**INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) SYSTEM FOR CERTIFICATION TO STANDARDS RELATING TO EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES (IECEx SYSTEM)**

**Title: Certification of equipment/assemblies using temperature monitoring/adjustment techniques to adjust internal ambient temperatures**

**Circulated to: ExTAG – IECEx Testing and Assessment Group**

**INTRODUCTION**

This draft decision sheet was originally prepared as a discussion paper, and was introduced at the ExTAG meeting in October, 2020 as ExTAG/622/CD. ExTAG provided valuable input at the meeting, which has been incorporated into this new draft, now being circulated for comment as a draft decision sheet.

In accordance with OD 035 this document is issued for a six week comment period.

Please submit comments on this new Draft DS using the comments table, a separate document, by –

**2021 01 25**

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**For Professor Xu Jianping,**

**ExTAG Chair**

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COLLECTION OF IECEx / ExTAG DECISION

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| Standard: IEC 60079-0:2017 (Ed. 7.0)  IEC 60079-0:2011 (Ed. 6.0) | **Clause:**  1  1 | **Draft Decision Sheet:** |
| **Subject:**  Certification of equipment/assemblies using temperature monitoring/adjustment techniques to adjust internal ambient temperatures  **Status of document:**  Draft | **Key words:**   * Ambient temperature | Date: 2020.12.15 **Originator of proposal:**  UL LLC  **TC/SC involved:** WG22 |
| Background:  Equipment assemblers and manufacturers have made requests to certify equipment with a rated ambient temperature range beyond that of some incorporated certified components.  An example of this is a control panel containing a power supply, an intrinsic safety barrier, and other switchgear.  The power supply and IS barrier are rated (-20C to +40C), but the manufacturer wants the complete control panel to be rated for (-40C to +50C).  To mitigate this issue when the equipment is energized, manufacturers have proposed to install heaters or refrigerators with interlocked sensors, or other methods of ensuring that the internal devices (for example, power supply or IS barrier) cannot be energized unless the internal surrounding air is within the rated ambient range for those internal parts of the assembly.  However, this ambient temperature concern can also be an issue when the equipment is not energized, including during storage, transportation, maintenance, repair or when switched off. Damage to the equipment may occur when subjected to these temperatures, which may influence the protection techniques. Examples of possible damage include: components shearing from printed wiring boards due to contraction of protective encapsulation, cracking and loss of adhesion of encapsulation for “ Ex m” devices, damage to elastomers in “Ex t” enclosures, or cracking of a “Ex d” cemented joint.  Questions:  Consider a scenario in which an overall piece of equipment is intended for use in an ambient temperature range beyond that of some internal devices.    Q1: Regarding when this overall piece of equipment is energized during normal operation, is it acceptable to incorporate an extra heater or refrigerator along with a temperature monitor, to ensure the internal devices remain within their rated ambient temperatures?  Q2: Regarding when this overall piece of equipment (including internal heating and cooling controls) is not energized (for example during storage, transportation, maintenance, repair or when switched off), is it necessary to ensure all internal devices remain within their rated ambient temperatures?  Answers:  A1: Yes, it is acceptable. Temperature monitoring/adjustment can be used to ensure internal devices remain within their rated ambient temperature range. The extra devices used for temperature monitoring/adjustment shall also meet the requirements of the applicable IEC 60079 standards.  A2: Yes, it is necessary. When the required heating or cooling means are not energized, then internal devices will be exposed to temperatures outside their ratings. It is the manufacturer’s responsibility to make a determination as to whether the internal devices are impacted by the ambient temperatures specified for the overall assembled equipment, in a manner that would impair the type of protection. It is not the certifier’s responsibility to verify the manufacturer’s determination.  If the manufacturer cannot make this determination, or if they determine that the internal parts are negatively impacted when such equipment is not energized (including during storage, transportation, maintenance, repair or when switched off), then internal devices need to remain within their rated ambient temperatures.  To facilitate this requirement, the Certificate shall detail the rated ambient temperature range in which such equipment can be installed and operated (Ta or Tamb), and there shall be an “X” condition that specifies the following:   * the ambient temperature range that needs to be maintained when the equipment is not energized (including during storage, transportation, maintenance, repair or when switched off), and * the reason for specifying this deenergized ambient temperature range (e.g. an indication that the overall piece of equipment is intended for use in an ambient temperature range, Tamb, that is beyond that of some internal devices). | | |