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ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 708

FILLER RODS FOR GAS WELDING

TEST TO DETERMINE THE COMPATIBILITY OF STEEL FILLER RODS AND THE PARENT METAL IN THE WELDING OF STEELS

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For each individual country the only valid standard is the national standard of that country.

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BRIEF HISTORY

The ISO Recommendation R 708, *Filler rods for gas welding – Test to determine the compatibility of steel filler rods and the parent metal in the welding of 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 1961 and led, in 1965, to the adoption of a Draft ISO Recommendation.

In May 1966, this Draft ISO Recommendation (No. 977) 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	Ireland	Switzerland
Belgium	Israel	Turkey
Brazil	Japan	U.A.R.
Canada	Korea, Rep. of	United Kingdom
Chile	Netherlands	U.S.A.
Czechoslovakia	Norway	U.S.S.R.
Denmark	Portugal	Yugoslavia
France	Romania	
Germany	South Africa, Rep. of	
Hungary	Spain	
India		

Three Member Bodies opposed the approval of the Draft :

Finland
Poland
Sweden

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in April 1968, to accept it as an ISO RECOMMENDATION.

ISO Recommendation R 708 April 1968

FILLER RODS FOR GAS WELDING

TEST TO DETERMINE THE COMPATIBILITY OF STEEL FILLER RODS AND THE PARENT METAL IN THE WELDING OF STEELS

1. SCOPE

This ISO Recommendation gives the conditions in which it is possible to determine the compatibility of filler rods and the parent metal in the gas welding of steels, based on the results of tests on a welded joint, welded under the conditions laid down for the construction, using the filler rod and parent metal specified for this construction.

2. NATURE AND DIMENSIONS OF THE TEST ASSEMBLY

The test assembly should be of plate of the same composition as that of the plates specified for the construction, and of the same thickness, but at least 4 mm. The dimensions of the test assembly should be in conformity with the information given in Figure 1.

3. WELDING PROCEDURE

The quality and dimensions of the filler rod, the edge preparation and root gap, the method of welding, the gas consumption and the flame adjustment of the blowpipe should be as specified for the construction.

If provision is made for heat-treating the construction, the joint should be given the same treatment.

With regard to the designation of the filler rod, reference should be made to ISO Recommendation R 636, *Code of symbols for filler rods for gas welding mild and low alloy high tensile steels.*

4. REMOVAL OF TEST PIECE BLANKS

If provision is made for non-destructive testing of the construction, the test assembly should be tested in the same way before the test pieces are taken.

The test piece blanks should be taken from the test assembly in accordance with the indications given in Figure 2. The test piece blanks required are as follows :

- one for the tensile test, taken from the parent metal . . . . . (1a)
- one for the bend test, taken from the parent metal . . . . . (2a)
- two for the tensile test, taken from the welded joint . . . . . (1b) and (1c)
- two for the bend test, taken from the welded joint . . . . . (2b) and (2c)

The test piece blanks may be removed either by mechanical machining or by thermal cutting. If thermal cutting is used, a large enough margin should be left to enable the influence of the heating to be eliminated by machining (see Fig. 1 and Fig. 2).

5. PROCEDURE FOR MECHANICAL TESTS

5.1 Tensile test

The shape and dimensions of the tensile test pieces should be as given in Figure 3 and Table 1.

In the case of test pieces taken from the welded joint, the reinforcement of the weld on the weld face and on the back of the weld should not be removed, except when the deposited metal would be machined for the construction.

The testing machine and the conditions for carrying out the test should be in accordance with ISO Recommendation R 82, *Tensile testing of steel.*

The tensile test should be carried out at room temperature.

5.2 Bend test

The bend test pieces (2a), (2b) and (2c) should be machined on all their faces to the shape and dimensions given in Figure 4 and Table 2. The two edges on the tension face should be rounded off.

The bend test should be carried out in accordance with the indications given in ISO Recommendation R 85, *Bend test for steel,* using a mandrel, the diameter D of which should be specified in each case. The weld should be placed in the centre in relation to the supports and the mandrel should apply the load to the test piece so that the weld face is in tension, until the prescribed angle of bend is reached.

Where the prescribed angle is 180°, the bending should be carried out in the following two stages :

- application of the load until the test piece is bent to an angle of about 120°;
- free bending between two level parallel jaws, a wedge of thickness D being interposed between the two branches of the test piece.

The bend test should be carried out at room temperature.

6. RESULTS OF THE MECHANICAL TESTS

6.1 Tensile test

The minimum fracture load obtained with the test pieces (1b) and (1c) should be at least equal to that determined by means of test piece (1a).

