

## INDUSTRIAL TESTING LABORATORY

Report No. 070910-04F

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**TEST REPORT**

Report Date: 11 October 2007

Test Component: Whacker Technologies LM-32 6-LED 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 21 Flash modes (see page 3)

**SUMMARY**

## Photometric Test - Directional Warning Lamp

SAE J595 JAN05

Amber (Class 1 - Patterns 2, 3, 5, 6, 8, 9, 20) .....Passed

Amber (Class 2 - Patterns 1, 7) .....Passed

Red (Class 1 - Patterns 1, 2, 3, 5, 6, 7, 8, 9, 20) .....Passed

Blue (Class 2 - Patterns 1, 2, 3, 5, 6, 7, 8, 9, 20) .....Passed

## Photometric Test - Optical Warning Devices

SAE J845 MAY97

Amber (Class 1 - Patterns 1, 2, 3, 5, 6, 7, 8, 9, 20) .....Passed

Red (Class 1 - Patterns 2, 3, 5, 6, 8, 9, 20) .....Passed

Red (Class 2 - Patterns 1, 7) .....Passed

Blue (Class 1 - Patterns 2, 3, 5, 6, 8, 9, 20) .....Passed

Blue (Class 2 - Patterns 1, 7) .....Passed

Flash patterns 4, 10-19, 21 outside SAE J595 parameters

## Flash Characteristics - SAE J595

Patterns 1, 2, 3, 5, 6, 7, 8, 9.....Passed

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

Mechanical Tests - SAE J575.....Passed

Color Test - SAE J578.....Passed

Signature of Responsible Laboratory Official:

A handwritten signature in blue ink that reads "Mark A. Evans".

Mark A. Evans  
Photometric Engineer

**DESCRIPTION SHEET**

Device Name: Whacker Technologies LM-32 6-LED Directional Warning Lamps (W)

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

DESCRIPTION:

LENS (2X): 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 circuit board/housing  
Slides into extruded aluminum housing

GASKET: None

MODULE

HOUSING (2X): MATERIAL: Unknown

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

METHOD OF MOUNTING: Two (2) screws to lens

GASKET: None

ALUMINUM

HOUSING: MATERIAL: Extruded Aluminum

SHAPE/DIMENSIONS: Rectangular,  
150mm x 50mm x 40mm

METHOD OF MOUNTING: Two (2) channel bolts to vehicle

GASKET: None

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

SYSTEM VOLTAGE: 12Vdc

**SUMMARY SHEET**

Device Name: Whacker Technologies LM-32 6-LED Directional Warning Lamps (W)

**PHOTOMETRIC TESTS****Specification(s): SAE J595 JAN05**

Tests performed by: Mark Evans

Date: 9/17-18/2007

NIST Reference Detector: P181-2

Test distance: 100 feet

Device operated at 12.80V.

Peak measured current in mode P8: A1=864mA, A2=864mA, R1=856mA, R2=856mA,  
B1=456mA, B2=456mA**Characteristics**

	Description	Pulses	# Lamps	Freq. (Hz)	Active (ms)	Off Time (ms)	Class Amber	Class Red	Class Blue
1	Signal Alert-Alternating	4 + 1	2	1.17	330	430	2	1	2
2	Signal Alert-Simultaneous	4 + 1	1	1.17	330	430	1	1	2
3	Same as 2	4 + 1	1	1.17	330	430	1	1	2
4	Cam-Flash - Alternating	4	2	0.77	320	735	N/A	N/A	N/A
5	Cam-Flash - Simultaneous	4	1	1.10	328	336	1	1	2
6	Same as 5	4	1	1.10	328	336	1	1	2
7	Single Flash-Alternating	1	2	1.23	314	500	2	1	2
8	Single Flash-Simultaneous	1	1	1.23	314	500	1	1	2
9	Same as 8	1	1	1.23	314	500	1	1	2
10	Fast Single Flash-Alternating	1	2	4.85	72	128	N/A	N/A	N/A
11	Fast Single Flash-Simultaneous	1	1	4.85	72	128	N/A	N/A	N/A
12	Same as 11	1	1	4.85	72	128	N/A	N/A	N/A
13	2 Quad Burst + 4 Singles - Sim	12	2	0.12	8.48	4.24	N/A	N/A	N/A
14	Same as 13	12	1	0.24	4.24	200	N/A	N/A	N/A
15	Alternating Variable	N/A	2	0.14	N/A	N/A	N/A	N/A	N/A
16	Simultaneous Variable	N/A	1	0.14	N/A	N/A	N/A	N/A	N/A
17	Alternating Variable	N/A	2	0.34	N/A	N/A	N/A	N/A	N/A
18	Same as 17	N/A	2	0.34	N/A	N/A	N/A	N/A	N/A
19	S.S. / Variable Pulse	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A
20	Steady On	N/A	1	N/A	N/A		1	1	2
21	Simultaneous Cyclic	N/A	1	0.26	N/A	N/A	N/A	N/A	N/A
	Required	N/A		1 - 4 Hz	N/A	≥160 ms			

Above flash data based on sample "R1".

"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

**SUMMARY SHEET**

Device Name: Whacker Technologies LM-32 6-LED Directional Warning Lamps (W)

**PHOTOMETRIC TESTS****Specification(s): SAE J845 MAY97**

Tests performed by: Mark Evans

Date: 9/17-18/2007

NIST Reference Detector: P181-2

Test distance: 100 feet

Device operated at 12.80V.

Peak measured current in mode P8: A1=864mA, A2=864mA, R1=856mA, R2=856mA,  
B1=456mA, B2=456mA**Characteristics**

	Description	Pulses	# Lamps	Freq. (Hz)	Active (ms)	Off Time (ms)	Class Amber	Class Red	Class Blue
1	Signal Alert-Alternating	4 + 1	2	1.17	330	430	1(70°)	2(70°)	2(55°)
2	Signal Alert-Simultaneous	4 + 1	1	1.17	330	430	1(70°)	1(60°)	1(40°)
3	Same as 2	4 + 1	1	1.17	330	430	1(70°)	1(60°)	1(40°)
4	Cam-Flash - Alternating	4	2	0.77	320	735	N/A	N/A	N/A
5	Cam-Flash - Simultaneous	4	1	1.10	328	336	1(70°)	1(60°)	1(40°)
6	Same as 5	4	1	1.10	328	336	1(70°)	1(60°)	1(40°)
7	Single Flash-Alternating	1	2	1.23	314	500	1(70°)	2(70°)	2(55°)
8	Single Flash-Simultaneous	1	1	1.23	314	500	1(70°)	1(60°)	1(40°)
9	Same as 8	1	1	1.23	314	500	1(70°)	1(60°)	1(40°)
10	Fast Single Flash-Alternating	1	2	4.85	72	128	N/A	N/A	N/A
11	Fast Single Flash-Simultaneous	1	1	4.85	72	128	N/A	N/A	N/A
12	Same as 11	1	1	4.85	72	128	N/A	N/A	N/A
13	2 Quad Burst + 4 Singles - Sim	12	2	0.12	8.48	4.24	N/A	N/A	N/A
14	Same as 13	12	1	0.24	4.24	200	N/A	N/A	N/A
15	Alternating Variable	N/A	2	0.14	N/A	N/A	N/A	N/A	N/A
16	Simultaneous Variable	N/A	1	0.14	N/A	N/A	N/A	N/A	N/A
17	Alternating Variable	N/A	2	0.34	N/A	N/A	N/A	N/A	N/A
18	Same as 17	N/A	2	0.34	N/A	N/A	N/A	N/A	N/A
19	S.S. / Variable Pulse	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A
20	Steady On	N/A	1	N/A	N/A		1(70°)	1(60°)	1(40°)
21	Simultaneous Cyclic	N/A	1	0.26	N/A	N/A	N/A	N/A	N/A
	Required	N/A		1 - 4 Hz	N/A	≥160 ms			

Above flash data based on sample "R1".

"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.

