

YA ONLY GET ONE PAIR OF PEEPERS; VISUAL PROTECTION WHEN ENAMELING

I have recently been investigating the use of protective lenses for enamelists for a number of reasons, not the least of which is that I was using lenses that I thought might be insufficient protection (they were). I also wanted to determine definitive information on the types of lenses that would be sufficient. I researched the types of emissions from kiln- and torch-firing, contacted a number of enamelists, enamelist/authors, protective lens suppliers, and one kiln manufacturer. This essay is an attempt to summarize my understanding of what enamelists need in order to protect their eyes when monitoring the enameling firing process.

I initially and briefly did an internet search for the types of emissions produced by a kiln/torch when firing enamels, those emissions that would have the capacity to damage eyesight. Here is a summary of what I found with a numbered list of points at the end.

ULTRAVIOLET LIGHT

UV light is broken into three different types, UVA UVB and UVC, two of which, UV-A and UV-B, are of concern for enamelists.

UV-A especially can pass into the eye through the cornea and into the lens. Overexposure to UV-A radiation has been linked to the development of certain types of cataracts, and research suggests UV-A rays may play a role in development of macular degeneration.

UV-B has been connected to cataracts as well.

INFRA-RED

The Indian Journal of Ophthalmology in 2011 reported the results of a study of the effects of intense IR on vision. “The risk of developing cataract is more for workers who deal with hot materials such as molten glass or steel, due to exposure to IR radiation. The relation between IR and cataract was studied . . . [and it was] found that exposure to intense optical radiation led to the development of IR cataract in the work place. The epidemiological studies . . . found a correlation between cataractogenesis and work with fused glass and metals. . . the cornea, lens and retina can be damaged due to thermal effects associated with IR exposure. The aversion response normally limits the duration of exposure to less than 0.25–10 seconds.”

My Takeaway from this: This study dealt with industrial exposure, and not the level of intensity enamelists who are kiln-firing might experience. However, torch-firing may be a different matter, I expect, since the length of time of exposure is extended.

It does appear that enamelists need to protect against both UV and IR, contrary to what I had previously thought, that UV alone was of concern. This should have been obvious to me, but sometimes what is obvious can be overlooked.

It had always been my understanding that it was cumulative (repeated over time) exposure to UV that would lead to cataracts. It appears that damage from exposure to IR can result as well, depending on length of exposure and cumulative exposure.

Once again, this may sound obvious, but I did not want to continue to make any assumptions.

THE ENAMELISTS' RESPONSES

In contacting the experienced enamelists and enamelist authors, many of them agreed that eye protection was essential when monitoring the firing process, but, although there was some overlap on what that protection should be, there was also a range of suggested lenses including: Welders lenses #2, #3, #5, and others.

One author commented, "Calobar lenses" were her preferred protection. (these are unfortunately not being manufactured currently. . . see below, my summary)." She also suggested Auralens (see below), as a substitute. A second author stated, "Infrared and ultraviolet rays are emitted from a heated furnace. If one often gazes directly inside, cataracts, a hazard of many glassblowers, could develop. Be certain to wear eye protection (get safety glasses with welder's shade #2 lenses, or calobar lenses, or go to Auralens, and avoid looking too long."

An enamelist who primarily does torch-firing noted, "I have used the AUR-99, but they are discontinued. My most recent purchase is the replacement AGW - 300 and it seems to be pretty much identical - I can't tell the difference. I have never found an eye doctor that can tell me exactly what I should use, but I use these for both enameling and soldering copper, and have since my late 20's, and they seem to protect [my eyes]." Her comment about ophthalmologists is somewhat troubling, since it would seem logical that an eye doctor would be able to suggest the appropriate protection. Since I only contacted a small number of enamelists for this research, it may be that others in our enamelist community may have had better information from their ophthalmologists (I would appreciate hearing from you, if you have had that input).

She also noted as follows: "I used to use #2, #3 & #5 welding lenses and I think they absolutely do protect your eyes. . . I started using #2 when I needed to see slight color/heat changes. #3's when it wasn't as crucial, and #5 for repetitive "monkey" work, as I know they protect from everything. The downside (with #5) is that you can't see, and as I aged and my night vision failed, I knew I was protecting my eyes, but I was working basically blind. . . I purchased the Aura lens in my late 30's to replace the #2 & #3 procedures because they provided good protection and you can see to work. They are expensive, but they do offer a clip on, readers and you can get your prescription special ordered, but, yes, very expensive. In short, if the welding lenses offer enough vision to work, they are great protection and inexpensive! I think the aura lens offer good protection and make it easier to see while I am working."

