IEC 62822-1

Edition 1.0 2016-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electric welding equipment – Assessment of restrictions related to human exposure to electromagnetic fields (0 Hz to 300 GHz) – Part 1: Product family standard

Matériels de soudage électrique – Évaluation des restrictions relatives à l'exposition humaine aux champs électromagnétiques (0 Hz à 300 GHz) – Partie 1: Norme de famille de produits

IEC 62822-1:2016-03(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue
Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,…). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org
Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary
65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

IEC 62822-1

Edition 1.0 2016-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electric welding equipment – Assessment of restrictions related to human exposure to electromagnetic fields (0 Hz to 300 GHz) – Part 1: Product family standard

Matériels de soudage électrique – Évaluation des restrictions relatives à l'exposition humaine aux champs électromagnétiques (0 Hz à 300 GHz) – Partie 1: Norme de famille de produits

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 25.160; 25.160.30

ISBN 978-2-8322-3269-9

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC WELDING EQUIPMENT – ASSESSMENT OF RESTRICTIONS RELATED TO HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS (0 Hz to 300 GHz) –

Part 1: Product family standard

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62822-1 has been prepared by IEC technical committee 26: Electric welding.

The text of this standard is based on the following documents:

FDIS	Report on voting
26/583/FDIS	26/590/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This Standard has the status of a product family standard.

A list of all parts in the IEC 62822 series, published under the general title *Electric welding equipment – Assessment of restrictions related to human exposure to electromagnetic fields (0 Hz to 300 GHz)*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

ELECTRIC WELDING EQUIPMENT – ASSESSMENT OF RESTRICTIONS RELATED TO HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS (0 Hz to 300 GHz) –

Part 1: Product family standard

1 Scope

This part of IEC 62822, which is a product family standard, applies to equipment for resistance welding, arc welding and allied processes designed for occupational use by professionals and for use by laymen.

NOTE 1 Typical allied processes are resistance hard and soft soldering, resistance heating by means comparable to resistance welding equipment, electric arc cutting and arc spraying.

The frequency range covered is 0 Hz to 300 GHz.

This product family standard specifies assessment methods and criteria to evaluate electromagnetic field (EMF) emissions of electric welding equipment with regard to national and international requirements for human exposure to EMF.

NOTE 2 Magnetic fields generated by the operation of welding equipment and the resulting non-thermal effects are the main assessment concern.

This product family standard does not define requirements and methods for workplace assessment regarding the risks arising from electromagnetic fields. However, the EMF exposure data that results from the application of this product family standard can be used to assist in workplace assessment.

NOTE 3 The equipment manufacturer is unaware of the overall exposure environment in which the equipment will be used (e.g. multiple sources) and is not responsible for all requirements for workplace assessment (e.g. information and training of workers, design and layout of the workplace).

Other standards may apply to products covered by this standard. In particular this standard cannot be used to demonstrate electromagnetic compatibility with other equipment. It does not specify any product safety requirements other than those specifically related to human exposure to electromagnetic fields.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-851:2008, *International Electrotechnical Vocabulary – Part 851: Electric welding*

IEC 60974-1, *Arc welding equipment – Part 1: Welding power sources*

IEC 60974-2, *Arc welding equipment – Part 2: Liquid cooling systems*

IEC 60974-5, *Arc welding equipment – Part 5: Wire feeders*

IEC 60974-6, *Arc welding equipment – Part 6: Limited duty equipment*

IEC 60974-8, *Arc welding equipment – Part 8: Gas consoles for welding and plasma cutting systems*

IEC 62135-1, *Resistance welding equipment – Part 1: Safety requirements for design, manufacture and installation*

IEC 62311, *Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)*

IEC 62822-2, *Electric welding equipment – Assessment of restrictions related to human exposure to electromagnetic fields (0 Hz to 300 GHz) – Part 2: Arc welding equipment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-851 on electric welding, in IEC 60974-1, IEC 60974-6 and in IEC 62135-1, as well as the following, apply.

3.1
basic restrictions
exposure limit values
restrictions on exposure to electric, magnetic and electromagnetic fields that are based directly on established health effects and biological considerations

3.2
contact current
electric current that appears when a person comes into contact with an object that is exposed to an electromagnetic field

3.3
exposure index
EI
result of the evaluation of exposure to (both sinusoidal and non-sinusoidal) EMF, expressed as a fraction or percentage of the permissible values

Note 1 to entry: Fractions higher than 1 (100 %) represent exceeding the permissible values.

3.4
general public
individuals of all ages and of varying health conditions

Note 1 to entry: Varying ages and health conditions can increase the individuals´ susceptibilities to EMF.

