The Product Safety Newsletter

IEEE

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Chairman's Message

We all try to keep in touch with developments that may affect our professional lives. Often magazine articles with new information or ideas will help educate and enlighten us, give us new angles on old problems or reveal new problems created by advancing technology.

Recently, I saw six articles that had something in common. The names of the articles were "The Ground Plane and Its Effect on ESD and EMI in the Electronics Industry," "The Ethics of Silicon Valley," "High Amperage Electrical Power Distribution: Bus Bar or Insulated Connector?," "Volt, Ohm Standards Change Takes Effect Internationally in 1990," "Engineered Plastic Motor Housing Simplifies Tooling and Assembly," and "Designed-in Safety Features Ease Compliance." Any guesses about what they had in common?

Rich Pescatore

They obviously were not discussing the same topic. They did not have the same author. They came from five different magazines. If you guess they all had something to do with product safety, then you're getting close, although only one addressed that subject directly. All of these articles did focus on topics that related to product safety in some way and attracted my interest as a product safety professional.

Of course, the main topic of most of the articles was not product safety. Some of the articles did not even mention the safety considerations (for example, the one about plastic motor housings). Some articles, such as the one about ethics, could also relate to other occupations, certainly not just product safety engineering. The point I am making is that all these topics are of interest to someone involved with product safety, and several of them do include a discussion of safety.

I think we're at the "So what?" point now. So, go ahead, ask me "So what?" Good! I'm glad you asked that question.

There are two implications that follow from what I've said. (1) Articles from many sources, fields of interest and engineering disciplines can have a significant product safety content. It follows that professionals in many electrical engineering disciplines need to have an awareness of product safety. (2) Articles that have a significant product safety content can come from many sources, fields of interest and engineering disciplines. This means that product safety engineers should

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The Product Safety Newsletter

Vol. 2, No. 3 May/June 1989

The *Product Safety Newsletter* is published bimonthly by the Product Safety Technical Committee of the IEEE EMC Society. Comments and questions about the newsletter may be addressed to the *Product Safety Newsletter,* Attention: Roger Volgstadt, LOC. 103, c/o Tandem Computers, 2550 Walsh Ave., Santa Clara, CA 95051-1392, Fax No. (408) 748-2137.

This newsletter is prepared by the Corporate Graphics Group of Tandem Computers Incorporated. The editor wishes to extend a special thanks to Jodi Elgin, Annie Valva and Karen Wolfram of Tandem Computers for their work in preparing this newsletter.

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Chairman's Message

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have a way to be able to locate those articles without spending 30 hours a week plowing through periodicals.

The Product Safety Technical Committee could be the vehicle to address both these concerns.

We are already working on the first issue by affiliating with the IEEE. Since we are part of the IEEE, we have the chance to contact engineers working in other technical areas who may have an interest in product safety. Although a plurality of our mailing list may be EMC Society members, rather than members of other IEEE Societies, we find that engineers from several other Societies are also concerned about product safety.

To address the second issue, I would like to propose starting a new feature in the *PS Newsletter,* somewhat based on the EMCABS of the *EMCS Newsletter*. However, because of the scattered distribution of articles that relate to product safety, we will need the help of our readers. I'm sure that you all find articles each month that have a product safety content and would be of interest to other product safety professionals. If you would take ten minutes to collect those articles (please be sure to include the periodical and date, as well as the author) and send them to the Editor of the *PS Newsletter*, we will try to make up a reference list with a brief abstract of each article. If you would like to write the abstract yourself, or if the author has included one with the article, that would help us even more. Please emphasize the product safety aspect of the article in your abstract.

Well, I've gone and done it again! I promised myself I would not ask our readers to volunteer for any PSTC tasks this issue, but I just couldn't help myself. Perhaps this proves that volunteer-based organizations need volunteers?

Best regards,

Rich Pescatore, *Chairman*

Technically Speaking

Rich Nute

Rich's photo is
not yet available.

Rich Nute

The Hi-Pot Test

Hello from Vancouver, Washington, USA:

The hi-pot test is another safety subject of which few of us feel comfortable that we are in control.

What is the purpose of the hi-pot test, and what hazard does it address or obviate?

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First, each of the standards seems to have its own unique voltage which differs from all the other standards. As if this was not enough, it often seems that each of the various test houses has its own unique voltage regardless of the standards. What voltage should we use?

And, why is the voltage so high compared to the working voltage?

Next, we are often given our choice of waveform, either ac or dc. More recently, a third waveform, the 1.2 x 50 usec impulse, is appearing in some standards. What waveform should we use?

Then, we must select the duration or time of the test. The conventional time is one minute. Some standards allow a shorter time, but a higher voltage. What duration should we use?

For the impulse test, duration is measured in number of impulses applied to the equipment under test. One standard is proposing three positive impulses and three negative impulses, with no more than one second between applications.)

Some standards specify different voltages and times depending on whether the test is a "type" test or a "routine" test. (A type test is the test done during the safety engineering investigation of the product, and the "routine" test is the test done on the production line.) Why do the voltages and times depend on whether the test is an engineering evaluation test or a production-line test?

Some standards specify a maximum rate of rise of the test voltage. Why?

Another concern that is not usually addressed, and often does not appear in hi-pot tester specs is output current. How much current does the hi-pot tester need to put out?

Finally, how do you know when you have a hi-pot test failure?

And, what should you do when you have a hi-pot test failure? What does the failure mean, and what should you do about it?

Have you ever had your friendly certification house inspector (field representative) ask you to prove that your hi-potter can detect a failure? How do you know your hi-potter will truly trip when it detects a legitimate failure?

Often, there is concern that the hi-pot test will damage sensitive semiconductors or other components in the equipment under test. Is this true, and what can you do to prevent damaging your newly built expensive product?

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Exactly what is a "hi-pot" test?

In its simplest form, the hi-pot test applies a relatively high voltage between two conductors which are separated by insulation. The insulation is supposed to withstand this voltage without breaking down. If it withstands the voltage without breaking down, the insulation is said to have adequate or acceptable electric strength (or dielectric strength).

In practice, the hi-pot test applies a voltage between two sets of conductors, the primary circuit and the grounding circuit, which are separated by various insulations.

The hi-pot test is also often applied between the primary circuit and low-voltage secondary circuits. But, since low-voltage secondary circuits are usually grounded, the primary-to-ground

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test also tests the primary-to-secondary insulations, and only one test need be performed.

(In some cases, it is necessary to disconnect the secondary from ground, and perform a primary-to-secondary hi-pot at a higher voltage, and with the equipment under test ground open.)

Thus, the hi-pot test is a test of the insulation surrounding the primary circuits.

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The insulation surrounding the primary circuits is essential to providing protection against electric shock from the primary circuits.

Therefore, the successful hi-pot test is one measure of the adequacy of one of the equipment's mechanisms providing protection against electric shock.

Some of my colleagues will claim that the insulation surrounding the primary circuits also provides protection against electrically-caused fire from the primary circuits.

Therefore, the successful hi-pot test is also one measure of the adequacy of one of the equipment's mechanisms providing protection against electrically-caused fire.

(I have yet to sort out this issue to my personal satisfaction; I cannot argue against it, so I include it as if it were a legitimate issue. Perhaps my readers would offer their views on the relationship of electric strength of insulation to electrically-caused fires.)

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There are two purposes for the hi-pot test. The purpose of a "type" test is quite different from the purpose of the "routine" test.

The purpose of the "type" test is to determine that the design engineer covered all his bases.

In order to pass the hi-pot test, the design engineer must make sure that the distance between the primary circuit and the ground circuit at every point meets the spacing requirements in the standard. In addition, he must make sure that the various solid insulations that are interposed between the primary circuits and the ground circuit are thick enough so that they have more than enough electric strength to withstand the test voltage. He must do the same for the spacings and solid insulations between the primary circuits and the low-voltage secondary circuits, and, indeed, all of the insulation surrounding the primary circuits. (Note that spacings are a form of insulation.)

If the design engineer does all these, the unit will pass the hi-pot test first time through and without any difficulty.

When I do a hi-pot "type" test, I not only determine that the unit passes the specified voltage, I also increase the voltage beyond that value until I get a breakdown. Then, I band-aid that point so it won't break down and continue increasing the voltage until I get the next breakdown. I continue this process until I get up to two or three times the required hi-pot test voltage. I like to know what are the weakest links in the insulation system so that if I should have a breakdown in my "routine" testing, I have a leg up on what might be breaking down and why. The results of such testing may identify some production-dependent processes that may cause the withstand voltage to decrease.

