



REPORT

3933 US ROUTE 11 CORTLAND, NEW YORK 13045

Order No. 3134578

Date: May 13, 2008

REPORT NO. 3134578CRT-001

QUALIFICATION TEST OF L-893 LIGHTED VISUAL AID TO INDICATE TEMPORARY RUNWAY CLOSURE

RENDERED TO

SHERWIN INDUSTRIES
2129 WEST MORGAN AVENUE
MILWAUKEE, WI 53221

INTRODUCTION

This report contains the results of examinations and tests of the above device to demonstrate compliance with the applicable requirements of U. S. Department of Transportation, Federal Aviation Administration, Advisory Circular, Specification for L-893, Lighted Visual Aid To Indicate Temporary Runway Closure, AC No. 150/5345-55A, dated 06/27/07.

Summary

The following is a summary of the results of tests of the device performed in accordance with the following AC No. 150/5345-55A specifications and referenced MIL-STD 810F test methods.

<u>Test</u>	<u>Requirement Paragraph (AC 150/5345-55A)</u>	<u>Test Method (MIL-STD-810F)</u>	<u>Remarks</u>
Photometric	3.3	*4.3	Complies
High Temperature	3.2a	Method 501.4, Procedure II	Complies
Low Temperature	3.2a	Method 502.4, Procedure II	Complies
Wind	3.2c	*4.5	Complies
Operational	3.3	*4.4	Complies
Visual Exam	3.3, 3.4	*4.2	Complies

*Test Method from AC 150/5345-55A



EQUIPMENT LIST

<u>Equipment Used</u>	<u>Model Number</u>	<u>Control Number</u>	<u>Calibration Due Date</u>
Tektronix Oscilloscope	TDS410A	E289	10/18/08
Fisher Scientific Stopwatch	---	N977	08/24/08
Optronic Laboratories Spectral Radiometer	750D	---	Before Use
Goniometer, Optronik	SMS 10h	O109	10/11/08
Imada Push/Pull Scale	FB	F363A	11/09/07
Shimpo Push/Pull Scale	MF-50	S243	02/09/08
Fluke Multimeter	87	E262	01/28/09
Thermotron Environmental Chamber	WP-1885	H167	06/19/08
Associated Environmental Chamber	HK2164	H157	01/02/09

AUTHORIZATION

The testing performed was authorized by purchase order no. rcm10207.

MATERIAL SUBMITTED

The client submitted one sample. The sample was received by Intertek on October 2, 2007 in undamaged condition, and tested as received. The sample designation is H07002F.

MANUFACTURER

Sherwin Industries
2129 West Morgan Avenue
Milwaukee, WI 53221

DESCRIPTION OF DEVICE

Type: L-893
Lamp: 90W Philips 120V, 25 degree flood x21
Generator: Yanmar
Leveling: Corner jacks
Nominal lamp voltage: 118VAC

Manufacturer's Catalog Number: S1701

(see picture page included in this report)

DATES OF TESTS

October 16, 2007 through May 22, 2008



TEST, TEST METHODS AND RESULTS OF TESTS

Photometric Test – 4.3 of AC 150/5345-55A

One lamp was energized at the nominal operating voltage and tested for compliance with the photometric requirements in 3.3f. The input voltage to the light was varied $\pm 3\%$ from nominal voltage and the effective intensity measured at the input extremes. The effective intensity was calculated by using intensity versus time plot produced with an oscilloscope and photomultiplier tube. The test distance is 25m. The horizontal and vertical beam spread is 15° .

The effective intensity of one lamp was multiplied by the number of lamps to determine compliance with the specified minimum. The color of light emitted of one lamp operating at the nominal operating voltage was measured with the spectral radiometer. Chromaticity coordinates were calculated from a spectral distribution measured in 5nm increments.

Results - Section 3.3 of AC No. 150/5345-55A

A photometric test was performed with the unit operating at nominal voltage. The voltage was varied $\pm 3\%$ of operating voltage. The unit was found to comply with the photometric requirements in Section 3.3f.

