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Replaceable Motorcycle Headlamp Bulbs

RATIONALE

SAE J1577 is being stabilized because it will no longer will be updated or revised.

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1. Scope

This SAE Recommended Practice provides performance parameters and dimensional specifications for available light sources (replaceable bulbs) which are appropriate for motorcycle headlamps.

1.1 Rationale

HB2 and H3 bulbs were added. IEC references and publications were removed including Table 1. References to ECE regulation 37 were added.

2. References

2.1 Applicable Publications

The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J584—Motorcycle Headlamps

2.1.2 ECE PUBLICATIONS

Available from Commission of the European Communities, Rue de la Loi 200, B-1049 Brussels, Belgium, www.europa.eu.int.

ECE Regulation R37—Filament Lamps Used in Approved Lamp Units

3. Definitions

3.1 Replaceable Motorcycle Headlamp Bulb (hereinafter referred to as "bulb" or "bulbs")

A radiant energy source with related envelope and mounting base which is removable from the motorcycle headlamp for the purpose of replacement.

3.2 Seasoning

Process of energizing the filament of a bulb at design voltage for a period of time equal to 1% of design life or 10 h, whichever is shorter.

4. Bulb Type and Specifications

4.1 Table 1 lists each bulb type with its specifications. Bulbs may be added to Table 1 in the future after review.

4.2 All the bulbs shall satisfy the following vibration test requirements.

4.2.1 Bulb shall be seasoned and mounted in a relevant headlamp and photometered to the applicable test points in accordance with Section 4.8 of SAE J584 before the vibration test.

4.2.2 Bulbs shall be mounted on the vibration test machine in their designed operating position.

4.2.3 Conditions of vibration test are shown in Table 2.

TABLE 1—TYPICAL REPLACEABLE MOTORCYCLE HEADLAMP BULBS

Bulb Type	Number of Filaments	Rated Watts	Rated Volts	Design Voltage	Luminous Flux (Lumens Approx.) at D.V.	Max. Wattage at D.V.	Rated Average Laboratory Life at D.V.[1]	Filament Type	Dimensions Fig
H4/HB2	2 (U.B/L.B.)	60/55	12/12	13.2	1650[2][3]	75/68	450	Axial/Axial	1 - 8
HS1	2 (U.B./L.B.)	35/35	12/12	13.2	825[2][3] 525[2][3]	36.75/ 36.75	[4]	Axial/Axial	9- 16
H3	1	55	12	13.2	1450[3]	68	500	Transverse	17 - 22

1. The filaments are operated alternately according to the following cycle and starting with the lower beam filament: lower beam filament 15 h on 45 min off, then the upper beam filament 7.5 h on 45 min off; repeat the cycle.
   The end of bulb life is determined by failure of either filament. The off periods are not considered as part of the bulb life.
2. With black cap.
3. Tolerances are ±15% for both U.B./L.B.
4. Not determined at this time.

   U.B. = upper beam
   L.B. = lower beam
   D.V. = Designed Volts

TABLE 2—CONDITIONS OF VIBRATION TEST

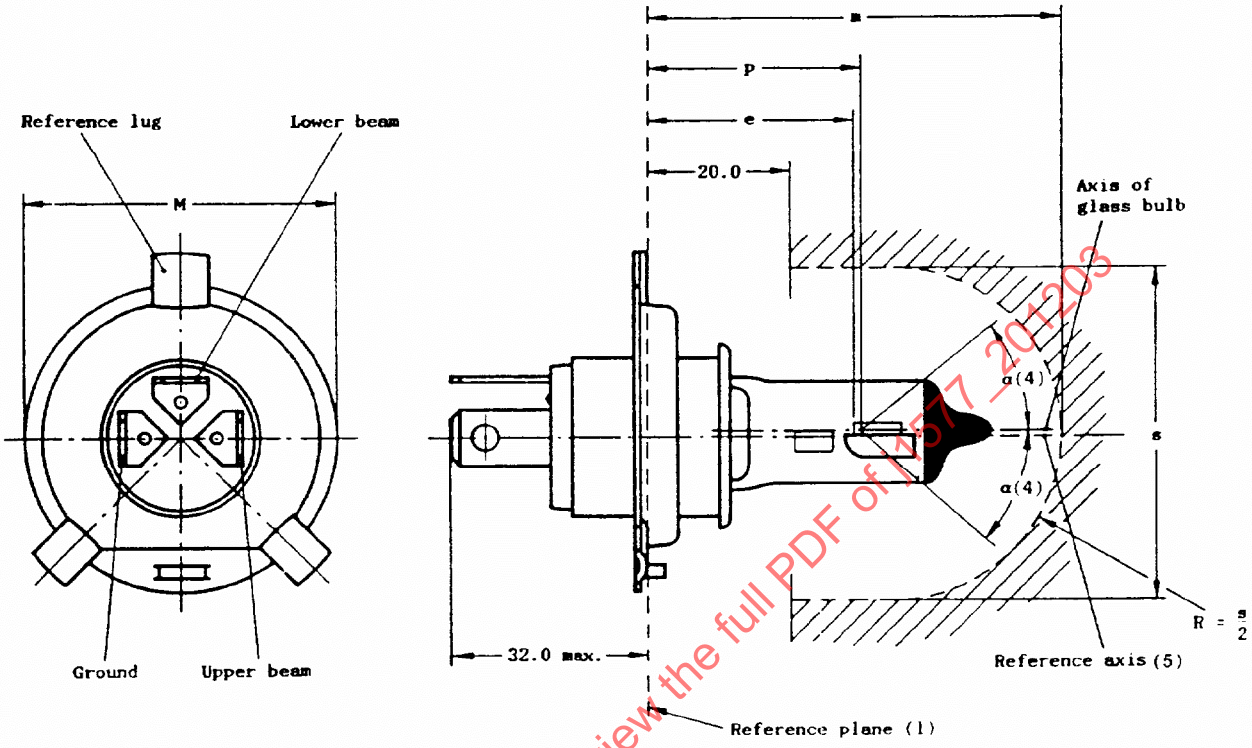
Wave Form	Sinusoidal
Frequency	50-500-50 Hz at a linear sweep period of two minutes
Acceleration and Direction	98 m/s^2 at bulb retaining portion. Vertical
Test Cycle	180 cycles

4.2.4 During the vibration test, the upper beam filament and the lower beam filament shall be energized alternately at 1 h intervals at design voltage.

4.2.5 Filament(s) shall not fail throughout the test period.

4.2.6 After the vibration test, the bulb shall be photometered to the applicable test points in accordance with Section 4.8 of SAE J584. The values shall not vary by more than ±10% from the values measured before the test.

The drawing is not mandatory, their sole purpose is to show which dimensions must be verified.



(1) The reference plane is the plane formed by the seating points of the three lugs of the base ring.

(2) "n" denotes the maximum length of the bulb.

(3) It must be possible to insert the bulb into a cylinder of diameter "s" concentric with the reference axis and limited at one end by a plane parallel to and 20 mm distance from the reference plane and at the other end by a hemisphere of radius s/2.

(4) The obscuration must extend at least as far as the cylindrical part of the glas bulb. It must also overlap the internal shield when the latter is viewed in a direction perpendicular to the reference axis.
The effect sought by the obscuration may also be achieved by other means.*

(5) The reference axis is the line perpendicular to the reference plane and passing through the centre of the circle of diameter "M".

