

**PC57.19.02**  
**Distribution Transformer**  
**Bushing Working Group**

# Agenda

- **Welcome**
- **Roster**
- **Introduction of Members and Guests**
- **Essential Patent Statement**
- **Quorum Verification**

## Participants have a duty to inform the IEEE

- Participants 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
- Participants should inform the IEEE (or cause the IEEE to be informed) of the identity of any other holders of potential Essential Patent Claims

**Early identification of holders of potential  
Essential Patent Claims is encouraged**

## Ways to inform IEEE

- **Cause an LOA to be submitted to the IEEE-SA (patcom@ieee.org); 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**

- **Speak up now and respond to this 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, please respond at this time by providing relevant information to the WG Chair

# 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 of different technical approaches that include relative costs of patent licensing terms may be discussed in standards development meetings.
      - **Technical considerations remain the 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.**

-----  
For more details, see *IEEE-SA Standards Board Operations Manual*, clause 5.3.10 and *Antitrust and Competition Policy: What You Need to Know* at <http://standards.ieee.org/develop/policies/antitrust.pdf>

## Patent-related information

The patent policy and the procedures used to execute that policy are documented in the:

- ***IEEE-SA Standards Board 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)**

# Agenda

- **Welcome**
- **Roster**
- **Introduction of Members and Guests**
- **Essential Patent Statement**
- **Quorum Verification**
- **Approval of Agenda**
- **Approval of the Minutes of the Last Meeting**
- **Old Business**
  - **Taskforce report – Cantilever Design Test Requirements**
    - **Dan Sauer**
  - **Taskforce report – Standard Mounting Holes – Martin Rave**
  - **Taskforce report – Stud Sizes – Al Traut**
- **New Business - Discussion of Draft 1.1**
- **Adjourn**

# Quorum Verification

Israel	Barrientos
Darren	Brown
Thomas	Callsen
Rhett	Chrysler
Jermaine	Clonts
John	Crotty
Michael	Dahlke
Craig	DeRouen
Fredric	Friend
Carlos	Gaytan
David	Geibel
Ali	Ghafourian
Alexander	Golubev
John	Graham
Said	Hachichi
Suh Joon	Han
Michael	Hardin

Thang	Hochanh
Eric	Humphrey
Marek	Kornowski
Gustavo	Leal
Weijun	Li
Jerry	Murphy
Aniruddha	Narawane
John	Owen
Jarrold	Prince
Gopalan	Ramesh
Martin	Rave
Clemens	Reiss IV
Sebastien	Riopel
Juan	Saldivar
Daniel	Sauer
Devki	Sharma
Stephen	Shull
Edward	Smith

Fabian	Stacy
Ronald	Stahara
David	Stockton
Wes	Suddarth
Michael	Thibault
Timothy	Tillery
Alan	Traut
Donnie	Trivitt
Lee	Tyler
Joshua	Verdell
Yves	Vermette
Shelby	Walters
Eric	Weatherbee
Alan	Wilks
Joshua	Yun
Shibao	Zhang
Peter	Zhao



# **Old Business**

- **Taskforce report – Cantilever Design Test Requirements – Dan Sauer**

# **Old Business**

- **Taskforce report – Cantilever Design Test Requirements – Dan Sauer**
- **Taskforce report – Standard Mounting Holes – Martin Rave (Rhett Chrysler Reporting)**

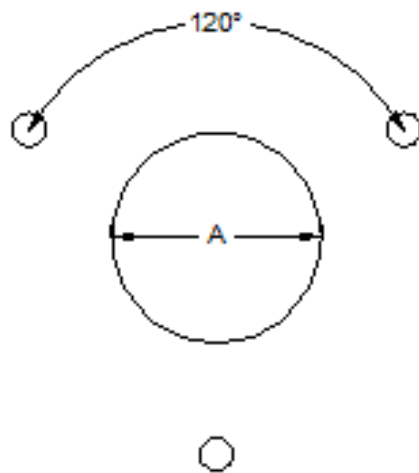
# **Taskforce report – Standard Mounting Holes**

