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AMERICAN NATIONAL STANDARD

American National Standard

ANSI C78.391-1997

AMERICAN NATIONAL STANDARD

FOR ELECTRIC LAMPS—

CHARACTERISTICS OF MINIATURE LAMPS OF T1 AND T1-3/4 SHAPES

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
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American National Standard

Approved July 11, 1997 Secretariat: National Electrical Manufacturers Association

for electric lamps:

Characteristics of Miniature Lamps of T1 and T1-3/4 Shapes

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Foreword (This Foreword is not part of ANSI C78.391-1997.)

Suggestions for improvement of this standard should be submitted to the Secretariat C78, National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1847, Rosslyn, VA 22209.

This standard was processed and approved by Accredited Standards Committee on Electric Lamps, C78, and its Sub-Committee, C78-7 for Miniature and Sealed Beam Lamps. Committee approval of the standard does not necessarily imply that all committee members voted for that approval. At the time it approved this standard, the C78 Committee had the following members:

Al Rousseau, Chairman, C78
Thomas C. Knopp, Technical Coordinator
Randolph N. Roy, Secretariat

Organization Represented:	*Name of Representative:*
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Duro-Test Corporation	Larry Sheinberg
Edison Electric Institute	William Maguire (Delegate)
GE Lighting	Cynthia Minshall
Illuminating Engineering Society	Rita M. Harrold
ITS, Inc.	Craig Davenport
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OSRAM SYLVANIA INC.	Peter Bleasby
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Tom Knopp, Chairman, C78-7

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AMERICAN NATIONAL STANDARD **C78.391-1997**

for electric lamps—

CHARACTERISTICS OF MINIATURE LAMPS OF T1 AND T1-314 SHAPES

1 Scope

This standard sets forth the physical and electrical characteristics of those groups of miniature incandescent lamps with T1 and T1-3/4 bulb shapes. Lamps with various base or termination configurations are included.

2 Reference standards and related publications

2.1 Normative references

When the following American National Standards, referred to in this standard, are superseded by a revision approved by the American National Standards Institute, Inc., the revision shall apply.

ANSI C79.1-1994, *Nomenclature for Glass Bulbs Intended for use with Electric Lamps.*

ANSI C81.61-1990 (1996), *Specifications for Electric Lamp Bases.*

ANSI C81.63-1991 (1996) , *Gauges for Electric Lamp Bases and Lamp Holders.*

ANSI C78.390-1992, *Miniature and Sealed beam Incandescent Lamps-Method of Designation.*

2.2 Related publications

Special Report, SR 25d-1996, *ANS Assigned Miniature Lamp Codes.*

3 Definitions

Application: the type of service or use for which the lamp was originally intended.

4 Lamp designations

Lamp number designations are assigned to miniature lamps in accordance with ANSI C78.390. Assignment of lamp numbers is performed by the Administrator of the designation program.

5 Bulb designations

Bulb designations are defined in ANSI C79.1. Customary units have long been utilized for lamps of this kind, so their use is continued in this standard.

6 Bulb finish

Unless otherwise indicated, the bulbs of all lamp types shown in tables in clause 9 shall have a clear finish.

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7 Base specifications

7.1 Bases on finished lamps shall comply with the standards sheets included in ANSI C81.61. Standard sheets for the gauges for checking bases are included in ANSI C81.63.

7.2 Wire terminal type lamp bases are not standardized. They normally consist of lead wires extending from the lamp bulb pinch to be used for an external connection.

8 Electrical, photometric and life characteristics

8.1 The value of lamp voltage, current and candela shown in the tables are those rated or nominal values that apply at the initial photometry point after the lamps have been aged.

8.2 Lamps shall be measured at rated voltage ± .1 volts. Lamps shall be operated on an AC or DC voltage equal to their rated voltage. For life testing, the voltage shall be maintained within ± .1 volts.

8.3 Lamp current

Not more than 20% of the test lamps shall deviate from the current specified for the relevant lamp in Tables 9.1 through 9.5 by more than an allowance of 10%.

