The Product Safety Newsletter

EMC SOCIETY

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IMPORTANT SURVEY ENCLOSED

Product Safety Newsletter Survey

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Periodically the Product Safety Newsletter must survey its readers to see who is reading the publication, and what their interests are. Would you please take a moment to complete this questionnaire and then return it at your earliest convenience?

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Are you an IEEE member? ❑ Yes ❑ No Member Number: ____________________

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(Continued on next page)

The following information will help us improve the PS Newsletter:

What is your favorite column?

What do you like best about it?

What subjects would you like to see covered?

How would you improve the newsletter?

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- ❑ Writing an article
- ❑ Doing layout
- ❑ Helping solicit institutional listing customers
- ❑ Helping maintain the mailing list
- ❑ Helping prepare the newsletter for the WWW (experience with HTML or an HTML editor helpful)
- ❑ Becoming an editor (reviewing articles, assisting with layout, reminding authors of deadlines, etc.)

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❑ Yes ❑ No

Any other comments:

The Product Safety Newsletter

Vol. 11, No. 1 January - March 1998

What's Inside

Chairman's Message

Safety Standards: Prescriptive or Performance-Based?

As I've shared in previous columns, the semiconductor equipment industry is in the midst of revising SEMI S2-93, "Safety Guidelines for Semiconductor Manufacturing Equipment-". S2-93 is an exemplary standard that in 11 pages of text and 7 pages of appendices addresses the numerous risks associated with semiconductor manufacturing equipment, equipment which use and generate a wide variety of extremely hazardous chemicals and energy forms. Across this $55 billion industry, tens of thousands of personnel work in and around this equipment continually.

In spite of these enormous potential for injury/destruction, the semiconductor industry enjoys the second lowest accident rate of the 150 industry/commercial sectors measured by the US federal government. Something must be working properly.

The stated objective for the revision effort was to create a document that was both compact and performance-based and that also improved the existing document where improvement was needed. However, a review of the final draft document as it is being prepared for ratification balloting suggests that these objectives were far from being met. The draft has now grown to over sixty pages, this in spite of some sections being removed for publishing as separate standards. In fact, the new draft looks dramatically less like the

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The Product Safety Newsletter

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existing edition and more like traditional prescriptive standards familiar to us all. This caused me to ponder why, in spite of a stated goal to create an elegant and progressive standard that actively promotes demonstrably more effective approaches, we have regressed to more of an old-fashioned “design it this way like we’re used to” tack. While this development is disappointing it is unfortunately quite typical of the safety profession when it comes to standards development.

The Prescriptive Approach

We are all familiar with the prescriptive approach to standards construction. Typically, it amounts to page after page of requirements that communicate specific design “dimensions” or specifications of one sort or another. Outcomes are predictable, mimic old approaches and require little in the way of judgement.

A couple of examples will help serve to illustrate this approach:

Creepage and Clearance Distances

Those of us elderly types can recall the old-fashion standards that managed to prescribe creepage and clearance requirements the space of a few clauses and a small table or two. In subsequent years, with the best of intentions, it was felt that these old requirements were inadequate and a whole new generation of insulation classes and significantly increased spacings in a variety of applications resulted. To communicate these requirements required at least eight to ten pages of text, tables and diagrams. Most recently, the latest generation, as evidenced by IEC1010/EN61010/UL3101, has -advanced- to the point where it takes over 20 pages of tables, etc., to communicate these requirements and this page count does not include the nifty creepage and clearance path diagrams from the past. Curiously, in most cases, the resulting dimensions are significantly reduced from the previous generation and more in line with those associated with pre-historic requirements.

Electromagneticinterlock implementation

Several months ago, the”emc-pstc Bulletin Board” was the setting for a discussion of solid state versus electromechanical interlock implementation (also a subject of animated S2 revision discussion). The discussion centered on a discussion and critique of prescriptive approaches with the final say going to a traditional, qualitative approach focusing on redundancy. But during all that exchange I don’t recall much, if any, of the discussion addressing physical performance or reliability data, any reference to measurable hazards effects (transient effects, etc.), objective characterisations of normal and foreseeable operating environments, etc. It seemed to be another case of what one industry godfather described as BOGSAT, a Bunch Of Guys Sitting Around Talking.

