



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

## **CEN/TC 121/SC 9 N 179**

**HANDLING OF COMMENTS FROM THE PARALLEL ENQUIRY ON  
PREN ISO 15011-4:2004,  
HEALTH AND SAFETY IN WELDING AND ALLIED PROCESSES –  
LABORATORY METHOD FOR SAMPLING FUME AND GASES –  
PART 4: FUME DATA SHEETS (ISO/DIS 15011-4:2004)**

**NOTE:** This document contains the CEN/TC 121/SC 9/WG 5 handling of comments from the parallel enquiry on prEN ISO 15011-4.

**2005-04-05**

## Template for comments and secretariat observations

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| Date: 2005-03-17 | Document: <b>prEN ISO 15011-4</b> |
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| 1               | 2                                                    | (3)                                                   | 4                                       | 5                                                                                                                                                                                                                                                                                                                          | (6)                                                                                                                                   | (7)                                                                                                                                                                                                                 |
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| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                                                                                                                                                                                                                                                               | Proposed change by the MB                                                                                                             | Secretariat observations<br>on each comment submitted                                                                                                                                                               |
| FR              | Standard title                                       | European<br>and ISO<br>flyleaves                      | ed                                      | The English title is incomplete                                                                                                                                                                                                                                                                                            | Read the second part of the title as follows:<br>« Laboratory method for sampling fume and gases<br><b>generated by arc welding</b> » | This is intentional.<br>ISO/TC 44/SC 9 has<br>requested a change to the<br>2 <sup>nd</sup> element of the title of the<br>ISO 15011 series to reflect<br>the scope of Part 5, which<br>includes resistance welding. |
| CA              | Introduction                                         |                                                       | ge                                      | In the Introduction, "Different welding processes, consumables, and parameters which give rise to different fume emission rates which, in turn lead to different welder exposures." This statement is somewhat confusing -- the word "different" shows up three times in the same sentence – re-wording may make it clear. |                                                                                                                                       | Accepted. Sentence revised.                                                                                                                                                                                         |
| CA              |                                                      |                                                       | ge                                      | Part 4's structure and technical content flows very well. This includes the various test procedures, calculation sheets and charts.                                                                                                                                                                                        |                                                                                                                                       | Noted.                                                                                                                                                                                                              |
| CA              |                                                      |                                                       | ge                                      | In North America the AWS and CSA standards are predominant and aligned with NAFTA and North American industry. However, in a global economy and trade with European trading block, the ISO Part 1 thru 5 standards may become a requirement. With two different trading blocks, standard requirements are different.       |                                                                                                                                       | Noted.                                                                                                                                                                                                              |
| CA              |                                                      |                                                       | ge                                      | It appears that the AWS F1.1 thru F1.5 standards are more user friendly when referenced to the ANSI AWS Standards and CSA Welding Standards.                                                                                                                                                                               |                                                                                                                                       | Noted.                                                                                                                                                                                                              |
| CA              |                                                      |                                                       | ge                                      | There are key areas in the ISO Part 4 document that assist in identifying welding fume generation rates.                                                                                                                                                                                                                   |                                                                                                                                       | Noted.                                                                                                                                                                                                              |

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**\*\*** = ISO/CS editing unit

2 **Type of comment:** ge = general te = technical ed = editorial

**NB** Columns 1, 2, 4, 5 are compulsory.

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| CA              |                                                      |                                                       | ge                                      | In North America welding consumable MSDS's should include another section with fume generation rates and supporting information. If not practical then a Fume Generation Data Sheet should be provided by the manufacturer and supplier. This technology is available and should be a requirement for manufacturers. WHMIS should also be updated to include this relevant information.                                          |                           | Noted.                                                                                                                                            |
| CA              |                                                      |                                                       | ge                                      | The FGR would also assist in environmental emissions reporting requirements. In Part 4, Section 7 (ISO) "Reporting of Results" (Fume data sheet) is an excellent methodology to provide this information. Various jurisdictions in Canada would be able to estimate welding fume particulate 10 micron and 2.5 micron emissions. This would be through normal reporting requirements, e.g. NPRI/Ontario Regulations 127/01, etc. |                           | Noted.                                                                                                                                            |
| CA              |                                                      |                                                       | ge                                      | It is recommended that both AWS and ISO welding related standards be referenced in W117.2                                                                                                                                                                                                                                                                                                                                        |                           | Noted.                                                                                                                                            |
| CA              |                                                      |                                                       | ge                                      | The AWS fume generation test chamber/methodology (standards) varies from the ISO model. These are two unique systems in determining fume generation and the rate.                                                                                                                                                                                                                                                                |                           | Noted.                                                                                                                                            |
| CA              |                                                      |                                                       | ge                                      | The American Welding Society offers Standard F1.2 "Laboratory Method for Measuring Fume Generation Rates & Total Fume Emissions of Welding and Allied Processes" that prescribes methods for determining FGR. I am not clear what the overall ISO standard offers above the AWS one.                                                                                                                                             |                           | Noted. F1.2 is similar to ISO 15011-1. ISO 15011-4 adds to this because it prescribes test conditions for generating fume data sheet information. |

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## Template for comments and secretariat observations

Date: 2005-01-24

Document: prEN ISO 15011-4:2004

| 1               | 2                                                    | (3)                                                   | 4                                       | 5                                                                                                                                                                                                                                                                                                                                                                                                            | (6)                                                                                                                                                   | (7)                                                                                          |
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| CA              |                                                      |                                                       | ge                                      | One aspect of the ISO document is the classification of welding consumables. This is a practice that has been long done in Europe but which has not received acceptance in North America. It would be necessary to establish some consensus from Industry, Government and, likely, Labour groups before heading in that direction. I don't see that occurring any time soon.                                 |                                                                                                                                                       | Noted.                                                                                       |
| CA              |                                                      |                                                       | ge                                      | I would certainly like to see manufacturers provide FGR to users in order to help the selection of lower fume consumables but that information has been tightly held in the past other than broad assertions                                                                                                                                                                                                 |                                                                                                                                                       | Noted.                                                                                       |
| CA              |                                                      |                                                       | ge                                      | The document does have some useful information such as Annex C which describes principal and key components of welding fume. However, the table does not help in terms of assigning these to AWS wire classes. On the other hand AWS F1.3 "Sampling Strategy Guide for Evaluating Contaminants in the Welding Environment" does provide similar information in terms of the AWS classes that are used in NA. |                                                                                                                                                       | Noted.                                                                                       |
| CA              |                                                      | Note 2                                                | ed                                      | When a key-component welding fume limit value is reported it is always necessary to provide a reference to the source of limit values used in its calculation. This means a reference to the source of limit values used in its calculation from country to country.<br><br>By the way, you are missing the word "to" provide in last sentence.                                                              |                                                                                                                                                       | Accepted                                                                                     |
| AT              | Introduction                                         | 3 <sup>rd</sup> para.                                 | ed                                      | Wrong emphasis                                                                                                                                                                                                                                                                                                                                                                                               | Delete last sentence of paragraph: <i>"The standard also considers how the data obtained may be used for welding fume consumable classification."</i> | Accepted in principle. But sentence revised rather than deleted. See response to UK comment. |