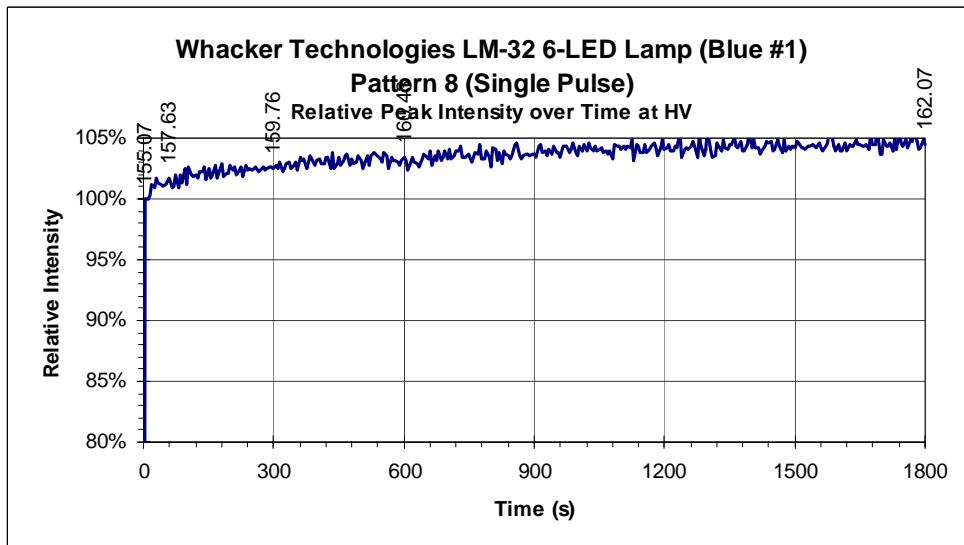
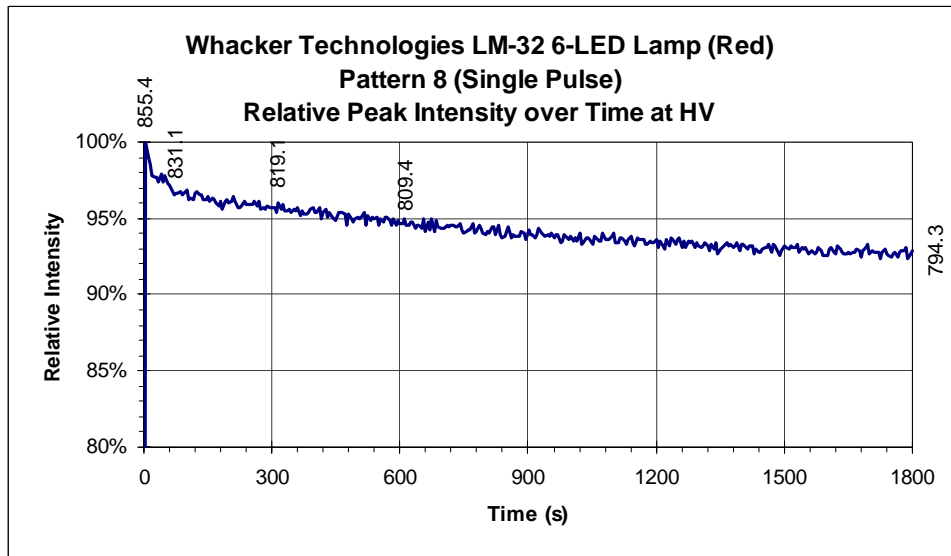
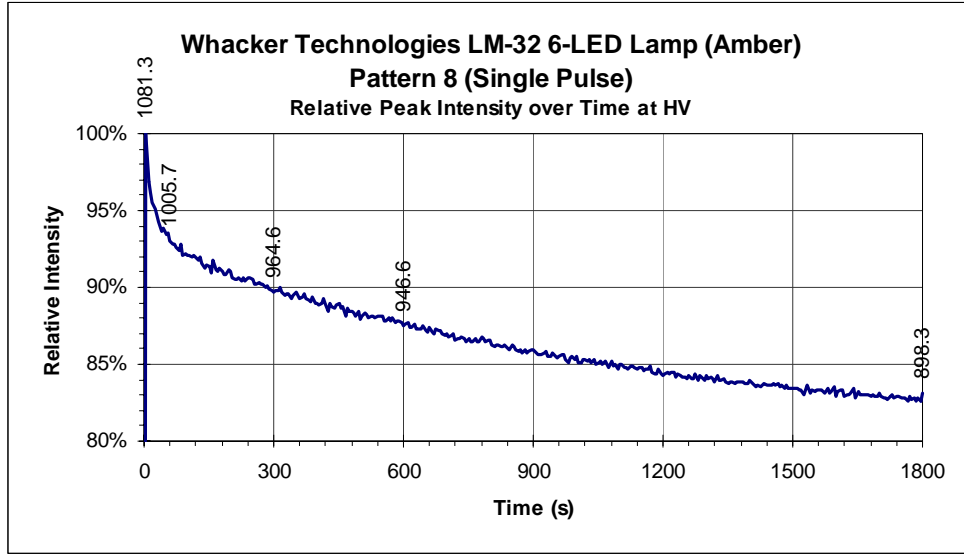
**FUNCTION MARKINGS**

None

PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-32 6-LED Directional Warning Lamps (W)

Time Log, Peak Intensity Captured in 5 Second Increments



## PHOTOMETRIC TEST DATA SHEET

Project Name: Whacker Technologies LM-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		P1				
Frequency:		1.17Hz				
Active Time/Flash:		0.330 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		54.3	17.9	1258.0	10	240
10.0U V		54.6	18.0	1263.9	25	600
10.0U 5.0R		55.4	18.3	1284.4	10	240
5.0U 20.0L		204.2	67.4	4730.3	10	240
5.0U 10.0L		178.9	59.0	4144.6	25	600
5.0U 5.0L		176.4	58.2	4085.9	50	1200
5.0U V		202.9	67.0	4701.0	75	1800
5.0U 5.0R		174.5	57.6	4042.3	50	1200
5.0U 10.0R		172.6	57.0	3998.0	25	600
5.0U 20.0R		193.4	63.8	4481.4	10	240
H 20.0L		409.0	135.0	9475.7	15	360
H 10.0L		390.7	128.9	9051.2	37.5	900
H 5.0L		383.1	126.4	8875.3	100	2400
H V		418.5	138.1	9695.6	150	3600
H 5.0R		381.2	125.8	8831.3	100	2400
H 10.0R		381.8	126.0	8845.6	37.5	900
H 20.0R		410.3	135.4	9505.0	15	360
5.0D 20.0L		183.3	60.5	4247.2	10	240
5.0D 10.0L		177.0	58.4	4101.0	25	600
5.0D 5.0L		168.8	55.7	3910.4	50	1200
5.0D V		193.5	63.8	4481.8	75	1800
5.0D 5.0R		176.4	58.2	4085.9	50	1200
5.0D 10.0R		176.4	58.2	4086.3	25	600
5.0D 20.0R		201.0	66.3	4657.4	10	240
10.0D 5.0L		53.2	17.6	1233.1	10	240
10.0D V		53.5	17.7	1240.4	25	600
10.0D 5.0R		50.9	16.8	1180.3	10	240
Zone 1		1152.5	380.3	26698.8	75	1800
2		164.3	54.2	3806.3	40	960
3		735.9	242.8	17047.5	125	3000
4		1579.2	521.1	36584.7	450	10800
5		732.7	241.8	16974.2	125	3000
6		157.7	52.1	3654.1	40	960
7		1153.8	380.7	26728.1	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		P2/P3			
Frequency:		1.17Hz			
Active Time/Flash:		0.330 Sec			
	Calculated			J595 (Class 1)	
	Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L	108.6	35.8	2516	40	960
10.0U V	109.1	36.0	2528	100	2400
10.0U 5.0R	110.9	36.6	2569	40	960
5.0U 20.0L	408.4	134.8	9461	40	960
5.0U 10.0L	357.8	118.1	8289	100	2400
5.0U 5.0L	352.8	116.4	8172	200	4800
5.0U V	405.9	133.9	9402	300	7200
5.0U 5.0R	349.0	115.2	8085	200	4800
5.0U 10.0R	345.2	113.9	7996	100	2400
5.0U 20.0R	386.9	127.7	8963	40	960
H 20.0L	818.1	270.0	18951	60	1440
H 10.0L	781.4	257.9	18102	150	3600
H 5.0L	766.2	252.9	17751	400	9600
H V	837.1	276.2	19391	600	14400
H 5.0R	762.4	251.6	17663	400	9600
H 10.0R	763.7	252.0	17691	150	3600
H 20.0R	820.6	270.8	19010	60	1440
5.0D 20.0L	366.7	121.0	8494	40	960
5.0D 10.0L	354.1	116.8	8202	100	2400
5.0D 5.0L	337.6	111.4	7821	200	4800
5.0D V	386.9	127.7	8964	300	7200
5.0D 5.0R	352.8	116.4	8172	200	4800
5.0D 10.0R	352.8	116.4	8173	100	2400
5.0D 20.0R	402.1	132.7	9315	40	960
10.0D 5.0L	106.5	35.1	2466	40	960
10.0D V	107.1	35.3	2481	100	2400
10.0D 5.0R	101.9	33.6	2361	40	960
Zone 1	2305.0	760.7	53398	300	7200
2	328.6	108.4	7613	160	3840
3	1471.8	485.7	34095	500	12000
4	3158.5	1042.3	73169	1800	43200
5	1465.4	483.6	33948	500	12000
6	315.5	104.1	7308	160	3840
7	2307.5	761.5	53456	300	7200

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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		P5/P6				
Frequency:		1.10Hz				
Active Time/Flash:		0.328 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		108.6	35.6	2351	40	960
10.0U V		109.1	35.8	2362	100	2400
10.0U 5.0R		110.9	36.4	2400	40	960
5.0U 20.0L		408.4	134.0	8841	40	960
5.0U 10.0L		357.8	117.4	7746	100	2400
5.0U 5.0L		352.8	115.7	7636	200	4800
5.0U V		405.9	133.1	8786	300	7200
5.0U 5.0R		349.0	114.5	7555	200	4800
5.0U 10.0R		345.2	113.2	7472	100	2400
5.0U 20.0R		386.9	126.9	8376	40	960
H 20.0L		818.1	268.3	17710	60	1440
H 10.0L		781.4	256.3	16916	150	3600
H 5.0L		766.2	251.3	16587	400	9600
H V		837.1	274.6	18121	600	14400
H 5.0R		762.4	250.1	16505	400	9600
H 10.0R		763.7	250.5	16532	150	3600
H 20.0R		820.6	269.2	17764	60	1440
5.0D 20.0L		366.7	120.3	7938	40	960
5.0D 10.0L		354.1	116.1	7664	100	2400
5.0D 5.0L		337.6	110.7	7308	200	4800
5.0D V		386.9	126.9	8376	300	7200
5.0D 5.0R		352.8	115.7	7636	200	4800
5.0D 10.0R		352.8	115.7	7637	100	2400
5.0D 20.0R		402.1	131.9	8704	40	960
10.0D 5.0L		106.5	34.9	2305	40	960
10.0D V		107.1	35.1	2318	100	2400
10.0D 5.0R		101.9	33.4	2206	40	960
Zone 1		2305.0	756.0	49899	300	7200
2		328.6	107.8	7114	160	3840
3		1471.8	482.7	31861	500	12000
4		3158.5	1036.0	68375	1800	43200
5		1465.4	480.7	31724	500	12000
6		315.5	103.5	6829	160	3840
7		2307.5	756.9	49953	300	7200