8.4 Initial candelas

Not more than 20% of the test lamps with clear finish shall deviate from the candlepower value specified for the relevant lamp in Tables 9.1 through 9.5 by more than an allowance of 25%.

8.5 Life

Test lamps shall yield an average life to burn-out of not less than that specified for the relevant lamp in Tables 9.1 through 9.5 as modified below to take account of the statistical effect of sample size.

Sample size	Allowable variation from specified life (%)
10–19	8
20–39	7
40–99	6
100 & above	5

8.5.1 Estimated performance characteristics at other than design voltage may be obtained by use of the following formulas. Note: This is only an approximation and the accuracy diminishes as V and V_1 become more widely separated (usually no more than 50% is acceptable).

8.5.1.1 Current consumption of a lamp is approximately proportional to the 0.55 power of the voltage ratio.

$$\text{Voltage Ratio} = \left(\frac{V}{V_1}\right)^{0.55}$$

Where:

V = Application Voltage
V_1 = Rated Voltage

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This voltage ratio factor when multiplied by the rated current in amps approximates the new current at the application voltage.

8.5.1.2 Candela (MSCD) of a lamp is approximately proportional to the 3.5 power of the voltage ratio.

$$\text{Voltage Ratio} = \left(\frac{V}{V_1}\right)^{3.5}$$

Where:

V = Application Voltage
V_1 = Rated Voltage

This voltage ratio factor when multiplied by the rated candela (MSCD) approximates the new candelas at the application voltage.

8.5.1.3 Life of a lamp is approximately proportional to the 12th power of the inverse voltage ratio.

$$\text{Voltage Ratio} = \left(\frac{V_1}{V}\right)^{12}$$

Where:

V = Application Voltage
V_1 = Rated Voltage

This voltage ratio factor when multiplied by the rated life hours approximates the new life at the application voltage.

8.5.2 Accelerated life tests

Since many of the lamps in this standard have extremely long life, accelerated life testing (testing at higher than rated voltage) may be used to approximate the actual life at rated voltage.

For reasonably accurate results the accelerated voltage should not exceed more than 50% of the rated voltage.

The following formula may be used:

$$\left[\begin{array}{c}\text{Average life at}\\ \text{accelerated voltage}\end{array}\right] \times \left(\frac{V_1}{V}\right)^{12} = \left[\begin{array}{c}\text{Approximate average}\\ \text{life at rated voltage}\end{array}\right]$$

Where:

V = Application Voltage
V_1 = Rated Voltage

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9 Physical electrical photometric requirements

9.1 T-1 bulb, SX4 base, 4.8mm LCL[1], 9.65mm MOL[2]

Lamp Number	Rated Voltage	Nom. Amperes	MSCD [3]	Life hours	Principal Applications
8022	5.0	0.021	0.03	10000	P.C. Boards
682	5.0	0.06	0.03	60000	Aircraft
685	5.0	0.06	0.05	25000	Aircraft
714	5.0	0.075	0.09	25000	Aircraft
718	5.0	0.115	0.15	40000	Aircraft
7240	10.0	0.027	0.10	10000	Indicator
7241	18.0	0.026	0.15	10000	Indicator
6839	28.0	0.024	0.15	4000	Indicator

9.2 T1 bulb, G1.3 bipin base, 7.1 mm LCL[1], 9.6mm MOL[2]

Lamp Number	Rated Voltage	Nom. Amperes	MSCD[3]	Life hours	Principal Applications
7683	5.0	0.06	0.05	25000	P.C. Boards
7714	5.0	0.075	0.09	25000	P.C. Boards
7715	5.0	0.115	0.15	40000	P.C. Boards
8099	18.0	0.02	0.15	10000	P.C. Boards
7839	28.0	0.024	0.15	4000	P.C. Boards

