ANSI C78.1500-1993

American National Standard

for electric lamps --

tungsten-halogen lamps with P28 bases and 89 mm LCL

Approved September 3, 1993 Secretariat: National Electrical Manufacturers Association

	SI (Metric)	Customary
Base:	P28	Medium Prefocus
Light Center Length:	89 mm	3-1/2 inches

1 Scope

This standard defines the dimensional limits and other physical characteristics required to ensure the interchangea lility and to assist in the proper application of a specific category of lamps. This category is tungsten-halogen lamps with P28 bases and 89 mm (3-1/2 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.

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. An American National Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American National Standard does not in any respect preclude anyone, whether he has approved the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standard. American National Standards are subject to periodic review and users are cautioned to obtain the latest editions.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Copyright © 1993 by the Secretariat, C78, National Electrical Manufacturers Association
2101 L Street, N.W., Suite 300, Washington, D.C. 20037

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS Not for Resale

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 studio applications are described in the following standards:

C78.1501-1993 American National Standard Specifications for Tungsten-Halogen Lamps with G22 Bases and 63.5 mm LCL.

C78.1502-1993, American National Standard Specifications for Tungsten-Halogen Lamps with G22 Bases and 101.6 mm LCL.

[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.

C78.1503-1993, American National Standard Specifications for Tungsten-Halogen Lamps with G9.5 Bases and 60.5 mm LCL.

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(R1984).

In this standard bulbs are described by metric designations, with customary designations in parentheses.

4.2 Base Specification

Finished lamps employing the P28 base shall comply with the detailed base requirements, given in ANSI C81.61-1990. Base gauging procedures are given therein.

4.3 Lamp Characteristics

Physical, electrical, and other characteristics of standard lamps are shown in Tables 1 and 2, 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

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

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

(4) The base shown in the drawing represents a typical form. The essential dimensions are controlled by the "Go" gauge for P28 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 Tables 1 and 2.

[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.

5.2 Seal Temperature

In the lamps covered by this standard, the metal-to-envelope seal is intended for operation at temperatures not to exceed 350°C for lamps with a rated life of 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:

(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.

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

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.

TABLE 1

T19 (T6) and Smaller Bulbs
P28 Medium Prefocus Base
89 mm Nominal Light Center Length
152.4 mm MOL

ANSI DESIGN.	RATED WATTAGE (W)	RATED VOLTAGE (V)	NOMINAL BULB SIZE	RATED * AVERAGE LIFE (HR.)	CORRELATED COLOR TEMP. (K) (±100K)[1]	LIGHT SOURCE ** D	LIGHT SOURCE ** H	OPERATING POSITION
EGC	500	120	T14 (T4)	150	3200	8.0	23.0	ANY
EGE	500	120	T16 (T5)	2000	3000	8.0	23.0	ANY
EGG	750	120	T16 (T5)	2000	3000	12.0	27.0	ANY
EGF	750	120	T16 (T5)	250	3200	12.0	27.0	ANY
EGJ	1000	120	T19 (T6)	400	3200	12.0	27.0	ANY
EGK***	1000	120	T19 (T6)	400	3200	12.0	27.0	ANY
EGM	1000	120	T19 (T6)	2000	3000	15.0	27.0	ANY
EWE	1000	220, 240	T19 (T6)	250	3200	12.0	30.0	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

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

TABLE 2

T35 (T11) or BT35 (BT11) and Smaller Bulbs
P28 Medium Prefocus Base
89 mm Nominal Light Center Length
160 mm MOL with C13 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
EXF	500	120	T25 (T8)	750	2950	17	18	5	C13	VBU±45****
EXB	750	120	BT35 (BT11)	750	3000	21	19	5	C13	VBU±45****
EXA	1000	120	BT35 (BT11)	750	3050	21	22	5	C13	ANY
FKE	1000	220, 240	BT35 (BT11)	750	3050	22.5	21	5	C13	ANY