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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		P7				
Frequency:		1.23Hz				
Active Time/Flash:		0.314 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		54.3	17.1	1258.4	10	240
10.0U V		54.6	17.1	1264.3	25	600
10.0U 5.0R		55.4	17.4	1284.8	10	240
5.0U 20.0L		204.2	64.1	4731.8	10	240
5.0U 10.0L		178.9	56.2	4145.9	25	600
5.0U 5.0L		176.4	55.4	4087.2	50	1200
5.0U V		202.9	63.7	4702.5	75	1800
5.0U 5.0R		174.5	54.8	4043.6	50	1200
5.0U 10.0R		172.6	54.2	3999.2	25	600
5.0U 20.0R		193.4	60.7	4482.8	10	240
H 20.0L		409.0	128.4	9478.6	15	360
H 10.0L		390.7	122.7	9054.0	37.5	900
H 5.0L		383.1	120.3	8878.0	100	2400
H V		418.5	131.4	9698.6	150	3600
H 5.0R		381.2	119.7	8834.0	100	2400
H 10.0R		381.8	119.9	8848.3	37.5	900
H 20.0R		410.3	128.8	9508.0	15	360
5.0D 20.0L		183.3	57.6	4248.5	10	240
5.0D 10.0L		177.0	55.6	4102.2	25	600
5.0D 5.0L		168.8	53.0	3911.6	50	1200
5.0D V		193.5	60.7	4483.2	75	1800
5.0D 5.0R		176.4	55.4	4087.2	50	1200
5.0D 10.0R		176.4	55.4	4087.6	25	600
5.0D 20.0R		201.0	63.1	4658.8	10	240
10.0D 5.0L		53.2	16.7	1233.5	10	240
10.0D V		53.5	16.8	1240.8	25	600
10.0D 5.0R		50.9	16.0	1180.7	10	240
Zone 1		1152.5	361.9	26707.1	75	1800
2		164.3	51.6	3807.4	40	960
3		735.9	231.1	17052.8	125	3000
4		1579.2	495.9	36596.1	450	10800
5		732.7	230.1	16979.5	125	3000
6		157.7	49.5	3655.3	40	960
7		1153.8	362.3	26736.4	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Yellow (Amber)

Flash Mode:		P8/P9				
Frequency:		1.23Hz				
Active Time/Flash:		0.314 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		108.6	34.1	2517	40	960
10.0U V		109.1	34.3	2529	100	2400
10.0U 5.0R		110.9	34.8	2570	40	960
5.0U 20.0L		408.4	128.2	9464	40	960
5.0U 10.0L		357.8	112.4	8292	100	2400
5.0U 5.0L		352.8	110.8	8174	200	4800
5.0U V		405.9	127.4	9405	300	7200
5.0U 5.0R		349.0	109.6	8087	200	4800
5.0U 10.0R		345.2	108.4	7998	100	2400
5.0U 20.0R		386.9	121.5	8966	40	960
H 20.0L		818.1	256.9	18957	60	1440
H 10.0L		781.4	245.4	18108	150	3600
H 5.0L		766.2	240.6	17756	400	9600
H V		837.1	262.8	19397	600	14400
H 5.0R		762.4	239.4	17668	400	9600
H 10.0R		763.7	239.8	17697	150	3600
H 20.0R		820.6	257.7	19016	60	1440
5.0D 20.0L		366.7	115.1	8497	40	960
5.0D 10.0L		354.1	111.2	8204	100	2400
5.0D 5.0L		337.6	106.0	7823	200	4800
5.0D V		386.9	121.5	8966	300	7200
5.0D 5.0R		352.8	110.8	8174	200	4800
5.0D 10.0R		352.8	110.8	8175	100	2400
5.0D 20.0R		402.1	126.3	9318	40	960
10.0D 5.0L		106.5	33.4	2467	40	960
10.0D V		107.1	33.6	2482	100	2400
10.0D 5.0R		101.9	32.0	2361	40	960
Zone 1		2305.0	723.8	53414	300	7200
2		328.6	103.2	7615	160	3840
3		1471.8	462.1	34106	500	12000
4		3158.5	991.8	73192	1800	43200
5		1465.4	460.1	33959	500	12000
6		315.5	99.1	7311	160	3840
7		2307.5	724.6	53473	300	7200

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-32 6-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:		P20				
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		108.6	42.1	3262	40	960
10.0U V		109.1	42.3	3277	100	2400
10.0U 5.0R		110.9	43.0	3330	40	960
5.0U 20.0L		408.4	158.5	12264	40	960
5.0U 10.0L		357.8	138.8	10746	100	2400
5.0U 5.0L		352.8	136.9	10594	200	4800
5.0U V		405.9	157.5	12188	300	7200
5.0U 5.0R		349.0	135.4	10481	200	4800
5.0U 10.0R		345.2	133.9	10366	100	2400
5.0U 20.0R		386.9	150.1	11619	40	960
H 20.0L		818.1	317.4	24568	60	1440
H 10.0L		781.4	303.2	23467	150	3600
H 5.0L		766.2	297.3	23011	400	9600
H V		837.1	324.8	25138	600	14400
H 5.0R		762.4	295.8	22897	400	9600
H 10.0R		763.7	296.3	22934	150	3600
H 20.0R		820.6	318.4	24644	60	1440
5.0D 20.0L		366.7	142.3	11012	40	960
5.0D 10.0L		354.1	137.4	10633	100	2400
5.0D 5.0L		337.6	131.0	10138	200	4800
5.0D V		386.9	150.1	11620	300	7200
5.0D 5.0R		352.8	136.9	10594	200	4800
5.0D 10.0R		352.8	136.9	10595	100	2400
5.0D 20.0R		402.1	156.0	12075	40	960
10.0D 5.0L		106.5	41.3	3197	40	960
10.0D V		107.1	41.6	3216	100	2400
10.0D 5.0R		101.9	39.5	3060	40	960
Zone 1		2305.0	894.3	69222	300	7200
2		328.6	127.5	9868	160	3840
3		1471.8	571.0	44199	500	12000
4		3158.5	1225.5	94853	1800	43200
5		1465.4	568.6	44009	500	12000
6		315.5	122.4	9474	160	3840
7		2307.5	895.3	69298	300	7200

