

FUJI MEDICAL X-RAY FILM  
 SUPER HR-S<sub>30</sub>

SUPER HR-S<sub>30</sub> is an orthochromatic, green sensitive, medical X-ray film that provides high speed and medium to high contrast with super-high resolution when used in conjunction with green-emitting rare-earth screens. This conventional screen-film should only be used in combination with green-emitting screens and the final image density of the processed film depends on the exposure and processing conditions.

This super-high resolution has been made a reality through the judicious combination of  $\Sigma$  (Sigma)-LIC Grain Technology, an improved version of  $\Sigma$  Grain Technology employed in the current HR-series, and the newly developed Cross-over Control Technology. The two technologies are integrated so harmoniously that together they cut much of the crossover light which causes image blur.

#### $\Sigma$ -LIC (Localized Image Centers) Grain Technology

- a)  $\Sigma$ -LIC Grain Technology is a further improvement on Fujifilm's original  $\Sigma$  Grain Technology. It has done much to increase the fluorescent light absorption efficiency, for it allows the spectral sensitizing dyes to be profusely adsorbed onto the surfaces of the silver halide crystals with large hexagonal surfaces incorporating  $\Sigma$ -shaped edges.
- b) Latent images are localized in the edges of the apexes which the hexagonal flat particles retain in the corners so that absorbed light utilization efficiency is substantially increased. Further, the latent images so formed are stabler and more intense than those obtainable with current materials.  
As a result, when compared to the current  $\Sigma$  grain, higher speed and greater processing stability have been achieved without increasing the particle size. The increase in speed has made it possible to incorporate the Cross-over Control Technology in this new medical X-ray film.

#### Cross-over Control Technology

This technology consists of incorporating Fujifilm's original ultra-thin light absorption layer between the emulsion layer and the film base. This highly light-absorbing layer cuts image-blurring crossover light significantly.

#### Blue Tint Image Control Technology

By the adoption of this technology, SUPER HR-S<sub>30</sub> can offer clear image.

Further, the SUPER HR-S<sub>30</sub> film provides excellent antistatic properties and remarkable surface smoothness. Therefore, reliable transport is ensured in a variety of film handling systems including chest changers, cassetteless tables, and rapid film changers. Processing is accomplished in sub-90 second, 90 second, and 3-1/2 minute processors, or manually.

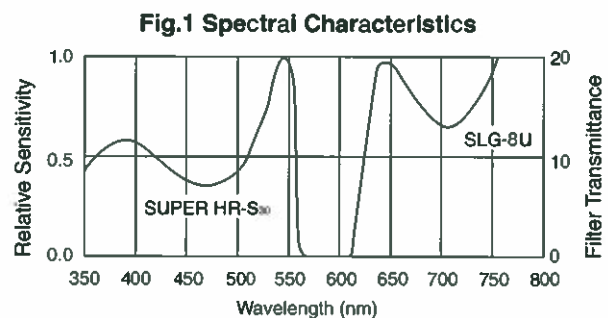
The SUPER HR-S<sub>30</sub> film offers the following special features :

1. High resolution, high contrast, and low fog.
2. High clarity images with bluer tint.
3. High processing stability (minimized contrast variation with developer temperature changes).
4. Resistance to decreased density kink marks.
5. Transport reliability (excellent antistatic and surface smoothness characteristics).
6. Consistently high quality.

## PHOTOGRAPHIC AND PHYSICAL CHARACTERISTICS

### Spectral Characteristics

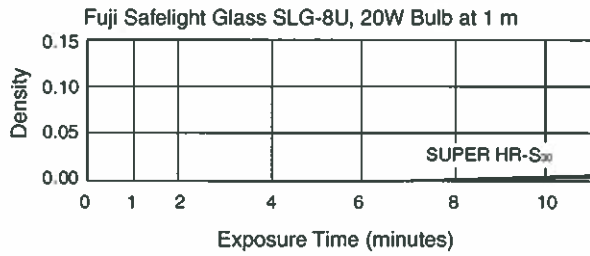
SUPER HR-S<sub>30</sub> film produces a spectral sensitivity distribution pattern having two peaks, one which is characteristic of a silver halide sensitivity (at 380 nm) and the other characteristic of an orthochromatic color sensitization (at 540 nm). These peaks coincide with the emission spectra of green-emitting screens, thus accounting for the high speed and excellent image quality.



**Safelight Safety**

SUPER HR-S<sub>30</sub> film tolerates high safelight illumination levels despite its high speed. It can be handled especially safely under Fuji Safelight Glass SLG-8U (refer to Fig. 1), or equivalent.

