



INDUSTRIAL TESTING LABORATORY

Report No. 070910-03F

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TEST REPORT

Report Date: 11 October 2007

Test Component: Whacker Technologies LM-31S 3-LED Directional Warning Lamps (W)

Submitted by: Whacker Technologies
Brooklyn, NY 11225

Test Laboratory: Calcoast - ITL
Emeryville, CA 94608

Samples Tested: Two (2) each submitted 9/10/2007
Devices have 11 flash modes (see page 3)

SUMMARY

Photometric Test - Directional Warning Lamp

SAE J595 JAN05

Amber (Class 2 - Patterns 1-11)Passed

Red (Class 1 - Patterns 1, 2, 5-11)Passed

Red (Class 2 - Patterns 3, 4)Passed

Blue (Class 2 - Patterns 1-11)Passed

Flash Characteristics - SAE J595

Patterns 1-11.....Passed

Flash Rate Tests - SAE J595.....Passed

Mechanical Tests - SAE J575.....Passed

Color Test - SAE J578.....Passed

Signature of Responsible Laboratory Official:

Mark A. Evans
Photometric Engineer

DESCRIPTION SHEET

Device Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

MARKINGS: LENS: None
REFLECTOR: N/A
HOUSING: None
CIRCUIT
BOARD: None visible
BEZEL: None

DESCRIPTION:

LENS: MATERIAL: Polycarbonate (Clear)
Lens material must meet requirements of SAE J576

SHAPE/DIMENSIONS: Rectangular,
70mm x 26mm x 20mm

METHOD OF ATTACHMENT: Two (2) screws to housing
Bezel screws to vehicle

GASKET: None

HOUSING: MATERIAL: Unknown

SHAPE/DIMENSIONS: Rectangular,
70mm x 28mm x 10mm

METHOD OF MOUNTING: Two (2) screws to lens
Bezel screws to vehicle

GASKET: None

BEZEL: MATERIAL: PLastic

SHAPE/DIMENSIONS: Rectangular,
95mm x 32mm x 18mm

METHOD OF MOUNTING: Two (2) screws to vehicle

GASKET: Foam

BULBS USED: QUANTITY: Three (3), Unspecified LEDs

SYSTEM VOLTAGE: 12Vdc

SUMMARY SHEET

Device Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

PHOTOMETRIC TESTS

Specification(s): SAE J595 JAN05

Tests performed by: Mark Evans

Date: 9/16/2007

NIST Reference Detector: P181-2

Test distance: 100 feet

Device operated at 12.80V.

Peak measured current in mode PA7: A1=328mA, A2=320mA, B1=424mA, B2=384mA,
R1=368mA, R2=352mA**Characteristics**

	Description	Pulses	Freq. (Hz)	Active (ms)	Off Time (ms)	Class Amber	Class Red	Class Blue
1	Signal Alert-Phase 1	4+1 long	1.25	244	460	2	1	2
2	Signal Alert-Phase 2	4+1 long	1.25	244	460	2	1	2
3	Cam-Flash - Phase 1	4	1.23	202	456	2	2	2
4	Cam-Flash - Phase 2	4	1.23	202	456	2	2	2
5	Double Flash-Phase 1	2	1.23	242	488	2	1	2
6	Double Flash-Phase 2	2	1.23	242	488	2	1	2
7	Single Flash-Phase 1	1	1.23	252	564	2	1	2
8	Single Flash-Phase 2	1	1.23	252	564	2	1	2
9	Com-Alert - Phase 1	2+1 long	1.23	248	462	2	1	2
10	Com-Alert - Phase 2	2+1 long	1.23	248	462	2	1	2
11	Steady On	N/A	N/A	N/A	N/A	2	1	2
	Required	N/A	1 - 4 Hz	N/A	≥160 ms			

Above flash data based on sample "B1".

"N/A" in the class column indicates that the pattern does not meet SAE J595 flash characteristics requirements of section 3.10 and 6.3.

"None" in the class column indicates that the pattern does not meet SAE photometry requirements of section 6.2.

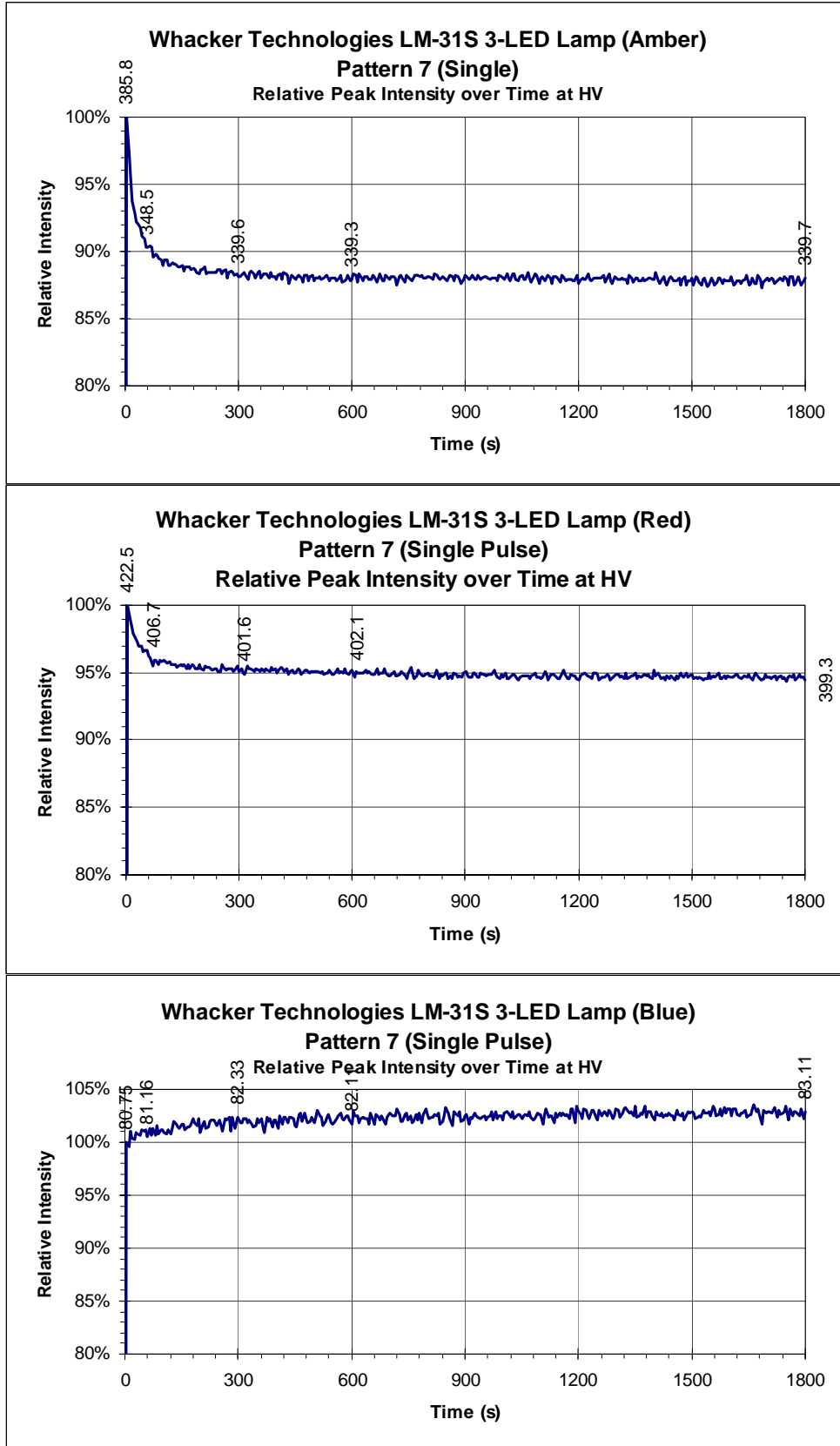
FUNCTION MARKINGS

None

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Time Log, Peak Intensity Captured in 5 Second Increments



PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		PA1/PA2				
Frequency:		1.23Hz				
Active Time/Flash:		0.244 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		51.2	12.5	921.8	10	240
10.0U V		53.5	13.1	964.7	25	600
10.0U 5.0R		50.5	12.3	910.4	10	240
5.0U 20.0L		191.2	46.7	3446.3	10	240
5.0U 10.0L		156.7	38.2	2824.9	25	600
5.0U 5.0L		152.9	37.3	2756.2	50	1200
5.0U V		175.2	42.7	3156.7	75	1800
5.0U 5.0R		157.7	38.5	2842.0	50	1200
5.0U 10.0R		157.9	38.5	2844.9	25	600
5.0U 20.0R		161.0	39.3	2902.1	10	240
H 20.0L		390.7	95.3	7041.4	15	360
H 10.0L		319.2	77.9	5752.7	37.5	900
H 5.0L		328.8	80.2	5925.0	100	2400
H V		389.1	94.9	7012.1	150	3600
H 5.0R		336.7	82.2	6068.1	100	2400
H 10.0R		337.5	82.4	6082.4	37.5	900
H 20.0R		335.1	81.8	6039.5	15	360
5.0D 20.0L		183.9	44.9	3314.7	10	240
5.0D 10.0L		152.0	37.1	2739.0	25	600
5.0D 5.0L		152.9	37.3	2756.2	50	1200
5.0D V		186.2	45.4	3355.5	75	1800
5.0D 5.0R		159.8	39.0	2879.2	50	1200
5.0D 10.0R		163.9	40.0	2953.6	25	600
5.0D 20.0R		180.3	44.0	3248.9	10	240
10.0D 5.0L		44.8	10.9	807.4	10	240
10.0D V		44.3	10.8	798.8	25	600
10.0D 5.0R		42.7	10.4	770.2	10	240
Zone 1		1074.6	262.2	19365.6	75	1800
2		155.2	37.9	2796.2	40	960
3		625.1	152.5	11265.8	125	3000
4		1415.9	345.5	25517.4	450	10800
5		655.0	159.8	11804.3	125	3000
6		131.8	32.2	2375.7	40	960
7		998.2	243.6	17988.9	75	1800

Sample meets all requirements for Class 2 optical warning devices.
 Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).
 Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		PA3/PA4				
Frequency:		1.23Hz				
Active Time/Flash:		0.202 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		51.2	10.3	763.2	10	240
10.0U V		53.5	10.8	798.7	25	600
10.0U 5.0R		50.5	10.2	753.7	10	240
5.0U 20.0L		191.2	38.6	2853.1	10	240
5.0U 10.0L		156.7	31.7	2338.6	25	600
5.0U 5.0L		152.9	30.9	2281.8	50	1200
5.0U V		175.2	35.4	2613.3	75	1800
5.0U 5.0R		157.7	31.9	2352.8	50	1200
5.0U 10.0R		157.9	31.9	2355.2	25	600
5.0U 20.0R		161.0	32.5	2402.5	10	240
H 20.0L		390.7	78.9	5829.3	15	360
H 10.0L		319.2	64.5	4762.5	37.5	900
H 5.0L		328.8	66.4	4905.2	100	2400
H V		389.1	78.6	5805.1	150	3600
H 5.0R		336.7	68.0	5023.6	100	2400
H 10.0R		337.5	68.2	5035.4	37.5	900
H 20.0R		335.1	67.7	4999.9	15	360
5.0D 20.0L		183.9	37.2	2744.2	10	240
5.0D 10.0L		152.0	30.7	2267.6	25	600
5.0D 5.0L		152.9	30.9	2281.8	50	1200
5.0D V		186.2	37.6	2777.9	75	1800
5.0D 5.0R		159.8	32.3	2383.6	50	1200
5.0D 10.0R		163.9	33.1	2445.2	25	600
5.0D 20.0R		180.3	36.4	2689.7	10	240
10.0D 5.0L		44.8	9.0	668.4	10	240
10.0D V		44.3	9.0	661.3	25	600
10.0D 5.0R		42.7	8.6	637.6	10	240
Zone 1		1074.6	217.1	16032.2	75	1800
2		155.2	31.3	2314.9	40	960
3		625.1	126.3	9326.6	125	3000
4		1415.9	286.0	21125.0	450	10800
5		655.0	132.3	9772.4	125	3000
6		131.8	26.6	1966.8	40	960
7		998.2	201.6	14892.5	75	1800

Sample meets all requirements for Class 2 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		PA5/PA6				
Frequency:		1.23Hz				
Active Time/Flash:		0.242 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		51.2	12.4	914.3	10	240
10.0U V		53.5	13.0	956.8	25	600
10.0U 5.0R		50.5	12.2	902.9	10	240
5.0U 20.0L		191.2	46.3	3418.1	10	240
5.0U 10.0L		156.7	37.9	2801.7	25	600
5.0U 5.0L		152.9	37.0	2733.6	50	1200
5.0U V		175.2	42.4	3130.8	75	1800
5.0U 5.0R		157.7	38.2	2818.7	50	1200
5.0U 10.0R		157.9	38.2	2821.6	25	600
5.0U 20.0R		161.0	39.0	2878.3	10	240
H 20.0L		390.7	94.6	6983.7	15	360
H 10.0L		319.2	77.2	5705.5	37.5	900
H 5.0L		328.8	79.6	5876.5	100	2400
H V		389.1	94.2	6954.6	150	3600
H 5.0R		336.7	81.5	6018.3	100	2400
H 10.0R		337.5	81.7	6032.5	37.5	900
H 20.0R		335.1	81.1	5990.0	15	360
5.0D 20.0L		183.9	44.5	3287.6	10	240
5.0D 10.0L		152.0	36.8	2716.6	25	600
5.0D 5.0L		152.9	37.0	2733.6	50	1200
5.0D V		186.2	45.1	3328.0	75	1800
5.0D 5.0R		159.8	38.7	2855.6	50	1200
5.0D 10.0R		163.9	39.7	2929.4	25	600
5.0D 20.0R		180.3	43.6	3222.3	10	240
10.0D 5.0L		44.8	10.8	800.8	10	240
10.0D V		44.3	10.7	792.3	25	600
10.0D 5.0R		42.7	10.3	763.9	10	240
Zone 1		1074.6	260.0	19206.9	75	1800
2		155.2	37.5	2773.3	40	960
3		625.1	151.3	11173.5	125	3000
4		1415.9	342.7	25308.2	450	10800
5		655.0	158.5	11707.5	125	3000
6		131.8	31.9	2356.3	40	960
7		998.2	241.6	17841.5	75	1800

