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

**TITLE: Compilation of comments and observations on ExTAG/696/CD Draft ExTAG Decision Sheet – Applicability of IEC 60079-15, especially regarding LED light sources**

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

**INTRODUCTION**

This document is a compilation of comments, along with originator observations, on ExTAG/696/CD Draft ExTAG Decision Sheet – Applicability of IEC 60079-15, especially regarding LED light sources, it was prepared by the originator, Dr Martin Thedens, PTB, DE, taking into account comments received on ExTAG/696/CD.

On the basis of comments received on this Draft DS the originator has advised that they wish the Draft DS to be withdrawn.

***Please inform the Secretariat immediately of any omissions or errors at-***

***Christine Kane***

On behalf of Dr Frank Lienisch

***ExTAG Chair***

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| **Address:****IECEx Secretariat** **Level 33 Australia Square****264 George Street** **Sydney NSW 2000****Australia****Web:** [**www.iecex.com**](file:///C%3A%5CUsers%5Cjugauthier%5CAppData%5CLocal%5CTemp%5CnotesC9812B%5Cwww.iecex.com) | **ExTAG Secretary****Mr Julien Gauthier****LCIE S.A.****33 Avenue du General Leclerc****92260 Fontenay-aux-Roses****FRANCE** **Tel: +33 1 40 95 55 26****Fax: +33 1 40 95 89 37****Email :** **julien.gauthier@fr.bureauveritas.com** |

| **ExCB/****ExTL** | **Clause/ Sub-clause** | **Paragraph Figure/****Table** | **Type of****comment****General/****technical/****editorial** | **COMMENTS** | **Proposed change** | **Observation****(to be completed by the originator)** |
| --- | --- | --- | --- | --- | --- | --- |
| **CMD****National forum and ExCBs/ExTLs from India** |  |  |  | **After a consultation with members of the National forum and ExCBs/ExTLs from India participating in ExTAG, it is hereby stated that we have 'no comments' on draft ExTAG/696/CD.** |  | **On the basis of comments received the Draft DS is withdrawn** |
| **CMExC****Ex TL）****CN** | **-** | **-** | - | We agree with that. This is the first time that IEC 60079-7 ed. 5 has added requirements for LED, and it is impossible to certify LED technology in explosive environments according to IEC 60079-15(old version). | **No** | **On the basis of comments received the Draft DS is withdrawn** |
| **CNEX-Global BV** | **-** | **-** | **G** | **CNEX-Global supports this Draft DS** | **-** | **On the basis of comments received the Draft DS is withdrawn** |
| **CSA****and****CSAE** |  |  | **Technical** | **CSA ExCBs/ExTLs and CSAE ExCB/ExTL do not support this draft decision sheet, due to the following:*** **LEDs are semiconductors (solid state components), which, by nature, are non-sparking parts and they have always been considered feasible for use under Ex nA concept.**
* **LEDs are parts of many Ex nA applications that are certified under IECEx system, for example status indicators on electronic devices, backlights for displays or luminaires (an LED luminaire is in essence a matrix of LEDs).**
* **Optical radiation is the specific feature of LEDs when comparing them with other semiconductors. However, optical radiation is addressed under 60079-0 and 60079-28, in the same manner regardless if for an Ex nA or an Ex ec application.**