Flash Rate: 2.5s on / 2.5s off

$$\frac{\text{Effective Intensity}}{\text{Steady Intensity}} : 0.9$$

Effective Flash Duration: 2.00s

Day Mode nominal Lamp Voltage: 118VAC

Night Mode Nominal Lamp Voltage: 62.2VAC

Voltage (V)	Intensity
118	5467
121.5 (+3%)	6015
114.5 (-3%)	4954
62.2	514
64.1 (+3%)	584
60.3 (-3%)	435

Chromaticity Coordinates @ 118VAC

x= .449
y= .411
z= .140



RESULTS OF TESTS

(Day) (Data is for nominal voltage minus 3%)

Lamp: 90W Philips

Data is calculated total of 21 lamps

	<u>Specified Circle</u>	<u>Figure 1 Minimum</u>
	3°	70,000cd
	10°	34,000cd
	15°	13,000cd

All effective intensities are in candela

	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0
-15	9141	10220	11426	12543	14112	15615	16910	18101	19288	20390	21501	22223	22893	23288	23366	23360
-14	10082	11426	12884	14141	15604	17459	19185	20764	22134	23423	24780	25634	26230	26898	26993	26861
-13	10931	12164	13769	15375	17211	19227	21542	23481	25298	26915	28501	29565	30155	30843	30977	30932
-12	11994	13375	15073	17080	19238	21730	24302	26840	29140	31046	32799	34205	34683	35150	35258	35252
-11	13000	14546	16503	18748	21151	24024	27276	30110	33009	35388	37354	38936	39505	39592	39702	39908
-10	13955	15869	18131	20673	23486	26697	30448	34107	37364	40083	42398	44092	44774	44819	44817	44636
-9	14992	17028	19498	22247	25723	29365	33527	37832	41803	44948	47724	49903	50767	50960	51018	50886
-8	15951	18329	21144	24601	28414	32582	37284	42171	46860	50733	53990	56573	57568	58030	58181	57902
-7	16835	19282	22591	26271	30554	35175	40420	46056	51755	56547	60567	63332	64831	65696	65636	64910
-6	17717	20498	24067	28195	32829	37940	43678	50053	56901	62867	67432	70404	72203	73005	72519	71548
-5	18357	21323	25235	29489	34808	40458	46348	53168	61210	67927	73136	76437	78234	78936	78320	77012
-4	19242	22479	26632	31323	36955	42992	49458	57033	65360	72971	78990	82265	83591	83859	83232	81555
-3	19968	23309	27396	32355	38257	44604	51590	59813	68997	77127	83861	87296	88459	88098	86469	84358
-2	20688	24317	28713	33614	39630	46231	53644	62612	71882	80699	87498	91155	91752	90663	88301	85993
-1	21062	24663	29127	34230	40255	46932	54672	63508	73327	82562	89588	93392	93555	91799	89180	87080
0	21127	24795	29240	34619	40807	47721	55534	64022	73708	83321	90725	94118	93801	91964	89662	87620
1	20862	24449	28857	34238	40376	47405	55037	63169	72650	82157	89469	93028	92867	91103	89131	86947
2	20361	24034	28439	33625	39565	46319	53933	61913	70635	79770	86921	90730	90887	89074	87316	85629
3	20030	23370	27554	32317	37906	44540	51584	58808	66902	75165	81933	86148	87380	86772	85468	83945
4	19756	22955	26829	31172	36645	42881	49104	55848	62865	69834	76109	80775	83536	83772	82820	81550
5	19140	22156	25816	30089	35067	40542	46264	52295	58478	64447	69765	74398	77753	79378	79191	78189
6	18446	21372	24793	28677	33183	38157	43358	49034	54415	59212	63597	67537	70856	73330	74217	73980
7	17312	20079	23271	26673	30747	35279	39981	44948	49671	53686	57277	60459	63398	65683	67059	67262
8	16582	19216	22113	25046	28535	32553	36583	40793	44960	48590	51765	54483	56848	58822	59679	59949
9	15611	17860	20397	22857	25984	29435	32879	36762	40324	43591	46286	48753	50657	51968	52886	52886
10	14612	16524	18587	20964	23840	26628	29539	32783	35867	38554	41004	42915	44465	45594	46256	46265
11	13477	15264	17154	19290	21618	24039	26464	29102	31550	33805	35807	37662	38870	39669	40109	39913
12	12380	14094	15728	17599	19546	21633	23708	25878	27859	29529	31329	32682	33835	34439	34616	34421
13	11025	12650	14275	15978	17563	19240	20822	22697	24309	25795	27156	28199	29036	29240	29534	29166
14	10025	11309	12854	14362	15703	17099	18375	19902	21151	22369	23292	24037	24506	24763	24920	24710
15	8910	10040	11279	12543	13884	15223	16460	17585	18467	19350	19974	20472	20758	21027	21172	21039