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| UK              | Introduction                                         | 3 <sup>rd</sup> para.                                 | ed                                      | Wrong emphasis                                                                                                         | Amend the last sentence of paragraph to: "The standard also gives information about how the data obtained can be used."                                  | Accepted.                                                                                    |
| DE              | Introduction                                         | 3 <sup>rd</sup> para.                                 | ed                                      | Wrong emphasis                                                                                                         | Delete last sentence of paragraph: " <i>The standard also considers how the data obtained may be used for welding fume consumable classification.</i> "  | Accepted in principle. But sentence revised rather than deleted. See response to UK comment. |
| NL              | Introduction                                         | 3 <sup>rd</sup> para.                                 | ed                                      | Wrong emphasis                                                                                                         | Delete last sentence of paragraph: " <i>The standard also considers how the data obtained may be used for welding fume consumable classification.</i> "  | Accepted in principle. But sentence revised rather than deleted. See response to UK comment. |
| AT              | 1                                                    | 1 <sup>st</sup> para.                                 | ed                                      | The classification aspect is optional and therefore should not be part of the scope                                    | Delete the second sentence: " <i>This information may be used to assess exposure to welding fume as a part of workplace assessment.</i> "                | Accepted.                                                                                    |
| UK              | 1                                                    | 1 <sup>st</sup> para.                                 | ed                                      | The use of fume data sheets is not dealt with in the normative part of the standard so should not appear in the scope. | Delete the second sentence.                                                                                                                              | Accepted.                                                                                    |
| DE              | 1                                                    | 1 <sup>st</sup> para.                                 | ed                                      |                                                                                                                        | Delete the second sentence: " <i>This information may be used to assess exposure to welding fume as a part of workplace assessment.</i> "                | Accepted.                                                                                    |
| NL              | 1                                                    | 1 <sup>st</sup> para.                                 | ed                                      | The classification aspect is optional and therefore should not be part of the scope                                    | Delete the second sentence and replace by: " <i>This information may be used to assess exposure to welding fume as a part of workplace assessment.</i> " | Accepted.                                                                                    |
| DE              | 2                                                    | last para.                                            | ed                                      | Normative reference to EN ISO 15011-1 should be undated.                                                               | Delete the date.                                                                                                                                         | Accepted.                                                                                    |
| DE              | 3.2                                                  |                                                       | ed                                      | No need to reference content after following the proposed changes                                                      | Delete whole paragraph                                                                                                                                   | Not accepted. See response to German comment on deletion of Annex B.                         |

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| AT              | 4.2                                                  |                                                       | te                                      | "Risk assessment" should not be content of standard dealing with documentation of technical figures | Delete " <i>and various ways in which the data may be used are described, e.g. to assess exposure to welding fume as part of a risk assessment and/or to define a classification system for welding consumables.</i> " | Accepted in principle. See UK proposed change, which is accepted.. |
| UK              | 4.2                                                  |                                                       | te                                      | "Risk assessment" should not be content of standard dealing with documentation of technical figures | Delete "... e.g. to assess exposure to welding fume as part of a risk assessment and/or to define a classification system for welding consumables."                                                                    | Accepted.                                                          |
| DE              | 4.2                                                  |                                                       | te                                      | Risk assessment » should not be content of standard dealing with documentation of technical figures | Delete " <i>and various ways in which the data may be used are described, e.g. to assess exposure to welding fume as part of a risk assessment and/or to define a classification system for welding consumables.</i> " | Accepted in principle. See UK proposed change, which is accepted.  |
| NL              | 4.2                                                  |                                                       | te                                      | "Risk assessment" should not be content of standard dealing with documentation of technical figures | Delete " <i>and various ways in which the data may be used are described, e.g. to assess exposure to welding fume as part of a risk assessment and/or to define a classification system for welding consumables.</i> " | Accepted in principle. See UK proposed change, which is accepted.  |
| AT              | 5.1                                                  |                                                       | te                                      | To cater for optional aspects                                                                       | Start sentence with " <i>When required, determine...</i> "                                                                                                                                                             | Accepted in principle. See UK proposed change, which is accepted.  |
| UK              | 5.1                                                  |                                                       | te                                      | To cater for optional aspects and to align with the scope of EN ISO 15011-1                         | Amend the first sentence of 5.1 to: "Determine the fume emission rate and/or collect welding fume samples for analysis, as required, using the procedure described in EN ISO 15011-1."                                 | Accepted.                                                          |
| NL              | 5.1                                                  |                                                       | te                                      | To cater for optional aspects                                                                       | Add 'Where required' before 'Determine' at the start of this clause.                                                                                                                                                   | Accepted in principle. See UK proposed change, which is accepted.  |

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| AT              | 5.2                                                  |                                                       | ed                                      |                                                                    | Replace "(see 3.5)" by "(see Annex C, Table C1)"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Accepted.                                                             |
| UK              | 5.2                                                  |                                                       | ed                                      | Clarify the procedure and give correct cross-reference             | Amend the first sentence of 5.2 to "Analyse the welding fume samples to generate...", replace "(see 3.5)" with "(see Table C.1)" and remove the note.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Accepted.                                                             |
| DE              | 5.2                                                  |                                                       | ed                                      |                                                                    | Replace "(see 3.5)" or at least add "(see Annex B, Table C. 1)"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Accepted.                                                             |
| NL              | 5.2                                                  |                                                       | ed                                      |                                                                    | Replace "(see 3.5)" by "(see Annex C, Table C1)"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Accepted.                                                             |
| UK              | 5.3                                                  | New 5.3                                               | te                                      | The standard should address the subject of measurement uncertainty | <p>Insert the following as a new subclause 5.3:</p> <p>"Estimate and report the uncertainty of measurements in accordance with the ISO GUM [Ref1]. Construct a cause and effect diagram [Ref2] to identify the individual sources of random and systematic error in the method and then estimate and/or determine these experimentally and combine them in an uncertainty budget. Finally, multiply the combined uncertainty by an appropriate coverage factor to produce an expanded uncertainty. A coverage factor of 2 is recommended, which gives a level of confidence of approximately 95 % in the calculated value.</p> <p>NOTE References [Ref3] and [Ref4] describe the application of cause and effect analysis to analytical methods."</p> <p>(For references see UK comment on the bibliography).</p> | Accepted in part. 1 <sup>st</sup> sentence of proposed text inserted. |
| UK              | 6                                                    | Heading                                               | ed                                      | Clause 6 prescribes test conditions rather than a procedure.       | Change the heading of clause 6 to "Test conditions".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Accepted.                                                             |