# Stud Size Actions

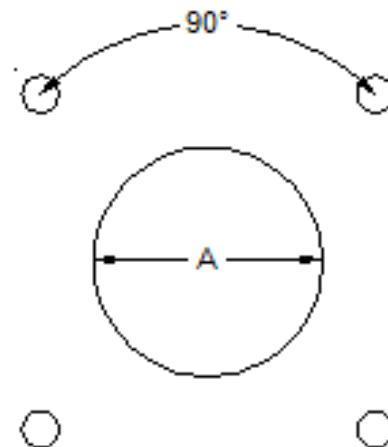
- Added stud sizes. Determine what the stud length should be – OPEN

Mounting Hole Designation	Minimum Mounting Stud Length Recommendation	Minimum Mounting Stud Length Manuf. 1	Minimum Mounting Stud Length Manuf. 2	Minimum Mounting Stud Length Manuf. 3
SA	38 (1.50)	38 (1.50)	41 (1.63)	38 (1.50)
S	38 (1.50)	38 (1.50)	41 (1.63)	38 (1.50)
S1	38 (1.50)	51 (2.00)	41 (1.63)	38 (1.50)
S2	51 (2.00)	51 (2.00)	54 (2.13)	57 (2.25)

**Figure 3— Standard Mounting Holes - Keyed**



**Three Stud Mounting**



**Four Stud Mounting**

Mounting Hole Designation	Stud and Thread Size	Hole Diameter (A) TOL. $\pm 0.4$ ( $\pm 0.016$ )	Mounting Stud Bolt Circle Diameter TOL. $\pm 0.4$ ( $\pm 0.016$ )	Mounting Stud Configuration	Minimum Mounting Stud Length
SA	5/8-11 UNC-2A	48 (1.875)	86 (3.375)	Figure 4	38 (1.50)
S	1-14 UNS-2A	48 (1.875)	86 (3.375)	Figure 4	38 (1.50)
S1	1 1/4-12 UNF-2A	58 (2.280)	114 (4.500)	Figure 4	38 (1.50)
S2	1 1/4-12 UNF-2A	70 (2.750)	135 (5.310)	Figure 5	51 (2.00)

NOTE — All dimensions are in millimeters (inches)

←NEW

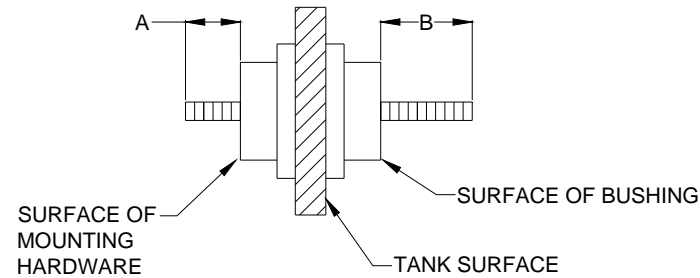
# **Old Business**

- **Taskforce report – Cantilever Design Test Requirements – Dan Sauer**
- **Taskforce report – Standard Mounting Holes – Martin Rave (Rhett Chrysler Reporting)**
- **Taskforce report – Stud Sizes – Al Traut**

**Task Force on Standard Studs  
and Terminals  
F18 Meeting Jacksonville, FL**



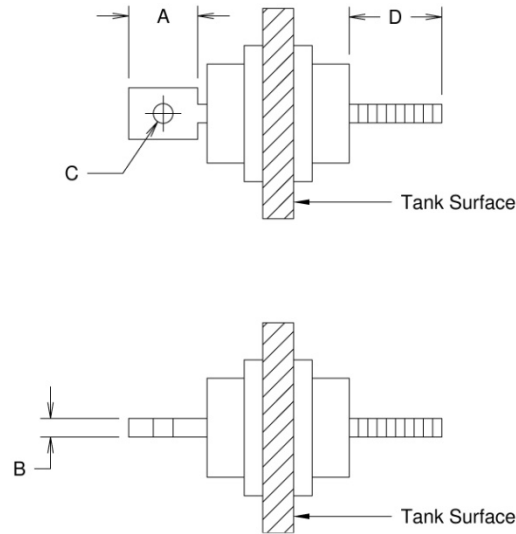
# Figure 1 – Standard stud sizes



Stud and Thread Size	Minimum Internal Useable Stud Length (A)	Minimum External Useable Stud Length (B)
3/8–16 UNC-2A	28 (1.12)	n/a
1/2–13 UNC-2A	35 (1.38)	n/a
5/8–11 UNC-2A	38 (1.50)	32 (1.25)
3/4–16 UNF-2A 3/4-10 UNC-2A	38 (1.50)	n/a
1–14 UNS-2A	44 (1.75)	44 (1.75)
1 1/4–12 UNF-2A	51 (2.00)	67 (2.62)
1 1/2–13 UNC-2A		
NOTE — All dimensions are in millimeters (inches) and are minimums		

