FUJICHROME MS 100/1000 Professional [RMS]

1. FEATURES AND USES

FUJICHROME MS 100/1000 Professional [RMS] is a multi-speed daylight-type high image quality color reversal film designed to produce consistently excellent results at the normal EI 100 rating as well as when push-processed up to EI 1000 (+3 1/3 stops).
Throughout this extended range of usable speeds, photographers will encounter very little loss of gradation, color balance and color reproduction. This important feature makes possible a wide range of applications, enabling RMS to be used under almost all lighting and environmental situations. This makes it especially useful for location work of all types, where unpredictable changes in exposure conditions and great variations in light levels may take place.

Features	Results
• **Excellent Push-processing Suitability**	• Push-processing capability between EI* 100 and EI* 1000 using E-6/CR-56** processing
	• Minimal gradation and color balance changes, creating a flexible exposure range and broadened application
• **Good Grain Quality and Sharpness**	• Minimal losses in grain quality and sharpness from push-processing
	• Highest quality images at EI 100 (normal) and, even when push-processed, fine results not possible before with ISO 200 or faster high-speed film
• **Excellent Color Reproduction**	• Faithfully reproduced colors with no loss of color hues and saturation which occur through push-processing

* EI = Exposure Index and exposure meters should be set to the EI being used.
** CR-56 is Fujifilm's equivalent to the E-6 process.

2. EXPOSURE INDEX AND PROCESSING REQUIREMENTS

Exposure indices shown below are for setting standard exposure meters (hand or built-in the camera) to the desired ISO rating. Push-process codes and development times are also indicated.

Light Sources	Daylight	Tungsten Lamps (3200K)	**E-6/CR-56 Push-Process Code**	**Recommended First Developer Processing Times (minutes)**
Filter	Not required	No.80A** (or LBB-12***)		
Exposure Index (EI)	100/21° 200/24° 400/27° 800/30° 1000/31°	32/16°* 64/19°* 125/22°* 250/25°* 320/26°*	N P-1 P-2 P-3 P-4	6 8 11 14 15~16

* Indicates the effective speed resulting from filter use.
** Kodak Filter
*** Fuji Light Balancing Filter

- Kodak E-6 or Fuji CR-56 is used to process this film according to the EI rating employed. With P-1, P-2, P-3 and P-4 push-processing, however, certain differences in maximum densities, color balance and gradation will be seen. For precise results it is advisable that test exposures be made whenever possible.

3. NOTES ON PROCESSING SPECIFICATIONS

- Since RMS is a multi-speed film, records of the EI speed(s) used should be kept and films correctly marked before they are sent for processing. For optimum results, it is recommended that, a small amount (i.e. a roll or two) of the exposed films be test-processed before actual processing is done.
- Quality cannot be guaranteed if the film is cut, torn or subjected to other abnormal usage. In certain cases processing will not be possible.

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

	Sizes*	**Emulsion Number**
Rolls	135 ..... 36-exp. ..... 36-exp. (5-roll and 20-roll packs) 35 mm x 30.5 m (100 ft) 120 ..... 12-exp. ..... 12-exp. (5-roll packs) 220 ..... 24-exp. (5-roll packs)	#451~

* Some sizes are not available in certain markets.
Base Material ..... Cellulose Triacetate
Base Thickness ..... Rolls 135 ; 127 µm
120 ; 98 µm
220 ; 98 µm

5. EXPOSURE GUIDE AND EXPOSURE UNDER VARIOUS LIGHT CONDITIONS

Use a meter for exposure determination. If a meter is not available refer to the following table. When this film is used with cameras equipped with DX code speed setting, the rating will automatically be set to ISO 100.

Daylight Exposure/EI 400

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/11	f/11	f/8
Exposure Time (sec.)	1/1000	1/1000	1/500	1/250	1/250

NOTES
- The above settings are for 2 hours after sunrise and 2 hours before sunset.
- Provide lens openings which are 1/2 stop smaller during the summer and 1/2 stop larger during the winter.
- Excessively bright (or dark) or backlighted subjects may require as much as plus or minus 1 stop lens opening adjustments.

