

The Product Safety Newsletter

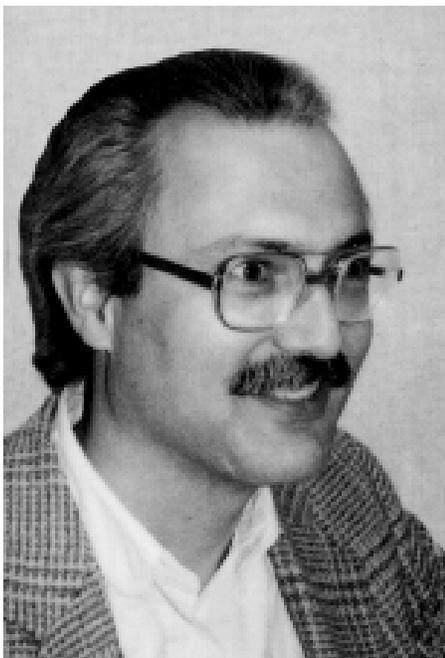


Volume 4, Number 2 March/April 1991

Guest Editorial

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former or subscribing to the latter - why wait any longer?

A Few Changes

The most dramatic change is that Rich Pescatore is stepping down as Chairman. Committee officers generally have a two year term of office in the EMC Society. By the time you read this, votes should be in for the new officers, but since it is not yet official I will only mention that I hope to be back as Secretary / Treasurer. (On the other hand, if some helpful volunteer should happen to be able to take over as Treasurer, splitting the position would certainly make my life easier!)

Product Safety Technical Committee (TC-8) Report

Does it sometimes amaze you how fast time goes by? More than two years have passed since the formation of TC-8 and more than three years since the first publication of the Product Safety Newsletter. If you have been "meaning to get around to" inquiring about the

Seriously, participating in a organization such as this is a very rewarding experience, both personally and professionally. If product safety is part of your job, then time spent here is time well spent. You can learn from your peers, make valuable contacts, increase your professional recognition, influence the future of product safety standards

and processes, and even have fun. Does this sound a little like a sales pitch? Well, it is one! If you would like to hear the rest of my spiel, feel free to call me at 408-447-0738.

The Product Safety Newsletter is really steaming along now that Ken Warwick has taken over the layout and production role. An issue every five or six weeks at first has caught us up to our regular schedule. Contributors are very welcome - articles, news items, letters and more - we are glad to be able to provide a forum for product safety. Contributions also are very welcome - if your company could benefit from an Institutional Listing and would like to support the publication of the Product Safety Newsletter, please let us know.

One important note: if you don't want to miss your issue of the Product Safety Newsletter soon, you'd better **REMEMBER TO SEND IN YOUR SUBSCRIPTION RENEWAL NOTICE.**

The Product Safety Newsletter

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Opinions expressed in this newsletter are those of the authors and do not necessarily represent the opinions of the Technical Committee or its members. Indeed, there may be and often are substantial disagreements with some of the opinions expressed by the authors.

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Laser Requirements Harmonization Meeting

by Brady Turner
Hewlett Packard
Greeley, Colorado

On January 28 and 29, 1991, representatives from the Center for Devices and Radiological Health (CDRH), the US Army, IEC TC76, and industry met to discuss harmonization between the United States laser product requirements (21 CFR 1040) and the international laser product requirements (IEC 825).

There are several factors motivating this effort:

- a. The need for harmonization of all US standards with international standards, specifically the laser safety standard of the International Electrotechnical Commission (IEC), IEC 825.
- b. The need to adjust Accessible Emission Limits (AEL's) and measurement criteria in the Federal standard in accordance with new biological data.
- c. To resolve problems related to new applications of laser technology.

Over the course of the two days, eighteen changes to the two standards were drafted. These proposals will be submitted to the CDRH and the IEC through TC76. If adopted, these proposals would virtually eliminate all variations between the two standards.

Recommended Changes to Both 21 CFR 1040 and IEC 825

1. Revise the time basis for classification for those laser products which emit laser radiation at wavelengths greater than 400 nm which are not intended to be viewed. This applies only to the use of Class 1AEL's.

JUSTIFICATION: Harmonization with IEC TC76/WG1 proposal for revision of paragraph 9.3ii, and to recognize realistic exposure conditions.

2. Consider the extension of Class 2 into the infrared based upon the concept of behavioral limitations upon exposure duration.

JUSTIFICATION: To address the concerns of IEC TC76/WG5 and the proposal of WG1 to reduce the abrupt transition from Class 1 to Class 3A and Class 3B in the infrared.

3. Revise the measurement criteria for other than collimated beams to measure with a 3.5 mm aperture located at a distance of 10 cm from the apparent source with 10 diopter collimating optics or less. A 7 mm aperture would be used for collimated beams for products intended to be used in a locale where the emitted laser radiation is unlikely to be viewed with optical instruments. A 50 mm aperture would be used with the same collimating optics where the laser product can be expected to be viewed by optical aids.

JUSTIFICATION: To harmonize with an expected change in IEC 825 and to recognize the possibility of strong myopes being able to view at 10 cm with a sharp retinal image.

4. Propose the wording on protective housing labels with simplified, more generic, such as "CAUTION, Laser Radiation Inside, Avoid Exposure." The ISO/IEC effort to revise safety symbols needs to be closely watched to maximize harmonization.

JUSTIFICATION: To facilitate compliance.

5. Eliminate the requirement for emission indicator on lasers emitting Class 3A levels or less and to adopt the current recommendation of IEC/TC76 to place emission indicators on remote exit apertures.

JUSTIFICATION: Harmonization between 21 CFR and IEC 825

6. Revise the AEL for Class 1 at 1535-1545 nm to apply to all exposures less than 10 seconds in the spectral region 1530 to 1550 nm.

JUSTIFICATION: To more realistically fit biological data.

Recommended Changes to 21 CFR 1040

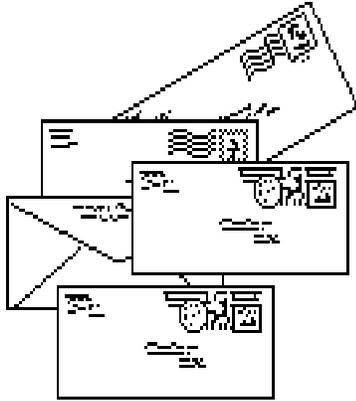
7. Revise Class 1 AEL's for wavelengths between 550 nm and 1400 nm for emission durations greater than or equal to 10 seconds. It is proposed that the AEL's be the same as those in ANSI Z136.1 and IEC 825 as amended.

JUSTIFICATION: For harmonization with IEC and to more closely fit actual biological data for retinal injury.

8. Extend the CDRH definition for

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Letters to the Editor



Best regards,
Don Clayton

[Have any readers had experience in using this type of circuit in their product certifications? When is it helpful to use "limited current" rather than "SELV" (or other) in product descriptions? Please send your comments and recommendations to the Editor. - Ed.]

outcome, not to be associated with the IEEE, disappointed many of the members.

Thanks again.

