

1. Welcome and introductions of all participants. The WG meeting was attended by 64 participants; 35 members and 29 guests.
2. Jeff Nelson, the chair, is presiding the meeting.
3. The WG Chair reviewed IEEE Policy on patents and Guidelines for IEEE WG Meetings
4. Meeting minutes from Spring meeting were approved. (Noting the MTTF definition to be added in General to C37.04)
5. Auxiliary Switch contact ratings were discussed using a slide presentation by John Webb:
  - The slides shown (attached to these minutes) covered the ratings that other relevant industry standards require/recommend.
  - Some industry auxiliary switches have only a 250Vdc published rating. Standard operating voltage ranges published in C37.06 are from 70Vdc – 280Vdc, depending on the nominal control voltage system.
  - It was decided that using Table 6 from IEC 62271-1 would be a good starting point for C37.04 ratings. Addition of a few classifications will be required; 24 and 48Vdc, 250Vdc @ 1000W and an overall voltage range covering 70-280Vdc.
  - Mr. Pat Dilillo has graciously offered to collect some specifications from users and manufactures and make some recommendations to the WG.
6. The WG was asked to review Annex B of C57.13 and provide comments back to the WG Chair or Vice Chair by Wednesday October 19, 2011. All comments will then be forwarded to the Chair of C57.13 for consideration.
7. Standard Operating Duty was discussed
  - It was mentioned that the 0.300 s, in the duty cycle for rapid reclosing, is the minimum time required to allow the fault to clear and the breaker to recover before reclosing.
  - The question was raised should this time delay always be required in the breaker controls. Currently, it appears manufacturers only include it in the breaker controls if requested by the user.
  - It appeared a majority of the group felt this was an application issue and should be referred to the application guide, C37.010.
  - It was noted that C37.04 contains the following sentence, “It may be necessary to add an external time delay to meet specific application requirements (see IEEE C37.010-1999).
8. Referring to Sound Pressure levels in C37.04 was questioned with no immediate resolution.
9. Volunteer assignments were reviewed and WG members were requested to provide input.
10. Motion to adjourn.
11. Slides from meeting are attached.

# Instructions for the WG Chair

The IEEE-SA strongly recommends that at each WG meeting the chair or a designee:

- Show slides #1 through #4 of this presentation
- Advise the WG attendees that:
  - The IEEE's patent policy is consistent with the ANSI patent policy and is described in Clause 6 of the *IEEE-SA Standards Board Bylaws*;
  - Early identification of patent claims which may be essential for the use of standards under development is strongly encouraged;
  - There may be Essential Patent Claims of which the IEEE is not aware. Additionally, neither the IEEE, the WG, nor the WG chair can ensure the accuracy or completeness of any assurance or whether any such assurance is, in fact, of a Patent Claim that is essential for the use of the standard under development.
- Instruct the WG Secretary to record in the minutes of the relevant WG meeting:
  - That the foregoing information was provided and that slides 1 through 4 (and this slide 0, if applicable) were shown;
  - That the chair or designee provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) of which the participant is personally aware and that may be essential for the use of that standard
  - Any responses that were given, specifically the patent claim(s)/patent application claim(s) and/or the holder of the patent claim(s)/patent application claim(s) that were identified (if any) and by whom.
- The WG Chair shall ensure that a request is made to any identified holders of potential essential patent claim(s) to complete and submit a Letter of Assurance.
- It is recommended that the WG chair review the guidance in *IEEE-SA Standards Board Operations Manual* 6.3.5 and in FAQs 12 and 12a on inclusion of potential Essential Patent Claims by incorporation or by reference.

Note: **WG** includes Working Groups, Task Groups, and other standards-developing committees with a PAR approved by the IEEE-SA Standards Board.



25 March 2008 (updated 29 March 2011)

(Optional to be shown)

# Participants, Patents, and Duty to Inform

All participants in this meeting have certain obligations under the IEEE-SA Patent Policy.