9.3 T1 bulb, wire terminals, 6.35mm MOL[2]

Lamp Number	Rated voltage	Nom. Amperes	MSCD [3]	Life hours	Principal Applications
6022	5.0	0.021	0.034	10000	Indicator
680	5.0	0.06	0.03	60000	Aircraft
683	5.0	0.06	0.05	25000	Aircraft
6834	5.0	0.06	0.05	25000	Indicator
713	5.0	0.075	0.09	25000	Aircraft
715	5.0	0.115	0.15	40000	Aircraft
7219	12.0	0.06	0.15	10000	Indicator
7220	18.0	0.026	0.15	16000	Indicator
6838	28.0	0.024	0.15	4000	Indicator

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9.4 T-1 3/4 bulb, SX6 midget flange base, 9.65mm LCL[1], 15.88mm MOL[2]

Lamp Number	Rated Voltage	Nom. Amperes	MSCD[3]	Life hours	Principal Applications
331	1.35	0.06	0.01	500	Indicator
368	2.5	0.20	0.22	500	Indicator
338	2.7	0.06	0.04	500	Indicator
375	3.0	0.015	*	10000	Indicator
3150	5.0	0.06	0.15	5000	Indicator
7332	5.0	0.06	0.03	60000	Indicator
7333	5.0	0.06	0.05	25000	Indicator
7335	5.0	0.115	0.15	40000	Indicator
345	6.0	0.04	0.03	10000	Indicator
328	6.0	0.20	0.34@05.0V	1000	Aircraft
328R	6.0	0.20	**	1000	Aircraft
380	6.3	0.04	0.03	20000	Indicator
377	6.3	0.075	0.23	1000	Indicator
350	6.3	0.15	0.45	3000	Aircraft
349	6.3	0.20	0.55	5000	Indicator
381	6.3	0.20	0.40	20000	Indicator
344	10.0	0.014	*	50000	Indicator
367	10.0	0.04	0.08	5000	Indicator
394	12.0	0.04	0.04	10000	Indicator
330	14.0	0.08	0.50	750	Aircraft
330R	14.0	0.08	**	750	Aircraft
382	14.0	0.08	0.30	15000	Indicator
8918	14.0	0.10	0.50	10000	Indicator
370	18.0	0.04	0.50	10000	Indicator
459	22.0	0.04	0.30	2000	Indicator
327	28.0	0.04	0.34	1000	Aircraft
327R	28.0	0.04	**	1000	Aircraft
385	28.0	0.04	0.15	10000	Indicator
387	28.0	0.04	0.30	7000	Indicator
387R	28.0	0.04	**	7000	Indicator
376	28.0	0.06	0.34	25000	Indicator
7341	28.0	0.065	0.65	5000	Indicator
269	32.0	0.04	0.30	4000	Automotive

* Below .01 MSCD
**Approximately 1/10 of clear lamp

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9.5 T-1 3/4 bulb-W2.1 x 4.9d wedge type base-10.16mm LCL[1], 20.32mm MOL[2]

Lamp Number	Rated Voltage	Nom. Amperes	MSCD[3]	Life Hours	Principal Applications
11	2.5	.20	.20	1000	Indicator
75	2.5	.35	Lens End	10000	Instrument
56	5.0	.115	.15	20000	Indicator
79	6.0	.20	.60	1000	Indicator
84	6.3	.04	.03	20000	Indicator
86*	6.3	.20	.40	20000	Indicator
18	14.0	.04	.04	5000	Indicator
73*	14.0	.08	.08	15000	Indicator
37*	14.0	.09	.09	1500	Auto
74	14.0	.10	.10	500	Auto
70	14.0	.15	.15	100	Auto
85*	28.0	.04	.04	7000	Indicator
17	28.0	.065	.065	5000	Indicator

*Suffix "E" after P/N denotes lamp is provided with leads extended for use as a wire terminal lamp.

Notes:

1 The values of Light Center Length (LCL) shown in the tables are nominal values.
2 The values shown in the tables for MOL are maximum overall length values.
3 MSCD = Mean Spherical Candela.

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