RESULTS OF TESTS cont'd

(Day) (Data is for nominal voltage minus 3%)

Lamp: 90W Philips

Data is the calculated total of 21 lamps.

All effective intensities are in candela

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-15	23130	22635	21809	20896	19720	18711	17524	16297	14985	13884	12783	11815	10800	9978	9157
-14	26855	26201	25133	24037	22527	21245	19790	18162	16738	15555	14198	13022	11846	10685	9693
-13	30699	30051	28838	27635	25869	24368	22750	20771	18907	17399	15831	14454	13172	11781	10490
-12	34891	34077	32778	31192	29577	27781	25831	23481	21427	19522	17536	15805	14373	12853	11332
-11	39310	38575	37125	35345	33441	31355	28955	26645	24377	21845	19455	17495	15671	13998	12419
-10	44169	43295	41503	39546	37356	34863	32276	29599	26862	24202	21682	19302	17089	15076	13380
-9	50153	48939	46931	44487	41516	38903	35812	32761	29687	26862	23991	21240	18662	16347	14387
-8	56793	55205	52719	49766	46147	42748	39125	35556	32400	29263	25988	22883	19962	17410	15386
-7	63527	61573	58847	55417	51236	47169	42967	38805	35222	31852	28273	24846	21654	18910	16584
-6	69970	67676	64825	61142	56462	51561	46785	42051	37912	34016	30290	26689	23330	20309	17679
-5	75479	73349	70401	66758	61801	56511	51042	45795	40939	36681	32472	28643	25096	21642	18671
-4	79830	77743	74948	71196	66265	60755	55020	49399	44258	39142	34328	30132	26211	22610	19391
-3	82584	80531	78327	74705	69784	64247	58350	52573	47248	41585	36243	31493	27439	23468	19976
-2	84155	82253	80047	76748	72153	66729	60863	55269	49686	43731	37927	32905	28343	24175	20594
-1	84954	82911	80710	77684	73328	68000	62363	56573	50960	45101	39101	33848	29121	24855	21005
0	85311	83246	81030	77791	73736	68808	62873	56861	51161	45309	39659	34468	29577	25096	21098
1	84715	82784	80571	77459	73145	68277	62727	56598	50870	45250	39649	34296	29299	24773	20858
2	83794	82085	80004	76698	72279	67044	61097	55265	49686	44141	38855	33657	28658	24194	20417
3	82468	80438	78246	74870	70384	65162	59439	53837	48104	42778	37526	32680	28023	23737	20111
4	79830	77802	75275	71918	67499	62650	57210	51616	46207	40883	35842	31034	26692	22822	19584
5	76902	74528	72079	68598	64298	59363	54194	48779	43355	38552	33803	29355	25407	21764	18779
6	72600	70545	67863	64124	59864	55460	50293	45186	40420	35812	31472	27486	23771	20567	17720
7	66691	64640	62226	58758	55023	50739	46458	41843	37505	33326	29345	25727	22451	19491	16784
8	59144	57468	55250	52559	49437	46075	42109	38391	34637	30625	27039	23886	20813	18192	15694
9	52279	50546	48963	46671	44114	41274	38216	34972	31654	28101	24697	21917	19307	16736	14568
10	45485	44222	42650	40962	38834	36590	33888	31056	28036	25043	22336	20015	17484	15203	13526
11	39338	38422	37482	35898	34185	32144	29864	27324	24680	22370	20102	17932	15892	13952	12427
12	33939	33359	32548	31181	29580	27836	25835	23812	21637	19632	17750	15920	14133	12812	11491
13	29034	28384	27687	26640	25377	23893	22317	20656	18950	17308	15665	14277	12835	11694	10783
14	24653	24013	23290	22505	21482	20419	19149	17939	16567	15193	13933	12882	11831	10895	9869
15	20903	20416	19832	19044	18325	17443	16534	15412	14576	13487	12570	11764	10885	10003	9120



