

TECHNICAL REPORT

AMENDMENT 2

**Information technology –
Generic cabling – Introduction to the MICE environmental classification**

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AMENDMENT 2

**Information technology –
Generic cabling – Introduction to the MICE environmental classification**

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FOREWORD

Amendment 2 to ISO/IEC TR 29106 has been prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

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

| DTR | Report on voting |
|--------------------|----------------------|
| JTC1-SC25/2836/DTR | JTC1-SC25/2853/RVDTR |

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

2 Reference documents

Delete the following references:

ISO/IEC 11801, *Information technology – Generic cabling for customer premises*

ISO/IEC 15018, *Information technology – Generic cabling for homes*

ISO/IEC 24702, *Information technology – Generic cabling – Industrial premises*

Add the following new references:

ISO/IEC 11801-1:2017, *Information technology – Generic cabling for customer premises – Part 1: General requirements*

ISO/IEC 11801-2, *Information technology – Generic cabling for customer premises – Part 2: Office premises*

ISO/IEC 11801-3, *Information technology – Generic cabling for customer premises – Part 3: Industrial premises*

ISO/IEC 11801-4, *Information technology – Generic cabling for customer premises – Part 4: Single-tenant homes*

ISO/IEC 11801-5, *Information technology – Generic cabling for customer premises – Part 5: Data centres*

ISO/IEC 11801-6, *Information technology – Generic cabling for customer premises – Part 6: Distributed building services*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

Replace the paragraph with the following new paragraph:

For the purposes of this document, the terms and definitions of the applicable parts of ISO/IEC 11801 apply.

3.2 Abbreviations

Replace the paragraph with the following new paragraph:

For the purposes of this document, the abbreviations of the applicable parts of ISO/IEC 11801 apply.

4 Application of environmental classification

4.3 Component selection

In the second paragraph, replace:

"Table 1, taken from ISO/IEC 24702:2006, shows ..."

with:

"Table 1, taken from ISO/IEC 11801-1:2017, shows ...".

Table 1 – Details of environmental classification

Replace Table 1 with the following new table:

| Mechanical | M ₁ | M ₂ | M ₃ |
|--|----------------------------------|--------------------------------------|--------------------------------------|
| Shock/bump ^a | | | |
| Peak acceleration | 40 ms ⁻² | 100 ms ⁻² | 250 ms ⁻² |
| Vibration | | | |
| Displacement amplitude (2 Hz to 9 Hz) | 1,5 mm | 7,0 mm | 15,0 mm |
| Acceleration amplitude (9 Hz to 500 Hz) | 5 ms ⁻² | 20 ms ⁻² | 50 ms ⁻² |
| Tensile strength | b | b | b |
| Crush | 45 N over 25 mm (linear) min. | 1 100 N over 150 mm (linear) min. | 2 200 N over 150 mm (linear) min. |
| Impact | 1 J | 10 J | 30 J |
| Bending, flexing and torsion | b | b | b |