One extremely important point she made is that one must "never peek over [the lenses] when you have been looking into the kiln! Your eyes will be dilated and peeking gives them a more dramatic & dangerous burst of light than if you were wearing nothing."

Another enamelist doing torch-firing shared the following. "[My lenses] work but are something like 20 years old and probably should be replaced. . . I probably didn't use the best glasses when I lampworked 'cos I bought the best at the time but now they say didymiums were probably not the best. [I] hope my eyes holdup. I'm buying myself new ones this year. I have not decided what I'm buying. I'm not sure #3 answers it all, but I'll find out. They should, is my guess, since they are for welding. . ."

NOTE: Didymium lenses were developed for lampworking, because they block sodium flare. Sodium flare is not the concern when enameling, so lenses that protect against sodium flare alone are not appropriate for protecting enamelists' vision.

One comment from a final enamelist was a bit troubling. She said, "I did wear goggles when I used a chamber kiln. But the little contact kiln isn't a big deal, I HOPE!" So many times we use processes in our work that can have adverse effects on us (think: lead-bearing AND nonlead-bearing enamels, fumes, as well as UV/IR, etc.), and we tend to assume that if we are moderately careful, or "hope" for the best, that we will be OK. I think it's important to emphasize that, even though, when checking the status of the state of enamels while firing, we would not be immediately aware of any damage to our vision. If we don't use protection, that damage will still be occurring despite any wishes or hopes that it won't. Ya only get one pair of peepers.

[THE LENS SUPPLIERS](#)

Below is summary of what I found when I checked out the lens suppliers suggested by the enamelists. There may be other suppliers, but I did not search for them. This should not be misconstrued as a suggestion to use *only* these suppliers.

[Auralens](#)

Auralens indicated that #3 lense is as low [light] as they can make and that, if #2 is available (from another source), that would be an ideal shade to use. This site still lists the Aura99, which they are not still offering. Go figure???? Apparently the AGW-300 is the multi-tasking (UV, IR, sodium flare) lens they offer now. <http://www.auralens.net/en/agw-300-filter> (the lens recommended for enameling by Auralens protects from most IR, some UV, and sodium flare (though the latter is not a concern for enamelists). The Auralens lenses are more expensive than simple welding lenses.

Here's the link to Auralens metalworking lenses (including enameling):

<<http://www.auralens.net/en/metalworking-filters>>

Mike Aurelius

Customer Service

<http://www.auralens.net>

<mailto:sales@auralens.net>

Mike also offers an interesting blog containing commentary on a range of studio safety issues, plus a thorough explanation of the lenses he makes. His focus is on glassworkers, but it's worth a read-through. His personal safety blog: <http://mikeaurelius.wordpress.com/>

[Phillips Safety Products](#)

Phillips offers a clip-on, which is useful for those who wear prescription glasses, as well as a range of frames. They stock #2 darkness and others. The cost of their product is less expensive than Auralens (Just a note: I ordered a pair of clip-on glasses, in #2 darkness).

When I wrote to Phillips just after receiving the glasses, asking them if the #2 would be sufficient, given the other suggestions I had received, the reply from Bill Brown at Phillips was illuminating (no pun intended). "Many people use Shade 2 for the purpose you describe. If you feel those are not dark enough after use, you can exchange them for a Shade 3", a rather generous offer.

<https://www.phillips-safety.com>

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[A KILN SUPPLIER](#)

I spoke with Arnold Howard at Paragon Kilns, who said that they had decided, based on contacts with lens suppliers, that #3 offers the best protection without being so dark that the inside of a kiln would be difficult to see.

<https://www.paragonweb.com/>

MY SUMMARY

1. Eye doctors are not necessarily the best or consistent source of information for enamelists' eye protection. Odd, that!
2. Shades #2-#3 are apparently good for blocking IR and UV when kiln-firing. For torch-firing, being a different 'animal', choose the #3 or darker.
3. A note about Calobar lenses suggested by several enamelists. . . vintage Calobar lenses are available on Etsy (very expensive) and on ebay (less expensive), and may be available on other auction sites as well.
4. As enamelists we depend on our eyes to select, test and use the beautiful colors that enamels offer us. As a result, we need to protect our eyes from the effects of the ultraviolet and infrared emissions during the firing, either torch-firing or kiln-firing, of the enamels. Ignoring protection will result in irreparable damage to our eyes.

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