Sample meets all requirements for Class 2 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		PA7/PA8				
Frequency:		1.23Hz				
Active Time/Flash:		0.252 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		51.2	12.9	952.1	10	240
10.0U V		53.5	13.5	996.4	25	600
10.0U 5.0R		50.5	12.7	940.2	10	240
5.0U 20.0L		191.2	48.2	3559.3	10	240
5.0U 10.0L		156.7	39.5	2917.5	25	600
5.0U 5.0L		152.9	38.5	2846.6	50	1200
5.0U V		175.2	44.1	3260.2	75	1800
5.0U 5.0R		157.7	39.7	2935.2	50	1200
5.0U 10.0R		157.9	39.8	2938.2	25	600
5.0U 20.0R		161.0	40.6	2997.2	10	240
H 20.0L		390.7	98.5	7272.3	15	360
H 10.0L		319.2	80.4	5941.3	37.5	900
H 5.0L		328.8	82.9	6119.3	100	2400
H V		389.1	98.1	7242.0	150	3600
H 5.0R		336.7	84.9	6267.0	100	2400
H 10.0R		337.5	85.1	6281.8	37.5	900
H 20.0R		335.1	84.5	6237.5	15	360
5.0D 20.0L		183.9	46.4	3423.4	10	240
5.0D 10.0L		152.0	38.3	2828.8	25	600
5.0D 5.0L		152.9	38.5	2846.6	50	1200
5.0D V		186.2	46.9	3465.5	75	1800
5.0D 5.0R		159.8	40.3	2973.6	50	1200
5.0D 10.0R		163.9	41.3	3050.4	25	600
5.0D 20.0R		180.3	45.4	3355.5	10	240
10.0D 5.0L		44.8	11.3	833.9	10	240
10.0D V		44.3	11.2	825.0	25	600
10.0D 5.0R		42.7	10.8	795.5	10	240
Zone 1		1074.6	270.8	20000.5	75	1800
2		155.2	39.1	2887.9	40	960
3		625.1	157.5	11635.2	125	3000
4		1415.9	356.8	26354.0	450	10800
5		655.0	165.1	12191.3	125	3000
6		131.8	33.2	2453.6	40	960
7		998.2	251.5	18578.7	75	1800

Sample meets all requirements for Class 2 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		PA9/PA10				
Frequency:		1.23Hz				
Active Time/Flash:		0.248 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		51.2	12.7	936.9	10	240
10.0U V		53.5	13.3	980.6	25	600
10.0U 5.0R		50.5	12.5	925.3	10	240
5.0U 20.0L		191.2	47.4	3502.8	10	240
5.0U 10.0L		156.7	38.9	2871.2	25	600
5.0U 5.0L		152.9	37.9	2801.4	50	1200
5.0U V		175.2	43.4	3208.4	75	1800
5.0U 5.0R		157.7	39.1	2888.6	50	1200
5.0U 10.0R		157.9	39.1	2891.5	25	600
5.0U 20.0R		161.0	39.9	2949.7	10	240
H 20.0L		390.7	96.9	7156.8	15	360
H 10.0L		319.2	79.2	5847.0	37.5	900
H 5.0L		328.8	81.5	6022.2	100	2400
H V		389.1	96.5	7127.0	150	3600
H 5.0R		336.7	83.5	6167.5	100	2400
H 10.0R		337.5	83.7	6182.1	37.5	900
H 20.0R		335.1	83.1	6138.5	15	360
5.0D 20.0L		183.9	45.6	3369.1	10	240
5.0D 10.0L		152.0	37.7	2783.9	25	600
5.0D 5.0L		152.9	37.9	2801.4	50	1200
5.0D V		186.2	46.2	3410.5	75	1800
5.0D 5.0R		159.8	39.6	2926.4	50	1200
5.0D 10.0R		163.9	40.6	3002.0	25	600
5.0D 20.0R		180.3	44.7	3302.2	10	240
10.0D 5.0L		44.8	11.1	820.6	10	240
10.0D V		44.3	11.0	811.9	25	600
10.0D 5.0R		42.7	10.6	782.8	10	240
Zone 1		1074.6	266.5	19683.1	75	1800
2		155.2	38.5	2842.1	40	960
3		625.1	155.0	11450.5	125	3000
4		1415.9	351.1	25935.7	450	10800
5		655.0	162.4	11997.8	125	3000
6		131.8	32.7	2414.7	40	960
7		998.2	247.5	18283.8	75	1800

Sample meets all requirements for Class 2 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 1 of 2 (with 1.29Hz/50% Duty Cycle External Flasher)

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		PA11				
Frequency:		1.29Hz				
Active Time/Flash:		0.388 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		51.2	19.8	1536.1	10	240
10.0U V		53.5	20.8	1607.6	25	600
10.0U 5.0R		50.5	19.6	1517.1	10	240
5.0U 20.0L		191.2	74.2	5742.9	10	240
5.0U 10.0L		156.7	60.8	4707.3	25	600
5.0U 5.0L		152.9	59.3	4592.9	50	1200
5.0U V		175.2	68.0	5260.2	75	1800
5.0U 5.0R		157.7	61.2	4735.9	50	1200
5.0U 10.0R		157.9	61.2	4740.6	25	600
5.0U 20.0R		161.0	62.5	4836.0	10	240
H 20.0L		390.7	151.6	11733.6	15	360
H 10.0L		319.2	123.9	9586.1	37.5	900
H 5.0L		328.8	127.6	9873.4	100	2400
H V		389.1	151.0	11684.8	150	3600
H 5.0R		336.7	130.6	10111.7	100	2400
H 10.0R		337.5	131.0	10135.5	37.5	900
H 20.0R		335.1	130.0	10064.0	15	360
5.0D 20.0L		183.9	71.4	5523.6	10	240
5.0D 10.0L		152.0	59.0	4564.3	25	600
5.0D 5.0L		152.9	59.3	4592.9	50	1200
5.0D V		186.2	72.2	5591.5	75	1800
5.0D 5.0R		159.8	62.0	4797.8	50	1200
5.0D 10.0R		163.9	63.6	4921.8	25	600
5.0D 20.0R		180.3	69.9	5414.0	10	240
10.0D 5.0L		44.8	17.4	1345.4	10	240
10.0D V		44.3	17.2	1331.1	25	600
10.0D 5.0R		42.7	16.6	1283.5	10	240
Zone 1		1074.6	416.9	32270.4	75	1800
2		155.2	60.2	4659.6	40	960
3		625.1	242.5	18773.1	125	3000
4		1415.9	549.4	42521.6	450	10800
5		655.0	254.1	19670.4	125	3000
6		131.8	51.1	3958.9	40	960
7		998.2	387.3	29976.4	75	1800

