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Available Color Aerial Photographic Materials

AS PART OF the work of the Color Committee of the American Society of Photogrammetry, a list has been compiled of the color aerial photographic materials available in North America, along with descriptions of some of their characteristics. It was believed that such data would be helpful to the members in the selection of films and papers for particular applications. Because such a list can reflect only current availability, plans will be made to update it periodically if its usefulness is confirmed.

Letters were written to ten film manufacturers throughout the world, describing the project and asking if they would supply data on any of their photographic products that were available in North America for color aerial photography. The data requested included a brief description of each product, the sizes available, recommended storage conditions, base material thickness, backing characteristics, ANS Effective Aerial Film Speed, resolving power, granularity, MTF, reciprocity, sensitometry, and processing data. A positive indication of whether each manufacturer did or did not have such products was obtained, and data were supplied by those who had suitable materials.

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Not all the data requested were available, but those received were tabulated. This approach produced some blank spaces in the resulting chart (Table 1), and these were later filled as far as possible by the individual manufacturers. The addition of such data has resulted in the accompanying chart, which represents the data currently available.

A comparison of the headings on the chart to the list of data originally requested shows that information that cannot be readily presented in tabular form is missing. This includes such items as sensitometric characteristics, reciprocity curves, and MTF. In many instances, these data were not available, but there was also some reluctance to have them included because the differences in measurement equipment and techniques at the various manufacturers would tend to invalidate direct comparisons. This argument also applies to some of the data included, and thus caution should be exercised in making direct comparisons between the products of different manufacturers, as is indicated by Footnote No. 1.

The chart does, nevertheless, give a good list of the products available, a general description of their characteristics, and enough specific information so that at least a preliminary selection for a given project can be made. More detailed information, if needed, may then be obtained from the manufacturer.

Footnotes for table on next page:

1. Data are supplied by the manufacturers, and thus may not be comparable from one manuacturer to another due to different equipment and conditions under which the measurements were made. The data for some special order products may represent averages for relatively few coatings but are the best currently available.
2. Aerial Film Speeds and Effective Aerial Film Speeds are for use with the new KODAK Aerial Exposure Computer, Kodak Publication No. R-10 (12/70 edition) in determining the correct camera exposure for aerial (air-to-ground) photography. Aerial Film Speeds and Effective Aerial Film Speeds are not equivalent to, and should not be confused with, conventional film speeds used in pictorial photography. Aerial Film Speed as defined in ANSI Standard PH2.34-1969 for black-and-white negative aerial film is 3/2E; E is the exposure (in meter-candle-seconds) at the point on the characteristic curve where the density is 0.3 above gross fog. Effective Aerial Film Speeds are values determined for films, such as infrared-sensitive and color, and films not processed under the conditions specified in the Standard. All the speed values given on this chart were obtained by rounding the calculated values to the nearest $\sqrt[3]{2}$ step (equivalent to 1/3 f-stop).
3. Some coatings of this film have been manufactured with a clear-gel backing and a nominal total film thickness of 5.1 mils.
4. With a KODAK WRATTEN Filter No. 12.
5. SO-397 Film can be exposed at 2 times the normal Effective Aerial Film Speed with very little loss in image quality if processing is "pushed" or "forced" in the KODAK EKTACHROME RT Processor, Model 1811 (modified).
6. Information on processing, and the literature listed can be obtained from the manufacturers.
7. Suggested trial exposure. Generally several filters are required, the specific ones depending on the product.

