

## General Guidelines for X-Ray Head Settings with Apex Dental Sensors

### Recommended Settings for Apex Dental Sensors:

**NOTE:** These are guidelines only – every x-ray unit will behave differently depending on age, maintenance and usage

Remember all X-ray units are different. Timing or pulses depends on the patient's size and the area of the mouth to be X-rayed.

MFR.	Model	kV/mA	Adult		
			Incisors	Premolars & Canines	Molars
Progeny	Preva	60*/*7	.125-.25	.125-.25	.16-.40
Sirona	Heliodent Plus	60*/7	.16-20	.16-.25	.16-.25
Sirona	Heliodent DS	60/7	.08-.12	.12-.16	.16-.25
Gendex	765DC/Expert DC	65/7	.10-.20	.125-.25	.16-.32
Gendex	770	70/7	8-10 Pulses	14-16 Pulses	16-20 Pulses
PlanMeca	Pro Style Intra	60*/8*	.125-.16	.16-.20	.20-.25
Belmont	Belray 096	70/10	.11-.19	.19-.22	.22-.31
Aribex	Nomad (Handheld)	60/2.5	.34-.40	.35-.45	.45-.50

\*Adjustable

NOTE about ARIBEX NOMAD: Unit uses 2.5mA - around 1/3 of that seen on most wall mounted units. As a result, exposure time must be increased by roughly a factor of 3 to compensate for both this along with lower than preferred kV.

NOTE: If a particular x-ray generator is not listed here, see the kV and mA settings on the x-ray generator in use and compare them to those listed above. If mA settings are higher (e.g. 10mA), reduce time by 1-2 steps.

### Understanding Technique Factors:

X- ray technique factors are made up of three variables:

1. Kilovolts (kV) - Controlling the penetration power of the x-ray.
2. Milliamps (mA) - Controlling the volume of x-ray.
3. Time (usually noted in seconds or milliseconds) or pulses (seen in older models) - Controlling the volume of x-ray.

All models allow the adjustment of time (or pulses), while the ability to adjust kV and mA varies from model to model. Masterlink recommends that if a model has adjustable kV and mA, these values should be set once at installation and not adjusted again. All technique factor adjustments should be performed via time (or pulses) to minimize confusion. Technique factors are adjustable to take into account the tissue densities of various imaging areas. Tissue density can be affected by several variables.

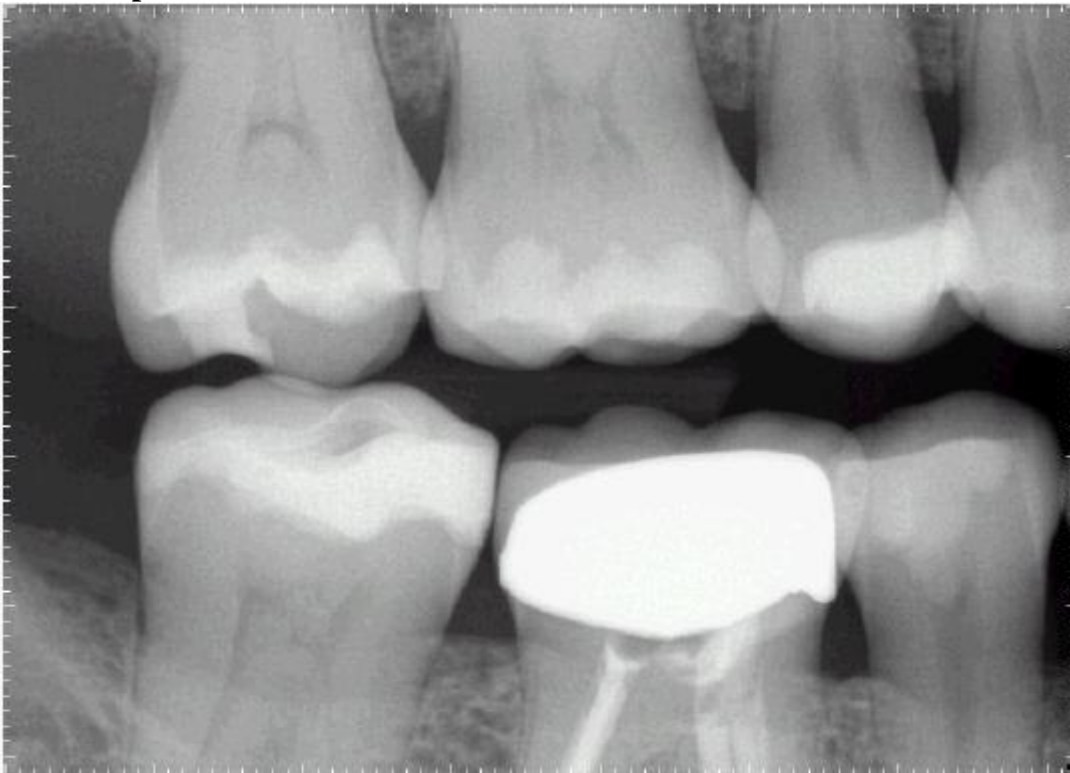
1. Patient Size - a 250 lb adult is almost certain to have denser tissue in the oral-maxillofacial region than that of a 70 lb child.
2. Patient Age - tissue densities will vary between patient ages. Children and elderly patients are more likely to have a lower density than adults.
3. Patient Health - the effects of certain illnesses such as osteoporosis may reduce tissue density.
4. Region within the Oral Cavity - the region around the mandibular anterior teeth has a lower tissue density than around maxillary molars.

The greater the tissue density, the higher the technique factors required to penetrate the tissue and provide satisfactory image quality.

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### **Recognizing Proper Technique Factor Applications**

#### **Under Exposure:**



The image above is slightly under-exposed. This can be recognized by the lack of contrast in the crowns of the teeth and the gray areas between the inter proximal regions and behind the molars, as well as the presence of the positioning tab in the inter proximal. While under-exposed images can be darkened using software, contrast may still be lacking. \*NOTE - this image is also unacceptable due to poor positioning recognized by the overlap of the contacts.

**Correct Exposure:**



The image above is correctly exposed. The apices, DEJ and bone detail are all clearly visible.

**Over Exposure:**

The above image is over-exposed. This can be recognized by the image overall being too dark - typified by the cervical burnout on the bicuspids. This can be corrected by software, but to keep with the ALARA (as low as reasonably achievable) principle, the technique factors (exposure time or pulses) should be reduced to provide acceptable imaging.

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**Other Considerations**

The distance between the x-ray head and the sensor can also have an impact on image quality. The further the x-ray head is from the sensor, the lower the amount of radiation is that reaches the sensor. To prevent inconsistent imaging, place the cone of the x-ray generator as close to the patient's cheek as possible. Ideally, this means sliding the ring of the positioning device as close as possible and aligning the cone against the ring.

**Technique Factors**

Once kV and mA levels are set (where available), it is up to the individual clinician to ensure the correct time/pulse level is selected. Many manufacturers of x-ray heads provide pre-sets for their x-ray generators that allow the time/pulse level to be selected depending on patient size and area being imaged. It is important to appreciate that these settings may not suit that required by your Apex sensors and therefore manual levels should be selected in these instances.