

Minutes
Electrical Power Working Group
Friday, July 14, 2000
Dallas/Ft. Worth Airport Marriott
Irving, TX

Chairs: Bob Luther; Lex Products Corp.; principal; producer
Ken Vannice; NSI Corporation (Leviton Manufacturing Co., Inc.); principal; producer

Recording secretary: Karl G. Ruling, ESTA

Members attending: Jeff de Recat; Advanced Devices, Inc.; alternate; producer
George Long; Aggreko Event Services; observer; producer (changed to principal at this meeting)
Tim Bachman; Barbizon Light; principal; user
Wolfgang Hofheinz; Bender GmbH & Co. KG; principal; producer (joined at this meeting)
Joe Boardman; Bender Inc. (Bender GmbH & Co. KG); alternate; producer (joined at this meeting)
Jeffrey Measley; Crouse-Hinds Molded Products; principal; producer
Trevor Forrest; Helvar Lighting Control; principal; producer
Bill Kanne; Hollywood Rental Co.; principal; user (joined at this meeting)
Roger Lattin; IATSE Local 728; alternate; user
Edwin S. Kramer; IATSE, Local 1; principal; user
Jose J. Flores; Kino Flo, Inc.; principal; producer
Don Gray; Kohler Event Services; observer; user (changed to principal at this meeting)
Louis Bradfield; Louis Bradfield; individual; user
W. G. Krokaugger P.E.; Mole-Richardson Co.; principal; producer
Tim Cox; PLASA; principal; general interest
Robert Barbagallo; Proximo Inc.; principal; general interest
Mitch Hefter; Rosco/Entertainment Technology (USITT); principal; general interest
William N. Masten; SMS Inc. / PGS LLC; principal; producer (joined at this meeting)
Richard A. Prey; SMS Inc. / PGS LLC; alternate; user (joined at this meeting)
Milton Davis; Strand Lighting; observer; general interest (joined at this meeting)
Andy Topinka; Technical Group Services, Inc.; principal; general interest
Warren Mays; TMB Associates; alternate; producer

1 Opening remarks

Ken Vannice called the meeting to order at 8:06. The start of the meeting had been held because of a service delay at the Marriott Café and because more chairs were needed.

2 Attendance and membership

2.1 Introduction of those present

Vannice noted that there were a lot of new faces. He suggested we start by offering self-introductions. Each person did, and told a bit about what his company does and the company's interests in the work of the group.

2.2 Determination of quorum (8 needed)

Vannice asked for a show of hands of voters. Eleven people raised their hands. Vannice announced that we had a quorum.

2.3 Recognition of alternate voting members

Alternates were recognized. Voting members were reminded that each organization or company has only one vote. Either the alternate or principal can vote on a motion, but not both.

2.4 Requirements for membership

Vannice reviewed the requirements. Membership is open to all who have a material interest in the work of the group. We work to keep a balance of interests.

2.5 Processing of new membership requests

Bob Luther noted that the new applications will help our interest balance. He read all the applications:

Mac Perkins; PNTA; observer; general interest
Wolfgang Hofheinz; Bender GmbH; principal; producer
Joe Boardman; Bender Inc.; alternate; producer
William Masten; SMS Inc./PGS LLC; principal; producer
Richard A. Prey; SMS Inc./PGS LLC; alternate; producer
Patric J. Abaravich; IATSE Local 728; alternate; user
Earl Williman; IATSE Local 728; alternate; user
Bill Kanne; Hollywood Rental Co.; principal; user
Milton Davis; Strand Lighting; observer; general interest

Mitch Hefter moved they be accepted. The motion was seconded. By a show of hands the motion was accepted unanimously.

George Long of Aggreko Event Services and Don Gray of Kohler Event Services asked to be changed from observers to principals. Eddie Kramer moved that their request be accepted. The motion was seconded. By a show of hands the motion was accepted unanimously.

At the July 1999 meeting Vannice had announced the following attendance policy:

Vannice announced that the penalty for non-attendance will be a change of voting status to

Observer. At the beginning of the third consecutive meeting missed by both a principal and his alternate, the principal and alternate (if there is one) will be changed to observer.