Jerry Kutcher
Xerox Imaging Systems, Inc.
Director Quality

[Are any readers able to answer these questions? Please drop us a line. - Ed.] ❖

Limited Current Info Needed:

Dear Sir:

I would appreciate your help in better understanding the actual intent of Sub-Clause 2.4.1 of IEC 950 regarding limited current circuits. Where are limited current circuits required? This Sub-Clause makes no mention of voltage levels. Is it to be implied that limited current circuits are also at hazardous voltage levels? One example I can give is the personal computer interface circuits which are operator accessible. Obviously I/O circuits with +5VDC steady-state output can put 2.5 ma through the 2 kohm test resistor.

Perhaps this Sub-Clause applies to wet-use applications or medical installations? I hope you or one of your associates can shed some light on this requirement.

Because the town of Grass Valley is so far from Santa Clara Valley, I have not been able to attend the regional meetings.

"Sweden Sour":

My thanks to you, and especially to Rich Pescatore, for a really fine job in bringing about the Product Safety Newsletter.

As you might guess from my comments on future articles in the Newsletter, I have a strong interest in European safety laws. This came about after I discovered that the Swedish safety testing group, SEMKO, does not recognize TÜV. This, indeed, was a painful and costly discovery, and one which caused us to scramble quite a bit.

By the way, what do other folks do with respect to shipping product into Sweden? Do they use a "national" testing agency (e.g. - BSI, VDE) or are they able to use TÜV?

My last comment concerns the Northeast Product Safety Group. The piece about it was quite good, although it didn't accurately portray all of the politics involved. The

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Hazard Markings: Signal Word and Color Perceptions

by Peter E. Perkins, PE

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One of the major objections to the proposed ANSI Hazard Marking standard is that there is no general differentiation in the population between the proposed signal words or colors. We believe that our current data shows that there is usually enough differentiation between the commonly used signal words and colors to proceed with the introduction of the ANSI standard Z535.4 *Product Safety Signs and Labels*.

We ought to move ahead with the ANSI Z535.4 standard. Our study reinforces the usefulness of their multilevel system of hazard identification. Within the standards setting efforts of companies and test houses, movement should be to-

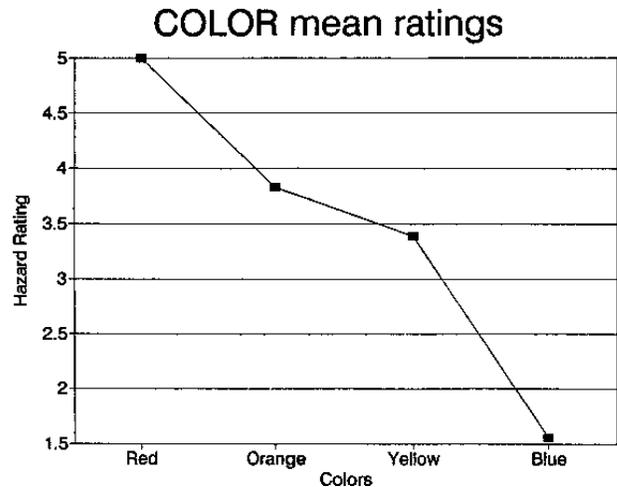
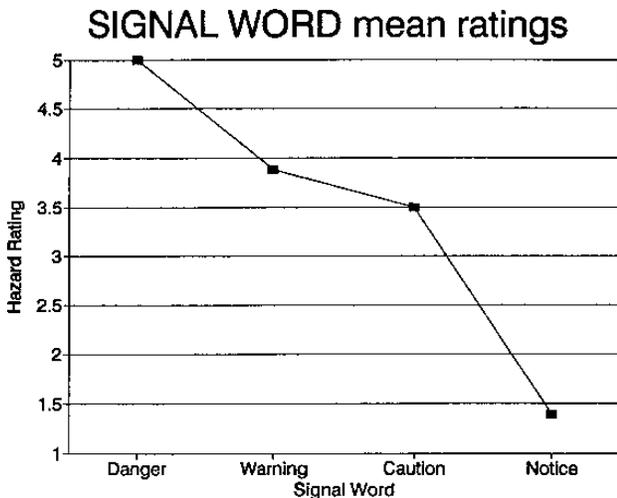
ward these commonly recognized principles in hazard markings.

We believe that our data shows that there is usually enough differentiation between the signal words or colors to proceed with the introduction of the ANSI standard Z535.4. The proposed ANSI Z535.4 standard institutes a 3 level system for differentiation of hazards in equipment. This system is already being used by some equipment manufacturers (industrial and farm equipment, heavy electrical equipment, etc.). Acceptance of the ANSI standard would bring it into general usage in the US. The use of DANGER on a RED label gives a feeling of urgency while NOTICE on a BLUE label does not. Broad application of these principles across equipment lines is important in training our mobile population in further differentiation among these signal words and colors.

Summarizing Key Points:

- 1) The use of uniform key signal words is important in telling the user the importance of the hazard. Our reactions in situations requiring quick decisions and actions is based on our lifetime experience and training. It is well known that the value of uniform signing techniques has given to increased safety of our U.S. freeway system.
- 2) The use of a recognized color to reinforce the importance of the hazard. Color is important to that large majority of the population that is not color blind because it conveys additional information from our surroundings.
- 3) There is some differentiation that exists between the signal words

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News and Notes



by Dave Edmunds

[Our readers are our greatest source of information. We thank you and remind you if you see a news item or an article that may be of interest to the product safety community, please send it to the Product Safety Newsletter, attention: News Editor. We will gladly recognize the contribution as yours. -Ed]

IEC Document on Laser Measurement

The IEC has recently announced a new standard IEC 1040 entitled "Power and Energy Measuring Detectors for Laser Radiation". This document establishes definitions and minimum requirements as well as test procedures for the characteristics and the manufacturing standards for detectors, instruments and equipment for measuring power energy of laser radiation.

The standard applies to instruments and equipment measuring laser radiation power and laser radiant energy in the optical range of 100nm to 1 mm.

Copies of this document are available from the U.S. National Committee of the IEC, 1403 Broadway, New York, New York 10018 for a cost of \$35.00.

UL Ad-hoc Meeting Report

On January 16, 1991, UL issued a report of a Ad-hoc meeting held July 18 and 19, 1990 for the development of IEC 950 based standards. An Appendix of the proposed changes to UL 1950 is available. These proposals are based on TC 74 six month rule and voting documents.

Northeast Product Safety Society

The Northeast Product Safety Society by mail vote in January has adopted a constitution and is now incorporated under the laws of Massachusetts as an independent, not-for-profit organization. This constitution does not require the affiliation of the society with any organization.

A mail ballot for officers and board members was conducted with the following results announced in their February 27th meeting:

President:

Bruce Langmuir,
Bose Corporation

Vice President:

Bill Von Achen,
DS&G

Secretary:

Tony Nikolassy,

Wang

Treasurer:

John Anderson,
Codex (Motorola)

Board Members:

Nancy Araway,
Data General

Manfred Popp,
TÜV America

Frank Pereira,
IBM

The Northeast Product Safety Society for approximately three years has been conducting monthly meetings with a guest speaker. The attendance for these meetings has averaged 30 people.

