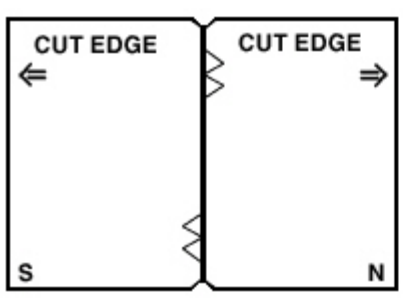
The Split Phantom Test

A split phantom test should be performed to radiographically determine relative speed differences between two different boxes of film, one of which is suspected of being much faster or slower than the film in current use for either cli nical films or for processor quality control. Speed comparisons made using a sensitometer may not accurately reflect the differences in *speed* between two films exposed by light from an intensifying screen.



The procedure is as follows:

1. Assemble the tools that are needed for the test:
    - A phantom used for mammography quality control testing.
    - The 18 x 24 cm mammography cassette normally used for the phantom test.
    - A piece of cardboard from the film box cut in half to use as a guide.
    - A pair of scissors.
    - A lead pencil.

    The mammography x-ray unit and the processor will also be used for this test.

2. In the darkroom, in total darkness to reduce any additional density added to the films due to long safelight exposure, cut a sheet of film from the current or "normal" box in half by using the cardboard as a guide. (This can be done by lining up the 18 cm edges of the cardboard and film, with the film closest to the countertop and the cardboard half on top. Use care in cutting the film in the dark)

3. Place the film, emulsion side up, in the cover of the opened cassette with the film on the right side and the cut edge toward the right edge of the cassette; use a lead pencil to mark the comer "N,' for normal.

4. Cut a sheet of film from the "suspect" box in half by using the cardboard as a guide.

5. Place the film, emulsion side up, in the cover of the opened cassette with the film on the left side and the cut edge toward the left edge of the cassette; use the lead pencil to mark the corner "S" for suspect.

6. Make sure the film edges in the center of the cassette are directly adjacent to one another and not overlapping before closing the cassette (see diagram).

7. Place the cassette with the two film halves in the grid of the mammography x-ray unit.

8. Place the phantom on top of the grid in the standard location used for mammography quality control testing.

9. Position the photocell beneath the center of the phantom (standard location), assuming the phantom exposure is always made using the phototimer.

10. Select the same technique factors usually employed when imaging the phantom (same kvp, etc.).

11. Make the exposure and process the two film halves immediately in the same manner (e.g., emulsion side up and on the right side of the processor).

12. Use a densitometer to take two optical density readings in the center of the phantom, just to the right and left of the cut edges (one on the "normal" and one on the "suspect" film).

13. Calculate the density difference by subtracting the optical density value of the "suspect" film from the optical density value of the "normal" film. If the density difference is a negative value and the "suspect" film is darker than die "normal" film, the "suspect" film is faster. if the density difference is a positive value and the "suspect" film is lighter than the "normal" film, the "suspect" film is slower.

According to the American College of Radiology in "Recommended Specifications for New Mammography Equipment:"

- "A density difference of 0.30 between any two films of the same type from the same manufacturer, exposed and processed together, is a reasonable maximum to be expected from manufacturing variability for films of roughly the same age and storage conditions."
- "If the difference between the two film densities exceeds 0.30 at a density of approximately 1.25, then the film supplier should be contacted to determine the source of the problem."