The Product Safety Newsletter

IEEE

In this issue		Page

Vol 2, No. 4 July/August/September/October 1989

Chairman's Message

You may have noticed two items (at least) that are unique to this issue of the *Product Safety Newsletter:* the date assigned and the reader survey.

This issue is dated July/August/September/October. No, not because it's twice as thick as previous issues (which it isn't), but because we are trying to get into synchronization with our actual publication dates. Your officers and newsletter staff will continue doing their best to publish the newsletter bimonthly. We just want to make a onetime adjustment to bring reality and meaning to the date. Publishing a calendar in advance of events instead of afterward makes a lot more sense.

Rich Pescatore

The second item, the enclosed reader survey, is very important. It must be completed and returned if you wish to continue receiving the newsletter.

Why?

Several reasons actually. First and foremost, it's a matter of our own sanity. The newsletter distribution has grown by leaps and bounds. The last mailing was over 1Ooo copies. While I am pleased that so many people are interested in what we are doing, it is becoming a matter of economics that we do whatever possible to ensure that the newsletter is getting to the right people; those of you that are truly interested in product safety. The survey will allow us to update our mailing list.

Speaking of economics, we are part of the IEEE EMC Society. The EMC Society partially funds the newsletter and, in order to continue to enjoy this support, we must determine the percentage of you who are actually EMC Society members.

As you know, we hope to migrate toward full IEEE Society status over the next few years. Our path toward achieving this is to solicit support from other IEEE Societies and move from a Technical Committee of one Society to a Technical Council of several Societies. The survey will provide us with information about our members' various affiliations and will help us learn which Societies may be most interested in product safety.

The questionnaire also serves as a forum for your suggestions and recommendations. We are always interested in your ideas. What can we do to make the

Continued

The Product Safety Newsletter

Vol 2, No 4 July/Aug./Sept./Oct. 1989

 Comments and questions about the newsletter may be addressed to the *Product Safety Newsletter,* Attention: Roger Volgstadt, Loc. 55, c/o Tandem, 10300 N. Tantau Ave., Cupertino CA 95014-0708, Fax No. (408) 285-0505.

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

Editor
Roger Volgstadt
News Editor
David Edmunds
Technical Editor
John Reynolds
Assistant Editor
John McBain
Subscriptions Manager
John McBain (acting)

Chairman's Message

Continued

PSTC more meaningful to you? What is it about the PSTC that you like? What are we doing that you don't like (go ahead, we can take it)? Take this opportunity to let us know your ideas.

The *Product Safety Newsletter* is presently sent to you without charge. We plan to continue this practice for the next several issues. However, after that, we expect that the newsletter may be sent free of charge only to IEEE members.

We are investigating the possibility of offering the newsletter to non-IEEE members for a subscription fee, but wouldn't it make more sense for you to join the IEEE (and the EMC Society)? The PSTC enjoys the benefits and support of the IEEE through the Society. With these benefits comes an obligation of return support. Fortunately, it's bargain time now, because you can join the IEEE in September, pay for only 12 months, and enjoy the many benefits through the end of 1990.

Please, show your support for the Product Safety Technical Committee by joining the IEEE (or renewing your membership). And don't forget to also join the EMC Society for an additional few dollars.

Most important and least expensive (just 25 cents postage) is for you to return the reader survey now, or as soon as you know your IEEE membership number.

If you cannot find a local IEEE Section for getting a membership application, write to:

IEEE Service Center
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855

We look forward to hearing from you soon.

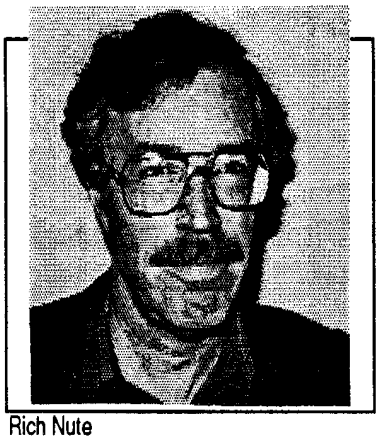
Best regards,
Rich Pescatore
Chairman

Correction: The author of "Worldwide Power" in the May/June edition of the PSN was incorrectly noted as Pete Perkins. The correct author is Mr. Perkins' counterpart in Tokyo, Japan, Mr. Yoshio Yamada of Sony/Tektronix. The Editor apologizes to Mr. Yamada for this error.

Technically Speaking

Rich Nute

Theory of Equipment Grounding Impedance



Rich Nute

Hello from Vancouver, Washington, USA:

Values for grounding impedance appear in many standards, including UL 478 and 1244, CSA C22.2 No. 0.4, and IEC 601 and 950. Values vary from 0.1 ohm to 1 ohm.

Everybody wants to know the derivation of the value of grounding impedance. And, which is the "correct" value?

I've asked, and searched, and have never found any answer with a sound technical basis. So, I've put together my own answer, which I'll share with you.

This is not a complete treatise on the purpose of equipment grounding; I'm limiting my discussion to the *value* of the impedance of the ground from accessible metal parts to the point where the power cord ground wire connects to the equipment.

• • •

Let's start with a definition:

Protective grounding
is a system
whereby
non-current-carrying
accessible conductive
parts
are connected to ground
in such a manner as to
prevent those parts from
rendering an electric shock.

(I use indents and line separations in complex statements so that 1 can separate and identify the modifiers from the essence of the sentence. The statement holds together if you ignore any level of indent. Note here the essence "...grounding is a system whereby parts are connected to ground..." This helps me keep track of the entire idea. 1 learned this technique from Jerry Hoard who, as he read a complex sentence, would ask: "What is connected? Connected to what? How is it connected? What is the connection doing? What kinds of parts?")

• • •

To do this job, we need some tools: A circuit or schematic diagram, Ohm's law, and Kirchoff's circuit laws. And a calculator.

And, we need a premise. In this case, the premise is:

The impedance
of the
equipment
protective grounding circuit
shall be of such value that,
in the event of a fault, the
voltage at
any accessible part
with respect to
the supply-circuit groundpoint
shall not exceed
the voltage limit value
for longer than
the time limit value.

Let's see what we have:

1. We're dealing with the equipment protective grounding circuit. That's the circuit from the point of the fault to the point where the power cord ground wire connects to the equipment. These are the parts we control in the design of the equipment. We don't control the power cord or the attachment plug cap.
2. We're dealing with fault conditions. That's pretty clear. Under normal conditions, the protective grounding circuit is not a deliberate current-carrying circuit. (We're ignoring its incidental function as a drain for leakage current.) The protective grounding circuit is there to provide protection in the event of a fault from the primary circuit to accessible conductive parts.
3. We're dealing with the ground the person is connected to. This ground is the floor, or building itself. Under fault conditions, Ohm's law tells us that there will be a potential difference across

Continued

the impedance of the entire protective grounding circuit. The objective is to limit this voltage to an acceptable value such that an electric shock will not occur.

4. Finally, we're dealing with the duration of the potential difference across the impedance of the entire protective grounding circuit. Why? If the fault has zero impedance, then the potential of accessible conductive parts will be at least one half the supply voltage - *even if the equipment-ground impedance is zero!* This value exceeds the conventional 30-volt limit for accessible voltages. With this condition, we rely on the circuit-breaker or fuse to *automatically* disconnect the circuit and thus provide protection against electric shock. In this case, the equipment grounding impedance must be sufficiently low as to guarantee that the circuit-breaker or fuse disconnects the voltage before a damaging electric shock can occur.

• • •

Now, let's turn to the circuit diagram in Figure 1. To prevent electric shock, we must limit the voltage on the conductive enclosure with respect to the building ground (the floor) to 30 volts or less.

We still don't have enough data to solve the circuit. Let's assume we have 120-volt branch circuit where the overcurrent device is rated 20 amperes. Let's further assume that the electrical engineer has sized the system so that there is no more than 5% voltage drop within the installation and power cord so that the equipment always gets at least 95% of the nominal system voltage.

With these assumptions, we can simplify the circuit as shown in the schematic diagram in Figure 2. We'll distribute the 5% installation and source voltage drops between both the Line conductor and the Neutral conductor, giving each 2.5%. Since the Protective Grounding conductor is the same size as the Line and Neutral conductors, we'll assume it has the same value impedance.

The impedance of the Line, Neutral, and Protective Grounding conductors is given by:

$$Z = \frac{\frac{2.5 \text{ percent}}{100} \times 120 \text{ volts}}{20 \text{ amps}}$$

$$Z = 0.15 \text{ ohm}$$

Now, we are left with two unknowns: the value of the fault resistance, and the value of the equipment grounding impedance.

Let's first look at a corner case where the value of the fault resistance is zero. For the moment, let's also assume the equipment grounding impedance is zero. What, then, is the value of the current?

$$I = \frac{120 \text{ volts}}{0.15 \text{ ohm} + 0.15 \text{ ohm}}$$

$$I = 800 \text{ amperes}$$

With the circuit we've hypothesized, we'll get one-half the 120 volts, 60 volts, across the protective grounding circuit. Can't avoid it.

Well, we can't get 800 amperes from a 20-ampere circuit breaker for very long. The breaker will disconnect real quick-in less than 1 cycle of the ac, which is 16.6 milliseconds long. Since it takes on the order of 200 milliseconds to cause fibrillation, we've got a reasonably safe system, roughly equivalent to the protection of a GFCI (ground fault circuit interrupter).

Recall that we assumed a value of zero for the equipment grounding impedance. Now, let's assume some real value for the equipment grounding impedance. But, where do we start?

