ANSI C78.1503-1993

American National Standard

for electric lamps --

tungsten-halogen lamps with G9.5 bases and 60.5 mm LCL

Approved September 3, 1993 | Secretariat: National Electrical Manufacturers Association

	SI (Metric)	Customary
Base:	G22	Medium Two-Pin
Light Center Length:	60.5 mm	2-3/8 inches

1 Scope

This standard defines the dimensional limits and other physical characteristics required to ensure the interchangeablility and to assist in the proper application of a specific category of lamps. This category is tungsten-halogen lamps with G9.5 bases and 60.5 mm (2-3/8 inches) nominal light center length. Lamps of various design voltages are included.

Lamps with the specifications listed in this standard are intended for stage and studio applications

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The grouping of lamps in this standard is based on general physical characteristics. It does not imply that the lamps listed are interchangeable with each other in a particular application.

Certain lamps in this standard are compatible with IEC 357.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ANSI C78.370-1982(R1989), American National Standard Method for the Designation of Photo Lamps.

ANSI C78.1450-1983(R1989), American National Standard for Electric Lamps, Incandescent Projection Lamps, Method for Life Testing.

ANSI C79.1-1980(R1984), American National Standard Nomenclature for Glass Bulbs Intended for Use with Electric Lamps.

ANSI C81.61-1990[1], American National Standard for Electric Lamp Bases.

Other tungsten-halogen lamps for stage and stuio applications are described in the following standards:

C78.1500-1993, American National Stndard for Electric Lamps, Tungsten-Halogen Lamps with a Light Center Length of 89 mm (3-1/2 inc.), Physical Characteristics.

[1] At the time of development of this standard, the standard sheets dealing with electric lamp bases that appeared in ANSI C81.40-1976 and its supplements were superseded by ANSI C81.61-1990. See for additional information C81.62-1991 and C81.63-1991 contact the Secretariat for more recent information.

C78.1501-1993 American National Standard for Electric Lamps, Tungsten-Halogen Lamps with G9.5 Bases and 63.5 mm LCL

C78.1502-1993, American National Standard for Electric Lamps, Tungsten-Halogen Lamps with a Light Center Length of 101.6 mm (4 in.).

C78.1504-1993, American National Standard for Tungsten-Halogen Lamps with P28 Medium Prefocus Bases and 55.5 mm Light Center Length

C78.1505-1993, American National Standard for Tungsten-Halogen Lamps with G38 Mogul Bipin Bases and 127 mm (5 in.) Light Center Length.

The following standard, although not an ANSI standard, is listed for reference:

IEC 682, Standard Method of Measuring the Pinch Temperature of Quartz Tungsten-Halogen Lamps

3 Lamp Designations

3.1 Marking

Lamps shall be marked with the relevant code in accordance with the photo lamp designation system, ANSI C78.370-1982(R1989).

3.2 Durability

The area of the marking of an unused lamp shall withstand, maintaining legibility, the application of a rubbing test. This test involves rubbing by hand with a smooth cloth, dampened with water, for a period of 15 seconds.

4 Physical Characteristics

4.1 Bulb Designations

Bulb designations are defined in ANSI C79.1-1980. In this standard bulbs are described by metric designation, with customary designation in parentheses.

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4.2 Base Specification

Finished lamps employing the G9.5 base shall comply with the detailed base requirements, given in ANSI C81.61-1990. Base gauging procedures are given therein.

NOTE: Althought the G9.5 base may have been referred to as the "medium two-pin base" in some circles, it has always been called the G9.5 in the ANSI standards.

4.3 Lamp Characteristics

Physical, electrical, and other characteristics of standard lamps are shown in Tables I and II, with tolerances as appropriate.

4.4 Dimensions

4.4.1 The lamp space drawings, Figures 1 and 2, show the maximum limits of the space that may be occupied by any part of a bulb. The space shown will accommodate the longest and shortest lamps with maximum bulb diameters, and maximum bulb excursion with respect to the base axis.

A typical bulb is shown as a dashed line, within the maximum space. The following general conditions apply to the construction of these drawings.

(1) Straight lines are used as much as possible to simplify the outline; all compromises with the actual space are in excess of the actual space required.

(2) All excursions of a lamp bulb are shown relative to a fixed-position base.

