Power Measurements

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ANSI Standards Update

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Power Measurements

The Presenter

- Member of ANSI C12 since 2004
  - Voting member C12 Main, C12SC1, C12SC15, C12SC16; C12SC29
  - Chairmain:
    - SC29 Field Testing
    - SC26 Harmonic Testing
  - Principal author of changes to C12.9 – 2012
  - US technical representative to OIML TC12

ANSI

- American National Standard Institute, Inc.
  - Not a government agency
  - Standards do not have force of Law
  - All compliance is voluntary
  - ANSI doesn't actually generate any standards
  - Each standard is controlled by an industry organization as the "secretariat"
    - For C12 NEMA (National Electrical Manufacturer's Association) is the secretariat

ANSI

- American National Standard Institute, Inc.
  - NEMA organizes committees to propose and review standards
  - Standards are republished approximately every 5 years
  - Standards codify consensus approaches in common practice
  - Generally, they do not break new ground or deal in controversial issues.
    - This is changing. Can't avoid issues any longer.

ANSI C12

- C12 Main Committee
  - General makeup has expanded slightly over last few years
  - More utility participation is needed
  - 32 voting members with equal representation from three groups:
    - 11 - Manufacturers: Meter, Socket, Test Equipment, etc.
    - 11 - Users: Utilities
    - 11 - General Interest: PUC, UL, IEEE, etc.
  - Usually meets twice a year in conjunction with EEI/AEIC

ANSI C12

- C12 Main Committee
  - Has final approval for all activities on any C12 family standard.
  - Establishes Subcommitties (SC) and Working Groups (WG) to address various standards and issues.
  - Meets twice a year in conjunction with EEI Transmission, Distribution and Metering Conference.

ANSI C12

- C12 Subcommittees
  - Various subcommittees have been organized to review specific standards
  - Each operates slightly differently
  - Each meets on a schedule of its own choosing
  - Most meet at EEI Biannual Transmission, Distribution and Metering Meetings
  - Communication WG meets more often and longer
  - Various subgroups meet frequently by teleconference.

ANSI C12 – Sub-Committees

Sub-Committee	Standards
C12 SC1	C12.1, C12.4, C12.5, C12.10
C12 SC15	C12.6, C12.7, C12.8, C12.9, C12.11
C12 SC16	C12.20
C12 SC17	C12.18, C12.19, C12.21, C12.22, C12.23, C12.26
C12 SC24	Work completed - Technical report published
C12 SC25	Statistical Sampling Plans for In Service Testing
C12 SC27	Meter Upgradeability, Not clear where output will end up.
C12 SC29	Standard for Field Testing of Metering Sites

ANSI C12 SC 1

- C12.1 – Code for Electricity Metering
  - Published Aug 2008 (Due for update 2013)
  - Current Activities
    - TRINIWOG – Temperature Rise Testing
      - Test program at ORNL completed
      - New tests for temperature rise in meters ready for review in October
    - Testing Meters with Disconnect Switches
      - Technical report being published through ANSI
    - Auxiliary Device Working Group
      - Meeting monthly, focus is:
      - Definition of auxiliary device
      - Changing of testing to include

ANSI C12 SC 1

- C12.1 – Code for Electricity Metering
  - Current Activities
    - Harmonics WG – Process of agreeing on active energy test waveforms
      - WG has come to preliminary agreement on a set of waveforms for testing
      - IR46 waveforms plus two additional more pathological
    - RF Emissions
      - WG in process, no activity since last meeting
    - Balance Voltage Testing
      - Decided to add definitions and drawings to the standard

ANSI C12 SC 1

- C12.1 – Code for Electricity Metering
  - Other Activities
    - UL Subject 2735
      - UL representative Paul Barnhart made presentation
      - Activity is an outline of investigation
      - Committed to work with ANSI on development
      - Motion was approved to formally respond that UL bring safety related concerns to ANSI C12 to address in C12 Standards and when this process is complete withdraw Subject 2735 Outline of Investigation.