6.2 Bend test

Whatever the prescribed angle, the test is considered satisfactory if the test piece undergoes bending without cracking.

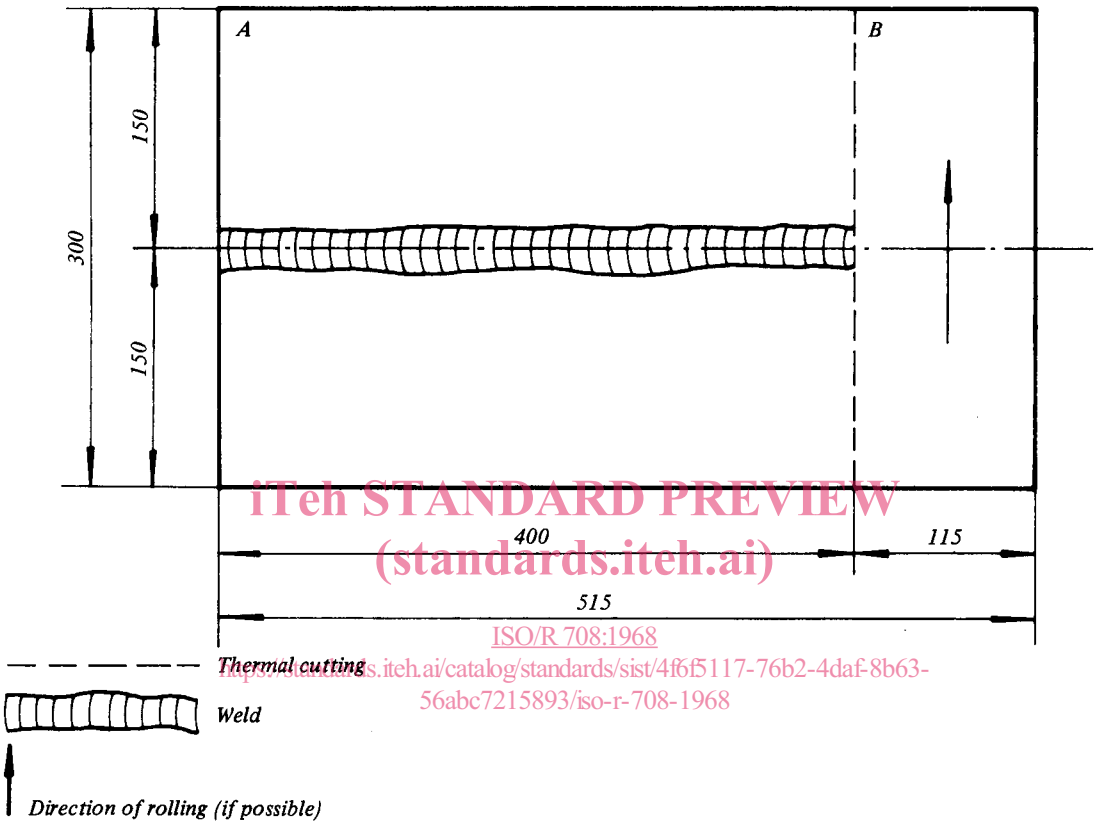
The results obtained should not be below the criteria specified for the type of construction in question.

7. RE-TESTING

The following rule is applicable to all tests :

If one of the test pieces, (1b), (1c), (2b) or (2c), does not give the required results, two new test pieces of the type in question may be taken from that part of the test assembly shown as "reserve" in Figure 2. These should be machined in the same way as the test piece which did not give the required results. These two new test pieces should both meet the conditions required.

