SRI LANKA STANDARD 769 : 1986

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SPECIFICATION FOR

HAND HAMMERS

SRI LANKA STANDARDS INSTITUTION

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SLS 769 : 1986

Gr. 13

SRI LANKA STANDARDS INSTITUTION
53, Dharmapala Mawatha,
Colombo 3,
Sri Lanka.

SRI LANKA STANDARD
SPECIFICATION FOR HAND HAMMERS

FOREWORD

This Sri Lanka Standard was authorised for adoption and publication by the Council of the Sri Lanka Standards Institution on 1986-12-17, after the draft finalised by the Drafting Committee on Hand Hammers, had been approved by the Mechanical Engineering Divisional Committee.

All standard values given in this specification are in SI units.

Hammer heads and handles shall be supplied as separate items. However, complete item "Hammer" may be supplied as agreed between manufacturer and purchaser.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or an analysis, shall be rounded off in accordance with **SLS 102**. The number of significant figures to be retained in the rounded off value shall be the same as that of the specified value in this standard.

The assistance derived from the publications of the American National Standards Institution, British Standards Institution, Bureau of Indian Standards and the South African Bureau of Standards in the preparation of the standard is gratefully acknowledged.

1 SCOPE

This Sri Lanka Standard covers the requirements for hand hammers of types specified in **3**. Specifications for handles are also provided.

2 REFERENCES

SLS	8	Wire nails.
SLS	102	Presentation of numerical values.
SLS	122	Vickers hardness test.
SLS	145	Rockwell hardness test.
SLS	146	Brinell hardness test.
SLS	263	Building Timber Part 2 : Permissible defects
SLS	428	Random Sampling Methods.

3 TYPES OF HAMMERS

(a)	Engineer's ball pein hammer	(Figure 3)
(b)	Ball pein pin hammer	(Figure 4)
(c)	Engineer's cross pein hammer	(Figure 5)
(d)	Cross pein pin hammer	(Figure 6)
(e)	Double face sledge hammer	(Figure 7)
(f)	Straight pein sledge hammer	(Figure 8)
(g)	Cross pein sledge hammer	(Figure 8)
(h)	Spiking hammer	(Figure 9)
(i)	Keying hammer	(Figure 10)
(j)	Spiking and keying hammer	(Figure 11)
(k)	Claw hammer	(Figure 12)
(l)	Stone breaker's hammer	(Figure 13)
(m)	Welder's chipping hammer	
	i. Wooden handle	(Figure 14(a)
	ii. Plain steel wire handle	(Figure 14(b)
	iii. Coiled steel wire handle	(Figure 14(c)

4 REQUIREMENTS

4.1 Material

4.1.1 *Hammer head*

All hammer heads shall be manufactured from fully killed forging quality steel, composition of which is given below :

Constituent		Percent
Carbon	-	0.50 - 0.60
Silicon	-	0.10 - 0.40
Manganese	-	0.50 - 0.90
Phosphorus	-	0.05 max.
Sulphur	-	0.05 max.

4.1.2 *Handle*

4.1.2.1 Wooden handle

The handle shall be manufactured from any hardwood as agreed between the manufacturer and the purchaser.

The timber shall be seasoned, tough and free from knots, shakes, or other defects except to the extent permitted for structural timber under 7 of **SLS 263 : Part 2.**

4.1.2.2 Steel handle

This shall be used only for welder's chipping hammers. Handle and spring material shall be bright drawn mild steel.

4.2 Manufacture

4.2.1 *Hammer head*

The hammer heads shall be soundly forged or stamped from one piece to the required shape and design. The eye shall be shaped in accordance with Figure 2 and shall be central in the width of the head.

The hammer heads shall be hardened on the striking faces and peins or claws only and then tempered to achieve the hardness specified in **4.5.**

The hardened zones shall not extend into the neck or, where there is no neck, to more than half way to the near edge of the eye. In claws the hardness shall diminish from the claw tip towards the eye and it shall not reach near the eye than 12 mm.

4.2.2 *Handle*

Wooden handles shall conform to the dimensions shown in Figure 15. It is recommended that immediately after manufacture the handles are given suitable treatment such as dipping in linseed oil to retard the changes in moisture content.

For welder's chipping hammer, steel handles shall conform to the dimensions in Figures 14 b and 14 c. They shall be either, pressed and pinned, welded or be integral forged extension of the head.

4.2.3 *Assembly*

When fitted, the handles shall be visually square with the heads and positively and securely fixed. In the case of wooden handles wedges may be used or any alternative methods of securing shall be as agreed between the purchaser and the manufacturer.

4.3 Finish

4.3.1 Hammer heads shall be well shaped and free from flaws, seams, cracks, pits or other defects.

4.3.2 The striking faces of hammer heads shall be ground to a smooth bright finish with all sharp edges removed. For types (a-1) the, striking faces shall be convexed with a maximum convexity of radius 250 mm, the centre of which should be on the projected longitudinal axis of the head, and chamferred as indicated in Fig. 1. The peins shall be ground smooth to the appropriate shape. Any other finish required may be agreed between the purchaser and the supplier. The claw hammers shall have a chisel edge ground on the under side of the claw in accordance with Figure 12.

4.3.3 The hammer head shall be coated with an approved anticorrosive paint except on the ground portions which shall be left varnished, or varnished all over.

4.3.4 Handles shall be cleanly paved off under the heads after fitting and smoothly finished all over. All wooden handles shall have a chamfer at the heel and shall be clear lacquered, varnished or waxed.

4.4 Dimensions and tolerances

4.4.1 *Hammer head*

The dimensions of the hammer heads shall be as given in Figures 1 to 14. The hammer heads shall be provided with oval eye for types shown in Figures 1 to 14 a which shall be proportioned as shown in Figure 2.

The tolerances of $\pm$ 1.5 mm shall be permissible on the dimension of the oval eye. Other dimensions given in Figure 3 to 14 are nominal values and the tolerance on these shall be in accordance with best forging practice.

The mass of the hammer heads shall be subject to a tolerance of $\pm$ 5 per cent.

4.4.2 *Handle*

The shape and dimensions of wooden handles shall be those given in Figure 15. For wooden handles the following tolerances shall be permissible.

(a) Hammer head end cross section : $^{+3\ mm}_{-0\ mm}$

(b) Other dimensions : $\pm$ 2 mm.

For welder's chipping hammers the dimensions of steel handles shall be as given in Figures 14 b and 14 c.

