

**Minutes**  
**Electrical Power Working Group**  
Wednesday 28 March 2012  
Westin Long Beach  
Long Beach, CA

**Presiding chairman:** Ken Vannice; Leviton Manufacturing Co., Inc.; P; MP

**Recording secretary:** Karl G. Ruling; PLASA

**Members attending:**

Ron Bonner; PLASA Technical Resources Office, PLASA EU; P; U  
Louis Bradfield; P; U  
Stephen (Steve) Brock; Bender ET Inc. (Bender GmbH & Co. KG); A; MP  
Richard Cadena; Academy of Production Technology; P; G  
Edward R. Condit; O; U  
James Davey; AC Power Distribution Inc.; P; CP  
Jeff deRecat; Marinco (Actuant Corporation); P; MP  
Jerry Gorrell; Theatre Safety Programs; P; U  
Wendy Holt; AMPTP/CSATF, representing the Alliance of Motion Picture and Television Producers; P; G  
Tyrone Mellon\_Jr.; Lex Products Corp.; A; CP  
Edwin S. Kramer; I.A.T.S.E. Local 1; P; U  
Roger Lattin; I.A.T.S.E. Local 728; P; U  
George Long; Aggreko Event Services (Aggreko); P; DR  
W. G. Krokaugger\_PE; Mole-Richardson Co.; P; CP  
Alan M. Rowe; I.A.T.S.E. Local 728; A; U  
Larry Schoeneman; DesignLab Chicago, Inc.; O; DE  
Steve Terry; Electronic Theatre Controls, Inc.; P; MP  
Art Wanuch; Entertainment Electrical Safety Committee of Ontario; A; G  
Jody Williquette; Electrivert, Inc.; P; CP

**Visitors:**

Ron Dahlquist; Dadco  
Brian Eustace; Mole-Richardson Co.  
Jared Saltzman; Bergen Community College

**1 Opening remarks**

Ken Vannice called the meeting to order at 9:00. He explained that Mitch Hefter was not attending due to Philips discontinuing funding for his standards work.

**2 Attendance and membership**

**2.1 Introduction of those present and taking attendance**

A bright yellow sign-in sheet was circulated.

**2.2 Determination of quorum**

Vannice asked for a show of hands of voters. He counted them and then announced that a quorum was present.

**2.3 Recognition of alternate voting members**

Tyrone Mellon Jr. was recognized as the representative for Lex Products.

**2.4 Requirements for membership**

Ken Vannice reminded the assembly that membership is open to all who are affected by the work of the group. Voters who would be in the designer or dealer/rental company interest category in particular are encouraged to become members. Voting members are required to attend meetings and to vote on letter ballots. Voting members and their alternates may not miss three consecutive meetings or three consecutive letter ballots without a loss of voting status.

## 2.5 Changes to observer status

Members who have missed the previous two meetings and who will not have met the minimum attendance requirement for voters if this meeting is missed:

James Davey and Greg Mayberry; AC Power Distribution Inc.; CP  
Joe Boardman, Torsten Gruhn, and Nathan Leonard; Bender GmbH & Co. KG; MP  
Michael Scudday; SSRC, Inc.; CP

James Davey was present, so there was no change in voting status for AC Power Distribution. Steve Brock was present to apply for membership status to represent Bender, so there was no change in voting status for Bender. Michael Scudday was not present, so SSRC was moved to observer voting status.

## 2.6 Processing of new membership requests

Dave Lester; Clair Global; Observer; User  
Richard Cadena, Academy of Production Technology; Principal; General interest  
Stephen (Steve) Brock; Bender; Alternate; Mass-market producer.

Steve Terry moved that the applications be accepted. The motion was seconded and then approved with a show of hands.

Louis Bradfield asked that his voting status be reinstated. Eddie Kramer moved that Louis Bradfield be reinstated as a voting member. The motion was seconded and then approved with a show of hands.