Vannice noted that the voting representatives from PRG (Steve Terry and Teddy Van Bommel) have missed three consecutive meetings. Their voting status is now changed to observer.

The voting body, after the above changes were made, was:

Name	Company	Company or organization represented	Voting status	Interest cat.
Doug Kraus	Advanced Devices, Inc.	Advanced Devices, Inc.	P	P
Bud Toly	Advanced Devices, Inc.	Advanced Devices, Inc.	A	P
Jeff deRecat	Advanced Devices, Inc.	Advanced Devices, Inc.	A	P
George Long	Aggreko Event Services	Aggreko	P	P
David Evaniew	B. I. M. Limited	B. I. M. Limited	P	P
Tim Bachman	Barbizon Light	Barbizon Companies	P	U
Wolfgang Hofheinz	Bender GmbH & Co. KG	Bender GmbH & Co. KG	P	P
Joe Boardman	Bender Inc.	Bender GmbH & Co. KG	A	P
Jeffrey Measley	Crouse-Hinds Molded Products	Crouse-Hinds Molded Products Inc.	P	P
Trevor Forrest	Helvar Lighting Control	Helvar Lighting Control	P	P
Bill Kanne	Hollywood Rental Co.	Hollywood Rental Co.	P	U
Edwin S. Kramer	IATSE, Local 1	I.A.T.S.E. Local 1	P	U
R. Bruce Prochal	I.A.T.S.E. Local 728	I.A.T.S.E. Local 728	P	U
Roger Lattin	IATSE Local 728	I.A.T.S.E. Local 728	A	U
Patric J. Abaravich	IATSE Local 728	IATSE Local 728	A	U
Earl Williman	IATSE Local 728	IATSE Local 728	A	U
Jose J. Flores	Kino Flo, Inc.	Kino Flo, Inc.	P	P
Don Gray	Kohler Event Services	Kohler Co.	P	U
Ken Vannice	NSI Corporation	Leviton Manufacturing Co., Inc.	P	P
Mitchell Stein	Leviton Manufacturing Co., Inc.	Leviton Manufacturing Co., Inc.	A	P

Bob Luther	Lex Products Corp.	Lex Products Corp.	P	P
Louis Bradfield	Louis Bradfield	Louis Bradfield	I	U
Phil Fram	Marinco	Marinco	P	P
W. G. Krokaugger P.E.	Mole-Richardson Co.	Mole-Richardson Co.	P	P
Brian Parker	Mole-Richardson Co.	Mole-Richardson Co.	A	P
Tim Cox	PLASA	PLASA	P	G
Robert Barbagallo	Proximo Inc.	Proximo Inc.	P	G
William N. Masten	SMS Inc. / PGS LLC	SMS Inc. / PGS LLC	P	P
Richard A. Prey	SMS Inc. / PGS LLC	SMS Inc. / PGS LLC	A	P
Andy Topinka	Technical Group Services, Inc.	Technical Group Services, Inc.	P	G
Colin Waters	TMB Associates	TMB Associates	P	P
Brian Dowd	TMB Associates (NJ)	TMB Associates	A	P
Warren Mays	TMB Associates	TMB Associates	A	P
Richard Wolpert	Union Connector Company	Union Connector Company	P	P
Mitch Hefter	Rosco/Entertainment Technology	USITT	P	G
			24 voting members	

3 Approval of the minutes from the previous meeting

Mitch Hefter moved that the draft minutes of the previous meeting be accepted as written. The motion was seconded. The motion was accepted unanimously by a show of hands.

4 Call for Patents

Ken Vannice noted that there are a number of new people present, so particular attention should be paid to the usual ESTA declarations. Ken Vannice read the following:

“ESTA intends to publish no standard that contains protected intellectual property, unless that property can be licensed by anyone for a reasonable fee. ESTA uses a process of open patent disclosure to implement this intent. ESTA does not conduct patent searches and does not warrant that its standards contain no protected intellectual property.