Continued

Let's look at the I - t characteristics of the overcurrent protection device - the circuit-breaker or fuse. The *time* for operating of a circuit breaker or a fuse is *inversely* proportional to the *square* of the current. (This is because fuses and common circuit-breakers are thermally operated, where the power is dissipated in a small resistance, and P is equal to the square of the current times the resistance, I*I*R.)

The higher the fault current, the faster the overcurrent device operates. Let's assume that, if the fault current is *ten* or more times the rated current of the device, the device operates in one cycle of the ac line current or less.

With a 20-amp circuit breaker, the total circuit impedance should be low enough to allow 200 amps (10 x 20 amps) from the 120-volt supply. The total impedance would be:

$$Z = \frac{120 \text{ volts}}{200 \text{ amps}}$$

$$Z = 0.6 \text{ ohms}$$

Since the L and G wires comprise a total of 0.3 ohms, we are left with the remainder, 0.3 ohms, for the equipment grounding circuit.

Now we have determined the maximum equipment grounding impedance for a zero-ohm fault. This equipment grounding impedance will allow 90 volts or more on the equipment accessible conductive parts for no more than 16.6 milliseconds. This meets our criteria for protection against fibrillation, given that we cannot limit the voltage to 30 volts or less.

What about a fault with an impedance greater than zero?

Again, we must examine the I - t characteristics of the overcurrent protective device. For a thermal circuit-breaker, one allowed comer point is 4 times rated current for no more than 2 minutes.

Let's see what voltage we get when we have 80 amps (4 x 20 amps), 0.3 ohm equipment grounding impedance, and 0.15 ohm installation grounding impedance:

$$E = 80 \text{ amps} \times (0.3 + 0.15) \text{ ohms}$$

$$E = 36 \text{ volts}$$

Clearly, the O.3-ohm value exceeds the 30-volt limit and does not meet our requirements.

Now we can work backward, using the 30-volt value, and solving for the equipment grounding impedance:

$$(Z + 0.15) \text{ ohm} = \frac{30 \text{ volts}}{80 \text{ amps}}$$

$$(Z + 0.15) = 0.375$$

$$Z = 0.375 - 0.15$$

$$Z = 0.225 \text{ ohm}$$

The value of 0.225 ohm meets both criteria, namely the case of a fault impedance of zero (maximum equipment grounding impedance which will operate the circuit breaker in less than 20 milliseconds), and the case of a fault impedance of such value as to take the longest time to operate the circuit breaker (4 times rated current).

0.225 ohm might not be the "right" answer. I selected two arbitrary points on the overcurrent device I - t curve:

(1) the trip current at 20 milli seconds, and
(2) the trip current at 2 minutes.

For all currents less than 2 minutes, the voltage on the accessible conductive parts with respect to building ground will exceed 30 volts.

Perhaps we should choose a value of equipment grounding impedance that, for all times greater than 20 milliseconds, limits the voltage to 30 volts or less.

We said that at 200 amps, the circuit breaker would trip in 20 milliseconds or less. Let's calculate the value of the equipment

Continued

grounding impedance which, at 200 amps, would limit the voltage to 30 volts:

$$Z + 0.15 = \frac{30 \text{ volts}}{200 \text{ amps}}$$

$$Z+0.15 = 0.15$$

$$Z = 0.15 - 0.15$$

$$Z = 0 \text{ ohm}$$

The value of the equipment grounding impedance which would limit the voltage to 30 volts is zero ohms. This, of course, is not possible.

So, there is, indeed *must* be, some degree of risk of electric shock from the accessible conductive parts of the equipment whenever the fault impedance is such that the current is more than 80 amps and less than 200 amps, *regardless* of the value of the equipment grounding impedance.

• • •

As you can see, there is no one answer as to the value of equipment grounding impedance. I have shown that the greatest value probably should not exceed 0.225 ohm for a 120-volt, 20-amp circuit (the most common circuit in the USA).

However, with other assumptions as to the percent voltage drop in the installation, and as to the overcurrent I - t characteristics, one can derive other values for the equipment grounding impedance. Suffice it to say that values in the range of 0.1 ohm to 0.2 ohm seem to fit the most common cases for 120-volt systems.

The message of this dissertation is that there are three interactive protective mechanisms at work. First is the overcurrent protection device; the second is the value of the equipment grounding impedance; and the third is the value of the distributed impedance of the electrical installation.

The overcurrent device provides protection against electric shock by disconnecting the source in a short period of time.

The value of the equipment grounding impedance affects the time of operation of the overcurrent device such that for very low impedance faults, the overcurrent device operates quickly, and for relatively high impedance faults, the equipment grounding impedance keeps the voltage low.

Thus, the equipment fault-current path has two significant parameters which must be considered when deciding on a value of equipment grounding impedance:

(1) The first is having a sufficiently robust circuit to withstand the very high current (on the order of 200 amps) when the fault is zero. Since the duration of the 2oo-amp current is short, 16.6 milliseconds or less, the typical equipment grounding circuit can withstand the current without overheating.

(2) The second is having an impedance low enough to limit the voltage when the fault impedance is something greater than zero.

As can be seen, deciding a single value for equipment grounding impedance is subject to a number of variables-the most significant being the open-circuit voltage and the overcurrent device I - t characteristics.

• • •

CSA C22.2, No. 0.4 is unique among grounding impedance standards in that it does not consider the voltage with respect to the building ground, but with respect to the point where the power cord ground wire connects to the equipment. There is some justification for this as this is controlled by the equipment designer whereas the installation is beyond his control.

No. 0.4 requires that the *voltage drop* across the equipment grounding impedance not exceed 4 volts rms at a current twice that of the rating of the overcurrent device. See Figure 3.

In Canada, unlike the USA, 15-amp plugs can only be used on I5-amp protected circuits. So, we are dealing, then, with 30 amps (2 x 15 amps) and 4 volts:

Continued

$$Z = \frac{4 \text{ volts}}{30 \text{ amps}}$$

Z = 0.133 ohm

This allows the remaining 26 volts to be dropped across the installation ground wire:

$$Z = \frac{26 \text{ volts}}{30 \text{ amps}}$$

Z = 0.866 ohm

But, the 5% voltage drop limitation requires the installation ground wire impedance to be 0.2 ohm. So, though there is a bit of inconsistency, it is on the conservative side holding the voltage to ground to 10 volts rather than 30 volts.

• • •

I am indebted to Robert Ferguson of Unisys (London) for providing the key element in solving the riddle of grounding impedance value: electrical engineers design distribution systems for no more than 5% voltage drop at 100% of rated load.

I am also indebted to Jerry Hoard for teaching me how to analyze and write complex sentences. When I met him he was with the State of Oregon Department of Labor and Industry.

Your comments on this article are welcome. Please address your comments to the Editor, *Product Safety Newsletter* (see return address on cover).