RESULTS OF TESTS cont'd

(Night) (Data is for nominal voltage minus 3%)

Lamp: 90W Philips

Data is calculated total of 21 lamps

Specified Circle Figure 1 Minimum

3° 2000cd

10° 970cd

15° 370cd

All effective intensities are in candela

	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0
-15	813	907	1002	1096	1247	1380	1493	1588	1701	1796	1890	1947	2022	2041	2060	2060
-14	888	1002	1134	1247	1380	1531	1682	1833	1947	2060	2174	2249	2306	2363	2381	2363
-13	964	1077	1210	1361	1512	1701	1890	2060	2230	2363	2514	2608	2646	2722	2722	2722
-12	1058	1172	1323	1512	1701	1909	2136	2363	2570	2741	2892	3005	3043	3100	3100	3100
-11	1153	1285	1455	1644	1852	2117	2400	2646	2911	3119	3289	3421	3478	3478	3497	3515
-10	1229	1399	1588	1814	2060	2344	2684	3005	3289	3534	3723	3875	3931	3950	3950	3931
-9	1323	1493	1720	1966	2268	2589	2948	3326	3686	3950	4196	4385	4460	4479	4498	4479
-8	1399	1607	1852	2174	2495	2873	3289	3704	4120	4460	4744	4971	5065	5103	5122	5103
-7	1474	1701	1985	2306	2684	3100	3553	4045	4555	4971	5330	5576	5708	5783	5783	5708
-6	1550	1796	2117	2476	2892	3345	3837	4404	5009	5538	5935	6199	6350	6426	6388	6294
-5	1607	1871	2211	2589	3062	3553	4082	4687	5387	5972	6445	6728	6880	6955	6899	6785
-4	1701	1985	2344	2759	3251	3780	4347	5027	5746	6426	6955	7239	7352	7371	7333	7182
-3	1758	2060	2419	2854	3364	3931	4536	5254	6067	6785	7371	7673	7787	7749	7617	7428
-2	1814	2136	2533	2967	3497	4064	4725	5519	6332	7106	7692	8014	8070	7976	7768	7560
-1	1852	2174	2570	3005	3534	4139	4820	5594	6445	7258	7881	8222	8240	8070	7844	7655
0	1852	2174	2570	3043	3591	4196	4895	5632	6483	7333	7976	8278	8259	8089	7881	7711
1	1833	2155	2533	3005	3553	4177	4838	5557	6388	7239	7881	8184	8165	8014	7844	7655
2	1796	2117	2495	2967	3478	4082	4744	5443	6218	7012	7655	7976	7995	7844	7692	7541
3	1758	2060	2419	2835	3326	3912	4536	5179	5897	6615	7201	7579	7692	7636	7522	7390
4	1739	2022	2363	2741	3232	3780	4328	4914	5538	6143	6691	7106	7352	7371	7295	7182
5	1682	1947	2268	2646	3081	3572	4064	4593	5141	5670	6143	6539	6842	6993	6974	6880
6	1625	1890	2174	2533	2930	3364	3818	4309	4782	5216	5594	5935	6237	6445	6539	6502
7	1531	1758	2041	2344	2703	3100	3515	3950	4366	4725	5046	5330	5576	5783	5897	5916
8	1455	1682	1947	2211	2514	2873	3213	3591	3950	4271	4555	4801	5009	5179	5254	5273
9	1380	1569	1796	2003	2287	2589	2892	3232	3553	3837	4082	4290	4460	4574	4649	4649
10	1285	1455	1644	1852	2098	2344	2608	2892	3156	3402	3610	3780	3912	4007	4064	4064
11	1191	1342	1512	1701	1909	2117	2325	2570	2778	2967	3156	3308	3421	3497	3534	3515
12	1096	1247	1380	1550	1720	1909	2079	2268	2457	2589	2759	2873	2986	3024	3043	3024
13	964	1115	1247	1399	1550	1701	1833	2003	2136	2268	2381	2476	2552	2570	2608	2570
14	888	1002	1134	1266	1380	1512	1625	1758	1852	1966	2041	2117	2155	2174	2192	2174
15	775	888	1002	1096	1229	1342	1455	1550	1625	1701	1758	1796	1833	1852	1871	1852