* **With the migration of the nA concept from 60079-15 to the ec concept under 60079-7, the allowance of using LED’s, represents an extension from the previous edition of 60079-7, under which, the use of semiconductors (including LED’s) was not allowed.**
 | **Withdraw this draft decision sheet, or otherwise, update the text of its answer as following: “Yes, IEC 60079-15 Edition 4 can be applied to LED luminaires with the EPL Gc”.** | **On the basis of comments received the Draft DS is withdrawn** |
| **DNV****NO** |  |  | **Gen** | **We agree with the proposed Decision sheet ExTAG/696/CD** |  | **On the basis of comments received the Draft DS is withdrawn** |
| **ExTC****AU** |  |  |  | **We agree with the necessity of this Decision Sheet.****We agree with the content of the Decision Sheet with no changes needed** |  | **On the basis of comments received the Draft DS is withdrawn** |
| **FME****GB** |  |  | **ge** | **We do not agree with the DS as written.****- IEC 60079-15 Ed 4 does not specifically exclude LEDs as a light source. It didn’t permit them either, in fact there is no mention of LEDs in IEC 60079-15 Ed 4.****- LEDs have been used as a light source for indication in Type nA for decades. They are a non-sparking electronic component when used within their ratings.****- The only difference, in this regard, between 60079-15 Ed 4 and IEC 60079-7 Ed 5 is that for ‘ec’ LED luminaires the method of temperature rise testing is defined. If the Certification Body that issued the certificates in question had used the temperature rise methods in clause 5.3.7.3 of IEC 60079-7 would this DS have been necessary?****- The Foreword of the standard which mentions that LEDs as a light source is an informative part of the standard. It is not mandatory to consider this as an extension. LEDs could have been used as a light source protected by ‘nC’ or ‘nR’.****As I understand it, the issue that raised this DS is that the ExCB in question used 60079-15 instead 60079-7 because the method in 5.3.7.3 for temperature assessment is too complicated. The DS does not mention that this is the problem. It doesn’t mention what the problem is.****I do not see this as a uniquely 60079-15 vs. 60079-7 problem. LEDs can be used as light sources in many of the Type of Protection in the 60079-X standards. As the informative Annex J for 60079-7 states, you could use “ic”, “nR” and “mc” as well as “ec”. Additionally, you could use EPL Gb Types of Protection covered by IEC 60079-1, -2, -5, -6, -11, or -18. This is a temperature measurement of light sources problem which should be addressed in 60079-0.****The problem behind this DS does need to be resolved, but the proposed wording for DS does not address it.****The Draft DS also needs to shared with two additional groups within IEC TC31. WG40 – Luminaires and WG47 – Gc equipment** | **Proposed solution****Background****With the publication of IEC 60079-7 Ed 5, requirements for non-sparking LED luminaires have been extended and clarified. Although non-sparking ‘nA’ is no longer covered by the IEC 60079-15 edition 5, the IECEx system permits the use of ‘current plus one prior edition of standards’ for certification.****Question:**1. **Can IEC 60079-15 Edition 4 be applied to LED luminaires with the EPL Gc?**
2. **If ‘Yes’ are there any additional aspects to be considered?**

