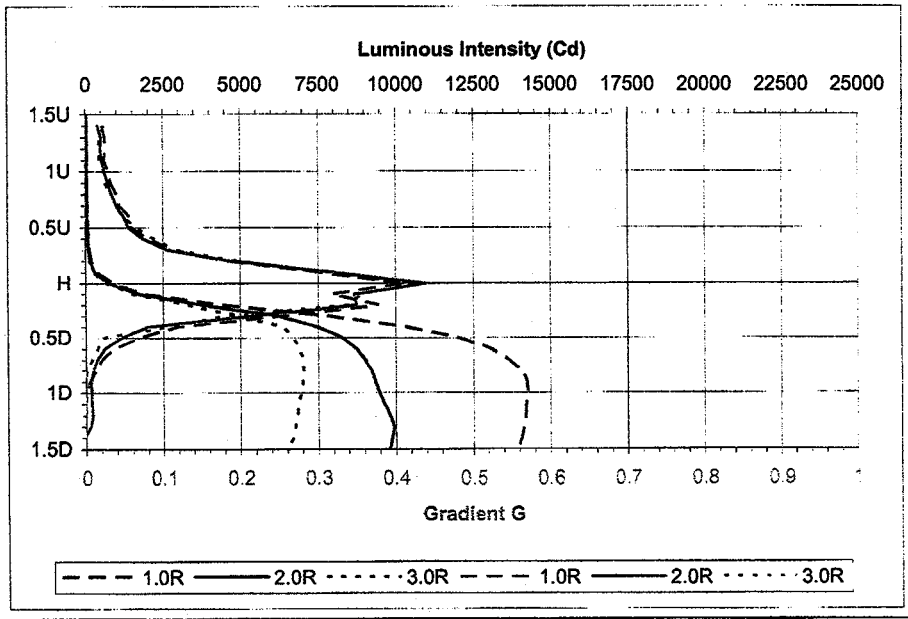
RH1

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.413	-
H/2.0R	0.439	> 0.13
H/3.0R	0.427	-

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

Maximum inclination of cutoff is within ±0.2°.



LB elbow/cutoff step located at 4.4L using fixture aim.

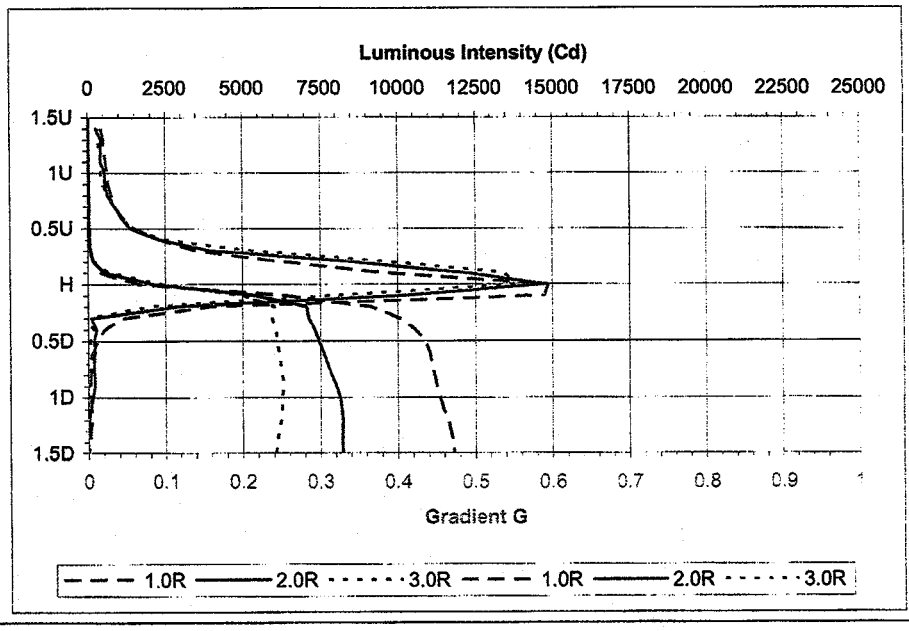
RH2

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.595	-
H/2.0R	0.591	> 0.13
H/3.0R	0.553	-

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

Maximum inclination of cutoff is within ±0.2°.



LB elbow/cutoff step located at 4.2L using fixture aim.

[Note: After aiming in accordance with FMVSS No. 108, the Lower Beam elbow/cutoff step was offset from the V-V line as noted. This may be an indication of an internal misalignment between the Lower Beam projector and the external housing. Devices have no horizontal aim adjustment capabilities. Upper Beam peak intensity was located at HV as expected.]

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3301 61504R - RH1
Production Markings: none

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		1252.81		-	-
4.0U	8.0L		12.55	12.86*	64	-
4.0U	8.0R		11.73	11.94*	64	-
2.0U	4.0L		20.89	21.47*	135	-
1.5U	1.0R TO 3.0R	3.0R	24.62	27.64*	200	-
1.5U	1.0R TO R	1.0R	31.96		-	1400
1.0U	1.5L TO L	1.5L	50.45		-	700
0.5U	1.5L TO L	1.6L	91.94		-	1000
0.5U	1.0R TO 3.0R	3.0R	49.75	93.54*	500	-
0.5U	1.0R TO 3.0R	1.0R	71.78		-	2700
H	8.0L		22.71	31.71*	64	-
H	4.0L		117.17	1252.36	135	-
H	V		1188.71		-	-
0.6D	1.3R		11035.66		10000	-
0.9D	3.5L		13035.41	10821.34	1800	12000
0.9D	V		21562.73		4500	-
1.5D	2.0R		9803.54	10218.15*	15000	-
2.0D	15.0L		1357.18		1000	-
2.0D	9.0L		2155.19		1250	-
2.0D	9.0R		1859.36		1250	-
2.0D	15.0R		836.05	868.60*	1000	-
4.0D	20.0L		757.82		300	-
4.0D	V		8016.32		-	-
4.0D	4.0R		3958.70		-	12500
4.0D	20.0R		620.15		300	-
MAXIMUM		1.4D 1.1L	22591.51		-	-
MX(10U-90U/90L-90R)		10.0U 7.0L	14.60		-	125
H	V		1028.14		-	-

*** - Denotes Failure.**

Bulb: Sylvania HB4 furnished with sample @ 12.80V / 4.315A / Flux not measured

Aim: Sample mounted on RH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.439 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3301 61504R - RH1
Production Markings: none

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		23826.14	26287.31*	40000	75000
2.0U V		8699.50		1500	-
1.0U 3.0L		17138.81		5000	-
1.0U 3.0R		7949.33		5000	-
H 12.0L		4481.50		1500	-
H 9.0L		7922.44		3000	-
H 6.0L		18364.26		5000	-
H 3.0L		41017.82		15000	-
H V		25194.53	26328.90*	40000	75000
H 3.0R		9398.42	9619.94*	15000	-
H 6.0R		5373.74		5000	-
H 9.0R		3310.96		3000	-
H 12.0R		2265.50		1500	-
1.5D 9.0L		7779.44		2000	-
1.5D V		18955.80		5000	-
1.5D 9.0R		3050.14		2000	-
2.5D 12.0L		3264.15		1000	-
2.5D V		10490.76		2500	-
2.5D 12.0R		1859.60		1000	-
4.0D V		4046.94		-	12000
MAXIMUM	0.7D 2.8L	44336.25		-	-
H V		25289.10	26382.03*	40000	75000