“In keeping with the open disclosure policy, I ask if anyone present wishes to notify the working group of the existence of a patent or copyright that might protect material in a standard being developed by the working group. You need not be the holder of the patent or copyright in order to notify the working group of its existence.”

No issues were identified by the group.

Vannice then read the following anti-trust statement:

“The ESTA Board of Directors, the Technical Standards Committee, and the leadership of this Working Group will reject or nullify any actions that restrain trade. Anyone who feels that an action restraining trade is being or has been taken is requested to bring the 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 ESTA president immediately.”

“ESTA legal counsel has informed us that any member of this working group may be found individually liable for any action that restrains trade taken by this working group. An individual convicted of a violation of the Sherman Act may be fined as much as \$100,000 and be imprisoned for up to three years. An easy to read pamphlet describing restraint of trade is available from the Technical Standards Committee.”

No issues were identified by the group.

5 Approval of Agenda

Mitch Hefter moved that the draft agenda be accepted as written. The motion was seconded. The motion was accepted unanimously by a show of hands.

6 Old Business - Task group reports

6.1 Task group on a recommended practice for selection, installation, and use of portable feeder cable

Lattin reported on the survey. A paper of the draft survey document was distributed at the meeting. Attendees were invited to send comments to 4ought@esta.org.

Vannice reviewed what we are going to do. The task group is to present a final draft by LDI. Kramer said this could be done to meet the two-week rule. Vannice said that when the survey form is done, we'll decide what we are going to do with it.

Barbagallo asked how the survey was going to be distributed to make sure it is valid. There was a discussion of this issue. Barbagallo offered Proximo's database of Canadian entertainment venues. Kramer asked Ruling for the LDI trade show mailing list.

Kramer asked the group for guidance as to whether the recommended practice for selection, installation, and use of portable feeder cable should be a US, International, or North American standard or document. There was a discussion of this.

6.2 Task group for a recommended practice for use of GFCI (Residual Current Devices) in entertainment applications.

Mitch Stein was not present to give a report.

Richard A. Prey spoke of his company's interest in the project. Mr. Hofheinz was introduced by Prey. Hofheinz has considerable experience with standards work in Germany dealing with RCD/GFP devices. Bob Luther said that Heinz's presence is appreciated.

There was a discussion of how to proceed. The consensus of the group was that a new task group head was needed. Bill Masten and Joe Boardman volunteered to be co-chairs of the task group. They volunteered to provide a mass of factual documentation about GFCI/RCD/GFP for the committee by LDI.

Ken Vannice and Bob Luther appointed William Masten and Joe Boardman to be the new heads of the GFCI/RCD Task Group. Ruling was directed to make a public announcement that the project has gotten off the ground.

Mitch Hefter reminded the new task group co-chairs of the two-week rule for documents to be acted on at a meeting. That is, any document that is to be acted on at a meeting must be distributed no less than two weeks before the meeting. If this is not done, action on the document may be tabled, or any votes may be done by letter ballot. A late document may be voted on at a meeting only if all the committee members agree. If Ruling is supposed to do this distribution, the documents have to be to him several days (approximately a week) before the two week deadline.

6.3 Task group to write a configuration standard for HMI power cables and/or head to ballast cables

Warren Mays presented the first draft of a standard for HMI ballast power cables.

Mitch Hefter moved that this HMI power configuration cable document become an American National Standard project. The motion was seconded by Tim Bachman. There was a discussion of making it an IEC standard. The motion to make it an American National Standard passed unanimously by a show of hands. No abstentions, no negative votes.

Mays said the head to ballast cable project would probably be simply an informational document, and would not be a standard.

6.4 EMC task group

Ken Vannice reported that another EMC workshop was held May 9 & 10 at the Baltimore Washington International Airport Sheraton. Vannice reviewed the changes being made to EN 61000-3-2. (A report

is attached.) There will be a CENELEC only amendment; the IEC amendment will happen later, if at all.

Vannice reported that the 61000-3-3 Flicker standard really deals with current inrushes. There are several amendments to it that the US opposes. Cox said they passed.

