



KODAK RELIABLE IMAGE TIP # 66

Density, Contrast and the Infamous 1.00 Density Aim

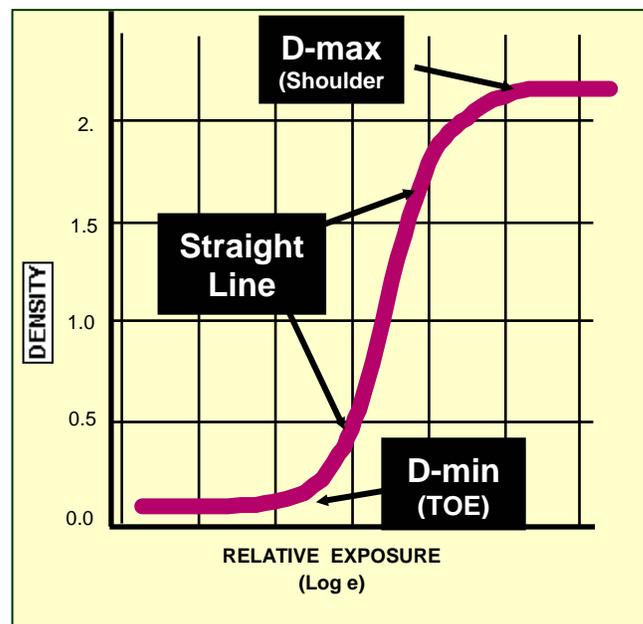
Why are we obsessed with a 1.00 density return for our processor and camera aims? I will not get very technical here so, as usual, I will explain this in down-to-earth terms and, of course, with pictures. First of all, here are some basic definitions:

Characteristic Curve: A performance graph showing the relationship between exposure and density under developing conditions. *All Kodak microfilms have a distinct characteristic curve which are available in Kodak Data Sheets (See RI Tip # 56).*

Contrast: The density range of a negative, print or slide; the brightness of a subject or the scene lighting.

Density: The blackness of an area, in a negative or print, that determines the amount of light that will pass through it or reflect from it.

Exposure: The quantity of light allowed to act on a photographic material; a product of light intensity (controlled by the lens opening) and the duration (controlled by the shutter speed or enlarging time) of light striking the film or paper.

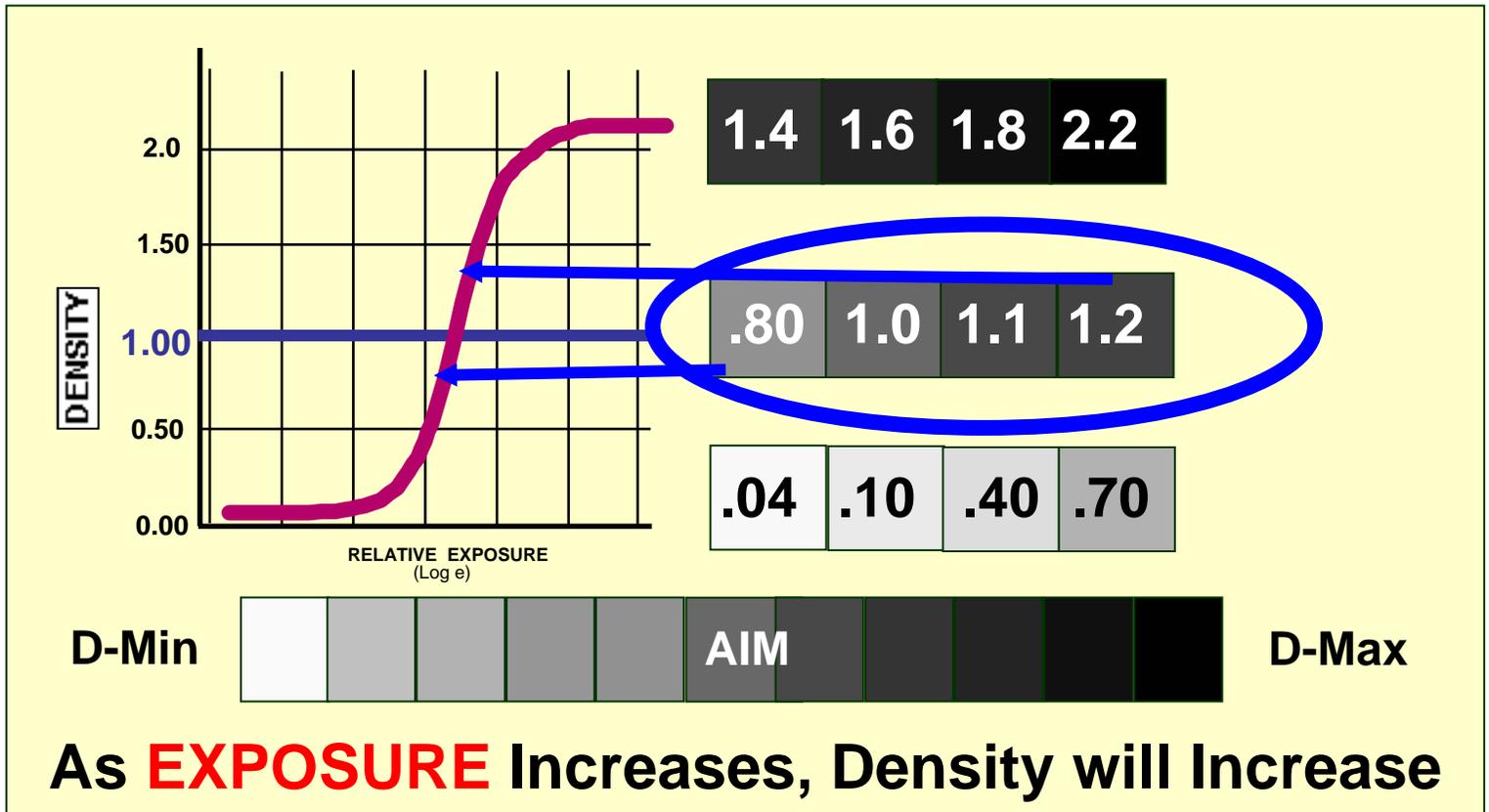


The Characteristic Curve

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Exposure VS. Density



Shown above is the approximate document density range of .75 to 1.30. Typically, this is where micrographic documents fall (See diagram below). In the center of the curve is the 1.00 density. In Source Document microfilming, the **D-Min** and the **Reference Density AIM** are the two most important areas. A correct **D-Min** (.03 to .06) assures us that the clear areas of the film are clear enough to provide sufficient contrast between the images and the background. The correct **Reference Density AIM** (closest to 1.00) assures us that the black areas are black enough.

These density ranges are the rule of thumb for typical source documents exposed on rotary and planetary cameras and film writers. Of course, this rule of thumb may be superseded by other entities that may have their own density specifications.

Document Density Aim Points:

Kodak microfilms are capable of providing extremely high-contrast images for a wide variety of documents. Documents of various contrast levels and color schemes can be successfully recorded by attaining proper density levels (level of contrast between text and background). Proper density levels are achieved by varying the amount of exposure used during the filming step.

Group	Documents	Density Aim
1	High-quality business documents, books, black type face	1.0 - 1.3
2	Pencil and ink drawings, faded and very small print, newspapers and scenic checks	.90 - 1.10
3	Low-contrast manuscripts, drawings, fine colored lines, letters on worn, old, discolored paper	.80 - 1.0
4	Very low-contrast documents, faded text, very thin lines. Worst case colored documents	.75 - .85

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Categorizes documents into 4 groups, relative to contrast and quality.