Low Level Electromagnetic Fields

The EPA issued a report concluding that enough evidence exists of a possible link between cancer and low level (60 Hertz) electromagnetic fields from power lines and household appliances to warrant new research. The study must be reviewed by high level EPA board members before the conclusions become policy.

UL Schedule for Course Seminars

UL has the following courses scheduled for UL 1950 and for Plastics:

Information Technology Equipment and UL 1950

May 22 - 23 in Boston

July 30 - 31 at La Guardia

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Revised Swedish Standard for Testing Visual Display Units

[The following press release is from MPR (National Board for Measurement and Testing) regarding the Standard MPR 1990:8 1990-12-01 (Sweden) Test Methods for Visual Display Units: Visual Ergonomics, Emission characteristics -Ed]

In 1985, the Swedish government ordered MPR (the Swedish National Board for Measurement and Testing) to establish a system for testing VDUs.

This was meant to provide the user organizations, like trade unions and health organizations, with the necessary means to evaluate individual VDUs from the point of view of work health. As support for its work MPR had a reference group consisting of representatives from trade unions, employers' organizations, computer distributors' organizations, manufacturers, health organizations, research institutes and test laboratories. MPR has two expert groups for developing test methods. One for emission characteristics and one for ergonomic characteristics.

Testing of VDUs has Proven Successful

The non-mandatory testing of VDUs started in the beginning of 1987. The system is considered successful as it has contributed to the development of better VDUs in all aspects. The test methods are used in

many countries and have won the status of an international standard. Laboratories wanting to have an official confirmation as to their capability to test according to these methods can seek accreditation by MPR.

Test methods will not focus on characteristics directly related to work environments

When the initial test methods were developed it was decided to revise them after a trial period of three years. This has now taken place. The result is that the number of characteristics to be tested has been decreased. Characteristics that were not considered to be relevant as factors in work environment have been excluded as new ones, like alternating electric field have been added. The characteristics tested according to the old methods and the characteristics to be tested according to the new methods, together with the recommended guidelines are given in Table 1.

Documentation of methods and handbook for users

The new test methods are going to be described in two documents which can be ordered from MPR from the 1st of December 1990. One of these documents contains a description of the methods and therefore addresses those who plan to perform the tests.

The other one is a handbook for

users to help them understand and interpret test results and their relevance to the work environment.

Simplified rules for accreditation

During the first era of VDU tests a laboratory seeking accreditation for testing VDUs had to have facilities to perform the complete test program or an approved subcontractor who provided the missing facilities. This was considered complicated by many laboratories who refrained from seeking accreditation for this very reason. It is now possible to seek accreditation either for testing emission characteristics or ergonomics characteristics. The quality requirements for accreditation are however still the same.

Validity

The revised methods will come into force from the 1st of January 1991. During the first half of 1991 both the old and the new methods will be valid. Starting from the 1st of July 1991 only the new methods will apply. Laboratories seeking accreditation for testing VDUs have to fulfill the requirements in "MPRs General Requirements For Accreditation Laboratories, MPFS 1990:1". These requirements are a direct application of the requirements in the European standards EN 45001 and 2 which specify requirements to be met by testing laboratories seeking accreditation.

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News

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Airport

Plastics in Electronic and Electrical Products

October 23 - 24 at O'Hare Airport

For additional information on these seminars, write or call UL's Northbrook office (708-272-8800, ext. 3444).

National Engineer's Week

February 17 to 23, 1991 was National Engineer's Week. Fifteen engineering organizations sponsored activities with the theme "Engineering and our Environment".

IEC Meeting Schedule

The IEC central office has issued a notice that rescheduling IEC meetings because of events in the Gulf should be decided by each committee Secretary and Chairman after polling the active committee members.

The 5th General meeting of the IEC is scheduled from September 30, 1991 to October 12, 1991 in Madrid, Spain.

TC 74 and CBEMA Notice Recipients Please Note:

The PSN News Editor has requested help from anyone who receives the TC 74 or CBEMA committee notices. The editor would like to include a summary of the notices in this column, as shown in the following example.

Example: "74(CO) 198: Because of changes to the power distribution in Europe, this document proposes to

revise clause 1.4.5 and 1.65. to include a + 10 % and - 10 % tolerance to rated voltages of either 230 V or 400 V."

Anyone wishing to participate in the above activity is invited to contact Dave Edmunds by mail in care of this newsletter.

UL Mark Puts on Weight: The Underwriters Laboratories symbol, a "UL" in a circle, will be looking a little fatter in the future. Although the traditional mark may continue to be used, the updated mark has a thicker line. Could it be harmonized with the CSA mark?? Ask UL for Reference Form 200-55 for relative design and proportions of the UL symbol.

CSA Power Cord Labels: Those individual labels on each CSA certified power cord may soon start disappearing. A new policy (*Certification Program Updates*, February '91) will allow bulk labelling or marking - similar to the UL approach. The result for products using power cords will probably be a revision of the power cord description in the CSA Report.

Coming Events:

May 20 - 22, 45th Annual Quality Congress, American Society for Quality Control (ASQC), Milwaukee, Wisconsin. The session 2.3.2, Product Safety & Inspection, is scheduled for Tuesday afternoon (May 21). The Product Safety & Liability Prevention Technical Committee (of the ASQC) meeting will be on Sunday afternoon (May 19). For information call

414-272-8575.

June 12 - 13, IEEE SCV EMC '91 Colloquium, IEEE EMC Society (Santa Clara Valley Chapter), Santa Clara, California. The colloquium slogan "Product Compliance, First Principles" refers to product safety as well as to EMC. A strong product safety program is planned on June 12, starting at 10:00 a.m., with talks on product liability, certification and safety engineering. For information call 408-922-4444, X9346.

June 17 - 20, CSA Annual Conference, Canadian Standards Association, Edmonton, Alberta, Canada. The theme this year is "Creating Quality Environments" and many of the sessions are oriented towards environmental programs. For information call 416-747-4128.

July 18 - 22, Tenth International System Safety Conference, System Safety Society, Dallas, Texas. A plethora of safety topics from the system point of view include process safety, safety management, nuclear safety, fire protection, product liability, software safety, ergonomics, and more. A special Mock Expert Witness Trial will be conducted during the conference. For information call 817-381-2562.

August 13 - 15, IEEE 1991 EMC Symposium, IEEE EMC Society, Cherry Hill, New Jersey. Generally EMC topics (we need a Symposium liaison to organize a product safety session for next year!). The Product Safety Technical Committee (TC-8) meets Wednesday morning (August 14). For information call 201-992-1793. ♦

NRTL Marking "Requirement"

by Dave Adams
Hewlett Packard
Palo Alto, California

The labelling requirement by OSHA (Occupational Safety and Health Administration) to add "Nationally Recognized Testing Laboratory" or "NRTL" to the certification marks of NRTLs (Nationally Recognized Testing Laboratories) needs some clarification.