## 2.7 Consensus body

The full consensus body during this meeting, including those not present, was:

Name	Representing	Voting status	Int. cat.
James Davey	AC Power Distribution Inc.	P	CP
Greg Mayberry	AC Power Distribution Inc.	A	CP
Richard Cadena	Academy of Production Technology	P	G
Jeff deRecat	Actuant Corporation	P	MP
William Drake	Actuant Corporation	A	MP
George Long	Aggreko	P	DR
Wendy Holt	Alliance of Motion Picture and Television Producers	P	G
Nathan Leonard	Bender GmbH & Co. KG	P	MP
Joe Boardman	Bender GmbH & Co. KG	A	MP
Torsten Gruhn	Bender GmbH & Co. KG	A	MP
Stephen (Steve) Brock	Bender GmbH & Co. KG	A	MP
Jody Williquette	Electrivot, Inc.	P	CP
Steve Terry	Electronic Theatre Controls, Inc.	P	MP
Ian Foulds	Entertainment Electrical Safety Committee of Ontario	P	G
Art Wanuch	Entertainment Electrical Safety Committee of Ontario	A	G
Ed Garstkiewicz	Harting KGAA	P	G
Howard Forryan	Harting KGAA	A	G
Edwin S. Kramer	I.A.T.S.E. Local 1	P	U
Roger Lattin	I.A.T.S.E. Local 728	P	U
R. Bruce Prochal	I.A.T.S.E. Local 728	A	U

Name	Representing	Voting status	Int. cat.
Patric J. Abaravich	I.A.T.S.E. Local 728	A	U
Alan M. Rowe	I.A.T.S.E. Local 728	A	U
Keith S. Woods	IATSE Local 891	P	U
Ken Vannice	Leviton Manufacturing Co., Inc.	P	MP
Bill Grande	Leviton Manufacturing Co., Inc.	A	MP
Bob Luther	Lex Products Corp.	P	CP
Tyrone Mellon_Jr.	Lex Products Corp.	A	CP
Sean Sloat	Lex Products Corp.	A	CP
Louis Bradfield	Louis Bradfield	P	U
W. G. Krokaugger_PE	Mole-Richardson Co.	P	CP
Alex Yoon	Mole-Richardson Co.	A	CP
Vincent J. Cannavale	Motion Laboratories	P	CP
Peter Herrmann	Motion Laboratories	A	CP
David Herrmann	Motion Laboratories	A	CP
Ron Bonner	PLASA EU	P	U
Michael Lay	Royal Philips Electronics	P	MP
Jerry Gorrell	Theatre Safety Programs	P	U
Mitch Hefter	USITT	P	U
	<b>Total</b>	<b>22</b>	
	Subtotals by interest categories	5	CP
		0	DE
		1	DR
		4	G
		7	U
		5	MP

### 3 Approval of the minutes from the previous meeting

See the draft minutes of the 29 January 2012 meeting, EPmin01-2012.pdf

Roger Lattin moved that the draft minutes be approved as written. The motion was seconded.

There was a discussion of the "one vote" reminder in the draft minutes. Ruling said that it was standard to remind voters that only one may vote when two people are present at a meeting to represent a company. It's a point that needs to be made clear for ANSI staff, who sometimes are confused when voting records are reviewed and multiple representatives are present.

The motion to approve the draft minutes was accepted with a show of hands.

### 4 Reading of the call for patents

Ken Vannice read the following statement aloud to the assembly:.

"PLASA intends not to publish any standard that contains protected intellectual property, unless that information can be licensed by anyone for a reasonable fee. PLASA uses a process of open patent and copyright disclosures to implement its intent. PLASA does not conduct patent or copyright searches and does not warrant that its standards contain no protected intellectual property.

"In keeping with the open disclosures policy, I ask if anyone present wishes to notify this working group of the existence of a patent or copyright or other intellectual property that might protect material in a standard being developed by this working group. You need not be the holder of the patent or copyright to notify this working group of its existence."

No patents or other intellectual property was revealed.

## **5 Reading of the anti-trust statement**

Ken Vannice read the following statement aloud to the assembly:

"The PLASA Board of Directors, the Technical Standards Council, and the leadership of this working group will reject or nullify any actions that unlawfully restrain trade. Anyone who feels that such an action is being or has been taken is requested to bring that matter to the attention of the chair immediately. Anyone who feels that actions in restraint of trade have been taken and not properly annulled is requested to notify the TSC chair or PLASA chairman immediately.

"PLASA legal counsel has informed us that violations of the anti-trust laws can have serious consequences. Individuals engaged in certain unlawful conduct can be found criminally liable. An individual convicted of a criminal violation of the Sherman Act may be fined as much as \$1,000,000 and imprisoned for up to ten years. An easy to read pamphlet describing restraint of trade issues is available from the Technical Standards Manager."