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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		P1				
Frequency:		1.17Hz				
Active Time/Flash:		0.330 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		54.1	17.9	1254	20	480
10.0U V		52.1	17.2	1208	50	1200
10.0U 5.0R		51.8	17.1	1199	20	480
5.0U 20.0L		158.4	52.3	3669	20	480
5.0U 10.0L		139.9	46.2	3241	50	1200
5.0U 5.0L		140.6	46.4	3256	100	2400
5.0U V		155.2	51.2	3595	150	3600
5.0U 5.0R		142.5	47.0	3300	100	2400
5.0U 10.0R		137.4	45.3	3183	50	1200
5.0U 20.0R		151.4	50.0	3507	20	480
H 20.0L		347.3	114.6	8045	30	720
H 10.0L		315.5	104.1	7308	75	1800
H 5.0L		325.0	107.3	7529	200	4800
H V		370.8	122.4	8590	300	7200
H 5.0R		314.8	103.9	7293	200	4800
H 10.0R		308.5	101.8	7146	75	1800
H 20.0R		332.0	109.6	7691	30	720
5.0D 20.0L		159.0	52.5	3684	20	480
5.0D 10.0L		145.7	48.1	3374	50	1200
5.0D 5.0L		146.9	48.5	3403	100	2400
5.0D V		166.0	54.8	3846	150	3600
5.0D 5.0R		144.4	47.6	3345	100	2400
5.0D 10.0R		152.6	50.4	3536	50	1200
5.0D 20.0R		167.9	55.4	3890	20	480
10.0D 5.0L		32.8	10.8	759	20	480
10.0D V		36.0	11.9	834	50	1200
10.0D 5.0R		33.8	11.1	782	20	480
Zone 1		950.2	313.6	22013	150	3600
2		158.0	52.2	3661	80	1920
3		602.9	199.0	13968	250	6000
4		1331.8	439.5	30852	900	21600
5		595.3	196.5	13791	250	6000
6		102.5	33.8	2375	80	1920
7		941.3	310.6	21807	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		P2/P3				
Frequency:		1.17Hz				
Active Time/Flash:		0.330 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		108.2	35.7	2508	20	480
10.0U V		104.3	34.4	2416	50	1200
10.0U 5.0R		103.5	34.2	2398	20	480
5.0U 20.0L		316.8	104.5	7338	20	480
5.0U 10.0L		279.8	92.3	6483	50	1200
5.0U 5.0L		281.1	92.8	6512	100	2400
5.0U V		310.4	102.4	7190	150	3600
5.0U 5.0R		284.9	94.0	6601	100	2400
5.0U 10.0R		274.8	90.7	6365	50	1200
5.0U 20.0R		302.7	99.9	7013	20	480
H 20.0L		694.5	229.2	16089	30	720
H 10.0L		630.9	208.2	14616	75	1800
H 5.0L		650.0	214.5	15058	200	4800
H V		741.6	244.7	17180	300	7200
H 5.0R		629.6	207.8	14586	200	4800
H 10.0R		616.9	203.6	14292	75	1800
H 20.0R		664.0	219.1	15383	30	720
5.0D 20.0L		318.0	104.9	7367	20	480
5.0D 10.0L		291.3	96.1	6748	50	1200
5.0D 5.0L		293.8	97.0	6807	100	2400
5.0D V		332.0	109.6	7691	150	3600
5.0D 5.0R		288.8	95.3	6689	100	2400
5.0D 10.0R		305.3	100.7	7072	50	1200
5.0D 20.0R		335.8	110.8	7780	20	480
10.0D 5.0L		65.5	21.6	1518	20	480
10.0D V		72.0	23.8	1668	50	1200
10.0D 5.0R		67.5	22.3	1565	20	480
Zone 1		1900.4	627.1	44026	150	3600
2		316.1	104.3	7322	80	1920
3		1205.9	397.9	27936	250	6000
4		2663.6	879.0	61705	900	21600
5		1190.6	392.9	27582	250	6000
6		205.1	67.7	4751	80	1920
7		1882.6	621.3	43613	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		P5/P6				
Frequency:		1.10Hz				
Active Time/Flash:		0.328 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		108.2	35.5	2343	20	480
10.0U V		104.3	34.2	2258	50	1200
10.0U 5.0R		103.5	34.0	2241	20	480
5.0U 20.0L		316.8	103.9	6857	20	480
5.0U 10.0L		279.8	91.8	6058	50	1200
5.0U 5.0L		281.1	92.2	6086	100	2400
5.0U V		310.4	101.8	6719	150	3600
5.0U 5.0R		284.9	93.5	6168	100	2400
5.0U 10.0R		274.8	90.1	5948	50	1200
5.0U 20.0R		302.7	99.3	6554	20	480
H 20.0L		694.5	227.8	15035	30	720
H 10.0L		630.9	206.9	13658	75	1800
H 5.0L		650.0	213.2	14071	200	4800
H V		741.6	243.2	16054	300	7200
H 5.0R		629.6	206.5	13631	200	4800
H 10.0R		616.9	202.4	13356	75	1800
H 20.0R		664.0	217.8	14375	30	720
5.0D 20.0L		318.0	104.3	6885	20	480
5.0D 10.0L		291.3	95.5	6306	50	1200
5.0D 5.0L		293.8	96.4	6361	100	2400
5.0D V		332.0	108.9	7187	150	3600
5.0D 5.0R		288.8	94.7	6251	100	2400
5.0D 10.0R		305.3	100.1	6609	50	1200
5.0D 20.0R		335.8	110.2	7270	20	480
10.0D 5.0L		65.5	21.5	1418	20	480
10.0D V		72.0	23.6	1559	50	1200
10.0D 5.0R		67.5	22.2	1462	20	480
Zone 1		1900.4	623.3	41141	150	3600
2		316.1	103.7	6843	80	1920
3		1205.9	395.5	26105	250	6000
4		2663.6	873.7	57662	900	21600
5		1190.6	390.5	25775	250	6000
6		205.1	67.3	4439	80	1920
7		1882.6	617.5	40755	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		P7				
Frequency:		1.23Hz				
Active Time/Flash:		0.314 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		54.1	17.0	1254	20	480
10.0U V		52.1	16.4	1208	50	1200
10.0U 5.0R		51.8	16.3	1200	20	480
5.0U 20.0L		158.4	49.7	3670	20	480
5.0U 10.0L		139.9	43.9	3242	50	1200
5.0U 5.0L		140.6	44.1	3257	100	2400
5.0U V		155.2	48.7	3596	150	3600
5.0U 5.0R		142.5	44.7	3301	100	2400
5.0U 10.0R		137.4	43.1	3184	50	1200
5.0U 20.0R		151.4	47.5	3508	20	480
H 20.0L		347.3	109.0	8047	30	720
H 10.0L		315.5	99.1	7310	75	1800
H 5.0L		325.0	102.1	7531	200	4800
H V		370.8	116.4	8593	300	7200
H 5.0R		314.8	98.9	7295	200	4800
H 10.0R		308.5	96.9	7148	75	1800
H 20.0R		332.0	104.3	7694	30	720
5.0D 20.0L		159.0	49.9	3685	20	480
5.0D 10.0L		145.7	45.7	3375	50	1200
5.0D 5.0L		146.9	46.1	3404	100	2400
5.0D V		166.0	52.1	3847	150	3600
5.0D 5.0R		144.4	45.3	3346	100	2400
5.0D 10.0R		152.6	47.9	3537	50	1200
5.0D 20.0R		167.9	52.7	3891	20	480
10.0D 5.0L		32.8	10.3	759	20	480
10.0D V		36.0	11.3	834	50	1200
10.0D 5.0R		33.8	10.6	783	20	480
Zone 1		950.2	298.4	22020	150	3600
2		158.0	49.6	3662	80	1920
3		602.9	189.3	13972	250	6000
4		1331.8	418.2	30862	900	21600
5		595.3	186.9	13795	250	6000
6		102.5	32.2	2376	80	1920
7		941.3	295.6	21813	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Red