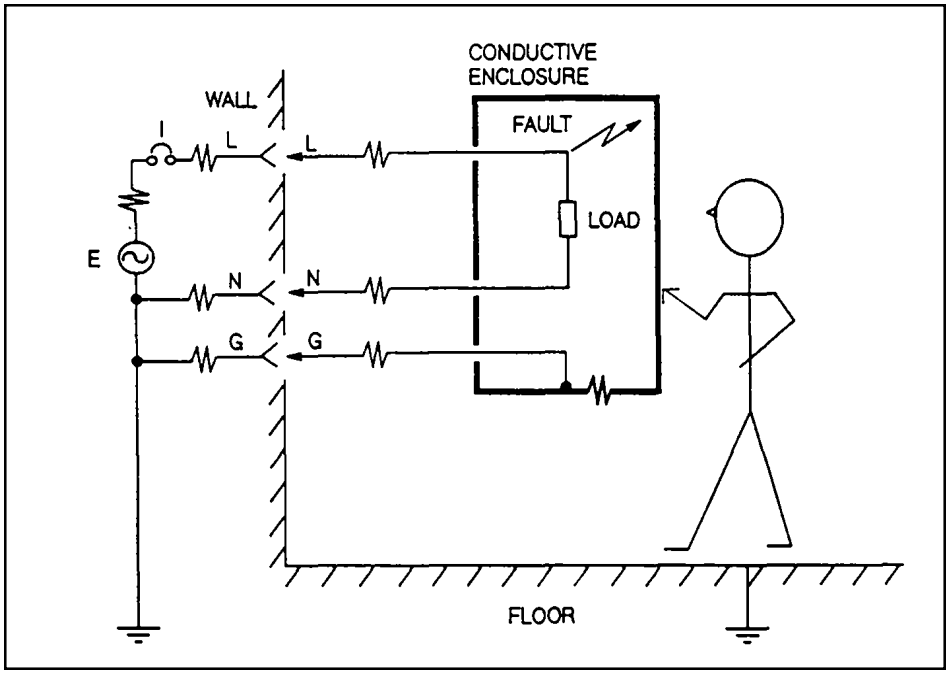


FIGURE 1

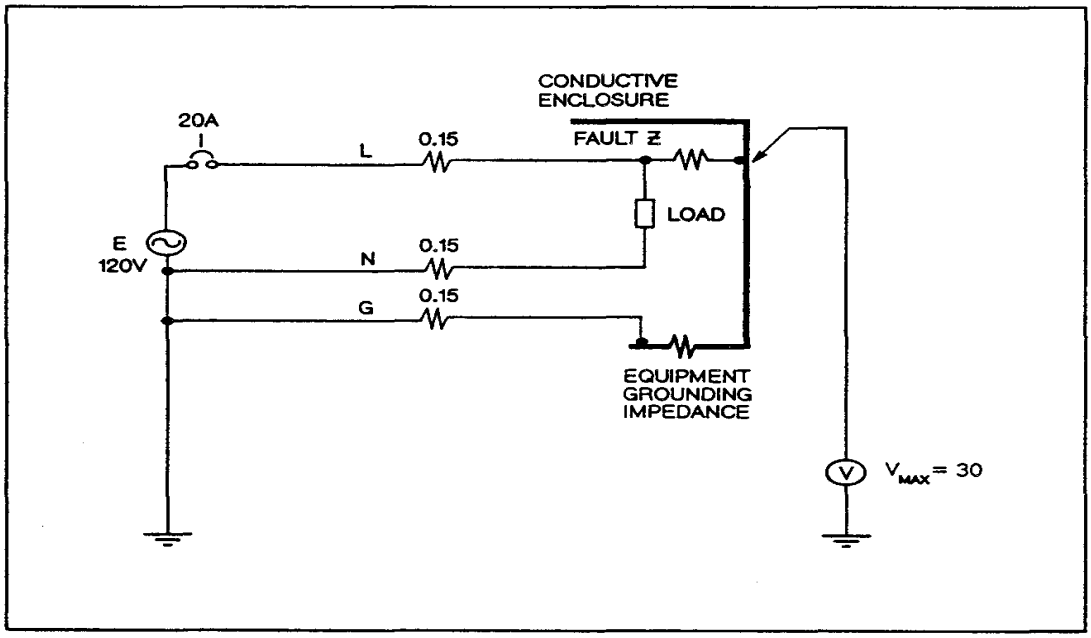


FIGURE 2

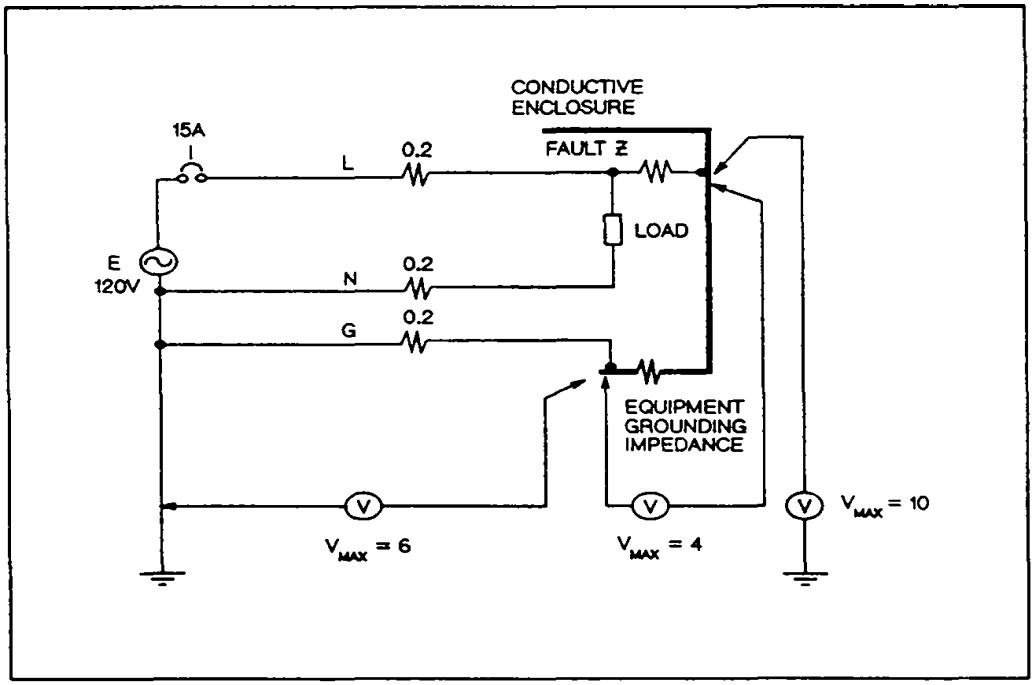


FIGURE 3

News and Notes

Dave Edmunds

Dave Edmunds

RFI Filter Capacitors
German VDE and DKE Outlaws "X2" Capacitors

The following material was supplied by Herbert R. Mertel and Helmut Landeck of Emaco, Inc.

Effective immediately, the RFI suppression capacitors of type "X2" and RFI filters with "X2" capacitors are prohibited for use in office and data processing equipment (IEC 380/IEC 950).

If the "X2" capacitors have the Swiss SEV approval mark they can be used since SEV subjects the capacitors to the "Xl" transient voltage test.

The "X 1" and "X2" characteristics are described in VDE 0565 Part 1, Section 2.1.4 which is shown on this page.

Excerpt from VDE 0565 Part 1
2.1.4 Capacitors of Class X

Capacitors of the Class X, for short: X-Capacitors, may have unlimited capacitance in applications where a failure caused by their shorting out cannot cause a dangerous electrical shock. The X-Capacitors are divided into the Xl and X2 subclasses per Table 1 in accordance to the peak voltages to which they may be subjected during operations. This peak voltage is in addition to the rated AC voltage.

Note: The following are considered to be the additional stress sources:

a) Peak voltages which are superimposed on the powerline voltage, e.g., due to switching processes. It is assumed that the peak voltages occurring in normal domestic mains reach up to 1,200 volts.

b) Peak voltages occurring from switching inductive loads in the appliance to be suppressed. The amplitude of these peak voltages is dependent on the type and construction of the appliance.

The subclass of X-Capacitors to be used is determined from the peak voltages measured at the X -Capacitor by the appliance manufacturer under the least favorable loading and disconnection conditions of the appliance to be RFI suppressed.

Table 1 Subclasses of X-Capacitors

Subclass	Operational Peak Voltage Stress, Volts	Application	Maximum Peak Voltage up to Which the Safety Requirements Are Met
X1	Above 1 ,200 V	With high peak voltages	4,000 volts for C = < .33 uF For C > .33 uF, the voltage is: 4,000 [e(exp .33 - C)]*
X2	=< 1 ,200 V	Normal use	1 ,400 volt

Example: With C = 1 uF, the voltage is
4,000 x e (exp -0.67) = 4,000 x 0.512
= 2.046 volts

Continued

News and Notes

Continued

CSA Notice 316C

CSA Notice 316C dated June 12, 1989, is a revision to a disclaimer marking that is required to appear on certain products. The difference between this note and an earlier notice is that it permits the abbreviation of "CEC" for "Canadian Electrical Code."

New Worldwide Standard for Volts and Ohms

The July issue of *IEEE Spectrum* has an article entitled "Preparing for the New Volt and Ohm." This article describes the new standard and how it will eliminate the differences that currently exist among the :volt and ohm standards of different countries. The new standards will result, by derivation, in new values of the standards for ampere and watt. These new standards will have a major impact on technologies that require precision in electrical measurement.

NEC

The 1990 edition of the National Electrical Code will be published in August. The IEEE will sponsor two special seminars on the NEC. One seminar is a one-day session devoted to changes in the code for those already familiar with the 1987 edition. A three-day seminar will cover the development and application of the code in more depth than the one-day session.

UL 1950 as an ANSI Document

Underwriters Laboratories is seeking recognition of its UL 1950 standard as an American National Standard.

UL/CSA Agreement

Letters dated July 17, 1989, from both Underwriters Laboratories Inc. and Canadian Standards Association announced further implementation of their April 1, 1986, Memorandum of Understanding. A coordinated program for the reciprocal acceptance of test data in 12 product categories, including Information Processing Equipment, was outlined. Further details are available from UL or CSA.

CSA Standards

One of our members received the following letter from CSA which we thought would be of interest to our readers.

Dear Sir,

In response to your question on the above subject concerning the CSA Standard to be used for certification of Information Processing equipment, I have been informed that C22.2 No. 220 will be used until CSA Standard C22.2 No. 950 has been published.

The interested manufacturer may currently make an application simultaneously with both agencies stating the Standards of their preference, however with respect to C22.2 No. 950, CSA will not be granting certification to that Standard until it has been issued.

Currently the scheduled issue date is the last week of October. In the event that certification is required to start prior to the issue date, please contact Mr. Lai Bahra, Senior Engineer, Data Processing, for scheduling of the simultaneous application.

Regards,
George Aldridge
Customer Service

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,

Why do test houses use consensus to determine the technical validity of a requirement?

Signed,

A Testy Engineer

Dear Testy,

I don't know. Your question should be addressed to the organization(s) you had in mind when the question was formulated. The best recent explanation Dr. Z has heard is:

Science is a medium of consensus (author wishes to remain nameless).

Dr. Z doubts that the scientific community agrees with the statement though, so there must be other reasons. Previously this column has offered comments on the standards writing process, and it looks like we are headed in that direction this time as well (no real product disasters come to mind that Dr. Z is free to discuss, and only this one lousy question was sent to my attention).

A fast review of previous letters and articles seems to leave one with the impression that the "agencies," with no help, cook up the requirements. Not quite true. Let us partition the activities.

First, there are requirements that cause the product designer to do something that actually affects basic product design. Proper selection of capacitance value of X capacitors to meet leakage current requirements and keep the EMC solution intact, for example.

Second, there are process requirements that do not affect the product design, but they do affect how the manufacturer does business. A rule that the X capacitor must be certified by thus and such organization is an example. This is independent of the capacitance value previously chosen, so design is not affected, but the materials purchasing system is.