The TSM held up some of the easy-to-read pamphlets to show they were available at the meeting. No restraint of trade issues were reported.

## **6 Approval of agenda**

Ken Vannice said that he wanted to add a report in "Other business" about UL industrial control and UL 334.

Steve Terry moved that the agenda with the "Other business" addition be accepted. The motion was seconded and then approved with a show of hands.

## **7 Old business - task group reports**

### **7.1 EMC task group**

Ken Vannice reported on recent harmonics-related standards work:

The IEEE-SA P1836/P1837 committee has been charged to write North American versions of IEC 61000-3-2 and 61000-3-12. The chairmen are Mark Halpin and Larry Conrad. The secretary is John O'Neill from CSA.

The committee received presentations on various approaches at a meeting March 12 and 13, at the CSA offices in Mississauga, Ontario. The NEMA Lighting Division presented a proposal to substitute ANSI C82.77 for the contents of Class C. It did not suggest substituting ANSI C82.77 for the contents of Class A. Lutron wrote a proposal for Class A and tried to get the NEMA Wiring Device Division to endorse it, but NEMA refused so Lutron presented it on their own. The committee received arguments on the presented approaches and discussed the topic at a meeting. It was clear from the discussion that the conflict is utilities vs. manufacturers. (There were no other interests, such as users, present.) It was also clear that it was the Canadian utilities vs. everyone else.

To move forward towards a first draft, the following principles were set forth by the chairmen:

- All consumer products will be covered by 61000-3-2
- 61000-3-2 will cover up to 50 amperes.
- There will be no Class A or B
- Class C for lighting will reference ANSI C82.77
- Class D will start at 1 kW
- The Class D limits will be 4x the existing IEC 61000-3-2 values
- No retest will be required for products that have been tested and found to meet IEC 61000-3-2
- Consumer products are those defined as Class B in 47 CFR 15 (FCC)

A two-hour phone meeting is scheduled for April 27 to assess progress on the draft. There will be a face-to-face meeting June 6 and 7.

Vannice urged all the IEEE members in the EPWG to be prepared to vote on this matter. You need to join IEEE-SA and join a ballot pool. [*Current IEEE-SA dues are \$49 for IEEE members and \$229 for non-members.*]

Vannice also reported that the IEC is considering revising 61000-3-2 to deal with the fact that incandescent lamps can be replaced in the field with self-ballasted CFLs and LEDs. There is a North American movement to do the same to C82.77, a standard which comes from the American National Standards Lighting Group C82 operated through NEMA with Randolph Roy as secretary. There are big issues with power line harmonics and power factor correction with household CFLs and LEDs.

Ron Bonner noted that Adam Bennette has measured immense emissions from household LED lamps.

## **7.2 ANSI E1.16-2002 (R2007)**

It's being voted on for reaffirmation by the working group using a letter ballot while we have a concurrent public review.

Tyrone Mellon has submitted a comment with the Lex Products Corporation's "Yes with comments" vote: The reference to MIL-C-5015 should be updated to read MIL-DTL-5015 as that is the name of the standard of the year 2000. There is very little chance that the incorrect reference would cause any confusion for those reading the standard which is why I am voting yes with comments instead of no with reasons.

The issue was discussed. Ty confirmed that the physical shape is the same; whether called MIL-C-5015 or MIL-DTL-5015, the connector is the same for mateability.

Roger Lattin moved that we reference both names in the standard. The motion was seconded and then approved with a unanimous show hands, 17 out of a total consensus body of 22.

## **7.3 BSR E1.18 portable feeder cable selection and use**

*Report by task group on public review comments, draft resolutions, and revised draft standard.*

Jerry Gorrell reported that he had suffered a heart attack, which has delayed his work. He hopes to have his work on the draft resolutions and the revised standard finished some time in May so they can be distributed in time for consideration at the July meeting.

## **7.4 GFCI and GFP**

### **7.4.1 ANSI E1.19 – 2009, Recommended Practice for the Use of Class A Ground-Fault Circuit Interrupters (GFCIs) Intended for Personnel Protection in the Entertainment Industry**

No news or action on this standard specifically.

