How to Choose Between Orange or Yellow High-Visibility Apparel

COMPLETE GUIDE

Did you know that “struck by an object or equipment, ranks number two in the construction sector’s top four fatality causes? According to the Bureau of Labor Statistics, 519 fatalities fell under this category in 2015. Of these fatalities, 104 deaths were caused by highway vehicles, and 54 were a result of logging, construction, and mining machinery accidents.

Moreover, there were 157,490 non-fatal injuries that resulted in the loss of time in the category titled “Struck by Object or Equipment.” What’s more is that the incident rate increased from 13.4 cases every 10,000 workers to 14.2. This leaves significant room for improvement in the category of worker protection on construction sites and busy roadways.

This is where high-visibility safety apparel (HSVA) enters the picture, and why choosing the right color is so important..

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The Science Behind Fluorescence

Fluorescence occurs when light energy that is normally invisible becomes visible. This happens when short wavelengths of light are converted into elongated wavelengths. When the light energy stops, It ceases almost instantly. Fluorescent hues are two to four times brighter than other hues because of this phenomenon. They are also markedly more visible during dusk, dawn, haze, fog, and low-light conditions when normal hues undergo a graying effect.

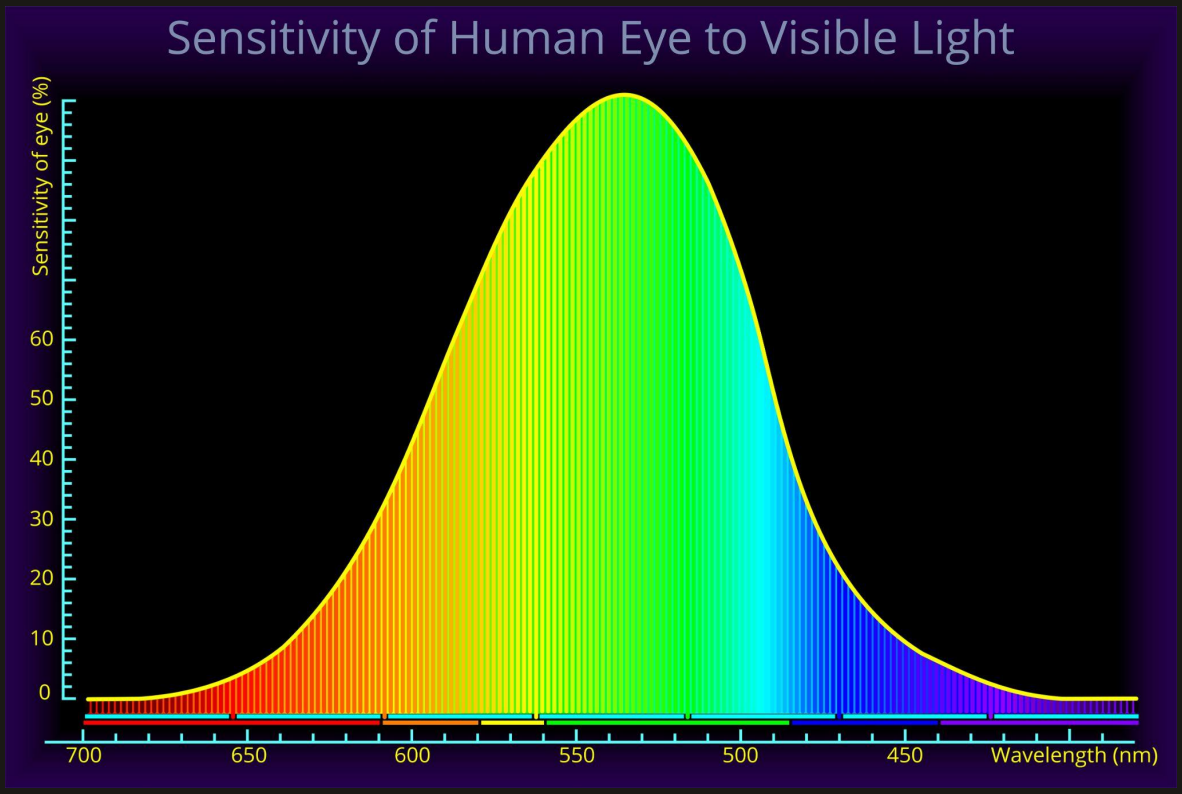
ANSI/ISEA 107 has specified three fluorescent hues that comply with its standard luminosity requirements. These colors are red, orange-red, and yellow-green. Currently, red fluorescent high-visibility clothing is pretty rarely used in the United States. It is likely because fluorescent red does not emit as much radiated light as its counterparts – orange and yellow. It might also have to do with the lack of supply chain options in America.

Since it's not common, we will skip red fluorescent apparel and stick with the comparison of the more commonly available fluorescent red-orange to yellow-green defined by the ANSI/ ISEA 107 standard. This way, you can choose between the two practical work apparel colors and use the one best suited for your industry.