| Ingress | I₁ | I₂ | I₃ |
|--|--|---|--|
| Particulate ingress (max. diameter) | 12,5 mm | 50 µm | 50 µm |
| Immersion | None | Intermittent liquid jet ≤ 12,5 l/min ≥ 6,3 mm jet > 2,5 m distance | Intermittent liquid jet ≤ 12,5 l/min ≥ 6,3 mm jet > 2,5 m distance and immersion (≤ 1 m for ≤ 30 min) |
| Climatic and chemical | C₁ | C₂ | C₃ |
| Ambient temperature | -10 °C to +60 °C | -25 °C to +70 °C | -40 °C to +70 °C |
| Rate of change of temperature | 0,1 °C per minute | 1,0 °C per minute | 3,0 °C per minute |
| Humidity | 5 % to 85 % (non-condensing) | 5 % to 95 % (condensing) | 5 % to 95 % (condensing) |
| Solar radiation | 700 Wm ⁻² | 1 120 Wm ⁻² | 1 120 Wm ⁻² |
| Liquid pollution ^c Contaminants | Concentration × 10 ⁻⁶ | Concentration × 10 ⁻⁶ | Concentration × 10 ⁻⁶ |
| Sodium chloride (salt/sea water) | 0 | < 0,3 | < 0,3 |
| Oil (dry-air concentration) (for oil types see ^b) | 0 | < 0,005 | < 0,5 |
| Sodium stearate (soap) | None | > 5 × 10 ⁴ aqueous non-gelling | > 5 × 10 ⁴ aqueous gelling |
| Detergent | None | ffs | ffs |
| Conductive materials | None | Temporary | Present |
| Gaseous pollution ^c Contaminants | Mean / Peak (Concentration × 10 ⁻⁶) | Mean / Peak (Concentration × 10 ⁻⁶) | Mean / Peak (Concentration × 10 ⁻⁶) |
| Hydrogen sulphide | < 0,003 / < 0,01 | < 0,05 / < 0,5 | < 10 / < 50 |
| Sulphur dioxide | < 0,01 / < 0,03 | < 0,1 / < 0,3 | < 5 / < 15 |
| Sulphur trioxide (ffs) | < 0,01 / < 0,03 | < 0,1 / < 0,3 | < 5 / < 15 |
| Chlorine wet (> 50 % humidity) | < 0,000 5 / < 0,001 | < 0,005 / < 0,03 | < 0,05 / < 0,3 |
| Chlorine dry (< 50 % humidity) | < 0,002 / < 0,01 | < 0,02 / < 0,1 | < 0,2 / < 1,0 |
| Hydrogen chloride | - / < 0,06 | < 0,06 / < 0,3 | < 0,6 / 3,0 |
| Hydrogen fluoride | < 0,001 / < 0,005 | < 0,01 / < 0,05 | < 0,1 / < 1,0 |
| Ammonia | < 1 / < 5 | < 10 / < 50 | < 50 / < 250 |
| Oxides of nitrogen | < 0,05 / < 0,1 | < 0,5 / < 1 | < 5 / < 10 |
| Ozone | < 0,002 / < 0,005 | < 0,025 / < 0,05 | < 0,1 / < 1 |

| Electromagnetic | E ₁ | E ₂ | E ₃ |
|---|--|--|---|
| Electrostatic discharge – Contact (0,667 µC) | 4 kV | 4 kV | 4 kV |
| Electrostatic discharge – Air (0,132 µC) | 8 kV | 8 kV | 8 kV |
| Radiated RF – AM | 3 V/m at (80 to 1 000) MHz 3 V/m at (1 400 to 2 000) MHz 1 V/m at (2 000 to 2 700) MHz | 3 V/m at (80 to 1 000) MHz 3 V/m at (1 400 to 2 000) MHz 1 V/m at (2 000 to 2 700) MHz | 10 V/m at (80 to 1 000) MHz 3 V/m at (1 400 to 2 000) MHz 1 V/m at (2 000 to 2 700) MHz |
| Conducted RF | 3 V at 150 kHz to 80 MHz | 3 V at 150 kHz to 80 MHz | 10 V at 150 kHz to 80 MHz |
| EFT/B (comms) | 500 V | 500 V | 1 000 V |
| Surge (transient ground potential difference) – signal, line to earth | 500 V | 1 000 V | 1 000 V |
| Magnetic field (50/60 Hz) | 1 Am ⁻¹ | 3 Am ⁻¹ | 30 Am ⁻¹ |
| Magnetic field (60 Hz to 20 000 Hz) | ffs | ffs | ffs |
| <p>^a Bump: the repetitive nature of the shock experienced by the channel shall be taken into account.</p> <p>^b This aspect of environmental classification is installation-specific and should be considered in association with IEC 61918 and the appropriate component specification.</p> <p>^c A single dimensional characteristic, i.e. concentration × 10⁻⁹, was chosen to unify limits from different standards.</p> | | | |

5 MICE system

5.1 General

Add the following sentence at the end of the second paragraph.

