

PRODUCT INFORMATION BULLETIN

COLOR REVERSAL FILMS

FUJICHROME Sensia 100 [RA]

1. FEATURES AND USES

FUJICHROME Sensia 100 [RA] is an ISO 100 daylight-type color reversal film. This film boasts smooth and rich tone reproduction, the world's highest level of RMS* granularity 8, and natural and faithful color reproduction. These features make Sensia 100 a well-rounded film suitable for a wide range of uses and subjects, such as scenery, portraiture and snapshot photography. It is also ideal for producing FUJICHROME RP prints, laser prints and other kinds of color prints.

Features

- Smooth, Rich Tone Reproduction**
 - Gradation with superb linearity, from the highlights to the shadows, for accurate renditions of skin and other fine textures
- Natural and Faithful Color Reproduction**
 - MCCL (Multi-Color-Correction Layer) technology and new color materials allowing colors (especially skin tones) to be naturally and faithfully reproduced, from subtle pastels to vivid primary colors
- Super-fine Grain**
 - RMS granularity of 8, one of the finest level for a reversal film, delivering superb results in large-scale enlargements or projections
- Improved Color Image Stability**
 - New couplers incorporated for sharply improved color image stability (anti-fading characteristics) compared with existing reversal films
- Excellent Light Source Suitability**
 - Minimum color bias when shooting under mixed light sources or fluorescent light, sharply reducing the need for correction filters in comparison with existing reversal films, or eliminating the need for filters altogether (depending on the scene)

* RMS stands for "Root Mean Square", a widely used standard method for measuring the degree of grain in photographic film. The lower the RMS number, the smaller the apparent grain.

2. SPEED

Light Source	Speed	Filter
Daylight	ISO 100/21°	None
Tungsten Lamps (3200K)	ISO 32/16**	No.80A** (LBB-12***)

* Indicates the effective speed resulting from designated filter use.

** Wratten Filter

*** Fuji Light Balancing Filter (not available in certain markets.)

3. FILM SIZES, EMULSION NUMBER, BASE MATERIAL AND THICKNESS

Sizes	Emulsion Number
Rolls: 135 24-exp. 36-exp. 36-exp. (2-roll, 3-roll, 5-roll and 20-roll packs)	#651 -

Base Material Cellulose Triacetate

Base Thickness .. 127 mm

4. EXPOSURE GUIDE FOR VARIOUS LIGHT CONDITIONS

Use a meter for exposure determination. If a meter is not available, refer to the following table.

Light Conditions	Seashore or Snow Scenes under Bright Sun	Bright Sunlight	Hazy Sunlight	Cloudy Bright	Cloudy Day or Open Shade
Lens Aperture	f/16	f/11	f/8	f/5.6	f/4

(Exposure time: 1/250 sec.)

NOTES

- The foregoing settings are for 2 hours after sunrise and 2 hours before sunset.
- Provide a lens opening 1/2-stop smaller during the summer and 1/2-stop larger during the winter (except for snow scenes).
- Excessively bright (or dark) or backlighted subjects may require plus (or minus) 1-stop lens opening adjustments.

Daylight

Under normal daylight conditions, color balancing filters are not necessary, but the following exposure conditions may require the indicated filters.

- A UV filter No. 2C* (SC-39 or SC-40)** or other appropriate ultraviolet absorbing filter is recommended for scenes that are shone upon by strong ultraviolet light, such as seaside locations, snow scenes, and bright distant views.
- Excessively high or low color temperatures may require the following filters and exposure corrections.

Subject Conditions	Filter	Exposure Correction
<u>High Color Temperature:</u> Cloudy weather landscapes or portraits in open shade in clear weather.	No.81A* (LBA-2)***	+1/3 stop****
<u>Low Color Temperature:</u> Morning and evening twilight scenes and portraits.	No.82A* or No.82C* (LBB-2 or LBB-4)***	+1/3 to +2/3 stop****

* Wratten Filter

** Fuji Sharp-cut Filter

*** Fuji Light Balancing Filter (not available in certain markets.)

**** A "+" followed by a number indicates the required increase in lens opening.

Electronic Flash

- Electronic flash produces light similar to daylight, so filters are not needed. However, the possibility of undesirable effects on color balance, due to various factors (differences in equipment, use duration, etc.) should be taken into consideration. Test exposures are recommended.
- The use of a flash meter is advisable, but the following formula can also be used to obtain a satisfactory lens opening.

$$\text{Aperture (F-number)} = \frac{\text{Lens Electronic Flash Guide Number (at ISO 100)}}{\text{Electronic Flash-to-Subject Distance (meters or feet)}}$$

- Set the film speed at ISO 100. Since the amount of light reflected onto the subject from surrounding surfaces will differ with the conditions, refer to the flash unit instructions.

