

CT Technical Questionnaire

X-ray Tube and Generator Characteristics	YES OR NO	AGREE OR DISAGREE	COMMENTS
<p>1. The x-ray tube must have 2 focal spots, a large and a small. Specify dimensions of focal spots according to IEC-NEMA standards.</p> <p>Small focal spot</p> <p>Large focal spot</p>			
<p>2. Provide details of average tube life in terms of slices. Within the last year and in Canadian sites, if possible, give a representative sampling of actual tube life achieved.</p>			
<p>3. Specify the maximum heat tube capacity.</p>			
<p>4. Specify the maximum housing heat capacity.</p>			
<p>5. Specify the minimum housing cooling rate.</p>			
<p>6. Specify the method by which the x-ray tube is cooled.</p>			
<p>7. Is the heat dissipated in the exam room?</p>			
<p>8. Describe any heat overload mechanisms.</p>			
<p>9. Specify the maximum number of consecutive scans at maximum mA with proposed tube in helical mode.</p>			
<p>10. State the generator frequency and type.</p>			
<p>11. Specify the available kVs.</p>			

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12. Specify the mAs range and increments associated with the above kVs with the large focal spot and the small focal spot in helical mode.			
13. How many consecutive helical slices are allowed before the tube overheats at the maximum mA setting?			
14. Upon powering the unit, specify the amount of time required for a full calibration (all kVs, all slice thicknesses).			
15. Do you have focal spot tracking?			
16. In what country is the x-ray tube built?			
17. State name of manufacturer.			
<i>Detector and Geometry</i>			
1. Specify composition of detector elements.			
2. Specify number of reference detectors.			
3. Specify location of reference detectors.			
4. Specify number of detectors, size of each detector, and interspace width.			
5. Specify interspace composition. If this information is proprietary, a generic name would suffice.			
6. Specify cone beam angle.			
7. Specify source to detector distance.			
8. Specify bore opening diameter.			
9. What is the distance from the tube focus to isocenter axis?			
10. What is the distance from the focal spot to the centre of the detector?			

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11. How often do the detectors need calibration to retain optimal image quality?			
12. What is the total efficiency of the system?			
13. In what country is the detector built?			
14. State name of manufacturer?			
CT Table			
1. The computed tomography table must not in any way interfere with image capture or reconstruction or display. Do you agree?			
2. The immobilization devices used in conjunction with the computed tomography table must not in any way interfere with image capture or reconstruction or display. Do you agree?			
3. Specify composition of table top.			
4. Specify x-ray attenuation of table top.			
5. Is the table of uniform density?			
6. Specify any part of the table which would have a different density and give its attenuation in terms of mmAl equivalent.			
7. Specify range of table vertical movement within the gantry.			
8. Specify speed of vertical movement when within the gantry.			
9. Specify minimum table height outside the gantry.			
10. Specify speed of table vertical movement outside the gantry.			

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11. Specify any emergency stop mechanisms in the vertical direction.			
12. In the horizontal direction.			
13. Specify unobstructed horizontal scanning length of table.			
14. Specify horizontal table speeds.			
15. Specify horizontal table increments.			
16. Specify horizontal table movement accuracy.			
17. Specify maximum load at centre of the table.			
18. Specify maximum load at foot of table.			
19. Does load specified above include extra load required for CPR?			
20. If not, please specify.			
21. Where is the rapid release feature?			
22. Where are the table controls located?			
23. Are the table controls protected from the patient, or water, or from other physical damage?			
24. State composition of mattress pad.			
Gantry			
1. Provide the noise power spectrum graph as a function of frequency during a routine head scan (120kV, 200mAs, 1mm slices). This is not the audible noise spectrum, this is the fundamental electronic noise power spectrum.			
2. Specify gantry tilt angles for helical			

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imaging.			
3. Specify gantry tilt angles for all table heights in the helical mode.			
4. Describe the pre and post patient collimation used on your system.			
5. Describe the filter material, in terms of mmAl, used in the pre or post patient collimation.			
6. In what country is the gantry built?			
7. State name of manufacturer.			
CT Fluoro			
1. Can you provide CT fluoro with this unit?			
2. Where is the physician monitor during CT fluoro?			
3. Is the monitor on a separate boom attached to the gantry?			
4. If not, how is the monitor mounted for easy viewing while fluoroscopy?			
5. How many frames per second are achievable during CT fluoro.			
6. Specify arc length, in degrees, of the x-ray tube during one frame of CT fluoro.			
7. How many arcs does one full imaging sequence require?			
8. Specify maximum x-ray tube angular displacement in CT fluoro.			
9. Attach the monitor specifications for CT fluoro.			

