

# IEC 60079-11 7th Edition

## *Coming (Soon?) To a Theater Near You*

Sean Costall, Sr. Certifications Engineer  
Spark Institute, Calgary, AB, Canada

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Work on the new 7<sup>th</sup> Edition of IEC 60079-11 (2023) has been underway for years – and (more or less) ever since the 6<sup>th</sup> Edition was released, way back in 2011.

However, fewer people realize that the 7<sup>th</sup> Edition has already been released - back in January, 2023, actually – and has been available for use since that time.

There have apparently been many difficulties in widespread adoption of this new standard, including the following:

- The new edition has not yet been published in the Official Journal of the European Union, and therefore cannot yet be used for compliance with ATEX Directive 2014/34/EU;

and

- There is no indication as to if or when the corresponding UL or CSA versions of this standard might be published.

This is all rather odd, as the EU usually adopts a new IEC standard within a few months of release. And sure, the United States and Canadian versions can take some time, but there is usually some indication as to when they're going to arrive.

The exact reasons why the IEC standard is stuck are not clear. There are some rumors that one or more national committees failed to put in their comments during COVID, and are now holding up adoption in order to make their objections heard. But this is not clear.

So – for the moment, anyway – the IEC version is, at best, in limited release. But it will certainly and eventually go worldwide.

Fortunately, it appears all of the hard work of TC31 has paid off, and that – in many respects, at least – the latest version is a marked improvement over the older 6<sup>th</sup> Edition. There are a huge number of clarifications and enhancements that will hopefully eliminate incorrect interpretations by equipment designers and certification organizations alike. <sup>(1)</sup>

Some significant changes include the following:

- Many items previously buried in the Annexes have been moved into the main text, including:
  - The spark ignition evaluation methods of Annex A, which have also been expanded and reworded;
  - Reduced PCB spacings (previously Annex F, Tables F.1 and F.2); and
  - Limiting resistors for capacitors (previously Table A.3).

This makes it significantly easier to find options for compliance.

- The permitted fault modes for infallible components are now explicitly defined, putting to rest individual agency interpretations as to if specific components are to be short-circuited, open-circuited or both. As part of this, the standard clarifies that:
  - It is possible to open-circuit an infallible current-limiting resistor; <sup>(2)</sup> and
  - It is indeed possible to have a single infallible capacitor, such as might be used in active voltage- or current-limiting circuits.
- Thickness requirements for infallible tracks and vias have been slightly reduced, and there is now an explicit option for achieving infallible tracking using more than 2 tracks.
- It is now a requirement that:
  - Conformal coating have a continuous operating temperature rating;
  - All OEM recommendations be followed during application; and
  - Inspection occurs whenever necessary to ensure compliance.

Type 1 and 2 coatings (used for reduced spacings per former Annex F) also now must undergo type testing per IEC 60664-3 – under conditions that might not match their original IEC 60664-3 certificates. (Pre-certified Type 1/2 coatings will hopefully still be acceptable.)

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<sup>1</sup> I am sure that the certifications organizations would claim that the majority of errors are by the equipment designers – and they would not be wrong. However, a significant number of lousy interpretations have been imposed by the agencies themselves, so they're not entirely innocent of this either.

<sup>2</sup> Good example of (1), above – in the past, some agencies have claimed open-circuit of an infallible current-limiting resistor was not a permitted fault.

- The section regarding encapsulation has been significantly expanded to cover individual use cases, such as reducing surface temperature, protecting a fuse, achieving separation, enhancing the rating of protective components, etc. – plus there is even an allowance for small amounts of free space (voids), courtesy of IEC 60079-18 type ‘m’!

There are still no requirements for thermal endurance testing for encapsulation (which is most fortunate). But there is now a requirement to document a means of verifying the encapsulation in production – so you’d better break out (or make up) those go/no-go gauges.

- Positive temperature coefficient (PTC) limiting devices are now permitted for thermal limiting purposes (but not for spark limiting), provided that (where applicable) 10 samples are tested to do so under worst-case thermal coupling conditions (in the same manner as done for loosely specified components). Such devices are subject to countable faults, so one will not do.
- 6<sup>th</sup> Edition made a single mention of “thermal trips”, which only applied to infallible transformers. 7<sup>th</sup> Edition, however, allows the use of such devices for limiting surface temperature and/or component power rating – and finally adds the specific (and obvious) requirements for compliance, such as thermal coupling and switching speed, that left agencies uncertain, unwilling, unable to accept thermal trips under 6<sup>th</sup> Edition.
- Supercapacitors are now explicitly treated as constant-voltage sources, in the same manner as cells and batteries – as has been the prevailing case for years – but also either need to meet UL 810A or be subjected to the same electrolyte leakage testing used for cells.
- Non-optical signal isolators are now expressly allowed, and can be used between non-IS and IS circuits so long as they are only operated within OEM ratings (such as for traditional optocouplers). However, these devices also have to meet other non-negligible criteria, including being certified to a recognized standard (such as IEC 60747-17 or DIN VDE V 0884-11) or undergoing a test regimen as part of 60079-11.
- There are now specific instructions that the voltages electrochemical cells for gas detection are to be considered during the spark ignition evaluation of the apparatus, but not for the thermal evaluation. (This is not new and has been the prevailing practice for a decade, but is now finally expressly stated.)
- The standard greatly cleans up and clarifies the requirements for Level of Protection ‘ic’ equipment for Zone 2, which had been previously shoved into 6<sup>th</sup> Edition from IEC 60079-15 in a most uncomfortable fashion.

These clarifications include the permitted uses for programmable components, the necessary ratings for ‘ic’ limiting devices under fault conditions, and explicit direction that ‘ic’ limiting devices that are properly rated under such conditions are not themselves subject to fault.

The above is just a sampling – it seems that almost every clause of 6<sup>th</sup> Edition has been touched in some way.

All is not perfect – the somewhat ambiguous requirements for enclosure ingress and dielectric withstand stand unchanged, and the somewhat confusing sections on shunt voltage limiting devices appear to have only been partially addressed. There are also typos and other minor errors, which could cause significant confusion if taken literally by those with no common sense.

Still, not everything has changed, and most of the basics are still there, so those with experience should eventually be able to slip into 7<sup>th</sup> Edition without too much fuss. Most of the changes align with what most agencies have been doing anyway.

Of more immediate import, however, are the following:

1. The new edition introduces *so many changes*. This will inevitably result in even more interpretations by the agencies as they get to grips with exactly what 7<sup>th</sup> Edition does and does not say – and not all of those interpretations might be favorable. A very careful reading of the new text will be required by all parties, which will take time and experience.
2. Many agencies have openly admitted they have not even begun to look at 7<sup>th</sup> Edition yet. This could make them less familiar with 7<sup>th</sup> than some of their clients, which is never good. This means it will be more important than ever for OEMs to have a full understanding of the standard.
3. The actual implementation date in the EU, USA and Canada remains elusive, and there is even the possibility that the IEC will (have to?) issue a major revision – or even bump all the way up to 8<sup>th</sup> Edition – before worldwide adoption is possible. Such things have happened before; the possible implications remain both wide-ranging and totally unknown.

In the immediate term, however, we all have to contend with the fact that 7<sup>th</sup> Edition has moved almost every clause to a new and unfamiliar spot. So, while the principles and much of the text is the same, and many of the changes are in keeping with recent agency practice, we are all going to start to have to learn the exact location of everything all over again.

Still, like it or not, 7<sup>th</sup> Edition is coming – it’s just a matter of time. So if you’d like to get a head start, Spark Institute is able to help! *Contact us today!*