

# INTERNATIONAL STANDARD

# ISO 15601

First edition  
2000-07-01

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## Hammers — Technical specifications concerning steel hammer heads — Test procedures

*Marteaux — Spécifications techniques relatives aux marteaux avec tête en  
acier — Modes opératoires d'essai*



Reference number  
ISO 15601:2000(E)

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Printed in Switzerland

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 15601 was prepared by Technical Committee ISO/TC 29, *Small tools*.

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# Hammers — Technical specifications concerning steel hammer heads — Test procedures

## 1 Scope

This International Standard defines the quality features of hand hammers which are judged to be satisfactory as far as the hammer head and the assembly are concerned.

It defines the characteristics and verification methods for hammer heads and for their assembly.

It applies to hammers used under normal working conditions, i.e. only used to strike items having a maximum hardness of 46 HRC.

NOTE Striking items of a greater hardness is liable to cause chipping, this necessitates choosing hammers with properties different from those defined in this International Standard.

This International Standard does not apply to steel hammer heads with a head mass of less than 100 g.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3130, *Wood — Determination of moisture content for physical and mechanical tests.*

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T).*

## 3 Hammer head characteristics and test methods

### 3.1 Heat-treatment and hardness specifications

After forging, the striking faces shall be dressed in order to remove decarburization.

The heads shall be

- hardened to achieve a martensitic structure;
- tempered so that the striking faces and peins, including claws, achieve a hardness of not less than 50 HRC but not more than 58 HRC.

The hardness at different points of the striking face shall be uniform within a total tolerance of 5 HRC.

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The central portion of the hammer shall not be hardened and in the area near the eye of the hammer the hardness shall not exceed 35 HRC.

The hardened zone of the striking faces shall extend to a minimum depth of 3 mm; at this depth, the hardness shall be not less than 46 HRC and not more than that of the surface (see Figure 1).

In the case of ball pein hammer ends (see Figure 2) the 3 mm depth of hardness shall only apply at the centre of the ball along the centre line and tapering towards the ball diameter, in order to avoid the hardened zone extending to the rest of the hammer.

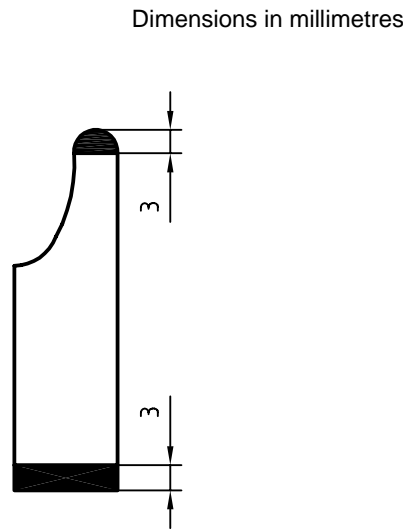


Figure 1 — Depth of hardened zone

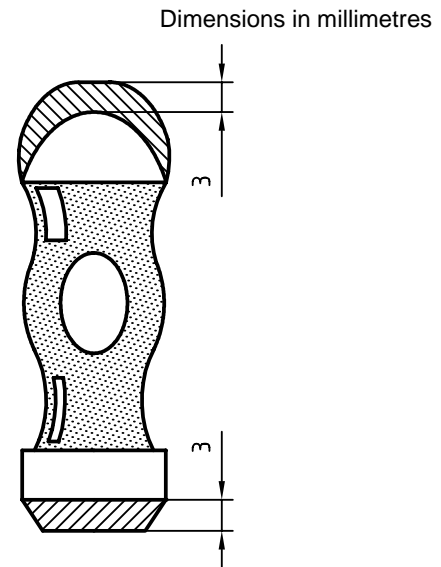
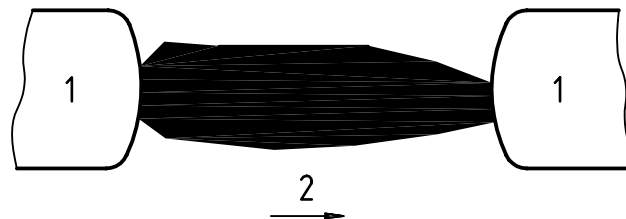


Figure 2 — Depth of hardened zone for ball pein hammer heads

## 3.2 Crack detection

All hammer heads shall be free of cracks.