RESULTS OF TESTS cont'd

(Night) (Data is for nominal voltage minus 3%)

Lamp: 90W Philips

Data is the calculated total of 20 lamps.

All effective intensities are in candela

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-15	2041	1985	1928	1833	1739	1644	1550	1436	1323	1229	1134	1040	945	869	813
-14	2363	2306	2211	2117	1985	1871	1739	1607	1474	1361	1247	1153	1040	945	851
-13	2703	2646	2533	2438	2268	2136	2003	1833	1663	1531	1399	1266	1153	1040	926
-12	3062	3005	2892	2741	2608	2438	2268	2060	1890	1720	1550	1399	1266	1134	1002
-11	3459	3402	3270	3119	2948	2759	2552	2344	2155	1928	1720	1531	1380	1229	1096
-10	3893	3818	3648	3478	3289	3062	2835	2608	2363	2136	1909	1701	1512	1323	1172
-9	4423	4309	4139	3912	3648	3421	3156	2892	2608	2363	2117	1871	1644	1436	1266
-8	4990	4857	4631	4385	4064	3761	3440	3137	2854	2570	2287	2022	1758	1531	1361
-7	5594	5424	5179	4876	4517	4158	3780	3421	3100	2797	2495	2192	1909	1663	1455
-6	6161	5954	5708	5387	4971	4536	4120	3704	3345	2986	2665	2344	2060	1796	1550
-5	6634	6464	6199	5878	5443	4971	4498	4026	3610	3232	2854	2514	2211	1909	1644
-4	7031	6842	6596	6256	5840	5349	4838	4347	3893	3440	3024	2646	2306	1985	1701
-3	7277	7088	6899	6577	6143	5651	5141	4631	4158	3667	3194	2778	2419	2060	1758
-2	7409	7239	7050	6747	6350	5878	5349	4857	4366	3856	3345	2892	2495	2136	1814
-1	7484	7295	7106	6842	6445	5991	5481	4971	4479	3969	3440	2986	2570	2192	1852
0	7503	7333	7125	6842	6483	6048	5538	5009	4498	3988	3497	3024	2608	2211	1852
1	7447	7277	7088	6823	6445	6010	5519	4990	4479	3988	3497	3024	2570	2174	1833
2	7371	7220	7050	6747	6369	5897	5368	4857	4366	3893	3421	2967	2514	2136	1796
3	7258	7088	6880	6596	6199	5727	5235	4744	4234	3761	3308	2873	2457	2098	1777
4	7031	6842	6615	6332	5935	5519	5027	4536	4064	3591	3156	2722	2344	2003	1720
5	6766	6558	6350	6029	5651	5216	4763	4290	3818	3402	2967	2589	2230	1909	1644
6	6388	6199	5972	5651	5273	4876	4423	3969	3553	3156	2778	2419	2098	1814	1569
7	5878	5689	5481	5179	4838	4460	4082	3686	3308	2930	2589	2268	1985	1720	1474
8	5198	5065	4857	4631	4347	4064	3704	3383	3043	2703	2381	2098	1833	1607	1380
9	4593	4442	4309	4101	3875	3629	3364	3081	2778	2476	2174	1928	1701	1474	1285
10	4007	3893	3761	3610	3421	3213	2986	2741	2476	2211	1966	1758	1531	1342	1191
11	3459	3383	3308	3156	3005	2835	2627	2400	2174	1966	1777	1569	1399	1229	1096
12	2986	2930	2873	2741	2608	2457	2268	2098	1909	1720	1569	1399	1247	1134	1021
13	2552	2495	2438	2344	2230	2098	1966	1814	1663	1531	1380	1247	1134	1021	945
14	2174	2117	2041	1985	1890	1796	1682	1588	1455	1342	1229	1134	1040	964	869
15	1833	1796	1739	1682	1607	1531	1455	1361	1285	1191	1115	1040	964	888	794



