



National Standards Authority of Ireland
Údarás um Chaighdeáin Náisiúnta na hÉireann

IRISH STANDARD

I.S. EN 50505:2008

ICS 25.160.30

**BASIC STANDARD FOR THE EVALUATION
OF HUMAN EXPOSURE TO
ELECTROMAGNETIC FIELDS FROM
EQUIPMENT FOR RESISTANCE WELDING
AND ALLIED PROCESSES**

National Standards
Authority of Ireland
Glasnevin, Dublin 9
Ireland

Tel: +353 1 807 3800
Fax: +353 1 807 3838
<http://www.nsai.ie>

Sales

<http://www.standards.ie>

*This Irish Standard was
published under the authority
of the National Standards
Authority of Ireland and
comes into effect on:
28 May 2008*

**NO COPYING WITHOUT NSAI
PERMISSION EXCEPT AS
PERMITTED BY COPYRIGHT
.....**

© NSAI 2008

Price Code T

Údarás um Chaighdeáin Náisiúnta na hÉireann

This page is intentionally left BLANK.

ICS 25.160.30

English version

**Basic standard for the evaluation
of human exposure to electromagnetic fields
from equipment for resistance welding
and allied processes**

Norme de base destinée à l'évaluation
de l'exposition humaine
aux champs électromagnétiques émanant
du matériel de soudage par résistance
et des techniques connexes

Grundnorm für die Bewertung
der menschlichen Exposition gegenüber
elektromagnetischen Feldern
von Einrichtungen zum Widerstands-
schweißen und für verwandte Verfahren

This European Standard was approved by CENELEC on 2008-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

I.S. EN 50505:2008

EN 50505:2008

- 2 -

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 26B, Electric resistance welding.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50505 on 2008-03-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2009-03-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2011-03-01

This European Standard shall be read in conjunction with EN 50445.

This European Standard has been prepared under mandates M/305 and M/351 given to CENELEC by the European Commission and the European Free Trade Association.

Contents

1	Scope	5
2	Normative references	6
3	Definitions	6
3.1	General	6
3.2	Specific for resistance welding and similar applications	8
4	Physical quantities, units and constants	10
4.1	Quantities and units	10
4.2	Constants.....	10
5	Assessment procedures	10
5.1	General	10
5.2	Resistance welding equipment EMF emission description	10
5.3	Assessment conditions.....	11
5.4	Averaging.....	11
5.5	Pulsed or non-sinusoidal welding current.....	12
5.6	Conductivity of living tissue	18
5.7	Frequency range limitations	18
5.8	Application of assessment procedures.....	19
5.9	Measurements	21
5.10	Analytical calculations	23
5.11	Numerical calculations.....	28
6	Uncertainty of assessment	30
6.1	Including uncertainty.....	30
6.2	Evaluation of uncertainties	31
6.3	Reasonable overall uncertainties	31
6.4	Examples of typical uncertainties	32
7	Assessment report	32
7.1	General principles.....	32
7.2	Items to be recorded in the assessment report.....	33
	Annex A (normative) Assessment parameters	34
	Annex B (informative) Examples for exposure assessment	46
	Annex C (informative) Numerical simulation using anatomical body models	59
	Annex D (normative) Determination of coupling factor	63
	Annex E (informative) Summation weighting and transfer function examples	65
	Annex F (informative) Example for an uncertainty budget	70
	Bibliography	71
	Figures	
	Figure 1 – Example for parameters of a welding current sequence	12
	Figure 2 – Average electrical conductivities for homogeneous body modelling from 10 Hz to 10 MHz	18
	Figure 3 – Double parallel conductor model.....	25
	Figure 4 – Rectangular conductor model	26
	Figure A.1 – Points of investigation for stationary welding equipment.....	35
	Figure A.2 – Point of investigation for portable hand-held welding equipment.....	36

I.S. EN 50505:2008

EN 50505:2008

- 4 -

Figure A.3 – Point of investigation for suspended welding equipment	37
Figure A.4 – Point of investigation for a single side welding tool	38
Figure A.5 – Point of investigation for a double side welding tool.....	38
Figure A.6 – Simulation geometry for stationary equipment	40
Figure A.7 – Simulation geometry A.....	41
Figure A.8 – Simulation geometry B.....	42
Figure A.9 – Simulation geometry C	43
Figure A.10 – Simulation geometry for single side welding tool equipment.....	44
Figure A.11 – 3D models dimensions for spheroid and cylindrical models.....	45
Figure B.1 – Flux density waveform and r.m.s. spectral components for summation.....	48
Figure B.2 – Summation of ratios $B_j / B_{L,j}$ including phases in the time domain	49
Figure B.3 – Flux density waveform and r.m.s. spectral components.....	50
Figure B.4 – Current density distribution on disk diameter for $f = 50$ Hz.....	51
Figure B.5 – Summation of ratios $J_j / J_{L,j}$ including phases in the time domain.....	52
Figure B.6 – Welding current and measured field waveform	53
Figure B.7 – Obtained flux density waveform and r.m.s. spectral components	55
Figure B.8 – Summation of ratios $J_j / J_{L,j}$ including phases in the time domain.....	56
Figure B.9 – J spectral components summation including phases in the time domain.....	56
Figure B.10 – Measurement sensor position.....	57
Figure E.1 – Peak reference level transfer function and tabulated values.....	66
Figure E.2 – B summation weighting function and phase tabulated values.....	67
Figure E.3 – Peak basic restriction transfer function and tabulated values	68
Figure E.4 – J summation weighting function and phase tabulated values	69

Tables

Table 1 – Permissible assessment procedures for resistance welding equipment	19
Table 2 – Reasonable expanded assessment uncertainties.....	31
Table B.1 – Flux density spectral components.....	47
Table B.2 – Flux density spectral components.....	48
Table B.3 – Flux density spectral components.....	49
Table B.4 – Flux density spectral components.....	50
Table B.5 – Result of flux density spectral components summation.....	50
Table B.6 – Result of current density spectral components summation	51
Table B.7 – Result of spectral components summation	54
Table B.8 – Flux density and induced current spectral components	55
Table C.1 – Electrical conductivity of tissue types	61
Table F.1 – Example uncertainty budget for broadband field measurement	70

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-