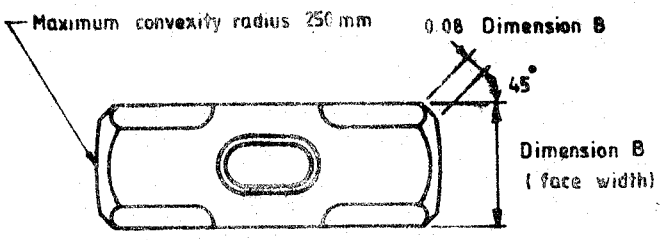


FIGURE 1 – Finishing details of hammer head (Type a - I)

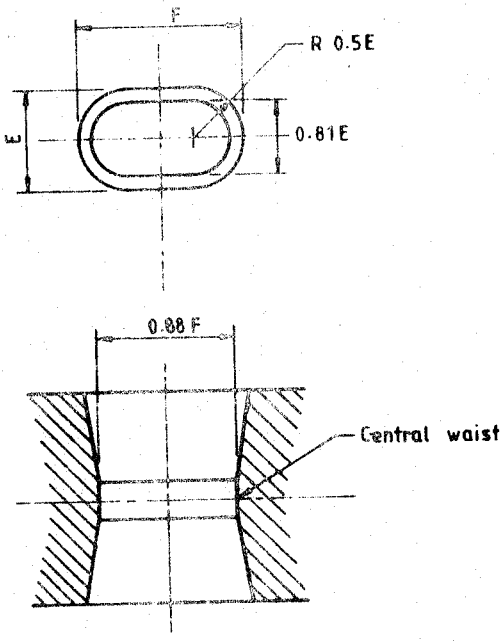
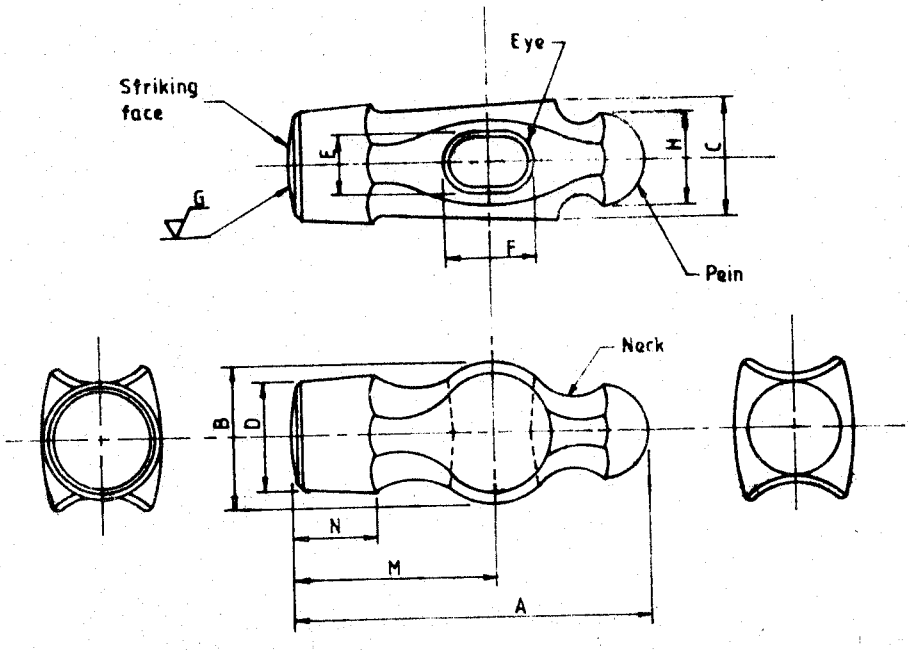


FIGURE 2 – Oval eye proportions

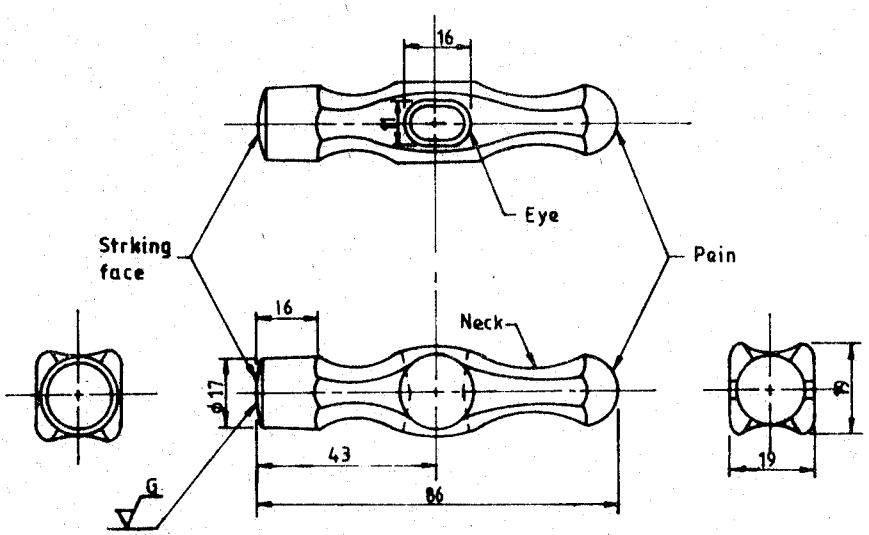


All dimensions in millimetres

Nominal mass (g)	A	B	C	D	H	M	N	E	F
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
100	65	25	20	20	15	35	15	10	15
200	80	30	25	25	20	48	20	15	20
300	90	35	30	25	25	50	20	15	25
500	105	40	32	30	25	60	22	15	25
600	110	45	35	35	30	65	25	20	30
800	120	50	35	40	32	68	25	20	30
1000	125	50	40	40	35	70	25	20	35

NOTE : For details of eye, see Fig. 2.

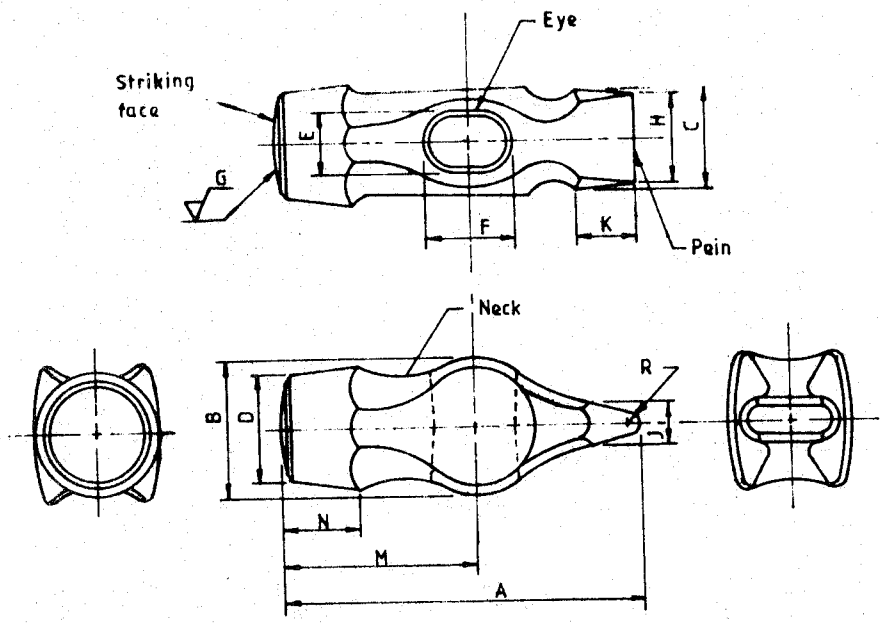
FIGURE 3 - Dimensions of engineer's Ball Pein Hammers.



