

IMAGE QUALITY REFERENCE LEVEL (IQRL) AND DOSE REFERENCE LEVEL (DRL)

Quality values (IQRL and DRL) based on results obtained by many dental offices provide the necessary information for comparison of those produced in each office. This is why it is necessary to measure performance using the IQ(D)P protocol.

Performance improvements naturally follow the introduction of these standards in dental offices. The acceptance of these standards will guarantee diagnostic quality at a minimum radiation dose.

International Atomic Energy Agency is widely known as the world's "Atoms for Peace" organization within the United Nations family, the IAEA is the international Centre for cooperation in the nuclear field. The Agency works with its Member States and multiple partners worldwide to promote the safe, secure and peaceful use of nuclear technologies.



Figure 1: Canada is member state and as such is committed to its Regulations

IAEA statement: "Why do we need DRLs in medical imaging?"

"Surveys of dose estimates from different imaging modalities highlight the substantial variations in dose between some healthcare facilities for same examination or procedure and similar patient group (adults or children of defined sizes). Such observations indicate the need for standardization of dose and reduction in variation in dose without compromising the clinical purpose of each examination or procedure. Examination-specific or procedure-specific DRLs for various patient groups can provide the stimulus for monitoring practice to promote improvements in patient protection".

Example:

Acceptance of standards will guarantee diagnostic quality at a minimum radiation dose. IQ(D)P is an excellent way to succeed in promoting solid dental practices. It is possible to computer analyze x-ray image data to calculate image indexes as in the table 7. What you see on this schema is original work of Nosil DSc, and was not done by other phantoms available.

It is my opinion that VGA must be implement first. Computer results as in figure 2 is necessary to meet IAEA standards. Image Quality calculated values could be a useful part of a research project, and I did this part. Certified Dental Assistants, Inspectors, Physicists, or Service Departments could run similar computer voluntary calculations as part of yearly testing or government regulations.

Following table shows the Image Quality Standards:

Index	DRL	DAL
Average Contrast	0.26	0.29
Min. Grey Level	13	10
Max. Grey Level	211	219
Scatter/Primary Ratio	0.36	0.29
Resolution	150 lines/inch	200 lines/inch

What is not said in above table is that the parameters on the image; e.g. density, contrast, etc. is possible be put in numbers for recording purposes. This so that these data can be recorded simply in a record manual covering the life of the x-ray unit and the record unit (film type, digital detector, etc.) Achievable contrast is 29%, Regulation requires minimum contrast of 26%. Minimum resolution required is 150 line pairs/inch, even though one can achieve 200 line pairs/inch (25% top offices will have these resolution).

Determination of the DRL and DAL standards for shades of Gray Display Monitor using IQ(D)P advanced manual. Display monitors and software uses pixel content between 0 and 256. Figure 2 gives us minimum acceptable ranges for monitor performance. Similar graphs exist for other imaging indexes.

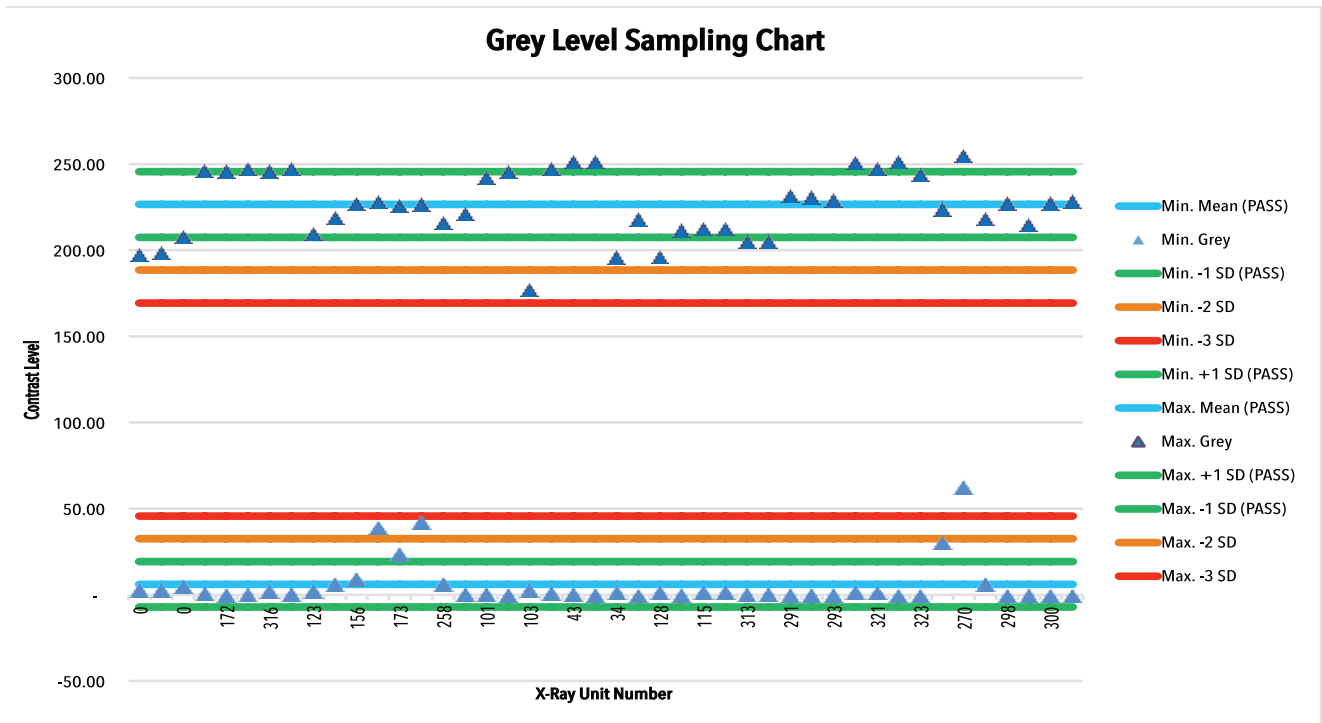


Figure 2: Measurements of the Gray Levels for one group of dentists.