

Minutes of Comment Recirculation Group WG PC37.04  
Standard for High Voltage Circuit Breaker  
Monday, 23 April 2018  
8:00 am - Noon  
Disney's Contemporary Resort, Lake Buena Vista, FL

I Introductions

Meeting opened with 45 of 56 members and 68 guests. A quorum was present.

II A call for knowledge of essential patents was made, no respondents.

III Motion to approve the minutes from fall meeting was approved unanimously by voice vote.

IV Old Business

a. The WG was briefed on the meetings of the previously appointed ballot resolution group (BRG) which occurred on 17 Jan. 2018 and 12 Feb. 2018. The work of the BRG resulted in Draft 4 of PC37.04.

b. Results of the recirculation 2 of the PC37.04 Draft 4 which closed on 16 April:

124 ballot group: 90 affirmative votes; 11 total negative votes w/ comments

117 / 124 votes received = **94% Returned**

90 / 114 votes = **78% affirmative**

<u>Comment Distribution</u>	<u>Must Satisfy?</u>		
	<u>No</u>	<u>Yes</u>	<u>Grand Total</u>
Editorial	36	90	126
General	18	2	20
Technical	8	46	54
<b>Grand Total</b>	<b>62</b>	<b>138</b>	<b>200</b>

Comment resolution focused on Technical and General “Must be satisfied” comments

- 7.5.5 – Comment r02-127. The revised wording of this clause removed the provision that the required rated of operation depended upon adequate supply energy and added text that seemed to allow for an exemption from the required frequency of operation in the previous draft, provided that the limits on the rate of operation be placed on the nameplate.
  - Motion to remove the added text by John Webb, 2<sup>nd</sup> by James van de Ligt. Motion carried by voice vote.
- 7.5.5 – It was further noted that that the (still removed) wording regarding an adequate supply of energy was likely necessary.
  - Motion to revert to the previous wording of 7.5.5 by Devki Sharma, 2<sup>nd</sup> by Curt Frazier. In discussion the remaining text read “up to 30 CO operations per hour” which could be read as allowing a lower number (e.g. 10 or 20 per hour), and further discussion on the motion was postponed until after the break for individuals to formulate proposals. Following the break, the wording for the first sentence of 7.5.5 was proposed to be: “Operating mechanism components shall be capable of 30 CO operations per hour without exceeding thermal or mechanical limitations, provided sufficient supply energy is maintained.”  
Motion with revised wording carried: 33 Aye, 5 Nay, 1 Abstain
- 5.4.2 – Comment r02-38: Proposal to adopt the temperature rise limitations for contacts as given in PC37.100.1/D8 which harmonize with IEC values. 115 °C total temperature. Motion to accept the proposed change in the comment by Denis Dufournet, 2<sup>nd</sup> Anne Bosma. Following significant discussion the motion failed. Vote was 16 Aye, 23 Nay, 2 Abstain.

- 5.4.2 – Comment r02-178: Proposal to change NOG “Non-Oxidizing Gases” to NRG “Non-Reactive Gases” and OG “Oxidizing Gases” to RG “Reactive Gases” in Table 1 and its footnotes. Carried by voice vote of the WG.
  - 5.4.2 – Comment r02-178: Proposal to modify footnote i of Table 1 to limit the use of the higher temperature limit with a factory controlled connection to connections with copper base material on both components. Carried by voice vote of the WG.
  - 3.1 – Comment r02-152 and r02-153: Definitions of circuit breaker class S1 and class S2 are incomplete without definitions of ‘cable system’ and ‘line system’. Proposals were to either provide a physically based definition for cable system and line system or redefine circuit breaker(s) class S1 and S2 as for application type S1 and S2 and add definitions for these applications types (as given in comment proposal). The WG reached a consensus to create definitions for ‘cable system’ and ‘line system’ in accordance with the physical descriptions provided in other documents. The proposal was submitted by Dennis Dufournet based on 100 meters minimum cable for S1. Longer distances of before the circuit breaker connection are S2. Exact wording to be approved by BRG.
  - 3.1 – Comment r02-137: Class S1 and Class S2 only apply for circuit breakers with a rated maximum voltage less than 100 kV. The definitions should be adjusted appropriately. WG agreed by voice vote.
  - 5 & 5.2 – Multiple comments: 5.2 changed from Rated dielectric withstand capability to Rated insulation level, but this change was not carried through the document consistently. Different comments were received to either revert to “Rated Dielectric Withstand” or use “Rated Insulation Level” consistently. Consensus of the WG was that “dielectric withstand capability” was a test to demonstrate the required (rated) insulation level and within this document to implement “Rated Insulation Level” wherever a reference to a specific test was not intended.
  - 6.8 – Comments r02-58, r02-99 and r02-126: General agreement that the removal of specific resistance checks was acceptable. The change to remove “is considered to be capable of” to “shall be capable of” was read by many to imply that what followed was a series of required retests imposed onto C37.09.  
 Motion to remove all of (6) following “open position” made by Ted Burse, 2<sup>nd</sup> Albert Livshitz.  
 Discussion was focused on there was not an intention by the WG to impose a lengthy series of retests (including ability to interrupt a short-circuit current).  
 Result of the voting on the motion was: 17 Aye, 18 Nay, 3 Abstain.  
 With the failure of the motion, there was no resolution on alternative wording. A task force was appointed by the Chair composed of Eldridge Byron, Ted Burse and Albert Livshitz to propose new wording for (6) by the end of the following week (4 May).
- c. John Webb made a motion to reauthorize the ballot resolution group (BRG) to continue working on the comments and when complete recirculate the next draft as well as continue with comment resolutions and recirculation ballots as necessary until the next regular WG meeting. The previous members of the BRG would continue as well as any new volunteers with the understanding that multiple teleconferences and several in person meetings may be required. Motion was seconded by Mike Christian and unanimously approved by voice vote of the WG.  
 First meeting of the BRG (by telco) was to be as soon after 30 days following this meeting as practical in order to provide required notice to all participants.  
 Volunteers for the BRG were to submit their names to the secretary following the meeting.