Low Light Exposure/EI 800

Light Conditions	Bright Daylight Indoor Scenes (under Fine Weather Conditions)	Indoor Scenes (Uner Fluorescent Light)	Stage or Show Scenes	Evening or Night Game Scenes	Night Scenes
Lens Aperture	f/2.8 to 4	f/4 to 5.6	f/2.8 to 5.6	f/2.8 to 4	f/2.8 to 4
Exposure Time (sec.)	1/125	1/30	1/60	1/125	1/60

NOTES Since light intensities for indoor scenes vary widely from location to location, the data above should be used only as a guide.

Daylight

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

Subject Conditions	Filter	Exposure Correction
Fair weather open shade and shaded landscapes.	UV Filter No. 2C* (SC39 or SC40)**	None
Bright distant scenes, snow landscapes, seaside scenes, aerial scenes and open landscapes.		
Close-ups of plants and subjects having bright colors.		

Excessively high or low subject color temperatures may require the following filter additions and exposure corrections.

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

* Kodak Filters
** Fuji Sharp-cut Filter
*** Fuji Light Balancing Filter
**** "+" followed by number = required increase in lens opening

Electronic Flash

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

$$\text{Lens Aperture (f-number)} = \frac{\text{ISO 400 Electronic Flash Guide Number}}{\text{Electronic Flash-to-Subject Distance (meters or feet)}}$$

- Set the film speed at ISO 400. Since the amount of light reflected onto the subject from surrounding surfaces will differ with the conditions, refer to flash unit instructions.

Daylight Photoflood/Photo-Reflector Lamps

- Daylight-type photoflood or photo-reflector lamp output tends to be lower than that indicated by an exposure meter, so it is advisable to compensate for this by increasing exposure time or the 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 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 make and age may affect light output and color balance.

(Exposure Time: 1/4 second)

Fluorescent Lamp Type	White (W)	Daylight (D)	Cool White (C.W)	Warm White (W.W)
Color Compensating Filters*	15M+20B	35R	30M	No. 80B
Exposure Corrections**	+1 stop	+1 stop	+2/3 stop	+1 1/3 stop

* Kodak Color Compensating Filters (or Fuji CC Filters) recommended.
** Exposure correction values include filter exposure factors. These values are added to unfiltered exposure meter reading. "+" followed by number = required increase in lens opening.

NOTES
- Use 1/30th or slower shutter speeds.
- For shutter speeds longer than 64 seconds, exposure adjustments will be necessary to compensate for reciprocity failure.

Tungsten Lamps

- A Kodak filter No. 80A (or Fuji Light Balancing Filter LBB-12) is recommended along with a 1 2/3 lens stop increase, when using 3200K tungsten lighting.
- If household tungsten lighting (room lamps, etc.) constitutes the main source of illumination, in addition to the above filter a Kodak filter No. 82A (or Fiji 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, derive the basic filter configuration to suit the main light source.

6. LONG AND MULTIPLE EXPOSURE COMPENSATIONS

No exposure or color balance compensation is required for exposures within a 1/4000 to 32 seconds shutter speed range. However for exposures of 64 seconds or longer, reciprocity-failure related color balance and exposure compensations are required.

Exposure Time	1/4000 to 32 sec.	64 sec.	2 min.	8 min.
Color Compensating Filters	None	None	None	Not Recommended
Exposure Corrections*		+ 1/3 stop	+ 1/2 stop	

Multiple Exposures

Make the following color and exposure compensations for electronic flash multiple exposures.

Number of Flashes	1	2	4	8
Color Compensating Filters	—	None		2.5Y
Exposure Corrections*	—			+ 1/3 stop

* Exposure correction values include filter exposure factors. These values are added to unfiltered exposure meter readings. "+" followed by number = required increase in lens opening.

7. EXPOSURE PRECAUTIONS

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

8. FILM HANDLING

- Expose film before the expiration date indicated on the film package and process promptly after exposure.
- When loading and unloading roll film avoid direct sunlight. If there is no shade, turning one's back toward the sun will shade the film.
- X-ray equipment, used to inspect carry-on baggage at airport terminals, can cause film fogging. Repeated inspections increase this possibility, so both exposed and unexposed films should be removed for manual inspection.
- 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.

9. FILM STORAGE

Unprocessed Film

- Storing exposed or unexposed film under high temperature and humidity conditions will cause adverse speed, color balance and physical property changes. 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 and bonding agents may produce gases which affect photographic film. Do not store film, lightproof boxes of film, loaded cameras or film holders under these conditions.
- Before use, allow films to stand at room-temperature; over 3 hours for refrigerated film, and over 6 hours for frozen film. Long rolls such as 100 feet (30.5m) will require additional time. Opening the package/ box while film is cold may cause harmful condensation.

