

TECHNICAL REPORT

AMENDMENT 2

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





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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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 × 10⁻⁶, 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>		
^a A single dimensional characteristic, i.e. concentration × 10 ⁻⁶ , was chosen to unify limits from different standards.			

5.5 Electromagnetic environment

Replace the title of 5.5 with the following new title:

5.5 Electromagnetic environment classification

Table 6 – Derivation of boundaries for electromagnetic criteria in Table 1

Replace Table 6 with the following new table:

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
	IEC 61000-6-1 and IEC 61000-6-2		
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
	IEC 61000-6-1		IEC 61000-6-2
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
	IEC 61000-6-1		IEC 61000-6-2
EFT/B (comms)	500 V	500 V	1 000 V
	IEC 61000-6-1		IEC 61000-6-2
Surge (transient ground potential difference) – signal, line to earth	500 V	1 000 V	1 000 V
	IEC 61000-6-1	IEC 61000-6-2	IEC 61000-6-2
Magnetic field (50/60 Hz)	1 Am ⁻¹	3 Am ⁻¹	30 Am ⁻¹
	–	IEC 61000-6-1	IEC 61000-6-2
Magnetic field (60 Hz to 20 000 Hz)	ffs	ffs	ffs

Bibliography

Delete the following references:

ISO/IEC 14763-1, *Information technology – Implementation and operation of customer premises cabling – Part 1: Administration*

ISO/IEC 18010, *Information technology – Pathways and spaces for customer premises cabling*

ISO/IEC 24764, *Information technology – Generic cabling for data centres (under consideration)*

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