IEEE C37.20.1 Working Group Meeting Minutes

IEEE Standard for Metal-Enclosed Low-Voltage (1000 Vac and below, 3200 Vdc and below) Power Circuit Breaker Switchgear

Meeting Date: October 19, 2022
Meeting Time: 2:00 pm - 6:00 pm
Location: Hilton Lake Champlain – Burlington, VT.

Attendance
Members: 13, Guests: 16, quorum met

Attendance is recorded at the end of the meeting minutes.

A. Call to Order
The meeting was called to order by WG Chair at 2:00pm on October 19, 2022.

B. Introductions
Participants introduced as recorded below.

C. Approval of Agenda and Previous Meeting Minutes
R2 of agenda was shared. Motion to approve by T. Burse, 2nd by D. Delfino. Approved by unanimous consent. Previous meeting minutes posted to PES SWG website. Motion to approve previous meeting minutes by T. Hawkins. 2nd by D. Delfino. Approved by unanimous consent.

D. Rules and Guidelines for conducting Working Group Meetings
Verbal call for Essential Patents – None Identified

E. IEEE SA Copyright Policy
Link and Slides for SA Copyright Policy shared

F. Working Group P&P's
Link for Working Group P&P's shared

G. PAR Status
Reiterated PAR approval by SA Standards Board on 03-Dec-2020 & expires 31-Dec-2024.

H. IEEE iMeet Center Workspace
Working Group workspace location and files shared (https://ieee-sa.imeetcentral.com/c37201/home).
Any working group members that require access, please contact either the Chair or Secretary.

I. Ad-hoc Reports

a. **Continuous Current Testing Improvements (C37.20.1/C37.13):**
M. Lafond: No meetings held since Fall 2021 session.
Action: WG Chair will continue to provide updates.

b. **Solidly Grounded Neutral Bus Testing Requirements:**
T. Hawkins: No ad-hoc meetings held since Fall 2021 session and recommends no changes.
Chair asked if any present were interested in pursuing this subject further. No volunteers
Action: WG Chair disbands the ad-hoc.

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J. Review Draft Document

The WG reviewed the comments distributed with the meeting notice and draft 4a was updated during the meeting.

Comments submitted by V. Savulyak were then shared during the meeting and a copy is attached with these meeting minutes. The comments highlighted several topic areas within the test clauses of 6.2.5 and 6.2.6 that would need some investigative work and if any changes were necessary what other actions would be required to align to other sub-clauses.

T. Burse volunteered to lead an ad-hoc to develop a recommendation for the WG at or before the Spring meeting for clauses 6.2.5 and 6.2.6. Ad-hoc members include T. Hawkins, M. Lafond, P. Barnhart, K. Sippel, V. Savulyak, and D. Hrncir.

WG Chair will proceed with internal copyright requests for material from C37.20.2 and continue efforts to collect copyright material from UL for cable lashing. Goal is to include this material in draft 5 and circulate prior to the next meeting for comments.

K. Adjourn

Meeting adjourned at 4:40 pm

Recorded by:

Jeff Mizener
Interim Secretary
October 19, 2022

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Attendance:

Role	First Name	Last Name	Company
Chair	Michael	Lafond	No Affiliation
Secretary (Int)	Jeff	Mizener	Siemens
Member	Paul	Barnhart	Underwriters Laboratories
Member	Ted	Burse	Powell Industries
Member	Sahadev	Gohil	Avail Switchgear Systems
Member	Lou	Grahor	Eaton Corporation
Member	Tom	Hawkins	Siemens Industry, Inc
Member	Jared	Hines	Eaton
Member	Dan	Hrncir	Eaton
Member	Monique	La Terreur	STACE
Member	Darryl	Moser	ABB
Member	Owen	Parks	ABB
Member	Kevin	Sippel	Eaton Electric
Member	William	Wilkie	Eaton
Guest	Francis	Beauchemin	Eaton
Guest	Robert	Burns	Eaton
Guest	Randall	Creach	Avail Switchgear Systems
Guest	Dan	Delfino	ABB
Guest	Arkadiusz	Doroz	Eaton
Guest	Tanner	Esco	Eaton
Guest	Erin	Hardy	Eaton
Guest	Ronald	Hartzel	Eaton
Guest	Albert	Livshitz	Qualus
Guest	Chirag	Patel	Powell Industries
Guest	Mark	Robertson	Avail Bus Systems
Guest	Wahaj	Saleem	Siemens
Guest	Victor	Savulyak	KEMA
Guest	Carl	Schneider	Schneider
Guest	Todd	Suave	Rockwell Automation
Guest	Christo	Thomas	Schneider

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V. Savulyak D4 Comments shared during WG meeting:

1. **6.2.5.1.3 Test duration** as part of Short-time withstand current tests does not allow a single period of 1 s duration if circuit breakers in the test current path. Suggestion is to allow it if manufacturer wants it.