How the Human Eye Sees Yellow & Orange

The human eye sees different colors to differing degrees. The same is true for fluorescent colors as well. Our eyes respond best to contrasting, bright, large, and moving objects. As a worker, your visibility will be enhanced by high color contracts between your work environment and your high-visibility safety apparel (HVSA). It makes both yellow and orange useful hues for high-visibility clothes as they will contrast against the dull work environment.

Moreover, the human eye is more sensitive to specific colors when compared to other hues. It experiences peak sensitivity at the yellow-green part of a visible spectrum. This means that human eyes are more sensitive to fluorescent yellow-green apparel than fluorescent orange ones by nature of how the human eye reads colors. While fluorescent yellow-green is the most visible to the human eye, fluorescent orange is also on the brighter end of the spectrum, making it also highly visible to the human eye.



Hazard Valuation

So, how will you choose between orange and yellow safety gear for work? Which color will provide you with the most protection? Most individuals will agree when comparing the two hues that yellow appears to be brighter. It's also true according to the sensitivity graph or spectrum. However, when it comes to exploring which fluorescent color will be safer to wear, let's explore some additional factors and their effect on the overall conspicuousness of these colors.

Conspicuity is the ability of an object to grab the attention of an observer. It is highly important for high-visibility clothing to have exceptional conspicuity in potentially dangerous environments with competing objects. An activity that will enable you to identify the risk factors is a hazard valuation of your work zone.

Sample Hazard Valuation Form

Environment and background of the worksite:

- ❑ Simple background
- ❑ Complex background
- ❑ Indoor
- ❑ Outdoor
- ❑ Rural
- ❑ Urban

Describe your workplace conditions:

- ❑ Work activity does not permit you full and undivided attention to approaching traffic.
- ❑ Poor separation from oncoming vehicle traffic
- ❑ Work activity diverts your attention from oncoming vehicle traffic.
- ❑ Work activity takes place near or in unimpeded vehicle traffic.

Notable hazards/exposures to workers:

- ❑ Moving equipment
- ❑ Moving vehicles
- ❑ Low/limited light
- ❑ Low visibility
- ❑ Pedestrian traffic
- ❑ Fire/flame
- ❑ Nighttime work
- ❑ Extreme temperatures
- ❑ Electrical arc
- ❑ Limited sightlines
- ❑ Precipitation
- ❑ Fog/steam
- ❑ Smoke/blowing dust
- ❑ Entanglement
- ❑ Other

Vehicle/equipment speed:

- ❑ Below 25 mph (40 kph)
- ❑ Above 25 mph (40 kph)

Vehicle/equipment volumes:

- ❑ Limited
- ❑ Controlled traffic
- ❑ High volume
- ❑ Uncontrolled

Existing safeguards:

- ❑ Barriers
- ❑ Traffic monitoring
- ❑ Traffic control plans
- ❑ Other:

Assessing Risk

Based on the recognition of your worksite hazards, your work activity has a:

- ❑ Low-risk environment
- ❑ Medium (moderate) risk environment
- ❑ High-risk environment

Worksite Backgrounds & Contrasting HVSA

When you're filling out the risk assessment form, you should consider the background colors of your worksite. When evaluating contrast, make sure to consider two factors – color contrast and color sensitivity. Color contrast is essentially the difference in an object's color next to the background. Even though fluorescent yellow has a higher sensitivity rate, in certain situations, the scale might tip in favor of fluorescent orange based on color contrast.

HVSA that Contrasts with the Background

For instance, if your work zone has areas of heavy foliage, fluorescent orange hi-vis safety wear will provide you with a greater contrast to the leafy background. On the flip side, if your work zone background is complex, wearing fluorescent yellow high-visibility clothing will be a better choice. In some worksites, you might benefit from using both colors to differentiate two groups of workers.

Both fluorescent orange and fluorescent yellow have shown positive conspicuity in daylight conditions, which means you can use both hues for complex backgrounds during the day.

High contrast, wide, reflective, fluorescent ribbon in yellow or orange with 2 inches wide, silver, retro-reflective down the middle will also offer the needed conspicuity. Reflective materials that are high contrast and offer combined performance enable both fluorescent yellow and fluorescent orange to be used in the same design.

Trends in HVSA Today

The current trends in high-visibility safety apparel for workers include two-tone or color-blocking options. Both create a strong visual contrast of fluorescent fabric with darker hues on the apparel. Thanks to this hybrid approach to high-visibility apparel, when it is used in high-dirt worksites, it extends the garment's life. The fluorescent garment does not stain or develop abrasions easily, keeping it from offering compromised visibility. It will allow you to keep your HVSA in prime condition while allowing visual conspicuity against all types of work backgrounds.

