Atomic Energy Council Criteria for Acceptability of Medical Radiological Equipment used in Diagnostic Radiology

The below summary a criteria for which radiological equipment is considered fit to be used for radiological examinations. The summary also highlights what is expected from other procedures related to the radiology practice.

In order to ensure radiation protection and safety of the patients, workers and the members of the public, levels known as suspension levels have been set for each performance parameter of the equipment. Beyond these levels, it is expected that the user of the equipment must repair the equipment to correct for the deficiencies. Failure to do so will automatically lead to the equipment made inoperable by Council upon discovery till a commitment is made to repair it. Therefore, all users of the radiation equipment must

- Perform acceptance testing of new equipment,
- Identify criteria of acceptability for equipment safety and performance throughout its life, and
- Establish quality assurance programmes.

Suspension levels/for X-ray generators and general radiography

#	**Parameter**	**Suspension Level**
1.	Leakage radiation at 1m , at every maximum settings specified by manufacturer	1mGy/h
2.	Beam alignment	maximum allowable is 3 degrees
3.	Light Field/X-Ray Field Alignment	Sum of –X-axis plus +X axis deviations or –Y-axis plus +Y-axis deviations should not exceed 2% of FFD
4.	Half Value Layer	≥2.3 mm Al at 80 kVp or specified by the manufacturer
5.	kVp Accuracy	within ± 5%
6.	kVp Reproducibility	CV must be less than 2%
7.	Tube Output linearity/consistency	< 0.1
8.	Timer Accuracy	Actual time should be within ± 5% of set time, OR ± 1 pulse (single phase, short exposures)
9.	Focal spot size measurement	• A nominal 0.8 focal spot should not exceed 1.2 mm in width and 1.6 mm in length. • A nominal 1.2 focal spot should not exceed 1.7 mm in width and 2.4 mm in length

10.	Grid (system factor, homogeneity) Measurement		Grid system factor ≤3.	
11.	Darkroom (light leakage)		Extra fog: ΔD ≤0.02 OD in 4 minutes	
12.	Darkroom safelight		Extra fog: ΔD ≤0.10 OD in 4 minutes.	
13.	Film Storage		< 26°C, 30-60% relative humidity	
14.	Dental			
15.	Image Quality		±10% reference values	
16.	Processing		Base+Fog: >0.2 OD Speed and Contrast: >0.15 OD about baseline	
	Dental			
	Leakage from the intraoral X-ray tube assemblies (including collimators);		0.25 mGy **in** 1 h at 1 m is recommended	
17.	Tube voltage		>50 kV and error <10%	
18.	Beam size/collimation		<60 mm diameter (intra-oral) <150 x 10 mm at cassette (panoramic)	
19.	Dose at cone tip		50 kV: <5.0 mGy 70 kV: <2.5 mGy (E speed film)	
20.	Dose-width product for panoramic film		<75 mGy mm	
21.	Collimator Light Intensity (Ceph units)		>100 lux at 1m	
22.	kVp Accuracy		within 5% of set value	
23.	kVp reproducibility		coefficient of variation ≤ 2%	
24.	Skin dose from I/O units (65-70 kVp):		2-3 mGy for molar view < 5 mGy for any view	
25.	Output Reproducibility (Standard I/O units & Ceph units		coefficient of variation ≤ 5%	
26.	Exposure Time Accuracy (Standard I/O units & Ceph units):		≤10 % error for I/O units ≤ 5% error for all other units	
27.	Timer Reproducibility (Standard I/O units & Ceph units):		coefficient of variation ≤5%	
	Half Value Layer (HVL)		HVL (mm Al)	
		kVp	intraoral	Ceph/OPG
		60	1.5	1.8
		70	1.5	2.1
		80	2.3	2.3
		90	2.5	2.5
28.	Leakage radiation at 1m from focus		≤0.25 mGy/hour - Standard I/O units ≤1.0 mGy/hour - Ceph & OPG units	
29.	Mammography			

30.	Leakage from the X-ray tube assemblies (including collimators), an additional limit	0.01 mGy per 100 mAs at 0.30 m from the side of the assembly facing the patient
31.	kV accuracy (25-31 kV)	< ± 1 kV
32.	kV reproducibility (25-31 kV)	< ± 1 kV
33.	Radiation output - linearity	acceptable: >30 mGy/mAs at 1 m desirable: 40-75 mGy/mAs at 1 m acceptable: > 7.5 mGy/s at a distance equal to the FFD desirable: 10-30 mGy/s at a distance equal to the FFD

To be continued

Fluoroscopic systems

Computed Tomography

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