

PEAK KILOVOLTAGE DETERMINATION

CALCULATION TECHNIQUE

(Test Procedure KVA - Form FDA 3068)

1. Refer to data items 6, 7, 8, 9, and 10 on the Field Test Record. Divide each exposure by the exposure for 0.0 mm Cu; i.e., data item 6 on the Field Test Record. Record the four resultant quotients, N_1 through N_4 , at Results 1, 2, 3, and 4.
2. On semilog paper, plot the four normalized exposures along the logarithmic scale with the corresponding thickness of copper absorbers along the linear axis. Draw a smooth curve fit to the points and determine the 8 and 2 percent transmission values as those thickness of copper that would yield normalized exposures of 0.08 and 0.02, respectively. Record the copper thickness values at Results 5 and 6.
3. Refer to Results 5 and 6. Calculate:

$$A = (\text{Result 6} - \text{Result 5})$$

Record at Result 7.

4. Select the proper equation, based on the type of compliance test performed, and calculate the measured kVp:

- a. Non-Dental Equipment

$$\text{Measured } kVp = \exp \frac{(11.6 - \ln(\frac{1.386}{A}))}{2.54}$$

- b. Dental Equipment, 70 kVp or lower

$$\text{Measured } kVp = \exp \frac{(12.52 - \ln(\frac{1.386}{A}))}{2.77}$$

- c. Dental Equipment, 90 kVp, fixed

$$\text{Measured } kVp = \exp \frac{(10.424 - \ln(\frac{1.386}{A}))}{2.31}$$

Record the measured kVp at Result 8.

5. Select the proper equation, based on the type of compliance test performed and calculate the actual kVp:

- a. Non-Dental Equipment

$$\text{Actual kVp} = (1.065 - (0.026 \times \text{HVL}_{\text{obs}})) \times \text{measured kVp}$$

where HVL_{obs} is the observed half-value layer during the Non-Dental radiographic field test.

- b. Dental Equipment, 70 kVp or lower

Actual kVp = measured kVp

- c. Dental Equipment, 90 kVp, fixed

Actual kVp = $(1.08 - (0.009 \times HVL_{act.})) \times \text{measured kVp}$

Where $HVL_{act.}$ is the actual half-value layer calculated from the Dental Radiographic Field Test.

- 6. Refer to data item 2 on the Field Test Record and record as Result 10. Calculate the percent deviation from the indicated kVp setting as follows:

Percent Deviation = $((\text{Indicated kVp} - \text{Actual kVp}) / \text{Indicated kVp}) \times 100$

Record Percent Deviation at Result 11.

RESULTS RECORD

PEAK KILOVOLTAGE DETERMINATION

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Field Test
Serial No. _____

Normalized Exposures

$N_0 = 1.0$

1. $N_1 =$ _____
2. $N_2 =$ _____
3. $N_3 =$ _____
4. $N_4 =$ _____

8% and 2% Transmission Copper Thicknesses

5. _____ mm Cu @ 8%
6. _____ mm Cu @ 2%

Difference in 8% and 2% Copper Thickness

7. $A =$ _____ mm Cu

Measured kVp

Actual kVp

8. _____ kVp

9. _____ kVp

Indicated kVp

Percent Deviation

10. _____ kVp

11. _____ %