What’s so bad about prescriptive approaches? After all, they appeal to what’s familiar and what we believe has worked well enough. Let me suggest a few shortcomings:

-They can be incredibly wasteful. Over twenty years representing an incredible investment of time and energy by the safety community was spent hacking out succeeding generations of creepage and clearance requirements. The result was a body of requirements 6000% larger than the original with arguably a relatively small net impact in product design implementation. In the meantime, assessment costs have increased along with a series of redesign cycles associated with changing requirements. Multiply this by all the other issues addressed by standards and we’re looking at an enormous investment with very little if any payback [or return].

-They don't force the improvement of product safety practice. The do promote memorizing and understanding the latest generation of requirements but they don't require safety professionals to better and more fully understand the scientific and environmental basis of the hazards and risks to be addressed.

-They don't promote the incentive to thoroughly investigate the actual real-life effectiveness of current approaches. We don't spend our time measuring and collecting data, thoroughly investigating incidents, etc.; rather, we revise design guidelines and re-educate our engineers in keeping with the latest changes to standards.

-They represent the net result of negotiations and politics much more than the demonstration of actual risk reduction, which, I believe, is really our reason to be.

-They create an unfortunate model and precedent for the approach for future and expanded standards activities.

-It could be argued that the prescriptive approach makes the product safety practice easier, lowering the minimum professional competency requirements.

-They put arbitrary restraints on design personnel. This is not automatically bad, but it does put the brakes on the best development engineers and designers in coming up with more effective solutions simply because they don't happen to fit the current thinking of the safety community.

An Alternative: Performance-Based Requirements

If one dissects any of a number of standards that we use, it seems that an extremely small portion of the verbiage (maybe less than 10%) actually addresses safety requirements. The remainder addresses how these requirements are to be met, prescriptively, often in excruciating detail. In actuality, this 90% is spent merely describing prescriptive solutions to assure a desired reliability in meeting the basic requirement. This being the case, why don't we learn from the reliability discipline's basic approaches?

The formal definition of reliability varies, but generally goes something like this: "the ability of a product to perform the specified function in the designated environment for a minimum length of time or minimum number of cycles of events " (Ireson and Coombs) or more succinctly, "the ability of an item to perform a required function under stated conditions for a stated period of time" (BS4778/O'Connor).

Reliability types deal with the sorts of things we've discussed. They deal with failure rates of components and systems. They are required to take into account environmental factors and the failure logic of the system. Better yet, there is some expectation that the reliability of the system first can be quantitatively estimated and then these estimates tested/validated.

If we were to apply this alternative thinking, we would initially have to define each desired safety-related characteristic (there really aren't that many), establish needed reliability, identify the environmental variables, take the product's life cycle into account and apply the principles to the design and verification of the product. Is it merely coincidental that the legal system (at least under tort liability theories) essentially leads us to do this anyway when we place products into the stream of commerce rather than place total reliance on standards compliance? Simply put, society expects us to study and take into account loss histories, human factors, foreseeable use/misuse/abuse, environmental effects, etc., rather than relying on an industry consensus standard addressing and limited to specific topics to define product design.

For instance, what if we were to restate the interlocking requirement in a different way the interlock system shall sense _____ (insert description of undesirable condition(s)) and remove power within ____ (insert desired constraints, response time, etc.) when subject to ________ (insert state environmental conditions) for _______ (insert time or number of operations factor related to the service life of the system)." This is a pure performance approach. The solid state implementation can now compete with the electromechanical approach on those terms that actually make the difference: namely, that it will really work the way it's supposed to when it's supposed to and for as long as it's supposed to. It may very well be that an electro-mechanical approach is more reliable than a particular solid state approach. At least we now know how and why much better and are equipped to push for even better solutions.

A Challenge

Before you dismisses this, please consider the following:

-Have you assured yourself of the true superiority of the safety approaches you're using and promoting?

-Can you prove why your trust in that which is specified in the standards is well-founded?

-Where is the substantiating feedback loop? Where is your data?

-How completely do you take life cycle and total environmental factors into account?

What about the untold investment in the 25 year evolution of prescriptive primary-to-secondary isolation requirements (or interlock implementation or [pick your favorite requirement])? Instead of working in standards committees, why wasn't the investment instead made in understanding and propagating the science and technology of insulating materials, effects of contamination, studies of electrical distribution system anomalies, actual-use failure investigation, loss history and so on. The focus would be on research and testing and real-life loss history to understand the environmental and life cycle effects; the results of said research could be reported in (IEEE) professional journals and proceedings for use by all. We could then state requirements in relevant performance terms and dispense with the myriad construction requirements? Thus, armed with basic requirements and qualitative/quantitative understanding of the system environment, the design staff rather than the safety community (and our 300 page safetystandard) could proceed to design the product.