- **Participants [Note: Quoted text excerpted from IEEE-SA Standards Board Bylaws subclause 6.2]:**
  - **“Shall inform the IEEE (or cause the IEEE to be informed)” of the identity of each “holder of any potential Essential Patent Claims of which they are personally aware” if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents**
    - **“Personal awareness” means that the participant “is personally aware that the holder may have a potential Essential Patent Claim,” even if the participant is not personally aware of the specific patents or patent claims**
  - **“Should inform the IEEE (or cause the IEEE to be informed)” of the identity of “any other holders of such potential Essential Patent Claims” (that is, third parties that are not affiliated with the participant, with the participant’s employer, or with anyone else that the participant is from or otherwise represents)**
- **The above does not apply if the patent claim is already the subject of an Accepted Letter of Assurance that applies to the proposed standard(s) under consideration by this group**
- **Early identification of holders of potential Essential Patent Claims is strongly encouraged**
- **No duty to perform a patent search**

# Patent Related Links

All participants should be familiar with their obligations under the IEEE-SA Policies & Procedures for standards development.

Patent Policy is stated in these sources:

IEEE-SA Standards Boards Bylaws

<http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#6>

IEEE-SA Standards Board Operations Manual

<http://standards.ieee.org/develop/policies/opman/sect6.html#6.3>

Material about the patent policy is available at

<http://standards.ieee.org/about/sasb/patcom/materials.html>

If you have questions, contact the IEEE-SA Standards Board Patent Committee Administrator at [patcom@ieee.org](mailto:patcom@ieee.org) or visit <http://standards.ieee.org/about/sasb/patcom/index.html>

This slide set is available at  
<https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.ppt>

# Call for Potentially Essential Patents

- If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance:
  - Either speak up now or
  - Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible or
  - Cause an LOA to be submitted

# Other Guidelines for IEEE WG Meetings

- **All IEEE-SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.**
  - **Don't discuss the interpretation, validity, or essentiality of patents/patent claims.**
  - **Don't discuss specific license rates, terms, or conditions.**
    - Relative costs, including licensing costs of essential patent claims, of different technical approaches may be discussed in standards development meetings.
      - Technical considerations remain primary focus
  - **Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.**
  - **Don't discuss the status or substance of ongoing or threatened litigation.**
  - **Don't be silent if inappropriate topics are discussed ... do formally object.**

-----  
See *IEEE-SA Standards Board Operations Manual*, clause 5.3.10 and “Promoting Competition and Innovation: What You Need to Know about the IEEE Standards Association’s Antitrust and Competition Policy” for more details.

# Preferred Ratings of Aux. Contacts

Recommendations for  
Task Force on C37.04 Revision  
John Webb



# Preferred Ratings of Aux. Contacts

- No Recommended Values in other ANSI/IEEE Switchgear Standards
  - Reviewed C37.06, C37.11, C37.010, C37.100.1, C37.20.2, C37.16, C37.20.1
- Survey of Manufacturers Documentation varies:
  - Normally lists ratings at nominal (IEC/ANSI) control voltages only, not max.
  - Often lacks time constants of DC current.
- C37.100.1 lists aux. voltages but no more details.
  - §5.4 No common requirements, refer to equipment standards.  
[Intentionally leaves 'Table 6' out to coordinate with IEC 62271-1]
- IEC 62271-1 (Common Clauses) Table 6 lists preferred ratings
  - 3 Classes of Switches
- UL 508 Industrial Control Devices, Part X Auxiliary Devices
  - Provides 'Standard loads for control-circuit devices' (Table 137.1)
  - Provides 'Rating codes for a-c (d-c) control circuit contacts' (Table 139.1, .2)
- NEMA ICS 5 Control Circuit & Pilot Devices
  - Standard Loads, Standard Ratings & Solid State Switching & PLC I/O
  - Same Standard ratings for contacts as UL 508