Sample meets all requirements for Class 2 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		PA1/PA2				
Frequency:		1.23Hz				
Active Time/Flash:		0.244 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		46.3	11.3	834	20	480
10.0U V		46.0	11.2	828	50	1200
10.0U 5.0R		46.1	11.3	831	20	480
5.0U 20.0L		192.3	46.9	3462	20	480
5.0U 10.0L		153.7	37.5	2768	50	1200
5.0U 5.0L		153.7	37.5	2768	100	2400
5.0U V		177.8	43.4	3202	150	3600
5.0U 5.0R		165.6	40.4	2982	100	2400
5.0U 10.0R		166.6	40.7	3000	50	1200
5.0U 20.0R		165.5	40.4	2980	20	480
H 20.0L		437.8	106.8	7883	30	720
H 10.0L		354.3	86.5	6381	75	1800
H 5.0L		360.6	88.0	6494	200	4800
H V		411.0	100.3	7401	300	7200
H 5.0R		386.5	94.3	6960	200	4800
H 10.0R		378.0	92.2	6806	75	1800
H 20.0R		344.1	84.0	6196	30	720
5.0D 20.0L		198.3	48.4	3570	20	480
5.0D 10.0L		157.8	38.5	2841	50	1200
5.0D 5.0L		153.9	37.5	2771	100	2400
5.0D V		180.6	44.1	3253	150	3600
5.0D 5.0R		177.2	43.2	3190	100	2400
5.0D 10.0R		170.7	41.7	3074	50	1200
5.0D 20.0R		177.8	43.4	3202	20	480
10.0D 5.0L		43.0	10.5	774	20	480
10.0D V		42.4	10.3	763	50	1200
10.0D 5.0R		41.9	10.2	754	20	480
Zone 1		1139.9	278.1	20526	150	3600
2		138.4	33.8	2493	80	1920
3		661.9	161.5	11919	250	6000
4		1516.6	370.1	27310	900	21600
5		720.7	175.9	12979	250	6000
6		127.2	31.0	2291	80	1920
7		1024.7	250.0	18452	150	3600

Sample meets all requirements for Class 1 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		PA3/PA4				
Frequency:		1.23Hz				
Active Time/Flash:		0.202 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		46.3	9.4	690.2	5	120
10.0U V		46.0	9.3	685.5	13	300
10.0U 5.0R		46.1	9.3	687.9	5	120
5.0U 20.0L		192.3	38.8	2866.5	5	120
5.0U 10.0L		153.7	31.0	2291.3	13	300
5.0U 5.0L		153.7	31.0	2291.3	25	600
5.0U V		177.8	35.9	2650.5	38	900
5.0U 5.0R		165.6	33.4	2468.6	25	600
5.0U 10.0R		166.6	33.7	2483.8	13	300
5.0U 20.0R		165.5	33.4	2467.4	5	120
H 20.0L		437.8	88.4	6526.5	8	180
H 10.0L		354.3	71.6	5282.2	19	450
H 5.0L		360.6	72.8	5376.1	50	1200
H V		411.0	83.0	6127.4	75	1800
H 5.0R		386.5	78.1	5762.3	50	1200
H 10.0R		378.0	76.3	5634.4	19	450
H 20.0R		344.1	69.5	5129.6	8	180
5.0D 20.0L		198.3	40.1	2955.7	5	120
5.0D 10.0L		157.8	31.9	2352.3	13	300
5.0D 5.0L		153.9	31.1	2293.7	25	600
5.0D V		180.6	36.5	2692.8	38	900
5.0D 5.0R		177.2	35.8	2641.1	25	600
5.0D 10.0R		170.7	34.5	2544.9	13	300
5.0D 20.0R		177.8	35.9	2650.5	5	120
10.0D 5.0L		43.0	8.7	640.9	5	120
10.0D V		42.4	8.6	631.5	13	300
10.0D 5.0R		41.9	8.5	624.5	5	120
Zone 1		1139.9	230.3	16992.9	38	900
2		138.4	28.0	2063.6	20	480
3		661.9	133.7	9867.2	63	1500
4		1516.6	306.4	22609.1	225	5400
5		720.7	145.6	10744.6	63	1500
6		127.2	25.7	1896.9	20	480
7		1024.7	207.0	15276.2	38	900

Sample meets all requirements for Class 2 optical warning devices.
Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).
Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		PA5/PA6				
Frequency:		1.23Hz				
Active Time/Flash:		0.242 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		46.3	11.2	827	20	480
10.0U V		46.0	11.1	821	50	1200
10.0U 5.0R		46.1	11.2	824	20	480
5.0U 20.0L		192.3	46.5	3434	20	480
5.0U 10.0L		153.7	37.2	2745	50	1200
5.0U 5.0L		153.7	37.2	2745	100	2400
5.0U V		177.8	43.0	3175	150	3600
5.0U 5.0R		165.6	40.1	2957	100	2400
5.0U 10.0R		166.6	40.3	2976	50	1200
5.0U 20.0R		165.5	40.1	2956	20	480
H 20.0L		437.8	105.9	7819	30	720
H 10.0L		354.3	85.7	6328	75	1800
H 5.0L		360.6	87.3	6441	200	4800
H V		411.0	99.5	7341	300	7200
H 5.0R		386.5	93.5	6903	200	4800
H 10.0R		378.0	91.5	6750	75	1800
H 20.0R		344.1	83.3	6145	30	720
5.0D 20.0L		198.3	48.0	3541	20	480
5.0D 10.0L		157.8	38.2	2818	50	1200
5.0D 5.0L		153.9	37.2	2748	100	2400
5.0D V		180.6	43.7	3226	150	3600
5.0D 5.0R		177.2	42.9	3164	100	2400
5.0D 10.0R		170.7	41.3	3049	50	1200
5.0D 20.0R		177.8	43.0	3175	20	480
10.0D 5.0L		43.0	10.4	768	20	480
10.0D V		42.4	10.3	757	50	1200
10.0D 5.0R		41.9	10.1	748	20	480
Zone 1		1139.9	275.9	20358	150	3600
2		138.4	33.5	2472	80	1920
3		661.9	160.2	11821	250	6000
4		1516.6	367.0	27086	900	21600
5		720.7	174.4	12872	250	6000
6		127.2	30.8	2273	80	1920
7		1024.7	248.0	18301	150	3600