Dimensions in millimetres

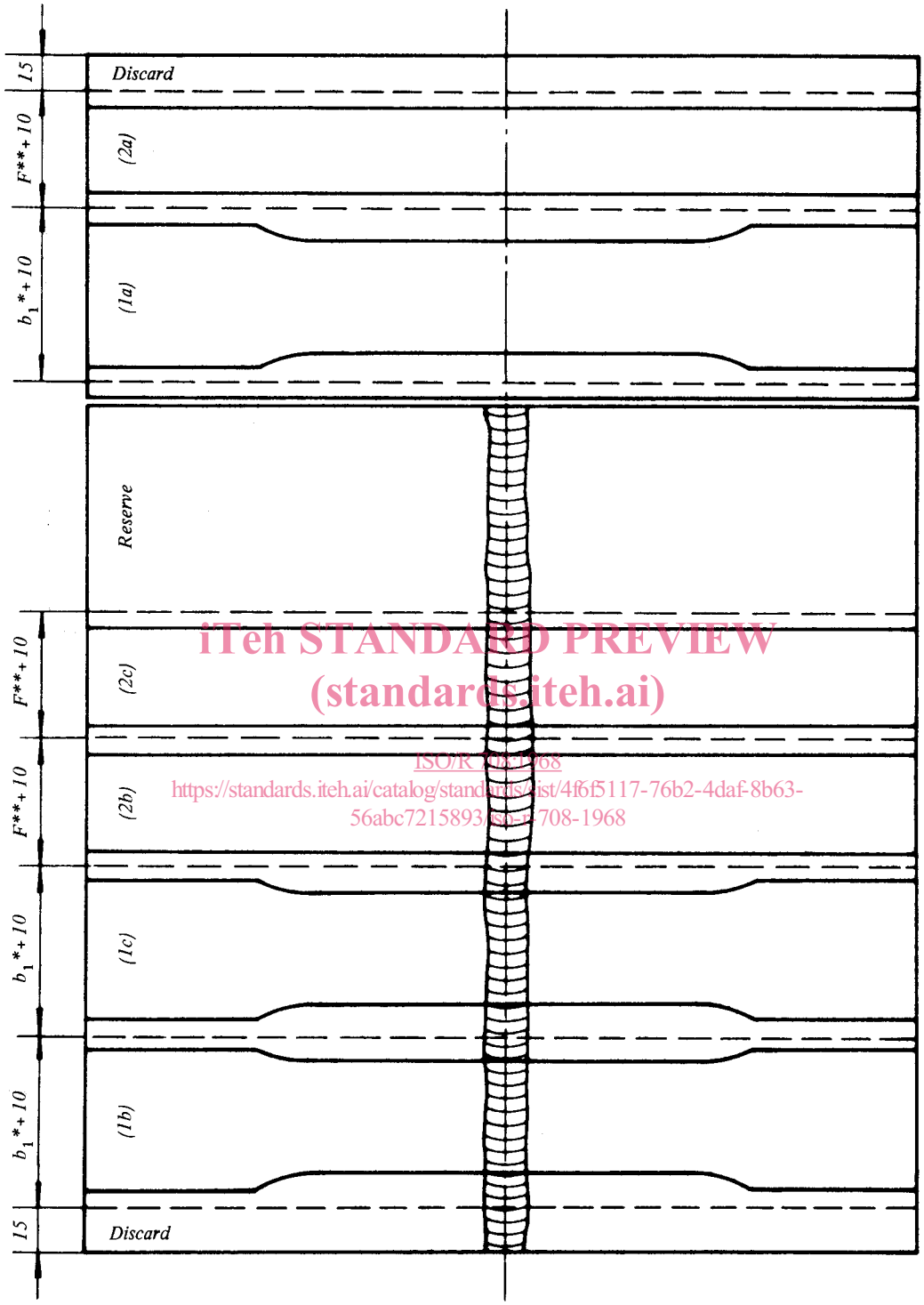


The plate for the test assembly is cut into two parts A and B; A is divided as shown, prepared for welding and welded.

B is used for the preparation of test pieces (1a) and (2a) (see Fig. 2).

FIG. 1 – **Initial cutting and welding of test plate**

Dimensions in millimetres



* b_1 = dimension indicated in Table 1.