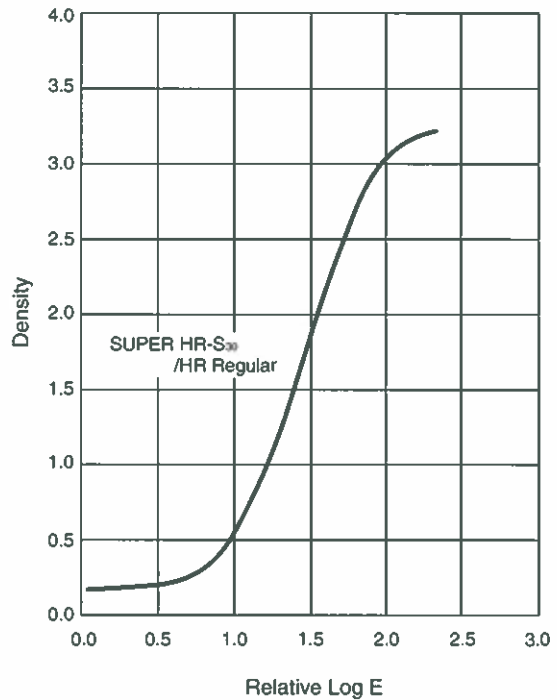
**Fig. 2 Safelight Tolerances**



**Sensitometric Characteristics**

Figure 3 designates the SUPER HR-S<sub>30</sub> characteristic curve and values obtained from 90 second processing.

**Fig. 3 Characteristic Curve**

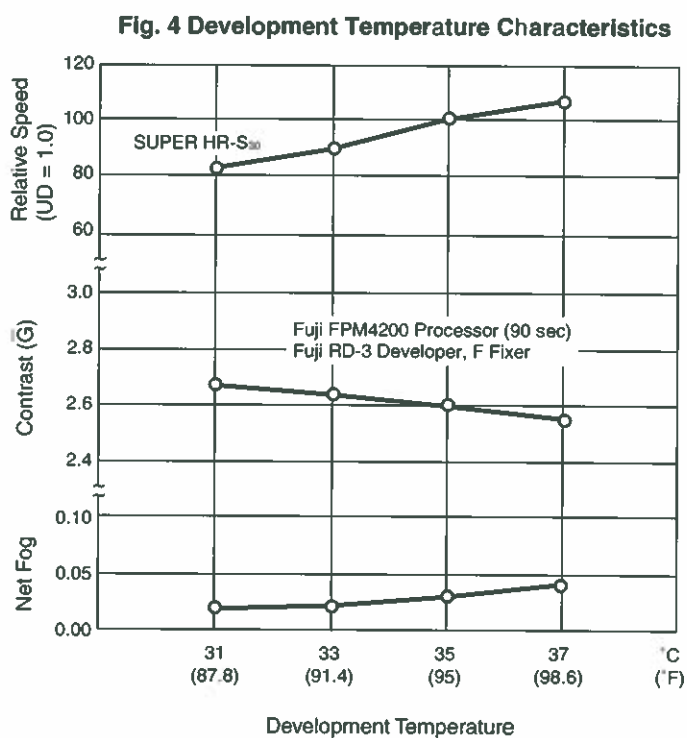


Rare-earth Screen	HR Fine	HR Medium	HR Medium Plus	HR Regular	HR Fast
Film	SUPER HR-S <sub>30</sub>	SUPER HR-S <sub>30</sub>	SUPER HR-S <sub>30</sub>	SUPER HR-S <sub>30</sub>	SUPER HR-S <sub>30</sub>
Relative Speed (UD=1.0)	120	200	300	400	600
$\bar{G}$	2.6	2.6	2.6	2.6	2.6
Net Fog	0.03	0.03	0.03	0.03	0.03

X-ray Sensitometry,  
 100 mm H<sub>2</sub>O Phantom, 80 kVp, 50 mA, 0.10 sec  
 Fuji FPM4200 Processor  
 Fuji RD-3 Developer at 35°C (95°F), F Fixer ; 90 second Processing

**Development Temperature Characteristics**

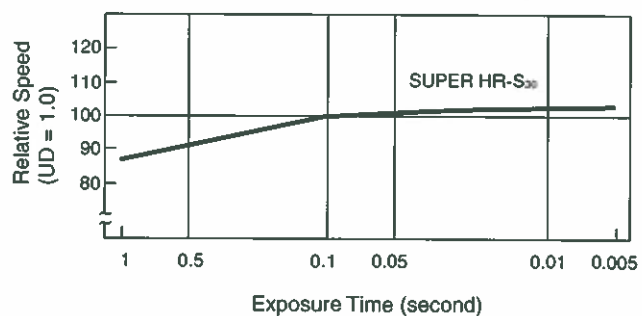
The 90 second processing derived development temperature variability characteristics for SUPER HR-S<sub>30</sub> film are indicated in Figure 4.