Sample meets all requirements for Class 1 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		PA7/PA8				
Frequency:		1.23Hz				
Active Time/Flash:		0.252 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		46.3	11.7	861	20	480
10.0U V		46.0	11.6	855	50	1200
10.0U 5.0R		46.1	11.6	858	20	480
5.0U 20.0L		192.3	48.5	3576	20	480
5.0U 10.0L		153.7	38.7	2858	50	1200
5.0U 5.0L		153.7	38.7	2858	100	2400
5.0U V		177.8	44.8	3307	150	3600
5.0U 5.0R		165.6	41.7	3080	100	2400
5.0U 10.0R		166.6	42.0	3099	50	1200
5.0U 20.0R		165.5	41.7	3078	20	480
H 20.0L		437.8	110.3	8142	30	720
H 10.0L		354.3	89.3	6590	75	1800
H 5.0L		360.6	90.9	6707	200	4800
H V		411.0	103.6	7644	300	7200
H 5.0R		386.5	97.4	7189	200	4800
H 10.0R		378.0	95.2	7029	75	1800
H 20.0R		344.1	86.7	6399	30	720
5.0D 20.0L		198.3	50.0	3687	20	480
5.0D 10.0L		157.8	39.8	2935	50	1200
5.0D 5.0L		153.9	38.8	2861	100	2400
5.0D V		180.6	45.5	3359	150	3600
5.0D 5.0R		177.2	44.6	3295	100	2400
5.0D 10.0R		170.7	43.0	3175	50	1200
5.0D 20.0R		177.8	44.8	3307	20	480
10.0D 5.0L		43.0	10.8	800	20	480
10.0D V		42.4	10.7	788	50	1200
10.0D 5.0R		41.9	10.6	779	20	480
Zone 1		1139.9	287.3	21199	150	3600
2		138.4	34.9	2574	80	1920
3		661.9	166.8	12310	250	6000
4		1516.6	382.2	28205	900	21600
5		720.7	181.6	13404	250	6000
6		127.2	32.1	2366	80	1920
7		1024.7	258.2	19057	150	3600

Sample meets all requirements for Class 1 optical warning devices.
Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).
Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		PA9/PA10				
Frequency:		1.23Hz				
Active Time/Flash:		0.248 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		46.3	11.5	847	20	480
10.0U V		46.0	11.4	842	50	1200
10.0U 5.0R		46.1	11.4	845	20	480
5.0U 20.0L		192.3	47.7	3519	20	480
5.0U 10.0L		153.7	38.1	2813	50	1200
5.0U 5.0L		153.7	38.1	2813	100	2400
5.0U V		177.8	44.1	3254	150	3600
5.0U 5.0R		165.6	41.1	3031	100	2400
5.0U 10.0R		166.6	41.3	3049	50	1200
5.0U 20.0R		165.5	41.0	3029	20	480
H 20.0L		437.8	108.6	8013	30	720
H 10.0L		354.3	87.9	6485	75	1800
H 5.0L		360.6	89.4	6600	200	4800
H V		411.0	101.9	7523	300	7200
H 5.0R		386.5	95.9	7075	200	4800
H 10.0R		378.0	93.7	6917	75	1800
H 20.0R		344.1	85.3	6298	30	720
5.0D 20.0L		198.3	49.2	3629	20	480
5.0D 10.0L		157.8	39.1	2888	50	1200
5.0D 5.0L		153.9	38.2	2816	100	2400
5.0D V		180.6	44.8	3306	150	3600
5.0D 5.0R		177.2	43.9	3243	100	2400
5.0D 10.0R		170.7	42.3	3124	50	1200
5.0D 20.0R		177.8	44.1	3254	20	480
10.0D 5.0L		43.0	10.7	787	20	480
10.0D V		42.4	10.5	775	50	1200
10.0D 5.0R		41.9	10.4	767	20	480
Zone 1		1139.9	282.7	20863	150	3600
2		138.4	34.3	2534	80	1920
3		661.9	164.1	12114	250	6000
4		1516.6	376.1	27758	900	21600
5		720.7	178.7	13191	250	6000
6		127.2	31.6	2329	80	1920
7		1024.7	254.1	18755	150	3600

Sample meets all requirements for Class 1 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2 (with 1.29Hz/50% Duty Cycle External Flasher)

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		PA11				
Frequency:		1.29Hz				
Active Time/Flash:		0.388 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		46.3	18.0	1390	20	480
10.0U V		46.0	17.8	1381	50	1200
10.0U 5.0R		46.1	17.9	1386	20	480
5.0U 20.0L		192.3	74.6	5775	20	480
5.0U 10.0L		153.7	59.6	4616	50	1200
5.0U 5.0L		153.7	59.6	4616	100	2400
5.0U V		177.8	69.0	5339	150	3600
5.0U 5.0R		165.6	64.2	4973	100	2400
5.0U 10.0R		166.6	64.6	5004	50	1200
5.0U 20.0R		165.5	64.2	4971	20	480
H 20.0L		437.8	169.9	13148	30	720
H 10.0L		354.3	137.5	10641	75	1800
H 5.0L		360.6	139.9	10830	200	4800
H V		411.0	159.5	12344	300	7200
H 5.0R		386.5	150.0	11608	200	4800
H 10.0R		378.0	146.6	11350	75	1800
H 20.0R		344.1	133.5	10334	30	720
5.0D 20.0L		198.3	76.9	5954	20	480
5.0D 10.0L		157.8	61.2	4739	50	1200
5.0D 5.0L		153.9	59.7	4621	100	2400
5.0D V		180.6	70.1	5425	150	3600
5.0D 5.0R		177.2	68.7	5320	100	2400
5.0D 10.0R		170.7	66.2	5127	50	1200
5.0D 20.0R		177.8	69.0	5339	20	480
10.0D 5.0L		43.0	16.7	1291	20	480
10.0D V		42.4	16.4	1272	50	1200
10.0D 5.0R		41.9	16.3	1258	20	480
Zone 1		1139.9	442.3	34232	150	3600
2		138.4	53.7	4157	80	1920
3		661.9	256.8	19877	250	6000
4		1516.6	588.4	45546	900	21600
5		720.7	279.7	21645	250	6000
6		127.2	49.4	3821	80	1920
7		1024.7	397.6	30774	150	3600