NOTES

1. Nominal mass of head = 115 g
2. All dimensions in millimetres
3. For details of eye, see Fig. 2

FIGURE 4 - Dimensions of ball pein pin hammer

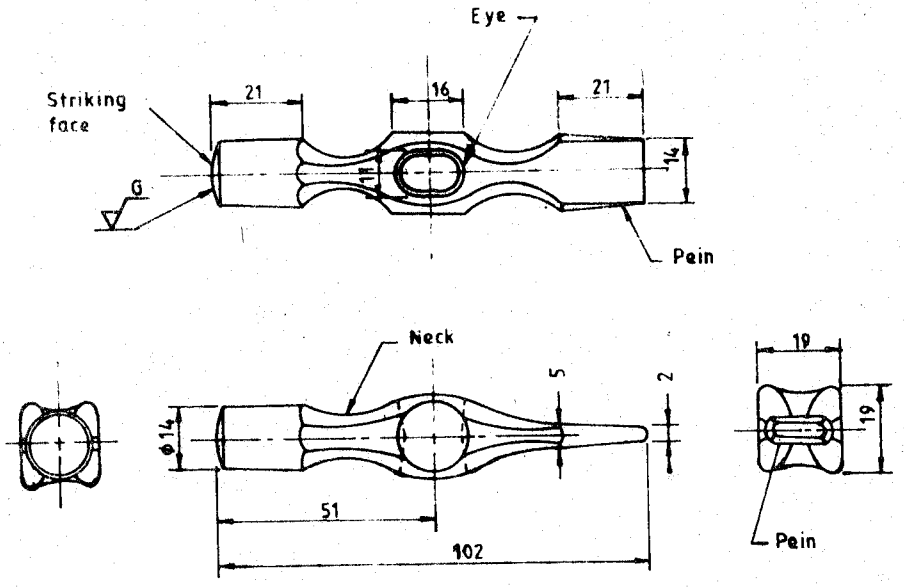


All dimensions in millimetres.

Nominal mass (g)	A	B	C	D	H	J	K	M	N	R	E	F
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
200	75	30	25	24	20	10	12	45	20	1.6	15	20
300	95	35	25	30	22	12	16	50	20	1.6	15	25
500	105	40	32	35	25	15	20	60	22	3.2	15	25
600	115	45	35	35	30	15	20	60	25	4.0	20	30
800	120	50	40	40	32	18	20	65	25	4.0	20	30
1000	130	50	40	40	35	18	22	70	25	4.0	20	35

NOTE : For details of eye, see Fig. 2.

FIGURE 5 - Dimensions of engineer's Cross Pein Hammers.



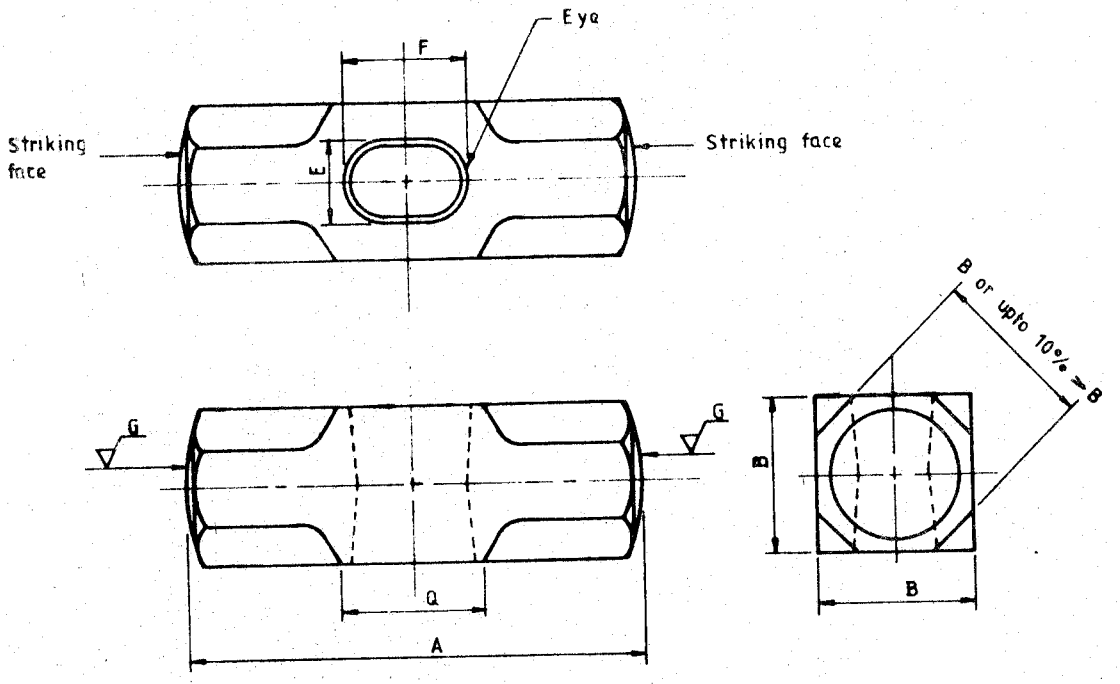
NOTES

1 Nominal mass of head = 100 g

2 All dimensions in millimetres

3 For details of eye, see Fig. 2

FIGURE 6 - Dimensions of cross pein pin hammer,

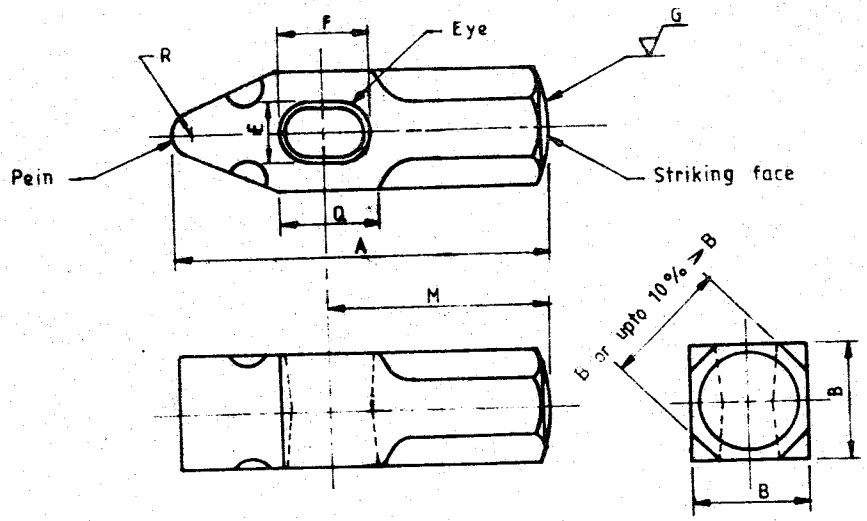


All dimensions in millimetres.