*** - Denotes Failure.**

Bulb: ABG H1-55W furnished with sample @ 12.80V / 4.552A / Flux not measured

Aim: Sample mounted on RH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.439 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3301 61504R - RH2
Production Markings: none

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		1328.70		-	-
4.0U	8.0L		12.74	13.61*	64	-
4.0U	8.0R		11.23	11.44*	64	-
2.0U	4.0L		22.02	23.28*	135	-
1.5U	1.0R TO 3.0R	3.0R	22.12	23.99*	200	-
1.5U	1.0R TO R	1.0R	28.13		-	1400
1.0U	1.5L TO L	1.5L	49.16		-	700
0.5U	1.5L TO L	1.5L	82.46		-	1000
0.5U	1.0R TO 3.0R	1.8R	39.35	107.62*	500	-
0.5U	1.0R TO 3.0R	1.0R	56.89		-	2700
H	8.0L		21.55	28.43*	64	-
H	4.0L		167.56		135	-
H	V		1267.46		-	-
0.6D	1.3R		9566.72	10185.93	10000	-
0.9D	3.5L		17498.76	15243.44*	1800	12000
0.9D	V		18351.66		4500	-
1.5D	2.0R		8227.94	8610.66*	15000	-
2.0D	15.0L		1346.53		1000	-
2.0D	9.0L		2314.23		1250	-
2.0D	9.0R		1764.91		1250	-
2.0D	15.0R		819.05	877.42*	1000	-
4.0D	20.0L		720.60		300	-
4.0D	V		7750.13		-	-
4.0D	4.0R		3806.11		-	12500
4.0D	20.0R		652.13		300	-
MAXIMUM		1.1D 1.3L	23200.46		-	-
MX(10U-90U/90L-90R)		10.0U 4.0L	15.80		-	125
H	V		1206.51		-	-

*** - Denotes Failure.**

Bulb: Sylvania HB4 furnished with sample @ 12.80V / 4.314A / Flux not measured

Aim: Sample mounted on RH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.591 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3301 61504R - RH2
Production Markings: none

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		21382.87	23815.33*	40000	75000
2.0U V		12320.69		1500	-
1.0U 3.0L		28629.17		5000	-
1.0U 3.0R		9237.29		5000	-
H 12.0L		5438.63		1500	-
H 9.0L		9074.75		3000	-
H 6.0L		21808.45		5000	-
H 3.0L		44049.05		15000	-
H V		22425.35	23512.30*	40000	75000
H 3.0R		9625.54	9779.71*	15000	-
H 6.0R		4982.76	5137.04	5000	-
H 9.0R		2612.38	2697.62*	3000	-
H 12.0R		2039.97		1500	-
1.5D 9.0L		7321.66		2000	-
1.5D V		12500.54		5000	-
1.5D 9.0R		2324.23		2000	-
2.5D 12.0L		3218.99		1000	-
2.5D V		7111.07		2500	-
2.5D 12.0R		1401.33		1000	-
4.0D V		2906.90		-	12000
MAXIMUM	0.1D 3.0L	42879.73		-	-
H V		21840.16	22941.94*	40000	75000

*** - Denotes Failure.**

Bulb: ABG H1-55W furnished with sample @ 12.80V / 4.576A / Flux not measured

Aim: Sample mounted on RH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.591 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

VOR Aim

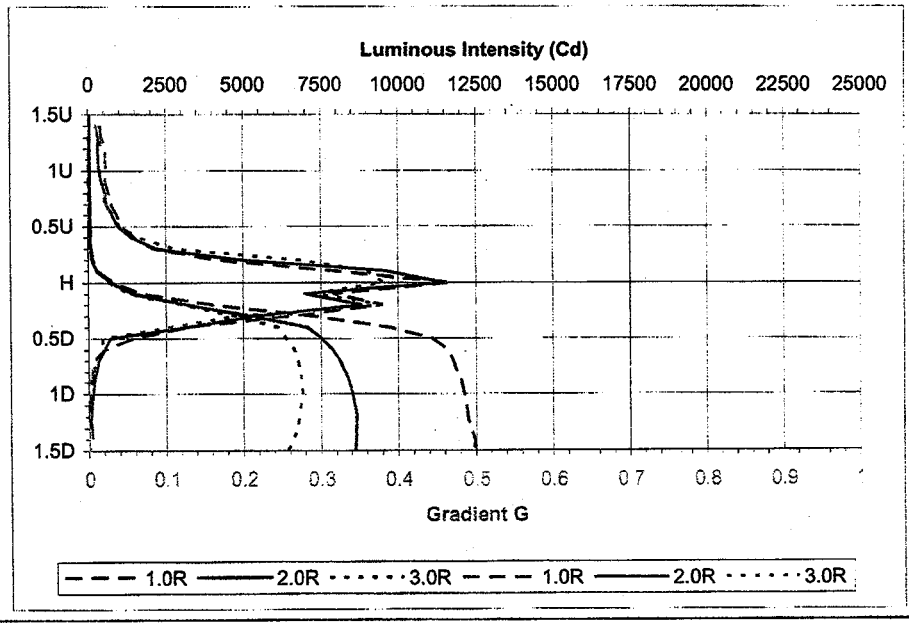
RH3

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.469	-
H/2.0R	0.459	> 0.13
H/3.0R	0.381	-

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

Maximum inclination of cutoff is within ±0.2°.



LB elbow/cutoff step located at 4.2L using fixture aim.

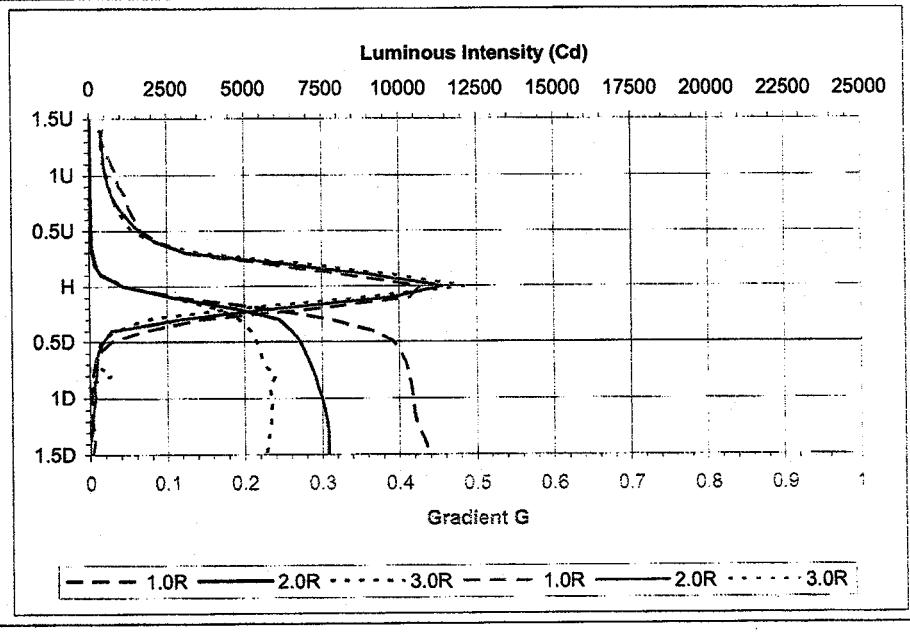
RH4

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.427	-
H/2.0R	0.456	> 0.13
H/3.0R	0.485	-

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

Maximum inclination of cutoff is within ±0.2°.