* Not applicable to HB2.

Dimensions in millimeters

Reference	Dimension	Tolerance
e	28.5	+ 0.45 - 0.25
p	28.95	-
n (2)	max. 60.0	-
s (3)	45.0	-
α (4)	max. 40°	-

FIGURE 1—SPECIFICATION FOR THE TYPE H4/HB2 REPLACEABLE BULB

The drawings are not mandatory with respect to the design of the shield.

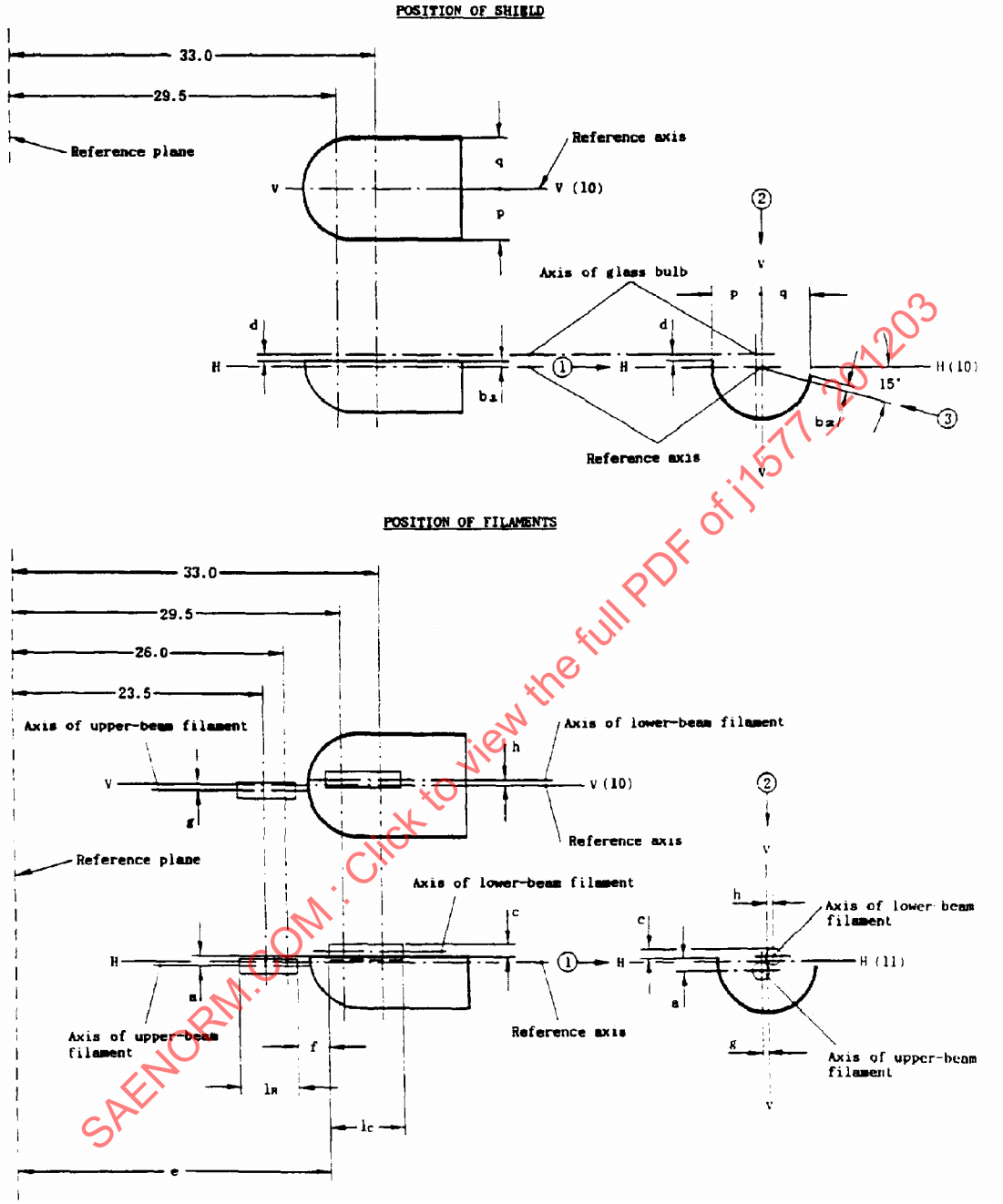


FIGURE 2—SPECIFICATION FOR THE TYPE H4/HB2 REPLACEABLE BULB

Dimensions indicated in Table are measured in three directions:

Direction ① for dimensions a, b_1, c, d, e, f, l_R and l_C;

Direction ② for dimensions g, h, p and q;

Direction ③ for dimension b_2.

Dimensions p and q are measured in a plane parallel to and 33 mm away from the reference plane.

Dimensions b_1, b_2, c and h are measured in planes parallel to and 29.5 mm and 33 mm away from the reference plane.

Dimensions a and g are measured in planes parallel to and 26.0 mm and 23.5 mm away from the reference plane.

(6) The end turns of the filaments are defined as being the first luminous turn and the last luminous turn that are at substantially the correct helix angle.

(7) For the lower-beam filament the points to be measured are the intersections, seen in direction ①, of the lateral edge of the shield with the outside of the end turns defined under footnote (6).

(8) "e" denotes the distance from the reference plane to the beginning of the lower-beam filament as defined under footnote (7).

(9) For the upper-beam filament the points to be measured are the intersections, seen in direction ①, of a plane parallel to plane HH and situated at a distance of 0.8 mm below it, with the end turns defined under footnote (6).

(10) Plane VV is the plane perpendicular to the reference plane and passing through the reference axis and through the intersection of the circle of diameter "M" with the axis of the reference lug.

(11) Plane HH is the plane perpendicular to both the reference plane and plane VV and passing through the reference axis.

