INTERNATIONAL STANDARD 637

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Filler rods for gas welding of mild steels and low alloy high tensile steels — Determination of mechanical properties of deposited weld metal

Métaux d'apport pour le soudage aux gaz des aciers doux ou faiblement alliés à haute résistance — Détermination des caractéristiques mécaniques du métal déposé

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 44 has reviewed ISO Recommendation R 637 and found it technically suitable for transformation. International Standard ISO 637 therefore replaces ISO Recommendation R 637-1967 to which it is technically identical.

ISO Recommendation R 637 was approved by the Member Bodies of the following countries :

Australia	India	Romania
Belgium	Israel	Spain
Bulgaria	Italy	Sweden
Denmark	Japan	Switzerland
Finland	Netherlands	United Kingdom
France	Norway	
Germany	Poland	

The Member Bodies of the following countries expressed disapproval of the Recommendation on technical grounds :

Austria
Canada*
Republic of South Africa*
U.S.S.R.

The Member Body of the following country disapproved the transformation of ISO/R 637 into an International Standard :

Germany

* Subsequently, this Member Body approved the Recommendation.

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Filler rods for gas welding of mild steels and low alloy high tensile steels — Determination of mechanical properties of deposited weld metal

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies methods of test for determining the mechanical properties of weld metal deposited by filler rods for gas welding. It also describes the preparation of the weld deposit, the conditions for the selection of test pieces, and the dimensions of the latter.

It applies only to filler rods for gas welding mild steels and low alloy high tensile steels.

NOTE — For the identification code for these filler rods, see ISO 636, *Filler rods for gas welding of mild steels and low alloy high tensile steels — Code of symbols.*

2 REFERENCES

ISO 82, *Steel — Tensile testing.*

ISO 148, *Steel — Charpy impact test (V-notch).* [1)]

3 PREPARATION OF WELD DEPOSIT

3.1 For a given filler rod it is necessary to determine the mechanical properties for each of the diameters manufactured.

3.2 To determine the mechanical properties of the weld metal from filler rods for gas welding, weld metal deposited on a backing strip shall be used, as shown in figure 1. The edge on which the metal is deposited shall be straight and clean.