LB elbow/cutoff step located at 4.0L using fixture aim.

[Note: After aiming in accordance with FMVSS No. 108, the Lower Beam elbow/cutoff step was offset from the V-V line as noted. This may be an indication of an internal misalignment between the Lower Beam projector and the external housing. Devices have no horizontal aim adjustment capabilities. Upper Beam peak intensity was located at HV as expected.]

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3301 61504R - RH3
Production Markings: none

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		1043.41		-	-
4.0U	8.0L		13.41	13.80*	64	-
4.0U	8.0R		12.54	12.59*	64	-
2.0U	4.0L		25.63	27.16*	135	-
1.5U	1.0R TO 3.0R	3.0R	27.30	29.91*	200	-
1.5U	1.0R TO R	1.2R	36.09		-	1400
1.0U	1.5L TO L	1.6L	61.65		-	700
0.5U	1.5L TO L	1.6L	102.39		-	1000
0.5U	1.0R TO 3.0R	2.5R	43.68	77.54*	500	-
0.5U	1.0R TO 3.0R	1.0R	65.78		-	2700
H	8.0L		24.76	33.97*	64	-
H	4.0L		96.46	1025.35	135	-
H	V		1004.03		-	-
0.6D	1.3R		9946.99	10611.03	10000	-
0.9D	3.5L		17136.37	12490.96*	1800	12000
0.9D	V		18991.55		4500	-
1.5D	2.0R		8636.53	9055.66*	15000	-
2.0D	15.0L		1614.28		1000	-
2.0D	9.0L		2175.98		1250	-
2.0D	9.0R		1768.93		1250	-
2.0D	15.0R		881.44	919.74*	1000	-
4.0D	20.0L		783.24		300	-
4.0D	V		7808.83		-	-
4.0D	4.0R		3931.10		-	12500
4.0D	20.0R		620.69		300	-
MAXIMUM		1.3D 1.4L	23422.59		-	-
MX(10U-90U/90L-90R)		10.0U 4.2L	16.69		-	125
H	V		938.73		-	-

*** - Denotes Failure.**

Bulb: Sylvania HB4 furnished with sample @ 12.80V / 4.331A / Flux not measured

Aim: Sample mounted on RH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.459 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3301 61504R - RH3
Production Markings: none

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		16175.38	17571.13*	40000	75000
2.0U V		5642.28		1500	-
1.0U 3.0L		10970.98		5000	-
1.0U 3.0R		5563.45		5000	-
H 12.0L		3722.75		1500	-
H 9.0L		6434.28		3000	-
H 6.0L		16290.11		5000	-
H 3.0L		20722.18		15000	-
H V		16917.55	17648.38*	40000	75000
H 3.0R		8256.37	8512.14*	15000	-
H 6.0R		4779.55	4888.51*	5000	-
H 9.0R		2946.47	3000.68	3000	-
H 12.0R		2079.39		1500	-
1.5D 9.0L		8338.63		2000	-
1.5D V		20512.26		5000	-
1.5D 9.0R		2971.18		2000	-
2.5D 12.0L		4544.58		1000	-
2.5D V		14798.33		2500	-
2.5D 12.0R		1886.03		1000	-
4.0D V		5579.95		-	12000
MAXIMUM	1.2D 2.7L	45283.35		-	-
H V		17077.77	17902.16*	40000	75000

*** - Denotes Failure.**

Bulb: ABG H1/55W furnished with sample @ 12.80V / 4.548A / Flux not measured

Aim: Sample mounted on RH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.459 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3301 61504R - RH4
Production Markings: none

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			1505.63		-	-
4.0U	8.0L			13.38	14.09*	64	-
4.0U	8.0R			12.91	13.11*	64	-
2.0U	4.0L			24.90	27.25*	135	-
1.5U	1.0R TO 3.0R		3.0R	26.26	28.69*	200	-
1.5U	1.0R TO R		1.1R	32.18		-	1400
1.0U	1.5L TO L		1.6L	58.92		-	700
0.5U	1.5L TO L		1.6L	114.24		-	1000
0.5U	1.0R TO 3.0R		2.8R	51.10	120.35*	500	-
0.5U	1.0R TO 3.0R		1.0R	74.28		-	2700
H	8.0L			26.87	37.32*	64	-
H	4.0L			211.67		135	-
H	V			1734.89		-	-
0.6D	1.3R			8907.70	9432.48*	10000	-
0.9D	3.5L			17021.22	13878.95*	1800	12000
0.9D	V			16134.13		4500	-
1.5D	2.0R			7737.42	8062.55*	15000	-
2.0D	15.0L			1402.85		1000	-
2.0D	9.0L			2280.19		1250	-
2.0D	9.0R			1675.88		1250	-
2.0D	15.0R			840.37	907.35*	1000	-
4.0D	20.0L			679.54		300	-
4.0D	V			7396.57		-	-
4.0D	4.0R			3672.13		-	12500
4.0D	20.0R			580.87		300	-
MAXIMUM		1.1D	1.4L	21454.76		-	-
MX(10U-90U/90L-90R)		10.0U	2.9L	15.34		-	125
H	V			1644.54		-	-

*** - Denotes Failure.**

Bulb: Sylvania HB4 furnished with sample @ 12.80V / 4.287A / Flux not measured

Aim: Sample mounted on RH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.456 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3301 61504R - RH4
Production Markings: none

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		23222.24	26111.52*	40000	75000
2.0U V		9553.95		1500	-
1.0U 3.0L		16676.99		5000	-
1.0U 3.0R		7260.39		5000	-
H 12.0L		3391.73		1500	-
H 9.0L		7160.83		3000	-
H 6.0L		17245.74		5000	-
H 3.0L		36403.03		15000	-
H V		24497.56	26162.79*	40000	75000
H 3.0R		9510.30	9694.29*	15000	-
H 6.0R		5839.96		5000	-
H 9.0R		3525.92		3000	-
H 12.0R		2489.93		1500	-
1.5D 9.0L		7741.34		2000	-
1.5D V		16943.54		5000	-
1.5D 9.0R		3098.82		2000	-
2.5D 12.0L		3111.82		1000	-
2.5D V		8278.08		2500	-
2.5D 12.0R		2058.27		1000	-
4.0D V		3197.66		-	12000
MAXIMUM	0.2D 2.3L	40506.24		-	-
H V		24997.24	26617.17*	40000	75000

*** - Denotes Failure.**

Bulb: ABG H1-55W furnished with sample @ 12.80V / 4.563A / Flux not measured

Aim: Sample mounted on RH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.456 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