### **7.4.2 Ground Fault Protection Study Group**

*Report from the task group (Ty Mellon and Roger Lattin) on changes to the Code to allow coordinated GFP.*

Ty Mellon spoke to the issue:

1. There is no requirement from the NEC or UL equipment standards to provide GFCI protection for connectorized branch circuits greater than 30A. (His audit of the NEC not complete, but he found nothing.)
2. The 4-6 mA trip threshold of GFCIs are prone to tripping either due to circuits tripping elsewhere in the overall power system, noise, or parasitic capacitance on larger loads specific to the entertainment industry.
3. Due to point 1 and 2, frequently no ground fault protection is applied to such circuits
4. There is a journal article in the IEEE Transactions on Industrial Applications, Vol. 46 No. 6, discussing the issues of large circuits and three phase GFCIs.

5. UL and the NEC allow 20 mA trip threshold ground fault devices to be considered personnel protection in electric vehicle charging equipment to avoid nuisance tripping on said circuits (typically sized 20 A - 80 A).
6. A trip threshold of 20 mA would reduce the risk of serious injury from a ground fault for all but the most the most vulnerable people. This is lower than the generally accepted threshold for fibrillation of the human heart, which is 40 mA.
7. Any proposal we might develop would deal with products or installations where only qualified personnel would have access.
8. Standard E1.19 calls out using Class A GFCIs on circuits in wet locations with circuits sized from 15 A to 100 A.

There was a big discussion of Mellon's report and structured GFP in our industry.

As a way forward, Mellon said he will look at the 20 mA trip-point for higher current systems and possibly suggest a revision to E1.19. At the July meeting he will have a proposal to revise or not to revise E1.19.

#### **7.5 ANSI E1.24 - 2012, pin connectors**

Steve Terry reported that the proposal to reference ANSI E1.24 - 2012 in UL 498 has been submitted, but that a previous ballot cycle needs to be completed before this will be put before the STP. Then it will be considered in a preliminary review, and, if there are no problems, there will be an acceptance ballot.

#### **7.6 BSR E1.32 luminaire inspection guidance**

Ruling reported that it's on his agenda to be sent to the PLASA NA Executive Committee for action.

#### **7.7 UL Stage and Studio Luminaire standard**

*Task group report on revision proposals*

Ruling reported that he still has nothing to report, no work has been done on this. Other projects have taken precedence.

Ken Vannice said that the CSA lighting committee is planning to revise the Canadian standard for stage lighting equipment (C22.2 NO. 166-M1983 (R2008) - Stage and Studio Luminaires). Will the revisions be minimal or major, the latter expanding it to cover automated luminaires, LED luminaires, or connector strips, to make it a bi-national standard, or to make it a North American of an IEC standard. The Standards Council of Canada has decreed that Canada should adopt IEC standards with minimal deviations necessary to make them conform to the CEC. These IEC standards are equal to and in parallel with CSA standards.

Steve Terry said that the big need is for a reasonable leakage current standard in UL 1573. He doesn't have the time to develop this, but that this issue would affect a number of automated luminaire and LED luminaire manufacturers. He identified a few: Martin Professional, Altman Stage Lighting, Philips, High End Systems (Barco), Mole-Richardson, German Light Products, Robe, Clay Paky, and Elation.

Steve Terry moved that we draft a letter and send it to identified people at these organizations to ask them to work on a 1573 revision. The motion was seconded and then approved with a unanimous show of hands.

Terry said he will identify the senior person at each of these companies to whom the letter should be sent.

#### **7.8 Grounding and Bonding on portable structures and electrical systems**

Roger Lattin reported that work on this has just been started. Richard Cadena has started on a draft of something.

### **8 New business**

#### **8.1 Fixing the strain relief requirement in UL 1691**

*See UL1691\_Proposal-StrainRelief\_RevB.pdf. The new UL standard would lead to the rejection of almost all current single-pole connector designs. The proposal from Steve Terry attempts to remedy this problem.*

Steve Terry gave the rationale for making a change to the newly published UL 1691:

The overwhelming majority of single-pole separable connectors used in Stage and Studio applications in North America utilize a molded rubber body containing a gland for cable entry, but no strain relief other than the holding force of the cable termination. Typical cable sizes for these connectors are 6 AWG though 4/0 AWG. The large conductor size and strong holding force of crimp or double set screw terminations provides very high resistance to conductor pullout or damage at the termination point.