Daylight Photoflood / Photo-Reflector Lamps

- Daylight-type photoflood or photo-reflector lamp output may be lower than that indicated by an exposure meter, so it is advisable to compensate for this by increasing exposure time or lens opening. Whenever possible, test exposures are recommended.
- Other factors requiring consideration when determining the exposure time are lamp configuration, use duration and line voltage, as they may affect lamp output and color balance

Fluorescent Lamps

- The use of the following combinations of color compensating filters is advisable when photographing under fluorescent lighting.
- For exacting work, however, test exposures are recommended because lamp brand and age may affect light output and color balance.

Fluorescent Lamp Type	White (W)	Daylight (D)	Cool White (CW)	Warm White (WW)
Color Compensating Filters*	10B+5M	25R	15M+5B	80C+10M
Exposure Corrections**	+1/2 stop	+1 stop	+2/3 stop	+1 stop

(Exposure time: 1/2 sec.)

* Wratten Color Compensating Filters (or Fuji Color Compensating Filters) are recommended.

** Exposure correction values when using a filter relative to unfiltered exposure results. A "+" followed by a number indicates the required increase in lens opening.

NOTES

- Use a shutter speed slower than 1/30 second.
- For shutter speeds of 2 minutes or more, exposure adjustments will be necessary to compensate for reciprocity law failure.

Tungsten Lamps

- A Wratten Filter No.80A (or Fuji Light Balancing Filter LBB-12) is required when using 3200K tungsten lighting. A 1 2/3-stop larger lens opening is also required.
- If household tungsten lighting (room lamps, etc.) constitutes the main source of illumination, in addition to the above filter a Wratten Filter No.82A (or Fuji Light Balancing Filter LBB-2) is required, plus an aperture increase of 1/3 stop (total 2 stops).

Mixed Light Sources

Under mixed light conditions, the basic filter configuration should suit the main light source. In the case of cameras with TTL metering, there is no need for additional exposure compensation for any CC filter(s) used.

5. LONG EXPOSURE COMPENSATION

No exposure correction or color balance compensation is required for exposures within a shutter speed range of 1/4000 second to 1 minute. However, for exposures of 2 minutes or longer, 'reciprocity law failure'-related color balance and exposure compensations are required.

Exposure Time	1/4000 sec. – 1 min.	2 min.	4 min.	8 min.
Color Compensating Filter	None	5B	5B	5B
Exposure Correction*		+1/3 stop	+1/2 stop	+2/3 stop

* Exposure correction values when using a filter relative to unfiltered exposure results. A "+" followed by a number indicates the required increase in the lens opening.

6. EXPOSURE PRECAUTIONS

With artificial light, such as electronic flash, photoflood, fluorescent, tungsten, high intensity discharge lamp (metal halide, sodium, mercury vapor), etc., the lamp output and color temperature may be affected by such factors as brand, age of equipment and line voltage. Reflectors and diffusers can also influence light intensity and color temperature.

7. FILM HANDLING

- Expose film before the expiration date indicated on the film package and process as soon as possible after exposure.
- When loading and unloading roll film, avoid direct sunlight. If there is no shade, shield the film from the sun with your body.
- Camera-loaded film should be exposed and processed immediately.
- At airport and other terminals, unprocessed film should be kept away from X-rays used to inspect checked-in baggage. Strong X-rays can cause fogging of unprocessed film. Always place such film in your carry-on baggage. (It is recommended that film be placed in transparent plastic bags or net bags through which the film is visible.) Film which may be subjected to multiple X-ray inspections should be removed from carry-on baggage for visual (manual) inspection instead.
- Film fogging may occur near X-ray equipment used in hospitals, factories, laboratories and other locations. Always keep film away from possible sources of radiation.