VOR Aim

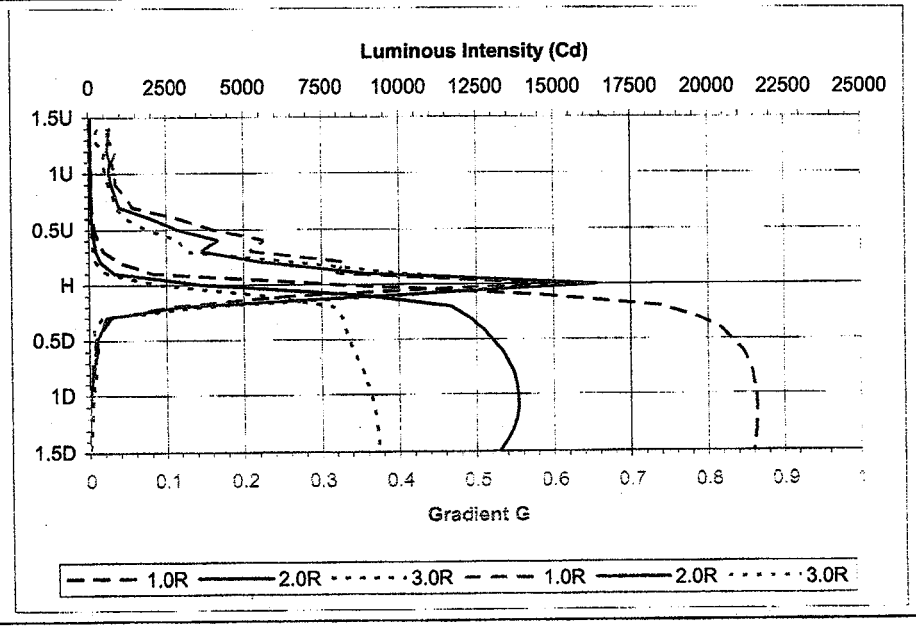
LH1

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.592	-
H/2.0R	0.657	> 0.13
H/3.0R	0.607	-

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

Maximum inclination of cutoff is within ±0.2°.



LB elbow/cutoff step located at 2.5L using fixture aim.

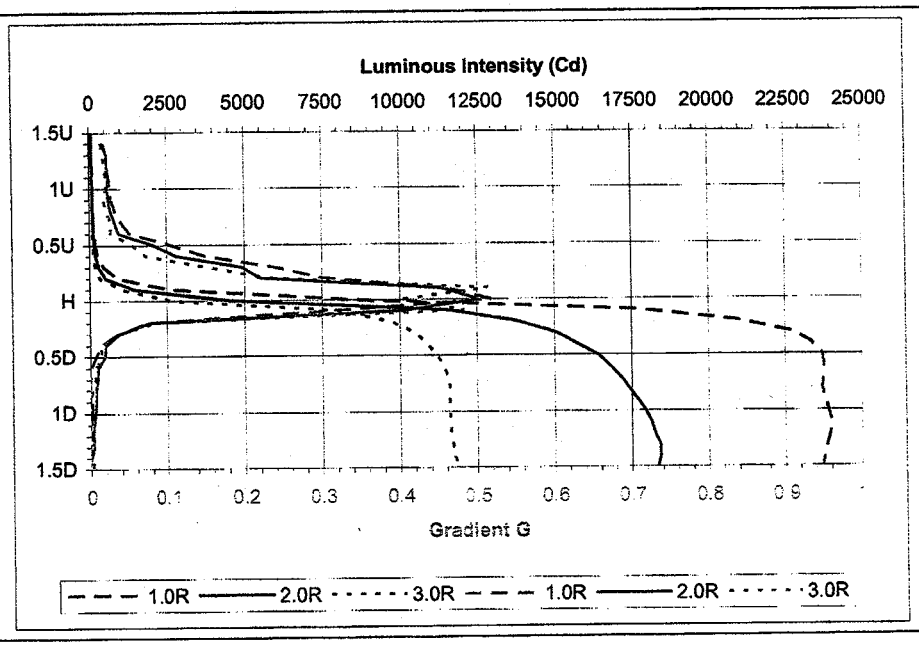
LH2

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.519	-
H/2.0R	0.501	> 0.13
H/3.0R	0.515	-

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

Maximum inclination of cutoff is within ±0.2°.



LB elbow/cutoff step located at 2.5L using fixture aim.

[Note: After aiming in accordance with FMVSS No. 108, the Lower Beam elbow/cutoff step was offset from the V-V line as noted. This may be an indication of an internal misalignment between the Lower Beam projector and the external housing. Devices have no horizontal aim adjustment capabilities. Upper Beam peak intensity was located at HV as expected.]

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3302 61504L - LH1
Production Markings: none

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			10023.20		-	-
4.0U	8.0L			17.29	17.67*	64	-
4.0U	8.0R			12.85	13.25*	64	-
2.0U	4.0L			24.57	26.16*	135	-
1.5U	1.0R TO 3.0R	3.0R		36.27	39.24*	200	-
1.5U	1.0R TO R	1.1R		46.99		-	1400
1.0U	1.5L TO L	1.5L		66.69		-	700
0.5U	1.5L TO L	1.7L		197.54		-	1000
0.5U	1.0R TO 3.0R	3.0R		70.09	151.04*	500	-
0.5U	1.0R TO 3.0R	1.0R		159.01		-	2700
H	8.0L			68.96		64	-
H	4.0L			102.63	847.12	135	-
H	V			9960.34		-	-
0.6D	1.3R			19088.21		10000	-
0.9D	3.5L			8633.25		1800	12000
0.9D	V			22775.92		4500	-
1.5D	2.0R			13367.23	14302.06*	15000	-
2.0D	15.0L			1290.90		1000	-
2.0D	9.0L			2224.67		1250	-
2.0D	9.0R			1968.21		1250	-
2.0D	15.0R			1149.26		1000	-
4.0D	20.0L			576.55		300	-
4.0D	V			9207.31		-	-
4.0D	4.0R			4794.41		-	12500
4.0D	20.0R			491.05		300	-
MAXIMUM		0.8D	0.1R	22862.77		-	-
MX(10U-90U/90L-90R)		10.0U	0.3L	15.44		-	125
H	V			9953.78		-	-

*** - Denotes Failure.**

Bulb: Sylvania HB4 furnished with sample @ 12.80V / 4.335A / Flux not measured

Aim: Sample mounted on LH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.657 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3302 61504L - LH1
Production Markings: none

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		22869.69	25577.39*	40000	75000
2.0U V		11602.01		1500	-
1.0U 3.0L		33303.71		5000	-
1.0U 3.0R		8596.63		5000	-
H 12.0L		5024.25		1500	-
H 9.0L		8976.94		3000	-
H 6.0L		20905.18		5000	-
H 3.0L		44384.51		15000	-
H V		24372.81	25468.87*	40000	75000
H 3.0R		9211.18	9449.19*	15000	-
H 6.0R		5432.12		5000	-
H 9.0R		3290.79		3000	-
H 12.0R		2153.95		1500	-
1.5D 9.0L		6265.71		2000	-
1.5D V		13883.42		5000	-
1.5D 9.0R		2997.77		2000	-
2.5D 12.0L		2565.15		1000	-
2.5D V		7563.65		2500	-
2.5D 12.0R		1644.62		1000	-
4.0D V		2691.41		-	12000
MAXIMUM	0.2U 2.9L	44640.97		-	-
H V		24003.82	25098.24*	40000	75000

*** - Denotes Failure.**

Bulb: ABG H1-55W furnished with sample @ 12.80V / 4.620A / Flux not measured

Aim: Sample mounted on LH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.657 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3302 61504L - LH2
Production Markings: none