Chair adjourned meeting at 12:00

The existing (bold typeface) and new members of the ballot resolution group are:

<b>Stephen Cary (Chair)</b>	<b>Roy Alexander (Vice-Chair)</b>	<b>John Webb (Secretary)</b>
Eldridge Byron	<b>Cory Johnson</b>	Tom Mulcahy
Steven Chen	Tony Ricciuti	<b>Sushil Shinde</b>
Victor Hermosillo	Victor Savulyak	Dan Schiffbauer
Jason Hollander	Robert Warren	Carl Schuetz
<b>Richard York</b>		

Three original members of the BRG have failed to attend BRG meetings either in person or by teleconference and did not explicitly request to continue participation in the BRG. In order to be able to reach a quorum they will be changed to ‘Guest’ status. Upon attending the first meeting of the reformed BRG and requesting member status they will be advanced to member status.

Hua Ying Liu	Charles (Allan) Morse	James van de Ligt
Jan Weisker		

In accordance with clause 4.1.1 of the policies and procedures manual: “Voting membership shall be granted automatically to those participants attending the meeting of a newly chartered Working Group upon their request. Thereafter, voting membership shall be granted after the participant attends two consecutive meetings of an existing Working Group, and also requests voting membership status.”

The following individuals have met the attendance requirements and have requested to join the working group. They will be advanced to member status prior to the next WG meeting.

Michael Crawford	Jeffery Door	Jennifer Hunter
Cory Johnson	Charles (Allan) Morse	Miklos Orosz
John Phouminh	Samala Santos Reddy	

In accordance with clause 4.1.1 of the policies and procedures manual: “Voting member status is maintained through consistent participation at meetings and through Working Group votes. If a Working Group member misses two consecutive meetings, or two consecutive Working Group letter ballots, his or her voting privileges may be revoked.”

The following individuals have met failed to meet the attendance requirements and having missed two consecutive meetings of the WG are changed to guest status.

Leslie Falkingham	Harsh Sharma	
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Attachments: (1) Membership and Attendance list  
 (2) Agenda and results of voting on Draft 4 / Recirculation 2