8. FILM STORAGE**Unprocessed Film**

- Storing exposed or unexposed film under hot and humid conditions may adversely affect the speed, color balance and physical properties of the film. Store film under the following conditions.
 - Short-to-medium-term Storage:
Below 15°C (59°F) (Refrigerator)
 - Long-term Storage:
Below 0°C (32°F) (Freezer)

- Building materials, finishes used on newly manufactured furniture, paints and bonding agents may produce gases which could affect photographic film. Do not store film, lightproof boxes of film, loaded cameras or film holders near these materials.
- Before use, films taken from cold storage should be allowed to stand at room temperature for over 3 hours for refrigerated film, and over 6 hours for frozen film. Opening a package/box of film that is cold may cause harmful condensation.

Processed Film

As with materials used in other products, the materials used in photographic products will change over time. Since film is usually used for the long-term recording of memorable events, as much effort as possible is made to use materials that exhibit the least amount of change over time, but the effects of light, heat, oxygen in the air, contaminating gases, humidity and mold cannot be completely avoided. It is possible, however, to minimize the change in the photographic image or base material^{*1} by maintaining the appropriate storage conditions for films, such as those used by museums and art galleries. Temperature and humidity control is the most important key to minimizing the change that occurs in film. Films stored in the dark under the following conditions^{*2} may be expected to show almost no change over time.

- Storage Period with Almost No Change:
More than 20 years, Temperature: Below 10°C,
Relative Humidity: 30% – 50%
- Storage Period with Almost No Change:
10 – 20 years, Temperature: Below 25°C,
Relative Humidity: 30% – 50%

*1 Changes in the photographic image or base material generally take the form of reduced image quality (color fading). In some cases, however, damage to the base material may be caused by chemical changes that occur in the product when placed in a closed environment under hot and humid conditions.

*2 For the conditions indicated above, a well-ventilated place is the ideal; however, since containers prevent the passage of air, it is recommended that films be removed from containers and ventilated about once a year. Ventilation should be done during seasons in which the air is dry. Color reversal film should either be mounted or inserted into sleeves.

9. PROCESSING

This film is designed for processing by Kodak Process E-6, or Fujifilm Process CR-56, etc.



10. LIGHT SOURCES FOR VIEWING

Use a standard transparency viewer, as visual responses will differ with light source quality and brightness.

11. PRINTS

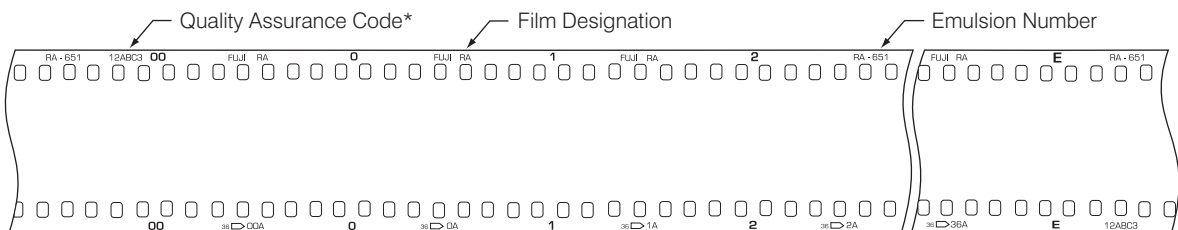
This film can produce high-quality prints when used with digital printers such as the Fuji Digital Minilab Frontier.

12. PACKAGING

Size	Item	Contents
135	Film Box	New Exclusive Design Identification Color: Violet Blue 
	Plastic Case	Same as the current product (Transparent container with a white cap).
	Cartridge	New Exclusive Design Identification Color: Violet Blue 

13. PROCESSED FILM EDGE MARKINGS

<Rolls>
• 135 Size



* This code represents an identification marking enabling Fujifilm's manufacturing quality control system to assure individual quality.

14. TECHNOLOGIES INCORPORATED IN Sensia 100

14-1 PSHC (Pure, Stable & High-performance dye-forming Coupler) Technology

The new couplers used in Sensia 100 provide it with high color purity, stability and color formation efficiency, making possible color reproduction with unprecedented fidelity and excellent image stability.

a) X-Coupler Technology:

This marks the first use in color reversal film of Fujifilm's new proprietary cyan coupler.

b) V-Coupler Technology:

New technologies have been incorporated with the V-coupler applied in Fujifilm's color papers and other products to vastly improve color reproduction and stability. The result is the new magenta coupler that is incorporated in reversal films for the first time.

c) S-Coupler Technology:

In place of the yellow coupler used in FUJICHROME films providing these films with Fujifilm's trademark color reproduction and stability, a new yellow coupler has been incorporated to further boost these characteristics to even higher levels.