The problem OSHA is attempting to solve with the marking is one their field officers have - "Does this mark from this test house mean the product is certified under the constraints of the NRTL program?". This problem exists because NRTLs have to apply for NRTL recognition for individual product categories. All the NRTLs offer additional certification services (using their mark) which are NOT covered by the NRTL accreditation. OSHA inspectors can't tell in the field who is accredited for what. OSHA thinks that a modified mark is the answer.

The original marking requirement was communicated by OSHA to the NRTLs. It was supposed to be implemented by January 1, 1991. OSHA expected the NRTLs to communicate the message to their respective clients.

Maybe you didn't hear from your testing lab? There could be a number of reasons.

A) The required implementation of the marking set for January

1, 1991, has been suspended, pending further study. OSHA staff had an internal meeting January 7, 1991, on this topic. The result was that the marking "requirement" is still voluntary until further notice.

B) UL and FM are "grandfathered" NRTLs until July 13, 1993. The NRTL marking only applies to those NRTLs who have gone through the formal accrediting process (MET, DS&G, ETL, AGA), NOT those NRTLs operating under the grandfather clause (UL and FM).

C) UL apparently opposes the OSHA NRTL marking idea, so they haven't communicated it to their customers. Other NRTLs see a marketing opportunity here, so they are promoting it.

D) Some testing labs are not NRTLs, so the marking does not apply.

If you are interested, you could work with UL or other NRTL to add the NRTL verbiage to the certification mark. OSHA will not prevent this use, regardless of how the "requirement" is resolved.

What we have is a "marketing" issue, not a "regulations" issue at the moment. In summary:

1) OSHA marking requirement implementation is delayed.

2) UL and FM wouldn't have to comply until January 1994 anyway.
3) Any of the NRTLs could require you to use the verbiage as a matter of contract regarding use of their mark.

My data sources are:

- * papers from the UL/CBEMA liaison meeting
- * conversations with two UL engineers who have heard nothing of the NRTL marking (verifies UL not following the OSHA plan)
- * Discussions and faxes from Jim Concannon, Office of Variance Determination OSHA. ❖

News Items Needed!

If you see a new item that would be of interest to the product safety community, won't you take a minute to send it to:

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(MS 843 1GS)
800 Phillips Road
Webster, NY 14580
(fax 716-422-7841)

—or—

Roger Volgstadt
c/o Tandem Computers Inc
10300 North Tantau Ave
Loc 55-53
Cupertino, CA 95014
(fax 408 285 2553)

NEMKO's Testing By Manufacturer (TBM) Program

General Facts about NEMKO

NEMKO (Norges Elektriske Materiellkontroll - the Norwegian Board for testing and approval of electrical equipment) is a fully independent test house, certification body and competence center for technical safety and reliability. It meets the stipulations of ISO/IEC guides 25/38/39/40 and the EN 45000 series of standards.

The sectors and types of equipment covered are mainly low voltage electrical products for household, office, farming and similar use, such as:

- * Electrical installation material,
- * EX-equipment [*Explosion proof/hazardous location equipment - Ed*],
- * Electromedical equipment,
- * Electromagnetic interference,
- * Environmental testing,
- * Metrology and instrument engineering.

The scope of activities for NEMKO includes testing, certification and inspection for:

- * NEMKO marking of products for the national [*Norway*] market,
- * Statements as basis for certification on international markets (e.g. - CCA, CB, EMKO agreements),
- * Reports on special testing/inspection assignments,
- * Quality systems assessment and authorization schemes,

- * Instrument calibration,
- * Standardization, failure analysis, safety research/consultancy and information services.

The main goals or current objectives of NEMKO are basically two:

- * Matching high technical quality and impartiality with speed and service to satisfy client needs,
- * Safeguarding lives, the environment and financial assets.

Testing by Manufacturer (TBM) Idea

This scheme may be described as cooperation with capable manufacturers for the purpose of rationalizing type-testing of electrical equipment, based on special agreement and mutual trust between the manufacturer and NEMKO. The NEMKO TBM scheme is first of all intended for manufacturers of products faced with rapidly evolving technology and frequent product design changes. Manufacturers who qualify for the TBM scheme basically test and evaluate their own products to ensure that they comply with applicable standards. They may, upon verification by NEMKO, obtain type approval and the right to apply the NEMKO mark to complying products.

NEMKO's TBM scheme was established in 1975 and today comprises well over one hundred authorized manufacturers worldwide.

Basis

Manufacturers having adequate qualifications, facilities and quality systems, for conducting conformity testing at their own laboratories and the ability to control production to assure compliance of the finished products, may apply for TBM authorization in order to attain certification of their products based on own measurements and investigations.

The harmonization of the manufacturers testing with the testing practices at NEMKO, is based on mutual references (TBM-INFO), current communication and visits to the manufacturer by the staff of NEMKO in order to ensure correct technical understanding and to clarify administrative matters.

Main Benefits

Reduced handling time as applications will be promptly dealt with at NEMKO.

Up to date knowledge of testing practice based on close contact between the testing personnel involved.

Give the manufacturer maximum flexibility and control over the introduction and scheduling of its products to the market.

Manufacturers must provide

Information about relevant parts of their organization and competence including quality management arrangements.

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IEC 950: Questions and Answers

Here are some questions and answers for use with IEC Standard 950, *Safety of Information Technology Equipment*, from the TC74 Chairman's Advisory Group (formerly Interpretation Panel).

The following notes should be read in conjunction with opinions of the Panel.

1. *The Panel consists of active members of TC74, but its opinions are those of the Panel and are not voted decisions of the IEC.*

2. *Where it is felt that a query arose due to lack of clarity in a standard, the matter will be brought to the attention of the appropriate group on TC74.*

3. *Panel opinions are restricted to interpretation of the words of the standard in question, as the members of the Panel recollect the original intentions of TC74. The Panel cannot be concerned with the application of the standard by test agencies and approval authorities.*

4. *The use made of Panel opinions by the originators of requests for interpretation, and others, is their own responsibility, and no guarantee can be given that a subsequent amendment to the standard will support their opinion. To assist in assessing the reliability of their opinion, the Panel will state whether it is unanimous or otherwise.*

Question (19 January 1988):

Under IEC 950: 1986, is it acceptable for a wire at hazardous voltage with one layer of insulation, with a minimum thickness of 0.4 mm, to

touch bare SELV parts?

Under sub-clause 2.3.4, third dashed paragraph, a wire with reinforced insulation appears to be accepted in this application. Sub-clause 2.9.4 specifies 0.4 mm distance through insulation for reinforced insulation when not subject to mechanical stress, etc..

For example, is this acceptable in the case of PVC or synthetic rubber insulated wiring:

- with 0.4 mm minimum insulation thickness,
- temperature rise of which does not exceed the value given in Table XIII of sub-clause 5.1,
- and which passes the electric strength test for reinforced insulation?

Can the Interpretation Panel give guidance regarding:

- when insulation is considered to be subject to mechanical stress?
- if the wire would need to be an approved component?
- the need for a second protection in the event of a single failure (i.e. - fault in 0.4 mm insulation on wire)?