Processed Film

- Exposure to light, high temperature and humidity can cause color changes in processed films. Therefore, place such films in mounts or sleeves and store in dark, dry cool and well ventilated locations under the following conditions.

○ Medium-term Storage:
Below 25°C (77°F) at 30 to 60% RH
○ Long-term Storage:
Below 10°C (50°F) at 30 to 50% RH

NOTE As with all color dyes, those used in this film will discolor or fade with time.

10. VIEWING LIGHT SOURCES

Use a standard viewer. Visual responses will differ with light source quality and brightness. Therefore, employ a viewer which meets the ISO/ANSI standard.

- The ISO standard (ISO/DP3664-2) specifies an illuminated viewing surface with a color temperature derived from a CIE illuminant D_{50} (D:Daylight) with a reciprocal color temperature of 5000K, an average brightness of 1400cd/m^2 ± 300cd/m^2, a brightness uniformity of more then 75%, a light diffusion level of more than 90% and average color rendition assessment value of more than Ra90. Transparency viewers should meet these standards.

11. PRINTS AND DUPLICATES

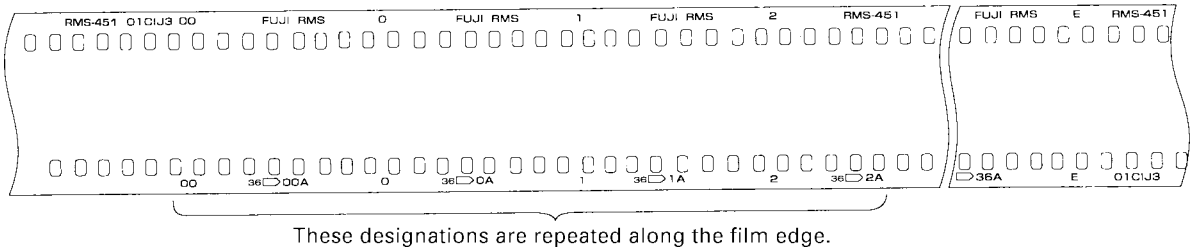
Processed transparencies can be made into prints using FUJICHROME PAPER TYPE 35 or FUJICOLOR INTERNEGATIVE FILM IT-N, thus greatly increasing its versatility. High-quality duplicates can be made on FUJICHROME DUPLICATING FILM CDU TYPE II.

12. RETOUCHING

Changes in density and color balance can be made by using readily available retouching dyes and bleaching chemicals.

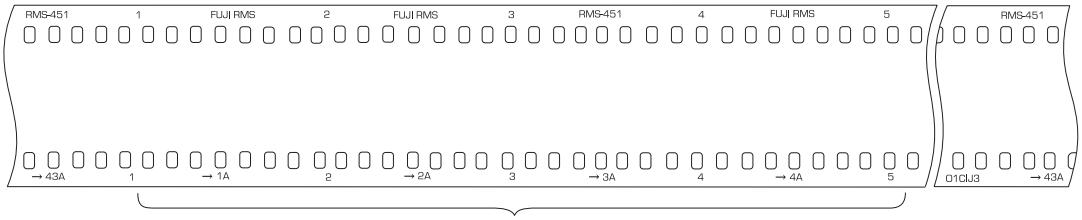
13. PROCESSED FILM EDGE MARKINGS*

<Rolls>
135 Size



These designations are repeated along the film edge.

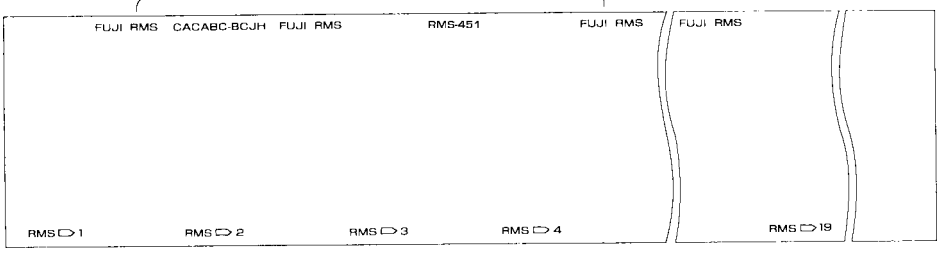
35 mm x 30.5 m (100 ft)