The purpose of the "routine" test is to determine that the production folks covered all their bases.

In order to pass the hi-pot test, the production folks must make sure that they made it like the design engineer designed it.

Unless the "type" test was marginal, the "routine" test, in the end, finds gross defects in the manufacturing process. It is really difficult to set up a hi-pot test to find marginal defects in the manufacturing process; if you did so, production folks would be continually testing and tweaking to get each unit to pass, and the process could be out of control insofar as assuring that any particular unit would retain its withstand capability for any length of time. So, for all practical purposes, the "routine" test is to find gross defects. (Some standards

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recognize this fact by allowing a lower hi-pot voltage for “routine” tests than that required for the “type” tests; since we are looking for gross defects, a few hundred volts difference out of a thousand or more is insignificant. Later, we’ll discuss why a lower voltage is desirable for “routine” tests.)

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How do you find where the breakdown is occurring?

Most of the time, this is obvious: you can see the arc. But, sometimes you can hear it, but you can’t see it. And, sometimes, it only trips the hi-pot tester, and you can’t see or hear it. Ultimately, you have to see the arc to know where the breakdown is occuring. What do you do to find the breakdown?

The trick is to narrow down the components or pieces until you are able to isolate the insulation or airgap that is breaking. One method is to remove components from the assembly, one at a time, each time re-testing the assembly to see if the breakdown is still in the assembly or went with the component. I set the trip point on the hi-pot tester to minimum so as to limit the damage and establish repeatability. I also adjust the voltage manually to creep up on the breakdown.

Besides setting the hi-pot to its most sensitive trip, I sometimes add a 10k to 100k resistor in series with the output so as to limit the current and therefore the power. This, too, limits the damage done by the hi-potter to the insulation, but still allows you to see what is happening and repeat the test over and over again. This only works if the current is in the tens of microamperes during the hi-pot test; otherwise, there is too much voltage drop across the resistor, and you may not get enough voltage to see the breakdown.

Later, we’ll discuss why there may be high current during the hi-pot test, and what you can do to reduce the current during trouble-shooting.

Still another technique of finding the breakdown is to use an “ultrasonic translator.” If your company is lucky enough to own one of these, I advise you to latch onto it. (Hardly anyone else in your company will have any use for it; you should get it before it is discarded!) The ultrasonic translator is an ultrasonic microphone with a heterodyne circuit which translates the ultrasonic frequencies to the sonic frequencies. Insulation breakdown is preceded by “partial discharge” which produces lots of ultrasonic noise. The ultrasonic translator allows you to hear the partial discharge long before it results in a breakdown. The microphone can be fitted with a flexible tube which can be used to search small areas for sounds of breakdown.

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What should be the value of test voltage, and where does the value come from?

Simply, the electric strength of the insulation must be greater than the applied or working voltage. But, how much greater?

Answer: Any value greater than zero.

Why, then, do we test 120-volt circuits at anywhere from 900 volts to 4000 volts?

Answer: Mains or primary circuits normally have transient overvoltages on them; the electric strength of mains or primary circuits must be greater than the greatest transient overvoltage that might occur on the building power wiring. Otherwise, the insulation may fail when a transient occurs.

So, the hi-pot test voltage must be greater than the greatest transient overvoltage that can occur. What is the greatest value of transient overvoltage?

The answer to this question is sort of like: Which came first, the chicken or the egg? The failure of insulation under transient overvoltage conditions limits the value of the transient overvoltage! So, if we have a low value of electric strength, then we will have corresponding low value of transient overvoltage. And, if we have a high value of electric strength, we will have the “natural” values of transient overvoltages. These “natural” values arise from switching inductive loads on and

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off the system, where the back-EMF goes into the power line. The "natural" values are related to the value of the inductance, the current through the inductance, and the aggregate load impedance at the point the transient is generated.

However, when the insulation fails, we either have a hazardous condition, or the circuit breaker pops open. So, we don't want a low value of electric strength.

Again, what voltage is appropriate?

In the "old days," the traditional value for the hi-pot test was 900 volts. Gradually, this increased to 1000 volts. And then, the familiar formula, 2V + 1000, gave us 1250 volts for a 125-volt rating.

There are many papers published on studies of overvoltages in household and commercial power distribution circuits. One of the most recent is "Transients on the Mains in a Residential Environment," by Ronald B. Standler in IEEE Transactions on Electromagnetic Compatibility, May 1989.

These studies boil down to identifying the maximum transient overvoltage as 1500 volts peak, and a duration less than ten microseconds. (The new impulse test was formulated from these studies to more closely test insulations under actual conditions of use.)

In practice, if you follow the spacings specified in the various standards, and if you choose UL or CSA certified solid insulating materials, you end up with spacings with electric strength in the order of 5000 volts rms, and solid insulation worth about 5000 volts rms.

Almost any solid insulation is worth 3000 volts rms; one wag once said that two layers of Mr. Whipple's squeezingly soft Charmin will pass 3000 volts!

It turns out that the standards for component insulations such as wire and transformer papers require electric strengths in the order of 5000 volts rms.

So, there is lots of margin built into almost every primary circuit insulating system. The actual breakdown potentials should be three or four times the worst-case peak transient voltage, 1500. This agrees with my personal experience.

Once again, what voltage is appropriate? Since the spacings and solid insulations should have several times higher dielectric strengths than those specified for the hi-pot test, the actual voltage or its waveform is not critical, and should only show up gross design or manufacturing errors.

A 1000-volt rms hi-pot very nearly covers the worst-case overvoltage (1000 volts rms = 1414 volts peak). 1000 volts rms and 1414 volts peak are the withstand voltages; the breakdown voltage should be considerably more than the withstand voltage. So, 1000 volts rms or 1500 volts peak or dc or impulse should be adequate to test whether the insulation has any gross errors. Furthermore, when the test voltage is low compared to the breakdown voltage of any part of the system, the waveform and duration of test are insignificant.

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These preceding rules-of-thumb do not apply when the dielectric breakdown voltage of any component of the system is less than twice the hi-pot test voltage. As the hi-pot voltage approaches the breakdown voltage, we see the inception of partial discharge in the solid insulation. Experts report that this inception of partial discharge is also the first step in the catastrophic dielectric breakdown of solid insulation. Therefore, for "routine" hi-pot testing, it is imperative that the test voltage be less than the partial discharge inception voltage—unless the waveform is the impulse, and the number of impulses is limited.

Fortunately, with primary insulations we commonly use, and with the relatively low hi-pot voltages, we are usually well below the partial discharge inception voltage. However, this is a good reason to use the least practi-

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cable voltage for the "routine" hi-pot test.

Partial discharge is not only a function of voltage, but also a function of the time the voltage is applied. Therefore, it is prudent to use the least time practicable for the "routine" hi-pot test.

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What current does the hi-pot tester need to supply?

The answer depends on whether the hi-pot tester is dc, ac, or impulse.

As a general rule, during the hi-pot test, the equipment under test appears to be a resistor and capacitor in parallel connected between the primary circuits and the ground circuit. The current required from the hi-pot tester depends on the values of the resistor and capacitor. The hi-pot tester must have enough current to develop the required voltage across the resistor-capacitor load.

The resistor is the insulation resistance and is of the order of 100 megohms or more. The capacitance is the "natural" capacitance that exists when two conductors are separated by an insulator and, for primary-to-ground, is typically in the range of 0.001 uF to 0.0025 uF depending on primary circuit complexity and excluding any line filter. With a line filter, the capacitance may be as high as 0.02 uF.

Thus, the hi-pot tester must be capable of at least:

$$I = \frac{E1}{R(\text{insulation})} + \frac{E1}{X(\text{capacitance})}$$

where I1 is the required hi-pot tester output current, E1 is the hi-pot tester output voltage, R(insulation) is the insulation resistance, and X (capacitance) is the capacitive reactance.