If we can successfully attack the sacred cows of prescriptive interlock and spacing requirements and replace them with performance requirements, why can't this be done with the other basic requirements in our standards and restate them in simple performance terms? In the case of S2, the work was well-intended, but we've worked ourselves into a trap, focusing on "how" rather that "what" and stifling creativity in the process.

So, what do you think? Are we going down the proper path? What difficulties do you have with performance-based risk and hazard management? As always, I look forward to hearing from you.

■

Brian Claes
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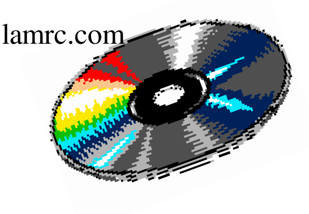

Area Activities

by Kevin Raso
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The following is a brief overview of recent and planned activities for the various Local Groups around the USA. IT has been a while since the last issue of the Newsletter, so some of the following is a bit dated. We will try to have some more current information the next time! As you can see, some of the Groups are very active and facilitate the sharing of useful information with PSTC members in their area. If your area is quiet or there is no contact, I encourage you to make contact with the individuals listed, get active, liven things up a bit, and get together to share information or just to have some fun!

Central Texas Chapter

Jack Burns
voice: (512) 248-2851

January Meeting:
January 28, 1998 at the Doubletree Hotel.
Chalres Giotos of Solectron - "When Safety Meets Quality". Robert Hunter, Consultant - "Could Kapton Insulattion Failure Have Caused TWA Plane Crash?". Thanks to Dell Computer, corporate sponser for the great dinner!

February Meeting:
February 25, 1998 at the Doubletree Hotel.

Chicago Chapter

John Allen
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Colorado Chapter

Richard Georgerian
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e-mail: richard@exabyte.com

September Meeting:
September 10, 1997 - HP in Colorado Springs, CO. Hosted by Ron Duffy who made a presentation on the effects of current and voltage on the human body. Elections were held for Chairman and Richard Georgerian was re-elected.This was the last meeting of the year.

January 1998 Meeting:
January 28, 1998, Jackson Hole Restaurant in Thorton. Planning Meeting.

Northeast Product Safety Society

Mirko Matejic
voice: (508) 549-3185
web site: http://www.safetylink.com/npss.html

November Meeting:
November 19, 1997. Third Annual Vendor's Night. Boxborough Woods (Holiday Inn), One Adams Pl., Boxborough, MA. 5:00pm - 9:00pm.

Orange County, Southern CA

Charlie Bayhi
voice: (714) 367-9194

October Meeting: Open forum discussions.

November Meeting:
November 4, 1997. Presentation by Hollice A. Favors of Favors EMC Engineering on "Personnel Hazard to Radiated and Conducted Electromagnetic Energy and a Review of Prudent Safety Measures".

December Meeting:
December 2, 1997 @ 6:00pm, Newport Corp. Presentation by Mr. Dwayne Davis from Associated Research made a presentation on "Products Safety Testing - Basic Requirements, Questions, and Common Misconceptions".

Pacific Northeast Chapter

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Santa Clara Valley Chapter

Edward Karl
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Meetings are on the fourth Tuesday of each month.

September Meeting:
Social and Planning Meeting

October Meeting:
Presentation by Mr. James Janosky, Intertek, discussed the latest requirements related to Medical Equipment, including the Medical Equipment Directive.

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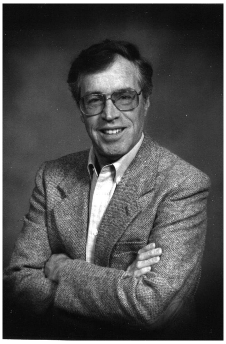
Technically Speaking



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HI-POT TEST CURRENT, LEAKAGE CURRENT, AND INSULATION RESISTANCE

Recently, there was discussion in the IEEE e-mail safety forum about the relationship between the hi-pot test current, leakage current, and insulation resistance. In particular, the question was whether the hi-pot test and the insulation resistance test could be combined into a single measurement.

Let's discuss each of these parameters as circuit parameters and as safety parameters.

