



SNS COLLEGE OF ALLIED HEALTH SCIENCES- COIMBATORE 35



DEPARTMENT : RADIOGRAPHY AND IMAGNG TECHNOLOGY

**SUBJECT : GENERAL PHYSICS, RADIATION PHYSICS AND PHYSICS OF
DIAGNOSTIC RADIOLOGY**

PAPER : PAPER II

TOPIC : 2.1 TYPES OF FILMS



TYPES OF FILMS



1. According to the Type of Emulsion,

- **Blue-Sensitive Films/ Monochromatic** : Blue-Sensitive films are more sensitive to the blue part of the visible spectrum. The emulsion of blue-sensitive films is more sensitive to the ultraviolet or shorter wavelengths.
- **Orthochromatic Films** : Orthochromatic films are sensitive to the green part of the visible spectrum.
- **Panchromatic Films** : Panchromatic films are sensitive to all colors of the visible spectrum.
- **Spectral Matching** : The color of the light emitted by the intensifying screen must be matched with the light sensitivity of the film is known as spectral matching. If the light spectrum does not match, there will be a significant loss of speed. Calcium Tungstate intensifying screen emits blue-violet light, so the blue-sensitive film must be used. The Rare earth intensifying screens commonly emits green light, so the green-sensitive film must be used.



TYPES OF FILMS

2. According to the Film Screen:-

- **Screen Film/ Indirect Expose Film** : The screen films are used in cassettes with intensifying screens. It reduces the patient dose and increases the film contrast. The screen films contains a thin emulsion layer that is more sensitive to light.
- **Non-Screen / Direct Exposure Films** : Non-screen films are used without a cassette and an intensifying screen. It is less sensitive to light and therefore it is used without the screens. These films have a thicker coat of emulsion and must be manually processed because of a thick emulsion. These films are used for smaller parts. It gives good contrast.
- **Example- Dental Film Intra-oral**
- Dental Film- the non-screen film is used in intra-oral radiography; it provides fine details and high-resolution images.
- **Dental Film Composition- It has three components,**
- **Film Base** : It is a transparent sheet of cellulose acetate.
- **Adhesive** : It connects the emulsion to the base.
- **Emulsion** : It is made of silver bromide (AgBr) crystals and gelatin. Most commonly, the silver halide crystals coated on both sides of the film base provide fine detail and high resolution in dental radiography.



TYPES OF FILMS



3. According to the Emulsion Layer

- **Single Coated X-ray Film :** The photosensitive emulsion is coated only on one side of the film base is called single coated or single side coated film. These films are used with a single intensifying screen.
- **Example of Single Side Coated Film,**
- **Duplicating Film:** It is a single-side emulsion film. It is used for duplicating the radiograph.
- **Mammography Film :** It is a single emulsion film and used with a single intensifying screen.
- **Photofluorography Film :** It is a single-side emulsion film. It is used in an odelca camera for mass miniature radiography.
- **Radiation Monitoring Film :** It is a single-side emulsion film. It is used in personal Radiation monitoring dosimeter.
- **Indirect Recording Film :** It is a single-side emulsion film. It is used in USG cameras, CT scan cameras etc.
- **Double Coated X-ray Film :** The photosensitive emulsion is coated on both sides of a transparent base is called double coated or double side coated film. The double-sided coated is more sensitive than single coated X-ray Film. The film is sandwiched between a pair of intensifying screens in the cassette. During the exposure, each side of the emulsion is exposed and resulting in two images that are superimposed upon each other but counted as one image. The Double side Coated X-ray Film is widely used in the radiology department.



TYPES OF FILMS



4. According to the Film Speed :

Film Speed,

- The speed of film means the amount of radiation required to produce a standard density on the film.
- The Film speed depends upon the size of the silver halide crystals and the thickness of the emulsion.
- If the crystals are larger, the film speed is faster.
- If the emulsion is coated only on one side, the film is slower, and if the emulsion is coated on both sides, the film is faster.



TYPES OF FILMS



FACTORS AFFECTING FILM SPEED

- **The Size of Crystals** : If the emulsion crystals are larger, the film speed is faster.
- **The Shape of Grains** : The shape of silver halide affects the speed. The globular grain shape of silver halide is used in blue-sensitive films, which gives higher speed, but the images are less sharper than tabular grains and tabular shape of silver halide used in green-sensitive films which gives higher speed, but the images are sharper than globular grain thus give good resolution.
- **The Thickness of Emulsion** : If the emulsion is thick, the film is faster.

TYPES OF FILMS

X-ray FILM STORAGE

- Unexposed radiographic films must be shielded from radiation.
- Films should be kept in a cool and dry place. The high temperature may spoil the film emulsion.
- Films should not be stored near the X-ray room. They tend to get foggy due to X-ray exposure.
- X-ray films are sensitive to pressure, so the films boxes should be stored in an upright position.
- The films should be kept in film-boxes, which never should be opened in daylight or white light.



EXPOSED AND UNEXPOSED FILMS

EXPOSED AND UNEXPOSED FILMS

- Unexposed X-ray film, seen in a darkroom, so as not to damage the silver compound, should be a cloudy translucent grey.
- However, as soon as it's exposed, it goes black. When an X-ray is taken, the bones show because they're the parts of the body through which X-rays cannot pass.





FILM HANDLING



HANDLING/CARE OF X-RAY FILM

- X-Ray film are packed or old is strong cardboard box.
- The lid can be removed by keeping the box in vertical position in the darkroom.
- The film are kept in hermetically sealed black polythene pouches when this is cut open films are visible under the dark room safe light along with the intensifying (leaving) paper (normally yellow coloured).
- X-Ray film is a delicate material & it should be handle carefully.
- The film should be handled always only by its edges with clean & dry hands.
- Film should be avoid touching the film surface, do not touch the film surface, with finger nails, scissor, knife & screwdrivers.
- When handling the x-ray film in processing room all white light is switched off.
- The film should be handled either in darkness or under the safe light.
- If film can not be processed at once, it should stored in a light tight container.– When loading the film in hangers for development.– They should be protected from direct light of lamp.– Improper safe light is common cause of film fog.



INTERROGATIONS



1. Types of Radiographic film
2. What is exposed and unexposed film ?
3. How you store the exposed film ?
4. X-ray Film Exposure to X-ray



REFERENCES



1. Radiographic latent image processing – W. E. J McKinney
2. Diagnostic Radiography – A concise practical Manual – Glenda J. Bryan (4th edn),
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THANK YOU