TABLE 1. AVAILABLE COLOR AERIAL PHOTOGRAPHIC MATERIALS

Film (Camera)	*Film Number*	*Description*	*Type*	*Base Thick (mils)*	*Base Type*	*Base Back*
AGFA AVIPHOT Color	CN	Unmasked color negative film of medium speed	Neg	4	Acetate	Clea Gel
AGFA AVIPHOT Chrome	CT	Color-reversal high-speed film	Pos	4	Acetate	Clea Gel
KODAK AEROCOLOR Negative (ESTAR Base)	2445	High-speed, color-negative film for mapping and reconnaissance	Neg	4	Polyester	Fast Dryi
KODAK EKTACHROME MS AERO GRAPHIC (ESTAR Base)	2448	Color reversal film for low-to-medium altitude aerial mapping and reconnaissance	Pos	4	Polyester	Fast Dryi
KODAK AEROCHROME Infrared (ESTAR Base)	2443	False-color for vegetation surveys and camouflage detection	Pos	4	Polyester	Fast Dryi
KODAK AEROCHROME Infrared (ESTAR Thin Base)	3443	False-color; high spool capacity and minimum storage space	Pos	2.5	Polyester	Clea Gel
KODAK High Definition AERO CHROME Infrared (ESTAR Base)	SO-131	Slow-speed, high-resolution, false-color, reversal film for high-altitude reconnaissance	Pos	2.5	Polyester	Clea Gel
KODAK Water-Penetration Color (ESTAR Base)	SO-224	High-speed, two-color reversal film for water-penetration photography	Pos	4	Polyester	Fast Dry
KODAK Aerial Color (ESTAR Thin Base)	SO-242	Slow-speed, high-resolution film for high-altitude reconnaissance	Pos	2.5	Polyester	Clea Gel
KODAK Aerial Color (ESTAR Ultra-Thin Base)	SO-255	Similar to SO-242; ultra-thin base for maximum spool capacity	Pos	1.5	Polyester	Clea Gel
KODAK EKTACHROME EF AERO GRAPHIC (ESTAR Base)	SO-397	High-speed, color-reversal film for aerial mapping and reconnaissance	Pos	4	Polyester	Fast Dry
Film (Duplicating and Printing)						
AGFA DUPLICHROME	D 13	Cut sheet color-reversal duplicating film	Pos	7	Acetate	Gel
CIBACHROME — Transparent Type D	661	Dye-Bleach reversal film for duplicating aerial transparencies	Pos	7	Polyester	Slig Mat Gel
KODAK AEROCHROME Duplicating (ESTAR Base)	2447	Low-contrast, color-reversal film for making duplicate transparencies	Pos	4	Polyester	Fas Dry
KODAK EKTACOLOR Print (ESTAR Thick Base)	4109	Cut sheets for making color aerial diapositives from 2445 film	Neg	7	Polyester	Cle Gel
Reflection Print Materials						
AGFACOLORPAPER RC	310	Rolls and sheets for making paper prints from color negatives				
CIBACHROME-Print CCP-D	182	Rolls and sheets for making reflection prints from color transparencies	Pos	8	Acetate	Ma Gel
KODAK EKTACOLOR 37 RC Paper		Rolls and sheets for making paper prints from color negatives	Neg		RC Paper	
KODAK EKTACHROME RC Paper		Rolls and sheets for making paper prints from color positive transparencies	Pos		RC Paper	

TABLE 1 *(Continued)*

Illuminant	*Aerial*[1] *Exposure Index*	*Effective*[1] *Aerial*[2] *Film Speed*	*Resolving*[1] *Power* *1000:1*	*1.6:1*	*Granularity*[1]	*Process*[6]	*Literature*[6]
Daylight			80	40		CN	Agfa-Gevaert Trade Publications
Daylight			80	40		CU	"
Daylight	32	100	80	40	13	AERO-NEG Color	M-70, M-29
Daylight	6	32	80	40	12	EA-5	M-29
Daylight	10[4]	40[4]	63	32	17	EA-5	M-69, M-29
Daylight	10[4]	40[4]	63	32	17	EA-5	M-69, M-29
Daylight		6	160	50	9	ME-4 (Modified), EA-5	
Daylight		40	125	50	24	EA-5	M-126
Daylight	2	6	200	100	11	ME-4 (Modified), EA-5	M-74
Daylight	2	6	200	100	11	ME-4 (Modified), EA-5	M-74
Daylight	12[5]	64[5]	80	40	13	EA-5	M-78
	Exposure						
3200°K	10 sec at 2 ft CNDL[7]		100			P-10	CDPO1-6/72
3000°K	3 sec at 3 ft CNDL[7]		125	63	8	EA-5	M-72
3200°K	10 sec at 1 ft CNDL[7]		125	63	16	C-22	
						85	
3200°K	10 sec at 1 ft CNDL[7]		41			P-10	Tech Data Booklet No. 23
						EKTAPRINT 300 Chemicals	
						EKTAPRINT 300 Chemicals	
						EKTAPRINT R-5 Chemicals	
						EKTAPRINT RD Chemicals	

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