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| SE              | 6.1                                                  |                                                       | ed                                      | FER and CC not defined or explained                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Add: definitions or explain in the text                                                                                                                                                                                                               | Accepted. Footnote inserted in Table 1.                                                                                                                                                                                                         |
| JP              | 6.1                                                  | Table 1 -<br>Diameter -<br>FER                        | te                                      | <p>It is certainly uneconomical to determine FER for all the diameters of solid wires that are used very widely in gas-shielded metal arc welding nowadays.</p> <p>The reason why the relationship between wire diameter and FER is not linear is considered to be the influence of the molten droplet transfer mode change from short-circuiting transfer to globular transfer at a certain welding current. The mode transition current is thought to be included in the range of optimum welding currents for 1.2-mm diameter that is most extensively used. This is why we believe it reliable—with almost the same reliability for other types of welding consumables—to estimate the FER of other diameters by interpolation, using the diameter vs. FER chart with a knick point at 1.2 mm developed with the smallest, 1.2-mm and largest diameters in the production range.</p> | Change “for all diameters” to “for the smallest, 1.2-mm and largest diameters in the production range and estimate the FER of other diameters by interpolation between the smallest diameter and 1.2 mm and between 1.2 mm and the largest diameter.” | Accepted in principle. No data is known to exist to support interpolation of FER v diameter for solid wires. However, to reduce the amount of work required 'all diameters' has been replaced by ' at least 1,0 mm and 1,2 mm diameter wires.   |
| UK              | 6.1                                                  | Table 1<br>"Current"                                  | te                                      | The way in which the current is measured should be specified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Add the following to the end of the cell containing the test parameters for current: "Measure the current in the return lead using an instrument whose calibration is traceable to national standards."                                               | <p>Accepted in principle. 'Measure the current in the return lead' inserted in Table 1.</p> <p>' All instruments used for measuring welding parameters shall have a calibration traceable to national standards' Inserted in subclause 6.1.</p> |

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| JP              | 6.1                                                  | Table 1 -<br>Welding<br>speed                         | te                                      | The description for test parameters seems ambiguous. | Change to "Generate fume using the optimum welding speed as established by an experienced welder to form sound weld beads. An automatic welding machine or a welding robot may be used to maintain a constant welding speed."                                                                                                                                                                   | Not accepted. The use of mechanised welding is already specified in subclause 6.3. |
| AT              | 6.1                                                  | Table 1 "Test<br>piece"                               | ed                                      | Better readability                                   | Change first paragraph to "Material: Use a test piece of unalloyed steel for <b>generating fume from</b> unalloyed, low alloyed, high alloyed, cast iron, and surfacing consumables. Use a test piece with a composition that is as similar as possible to that of the weld metal for <b>generating fume from</b> nickel alloy, aluminium alloy and copper alloy consumables."                  | Accepted.                                                                          |
| NL              | 6.1                                                  | Table 1<br>"Test piece"                               | ed                                      | Better readability                                   | Change first paragraph to "Material: Use a test piece of unalloyed steel for <b>generating fume from</b> unalloyed, low alloyed, high alloyed, cast iron, and surfacing consumables. Use a test piece with a composition that is as similar as possible to that of the weld metal for <b>generating fume from</b> nickel alloy, aluminium alloy and copper alloy consumables."                  | Accepted.                                                                          |
| UK              | 6.1                                                  | Table 1 "Test<br>piece"                               | ed                                      | Modify the text for better readability.              | Change the first paragraph to read:<br><br>"Material: Use a test piece of unalloyed steel for <b>generating fume from</b> unalloyed, low alloyed, high alloyed, cast iron, and surfacing consumables. Use a test piece with a composition that is as similar as possible to that of the weld metal for <b>generating fume from</b> nickel alloy, aluminium alloy and copper alloy consumables." | Accepted.                                                                          |

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| UK              | 6.1                                                  | Table 1 "Test piece"                                  | te                                      | The test piece size specified is too restrictive.                                                                                                | Change the second paragraph to read:<br><br>"Dimensions: Use a test piece of suitable dimensions, such that a weld can be continuously deposited for the desired arcing time, e.g. use a test piece of commercial bar stock, 50 mm width x 10 mm thickness x. 250 mm length, for deposition of a linear weld. Other configurations, such as the deposition of a circular weld on a rotating plate or pipe of suitable dimensions, may be used provided that the weld metal is not deposited on hot metal." | Accepted.                                             |
| AT              | 6.1                                                  | Table 1 "Power source"                                | ed                                      | Clearer content: inverter power sources do not generally vary real inductance                                                                    | Replace "record the inductance used" by "note the set-up of the machine on the fume data sheet"                                                                                                                                                                                                                                                                                                                                                                                                            | Accepted.                                             |
| NL              | 6.1                                                  | Table 1 "Power source"                                | ed                                      | Clearer content: inverter power sources do not generally vary real inductance                                                                    | Replace "record the inductance used" by "note the set-up of the machine on the fume data sheet"                                                                                                                                                                                                                                                                                                                                                                                                            | Accepted.                                             |
| UK              | 6.1                                                  | Table 1 "Power source"                                | ed                                      | Clearer content: inverter power sources do not generally vary real inductance                                                                    | Replace "record the inductance used" by "note the set-up of the machine on the fume data sheet".<br><br>If accepted also amend the fume data sheet examples in Annex A and Annex E, accordingly.                                                                                                                                                                                                                                                                                                           | Accepted.                                             |
| DE              | 6.1                                                  | Table 1 "Power source"                                | ed                                      | Clearer content                                                                                                                                  | Replace "record the inductance used" by "note the set-up of the machine on the fume data sheet"                                                                                                                                                                                                                                                                                                                                                                                                            | Accepted.                                             |
| JP              | 6.1                                                  | Table 1 - Power source                                | te                                      | Recording inductance used is unnecessary because Annex A provides that the type, manufacturer and model of the power source should be described. | Delete "and record the inductance used."<br><br>Otherwise addition of "inductance" is necessary into the fourth table of Annex A.                                                                                                                                                                                                                                                                                                                                                                          | Accepted.                                             |

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2 Type of comment: ge = general te = technical ed = editorial

NOTE Columns 1, 2, 4, 5 are compulsory.