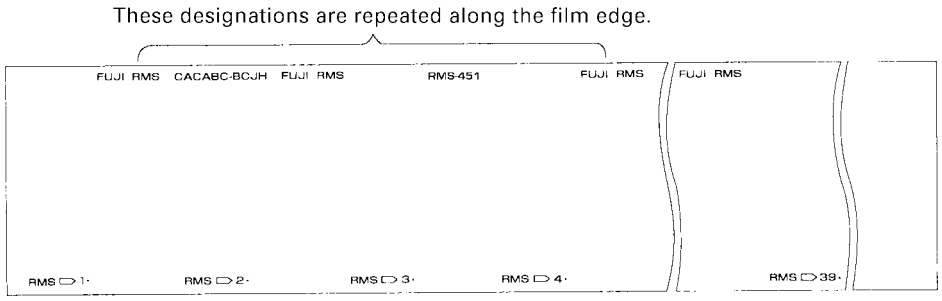
These designations are repeated along the film edge.

120 Size

These designations are repeated along the film edge.

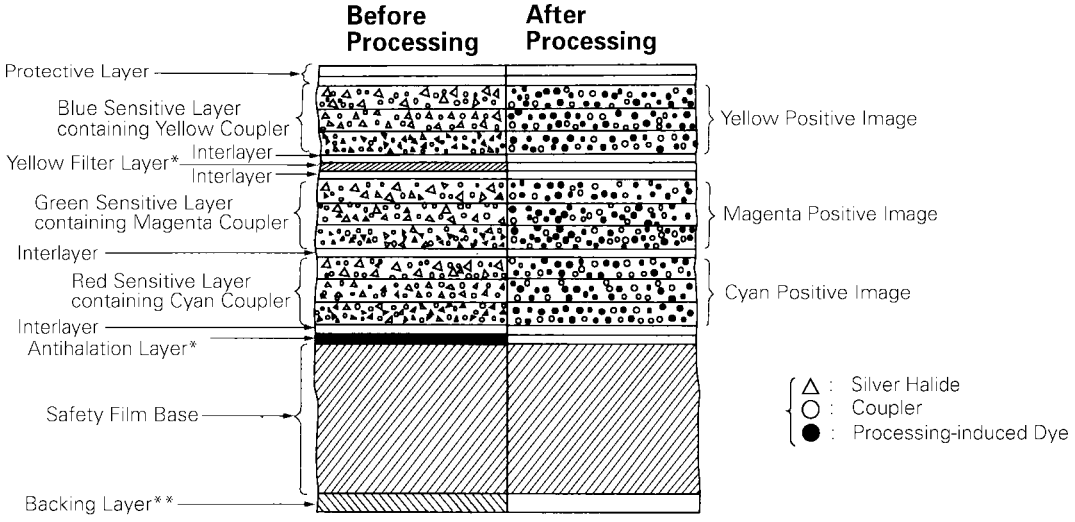


220 Size



* The emulsion is on the opposite side. (Base side facing you)

14. FILM STRUCTURE



* These layers become colorless and transparent after processing.
** The backing layer is colorless and transparent after processing, but it is not provided with 135 size film.

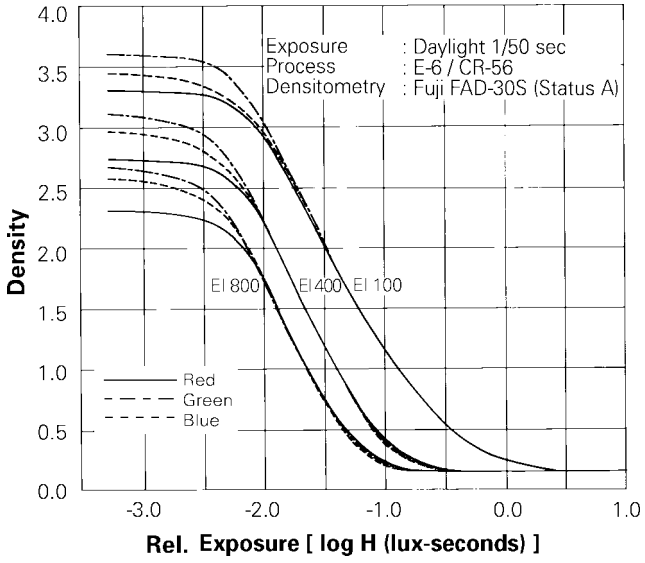
15. DIFFUSE RMS GRANULARITY VALUE

EI 100 .....**10**
EI 200 .....**11**
EI 400 .....**13**
EI 800 .....**15**
EI 1000 .....**16**
Micro-densitometer Measurement Aperture: 48µm in diameter
Sample Density: 1.0 above minimum density