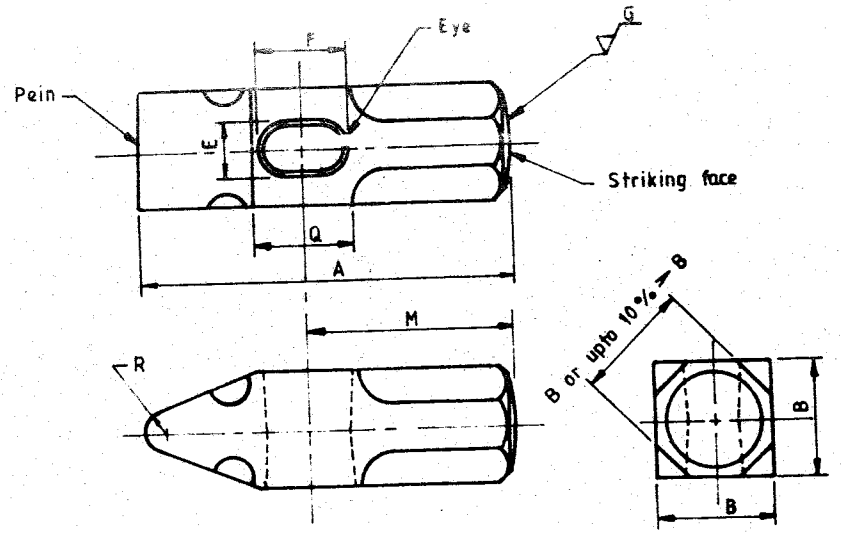
Nominal mass (kg)	A	B	Q	E	F
(1)	(2)	(3)	(4)	(5)	(6)
0.5	80	32	25	15	25
1.0	105	40	35	20	32
1.5	128	45	40	20	35
2.0	135	50	40	25	35
2.5	155	52	45	25	35
3.0	160	55	47	25	45
3.5	170	55	50	25	45
4.0	170	60	50	30	45
5.0	190	65	52	30	45
6.0	210	68	52	30	45
8.0	230	72	62	30	50
10.0	240	80	65	30	50

NOTE : *For details of eye, see Fig. 2.*

FIGURE 7 - Dimensions of Double Face Sledge Hammers.



Straight pein sledge hammers



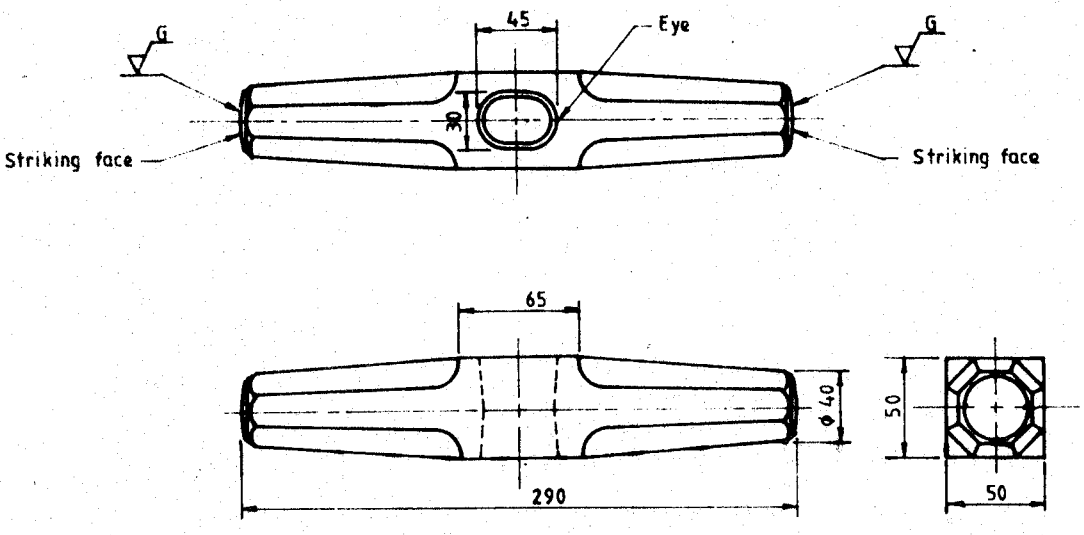
Cross pein sledge hammers

All dimensions in millimetres.

Nominal mass (kg)	A	B	M	Q	R	E	F
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0.5	95	30	55	25	6	15	25
1.0	125	40	65	35	6	20	35
1.5	135	40	75	35	8	20	35
2.0	145	45	75	35	10	25	35
2.5	155	50	85	50	10	25	35
3.0	160	55	90	50	15	25	45
3.5	175	55	100	55	15	25	45
4.0	185	60	105	55	15	30	45
5.0	195	60	110	60	20	30	45
6.0	220	70	120	65	20	30	45
8.0	225	75	130	75	20	30	50

NOTE : For details of eye, see Fig. 2.

FIGURE 8 - Dimensions of straight pein sledge hammers and cross pein sledge hammers.



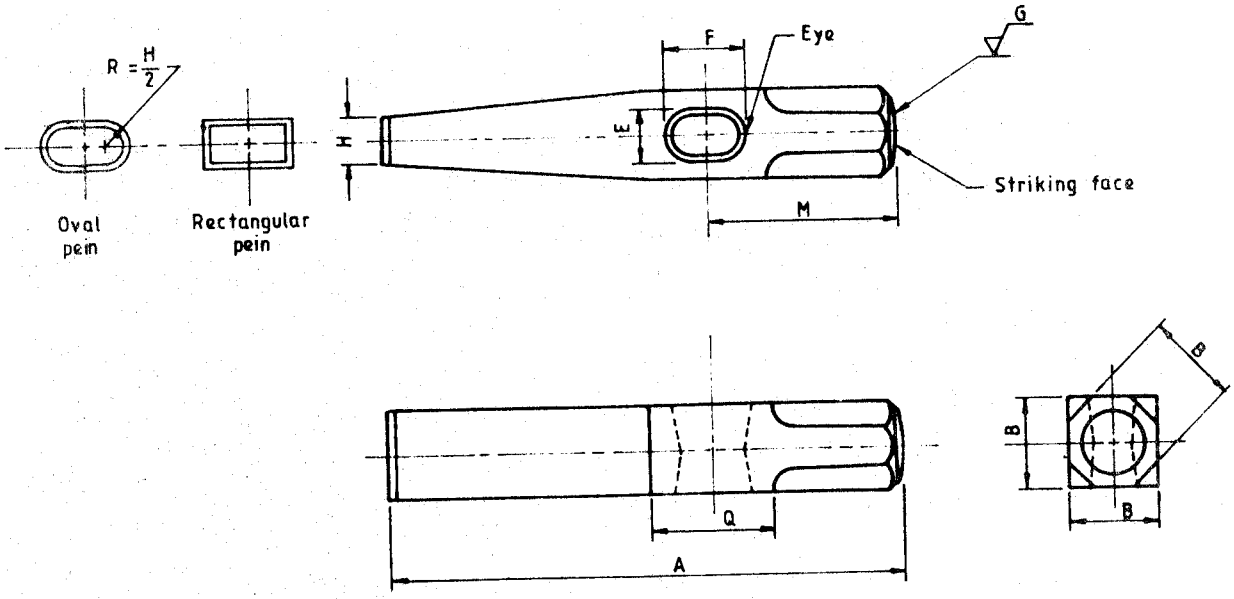
NOTES -

1 Nominal mass = 4 kg

2 All dimensions in millimetres

3 For details of eye, see Fig. 2

FIGURE 9 - Dimensions of Spiking Hammers.