## Template for comments and secretariat observations

Date: 2005-01-24

Document: prEN ISO 15011-4:2004

| 1               | 2                                                    | (3)                                                   | 4                                       | 5                                                                            | (6)                                                                                                                                                                                    | (7)                                                                                                                                  |
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| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                 | Proposed change by the MB                                                                                                                                                              | Secretariat observations<br>on each comment submitted                                                                                |
| JP              | 6.1                                                  | Table 1 -<br>Torch                                    | te                                      | It is meaningless to confine the torch to be used to water-cooled type only. | Delete "water-cooled."                                                                                                                                                                 | Not accepted. Reproducibility of fume emission rate measurements is better with a water-cooled torch.                                |
| UK              | 6.1                                                  | Footnote                                              | ed                                      | Mistake in text of "Configuration".                                          | Should read "...FER is affected...." rather than "...FER is not affected....".                                                                                                         | Accepted.                                                                                                                            |
| AT              | 6.1                                                  | Footnote<br>"Configur-<br>ation"                      | te                                      | Mistake in text                                                              | Should read "...FER is affected...."                                                                                                                                                   | Accepted.                                                                                                                            |
| DE              | 6.1                                                  | Footnote<br>"Configur-<br>ation"                      | ed                                      | Correction                                                                   | Correct: " <i>FER is not affected...</i> " in "FER is affected..."                                                                                                                     | Accepted.                                                                                                                            |
| NL              | 6.1                                                  | Footnote<br>"Configur-<br>ation"                      | ed                                      | Mistake in text                                                              | Should read "...FER is affected...."                                                                                                                                                   | Accepted.                                                                                                                            |
| AT              | 6.1                                                  | Footnote<br>"Diameter",<br>3 <sup>rd</sup> line       | ed                                      | Clearer content                                                              | Insert after "linear for processes" the words " <i>within the scope of this standard</i> "                                                                                             | Accepted.                                                                                                                            |
| NL              | 6.1                                                  | Footnote<br>"Diameter",<br>3 <sup>rd</sup> line       | te                                      | Clearer content                                                              | Insert after "linear for processes" the words " <i>within the scope of this standard</i> "                                                                                             | Accepted.                                                                                                                            |
| UK              | 6.2                                                  | Table 2                                               | te                                      | The way in which the voltage is measured should be specified.                | Add the following to the end of the cell containing the test parameters for voltage: "Attach the reference lead of the measuring instrument across the terminals of the power source." | Accepted in principle. The following has been added "Attach the reference lead of the measuring instrument to the electrode holder." |

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| 1               | 2                                                    | (3)                                                   | 4                                       | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | (6)                                                                                                                                                                                                                                                                                                                                         | (7)                                                                                                                                                                                                                                                                 |
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| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Proposed change by the MB                                                                                                                                                                                                                                                                                                                   | Secretariat observations<br>on each comment submitted                                                                                                                                                                                                               |
| UK              | 6.2, 6.3 and<br>6.4                                  | Tables 2, 3<br>and 6                                  | te                                      | FER measurements made under the conditions prescribed in the standard are influenced by voltage. The extent and significance of this is process-dependent, but in general the reproducibility of FER measurements would be improved if the way in which the voltage is set could be specified more precisely.                                                                                                                                                                                                                                                   | Specify the way in which the voltage is set more precisely, if possible.                                                                                                                                                                                                                                                                    | Accepted. The following has been inserted in subclause 6.1 " Where it is specified in the following tables that a test condition is established by an experienced welder, If possible use the median of conditions established by a number of experienced welders." |
| JP              | 6.2                                                  | Table 2 -<br>Polarity                                 | te                                      | Polarity for almost all the manual metal arc welding electrodes is specified as "ac or dc±" or "ac or dc□" except for some electrodes designed for exclusive use with dc. Therefore, as per the proposed draft standard, almost all the electrodes must be used with dc□ to measure the FER, which is impractical. For, in some countries, in Japan for instance, the electrodes for use with both ac and dc are used with ac in most cases and therefore, the use of FER data obtained by dc□ only may not result in accurate evaluation of the fume exposure. | Change to "... or if more than one polarity is recommended, generate fume with the polarity used most ordinarily."<br><br>Addition to the description of Polarity in NOTE for Table 2: However, measurement of fume generated with the polarity used most ordinarily in the country leads to more accurate evaluation of the fume exposure. | Accepted in principle. Changes proposed have been made with some minor amendment to the wording.                                                                                                                                                                    |
| AT              | 6.3                                                  | 1 <sup>st</sup> para                                  | ed                                      | Makes reading clearer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Insert "When determining fume emission rate (FER) and chemical composition (CC) for fume data sheets." before "Generate fume....."                                                                                                                                                                                                          | Not accepted. Redundant information.                                                                                                                                                                                                                                |
| NL              | 6.3                                                  | 1 <sup>st</sup> para                                  | ed                                      | Makes reading clearer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Insert "When determining fume emission rate (FER) and chemical composition (CC) for fume data sheets." before 'Generate fume.....'.                                                                                                                                                                                                         | Not accepted. Redundant information.                                                                                                                                                                                                                                |

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| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                                                                                        | Proposed change by the MB                                                                                                                                                                                                                          | Secretariat observations<br>on each comment submitted                                            |
| DE              | 6.3                                                  | 1 <sup>st</sup> para.                                 | ed                                      | Makes reading clearer                                                                                                                               | Start the sentence: <i>"When determining fume emission rate (FER) and chemical composition (CC) for fume data sheets generate..."</i>                                                                                                              | Not accepted. Redundant information.                                                             |
| JP              | 6.3                                                  | Table 3 – Polarity                                    | te                                      | Our proposal is based on the same reason mentioned in the comment for Table 2 above and another reason of seeking for better economical efficiency. | Change to "... or if more than one polarity may be used, generate fume with the polarity used most ordinarily."<br><br>For the description of NOTE for Table 3, an appropriate change should be made in accordance with the above proposed change. | Accepted in principle. Changes proposed have been made with some minor amendment to the wording. |
| UK              | 6.3 and 6.4                                          | Tables 3 and 6                                        | te                                      | The way in which the voltage is measured should be specified.                                                                                       | Add the following to the end of the cell containing the test parameter for voltage: "Attach the reference lead of the measuring instrument to the wire feed unit rather than across the terminals of the power source."                            | Accepted in principle. The change proposed has been made in part.                                |
| UK              | 6.3 and 6.4                                          | Tables 3 and 6                                        | te                                      | The way in which the CTWD is measured should be specified.                                                                                          | At the end of the cell containing the test parameter for CTWD, specify how the CTWD is to be measured.                                                                                                                                             | Not accepted. Not necessary.                                                                     |
| JP              | 6.3                                                  | Table 4 – Title                                       | ed                                      |                                                                                                                                                     | Delete "and wire feed speeds".                                                                                                                                                                                                                     | Accepted.                                                                                        |
| DE              | 6.3                                                  | Table 4                                               | ed                                      | This table does not include any values regarding wire feed speed.                                                                                   | Title shall be read as follows:<br><br>"Recommended contact tip to workpiece distance for gas-shielded metal arc welding with solid wires"                                                                                                         | Accepted.                                                                                        |