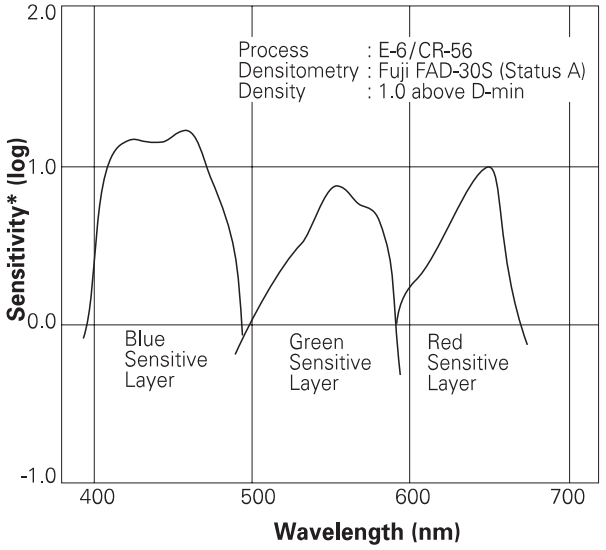
16. RESOLVING POWER

○ Chart Contrast 1.6 : 1 ..... **55** lines/mm (EI100 – EI1000)
○ Chart Contrast 1000 : 1 .....**135** lines/mm (EI100 – EI1000)

17. CHARACTERISTIC CURVES

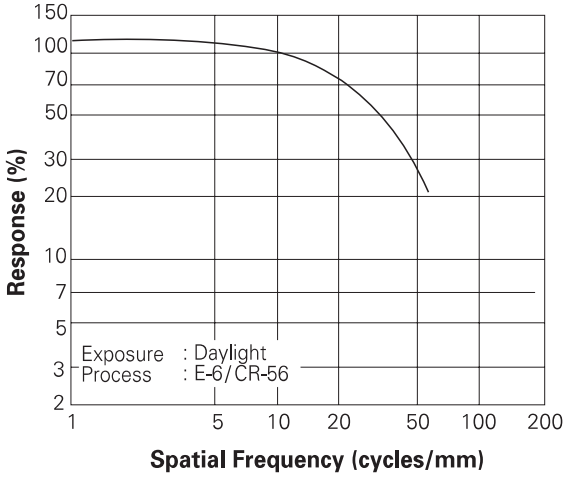


18. SPECTRAL SENSITIVITY CURVES

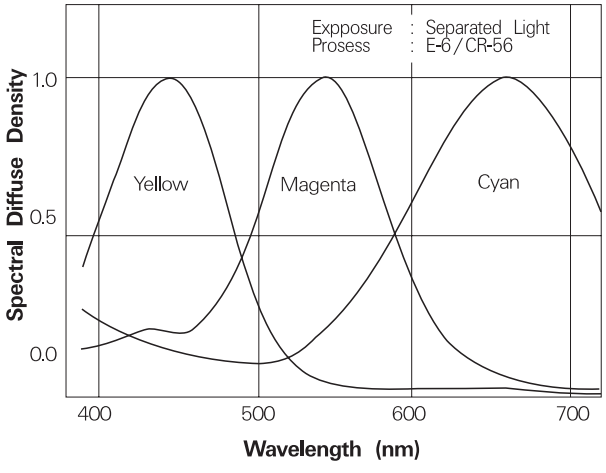


* Sensitivity equals the reciprocal of the exposure (ergs/cm²) required to produce a specified density.

19. MTF CURVE



20. 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 notice.

FUJIFILM
FUJI PHOTO FILM CO., LTD.
26-30, Nishiazabu 2-chome, Minato-ku, Tokyo 106-8620, Japan
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