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For example, if your product had an insulation resistance of 100 megohms, a capacitance of 0.0025 uF, and hi-pot test voltage 1500 volts rms, the required hi-pot tester output current would be:

$$I1 = \frac{1500\text{ V}}{100\text{ M}} + \frac{1500\text{ V}}{X(0.0025\text{ uF, }60\text{ Hz})}$$

$$I1 = 0.015 + 1.50 \text{ milliamperes}$$

$$I1 = 1.515 \text{ milliamperes}$$

The same product with a line filter would require about ten times the "natural" current, or about 15 milliamperes at 1500 volts. When I'm evaluating a design, I often disconnect the line filter line-to-ground capacitors as it usually is not the culprit I'm looking for. After I remove these caps, I'm testing insulation, and I can better assess what is happening.

Here's another way of calculating how much current the hi-pot tester must supply. If you examine the circuits for the hi-pot test and for the neutral-open, power on leakage current test, you will find that they are identical. The required current for the hi-pot tester is proportional to the equipment leakage current, and can be predicted from the following information:

$$I1 = \frac{E1}{E2} \times I2$$

where I1 is the required hi-pot tester output current, E1 is the hi-pot tester output voltage, E2 is the line voltage at which leakage current was measured, and I2 is the maximum measured leakage current.

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For example, if your product was rated 120 volts, leakage current 0.5 mA maximum, and hi-pot test voltage 1500 volts, the required hi-pot tester output current would be:

$$I1 = \frac{1500\text{ V}}{120\text{ V}} \times 0.5\text{ mA}$$

$$I1 = 6.25 \text{ milliamperes}$$

If you're using a dc hi-pot tester, you need to be concerned with the rate-of-rise of voltage. You must charge the capacitance that is in the circuit, and it takes current to do that. The charging current is given by the relationship:

$$I(\text{charging}) = C\frac{dV}{dt}$$

Rearranging terms, if we know

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the value of capacitance, C, and the maximum hi-pot tester output current, we can calculate the maximum rate-of-rise of voltage.

$$\frac{dV}{dT} = \frac{I(charging)}{C}$$

If your dc hi-pot tester puts out 0.5 microamperes as mine does, and the capacitance of your product is 0.0025 uF, then the maximum rate-of-rise is:

$$\frac{dV}{dT} = \frac{0.5\ uA}{0.0025\ uF} = 200\ volts/second$$

If your test voltage is 1500, then you must take at least 7.5 seconds to raise the voltage from 0 to 1500. If you do it faster, either the hi-pot tester will trip, or the voltage won't go to 1500.

There is no corresponding limitation for an ac hi-pot tester.

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Now the $64 question: At what current do you set the hi-pot tester trip for "routine" tests? Or, what current constitutes a failure?

We've already answered these questions. The trip current must be set above the current to develop the required voltage across the resistor-capacitor load. Since we are only looking for gross manufacturing defects, the actual value of the trip is not significant. It probably should be set for about 25% more current than that necessary for the resistor-capacitor load. Typical manufacturing defects are pinched wires and bent-over components. These kinds of defects result in really high current when breakdown occurs, so the trip current usually is not critical. It should be as low as practicable, but we're not making a precision measurement.

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How do you know your hi-pot tester is working? How do you know it will trip when it tests a bad unit?

Most hi-pot testers have a voltmeter on the output which is good enough to indicate the presence of voltage.

But, how do you know the trip circuit is working? We apply the voltage to a resistor which can be switched into the circuit after the hi-pot tester reaches its output voltage. Just a simple box with a resistor and a switch will suffice. What value resistor? If you know the output current at which you set the trip point, you can calculate the value of resistor which should trip the tester. We check our testers at the beginning of each shift.

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What about damaging semiconductors and other components with the hi-pot test?

Semiconductors are damaged by either excessive voltage or excessive current. When the hi-pot test is successful, there is no current (except as described earlier). So, there should be no semiconductor damage when the test is successful. But, when an insulation fails, we have current from a high-voltage source which, depending on the current path, will indeed damage the semiconductors. The answer is to make sure your product has a good primary-to-ground insulation system, and you won't have any failures.

There are reports that line filter capacitors can be damaged by the high test voltage. These fellas are supposed to be designed for such application and, if they are of good quality, should easily withstand the test voltage without any untoward effects.

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The hi-pot test is neither sophisticated nor precise. The trick to making it work for you is to understand what it tests, and how the hi-pot tester works. I hope my comments have helped you better understand both of these.

Your comments on this article are welcome. Please address your comments to the Editor, *Product Safety Newsletter.*

News and Notes

Dave Edmunds

Dave's photo is
not yet available.

Dave Edmunds

UL 1950 Standard

UL has issued the first edition (March 15, 1989) of UL 1950 entitled "Standard for Safety of Information Technology Equipment including Electrical Business Equipment." This harmonization to IEC 950 has national deviations that accommodate existing US requirements, marked as D1 or D2 in the margin. The document is to become effective March 15, 1992, replacing UL 478 and UL 114.

This document is based upon IEC 950 but contains six different types of deviations. Five of these deviations (D1, D2, DI, DC, DE) are noted in the margin on the appropriate pages. The sixth set of deviations, D3, is not noted in the main body of the standard but is contained in Appendix C. Any product submitted to D3 alternate requirements will be considered to comply to UL 478 and not to UL 1950. The D3 deviation will be applicable until March 15, 2000.

CSA Draft 950

CSA on March 9, 1989 issued a draft of C22.2 No. 950 to Technical Committee for vote, with the ballot closing April 7, 1989. This draft is a harmonization to IEC 950. There are six types of deviations, similar to UL 1950 deviation. The proposed schedule is similar to UL 1950: 1992 implementation, but permitting D3 deviations until 2000.

UL Accepts CSA Test Data

UL will accept the results of cable flame tests conducted to CSA FT4 test method (CSA22.2 No. 3, clause 4.11.4) as an alternate to UL vertical-tray flame test (UL 1581), although CSA will not accept the UL test method.

The NEC (National Electric Code) edition to be adopted in 1990 will indicate that either the UL or CSA test methods will be acceptable.

ETL Purchased

ETL testing laboratories, primarily involved with performance and safety testing of electrical consumer product and component, including product safety labeling and listing, was recently purchased by Inchcape Inspection and Testing Services USA, Inc. (ITTS). ITTS is a member of the Inchcape International Service and Marketing Group with headquarters in London, England. The ETL headquarters and main test facility is located in Cortland, New York.

TUV America EMACO Mergers

In February TUV America, Danvers, Mass., a subsidiary of a European firm, merged with EMACO, San Diego, Ca.

TUV America certifies US products exported to foreign markets and insures that products conform to the appropriate standard prior to issuing GS or other European safety marks. TUV specializes in medical and office equipment, with a newly formed Environmental Safety Services Division offering testing and consulting services in waste management.

EMACO specializes in national and international Electromagnetic Compatibility and RFI consulating and compliance testing. They have facilities to test to the requirements of the FCC, FTZ/VDE, MIL-STD and similar industrial and military specifications. The company also conducts seminars in safety and RFI and translates VDE standards.

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The following material appeared in the TUV Rheinland Product Safety Newsletter No. 7, *published in Tokyo, Japan.*

Mains Voltage 230V

In 1988, the new standard DIN IEC 38 was published, recommending 230V as the new single-phase mains voltage (400V for three-phase systems). This does not mean bad news for the sale and use of equipment built for 220V, as these have been tested for safe operations with 10% overvoltage. Up to now, the allowed tolerance range for 220V networks was +10% (198V to 242V). Power plants will accommodate the change by introducing a smaller voltage tolerance of 230V + 6% -10% (207V to 244V) for an interim period until the year 2003.

Household Equipment Standard EN 60 335/IEC 335

The European Committee for Electrotechnical Standardization (CENELEC) has ratified IEC 335 (similar to DIN VDE 0700) as the binding European standard EN 60 335 for household and similar electrical appliances. You may now get a certificate for:

Vacuum cleaners	EN 60 335-2-2
Spin extractors	EN 60 335-2- 4
Dishwashers	EN 60 335-2- 5
Kitchen machines	EN 60-335-2-14
Refrigerators and food freezers	EN 60-335-2-24
Skin treatment appliances	EN 60 335-2-27
Garment and towel dryers	EN 60 335-2-43

Ergonomics of Display Workstations

A number of discussions have taken place last year concerning the ergonomic standards for display workstations and their components. The currently valid requirements of ZH1/618 are based on the state-of-the art in 1980. Since then, technology has been improving, personal computers and workstations have become very popular, and advanced features have increased the necessary number of test items.

