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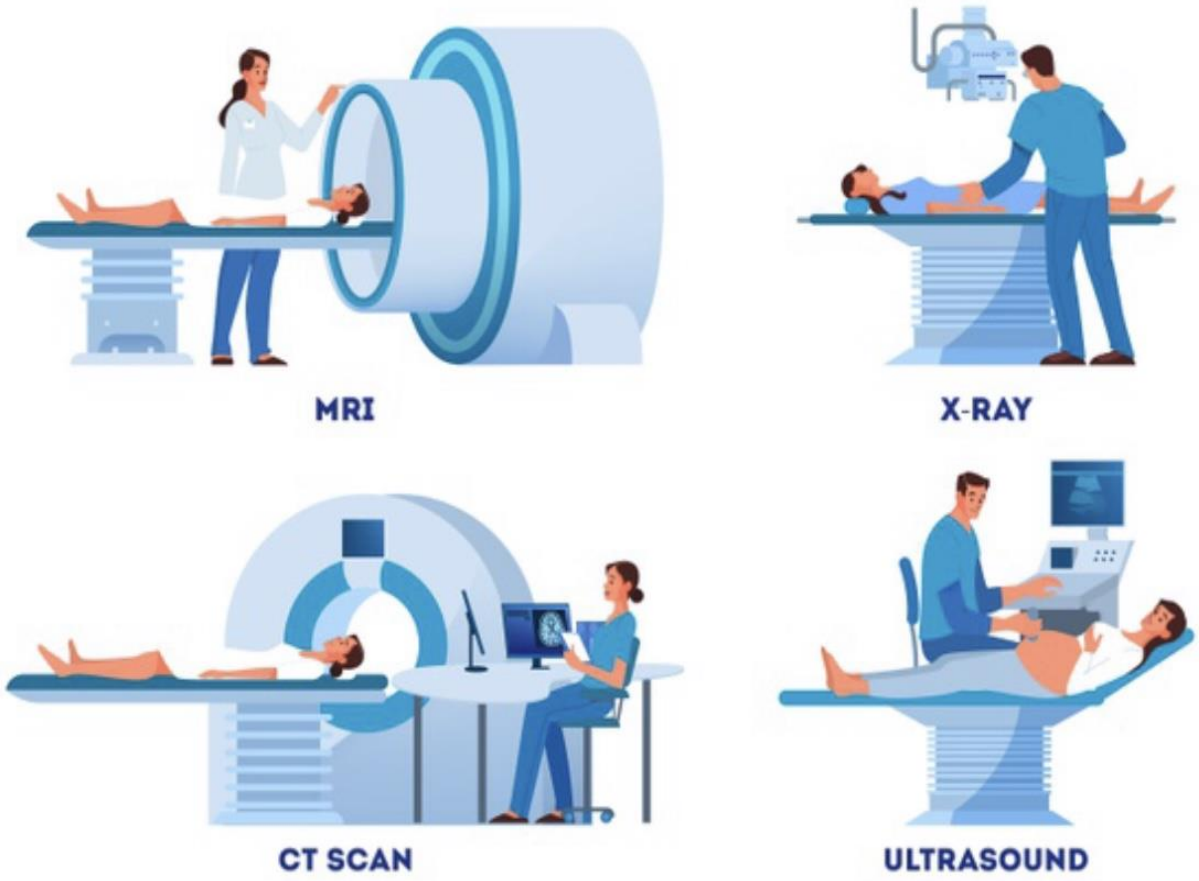
PRACTICAL RADIOLOGY MEDICAL DEVICE TECHNIQUE

(SOPHOMORE)



Intensifying screens

X – Ray intensifying screens resemble flexible sheets of plastic or cardboard. They come in sizes corresponding to film sizes. Usually, the radiographic film is sandwiched between two screens; the film so used is double – emulsion film.

In most screens there are four distinct layers:

1- Protective coating
2- Phosphor
3- Reflective layer
4- Base

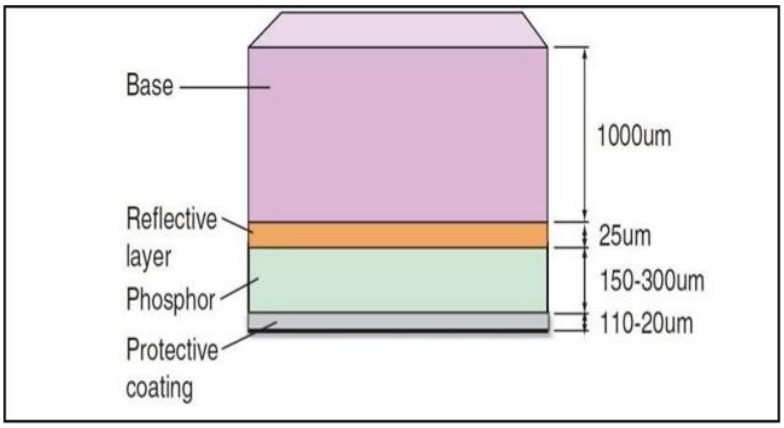


Fig. (1): Cross-sectional view of an intensifying screen, showing its four principal layers.

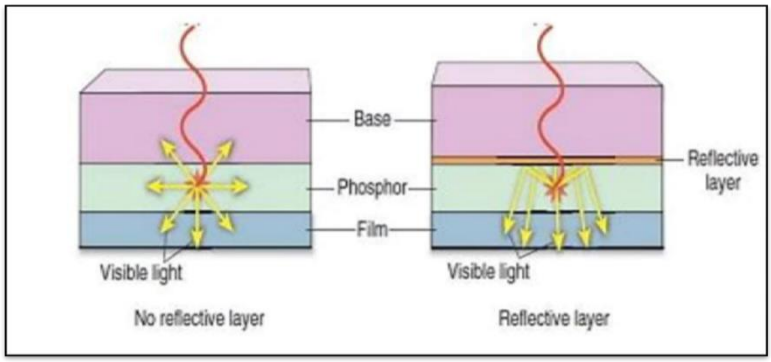


Fig.(2): Screen without reflective layer. B, Screen with reflective layer. Screens without reflective layers are not as efficient as those with reflective layers, because fewer light photons reach the film

Cassette

The cassette is the flat rigid holder that contains the screens and film for exposure to ionizing radiation, so it's called (screens – film combination).

The cassette has related functions as:

1.Contain a film

2.Exclude light

3.Maintain a close distance to the film, During the exposure, make good contact with both screens. Protect the intensifying screens from physical damage.

Some of the important characteristics of a good cassette are indicated in Fig (3). The front surface, the side facing the x-ray source, should be made of material with a low atomic number, such as plastic or cardboard. It should be as thin as practicable. Attenuation of the x-ray beam by the front cover of the cassette is undesirable.

The front screen is attached to the inside of the front cover, and attached to the back cover is the back screen. The radiographic film is loaded between these two screens.

Figure (3) is a cross-section of a properly loaded film cassette containing front and back screens with a double-emulsion film. Production of the latent image will be nearly event divided between front and back screens. Each screen exposes the emulsion with which it is in contact.

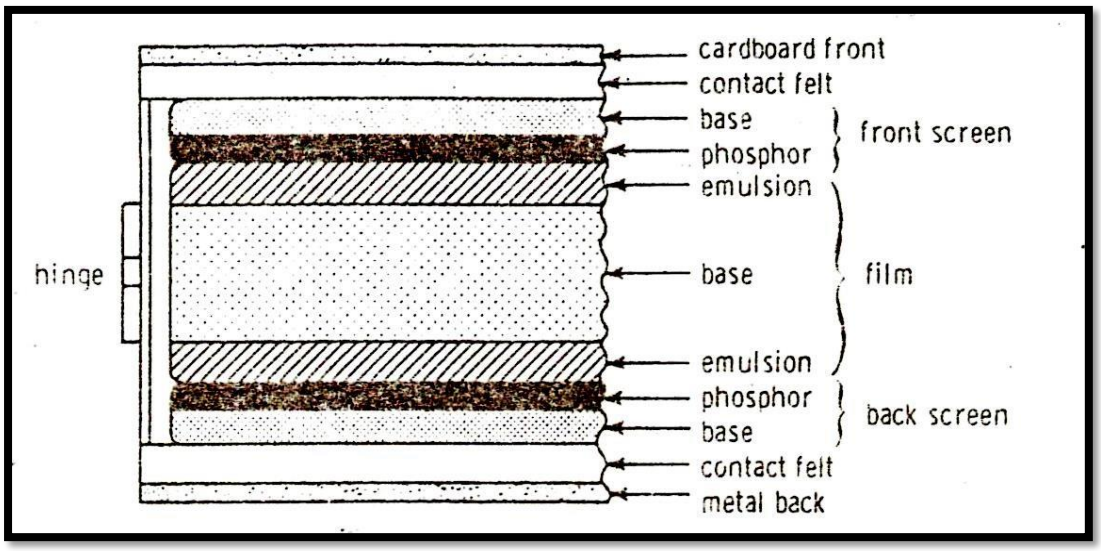


Fig (3): Cross-sectional view of a cassette containing front, back screens and loaded with double-emulsion film