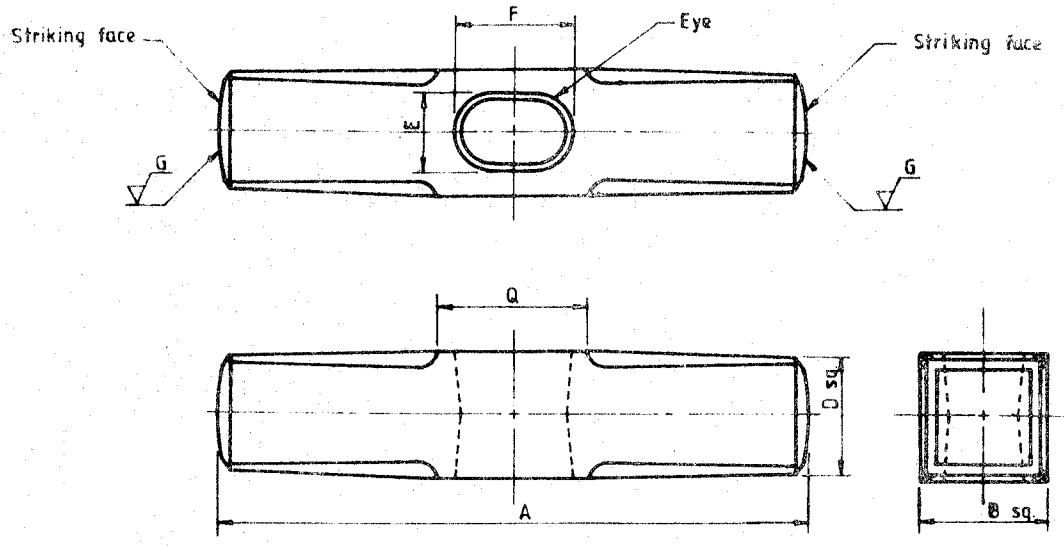


All dimensions in millimetres.

Nominal mass (kg)	A	B	H	M	Q	R	E	F
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2.0	210	40	20	75	55	10	25	35
3.0	265	45	20	95	66	10	25	45

NOTE : For details of eye, see Fig. 2.

FIGURE 10 - Dimensions of Keying Hammers

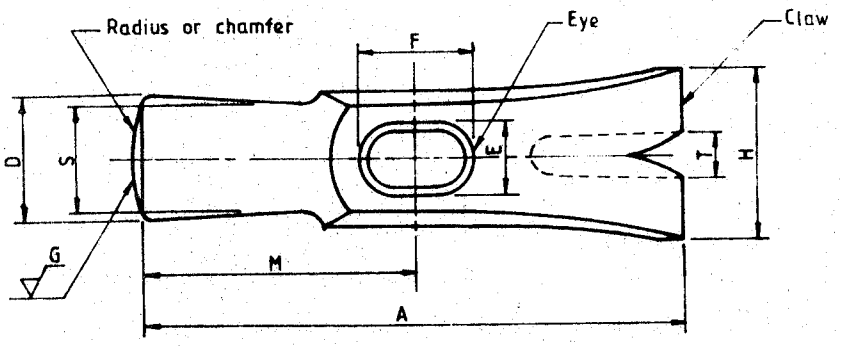


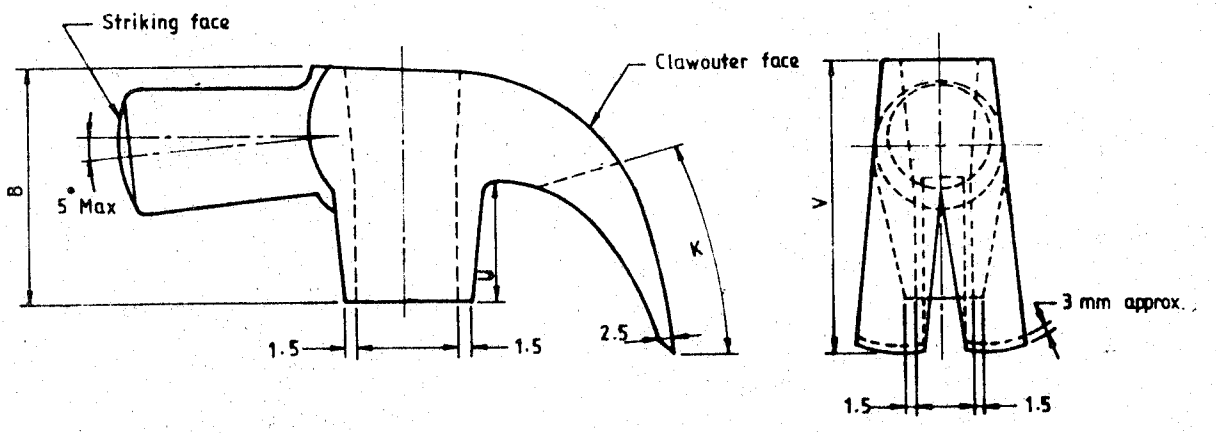
All dimensions in millimetres.

Nominal mass (kg)	A	B	D	Q	E	F
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.5	170	35	30	40	20	35
3.0	260	40	40	65	25	45

NOTE : For details of eye, see Fig. 2.