The certification procedure which has become common during recent years, however, did not change significantly. The GS license certifies electrical and mechanical safety and compliance with the ergonomic standard ZH1/618. For built-in type units such as monitors without enclosure, or for computers that are clearly designed not to be used as workstations, the TUV Rheinland Mark certifies electrical safety alone. To discuss details, please contact our office for consultation.

The Future Ergonomic Standard

A new ergonomic standard ISO 9241, titled “Visual Display Terminals (VDTs) used for Office Tasks—Ergonomic Requirements,” has been under discussion for several years at the ISO (International Organization for Standardization). The “Commission Europeenne de Normalization” (CEN, European Commission for Standardization) has decided that upcoming ISO standards will be binding throughout Europe, so ISO 9241 will become the rule when the discussion and the voting process will be concluded.

Many manufacturers of office equipment are taking part in the shaping of these draft standards. TUV Rheinland is now the first test institute to actively participate in the ISO committee on ergonomics.

The ISO procedure may be roughly summarized as follows: Draft proposals are discussed among ISO experts or national experts for standardization only. They are not for public viewing. When a majority of members in the technical committee (TC 159 for ISO 9241) support the draft proposal, ISO publishes the Draft International Standard (ISO/DIS). Draft standards are laid open to public discussion and amendment up until a set voting date. When a draft standard is accepted by its council, ISO will publish the final ISO standard, which is a recognized technical standard. As of now, certifications cannot be based on ISO 9241, because most parts are still draft proposals or draft standards.

ISO/DIS 9241-1 (Draft International Standard 9241, Part 1)

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titled "General Introduction," and ISO/DIS 9241-2, titled "Office VDT Task Requirements" have become a draft standard in 1988. Both parts might become a valid standard in 1989, provided they are approved by the members in their current form.

ISO/DIS 9241-3, titled "Visual Display Requirements," describes the ergonomic specifications for office and data processing equipment. Part 3 gained substantial support in 1987 from the members of Belgium, China, France, Italy, Sweden, and the United Kingdom. Germany, Japan, Netherlands, Norway and the USA did not support this part, and Austria and Poland did not vote. As of now, members' voting on this Draft International Standard will be terminated on May 22, 1989. Part 3 is the most important part for manufacturers of office equipment.

The other parts of ISO 9241 are now draft proposals and still subject to change. They are listed here solely to give you an overview of the scope of this upcoming standard.

PPart 4 Keyboards and other input devices
Part 5 VDT workplace design
Part 6 VDT working environment
Part 7 VDT surfaces and filters
Part 8 Use of color and graphics
Part 9 Non-keyboard input devices
Part 10 Dialogue interface
Part 11 Methods for evaluating andtesting software usability
Part 12 Coding and formatting
Part 13 Terminology

For more detailed information, please contact your country's standards committee or the International Organization for Standardization at the following address:

ISO Central Secretariat
ISO/TC 159
Case Postale 56
CH-1211 Geneve 20
Switzerland

Optocoupler Requirement to be Withdrawn

The German Electrotechnical Commission (DKE) intends to withdraw the standard for optocouplers, DIN 57883/VDE 0883/06.80. If the standard should be withdrawn as scheduled on June 1, 1989, all licenses based on that standard will become invalid on September 1, 1989. Objections to the withdrawal may be submitted to the DKE until May 1, 1989.

The new standard DIN VDE 0884/08.87 will bring about significant changes in test procedure and quality control measurements.

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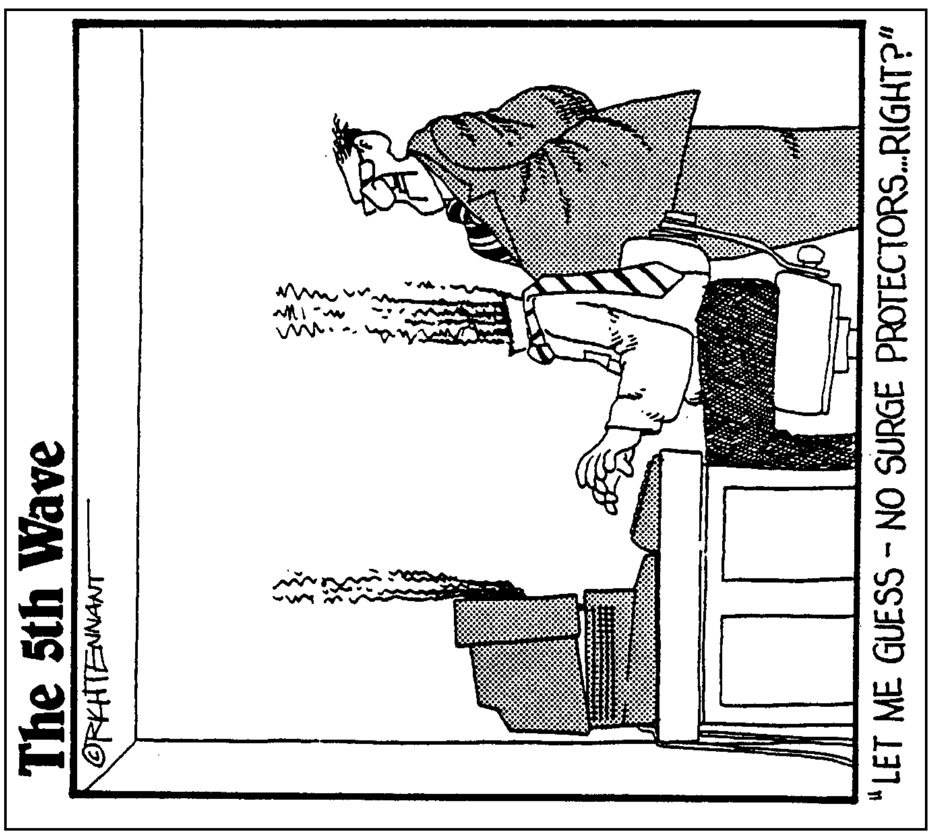

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Worldwide Power

Pete Perkins

A basic understanding of the power systems of foreign countries is essential for a product safety engineer involved in qualifying products for those countries. The following article on Japan is the first in a series of articles explaining foreign country power generation and distribution.

Japanese Mains Circuits and Plugs

1. Circumstances of Power Generation

At present, there are about 1,500 power plants in all Japan that provide about 1,000 million kilowatts of electric power. The main kinds of power generation are heat (oil, LNG and coal), nuclear and hydraulic power generation. The ratio of each kind of generated power is indicated in Table 1.

2. Power Frequency in Japan

Both 50Hz and 60Hz are used as the power frequency in Japan. As Figure 1 shows, 50Hz power is provided to eastern Japan and 60Hz power to western Japan. Also 50/60Hz mixed areas exist. (See Figure 1.)

About one hundred years ago, Tokyo Electric Light Co. imported 50Hz generators from Allgemeine Elektricitats-Gesellschaft in Germany and constructed power plants in Tokyo, Yokohama and other areas. Osaka Electric Light Co. imported 60Hz generators from General Electric Co. in America and constructed power plants in Osaka, Kobe, Hiroshima, and other areas. This is said to be the main reason for different frequencies between eastern Japan and the western region.

3. Distribution System and the Voltage to Ground

The voltage to ground, 150V, is considered to be a maximum limit for general electric installations in the Japanese standard. Therefore, the working voltage source for an instrument which is easily touched by operators should not exceed 150V as a general rule. Voltages over 150V are only permitted as special cases or reinforced distribution systems. (See Figure 2.)

Ungrounded distribution systems have been adopted in the average house in Japan. But branch circuits connected to a washing machine or outdoor equipment that is used in a humid environment should have an earth leakage breaker (ELB) to avoid an electric shock. Grounded distribution systems have been adopted in many offices, factories, hospitals, etc., and are becoming popular in housing recently.

4. Grounding

Grounding should be provided in order to avoid shock hazard and protect the distribution system and/or equipment during any ground fault. According to these purposes, four grounding types have been stipulated. (See Table 2.)

5. Plugs

The plugs defined by the JIS (Japanese Industrial Standard) are indicated in Table 3.

Some plugs have a same blade arrangement but a different rating such as type in the table. In this case, the size of blades and the spacing between blades are different.