* Lamp manufacturers published values of rated life may vary.
** See definition of light source in Section 4.4.2
*** Vertical base-up ±45°
[1] Under consideration

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

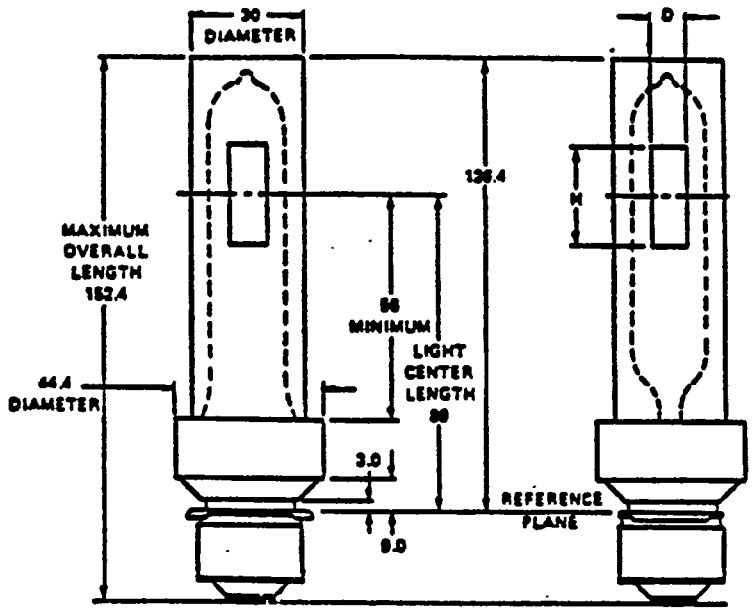

Figure 1

Space limits for Tungsten-Halogen Stage/Studio Lamps
T-19 (T6) and Smaller Bulbs, P28 Base,
89 mm Nominal Light Center Length (LCL)
152.4 mm Maximum Overall Length (MOL)

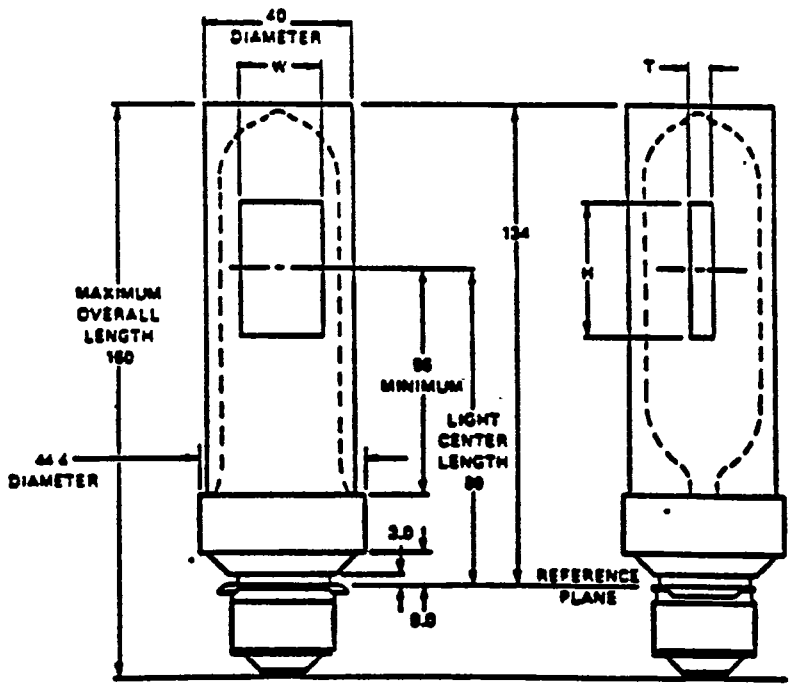

Figure 2

Space Limits for Tungsten-Halogen Stage/Studio Lamps
T35 (T11) or BT35 (BT11) and Smaller Bulbs, P28 Base,
89 mm Nominal Light Center Length (LCL)
160 mm Maximum Overall Length (MOL)

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale