

## CASSETTES.

Neill Serman

**DEFINITION:** A flat, light-tight container in which x-ray films are placed for exposure to ionizing radiation and usually backed by lead to eliminate the effects of back scatter radiation.

Cassettes are used in association with intensifying screens and have related **FUNCTIONS:**

1. To contain a film
2. to exclude light,
3. to maintain the film in close, uniform contact with both screens during the exposure,
4. to protect the intensifying screens from physical damage.

The structure of a standard cassettes suggests a book as it consists of two flat rectangular plates hinged along one edge. The front aspect of the cassette faces the x-ray tube and consists of a sturdy metal frame into which is fixed a sheet of either light metal such as aluminum, or plastic material; the critical point being that it must be transparent to x-rays. The frame constitutes a shallow container into which can be placed thin intensifying screens and a film.

The back of the cassette is constructed from a strong metal. It is customary to spray the internal surface of the back of the cassette with lead paint, the purpose of which is to absorb secondary radiation scattered back onto the film. [back scatter]

The back of the cassette contains a felt pad. The intensifying screen at the back of the film lies on this felt and is usually glued to it. The function of the felt is to maintain this screen, the film and its fellow screen in uniform, firm contact. The front and back of the cassette are held tightly together, either by spring clips on the edge opposite to the hinge or by means of pivoted resilient metal bars on the back of the cassette which fit into grooves in the frame.

The cassette utilized with many panoramic radiographs are made from plastic that can bend. However, when they are placed on the drum of the panoramic machine they become rigid, and the functions as stated above apply.

### **PROPERTIES OF A CASSETTE:**

- a) weight - It should be light for easy manipulation
- b) robust structure - cassettes in daily use are subject to considerable stress and wear. Screens may fail to maintain contact with the film or leakage of light at the edges can occur. Cassettes deserve and should have stringent care in handling.
- c)
  - i. Non flexible - so as not to allow the film to bend.
  - ii. Flexible cassettes - for panoramic machines.

Are necessary for the specialized equipment associated with panoramic radiography. They are mounted within a simple envelope of plastic material, folded at one end and fastened with press buttons of conventional design. The cassette is attached to a drum and is non flexible for the duration of the exposure.

- d) Size - Slightly larger than the x-ray beam and area to be radiographed.
- e) Ease of operation.

### **CARE OF CASSETTES.**

Treated with care x-ray cassettes [and intensifying screens] are good for years of hard work. Their general care is aimed at the avoidance of rough handling by all who use them.

It is helpful to mark each cassette, with identifying numerals which are inconspicuous - it makes it easy to eliminate, if radiographic faults are observed, ascribable to damage of some kind. e.g. cracks in the intensifying screens or light leaks.

### **REGULAR INSPECTION.**

Cassettes should be inspected at regular intervals to maintain them in serviceable condition. Hinges and clips are subject to stress and their proper functioning should be checked frequently to ensure that wear has not occurred. Intensifying screens may come adrift and should be re-fixed immediately. Loose screens are an invitation to error in the darkroom for even with the best of intentions it is easy, when loading a cassette, to slip the film on top of both screens if these are unattached. The felt pad in the back of the cassette may have become insecure or worn. This can result in failure of the intensifying screens to maintain uniform contact with the film and this in turn causes a localized area of unsharpness on the film due to the spread of fluorescent light between the screens and the emulsion.

Flexible cassettes may tear at the edges allowing the entry of light, and this must be regularly checked..

### **TEST FOR LIGHT LEAKAGE**

Following a number of fogged films physical inspection of a cassette usually makes evident the admission of extraneous light (black areas) and the points at which it has entered. Broken clips or hinges, buckled corners or loose fronts are the likely causes.

Heat diminishes the efficiency of intensifying screens. Cassettes should not be left lying close to radiators or stored near hot pipes. It may be noted that film emulsions

gain speed with increased temperatures but screens lose it. If the cassette has a plastic front, this may warp and spoil the contact with the front screen thus reducing the detail of the image.

In the darkroom cassettes should never be stored, opened or reloaded in the vicinity of chemicals. An open cassette lying on the bench almost certainly will be a victim to anything falling onto it. It is good practice always to leave cassettes closed, and placed on a shelf. Cassettes that are not loaded should not be left locked.

Cassettes need to have the letters R or L (made of lead) placed on the exposure (front) side to indicate the right or left side of the patient. In the panoramic machines the "L" and "R" are part of the machine.

A grid is sometimes placed in a cassette to avoid scatter radiation from reaching the film and diminishing the detail of the image.

The screen speed is always recorded on the outside of the cassette to ensure that the film and the screen speed correspond otherwise the detail and density of the image will be affected. □