Vannice also reported that IEEE 519 is being revised.

The task group is going to work toward a survey of power use in the entertainment industry, so that we can develop a comparison of it to the total power use in the United States.

6.5 Task group on troubleshooting power quality problems

Andy Topinka reported that he has been working on a layman's document on troubleshooting power quality problems. He has about 70 pages done so far, that address:

- Problems
- How to identify
- How to ameliorate.
- Case studies.

Topinka said he plans to have a draft to working group in time for the January meeting.

Roger Lattin reported problems with harmonics affecting the control electronics of generators and asked that the document provide guidance on this. Topinka said it already does.

There was general praise for the project and the progress so far.

7 New business

There was a discussion of a project to standardize the identification of cable lengths. Bob Luther pointed out that this was a recurring topic on the Stagecraft mailing list. The consensus was that we do not have the resources to address this issue now.

8 Other business

None.

9 Schedule for future meetings

Vannice announced that the next meeting will be Friday, October 20, 2000 from 7:00 p.m. to 11:00 p.m. at Harrah's Las Vegas.

10 Adjournment

Tim Bachman moved the meeting adjourn. The motion was seconded. The motion was accepted unanimously on a voice vote. Vannice declared the meeting adjourned at 11:05 a.m.

The State of IEC 61000-3-2 and –3-3
As of May 2000
By
Ken Vannice

IEC 61000-3-2, EMC, Limits for Harmonic Current Emissions (equipment input current \leq 16A per phase), and 61000-3-3, EMC, Limits, Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current \leq 16A are scheduled to go into effect in the European Community (EC) on January 1, 2001. Currently these standards cover only those systems operating at 220V and above line-to-neutral.

Most of the action evolves around the –3-2 standard. Based on the lack of documented technical rationale, un-repeatable test requirements, failure to consider all mitigation options, conflicting requirements between standards and an approved plan to extensively revise the standard, the US has been pushing hard to have the effectivity date moved out three years. The IEC Technical Committee (TC77) was under pressure to band-aid the standard, and therefore, created a proposed amendment known as the Woodgate amendment. CENELEC, the EC’s standard-making body, has apparently given up on the timely adoption of the IEC amendment and are processing that same amendment as their own but with changes. Consequently the IEC amendment has been stalled. The US will probably file a complaint as this stalling tactic precludes the amendment from applying to several non-EC countries that have adopted –3-2.

A comparison of the existing –3-2 standard and the proposed CENELEC amendment is as follows:

EN 61000-3-2 (1998)	PrA14 to EN 61000-3-2
Class C status of dimmers and lamps used for secondary functions (e.g. photocopiers) unclear	Dimmers for incandescent lamps and lamps used for secondary functions (e.g. photocopiers) are Class A
Class D membership based on current waveform	Waveform test eliminated – Class D membership restricted to PC’s, PC monitors, and TV’s
Possibility for dynamic Class D membership & limits – limits track power & waveform in 320ms windows	Fixed Class D limits based on measured power – average emissions vs. maximum power
Basis for power-proportional limits unclear	Measured and specified power (within +/- 10% band)
75W lower boundary for Class D limits transitions to 50W – When?	75W lower boundary fixed until an amendment is written, circulated to NC’s, and approved (2004?)
Sliding 2.5 minute window for fluctuating emissions – 10% of samples may be 150% of applicable limits – no sample may be > 150% of applicable limits	Sliding window eliminated – average of all samples must be < applicable limits – no sample may be > 150% of applicable limits
Failures of individual higher order harmonics result in equipment failure (i.e. nuisance failures)	R.M.S. of higher order odd harmonics must be < R.M.S. of applicable limits (n = 21, 23,39)
Most electronic products subjected to proportional limits according to “equal rights” principle	Beachhead established for imposing emission limits according to USCEMC-9901 “impact” principle
Limits for professional equipment > 1kW “under consideration”	Limits for professional products > 1kW “...may be defined in a future amendment...”
“C.1 – General Test Conditions” includes requirement to conduct 39 separate tests	“C.1 – General Test Conditions” amended to eliminate requirements to conduct 39 separate tests

The amendment redefines the test procedures to promote repeatability as follows:

6.2.3.1 Repeatability

The repeatability of the measurements shall be better than +/- 5%, when the following conditions are met:

- a) the same equipment under test (EUT) (not another of the same type, however similar),
- b) identical test conditions,
- c) same test system,
- d) identical climate conditions, if relevant.