INSULATION RESISTANCE

Insulation resistance is the resistance of an insulation. Insulations do not have an infinite resistance. They appear infinite because ordinary ohmmeters do not have sufficient range to measure values in the gigaohm and teraohm regions, which are typical resistance ranges for insulation.

An ohmmeter is simply a dc voltage source, a precision resistor, and a current meter. Ohmmeters operate by measuring the current through the series circuit of the precision resistor and the resistor under test. They use a small dc voltage, about 1 volt, to provide the current.

Here's an experiment: Connect the terminals of an ohmmeter and a dc voltmeter together. The ohmmeter will measure the voltmeter input resistance, and the voltmeter will measure the ohmmeter voltage. The voltmeter input resistance will be about 10 megohms, and the ohmmeter voltage will be about 1 volt dc.

To measure insulation resistance, the ohmmeter voltage must be much higher than 1 volt in order to get enough current for an indication. Typical voltage is 500. Some insulation resistance meters have an operator-selectable voltage, from 100 volts to several thousand volts.

Some safety standards require a measurement of insulation resistance. This is usually a type test, not a production-line test. Nevertheless, some manufacturers have an interest in measuring insulation resistance on the production line.

Note that a dc hi-pot tester uses high voltage and may be provided with a dc current meter. If the dc voltage is stable, then the current meter can be calibrated in ohms to read insulation resistance. Easy. Some commercial hi-pot testers include an insulation resistance function.

LEAKAGE CURRENT

Leakage current is the sum of all ac currents from mains conductors to ground through these resistances and impedances: the insulation resistance, the capacitive reactance across the insulation resistance, the capacitive reactance (impedance) of the Y capacitors.

Insulation resistance exists in ALL components between the mains circuits and the protective ground circuit. These insulations include the wire insulation of the mains cord, the solid insulations of appliance couplers, fuseholders, switches, circuit boards, and transformers. Also included is the insulation resistance of the Y capacitors.

For the purposes of this discussion, assume the the power input is 250 volts, 60 Hertz. If we assume the resistance across the insulation in the mains circuit is 1 gigaohm, then the leakage current due to insulation resistance is about 0.25 microamperes.

If we assume the capacitance across the insulation within a mains circuit is 100 pF, then the leakage current due to capacitive reactance across the insulation is about 10 microamperes. If we assume the Y capacitor is 0.05 microfarads, then the leakage current due to capacitive reactance across the Y capacitor is about 5000 microamperes.

Insulation resistance	0.25 microamperes
Capacitive reactance	10.0
Y capacitors	5,000.0

This demonstrates that the leakage current due to the insulation resistance is negligible compared to the other sources of leakage current. The insulation resistance cannot be determined from a measurement of leakage current.

HI-POT (DIELECTRIC STRENGTH) TEST

The dielectric strength (hi-pot) test is a test of the electric strength of one or more insulations. The electric strength of an insulation is proportional to the distance through the insulating medium (whether solid insulation or gaseous insulation, i.e., air).

Electric strength can be tested with either ac or dc. If the test is ac, then the current during the test is a function of the capacitive reactance of the Y capacitors, the capacitive reactance of the stray insulation, and the insulation resistance. (Indeed, some people use this current to determine that a product is indeed connected to the hi-pot tester; other people use this current to additionally determine that the capacitors are of the approximately correct value.) Because the insulation resistance and reactance of the stray capacitance is so high, the ac test current can be simplified to the leakage current at 250 V times the ratio of hi-pot test voltage to 250 V. If the test voltage is 3000, then the test current would be 3000/250 x 0.5 or 6 mA.

If the test is dc, then the current during the test is a function of the insulation resistance of the system, including the insulation resistance of the stray capacitance and the Y capacitors. The dc current is typically in the tens of microamps.

CONCLUSIONS

AC cannot be used for an insulation resistance test. Even if the product has no Y capacitors, there is still a lot of capacitance that exists across every insulation. The total capacitive

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Safety Abstracts

by Dave Lorusso
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"How the Low-Voltage Directive Addresses Product Safety", was published in the August, 1997 issue of "Evaluation Engineering".

Dwayne M. Davis answers the many questions that arise about the Low-Voltage Directive's product safety requirements and CE Marking. What they mean to a manufacturer of electrical and electronic products and what is necessary to comply is detailed.

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"Meet the Low Voltage Directive's Requirements", appeared in the October, 1997 issue of "Test & Measurement World".