For checking, the magnetic particle flow detection technique shall be used in which an alternating current of at least 15 mA/mm<sup>2</sup> is applied to the hammer head (see Figure 3).



**Key**

- 1 Contact pad
- 2 Current

Figure 3 — Method for crack detection

Cracks are detected with appropriate means.

Other equivalent non-destructive test methods may be used.

### 3.3 Chamfer

When a chamfer on the edge of the striking face is necessary, it shall be at least 1/15 of the head width and have a slant of 40° to 50°.

## 4 Test procedures

### 4.1 Wooden handle moisture requirements

For hammers fitted with a wooden handle, the moisture content of the handle at the moment the test is carried out shall be between 10 % and 15 % in accordance with ISO 3130.

### 4.2 Pull apart test

Prior to carrying out this test, two series of 25 vigorous blows with varying delivery angle (see Figure 4) shall be applied to a surface of hardness equal to or less than 46 HRC.

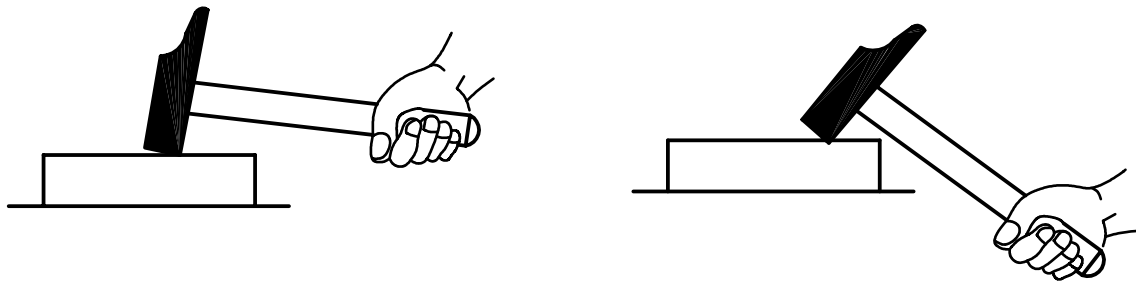


Figure 4 — Variation of delivery angle

The hammer head and the end of the handle shall be securely worked in a tensile testing machine or other suitable device.

A tensile load on the handle side (see Figure 5) and a compression load on the head side (see Figure 6) shall be applied gradually and without jerking.

Loads to be applied are given in Table 1.

For reverse assembled hammers with thermoplastic handles, only the compressive load shown in Figure 6 shall be applied.

After this test the hammer head and handle shall show no damage such as shifting of the handle in the eye or other defects that may reduce to its solidity.

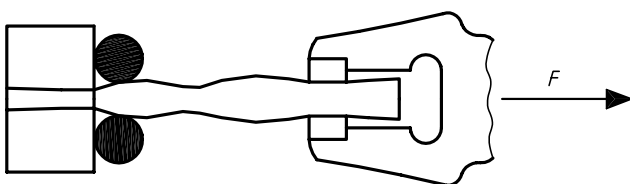


Figure 5 — Tensile load (handle side)

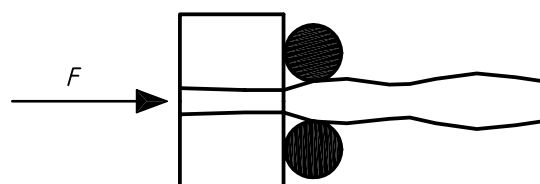


Figure 6 — Compression load (head side)

