

**Guidelines on the Care and Maintenance of Historic Classical Fresnel Lenses
Transferred with their associated lighthouses under NHLPA
February 17, 2011**

FINAL

Introduction

Classical Fresnel lenses that are slated for transfer along with their lighthouses and Classical Fresnel lenses that are still in the lantern rooms and are considered an important historic feature of their lighthouses, represent a unique aspect of both lighthouse and Coast Guard History. These unique lenses are highly sought by a variety of museums and organizations throughout the United States. Due to their historical significance, fragility, and high value, Fresnel lenses require their own set of conditions that are to be met by prospective organizations and candidates who wish to acquire a lighthouse that comes with a Classical Fresnel lens. The United States Coast Guard and the National Park Service have developed a set of guidelines for the care, security and display of a Fresnel lens in order to preserve and protect these valuable national assets.

Facility

Due to harsh environmental conditions and temperature fluctuations inherent in coastal and Great Lakes lighthouses and their lantern rooms, and because of the difficulty of maintaining museum standard conditions in such structures, it is preferable that the Fresnel lenses not be retained or placed in lantern rooms or be relit for any navigational purposes. **Active use of Fresnel lenses is not conducive to long term preservation.** Fresnel lenses should be properly displayed in a location as physically close as possible to the original, historic point of their installation such as a restored Keepers quarters or local museum. In the event that a Fresnel is to remain in the lantern room (lit or unlit), a plan must be implemented for the protection of the lens in the potentially harsh lantern room environment. The more time, money and effort that is initially invested in the proper housing and care of a lens, the longer one can extend and preserve the life of the lens, in addition to maintaining a visually appealing artifact for future generations.

Care for lenses kept in original lantern rooms

Minimum standards:

- To protect against harmful Ultra Violet rays of the sun, use historically correct shades, curtains or lens covers and/or where possible, UV rated film on lantern room windows. Minimum UV protective rating required is 99%. (UV rate film must meet the Secretary of the Interior's Standards for the treatment of historic properties.)
- The lantern room is to be kept clean and clear of debris, and in good repair. At a minimum, there should be no roof leaks, lantern windows need to be kept properly glazed and caulked to protect against air and water intrusion. Floor, wall, and roof vents should be kept clean and free of accumulations of dirt, insects, birds or their nests. Cleaning tools, stools, ladders, etc. will not be stored in the lantern room.
- Access to lantern room by visitors shall be supervised at all times by authorized personnel (trained docents or staff). Visitors shall be prohibited from touching or coming into contact with any part of the lens, such as touching with hands or bumping with camera equipment.
- The size of the lantern room shall be used in determining the number of visitors allowed inside at any one time in order to prevent overcrowding and possible damage to the Fresnel lens. The number of visitors allowed at one time shall not exceed six persons and may be less depending on the situation.
- An initial baseline condition assessment of a Fresnel lens following its transfer from the Coast Guard to the new owner is a necessary starting point from which to measure its condition through time. Therefore, this initial assessment shall be conducted in situ by a professional lampist (see list) or a professional artifact conservator (AIC affiliated) within six months after the Fresnel lens is transferred. The lampist or conservator shall prepare a written report and file a copy with the Coast Guard Curator's office not later than

one month following this assessment. Additional condition assessments by a professional lampist/conservator with written reports shall be conducted at intervals of not more than six years thereafter, as determined necessary by a professional lampist/conservator depending on the lens' overall condition, and a copy of the report filed with the Coast Guard Curator's office within one month.

- Appropriate repair and restoration work shall be completed as necessary and in a timely fashion by a professional lampist or artifact conservator.

Optimal standards (same standards outlined above with the following additions/changes):

- Stable temperature. Range: 50 to 80 degrees F. Use of heat source may be necessary to maintain this range in colder months.
- Stable relative humidity. Range: 40 to 60%. Use of a dehumidifier may be necessary to maintain this humidity range in warmer months.
- Visitors shall be prohibited from accessing and touring the lantern room.
- Access to lantern room by authorized personnel only (trained staff).
- Use of low wattage (not to exceed 100 watts) light sources is acceptable.