In most cases, requirements affecting real product design and published in standards are the work of many individuals and organizations participating on various committees. The IEC Technical Committees, Subcommittees and Working Groups are certainly not agencies or test houses. The CSA Subcommittees that write CSA standards have a representative from the certification side of the CSA organization, but most members are from industry, government, etc. UL lACs have a similar structure. In the case of North America electronic products safety standards writing, and North America participation in the IEC process, non test house organizations and people playa role. This is not to say that test houses such as CSA and UL are not active. They are. But recognize the test houses are only part of the players. The rest are us! If we don't like what the technical requirements are, we need to teach ourselves how to better engineer the standards writing processes so better

Continued on Page 26

OSHA's Nationally Recognized Testing Labs

Glen Dash-Dash, Straus and Goodhue, Inc.

Pursuant to the authority in 29 *CFR 1910.7, it is ordered that the MET Electrical Testing Company, Inc. be recognized as a Nationally Recognized Testing Laboratory...*

With that phrase, the landscape of product safety in the United States irrevocably changed. A federal agency was now ordering authorities over which it had jurisdiction to recognize a small commercial laboratory as a Nationally Recognized Testing Laboratory (NRTL). It had taken MET 15 years to obtain that status. It had come only after OSHA had gathered hundreds of pages of evidence, issued an order 135 pages long, waded through two lawsuits, engaged in a review lasting 13 months and employed hundreds of agency man hours.

Through it all, both the agency and those private sector individuals who watched the developments learned a great deal about how the federal government should manage safety in the workplace. But most product safety engineers do not have the time to study orders, legal documents and lawsuits. Nonetheless, OSHA's activation of a long dormant program to accredit NRTLs affects each and every one of us product safety engineers. The purpose of this article is to describe what has happened, and how it affects us.

The Authority Having Jurisdiction

The picture begins to emerge from the hazy history of product safety regulations in the 1950s and 196Os. Enforcing product safety in the workplace then fell to state and local authorities. Usually, a state or local electrical inspector bore that burden. He was tasked with the enforcement of the electrical code passed either by a state or local legislature. Often, this regulatory framework was similar to, but not exactly the same as, the National Electrical Code, a private consensus standard developed by the National Fire Protection Association. rmed with his knowledge, the code and the state or local ordinance, the electrical inspector went about his business ensuring public safety.

The system suffered from a number of shortcomings. First, building and electrical codes often varied from jurisdiction to jurisdiction. A manufacturer never knew for certain in which jurisdictions his product would be deemed appropriate. That determination was made by the electrical inspector (Article 90 of the National Electrical Code). The electrical inspector was the "authority having jurisdiction," the all powerful arbitrator of public safety.

But the 196Os changed almost everything. A variety of forces were brought to bear, which served to harmonize state and local building and electrical codes. Both equipment manufacturers and the federal government argued that varying standards in differing jurisdictions served to restrict the use of innovative electrical products [1]. Criticism was voiced that the local codes were politically influenced. For instance, Field and Ventre asserted that an "Intimate relationship exists between code reform and the city's political structure. Building codes often bestow favorite economic positions upon different participants by stating as construction standards specifications favoring a particular participant.. [2]

It was primarily the federal government that promoted the adoption of harmonized codes in three major ways. First, federal funding of localities was tied to local adoption of one of three nationally standardized building codes. Secondly, to qualify for the Urban Renewal program, localities had to adopt building codes based on one of these harmonized codes. Third, an effort was made through "Operation Breakthrough," a program that was sponsored by the Department of Housing and Urban Development, which further forced such harmonization. That, along with private lawsuits, changed the nature of state and local codes. For

Continued

example, in 1964, only about 47% of cities used model codes. By 1981,97% of them used one of three of the model codes. These were the code of the International Conference of Building Officials (ICBO), the model code of the Southern Building Code Congress and the code promulgated by the Building Officials and Code Administrators International (BOCA). A regional pattern has developed. The BOCA code is used in the Northeast and the Midwest, the Southern code in the South and the ICBO code in the West. All three of the codes reference the National Electrical Code for their electrical requirements.

These events served to make the action of the electrical inspector a bit more predictable. By making sure the equipment complies with the three major building codes and the National Electrical Code, one could largely ensure that manufactured product would be acceptable nationwide. But one gap remained. It was still up to the electrical inspector to determine whether listing by a specific organization such as Underwriters Laboratories, Inc. (UL) was needed. It became an axiom of product safety engineering that at least some products required listing by a "Nationally Recognized Testing Laboratory."

Enter Goliath

Harmonization of local building codes removed some uncertainty, but not enough. Nor did local building and safety ordinances necessarily guarantee that workers would be safe in their workplaces. The 196Os saw a rash of grass roots efforts by both labor and consumers to create new federal agencies to protect their interests. Created during that period was the Environmental Protection Agency, the Consumer Product Safety Commission and, most importantly for product safety, the Occupational Safety and Health Administration (OSHA). That administration would take over enforcement of safety practices in the workplace, federalizing what, till then, had been a state and local requirement.

OSHA was created by the Occupational Safety and Health Act of 1970. The Act grew out of Congressional concern that injuries and illnesses arising from working situations "impose a substantial burden upon, and are a hindrance to interstate commerce..." (Section 2 of the Act). To remedy this situation, Congress mandated a new agency to "assure so far as possible every working man and woman in the Nation safe and healthful working conditions" by authorizing the Secretary of Labor to set mandatory occupational safety and health standards applicable to the workplace. Those standards can currently be found in OSHA regulations, Section 1910. In 1981, OSHA promulgated Section 1910, Subpart S which adopted many of the elements of the National Electrical Code.

Section 1910, Subpart S, in Section 1910.301 states that "this subpart addresses electrical safety requirements that are necessary for the practical safeguarding of employees in their workplaces..." It is followed by Section 1910.302 which says that electrical safety regulations govern specifically "electric utilization systems," that is, devices which utilize electricity for a purpose of other than providing electrical power (wires, outlets, service panels, .etc., which transport electrical power are known as "electrical installations"). The remaining sections of 1910 will be familiar to those who have studied the NEC. There are requirements, for example, that splices used to join conductors within equipment be mechanically secured prior to soldering (191O.303(c». Parts which arc in normal operation must be isolated from flammable materials (191O.303(d». Parts which represent a shock hazard must be guarded from the operator (191O.303(g». Grounding wires must be suitably identified (191O.304(a)).

Continued

OSHA's Nationally Recognized Testing laboratories
Continued

But it is on the subject of listing that OSHA regulations differ most markedly from the NEC. While the NEC leaves the determination of which products must be listed and by whom to the whim of the local inspector, the OSHA regulations do not. They require, first of all, that utilization equipment be listed. Section 1910.303 states that "conductors and equipment required or permitted by this subpart shall be acceptable only if approved." In turn, "approved" is defined in Section 1910.399 as "accepted or certified or listed or labelled or otherwise determined to be safe by a Nationally Recognized Testing Laboratory..." The upshot is this: such utilization equipment, including computers, telecommunications and electromedical devices, needs to be listed by (in that famous phrase) a Nationally Recognized Testing Laboratory.

It is from that phrase that our drama springs. It is a story of David vs. Goliath and the efforts of a small laboratory in Baltimore to change the law of product safety; for until May of this year only UL and Factory Mutual (FM) were defined by OSHA as NRTLs.

Enter David

MET, a small commercial laboratory in Baltimore, Maryland, petitioned OSHA for recognition as a Nationally Recognized Testing Laboratory. Although OSHA had regulations on its books for recognizing such laboratories since 1973, they failed to act. MET's frustration led to a lawsuit in 1984 (MET vs. Donovan). The case never got to trial and was settled out of court. OSHA agreed to engage promptly in a rulemaking and to finish that rulemaking according to a court ordered schedule. That rulemaking would set up a plan for recognizing electrical safety laboratories for listing pursuant to 1910, Subpart S. After the settlement, an employee of OSHA acknowledged that "[MET] was correct, and we were incorrect. "[3]

But MET did not get its accreditation. The agency simply failed to live up to its commitment. MET sued for a second time in 1987. To the astonishment of MET, OSHA decided now that they wanted to fight and waded in with a brief claiming that MET had chosen the wrong court to argue its case in. The court summarily dismissed the petition and ordered OSHA to finish the rulemaking in 120 days. On April 12, 1988, 120 days to the day, the rulemaking was done.

But the rulemaking itself did not authorize MET to be an NRTL. It only created a detailed regulatory structure for authorizing NRTLs. MET and a Massachusetts laboratory, Dash, Straus and Goodhue, Incorporated (DS&G) promptly filed for accreditation.

What followed was one of the most complete and detailed examinations of any laboratory under any federal accreditation system. MET's application for accreditation took 13 months to process. It was visited by a half a dozen federal officials and was required to demonstrate competence in each one of the categories for which it filed for recognition. A Public Notice was issued asking for the public to comment on MET's qualifications. Employees from OSHA flew to California to interview one company who had filed critical comments. But in the end, MET was found qualified. On May 13, 1989, they were recognized by OSHA as a Nationally Recognized Testing Laboratory and OSHA ordered authorities under its jurisdiction to recognize MET's listing mark. DS&G was the next laboratory in line and was granted its recognition one month later.

States vs. OSHA

What about the local electrical inspector? What remains of his responsibilities after the Occupational Safety and Health Act of 1970? He is hardly out of a job. It turns out that conflicts between local electrical inspectors and OSHA inspectors rarely arise. The

Continued

reason for this is that the electrical inspector is primarily concerned with building and occupancy permits. Once he has issued those permits, his job is usually done. A company would then move into the premise and plug its equipment into the wall in order to start its operation. The electrical inspector frequently never saw plug operated equipment and often did not care since the inspector's jurisdiction usually ended with the issuance of the occupancy permit.