   For LV ac switchgear, the test current shall continue for two periods of 0.5 s separated by a 15 s interval of zero current. At the option of the manufacturer, a single period of 1 s duration may be used ~~if circuit breakers are not included in the test current path of the assembly~~. The alternating component of the current at the end of each 0.5 s period (or 1 s period if manufacturer elects to use 1 s duration) shall remain constant. If the ac component of the test current does not remain constant for the test duration, the value of the average symmetrical current squared times the actual duration of the test shall be no less than 0.5 x I2 where I is the rated short-time current withstand current of the assembly (for a 0.5 second test) or 1.0 x I2 (for a 1.0 second test). If necessary, the test duration may be extended to not more than 125% of the specified time to achieve the required value of I2 x t.

2. During Short-time withstand current tests *The circuit breaker shall be closed and the direct acting trip device shall be removed or made inoperative*. Nothing is mentioned for Short-circuit current withstand test.
   a. How it needs to be set? What is the intent of the standard, shall it be withstand or interruption?
      i. If it is withstand, Is there any reasons not to combine it with Short-time test? See item 3. Also, section needs to be re-written to be clear. Can help with that
      ii. If it is interruption, section needs to be re-written. Can help with that

3. Standard allows to combine Short-time and Short-circuit tests only for dc switchgears. It is in **6.2.5.1.1 Test current.** Suggestion is to allow for ac switchgears as well

   6.2.5.1.1 Test current For LV ac switchgear, and LV dc switchgear not supplied by solid state rectifiers, the prospective current shall be the rms value calculated in accordance with IEEE Std C37.09. This test shall be conducted as a three-phase test, except for the tests of the ground bus and the neutral bus in 6.2.5.2 and 6.2.5.3. If the circuit also meets the requirements of 6.2.6, this test may be combined with the short-circuit current withstand test.

   For LV dc switchgear used with solid-state rectifiers, a dc test source is preferred. If the initial peak current applied is 1.65 times the average rms or dc sustained current value, and the test current also meets the requirements of 6.2.6, this test may be combined with the short-circuit current withstand test. Either a dc prospective current may be used, or the test may be performed using the *I2t* true rms current through the test assembly. The prospective current is determined by calibrating the test circuit with a short-circuit placed directly across the bus connection at the incoming switchgear terminals.

4. There is no definition for “current-limiting device” in the standard

   6.2.6.2 LV ac switchgear and LV dc switchgear (not for solid-state rectifier applications) The duration of current flow during the short-circuit current withstand test shall be for no less than four cycles on a 60 Hz basis (0.067 s), unless the bus is protected by a current-limiting device, in which case the duration shall be for the time permitted by that device.

5. Several sections of the standard require 30A fuse and allow to use no. 10 AWG copper, but there is no requirement on the length. To match it with some other standards propose to add

   …shall be connected through a 30 A fuse of adequate interrupting rating to the supply side of the phase … by means of a 4 to 6 ft long no. 10 AWG copper. As an alternate configuration, at the manufacturer's option, the 30 A fuse may be replaced by 4 to 6 ft long a wire no larger than no. 10 AWG copper.

6. Performance requirements for 6.2.6 Short-circuit current withstand tests is only under **6.2.6.5 Auxiliary equipment primary disconnecting device short-circuit current withstand test**. It shall be applicable for 6.2.6.2. Proposed change is to make Performance as 6.2.6.6 so it will apply to all tests under 6.2.6 or add it under each section as it is for 6.2.5 Short-time test.

7. Circuit is described as "prospective current" in 6.2.5.1.1 Test current for Short-time withstand current tests and by other words as "calibrating the test circuit with the LV switchgear omitted" in 6.2.6.2 LV ac switchgear and LV dc switchgear for 6.2.6 Short-circuit current withstand tests. Suggestion is to use same words as "prospective current" or "available current" and add definition to the standard or describe in the same paragraph. The biggest problem that in some places standard requires to have circuit with not available, but with actual rated current during the test. Suggestion is to add same words that will be used in the description of the circuit to the highlighted sentences or re-write those sections.

6.2.5 Short-time withstand current tests

Short-time withstand current tests shall be made to demonstrate the thermal and mechanical capability of the buses and connections in LV switchgear to withstand the rated short-time current of the assembly. This test shall be conducted as a three-phase test, except for the tests of the ground bus and the neutral bus in 6.2.5.2 and 6.2.5.3. This test is not required for fused circuit breaker compartments.

6.2.6.1 General

Short-circuit current withstand tests shall be made to demonstrate the mechanical adequacy of the structure, buses, and connections when the bus is subjected to a high current for a specified time. The current for these tests is to be equal to the short-circuit rating of the circuit breakers intended for use in the tested switchgear.