



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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Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols and abbreviated terms	1
5 General	2
6 Risk levels	2
7 Measuring welding parameters during WPQR welding	3
7.1 Calibration, validation of measurement of the measuring equipment	3
7.2 Determination of runs to be measured	3
7.3 Length of run in pipe and plate	3
7.4 Weaving width in relation with arc energy	3
7.5 Arc voltage, welding current, length of the run, arc energy and temperature	4
7.5.1 General	4
7.5.2 Arc voltage (U)	4
7.5.3 Welding current (I)	5
7.5.4 Length of the run	5
7.5.5 Arc energy	5
7.5.6 Preheat temperature	5
7.5.7 Interpass temperature	5
8 Reporting welding variables to a WPQR	5
9 Transferring WPQR welding parameters to a WPS	5
9.1 Welding areas	5
9.2 Thickness	6
9.3 Arc-voltage, welding current and welding speed in relation to arc energy	6
9.4 Relation preheat- and interpass temperature and arc energy	7
9.5 Weaving width in relation with arc energy	7
10 Measuring welding parameters during production welding	7
10.1 Calibration, validation of the measuring equipment	7
10.2 Determination of several weld areas	7
10.2.1 Length of the run in pipe and plate	8
10.3 Weaving width in relation with arc energy	8
Annex A (informative) Example WPQR sheet for a weld divided in several weld areas	9
Annex B (informative) Example sheet WPS with calculation of arc energy based on Annex A	10
Bibliography	11

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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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*.

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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*

<https://standards.iteh.ai/catalog/standards/iso/2e3807ea-03e5-4705-92c0-36c02fd63ad8/iso-dts-8182>

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.