3.5
general public exposure
the exposure of members of the general public to EMF

Note 1 to entry: In many cases, members of the general public are unaware of their exposure to EMF.

3.6
health effects
adverse effects, such as thermal heating or stimulation of nerve and muscle tissue as a result of human exposure to EMF

3.7
layman
operator who does not weld in the performance of his profession and may have little or no formal instruction in welding

[SOURCE: IEC 60050-851:2008, 851-11-14, modified – "arc welding" was replaced by "welding"]

3.8
non-thermal effects
the stimulation of muscles, nerves or sensory organs as a result of human exposure to EMF

3.9
occupational exposure
the exposure of workers to EMF at their workplaces, generally under known conditions, and as a result of performing their regular or assigned job activities

Note 1 to entry: A worker is any person employed by an employer, including trainees and apprentices.

3.10
reference levels
action levels
directly measurable quantities, derived from basic restrictions, provided for practical exposure assessment purposes

Note 1 to entry: Respect of the reference levels will ensure respect of the relevant basic restriction. If the reference levels are exceeded, it does not necessarily follow that the basic restriction will be exceeded.

3.11
required minimum distance
distance from the source of EMF to various parts of the body to comply with applicable regulations

3.12
sensory effects
transient disturbed sensory perceptions and minor changes in brain functions as a result of human exposure to EMF

3.13
thermal effects
tissue heating through energy absorption in the tissue as a result of human exposure to EMF

4 Requirements

4.1 General

This standard does not include normative limits. Different guidelines and limit values may apply in different regions and shall be used in conjunction with this standard. Annexes A, B and C provide examples of regional or national limits.

Limits for exposure to electromagnetic fields are typically given as body internal metrics directly related to biological effects like nerve stimulation or heating. These metrics cannot be measured directly, therefore derived levels are given in measureable quantities for practical exposure assessment purposes. If these conservative levels are met, the body internal limits are not exceeded.

Different limits for general public or occupational exposure may exist.

4.2 Non-thermal effects due to magnetic fields

4.2.1 Limits for equipment used by laymen

Equipment designed for use by laymen shall be assessed as specified in Clause 6 and shall comply with the limits for general public exposure, as applicable. Equipment assessed for use by laymen may also be used by professionals without additional assessment.

Arc welding equipment designed in accordance with IEC 60974-6 is intended to be used by laymen.

4.2.2 Limits for occupational use by professionals

Equipment designed for occupational use by professionals shall be assessed as specified in Clause 6 and shall comply with the limits for occupational exposure, as applicable. Equipment assessed for occupational use shall only be used in environments where general public access is prohibited or regulated.

Arc welding equipment designed in accordance with IEC 60974-1 is intended for industrial and professional use.

If the occupational limits are exceeded for some or all configurations, as specified in Clause 6, additional measures shall be defined which allow compliance (e.g. the definition of required minimum distances for occupational exposure, the use of protection devices, restrictions for manual use, etc.).

Additionally, the manufacturer shall determine the required minimum distance for the general public.

4.3 Non-thermal effects due to electric fields

Electric fields produced by electric welding equipment shall be taken into account. Electric welding equipment designed in accordance with IEC 60974-1, IEC 60974-2, IEC 60974-5, IEC 60974-6, IEC 60974-8, or IEC 62135-1 complies unless it contains additional technology capable of creating significant electric fields.

When, by analysis of such additional technology, electric fields are found to be significant, an assessment shall be made in accordance with the methods defined in the generic standard IEC 62311 or relevant basic standards.

4.4 Contact currents

The risk of touch currents generated by voltages induced in conducting structures at the workplace by electromagnetic fields due to the welding current is avoided by the application of general safety rules for electric welding, e.g. equipotential bonding and other measures. Therefore no assessment is required.

4.5 Non-thermal effects of output current ripple

High-frequency components of the ripple of the welding current may cause non-thermal effects. Ripple currents with a fundamental frequency above 10 kHz may be neglected if the peak to peak value of the ripple does not exceed

– 100 A for equipment for occupational use;
– 10 A for equipment for use by laymen with current ripple frequencies up to 100 kHz;
– 10 A × 100 / f_{ripple} [kHz] for equipment for use by laymen with current ripple frequencies above 100 kHz.

Other ripple currents of arc welding equipment shall be assessed in accordance with the methods defined in IEC 62822-2.

NOTE 1 Methods for the assessment of ripple currents of resistance welding equipment can be found in the future IEC 62822-3 [10].[1]

NOTE 2 The exclusion limit for occupational exposure is constant over frequency as both the permissible basic restrictions and the induced electric field-strength are proportionally increasing with frequency in the relevant range. The magnitude is set at a level where the resulting internal electric field strengths are considerably below the permissible values of all regulations given in the annexes, even at very short distances from the welding cable to the welder´s body.