Recognition of the Workers

When choosing a fluorescent color for your high-visibility clothes, you must consider the fact that the color you select should be able to help equipment operators and drivers recognize your crew at a work site. Even though yellow is the most widely used and brightest fluorescent color, orange has the upper hand when it comes to being recognized as a hazard identifier. Most people associate orange with the words “watch out.”

Orange has been widely utilized in traffic cones, road construction signs, barrels, and delineators. Moreover, it is featured in most warning signs. When it comes to road construction, orange is likely the color of recognition for drivers.

Orange also has the benefit of identifying people while hunting as it is the required safety color hunters have to wear to ensure they are recognized by one another in complex, camouflaging environments. People started promoting wearing orange while hunting in the 1960s, as it is hands down the easiest color to spot outdoors. Since this color does not naturally occur in the woods, it is easier for the human mind to spot fluorescent orange as identifying a human figure.

Additionally, reflective patterns can also boost recognition. If you wear a reflective pattern with a Chevron or X on the back, it signifies a worker facing away from oncoming traffic. The combination of X reflective designs on the back in fluorescent orange is usually preferred by railroad workers. This is because these workers have to work on sites with heavy foliage, and wearing orange can help operators identify them when they are facing away from the oncoming train.


Which Color Works Best at Night?

Sometimes, you have to work at a site where there is minimum light, or you get assigned work at night. Traffic is undoubtedly lighter when the environment is darker. It's why workers often do roadwork at night even though the visibility is the poorest. Wearing appropriate high-visibility safety apparel (HVSA) becomes critical during these times.

When you have little to no surrounding light, your HVSA will rely on retro-reflective tape to illuminate your frame. Headlights from oncoming traffic will fall on the reflective tape, and light will bounce back before the color becomes discernible. It's why the choice between yellow and orange becomes less relevant in an environment with minimal light. The color of your high-visibility clothing will only come into play and truly matter when night work overlaps with work during the day.

The Bottom Line

When color is not enough to help you ensure your safety, you can look at additional protection, such as full-body coverage. Hi-vis safety wear designs that mark the arms and legs boost the identity of the worker wearing them.

If you are working in a high-hazard work zone, you can choose to look beyond the fundamental requirements of high-visibility apparel and choose the safety offered by full-body coverage. In such an instance, you will have to wear a coverall with both the arms and legs marked with fluorescent reflective designs for maximized motion identity and complete body coverage.

ANSI has Classes 1, 2, and 3 for various levels of hazard. You can look at the chart below and see how the class increases as the body coverage increases.

Type of Garment	"O" Type	"R" Type		"P" Type		Supplemental Items
Description	**Off-road**	**Roadways**		**Police, Fire, EMS Personnel**		**Garments with Legs, Including Gaiters**
Performance Class	Class 1	Class 2	Class 3	Class 2	Class 3	Class E
Retro-reflective Material Amounts	155 in^2	201 in^2	310 in^2	201 in^2	310 in^2	109 in^2
Background Material Amounts	217 in^2	775 in^2	1240 in^2	450 in^2	775 in^2	465 in^2
Width Minimums of Retro-reflective Material	1"	1.38" 1" for split trim designs	2" 1" for split trim designs	2" 1" for split trim designs	2" 1" for split trim designs	2" 1" for split trim designs
Previous Standard and Class	**ANSI 107 Class 1**	**ANSI 107 Class 2**	**ANSI 107 Class 3**	**ANSI 207**	**NEW!**	**ANSI 107 Class E**

Orange is vastly underrepresented in the flame-resistant high-visibility apparel category because many FR fibers are incompatible with fluorescent dyes. It becomes challenging and costly to get fire-resistant fabrics dyed in fluorescent orange. Because fluorescent yellow is brighter and more commonly used, supply and demand have kept fluorescent orange FR clothing to a minimum.

There is only one fluorescent orange FR fabric that meets ASTM F1506 and ANSI standards. Other fabrics fall short and can only fulfill the Canadian CSA Z96 "Bright Orange" standard, which only accepts fluorescent oranges with a minimum total luminance factor of 17%, versus the ANSI standard that requires fluorescent oranges to have a minimum total luminance factor of 40%. If your work environment requires you to wear fluorescent orange high-visibility safety apparel (HVSA) to ensure your safety and you cannot find the relevant HVSA solution, find a supplier that carries the clothing you need.

360 USA®

360 USA is a leading high visibility clothing manufacturer in Garden Grove California. We got our start when our founder began jogging at night to avoid the heat and sun. When looking to find high visibility clothing that would not interfere with the run and increase visibility and safety, everything available was either too expensive or very low quality. Seeing an unmet market need, we created a hi-vis running harness that delivered real value and high quality at an affordable price. Other runners saw the product, asked where they could get one for themselves, and 360 USA was born.

Our core mission is to manufacture exceptional high visibility clothing at a reasonable price.

Today, 360 USA is a major high-quality safety and sporting clothing supplier to individuals and corporate accounts.