PRODUCT SAFETY NEWS

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INTRODUCTION

This is the first edition of what we hope will be a regular publication. It is intended to help you understand the sometimes conflicting safety standards that are beginning to affect the design of our products. It will from time to time contain interpretations of those standards as we intend to apply them to the design of products here in Beaverton. If it seems arbitrary, that is not our intent, but safety standards imposed by outside authorities tend to be arbitrary and difficult of clear interpretation.

Over the past year we have had many discussions with individual design groups regarding the bearing of standards on particular projects. From time to time we find ourselves making a new interpretation on an old question for a new project; this News Letter is intended to communicate decisions as they are made so that we don't trap ourselves into specifying conflicting standards.

Initially this paper will be distributed to those on the Component News list. We welcome your comments; please send them to Charlie Chartrey or directly to me. We welcome contributions related to product safety from any group or individual as well.

Jess Gard

SOURCES FOR SAFETY STANDARDS:

We are using several primary sources for our product safety standards.

1. International Electo-technical Commission (IEC): The IEC has drafted a Safety Standard for electronic measuring instruments. This is a comprehensive document based largely on European practice and will likely be a model for legally adopted standards in many European coutries and their former colonies. It will probably be formally approved during 1970. We are attempting to interpret and meet its requirements in new design.
2. Canadian Standards Association (CSA): Canada has made CSA approval almost mandatory for electronic products. They have a written brief standard for instruments, and we also use their radio and TV standard as a guide for some products.
3. Underwriters' Laboratories (UL): UL is an independant testing lab whose standards are generally accepted by local inspecting authorities in the United States. There is little concerted effort pointed at approval of industrial instruments; authorities in the United States are most concerned with consumer products. Inspection authorities have had concern for medical equipment and data processing equipment, and we have submitted some items to UL for their examination.

We also have access to certain Australian, British and German standards, as well as certain private standards such as those of IBM. Other references include the National Electric Code, the ISO, EIA, and ISA. These often help clarify the intent of the primary sources.

J.G.

IMPLOSION PROTECTION FOR CRT'S:

Both UL and IEC require implosion protection for viewers of CRT's. UL has been primarily concerned with TV tubes, but the IEC Measuring Instrument Standard does require that tubes be either "intrinsically safe" or that they have protective shields. Our Safety Policy Committee has agreed that our instruments should provide adequate protection for the user against implosion and adequate protection for the CRT against external impact.

In the past little testing of implosion protection has been done. We have generally assumed that the external graticule or the bonded light pipe provided sufficient protection. With the internal graticule and the ceramic envelope, we find ourselves wanting to use only a very thin acrylic color filter between the user and the CRT. Hence the need for some minimum test standard to prove the implosion protection. The history to date includes studies, temperature cycling tests, and isostatic pressure tests (to 45 psi) of ceramic envelope designs; some evaluation work on the 410 glass shield; some work on the 611; and a series of impressive high speed movies of impact-caused implosions of a variety of tubes.

Recent concern has prompted a series of tests of the 5030, resulting in the addition of a polycarbonate shield to the bezel assembly. It was found that a simple acrylic color filter would not withstand the impact test.

As an initial program for evaluation of implosion protection in our instruments, we have decided to adopt the following tests from UL and IEC standards, respectively. As we gain experience, and obtain other standards, we may modify these tests to more nearly suit our own CRT and enclosure design needs. But for the time being, all new products should be subjected to these tests to evaluate implosion protection. Detailed test descriptions are available in the referenced standards. The CRT design groups will continue to evaluate new envelope designs with temperature and pressure tests.

Bill Pickering has a setup for performing the impact test in the Environmental Test Lab.

1. ENCLOSURE IMPACT TEST (UL 492, Clauses 157, 352, 362):
   a. With the CRT properly installed in the enclosure, subject the CRT face (bonded or unprotected tubes) or the protective shield to a single impact of 5 foot pounds obtained from a solid, smooth, steel sphere two inches in diameter weighing 1.18 pounds. The sphere is allowed to fall freely to produce the desired impact, or it may be suspended and allowed to swing as a pendulum. An unprotected tube shall not implode, or for protected tubes, the shield shall not be cracked nor glass expelled. This test may also be used to evaluate the face plate strength of unmounted CRT's.
2. IMPLOSION TEST (IEC Pub. 65, clause 18):
   a. INTRINSICALLY SAFE TUBES (bonded or not needing additional protection): Five tubes are tested as received and five after accelerated aging. The tube is placed in normal viewing position on a support 75 cm high which stands on a sheet of non-skid material (a blanket). The tube is imploded, and is acceptable "if no particles with a mass exceeding 0.1 gram each have passed a line drawn on the sheet 50 cm from the projection of the device.
   b. TUBES PROTECTED WITH SEPARATE SHIELDS: The instrument is mounted on a support as described in 2.a) and the tube is caused to implode. The protective screen shall prevent particles with mass greater than 0.1 gram each from passing lines drawn on the sheet 50 cm forward and to the sides of the projection of the outer surface of the instrument. The tube may be imploded by a mechanical or thermal method that does not damage the enclosure or protective shield.

J.G.