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R 637

METHODS OF TEST FOR DETERMINING THE MECHANICAL PROPERTIES OF WELD METAL DEPOSITED BY FILLER RODS FOR GAS WELDING MILD STEELS AND LOW ALLOY HIGH TENSILE STEELS

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BRIEF HISTORY

The ISO Recommendation R 637, *Methods of Test for Determining the Mechanical Properties of Weld Metal Deposited by Filler Rods for Gas Welding Mild Steels and Low Alloy High Tensile Steels*, was drawn up by Technical Committee ISO/TC 44, *Welding*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question by the Technical Committee began in 1955 and led, in 1958, to the adoption of a Draft ISO Recommendation.

In September 1958, this Draft ISO Recommendation (No. 227) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

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

Four Member Bodies opposed the approval of the Draft:

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

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in November 1967, to accept it as an ISO RECOMMENDATION.

ISO Recommendation R 637 November 1967

METHODS OF TEST FOR DETERMINING THE MECHANICAL PROPERTIES OF WELD METAL DEPOSITED BY FILLER RODS FOR GAS WELDING MILD STEELS AND LOW ALLOY HIGH TENSILE STEELS

FOREWORD

This ISO Recommendation is one of a set which also includes the following:

ISO/R 636, *Code of Symbols for Filler Rods for Gas Welding of Mild Steels and Low Alloy High Tensile Steels.*

1. PREPARATION OF WELD DEPOSIT

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

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

Dimensions in millimetres

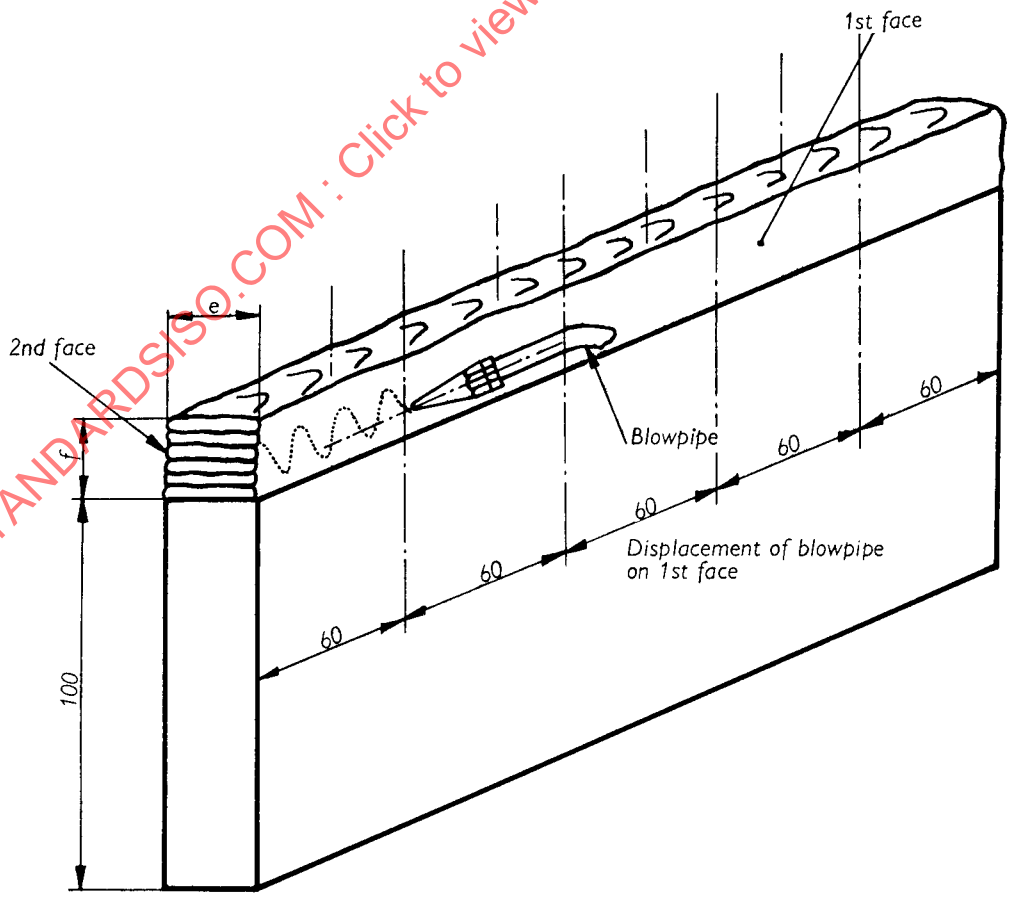

FIG. 1 — **Method of heat treatment of weld deposit.**

1.3 The thickness of the backing strip and the welding conditions should be selected as follows, 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 of backing strip "*e*", mm	8	10	10	12	15	15
Output of blowpipe * in l/h of acetylene	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 in minutes **	80	70	60	60	60	60

1.3.1 The backing strip should be of mild steel or low alloy high tensile steel.

1.4 The welding method should 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.

1.5 The weld deposit should be heat treated with a blowpipe.

1.5.1 The output of the blowpipe having been selected according to the data given in Table 1 above, and heating time selected according to the Annex, the treatment should be carried out as follows:

1.5.1.1 The temperature of the weld metal should be brought up to about 900 °C (cherry-red) by successively heating sections 50 to 60 mm long (see Fig. 1, page 3), 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 should be moved from side to side so as to ensure proper distribution of heat throughout the deposited weld metal.

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

* The operator should set the blowpipe he is using to the rate of flow nearest that shown in the Table.

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

2. SELECTION AND DIMENSIONS OF TEST PIECES

2.1 Selection of test pieces

Two test pieces for tensile testing, and three test pieces for impact testing * should be taken as shown in Figure 2. The deposited metal should be removed from the backing strip by machining only. Test pieces should 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.

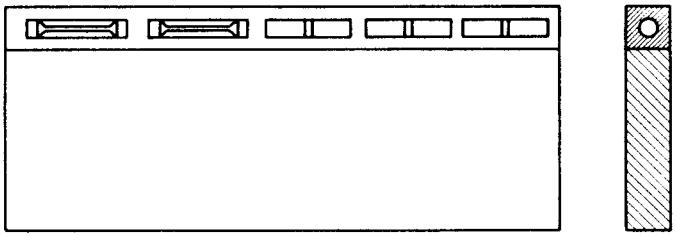

FIG. 2. — **Positions from which test pieces are taken.**

2.2 Dimensions of test pieces

2.2.1 *Tensile testing.* The test pieces should be machined in accordance with ISO Recommendation R 82. **

2.2.2 *Impact testing.** The test pieces should be machined in accordance with ISO Recommendation R 148. ***

3. METHODS OF TESTING

3.1 The tensile test and impact test should be carried out as described respectively in ISO Recommendations R 82 and R 148.

3.2 The following should be determined during the mechanical tests:

— tensile strength in kgf/mm²
— elongation in % ****
— impact strength KV in kgf·m

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

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

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

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* Impact test pieces should only be taken when the backing strip is 10 mm or more thick.

** *Tensile Testing of Steel.*

*** *Beam Impact Test (V-notch) for Steel.*

**** To determine elongation, the following value should be taken for the original gauge length: $L_o = 5.65\sqrt{S_o}$ where S_o = original cross-sectional area of the gauge length in square millimetres.