Table 1 — Loads to be applied according to head mass

Hammer head mass <i>m</i> g	Tensile/compression load <i>F</i> min. N
$100 \leq m < 200$	1 400
$200 \leq m < 300$	1 800
$300 \leq m < 400$	2 500
$400 \leq m < 500$	3 500
$500 \leq m < 700$	3 500
$700 \leq m < 1\ 250$	5 200
$1\ 250 \leq m < 2\ 000$	7 000
$2\ 000 \leq m < 4\ 000$	8 000
$4\ 000 \leq m < 8\ 000$	9 000
$8\ 000 \leq m < 12\ 000$	10 000

4.3 Handle bending test for claw hammers

Firmly keep the hammer head in a holding fixture with the axis of the handle parallel to the surface of the fixture (see Figure 7).

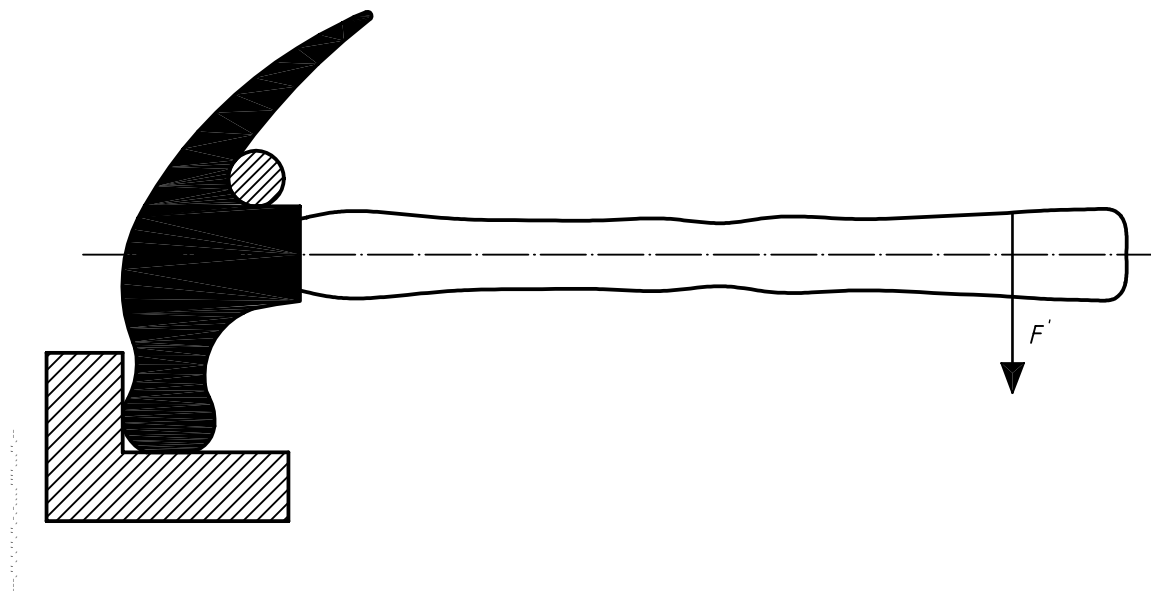


Figure 7 — Handle bending test for claw hammers

Apply a load,  $F'$ , perpendicular to the axis of the handle and close to the end, so as to obtain a 125 N·m torque, irrespective of the size of the hammer.

The load shall start at zero and be applied gradually, without jerking.

The test load shall be held for at least 10 s, after which the handle shall show no sign of damage nor exhibit any defect.



#### 4.4 Grip adhesion test

For handles equipped with a grip, the grip shall not turn with respect to the handle when a 10 N·m torque is applied.

The test shall be carried out by applying an evenly distributed pressure on the whole of the grip surface. The necessary pressure shall not warp the grip.

### 5 Marking

Hammers shall be marked on the head permanently and legibly with at least the name of the manufacturer or the name of supplier or trademark.

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**ICS 25.140.30**

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