FINAL DRAFT
Technical Specification

ISO/DTS 8182

Welding and allied processes — Guidelines for the use of the welding parameters related to the welding energy for qualification and specification of welding procedures

Soudage et techniques connexes — Lignes directrices pour l'utilisation des paramètres de soudage liés à l'apport de chaleur pour la qualification et le descriptif d'un mode opératoire de soudage

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 10, *Quality management in the field of welding*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Welding and allied processes – Guidelines for the use of the welding parameters related to the welding energy for qualification and specification of welding procedures

1 Scope

This document gives guidelines for reporting the welding parameters related to the arc energy of a welding procedure qualification record (WPQR) and transferring this data to a welding procedure specification (WPS) for production welding for all arc welding processes.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13916, *Welding — Measurement of preheating temperature, interpass temperature and preheat maintenance temperature*

ISO/TS 18491, *Welding and allied processes — Guidelines for measurement of arc energies*

ISO/TR 25901-1, *Welding and allied processes — Vocabulary — Part 1: General terms*

ISO/TR 25901-3, *Welding and allied processes — Vocabulary — Part 3: Welding processes*

ISO/TR 25901-4, *Welding and allied processes — Vocabulary — Part 4: Arc welding*

IEC 60974-14, *Arc welding equipment — Part 14: Calibration, validation and consistency testing*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 18491, ISO/TR 25901-1, ISO/TR 25901-3, ISO/TR 25901-4 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
documentation value
arithmetic mean value over the main process phase

4 Symbols and abbreviated terms

For the purposes of this document, the general symbols and abbreviations given in Table 1 apply.

Table 1 — Symbols and abbreviated terms

Abbreviations and symbols	Term	Unit
E	Arc energy of a run	kJ/mm
E_{low}	Lowest arc energy in WPQR	kJ/mm
E_{high}	Highest arc energy in WPQR	kJ/mm
E_{avg}	Average arc energy of a run for a weld area	kJ/mm
E_{min}	Minimum qualified arc energy	kJ/mm
E_{max}	Maximum qualified arc energy	kJ/mm
I_{avg}	Average arc welding current of a run	A
I_{min}	Minimum welding current limit in a WPS	A
I_{max}	Maximum welding current limit in a WPS	A
U_{avg}	Average arc voltage of a run	V
U_{min}	Minimum arc voltage limit in a WPS	V
U_{max}	Maximum arc voltage limit in a WPS	V
ΔU	Practical arc voltage range - process dependent	V
V_{avg}	Average welding speed of a run	mm/s
V_{min}	Minimum welding speed of a run	mm/s
V_{max}	Maximum welding speed of a run	mm/s
W	Width of run	mm

5 General

The specifications given in ISO 15607 reflect minimum requirements for the use of the arc energies, but it is possible that these requirements are not suitable under all conditions.

Not all materials are sensitive to a large variation in heat input under normal service conditions. It is therefore not realistic to prescribe a strict regime of maintaining the heat input for these materials.

In certain situations, for example, when the mechanical or corrosion properties of base materials and the weld metal can be strongly degraded by the use of the wide range of arc energy rules as given in ISO 15607, it can be appropriate to implement additional provisions that may lead to restrictions.

This is only possible if the WPQR contains sufficiently detailed information, as specified in this document.

Other documents may set rules for welding procedure qualification, while this technical specification gives guidance on how this can be carried out.

6 Risk levels

The risk levels indicate how the arc energy shall be handled in order to guarantee the mechanical and/or corrosion properties as much as possible.

Especially when there are hardness requirements or notch toughness requirements it is wise to choose the right risk level according to Table 2.

The risk level should be agreed in advance in an application standard, contract or specification.

If no risk level is specified, then the high-risk level is applicable.