NEW →

# Figure 2 – Internal spade terminal



Stud and Thread Size	Minimum Internal Flat Surface (A)	Minimum Internal Spade Thickness (B)	Hole Diameter (C)	Minimum External Useable Stud Length (D)
5/8–11 UNC-2A	38 (1.44)	6.4 (0.25)	11.2 (0.44)	32 (1.25)
1–14 UNS-2A	44 (1.61)	12.7 (0.50)	11.2 (0.44)	44 (1.75)
1 1/4–12 UNF-2A	63.5 (2.50)	12.7 (0.50)	14.3 (0.563)	67 (2.62)
NOTE — All dimensions are in millimeters (inches) and are minimums				

## Stud Size Actions

- Split into Fig 1 for internal threaded stud and Fig 2 for internal spade connection. - COMPLETE
- Consider removing ¼” and 1-1/8” stud sizes as a standard. Not presently used in distribution products. – COMPLETE
- Added 1 ½-13 UNC-2A. We need to confirm thread size and establish internal and external thread lengths – OPEN

# Eyebolt Terminals

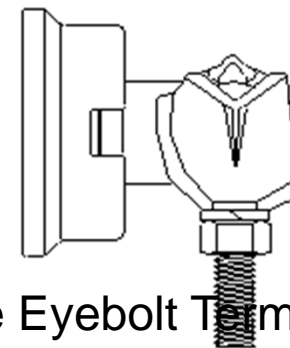
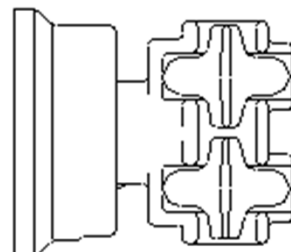
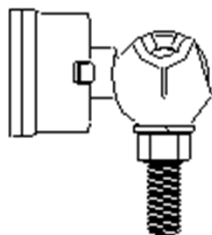
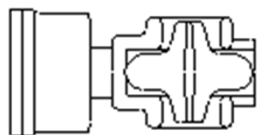


Figure 5 – Single Eyebolt Terminal

Figure 6 – Double Eyebolt Terminal

Eyebolt Style	Eyebolt Opening	Cable size range	External eyebolt quantity and thread size
Figure 4	8 (0.31)	#8 AWG solid to #2 AWG Solid	(1) 3/8-16 UNC-2A
Figure 4	16 (0.63)	#6 AWG solid to #4/0-19 stranded	(1) 3/8-16 UNC-2A
Figure 4	21 (0.81)	#2 AWG solid to 350-19 kcmil stranded	(1) 1/2-13 UNC-2A
Figure 4	24 (0.94)	#1/0 solid to 500-37 kcmil stranded	(1) 1/2-13 UNC-2A
Figure 5	32 (1.25)	#2/0 solid to 1000-61 kcmil stranded	(2) 1/2-13 UNC-2A

NOTE 1- All dimensions are in millimeters (inches) **and are minimums**.

NOTE 2- Threaded parts of connector **shall** be removable without removing bushings.

NOTE 3- One or two connector clamping bolts may be used, but U-bolts or J-bolts **shall** not be used.

NOTE 4- Terminal opening **shall** be arranged for vertical takeoff.