FIGURE 11 - Dimensions of Spiking and Keying Hammers



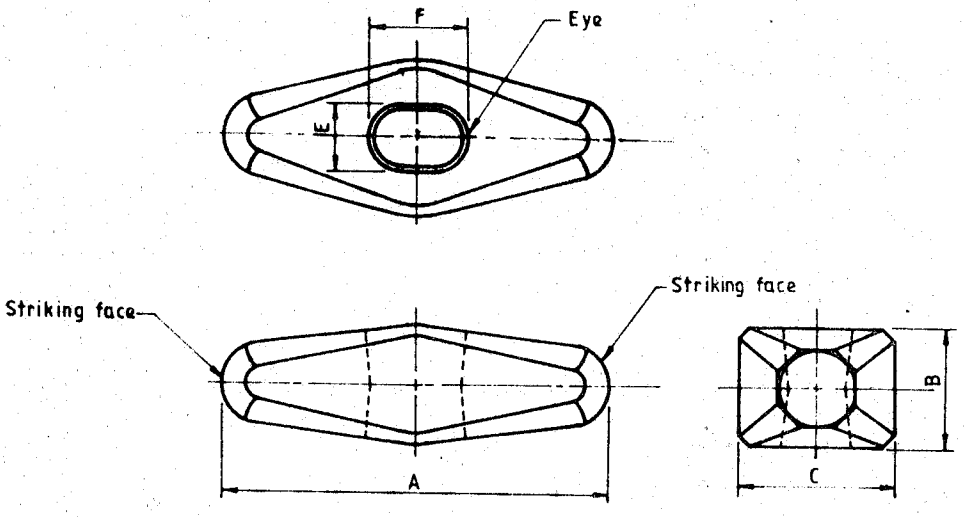


All dimensions in millimetres

Nominal mass (g)	A	B	D	H	K	M	S	T	U	V	E	F
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
500	120	52	28	30	36	60	23	6	28	60	15	25
700	135	62	30	35	42	65	25	9	32	75	20	30

NOTE : For details of eye, see Fig. 2.

FIGURES 12 - Dimensions of claw hammers

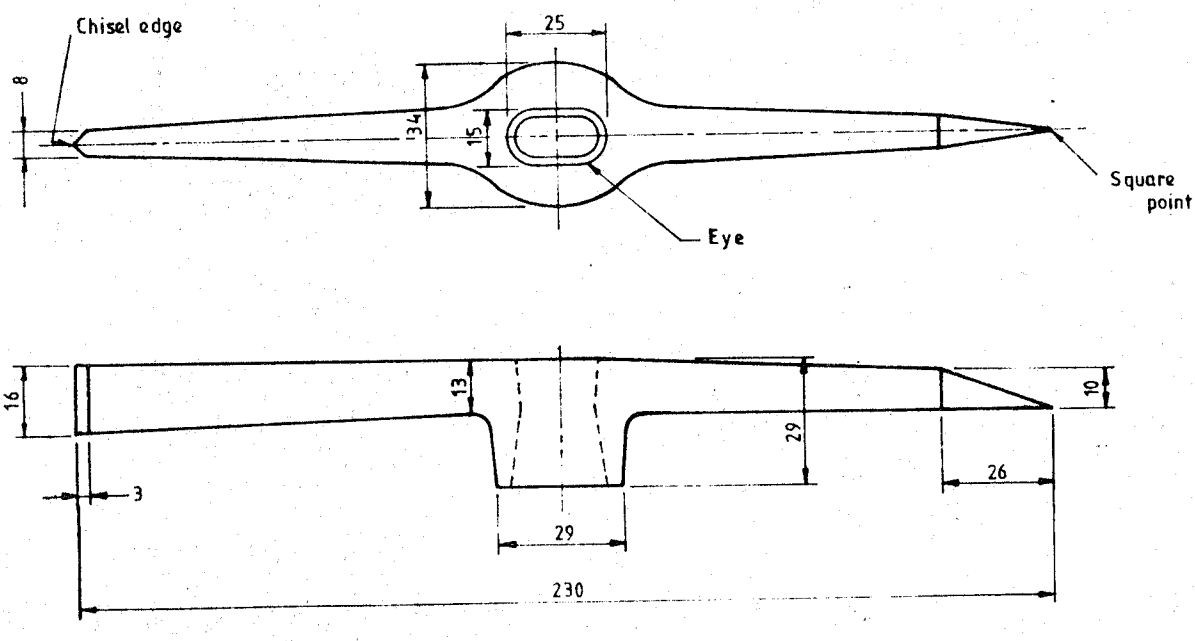


All dimensions in millimetres.

Nominal mass (g)	A	B	C	E	F
(1)	(2)	(3)	(4)	(5)	(6)
500	100	40	30	15	25
800	110	50	40	20	30
1000	130	55	40	20	35

NOTE : For details of eye, see Fig. 2.