# Sample of Mfg. Data

Cont. Curr.	120 Vac (110 Vac)	240 Vac (220 Vac)	48 Vdc (48 Vdc)	125 Vdc (110 Vdc)	250 Vdc (220 Vdc)
20	15	10	16	10	5
20	20	20	20	10	2
10	2A @ 220 Vdc, $\tau=20$ ms				
20	20	20	20	10	2
	15	10		10	5
20				10	5
10	25	25	10	8	2
20	15	10	16	10	5
15	75	40	40	11	2

# IEC 62271-1 Table 6

DC Current				
Class	Rated Continuous Current	Rated short-time withstand current	Breaking Capacity	
			≤48 V	110 V ≤ U <sub>a</sub> ≤ 250 V
1	10 A	100 A / 30 ms		440 W
2	2 A	100 A / 30 ms		22 W
3	200 mA	1 A / 30 ms	50 mA	
Note 1	This table refers to auxiliary contacts [IEV 441-15-10] which are included in an auxiliary circuit and mechanically operated by the switching device. Control contacts [IEV 441-15-09] which are included in a control circuit of a mechanical switching device may be covered by this table.			
Note 2	If insufficient current is flowing through the contact, oxidation may increase the resistance. Therefore, a minimum value of current may be required for class 1 contact.			
Note 3	In the case of the application of static contacts, the rated short-time withstand current may be reduced if current-limiting equipment, other than fuses, is employed.			
Note 4	For all classes, breaking capacity is based on a circuit time constant of not less than 20ms with a relative tolerance of +20 / -0 %.			
Note 5	An auxiliary contact which complies with class 1, 2 or 3 for d.c. is normally able to handle corresponding a.c. current and voltage.			
Note 6	Class 3 contacts are not intended to be subjected to full substation auxiliary-supply short-circuit current. Class 1 and 2 contacts are intended to be subjected to full substation auxiliary-supply short-circuit current.			
Note 7	Breaking current at a defined voltage value between 110 V and 250 V may be deduced from the indicated power value for class 1 and class 2 contacts (for example, 2 A at 220 V d.c. for a class 1 contact).			

