ON Your Mark

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On Your Mark *is a quarterly column written by Geoffrey Peckham, CEO of Clarion Safety Systems. Mr. Peckham is chair of both the ANSI Z535 Committee for Safety Signs and Colors and the U.S. Technical Advisory Group to ISO Technical Committee 145 – Graphical Symbols. Over the past two decades, he has played a pivotal role in the harmonization of U.S. and international standards dealing with safety signs, colors, formats and symbols. This article is courtesy of Clarion Safety Systems © 2015. All rights reserved.*

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Understanding Symbols
Static Electricity Hazards

BY GEOFFREY PECKHAM

One of the critical building blocks for your product safety labels is symbols. This month, we'll explore ESD symbols and their application.

Today's equipment contains many complex and highly sensitive electronic devices for control. Providing notice to workers is critical for protecting electrostatic discharge (ESD) sensitive devices from damage. Your safety labels related to ESD help remind workers to use proper grounding equipment, wear appropriate attire and use compatible handling methods, as well as to indicate the location of the best grounding points; this is all so that equipment is not damaged. While in the U.S., adherence to ESD labeling standards is voluntary, choosing to use the right international symbols on your labels will help to assure consistency among products, promote a quick understanding of the label's meaning and reduce unnecessary confusion in the marketplace. In this article, we'll look at the standards, symbols and label formats involved in ESD. The goal is to help you, as a product engineer, better choose label and symbol designs to fit your applications.

ESD SYMBOL STANDARDS

For the U.S. domestic market, the best practice standard is currently ANSI S8.1:2012 for symbol design and ANSI/ESD S20.20:2007 for ESD control program development. These two standards have incorporated – and in most situations replaced – the JESD471:2009 (EIA-471) symbol standard and the MIL-STD-1686 standard for ESD control programs. Some military contracts and suppliers still reference the older MIL-STD even though ANSI S20.20-2007 was designed to replace it.[1] Internationally, IEC 61340-5-1 covers ESD control programs and it was recently updated and is now virtually equivalent to ANSI S20.20:2007.

ESD "SENSITIVITY" SYMBOL

Many ESD symbols have been developed over the years. **Figure 1** shows the two most current symbols as defined by ANSI/ESD S8.1 – ESD Awareness Symbols and IEC 60417 – Graphical symbols for use on equipment (at left and at middle). The IEC design is preferred for the international market, and is easier to reproduce in small sizes.

Figure 1: The ESD susceptibility symbol from ANSI/ESD S8.1 (at left), the simplified electrostatic sensitivity symbol from IEC 60417 (at middle) and the JESD471 symbol for electrostatic sensitive devices (at right).

1. If you're making products for the military, we suggest you continue to use MIL-STD-1686.

ON Your Mark

The ESD sensitivity/susceptibility symbol is to be used on ESD sensitive components, assemblies, packaging containing ESD devices or the access panel to ESD sensitive devices. Black on a yellow background is the preferred color scheme. The ANSI standard gives you the option to include a sensitivity-based alphanumeric code to tell people the proper level of precautions necessary to avoid damage to the equipment. For military standards, there are specific word messages to be paired with the JESD471 symbol (see **Figure 1**, at right). The standards suggest that the symbol be black on a yellow background, but monochromatic reproduction in any color that contrasts with the background may be used.

ESD "PROTECTIVE" SYMBOL

The ANSI S8.1 standard and IEC 61340-5-3 both prescribe symbols to be used to either 1) identify protective packaging materials or 2) identify an electrostatic protective area (EPA) where ESD precautions are in place (see **Figure 2**). The ESD protective symbol differs from the ESD sensitivity symbol by removing the slash and adding a 'bold arc' around the triangle to suggest the idea of protection. In Europe, a letter is added to identify the type of protection provided by a package. As described in IEC 61340-5-3, the four letter codes for IEC 60417 6202 are:

S for electrostatic discharge shielding

F for electrostatic field shielding

C for electrostatic conductive

D for electrostatic dissipative

In addition to identifying protective packaging, the ESD protective symbol is also used on signage, tapes, physical barriers and markings for ESD protective areas (EPA), protective garments, shoes and equipment. Guidelines suggest having a sign

at the entrance to an EPA and at the workstation. ANSI/ESD S8.1 states that the word message, "May include manufacturer's name, date of manufacture, or lot code where applicable." The preferred color is yellow on a black background.