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		10088.30		-	-
4.0U	8.0L		30.29	30.63*	64	-
4.0U	8.0R		20.07	20.75*	64	-
2.0U	4.0L		51.03	53.33*	135	-
1.5U	1.0R TO 3.0R	3.0R	64.74	71.01*	200	-
1.5U	1.0R TO R	1.0R	78.80		-	1400
1.0U	1.5L TO L	1.5L	94.38		-	700
0.5U	1.5L TO L	1.6L	158.67		-	1000
0.5U	1.0R TO 3.0R	3.0R	107.23	204.25*	500	-
0.5U	1.0R TO 3.0R	1.0R	167.53		-	2700
H	8.0L		91.03		64	-
H	4.0L		105.85	499.04	135	-
H	V		9469.02		-	-
0.6D	1.3R		23089.86		10000	-
0.9D	3.5L		7285.35		1800	12000
0.9D	V		24047.61		4500	-
1.5D	2.0R		18286.62		15000	-
2.0D	15.0L		1197.46		1000	-
2.0D	9.0L		2026.78		1250	-
2.0D	9.0R		2149.32		1250	-
2.0D	15.0R		1084.99		1000	-
4.0D	20.0L		559.24		300	-
4.0D	V		11112.74		-	-
4.0D	4.0R		5736.66		-	12500
4.0D	20.0R		536.25		300	-
MAXIMUM		1.0D 0.5R	24100.71		-	-
MX(10U-90U/90L-90R)		10.0U 2.6L	20.39		-	125
H	V		9859.78		-	-

*** - Denotes Failure.**

Bulb: Sylvania HB4 furnished with sample @ 12.80V / 4.285A / Flux not measured

Aim: Sample mounted on LH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.501 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3302 61504L - LH2
Production Markings: none

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		13569.71	15077.16*	40000	75000
2.0U V		14267.61		1500	-
1.0U 3.0L		39105.23		5000	-
1.0U 3.0R		7813.19		5000	-
H 12.0L		3842.89		1500	-
H 9.0L		6923.83		3000	-
H 6.0L		16243.39		5000	-
H 3.0L		20446.85		15000	-
H V		14321.18	15717.07*	40000	75000
H 3.0R		6484.87	6862.88*	15000	-
H 6.0R		3782.53	4121.48*	5000	-
H 9.0R		2814.87	2911.56*	3000	-
H 12.0R		1784.03		1500	-
1.5D 9.0L		4444.48		2000	-
1.5D V		8054.39		5000	-
1.5D 9.0R		2334.70		2000	-
2.5D 12.0L		2101.14		1000	-
2.5D V		4569.46		2500	-
2.5D 12.0R		1175.92		1000	-
4.0D V		1816.46		-	12000
MAXIMUM	1.0U 3.1L	39868.56		-	-
H V		14483.46	15907.96*	40000	75000

*** - Denotes Failure.**

Bulb: ABG H1-55W furnished with sample @ 12.80V / 4.490A / Flux not measured

Aim: Sample mounted on LH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.501 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

VOR Aim

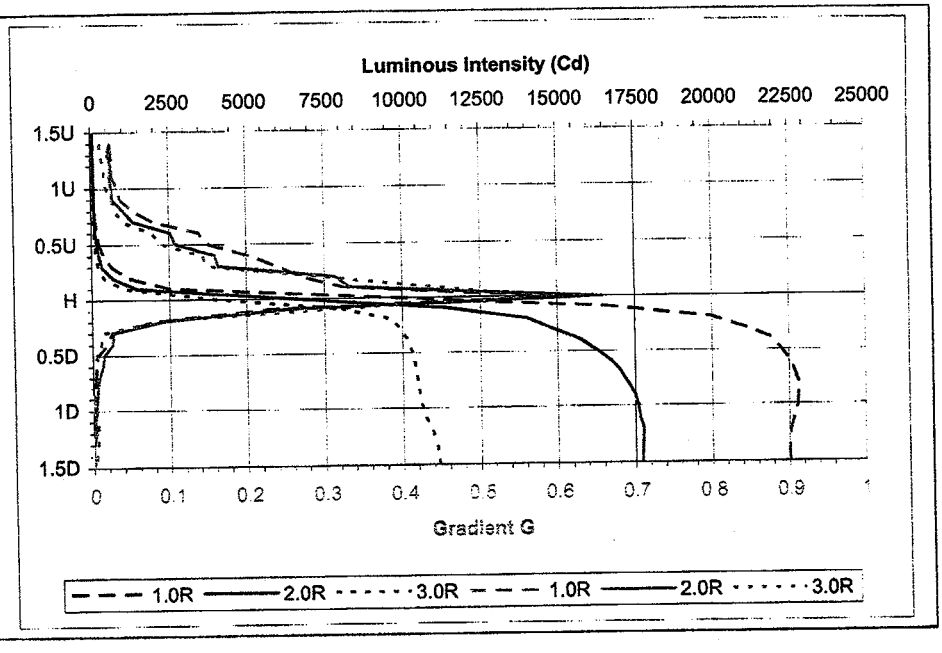
LH3

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.597	-
H/2.0R	0.658	> 0.13
H/3.0R	0.585	-

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

Maximum inclination of cutoff is within ±0.2°.



LB elbow/cutoff step located at 2.2L using fixture aim.

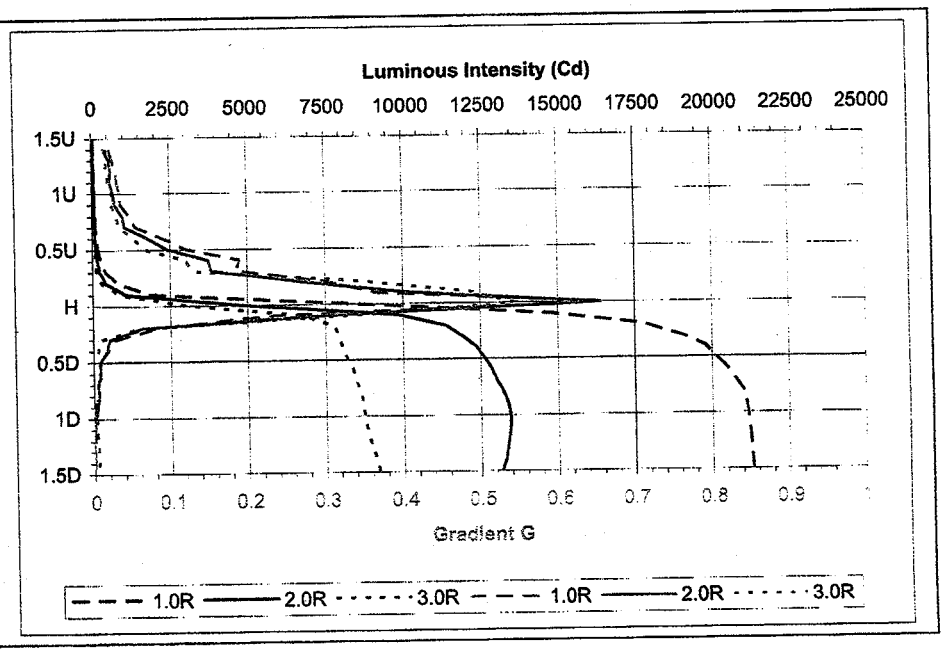
LH4

Maximum Vertical Gradient

Location	Value	Required
H/1.0R	0.661	-
H/2.0R	0.656	> 0.13
H/3.0R	0.545	-

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

Maximum inclination of cutoff is within ±0.2°.



LB elbow/cutoff step located at 2.5L using fixture aim.