Flash Mode:		P8/P9				
Frequency:		1.23Hz				
Active Time/Flash:		0.314 Sec				
		Calculated			J595 (Class 1)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		108.2	34.0	2508	20	480
10.0U V		104.3	32.8	2417	50	1200
10.0U 5.0R		103.5	32.5	2399	20	480
5.0U 20.0L		316.8	99.5	7340	20	480
5.0U 10.0L		279.8	87.9	6485	50	1200
5.0U 5.0L		281.1	88.3	6514	100	2400
5.0U V		310.4	97.5	7193	150	3600
5.0U 5.0R		284.9	89.5	6603	100	2400
5.0U 10.0R		274.8	86.3	6367	50	1200
5.0U 20.0R		302.7	95.1	7015	20	480
H 20.0L		694.5	218.1	16094	30	720
H 10.0L		630.9	198.1	14621	75	1800
H 5.0L		650.0	204.1	15063	200	4800
H V		741.6	232.9	17185	300	7200
H 5.0R		629.6	197.7	14591	200	4800
H 10.0R		616.9	193.7	14297	75	1800
H 20.0R		664.0	208.5	15387	30	720
5.0D 20.0L		318.0	99.9	7370	20	480
5.0D 10.0L		291.3	91.5	6750	50	1200
5.0D 5.0L		293.8	92.3	6809	100	2400
5.0D V		332.0	104.3	7694	150	3600
5.0D 5.0R		288.8	90.7	6691	100	2400
5.0D 10.0R		305.3	95.9	7074	50	1200
5.0D 20.0R		335.8	105.5	7782	20	480
10.0D 5.0L		65.5	20.6	1518	20	480
10.0D V		72.0	22.6	1669	50	1200
10.0D 5.0R		67.5	21.2	1565	20	480
Zone 1		1900.4	596.7	44039	150	3600
2		316.1	99.3	7325	80	1920
3		1205.9	378.7	27944	250	6000
4		2663.6	836.4	61724	900	21600
5		1190.6	373.9	27591	250	6000
6		205.1	64.4	4752	80	1920
7		1882.6	591.2	43627	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-32 6-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:		P20				
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		108.2	42.0	3251	20	480
10.0U V		104.3	40.5	3132	50	1200
10.0U 5.0R		103.5	40.2	3109	20	480
5.0U 20.0L		316.8	122.9	9512	20	480
5.0U 10.0L		279.8	108.6	8404	50	1200
5.0U 5.0L		281.1	109.1	8442	100	2400
5.0U V		310.4	120.4	9321	150	3600
5.0U 5.0R		284.9	110.6	8557	100	2400
5.0U 10.0R		274.8	106.6	8252	50	1200
5.0U 20.0R		302.7	117.5	9092	20	480
H 20.0L		694.5	269.5	20857	30	720
H 10.0L		630.9	244.8	18947	75	1800
H 5.0L		650.0	252.2	19520	200	4800
H V		741.6	287.7	22271	300	7200
H 5.0R		629.6	244.3	18909	200	4800
H 10.0R		616.9	239.4	18528	75	1800
H 20.0R		664.0	257.6	19941	30	720
5.0D 20.0L		318.0	123.4	9551	20	480
5.0D 10.0L		291.3	113.0	8748	50	1200
5.0D 5.0L		293.8	114.0	8824	100	2400
5.0D V		332.0	128.8	9971	150	3600
5.0D 5.0R		288.8	112.0	8672	100	2400
5.0D 10.0R		305.3	118.5	9168	50	1200
5.0D 20.0R		335.8	130.3	10085	20	480
10.0D 5.0L		65.5	25.4	1967	20	480
10.0D V		72.0	27.9	2162	50	1200
10.0D 5.0R		67.5	26.2	2029	20	480
Zone 1		1900.4	737.4	57073	150	3600
2		316.1	122.6	9492	80	1920
3		1205.9	467.9	36214	250	6000
4		2663.6	1033.5	79991	900	21600
5		1190.6	462.0	35756	250	6000
6		205.1	79.6	6158	80	1920
7		1882.6	730.5	56538	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		P1				
Frequency:		1.17Hz				
Active Time/Flash:		0.330 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		12.1	4.0	280.4	5	120
10.0U V		13.0	4.3	301.7	12.5	300
10.0U 5.0R		12.1	4.0	280.7	5	120
5.0U 20.0L		42.5	14.0	984.8	5	120
5.0U 10.0L		42.3	13.9	978.9	12.5	300
5.0U 5.0L		41.1	13.6	952.4	25	600
5.0U V		46.8	15.4	1083.1	37.5	900
5.0U 5.0R		39.8	13.1	921.4	25	600
5.0U 10.0R		38.0	12.5	880.1	12.5	300
5.0U 20.0R		44.7	14.7	1034.5	5	120
H 20.0L		78.1	25.8	1808.9	7.5	180
H 10.0L		78.5	25.9	1819.2	18.75	450
H 5.0L		76.4	25.2	1770.6	50	1200
H V		86.3	28.5	2000.1	75	1800
H 5.0R		75.0	24.8	1738.2	50	1200
H 10.0R		70.6	23.3	1636.5	18.75	450
H 20.0R		84.9	28.0	1966.2	7.5	180
5.0D 20.0L		43.9	14.5	1016.8	5	120
5.0D 10.0L		43.6	14.4	1009.5	12.5	300
5.0D 5.0L		41.3	13.6	956.8	25	600
5.0D V		48.3	16.0	1120.0	37.5	900
5.0D 5.0R		42.2	13.9	977.4	25	600
5.0D 10.0R		40.2	13.3	930.3	12.5	300
5.0D 20.0R		50.1	16.5	1159.8	5	120
10.0D 5.0L		10.7	3.5	247.6	5	120
10.0D V		11.9	3.9	276.3	12.5	300
10.0D 5.0R		10.9	3.6	252.7	5	120
Zone 1		250.3	82.6	5798.9	37.5	900
2		37.2	12.3	862.8	20	480
3		160.9	53.1	3728.0	62.5	1500
4		332.9	109.9	7712.1	225	5400
5		152.6	50.4	3535.0	62.5	1500
6		33.5	11.1	776.6	20	480
7		257.7	85.1	5970.9	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		P2/P3				
Frequency:		1.17Hz				
Active Time/Flash:		0.330 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		24.2	8.0	560.7	5	120
10.0U V		26.0	8.6	603.5	12.5	300
10.0U 5.0R		24.2	8.0	561.5	5	120
5.0U 20.0L		85.0	28.1	1969.6	5	120
5.0U 10.0L		84.5	27.9	1957.8	12.5	300
5.0U 5.0L		82.2	27.1	1904.7	25	600
5.0U V		93.5	30.9	2166.3	37.5	900
5.0U 5.0R		79.5	26.3	1842.8	25	600
5.0U 10.0R		76.0	25.1	1760.3	12.5	300
5.0U 20.0R		89.3	29.5	2069.0	5	120
H 20.0L		156.2	51.5	3617.8	7.5	180
H 10.0L		157.1	51.8	3638.5	18.75	450
H 5.0L		152.9	50.4	3541.2	50	1200
H V		172.7	57.0	4000.3	75	1800
H 5.0R		150.1	49.5	3476.4	50	1200
H 10.0R		141.3	46.6	3273.0	18.75	450
H 20.0R		169.8	56.0	3932.5	7.5	180
5.0D 20.0L		87.8	29.0	2033.7	5	120
5.0D 10.0L		87.2	28.8	2018.9	12.5	300
5.0D 5.0L		82.6	27.3	1913.6	25	600
5.0D V		96.7	31.9	2240.0	37.5	900
5.0D 5.0R		84.4	27.8	1954.8	25	600
5.0D 10.0R		80.3	26.5	1860.5	12.5	300
5.0D 20.0R		100.1	33.0	2319.5	5	120
10.0D 5.0L		21.4	7.1	495.2	5	120
10.0D V		23.9	7.9	552.6	12.5	300
10.0D 5.0R		21.8	7.2	505.5	5	120
Zone 1		500.6	165.2	11597.7	37.5	900
2		74.5	24.6	1725.7	20	480
3		321.9	106.2	7456.0	62.5	1500
4		665.8	219.7	15424.1	225	5400
5		305.2	100.7	7069.9	62.5	1500
6		67.0	22.1	1553.2	20	480
7		515.5	170.1	11941.8	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		P5/P6				
Frequency:		1.10Hz				
Active Time/Flash:		0.328 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		24.2	7.9	524.0	5	120
10.0U V		26.0	8.5	563.9	12.5	300
10.0U 5.0R		24.2	7.9	524.7	5	120
5.0U 20.0L		85.0	27.9	1840.5	5	120
5.0U 10.0L		84.5	27.7	1829.5	12.5	300
5.0U 5.0L		82.2	27.0	1779.9	25	600
5.0U V		93.5	30.7	2024.3	37.5	900
5.0U 5.0R		79.5	26.1	1722.1	25	600
5.0U 10.0R		76.0	24.9	1644.9	12.5	300
5.0U 20.0R		89.3	29.3	1933.4	5	120
H 20.0L		156.2	51.2	3380.8	7.5	180
H 10.0L		157.1	51.5	3400.1	18.75	450
H 5.0L		152.9	50.1	3309.2	50	1200
H V		172.7	56.6	3738.1	75	1800
H 5.0R		150.1	49.2	3248.6	50	1200
H 10.0R		141.3	46.3	3058.5	18.75	450
H 20.0R		169.8	55.7	3674.8	7.5	180
5.0D 20.0L		87.8	28.8	1900.4	5	120
5.0D 10.0L		87.2	28.6	1886.6	12.5	300
5.0D 5.0L		82.6	27.1	1788.2	25	600
5.0D V		96.7	31.7	2093.2	37.5	900
5.0D 5.0R		84.4	27.7	1826.7	25	600
5.0D 10.0R		80.3	26.3	1738.6	12.5	300
5.0D 20.0R		100.1	32.8	2167.6	5	120
10.0D 5.0L		21.4	7.0	462.7	5	120
10.0D V		23.9	7.8	516.4	12.5	300
10.0D 5.0R		21.8	7.2	472.3	5	120
Zone 1		500.6	164.2	10837.8	37.5	900
2		74.5	24.4	1612.6	20	480
3		321.9	105.6	6967.4	62.5	1500
4		665.8	218.4	14413.4	225	5400
5		305.2	100.1	6606.6	62.5	1500
6		67.0	22.0	1451.5	20	480
7		515.5	169.1	11159.3	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		P7				
Frequency:		1.23Hz				
Active Time/Flash:		0.314 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		12.1	3.8	280.5	5	120
10.0U V		13.0	4.1	301.8	12.5	300
10.0U 5.0R		12.1	3.8	280.8	5	120
5.0U 20.0L		42.5	13.3	985.1	5	120
5.0U 10.0L		42.3	13.3	979.2	12.5	300
5.0U 5.0L		41.1	12.9	952.7	25	600
5.0U V		46.8	14.7	1083.5	37.5	900
5.0U 5.0R		39.8	12.5	921.7	25	600
5.0U 10.0R		38.0	11.9	880.4	12.5	300
5.0U 20.0R		44.7	14.0	1034.8	5	120
H 20.0L		78.1	24.5	1809.5	7.5	180
H 10.0L		78.5	24.7	1819.8	18.75	450
H 5.0L		76.4	24.0	1771.2	50	1200
H V		86.3	27.1	2000.8	75	1800
H 5.0R		75.0	23.6	1738.7	50	1200
H 10.0R		70.6	22.2	1637.0	18.75	450
H 20.0R		84.9	26.7	1966.8	7.5	180
5.0D 20.0L		43.9	13.8	1017.1	5	120
5.0D 10.0L		43.6	13.7	1009.8	12.5	300
5.0D 5.0L		41.3	13.0	957.1	25	600
5.0D V		48.3	15.2	1120.3	37.5	900
5.0D 5.0R		42.2	13.2	977.7	25	600
5.0D 10.0R		40.2	12.6	930.5	12.5	300
5.0D 20.0R		50.1	15.7	1160.1	5	120
10.0D 5.0L		10.7	3.4	247.7	5	120
10.0D V		11.9	3.7	276.4	12.5	300
10.0D 5.0R		10.9	3.4	252.8	5	120
Zone 1		250.3	78.6	5800.7	37.5	900
2		37.2	11.7	863.1	20	480
3		160.9	50.5	3729.2	62.5	1500
4		332.9	104.5	7714.4	225	5400
5		152.6	47.9	3536.1	62.5	1500
6		33.5	10.5	776.9	20	480
7		257.7	80.9	5972.8	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		P8/P9				
Frequency:		1.23Hz				
Active Time/Flash:		0.314 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		24.2	7.6	560.9	5	120
10.0U V		26.0	8.2	603.7	12.5	300
10.0U 5.0R		24.2	7.6	561.6	5	120
5.0U 20.0L		85.0	26.7	1970.2	5	120
5.0U 10.0L		84.5	26.5	1958.4	12.5	300
5.0U 5.0L		82.2	25.8	1905.3	25	600
5.0U V		93.5	29.4	2167.0	37.5	900
5.0U 5.0R		79.5	25.0	1843.4	25	600
5.0U 10.0R		76.0	23.9	1760.8	12.5	300
5.0U 20.0R		89.3	28.0	2069.7	5	120
H 20.0L		156.2	49.0	3619.0	7.5	180
H 10.0L		157.1	49.3	3639.6	18.75	450
H 5.0L		152.9	48.0	3542.3	50	1200
H V		172.7	54.2	4001.5	75	1800
H 5.0R		150.1	47.1	3477.5	50	1200
H 10.0R		141.3	44.4	3274.0	18.75	450
H 20.0R		169.8	53.3	3933.7	7.5	180
5.0D 20.0L		87.8	27.6	2034.3	5	120
5.0D 10.0L		87.2	27.4	2019.5	12.5	300
5.0D 5.0L		82.6	25.9	1914.1	25	600
5.0D V		96.7	30.4	2240.7	37.5	900
5.0D 5.0R		84.4	26.5	1955.4	25	600
5.0D 10.0R		80.3	25.2	1861.1	12.5	300
5.0D 20.0R		100.1	31.4	2320.3	5	120
10.0D 5.0L		21.4	6.7	495.3	5	120
10.0D V		23.9	7.5	552.8	12.5	300
10.0D 5.0R		21.8	6.9	505.6	5	120
Zone 1		500.6	157.2	11601.3	37.5	900
2		74.5	23.4	1726.2	20	480
3		321.9	101.1	7458.3	62.5	1500
4		665.8	209.1	15428.9	225	5400
5		305.2	95.8	7072.1	62.5	1500
6		67.0	21.1	1553.7	20	480
7		515.5	161.9	11945.5	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-32 6-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: Blue