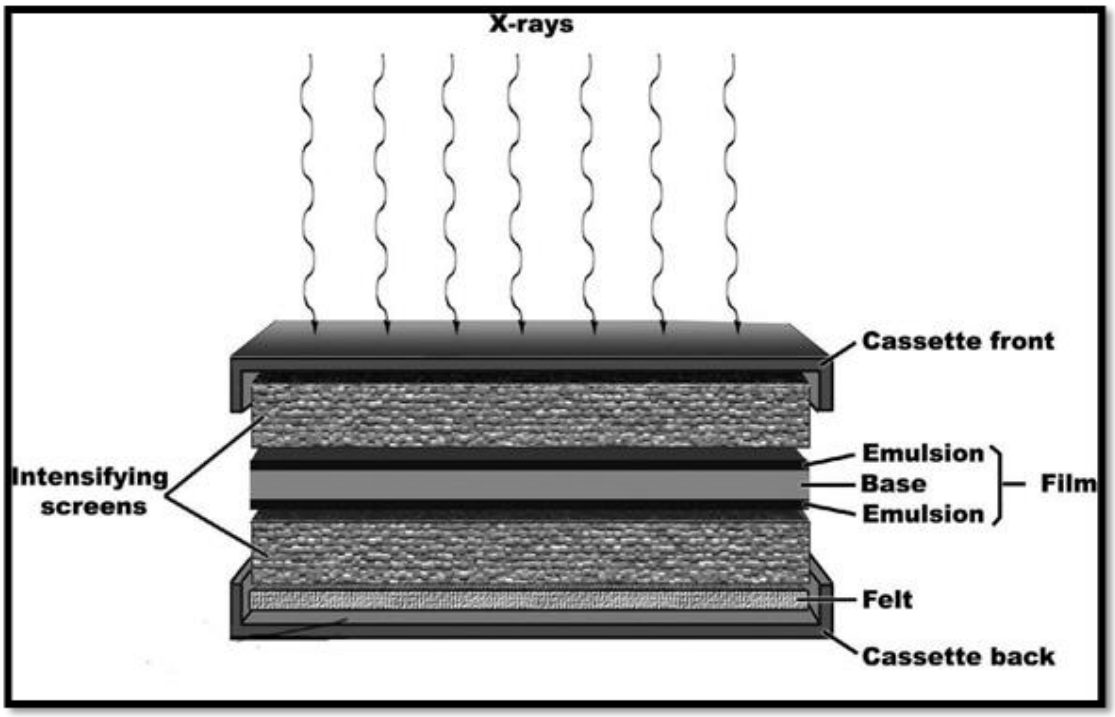


Fig (4) : Another view of of cassette.

The back cover is usually made of heavy metal to minimize backscatter. The x- rays transmitted through the screen-film combination of the back cover will be absorbed photoelectrically more readily in a high-Z material than in a low-Z material.

If the back plate were made of a low-Z material, x-rays could be transmitted through the entire cassette, and some might be scattered back to the film by the cassette holding device or a nearby wall. This is called backscatter radiation and results in decreased image contrast. Sometimes the cassette hinges or hold-down clamps on the back cover are imaged.

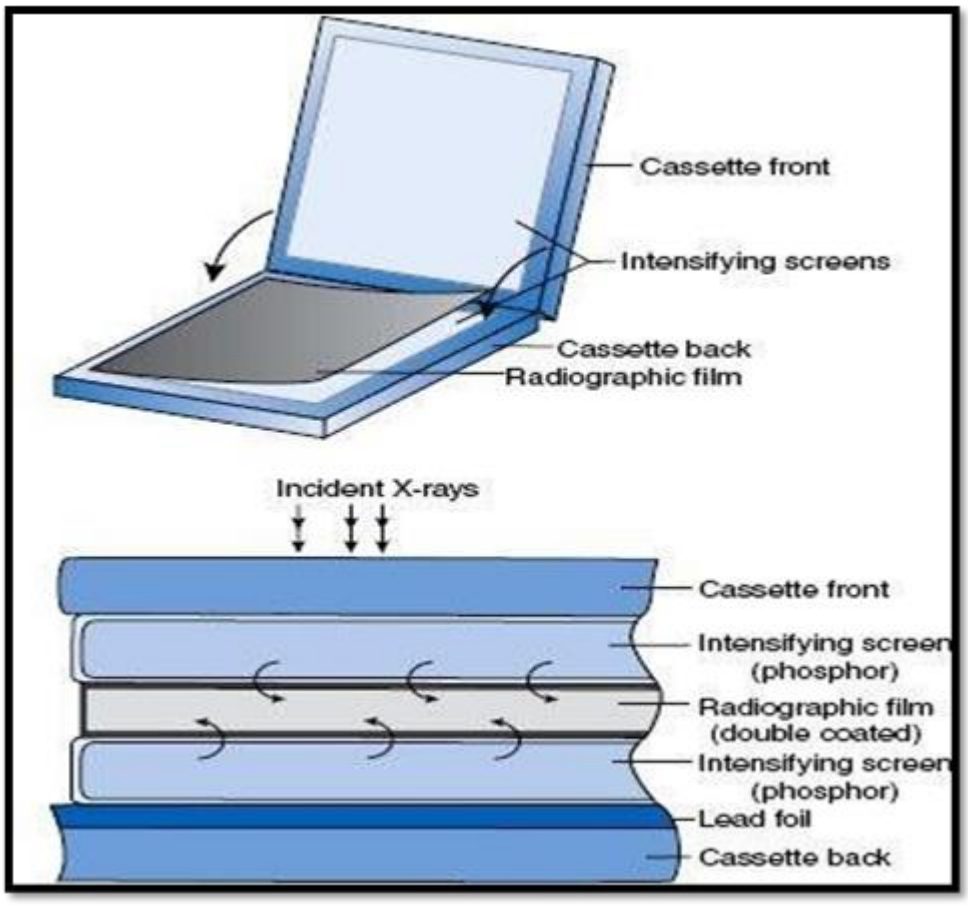


Fig (5) : The combination of film, intensifying screen & cassette.