

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

AMENDMENT 1  
AMENDEMENT 1

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**Optical amplifiers -  
Part 5-2: Qualification specifications - Reliability qualification for optical fibre  
amplifiers**

**Amplificateurs optiques -  
Partie 5-2: Spécifications de qualification - Qualification de fiabilité pour  
amplificateurs à fibres optiques**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Optical amplifiers -  
Part 5-2: Qualification specifications -  
Reliability qualification for optical fibre amplifiers**

**AMENDMENT 1**

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Amendment 1 to IEC 61291-5-2:2017 has been prepared by subcommittee 86C: Fibre optic systems, sensing and active devices, of IEC technical committee 86: Fibre optics.

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

Draft	Report on voting
86C/2005/FDIS	86C/2010/RVD

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

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications/](http://www.iec.ch/publications/).

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### Table 3 – Tests required for splices

*Replace the existing "Damp heat" row with the following new row:*

Damp heat <sup>b</sup>	40 °C 93 % RH 500 h	IEC 60068-2-78
	85 °C 85 % RH 500 h	

*After footnote "a", add the following new footnote "b":*

- <sup>b</sup> Damp heat: the damp heat test at 85 °C 85 % RH has been advocated by some manufacturers, as justified by observations of conditions within peculiar environments. These test conditions shall be used for splices within OFAs to be deployed in very harsh environments (such as optical fibre communication systems). Otherwise, the damp heat test at 40 °C 93 % RH shall be used.

**Table 4 – Minimum list for tests required on OFA devices and sub-systems**

Replace the existing table with the following new table:

Test		Condition	Duration	Operating	Samples
Temperature storage		$T_{stg,min}/T_{stg,max}$	72 h	-	3
Temperature cycling <sup>a</sup>		$T_{stg,min}/T_{stg,max}$ <sup>b</sup> Ramp > 1 °C/min	$Q = 100$ cycles $I = 500$ cycles	-	3
Damp heat <sup>c</sup>		85 °C to 85 % RH	$Q = 500$ h	-	3
		40 °C to 93 % RH	$I = 1\,000$ h		
Mechanical test	Shock ( $\leq 0,225$ kg) <sup>d</sup>	3 000 m/s <sup>2</sup> 3 ms pulse	5 shocks per direction, 6 directions	-	3
		See table below <sup>e</sup>	See table below <sup>d</sup>	-	
	Shock ( $> 0,225$ kg) <sup>d</sup>	500 m/s <sup>2</sup> , 11 ms pulse	5 shocks per direction, 6 directions	-	3
		See table below <sup>e</sup>	See table below <sup>d</sup>	-	
	Shock: circuit pack, blades and racks <sup>d</sup>	See table below <sup>e</sup>	See table below <sup>d</sup>	-	3
	Vibration ( $\leq 1$ kg)	200 m/s <sup>2</sup> , 20 Hz to 2 000 Hz to 20 Hz 3-axis, 4 cycles per axis, 2 h/axis	4 min/cycle	-	3
	Vibration ( $> 1$ kg)	5 Hz to 50 Hz, 15 m/s <sup>2</sup> 50 Hz to 500 Hz, 30 m/s <sup>2</sup> 3-axis	0,1 oct/min 0,25 oct/min	-	3
	Vibration: circuit pack, blades and racks	5 Hz to 100 Hz to 5 Hz, 10 m/s <sup>2</sup> 3-axis	0,25 oct/min	-	3
Pull <sup>f</sup>	2 N, 5 N, 10 N, or 50 N		-	$\geq 12$	
Endurance <sup>a</sup>		$T_{op,max}/P_{nom}$	$Q = 1\,000$ h $I = 2\,000$ h	Y	3
<p>No failures are allowed.</p> <p>Tests may be performed sequentially or in parallel.</p> <p>If the storage temperature is lower than the specified humidity temperature, another test at <math>T_{stg,max}</math> and RH <math>\geq 85</math> % is done.</p> <p>If the maximum storage temperature is similar to the maximum operating temperature, the storage test at <math>T_{stg,max}</math> is not required and is replaced by the endurance test. The endurance test is performed at fixed pump current, output power or pump monitor current (nominal values given in the product specification (PS)). To check any drift of the amplifier, relevant parameters [such as output power, pump parameters (if accessible) etc.] may be measured during the test.</p> <p>A reference to the temperature cycle test method is provided in Annex B.</p> <p><math>T_{stg,min}</math> is the OFA minimum storage temperature;</p> <p><math>T_{stg,max}</math> is the OFA maximum storage temperature;</p> <p><math>T_{op,max}</math> is the OFA maximum operating temperature;</p> <p><math>P_{nom}</math> is the OFA nominal output power.</p>					