Flash Mode:		P20				
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		24.2	9.4	726.9	5	120
10.0U V		26.0	10.1	782.3	12.5	300
10.0U 5.0R		24.2	9.4	727.9	5	120
5.0U 20.0L		85.0	33.0	2553.2	5	120
5.0U 10.0L		84.5	32.8	2537.9	12.5	300
5.0U 5.0L		82.2	31.9	2469.2	25	600
5.0U V		93.5	36.3	2808.3	37.5	900
5.0U 5.0R		79.5	30.9	2388.9	25	600
5.0U 10.0R		76.0	29.5	2282.0	12.5	300
5.0U 20.0R		89.3	34.7	2682.2	5	120
H 20.0L		156.2	60.6	4690.0	7.5	180
H 10.0L		157.1	60.9	4716.7	18.75	450
H 5.0L		152.9	59.3	4590.6	50	1200
H V		172.7	67.0	5185.7	75	1800
H 5.0R		150.1	58.2	4506.6	50	1200
H 10.0R		141.3	54.8	4243.0	18.75	450
H 20.0R		169.8	65.9	5097.9	7.5	180
5.0D 20.0L		87.8	34.1	2636.3	5	120
5.0D 10.0L		87.2	33.8	2617.2	12.5	300
5.0D 5.0L		82.6	32.0	2480.6	25	600
5.0D V		96.7	37.5	2903.8	37.5	900
5.0D 5.0R		84.4	32.7	2534.1	25	600
5.0D 10.0R		80.3	31.2	2411.9	12.5	300
5.0D 20.0R		100.1	38.8	3006.9	5	120
10.0D 5.0L		21.4	8.3	641.9	5	120
10.0D V		23.9	9.3	716.4	12.5	300
10.0D 5.0R		21.8	8.5	655.3	5	120
Zone 1		500.6	194.2	15034.7	37.5	900
2		74.5	28.9	2237.1	20	480
3		321.9	124.9	9665.6	62.5	1500
4		665.8	258.3	19995.0	225	5400
5		305.2	118.4	9165.1	62.5	1500
6		67.0	26.0	2013.5	20	480
7		515.5	200.0	15480.8	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-32 6-LED Directional Warning Lamps (W)

Sample Number: 2 of 2

Specification: SAE J595 JAN05 (Directional Flashing Optical Device)

Color: Blue

Flash Mode:		P8/P9				
Frequency:		1.22Hz				
Active Time/Flash:		0.314 Sec				
		Calculated			J595 (Class 2)	
		Cd	Cd-Sec	Cd-Sec/Min	Cd	Cd-Sec/Min
10.0U 5.0L		27.8	8.8	641.6	5	120
10.0U V		28.7	9.0	662.1	12.5	300
10.0U 5.0R		27.7	8.7	638.6	5	120
5.0U 20.0L		99.3	31.2	2289.8	5	120
5.0U 10.0L		89.2	28.0	2055.9	12.5	300
5.0U 5.0L		88.4	27.8	2038.3	25	600
5.0U V		101.6	32.0	2342.6	37.5	900
5.0U 5.0R		88.4	27.8	2038.3	25	600
5.0U 10.0R		87.8	27.6	2023.6	12.5	300
5.0U 20.0R		95.7	30.1	2206.9	5	120
H 20.0L		161.6	50.8	3725.4	7.5	180
H 10.0L		150.8	47.4	3476.1	18.75	450
H 5.0L		152.6	48.0	3517.2	50	1200
H V		171.2	53.8	3947.5	75	1800
H 5.0R		155.4	48.9	3581.7	50	1200
H 10.0R		150.2	47.2	3461.4	18.75	450
H 20.0R		162.8	51.2	3751.8	7.5	180
5.0D 20.0L		86.3	27.1	1988.4	5	120
5.0D 10.0L		79.8	25.1	1838.9	12.5	300
5.0D 5.0L		77.2	24.3	1780.2	25	600
5.0D V		91.5	28.8	2108.7	37.5	900
5.0D 5.0R		81.6	25.6	1879.9	25	600
5.0D 10.0R		79.0	24.8	1821.3	12.5	300
5.0D 20.0R		89.7	28.2	2067.6	5	120
10.0D 5.0L		20.1	6.3	464.1	5	120
10.0D V		22.3	7.0	514.0	12.5	300
10.0D 5.0R		20.6	6.5	475.8	5	120
Zone 1		516.2	162.3	11898.4	37.5	900
2		84.2	26.5	1941.5	20	480
3		316.4	99.5	7294.6	62.5	1500
4		672.3	211.4	15497.6	225	5400
5		320.1	100.7	7379.7	62.5	1500
6		63.1	19.8	1453.9	20	480
7		515.0	161.9	11871.2	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**

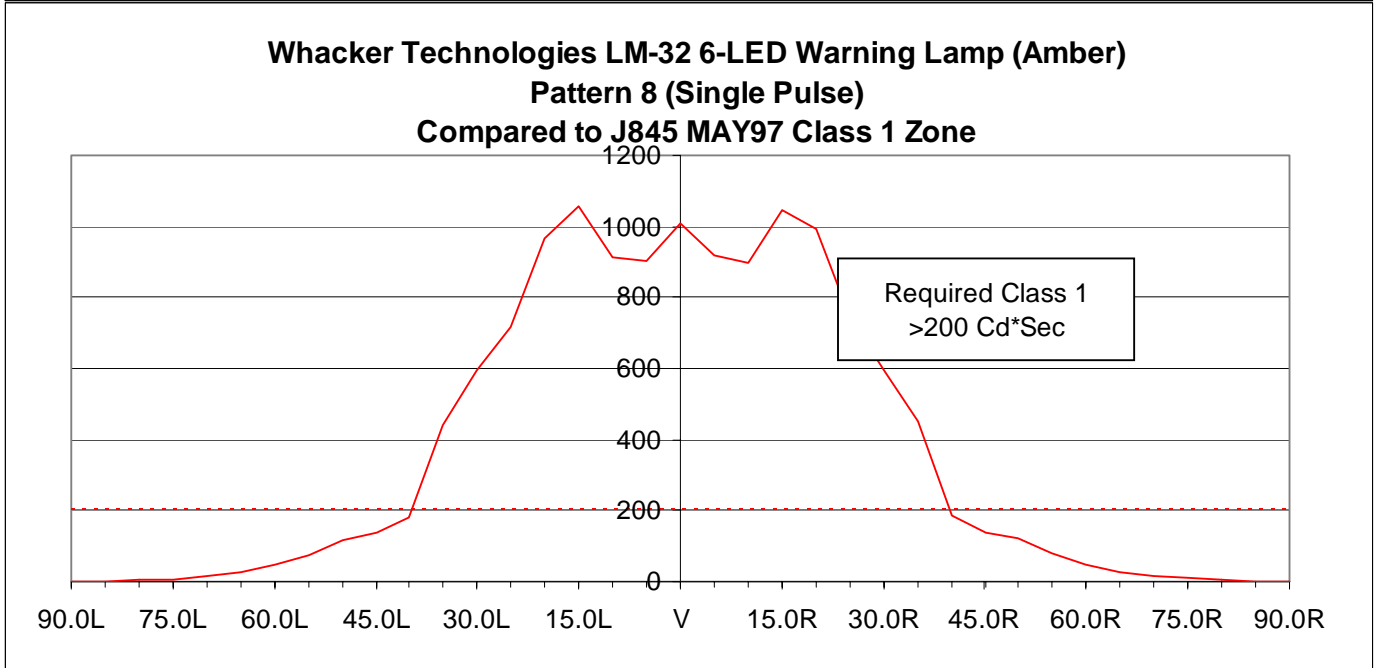
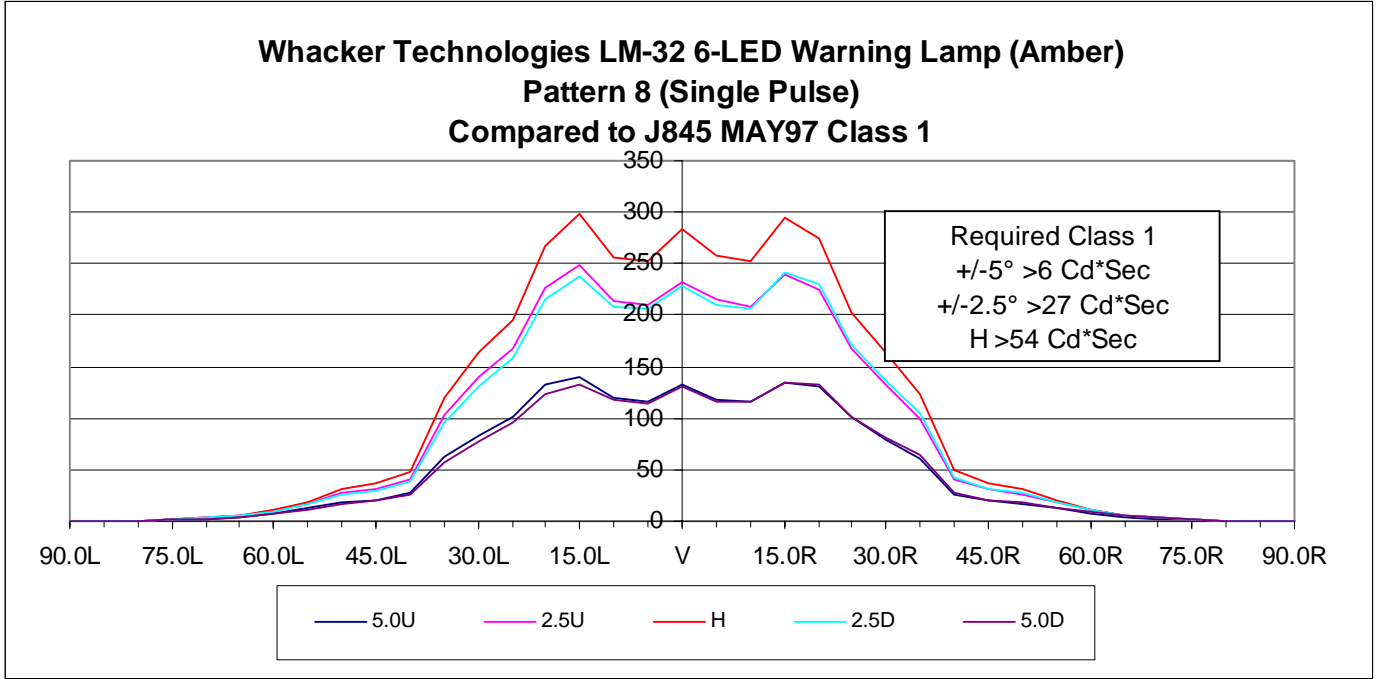
Project Name: Whacker Technologies LM-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J845 MAY97 (Zonal Optical Warning Device)