# IEC 62271 -1 Aux. Contacts

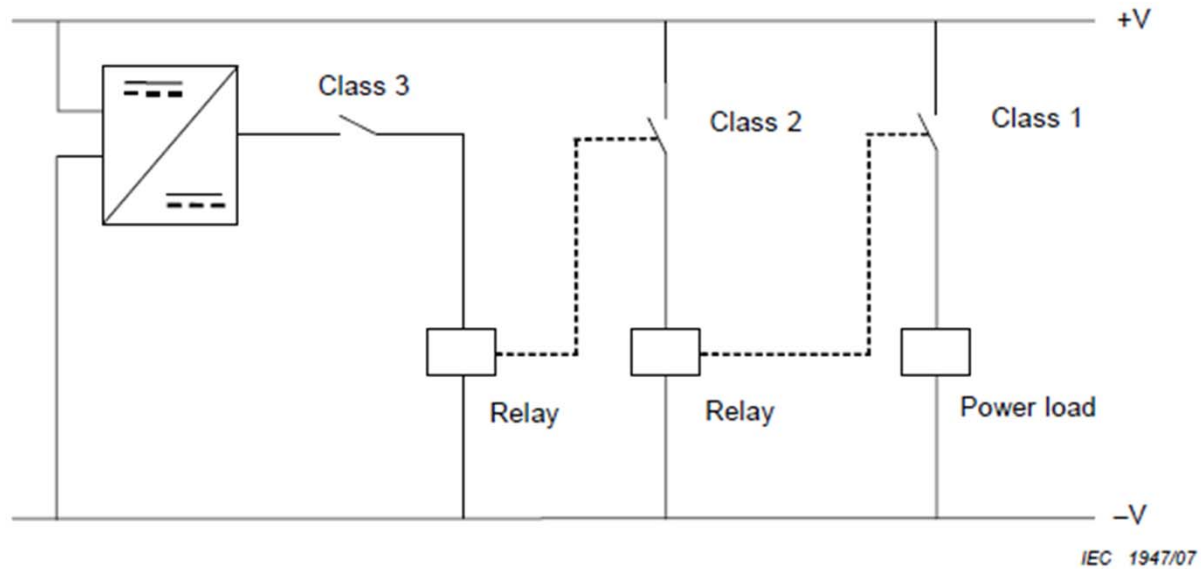


Figure 2 – Examples of classes of contacts

# UL 508 DC Contacts

Rating codes for d-c control-circuit contacts					
Contact rating code designation	Thermal continuous test current (A)	Maximum make or break current (A)			Maximum make or break VA at 300 volts or less
		125 Volt	250 Volt	301 to 600 Volt	
N150	10	2.2	-	-	275
N300	10	2.2	1.1	-	275
N600	10	2.2	1.1	0.4	275
P150	5.0	1.1	-	-	138
P300	5.0	1.1	0.55	-	138
P600	5.0	1.1	0.55	0.2	138
Q150	2.5	0.55	-	-	69
Q300	2.5	0.55	0.27	-	69
Q600	2.5	0.55	0.27	0.1	69
R150	1.0	0.22	-	-	28
R300	1.0	0.22	0.11	-	28

<sup>a</sup> The numerical suffix designates the maximum voltage design values, which are to be 600, 300, and 150 volts for suffixes 600, 300, and 150 respectively. Test voltage shall be 600, 250, or 125 volts.

<sup>b</sup> For maximum ratings at 300 volts or less, the maximum make and break ratings are to be obtained by dividing the volt-ampere rating by the application voltage, but the current values are not to exceed the thermal continuous test current.

<sup>c</sup> Inductive loads as specified in Section 8.2.7 of Industrial Control and Systems; Control Circuit and Pilot Devices, ANSI/NEMA ICS5-1993.

10A Continuous Current Rating

AC Contact Table also exists (139.1) Not as limiting as DC Table

# UL 508 Standard Loads

Standard loads for control-circuit devices				
Normal Potential	Standard Duty Codes B & P		Heavy Duty Codes A & N	
	Normal Current	Current inrush	Normal Current	Current inrush
110 - 120 a-c	3	30	6	60
220 -240 a-c	1.5	15	3	30
440 - 480 a-c	0.75	7.5	1.5	15
550 -600 a-c	0.6	6	1.2	12
115 - 125 d-c	1.1	-	2.2	-
230 - 250 d-c	0.55	-	1.1	-
550 -600 d-c	0.2	-	0.4	-

# Summary

- Existing Manufacturer info too diverse and poorly documented to easily reconcile.
- Existing ratings do not appear to have a basis for the ratings assigned; merely what was historically available and continues in use.
- IEC 62271-1 also appears ‘arbitrary’ but is within limits of most manufacturers surveyed.
- 3 Classes of contacts w/in IEC 62271-1 is good.
  - High rated contacts have trouble with digital I/O.
- UL 508 / NEMA ICS 5 provide most well defined ratings, include testing & performance criteria.
- UL 508 / ICS 5 also the smallest ratings of all.

# Recommendations

- Set aside “Retrofit” which will always require special considerations. Concentrate on new installations.
- Control contacts (e.g. spring charging) may have high ratings, but need not be replicated to every auxiliary contact.
- In principle UL 508 should be adequate because the contacts ratings are designed to coordinate with ‘standard loads’ which would normally be UL/UR components.
  - However, UL 508 is significantly lower than existing ratings, may cause problems regardless.
- Recommend:
  - IEC 62271-1 levels at ratings up to max. V of C37.06 controls.
    - Perhaps 400W (R10 #) at 280Vdc?
  - Expand 62271-1 for 24/48 VDC Class 1 & 2 (currently digital I/O)
  - Reference testing & performance from UL 508 (UL 60947?)
  - Provide for contacts in series to increase ratings (testing req’d)?