John C. Webb  
 Secretary

Stephen Cary  
 Chair

## C37.04 Attendance S18

Role	First Name	Last Name	Company	City	State	10/11/2016	04/24/2017	10/08/2017	04/23/2018
Chair	Stephen	Cary	GE Energy Managemen	Chapel Hill	NC	X	X	X	X
Secretary	John	Webb	ABB	Florence	SC	X	X	X	X
Member	Mauricio	Aristizabal	ABB	Pittsburgh	PA	X	X		X
Member	Anne	Bosma	ABB AB	Ludvika	Other	X	X		X
Member	Arben	Bufi	Hitachi T&D Solutions, I	Suwanee	GA	X	X	X	X
Member	Ted	Burse	Powell Industries, Inc	Houston	TX	X	X	X	X
Member	Eldridge	Byron	Schneider Electric	Smyrna	TN	X	X	X	X
Member	Steven	Chen	Eaton Corporation	MOON TOWNSHIP	PA	X	X	X	X
Member	Chih	Chow	PEPCO	Washington	DC	X	X	X	X
Member	Michael	Christian	ABB	Lake Mary	FL		X	X	X
Member	Lucas	Collette	Duquesne Light	Pittsburgh	PA	X	X		X
Member	Patrick	Di Lillo	Consolidated Edison Co	New York	NY	X	X	X	X
Member	Denis	Dufournet	Retired	Sathonay-Camp	Other	X	X		X
Member	Raymond	Frazier	Ameren	St. Louis	MO		X	X	X
Member	Paul	Grein	Circuit Breaker Sales, Cc	Gainesville	TX		X	X	X
Member	John	Hall	Tennessee Valley Authc	Chattanooga	TN		X	X	X
Member	Helmut	Heiermeier	ABB	Baden	Other	X	X	X	X
Member	Jeremy	Hensberger	Mitsubishi Electric Pow	Warrendale	PA		X	X	X
Member	Victor	Hermosillo	GE Grid Solutions	Charleroi	PA	X		X	X
Member	Roy	Hutchins	Southern Company Ser	Birmingham	AL	X	X	X	X
Member	Todd	Irwin	GE Grid Solutions	Smithville	MO	X	X	X	X
Member	Scott	Lanning	S&C Electric	Libertyville	IL	X	X	X	X
Member	Brad	Leccia	Eaton	Moon Township	PA	X	X	X	X
Member	Hua Ying	Liu	Southern California Edis	Pomona	CA	X	X	X	X
Member	Albert	Livshitz	CE Power Solutions	Loveland	OH		X		X
Member	Vincent	Marshall	Southern Company Ser	Forest Park	GA	X		X	X
Member	Gary	Martin	Entergy	Kenner	LA	X	X		X
Member	Peter	Marzec	S&C Electric Co.	Chicago	IL	X	X		X
Member	Dave	Mitchell	Dominion Energy	Richmond	VA	X	X	X	X
Member	Tom	Mulcahy	Dominion Virginia Powe	Richmond	VA	X	X	X	X
Member	Andrew	Peterson	ABB	Sanford	FL	X	X	X	X
Member	Anthony	Ricciuti	Eaton Corporation	Moon Township	PA	X	X	X	X
Member	Daniel	Schiffbauer	Toshiba International C	Oliver	PA	X	X		X
Member	Carl	Schuetz	American Transmission	Waukesha	WI	X	X	X	X
Member	Devki	Sharma	Consultant	Byram	MS		X	X	X
Member	Sushil	Shinde	ABB Inc.	Mt Pleasant	PA	X	X	X	X
Member	Dean	Sigmon	Eaton Corporation	Greenwood	SC	X	X	X	X
Member	Michael	Skidmore	AEP	Pickerington	OH	X	X	X	X
Member	Vernon	Toups	Siemens	Richland	MS	X	X	X	X
Member	James	van de Ligt	CANA High Voltage Ltd.	Calgary	AB	X	X	X	X
Member	Jan	Weisker	Siemens AG	Berlin	Other		X	X	X
Member	Terry	Woodyard	Siemens Industry Inc.	Wendell	NC		X	X	X