**Reciprocity Characteristics**

In screen radiography, exposure times vary greatly from the brief exposures used for chest and circulatory system studies to the prolonged exposures used in tomography. To allow for such wide exposure variations, reciprocity failure is minimized in SUPER HR-S<sub>30</sub> film. Therefore, high stability is provided under a wide variety of exposure conditions.

**Fig. 5 Reciprocity Characteristics**

Fuji FPM4200 processor (90 sec), Fuji RD-3 Developer at 35°C(95°F), F Fixer

**Base and Emulsion Layer Thickness**

The SUPER HR-S<sub>30</sub> film base material is blue-tinted 175  $\mu\text{m}$  polyester with an emulsion layer thickness of about 5  $\mu\text{m}$ .

**Storage and Handling**

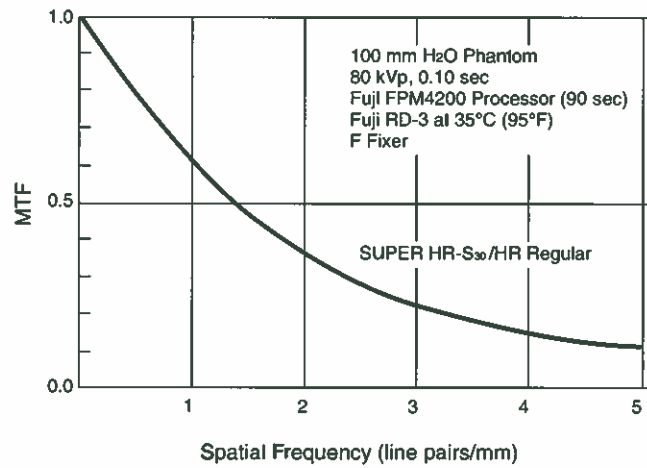
Store and handle film at 10 to 23°C, at 30 to 60%RH and properly shielded from X-rays, gamma rays or other penetrating radiations.

### IMAGE STRUCTURE CHARACTERISTICS

#### Sharpness

Figure 6 indicates image sharpness in MTF (Modulation Transfer Function) terms. In this case, the higher values designate better image sharpness.

Fig. 6 MTF Curve

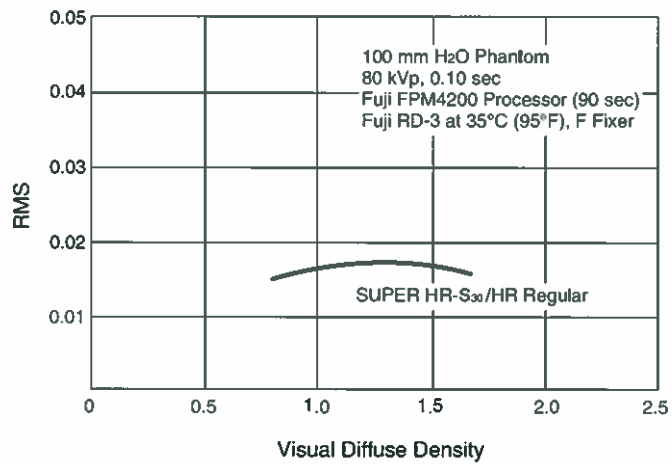


#### Granularity

Figure 7 indicates RMS (Root Mean Square)\* granularity for SUPER HR-S<sub>30</sub> film. In this case, the higher values designate coarser granularity.

\* Deviations of the mean density per unit area.

Fig. 7 RMS Granularity Curve



### SYMBOLS AND ABBREVIATIONS



Batch code



Expiry (Use by)

**NIF**

Non Interleaved Film



Store film at 10 to 23°C, at 30 to 60%RH



Store film properly shielded from X-rays, gamma rays or other penetrating radiations and the direct sun.

**REF**

Reference to the film ID number

**FUJIFILM**

**FUJI PHOTO FILM CO., LTD.**

26-30, Nishiazabu 2-chome, Minato-ku, Tokyo 106-8620, Japan



European Authorized Representative:  
**FUJI PHOTO FILM (Europe) GmbH**  
 Heesenstrasse 31, D-40549 Düsseldorf Germany