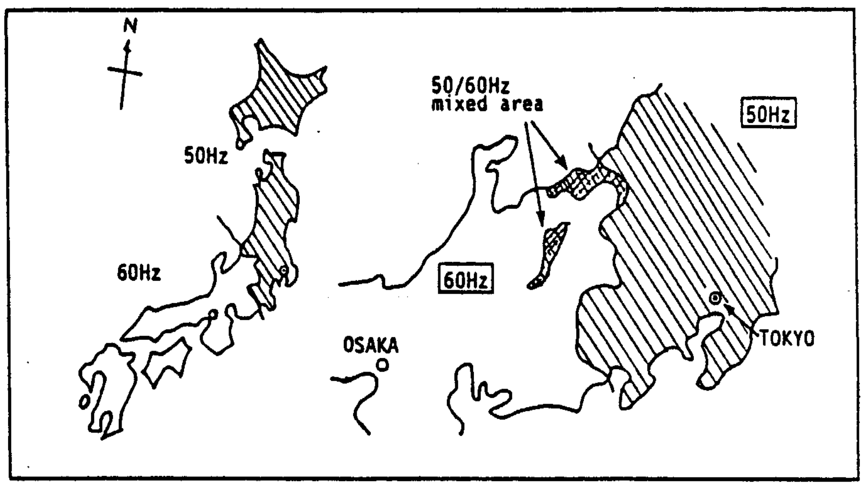
All the plugs, receptacles, switches, circuit breakers, etc., used in Japan should be recognized by the “T mark system” (the Electrical Appliance and Material Control Law of Japan, one of the ministerial ordinances of MITI). (See Table 3.)

Continued

GENERATED POWER	1981	1986	1991 (Prediction)
Oil heat power	42 %	29 %	17 %
LNG heat power	18	25	23
Coal heat power	6	9	13
Nuclear power	17	23	34
Hydraulic power	17	14	13

Table 1 Ratio of Generated Power

Fig 1 Power Frequency



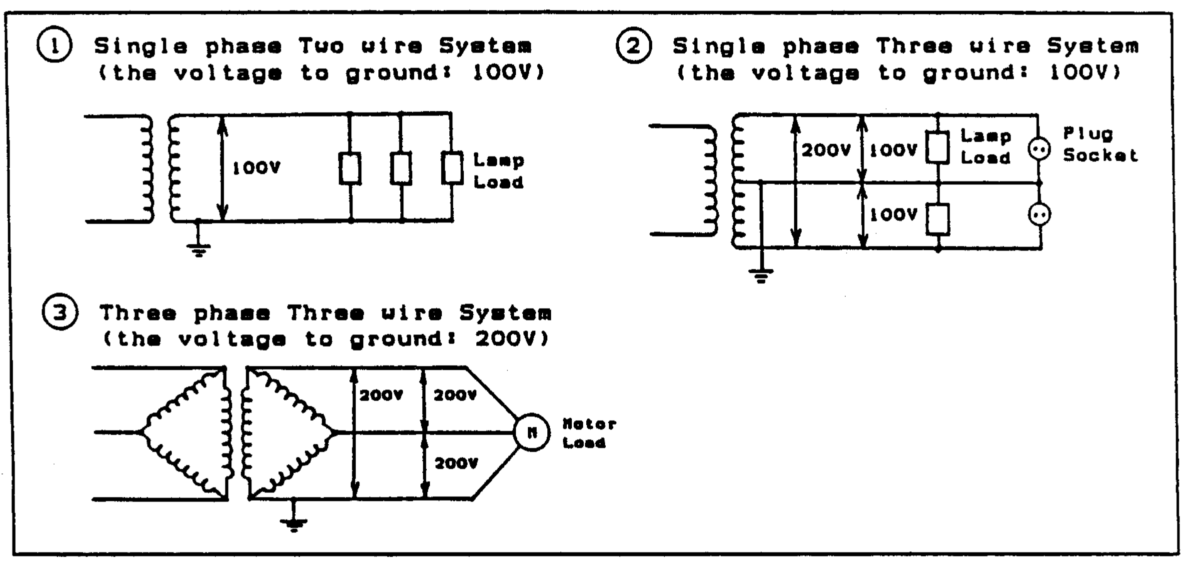


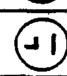
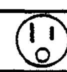
Fig 2 Distribution System and the Voltage to Ground

Continued

Table 2 *note: "I" is the current in one high-tension line of the transformer while grounding occurs.*

Grounding	Points of Connection	Grounding Resistance
Class 1	Dead metal parts, e.g., the iron base of high-voltage equipment or the metallic enclosure for high-tension cables, etc.	10 ohms or less
Class 2	Neutral point of the low-tension side of the transformer that couples high-tension line with low-tension line, e.g., a pole transformer	Not exceeding 150/I ohms (see following note)
Class 3	Dead metal parts, e.g., the iron base of the low-voltage equipment, conduit tube, cabinet's panel, etc. not exceeding 300V	100 ohms or less
Special Class 3	Same as Class 3 Grounding except when the voltage is from 300 to 600V	10 ohms or less

Table 3 Type of Plugs

Number of poles	Grounding or Not	Blade Arrangement	Rating
2	Non-grounding Type		15A 125V
			15A 250V
			20A 125V
			20A 250V
			30A 250V 50A 250V
2	Grounding Type		15A 125V
			15A 250V
			20A 125V
			20A 250V
			30A 250V
			50A 250V
3	Non-grounding Type		15A 250V 20A 250V 30A 250V 50A 250V
3	Grounding Type		15A 250V 20A 250V 30A 250V 50A 250V

What Do You Think?

The Product Safety Newsletter *seeks to provide an opportunity for its readers to express their views and interests on product safety related issues. Please take time to read and consider the writer's viewpoint and respond directly to the newsletter (see return address on cover). If you would like to express your views on a product safety related topic in a future issue, please send your contribution to the Editor,* Product Safety Newsletter.

If you were hiring an experienced safety engineer, what should that person know?

If you were to design a course to teach product safety concepts to new safety engineers, what would the course include?

Make a list of the things that come to mind and send it in, with any discussion you care to add about why you feel it is important to include that item. You may want to prioritize certain groups of ideas as more important than others.

Some examples follow:

1. Understanding spacing terms and applications of measuring methods and practices.
2. Grounding philosophies.
3. Temperature rise philosophies,test methods, criteria.

If you have any ideas about how you would teach the topic(s), please include them.

I am sure that many more ideas will come from your fertile minds. This input could serve as the seed for a course for upgrading skills or for educating design engineers about product safety principles and practices.

Mike Harris
Teccom Company

Ask Doctor Z

Doctor Z

In the world of Product Safety and Certification, there are many pitfalls for the unwary. If you have a problem that seems insoluble, then it's time to ask Doctor Z! He has the answers, derived from his many years of training and experience in the Science of Product Safetiology. Pitfalls hold no terrors for Dr. Z, since he is on a first name basis with most of them. Any resemblance to persons, places, products, agencies, or good advice is purely coincidental, but don't let that stop you. Write to Dr. Z today!

Dear Dr. Z,
UL just published a monster standard called UL 1950. It looks like I have about three years to figure this one out. With some apprehension, I would like your not-so-learned opinion on the standard. Is it a good safety standard?

Signed,
Ready Kilowatt, Test Engineer

Continued

Dear Ready,

Webster's New World Dictionary (Second Edition) has a long definition of the word "good." For your question, let's use this definition: good—a) suitable to a purpose; effective; efficient; valid.

Suitable to a purpose, effective.
Actually, I think we are dealing with multiple purposes here. The first purpose is to create a standard for a safe product, the second one is to combine IEC 380 and IEC 435, the third one is to write a UL standard (1950) with a direct relation to IEC 950 being adapted elsewhere in the world, the fourth one is to provide UL 1950 support of the NEC requirements, and the last purpose is to minimize the UL certification process impact. It does not take a rocket scientist to realize that the trade-offs probably made during the standards writing process result in a less than optimum solution for each of the purposes.

In Dr. Z's opinion, products meeting UL 1950 will be at least as safe as products meeting UL 478, or IEC 435. Products meeting one or more of those standards have generally had a safe field record. I do not expect UL 1950 complying products to be unsafe. So, we can hypothesize UL 1950 will result in safe products, making the standard suitable to a purpose and effective.