Furthermore, the amendment modifies the test duration as follows:

Type of equipment behavior	Observation period
Quasi-stationary	T_{obs} of sufficient duration to meet the requirements for repeatability in 6.2.3.1.
Short cyclic ($T_{cycle} \leq 2.5$ min)	$T_{obs} \geq 10$ cycles (reference method) or T_{obs} of sufficient duration or synchronization to meet the requirements for repeatability in 6.2.3.1 (see Note).
Random	T_{obs} of sufficient duration to meet the requirements of repeatability in 6.2.3.1.
Long cyclic ($T_{cycle} > 2.5$ min)	Full equipment program cycle (reference method) or a representative 2.5-min period considered by the manufacturer as the operating period with the highest THC.

Note: By “synchronization” is meant that the total observation period is sufficiently close to including an exact integral number of equipment cycles such that the requirements for repeatability in 6.2.3.1 are met.

There is also an amendment to –3-3 circulating at the IEC level for a vote. The USNC will probably vote against the amendment. It is expected to pass anyway. Don’t be deceived by the –3-3 title. The standard actually seeks to control current inrush. A comparison of the existing –3-3 standard and the proposed IEC amendment is as follows:

EN 61000-3-3 (1995)	77A/303/CDV and 77A/303A/CDV
Implied limits on inrush current from manual switching	Explicit limits on inrush current from manual switching
Z_{ref} is IEC725 value of $0.4 + j0.25$ ohms	Reference to IEC 61000-3-11 permits use of lower Z_{ref} values in commercial/industrial environments
D_{max} limit for automatic switching is 4% D_{max} limit for manual switching is 5.32%	D_{max} limit for automatic switching is 4% D_{max} limit for manual switching is 6% D_{max} limit for automatic switching more than twice per day with delayed restart (> “...few tens of seconds...”) is 6% D_{max} limit for equipment which is “attended” or has delayed or manual restart and manual or automatic switching no more than twice per day is 7%
Measurement of r.m.s. voltage drop across Z_{ref} in 10ms windows synchronized for frequency	Measurement of r.m.s. voltage drops across Z_{ref} in 10ms windows synchronized for frequency and zero-crossings
Unworkable and unrepeatable test method for inrush measurements	New unworkable and unrepeatable test method for inrush measurements
D_c limit is 3.0%	D_c limit is 3.3%
$P_{st} \leq 1.0$; $P_{lt} \leq 0.65$	$P_{st} \leq 1.0$; $P_{lt} \leq 0.65$ (no change)

The US is increasing its pressure to move the effectivity dates of these standards out 3 years. It has moved the issue from the Cabinet and Congress level up to the US Presidential level. Legal action is also being considered. The US protest has had a large effect on the process, but whether that protest will have enough effect before the 1/1/01 deadline, is yet to be seen.