FIGURE 13 - Dimensions of Stone Breaker's Hammers

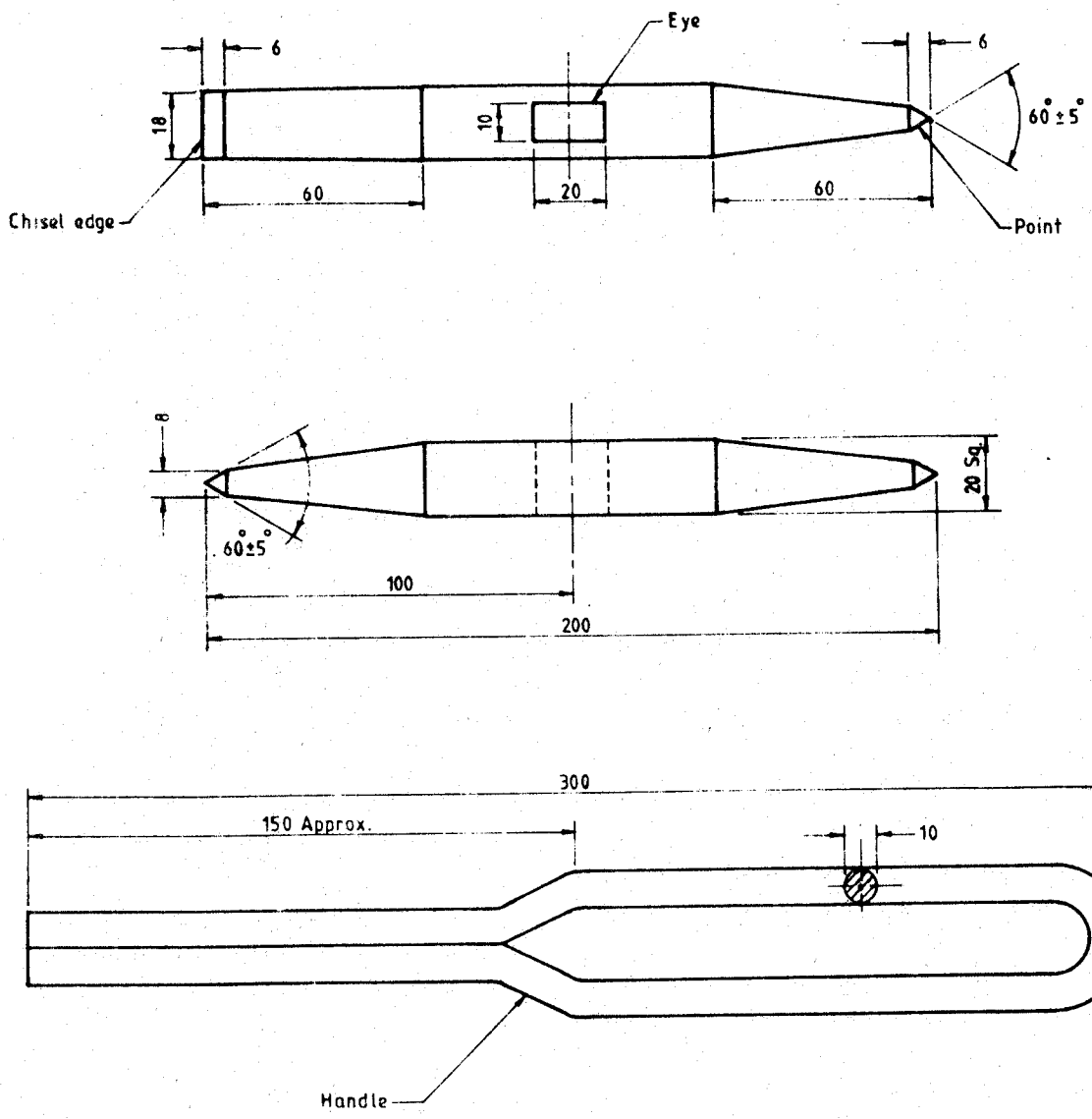


Nominal mass of head = 340 g

All dimensions in millimetres.

NOTE : For details of eye, see Fig. 2.

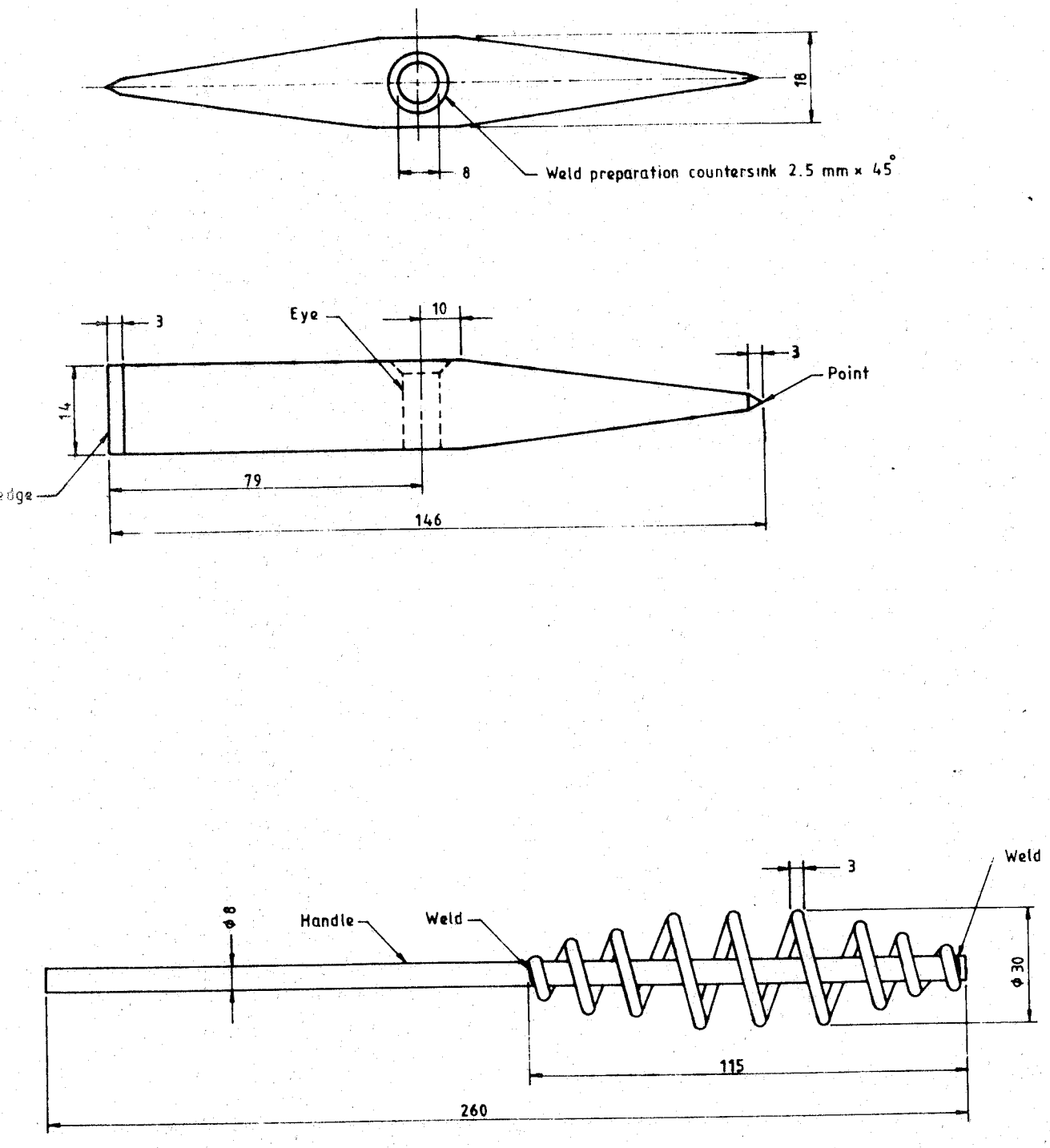
FIGURE 14 (a) - Dimensions of welder's chipping hammer
Type (a) - Wooden handle



Nominal mass of head = 500 g

All dimensions in millimetres.

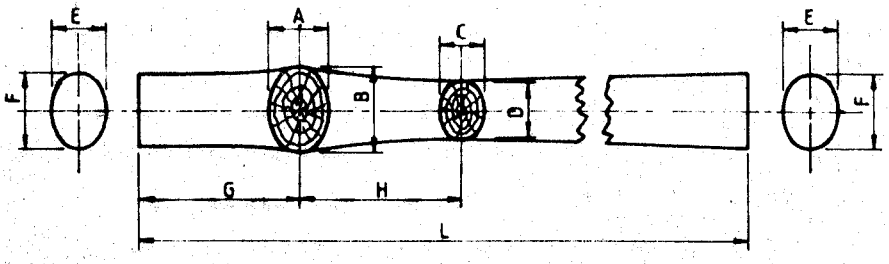
FIGURE 14 (b) - Dimensions of welder's chipping hammer Type (b) Plain steel wire handle



Nominal mass of head = 200 g

All dimensions in millimetres.

FIGURE 14 (c) - Dimensions of welder's chipping hammer
Type (c) - Coiled steel wire handle



All dimensions in millimetres

A	B	C	D	G	H	E	F	L
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
15	20	10	15	57	57	10	15	300
20	25	12	18	57	57	15	20	300
20	30	13	20	57	57	15	25	300
25	35	15	25	60	60	20	30	300
25	40	15	27	75	60	20	30	350
25	40	15	27	75	60	20	35	600
29	40	20	17	75	75	25	35	400
29	40	20	27	75	75	25	35	750
30	50	20	38	100	75	25	45	450
30	50	20	38	125	125	25	45	600
30	50	20	38	125	125	25	45	900
32	50	24	35	125	125	30	45	750
30	45	24	35	150	150	30	45	900
35	55	24	40	150	150	30	50	900

NOTE : For details of eye, see Fig. 2.