Opinion of the Panel:

The example you describe is acceptable according to the text of IEC 950 provided that it can be agreed that the wire is not subject to mechanical stress, etc.. This term is intended to refer to wiring which, for example, connects a hinged part to a fixed part, or is in such a position that frequent rubbing is likely by operator functions such as load-

ing paper. Simply being exposed, for example, to occasional contact by a tool during service operations is not considered "likely to lead to deformation or deterioration of the insulating material".

Regarding your other two questions, the matter of an approved component is not a matter for TC74 but is rather a means for a test house to assure itself that TC74's requirements have been met. The insulation in question is Reinforced Insulation defined as being equivalent to Double Insulation. Only a single fault in Double Insulation is ever considered. Reinforced Insulation is considered to be equally reliable so that no fault can ever occur, and the question of an additional (third) protection does not arise.

Question (11 September 1989):

Is it part of the procedure for the operation of the Chairman's Advisory Panel that the answers to question be sent to certain bodies for information (e.g. - IECCE Committee of Testing Laboratories)? If so, is this being done?

Opinion of the Panel:

Yes. The answers to date will shortly be distributed to test houses and others.

[There are more questions and opinions in the package distributed, some of which may appear in future issues of the PSN. Here's a question for our Readers - Did you know that this Panel existed? - Ed.] ❖

Power Factor Correction for European Use

by Arnold Hagiwara,
Vice President Pioneer Magnetics,
Santa Monica, CA.

Beginning in 1992, new regulations recommended by the International Electrotechnical Commission (IEC) go into effect in Europe, toughening requirements for power supplies. Included in these regulations are sections limiting the harmonic current for all electrical and electronic equipment sold with an input current of up to 16 A and nominal voltages of up to 240 V; single phase, two or three wire; or nominal voltages of up to 415 V, three-phase, three or four wire.

U.S. manufacturers should be concerned with these standards for two reasons. First, to sell power supplies or equipment using power supplies in Europe after these regulations take effect, U.S. manufacturers will have to meet the tougher standards. Second, many believe the Canadian Standards Association and UL won't be far behind in adopting similar rules.

The EC 555-2 standard covering harmonic-current limitation divides equipment into four classes.

Class A covers balanced, three-phase equipment, except for equipment covered in one of the other classes.

Class B governs portable tools. **Class C** covers lighting equipment, including dimmers. Finally, **Class D** includes equipment hav-

ing an input current with a "special wave shape."

While Class A power supplies have a maximum permissible harmonic current of 2.3A in the third harmonic, Class D power supplies are limited to a maximum permissible harmonic current of 1.08A in the third harmonic—a significant difference.

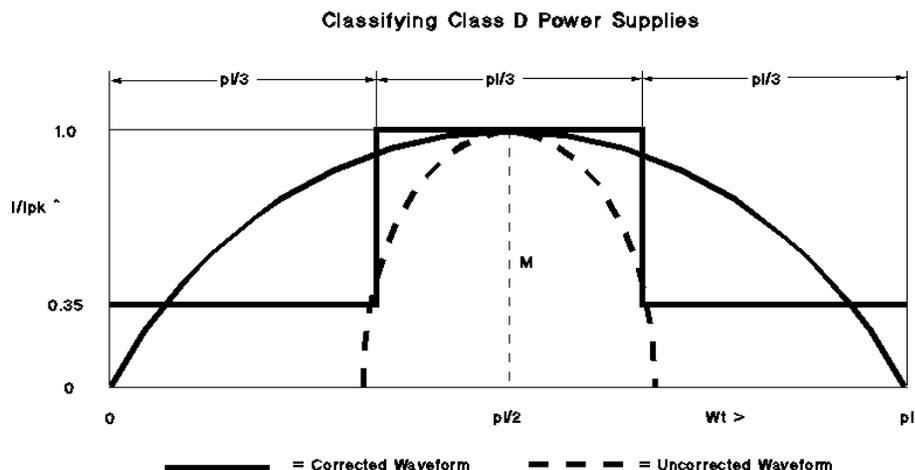
The IEC 555-2 specification calls for equipment to be deemed Class D if the input current's wave shape of each half-period—referred to as its peak value, $i(pk)$, is within the envelope of the accompanying figure for at least 95 percent of the duration of each half-period. The center line M coincides with the peak value of the current. The figure shows the "special wave shape" with a typical uncorrected wave-

form and a typical corrected waveform superimposed on it. Without some form of power factor correction, the power supply would fall into the tougher, more restrictive Class D. Even if classification is not a concern, power-factor correction is generally advisable because, without it, harmonic distortion could lower the available power to the supply.

Uncorrected Power Factor Limits Output Power and Increases Line-Current Harmonics

Power factor is the ratio of true power to apparent power. A resistive load has a power factor of one (the highest possible) because its current waveform is identical to, and in-phase with, its voltage waveform. When a load is not purely resistive, its current waveform is

Continued on page 19



**Under IEC specifications effective in 1992,
power supplies rated above 300 W need power-
factor correction to avoid the Class D label.**

TABLE 1

Characteristics tested according to the old methods**Characteristics to be tested according to the new methods****New Guidelines****Visual ergonomic properties**

- 1.01 Polarity
- 1.02 Background/character color
- 1.03 Screen/cursor luminance
- 1.04 Mean luminance
- 1.05 Luminance uniformity
- 1.06 Reflex sensitivity, specular
- 1.07 Reflectance, diffuse
- 1.08 Image trace decay after change of character
- 1.09 Jitter
- 1.10 Calculated critical flimmer frequency
- 1.11 Character distortion
- 1.12 Number of pixels in character image "H"
- 1.13 Character sizes ("H")
- 1.14 Linearity
- 1.15 Orthogonality
- 1.16 External and internal luminance modulation
- 1.17 Angle-dependent luminance modulation
- 1.18 Raster modulation
- 1.19 Line definition: MTF analysis

Emission properties

- 2.01 X-ray radiation
- 2.02 Electrostatic potential
- 2.03 Induction
- 2.04 Magnetic field

Visual ergonomic properties

- 1.02 Background/character color
- 1.03 Screen/cursor luminance
- 1.04 Mean luminance
- 1.05 Luminance uniformity
- 1.06 Reflex sensitivity, specular & partly spec.
- 1.07 Reflectance, diffuse
- 1.09 Jitter
- 1.10 Calculated critical flimmer frequency
- 1.11 Character sizes, character distortion
- 1.16 External and internal luminance modulation
- 1.17 Angle-dependent luminance modulation
- 1.18 Raster modulation - raster frequency
- 1.19 Sharpness/ MTF analysis

Emission properties

- 2.01 X-ray radiation
- 2.02 Electrostatic potential
- 2.04 Magnetic field
2 kHz - 400 kHz

>100 cd/m²

•80%

<1%

<10%

0.0002 mm/mm

CFF

<10%

<(1%)

<(1%)

>70%

max 25% vid 40°

<15%

>65%

±500 V

-25 nT @ 50 cm

Emission properties (cont.)

