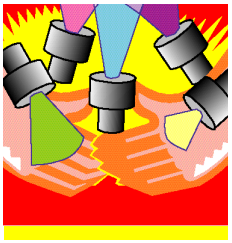
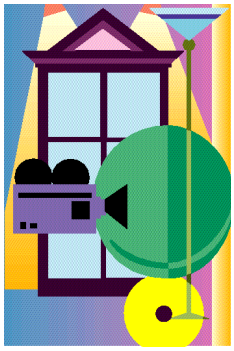
# COSMETIC SURFACE QUALITY

6/01



## Description

Cosmetic surface quality describes the level of defects which can be visually noted on the surface of an optical component. Specifically, it defines the state of polish, and freedom from scratches and digs. These factors are important, not merely to enhance the appearance of the component, but because they can have a serious adverse effect on performance due to light scattering.
Over specifying cosmetic surface quality, on the other hand, can be costly.
The most common and widely accepted convention for specifying surface quality is the U.S.military surface quality specification, MIL-PRF-13830 B. The surface quality of all Abrisa Glass products are defined according to this specification.



## Specification Standards

It is important to note that inspection of polished optical surfaces for scratches is accomplished by a purely visual comparison to scratch standards. Thus, it is not the actual width of the scratch which is ascertained, rather it is the appearance of the scratch as compared to these standards.
A part is rejected if there are any scratches present which are more visible than the specified maximum. Due to the subjective nature of this examination, it is critical to use trained inspectors operating under standardized lighting conditions to achieve consistent results.

## Scratches

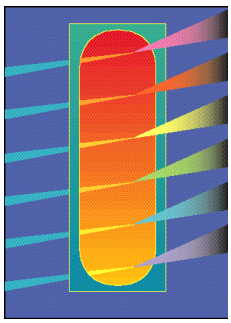
A scratch is defined as any marking or tearing of a polished optical surface. In principle, the scratch number refers to the width of the reference scratch in ten thousandths of a millimeter; thus an 80 scratch is equivalent to an 8µm standard scratch. However, keep in mind that this equivalence is determined purely by visual comparison, and the appearance of a scratch can depend upon the component material and presence of any coatings. Therefore, a scratch on the test optic which appears equivalent to the 80 standard scratch is not necessarily 8µm in width.

## Digs

A dig is defined as a pit or small crater on the polished optical surface. Digs are defined by their diameter. The dig number represents the actual size of the dig in hundredths of a millimeter.
The diameter of an irregularly shaped dig is 1/2 x (Length + Width).

80 Dig = 0.8mm diameter
50 Dig = 0.5mm diameter
40 Dig = 0.4mm diameter

Abrisa optics are compared by experienced Q.C.personnel using scratch & dig standards which were manufactured according to the U.S. military drawing C 7641866 Rev. C. Our inspection areas are equipped with lighting which meets the specific requirements of MIL-PRF-13830 B.
The scratch and dig designation for a component is specified by two numbers; the first defining the allowable maximum scratch visibility, and the second referring to the allowable maximum dig diameter. Example:



120 - 80 = commercial quality.
80 - 50 = common acceptable cosmetic standard.
60 - 40 = acceptable for most scientific research applications.

## Coating Defects

Coating scratches and digs shall not exceed the values specified for the substrate on the component drawing or procurement document. Coating scratches and digs shall be considered separate from the substrate scratch and dig requirement.

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