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| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                                                                                                                 | Proposed change by the MB                    |                  |                                           | Secretariat observations<br>on each comment submitted |                                                                                                                                                                                                                                                                                                                                                      |
| JP              | 6.3                                                  | Table 4                                               | te                                      | Recommended contact tip to workpiece distance varies according to the manufacturer. Hence, it is not appropriate to specify a particular distance for each diameter of wire. | Diameters of 0.9 and 1.4 mm are to be added. | Diameter<br>(mm) | Contact tip to workpiece<br>distance (mm) |                                                       | Not accepted. The objective is to standardise, as far as possible, the test conditions. Hence a range of CTWDs is not acceptable. The situation regarding other CTWDs has been addressed by adding the following footnote to the table "Contact tip to workpiece distances for other diameters may be determined by interpolation".                  |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              |                  | ISO/DIS                                   | Proposal                                              |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 0.6              | 8                                         | 8 - 12                                                |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 0.8              | 10                                        |                                                       |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 0.9              | -                                         | 11 - 17                                               |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 1.0              | 15                                        |                                                       |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 1.2              | 18                                        | 15 - 25                                               |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 1.4              | -                                         |                                                       |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 1.6              | 22                                        | 26 - 33                                               |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 2.0              | 26                                        |                                                       |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              | 2.4                                          | 28               |                                           |                                                       |                                                                                                                                                                                                                                                                                                                                                      |
| JP              | 6.3                                                  | Table 5                                               | te                                      |                                                                                                                                                                              | Diameter of 0.8 mm is to be added.           | Diameter<br>(mm) | Contact tip to workpiece<br>distance (mm) |                                                       | Not accepted. The objective is to standardise, as far as possible, the test conditions. Hence a range of CTWDs is not acceptable. The situation regarding other CTWDs has been addressed by adding the following footnote to the table "Contact tip to workpiece distances for other diameters may be determined by interpolation or extrapolation". |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              |                  | ISO/DIS                                   | Proposal                                              |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 0.8              | -                                         | 14 - 16                                               |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 0.9              | 15                                        | 12 - 18                                               |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 1.0              | 18                                        |                                                       |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 1.2              | 20                                        | 15 - 25                                               |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 1.4              | 22                                        |                                                       |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 1.6              | 25                                        | 20 - 30                                               |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 2.0              | 28                                        |                                                       |                                                                                                                                                                                                                                                                                                                                                      |
|                 |                                                      |                                                       |                                         |                                                                                                                                                                              |                                              | 2.4              | 30                                        |                                                       |                                                                                                                                                                                                                                                                                                                                                      |

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| 1               | 2                                                    | (3)                                                   | 4                                       | 5                                                                                                     | (6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (7)                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                                          | Proposed change by the MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Secretariat observations<br>on each comment submitted                                                                                                                                                                                                                                                                                                                                                                                             |
| UK              | 6.4                                                  | Table 6                                               | te                                      | The torch requirements for self-shielded metal arc welding with a flux-cored wire should be specified | Enter a new row in Table 6 as follows: "Use a water-cooled torch designed specifically for self-shielded metal arc welding or use a water-cooled torch designed for gas-shielded metal arc welding with the gas shroud removed."                                                                                                                                                                                                                                                                   | Accepted in principle. The torch entry in table 1 has been changed to " For gas-shielded metal arc welding, use a water-cooled torch with a standard diameter gas shroud, as recommended by the torch manufacturer. For self-shielded metal arc welding, use a water-cooled torch designed specifically for self-shielded metal arc welding or use a water-cooled torch designed for gas-shielded metal arc welding with the gas shroud removed." |
| UK              | 7                                                    | New 7                                                 | te                                      | Performance data should be included in the method                                                     | <p>Insert the following:</p> <p>"7 Method performance</p> <p>7.1 Repeatability</p> <p>7.1.1 Fume emission rate</p> <p>The repeatability of fume emission rate measurements has been evaluated <sup>[Ref5]</sup> in an interlaboratory comparison. The results are presented in Table X.</p> <p>7.1.2 Chemical composition</p> <p>The repeatability of chemical composition measurements has been evaluated <sup>[Ref5]</sup> in laboratory experiments. The results are presented in Table XX.</p> | Accepted in principle. Data inserted in a new Annex B, with an additional table giving test conditions. Cross reference given in new subclause 5.3 (see UK comments above).                                                                                                                                                                                                                                                                       |

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| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                        | Proposed change by the MB                                                                                                                                                                                                                                                                                                               | Secretariat observations<br>on each comment submitted                   |
| UK              | 7 (cont)                                             | New 7                                                 | te                                      |                                                                                     | <p>7.2 Reproducibility</p> <p>The reproducibility of fume emission rate measurements has been evaluated <sup>[Ref5]</sup> in an interlaboratory comparison. The results are presented in Table XXX."</p>  <p>"Appendix to UK comments on prEN I"</p> |                                                                         |
| AT              | 7.1                                                  | After point k)<br>before point l)                     | Ed                                      | Change of emphasis                                                                  | Replace with "A fume data sheet may contain additional, optional information, possible examples include:"                                                                                                                                                                                                                               | Accepted in principle. Slightly different wording used. See UK comment. |
| NL              | 7.1                                                  | After point k)<br>before point l)                     | Ed                                      | Change of emphasis                                                                  | Replace with 'A fume data sheet may contain additional, optional information, possible examples include:'.                                                                                                                                                                                                                              | Accepted in principle. Slightly different wording used. See UK comment. |
| UK              | 7.1                                                  | After point k)<br>before point l)                     | ed                                      | Change of emphasis                                                                  | Replace "A fume data sheet may also contain the following optional additional information:" with "A fume data sheet may contain optional information, including:"                                                                                                                                                                       | Accepted.                                                               |
| AT              | 7.1                                                  | Footnote at<br>end                                    | Ed                                      | Example for fume data sheet is misleading, proposed later in list to become deleted | Delete whole footnote.                                                                                                                                                                                                                                                                                                                  | Accepted in part. Last sentence of the note deleted.                    |
| NL              | 7.1                                                  | Footnote at<br>end                                    | Ed                                      | Example for fume data sheet is misleading, proposed later in list to become deleted | Delete whole footnote.                                                                                                                                                                                                                                                                                                                  | Accepted in part. Last sentence of the note deleted.                    |
| DE              | 7.1                                                  | Footnote at<br>end                                    | ge                                      | Example for fume data sheet is misleading, proposed later in list to become deleted | Delete whole footnote.                                                                                                                                                                                                                                                                                                                  | Accepted in part. Last sentence of the note deleted.                    |
| UK              | 7.1                                                  | Line 2 of<br>point o)                                 | ed                                      | Incorrect reference.                                                                | Change "NOTE 3 in B.1.1.2" to read "NOTE 2 in B.1.1.2"                                                                                                                                                                                                                                                                                  | Accepted.                                                               |