OSHA, on the other hand, is not involved with the building permits but is concerned with the operation of the workplace. Their inspectors can come into premises and look to see that equipment is listed by a Nationally Recognized Testing Laboratory. So the two "authorities having jurisdiction" don't usually conflict. The inspector is concerned with electrical installations, Le., wires, conduit and outlets. Generally, he is not concerned with plug operated equipment. OSHA, on the other hand, comes into play only when the workplace is created. Their concern is focused on those things the electrical inspector did not inspect, Le., those things that were plugged in after the occupancy permit was granted.

Occasionally, conflicts do arise. Some jurisdictions grant their inspectors the right to determine if equipment within the workplace is listed, overlapping OSHA's jurisdiction. In the rare cases these conflicts do arise, it is OSHA that prevails. It is well settled that a state or local ordinance primarily concerned with safety in the workplace which conflicts with a federal standard promulgated by OSHA is preempted. [4]

For You, a Choice

OSHA's recognition of Nationally Recognized Testing Laboratories gives the product safety engineer a choice. A duopoly created by OSHA has now been ended as has the need to seek out FM or UL approvals. MET and DS&G are now available for that task, and other labs are pending accreditation. Pursuant to federal law, their services must be roughly equivalent to those of UL in order to qualify for recognition. You will find listing agreements to be signed, tests to be performed, initial production inspections to be conducted and follow-up services at your door every 90 days. You still have to comply and get your listing. But at least now you have a choice.

As time goes on, the program will expand and more laboratories will be accredited. Indeed, on April 13, 1993, even UL will come up for renewal of its status as a Nationally Recognized Test Laboratory by OSHA and, at that time, presumably, the public will be able to comment on its work the way it has already commented on the work of MET and DS&G. Undoubtedly, that review will add more pages to the voluminous history leading to recognition of the country's NRTLs.

Footnotes

[1] *Local Building Codes and the Use of Cost Saving Methods,* Staff Report of the Bureau of Economics to the Federal Trade Commission, December 1988, p.l.

[2] Field, Charles G., *Building Regulatory Practices and the Courts,* Federal Trade Commission, September 1980.

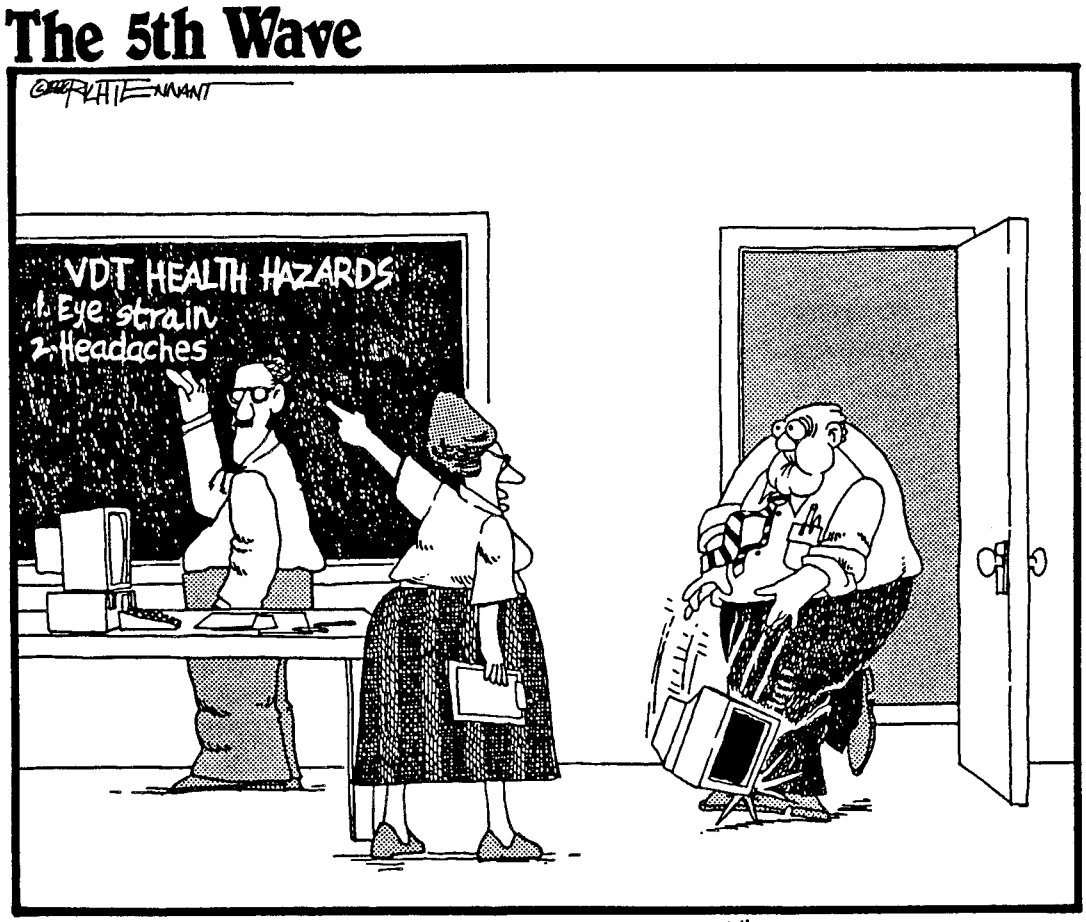
Ventre, Francis T., "Maintaining Technological Currency in the Local Building Code: Patterns of Communication and Influence," *Urban Data Service Report* (International City Management Association, Washington, D.C., 1971).

[3] "Test Labs May Be Accredited by OSHA Under New Rules," *Wall Street Journal,* June 13, 1983.

Continued

OSHA's Nationally Recognized Testing laboratories
Continued

[4] Section 1901.2 of OSHA's regulations states that the Occupational and Safety Act of 1970 "is read as preventing any State agency or court from asserting jurisdiction under State law over any occupational safety or health issue with respect to which a Federal standard has been issued [by OSHA]. Section 18(h) [of the Occupational Safety Act of 1970] permits the Secretary [of Labor] to provide an alternative to the exclusive Federal jurisdiction on such occupational safety or health issue. This alternative follows submission and approval of a plan submitted by a State for the development and enforcement of occupational safety and health standards..." Therefore, a State or municipality which seeks to regulate the workplace may do so only after filing a State plan and having it approved by OSHA. As a practical matter, most State plans merely grant the State or municipality authority to enforce regulations which are identical to Federal standards. In this way, a State or municipality can have power to enforce regulations for the workplace and not have to rely on Federal inspectors. However, the law they will be enforcing will be Federal, not State or local. *Copyright* 1989, *by Dash, Straus and Goodhue, Inc. All rights reserved.*



1992 One Europe

Ercell Bryant

How will it affect you?

The TUV Seminar 1992 *ONE EUROPE* held in Dallas was an informative seminar. The seminar was broken into seven topics, each presentation lasting approximately two hours. I have attempted to highlight each presentation for your information.

Goals of the European Community

Mary Howard Saunders
(U.S. Dept. of Commerce)

The European Community (EC) is developing a system that will allow free trade between member nations. The following steps are being taken to allow this to come about:

1. Common Tax Base-The EC is setting up a system of taxation that will allow movement of products between EC countries. without additional taxes needing to be paid.
2. Common Monetary Base-A proposal has been made for the EC to establish a common monetary base to make it easier for a common tax base to be established.
3. Common Standards for Product Safety, EMI, Ergonomics, Etc.-Most of these standards will be in place by 1992.
4. Common Quality Standards-In order for products to be moved between member countries, a quality standard is being developed. Customers will require the supplier's quality program to be certified to the IEC 9000 Series standards. This is expected to be a major non-tariff trade barrier for manufacturers outside the EC. This may not be in place by 1992.

Effects

All products currently approved by an EC safety agency will have to be reevaluated for compliance to new safety standards.

Your Quality Assurance program will need to be evaluated by an accredited agency and certified to ISO standards.

IEC 950 / EN 60 950

Dr.Steve Kraemer(TUV)

IEC 950 is the international safety standard of EDP equipment. The EC has adopted IEC 950 with some variations which are described in EN 60 950. All EDP equipment will have to comply to EN 60 950 by 1992 or lose EC safety agency approval.

Effects

All products currently approved by an EC safety agency will have to be reevaluated for compliance to EN 60 950 by January 1, 1993.

IEC/UL & CSA Requirements

Mark Swank (TUV)

UL has followed the lead of the EC and adopted IEC 950 with variations required by the national electrical code and has published a new EDP standard, UL 1950. All EDP equipment will have to comply with UL 1950 by 1992 or lose UL approval, as UL 478 will be discontinued at that time.

CSA has a draft standard (CSA 950) based on IEC 950, with required changes for Canada. It is expected to be published in June of this year.

Effects

All products currently approved by UL will have to be reevaluated for compliance to UL 1950 by March 15, 1992.

It is unclear at this time whether compliance with CSA 950 will be required by 1992.

Compliance in Sweden and Nordic Countries

Hank Erik Rundvist (SEK)

Compliance to product safety standards (IEC 950) is not required by law. Sweden and the Nordic Countries are not members of the EC. However, the GS mark is recognized by most companies as proof of compliance.