Efficient.
Is UL 1950 efficient? Dr. Z suspects the answer will be a function of the individual's view of the total product life cycle. If looked at from a multi-country perspective, UL 1950 may be efficient, as the requirements are by and large the same as those which will be used in other countries. With the core materials the same, only the deviations need to be tracked. This should prove to be easier than dealing with entirely different standards. If viewed from a UL certification perspective, the standard may be less efficient than UL 478, as it is more complex, hence certification time and cost may increase. If efficiency is looked at from the perspective of what is needed for a safe product, UL 1950, like most other ITE safety standards, is extremely inefficient. This unhappy result stems from two conflicting needs, the first is the specification of acceptable performance for hazard protection mechanisms, and the second is the need of some people for a construction cookbook that will allow them to avoid the discipline of safety engineering but still easily get test house approval. As a result, UL 1950 (IEC 950) etc. is not an efficient or elegant standard for product from the narrow view of "what are the parameters of a safe product, and how are they measured."

There is no doubt in Dr. Z's mind that the efficiency of IEC 950, UL 1950, and others can be increased many fold by requiring the standards writing committees to (a) identify the hazard, (b) specify the limit values the product protection mechanisms must reduce the hazard to from the user or service perspective, and (c) specifiy the conditions under which the effectiveness of the protection mechanism must be judged. Once this is done, prototyping and testing should be required to verify that the requirements achieve the intended result before the standard is changed. Dr. Z suggests that safety standards should be verified by testing before being "put into production," the same as manufacturers do with real products. Only people asking for trouble release unverified products. Why should safety standards development be any different?

Oops, Dr. Z moved off the topic! Back on track, we come to the last measure.

Valid.
As one might suspect from the number of purposes UL 1950 has, there are many requirements that

Continued on Page 18

Hazard Markings

Pete Perkins

Hazard Markings As Described by ANSI Z535.4 Product Safety Signs and Labels

Hazard markings are used extensively on electrical products. By their use we expect that a user will see the markings and change their behavior to reduce the risk of injury. These hazard markings are a reminder to either an experienced user or to someone who is unsure of the importance of the hazard to which they're exposed. Either user should get the same message from the marking.

Hazard markings are one of the three key areas where manufacturers must focus to provide safe equipment. Failure to warn adequately has resulted in many injuries and the resulting loss to manufacturers. The court's expectations focus on meeting the "usual requirements" which, in the US, means ANSI standards rather than other industry-based requirements.

Let us examine the current system. This principally comes from ANSI Z35.2-R1974 (Specifications for Accident Prevention Tags) which focuses on a two-level system, using the key words *Danger* or *Caution*. In the electronic equipment area there is quite a bit of confusion in the use of key words. UL does not define the key words in their standards; neither does UL refer to any defining document (such as an ANSI standard). Some examples are: UL478, EDP Equipment, specifies *Danger, Warning* or *Caution* but only gives examples for *Caution*. UL508, Industrial Control Equipment, specifies *Warning* and *Caution* with the word *Danger* reserved for a specific fusing issue associated with motor controllers. UL1244, Test and Measuring Equipment, uses the key words *Warning* and *Caution.* UL1410 TV and Video Products, specifies the key words *Warning* and *Caution*. Between these standards different key words are used for the same hazard; there is no consistency of use.

ANSI Z535.4 is the codification of recent US practice. It is organized equivalent to standards used by a group of manufacturers, many of which have considerable experience with defending deficient labeling. One example of a good industrial implementation is the 1981 Westinghouse Electric Corp. Product Safety Label Handbook. Their equipment shows the results.

The current state of affairs in the US is that the standards have not kept pace with current practice. The resulting disparity is a key argument for adopting this specific US position. We would argue for the adoption of ANSI Z535.4 on the following grounds.

- This standard supports the societal expectations for providing adequate warning as reinforced by court decisions.
- This standard would give a consistent meaning to the key words used regardless of the application.
- This standard expands the recommended use to include colors and symbols which provide additional reinforcement of the need to be alert.

Further, the adoption of this standard shows that the US has a consistent practice. Finally, the adoption of this standard provides a basis for introducing US practice into the worldwide scheme.

Here are the specific reasons that this proposed standard is a technical improvement over the current ANSI Z523.1-1979.

- It more clearly differentiates various levels of hazards.
- It reduces the confusion of interchanging the words *Warning* and *Caution* by giving them distinct definitions.
- It provides for the (optional) use of color which will provide an additional indication to uneducated or foreign users.
- It encourages the use of symbols with the plain language marking —which will train users in the meaning of the symbols.

Continued

Hazard Markings
Continued

- It recognizes that the mixture of symbols, words and color will give quick recognition to most users.

The use of common symbols, words and colors across broad lines of equipment will give quick recognition of hazards.

A compelling reason for accepting ANSI Z535.4 is that it is in line with cases where the courts provided protection to manufacturers for following US practice. Adoption of ANSI Z535.4 gives opportunity to introduce American practice into the worldwide scheme.

There are some objections to adopting this US standard claiming that it isn't harmonized with the IEC. Unfortunately ISO TC145/SC2 "Safety Colors and Signs" and IEC TC16 "Coding by Colors..." are still struggling with many issues. There is no harmonized IEC standard that deals will all the issues. The worldwide community has not faced the problems arising from product liability pressures. They have not caught up with US practice on user protection and the need for adequate hazard markings. Once they feel the same pressure they will work toward a solution that will probably be similar to that outlined in ANSI Z535.4.

Again, for the reasons stated, ANSI 535.4 should be adopted in the US. It provides the expectation supported by the court to provide adequate warning to the user. It brings consistency to the use of the key words *Danger, Warning* and *Caution.* It expands to include the use of colors and symbols to reinforce the attention of the user. As manufacturers of electronic equipment, we should work together to adopt ANSI Z535.4 as an American National Standard.

Ask Doctor Z
Continued from Page 16

are not valid if viewed from only one of the perspectives, and some are only valid if looked at from a certification system perspective!

Overall, Dr. Z offers the following summary for UL 1950:

The people and organizations involved in the standard get an A+ for effort and work output (at the UL 1950 level and IEC TC 74 level).

The product is graded a B for IEC 950 harmonization, and C for technical content, realizing the technical content was constrained by IEC 950.

Dr. Z once worked for a company in which the CEO said "We've got A+ people at this outfit, but we are only producing C results. We need to reconsider our product development processes." Dr. Z thinks this same statement is applicable to the standards writing committee.

There is no doubt the future with IEC 950 and UL 1950 will be interesting. The challenge is to interject engineering rigor into the standards writing/revision process to make the future better.

Dr. Z thinks that UL 1950 is "good" for harmonization of requirements and possibly for encouraging reciprocity of test house approvals, but that IEC 950 and UL 1950 have a ways to go before they can be considered good safety standards in the more complete meaning of "good."

Dr. Z

Area Activity Reports

Northeastern Chapter

The April meeting of the Northeastern Chapter centered on the new draft of the European Prestandard ENV 41003. The discussion was led by Gerrett Durling. It was noted that the European community has a 1992 deadline to create consistency within the European telecommunications requirements. ENV 41003 is likely to become the standard for equipment intended to be directly connected to the telecommunications network and for equipment that can be interconnected to that apparatus. These requirements are more stringent than those presently enforced within North America. As the 1992 deadline nears, designers may finally be able to build a common product for submittal throughout Europe.

The May 24 meeting covered the second edition of UL 1459. Lou Feudi led the discussion and included information about the significant changes and required re-evaluation of telephone equipment. It was noted that manufacturers with products currently listed to 1459 1st edition will have until September 15, 1989 to resubmit their product for investigation to the new 1459.

Please refer to the Calendar at the end of the newsletter for information about upcoming meetings. The June meeting will include an election of officers for the chapter. Should you have any questions about the Northeastern chapter, please call Jim Norgaard at
(508) 263-2662.

Santa Clara Valley Chapter

The April meeting was a huge success. More than 60 people listened to Chris Kendall of C.K. Consultants speak on grounding for EMI reduction. Our May meeting was no less interesting as approximately 30 product safety professionals heard Mike Hopkins of KeyTek discuss power line transients and their effect on electronic equipment. Mike indicated how the simple addition of varistors is often not enough to protect the equipment as they may themselves generate high voltage pulses to the equipment. Mike passed out booklets describing line transients and how to test for and protect against their effects. The audience contributed to the discussion, making the presentation all the more interesting and informative.