Care for lenses displayed inside a Keepers quarters/nearby facility/museum

Interior environmental standards, conditions, and lighting:

- For long term care and preservation, the ideal exhibit location is an environmentally controlled setting- such as a museum, restored keeper's quarters or other nearby facility with controlled access by staff.
- If the lens is located in a museum or facility on the lighthouse property, it must be displayed within a secure enclosure such as a locked Plexiglas case, or defined exhibition area or structure that prevents unauthorized handling or touching. If not protected by a case or other structure, a barrier railing or wall will be located no closer than 5 feet from the lens. The barrier will fully encircle the lens or in the case of a corner display, the exposed faces will be protected by a barrier at a minimum of 4 feet high.
- Larger sized lenses (1st, 2nd, and 3rd orders) should be placed for viewing in a location with an appropriate barrier that protects it from intentional or unintentional contact such as touching, bumping, knocking, or scraping of the lens by visitors.
- Theft prevention and security safeguards for the lens are required.
- Whenever possible, lens exhibition and display areas should be accessible to all visitors.
- Optimal temperature range: 60-75 degrees F.
- Optimal relative humidity: 45-55%
- Fluctuations of more than +/- 15 percent humidity should be avoided.
- Daily collection of humidity and temperature data is required. This can be achieved using a museum standard hygrothermograph, digital temperature/humidity data reader, or a standalone device such as the PEM2 Datalogger (additional information here: <http://www.pemdata.com/faq.asp?page=pem2#1>)
- 12 monthly humidity/temperature data reports shall be sent for review to Coast Guard Curator on a once yearly basis.
- Avoid direct sunlight for lens display. Light damage to the glass prisms is cumulative and irreversible.
- Use UV filters or shades on windows if a lens is situated near a window or windows.
- Use low wattage (not to exceed 40 watts), clear incandescent bulbs or LED bulbs for exhibit illumination. Light source will be placed slightly above or below the focal point of the lens in order to better disperse the light for display purposes.
- Prolonged exposure to heat and light will speed up degradation of litharge (glazing compound used to seal the prisms within the metal framework). Once litharge dries out and cracks, the underlying wood wedges holding the prisms in place within the frame can fall out, or will deteriorate and potentially rot causing the glass to loosen and fall out.

Standard care, maintenance, and cleaning methods

- Bi-weekly to monthly visual checks on prism glass and metal framework. Polishing of metalwork is prohibited due to erosion of metal.
- If the lens appears to be in good condition and maintained within recommended parameters, minimal contact is considered best practice for long term preservation and damage control.

- Staff should be trained initially by a qualified individual familiar with the proper care and maintenance of Classical Fresnel lenses.
- As needed light dusting of glass and metal parts with a microfiber cloth or soft microfiber duster
- Remove all jewelry, watches and belt buckles prior to cleaning.
- Use of nitrile or soft cotton gloves required when cleaning the lens.
- **To wet-clean dirty glass:** combine 2 parts distilled water to 1 part isopropyl alcohol. Add only *one* drop of original, non-concentrated Woolite per quart of distilled water/isopropyl alcohol mixture. **To wipe:** dampen cloth and gently wipe from side to side, and wipe dry with dry cloth. Use a clean microfiber rag. *Do not* spray cleaning solution directly onto glass.
- **STRICTLY PROHIBITED** products: sandpaper, Brillo pad, Brasso, Windex or ammonia products. No abrasive or corrosive cleaning and polishing products.

Financial Considerations

- Money should be budgeted in a dedicated account for a lens condition assessment to be accomplished once every 5 to 6 years, or on an as needed basis, depending on the lens' overall condition. Condition assessments will vary depending on location, but are estimated to cost anywhere from \$1000 to \$3000. Repair and restoration costs can vary widely (several thousand dollars to more than \$100,000) depending on order of lens, condition and treatment needs.

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