

# PC37.016 WG, Standard for AC High Voltage Circuit Switchers Rated 15.5 kV (HVCB)

April 13, 2022 – Hilton Bonnet Creek, Orlando, FL

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**Chair:** Neil McCord (Consultant)

**Vice Chair:** Luke Collette (Utility)

**Secretary:** Scott Lanning (Manufacturer)

## Meeting Minutes

### 1. Call to order and introduction:

The PC37.016 WG IEEE Standard for AC High Voltage Circuit Switchers Rated 15.5 kV met on Wednesday, April 13, 2022, at 10:15AM. Neil McCord, Working Group Chair, presided over the meeting.

The Copyright, Patent, and Behavior/Ethics slides were presented.

Chair called for any potential Patent claims. No Patent claims identified.

### 2. Agenda:

Chair presented the agenda and discussed that this is the first WG meeting, so there is no membership. Attendance sheet was circulated, and attendees interested in WG membership were instructed to indicate so on the attendance sheet by placing a star/asterisks by their name.

### 3. Previous Meeting Minutes

Chair presented the minutes from the last meeting. Chair indicated the PAR has been approved since the last meeting. Chair asked the group if harmonization with IEC standards was more important than IEEE standards, and there was no indication that it was. Chair asked if there was any objection to using iMeet Central for managing the WG versus direct e-mails. No objections.

- It was noted that iMeet doesn't do e-mails, but whenever something is uploaded an automatic e-mail is sent to the members as long as they did not opt out of e-mails.
- Another option for e-mails would be for IEEE-SA to set up a listserv.

### 4. Introduction of WG Leadership

Chair: Neil McCord (Consultant)

Vice Chair: Luke Collette (Utility)

Secretary: Scott Lanning (Manufacturer)

## 5. Introduction of Members and Guests

Roster distributed and attendance recorded (attendance sheet attached to MOM).  
29 in attendance with 13 requesting membership

## 6. Presentation by Chair (attached to MOM)

Chair provided background on IEEE Std C37.016. Chair would like to time the completion of the document so it aligns better with revisions of other standards like C37.04 and C37.09.

On the discussion regarding circuit breaker versus circuit switcher, there was a comment that application guidance should be provided discussing the appropriate application of a circuit switcher. For instance, there are certain faults that a circuit switcher cannot interrupt so care must be taken on development of the protection scheme.

Question was raised about concerns for circuit switchers with integral disconnect switch regarding worker clearances to live parts. Chair indicated that is a concern that does drive some users from applying circuit switchers in their system.

Question regarding the application of circuit switchers for generation interconnections. A comment was raised that concerns would exist for the duty from closing into the generation. Another comment was that some circuit switchers are designed adequately for such duty.

Chair proposed harmonization with IEEE Std C37.04, C37.09, and C37.100.1 on TRV.

Question on the definition of transformer-limited fault current (TLF) in the presentation where it states with no parallel lines or cables. Clarification provided that it means with lines or cables connected between the circuit switcher and transformer.

Chair proposed that PBF60 should be T60 and pointed out some rounding errors which give inconsistency between the C37.016 and C37.04. [See presentation with proposed changes].

Chair asked if there were any objections to harmonizing C37.016 with C37.04. There were no objections.

Chair indicated that for T60 the 4 parameter curve is close to a 2 parameter curve, and some test labs have difficulty achieving the 4 parameter curve. Therefore, some use a 2 parameter curve.

Chair reviewed existing standard showing notes that the Chair had made.

Question as to why the chopped wave withstand test is optional? It has always been required for circuit breakers. A comment was made that in the past there possibly was a discussion that some thought it wasn't applicable to circuit switchers. Chopped wave is representative of an air gap flashing over during a lightning overvoltage. Chair asked if there were any objections to making chopped wave a requirement, and there were no objections.

A question was raised as to why the test voltages are different? It is possible that there is a rounding error.

Regarding the equations for TRVs, a suggestion was made to reference relevant standards where the background is provided.