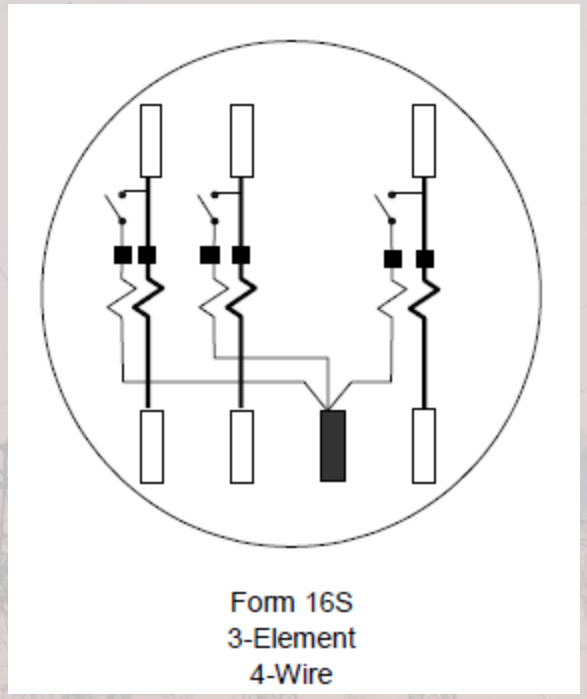
ANSI C12 SC 1

- C12.4 – Mechanical Demand Registers
  - Reaffirmed without change, In Publication
- C12.5 – Thermal Demand Meters
  - Reaffirmed without change, In Publication
- C12.10 – Physical Aspects of Watthour Meters – Safety Standards
  - Published C12.10 - 2011

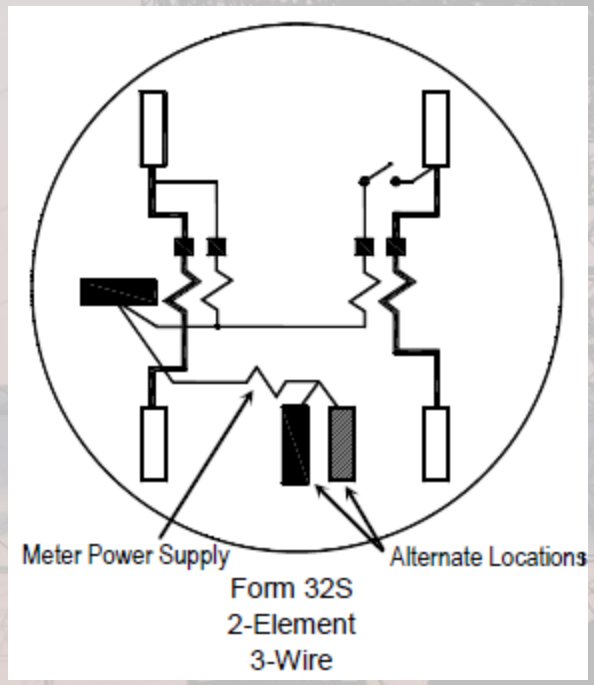
ANSI C12 SC 1

- C12.10 – Physical Aspects of Watthour Meters – Safety Standards
  - Published C12.10 – 2011
  - Changes
    - Form 32S added
    - Minor corrections to mechanical drawings
    - Disconnect links made optional

C12.10



Form 16S
3-Element
4-Wire



Form 32S
2-Element
3-Wire

Voltage links which were a fundamental part of the form definition are now optional.

New meter form.

ANSI C12 SC 15

- C12.6 – Marking and Arrangement of Terminals for Phase-Shifting Devices used in Metering
  - Reaffirmed without change, In Publication
- C12.7 – Requirements for Watthour Meter Sockets
  - Last Published 2005
  - Thorough review under way.
  - Update planned for approval in October 2012.