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| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                                                                          | Proposed change by the MB                                                                                                                                                                                                                                                                                                                                                                                                                                 | Secretariat observations<br>on each comment submitted                                   |
| AT              | 7.1                                                  | Point J                                               | Te                                      | To agree with amended 5.1                                                                                                             | Move into the optional section (will require renumbering)                                                                                                                                                                                                                                                                                                                                                                                                 | Accepted in principle. Changes made in accordance with UK comment on 7.1                |
| NL              | 7.1                                                  | Point J                                               | Te                                      | To agree with amended 5.1                                                                                                             | Move into the optional section (will require renumbering)                                                                                                                                                                                                                                                                                                                                                                                                 | Accepted in principle. Changes made in accordance with UK comment on 7.1                |
| UK              | 7.1                                                  | Point j and k                                         | te                                      | To agree with amended 5.1                                                                                                             | Amend (j) to: "if determined, the welding fume emission rate, in mg/s and g/h, reported to at least two significant figures; and/or".<br><br>Amend (k) to: " the chemical composition of the fume, in % m/m, reported for all principal components of the welding fume (see table C.1) with a concentration above the reporting limit given in table C.2, reported to at least the number of decimal places and significant figures given in table C.3.". | Accepted.                                                                               |
| DE              | 7.1                                                  | Point l)                                              | ge                                      | Continuous changing of different national values; EN- and ISO-standards cannot reflect individual national requirements               | Delete the rest of the sentence after mg/m <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                   | Not accepted. Data is optional.                                                         |
| DE              | 7.1                                                  | Point o)                                              | ed                                      | Note 3 in B.1.1.2 is misleading.                                                                                                      | Text shall be read as follows:<br>...(see Note 2 in B.1.1.2 and Note 3 in B.1.2.2).                                                                                                                                                                                                                                                                                                                                                                       | Accepted.                                                                               |
| DE              | 7.1                                                  | Points m) to p)                                       | ge                                      | Requirements of markets are not content of a standard; resources for document management will multiply if points are kept in standard | Delete points m) n) o) p)                                                                                                                                                                                                                                                                                                                                                                                                                                 | Not accepted. Data is optional.                                                         |
| UK              | 7.2                                                  |                                                       | ed                                      | There is no specific legal requirement for safety data sheets for all consumables.                                                    | Replace sentence with "When a safety data sheet is necessary to meet European and/or National requirements, consumable manufacturer shall include in it a summary of the test results."                                                                                                                                                                                                                                                                   | Not accepted. See response to comment on 7.2 from Austria, The Netherlands and Germany. |

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| 1               | 2                                                    | (3)                                                   | 4                                       | 5                                                                                             | (6)                                                                                                                                                                                                                                                                                                                                                                                          | (7)                                                                               |
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| AT              | 7.2                                                  |                                                       | Ed                                      | The standard is dealing with fume data sheets and shall not define any requirements for MSDS  | Delete whole clause.                                                                                                                                                                                                                                                                                                                                                                         | Accepted.                                                                         |
| NL              | 7.2                                                  |                                                       | Ed                                      | The standard is dealing with fume data sheets and should not define any requirements for MSDS | Delete whole clause.                                                                                                                                                                                                                                                                                                                                                                         | Accepted.                                                                         |
| DE              | 7.2                                                  |                                                       | te                                      | The standard is dealing with fume data sheets and shall not define any requirements for MSDS  | Delete whole clause.                                                                                                                                                                                                                                                                                                                                                                         | Accepted.                                                                         |
| AT              | 7.3                                                  |                                                       | Te                                      | Change not needed if FER determination optional                                               | Change content to “As a transitional arrangement, suppliers of welding consumables may continue to cite chemical composition data and fume emission rates acquired before the publication of this European and International Standard until conditions described in 7.3 apply and retesting is required, provided the welding parameters used are within the conditions stated in clause 6.” | Noted. FER determination is optional (see subclause 5.1), so change not required. |
| DE              | 7.3                                                  |                                                       | ed                                      |                                                                                               | Change content to “As a transitional arrangement, suppliers or welding consumables may continue to cite chemical composition data and fume emission rates acquired before the publication of this European and International Standard until conditions described in 7.3 apply and retesting is required, provided the welding parameters used are with the conditions stated in clause 6.”   | Noted. FER determination is optional (see subclause 5.1), so change not required. |
| NL              | 7.3                                                  |                                                       | Te                                      | Change not needed if FER determination optional                                               | Change content to “As a transitional arrangement, suppliers of welding consumables may continue to cite chemical composition data and fume emission rates acquired before the publication of this European and International Standard until conditions described in 7.4 apply and retesting is required, provided the welding parameters used are within the conditions stated in clause 6.” | Noted. FER determination is optional (see subclause 5.1), so change not required. |

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2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

**NOTE** Columns 1, 2, 4, 5 are compulsory.

| 1                                                  | 2                                                    | (3)                                                   | 4                                       | 5                                                                                                                                                                                                                                                       | (6)                                                                                                                                                                                                                                                                                                                                                                                                        | (7)                                                                                                                                                                                                          |                                                    |      |      |                |      |               |      |                |      |           |
|----------------------------------------------------|------------------------------------------------------|-------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------|------|----------------|------|---------------|------|----------------|------|-----------|
| MB <sup>1</sup>                                    | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                                                                                                                                                                                            | Proposed change by the MB                                                                                                                                                                                                                                                                                                                                                                                  | Secretariat observations<br>on each comment submitted                                                                                                                                                        |                                                    |      |      |                |      |               |      |                |      |           |
| JP                                                 | 7.4                                                  | Table 7                                               | te                                      | In the case of manual metal arc welding electrodes and flux-cored wires, flux ingredient proportions have be adjusted according to the progress of technology. The range of such normal adjustment may often exceed the tolerated variation in Table 7. | <table><tr><td>Original proportion<br/>of the ingredient<br/>%(m/m)</td><td>Tolerated variation of<br/>original proportion<br/>%</td></tr><tr><td>≤2.5</td><td>± 50</td></tr><tr><td>&gt; 2,5 % ≤ 10 %</td><td>± 30</td></tr><tr><td>&gt; 10 % ≤ 25 %</td><td>± 20</td></tr><tr><td>&gt; 25 % ≤ 100 %</td><td>± 10</td></tr></table> <p>For metallic ingredients, another consideration may be needed.</p> | Original proportion<br>of the ingredient<br>%(m/m)                                                                                                                                                           | Tolerated variation of<br>original proportion<br>% | ≤2.5 | ± 50 | > 2,5 % ≤ 10 % | ± 30 | > 10 % ≤ 25 % | ± 20 | > 25 % ≤ 100 % | ± 10 | Accepted. |
| Original proportion<br>of the ingredient<br>%(m/m) | Tolerated variation of<br>original proportion<br>%   |                                                       |                                         |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                              |                                                    |      |      |                |      |               |      |                |      |           |
| ≤2.5                                               | ± 50                                                 |                                                       |                                         |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                              |                                                    |      |      |                |      |               |      |                |      |           |
| > 2,5 % ≤ 10 %                                     | ± 30                                                 |                                                       |                                         |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                              |                                                    |      |      |                |      |               |      |                |      |           |
| > 10 % ≤ 25 %                                      | ± 20                                                 |                                                       |                                         |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                              |                                                    |      |      |                |      |               |      |                |      |           |
| > 25 % ≤ 100 %                                     | ± 10                                                 |                                                       |                                         |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                              |                                                    |      |      |                |      |               |      |                |      |           |
| JP                                                 | 7.4                                                  | Table 7                                               | ed                                      | Designation of % after the figures in the table is unnecessary as the uppermost columns of the table specify that the figures are designated in percentage.                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                            | Accepted.                                                                                                                                                                                                    |                                                    |      |      |                |      |               |      |                |      |           |
| DE                                                 | 7.6                                                  |                                                       | ge                                      |                                                                                                                                                                                                                                                         | Change validation period to five years.<br>Change point c) to “and updated key components” and delete point d) totally.                                                                                                                                                                                                                                                                                    | Accepted. Also additional text inserted to compensate for the change, as follows:<br><br>c) the consumable ingredient proportions; and<br><br>d) the content of the optional section of the fume data sheet. |                                                    |      |      |                |      |               |      |                |      |           |
| AT                                                 | 7.6                                                  |                                                       | Te                                      |                                                                                                                                                                                                                                                         | Change validation period to <u>five years</u> .                                                                                                                                                                                                                                                                                                                                                            | Accepted.                                                                                                                                                                                                    |                                                    |      |      |                |      |               |      |                |      |           |
| UK                                                 | 7.6                                                  |                                                       | te                                      | Suggested timeframe too short                                                                                                                                                                                                                           | Change validation period to <u>five years</u> .                                                                                                                                                                                                                                                                                                                                                            | Accepted.                                                                                                                                                                                                    |                                                    |      |      |                |      |               |      |                |      |           |
| NL                                                 | 7.6                                                  |                                                       | Te                                      |                                                                                                                                                                                                                                                         | Change validation period to <u>five years</u> .                                                                                                                                                                                                                                                                                                                                                            | Accepted.                                                                                                                                                                                                    |                                                    |      |      |                |      |               |      |                |      |           |