[Note: After aiming in accordance with FMVSS No. 108, the Lower Beam elbow/cutoff step was offset from the V-V line as noted. This may be an indication of an internal misalignment between the Lower Beam projector and the external housing. Devices have no horizontal aim adjustment capabilities. Upper Beam peak intensity was located at HV as expected.]

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3302 61504L - LH3
Production Markings: none

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		10965.09		-	-
4.0U	8.0L		13.66	14.06*	64	-
4.0U	8.0R		11.72	12.43*	64	-
2.0U	4.0L		24.60	24.88*	135	-
1.5U	1.0R TO 3.0R	3.0R	45.70	48.88*	200	-
1.5U	1.0R TO R	1.3R	59.50		-	1400
1.0U	1.5L TO L	1.5L	64.50		-	700
0.5U	1.5L TO L	1.5L	218.13		-	1000
0.5U	1.0R TO 3.0R	3.0R	96.76	241.97*	500	-
0.5U	1.0R TO 3.0R	1.0R	227.53		-	2700
H	8.0L		62.64	1674.89	64	-
H	4.0L		102.45	891.69	135	-
H	V		10942.82		-	-
0.6D	1.3R		21857.22		10000	-
0.9D	3.5L		7220.68		1800	12000
0.9D	V		22993.22		4500	-
1.5D	2.0R		17380.16		15000	-
2.0D	15.0L		1204.25		1000	-
2.0D	9.0L		2041.01		1250	-
2.0D	9.0R		1918.62		1250	-
2.0D	15.0R		1046.75		1000	-
4.0D	20.0L		502.79		300	-
4.0D	V		9993.77		-	-
4.0D	4.0R		5194.27		-	12500
4.0D	20.0R		481.29		300	-
MAXIMUM		0.8D V	22966.24		-	-
MX(10U-90U/90L-90R)		10.0U 3.0R	14.21		-	125
H	V		10420.12		-	-

*** - Denotes Failure.**

Bulb: Sylvania HB4 furnished with sample @ 12.80V / 4.303A / Flux not measured

Aim: Sample mounted on LH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.658 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3302 61504L - LH3
Production Markings: none

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		16087.78	16878.79*	40000	75000
2.0U V		10993.89		1500	-
1.0U 3.0L		39154.30		5000	-
1.0U 3.0R		8319.27		5000	-
H 12.0L		6093.41		1500	-
H 9.0L		10248.91		3000	-
H 6.0L		28083.66		5000	-
H 3.0L		40313.27		15000	-
H V		16007.21	16756.24*	40000	75000
H 3.0R		8103.14	8320.61*	15000	-
H 6.0R		4187.52	4315.17*	5000	-
H 9.0R		2798.66	2849.32*	3000	-
H 12.0R		2063.52		1500	-
1.5D 9.0L		6279.26		2000	-
1.5D V		9835.52		5000	-
1.5D 9.0R		2453.66		2000	-
2.5D 12.0L		2593.03		1000	-
2.5D V		6276.18		2500	-
2.5D 12.0R		1441.21		1000	-
4.0D V		2763.37		-	12000
MAXIMUM	0.3U 4.1L	44586.51		-	-
H V		15780.12	16518.36*	40000	75000

*** - Denotes Failure.**

Bulb: ABG H1-55W furnished with sample @ 12.80V / 4.599A / Flux not measured

Aim: Sample mounted on LH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.658 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3302 61504L - LH4
Production Markings: none

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			9997.11		-	-
4.0U	8.0L			12.71	13.05*	64	-
4.0U	8.0R			11.45	11.86*	64	-
2.0U	4.0L			21.62	22.07*	135	-
1.5U	1.0R TO 3.0R		3.0R	36.32	40.40*	200	-
1.5U	1.0R TO R		1.1R	54.29		-	1400
1.0U	1.5L TO L		1.5L	74.31		-	700
0.5U	1.5L TO L		1.5L	174.57		-	1000
0.5U	1.0R TO 3.0R		3.0R	72.75	159.44*	500	-
0.5U	1.0R TO 3.0R		1.0R	165.74		-	2700
H	8.0L			54.39	1634.94	64	-
H	4.0L			78.64	603.02	135	-
H	V			11276.37		-	-
0.6D	1.3R			18471.75		10000	-
0.9D	3.5L			7858.77		1800	12000
0.9D	V			22958.55		4500	-
1.5D	2.0R			13744.81	14493.22*	15000	-
2.0D	15.0L			1133.96		1000	-
2.0D	9.0L			2075.23		1250	-
2.0D	9.0R			1899.32		1250	-
2.0D	15.0R			1013.70		1000	-
4.0D	20.0L			620.85		300	-
4.0D	V			10014.48		-	-
4.0D	4.0R			4860.88		-	12500
4.0D	20.0R			511.42		300	-
MAXIMUM		1.3D	0.2R	23143.14		-	-
MX(10U-90U/90L-90R)		10.0U	3.6R	13.87		-	125
H	V			10573.52		-	-

*** - Denotes Failure.**

Bulb: Sylvania HB4 furnished with sample @ 12.80V / 4.285A / Flux not measured

Aim: Sample mounted on LH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.656 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

Sample Number: SK3302 61504L - LH4
Production Markings: none

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		19221.99	21240.31*	40000	75000
2.0U V		9057.12		1500	-
1.0U 3.0L		26364.66		5000	-
1.0U 3.0R		8269.86		5000	-
H 12.0L		4895.38		1500	-
H 9.0L		8738.71		3000	-
H 6.0L		22853.26		5000	-
H 3.0L		42817.39		15000	-
H V		20070.74	20956.48*	40000	75000
H 3.0R		9242.54	9391.23*	15000	-
H 6.0R		5152.62		5000	-
H 9.0R		3239.56		3000	-
H 12.0R		2227.21		1500	-
1.5D 9.0L		6542.79		2000	-
1.5D V		12630.11		5000	-
1.5D 9.0R		2942.89		2000	-
2.5D 12.0L		2748.17		1000	-
2.5D V		6962.23		2500	-
2.5D 12.0R		1837.86		1000	-
4.0D V		2949.16		-	12000
MAXIMUM	0.1D 2.8L	43153.21		-	-
H V		19528.18	20405.36*	40000	75000

*** - Denotes Failure.**

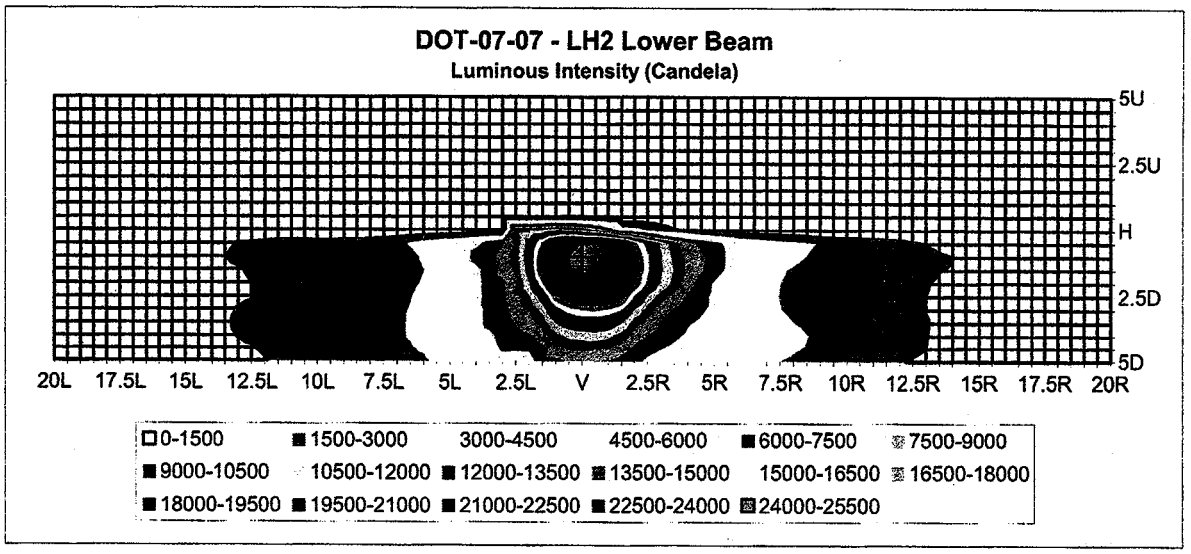
Bulb: ABG H1-55W furnished with sample @ 12.80V / 4.516A / Flux not measured