The performance and reliability of these devices has been proven across millions of listed connectors from multiple manufacturers used in the field over the last 35 years. These devices are currently manufactured by at least: Cooper Crouse Hinds, Leviton, Hubbell, Pass & Seymour Legrand, and Kupo.

This issue of strain relief was raised by UL IAG members in commenting on the very first draft of Subject 1691 in 1996. At that time, UL made a written commitment to correct the strain relief issue for these devices, which can be found in the pdf letter attached to this proposal from UL to Steve Terry. Unfortunately, it appears that the early comments from the IAG and UL's response were somehow lost in the transition of Subject 1691 to CANENA, and subsequently to CSDS and STP1691. As a result, despite the 16 intervening years, the strain relief problem remains unchanged in the first edition of the standard.

In addition, the NEC was changed in 1999 and 2002 to specifically acknowledge the suitability of these connectors without strain relief in two sections:

1. 520.53(k), which exempts these connectors from the strain relief requirements of section 400.10, the construction requirements of 406.7, and the non-interchangeability of 406.8.
2. 400.10 Exception, which removes the requirement for strain relief on "Listed portable single-pole devices that are intended to accommodate such tension at their terminals...." The connectors of UL1691 are just such devices.

These specific exemptions allowed these devices to be listed under category code RTRT, which is the listing of the above-mentioned manufacturers' products. UL1691 ignores the exemptions of these NEC sections and introduces a major new requirement. Such a change will have far-reaching economic and logistical effects on an entire industry. There is no record of loss or damage to warrant the new strain relief requirements introduced by sections 5.11 and 6.14. There is no technical justification for this change, based on the large volume of connectors in the field, the length of time in the field, and the low failure rate of these connectors.

There has been no request for this major change from connector manufacturers, end users, NRTL's, the inspection community, or any other organization that I know of.

I am not sure what level of industry review this standard was subjected to outside UL subscribers, but it is clear that the implications of sections 5.11 and 6.14 on industry-standard connectors were not fully appreciated by the review group. Nowhere is this more evident than in the CSDS comment matrix for the proposal opened 1/4/12. This proposal asks for comments on the effective date of the standard. In their responses, STP1691 commenters outline various tasks that will need to be done such as:

Comment 1: "I recognize the fact that there are new requirements for devices use for bonding and grounding, but the rest of the devices do not have new requirements other than dimensional."  
(*Underscore added by Steve Terry*)

Comment 3: "Given the additional short circuit testing requirements in 5.13.4 and the necessary tooling changes for dimensional and marking revisions, I propose an effective date of 36 months.

Nowhere in the comment matrix is any reference to the time needed for the addition of a strain relief required by sections 5.11 and 6.14. This indicates to me that this was missed by the STP members who reviewed the standard, since this task is major and complex.

Terry presented proposed text to remedy the problem. There was a discussion of the #2 minimum conductor size in Terry's proposal. Type 15 connectors are a significant part of the market, and these often use smaller conductors. These smaller conductors, down to 6 AWG, are mechanically strong enough not to need an additional strain relief.

Terry moved that we endorse proposal B with 2 AWG changed to 6 AWG. The motion was seconded and approved with a unanimous show of hands.

*[The final document, after two iterations of editing, is UL1691 Proposal--Strain Relief RevD.pdf.]*

## **8.2 Other new business**

None.

## **9 Other business—UL industrial controls and entertainment lighting dimmers**

Ken Vannice reported that UL has announced that some industrial control equipment, mainly relays and contactors, will be moving from UL 508 to a new North American version of an IEC standard, 60947-4-1A, which is already adopted. Dimmers and relay panels will remain under UL 508 (and CSA 14) for now. The 60947-4-1A standard has enough local deviations to make it match UL 508. All affected equipment can be moved from one to the other without further test and evaluation.

Vannice also reported that a new UL group has been formed to further move relays to a different North Americanized IEC standard, 61810-1. It too has enough deviations for the North American market to make this be a straight transfer of product listings from one to the other without retesting.

Steve Terry reported that there is work being done to put entertainment dimmers under a new UL standard, UL 334. This is a good thing. Right now stage dimmers are tested using a selection of requirements from different standards, which obfuscates the Listing requirements.

## **10 Schedule for future meetings**

Ken Vannice announced that the next working group meeting is scheduled for Friday 20 July 2012, from 14:00 to 18:00 at the Hilton New York in New York, NY.

