Adoption of IEEE C37.100.1 "Common Requirements"

The following notes are presented to help the WG evaluate an existing standard to see which, if any, of the specifications in C37.100.1 can be adopted into their relevant equipment standard**.**

A Quick Review of C37.100.1

- The standard follows the IEC clause numbering format. Therefore, the clause numbers probably will not match those of your document unless the WG decides to adopt the IEC format. (check with IEEE Editorial first)
- Review the SCOPE carefully to understand how the C37.100.1 applies. See "A Review of the Scope" below.
- Review Annex A carefully to understand how to word the normative references.

A Review of the Scope

The scope of C37.100.1 is reproduced below.

> ***1.1 Scope***
>
> *This standard applies to alternating current switchgear, designed for both indoor and outdoor installation and for operation at service frequencies up to and including 60 Hz on systems having voltages above 1000 V.*
>
> *Application of this standard shall be indicated by normative reference to C37.100.1-20xx in the relevant equipment standard on a section or clause-by-clause basis. Refer to Annex A. The inclusion of this standard as a normative reference shall not imply that all of the requirements contained herein apply as a default. In the absence of a normative reference, this standard shall be considered informative only1. In case of a conflict in requirements, the requirements of the relevant equipment standard shall prevail.*

Note the following points that can be extracted from the scope above:

- Applies to alternating current switchgear, designed for both indoor and outdoor installation
- Application shall be indicated by normative reference to C37.100.1-2007
  - in the relevant equipment standard
  - on a section or clause-by-clause basis
- Normative reference shall not imply that all of the requirements contained [herein] apply as a default.
- In the absence of a normative reference, this standard shall be considered informative only
- In case of a conflict in requirements, the relevant equipment standard shall prevail.

- Footnote emphasizes that, “This standard cannot be applied retroactively to an existing relevant equipment standard.”

Normative References – What are they?

Normative references have two parts.
First is the list of “normative” references found in clause 2 of most IEEE Standards and in clause 1.2 of IEEE C37.100.1 (IEC numbering format). This is the list of “referenced documents [that] are indispensable for the application of this document”. An example is shown below.

> **1.2 Normative references**
>
> ANSI/IEC AS 60529, Degrees of protection provided by enclosures (IP Code)
>
> IEEE Std 1125™, IEEE Guide for Moisture Measurement and Control in SF6 Gas-Insulated Equipment

The second part of the normative reference is the statement embedded in the specifications that refers to a specific document in the list of normative references. These “normative reference statements” may take on several forms, some of which are suggested in Annex A of C37.100.1.

Several examples are given below.

Example 1 (taken from C37.100.1)

> **5.2 Requirements for gases in switchgear**
> Adequate correction shall be made for measurement made at other temperatures. For the measurement and determination of the dew point, refer to IEEE Std 1125 or IEC 60376 and IEC 60480 [B13].

Example 2 (taken from C37.20.2)

> **6.2.7.1 Flame-resistance tests**
> Sheet, molded, or cast primary insulating materials used in switchgear assemblies shall have a minimum average ignition time of 60 s and a maximum average burning time of 500 s when tested in accordance with method II in ASTM D229-96.

Example 3 (taken from IEC 62271-100 for HV Circuit Breakers)

> **2 Normal and special service conditions**
>
> Clause 2 of IEC 60694 is applicable.

Note: By referencing clause 2 without any qualifications, sub clauses 2.1 and 2.2 and all their respective sub clauses are automatically included in the normative reference.

Example 4 (taken from IEC 62271-100 for HV Circuit Breakers)

4.1 Rated voltage (U_r)

Subclause 4.1 of IEC 60694 is applicable.

Note: By referencing clause 4.1 without any qualifications, sub clauses 4.1.1 and 4.1.2 are automatically included in the normative reference. However, 4[.0] and 4.2 are not included here.

Example 5 (taken from IEC 62271-100 for HV Circuit Breakers)

Subclause 4.2 of IEC 60694 is applicable with the following addition:

The standard values of rated withstand voltages across the open circuit-breaker are given in tables 1a, 1b, 2a and 2b of IEC 60694.

However, for circuit-breakers intended for use in synchronising operations simultaneously with a substantial transient or temporary overvoltage, the insulation of a standard circuit-breaker may be insufficient.

[More, the addition consists of three paragraphs]

Example 6 (taken from IEC 62271-100 for HV Circuit Breakers)

5.6 Stored energy closing

Subclause 5.6 of IEC 60694 is applicable with the following addition to the first paragraph.

A circuit-breaker arranged for stored energy closing shall also be capable of opening immediately following the closing operation with the rated short-circuit making current.

Example 7 (taken from IEC 62271-100 for HV Circuit Breakers)

5.7 Independent manual operation

Subclause 5.7 of IEC 60694 is not applicable for circuit-breakers.

Suggested Plan of Attack

1) Review the specifications in the relevant equipment standard – one by one.
2) Compare the specifications with those found in C37.100.1.
3) Identify the technical differences in a table or listing, i.e. DOCUMENT
4) Make a preliminary decision for the WG, decide if:
   a) The specifications are technically equivalent (even if not worded the same), or
   b) The specifications are close and can those given in C37.100.1 can be adopted “as is”. This will be a (slight) technical change to the relevant equipment standard, or
   c) The specifications in C37.100.1 are close but the differences are not acceptable. In this case, the WG might adopt C37.100.1 specs with additions or changes, or

d) The specifications is C37.100.1 are too different to consider, in which case, C37.100.1 “does not apply” and the original specs of the relevant equipment standard must be retained, of

e) The specifications are not covered in C37.100.1. The specs of the relevant equipment standard must be retained.

5) Review the other specifications in C37.100.1 not originally covered or considered in the relevant equipment standard. The WG may decide to adopt some of them.

There will be many questions arising from the Switchgear WG’s first attempts to implements this standard. As questions arise, feel free to contact Dave Stone or Larry Farr for assistance. We will act as a clearing house for these questions and answers and in so doing will expand this “tutorial” and work toward consistency in the application of C37.100.1 to the various switchgear standards.

Good Luck,

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