NOTE 3 The exclusion limit for the exposure of laymen is decreasing above 100 kHz as the conductivity of tissues is increasing above 100 kHz, and therefore the induced current density is disproportionally increasing with frequency, compared to the basic restrictions. The magnitude is set at a level where the resulting induced current densities or internal electric field strengths are considerably below the permissible values of all regulations given in the annexes, even at very short distances from the welding cable to the welder´s body.

4.6 Thermal effects

High-frequency components of the ripple of the welding current may cause thermal effects. Such effects generated by the ripple of the welding current with a fundamental frequency below 10 kHz may be neglected.

Current ripple with a fundamental frequency above 10 kHz may be neglected if the peak to peak value of the ripple does not exceed

– 100 A × 100 / f_{ripple} [kHz] for equipment for occupational use;

– 10 A × 100 / f_{ripple} [kHz] for equipment for use by laymen.

Other current ripple shall be assessed in accordance with the methods defined in the generic standard IEC 62311 or relevant basic standards.

NOTE 1 The exclusion limits are set at levels where the resulting heat absorption is considerably below the permissible values of all regulations given in the annexes, even at very short distances from the welding cable to the welder´s body.

The technology used in the welding equipment shall be analysed in order to identify other potential sources for thermal effects. If such sources are identified, they shall be assessed in accordance with the methods defined in the generic standard IEC 62311 or relevant product standards.

NOTE 2 Examples for other potential sources for thermal effects are RFID readers or radio-communication components.

5 Assessment methods

5.1 General

The assessment of arc welding equipment shall be performed in accordance with the basic standard IEC 62822-2, using one of the methods given there. If multiple scenarios are assessed, different methods may be applied.

NOTE 1 Methods for the assessment of resistance welding equipment can be found in the future IEC 62822-3 [10].

NOTE 2 An example for the application of different methods is to perform measurements to show compliance with reference levels for the exposure of all parts of the body in d.c. mode, calculations to show compliance with the

———————

1 Numbers in square brackets refer to the Bibliography.

basic restrictions for the exposure of head and trunk in pulsed mode and numerical simulation to show compliance with the basic restrictions for the exposure of limbs in pulsed mode.

5.2 Time averaging

If time averaging of exposure is not excluded and no procedures are specified in applicable national and international requirements, the procedures given in IEC 62822-2 shall be applied for arc welding equipment.

NOTE Time averaging procedures for resistance welding equipment can be found in the future IEC 62822-3 [10].

5.3 Spatial averaging

If spatial averaging of exposure is not excluded and no procedures are specified in applicable national and international requirements, the procedures given in IEC 62822-2 shall be applied for arc welding equipment.

NOTE Spatial averaging procedures for resistance welding equipment can be found in the future IEC 62822-3 [10].

5.4 Assessment of equipment with pulsed or non-sinusoidal welding current

Assessment of arc welding equipment shall be made in accordance with the basic standard IEC 62822-2. If summation procedures are applied, parameters for summation can be found in applicable guidelines or regulations containing the EMF limits. Examples are given in Tables A.5 and B.5.

The basic restrictions, reference levels and phases of the weighting functions for summation of spectral components can also be approximated by first order filters. Details and examples are given in the basic standard IEC 62822-2. The first order filter approach is applicable to both analytical and numerical methods as well as for field measurements.

NOTE Assessment methods for pulsed or non-sinusoidal welding current wave-shapes of resistance welding equipment can be found in the future IEC 62822-3 [10].

5.5 Uncertainty of assessment

5.5.1 Using uncertainty for comparison with permissible values

The concept of “shared uncertainty budget” shall apply to the assessment (both measurements and calculations). This means that the actual measured or calculated values shall be used for comparison with the permissible values, based on the relevant exposure guidelines. Uncertainty values shall be recorded but shall not be included in the comparison, provided that the expanded assessment uncertainty is less than or equal to that specified in Table 1, or if the measurement or calculation method is proven to always provide conservative results (i.e. overestimates the exposure).

The uncertainty of the assessment method applied on arc welding equipment shall be calculated as defined in the basic standard IEC 62822-2.

NOTE 1 Procedures to calculate the uncertainty of assessment methods applied on resistance welding equipment can be found in the future IEC 62822-3 [10].