There was a discussion of alternative, less expensive hotels.

## **11 Adjournment**

Wendy Holt moved that the meeting adjourn. The motion was seconded and then approved by acclamation. Ken Vannice declared the meeting adjourned at 11:54.



**Membership and Contact Information as of 18 April 2012**

<b>Name</b>	<b>Company</b>	<b>Representing</b>	<b>Voting status</b>	<b>Int. cat.</b>
Patric J. Abaravich	I.A.T.S.E. Local 728	I.A.T.S.E. Local 728	A	U
Daniel Ayers	Norcostco (Sales-Midwest)	Norcostco	O	DR
Robert Barbagallo	Solotech Inc.	Solotech Inc.	O	DR
Lee J. Bloch	Bloch Design Group, Inc.	Bloch Design Group, Inc.	O	G
Joe Boardman	Bender Inc.	Bender GmbH & Co. KG	A	MP
Ron Bonner	PLASA Technical Resources Office	PLASA EU	P	U
Eric Bouchard	Cirque du Soliel	Cirque du Soliel	O	CP
Louis Bradfield	Louis Bradfield	Louis Bradfield	P	U
Stephen (Steve) Brock	Bender ET Inc.	Bender GmbH & Co. KG	A	MP
André Broucke	André Broucke	André Broucke	O	G
John (Javid) D. Butler	Integrated Theatre, Inc.	Integrated Theatre, Inc.	O	CP
Richard Cadena	Academy of Production Technology	Academy of Production Technology	P	G
Vincent J. Cannavale	Motion Laboratories	Motion Laboratories	P	CP
Michael J. Carnaby	Mikan Theatricals	Mikan Theatricals	O	DR
Edward R. Condit	Edward R. Condit	Edward R. Condit	O	U
James Davey	AC Power Distribution Inc.	AC Power Distribution Inc.	P	CP
Kenny Delahoussaye	Aggreko	Aggreko	O	DR
Jeff deRecat	Marinco	Actuant Corporation	P	MP
Jim Digby	The Collaborative Endeavor Group	Linkin Park Touring/The Collective	O	U
William Drake	Marinco	Actuant Corporation	A	MP
Marsha DuBois	Pintech Stage Connectors, Inc.	Pintech Stage Connectors, Inc.	O	CP
Steve DuBois	Pintech Stage Connectors, Inc.	Pintech Stage Connectors, Inc.	O	CP
James Eade	PLASA	PLASA	O	G
Don Earl	Earl Girls, Inc.	Earl Girls, Inc.	O	DR

<b>Name</b>	<b>Company</b>	<b>Representing</b>	<b>Voting status</b>	<b>Int. cat.</b>
Jose J. Flores	Kino Flo, Inc.	Kino Flo, Inc.	O	MP
Trevor Forrest	Helvar Lighting Control	Helvar Lighting Control	O	MP
Howard Forryan	Harting Ltd.	Harting KGAA	A	G
Ian Foulds	IATSE Local 873	Entertainment Electrical Safety Committee of Ontario	P	G
Phillip M. Gallo	TMB	TMB	O	DR
Ed Garstkiewicz	Harting Inc., North America	Harting KGAA	P	G
Richard B. Glickman	Gliconen Corporation	Rosco Laboratories	O	MP
Reuben Goldberg	Technic Services	Technic Services	O	U
Jerry Gorrell	Theatre Safety Programs	Theatre Safety Programs	P	U
Bill Grande	Leviton Manufacturing Co., Inc.	Leviton Manufacturing Co., Inc.	A	MP
Torsten Gruhn	Bender Inc.	Bender GmbH & Co. KG	A	MP
Mitch Hefter	Mitch Hefter	USITT	P	U
Peter Herrmann	Motion Laboratories	Motion Laboratories	A	CP
David Herrmann	Motion Laboratories	Motion Laboratories	A	CP
Jim Holladay	Luxence	Luxence	O	G
Wendy Holt	AMPTP/CSATF	Alliance of Motion Picture and Television Producers	P	G
Simon Hunt	IATSE Local 891	IATSE Local 891	O	U
Richard L. Eberth_Jr.	North Shore Safety	Airpax Corporation	O	MP
Tyrone Mellon_Jr.	Lex Products Corp.	Lex Products Corp.	A	CP
Kirk D. Keen	Hollywood Lighting Services, Inc.	Hollywood Lighting, Inc.	O	DR
Hiroshi Kita	Marumo Electric Co., Ltd.	Marumo Electric Co., Ltd.	O	MP
Wayne Kowalski	Coleman Cable Inc.	Coleman Cable Inc.	O	MP
Edwin S. Kramer	I.A.T.S.E. Local 1	I.A.T.S.E. Local 1	P	U
Charles (Chuck) Kurten	Underwriters Laboratories, Inc.	Underwriters Laboratories, Inc.	O	G
Roger Lattin	I.A.T.S.E. Local 728	I.A.T.S.E. Local 728	P	U