Aim: Sample mounted on LH fixture. Fixture mounted on level platform with HB4 filament at center of rotation and tilt. Fixture laser-aimed such that baseplate markings parallel to detector axis at HV then sample aim screw adjusted until LB max gradient G located at H/2.0R and balanced from H/1.0R to H/3.0R (VOR aim). Gmax = 0.656 (>= 0.13 required)

PHOTOMETRIC TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

ISOSCANS



TEST DATA SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150

COLOR TEST: SAE J578c

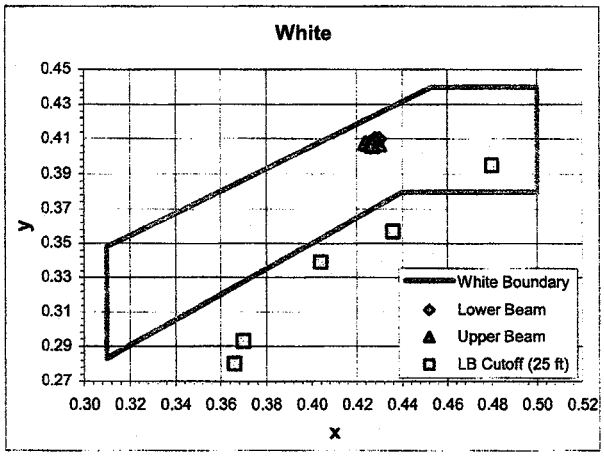
Test Method: Tristimulus Method using Minolta CL100

Test Performed by: Douglas Cummins Date: 27-29 June 2007

Lamp Voltage: 12.80V

Test Distance: 50 Feet (Lower Beam, Upper Beam); 25 Feet (Lower Beam Cutoff)

Test Location: 1.5D/2.0R (Lower Beam) or HV (Upper Beam)

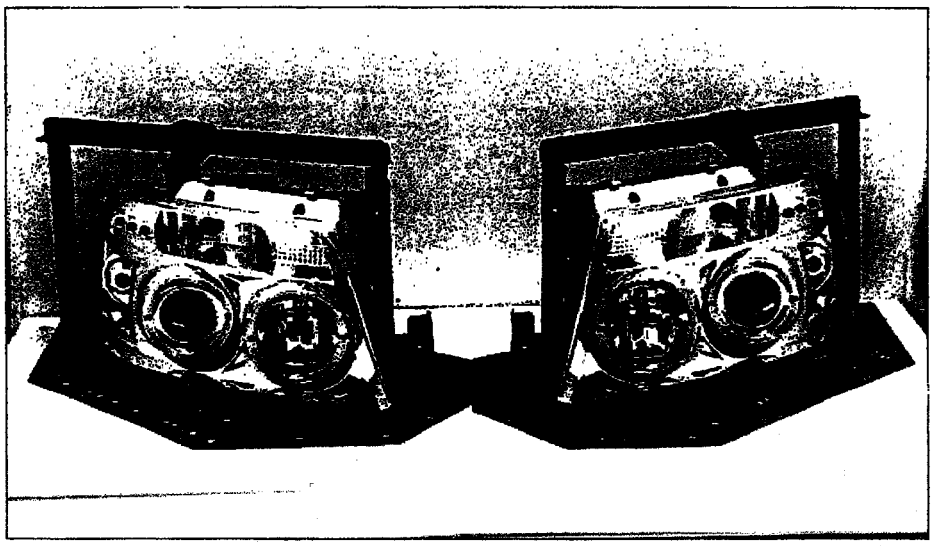
	Measured (x, y)	Required	Chart
White	Lower Beam RH1: (0.427, 0.408) RH2: (0.426, 0.408) RH3: (0.425, 0.407) RH4: (0.429, 0.408) LH1: (0.429, 0.409) LH2: (0.429, 0.408) LH3: (0.428, 0.410) LH4: (0.430, 0.410) Lower Beam Cutoff RH1: (0.240, 0.186)* RH2: (0.370, 0.293)* RH3: (0.229, 0.254)* RH4: (0.248, 0.219)* LH1: (0.436, 0.357)* LH2: (0.404, 0.339)* LH3: (0.480, 0.395) LH4: (0.366, 0.280)* Upper Beam RH1: (0.425, 0.407) RH2: (0.426, 0.407) RH3: (0.425, 0.407) RH4: (0.424, 0.408) LH1: (0.426, 0.407) LH2: (0.430, 0.407) LH3: (0.427, 0.406) LH4: (0.427, 0.407)	$0.31 \le x \le 0.50$ $0.38 \le y \le 0.44$ $y \ge 0.75x + 0.05$ $y \le 0.64x + 0.15$	

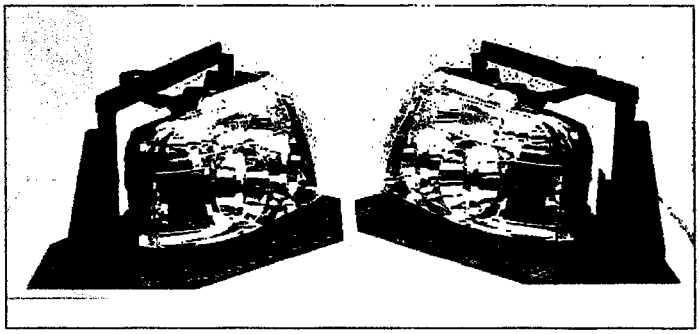
*** - Denotes Failure.**

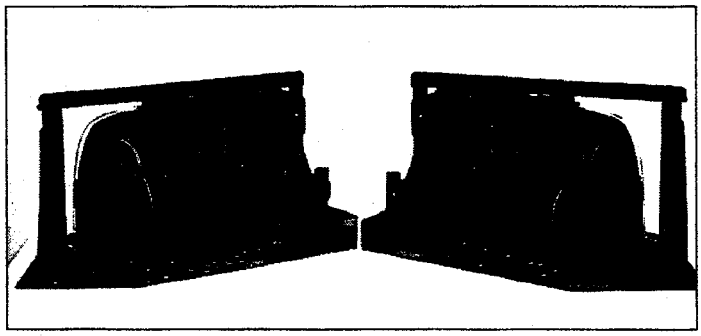
Samples' Lower Beam and Upper Beam comply with color requirements.
Samples' Lower Beam Cutoff region does **NOT** comply with color requirements.