Where such standards are not listed within Tables 2 to 6, no appropriate external references were identified during the development of ISO/IEC 11801-1.

5.2 Mechanical environment

Replace the title of 5.2 with the following new title:

5.2 Mechanical environment classification

Table 2 – Derivation of boundaries for mechanical criteria in Table 1

Replace Table 2 with the following new table:

| Mechanical | M ₁ | M ₂ | M ₃ |
|---|---------------------|----------------------|----------------------|
| Shock/bump ^a | | | |
| Peak acceleration | 40 ms ⁻² | 100 ms ⁻² | 250 ms ⁻² |
| Vibration | | | |
| Displacement amplitude (2 Hz to 9 Hz) | 1,5 mm | 7,0 mm | 15,0 mm |
| Acceleration amplitude (9 Hz to 500 Hz) | 5 ms ⁻² | 20 ms ⁻² | 50 ms ⁻² |

| | | | |
|--|-------------------------------|-----------------------------------|-----------------------------------|
| Shock/bump/vibration (source material) | IEC 60721-3-3 Class 3M2 | < IEC 60721-3-3 Class 3M6 | IEC 60721-3-3 Class 3M8 |
| Crush | 45 N over 25 mm (linear) min. | 1 100 N over 150 mm (linear) min. | 2 200 N over 150 mm (linear) min. |
| Impact | 1 J | 10 J | 30 J |
| Bending, flexing and torsion | ^b | ^b | ^b |
| ^a Bump: the repetitive nature of the shock experienced by the channel shall be taken into account. ^b This aspect of environmental classification is installation-specific and should be considered in association with IEC 61918 and the appropriate component specification. | | | |

5.3 Ingress protection and climatic environment

Replace the title of 5.3 with the following new title:

5.3 Ingress protection and climatic environment classification

5.4 Chemical environment

Replace the title of 5.4 with the following new title:

5.4 Chemical environment classification

Table 5 – Derivation of boundaries for chemical criteria in Table 1

Replace Table 5 with the following new table:

| Chemical | C ₁ | C ₂ | C ₃ |
|--|--|--|--|
| Liquid pollution ^a Contaminants | Concentration × 10 ⁻⁶ | Concentration × 10 ⁻⁶ | Concentration × 10 ⁻⁶ |
| Sodium chloride (salt/sea water) | 0 | < 0,3 | < 0,3 |
| | IEC 60721-1 | | |
| Oil (dry-air concentration) | 0 | < 0,005 | < 0,5 |
| Sodium stearate (soap) | None | > 5 × 10 ⁴ aqueous non-gelling | > 5 × 10 ⁴ aqueous gelling |
| Detergent | None | ffs | ffs |
| Conductive materials | None | Temporary | Present |
| Gaseous pollution ^a Contaminants | Mean/Peak (Concentration × 10 ⁻⁶) | Mean/Peak (Concentration × 10 ⁻⁶) | Mean/Peak (Concentration × 10 ⁻⁶) |
| Hydrogen sulphide | < 0,003 / < 0,01 | < 0,05 / < 0,5 | < 10 / < 50 |
| | The limits are taken from IEC 60654-4:1987 for the environmental descriptions Class 1, 2 and 3. They are within the same region as those in IEC 60721-3-3:1994 for the environmental descriptions 3C1, 3C2 and 3C4. NOTE For comparison, the values in IEC 60721-3-3:1994 have been converted from mg.cm ⁻³ using the STP density = 1,539. | | |
| Sulphur dioxide | < 0,01 / < 0,03 | < 0,1 / < 0,3 | < 5 / < 10 |