Apple Computer is hosting our meetings in their impressive new facilities. Early arrivals get the sofas and an "up-close and professional" view of the proceedings. The June 27 meeting will feature Roy Clay of Rod-L, speaking on Hi-Pot and Ground Continuity Testing. The July guest speaker will be Peter Tarver on Plastics and Printed Wiring Boards. Peter is from UL in Santa Clara. Both meetings start at 7:00 p.m. Please refer to the Calendar in this newsletter for a full listing of meetings and the address of Apple Computer.

For further information, please contact Mike Campi at (408) 773-0770.

Los Angeles Chapter

Minutes for the meeting of Monday, May 1, 1989 are as follows:

Rolf Burckhardt opened the meeting by welcoming everyone and announced the guest speaker and topic presentation for the evening.

Seven members were in attendance.

Rolf announced the premier of a new magazine entitled *1992 America.* It concerns the coming changes affecting the 12 member European Economic Community and the impact of the changes on the rest of the world—politically, economically and of course product safety wise. The magazine focuses on current and future events to keep you informed. A complimentary copy was distributed to attendees.

The new release of IEC 601-1 (1988), Medical Electrical Equipment, Part 1: General Requirements for Safety, was briefly discussed and compared to IEC 601-1 (1977). Many sub-clauses have been eliminated, Appendix J (Transformers) has been moved to Clause 57.9, Appendix K (Medi-

Continued

cal Isolating Xfmr) has been eliminated, spacings designated A-K (input or output signals and accessible ungrounded parts; new requirement) have been assigned 5mm and 8mm (clearance and creepage) respectively, others have increased, temperature limits have changed, etc.

Jim de Vries, Senior Engineer of CSA (Vancouver) was present and gave a most welcome presentation of the CSA Category Program.

The Category Certification Program is a certification program whereby the manufacturer has the ultimate amount of flexibility within the certification process. A leap above the Model and Shared programs, Category Certification allows the manufacturer to perform any portion which he is capable and qualified to do, from review to testing and certification. A preliminary questionnaire executed by the manufacturer assesses qualification covering subjects such as personnel, responsibilities, test equipment, test and manufacturing procedures, documentation, etc. The program does not require a file report as with Model Certification, instead the documentation package becomes the report (drawings, ECO's, procedures, etc.).

An announcement was made that the Orange County Chapter will hold its meeting tomorrow evening, May 2, at 6:00 p.m. at MAI Basic Four in Tustin. The meeting program is a discussion amongst members on IEC 950.

The next meeting is scheduled for Monday, June 5, 6:30 p.m. at Harman Electronics. The guest speaker is to be Bruce Santo, Field Engineer, FUS, Santa Clara. The topic of the program will be UL's COMPASS Program.

The July meeting was scheduled for Monday, July 10, 6:30 p.m. at Harman Electronics. The guest speaker will be Bob Wersen, president of Panel Components Corp. The topic will be line cords, attachment plugs, power entry components, etc., and international product safety standards concerning the same.

For further information, please contact Rolf Burckhardt at (818) 368-2786.

Orange County Chapter

The minutes for the meeting of Tuesday, April 4, 1989 are as follows:

Charlie Bayhi opened the meeting. Fifteen members were in attendance. The March meeting minutes were approved as written. Program: UL COMPASS program. Bruce Santo, UL Field Engineer, gave a presentation on the UL Compliance Management and Product Assurance (COMPASS) program for submittal of new and revised products to UL. The November 3, 1986 UL bulletin on the COMPASS program was distributed and discussed.

Agencies' certification activities: The second edition of IEC 601-1 Medical Electrical Equipment is now available. IEC 1010 Lab Equipment is expected in September 1989.

The next meeting is scheduled for 6:00 p.m. Tuesday, May 2, 1989 at MAI Basic Four Corp. The program will be a discussion of UL 950 by attending members and report on the TUV-R 1992 conference. The June 6 meeting will be a presentation on product liability by Denise Damrow, Attorney at Law. A program by Ed Spooner of TUV Rheinland of N.A. Inc. on EN60950 will be scheduled for a later meeting.

For additional information, contact Paul Herrick of Gradco Systems, Inc., (714) 770-1223, fax (714) 768-6939 .

Pacific Northwest Chapter

On April 18 and 19, the Pacific Northwest Chapter (PNP) met in consecutive meetings, first in Portland, and then in Everett, to listen to Jim De Vries speak on the implications of the latest CSA bulletin for EDP component power supplies, 1402C. Switch mode power supplies for EDP equipment and the draft standard, CSA 234, for linear power supplies were also covered.

In addition to a rundown on power supply testing, it was

Continued

interesting to learn the difference between CSA standards and bulletins and how their standards writing process works. CSA standard C22.2 No. 950-M1984 is actually a compilation of CSA No. 220 + IEC 950 + General Instructions 1-4 + Tech Info letters 15 and 16.

In May, we will be doing something different. Instead of attending our own meeting, we're going to someone else's! Rich Nute will be the guest speaker for the Society of Manufacturing Engineers meeting in Portland on May 18 and he's going to give us a preview of this speech up in Everett on May 17. Please mention these meetings to your company's manufacturing engineers. All guests are cordially welcome.

May Meeting for P.N.C. Seattle Area Sub-Chapter

Wednesday, May 17, 1989
5:00 p.m., No-host Dinner
7:00 p.m., Meeting

RSVP
(Dinner) by May 15
Walt Hart - Fluke Mfg.
(206) 356-5177

Location
John Fluke Mfg. Co.
6920 Seaway Blvd.
Everett, WA 98206
(Use night entrance)

Portland Area Sub-Chapter

Thursday, May 18, 1989
6:00 p.m., No-host Bar
6:30 p.m., Dinner
7:15 p.m., Meeting

RSVP
Dinner and/or Meeting
by May 15,
Stan Tellin - Kentrox Industries
(503) 643-1681 x285 (bus.)
(503) 646-5950 (res.)

Location
Marika's Restaurant
11525 SW Barnes Road
Portland, OR
Hwy 26 (Sunset Hwy),
Cedar Hills Blvd., Barnes
Rd. Exit just west of Hwy 127 interchange.
Cost: Dinner $15 (Students $10)

Subject
Product Safety and Regulatory Compliance and Its Impact on Electronics Manufacturing.

Speaker
Rich Nute, Product Regulations Engineer, Hewlett-Packard, Vancouver, WA

Topics
What is the design shortsightedness of both design and manufacturing engineering in preparing for compliance issues? Where does the responsibility lie in regard to safety compliance? Why is safety compliance so important today? What is the current direction of the regulatory agencies? A brief explanation of the regulatory agencies. Legal ramifications and company liability issues. What is the cost of compliance for a typical product? How are product safety and manufacturing related? What ongoing manufacturing and production controls must be in place for a product that will comply? What manufacturing practices are UL recognized? Storage requirements and shelf life? Re-spooling and packaging? Traceability of parts and source control? How is safety and regulatory compliance implemented and maintained for a typical new product development cycle? How does one design for safety? What manufacturing processes must be implemented and monitored?

For further information, contact Al Van Houdt, Product Safety Engineer, (206) 882-3700, X4006, fax (206) 885-4877.

Chicago Chapter

The Chicago Chapter will hold their second meeting on June 6, 1989, at Packer Engineering, Inc. The meeting will revolve around a tour of the research and forensic laboratories and facilities of Packer Engineering, Inc., highlighting electronic and electrical products that have experienced dramatic safety problems.

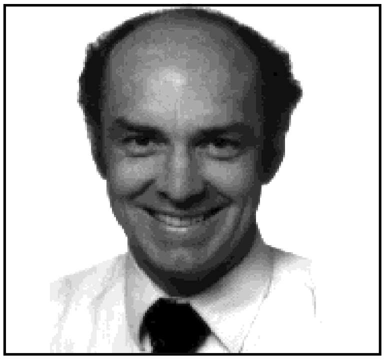
Wine and cheese will be served during Registration, which will begin at 5:30 p.m. This is then to be followed by an informal Chicken Buffet, served between 6:15 - 7:00 p.m.