Sample meets all requirements for Class 1 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		PA1/PA2				
Frequency:		1.24Hz				
Active Time/Flash:		0.244 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		16.8	4.1	304.2	5	120
10.0U V		17.4	4.3	315.0	12.5	300
10.0U 5.0R		16.3	4.0	294.2	5	120
5.0U 20.0L		61.5	15.0	1112.8	5	120
5.0U 10.0L		49.7	12.1	898.3	12.5	300
5.0U 5.0L		50.3	12.3	909.8	25	600
5.0U V		57.6	14.0	1041.1	37.5	900
5.0U 5.0R		50.3	12.3	909.8	25	600
5.0U 10.0R		52.4	12.8	947.1	12.5	300
5.0U 20.0R		51.9	12.7	937.7	5	120
H 20.0L		108.4	26.4	1959.4	7.5	180
H 10.0L		88.2	21.5	1594.9	18.75	450
H 5.0L		96.0	23.4	1735.6	50	1200
H V		102.3	25.0	1850.4	75	1800
H 5.0R		95.4	23.3	1724.1	50	1200
H 10.0R		97.6	23.8	1764.3	18.75	450
H 20.0R		95.5	23.3	1727.0	7.5	180
5.0D 20.0L		61.7	15.1	1115.7	5	120
5.0D 10.0L		49.8	12.2	901.2	12.5	300
5.0D 5.0L		51.7	12.6	934.9	25	600
5.0D V		59.2	14.4	1069.8	37.5	900
5.0D 5.0R		52.7	12.9	952.8	25	600
5.0D 10.0R		54.6	13.3	986.5	12.5	300
5.0D 20.0R		56.2	13.7	1015.2	5	120
10.0D 5.0L		13.1	3.2	236.0	5	120
10.0D V		14.6	3.6	264.7	12.5	300
10.0D 5.0R		13.3	3.2	240.4	5	120
Zone 1		331.2	80.8	5987.3	37.5	900
2		50.6	12.3	914.1	20	480
3		190.2	46.4	3439.6	62.5	1500
4		410.5	100.2	7421.6	225	5400
5		200.6	48.9	3626.1	62.5	1500
6		41.0	10.0	741.2	20	480
7		310.5	75.8	5614.3	37.5	900

Sample meets all requirements for Class 2 optical warning devices.
 Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).
 Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		PA1/PA2				
Frequency:		1.23Hz				
Active Time/Flash:		0.244 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		15.0	3.7	269.8	5	120
10.0U V		15.9	3.9	286.3	12.5	300
10.0U 5.0R		15.4	3.8	278.4	5	120
5.0U 20.0L		61.3	14.9	1105.1	5	120
5.0U 10.0L		50.0	12.2	901.8	12.5	300
5.0U 5.0L		51.7	12.6	933.3	25	600
5.0U V		58.1	14.2	1047.8	37.5	900
5.0U 5.0R		51.6	12.6	930.5	25	600
5.0U 10.0R		52.9	12.9	953.4	12.5	300
5.0U 20.0R		54.3	13.2	979.1	5	120
H 20.0L		107.4	26.2	1937.5	7.5	180
H 10.0L		89.8	21.9	1619.7	18.75	450
H 5.0L		92.5	22.6	1668.4	50	1200
H V		105.4	25.7	1900.3	75	1800
H 5.0R		101.5	24.8	1831.6	50	1200
H 10.0R		98.8	24.1	1782.9	18.75	450
H 20.0R		101.1	24.7	1823.0	7.5	180
5.0D 20.0L		58.4	14.3	1053.6	5	120
5.0D 10.0L		48.7	11.9	878.9	12.5	300
5.0D 5.0L		49.5	12.1	893.2	25	600
5.0D V		56.7	13.8	1022.1	37.5	900
5.0D 5.0R		53.7	13.1	967.7	25	600
5.0D 10.0R		52.9	12.9	953.4	12.5	300
5.0D 20.0R		56.2	13.7	1013.5	5	120
10.0D 5.0L		14.9	3.6	268.4	5	120
10.0D V		15.4	3.7	277.0	12.5	300
10.0D 5.0R		14.7	3.6	265.5	5	120
Zone 1		325.8	79.5	5876.2	37.5	900
2		46.3	11.3	835.3	20	480
3		191.1	46.6	3446.3	62.5	1500
4		414.2	101.1	7470.1	225	5400
5		204.1	49.8	3681.0	62.5	1500
6		45.0	11.0	810.9	20	480
7		317.2	77.4	5721.6	37.5	900

Sample meets all requirements for Class 2 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		PA3/PA4				
Frequency:		1.23Hz				
Active Time/Flash:		0.202 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		15.0	3.0	223.4	5	120
10.0U V		15.9	3.2	237.0	12.5	300
10.0U 5.0R		15.4	3.1	230.5	5	120
5.0U 20.0L		61.3	12.4	914.9	5	120
5.0U 10.0L		50.0	10.1	746.6	12.5	300
5.0U 5.0L		51.7	10.5	772.7	25	600
5.0U V		58.1	11.7	867.5	37.5	900
5.0U 5.0R		51.6	10.4	770.3	25	600
5.0U 10.0R		52.9	10.7	789.3	12.5	300
5.0U 20.0R		54.3	11.0	810.6	5	120
H 20.0L		107.4	21.7	1604.0	7.5	180
H 10.0L		89.8	18.1	1340.9	18.75	450
H 5.0L		92.5	18.7	1381.2	50	1200
H V		105.4	21.3	1573.2	75	1800
H 5.0R		101.5	20.5	1516.3	50	1200
H 10.0R		98.8	20.0	1476.0	18.75	450
H 20.0R		101.1	20.4	1509.2	7.5	180
5.0D 20.0L		58.4	11.8	872.2	5	120
5.0D 10.0L		48.7	9.8	727.6	12.5	300
5.0D 5.0L		49.5	10.0	739.5	25	600
5.0D V		56.7	11.4	846.1	37.5	900
5.0D 5.0R		53.7	10.8	801.1	25	600
5.0D 10.0R		52.9	10.7	789.3	12.5	300
5.0D 20.0R		56.2	11.4	839.0	5	120
10.0D 5.0L		14.9	3.0	222.2	5	120
10.0D V		15.4	3.1	229.3	12.5	300
10.0D 5.0R		14.7	3.0	219.8	5	120
Zone 1		325.8	65.8	4864.7	37.5	900
2		46.3	9.4	691.5	20	480
3		191.1	38.6	2853.0	62.5	1500
4		414.2	83.7	6184.3	225	5400
5		204.1	41.2	3047.4	62.5	1500
6		45.0	9.1	671.3	20	480
7		317.2	64.1	4736.7	37.5	900

Sample meets all requirements for Class 2 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		PA5/PA6				
Frequency:		1.23Hz				
Active Time/Flash:		0.242 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		15.0	3.6	267.6	5	120
10.0U V		15.9	3.8	283.9	12.5	300
10.0U 5.0R		15.4	3.7	276.1	5	120
5.0U 20.0L		61.3	14.8	1096.0	5	120
5.0U 10.0L		50.0	12.1	894.4	12.5	300
5.0U 5.0L		51.7	12.5	925.7	25	600
5.0U V		58.1	14.1	1039.2	37.5	900
5.0U 5.0R		51.6	12.5	922.8	25	600
5.0U 10.0R		52.9	12.8	945.5	12.5	300
5.0U 20.0R		54.3	13.1	971.1	5	120
H 20.0L		107.4	26.0	1921.6	7.5	180
H 10.0L		89.8	21.7	1606.4	18.75	450
H 5.0L		92.5	22.4	1654.7	50	1200
H V		105.4	25.5	1884.7	75	1800
H 5.0R		101.5	24.6	1816.5	50	1200
H 10.0R		98.8	23.9	1768.3	18.75	450
H 20.0R		101.1	24.5	1808.0	7.5	180
5.0D 20.0L		58.4	14.1	1044.9	5	120
5.0D 10.0L		48.7	11.8	871.7	12.5	300
5.0D 5.0L		49.5	12.0	885.9	25	600
5.0D V		56.7	13.7	1013.7	37.5	900
5.0D 5.0R		53.7	13.0	959.7	25	600
5.0D 10.0R		52.9	12.8	945.5	12.5	300
5.0D 20.0R		56.2	13.6	1005.2	5	120
10.0D 5.0L		14.9	3.6	266.2	5	120
10.0D V		15.4	3.7	274.7	12.5	300
10.0D 5.0R		14.7	3.6	263.4	5	120
Zone 1		325.8	78.8	5828.0	37.5	900
2		46.3	11.2	828.4	20	480
3		191.1	46.2	3418.0	62.5	1500
4		414.2	100.2	7408.9	225	5400
5		204.1	49.4	3650.8	62.5	1500
6		45.0	10.9	804.3	20	480
7		317.2	76.8	5674.7	37.5	900

Sample meets all requirements for Class 2 optical warning devices.
Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).
Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		PA7/PA8				
Frequency:		1.23Hz				
Active Time/Flash:		0.252 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		15.0	3.8	278.7	5	120
10.0U V		15.9	4.0	295.7	12.5	300
10.0U 5.0R		15.4	3.9	287.5	5	120
5.0U 20.0L		61.3	15.4	1141.3	5	120
5.0U 10.0L		50.0	12.6	931.4	12.5	300
5.0U 5.0L		51.7	13.0	963.9	25	600
5.0U V		58.1	14.6	1082.2	37.5	900
5.0U 5.0R		51.6	13.0	961.0	25	600
5.0U 10.0R		52.9	13.3	984.6	12.5	300
5.0U 20.0R		54.3	13.7	1011.2	5	120
H 20.0L		107.4	27.1	2001.0	7.5	180
H 10.0L		89.8	22.6	1672.8	18.75	450
H 5.0L		92.5	23.3	1723.1	50	1200
H V		105.4	26.6	1962.6	75	1800
H 5.0R		101.5	25.6	1891.6	50	1200
H 10.0R		98.8	24.9	1841.3	18.75	450
H 20.0R		101.1	25.5	1882.7	7.5	180
5.0D 20.0L		58.4	14.7	1088.1	5	120
5.0D 10.0L		48.7	12.3	907.7	12.5	300
5.0D 5.0L		49.5	12.5	922.5	25	600
5.0D V		56.7	14.3	1055.6	37.5	900
5.0D 5.0R		53.7	13.5	999.4	25	600
5.0D 10.0R		52.9	13.3	984.6	12.5	300
5.0D 20.0R		56.2	14.2	1046.7	5	120
10.0D 5.0L		14.9	3.8	277.2	5	120
10.0D V		15.4	3.9	286.1	12.5	300
10.0D 5.0R		14.7	3.7	274.2	5	120
Zone 1		325.8	82.1	6068.8	37.5	900
2		46.3	11.7	862.6	20	480
3		191.1	48.2	3559.2	62.5	1500
4		414.2	104.4	7715.0	225	5400
5		204.1	51.4	3801.7	62.5	1500
6		45.0	11.3	837.5	20	480
7		317.2	79.9	5909.2	37.5	900

Sample meets all requirements for Class 2 optical warning devices.

Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).

Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		PA9/PA10				
Frequency:		1.23Hz				
Active Time/Flash:		0.248 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		15.0	3.7	274.3	5	120
10.0U V		15.9	3.9	291.0	12.5	300
10.0U 5.0R		15.4	3.8	283.0	5	120
5.0U 20.0L		61.3	15.2	1123.2	5	120
5.0U 10.0L		50.0	12.4	916.6	12.5	300
5.0U 5.0L		51.7	12.8	948.6	25	600
5.0U V		58.1	14.4	1065.0	37.5	900
5.0U 5.0R		51.6	12.8	945.7	25	600
5.0U 10.0R		52.9	13.1	969.0	12.5	300
5.0U 20.0R		54.3	13.5	995.2	5	120
H 20.0L		107.4	26.6	1969.3	7.5	180
H 10.0L		89.8	22.3	1646.3	18.75	450
H 5.0L		92.5	22.9	1695.7	50	1200
H V		105.4	26.1	1931.4	75	1800
H 5.0R		101.5	25.2	1861.6	50	1200
H 10.0R		98.8	24.5	1812.1	18.75	450
H 20.0R		101.1	25.1	1852.9	7.5	180
5.0D 20.0L		58.4	14.5	1070.8	5	120
5.0D 10.0L		48.7	12.1	893.3	12.5	300
5.0D 5.0L		49.5	12.3	907.9	25	600
5.0D V		56.7	14.1	1038.8	37.5	900
5.0D 5.0R		53.7	13.3	983.5	25	600
5.0D 10.0R		52.9	13.1	969.0	12.5	300
5.0D 20.0R		56.2	13.9	1030.1	5	120
10.0D 5.0L		14.9	3.7	272.8	5	120
10.0D V		15.4	3.8	281.5	12.5	300
10.0D 5.0R		14.7	3.7	269.9	5	120
Zone 1		325.8	80.8	5972.5	37.5	900
2		46.3	11.5	849.0	20	480
3		191.1	47.4	3502.8	62.5	1500
4		414.2	102.7	7592.6	225	5400
5		204.1	50.6	3741.4	62.5	1500
6		45.0	11.2	824.2	20	480
7		317.2	78.7	5815.4	37.5	900

Sample meets all requirements for Class 2 optical warning devices.
Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).
Aim: Lamp mounted level and perpendicular to HV.

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		PA11				
Frequency:		1.29Hz				
Active Time/Flash:		0.388 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		15.0	5.8	449.3	5	120
10.0U V		15.9	6.2	476.7	12.5	300
10.0U 5.0R		15.4	6.0	463.6	5	120
5.0U 20.0L		61.3	23.8	1840.0	5	120
5.0U 10.0L		50.0	19.4	1501.6	12.5	300
5.0U 5.0L		51.7	20.1	1554.0	25	600
5.0U V		58.1	22.5	1744.7	37.5	900
5.0U 5.0R		51.6	20.0	1549.2	25	600
5.0U 10.0R		52.9	20.5	1587.4	12.5	300
5.0U 20.0R		54.3	21.1	1630.3	5	120
H 20.0L		107.4	41.7	3226.0	7.5	180
H 10.0L		89.8	34.8	2696.8	18.75	450
H 5.0L		92.5	35.9	2777.9	50	1200
H V		105.4	40.9	3164.0	75	1800
H 5.0R		101.5	39.4	3049.6	50	1200
H 10.0R		98.8	38.4	2968.6	18.75	450
H 20.0R		101.1	39.2	3035.3	7.5	180
5.0D 20.0L		58.4	22.7	1754.2	5	120
5.0D 10.0L		48.7	18.9	1463.4	12.5	300
5.0D 5.0L		49.5	19.2	1487.3	25	600
5.0D V		56.7	22.0	1701.8	37.5	900
5.0D 5.0R		53.7	20.8	1611.2	25	600
5.0D 10.0R		52.9	20.5	1587.4	12.5	300
5.0D 20.0R		56.2	21.8	1687.5	5	120
10.0D 5.0L		14.9	5.8	446.9	5	120
10.0D V		15.4	6.0	461.2	12.5	300
10.0D 5.0R		14.7	5.7	442.1	5	120
Zone 1		325.8	126.4	9784.0	37.5	900
2		46.3	18.0	1390.7	20	480
3		191.1	74.1	5738.1	62.5	1500
4		414.2	160.7	12437.9	225	5400
5		204.1	79.2	6129.0	62.5	1500
6		45.0	17.4	1350.2	20	480
7		317.2	123.1	9526.6	37.5	900

Sample meets all requirements for Class 2 optical warning devices.
 Applied Voltage: 12.80V - operated 30 minutes prior to testing (SAE J1889).
 Aim: Lamp mounted level and perpendicular to HV.