TEST, TEST METHODS AND RESULTS OF TESTS

High Temperature Test - MIL-STD-810F, Method 501.4, Procedure II

The lighted "X" was placed in a preheated chamber at +130°F (+55°C) and allowed to temperature stabilize. The sample was operated in the highest intensity for four hours after stabilization. The light was examined visually for any deterioration in materials and proper operation.

Results - 3.2a of AC No. 150/5345-55A

There was no deterioration in material and the light operated properly. The proper flash rate was observed.

Low Temperature Test - MIL-STD-810F, Method 502.4 Procedure II

The lighted "X" was placed in a chamber operating at -40°C for 24 hours with input power off. The light was then turned on for a one hour time period. The light was examined visually for any deterioration in materials and for proper operation. It was demonstrated that the proper flash rate was reached within 1 minute of start up. The portable power supply was not included for this test. The lighted "x" was powered from standard utility power.

Results - 3.2a of AC No. 150/5345-55A

The equipment operated properly and there was no deterioration in materials. The proper flash rate was observed.

Wind Test - 4.5 of AC No. 150/5345-55A

The lighted "X" was deployed as per the manufacturer's instructions and subjected to a calculated mechanical force equivalent to a 40 mph wind.

Results - 3.2c of AC No. 150/5345-55A

The fixture was shown to withstand winds of 40 mph through the application of a calculated mechanical force.



TEST, TEST METHODS AND RESULTS OF TESTS

System Operational Test – 4.4 of AC 150/5345-55A

The lighted “X” was deployed per the manufacturer’s instructions to simulate an actual installation. The system was energized and operated to demonstrate compliance with all specification operating requirements. Flash rate, photoelectric switching of intensity steps, failed flasher operation, and satisfactory operation duration was demonstrated.

Results – 3.3 of AC 150/5345-55A

The system demonstrated compliance with all specification operating requirements.

Visual Examination – 4.2 of AC 150/5345-55A

The unit was examined for compliance with the requirements on materials, finish, quality of workmanship, size, paint color, and required features.

Results – 3.3, 3.4 of AC 150/5345-55A

The unit complied with the requirements on materials, finish, quality of workmanship, size, paint color, and required features.

In Charge Of Tests:

Jeremy N. Downs, P.E.
Engineering Team Leader
Lighting Division

Report Reviewed By:

David C. Edwards
General Manager
Lighting Division

Attachment: Two picture pages.

QUALIFICATION TEST OF L-893 LIGHTED VISUAL AID TO
INDICATE TEMPORARY RUNWAY CLOSURE
TESTED FOR SHERWIN INDUSTRIES





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INDICATE TEMPORARY RUNWAY CLOSURE
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