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Technical Question – Color-Coding Machine Guards

ASSE recently received an interesting question from a member addressing machine guarding. Since the whole issue of machine-guarding is of interest to ASSE members and the OSH profession, we are including a short article on the issue.

The technical question: “…We have a hazard/exposure in one of our manufacturing places addressing machine guarding. This has generated a subsequent discussion on the whole issue of machine guarding, warning, and mandatory paint colors. Our question is as follows: “Is it required that machine guards be painted yellow”…

ASSE then sent the inquiry to the requestor and asked ASSE members for their response and feedback. Of use is an OSHA interpretation released 2002/2003 addressing the issue. Some of the language from the OSHA Letter of Interpretation (2002/2003) is below and might assist:

“…Color-Coding: Color-coding machinery is a way to use a bright color (usually orange or yellow) to mark a potential physical hazard to make the operator more aware of the danger. The use of color-coding should never be accepted as a substitute for the reduction or elimination of a hazard and in no way eliminates the need for adequate guarding of the equipment. The [OSHA] Standards do not specify what machines or portions of machines or guards need to be color-coded. If there is a portion of a machine that creates a hazard and the use of color-coding will
enhance employee safety, then that part or hazard shall be color-coded. It is also a good practice to paint the surfaces behind the guard a different color (blue or red) so that when a guard has been removed, the exposed color is clearly visible. Color-coding is left to the discretion of the employer to determine first, the necessity of color-coding, and second, the optimum location and extent of the markings...

Additional Member Insight
The inquiry was also distributed to several of our subject matter experts for their review and opinion. This technical insight is of value and is listed below for the purposes of providing additional information and clarification.

Bruce Main, P.E., CSP
Owner, design safety engineering, inc.

Bruce represents ASSE on the ANSI B11 Committee, which addresses machinery safety including risk assessment and guarding. Bruce has been engaged in mechanical and safety engineering project consultations and execution for many years.

Bruce’s Insight:
I tell many of my colleagues and clients that a safety color is often used to draw attention as a visual indication of a guard. But there is no requirement to do so in the national (ANSI) or international (ISO) machinery safety standards. Color is just one of many potential risk reduction measures that can be used, and the appropriate selection of color and other measures will depend on the risk, the machinery, and the application.

As the OSHA Letter of Interpretation notes, one strategy is to color the area behind a guard in a specific color so that management can easily see if a guard is missing. This is considered a good idea/best practice but I cannot say that it is commonly done based on what I’ve seen in industry.

On a different issue, but potentially applicable, is the color of the guard. If a task requires that someone be able to see what is happening, behind or through a guard (such as at the point of operation), it is a very good idea to color the guard in a dark color so that one can see through the guard easily. For example, you see this in situations where the perimeter of the guard is painted yellow, but the mesh is painted...
Geoffrey Peckham
CEO at Clarion Safety Systems
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Geoffrey Peckham is the founder and CEO of Clarion Safety Systems. Since 2011, he has chaired the ANSI Z535 Committee for Safety Signs and Colors, the committee in charge of the principle standards in the United States for safety signs, product safety labels, safety colors, safety symbols, and safety tags.

**Geoffrey’s Insight:** The OSHA letter of interpretation does a good job of laying out the boundaries of what is, and is not, required by OSHA. It is important to note that in terms of the ANSI Z535 standards, they are guidelines and are not legal requirements unless cited by reference by a governmental body. That having been said, the Z535 standards define "best practices" in industry for visually conveying safety information. But, the application of these standards is limited to safety signs, labels, tags and safety information in manuals.

I had the honor of serving as the chair of the Z535.1 subcommittee from 1994-2008. During that time consensus was reached to rail back the standard's scope and content to just defining the colorimetric specifications for the safety colors specified in the ANSI Z535.1 safety color code. The committee voted to remove content that appeared in the 1991 version of this standard that had to do with the application of safety colors, including the stipulation that machine guards should be colored orange.

The ANSI Z535 committee realized this left a hole in the standards world with regards to the specification for the use of safety colors for things like fire extinguishers, fuel storage cans, and machine guarding. However, the change in the scope of the ANSI Z535.1 standard was necessary because the ANSI Z535 committee was and is made up of experts in safety signs, labels, tags and safety information in literature. It is not a group of people who are all experts in machine design, fire safety, chemical safety and egress path marking. All of these fields, and many others, use color-coding to some extent. The right place for specifying such color coding applications must be in the standards written by these industries, not the ANSI Z535 committee.
If/when industry-specific committees chose to write standards that specify the use of a safety color, they should reference back to the ANSI Z535.1 standard for the color specification for that specific color. For instance, if a machine design standard was to require guards to be painted orange, the requirement in that standard would state something like, “Machine guards shall be colored Safety Orange (see ANSI Z535.1 Standard for Safety Colors).” To my knowledge, such a requirement does NOT exist in any machine design standard, and as I’ve stated here, it no longer exists in the ANSI Z535.1 standard. I believe I am safe in saying that the Z535.1 standard will not go back to defining specific application uses of safety colors, like for machine guarding.

Of additional importance, please note that the 2016 version of the ANSI Z535.1 Standard for Safety Colors was greatly expanded to include color charts and specifications that compare the ANSI and ISO standards for safety colors. This is information should be important to product manufacturers who wish to comply with both ANSI and ISO standards.

For Information

ASSE is a broker of the ANSI B11 Standards. If you are interested in more information, and/or viewing the standard titles and scopes please visit the ASSE B11 website. The B11 Standards are available for new, existing, modified or rebuilt power and manual driven machines that are used to process materials and the associated equipment used to transfer material or tooling.

ASSE does not broker the ANSI Z535 Standards. If you are interested in more information, and/or viewing the standard titles and scopes please visit the ANSI Z535 Website.

For more information on ANSI/ASSE Standards overall please visit the ANSI/ASSE Website for a breakdown of our standards by area, title, and scope.