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Role	First Name	Last Name	Company	City	State	10/11/2016	04/24/2017	10/08/2017	04/23/2018
Member	Richard	York	Mitsubishi Electric Pow	Pittsburgh	PA	X	X	X	X
Member	Wei	Zhang	Hitachi T&D Solutions, I	Suwanee	GA		X	X	X
Member	Xi	Zhu	GE Energy Managemen	Atlanta	GA	X	X	X	X
Guest	Benjamin	Abebe	Qualitrol	Wexford	PA				X
Guest	Brad	Armstrong	Meramec Instrument Ti	Cuba	MO		X	X	X
Guest	Herman	Bannink	KEMA Netherlands	Zelhem	Other			X	X
Guest	Paul	Barnhart	Underwriters Laborator	Walkertown	NC				X
Guest	George	Becker	POWER Engineers	Guilford	CT				X
Guest	Robert	Behl	ABB	Lake Mary	FL	X	X		X
Guest	Thomas	Blair	Tampa Electric Compan	Riverview	FL				X
Guest	Andrew	Brignac	Entergy	Ponchatoula	LA				X
Guest	Jeffrey	Brogdon	Georgia Transmission	Suwanee	GA		X		X
Guest	Vincent	Chiodo	HICO	Pittsburgh	PA	X	X	X	X
Guest	Andrew	Chovanec	GE Power	Charleroi	PA			X	X
Guest	Michael	Crawford	Mitsubishi Electric	Cranberry Twp	PA			X	X
Guest	Jason	Cunningham	Hitachi HVB, Inc.	Suwanee	GA	X	X	X	X
Guest	Jeffrey	Door	H-J Family of Companie	High Ridge	MO	X		X	X
Guest	Bernie	Dwyer	PECO	Berwyn	PA				X
Guest	John	Eastman	INCON	Saco	ME	X		X	X
Guest	Howard	Fennell	Nashville Electric Servic	Nashville	TN		X		X
Guest	Sergio	Flores	Schneider Electric Inc. L	SMYRNA	TN		X		X
Guest	Paul	Fox	Schneider Electric	West Chester	OH		X		X
Guest	Elizabeth	Gall	MEPPI	Orange Park	FL				X
Guest	Sahadev	Gohil	AZZ Switchgear System:	Fulton	MO		X		X
Guest	Ronald	Hartzel	Eaton Corporation	Moon Township	PA				X
Guest	Jason	Hollander	RESA Power	Winter Garden	FL				X
Guest	Jennifer	Hunter	MEPPI	Warrendale	PA			X	X
Guest	Christopher	Jarnigan	Southern Company	Birmingham	AL				X
Guest	Joseph	Jasinski	ITC Holdings Corp.	Novi	MI	X		X	X
Guest	Cory	Johnson	BPA	Brush Prairie	WA			X	X
Guest	Amir	Khosravi	BC Hydro	Burnaby	BC		X	X	X
Guest	Hong Jun	Kim	HICO	Changwon-si	Other				X
Guest	SangTae	Kim	HICO/HYOSUNG	Pittsburgh	PA		X		X
Guest	SangTae	Kim	HICO America	Pittsburgh	PA			X	X
Guest	Robert	Kuntz	HICO AMERICA	Pittsburgh	PA				X
Guest	David	Lemmerman	PECO/Exelon	Berwyn	PA			X	X
Guest	Steven	May	Southern Company Ser	Forest Park	GA				X
Guest	Steven	Meiners	GE	Cary	NC		X		X
Guest	Charles	Morse	Siemens Industry, Inc.	Arden	NC		X	X	X
Guest	Miklos	Orosz	Myers Controlled Powe	Murfreesboro	TN			X	X
Guest	Mary	Owens	Eaton	Cross Hill	SC				X
Guest	Justin	Palmer	ELECTRONSYSTEM MD	Clearwater	FL		X		X

Role	First Name	Last Name	Company	City	State	10/11/2016	04/24/2017	10/08/2017	04/23/2018
Guest	Mark	Pattison	H-J Family of Companie	Waterdown	ON				X
Guest	Thomas	Pellerito	DTE Energy	Detroit	MI		X	X	X
Guest	Alan	Peterson	Utility Service Corporat	Huntsville	AL			X	X
Guest	Mark	Peterson	Xcel Energy	Denver	CO			X	X
Guest	John	Phouminh	PEPCO HOLDINGS, INC.	WASHINGTON	DC		X	X	X
Guest	Robert	Ramsey	Bechtel	Houston	TX				X
Guest	Samala Santosh	Reddy	Powell Industries	Houston	TX	X	X	X	X
Guest	Bobby	Rich	Dominion Virginia Powe	Richmond	VA		X	X	X
Guest	Brian	Roberts	Southern States, LLC	Hampton	GA		X	X	X
Guest	Leonel	Santos	Schneider Electric	Smyrna	TN				X
Guest	Victor	Savulyak	DNV GL KEMA Laboratc	Chalfont	PA	X			X
Guest	Daniel	Sims	Eaton Corp.	Greenwood	SC				X
Guest	Christopher	Slattery	FirstEnergy	Fairlawn	OH				X
Guest	Erin	Spiewak	IEEE	Piscataway	NJ		X		X
Guest	Don	Steigerwalt	Duke Energy	Charlotte	NC			X	X
Guest	Dragan	Tabakovic	Meramec Instrument Ti	Clearwater	FL				X
Guest	Chand	Tailor	Eaton Corporation	Greenwood	SC			X	X
Guest	Henk	te Paske	KEMA Netherlands	Arnhem	Other		X		X
Guest	Michael	Titus	Schneider Electric	Hamilton	OH				X
Guest	francois	trichon	schneider electric	Saint martin d'uriage	Other				X
Guest	Jordan	Tsvetanoff	First Energy	Twinsburg	OH			X	X
Guest	Michael	Wactor	Powell Industries, Inc	Houston	TX				X
Guest	Jeffrey	Ward	Doble Engineering Com	Watertown	MA		X	X	X
Guest	Robert	Warren	DNV GL - KEMA Laborat	Chalfont	PA		X	X	X
Guest	Casey	Weeks	Siemens Energy	Richland	MS			X	X
Guest	Jerry	Wen	BC Hydro	Burnaby	Other	X		X	X
Guest	Matt	Westerdale	Bureau of Reclamation	Denver	CO		X		X
Guest	William	Wilkie	Eaton	Arden	NC				X
Guest	Hua	Yang	Rockwell Automation C	Cambridge	ON				X
<b>56 Members</b>									<b>45</b>
177 Guests									<u>68</u>
									<u>113</u>