Dimensions in millimeters

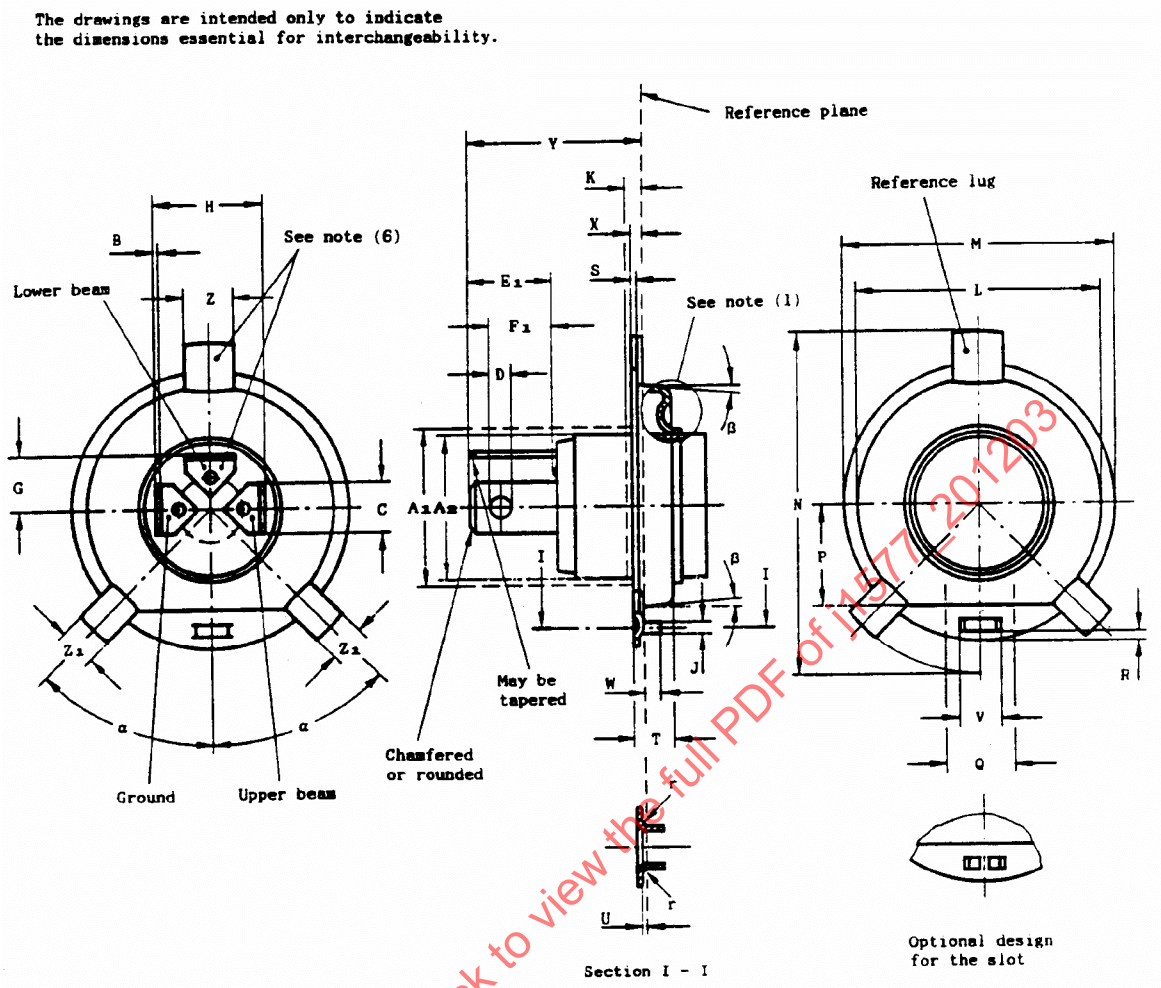
Reference	Dimension	Tolerances		
		H4 ***		HB2
a/26 *	0.8	± 0.35	± 0.2	± 0.30
a/23.5 *	0.8	± 0.60	± 0.2	± 0.40
b_1/29.5 *	0	± 0.30	± 0.2	± 0.25
b_1/33 *	b_1/29.5vm **	± 0.30	± 0.15	± 0.20
b_2/29.5 *	0	± 0.30	± 0.2	± 0.25
b_2/33 *	b_2/29.5vm **	± 0.30	± 0.15	± 0.20
c/29.5 *	0.6	± 0.35	± 0.2	± 0.30
c/33 *	c/29.5vm **	± 0.35	± 0.15	± 0.30
d	min. 0.1	-	-	-
e (8)	28.5	+ 0.35 - 0.25	+ 0.2 - 0.0	+ 0.35 - 0.15
f (6)(7)(9)	1.7	+ 0.50 - 0.30	+ 0.3 - 0.1	+ 0.30 - 0.30
g/26 *	0	± 0.5	± 0.3	± 0.4
g/23.5 *	0	± 0.7	± 0.3	± 0.5
h/29.5 *	0	± 0.5	± 0.3	± 0.5
h/33 *	h/29.5vm **	± 0.35	± 0.2	± 0.35
l_R (6)(9)	4.5	± 0.8	± 0.4	± 0.8
l_C (6)(7)	5.5	+ 0.5	+ 0.35	+ 0.8
p/33 *	Depends on the shape of the shield	-	-	-
q/33 *	$\frac{p+q}{2}$	± 0.6	± 0.3	± 0.6
$b_1 - b_2$	-	-	-	+ 0.25

* Dimension to be measured at the distance from the reference plane indicated in mm after the slash.

** ./29.5vm means the value measured at a distance of 29.5 mm from the reference plane.

*** Left column shows the tolerances for normal production bulbs.
Right column shows the tolerances for accurate rated bulbs.

FIGURE 3—SPECIFICATION FOR THE TYPE H4/HB2 REPLACEABLE BULB (CONTINUED)



Dimensions in millimeters

Dimension	Min.	Max.
A1 (8)	25.0	
A2 (10)	Nom. 22*	
B	0.7	0.8
C	7.7	8.1
D	3.0	3.3
E1	11.8	13.6
F1	8.8	10.3
G	8.5	9.0
H	17.0	17.9
J	1.9	2.1
K (10)	2.0	
L (2)(4)	37.8	38.0
M (3) H4	42.8	43.0
M (3) HB2	42.9	43.0
N	51.6	52.0

Dimension	Min.	Max.
P (2)(7)	15.3	15.5
Q (2)(7)	8.5	-
R	1.3	1.7
S	0.50	-
T	5.0	6.0
U	(9)	
V (2)(5)	6.3	6.5
W	1.8	2.2
X	1.1	1.3
Y	-	32.0
Z	7.9	8.0
Z1	5.8	6.2
r	(9)	
α	44°	46°
β	-	5°

FIGURE 4—SPECIFICATION FOR THE TYPE H4/HB2 REPLACEABLE BULB BASE P43T-38

(1) The form of this annular part of the ring is optional and may be flat or recessed.
However, the form shall be such that it will not cause any abnormal glare from the lower beam filament when the bulb is in its normal operating position in the vehicle.

(2) This dimension is measured at the reference plane.

(3) Dimension M is the diameter on which the bulb is centred.

(4) The maximum allowable eccentricity of cylinder L with respect to the circle of diameter M is 0.05 mm.

(5) The maximum allowable displacement of the centre of the nose from the line running through the centre of the reference lug and the circle of diameter M is 0.05 mm.
The sides of the nose shall not bend outwards.

(6) The relative positions of the contact tabs and the reference lug shall not deviate from the position shown by more than ± 20°.

(7) Dimension Q denotes the minimum width over which both the minimum and maximum limits of dimension P shall be observed.
Outside dimension Q, the maximum limit for dimension P shall not be exceeded.