TEST DATA SHEET

Device Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

ADDITIONAL TESTS (SAE J595)

Tests performed by: Mark Evans

Date: 9/18-28/2007

High Temperature Flash Rate Passed

At a temperature of 50°C for six hours.

One hour "off" - Five hours "on"

Sample	A2(Mode PA7 - Single Flash)
0 hour	1.23Hz
1 hour	1.23Hz
6 hours	1.24Hz
SAE Required 1 - 4 Hz, $\Delta f \leq 20\%$	

Low Temperature Flash Rate Passed

At a temperature of -30°C for six hours.

Five hours "off" - One hour "on"

Sample	A2(Mode PA7 - Single Flash)
0 hour	1.23Hz
5 hour	1.18Hz
6 hours	1.20Hz
Start Time	<0.5 sec
SAE Required 1 - 4 Hz, $\Delta f \leq 20\%$, S.T. ≤ 5 sec.	

Durability Passed

At an ambient temperature of 23°C for two hundred hours. Cycled at 50 minutes "on" ten minutes "off"

Sample	A2(Mode PA7 - Single Flash)
0 hour	1.22Hz
100 hour	1.23Hz
200 hours	1.23Hz
SAE Required 1 - 4 Hz, $\Delta f \leq 20\%$	

Device meets all flash rate requirements.

TEST DATA SHEET

Device Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

MECHANICAL TESTS (SAE J575 NOV06)

Test performed by: MAE/DGC

Date: 10/01-10/2007

Vibration Test (J577 1hr Shock): Passed
There was observed rotation, displacement,
cracking, or rupture of parts of the device (except
possibly filaments) which would cause the device to
fail any other requirements.
Sample A1 tested.

Vibration Test (6hr Random): Not Tested
There was no observed rotation, displacement,
cracking, or rupture of parts of the device (except
possibly filaments) which would cause the device to
fail any other requirements.

Moisture Test: Passed
There was 0cc of moisture accumulation inside the
device. (≤ 2 cc Required)
Sample A1 tested.

Dust Test: Passed
No dust was found on the interior surfaces of the
device. The maximum luminous intensity after the
dust test was 100% of the initial maximum luminous
intensity.
Sample A1 tested.

Corrosion Test: Passed
There was no observed corrosion which would cause
the device to fail any other requirements.
Sample R1 tested.

Lens Warpage Test: Passed
There was no observed warpage of plastic components
that would cause the device to fail any other
requirements.
Sample A2 tested.

Devices meet all mechanical test requirements
Note: Only one vibration method required to pass

TEST DATA SHEET

Device Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

Sample No.: A1, R1 and B1 (Steady state mode - worst case)

COLOR TEST (SAE J578 JUL02)

Spectroradiometric method using Photo Research PR650

Lamp Voltage: 12.80V

Test Performed By: Douglas Cummins

Test Distance: 5 ft

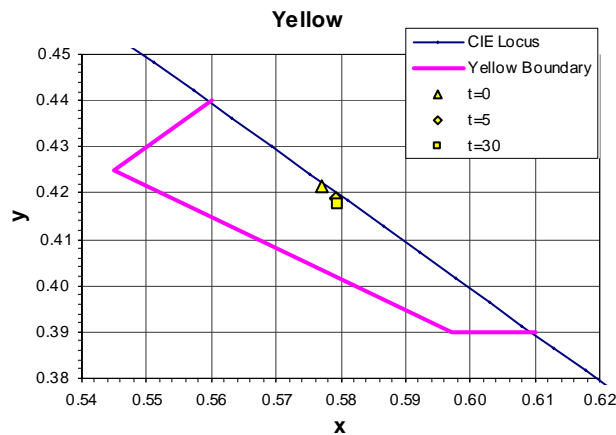
Date: 9/27/2007

Measured Average xy Chromaticity Coordinate Values:

Amber (T = 30 min)

x=0.5796

y=0.4176



Red (T = 30 min)

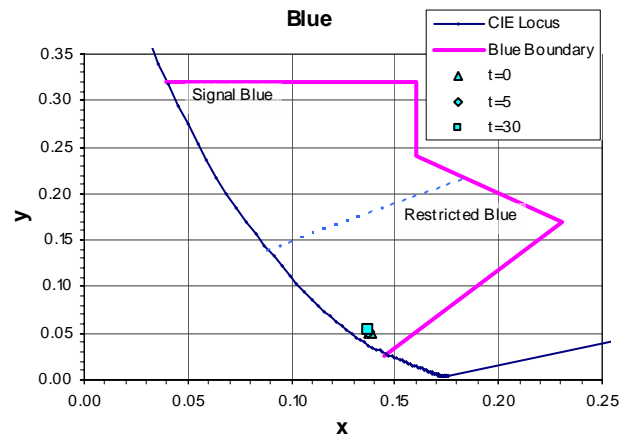
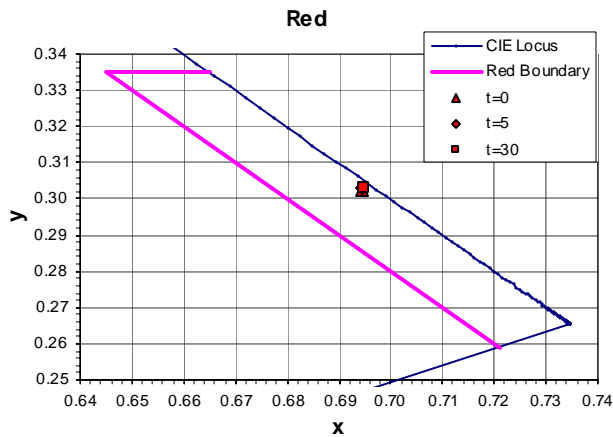
x=0.6950

y=0.3030

Blue (T = 30 min)

x=0.1373

y=0.0527



Devices comply with all color requirements.

PHOTOGRAPH SHEET

Device Name: Whacker Technologies LM-31S 3-LED Directional Warning Lamps(W)

