U. S. NAVAL MEDICAL RESEARCH LABORATORY
U. S. Naval Submarine Base
New London, Connecticut

MEMORANDUM REPORT 53-10

LIST OF RED FILTERS FOR DARK ADAPTATION

Bureau of Medicine and Surgery, Navy Department
Project NM 003 041.51 - Goggles Design and Evaluation

Visual Engineering Section
8 July 1953

LIST OF RED FILTERS FOR DARK ADAPTATION

In the course of the past few years the Visual Engineering Section has obtained a number of samples of red glass and red plastic materials for testing. This report has been prepared to suggest sources from which materials for various types of red lighting purposes may be procured. No attempt has been made to include all possible sources—only the limited number of samples which have come to the attention of this laboratory, and which have been found to meet one or more specifications, are listed.

All materials were tested for per cent visible transmittance on the Beckman Model DU Spectrophotometer. From these measurements rod and cone factors according to the Webster and Lee and the Projector formulas were calculated. The Webster and Lee goggle requirements are as follows: rod stimulation factors must not exceed 11.0, while cone stimulation factors must equal or exceed 120.0. The Projector formuia is discussed in MRL Report No. 219. According to this method, cone factors for filters must not be under 115, nor less than 18.0 times the sum of the rod factors. Cone factors for lamps and lamp covers must not be under 50, nor less than 18.0 times the sum of the rod factors. High cone requirements are regarded as necessary for goggles and general compartment illumination. Materials having lower cone stimulation factors are considered suitable for use in instrument panel lights, internally illuminated dials and pilot lights.

It is important to note that the figures listed hold only for the specimens tested. Both glass and plastics are subject to considerable variability from melt to melt. It cannot be expected that subsequent runs of a given material will duplicate exactly the transmittances obtained at this laboratory.

The publication of this list does not constitute an endorsement of the product nor a guarantee that future procurements will comply

with the specifications mentioned.

This listing will be brought up to date from time to time and changes or corrections will be made in subsequent listings.

For convenience a list of suppliers of these materials is appended.

	COMPANY	PRODUCT	WEBSTER - LEE ROD	WEBSTER - LEE CONE	PROJECTOR ROD	PROJECTOR CONE
1. Glass	Corning Glass*	#2412 (hard, durable, excellent optics)	8.4	117.3	4.8	111.6
2. Plastics	Cellanese Corp.	#19481 (moderately soft, flexible, fair optics)	10.5	130.8	6.1	124.9
	duPont deNemours	"Plastacele" (soft, flexible, fair optics)	9.4	120.4	5.4	114.9
	Rohm and Haas	"Plexiglas" #2071 (hard, non-flexible, good optics)	9.4	113.2	5.4	107.9
		"Plexiglas" #2444 (weather stability poor)	9.9	128.5	5.5	122.6
	U.S. Safety Service	"Optilite" (soft, flexible, fair optics)	8.3	110.3	4.7	105.1
3. Lamps	No uniformly acceptable lamps are known to this laboratory.					

* Corning produces a family of reds which can be polished to thicknesses of various rod-cone ratios.

ADDRESSES OF SUPPLIERS

1. Corning Glass Works
   Corning, New York

2. Cellanese Corporation of America
   Plastics Division
   180 Madison Avenue
   New York 16, New York

3. E. I. duPont deNemours and Company
   Polychemicals Department
   Wilmington 98, Delaware

4. Rohm and Haas Company
   Washington Square
   Philadelphia, Pennsylvania

5. U. S. Safety Service Company
   1215 McGee Street
   Kansas City 6, Missouri