ANSI C12 SC 15

- C12.8– Test Block and Cabinets for Installation of Self contained “A” Base Watthour Meters
  - Reaffirmed without change, In Publication
- C12.9 – Test Switches for Transformer Rated Meters
  - Last Issued 2005
  - Extensive Revision just completed
  - Update planned for approval in October 2012.

Adobe Acrobat Document

ANSI C12 SC16

- C12.20 – 0.2 and 0.5 Accuracy Class Metering
  - Published in 2010
  - Current Activities
    - Pulse Output Committee
      - Work complete, ready for incorporation in next revision
    - Inclusion of Non-Blondel Forms
      - Previous decision to include reversed
      - New recommendation to ask SC1 to include in C12.1 rather than in C12.20.
      - A report addressing errors in Form 2 metering was presented
    - Demand Type Test WG held first meeting

ANSI C12 SC16

- C12.20 – 0.2 and 0.5 Accuracy Class Metering
  - Current Activities
    - Demand Type Test WG held first meeting
      - Communications Interface WG (Dan Nordell, Chair) held first meeting
    - Three Phase Unbalanced Testing
      - Need for additional testing being considered
    - Table 2 updated to make clear which forms and applications are Blondel compliant.
    - Table 2A added to make clear which forms and applications are NOT Blondel compliant

ANSI C12 SC16

- C12.20 – 0.2 and 0.5 Accuracy Class Metering
  - Current Activities
    - 0.1% Class
      - Updated standard reviewed in April
      - Plans to include in next update
    - Harmonics WG
      - Meter testing shows some meters cannot handle some harmonic waveforms
      - A set of test waveforms has been recommended
      - Proceeding to draft test development

ANSI C12 SC 17

- C12.18 – Protocol Specification for ANSI Type 2 Optical Port
  - Security issues under consideration
- C12.19 – Utility Industry End Device Data Tables
  - Massive update published March 2009
  - IEEE version being readied for ballot
- C12.21 – Protocol Specification for Telephone Modem Communication
  - Security approach rejected by NIST

ANSI C12 SC 17

- C12.22 – Protocol Specification for Data Communication Networks
  - Published March 2009
  - IEEE version being readied for ballot
- C12.23 AMR Device Compliance Test Standards
  - Main focus of current activities
  - IEEE P170, Measurement Canada actively working together on a consistent set of compliance tests

ANSI C12 SC24

- kVARHr and kVAHr
  - Technical Report has been published
  - No standard will be forthcoming

ANSI C12 SC25

- Statistical Sampling Plans for In Service Testing
  - Work proceeding
  - Proposal is to update section 5 of C12.1

ANSI C12 SC27

- Meter Upgradeability
  - Attempting to address the issues associated with upgrading meter software
  - Standards are changing for communications, security and data storage.
  - How do we cope with meters already in service
  - What can and cannot be updated after approval
  - Canada has adopted a standard
  - SGIP CSWG is also working in this area

ANSI C12 SC29

Field Testing of Metering Installations

- Field Testing of Metering Accuracy
  - Testing using voltages and currents supplied by the test equipment
  - Testing using site voltage with current supplied by the test equipment
  - Testing using site voltage and current

ANSI C12 SC29

Field Testing of Metering Installations

- Field Testing of Current Transformers in the Metering Circuit
  - Ratio Testing
  - Ratio Testing with Applied Burden
  - Admittance Testing

ANSI C12 SC29

Field Testing of Metering Installations

- Field Testing of Potential Transformers in the Metering Circuit
  - Ratio Testing
  - Ratio Testing with Applied Burden
- Validation of Wiring

- Work has been suspended for six months due to funding issues at NEMA

OIML R46

- International Organization for Legal Metrology
  - Developed by TC12 - Instruments for measuring electrical quantities
  - R46 is a Recommendation for International Metering Standards
  - Has been in preparation for nine years
  - CD6 approved by TC12 November 2011.