**Answer:**1. **Yes.**
2. **IEC 60079-15 Ed 4 does not exclude the use of LEDs in luminaires. In fact, no mention of LEDs is made in the standard. When used within their ratings LEDs are a non-sparking component and covered by the scope of both IEC 60079-7 and IEC 60079-15 for EPL Gc. IEC 60079-7 Ed 5 added a section to specifically address the concerns relating to the temperature rise measurement of luminaires using LED technology which was not included in IEC 60079-15 because the technology was not sufficiently advanced and the use LED in luminaires were not considered at the time.**

**IEC 60079-15 Ed 4 does not include a specific test for the temperature rise testing of luminaires (high pressure sodium, metal halide, LED or any other technology) so the test configuration requirements of and the thermal tests of IEC 60079-0 and the apply. As there is no other guidance except that stated in IEC 60079-7 the temperature rise test for LED luminaires shall take into consideration the test methods stated in clause 5.3.7.3 which are as follows.****As the photon emissions can affect thermocouple readings, care should be taken when temperature measurements are made inside of the focused light emission region, and for consistency of application for EPL Gc luminaires using LED technology, the maximum surface temperature shall therefore be using one of the following methods:****a) an indirect method, by measuring the solder point and then calculating the junction temperature which is then used as the surface temperature of the LED;****b) thermocouple method involving [copper – constantan], no larger than 0.1 mm diameter, adhered with a small drop of silicone adhesive in accordance with the adhesive manufacturer’s instructions for application and curing;****c) thermocouple method involving shielded [iron – constantan] or [chromel – alumel] thermocouples adhered with a small drop of silicone adhesive in accordance with the adhesive manufacturer’s instructions for application and curing.****NOTE The effect of irradiation on thermocouples can result in temperature measurements that are higher than the actual temperature of the surface being measured if the thermocouples are not shielded from the direct effect of such irradiation.** | **On the basis of comments received the Draft DS is withdrawn** |
| **FMG****US** |  |  | **ge** | **Support the ANSWER of NO, but the QUESTION needs clarification. IEC 60079-15, Ed 4 did not include LEDs as a “light source” for nA luminaires. It only included “lamps”. It was IEC 60079-7, Ed 5 that included LEDs as a “light source” in addition to “lamps” as an “Extension” as noted.** | **Clarify that the question / answer is specific to “nA” luminaires.** | **On the basis of comments received the Draft DS is withdrawn** |
| **FTZU****CZ** |  |  | **G** | **We agree with this draft ExTAG Decision Sheet with additional sentence.** | **Answer would be added by text:** **LED technology is possible to certify according to standard IEC 60079-15:2010 if the standard clause 13 is applied.** | **On the basis of comments received the Draft DS is withdrawn** |
| **IBE****DE** | **--** | **--** | **General** | **LEDs are not explicitly excluded by IEC 60079-15, Ed. 4, and can be considered as non-sparking components as they do not produce an operational arc or spark.** | **DS draft shall not be accepted** | **On the basis of comments received the Draft DS is withdrawn** |
| **ITS****GB** |  |  | **General / Technical** | **The justification for this prohibition on using 60079-15 Ed.4 to certify LED luminaires does appear to be adequately explained or justified:****An LED is like any electronic component – but it just so happens to emit visible light. Equipment type “nA” can contain all sorts of electronic components, either assessed using the standard’s main rules for creepage and clearance, or the rules for “low power apparatus”, and assessed for temperature, of course. Excluding LED’s retrospectively seems unreasonable.****Comparing the additional requirements from 60079-7 Ed. 5.1 for LED luminaires type “ec”, this appears to be limited to assessing creepage and clearance, nothing else. A correct assessment under 60079-15 should have done the same.****Exclusion of LED’s would appear to be introducing a technical requirement to the standard, which a DS is not permitted to do.****See also Annex A for additional information / discussion** | **Clarify the reasoning behind this decision sheet, including if this is considered to be applied retrospectively (i.e. is there a need for CB’s to withdraw certificates already issued), or preferably, this is decision sheet is not needed.**  | **On the basis of comments received the Draft DS is withdrawn** |
| **KRH****KR** | **5.3.2.5** |  | **-** | **No** | **No** | **On the basis of comments received the Draft DS is withdrawn** |
| **NANIO CCVE (RU)** |  |  | **General** | **We support DS ExTAG/696/CD without any comments.** |  | **On the basis of comments received the Draft DS is withdrawn** |
| **NEPSI****CN** |  |  | **G** | **We support the draft decision sheet ExTAG/696/CD.** |  | **On the basis of comments received the Draft DS is withdrawn** |
| **QPS****AU** |  |  |  | **QPS supports the DS 100% and has no comments.** |  | **On the basis of comments received the Draft DS is withdrawn** |
| **SIMTARSAU** |  |  |  | **Simtars has no comments.** |  | **On the basis of comments received the Draft DS is withdrawn** |
| **IEC TC31** |  | **General** | **General** | **With regard to the general DS, there is no clear consensus on the part of TC31, which basically shows that the DS in this formulation is not suitable for providing clarity for the original question.** | **The DS should generally be revised in order to address the following concerns.** | **On the basis of comments received the Draft DS is withdrawn** |