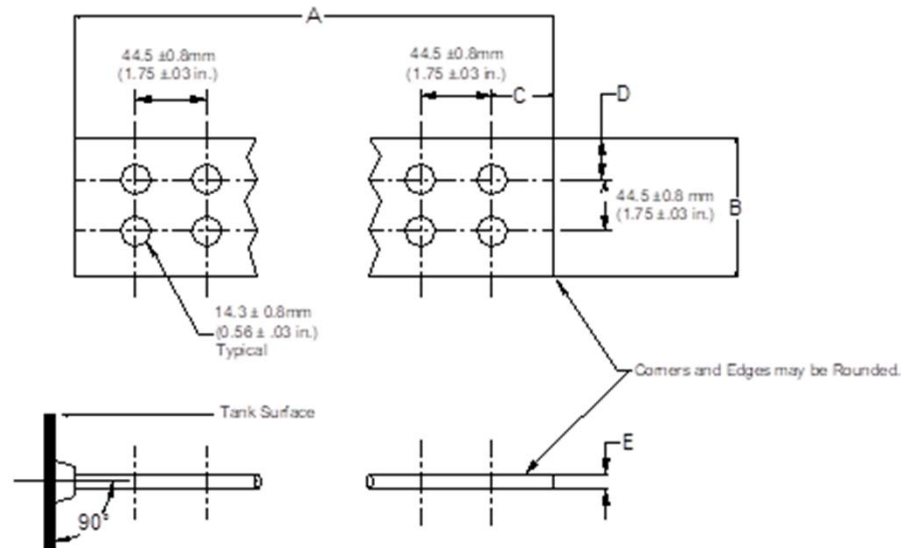
NOTE 5- Terminals **are to be** tin plated and aluminum conductors **are to be** properly prepared.

Table 4 – Eyebolt Termination Configuration

# Eyebolt Actions

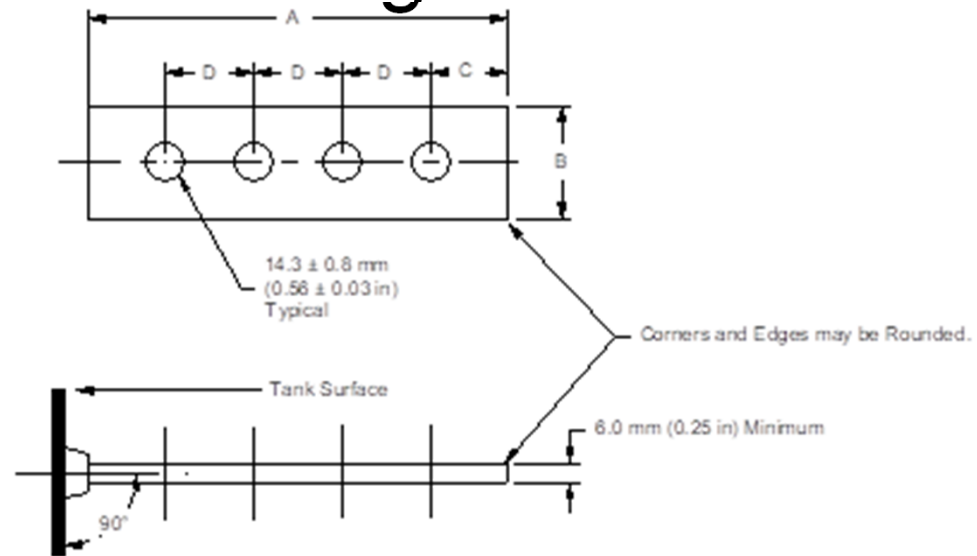
- Change NOTES (informative) to footnotes (normative)
- Remove “and are minimums” from NOTE 1

# Figure 7 – “H” Pad Termination Configuration



Number of Holes	A	B	C	D	E	Rated Nominal Current (A)
2		76 (3.00)	16 (0.63)	16 (0.63)	6.35 (0.25)	<del>1042</del>
4	86 (3.38)	89 (3.50)	16 (0.63)	22 (0.875)	6.35 (0.25)	2083
4	114 (4.50)	102 (4.00)	22 (0.88)	29 (1.12)	6.35 (0.25)	1805
6	137 (5.375)	102 (4.00)	22 (0.88)	29 (1.12)	15.88 (0.63)	3000
10	225 (8.88)	102 (4.00)	22 (0.88)	29 (1.12)	19.05 (0.75)	4500
12	305 (12.00)	102 (4.00)	22 (0.88)	29 (1.12)		
NOTE — All dimensions are in millimeters (inches)						

# Figure 8 – In-line Pad Termination Configuration



Number of Holes	A	B	C	D	Nominal Rated Current (A)
4	171 (6.75)	35 (1.38)	16 (0.63)	45.5 ± 0.8 (1.75 ± 0.03)	1042
NOTE — All dimensions are in millimeters (inches)					

# **New Business - Discussion of Draft 1.2**



**Adjourn**