<b>Name</b>	<b>Company</b>	<b>Representing</b>	<b>Voting status</b>	<b>Int. cat.</b>
Michael Lay	Philips Color Kinetics	Royal Philips Electronics	P	MP
Marty Lazarus	Chicago Spotlight, Inc.	Chicago Spotlight, Inc.	O	DR
Nathan Leonard	Bender Group	Bender GmbH & Co. KG	P	MP
Dave Lester	Clair Global	Clair Global	O	U
George Long	Aggreko Event Services	Aggreko	P	DR
Bob Luther	Lex Products Corp.	Lex Products Corp.	P	CP
William L. Maiman	William L. Maiman	William L. Maiman	O	U
Paul F. Mardon	Pulsar Ltd.	Pulsar Ltd.	O	MP
Greg Mayberry	AC Power Distribution Inc.	AC Power Distribution Inc.	A	CP
Pat Miller	Hubbell Wiring Devices	Hubbell Inc.	O	MP
Martin Moore	Martin Moore	Martin Moore	O	DE
David Murray	IPC Resistors Inc.	IPC Resistors Inc.	O	CP
Kevin O'Brien	Bestek Lighting & Staging	Bestek Lighting & Staging	O	U
W. G. Krokaugger_PE	Mole-Richardson Co.	Mole-Richardson Co.	P	CP
Natti Pierce-Thomson	North American Theatre Technology	North American Theatre Technology	O	U
Elizabeth E. (Lizz) Pittsley	Elizabeth Pittsley	Elizabeth Pittsley	O	U
R. Bruce Prochal	IATSE Local 728	I.A.T.S.E. Local 728	A	U
Alan M. Rowe	IATSE Local 728	I.A.T.S.E. Local 728	A	U
Larry Schoeneman	DesignLab Chicago, Inc.	DesignLab Chicago, Inc.	O	DE
Michael Scudday	SSRC, Inc.	SSRC, Inc.	O	CP
Ford Sellers	Cornell University	Cornell University	O	U
Mike Skinner	CBS Studio Center	Alliance of Motion Picture and Television Producers	O	U
Sean Sloat	Lex Products Corp.	Lex Products Corp.	A	CP
Arnold Tang	Arnold Tang Productions	Arnold Tang Productions	O	G
Steve Terry	Electronic Theatre Controls	Electronic Theatre Controls, Inc.	P	MP

Name	Company	Representing	Voting status	Int. cat.
Eric Tishman	Rosco Laboratories	Rosco Laboratories	O	MP
Stephen Vanciel	Stephen Vanciel	Stephen Vanciel	O	U
Ken Vannice	Leviton Manufacturing Co., Inc.	Leviton Manufacturing Co., Inc.	P	MP
Art Wanuch	Entertainment Electrical Safety Committee of Ontario	Entertainment Electrical Safety Committee of Ontario	A	G
Colin Waters	TMB	TMB	O	DR
Jody Williquette	Electrivers, Inc.	Electrivers, Inc.	P	CP
Richard Wolpert	Union Connector Company (MO)	Union Connector Company	O	CP
Keith S. Woods	Lakhri Impressions Ltd.	IATSE Local 891	P	U
Jiantong Wu	Beijing Special Engineering Design & Research Institute	Beijing Special Engineering Design & Research Institute	O	G
Alex Yoon	Mole-Richardson Co.	Mole-Richardson Co.	A	CP

**Key to codes:**

P principal voting member  
A alternate voting member  
I individual voting member  
O observer, non-voting

MP mass-market producer interest category  
CP custom-market producer interest category  
DR dealer or rental company interest category  
U user interest category  
G general-interest interest category  
DE designer interest category