- 2.05 A-weighted sound level
- 2.06 Sound intensity level in the 16 kHz octave band
- 2.07 Heat emission

Physical design

- 3.01 Vertical tilt
- 3.02 Adjustment for height
- 3.03 Placing of controls
- 3.04 Reflectance

- 3.05 Dimensions
- 3.06 Weight

Ergonomic properties

- 1.01 Height of cross-section
- 1.02 Angle of slope
- 1.03 Pressure to depress key
- 1.04 Friction against undrlay

Physical design

- 2.01 Dimensions
- 2.02 Weight
- 2.03 Placing of keys
- 2.04 Grouping of keys
- 2.05 Design of keys

Other properties

- 3.01 Size of characters on keys
- 3.02 Sensitivity to reflexes of the keys
- 3.03 Connecting cable
- 3.04 Electrostatic run-off

Emission properties (cont.)

5 Hz - 2 kHz

Alternating electric fields

2 kHz - 400 kHz
5 Hz - 2 kHz

Physical design

- 3.04 Reflectance (screen casing)

Other properties

- 3.04 Electrostatic discharge

-250 nT @ 50cm

-2.5 V/m @ 50cm
-25 V/m @ 50cm
(in front)

Laser

Continued from page 3

Class 3A to include non-visible lasers having an output power of 5 times the AEL for Class 1.

JUSTIFICATION: Harmonization with IEC 825 and ANSI Z136.1.

9. Revise the requirements for specific labeling in the CDRH standard to specifically allow the IEC symbols as an alternative to the DANGER and CAUTION labels.

Arabic numerals shall be used instead of Roman numerals for classes. JUSTIFICATION: Harmonization with IEC standard 825 and ISO safety labeling standards.

10. Delete the requirements for interlocks on access panels where access only allows exposure to levels of laser radiation less than Class 3A. (This change would include IR wavelengths as per proposal #8 above.)

JUSTIFICATION: Harmonization with IEC 825.

11. Eliminate the requirements for collateral radiation, so that CDRH could always rely on the defect provision of the standard if there really was a significant hazard. This would eliminate Table 6 for AEL's for collateral radiation.

JUSTIFICATION: Harmonization with IEC 825 and to make measurement and compliance with the standard more straightforward.

12. Eliminate the requirement for a beam attenuator for Class 3A and lower. (This change would include IR wavelengths as per proposal #8 above.)

JUSTIFICATION: Harmonization and performance feature not really used.

13. Adopt the N-1/4 repetitive-pulse requirement for Class 1 AEL's (thereby also applying indirectly to Class 2 and 3A) as currently existing in the ANSI Z136.1 and IEC 825 (with proposed revision). This proposal is mutually inclusive with proposals #1 and #7 above.

JUSTIFICATION: Bring 21 CFR 1040 into agreement with more recent biological data and harmonization with IEC 825.

14. Adopt the IEC wording for emission indicator in current standards: ". . . give an audible or visible warning when the energy source is activated or if capacitor banks of pulsed lasers are being charged or have not been positively discharged . . ." Consider adopting changes now being considered by WG1 for requiring emission indicators on multiple or remote apertures.

JUSTIFICATION: Improved wording, harmonization with IEC.

RECOMMENDED CHANGES TO IEC 825

15. Add requirements for interlocks on access panels where access allows exposure to levels of laser radiation exceeding Class 3A.

JUSTIFICATION: Concern with potential hazards of viewing hazardous laser radiation emitted from opened enclosures in Class 3B and Class 4 laser products. It is felt that even though eye protection would be worn with Class 3B and 4 laser products, maintenance of an otherwise enclosed laser system might not require the use of laser eye protection.

16. Add the concept of permitting

an alternative means of protection to the beam attenuator for Class 3b and 4.

JUSTIFICATION: The beam attenuator is normally not relied upon for very high power lasers and may be impractical.

17. Request the addition of a manual reset for power interruption of Class 4 lasers.

JUSTIFICATION: Where lasers have been shut down by interlock interruption of main power or by a general power failure.

18. Clarify that the beam attenuator, emission indicator, key switch, and remote interlock connectors requirements apply only to laser products and not to laser systems. JUSTIFICATION: WG1 recommended this to avoid needless installation on OEM laser systems, etc. ♦

Product Safety Abstracts Needed!

Please send your product safety abstracts to:

Dave Lorusso MS PS-1
c/o Codex Corporation
4 Conlyn Avenue
Franklin, MA 02038

Editorial,

Continued from page 1

Have you done so? Better check!

Standards and More

Standards are presently hot topics for product safety engineers, especially those concerned about the harmonization of standards in Europe for 1992. The question that our Standards Subcommittee is addressing is NOT "How do we make another flavor of IEC 950?", but rather "Are there some areas where a new standard would help product safety?". If you have opinions about this topic, and suggestions that a Working Group could sink its teeth into, Tania Grant (408-957-7877) wants to hear from you.

Another topic that concerns Technical Committees - Conferences and Symposia - has some good news and some bad news to report. The good news is that the regional Colloquium sponsored by the Santa Clara Valley Chapter of the EMC Society in June will have a session on product safety. The bad news... excuse me, the OPPORTUNITY is that we have a position to fill for Liaison with the EMC Society National / International Symposium. This vacant position, ably handled last year by John Knecht of Underwriters Laboratories, prevented our planning a separate product safety session for New Jersey in August. Please call Brian Claes (408-285-4768) now if you can help with the National Symposium in Los Angeles in 1992! (And what about Texas in 1993?)

Continuing news is that various local groups are becoming more (or occasionally less) active, as the Santa

Clara Valley regional Colloquium might suggest. The Central Texas (Austin) group is coordinating meetings with the local EMC Society Chapter after a lull in activity when the original organizer, George Jurasich of TÜV Rheinland, transferred to Singapore. The Northeastern group in Boston decided to try forming a separate incorporated Society immediately, instead of working up through Technical Council status to form a Society within the IEEE. Of course, individual members are still members of the IEEE and the EMC Society and continue to participate in TC-8 activities. The new San Diego group has developed strong local interest, meeting topics and attendance and is off to a great start.

What's Next?

Many of our ongoing activities for the next year have already been mentioned, but perhaps I can sum it up. First, the Product Safety Newsletter plans to become stronger, both technically and financially. This will let it become the forerunner of the technical journal we intend to publish after becoming a Technical Council. Second, support is being sought from other IEEE Societies to form a Technical Council for Product Safety. The EMC Society Board of Directors formally approved that goal at their August, 1990, meeting. Third, standards activities should be increased and organized. Fourth - or perhaps first - more participation is needed to be able to achieve the other three goals. Join us!

Submitted by John McBain, PSTC Secretary/Treasurer, 3/18/91 ♦

Markings

Continued from page 5

commonly used.

Our data shows that there is a difference in the understanding of the hazard associated with these signal words surveyed. The FMC manual or the Westinghouse manual are the best examples of hazard markings that are in line with the ANSI proposal.