FIGURE 15 - Dimensions of wooden handles for hand hammers

4.5 Mechanical properties

4.5.1 The hammer heads shall be hardened and tempered on the striking faces, peins and claw only. The hardness of striking faces and peins shall be within the range 520 HV to 695 HV or 50 HRC to 60 HRC or 490 HB to 650 HB. (See 7.1)

For hammer heads up to and including nominal mass of 1.5 kg, the area of specified hardness shall extend not less than 3 mm from the striking face as measured along the surface. For hammer heads with nominal mass of over 1.5 kg, the area of specified hardness shall extend not less than 6 mm form the striking face as measured along the surface. In no case shall the hardened zone extend to any part of the neck or where there is no neck more than half way to the nearest point of the eye. In case of peins the hardened area shall not extend to the neck or if there is no neck to a distance more than half way between the extreme end of the pein, and the nearest point of the eye as measured along the surface.

4.5.2 In case of claws the hardness shall be within 40 HRC to 55 HRC and the hardened area shall not extend to within 12 mm of the nearest point of the eye as measured along the surface.

4.5.3 In case of welder's chipping hammers the hardness shall be within 45 HRC to 50 HRC and the hardened area shall not extend to any point beyond 13 mm from the working edge.

5 MARKING

5.1 Each hammer head shall be clearly, legibly and indelibly marked with the following particulars.

(a) Manufacturer's name or trade mark ; and

(b) Mass.

NOTE : Attention is drawn to certification facilities offered by SLSI, see inside back cover of this specification.

6 PACKING

The hammer heads shall be securely packed in suitable packing cases of size convenient for handling in transit. Each type and size of hammer head shall be kept separate when packed and no package shall contain more than one variety of hammer head.

7 METHODS OF TEST

7.1 Hardness test

The hammer shall be capable of complying with all the hardness requirements of 4.5.

7.2 Crack test

All hammer heads when tested by using magnetic method, penetrant method or any other acceptable non-destructive test shall show no sign of cracks.

7.3 Striking test (for hammer heads and soundness of assembly)

With a normal grip of the handle six full sharp consecutive blows of maximum swing and force appropriate to the type of hammer shall be struck squarely with each striking face/pein/chipping edge as relevant on a block of material of composition same as that used for the hammer head, but in a normalised condition.

Following this, a further six blows shall be struck, varying the angle of delivery, to bring as much as possible the periphery of the face or pein into contact with the block.

After the striking test the hammer heads shall show no flaw or defect. The head shall remain firmly fixed to the handle and no damage to the handle shall be evident.

NOTE : If only hammer heads are supplied the test should be carried out, fitted with a handle and is intended to detect the hammer head quality.

7.4 Ringing test (for hammer heads)

Suspend the hammer head from a cord and by using the ballpein end of a 100 g Engineer's ball pein hammer, having a hardness within the limits specified under 4.5.1 apply four sharp blows to each striking face/pein. During these blows, the head shall give a clear metallic ring.

7.5 Pull apart test (for hammers fitted with handles)

By means of a Tensile Testing machine or any other equally suitable machine gradually apply to the handle and maintain for 1 min. the appropriate of the following forces.

(a) Hammer with head of nominal mass less than 350 g : 3.4 kN
(b) Hammer with head of nominal mass over 350 g : 10 kN

Following this test the handle shall not loosen or pull out of the hammer head.

7.6 Nail pulling test (for claw hammers only)

7.6.1 Three round M.S. lost head nails of size (76 x 3.7 ϕ) mm conforming to **SLS 8** shall be driven into a sound pine wood board 25 mm thick. Head shall be driven flush with the board.

The board shall then be turned over, the protruding ends of the nails shall in turn be firmly gripped in the claw and the handle shall be quickly and forcibly levered to pull the head of the nail through the board.

As each withdrawal is commenced the face of the claw shall be in contact with the surface of the board and during each withdrawal stroke, proper contact shall be maintained between the board and the claw face, while moving the hammer handle through an arc.

7.6.2 Three round M.S. chequered head wire nails of size (102 x 4.9 ¢) mm conforming to **SLS 8** shall be driven firmly into hardwood (such as satin, palu) of such thickness that the pointed end of the nail does not protrude.

The head end of the nail shall protrude an amount sufficient to enable the nail body to be gripped under the head with the claw, so that the claw face is in contact with the wood where the nail head protrudes. Each nail shall be withdrawn up to the limit of possible movement of the handle by applying the necessary force.

Following these tests the handle shall be undamaged and firmly fixed to the head and the claw shall show no sign of wear or damage.

NOTE : If only hammer heads are supplied the test should be carried out, fitted with a handle and is intended to detect the hammer head quality.

8 SAMPLING

8.1 Lot

In any consignment all the hammers of the same type and size manufactured under essentially similar conditions of manufacture shall constitute a lot.

8.2 Scale of sampling

8.2.1 Sample shall be selected from each lot for ascertaining conformity of the lot to the requirements of this specification.

8.2.2 The number of hammers to be selected from a lot shall be in accordance with Columns 1 and 2 of the Table 1.

TABLE 1 - Scale of sampling

Number of hammers in the lot (1)	Number of hammers to be selected (2)	Acceptance number (see 9.2) (3)	Sub sample size (4)
Up to 25	3	0	2
26 - 50	5	0	2
51 - 100	8	0	3
101 - 150	13	1	4
151 - 300	20	1	5
301 and above	32	2	8

8.2.3 The hammers shall be selected at random. In order to ensure randomness of selection random number tables as given in SLS 428 shall be used.

8.3 Number of tests

8.3.1 Each hammer selected as in 8.2.2 shall be examined for marking requirements given in 5.

8.3.2 Each hammer selected as in 8.2.2 shall be inspected for requirement given in 4.2, 4.3 and 4.4.

8.3.3 If the lot has been found satisfactory in respect of requirements when examined under 8.3.2, a sub sample of size given in Column 4 of Table 1 shall be selected and subjected for the following tests.

(a)	Hardness test	(see 7.1)
(b)	Crack test	(see 7.2)
(c)	Striking test	(see 7.3)
(d)	Ringing test	(see 7.4)
(e)	Pull apart test	(see 7.5)
(f)	Nail pulling test	(see 7.6)

9 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of this specification if the following conditions are satisfied.

9.1 Each hammer examined as in 8.3.1 satisfies the marking requirements.

9.2 The number of hammers not conforming to, one or more requirements when inspected as in 8.3.2 is less than or equal to the corresponding acceptance number given in Column 3 of Table 1.

9.3 Each hammer of the sub sample, when tested as in 8.3.3 satisfies the relevant test requirements.

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