Dimensions in millimetres

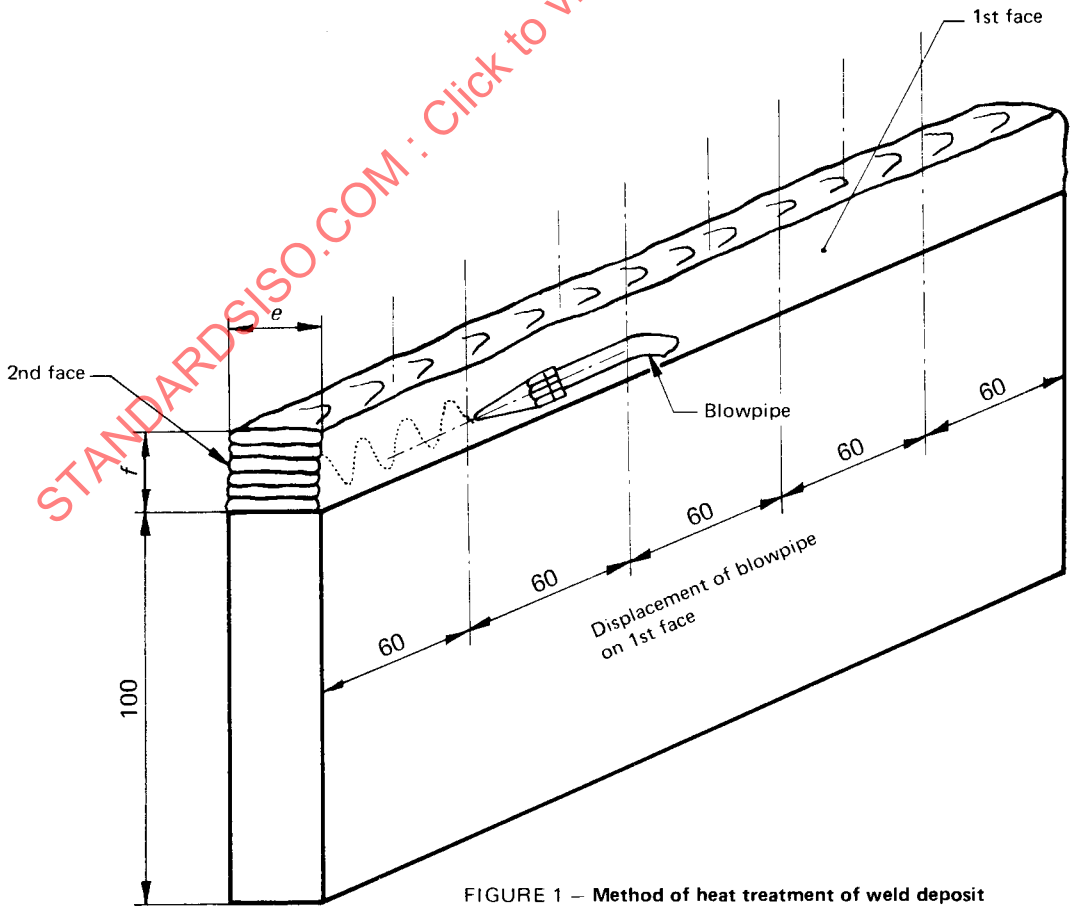

FIGURE 1 — **Method of heat treatment of weld deposit**

1) At present at the stage of draft. (Revision of ISO/R 148.)

3.3 The thickness of the backing strip and the welding conditions shall be as specified in table 1, according to the diameter of the filler rod.

TABLE 1 – **Welding conditions**

Diameter of filler rod, mm	2	2,5	3,15	4	5	6,3
Thickness, *e*, of backing strip, mm	8	10	10	12	15	15
Acetylene consumption of blowpipe, l/h*	200	315	315	400	630	630
Number of runs	10 to 15	8 to 12	7 to 8	7 to 8	4 to 6	4 to 6
Approximate time of execution, minutes**	80	70	60	60	60	60

* The operator should ensure that the acetylene consumption of his blowpipe corresponds as closely as possible to the value shown.

** The weld metal should be deposited within the shortest possible time.

3.3.1 The backing strip shall be of mild steel or low alloy high tensile steel.

3.4 The welding method shall be either leftward welding in a slightly upward position (slope about 30°), or rightward welding in a horizontal position, the backing strip being placed edgewise in all cases.

3.5 The weld deposit shall be heat treated with a blowpipe.

3.5.1 The output of the blowpipe having been selected according to the data given in table 1 and heating time selected according to the annex, the treatment shall be carried out as follows :

The temperature of the weld metal shall be brought up to about 900 °C (cherry-red) by successively heating sections 50 to 60 mm long (see figure 1), the blowpipe being displaced progressively first along one side and then along the other side of the deposited metal. During its regular advance, the blowpipe shall be moved from side to side so as to ensure proper distribution of heat throughout the deposited weld metal.

3.5.2 After this heat treatment, the weld metal shall be allowed to cool in still air.

4 SELECTION AND DIMENSIONS OF TEST PIECES

4.1 Selection of test pieces

Two test pieces for tensile testing and three test pieces for impact testing[1] shall be taken as shown in figure 2. The deposited metal shall be removed from the backing strip by machining only. Test pieces shall be taken as close as possible to the upper surface of the weld deposit. If the width of the weld deposit, *f*, does not allow impact test pieces to be taken, the two tensile test pieces may be taken from the centre of the weld deposit.

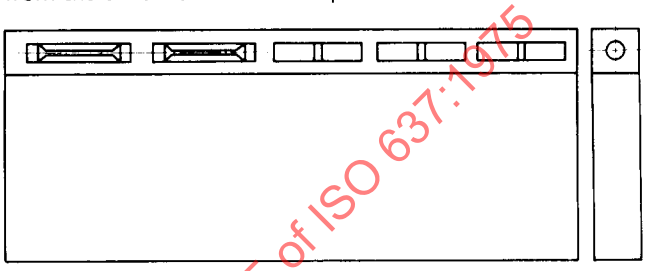

FIGURE 2 – **Positions from which test pieces are taken**

4.2 Dimensions of test pieces

4.2.1 *Tensile testing*

The test pieces shall be machined in accordance with ISO 82.

4.2.2 *Impact testing*[1]

The test pieces shall be machined in accordance with ISO 148.

5 METHODS OF TESTING

5.1 The tensile test and impact test shall be carried out in accordance with ISO 82 and ISO 148 respectively.

5.2 The following shall be determined during the mechanical tests :

- tensile strength, in newtons per square millimetre;
- percentage elongation[2];
- impact strength, *KV*, in joules.

The result of the tensile test shall be expressed as the average of the values obtained for the two test pieces.

The result of the impact test shall correspond to the average *KV* value obtained for the three test pieces.

5.3 All tests shall be made at a temperature of 20 ± 2 °C in temperate climates, and 27 ± 2 °C in tropical climates.

1) Impact test pieces shall only be taken when the backing strip is 10 mm or more thick.

2) To determine elongation, the following value shall be taken for the original gauge length :

$$L_o = 5{,}65\sqrt{S_o}$$

where S_o is the original cross-sectional area of the gauge length, in square millimetres.