ESD "COMMON GROUND POINT" SYMBOL

ANSI S8.1 also has a symbol for "common ground point." IEC 60417 has a similar wordless symbol meaning "earth; ground." See **Figure 3.**

This ESD-related symbol is used to indicate the location of an acceptable common ground point as described in ANSI/ESD S6.1. The colors are optional per the standard, but it suggests either using black or using white on green.

The common ground point symbol is used in an EPA for identifying where to attach ground wires when servicing equipment in the field or in your facility. If possible, the inner circle of this label should be the location of the ground post or socket.
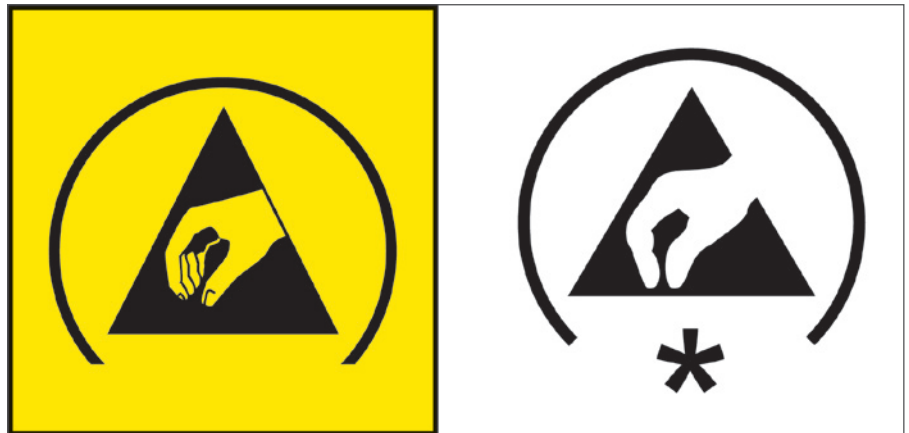
Figure 2: The ESD protective symbol from ANSI S8.1 (at left) and the IEC packaging version of the symbol from IEC 60417 (at right). The '*' in the IEC symbol is for the letter code to be added.

Figure 3: The common ground point symbol from ANSI S8.1 (at left) and the general earth (ground) terminal identification symbol from IEC 60417 (at right).

ON Your Mark

HARMONIZATION WITH ANSI Z535

When it comes to your ESD label's content, some of the older standards refer to "CAUTION" as the signal word to use when warning about part and assembly damage from ESD. Other standards specify the use of "ATTENTION". Per ANSI Z535 (the standard in the U.S. which sets the overall benchmark for product safety labeling), "NOTICE" is the more appropriate choice for an ESD label's signal word. "NOTICE" is used to indicate information to avoid equipment damage (in contrast to using the signal words DANGER, WARNING or CAUTION which are used to indicate potential personal injury hazards). The ANSI Z535.4 Standard for Product Safety Signs and Labels can be used for ESD labels – harmonizing with IEC standards by incorporating one of the three internationally recognized ESD symbols discussed above into the symbol panel of an ANSI Z535.4 label (see **Figure 4**). Taking this extra step towards harmonization will help to ensure consistency with the latest best practice standards in the U.S., and will help to maintain consistency within your product's overall system of safety labels.

Stay tuned for the next article in this year's *On Your Mark* series which will explore the history and progress in standardized symbols related to laser labeling. IN

Figure 4: Examples of ANSI Z535-style ESD labels. (Designs ©2015 Clarion Safety Systems. All rights reserved.)