Tony Leathart reviews the requirements of the Low-Voltage Directive including what it applies to; applying the Directive; paperwork; and Marking.

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"Hipot Testing of Motors and Safety Standard Compliance", was published in the September, 1997 issue of "PCIM".

James Richards writes about standards governing the design of products using electric motors and motor subsystems. These standards clearly define the electrical requirements that must be met and are usually not difficult to satisfy when they are well understood.

"Principles for the Practice of Safety", was published in the July, 1997 issue of "Professional Safety".

Fred A. Manuele writes about the practice of safety and its recognition as a profession. To promote a discussion toward establishing a sound theoretical and practical base for the practice of safety, a list of general principles and statements and definitions are presented.

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"Summary and Evaluation of Guidelines for Occupational Exposure to Power Frequency Electric and Magnetic Fields" was published in the September, 1997 issue of "Health Physics".

The authors, William H. Bailey, Steave H. Su, T. Dan Bracken, and Robert Kavet present a paper that evaluates major U.S. and international guidelines for occupational exposures to power frequency EMF. The rationale behind these guidelines and the interpretation of the guidelines are discussed, as well as important issues concerning their application. ■

News and Notes

by John Rolleston
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IEC has developed a new international standard that addressses measurement of electrical fields hazards to workers and the general public exposed to RF fields. This standard IEC 61566 (First edition):

"Measurement of Exposure to Radio-frequency Electromagnetic Fields - Field Strength in the Frequency Range 100Khz to 1Ghz" does not specify exposure limits. The International Non-ionizing Radiation Committee (INIRC) provides recommendations that may be followed lacking national or other guidelines from health authorities. Specific absorbtion rates(SAR) - the power absorbed per kilogram of body weight and the induced current in the human body are the consensus exposure standards being studied.

From Compliance Engineering - Sept./Oct. 1997

Time to check on your CE, marking for the Low Voltage Directive. It became mandatory Jan. 1, 1997 for all electrical products operating at 50 volts AC(70 VDC) or higher to be examined for safety and labeled. Declaration of Conformities must be provided and enforcement of the EU directive is to be expected.■

Technically Speaking, Continued from Page 10

reactance will be very much less than the insulation resistance. Consequently, ac cannot be used for measuring insulation resistance.

The only way to combine the two tests, insulation resistance and dielectric strength, into one test is to test with dc. One of my colleagues insists that hi-pot tests should be dc. One of the problems with dc is that if the unit under test is not connected to the hi-pot tester, the tester will nevertheless indicate a pass. My colleague uses a programmable ac/dc hi-pot tester to (1) determine that a unit under test is truly connected to the hi-pot tester and (2) conduct a dc hi-pot test. He programs the first step of the hi-pot tester sequence for 250 V, 60 Hz. The tester measures the "leakage" current. If the current is between two pre-selected values, then the tester moves to the next step which is to apply the prescribed dc hi-pot voltage. (The dc current is proportional to the insulation resistance.) In this way, he is assured that the unit under test is truly connected to the hi-pot teste■

Ten Tips to Safety Compliance

by Tony Leathart
Technology International (Europe) Ltd.

Integrating the safety requirements at the design stage is much easier than trying to achieve conformity of a non-compliant design later. Put another way, compliance by design is much cheaper than assessing safety as a development function and embodying all the consequent modifications and component changes later. From experience with LVD product design, these are the main considerations at the design stage:

1 Decide method of use (e.g. portable, transportable, pluggable, installed etc) and select type of construction, preferably choosing Class 1 earthed through power supply cord unless weight/cosmetic considerations are paramount.

2 Decide power requirement of the purpose of the equipment (e.g. single/ 3 phase, 230 V/400V ac), and try to keep the secondary voltage below Safety Extra Low Voltage of 30 V ac rms or 60 V dc.

3 Select internal conductor sizes to match rated current in order to minimise heat loss.

4 Decide environment of use (e.g. outdoor/ indoor, ambient temperature and internal heat to be dissipated, relative humidity, height, level of conductive dust in the atmosphere, operator intervention/automatic etc) and using this data, select type of enclosure, level of ingress protection (IP rating of IEC529), material and strength (steel, aluminium, alloy etc) and method of cooling (chiller, forced convection, vented convection, enclosed convection).