The Chicago Chapter will meet

Continued on page 13

Editorial

Roger Volgstadt



Roger Volgstadt

Our first edition of the *Product Safety Newsletter* occurred in February of 1988. Many of you have been with us from the beginning and know the changes we've gone through. After eleven issues, we are still discovering new ways to improve the publication. One of the more recent improvements is discussed in the Chairman's Message—the creation of a Product Safety abstracts file. Of course, while the collection depends on many participants, the writing of abstracts and organization of material requires a special editor. Would someone care to join the distinguished ranks of the *Product Safety Newsletter* staff as a Product Safety Abstracts editor? Your work a few hours each month could be of great benefit to the entire Product Safety Technical Committee and do much to advance the knowledge and competance of your fellow professionals. Besides the committee's benefit, you would be the first to see any articles and thereby expand your product safety expertise. If you think that a long-term commitment is more than your schedule can handle, let me encourage you to consider the commitment on a quarterly basis.

Another area of improvement deals with our date of publication. Some have wondered why a January/February issue is being distributed in March. Good question. Delays and schedule conflicts have done much to get us off our bimonthly commitment to you. To more accurately reflect the actual date of publication, we have decided that the next issue will be our July/August/September/October issue. We will still be publishing bi-monthly, but the July-October issue will be sent in August and the November/December issue in October. This way, it should arrive in time to be a legitimate November/December edition.

Finally, in our July-October edition, we plan to include a reader survey card and subscription renewal notice. While there are presently no subscription fees of course, we do want to make sure that each edition is actually getting to someone interested in product safety. The survey will keep us up to date with the interests and experiences of our readers—what better way than to conduct a survey?

Our goal is to make this newsletter the best product safety publication you read. Your contributions and suggestions toward that end are always greatly appreciated.

Roger Volgstadt
Editor

Area Activity Reports

Continued

the first Tuesday of every month. There will be no meeting in July or August. January's (1990) meeting will be on January 9, 1990, due to the holidays. The meeting place will be announced at a later date.

For reservations, please contact John Allen (312) 699-4414, or Dick Hagedorn (312) 355-5722.

Austin Chapter

There have been no meetings since our last newsletter. However, work is now progressing on the next meeting schedules for September. Professionals in the Ft. Worth/Dallas/Houston area should plan on attending in September when officers will be installed and plans laid for future activities. Individuals wishing further information about the Texas Chapter are encouraged to contact either Bob Hunter at (512) 250-6878 or George Jurasich at (512) 343-6231.

Institutional Listings

The Product Safety Technical Committee of the IEEE EMC Society is grateful for the assistance given by the firms listed below and invites applications for Institutional Listings from other firms interested in the product safety field.

9420 RESEDA BLVD.
SUITE 800
NORTHRIDGE, CA 91324

TEL (818) 368-2786
FAX (818) 360-3804

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INTERNATIONAL PRODUCT SAFETY CORP.
60A Rickenbacker Cir., Livermore, CA 94550

- Complete Safety Laboratory for testing
- Design & Submittals to all agencies.

(415) 449-8578 FAX (415) 449-8565

HEWLETT PACKARD

SYSTEMS TECHNOLOGY DIVISION

The Quality Engineering Department is pleased to help support the publication of the *Product Safety Newsletter.*

TANDEM

Tandem Computers Incorporated is a leading supplier of computer systems and networks for on-line transaction processing.

An Institutional Listing recognizes contributions to support the publication of the *Product Safety Newsletter* of the IEEE EMC Society Product Safety Technical Committee. Minimum rates are $100.00 for listing in one issue or $400.00 for six consecutive issues. Inquiries, or contributions made payable to the Product Safety Technical Committee of the IEEE EMC Society and instructions on how you would like your Institutional Listing to appear, should be sent to: PSTC *Product Safety Newsletter,* c/o John McBain (M/S 42LS), Hewlett-Packard, 19447 Pruneridge Avenue, Cupertino, CA 95014.

Calendar

The Product Safety Technical Committee of the IEEE EMC Society

JUNE

Monday, June 5
Los Angeles Chapter
No meeting for June

Tuesday, June 6
Orange County Chapter
Subject: Product Liability
Speaker: Denise Damrow, Attorney
Time: 6:00 p.m.
Location: MAI Basic Four
14101 Myford Road
Tustin, CA
Contact: Paul Herrick
(714) 770-1223

Tuesday, June 6
Chicago Chapter
Subject: Dramatic Safety Problems
Speaker: TBD
Time: 5:30 p.m.
Location: Packer Engineering
Contact: John Allen
(312) 699-4414
Dick Hagedorn
(312) 355-5722

Tuesday, June 20
Pacific Northwest Chapter
Subject: Hi-Pot Testing
Speaker: Roy Clay, Rod-L
Time: 7:00 p.m.
Location: Marika's Restaurant
11525 SW Barnes Road
Portland, OR
(Hwy 26 (Sunset Hwy), Cedar Hills Blvd., Barnes Road exit. Just west of Hwy 217 Interchange.

Wednesday, June 21
Pacific Northwest Chapter
Subject: Hi-Pot Testing
Speaker: Roy Clay, Rod-L
Time: 7:00 p.m.
Location: John Fluke Mfg. Co.
6920 Weaway Blvd.
Everett, WA
(Use Night Entrance)

Tuesday, June 27
Santa Clara Valley Chapter
Subject: Hi-Pot Testing
Speaker: Roy Clay, Rod-L
Time: 7:00 p.m.
Location: Apple Computer
20705 Valley Green Dr.
Cupertino, CA
Contact: Mike Campi
(408) 773-0770

Wednesday, June 28
Northeast Chapter
Subject: OSHA Accreditation of Test Labs
Speaker: OSHA
Time: 7:00 p.m.
Location: Sheraton Boxborough
Intersection of Rts 495/111
Boxborough, MA
Contact: Jim Norgaard
(508) 263-2662

JULY

Tuesday, July 4
Chicago Chapter
No meeting for July

Monday, July 10
Los Angeles Chapter
Subject: Primary Components International Standards
Speaker: Bob Wersen, Panel Components
Time: 6:30 p.m.
Location: Harman Electronics
8500 Balboa Blvd.
Northridge, CA
Contact: Rolf Burckhardt
(818) 368-2786

Continued

Calendar

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Tuesday, July 11
Orange County Chapter
Subject: Primary Components/ International Standards
Speaker: Bob Wersen, Panel Components
Time: 6:00 p.m.
Location: MAI Basic Four
14101 Myford Rd.
Tustin, CA
Contact: Paul Herrick
(714) 770-1223

Tuesday, July 18
Pacific Northwest Chapter
Location: Portland and Seattle Meetings Canceled for July

Tuesday, July 25
Santa Clara Valley Chapter
Subject: Plastics and PWBs
Speaker: Peter Tarver, UL
Time: 7:00 p.m.
Location: Apple Computer
20705 Valley Green Dr.
Cupertino, CA
Contact: Mike Campi
(408) 773-0770

Wednesday, July 26
Northeast Chapter
Subject: North American vs. European Circuit Breaker Specs.
Speaker: Bruce Langmuir, Bose
Time: 7:00 p.m.
Location: Sheraton Boxborough
Intersection of Rts 495/111
Boxborough, MA
Contact: Jim Norgaard
(508) 263-2662

AUGUST

Tuesday, August 1
Chicago Chapter
No meeting for August

Tuesday, August 1
Orange County Chapter
Subject: EN 60 950
Speaker: Ed Spooner, TUV
Time: 7:00 p.m.
Location: MAI Basic Four
14101 Myford Rd
Tustin, CA
Contact: Paul Herrick
(714) 770-1223

Tuesday, August 15
Pacific Northwest Chapters
No meeting for August

Tuesday, August 22
Santa Clara Valley Chapter
Subject: Picnic/Speaker Reunion
Speaker: N/A
Time: 7:00 p.m.
Location: TBD (see local newsletter)
Contact: Mike Campi
(408) 773-0770

Wednesday, August 23
Northeast Chapter
Subject: TBD
Speaker: TBD
Time: 7:00 p.m.
Location: Sheraton Boxborough
Intersection of Rts 495/111
Boxborough, MA
Contact: Jim Norgaard
(508) 263-2662

SEPTEMBER

Austin Chapter
Subject: Organizational
Contact: Bob Hunter
(512) 250-6878
George Jurasich
(512) 343-6231

The Product Safety Newsletter
c/o Tandem Computers Incorporated
2550 Walsh Avenue, LOC. 103
Santa Clara, CA 95051
Attn: Roger Volgstadt

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(See inside for expanded calendar!)