(3) Bulb "eccentricity" with respect to the base axis is a combination of allowances for angular tilt and lateral displacement

[2] At the time of development of this standard, the standard sheets dealing with electric lamp bases that appeared in ANSI C81.40-1976 and its supplements were superseded by ANSI C81.61-1990. See for additional information C81.62-1991 and C81.63-1991. Contact the Secretariat for more recent information.

(4) The base shown in the drawing represents a typical form. The essential dimensions are controlled by the "Go" gauge for G9.5 based lamps described in ANSI C81.30b-1983[2].

(5) All dimensions are in millimeters unless otherwise specified.

4.4.2 The light source dimensions, diameter (D) and height (H) in Table 1 and width (W), height (H), and thickness (T) in Table 2, define a maximum size volume centered on the Light Center Length and base axis within which all luminous parts of the filament are located. This volume accounts for all positions of the filament. Actual filament size may be significantly smaller than the defined light source volume.

5 Restrictions

5.1 Operating Position

Lamp types in this standard may operate properly in any position or they may be restricted as to position. Such restrictions are indicated in the Operating Position column of Table 1 and Table 2.

5.2 Seal Temperature

In the lamps covered by this standard, the metal-top-envelope seal is intended for operation at temperatures not to exceed 350°C for lamps with a rated life greater than 500 hours and 400°C for lamps with a rated life of 500 hours or less.

5.3 Bulb Wall Temperature

A lamp's bulb wall temperature shall be maintained about 250°C for proper operation of the halogen cycle. An upper limit of approximately 900°C is recommended for maintaining the integrity of fused silica bulbs.

5.4 Shielding

A protective shield shall be provided relevant to the following cautionary notice. To assure maximum safety during handling and use of the subject lamps, observe the following notices:

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(1) Tungsten-halogen lamps operate at high temperature and at internal gas pressures above atmospheric pressure. Consequently, a lamp could shatter. Certain lamps may also emit some amount of ultraviolet radiation. Therefore a suitable protective shield, screening technique, or both shall be used with the luminaire to protect people and surroundings from both hazards.

(2) Always read and observe the information contained in the lamp manufacturer's caution notice.

6 Test Procedures

6.1 Life

Lamps shall be tested in open racks, at the 45° base-down operating position with cooling to maintain temperature limits. A test cycle of 6-1/2 hours ON and 1/2 hour OFF is under consideration. Additional procedures are defined in ANSI C78.1450-1983(R1989). It should be noted that lamp life results from an open rack test procedure may not be representative of life of luminaries.

6.2 Seal (Pinch) Temperature

The measurement procedure is defined in IEC 682.

6.3 Operating Temperature

Standard methods of measuring other lamp operating temperatures (bulb and base) are under consideration.

7 Information for Luminaire Design

Proper luminaire design must take into account the several aspects of lamp restrictions mentioned in Section 5, operating position, seal temperature, bulb wall temperature, and shielding.

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TABLE 1

T19 (T6) and Smaller Bulbs
G9.5 Base
60.5 mm Nominal Light Center Length
105 mm MOL with CC-8 Filaments

ANSI DESIGN.	RATED WATTAGE (W)	RATED VOLTAGE (V)	NOMINAL BULB SIZE	RATED * AVERAGE LIFE (HR.)	CORRELATED COLOR TEMP. (K) (±100K)[1]	LIGHT SOURCE ** W	H	Fil. Conf.	OPERATING POSITION
EHC	500	120	T14 (T4)	200[1]	3200	8	23	CC-8	ANY
EHD	500	120	T18 (T5)	2000	3000	8	23	CC-8	ANY
FKV	650	120	T19 (T6)	300	3200	12	16	CC-8	ANY
FKR	650	220, 240[1]	T19 (T6)	300	3100	10	30	CC-8	ANY
EHF	750	120	T16 (T5)	300	3200	12	27	CC-8	ANY
EHG	750	120	T16 (T5)	2000	3000	12	27	CC-8	ANY
FEL	1000	120	T19 (T6)	300	3200	12	27	CC-8	ANY
FCV***	1000	120	T19 (T6)	300	3200	12	27	CC-8	ANY
FEP	1000	240	T19 (T6)	150	3200	--	--	2CC-8	ANY

* Lamp manufacturers published values of rated life may vary.