** F = dimension indicated in Table 2.

FIG. 2 – **Preparation of test piece blanks**

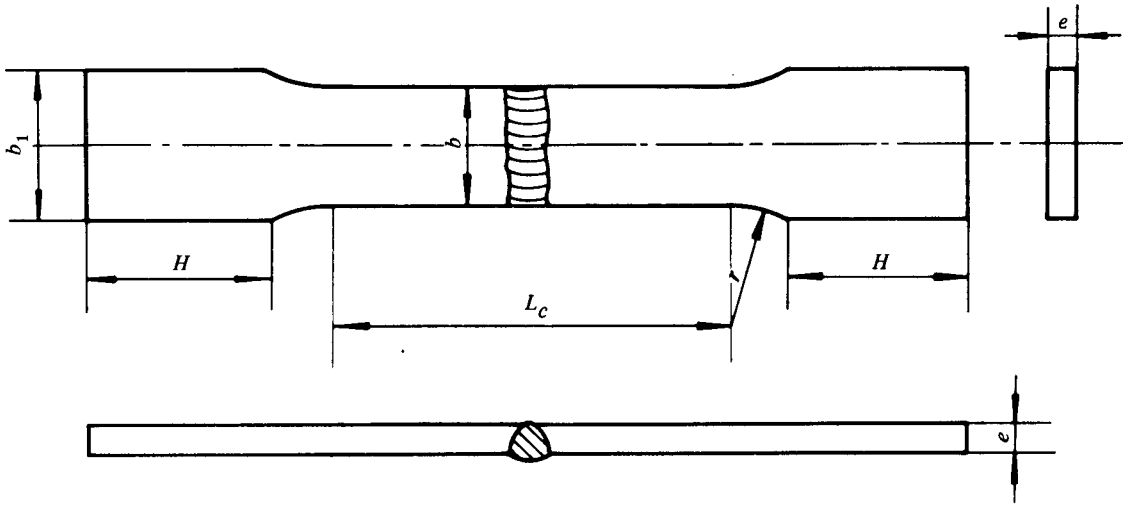
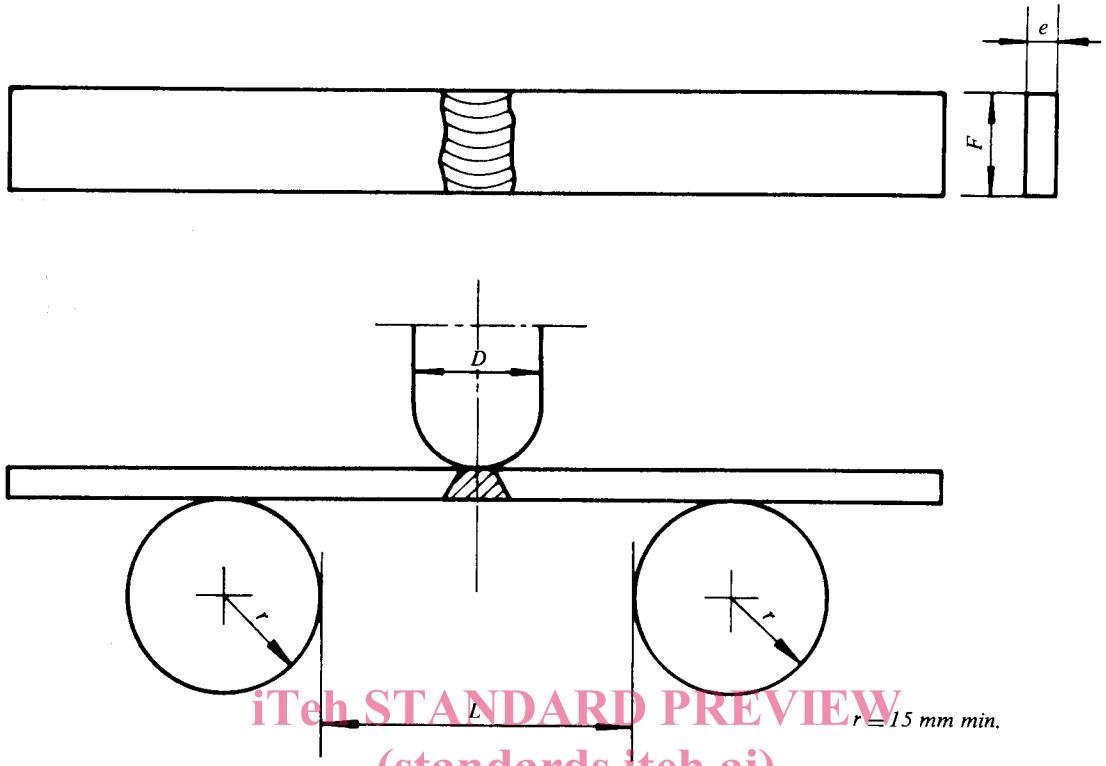


FIG. 3 – Tensile test piece (1a) - (1b) - (1c)

TABLE 1 – **Dimensions (in millimetres) of tensile test pieces**

Plate thickness *e*	*b*	L_c min.	b_1 max.	*H* min.	*r* min.
4	10	36	15	40	20
6	15	53	25	40	30
8	20	71	30	50	40
10	20	80	30	60	40



The longitudinal edges of the test piece on the tension side, should be rounded off.

FIG. 4 – **Bend test piece (2a) – (2b) – (2c)**

TABLE 2 – **Dimensions (in millimetres) of bend test pieces**

Plate thickness *e*	*F*	*L*
4	10	*D* + 12
6	10	*D* + 18
8	15	*D* + 24
10	15	*D* + 30

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