Effects

It may become necessary to submit your system to a safety agency in the Nordic Countries

Continued

for evaluation to IEC 950 (with the Nordic exceptions) and IEC ergonomic compliance. TUV can perform the testing and submissions.

ISO 9000 Series Quality Program

Robert Peach

The ISO 9000 Series specifies the requirements for a basic Quality Assurance program. The concern at this time is that it will be necessary to have your Quality Assurance system certified to ISO standards before transporting products between countries in the EC. Great Britain is already certifying companies in the US and other countries to comply with this new requirement. This is expected to be the next major non-tariff trade barrier with the EC.

Effects

Your Quality Assurance program will need to be evaluated by an accredited agency and certified to ISO standards. This will require audits by the agency.

Product Liability

Richard Jacobs

The EC has adopted the same basic principals for product liability as the US with the exception that some countries in the EC allow the individuals responsible for the defective product or product design to be sued. This means the design engineer, safety engineer, inspector, etc. The EC has the same right of discovery as a US court.

Effects

You need to go beyond the safety agency requirements for product design. The operator and service personnel safety must be considered at all cost.

Ergonomics

Dr. Walter E. Baker (retired) and Mr. Dziambor (TUV)

As the computer age matures, the hazards involved with working with computers are being better defined. As we learned to put guards and interlocks on manufacturing equipment to protect the operator, we now are starting to define the requirements for safely working with computers. These requirements are being defined in IEC standards as well as individual country standards. IEC is working on a standard which will be required for all EDP equipment in the EC by 1992. The standard is split into several sections and all sections are not expected to be complete by 1992.

Effects

You need to watch the development of the IEC standards closely as VDTs will be affected by the standards currently being developed.

Software will be addressed in the ergonomics standards within the next three to five years. The character height, width, spacing, and contrast ratio between character and background will be specified in standards which are still in the early stages of development. This will require software to be approved by an EC safety agency before selling in Europe.

UL's Compass Program

[During the April meeting of the Southern California Chapter of the PSTC, members of the UL, Santa Clara, staff answered questions regarding their Compliance Management and Product Assurance Program (COMPASS). The following is an excerpt from UL's letter to the chapter, putting in writing their answers to those questions. For your information, the UL COMPASS program resembles the CSA Category Program in that the manufacturer runs the necessary tests in-house and provides an opportunity for a UL engineer to then spot check the results. Details of the program follow. Questions about the program should be directed to your local office of Underwriters Labs. - Ed.]

lQ. Why does COMPASS only cover professional products and not household products?

lA. Currently, the program is restricted to products which fall under the following set of criteria:

A. The product is covered under one of the COMPASS product categories.

B. The products and accessories that may be included under the scope of the COMPASS program are those that are operated by professional personnel or operated by personnel who have received training in proper operation of the product and the hazards that may be involved in such operations.

C. The products are maintained by professional or technically trained personnel.

D. The production of the product may be subjected to frequent changes.

E. The field experience with the product has been acceptable.

A household product is not eligible for COMPASS coverage, since it does not meet all the criteria noted above.

2Q. Is a product that is FCC (B) rated (such as a printer) automatically precluded from COMPASS?

2A. In general, products intended for use in a nonresidential area (e.g., engineering workstations, computer-aided test equipment, computer-aided design and computer-aided manufacturing computers) are eligible for coverage under COMPASS regardless of their FCC rating.

Products exempted from coverage under COMPASS are products intended for use in residential areas that do not meet the criteria noted above in A-E and are typically provided with a 15 A, parallel blade attachment plug. These products are typically marked with an FCC Type B rating.

3Q. Can outsiders attend UL's report-training program?

3A. The training program is on an individual basis. An engineer from our Electrical Department will train the manufacturer's designated personnel in report writing during the initial COMPASS investigation. The engineer will provide feedback to the manufacturer's designated personnel throughout the course of the COMPASS program.

Clients may request training in UL's report-writing program. For more information, please contact Ms. Wanda Holland (408-985-2400, ext. 2279) or Mrs. Ellen Lovelady (Extension 2491), our Client Advisors for the Santa Clara office.

4Q. Are form reports available on computer disk?

4A. Form reports are not currently available on computer disk.

5Q. What is a minor modification versus a major modification?

5A. A minor and major modification may vary from product to product. Generally, a major modification will affect the primary circuitry of the product and will require extensive testing. An alternate transformer or power supply may be considered as a major modification. A minor

Continued

modification may be considered as an alternate switch or relay, since primary circuitry is not directly affected. See Appendix B for additional examples. All modifications under Path I or Path 2 are subject to review by our Electrical Department at the time of submittal.

6Q. When "contacting your engineer" was mentioned, negative comments were made about the turnover in Engineering and the delays that this caused while waiting for a new engineer to be assigned and to become familiarized with the products.

6A. COMPASS coordinators are assigned for all the COMPASS categories. See Appendix A for the designated coordinators at Santa Clara. The manufacturer can present and discuss their views to the designated coordinators at UL. If a satisfactory resolution of the matter cannot be reached, the manufacturer should feel free to immediately contact the next higher supervisory level. *[A copy of the Santa Clara Electrical Department Personnel Bulletin is available from their Santa Clara office upon request - Ed.]*

7Q. What is the cost range for the initial COMPASS investigation?

7 A. The cost for the initial CAMPASS investigation is determined on an individual basis. The cost limit will depend on the size of the manufacturing facility and the number of manufacturing locations.

8Q. Are there two or three UL personnel during the COMPASS audit?

8A. The initial COMPASS audit generally consists of one engineer from Electrical and one engineer from Follow-Up Services (total of two). The annual audits will generally consist of engineers from Electrical and Follow-Up Services and a UL field representative (total of three). These visits are intended to coincide; however, scheduling may require separate inspections.

9Q. How are multiple plants handled under COMPASS? Example: Tustin and Singapore?

9A. Each facility must be visited to determine the similarities and degrees of control and implementation of the Corporate Product Assurance System at alternate and satellite facilities. The evaluation at subsequent facilities could be reduced to the extent that the similarities and degrees of control are demonstrated.

10Q. Are there any cost or requirements to cancel the COMPASS program?

lOA. There is no cost to cancel the COMPASS program. The program is voluntary and may also, at the manufacturer's choice, be used only for the selected products within the six specified product categories. However, cancellation of the program will require the manufacturer to requalify the product assurance system and test data program.

llQ. Negative comments were made about UL's Word Processing. They asked if they could send in the final draft of the Procedure writeups.

IIA. Under the COMPASS program, the manufacturer provides a Descriptive Report of the new or revised product. However, the final draft Procedure or revised pages will be prepared by UL' s Word Processing Department. The material should be reviewed, and any inaccuracies should be reported to our Electrical or Follow-Up Services Department.

12Q. Would like copies of overhead presentation.

12A..Copies of the overhead presentation were given to Mr. Reinaldo Jimenez at the meeting.

13Q. How do you get started with COMPASS? Is it necessary to complete the large questionnaire?

13A. The Preliminary Information Form, PA-I, and Product

UL's Compass Program
Continued

Assurance Survey Form, PA-2, should be completed before the initial COMPASS audit. The PA-l is used to provide us with information on the manufacturer's product assurance system in preparation for the on-site evaluation (survey) to be conducted using the PA-2. Form PPA-2 is provided to enable the manufacturer to prepare for an evaluation visit. In addition, by going through and filling out the PA-2 form, the manufacturer may cover potential problems which can be resolved before our initial visit.

14Q. How do you convert from "Client Test Data Program" to COMPASS?

14A. A manufacturer already covered under the "Client Test Data Program" only needs to qualify their designated factory/ facility personnel and product assurance program under the COMPASS program.

15Q. How is spot-checking performed and scheduled?

15A. Generally, the majority of check tests will be conducted in those areas where UL' s experience in a product category or a particular client's product has shown a risk of fire, electric shock or personal injury to exist. Obviously, this is going to vary from case to case, and adjustments may be necessary as UL gains experience with the involved clients and products. In addition, information gained about a client during the process of the Client's Test Data Program and the periodic review visits may be another source of information in determining which tests must be conducted. Other check tests will be done on a random basis to ensure review over a reasonable period of time of all tests which a client is conducting.

16Q. Can UL field representatives do some of the engineering?

16A. Any engineering decisions must be made by the engineers from Electrical and/or Follow-Up Services Department. However, the field representative may witness the required tests outlined in the Follow-Up Service Procedure's Appendix pages. Under special circumstances, the field representative may be asked by a UL field engineer to witness or perform tests not outlined in the Follow-Up Procedure.

17Q. Do you have to be on the "Client Test Data Program" first?

17 A. The "Client Test Data Program" and the "Product Assurance System" can be evaluated concurrently.

18Q. How/when is UL handling IEC950 and UL 1950? (See *Product Safety News,* First Quarter 1989, page 4.)

18A. UL will conduct a file review on all UL 114 and UL 478 files within the next three years. If you would like UL to review your file sooner, please contact our Electrical Department. *[A copy of the Santa Clara Electrical Department Personnel Bulletin is available from their Santa Clara office upon request - Ed.]*

19Q. Comments were made when one member was charged as much as $173.00 UL 1950 Standard service.

19 A. The subscription fee for UL 1950 is $137.50. Please contact Eleonora Jovel (408-985-2400, ext. 2880) of our Accounting Department if you were overcharged.

20Q. It was questioned why power supplies were not included on November 3, 1986 bulletin. Are power supplies covered by COMPASS?

