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INTERNATIONAL STANDARD

ISO 13916

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Welding — Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature

Soudage — Lignes directrices pour le mesurage de la température de préchauffage, de la tempérture entre passes et de la température de maintien du préchauffage

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International Standard ISO 13916 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 44, *Welding and allied processes*, Subcommittee SC 10, *Unification of requirements in the field of metal welding*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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Foreword

The text of EN ISO 13916:1996 has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS, in collaboration with Technical Committee ISO/TC 44 "Welding and allied processes".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 1997, and conflicting national standards shall be withdrawn at the latest by February 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This standard specifies requirements for the measurement of preheating temperature, interpass temperature and preheat maintenance temperature for fusion welding. This standard may also be applied as appropriate in the case of other welding processes. This standard does not cover the measurement of post weld heat treatment temperatures.

2 Definitions

For the purposes of this standard the following definitions apply:

2.1 preheating temperature (T_p): the temperature of the workpiece in the weld zone immediately prior to any welding operation. It is normally expressed as a minimum and is usually equal to the minimum interpass temperature.

2.2 interpass temperature (T_i): the temperature in a multi-run weld and adjacent parent metal immediately prior to the application of the next run. It is normally expressed as a maximum temperature.

2.3 preheat maintenance temperature(T_m): the minimum temperature in the weld zone which shall be maintained if welding is interrupted.

3 Requirements

3.1 Point of measurement

The temperature measurement shall normally be made on the surface of the workpiece facing the welder, at a distance of A = 4 x t, but not more than 50 mm, from the longitudinal edge of the groove (see figure 1). This shall apply for workpieces thickness t not exceeding 50 mm in the weld.

When the thickness exceeds 50 mm, the required temperature shall exist in the parent metal for a distance of at least 75 mm or as otherwise agreed in any direction from the joint preparation. Where practicable, the temperature shall be measured on the face opposite to that being heated. Otherwise, the temperature shall be confirmed on the heated face at a time after removal of the heat source related to parent metal thickness to allow for temperature equalization. Where fixed permanent heaters are in use and there is no access to the reverse face for temperature measurement, readings shall be taken on the exposed parent metal surface immediately adjacent to the weld preparation. The time allowed for the temperature equalization shall be of the order of 2 min for each 25 mm of parent metal thickness.

Interpass temperature shall be measured on the weld metal or the immediately adjacent parent metal.

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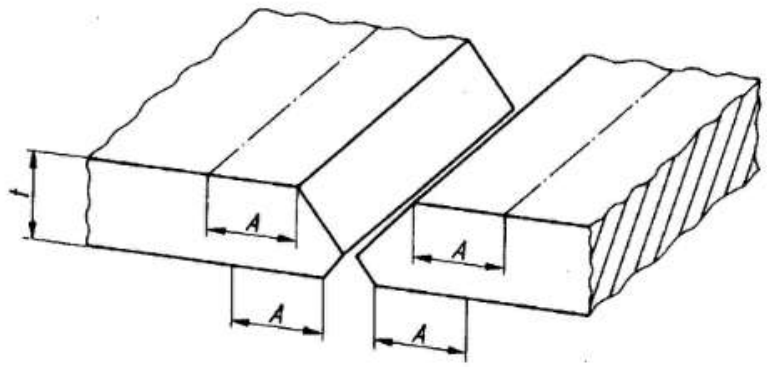
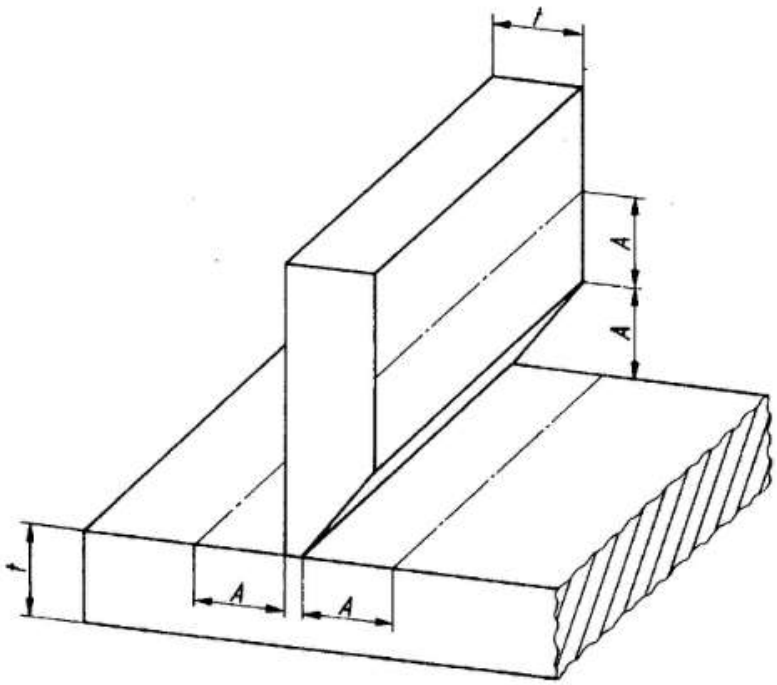
Dimensions in mm



a) butt joint



b) fillet joint

$t \leq 50$: $A = 4 \times t$, max. 50 mm
$t > 50$: $A = 75$

Figure 1 - Distance between points of measurement

3.2 Time of measurement

Interpass temperature shall be measured in the weld area immediately before passage of the arc.

If the preheat maintenance temperature is specified it shall be monitored during the period of welding interruption.

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3.3 Test equipment

Equipment used for temperature measurement should be specified in the welding procedure specifications, e.g.:

- temperature sensitive materials (e.g. crayons or paints) (TS);
- contact thermometer (CT);
- thermocouple (TE);
- optical or electrical devices for contactless measurement (TB).

4 Test report

If a test report is required, it shall refer to this standard and give the following minimum information in accordance with the specification in welding procedure specification:

- measured preheating temperature, in °C;
- measured interpass temperature, in °C;
- measured preheat maintenance temperature, in °C;
- any deviation from this standard, if applicable.

5 Designation

Examples of designation, which should be used in test reports

5.1 Example 1

A preheating temperature T_p measured only once in accordance with this standard as 155 °C (T_p 155) using a contact thermometer (CT) shall be designated as follows:

Temperature EN ISO 13916 - T_p 155 - CT

5.2 Example 2

An interpass temperature T_i measured more than once in accordance with this standard as 130 °C, 153 °C and 160 °C (T_i 130/160) using a thermocouple (TE) shall be designated as follows:

Temperature EN ISO 13916 - T_i 130/160 - TE

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