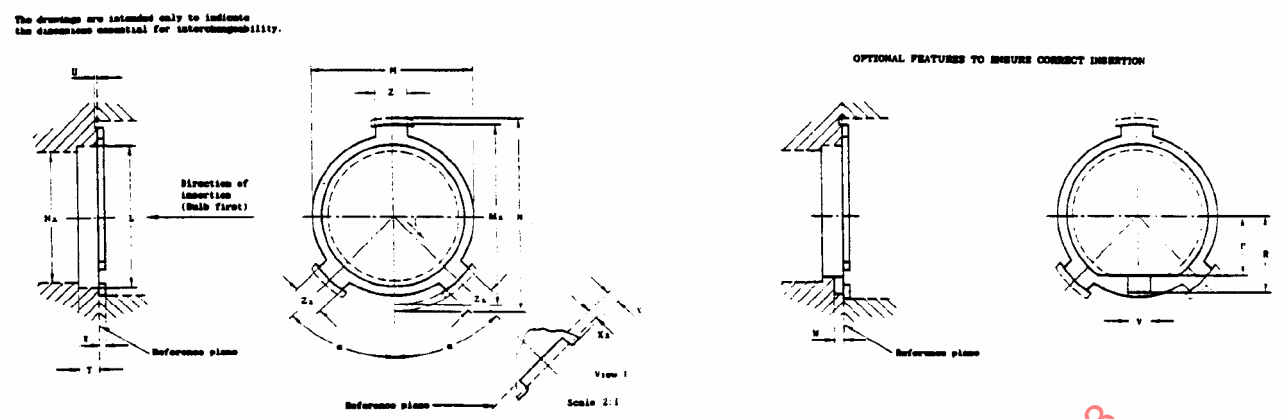
(8) The means of securing the ring in the headlamp shall not encroach on this cylindrical zone, which extends over the full length of the shell shown on this side of the ring.

(9) The radius r shall be equal to or smaller than dimension U.

(10) Beyond distance K, in the direction of the contact tabs, dimension A_2* shall be observed.

* This dimension is solely for base design and is not to be gauged on the finished lamp.

FIGURE 5—SPECIFICATION FOR THE TYPE H4/HB2 REPLACEABLE BULB BASE P43T-38 (CONTINUED)



The holder shall be so designed that, without using undue force, the means of retention of the bulb can be applied only when it is in the correct position.

The means of retention shall make contact with the prefocus base ring only and the total force exerted, when the bulb is in position, shall be not less than 10 N and be not more than 60 N.

(1) This value shall be complied with between the rim of the holder and the reference plane (dimension X). However, it may be reduced to 38.5 mm within the dimensions Z and Z_1 which correspond with the support points for the lugs of the ring.

(2) Dimension X_1 denotes the minimum distance over which dimensions Z and Z_1 shall apply. Outside dimension X_1 the slots may be chamfered or rounded.

(3) Wrong adjustment of the bulb in the holder can be prevented in different ways e.g.:

- by applying the additional optional features. (See figures).
- By decreasing dimension Z_1 to 7.5 - 7.7 mm followed by a decrease of the tolerance for α to give values of 44°40' - 45°20'.
- by using a sufficiently large value for X depending on the construction of the holder.

(4) If dimension L is smaller than 40.5 mm, dimension V, R and W shall apply.

(5) Dimension N delineates the minimum free space to be reserved for the three lugs of the ring.

(6) Dimension N_1 shall be not less than 35 mm diameter over a distance of 20 mm from the reference plane and shall be not less than 45 mm diameter at any distance greater than 20 mm from the reference plane.

Dimensions in millimeters

Dimension	Min.	Max.
L (4)	38.2	-
M	43.02 (1)	43.2
M_1	-	49.0
N (5)	52.5	
N_1	(6)	
P (3)	16.0	-
R (4)	20.5	-
T	5.5	-

Dimension	Min.	Max.
U	0.4	-
V (4)	6.8	-
W (4)	2.5	-
X (3)	1.8	-
X_1 (2)	1.4	-
Z (3)	8.05	8.15
Z_1 (3)	8.0	8.5
α	44°	46°

