

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: April 12, 2022

Meeting Time: 4:15 pm - 6:00 pm

Location: Hilton Bonnet Creek – Orlando, FL.

Attendance

Members: 13, Guests: 14, 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 4:15pm on April 12, 2022.

B. Introductions

Participants introduced as recorded below.

C. Approval of Agenda

R1 of agenda was shared. Motion to approve by D. Hrncir, 2nd by K. Sippel. 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. Adhoc 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 adhoc meetings held since Fall 2021 session.

Action: T. Hawkins will convene a meeting within next 4 weeks. Targeting update at Fall 2022 meeting.

c. Use of Cables in Type Testing:

T. Hawkins: Ad hoc group met between the fall & spring meetings. Adhoc recommended that no additional type testing or modification of type testing to include cable(s) above & beyond the current draft. Adhoc presented a proposal that in the absence of any cable lashing instructions from the manufacturer, cable lashing instructions & modified diagram from UL Marking and Guidance for Dead-Front Switchboards document be added in Annex C.

Motion by T. Burse to accept the Adhoc recommendation and advised the WG Chair to request approval from SA S/C for a PAR revision to include the notation on the PAR will be using copyright material. 2nd: D. Hrncir. Approved by unanimous consent.

Action: WG Chair to request PAR revision from SA S/C.

Action: Adhoc presentation to be attached to these meeting minutes.

Action: WG Chair disbands the adhoc.

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J. Review Draft Document

Chair has shared draft 3 and blank comment form for collection of comments. 1 comment received. Chair commented on needing an improvement in comment activity from the WG to maintain progress. WG target is to be ready for ballot ideally before or shortly after our Spring 2023 meeting. To facilitate this goal, the WG reviewed all topic areas identified as areas of interest to collect consensus to create draft 4. Sections of the draft 3a addressed during the meeting included:

- Commenter proposed some text for 6.2.7.2 regarding stored-energy discharge. WG accepted the proposed text change unanimously.
- Clause 4 d): WG preferred to remove the 100.1 reference and pull-in the relevant text for Light pollution from 100.1 into the next draft. Remove footnote 15.
- Clause 5.5.5 to be removed to align with SA S/C request and actions taken in C37.20.2 & C37.20.3.
- Clause 6: Circuit breaker door, hinge, latch requirements not aligned with testing within C37.13 nor defined tests when 20.1 door design differs from C37.13 type door tested. Topic left for further commentary.
- Clause 6.2.2 Line 788-789: This sentence requires a horizontal bus size to match the frame rating of circuit breaker but that may vary by design. Intent is the smallest bus size offered if not matching the frame rating of the circuit breaker. WG Chair will rephrase the section to clarify the bus requirement.
- Clause 6.2.4.9: WG discussed the option of changing this section to align with the final text of PC37.20.2. Last draft of PC37.20.2 text shared with WG by Chair.

C37.20.2 text may require some considerations such as quantity of thermal couples when there are multiple conductors; ensure that cable connection temperature rise is clearly defined when testing with bus bars; retain current content of 6.2.4.9 in an informative annex; retain compliance for legacy type testing.

Motion by P. Barnhart to incorporate the RevCom approved text from PC37.20.2 relevant to Clause 6.2.4.9 into PC37.20.1 draft 4 for further commenting. 2nd: T. Hawkins. Approved by unanimous consent.

Action: WG Chair will retain original Clause 6.2.4.9 text into an informative area in draft 4 for comments.

- Clause 6.2.8: Consideration to update flame resistance tests to include UL V0 ratings as an alternative.

Action: Chair will incorporate changes from draft 3a into draft 4 and re-circulate to WG for comments.

K. Adjourn

Meeting adjourned at 6:00 pm

Recorded by:

Dan Delfino
Interim Secretary
April 12, 2022

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Attendance:

Role	First Name	Last Name	Company
Chair	Michael	Lafond	ABB
Secretary (Int)	Dan	Delfino	ABB
Member	Paul	Barnhart	Underwriters Laboratories
Member	Ted	Burse	Powell Industries
Member	Sahadev	Gohil	AZZ Switchgear Systems
Member	Lou	Grahor	Eaton Corporation
Member	Tom	Hawkins	Siemens Industry, Inc
Member	Dan	Hrncir	Eaton
Member	Darryl	Moser	ABB
Member	Owen	Parks	ABB
Member	Tim	Roher	Exiscan
Member	Kevin	Sippel	Eaton Electric
Member	Paul	Sullivan	DuPont
Member	William	Wilke	Eaton
Guest	Robert	Burns	Eaton
Guest	Randall	Creach	AZZ Switchgear Systems
Guest	Arkadiusz	Doroz	Eaton
Guest	Tanner	Esco	Eaton
Guest	Erin	Hardy	Eaton
Guest	Ronald	Hartzel	Eaton
Guest	Ken	McKenney	UL LLC
Guest	Mary	Owens	Eaton
Guest	Carl	Schneider	Schneider
Guest	Dean	Sigmon	Eaton
Guest	Todd	Suave	Rockwell Automation
Guest	Christo	Thomas	Schneider
Guest	Will	Weishuhn	ABB

IEEE C37.20.1 Ad Hoc for “Testing with Cables”

Tom Hawkins, Ad Hoc Chair

4/12/2022

Ad Hoc participants

- Tom Hawkins, Siemens
- Darryl Moser, ABB
- Eddie Wilkie, Eaton
- Mike Lafond, ABB
- Randy Creach, AZZ
- Paul Barnhart, UL
- Bryan Tatum, UL

Discussion points

- This is a S/C phenomenon. S/T tests are thermal in nature.
- How to determine worse case test?
 - For example – Mechanical vs. Compression lugs? Cable type?
- Cables increase impedance, but we need to keep the 4 cycle max energy test
- Cable lashing is important in the end installation when required by the manufacturer

Ad hoc recommendations

- The use of cables within C37.20.1 conformance testing should not be required
- But, adding wording is appropriate in Annex C (informative) Guide for handling, storage, and installation
- We'll need copyright permission from UL

IEEE PC37.20.2 D15
Clause 6.2.2.8 Excerpt

945 Test connections to the main circuit shall be such that there is no significant difference in heat conducted
946 away from, or conveyed to, the switchgear during the test compared to the connections intended to be used
947 for service. In order to determine that the connections to the main circuit do not conduct away from, or
948 convey to the switchgear a significant amount of heat, it is necessary to record the temperature differences
949 between the terminals of the switchgear and the test connections. ¶

950 ¶
951 The temperature of the test connections shall be measured at the point where they leave the enclosure and
952 at a distance of 1 m (39 in) externally. The difference in temperature rise shall not exceed 5° C and the
953 temperature limits shall not exceed the values in Table 3. For the higher current ratings where it is
954 necessary to use several conductors in parallel for each pole, the mean of the temperature difference along
955 each conductor of the multi-conductor arrangement shall not exceed 5° C. The type and sizes of the test
956 connections shall be recorded in the test report. ¶

957 ¶
958 Adjustment of the temperature gradient in the test connections, if necessary, may be achieved by modifying
959 the cross-section of the conductors or by the addition of temperature controlling devices to the conductors,
960 but not by the deliberate introduction of faulty joints. ¶

961 ¶
962 For the convenience of testing, a conveyed heat to the test sample because of a temperature difference
963 higher than 5° C, may be accepted with the consent of the manufacturer. ¶

964 ¶
965 The conductors used for test connections shall have a minimum external length of 1.2 m (4 ft) and shall be
966 insulated, as a minimum, for the closed-circuit output voltage of the test supply. ¶

967 ~~The test connections may be made with cables or bus. Table 6 provides the recommended bus size for~~
968 ~~connection to the main bus. The conductors listed in Table 7 should be utilized for connection to the circuit~~
969 ~~breaker outgoing terminals. If test arrangement internal bus sizes or configurations are different from those~~
970 ~~in Table 6 and Table 7, external bus sizes or configurations equal to internal bus bars may be substituted at~~
971 ~~the option of the manufacturer. ¶~~

972 The test connections may be made with cables or bus. Test connection cables should be approximately
973 equal to the cross sectional area of the internal bus bars. Test connection bus bar sizes or configurations
974 should be equal to internal bus bars. Where multiple bus bars are used, they are to be spaced 9.5 mm (3/8
975 in) apart or equal to the internal bar spacing. Vertical or horizontal configuration is at the option of the
976 manufacturer. ¶

977 ¶
978 Shorting bars shall be equal in cross-sectional area to the outgoing terminal conductors and shall be located
979 outside the switchgear assembly. ¶