

# TECHNICAL REPORT

## AMENDMENT 2

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

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

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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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 <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>
Shock/bump <sup>a</sup>			
Peak acceleration	40 ms <sup>-2</sup>	100 ms <sup>-2</sup>	250 ms <sup>-2</sup>
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 <sup>-2</sup>	20 ms <sup>-2</sup>	50 ms <sup>-2</sup>
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

<b>Ingress</b>	<b>I<sub>1</sub></b>	<b>I<sub>2</sub></b>	<b>I<sub>3</sub></b>
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)
<b>Climatic and chemical</b>	<b>C<sub>1</sub></b>	<b>C<sub>2</sub></b>	<b>C<sub>3</sub></b>
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 <sup>-2</sup>	1 120 Wm <sup>-2</sup>	1 120 Wm <sup>-2</sup>
Liquid pollution <sup>c</sup> Contaminants	Concentration × 10 <sup>-6</sup>	Concentration × 10 <sup>-6</sup>	Concentration × 10 <sup>-6</sup>
Sodium chloride (salt/sea water)	0	< 0,3	< 0,3
Oil (dry-air concentration) (for oil types see <sup>b</sup> )	0	< 0,005	< 0,5
Sodium stearate (soap)	None	> 5 × 10 <sup>4</sup> aqueous non-gelling	> 5 × 10 <sup>4</sup> aqueous gelling
Detergent	None	ffs	ffs
Conductive materials	None	Temporary	Present
Gaseous pollution <sup>c</sup> Contaminants	Mean / Peak (Concentration × 10 <sup>-6</sup> )	Mean / Peak (Concentration × 10 <sup>-6</sup> )	Mean / Peak (Concentration × 10 <sup>-6</sup> )
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 <sub>1</sub>	E <sub>2</sub>	E <sub>3</sub>
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 <sup>-1</sup>	3 Am <sup>-1</sup>	30 Am <sup>-1</sup>
Magnetic field (60 Hz to 20 000 Hz)	ffs	ffs	ffs
<p><sup>a</sup> Bump: the repetitive nature of the shock experienced by the channel shall be taken into account.</p> <p><sup>b</sup> This aspect of environmental classification is installation-specific and should be considered in association with IEC 61918 and the appropriate component specification.</p> <p><sup>c</sup> A single dimensional characteristic, i.e. concentration × 10<sup>-9</sup>, 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 <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>
Shock/bump <sup>a</sup>			
Peak acceleration	40 ms <sup>-2</sup>	100 ms <sup>-2</sup>	250 ms <sup>-2</sup>
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 <sup>-2</sup>	20 ms <sup>-2</sup>	50 ms <sup>-2</sup>

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	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>
<sup>a</sup> Bump: the repetitive nature of the shock experienced by the channel shall be taken into account. <sup>b</sup> 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 <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
Liquid pollution <sup>a</sup> Contaminants	Concentration × 10 <sup>-6</sup>	Concentration × 10 <sup>-6</sup>	Concentration × 10 <sup>-6</sup>
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 <sup>4</sup> aqueous non-gelling	> 5 × 10 <sup>4</sup> aqueous gelling
Detergent	None	ffs	ffs
Conductive materials	None	Temporary	Present
Gaseous pollution <sup>a</sup> Contaminants	Mean/Peak (Concentration × 10 <sup>-6</sup> )	Mean/Peak (Concentration × 10 <sup>-6</sup> )	Mean/Peak (Concentration × 10 <sup>-6</sup> )
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 <sup>-3</sup> 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 &lt; 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 &lt; 4,5, max &lt; 14).</p> <p>NOTE For comparison, the values in IEC 60721-3-3:1994 have been converted from mg.cm<sup>-3</sup> 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<sup>-3</sup> 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<sup>-3</sup> 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<sup>-3</sup> 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<sup>-3</sup> 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<sup>-3</sup> using the STP density = 1,350 (averaged on NO, NO<sub>2</sub> and NO<sub>3</sub>).</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<sup>-3</sup> using the STP density = 2,144.</p>		
<p><sup>a</sup> A single dimensional characteristic, i.e. concentration × 10<sup>-6</sup>, 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