- 4) There is also some differentiation between the colors commonly used. The people surveyed do distinguish a range of urgency associated with these colors. This reinforces our common perception.

Reviewing the Problem

There are two key elements of any hazard markings that appear on equipment; these are the signal words used and the color of the hazard marking itself. Do people today differentiate enough between the commonly used words or colors to make them useful? What do we think when we see the word DANGER or the color YELLOW?

By now, many people have noticed the change hazard markings found on some equipment. A prominent example is the marking used on pad mounted electrical transformers found in many neighborhood where the power is underground.

Our business community needs to see these results since adequate hazard markings is a big product liability issue. One of the three key ways a manufacturer can get into trouble is to have inadequate hazard markings on their equipment. In review-

ing any accident for a potential product liability claim, the legal team will carefully look at the hazard markings on the equipment to assess if they deem them to be inadequate. If so, they will feel that they have a case.

Our Results

These results show that there is some differentiation in the use of the words or colors. The difference is not absolute, since there is a wide range of responses. This is not surprising since there is not any consistency in the range of colors or signal words in use today. UL (Underwriters Labs) usually uses a two level set; Danger and either Warning or Caution. ANSI is recommending a three level set, using all of these words. Acceptance of the ANSI standard would set the three level system in place. There are continuing questions as to whether there is any differentiation between these words or colors. This survey is an attempt to find out. The same questions arise with respect to the colors used.

We have surveyed a few folks regarding this differentiation. We want our product safety community to see that there is some differentiation that exists without extensive special training. Describing the differences between hazards is already understood by many people.

A good rationale is given by Bass: "The underlying principle in failure to warn cases can be stated as follows:

Where the manufacturer can foresee that the condition or hazardous characteristics of the product are not likely to be known or appreci-

ated by those using it, and that a foreseeable use of the product will be dangerous without that knowledge, the manufacturer is under an affirmative duty to give reasonable warning about such condition or hazard and instructions for safe use."¹

The interest here is in determining whether or not there is a perceived difference between the words used (DANGER, WARNING, CAUTION or NOTICE) or the colors used for the marking itself (RED, ORANGE, YELLOW or BLUE).

Additional Questions

An area that is still unclear is how well training would reduce the uncertainty in the use of these signal words and colors. The range of response overlaps. The signal words we are looking at here are DANGER, WARNING, CAUTION and NOTICE. The colors we are reviewing are RED, ORANGE, YELLOW and BLUE. These are the words and colors recommended by the proposed ANSI Z535.4 standard. There is apparently no widely available information on the rating of the signal words or colors both before and after training.

Consistency in the use of these signal words and colors will provide the reinforcement desired for the user community at large. The adoption of the ANSI standard would be a major step in that direction. As we see a consistent set of signal words and colors used on common items, we will better understand the importance of each of them.

¹Bass, Lewis 'Products Liability, Design and Manufacturing Defects', 1986, Shepard's/McGraw-Hill, Inc., Colorado Springs, CO. ❖

NEMKO

Continued from page 10

Manufacturers must have

Qualified testing personnel with working knowledge of applicable standards and test methods (NEMKO, IEC, EN, etc.).

Necessary test equipment with proper characteristics and tolerances.

Calibration procedures to appropriate reference standards which in turn are identified as traceable to national or international calibration standards.

A qualified program to control design, product verification, production and testing activities. (Preferably based on the ISO 9000 series and ISO/IEC Guide 25 and respectively the EN 29000 series and EN 4500 in Europe).

Authorization and working process — Initial Phase

Introductory visit including information collection and general survey.

Testing results correlation

Acceptance Phase

Signing the authorization agreement which confirms that the manufacturer qualifies for the TBM-scheme. NEMKO's type approvals of the products are then currently based on the manufacturers own data and test reports.

Follow Up Phase

In order to maintain a sound basis for the TBM-cooperation, NEMKO's staff will visit the manufacturer normally once a year to carry out surveillance and exchange essential information. NEMKO will

provide the manufacturer with updated TBM-INFO's describing the terms of preference for testing of the applicable equipment categories. Less frequent or more frequent visits may however be appropriate and be subject to current agreement between NEMKO and the manufacturer.

Multinational Certification:

NEMKO is taking active part in the Nordic (EMCO), European (CCA) and international (IECEE/CB) certification cooperation agreements and may issue certified reports to simplify the certification/approval process in other countries. In such cases, samples must be provided to NEMKO for verification and necessary testing (or alternatively at the manufacturers premises under supervision of NEMKO personnel.) However, base on the TBM-scheme, NEMKO offers the manufacturers **first priority handling of applications** and a service degree that should serve the clients needs, whether it concerns certification for Norway only or multinational certification.

Costs

The manufacturer or his representative will have to cover all costs in connection with necessary visits to the manufacturer. Visits will however be coordinated and organized in such a way that the costs as far as possible can be shared between different manufacturers in the same area.

From 1991, an annual charge of NOK 5000 (approx. USD 850) is introduced to cover NEMKO's costs associated with the contingency, administration and technical infor-

mation services involved.

Option: Quality System Assessment

As NEMKO personnel involved has been particularly trained in the ISO 9000 series and corresponding auditing techniques, we may also offer full assessment of manufacturers quality systems to ISO 9000.

This may either be associated with or separate from the TBM authorization - and may ultimately lead to accredited certification of the manufacturers quality system in line with future European conditions.

Key Personnel

Key personnel in NEMKO to contact for further information about the TBM-scheme and quality systems assessment: Leif Nybro (Electronics), Grim Langås (Appliances), Nils Bøvre (Lighting equipment and installation material) at the following address:

NEMKO

Norges Elektriske Materiellkontroll (Norwegian Board for testing and approval of electrical equipment)

Office address:

Gaustadalleen 30,
0314 OSLO 3

Postal address:

NEMKO
Boks 73 Blindern
N-0314 Oslo 3
NORWAY

Telefax:

int + 47 2 69 86 36

Telephone:

int + 47 2 69 19 50 ❖

Some additional facts about NEMKO's TBM program

As of early March:
NEMKO had
83 European
32 USA
37 Far East
manufacturers
participating in TBM.

NEMKO Profile:

150 employees of which
100 are directly involved
in Testing and
Certification.

In 1990, approximately
18,000 projects were
opened of which
approximately 15,000
resulted in Certificates
or Approvals.

NEMKO has
approximately 60,000
type approvals listed

NEMKO has
approximately 2,300
clients

Correction

Continued from page 12

out-of-phase with, or different from, its voltage waveform. In this case the power factor is less than unity (see Fig. 1).

A switching power supply represents a nonlinear load and draws a pulse current whose waveform differs significantly from the input voltage waveform (see Fig. 2). This pulse current consists of fundamental and harmonic current components. Only the fundamental current component, whose waveform matches the input voltage waveform, will contribute to the power used by the power supply. The harmonic components contribute to the RMS line current, but not to the usable power.

There are two considerations that make power factor correction desirable:

1. Maximizing the wattage avail-

able to drive the system given the 80% limitation on allowable current in a branch circuit.