Compared with existing FUJICHROME films, the X, V and S couplers have resulted in a drastic reduction in auxiliary absorptive components (which cause muddiness) and provide high color stability.

14-2 MCCL (Multi-Color-Correction Layer) Technology

Not only has the spectral sensitivity of the three light-sensitive layers (R, G, B) been optimized, "4th Color Layer (Green-Color-Correction Layer)" has been incorporated that performs the "negative spectral sensitivity" function of the human eye. Additionally, in order to enable more appropriate color reproduction with a higher level of fidelity, Sensia 100 has incorporated MCCL Technology, as an extension of "4th Color Layer Technology". This new technology has provided "Red-Color-Correction Layer (5th Color Layer)" to enable more faithful color reproduction and excellent skin tone reproduction.

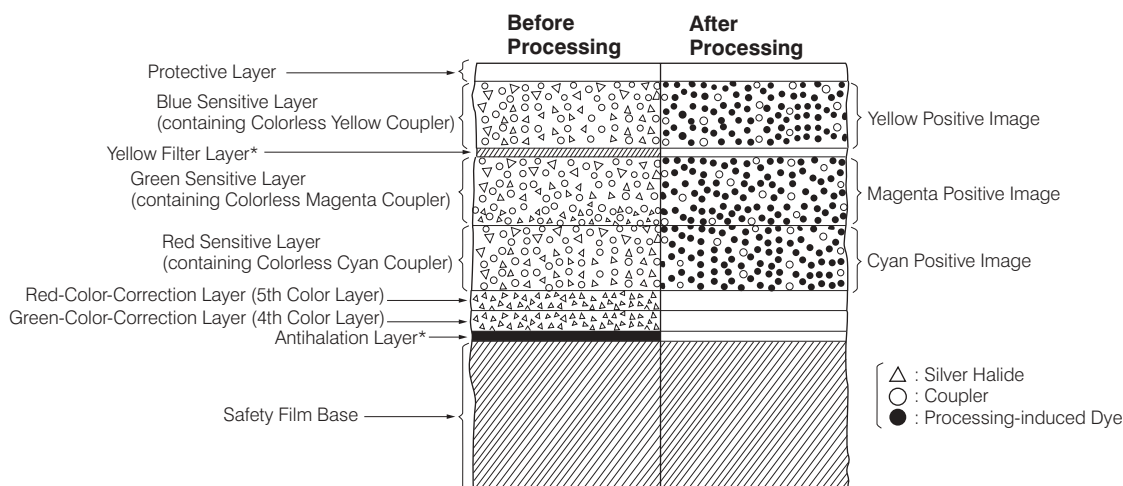
14-3 MSSC (Multi-Structured Sigma Crystal) Technology

This technology is incorporated in Sensia 100 to improve upon the highly acclaimed ultra-fine grain emulsion technology used in PROVIA 100F, resulting in the world's highest level of RMS granularity 8. This technology has greatly contributed to faithful color reproduction, and superb skin tone reproduction.

14-4 HTILE (Highly Tuned Inter-Layer Effect) Technology

With Sensia 100, clear skin tones with minimal muddiness are produced by the use of color materials of high purity. The exquisitely adjusted gradation produced by MSSC grains enable the reproduction of smooth skin textures, while the inter-layer effect, which has been precisely designed and adjusted down to the smallest of details using computer simulations, makes possible smoothness in skin tone continuity.

15. FILM STRUCTURE



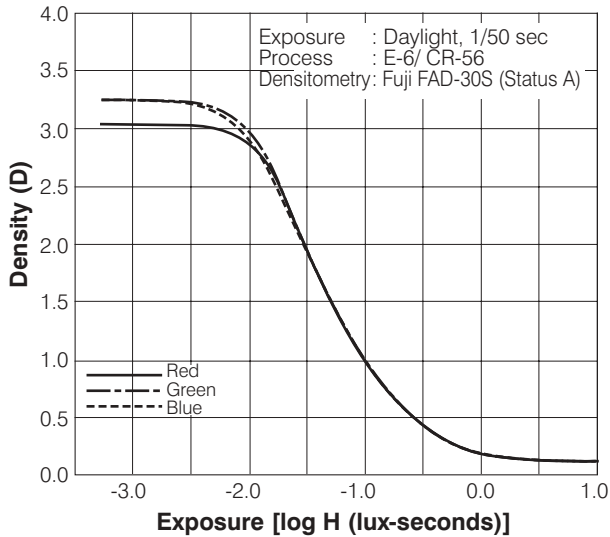
* These layers become colorless and transparent after processing.

