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

**Title: ExTAG/622/CD** – **Discussion Paper - Certification of equipment/assemblies using temperature monitoring/adjustment technics to adjust internal ambient temperatures**

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

**INTRODUCTION**

This discussion paper has been prepared by UL, LLC, US, with input from NEPSI, on the topic of Certification of equipment/assemblies using temperature monitoring/adjustment technics to adjust internal ambient temperatures and is issued for discussion during the ExTAG 2020 Remote ExTAG Meeting. .

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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 technics to adjust internal ambient temperatures  **Status of document:**  Draft | **Key words:**   * Ambient temperature | Date: 2020.9.5 **Originator of proposal:**  NEPSI, 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 +40C).  We have seen certificates from other ExCBs that allow the end-product manufacturer to incorporate a heater within the control panel enclosure, and in this way the heater will increase the internal temperature within the control panel so that it is always warmer than -20C inside the panel, during operation of the control panel.  In some cases the manufacturer also proposes to have 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 above the rated ambient range for those internal parts of the assembly.  This raises the question, is there an expectation that equipment must always be maintained within the declared ambient temperature rating? (i.e. not only when energized, but also when switched off, for example at nighttime, during maintenance, etc.)  It is possible that the internal devices (ex: power supply and IS barrier) would be subjected to temperatures outside their rated ambient temperature, for example when the control panel is de-energized. 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, or cracking of a “Ex d” cemented joint.  However, the standards do not address or anticipate this situation. It seems necessary to clarify the opinions of ExTAG on this type of apparatus, whether this should be a concern for the ExCBs, equipment assemblers/manufacturers and the end-users.  **Question**  Q1: 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, if the assembly is intended to be used outside of their rated ambient temperature ranges?  Q2: Is it necessary to obey the declared ambient temperature during off-time, such as storage, transportation, switched off, maintenance or repair？  **Answer**  A1: Yes, it is acceptable. Temperature monitoring/adjustment could be used to switch on/off the main power to keep the internal devices within the rated ambient temperature range. The extra devices used for temperature monitoring/adjustment shall also meet the requirements of IEC60079 standards.  A2: For components/materials related to Ex performance, when they are submitted outside of the declared ambient temperature, during storage, transportation, stop using, maintenance or repair.   1. In case that they will be irreversibly damaged, the declared ambient temperature or the specification sheets of the components/materials shall be obeyed. Examples are: plastic materials, elastomers, cemented joints, semiconductors, batteries or cells. 2. In case that they will not be irreversibly damaged, the specification sheets of the components/materials shall be considered and referred to. Examples are: Metallic materials, glass or ceramic materials. | | |