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2 Type of comment: ge = general te = technical ed = editorial

NOTE Columns 1, 2, 4, 5 are compulsory.

## Template for comments and secretariat observations

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| Date: 2005-01-24 | Document: <b>prEN ISO 15011-4:2004</b> |
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| 1               | 2                                                    | (3)                                                   | 4                                       | 5                                                                                                                                  | (6)                                                                                                                             | (7)                                                                                                                                                                                                                                                           |
|-----------------|------------------------------------------------------|-------------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                                                                       | Proposed change by the MB                                                                                                       | Secretariat observations<br>on each comment submitted                                                                                                                                                                                                         |
| UK              | New 8                                                |                                                       | te                                      | There is currently no specific reference to Annex B in the normative text                                                          | Insert a new clause:<br>"8 Uses of welding fume data<br>Examples of how welding fume data can be used<br>are given in Annex B." | Not accepted. Reference to Annex B in the text not required.                                                                                                                                                                                                  |
| UK              | Annexes                                              |                                                       | ed                                      | The Annexes are not listed in the order in which reference is made to them in the normative text.                                  | Rearrange the annexes in the order in which reference is made to them in the normative text.                                    | Accepted. The secretariat will be advised that this need to be attended to when the draft for formal vote is prepared.                                                                                                                                        |
| AT              | Annex A                                              |                                                       | Ed                                      | An optional section doesn't make sense because everybody will leave it open                                                        | Delete the optional section beginning with heading of section down to marking of product                                        | See response to Sweden comment below.                                                                                                                                                                                                                         |
| NL              | Annex A                                              |                                                       | Ed                                      | An optional section doesn't make sense because everybody will leave it open                                                        | Delete the optional section                                                                                                     | See response to Sweden comment below.                                                                                                                                                                                                                         |
| DE              | Annex A                                              |                                                       | ge                                      | An optional section doesn't make sense because everybody will leave it open                                                        | Delete the optional section beginning with heading of section down to marking of product.                                       | See response to Sweden comment below.                                                                                                                                                                                                                         |
| SE              | Annex A                                              |                                                       | te                                      | Better to have an optional section in an informative annex.                                                                        | Move optional additional section to a separate informative annex.                                                               | Accepted. New sentence also inserted in the last paragraph of subclause 7.1 to take account of this change, as follows:<br><br>"If optional information is reported it can be included in an additional section of the fume data sheet, as shown in Annex B." |
| DE              | Annex B                                              |                                                       | ed                                      | This annex doesn't add any use to the standard                                                                                     | Remove whole Annex B and change all references to Annex C accordingly.                                                          | Not accepted.                                                                                                                                                                                                                                                 |
| DE              | Annex B                                              |                                                       | ed                                      | Numbers given to mathematical formulae of an annex shall be preceded by the letter designating that annex followed by a full-stop. | Example:<br>(B.1), (B.2)...                                                                                                     | Accepted.                                                                                                                                                                                                                                                     |

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**NOTE** Columns 1, 2, 4, 5 are compulsory.

| 1               | 2                                                    | (3)                                                   | 4                                       | 5                                                                                                                                                                                                                                                        | (6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (7)                                                                                                                                                                                                                                                                                                                                         |
|-----------------|------------------------------------------------------|-------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                                                                                                                                                                                             | Proposed change by the MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Secretariat observations<br>on each comment submitted                                                                                                                                                                                                                                                                                       |
| UK              | Annex B                                              | B.2.1                                                 | ed                                      | Incorrect cross-reference                                                                                                                                                                                                                                | Text should read: "As mentioned above in B.1.1.1                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Accepted.                                                                                                                                                                                                                                                                                                                                   |
| UK              | Annex D                                              |                                                       | te                                      | If a classification system such as that described in Table D.1 is to be used it is important to set out criteria for deciding in which class a consumable should be placed, based on the measurement results and the associated measurement uncertainty. | Insert a new paragraph in D.1 setting out criteria for deciding in which class a consumable should be placed, based on the measurement results and the associated measurement uncertainty. For example, it might be appropriate to say that when a measurement result is within one standard deviation of the boundary between one class and the class above, the consumable should be placed in the higher of the two classes concerned (for both fume emission rate and chemical composition data). | Accepted in principle. The following text has been inserted:<br><br>"When the uncertainty associated with a measurement is such that the upper 66 % confidence limit falls within the class above, the consumable should be placed in the higher of the two classes concerned (for both fume emission rate and chemical composition data)." |
| SE              | Annex D                                              |                                                       | te                                      | If this annex is going to stay it needs connection to a level of protection, e.g. requirements on ventilation, extraction device (capture efficiency) etc.                                                                                               | Add requirements for protection connected to the classes or delete annex.                                                                                                                                                                                                                                                                                                                                                                                                                             | Not accepted. This is not appropriate.                                                                                                                                                                                                                                                                                                      |
| SE              | Annex D                                              |                                                       | te                                      | The different classes are too many.                                                                                                                                                                                                                      | Decrease the number of classes to fit with the possibility of differentiation regarding protection level.                                                                                                                                                                                                                                                                                                                                                                                             | Not accepted. This system has been decided upon as an example after prolonged discussion within the working group that developed the draft and is considered to be satisfactory.                                                                                                                                                            |
| CA              | Annex D                                              | Table D.1                                             | ge                                      | The classification of welding consumables is an excellent method to categorize calculation of welding fume emission rates.                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Noted.                                                                                                                                                                                                                                                                                                                                      |