| | | | |
|---|---|------------------|----------------|
| | <p>The limits are taken from IEC 60654-4:1987 for the environmental descriptions Class 1, 2 and 3, with the exception of Class 3 (max < 15). They are identical to those in IEC 60721-3-3:1994 for the environmental descriptions 3C1 and 3C2 and within the same region for the environmental description 3C4 (mean < 4,5, max < 14).</p> <p>NOTE For comparison, the values in IEC 60721-3-3:1994 have been converted from mg.cm⁻³ using the STP density = 2,927.</p> | | |
| Sulphur trioxide (ffs) | < 0,01 / < 0,03 | < 0,1 / < 0,3 | < 5 / < 15 |
| | There are no limits in IEC 60654-4:1987 or IEC 60721-3-3. | | |
| Chlorine wet (> 50 % humidity) | < 0,000 5 / < 0,001 | < 0,005 / < 0,03 | < 0,05 / < 0,3 |
| | The limits are taken from IEC 60654-4:1987 for the environmental descriptions Class 1, 2 and 3. There are no limits in IEC 60721-3-3. | | |
| Chlorine dry (< 50 % humidity) | < 0,002 / < 0,01 | < 0,02 / < 0,1 | < 0,2 / < 1,0 |
| | <p>The limits are taken from IEC 60654-4:1987 for the environmental descriptions Class 1, 2 and 3. They are within the same region as those in IEC 60721-3-3:1994 for the environmental descriptions 3C1, 3C2 and 3C4.</p> <p>NOTE For comparison, the values in IEC 60721-3-3:1994 have been converted from mg.cm⁻³ using the STP density = 3,124.</p> | | |
| Hydrogen chloride | - / < 0,06 | < 0,06 / < 0,3 | < 0,6 / 3,0 |
| | <p>There are no limits in IEC 60654-4:1987. The limits are taken from IEC 60721-3-3:1994 for the environmental descriptions 3C1, 3C2 and 3C4.</p> <p>NOTE For comparison, the values in IEC 60721-3-3:1994 have been converted from mg.cm⁻³ using the STP density = 1,639.</p> | | |
| Hydrogen fluoride | < 0,001 / < 0,005 | < 0,01 / < 0,05 | < 0,1 / < 1,0 |
| | <p>The limits are taken from IEC 60654-4:1987 for the environmental descriptions Class 1, 2 and 3. They are within the same region as those in IEC 60721-3-3:1994 for the environmental descriptions 3C1, 3C2 and 3C4.</p> <p>NOTE For comparison, the values in IEC 60721-3-3:1994 have been converted from mg.cm⁻³ using the STP density = 0,901.</p> | | |
| Ammonia | < 1 / < 5 | < 10 / < 50 | < 50 / < 250 |
| | <p>The limits are taken from IEC 60654-4:1987 for the environmental descriptions Class 1, 2 and 3. They are within the same region as those in IEC 60721-3-3:1994 for the environmental descriptions 3C2, 3C3 and 3C4.</p> <p>NOTE For comparison, the values in IEC 60721-3-3:1994 have been converted from mg.cm⁻³ using the STP density = 0,771.</p> | | |
| Oxides of nitrogen | < 0,05 / < 0,1 | < 0,5 / < 1 | < 5 / < 10 |
| | <p>The limits are taken from IEC 60654-4:1987 for the environmental descriptions Class 1, 2 and 3. They are within the same region as those in IEC 60721-3-3:1994 for the environmental descriptions 3C1, 3C2 and 3C4.</p> <p>NOTE For comparison, the values in IEC 60721-3-3:1994 have been converted from mg.cm⁻³ using the STP density = 1,350 (averaged on NO, NO₂ and NO₃).</p> | | |
| Ozone | < 0,002 / < 0,005 | < 0,025 / < 0,05 | < 0,1 / < 1 |
| | <p>The limits are taken from IEC 60654-4:1987 for the environmental descriptions Class 1, 2 and 3. They are within the same region as those in IEC 60721-3-3:1994 for the environmental descriptions 3C2, 3C3 and 3C4.</p> <p>NOTE For comparison, the values in IEC 60721-3-3:1994 have been converted from mg.cm⁻³ using the STP density = 2,144.</p> | | |
| <p>^a A single dimensional characteristic, i.e. concentration × 10⁻⁶, was chosen to unify limits from different standards.</p> | | | |

5.5 Electromagnetic environment

Replace the title of 5.5 with the following new title:

5.5 Electromagnetic environment classification