16. DIFFUSE RMS GRANULARITY VALUE

..... 8

Read at a gross diffuse visual density of 1.0, using a 48-micrometre aperture.

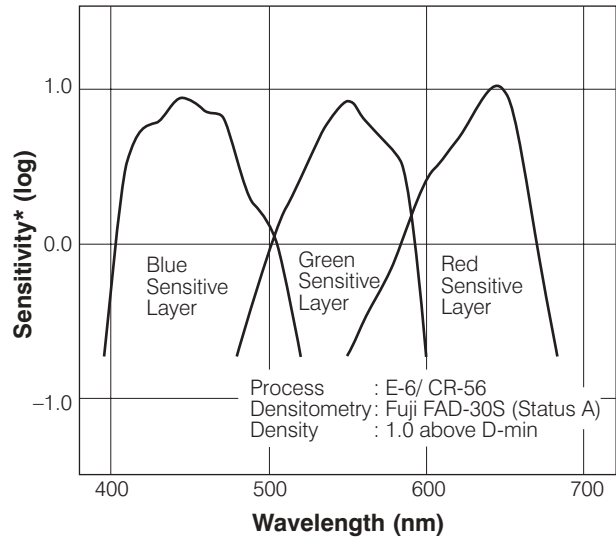
18. CHARACTERISTIC CURVES



17. RESOLVING POWER

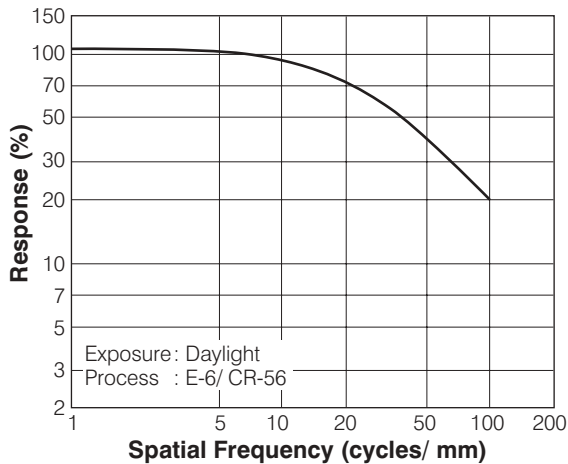
Chart Contrast 1.6 : 1 60 lines/mm
Chart Contrast 1000 : 1 140 lines/mm

19. SPECTRAL SENSITIVITY CURVES

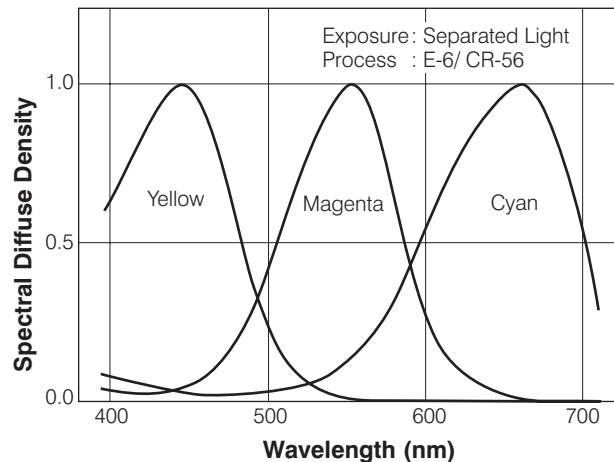


* Sensitivity equals the reciprocal of the exposure (J/cm²) required to produce a specified density.

20. MTF CURVE



21. SPECTRAL DYE DENSITY CURVES



NOTICE The data herein published were derived from materials taken from general production runs. However, as Fujifilm is constantly upgrading the quality of its products, changes in specifications may occur without prior notice.