FIGURE 6—SPECIFICATION FOR THE TYPE H4/HB2 REPLACEABLE BULB—BULB HOLDER P43T

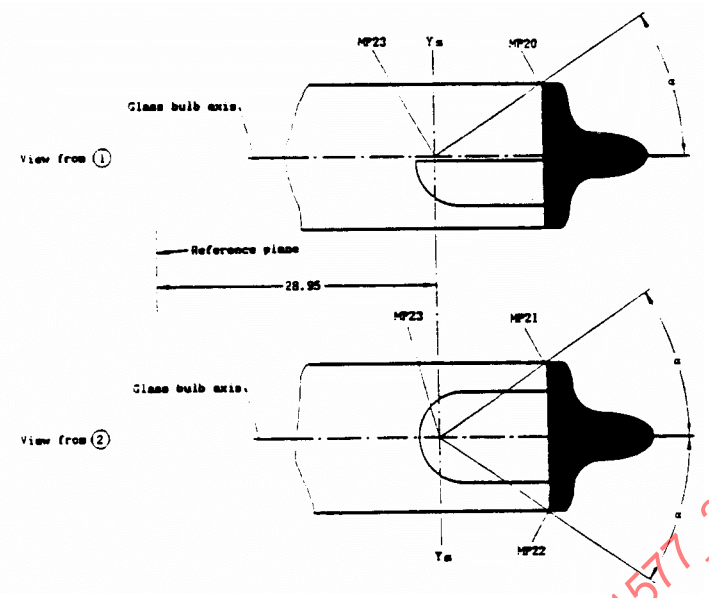


FIGURE 7—SPECIFICATION FOR THE TYPE H4/HB2 REPLACEABLE BULB—TOP OBSCURATION

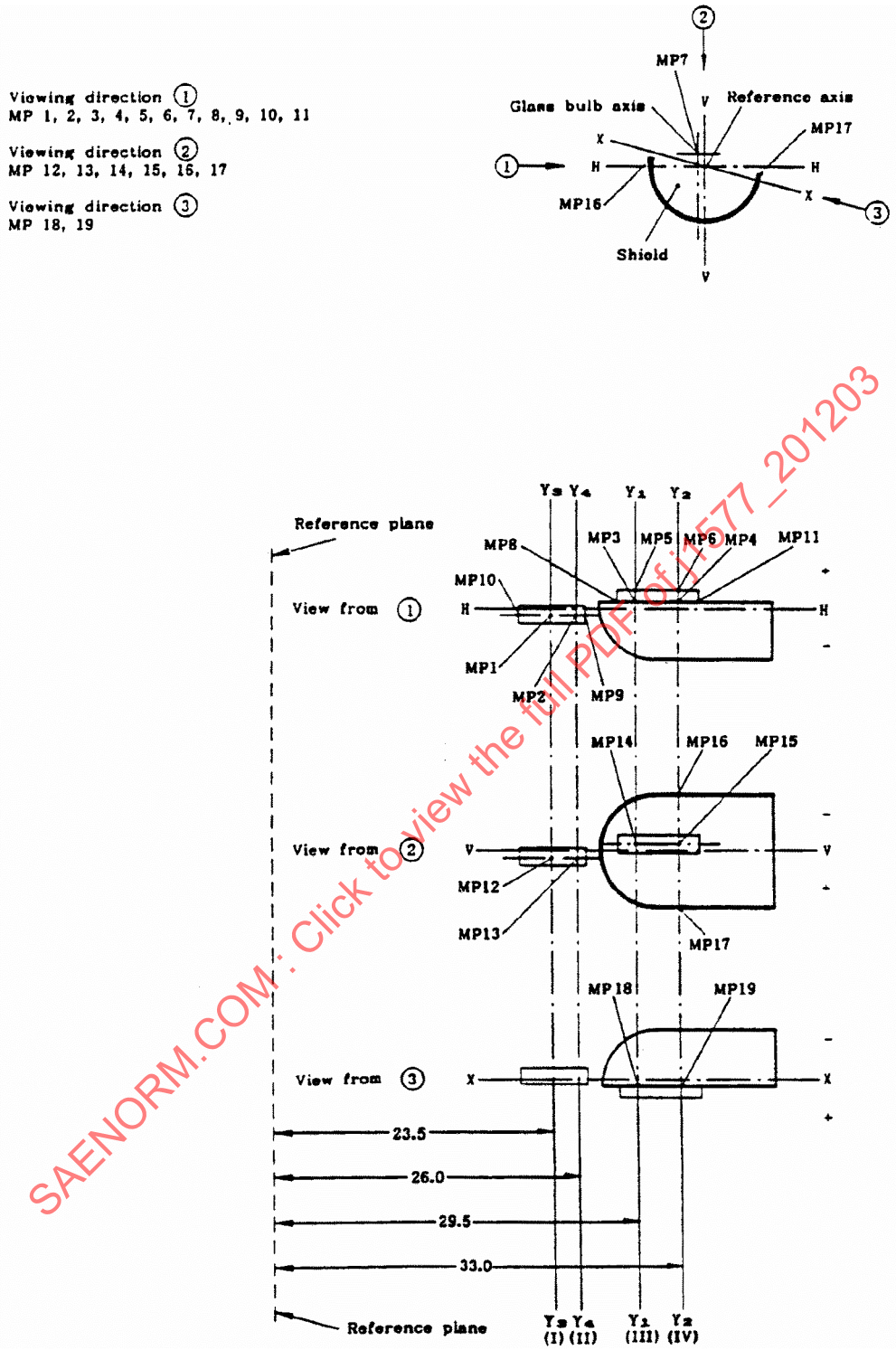
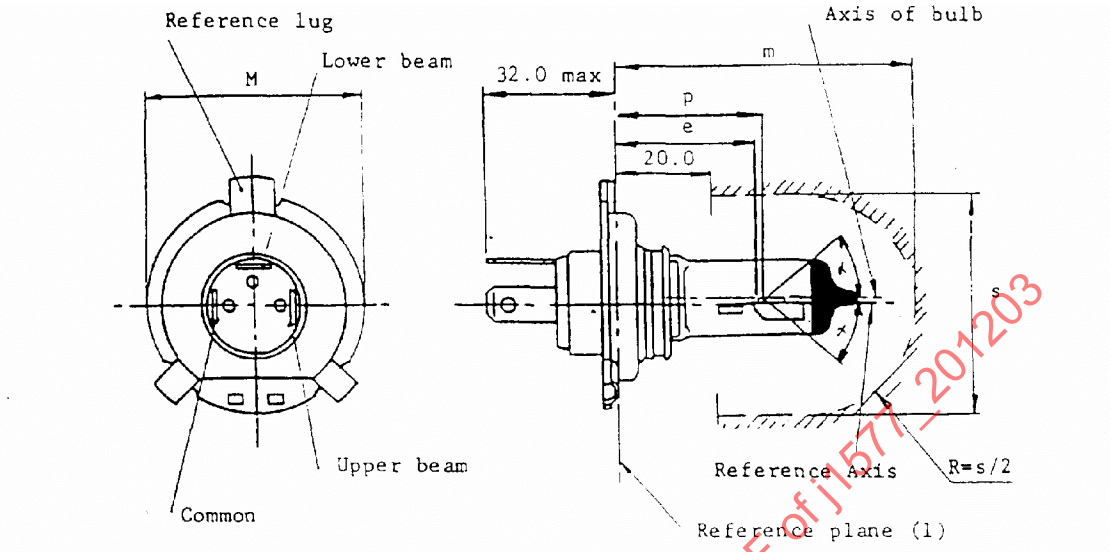


FIGURE 8—SPECIFICATION FOR THE TYPE H4/HB2 REPLACEABLE BULB—POSITIONS OF MEASURING POINTS OF H4/HB2 BULBS

Dimensions in mm

The drawing are not mandatory; their sole purpose is to show which dimensions must be verified.



Reference	Dimension	Tolerance
e	28.5	+0.45/−0.25
p	28.95	—
m (2)	max. 60.0	—
s (3)	45.0	—
α (4)	max. 40°	—

(1) The reference plane is the plane formed by the seating points of the three lugs of the base.

(2) Dimension m denotes maximum length of the bulb.

(3) It must be possible to insert the bulb into a cylinder of diameter s concentric with the reference axis and limited at one end by a plane parallel to and 20 mm distant from the reference plane and at the other end by a hemisphere of radius s/2.

(4) The obscuration must extend at least as far as the cylindrical part of the capsule. It must also overlap the internal shield when the latter is viewed in a direction perpendicular to the reference axis. The effect sought by obscuration may also be achieved by other means.

FIGURE 9—TYPE HS1 REPLACEABLE MOTORCYCLE HEADLAMP BULB—DIMENSIONAL SPECIFICATIONS

Dimensions in mm

The drawings are not mandatory with respect to the design of the shield.