Color: Yellow (Amber)

Flash Energy, Candela\*Seconds



Class 1 Patterns: 1(70°), 2(70°), 3(70°), 5(70°), 6(70°), 7(70°), 8(70°), 9(70°)

Patterns without any class rating: 4, 10-19, 21

Applied Voltage: 12.80V

Device operated 30 minutes prior to testing (SAE J1889 methodology).

Aim: Lamp mounted level and perpendicular to HV.

**PHOTOMETRIC TEST DATA SHEET**

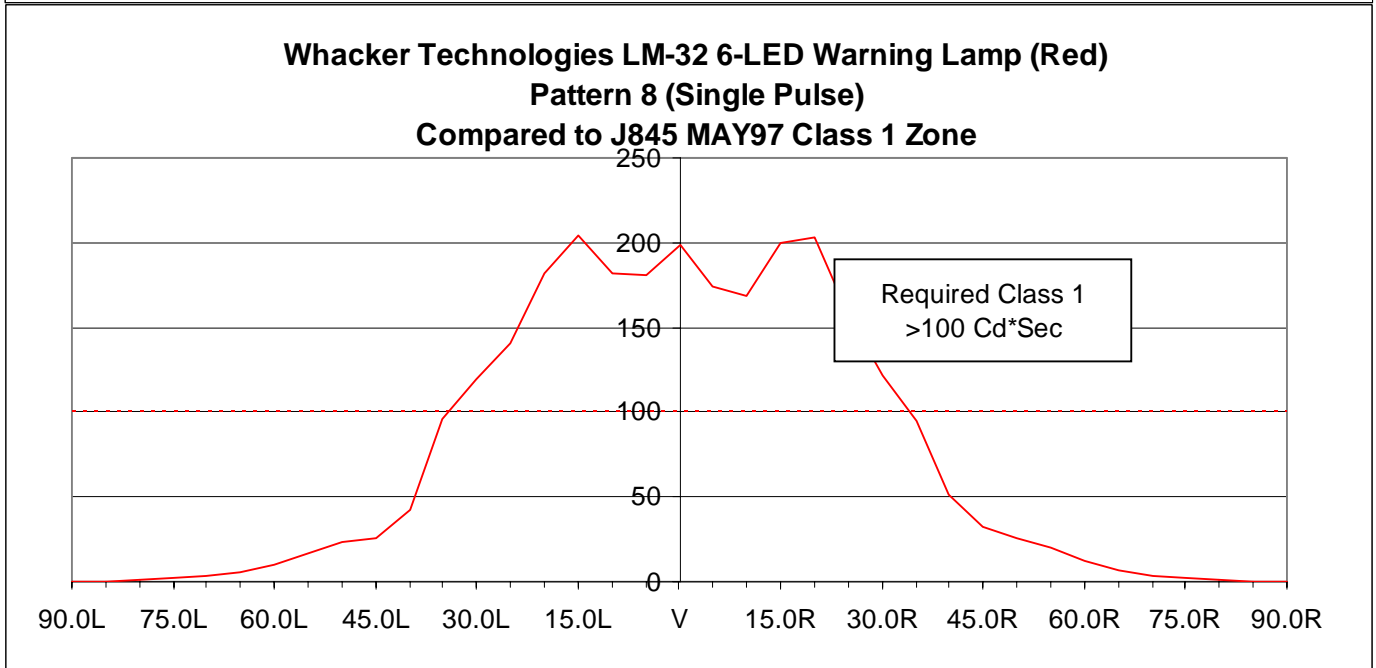
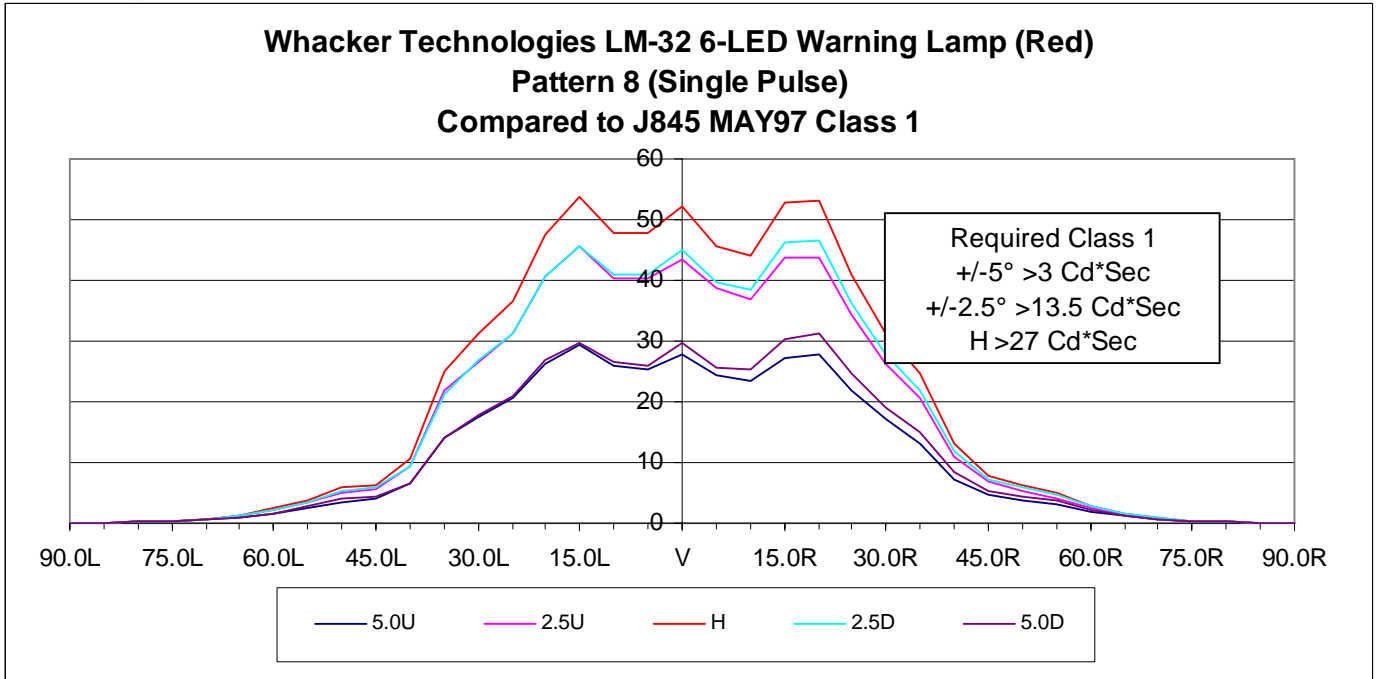
Project Name: Whacker Technologies LM-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J845 MAY97 (Zonal Optical Warning Device)

Color: Red

Flash Energy, Candela\*Seconds



Class 1 Patterns: 2(60°), 3(60°), 5(60°), 6(60°), 8(60°), 9(60°)

Class 2 Patterns: 1(70°), 7(70°)

Patterns without any class rating: 4, 10-19, 21

Applied Voltage: 12.80V

Device operated 30 minutes prior to testing (SAE J1889 methodology).

Aim: Lamp mounted level and perpendicular to HV.