20A. Manufacturers of components (power supply) may qualify for COMPASS coverage if the components are for use in the "COMPASS SIX" categories. Only the components which will be used in end-product categories included in the COMPASS program are eligible.

Continued

21Q. How can you tell or obtain the "CTI" rating of printed wiring boards? Santa Clara is referring EDP manufacturers to printed wiring board manufacturers, who are not aware of the new requirements. Clients feel this is an unnecessary run-around.

21A. The OEM needs to contact the printed wiring board manufacturer in order to determine if the laminate has comparative track index (CTI) ratings. It is the responsibility of the OEM to select the appropriate printed wiring boards for use in their products.

Thank you for the opportunity to talk to you. If you have any additional questions or comments concerning the above, please do not hesitate to contact us.

Very truly yours,
Bruce Santo
Field Engineer
Follow-Up Services Dept.

Reviewed By:
Donald Ando
Senior Field Engineer
Follow-Up Services Dept.

Jim Pierce
Associate Managing Engineer
Electrical Department

APPENDIX A
UL SANTA CLARA OFFICE PERSONNEL

Product Category	Contact Person	Section
Electrical and Electronic Measuring and Testing	Kent Jones	C
	Deborah Tinsley	C
Information Processing and Business Equipment	Roselli Tria	B
	Manuel Hernandez	B
	Anh Nguyen	F
	Lara Lagattuta	K
Laboratory Equipment	Kent Jones	C
	Deborah Tinsley	C
Medical and Dental Equipment, Professional	Deborah Tinsley	C
	Kent Jones	C
X-Ray Equipment	Lara Lagattuta	K

APPENDIX B

PATH 1
Examples of Minor Revisions for Recognized Components
1. RFI filters
2. Wire connectors
3. Terminal blocks
4. Thermally protected motors 5. Capacitors
6. Strain relief
7. Marking and labeling system

PATH 2
Examples of Major Revisions
1. Removal of fans
2. Reduction in ventilation or enclosure size
3. Change in primary or Type 1 circuits

Area Activity Reports

Northeastern Chapter
The June meeting of the Northeastern Chapter of the Product Safety Society was held on Wednesday, June 28, 1989. This meeting featured a presentation by Glen Dash and William von Achen of Dash, Straus and Goodhue, Inc. on the sweeping changes recently enacted by the Federal Government regarding test lab accreditation. *[See "OSHA's Nationally Recognized Testing Laboratories" in this issue. - Ed.]*

Glen Dash gave an overview on the legal aspects of the recent decision by the Occupational Safety and Health Administration (OSHA) to accredit independent product safety laboratories to issue listing marks. He also described how the revised regulations were a result of a suit brought by MET Electrical Testing Company against the Department of Labor and OSHA in May 1982. Glen went on to discuss the basis for OSHA's exclusive jurisdiction over workplace equipment.

Bill then reviewed the specific. basis for mandatory product safety approvals in the United States, citing OSHA regulations embodied in 29 Code of Federal Regulations CFR, and the penalties which noncompliance can incur. He also pointed out how the revised regulations issued by OSHA in April 1988 provided more open access to product safety testing by independent labs, and provided manufacturers with legitimate alternatives to UL for product safety approvals within the United States.

The presentation was followed by a question and answer period.

The most recent meeting of the Northeastern Chapter of the Product Safety Society was held on Wednesday, July 26, 1989. This meeting featured a presentation by Bruce Langmuir of Bose Coporation and Josef Kirchdorfer of Weber, AG on circuit breaker designs both here and overseas.

Bruce Langmuir gave an update to his previous presentation on inherent problems with branch circuit breakers designed in the United States. According to Bruce, ongoing research by Rick Franklin of Professional Analytical and Consulting Engineers, Incorporated repeatedly shows that American circuit breakers fail to trip as a result of the short duration pulses created by a shorted power cord. The failure of American circuit breakers to open in these conditions can easily cause fires.

Bruce then showed a series of video clips featuring simulations of short circuit conditions, in which circuit breakers repeatedly failed to open. In almost every instance, failing circuit breakers resulted in the combustion of material near the fault and subsequent fires. Fire resulted even in those cases where the area immediately surrounding the fault was covered with heavy materials such as a blanket.

Bruce indicated that NEMA has initiated an investigation into branch circuit breaker problems. However, according to Bruce, Underwriters Laboratories (UL) has taken no action to date. Bruce urged attendees to communicate their concern about this issue to UL.

Josef Kirchdorfer of Weber, AG gave a detailed presentation of the differences between American and European circuit breaker designs. Briefly, European circuit breakers designed to IEC specifications trip at around four milliseconds, significantly faster than their American counterparts. Kirchdorfer also commented on current efforts to harmonize European circuit breaker standards with American standards.

For more information about the Northeastern Chapter, contact William von Achen, Acting Chairman, (508) 263-2662.

Pacific Northwest Chapter
Our May meeting featured Rich Nute from HP speaking on the impact Product Safety & Regulatory Compliance has on electronics manufacturing. Rich's speech focused on the myriad of issues that confront both the regulatory and manufacturing engineers in producing a compliant product.

Continued

Area Activity Reports

Continued

Some of the issues discussed were: Who's responsible? What are the legal ramifications? What are the costs involved? And what are the controls, design guidelines, and processes involved?

The speaker for our June meeting was Mr. Roy Clay from Rod-L Electronics. His enlightening speech on Hi-Pot testing showed how the agencies do not go far enough in specifying the parameters of dielectric withstand testing. Roy showed how easy it can be to merely pass the agency requirements without fully testing your product before it is shipped. Roy clearly showed how easy it is to get very different results from the same product just by varying the parameters of the test while still staying within the agency constraints.

Our next meeting will be either in September or October concerning EC 1992. Speakers for the meeting will be Mr. Pete Perkins from Tektronix who has been working with the Department of Commerce in regards to the harmonization, Mr. Joe Patterson from Spectraphysics who has some seminars to report on, and hopefully one other speaker from the EC itself. The exact date, time, and location of the meetings will be sent out in a local mailing well before the meeting.

For further information about the two Northwest Chapter meetings, contact Mr. Al Van Houdt at (206) 882-3700.

Orange County Chapter

The featured speaker for June was Ms. Denise Damrow, Attorney at Law. Denise provided a presentation on Product Liability. The speaker for July was Mr. Robert Wersen, Panel Components Corporation. His presentation covered International Connectors and Cord Sets. The program for August was a workshop and roundtable discussion of UL 1950, led by Mr. Jim To of UL, Santa Clara.

The presentation for September will be Mr. Ed Spooner of TUV Rheinland of North America. Ed will speak on EN 60 950. (Note the date change for the September meeting due to the Labor Day holiday.)

Please plan on attending, and bring a friend to help spread the product safety knowledge, networking, and most of all, camaraderie to all of Southern California! Questions and/or comments about the Orange County Chapter may be addressed to Charlie Bayhi at (714) 730-2556.

Chicago Chapter

The last meeting was on June 6, 1989. Our discussion covered Hazards of Unsafe and Unreliable Products. As part of the presentation, 33 engineers toured the facilities of Packer Engineering, Inc., specifically the Photo, Mechanical, Metallurgical, Automotive, and Electrical labs. The tour showed the many methods of testing and analysis of a failure to provide a solution. Our thanks is extended to Packer Engineering, Inc. for their hospitality.

In addition to the tour, a slate of officers was presented and agreed upon as follows:

Administration Committee
Chairman: John R. Allen
Vice Chairman: Richard H. Hagedorn, P .E.
Secretary (Acting): John R. Allen
Treasurer: Lance Dekker

Standing Committees
1. Membership: Brian Cunningham
2. Program (Acting): Richard H. Hagedorn, P.E.
3. Publicity: John Knecht

The next meeting is scheduled for September 5, 1989 at Aurthers Restaurant in Elk Grove, IL. The topic will be "Third Party Certification Programs in the United States and Their Relationship and Acceptance with Other Countries, Europe and Canada."

Please watch for *Scanfax* in the Chicago area and your mail boxes for further information. Any questions should be directed to John R. Allen at (312) 699-4414 or (312) 827-7520.

Continued

Area Activity Reports

Continued

Los Angeles Chapter
Rolf Burckhardt opened the meeting and welcomed the eight attendees. Due to the cancellation of the Monday, June 5 meeting, there were no minutes.

Members present were asked about the elections of chapter officers as discussed during the May 1 meeting and it was decided, due to low meeting turnout, that elections should be held at the next meeting.

Bob Wersen, President of Panel Components Corp., was present and gave a presentation on the Recent Developments in International Power Connector Standards. The presentation, accompanied by slides, was an introduction to IEC320, "Appliance Couplers for Household and Similar General Purposes." This standard addresses two-pole appliance couplers for general use. There was an emphasis placed on the re-rating of C13 power inlets from 6 to 10 amps. Other items covered were 16 amp rated systems as described in sheets *CI91C20* and accessory power connectors covered in the soon to be published IEC320-2-2. Members were given a well written paper describing changes and upcoming requirements.

Due to summer vacations and expected low summer attendance, the next meeting will be held Monday, September 11,6:30 p.m. at Harman Electronics. Ed Spooner of TUV Rheinland is tentatively scheduled to give a presentation on TUV Rheinland's interpretation of IEC 950. In addition, election of officers will be held at the September meeting. Any questions about the Los Angeles Chapter should be directed to:

Rolf Burckhardt
Tel: (818) 368-2786
9420 Reseda Blvd.,
Suite 800
Northridge, CA 91324
Fax: (818) 360-3804

Austin Chapter
No meetings have been held since the last newsletter. However, plans have been made for the September meeting. On September 28, 1989, the local Product Safety Technical Committee chapter will meet with the local EMC Society to discuss the future agenda of the committee. It is expected that there will be a separate meeting of the PSTC in the October/November time frame. The local newsletter, the *Analog,* will announce the details of the upcoming meetings. Questions regarding the chapter activities may be directed to George Jurasich at (512) 343-6231 or Bob Hunter at (512) 250-6878.