**7. Next meeting:**

Fall 2022      9-13 October 2022      Planned for Hilton Burlington Lake Champlain, Burlington, VT

**8. Meeting Adjourned: 12:00 PM**

Submitted by:

Neil A. McCord  
WG Chair, C37.016  
Standard for AC High Voltage Circuit Switchers Rated 15.5 kV

29 IN ATTENDANCE [INCLUDING CHAIR & VICE CHAIR]  
 13 REQUESTING MEMBERSHIP

C37.016 Working Group Meeting Sign-In Sheet [2022-04-13]

By choosing to attend and sign in to this meeting, you acknowledge and agree that your personal data will be documented for IEEE standards development purposes to comply with policies and procedures, legal and accreditation requirements, and evaluation of patent claims by patent offices. IEEE must capture your personal data for these purposes, and will provide information about activities related to standards development groups in which you participate. IEEE standards development participation is documented through various methods, e.g., rosters, submission documents, email reflectors, records of meeting attendance, responses to ballots, publicly available participation lists, and declaration of affiliations. See the IEEE Privacy Policy at <https://www.ieee.org/security-privacy.html>.

Member  
request

Name	Employer	Other Affiliations	eMail Address OPTIONAL	Sign-in
* Jeff Ward	Doble Engineering			Jeff Ward
* Tom Franken	GE Grid Solutions			Tom Franken
BRUCE FENNELL	NASHVILLE ELECT SUP			Bruce Fennell
* Chris Jarnigan	Southern Company Services			Chris Jarnigan
* Francois. Erichon	Schneider Electric			Francois Erichon
* Adam Vogles	Ameren			Adam Vogles
Dan Schiffbauer	Toshiba Int'l. Corp			Dan Schiffbauer
San Santulli	Free SA			San Santulli
* Wei Zhang	Southern Company			Wei Zhang
<del>Southern Co</del> Elizabeth Bz	Southern Company			Elizabeth Bz
ANDREW MONROE	SOUTHERN COMPANY			Andrew Monroe
JEFF SCOTT	Ameren			Jeff Scott
* SPHON CARY	2phase Solutions			Sphon Cary
BHARAT JAGADEESAN	SOUTHERN STATES LLC			Bharat Jagadeesan
Don Stegerwalt	Duke Energy			Don Stegerwalt
Tom Pellenza	DTE Energy			Tom Pellenza
* DAVID K MITCHELL	Southern States			David Mitchell
VERNON TOURS	SIEMENS ENERGY			Vernon Tours
* Carl Schuetz	ATC			Carl Schuetz
LEO LOPEZ	WKA			Leo Lopez
JASON CUNNINGHAM	SOUTHERN STATES			Jason Cunningham
* NEIL HUTCHINS	Georgia Power			Neil Hutchins
* Patrick DiIillo	CONSOLIDATED EDISON CO OF NY			Patrick DiIillo
Bill Hurst	GE			Bill Hurst
Ngoc Bui	SOGE			Ngoc Bui
* M.K. SK. Idmore	AEP			M.K. SK. Idmore
* PETE. MARZEC	STC ELECTRIC CO.			Pete Marzec



# C37.016

IEEE Standard for AC High Voltage  
Circuit Switchers Rated 15.5 kV  
through 245 kV

# C37.016

## Agenda:

- Review minutes to approve
- WG leadership
- iMeet Central
- History and context
- Present Corrigenda
  - 100% participation and 100% approval.
  - Released.
- This is the first meeting of WG with approved PAR
- Who uses this or has read some of it?
- Review document with Notes from Chair
- Discuss what revisions are needed



# PC37.016D1

**Committee Chair: Neil McCord**

**Vice Chair: Luke Collette**

**Secretary: Scott Lanning**

# PC37.016D1

How the standard got here

The first release of the standard was -2006  
Randy Dotson, Pete Meyer and Tom Tobin were  
some of the leaders in creating this standard.  
At the time C37.09-1999 was in effect and  
C37.04-1999. Both were in the process of  
harmonizing with IEC 62271-100.

Since 2006 standards .04, .06, .09 and IEC have  
all been revised.