If the expanded uncertainty is higher than the value specified in Table 1 and the assessment is not proven to provide conservative results, the principle given in the generic standard IEC 62311 shall be followed. Uncertainty penalties for the applicable limits shall be calculated in accordance with Equation (1).

$$L_m \leq L \times \left(\frac{1}{1 - \frac{U_p}{100} + \frac{U_m}{100}} \right) \quad (1)$$

where

L_m is the assessed value;

L is the applicable limit without consideration of assessment uncertainty;

U_p is the permissible expanded uncertainty, given in %, as defined in Table 1;

U_m is the expanded uncertainty of the assessment method applied, given in %.

NOTE 2 If, for example, the permissible expanded assessment uncertainty is ± 40 % and the actual calculated expanded uncertainty of the applied assessment method is ± 50 %, the assessment results are compared to the applicable limits reduced by a factor of 0,91.

In all cases, the assessment shall be made based on a representative sample of the equipment.

5.5.2 Permissible expanded uncertainties

The expanded uncertainties of the assessment should be less than the values given in Table 1 except where it can be shown that because of the nature of the measurement environment, a higher uncertainty is appropriate. In this case the higher uncertainty shall be quoted and justified.

Table 1 – Permissible expanded uncertainties

Frequency range	Measurement	Calculation
< 10 kHz	+ 58 %, – 37 % (± 4 dB)	± 50 %
10 kHz to 1 MHz	+ 41 %, – 30 % (± 3 dB)	± 50 %
1 MHz to 10 MHz	+ 41 %, – 30 % (± 3 dB)	± 40 %

When the uncertainties specified in Table 1 are asymmetric (e.g. + 58 %, – 37 %) the values for possible underestimation shall be used for comparison. For combined assessment procedures, the highest value of permissible uncertainty shall apply.

6 Assessment conditions

6.1 Assessment configurations

Typically, different permissible values and coupling models need to be applied for different parts of the human body. This differentiation is based on the variety of tissue types, anatomic shapes or dimensions and distances to the source of electromagnetic fields that are applicable for various parts of the body.

Therefore standardized configurations, reflecting the normal operator position for manual arc welding, are defined in the basic standard IEC 62822-2. These configurations cover all necessary assessment positions to demonstrate protection of the head, trunk and limbs of the welder.

NOTE Standardized configurations for resistance welding equipment can be found in the future IEC 62822-3 [10].

The manufacturer shall show compliance for all applicable standardized configurations. If compliance is not achievable for all points, specific required minimum distances shall be determined as defined in 4.2.2. The manufacturer may assess additional configurations, e.g.

to provide information on exposure at other distances than those defined for the standardized configurations.

For equipment designed exclusively for mechanized or robotic applications, the standardized configurations are not applicable. The manufacturer of this type of equipment shall define specific required minimum distances.

6.2 Welding current conditions

6.2.1 General

The manufacturer shall select at least one of the following assessment conditions. This allows for assessing a single (worst case) condition or various different operating modes, as determined by the manufacturer.

6.2.2 Single operating mode

Equipment shall be evaluated using the settings and conditions that lead to the highest exposure. The selection of the relevant assessment conditions shall be based on the manufacturers´ technical knowledge of the welding equipment.

Further information is provided in the basic standards IEC 62822-2 and IEC 62822-3 [10].

The application of this concept allows the assessment of the worst case setting of the welding equipment at the time of testing. If new options for setting or use (e.g. new welding programs) are added after the assessment, the assessment shall be repeated.

6.2.3 Multiple operating modes

Equipment shall be evaluated in multiple operation modes that are selected by the manufacturer. These modes may include different process settings as well as different power settings. The selection of assessment conditions shall be based on the manufacturers´ technical knowledge of the welding equipment and shall include the settings that lead to the highest exposure.

Further information is provided in the basic standards IEC 62822-2 and IEC 62822-3 [10].

The application of this concept allows the provision of multiple sets of EMF data for the users, reducing overestimation of exposure for operating modes with EMF lower than the worst case mode (e.g. d.c. TIG welding, compared to a.c. square-wave TIG welding). Therefore unnecessary restrictions for workplaces where only lower EMF operating modes are used can be avoided. If new options for setting or use (e.g. new welding programs) are added after the assessment, the assessment shall be repeated.

6.2.4 Worst case condition

Equipment shall be assessed using the current wave-form that includes the maximum *di/dt* capability of the welding power source or resistance welding gun.

This worst case exposure capability is determined by the design including related control systems (controlling the power circuit) and is independent from pre-programmed or otherwise pre-defined current wave-shapes (controlling the welding process).

Further information is provided in the basic standards IEC 62822-2 and IEC 62822-3 [10].

The application of this concept represents the assessment of the worst case technical *di/dt* capability of the welding power source. If new options for setting or use (e.g. new welding programs) are added after the assessment, there is no need to repeat the assessment.