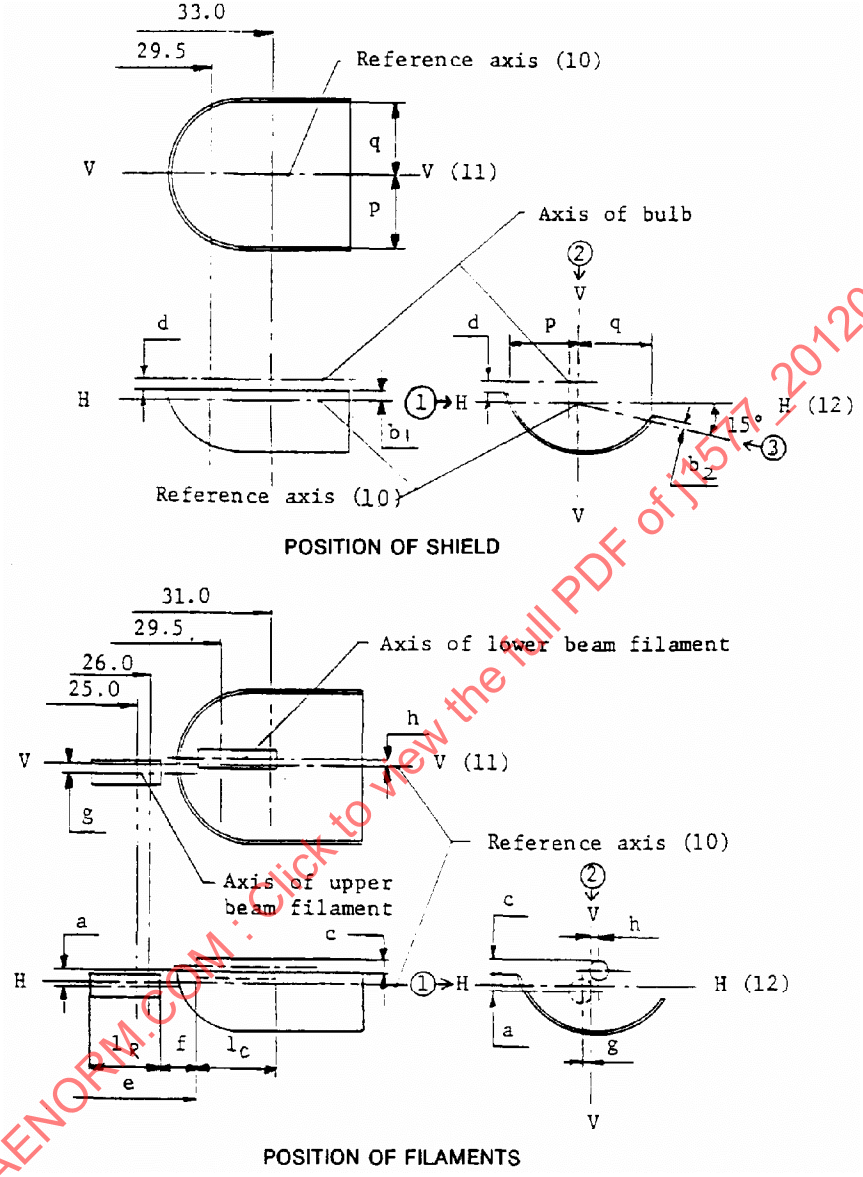


FIGURE 10—TYPE HS1 REPLACEABLE MOTORCYCLE HEADLAMP BULB—SHIELD AND FILAMENT POSITION DIMENSIONAL SPECIFICATIONS

Reference		Dimension	(in mm) Tolerance
a/26 *	(4)	0.8	± 0.35
a/25 *	(4)	0.8	± 0.55
b_1/29.5 *	(3)	0	± 0.35
b_1/33 *	(3)	b_1/29.5 mv **	± 0.35
b_2/29.5 *	(3)	0	± 0.35
b_2/33 *	(3)	b_2/29.5 mv **	± 0.35
c/29.5 *	(5)	0.6	± 0.35
c/31 *	(5)	c/29.5 mv **	± 0.3
d		min 0.1/max 1.5	—
e	(8)	28.5	+ 0.45 − 0.25
f	(6)(7)(9)	1.7	+ 0.5 − 0.3
g/26 *	(4)	0	± 0.5
g/25 *	(4)	0	± 0.7
h/29.5 *	(5)	0	± 0.5
h/31 *	(5)	h/29.5 mv **	± 0.3
l_R	(6)(9)	4.0	± 0.8
lc	(6)(7)	4.5	± 0.8
p/33 *	(2)	Depends on the shape of the shield	—
q/33 *	(2)	$\frac{p+q}{2}$	± 0.6

* Dimension to be measured at the distance from the reference plane indicated in mm after the stroke.
** "./29.5 mv means that the value is to be measured at a distance of 29.5 mm from the reference plane.

(1) The dimensions noted are measured as seen in the indicated directions.
  ① for dimensions a, b_1, c, d, e, f, l_R, and lc;
  ② for dimensions g, h, p, and q;
  ③ for dimension b_2.

(2) Dimensions p and q are measured in a plane parallel to and 33 mm away from the reference plane.

(3) Dimensions b_1 and b_2 are measured in planes parallel to and 29.5 mm and 33 mm away from the reference plane.

(4) Dimensions a and g are measured in planes parallel to and 25 mm and 26 mm away from the reference plane.

(5) Dimensions c and h are measured in planes parallel to and 29.5 mm and 31 mm away from the reference plane.

(6) The end turns of the filament are defined as being the first luminous turn and the last luminous turn that are at substantially the correct helix angle.

(7) For the lower-beam filament the points to be measured are the intersections, seen in direction ①, of the lateral edge of the shield with the outside of the end turns defined under footnote (5).

FIGURE 11—TYPE HS1 REPLACEABLE MOTORCYCLE HEADLAMP BULB—SHIELD AND FILAMENT POSITION DIMENSIONAL SPECIFICATIONS (CONTINUED)

(8) Dimension e denotes the distance from the reference plane to the beginning of the lower-beam filament as defined above.

(9) For the upper-beam filament the points to be measured are the intersections, seen in direction ①, of a plane, parallel to plane HH and situated at a distance of 0.8 mm below it, with the end turns defined under footnote (5).

(10) The reference axis is the line perpendicular to the reference plane and passing through the center of the circle of diameter M (see Figure 5).

(11) Plane VV is the plane perpendicular to the reference plane and passing through the reference axis and through the intersection of the circle of diameter M with the axis of the reference lug.

(12) Plane HH is the plane perpendicular to both the reference plane and plane VV and passing through the reference axis.

FIGURE 12—TYPE HS1 REPLACEABLE MOTORCYCLE HEADLAMP BULB—SHIELD AND FILAMENT POSITION DIMENSIONAL SPECIFICATIONS (CONTINUED)

Dimensions in mm

The drawings is intended only to indicate the dimensions essential for interchangeability.

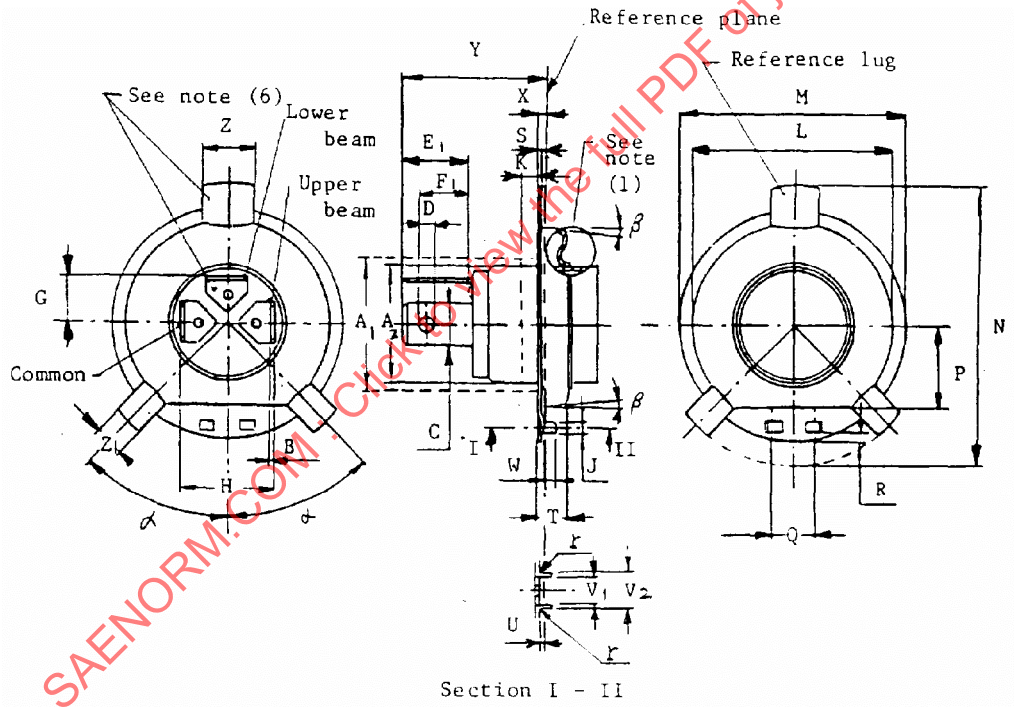


FIGURE 13—TYPE HS1 REPLACEABLE MOTORCYCLE HEADLAMP BULB—ASSEMBLED BASE PX43t-38 ON FINISHED BULB—DIMENSIONAL SPECIFICATIONS