5 Select power supply unit module within own earthed enclosure, and over-current protection, approved to the appropriate European specification (e.g. preferably CE or national approval to EN 60742, EN 60950, EN 61010-1, EN 61204), preferably with an IEC 320 power inlet socket able to become the equipment power inlet when the PSU is mounted flush with the equipment enclosure wall, thus eliminating any unapproved primary circuit, overcoming the need for power supply cord strain relief and isolating the electrical hazard in its own internal enclosure.

Ten Tips to Safety Compliance,
Continued from Page 12

6 Provide over-current protection in the secondary circuit in order to minimise the likelihood of the primary fuse, embedded in the enclosed PSU, from blowing because of a secondary circuit fault. Select a fuse and fuse holder approved for Europe (EN 60269) and mount it on the enclosure wall with safe access by the operator.

7 Decide if unexpected start up on re-establishment of lost power causes a hazard (e.g. motor-operated tools etc) and select power disconnect technique accordingly, always choosing a switch/circuit breaker/contactor/relay that is approved to the appropriate European specification (e.g. EN 61058, EN 60947).

8 Select a power supply cord approved for Europe by one of the signatories to the CENELEC common marking agreement (e.g. BASEC) which apply the <HAR> mark to cables. Preferably fit a cable with a non-rewireable plug for the country of use moulded to the supplementary insulation (the UK regulations require the plug to be fitted for the public consumer market).

9 Decide if an Emergency Stop system is needed and if so, design it to EN 418, and select the EMO button to be the mushroom-shaped latch-in type not allowing restart until manually reset and coloured red with a yellow background.

10 Ensure markings, colour codes and warning labels meet European requirements (EN 60204, IEC 417) and select ON and OFF buttons/indicators to be white and black (not green and red), marked “I” and “O” (not ON and OFF). Fit rating plate including manufacturer’s brand name, equipment type, model no., serial no., rated voltage (to include 230 or 400 V ac), rated frequency (50Hz), rated maximum power/current, and no. of phases, and CE Marking ■

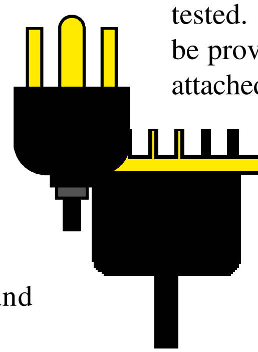
The following excerpt was taken from the European Community Quarterly Review, published by Technology International.

For questions to the author, you can contact Tony Leathart by e-mail at Tony.Leathart@ITI.Co.UK or you contact its U.S. office, Technology International, at 1-800-810-9000.

Cables for Europe

by Helge Nielsen, Project Engineer
Demko A/s

For many manufacturer's the task of CE Marking cables for the European market can be overwhelming. However, there is a direct route into the cable market of Europe. The following article will provide you with information on the possibilities for third party testing schemes for national marks and the standards to use, when you need to certify your polyvinyl chloride (PVC) or rubber insulated cords and cables for Europe.



The Standards

The European standard HD 21 (IEC 60227 Modified) applies to rigid and flexible cables with insulation and sheath if any, based on PVC, of rated voltages up to and including 450/750V. The European standard HD 22 (IEC 60245 Modified) applies to rigid and flexible cables with insulation and sheath if any, based on vulcanised rubber, of rated voltage up to and including 450/750V.

CE Marking

The cords and cables explained above are covered by the Low Voltage Directive, and therefore they have to be labeled with a CE Marking before they are distributed in Europe. Compliance with the European regulation for cords and cables is demonstrated through the technical dossier. The technical dossier shall contain a statement of conformity with reference to the standard, according to which the cord or cable has been tested. The application of the CE Marking, may be provided directly on the cable or placed on an attached label. Although CE Marking is the responsibility of the manufacturer, his European representative or European importer, most companies in the U.S. prefer an impartial third party organisation to perform the testing, write or assist with the formalities and the requirements for the CE Marking procedures to ensure compliance.

Supplier of Cords and Cables to OEMs

If you are a supplier of cords or cables to OEMs (Original Equipment Manufacturers) of household appliances e.g. coffee makers, vacuum cleaners, etc. and the OEM wants to have his product certified by a European National Certification Body, the Certification Bodies will only approve the appliance if there is a Test Certificate from a recognized third party testing station which states that the supply cord or cable attached to the appliance has been tested according to the European standards HD 21/HD 22, and fulfills the requirements.