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| 1               | 2                                                    | (3)                                                   | 4                                       | 5                                                                                         | (6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | (7)                                                                                                                                  |
|-----------------|------------------------------------------------------|-------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| MB <sup>1</sup> | Clause No./<br>Subclause No./<br>Annex<br>(e.g. 3.1) | Paragraph/<br>Figure/Table/<br>Note<br>(e.g. Table 1) | Type<br>of<br>com-<br>ment <sup>2</sup> | Comment (justification for change) by the MB                                              | Proposed change by the MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Secretariat observations<br>on each comment submitted                                                                                |
| UK              | Bibliography                                         |                                                       | ed                                      | Add references to the bibliography, as included in the proposed new subclauses 5.3 and 7. | <p>Insert the following references:</p> <p>Ref1: ISO GUM:1993, <i>Guide to the expression of uncertainty in measurement</i></p> <p>Ref2: ISO 9004-4:1993, <i>Total quality management — Part 2: Guidelines for quality improvement.</i></p> <p>Ref3: Ellison S.L.R. and Barwick V.J., Estimating measurement uncertainty: reconciliation using a cause and effect approach, <i>Accred. Qual. Assur.</i>, 1998, <b>3</b>, 101.</p> <p>Ref4: Ellison S.L.R. and Barwick V.J., Using validation data for ISO measurement uncertainty investigation Part 1. Principles of an approach using cause and effect analysis, <i>Analyst</i>, 1998, <b>123</b>, 1387.</p> <p>Ref5: Howe A. M., Taylor C. A. and Carter G. J. <i>Performance of the prEN ISO/DIS 15011-4 method for generating fume emission rate and chemical composition data</i> Health and Safety Laboratory, Buxton, United Kingdom (in press). <a href="http://www.hsl.gov.uk/">http://www.hsl.gov.uk/</a></p> | Accepted in part.<br>Reference 1 inserted (see response to UK comment for a new subclause 5.3.<br>Reference 5 inserted with changes. |

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## Appendix to UK comments on prEN ISO 15011-4

**Table X — Repeatability of fume emission rate measurements determined in an interlaboratory comparison**

| Process                                                     | Mean fume emission rate (mg/s) | Mean repeatability (%) | Repeatability range (%) |
|-------------------------------------------------------------|--------------------------------|------------------------|-------------------------|
| Manual metal arc welding                                    | 4,8                            | 6,3                    | 2,5 – 10,1              |
| Gas-shielded metal arc welding with solid wires             | 2,0                            | 14                     | 5 – 44                  |
| Gas-shielded metal arc welding with rutile flux-cored wires | 18,7                           | 4,5                    | 2,3 – 11,3              |
| Gas-shielded metal arc welding with basic flux-cored wires  | 23,5                           | 4,2                    | 2,7 – 7,3               |
| Gas-shielded metal arc welding with metal-cored wires       | 14,3                           | 6,2                    | 3,0 – 10,0              |
| Self-shielded metal arc welding with flux-cored wires       | 10,1                           | 4,8                    | 1,7 – 11,0              |

**Table XX — Examples of repeatability of chemical composition measurements determined by a single laboratory**

| Process                                                     | Element | Mean composition (% m/m) | Repeatability (%) |
|-------------------------------------------------------------|---------|--------------------------|-------------------|
| Manual metal arc welding                                    | Cr      | 4,4                      | 8,5               |
|                                                             | Fe      | 5,5                      | 8,7               |
|                                                             | Mn      | 4,9                      | 6,4               |
|                                                             | Ni      | 0,3                      | 8,8               |
|                                                             | Pb      | 0,4                      | 4,0               |
|                                                             | V       | 2,2                      | 7,2               |
| Gas-shielded metal arc welding with rutile flux-cored wires | Fe      | 36,9                     | 3,7               |
|                                                             | Mn      | 8,8                      | 4,9               |
|                                                             | Cu      | 0,2                      | 4,0               |
|                                                             | In      | 0,2                      | 6,2               |
|                                                             | Mg      | 4,1                      | 7,4               |
| Gas-shielded metal arc welding with basic flux-cored wires  | Fe      | 56,9                     | 4,6               |
|                                                             | Mn      | 6,9                      | 5,0               |
|                                                             | In      | 0,3                      | 4,7               |
|                                                             | Mg      | 1,4                      | 4,8               |
|                                                             | V       | 0,3                      | 10,5              |
| Gas-shielded metal arc welding with metal-cored wires       | Fe      | 64,3                     | 5,8               |
|                                                             | Mn      | 5,9                      | 9,4               |
|                                                             | In      | 0,2                      | 8,8               |
| Self-shielded metal arc welding with flux-cored wires       | Fe      | 34,9                     | 5,2               |
|                                                             | Mn      | 1,6                      | 8,0               |
|                                                             | Ba      | 16,6                     | 7,1               |
|                                                             | Li      | 0,6                      | 7,9               |
|                                                             | Mg      | 10,5                     | 10,0              |
|                                                             | V       | 5,3                      | 7,9               |

**Table XXX — Reproducibility of fume emission rate measurements determined in an interlaboratory comparison**

| Process                                                     | Fume emission rate,<br>expressed as a mean $\pm$ 2 SD<br>(mg/s) | 95 % confidence<br>limits |
|-------------------------------------------------------------|-----------------------------------------------------------------|---------------------------|
| Manual metal arc welding                                    | 4,8 $\pm$ 1,7                                                   | $\pm$ 36 %                |
| Gas-shielded metal arc welding with solid wires             | 2,0 $\pm$ 3,7                                                   | $\pm$ 157 %               |
| Gas-shielded metal arc welding with rutile flux-cored wires | 18,7 $\pm$ 1,9                                                  | $\pm$ 10 %                |
| Gas-shielded metal arc welding with basic flux-cored wires  | 23,5 $\pm$ 9,4                                                  | $\pm$ 40 %                |
| Gas-shielded metal arc welding with metal-cored wires       | 14,3 $\pm$ 11,3                                                 | $\pm$ 79 %                |
| Self-shielded metal arc welding with flux-cored wires       | 10,1 $\pm$ 3,6                                                  | $\pm$ 35 %                |