Santa Clara Valley Chapter
In July approximately 40 people heard Peter Tarver of UL review the plastics requirements of UL. Rex Gordon, Liability Prevention Program Manager of FMC, also spoke briefly on Certification for the Safety Professional (CSP).

The August meeting was a working meeting in which attendees presented their ideas on subjects for future meetings and gave nominations for chapter officers.

In September, a speaker from UL will give a presentation on UL 1950. Details of the presentation and the speaker's name are being finalized now.

Also in September, members of the chapter have been invited to a free dinner and presentation sponsored by the System Safety Society and the Human Factors Society. This month, on Thursday, September 21, at 7:00 p.m. at FMC in Santa Clara, the presentation will be "The Safety Challenges of the Bradley Fighting Vehicle." A close examination of the vehicle will be included. Those interested should call Judith at (408) 289-3637 for dinner and program reservations and further information. Please note that this tour will be separate from the PSTC meeting and is a special, get-acquainted meeting for the above professional groups.

Further information about the Santa Clara Valley Chapter in general may be obtained from Mike Campi at (408) 773-0770.

Doctor Z

Continued from Page 11

requirements are generated. Dr. Z thinks the IEEE EMC PSTC can playa major role in that by providing engineering focus on product safety. More crudely, why would you expect to be able to help standards committees write technically sound requirements if the only thing you have previously studied is "how to get certified"?

The rules affecting process are harder to get at. Many times they are cooked up by the test house. You want their certification mark? Then you follow their certification rules and continued compliance rules. In some cases the test houses have industry or customer groups on panels to provide feedback on the certification processes (rules). UL uses the IAC (Industry Advisory Committee) in this capacity. CSA has similar feedback processes. Keep in mind that the test house is not obligated to respond or pay attention to the feedback.

As you might suspect, with different ownership of the two types of requirements (design and certification process) each owner group uses their requirements to try and offset "disliked" requirements in the other arena they cannot get at directly.

As long as the committee participants work with hidden agendas, the "consensus process" will be used to generate requirements, both for design and certification processes. When those of us who are involved, or will be involved in the standards writing processes, start to spend more time exploring safety engineering, and less time beating another incremental deal out of the certification system, the safety standards writing effort and even the certification work will head in a new and more constructive direction. This is worth working on even while we face IEC 950, EN60950, UL 1950, CSA 950, IEC 1010, ISA/ANSI 82.X, CSA 234, UL 1244, etc.

The "Technically Speaking" column has periodically examined requirements in standards to see if they relate to safety, and if so, how. Dr. Z would like to suggest that if you have questions concerning the basis for a requirement in a particular standard, that you send it to Dr. Z in care of the Editor of the *Product Safety Newsletter.* Dr. Z will post the question in the column along with a reply from someone capable of providing an intelligent answer. This activity may prove to be a useful tool for bringing more safety engineering into committee activities.

Dr.Z

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.

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

Austin Chapter Activities

August. No Meeting

***Tuesday, September* 5**

Subject: Working/Planning
Speaker: TBO*
Time: TBD*
Location: TBD*
Contact: George Jurasich
(512) 343-6231

* Details to be announced in local newsletter.

October

Subject: TBD
Speaker: TBD
Time: TBD
Location: TBD
Contact: George Jurasich
(512) 343-6231

November

Subject: TBD
Speaker: TBD
Time: TBD
Location: TBD
Contact: George Jurasich
(512) 343-6231

Chicago Chapter Activities

August. No Meeting

***Tuesday, September* 5**

Subject: Third Party Certification
Speaker: Len Frier, MET Labs
Time: TBD
Location: Aurther's Restaurant
Elk Grove, IL
Contact: John Allen
(312) 827-7520

***Tuesday, October* 3**

Subject: TBD
Speaker: TBD
Time: TBD
Location: TBD
Contact: John Allen
(312) 827-7520

***Tuesday, November* 7**

Subject: TBD
Speaker: TBD
Time: TBD
Location: TBD
Contact: John Allen
(312) 827-7520

Los Angeles Chapter Activities

August. No Meeting

***Monday, September* 11**

Subject: Election of Officers! IEC 950 Interpretation
Speaker: Ed Spooner, TUV Rheinland
Time: 6:30 p.m.
Location: Harman Electronics
8500 Balboa Blvd.
Northridge, CA
Contact: Rolf Burckhardt
(818) 368-2786

***Monday, October* 2**

Subject: TBD
Speaker: TBD
Time: 6:30 p.m.
Location: Harman Electronics
8500 Balboa Blvd.
Northridge, CA
Contact: Rolf Burckhardt
(818) 368-2786

***Monday, November* 6**

Subject: TUV America! Europe1992
Speaker: Konrad Kobel, TUV America
Time: 6:30 p.m.
Location: Harman Electronics
8500 Balboa Blvd.
Northridge, CA
Contact: Rolf Burckhardt
(818) 368-2786

Northeast Chapter Activities

***Wednesday, August* 23**

Subject: UL 1950
Speaker: Lou Feudi, DS&G
Time: 7:00 p.m.
Location: Sheraton Boxborough
Intersection of Rts 495/111
Boxborough, MA
Contact: Bill Von Achen
(508) 263-2662

***Wednesday, September* 27**

Subject: TBD
Speaker: TBD
Time: 7:00 p.m.
Location: Sheraton Boxborough
Intersection of Rts 495/111
Boxborough, MA
Contact: Bill Von Achen
(508) 263-2662

***Wednesday, October* 25**

Subject: TBD
Speaker: TBD
Time: 7:00 p.m.
Location: Sheraton Boxborough
Intersection of Rts 495/111
Boxborough, MA
Contact: Bill Von Achen
(508) 263-2662

***Wednesday, November* 29**

Subject: TBD
Speaker: TBD
Time: 7:00 p.m.
Location: Sheraton Boxborough
Intersection of Rts 495/111
Boxborough, MA
Contact: Bill Von Achen
(508) 263-2662

Continued

Calendar

Continued

Orange County Chapter Activities

***Tuesday, August* 1**
Subject: UL 1950
Speaker: Jim To, UL
Time: 7:00 p.m.
Location: MAI Basic Four
14101 Myford Rd.
Tustin, CA
Contact: Paul Herrick
(714) 770-1223

***Tuesday, September* 12**
Subject: EN 60 950
Speaker: Ed Spooner, TUV
Rheinland
Time: 7:00 p.m.
Location: MAI Basic Four
14101 Myford Rd.
Tustin, CA
Contact: Paul Herrick
(714) 770-1223

***Tuesday, October* 3**
Subject: TBD
Speaker: TBD
Time: 7:00 p.m.
Location: MAI Basic Four
14101 Myford Rd.
Tustin, CA
Contact: Paul Herrick
(714) 770-1223

***Tuesday, November* 7**
Subject: TBD
Speaker: TBD
Time: 7:00 p.m.
Location: MAI Basic Four
14101 Myford Rd.
Tustin, CA
Contact: Paul Herrick
(714) 770-1223

Portland/Seattle Chapter Activities

August- No Meeting

September
Subjects: (1) Dept. of Commerce/
Harmonization (2) Seminar
Reports (3) 1992 in the EC
Speakers: (1) P. Perkins, Tektronix
(2) J. Patterson,
Spectraphysics
(3) TBD*
Time: 7:00 p.m. -Portland
7:30 p.m. -Seattle
Location: TBD*
Contact: Al Van Houdt
(206) 882-3700

* Details to be announced in local newsletter.

October
Subject: TBD
Speaker: TBD
Time: TBD
Location: TBD
Contact: Al Van Houdt
(206) 882-3700

November
Subject: TBD
Speaker: TBD
Time: TBD
Location: TBD
Contact: Al Van Houdt
(206) 882-3700

Santa Clara Valley Chapter Activities

***Tuesday, August* 22**
Subject: Working Meeting/ Nom. of
Officers Speakers:
Brian Claes/Hugh Hagel
Time: 7:00 p.m.
Location: Apple Computer
20705 Valley Green Drive
Cupertino, CA
Contact: Mike Campi
(408) 773-0770

***Tuesday, September* 26**
Subject: UL 1950/IEC 950
Speaker: UL
Time: 7:00 p.m.
Location: Apple Computer
20705 Valley Green Drive
Cupertino, CA
Contact: Mike Campi
(408) 773-0770

***Tuesday, October* 24**
Subject: TBD
Speaker: Apple Computer
Time: 7:00 p.m.
Location: Apple Computer
20705 Valley Green Drive
Cupertino, CA
Contact: Mike Campi
(408) 773-0770

***Tuesday, November* 28**
Subject: Ethics in Product Safety
Speaker: Joseph Wujek, HP
Time: 7:00 p.m.
Location: Apple Computer
20705 Valley Green Dr.
Cupertino, CA
Contact: Mike Campi
(408) 773-0770

The Product Safety Newsletter

c/o Tandem Computers Incorporated
10300 North Tantau Avenue, Loc 55
Cupertino, CA 95014-0708
Attn: Roger Volgstadt

(See Inside for expanded calendar!)