CB Scheme

For manufacturers outside of Europe the CB Scheme

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Cables for Europe,
Continued from Page 14

is an obvious possibility. A member of the CB Scheme for cords and cables (e.g. DEMKO) can test and certify the cord or cable based on the IEC Standard 60227 for the PVC insulated or IEC 60245 for rubber insulated cords and cables. As an annex to the CB Test Certificate and the Test Report, it will also document compliance with the Group Differences to HD 21 and HD 22 on your request. The Group Differences are common to all European countries. When the CB Test Certificate and Test Report have been issued and presented to other European National Certification Bodies the national marks can be granted without further testing of the Certification Bodies in question.

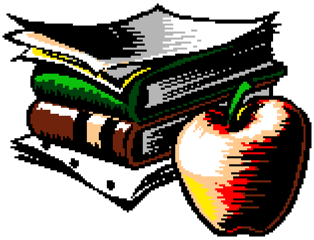
All the mentioned possibilities in this article for third party testing, can of cause be conducted at UL's subsidiary DEMKO A/S.

If you need further information on the Schemes or on the cords and cables standard, please feel free to call one of the following:

At Underwriters Laboratories Inc.:
Engineering Team Leader
Ed Milacek Jr.
E-mail: milaceke@ul.com
Tel.: (516) 271 6200 ext. 22434
Fax (516) 271 8259

At DEMKO A/S:
Project Engineer
Helge Nielsen
E-mail: hni@demko.dk
Tel.: +45 44 85 63 74
Fax: +45 44 85 65 09

We are looking for Product Safety Articles!



Please send your articles to
Roger Volgstadt
Tandem Computers
M/S 55-53
10300 Tantau Ave.
Cupertino, CA 95014

Volunteers Needed!

We are looking for those interested in serving as (1) Editor of the Product Safety Newsletter and (2) Layout Editor. If interested, contact Roger Volgstadt at roger.volgstadt@tandem.com

Area Activities, Continued from page 7

November Meeting:
November 25, 1997. Hewlett Packard, Oak Room, Bldg 48, 19447 Pruneridge Ave, Cupertino, 7:15pm. Presentation by Mr. Tom Burke, Underwriters Laboratories Inc. on the Bi-National Standard for Infromation Technology Equipment, UL 1950/CSA 950 Third Edition. Also, check out the new Practical Applications On-Line System (PAGOS) at http://www.ul.com/pag that was demonstrated by Kevin Ravo, which contains the PAGs for UL 1950 Third Edition.

December Meeting:
Joint Meeting with EMC Society.

NEW!!

Twin Cities - Minneapolis/Saint Paul (TCPSS)

Paul Schilke
voice: (612) 745-3529
fax: (612) 745-3863
e-mail: pschilke@advmac.com

This Chapter is just getting started and had their initial planning meeting in October. Stay tuned for more information or contact Paul directly.

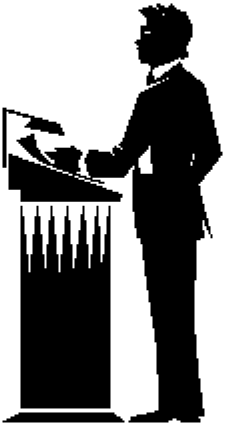
February Meeting:
February 18, 1998 at the Wagner facilities in Plymouth, MN. Mike Sherman from FSI - "Design of Equipment Hazard Warning Labels for both the USA and European Markets".

That is it for now. If you are aware of any 'activities' information that may be of interest to readers, please forward it to the above address and I will try to include the information in the next issue. I look forward especially to hearing from the local area coordinators so I can add their exciting updates to this report!

Again, support your local Chapter by getting involved - or start a new Chapter!

Live Long and Prosper,

Kevin L. Ravo ■



REMINDER

Be sure to mail in your survey!!

Institutional Listings

We are grateful for the assistance given by these firms and invite applications for Institutional Listings from other firms interested in the product safety field. An Institutional Listing recognizes contributions to support publication of the Product Safety Newsletter of the IEEE EMC Society Product Safety Technical Committee. Rates are $150 per issue and $400 for four consecutive issues. To place ad with us, please contact Ron Baugh at (503) 691-7369 (phone); (503) 691-7568 (fax); or ron.baugh@sentrol.com (e-mail).

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5. Fold the survey on the dotted line
6. Seal folded sheet using tape
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