



## Ultraviolet Reflectance by Paint

### INTRODUCTION

Ultraviolet (UV) and visible light produced during welding and cutting operations can be reflected off of surfaces such as walls and ceilings. Reflected UV light can be harmful to eyes and skin even when direct exposure to the welding light is blocked by protective devices such as welding curtains or screens. For this reason, it is desirable to reduce the reflection of UV light by painting surfaces with low UV reflecting paint.

### NATURE OF THE HAZARD

UV reflection off of painted surfaces arises from multiple reflections among pigment particles within the paint layer. The UV reflectance of paint is primarily affected by the nature of the paint pigment.

- **Bad Pigments (High UV Reflectivity)**

The use of paints containing a significant portion of metallic particles should be avoided in a welding environment due to the high UV reflecting properties of metallic particles.

Nonmetallic pigments identified as having high UV reflectance are listed in the following Table:

#### High UV Reflecting Nonmetallic Pigments

Not suitable for use in welding environments

MgO	magnesium oxide; magnesia
CaCO <sub>3</sub>	calcium carbonate; whiting; precipitated chalk
Ca(OH) <sub>2</sub>	kalsomine; calcimine; slaked lime
Sb <sub>2</sub> O <sub>3</sub>	antimony trioxide
BaSO <sub>4</sub>	barium sulfate; barytes
MgCO <sub>3</sub>	terra alba (any of several white mineral substances: gypsum, kaolin, magnesia)
Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>	
CaCO <sub>4</sub> ·2H <sub>2</sub> O	
Al <sub>2</sub> O <sub>3</sub> ·2SiO <sub>2</sub> ·2H <sub>2</sub> O	china clay
Ca/Mg Silicates	asbestine
SiO <sub>2</sub>	Silex; quartz; silica
PbCO <sub>3</sub> and Pb(OH) <sub>2</sub>	sublimed white lead, may also be termed basic carbonate white lead when in purer forms
BaSO <sub>4</sub> – 70 percent	lithopone
ZnS – 30 percent	zinc sulfide
Al <sub>2</sub> (OH) <sub>3</sub> PO <sub>4</sub> H <sub>2</sub> O	turquoise blue

- Good Pigments (Low UV Reflectivity)

Most present-day paint, white or colored, is safe to use in a welding environment from the standpoint of low UV reflectance. This is because most present-day paint contains up to 50 percent titanium dioxide ( $TiO_2$ ) as a pigmenting agent, and  $TiO_2$  has a very low UV reflectance. Furthermore, with the exception of turquoise blue, all colored pigments were found to have low UV reflectance (see Information Sources).

## SUMMARY

In welding environments, it is desirable to use low UV reflecting paint to help reduce exposure to UV light. Avoid paints with metallic particles and use paints with high concentrations of  $TiO_2$  pigments. Consult your paint supplier for additional information about UV reflectance.

## INFORMATION SOURCES

AWS, *Ultraviolet Reflectance of Paint (ULR)*, study sponsored by AWS and performed at Battelle Columbus Laboratories, 1976. This historical document is available from American Welding Society, <[www.aws.org](http://www.aws.org)>.