Dimension		Min.	Max.
A_1	(8)	25.0	—
A_2		21.94	22.0
B		0.7	0.8
C		7.7	8.1
D		3.0	3.3
E_1		11.8	13.6
F_1		8.8	10.3
G		8.5	9.0
H		17.0	17.9
J		1.9	2.1
K	(10)	2.0	—
L	(2)(4)	37.5	38.0
M	(3)	42.8	43.0
N		51.6	52.0
P	(2)(7)	15.3	15.5
Q	(2)(7)	8.5	—
R		1.8	2.2
S		0.5	—
T		5.0	6.0
U			(9)
V_1	(2)(5)	8.0	—
V_2	(2)(5)	—	10.0
W		1.8	2.2
X		1.1	1.3
Y		—	32.0
Z		9.9	10.0
Z_1		5.8	6.2
r			(9)
α		44°	46°
β		—	5°

(1) The form of this annular part of the ring is optional and may be flat or recessed. However, the form shall be such that it will not cause any abnormal glare from the lower-beam filament when the bulb is in its normal operating position in the vehicle.
(2) This dimension is measured at the reference plane.
(3) Dimension M is the diameter on which the bulb is centered when checking the dimensional characteristics of the bulb.
(4) The maximum allowable eccentricity of cylinder L with respect to the circle of diameter M is 0.05 mm.
(5) The maximum allowable displacement of the center of the nose from the line running through the centers of the reference lug and the circle of diameter M is 0.05 mm. The sides of the nose shall not bend outward.

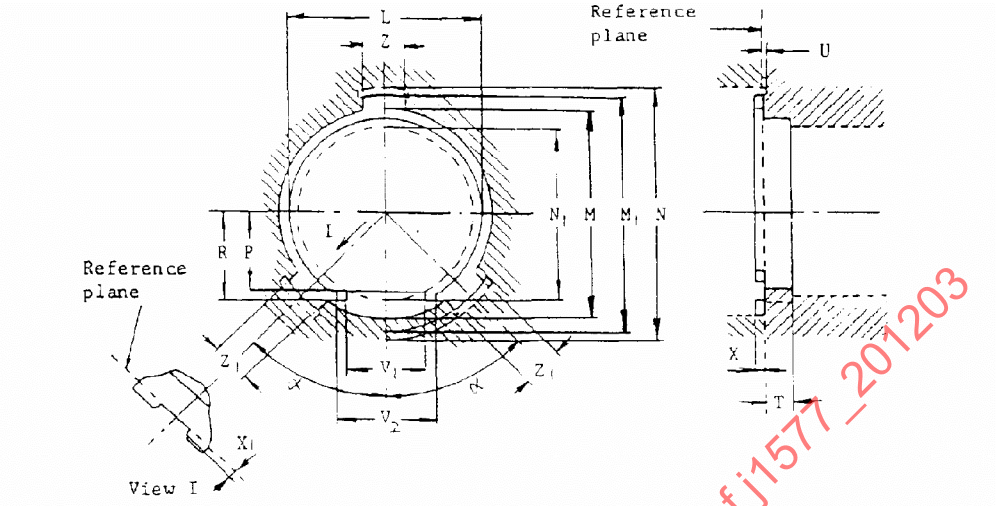
FIGURE 14—TYPE HS1 REPLACEABLE MOTORCYCLE HEADLAMP BULB—ASSEMBLED BASE PX43t-38 ON FINISHED BULB—DIMENSIONAL SPECIFICATIONS (CONTINUED)

(6) The relative positions of the contact tabs and the reference lug shall not deviate from the position shown by more than ±20 degrees.
(7) Dimension Q denotes the minimum width over which both the minimum and maximum limits of dimension P shall be observed. Outside dimension Q, the maximum limit for dimension P shall not be exceeded.
(8) The means of securing the ring in the headlamp shall not encroach on this cylindrical zone.
(9) The radius r shall be equal to or smaller than dimension U.
(10) Beyond distance K, in the direction of the contact tabs, both the minimum and the maximum limits of dimension A_2 shall be measured.

FIGURE 15—TYPE HS1 REPLACEABLE MOTORCYCLE HEADLAMP BULB—ASSEMBLED BASE PX43t-38 ON FINISHED BULB—DIMENSIONAL SPECIFICATIONS (CONTINUED)

Dimensions in mm

The drawing is intended only to indicate the dimensions essential for interchangeability.



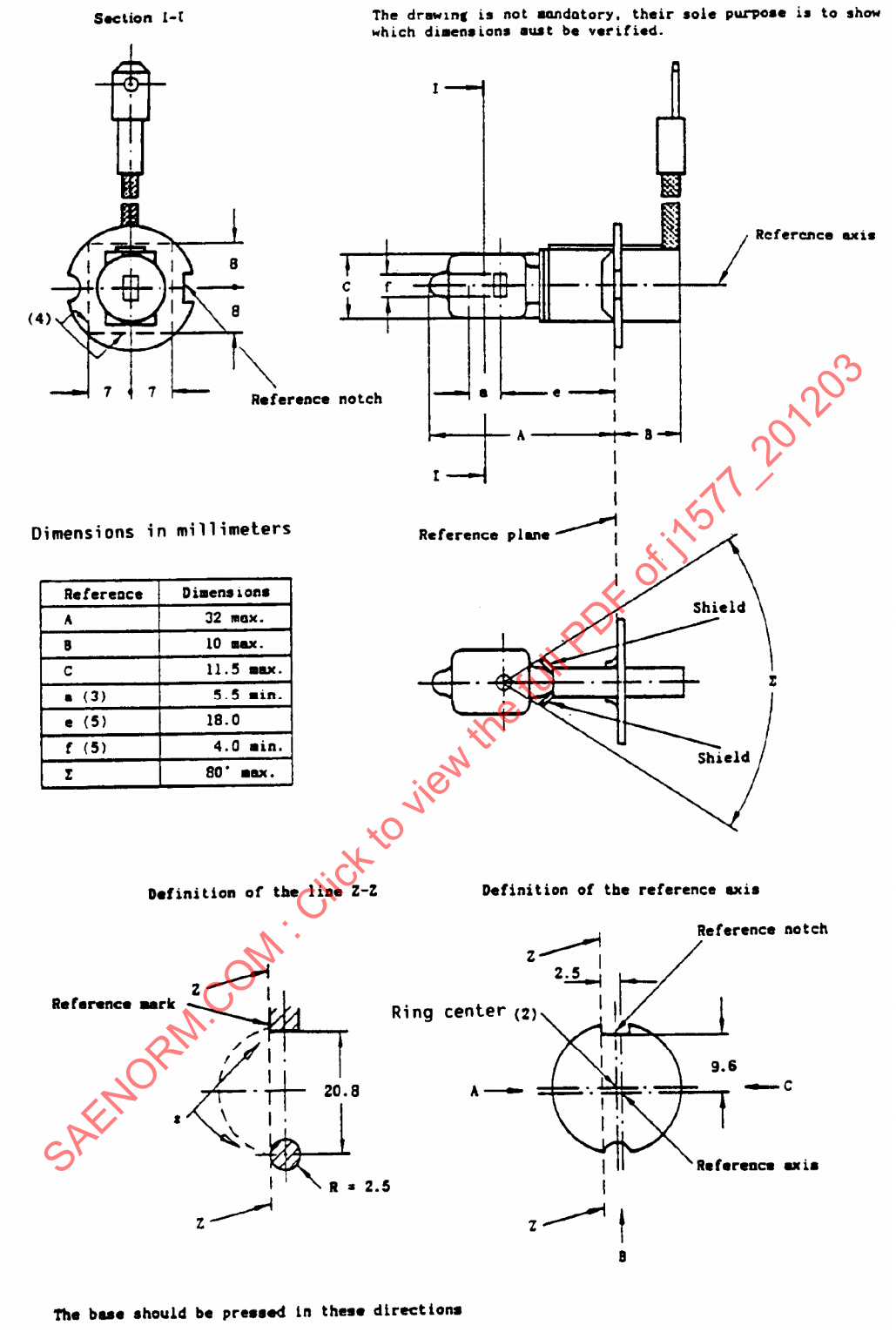
Dimension	Min.	Max.
M	43.02 (1)	43.2
M_1	—	49.0
N	52.2	—
N_1	35.0	—
L	38.2	38.5
P	15.7	16.7
R	20.0	—
T	5.5	—
U	0.4	—
V_1	7.5	7.8
V_2	10.2	—
X	1.8	—
X_1 (2)	1.4	—
Z	10.05	10.15
Z_1	8.0	8.5
α	44°	46°