# PC37.016D1

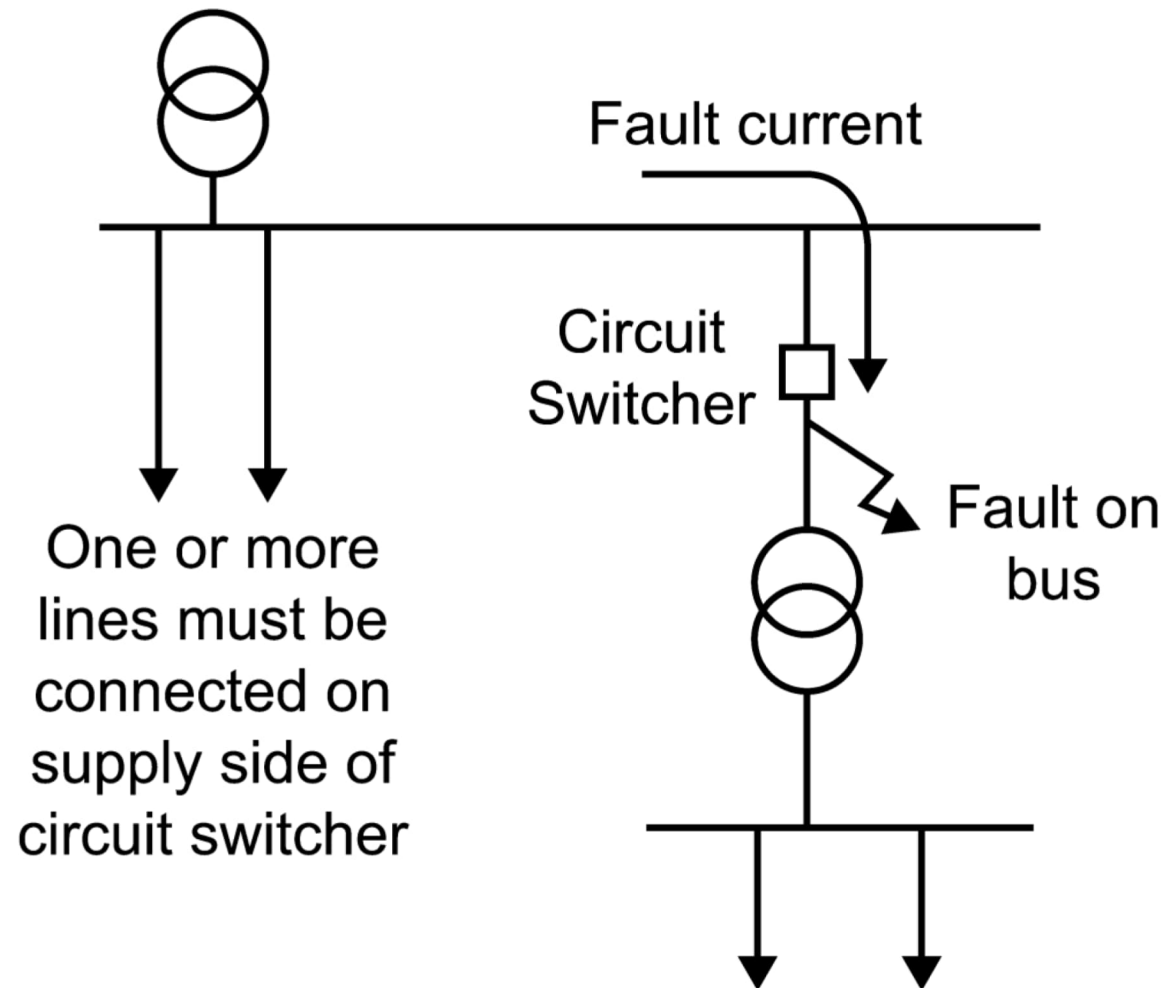
**circuit switcher:** A mechanical switching device with an integral interrupter, suitable for making, carrying, and interrupting currents under normal circuit conditions. It is also suitable for interrupting specified primary-bus fault current and transformer-limited fault current that may be less than its rated short-circuit making current and rated short-time withstand current.

**primary-bus fault current (PBF):** The fault current supplied by a system with single or multiple transmission lines connected between the source of the current and the interrupting device. Transformers may also be directly connected in parallel with the lines.

**transformer-limited fault current (TLF):** The fault current supplied by or limited by a transformer directly connected to the interrupting device without transmission lines or cables connected in parallel with the transformer.