| **IEC TC31** |  | **Question** | **General** | **It seems the DS is specifically about Type of Protection "nA". This should already be emphasized in the question.** | **Rephrase the questions: Can the Type of Protection "nA" in IEC 60079-15 Edition 4 be applied for LED luminaires with the EPL Gc?****In addition, perhaps the question of the application of high-power LEDs in luminaires could be made more precise in the question.** | **On the basis of comments received the Draft DS is withdrawn** |
| **TIIS****JP** |  |  | **ge** | **We do not support the Draft DS. We think IEC 60079-15, Ed.4 (2010) should be applicable to equipment which contains LEDs as light sources. There is no limitation regarding the use of LEDs or other semiconductors in the standard.****At least Background and Question should be a bit more precise. Currently, Background and Question just say IEC 60079-15 and they are lack of information of specific Type of protection such as “nA”.** | **Withdraw the Draft DS or change Answer into Yes.****If the DS proceeds publication, add Ex nA for Background and Question to narrow down the topic as follows.****Background****Internationally, ExCB’s apply IEC 60079-15 Edition 4 for issuing an approval for LED luminaires as Ex nA.****Question:****Can Ex nA in accordance with IEC 60079-15 Edition 4 be applied to LED luminaires with the EPL Gc?** | **On the basis of comments received the Draft DS is withdrawn** |
| **TÜV NORD** **DE** |  |  |  | **TÜV NORD support this CD** |  | **On the basis of comments received the Draft DS is withdrawn** |
| **ULBR****BR** | **5.3.2.5** | **-** | **General** | **We do not support this decision sheet as currently written.****When new technologies are developed, such as LEDs, it is not necessary for ExCBs/ExTLs to wait for the standards to be updated to explicitly add those technologies to the scope as long as the standards have sufficient construction and testing requirements. Because Clause 5.3.2.5 of IEC 60079-7, Ed. 5.1, does not contain any special construction or testing requirements, there is no reason that certification of LED luminaries to IEC 60079-15, Ed. 4.0 cannot be allowed.****This comment is supported by the over 100 IECEx certificates already issued for LED luminaires to IEC 60079-15, Ed. 4.0.** | **Answer:****No.Yes****Because Clause 5.3.2.5 of IEC 60079-7, Ed. 5.1, does not contain any special construction or testing requirements, there is no reason that certification of LED luminaries to IEC 60079-15, Ed. 4.0 cannot be allowed.** | **On the basis of comments received the Draft DS is withdrawn** |
| **UL Demko****DK** | **5.3.2.5** | **-** | **General** | **We do not support this decision sheet as currently written.****When new technologies are developed, such as LEDs, it is not necessary for ExCBs/ExTLs to wait for the standards to be updated to explicitly add those technologies to the scope as long as the standards have sufficient construction and testing requirements. Because Clause 5.3.2.5 of IEC 60079-7, Ed. 5.1, does not contain any special construction or testing requirements, there is no reason that certification of LED luminaries to IEC 60079-15, Ed. 4.0 cannot be allowed.****This comment is supported by the over 100 IECEx certificates already issued for LED luminaires to IEC 60079-15, Ed. 4.0.** | **Answer:**~~No.~~YesBecause Clause 5.3.2.5 of IEC 60079-7, Ed. 5.1, does not contain any special construction or testing requirements, there is no reason that certification of LED luminaries to IEC 60079-15, Ed. 4.0 cannot be allowed. | **On the basis of comments received the Draft DS is withdrawn** |
| **UL LLC****US** | **5.3.2.5** | **-** | **General** | **We do not support this decision sheet as currently written.****When new technologies are developed, such as LEDs, it is not necessary for ExCBs/ExTLs to wait for the standards to be updated to explicitly add those technologies to the scope as long as the standards have sufficient construction and testing requirements. Because Clause 5.3.2.5 of IEC 60079-7, Ed. 5.1, does not contain any special construction or testing requirements, there is no reason that certification of LED luminaries to IEC 60079-15, Ed. 4.0 cannot be allowed.****This comment is supported by the over 100 IECEx certificates already issued for LED luminaires to IEC 60079-15, Ed. 4.0.** | **Answer:****No.Yes****Because Clause 5.3.2.5 of IEC 60079-7, Ed. 5.1, does not contain any special construction or testing requirements, there is no reason that certification of LED luminaries to IEC 60079-15, Ed. 4.0 cannot be allowed.** | **On the basis of comments received the Draft DS is withdrawn** |
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**ANNEX A**

**ITS additional information / discussion:**

Banning 60079-15 Ed 4 from being used for certification of luminaires retrospectively on the basis that it did not mention LED’s as light sources seems harsh since an LED is just another electronic component, which just so happens to emit visible light. Electronic components on circuit boards are permitted in general under 60079-15 Ed. 4. Other light sources are not specifically named either in this standard, such an incandescent light bulbs.

The requirements introduced by 60079-7 Ed.5.1 are minimal. It says that LED’s are permitted for “ec”, and that their external connections shall comply with the spacing requirements of (presumably) Clause 4 – There is a typographical error in the standard here, so the precise meeting is unclear.



This is clarified in the later and virtually identical clause 5.3.4.3



Meeting spacing requirements under 60079-15 Ed. 4 would be expected under clause 6.4, unless the luminaire was being considered as low power apparatus under clause 13 (and all the additional requirements thereof). Clause 13, if applied, does not specifically exclude application to luminaires