The holder shall be so designed that the means of retention of the bulb can be applied only when the bulb is in the correct position.

The means of retention shall make contact only with the prefocus ring of the base and the total force exerted, when the bulb is in position, shall be not less than 10 N and be not greater than 60 N.

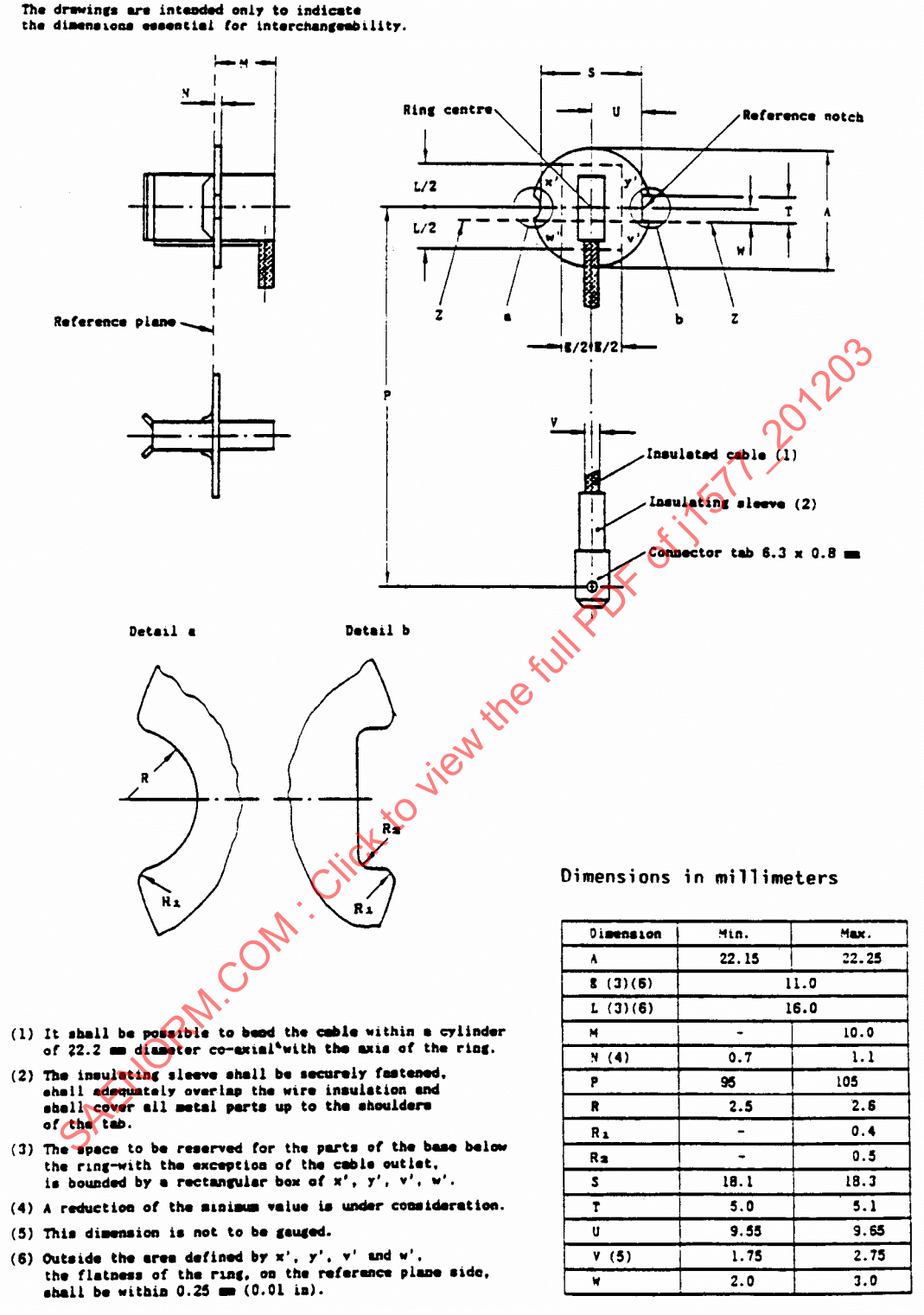
(1) This value shall be complied with between the rim of the bulbholder and the reference plane (dimension X). However, it may be reduced to 38.5 mm within the dimensions Z and Z_1 which correspond with the support points for the lugs of the cap.
(2) Dimension X_1 denotes the minimum distance over which dimensions Z and Z_1 shall apply. Outside dimension X_1 the slots may be chamfered or rounded.

FIGURE 16—TYPE HS1 REPLACEABLE MOTORCYCLE HEADLAMP BULB—BULBHOLDER PX43t—DIMENSIONAL SPECIFICATIONS



Reference	Dimensions
A	32 max.
B	10 max.
C	11.5 max.
a (3)	5.5 min.
e (5)	18.0
f (5)	4.0 min.
Σ	80° max.

FIGURE 17—SPECIFICATION FOR THE TYPE H3 REPLACEABLE BULB



Dimensions in millimeters

Dimension	Min.	Max.
A	22.15	22.25
E (3)(6)	11.0	
L (3)(6)	16.0	
M	-	10.0
N (4)	0.7	1.1
P	95	105
R	2.5	2.6
R_1	-	0.4
R_2	-	0.5
S	18.1	18.3
T	5.0	5.1
U	9.55	9.65
V (5)	1.75	2.75
W	2.0	3.0

(1) It shall be possible to bend the cable within a cylinder of 22.2 mm diameter co-axial with the axis of the ring.

(2) The insulating sleeve shall be securely fastened, shall adequately overlap the wire insulation and shall cover all metal parts up to the shoulders of the tab.

(3) The space to be reserved for the parts of the base below the ring-with the exception of the cable outlet, is bounded by a rectangular box of x', y', v', w'.

(4) A reduction of the minimum value is under consideration.

(5) This dimension is not to be gauged.

(6) Outside the area defined by x', y', v' and w', the flatness of the ring, on the reference plane side, shall be within 0.25 mm (0.01 in).

FIGURE 18—SPECIFICATION FOR THE TYPE H3 REPLACEABLE BULB BASE PK22S