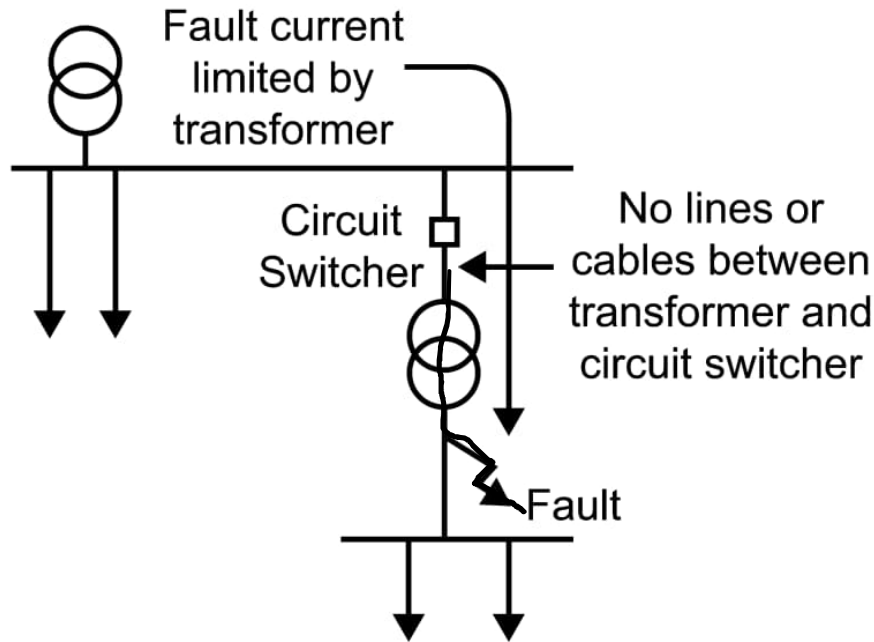
# PC37.016D1

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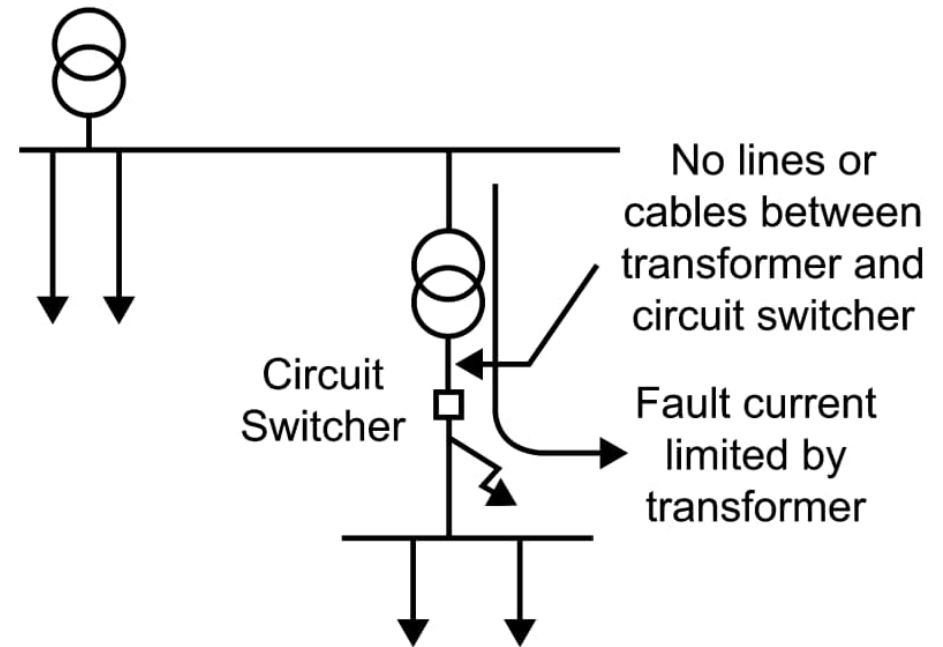


# PC37.016D1

**transformer-limited fault current (TLF):** The fault current supplied by or limited by a transformer directly connected to the interrupting device without transmission lines or cables connected in parallel with the transformer.



a) Example 1



b) Example 2

# PC37.016D1

**I propose that we should harmonize .016 with the ratings and test procedures of .04, .09 and .100.1:**

- Replace TRV values of PBF100 with T100 from C37.04 ✓
- Replace PBF60 with T60 from C37.04
- I am open to keep TLF. The challenge is that it is now so close to T10 I am not sure that it is valuable.
- Replace 5.13.4 with Tables 19 and 20 from .04
- Replace 7.2.1 to 7.3.1 of .100.1
- Change 7.2.6.1 to 7.3.6.1 of .100.1

# PC37.016D1

## Proposed Revision PAR

**5.1** Approximate number of people expected to participate: **16**

**5.2.a** No changes to scope of standard

**5.2.b** Scope of proposed changes: Harmonize PBF100 PBF60 PBF30 to T100, T60, T30 C37.04, C37.09. and C37.100.1.  
Some small spelling and other clarifications.

Consider harmonize TLF with C37.06.1.

**5.4** Purpose: Consistency within switchgear standards

**5.5** Need for the project: The small variations between .016 and the other standards creates confusion for manufacturers, test labs and customers.

# PC37.016D1

In this graph you can see that the 145 kV PBF60 and the T60 tests are not harmonized.

