CALCULATION TECHNIQUES
ABOVETABLE X-RAY SOURCE
FLUOROSCOPIC AND SPOT-FILM SYSTEMS

(Test Procedure AFA - Form FDA 3069)

A. FLUOROSCOPIC X-RAY FIELD/IMAGE RECEPTOR ALIGNMENT

1. Refer to data items 6 through 13 of the test record. Calculate the misalignment between the x-ray field and the visible dimension of the image receptor as follows:

   Misalignment 1/4 = Data item 10 - (Data item 6 x 2.54)
   Misalignment 2/1 = Data item 11 - (Data item 7 x 2.54)
   Misalignment 3/2 = Data item 12 - (Data item 8 x 2.54)
   Misalignment 4/3 = Data item 13 - (Data item 9 x 2.54)

   Record at Results 1-4. Note that the misalignments must be equal to or greater than zero, since the x-ray field cannot be smaller than the visible area. Therefore, small negative misalignments should be taken as zero misalignment.

2. Determine the distance form the source to the center of the x-ray field image, SID:

   SID = (Data item 5 - 41.2) Centimeters

   Record this value at Result 5.

3. Calculate the following misalignments:

   a. (1/4 + 3/2) Misalignment = Result 1 + Result 3

      Record the (1/4 + 3/2) Misalignment at Result 6.

   b. Percent (1/4 + 3/2) Misalignment = (Result 6 x 100)/SID

      Record at Result 7.

   c. (2/1 + 4/3) Misalignment = Result 2 + Result 4

      Record the (2/1 + 4/3) Misalignment at Result 8.

   d. Percent (2/1 + 4/3) Misalignment = (Result 8 x 100)/SID

      Record the percent (2/1 + 4/3) misalignment at Result 9.

   e. Total Misalignment = (Result 6) + (Result 8)

      Record the total misalignment at Result 10.

   f. Percent Total Misalignment + (Result 10 x 100)/SID

Record the percent total misalignment at Result 11.

4. Repeat the calculations of steps 1 through 3 for data items 14 through 22 and record at Results 12 through 22.

B. FLUOROSCOPIC ENTRANCE EXPOSURE RATE

1. Manual Mode:

Refer to data items 27 and 24. Calculate the entrance exposure rate (EER) in R/min as follows:

$$EER = (\text{data item 27}) \times ((\text{data item 24-31.3}) / (\text{data item 24-30}))^2$$

Record this value at Result 23.

2. Automatic Mode:

Refer to data items 32 and 24. Calculate the entrance exposure rate (EER) in R/min as follows:

$$EER = (\text{data item 32}) \times ((\text{data item 24-31.3}) / (\text{data item 24-30}))^2$$

Record this value at Result 24.

C. MINIMUM SSD DETERMINATION

1. Refer to data item 24. The minimum SSD is determined as follows:

Minimum SSD + (Data item 24 - 31.3) cm

Record this value at Result 25.

D. X-RAY FIELD/SPOT FILM SIZE COMPARISON

1. Calculate the SID for the spot-film sizing using data items 24 and 35 as follows:

SID = Data item 24 + Data item 35

Record the SID at Result 26.

2. Refer to data items 36 and 37 and record at Results 27 and 28.

3. Refer to data items 38 and 39 and calculate the x-ray field dimensions in the plane of the image receptor, using the Along Table Correction Factor (ALCF) and Across Table Correction Factor (ACCF) determined during testing of the Radiographic portion of the system (Abovetable Source Radiographic Systems Results 25 and 26).

CAL = Data item 38 x ALCF x Result 26/(Result 26 - Date item 35)

CAC = Data item 39 x ACCF x Result 26/(Result 26 - Data item 35)

Record the calculated dimension along the across table as Results 29 and 30.

4. Calculate the difference between the dimensions of the x-ray field and the dimensions of the image receptor as follows:

   Along Table Difference = CAL - Data item 36

   Across Table Difference = CAC - Data item 37

   Record the results at Results 31 and 32.

5. Calculate the percent along and across table differences:

   % Along Table Difference = Result 31 x 100/Result 26

   % Across Table Difference = Result 32 x 100/Result 26

   Record at Results 33 and 34.

6. Calculate the percent total difference, and record at Result 35.

   % Total Difference = abs (Result 33) + abs (Result 34)

RESULTS RECORD
ABOVETABLE X-RAY SOURCE
FLUOROSCOPIC AND SPOT-FILM SYSTEMS

(Test Procedure AFA - Form FDA 3069) FIELD TEST
SERIAL NO. _____

FLUOROSCOPIC X-RAY FIELD/IMAGE RECEPTOR ALIGNMENT

1. 1/4 Misalignment = _____ cm
2. 2/1 Misalignment = _____ cm
3. 3/2 Misalignment = _____ cm
4. 4/3 Misalignment = _____ cm
5. SID = _____ cm
6. (1/4 + 3/2) Misalignment = _____ cm
7. % (1/4 + 3/2) Misalignment = _____ %
8. (2/1 + 4/3) Misalignment = _____ cm
9. % (2/1 + 4/3) Misalignment = _____ %
10. Total Misalignment = _____ cm
11. Percent Total Misalignment = _____ %
12. 1/4 Misalignment = _____ cm
13. 2/1 Misalignment = _____ cm
14. 3/2 Misalignment = _____ cm
15. 4/3 Misalignment = _____ cm
16. SID = _____ cm
17. (1/4 + 3/2) Misalignment = _____ cm
18. % (1/4 + 3/2) Misalignment = _____ %
19. (2/1 + 4/3) Misalignment = _____ cm
20. % (2/1 + 4/3) Misalignment = _____ %
21. Total Misalignment = _____ cm

22. Percent Total Misalignment = _____ %

ENTRANCE EXPOSURE RATE

23. Manual Mode EER = _____ R/min

24. Automatic Mode EER = _____ R/min

MINIMUM SSD

25. Minimum SSD = _____ cm

X-RAY FIELD/SPOT-FILM SIZE COMPARISON

26. SID = _____ cm

27. Film Dimension Along Table = _____ cm

28. Film Dimension Across Table = _____ cm

29. X-ray Field Dimension Along Table = _____ cm

30. X-ray Field Dimension Across Table = _____ cm

31. Along Table Difference = _____ cm

32. Across Table Difference = _____ cm

33. % Along Table Difference = _____ %

34. % Across Table Difference = _____ %

35. % Total Difference = _____