**PHOTOMETRIC TEST DATA SHEET**

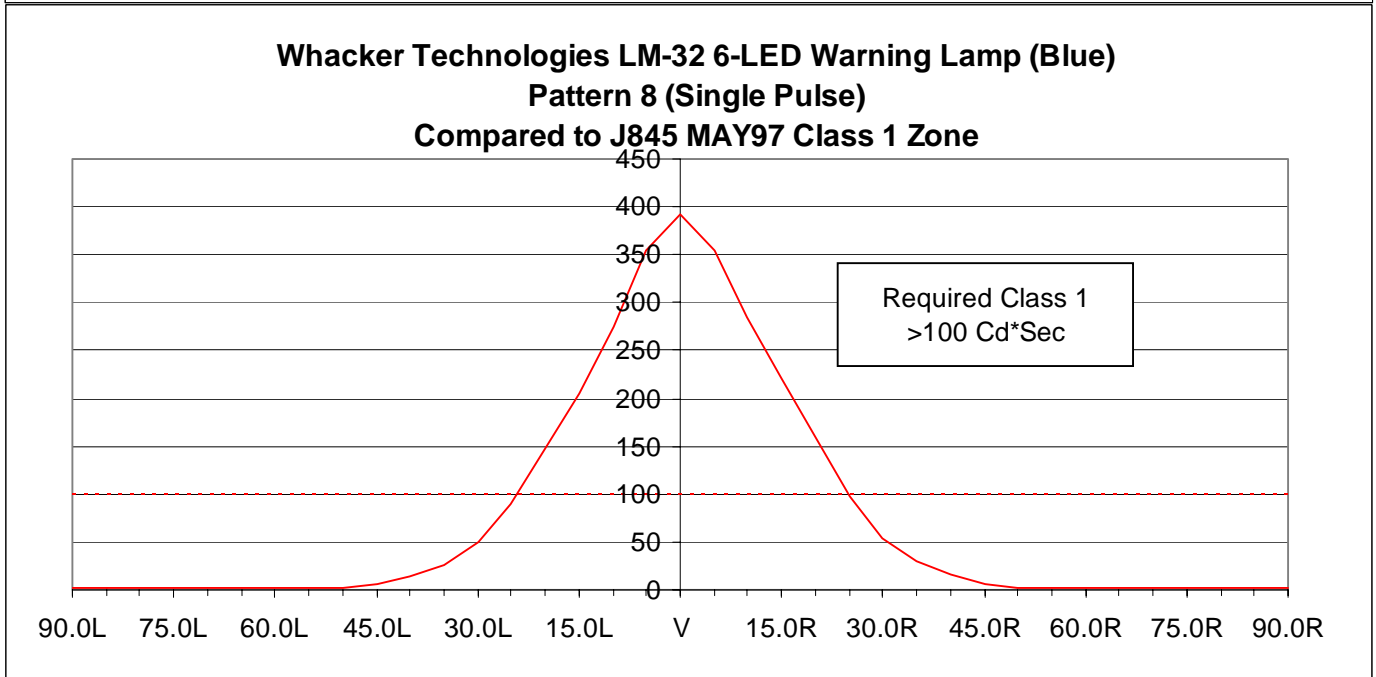
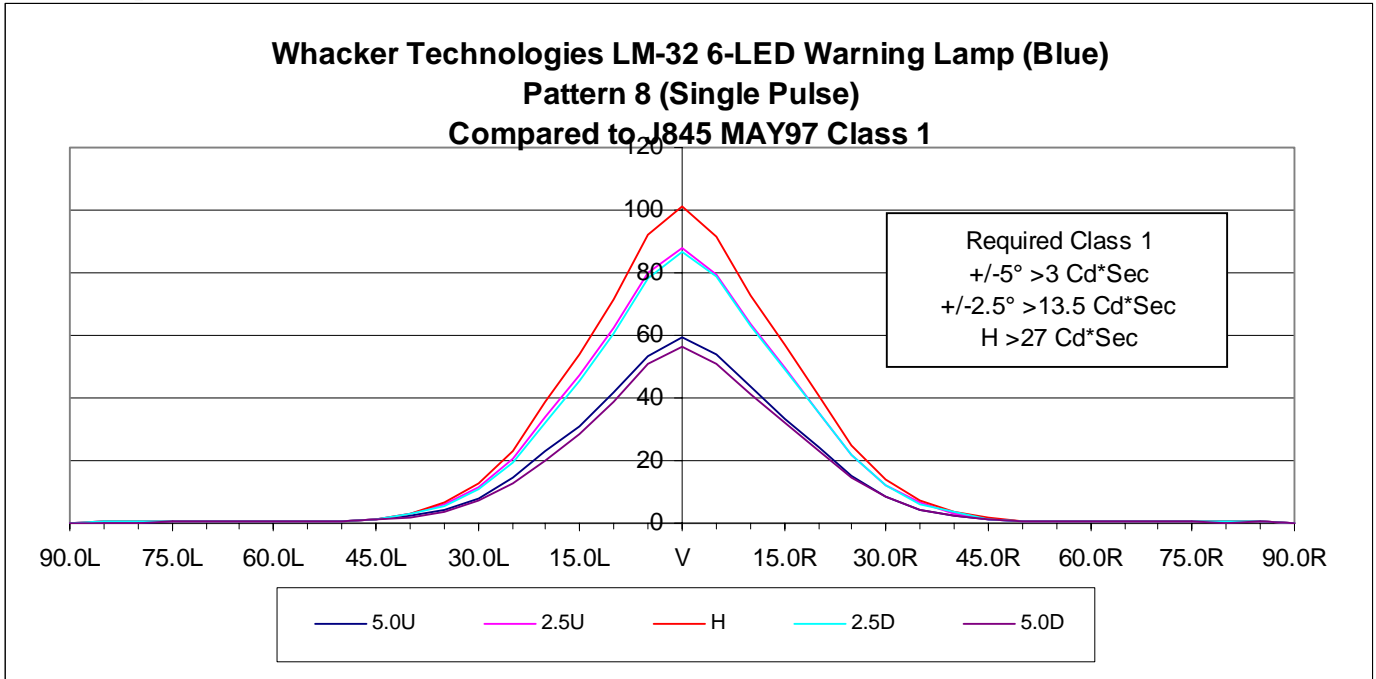
Project Name: Whacker Technologies LM-32 6-LED Directional Warning Lamps (W)

Sample Number: 1 of 2

Specification: SAE J845 MAY97 (Zonal Optical Warning Device)

Color: Blue

Flash Energy, Candela\*Seconds



Class 1 Patterns: 2(40°), 3(40°), 5(40°), 6(40°), 8(40°), 9(40°)

Class 2 Patterns: 1(55°), 7(55°)

Patterns without any class rating: 4, 10-19, 21

Applied Voltage: 12.80V

Device operated 30 minutes prior to testing (SAE J1889 methodology).

Aim: Lamp mounted level and perpendicular to HV.

**TEST DATA SHEET**

Device Name: Whacker Technologies LM-32 6-LED Directional Warning Lamps (W)

**ADDITIONAL TESTS** (SAE J595/J845)

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	B2(Mode P8 - Single Flash)
0 hour	1.23Hz
1 hour	1.24Hz
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	B2(Mode P8 - Single Flash)
0 hour	1.23Hz
5 hour	1.18Hz
6 hours	1.19Hz
Start Time	<0.5 sec
SAE Required 1 - 4 Hz, $\Delta f \leq 20\%$ , S.T. $\leq 5$ sec.	

Durability ..... Passed

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

Sample	B2(Mode P8 - Single Flash)
0 hour	1.23Hz
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-32 6-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 R2 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. ( $\leq$  2cc Required)  
Sample R2 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 R2 tested.

Corrosion Test: ..... Passed  
There was no observed corrosion which would cause the device to fail any other requirements.  
Sample A2 tested.

Lens Warpage Test: ..... Passed  
There was no observed warpage of plastic components that would cause the device to fail any other requirements.  
Sample B2 tested.

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

**TEST DATA SHEET**

Device Name: Whacker Technologies LM-32 6-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

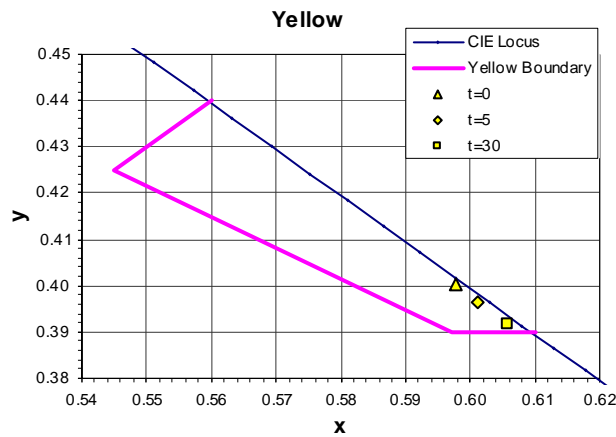
Date: 9/27/2007

Measured Average xy Chromaticity Coordinate Values:

Amber (T = 30 min)

x=0.6059

y=0.3918



Red (T = 30 min)

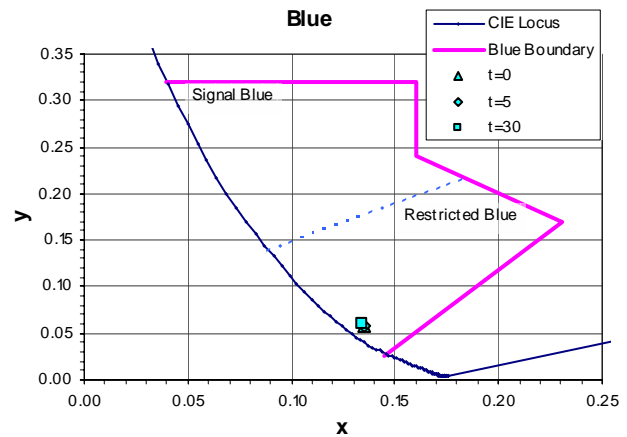
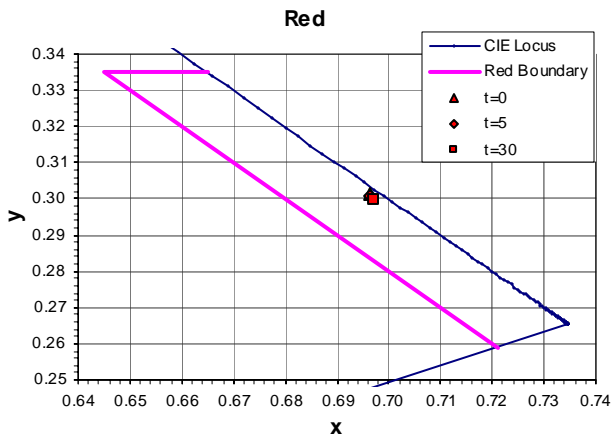
x=0.6972

y=0.2997

Blue (T = 30 min)

x=0.1345

y=0.0597



Devices comply with all color requirements.

PHOTOGRAPH SHEET

Device Name: Whacker Technologies LM-32 6-LED Directional Warning Lamps (W)