2. Minimizing the harmonic distortion to insure compliance with pending legislation.

As the power factor increases, the required input RMS current decreases for a fixed output power level. Therefore, more useful power can be obtained from a set line current. Output power (P_{out}) is defined as:

$$V_{in(rms)} \times I_{in(rms)} \times PF \times Efficiency$$

If the available line current I_{in} is limited, the useful power output can be increased if the Power Factor \times Efficiency (PFE) product is increased. On a 15-ampere service, U.L. the draw to a maximum of 1440 VA (120 VAC \times 12 A) If the power supply is 70% efficient, and the power factor is 0.65, the PFE product equals 0.46, allowing a maximum output of 655 watts. By increasing the PFE prod-

uct to 0.7, the power output increases to 1007 watts—a 54% increase.

High harmonic currents typical in switching power supplies result in poor utilization of the power distribution system (power companies have to generate the RMS current even though it is not usable by the load). As an example, circulating currents in the delta windings of three-phase power distribution transformers can cause temperatures in these transformers to rise to full load values well before they reach their full load power levels. Also, these currents cause additional stress on fuses, circuit breakers, wall sockets and wiring. *Most significantly, the high energy content of third harmonic results in the neutral wire of the three phase power grid being subjected to a 70% overload*. As a result, governmental agencies have begun to set standards limiting harmonic current content of electronic equipment. ❖

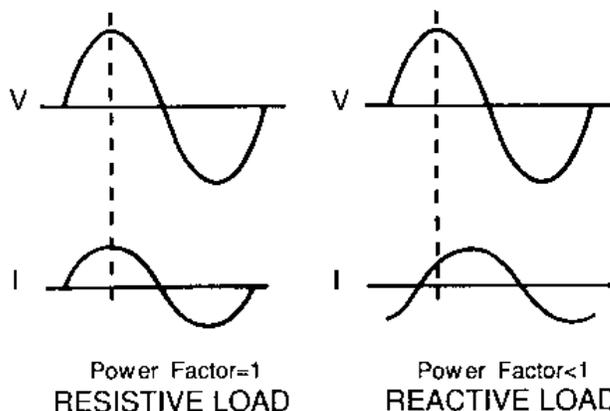


FIGURE 1

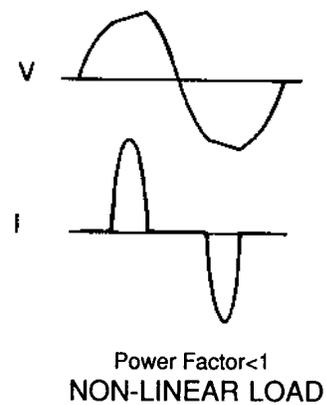


FIGURE 2

Institutional Listings

We are grateful for the assistance given by these firms and invite application for Institutional Listings from other firms interested in the product safety field. An Institutional Listing recognizes contributions to support the publication of the *Product Safety Newsletter* of the IEEE EMC Society Product Safety Technical Committee. Inquiries should be send to: *The Product Safety Newsletter*, C/O John McBain (M/S 42LS), Hewlett-Packard, 19447 Pruneridge Avenue, Cupertino, CA 95014.

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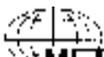
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Fax# (415) 862-9013

*Contact the Product Safety
Newsletter to have your List-
ing placed in the next issue.*

Area Activity Reports

Santa Clara Valley:

The February meeting featured Mr. Leif Nybro who covered the Norwegian Product Safety agency's (NEMKO) testing program for manufacturers. Please refer to the article on page 10 of this newsletter.

The March meeting featured a presentation by Gary Fujii of UL on UL 1459. Gary basically went briefly over the latest edition and relevant bulletins of the standard, the Definitions, and construction and test requirements. The latest revision to the standard dated March

8, 1991, has many pages of revisions and incorporates the requirements from earlier bulletins. Gary also covered requirements in the standard that often prove to be pitfalls to manufacturers.

Future meetings are noted in the Area Activities Calendar, page 22. For more information about the Santa Clara Valley activities, please contact David McChesney at 408-985-2400, extension 2771.

Portland/Seattle:

According to Fran Pelinka, the

March meeting of the Portland and Seattle area groups featured Bob Pollock of UL. Bob spoke on the double insulation requirements in UL 2097. Great slides and a good question and answer period followed.

Future meetings are noted in the Area Activities Calendar, Page 22. For more information about the Portland activities, please call Fran Pelinka at 503-641-4141. More information about the Seattle activities may be obtained by contacting Walt Hart at 206-356-5177. ❖

Area Activities Calendar

April

May

June

Central Texas

Vic Baldwin
(512) 469 7289

David Staggs
(512) 343 3751

Thursday, April 25, 8PM
"Safety and EC92"
Jim deVries
Dell Computer
Location: New Braumfels

Thursday, May 23, 8PM
"ESD and Susceptibility"
Warren Boxleitner
KeyTek

Thursday, June 20
No Meeting Scheduled

Chicago

Dick Hagedorn
(708) 505 5722

Call for Information

Call for Information

Call for Information

Orange County Southern California

Filenet Corp., Bldg 3
1550 Scenic Ave.
Costa Mesa, CA

Ercell Bryant
(714) 966 3459

Tuesday, April 2, 6PM
"UL Plastics Program"
Bob Schmidt
Underwriters Laboratories Inc

Tuesday, May 7, 6PM
"Review of CBEMA Meeting"
Charlie Bayhi and others

Tuesday, June 4, 6PM
Topic and Speaker TBD

Portland

PGE Co.
14655 SW Old Scholls Ferry Rd
Beaverton, OR 97005

Fran Pelinka
(503) 641 4141

Tuesday, April 16, 6PM
"CSA Checklist"
Paul Fabrey
CSA

Tuesday, May 21, 6PM
"Power Quality"

Tuesday, June 18, 6PM
"Plastics"
Jim Pierce
ETL

San Diego

HP Cafeteria
16399 West Bernardo Rd.
Rancho Bernardo, CA

Scott Bonnet
(619) 592 4571

Wednesday, April 3, 6PM
"UL Plastics Program"
Bob Schmidt
Underwriters Laboratories Inc

Wednesday, May 1, 6PM
"Product Safety Liability"
Rick Schneider
Attorney

Wednesday, June 5, 6PM
Topic and Speaker TBD

Santa Clara Valley

Apple Computer Inc
20705 Valley Green Drive
Cupertino, CA

John Reynolds
(415) 335 1344

No Regular Meeting Scheduled

Tuesday, May 28, 7PM
"EMC Directives, Conducted an
Susceptability"
Leo Makowski
Haefely Test Systems

No Regular Meeting Scheduled

Seattle

John Fluke Mfg., Co.
6920 Seaway Blvd.
Everett, WA

Walt Hart
(206) 356 5177

Wednesday, April 17, 6PM
"CSA Checklist"
Paul Fabrey
CSA

Wednesday, May 22, 6PM
"Power Quality"

Wednesday, June 19, 6PM
"Plastics"
Jim Pierce
ETL

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