** See definition of light source in Section 4.4.2

*** Frosted Bulb

[1] Under consideration

TABLE 2

T22 (T7) and Smaller Bulbs
G9.5 Base
60.5 mm Nominal Light Center Length
115 mm MOL with C130 Filaments

ANSI DESIGN.	RATED WATTAGE (W)	RATED VOLTAGE (V)	NOMINAL BULB SIZE	RATED * AVERAGE LIFE (HR.)	CORRELATED COLOR TEMP. (K) (±100K)[1]	LIGHT SOURCE ** W	H	T	Fil. Conf.	OPERATING POSITION
BWM	750	120	T22 (T7)	200	3200	16	16	9	C130	BDTH ***
BWN	1000	120	T22 (T7)	250	3200	16	20	9	C130	BDTH ***

* Lamp manufacturers published values of rated life may vary.

** See definition of light source in Section 4.4.2

*** Base down to horizontal

[1] Under consideration

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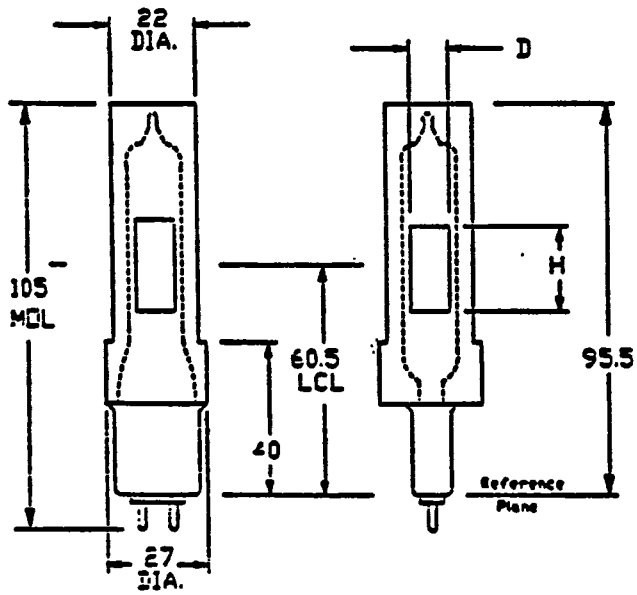

Figure 1

Space limits for Tungsten-Halogen Stage/Studio Lamps
T-19 (T6) and Smaller Bulbs, G9.5 Base,
60.5 mm Nominal Light Center Length (LCL)
105 mm Maximum Overall Length (MOL)

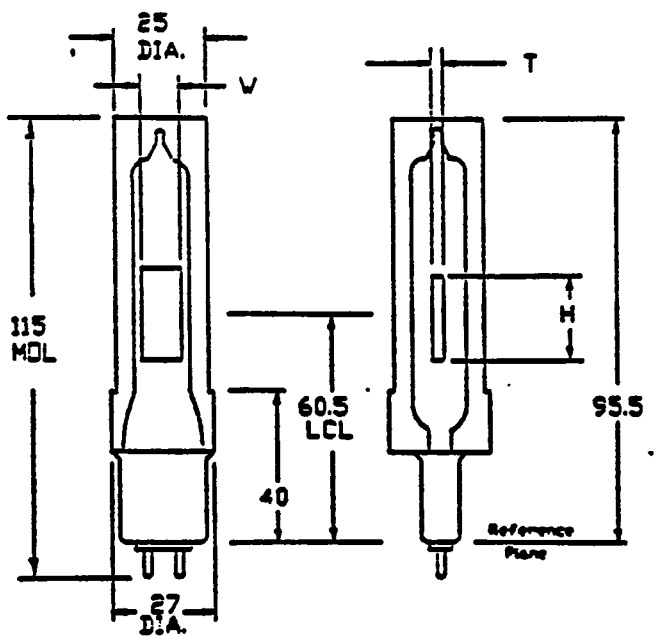

Figure 2

Space Limits for Tungsten-Halogen Stage/Studio Lamps
T19 (T6) and Smaller Bulbs, G9.5 Base,
60.5 mm Nominal Light Center Length (LCL)
115 mm Maximum Overall Length (MOL)

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