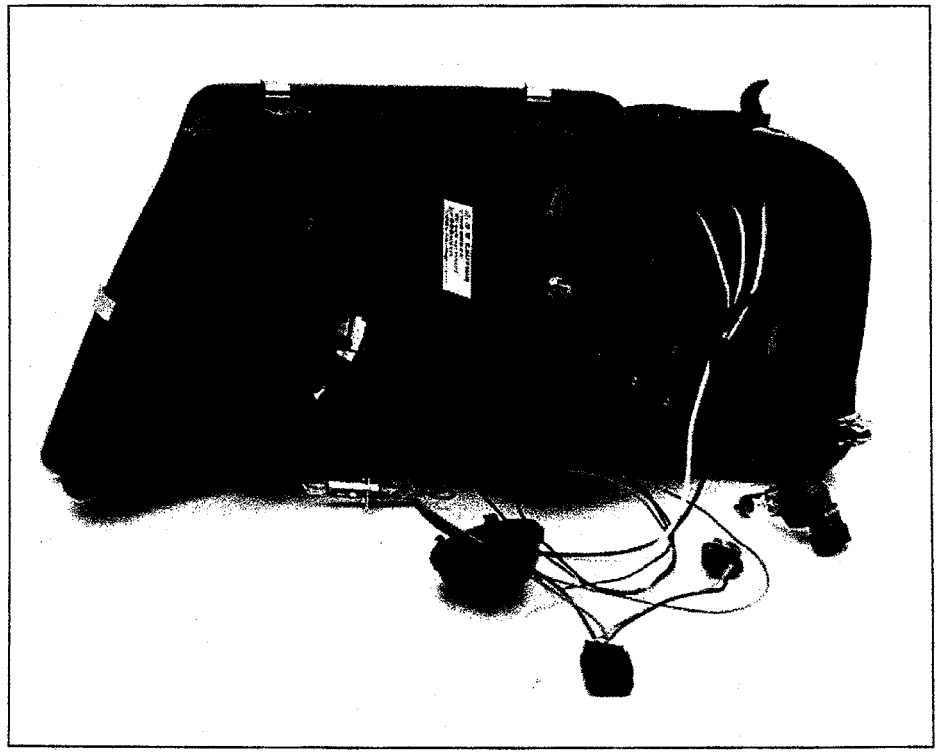
PHOTOGRAPH SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150



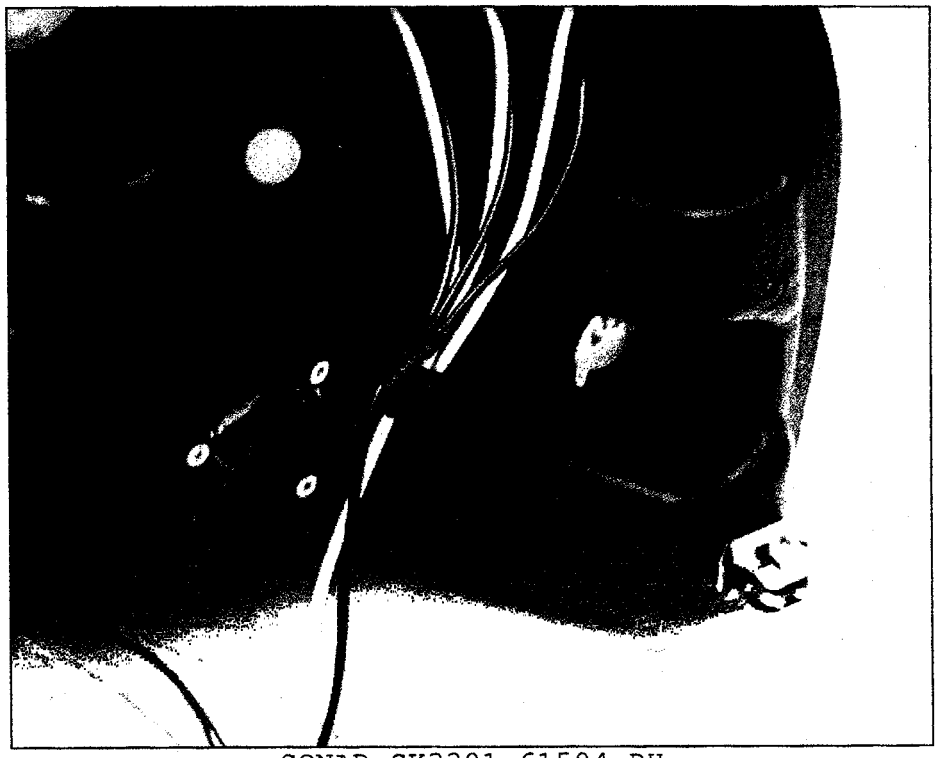




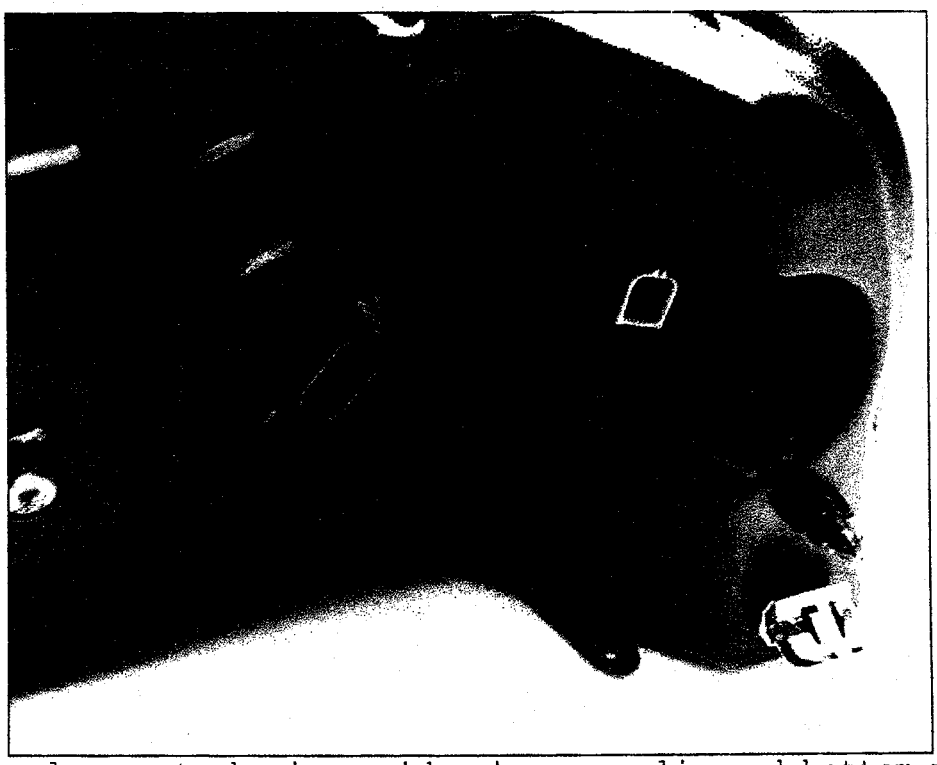


PHOTOGRAPH SHEET

Project Name: Sonar SK3301/3302 61504 VOR Replaceable Bulb (HB4/H1) Headlamps for 2006 Ford F150



SONAR SK3301 61504 RH
(missing guide pin over clip & bottom mounting hole)



OE supplier replacement showing guide pin over clip and bottom mounting hole