Working Group Membership After All Changes Made At The Meeting

Name	Company	Parent Co./Org Represented	Vot. Stat.	Int. Cat.
Doug Kraus	Advanced Devices, Inc.	Advanced Devices, Inc.	P	P
Bud Toly	Advanced Devices, Inc.	Advanced Devices, Inc.	A	P
Jeff deRecat	Advanced Devices, Inc.	Advanced Devices, Inc.	A	P
George Long	Aggreko Event Services	Aggreko	P	P
David Evaniew	B. I. M. Limited	B. I. M. Limited	P	P
Tim Bachman	Barbizon Light	Barbizon Companies	P	U
Wolfgang Hofheinz	Bender GmbH & Co. KG	Bender GmbH & Co. KG	P	P
Joe Boardman	Bender Inc.	Bender GmbH & Co. KG	A	P
Lee J. Bloch	Bloch Design Group Inc.	Bloch Design Group Inc.	O	G
Jeffrey Measley	Crouse-Hinds Molded Products	Crouse-Hinds Molded Products Inc.	P	P
Ron Dahlquist	Dadco	Dadco	O	P
Trevor Forrest	Helvar Lighting Control	Helvar Lighting Control	P	P
Bill Kanne	Hollywood Rental Co.	Hollywood Rental Co.	P	U
Kevin Stolpe	Hollywood Rental Company	Hollywood Rental Company	O	G
Edwin S. Kramer	IATSE, Local 1	I.A.T.S.E. Local 1	P	U
R. Bruce Prochal	I.A.T.S.E. Local 728	I.A.T.S.E. Local 728	P	U
Roger Lattin	IATSE Local 728	I.A.T.S.E. Local 728	A	U
Patric J. Abaravich	IATSE Local 728	IATSE Local 728	A	U
Earl Williman	IATSE Local 728	IATSE Local 728	A	G
Jose J. Flores	Kino Flo, Inc.	Kino Flo, Inc.	P	P

Name	Company	Parent Co./Org Represented	Vot. Stat.	Int. Cat.
Don Gray	Kohler Event Services	Kohler Co.	P	U
Ken Vannice	NSI Corporation	Leviton Manufacturing Co., Inc.	P	P
Mitchell Stein	Leviton Manufacturing Co., Inc.	Leviton Manufacturing Co., Inc.	A	P
Bob Luther	Lex Products Corp.	Lex Products Corp.	P	P
Louis Bradfield	Louis Bradfield	Louis Bradfield	I	U
Phil Fram	Marinco	Marinco	P	P
Hiroshi Kita	Marumo Electric Co., Ltd.	Marumo Electric Co., Ltd.	O	P
W. G. Krokaugger P.E.	Mole-Richardson Co.	Mole-Richardson Co.	P	P
Brian Parker	Mole-Richardson Co.	Mole-Richardson Co.	A	P
Tim Cox	PLASA	PLASA	P	G
Mac Perkins	PNTA	PNTA Inc.	O	G
Steve Terry	PRG Lighting Division	PRG	O	U
George Sabbi	PRG Lighting Group	PRG	O	U
Robert Barbagallo	Proximo Inc.	Proximo Inc.	P	G
Paul F. Mardon	Pulsar Ltd.	Pulsar Ltd.	O	P

Name	Company	Parent Co./Org Represented	Vot. Stat.	Int. Cat.
Andre Broucke	ADB - TTV Technologies	Siemens	O	P
William N. Masten	SMS Inc. / PGS LLC	SMS Inc. / PGS LLC	P	P
Richard A. Prey	SMS Inc. / PGS LLC	SMS Inc. / PGS LLC	A	P
Milton Davis	Strand Lighting	Strand Lighting Ltd.	O	G
Paul Smith	Strand Lighting Ltd.	Strand Lighting Ltd.	O	U
Andy Topinka	Technical Group Services, Inc.	Technical Group Services, Inc.	P	G
Colin Waters	TMB Associates	TMB Associates	P	P
Brian Dowd	TMB Associates (NJ)	TMB Associates	A	P

Voting Status

- P Principal voting representative for a company or organization
- A Alternate voting representative for a company or organization
- I Individual representing no organization other than himself or herself
- O Observer; non-voting

Warren Mays	TMB Associates	TMB Associates	A	P
Richard Wolpert	Union Connector Company	Union Connector Company	P	P
Mitch Hefter	Rosco/Entertainment Technology	USITT	P	G
Eckart Steffens	SOUNDLIGHT	VPLT	O	G
Bruce Whitehead	Whitehead Engineering Services	Whitehead Engineering Services	O	G
Richard Thornton Brown	Zero 88 Ltd.	Zero 88 Ltd.	O	P

Note: Teddy Van Bommel was removed from this roster subsequent to the meeting on 1 August 2000 because he no longer works for PRG.

Interest Categories

- P Producer (manufacturer) of electrical power devices or products
- U User of electrical power devices
- G General interest in electrical power devices