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10. Is fluoro engaged by using a foot pedal?			
11. If a foot pedal is used, is there a means to disengage fluoro when not in use?			
12. What range of mAs is used for CT fluoro?			
13. For the above specified mAs range, what are the kVs available?			
<i>Computing and Network Requirements</i>			
1. It is required that a 3D physician workstation be included in the package. Specify whether this is standard or an option.			
2. Specify all software packages currently available, such as volume rendering, surface shading, multi-planar reformatting, etc.			
3. Specify all software packages which are standard with this unit.			
4. Specify all software packages which are optional with this unit.			
5. Specify all software packages which are expected to become available in the next several years.			
6. Of those anticipated software packages, which would become standard on the unit?			
7. Which would be optional packages?			
8. When is the next projected release of the operating system for your unit?			

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9. Specify the computing architecture that is provided with your system.			
9 (a) Specify the RAM.			
9 (b) Specify the processor.			
9 (c) Specify the processing speed.			
9 (d) Specify the removable storage device.			
9 (e) Specify the internal storage capacity.			
10. It is the vendor's responsibility to show that if efilm is installed on the CT physician's workstation, it can push and pull images from the central archive.			
11. Provide a reference site, less than 6 months, where such connectivity is fully functional.			
<i>Dose Management</i>			
1. Do you display CTDI w or volumetric?			
2. Do you display DLP?			
3. Where do these values appear?			
4. Are both or either displayed throughout the scan?			
5. Can either be accessible after the scan is completed?			
6. Is calibration required to keep values displayed fairly accurate?			
7. If so, how often is calibration required?			
8. Is there a permanent record of the CTDI or DLP kept with the patient information?			

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9. Provide CT fluoro dose for one rotation (either full or partial) of the x-ray tube.			
10. Describe how your system can modulate the mAs during an imaging sequence.			
11. Describe any other dose saving mechanisms available on your system.			
<i>Image Capture, Reconstruction and Display</i>			
1. Specify matrix size of acquired raw data image and any restrictions.			
2. Specify memory size of one acquired CT-DICOM image for the standard and high resolution modes.			
3. Specify acquired bit depth of one image.			
4. Specify stored bit depth of one raw image.			
5. Specify bit depth used in reconstruction process.			
6. Specify bit depth displayed on viewing monitor.			
7. Specify bit depth displayed on primary diagnostic monitor.			
8. Specify matrix size of raw data used in all parts of the reconstruction.			
9. For the high resolution mode, specify the filters used in the reconstruction algorithm.			
10. Provide the MTF curve for the high resolution mode. If more than one curve is provided, explain the difference between each (ie, under what real conditions does			

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each curve represent?)			
11. State the minimum slice thicknesses available for the standard helical mode, and for the high resolution helical mode.			
12. Can you scan feet first in all modes available?			
13. How much time is required to switch between a forward scan and a backward scan?			
14. Specify the maximum number of slices in the helical mode.			
15. What is the minimum slice scan time achievable with the proposed model?			
16. Can you retrospectively increase or decrease the FOV with the raw scan data?			
17. What is the time elapsed between initiating scanning and the first image to appear at the console?			
18. Is it possible to print while scanning?			
19. Can 3D reconstruction take place while scanning?			
20. List all correction algorithms used in the reconstruction including any for metal artefacts. Also describe any restrictions.			
21. Can the system change any patient demographics after the exam is completed?			
22. Is it possible to strip the patient identification label to produce anonymous images for publication?			
23. Specify reconstruction time.			
24. Specify the reconstruction matrix size.			

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25. Specify the fundamental collimated widths available for your system.			
26. For the fundamental collimated widths specified above, state the possible reconstructed slice widths.			
27. State the minimum rotational speeds available for each collimated width available on your system.			
Acceptance Testing			
1. Acceptance testing will be conducted after the unit is fully installed and has been tested by the vendor's service engineer. As this will also include commissioning, it is expected that this will take at least one week. The senior service engineer qualified for this modality must be present. Do you agree?			
2. Testing will follow the AAPM guide to CT acceptance testing. A copy of the guide can be provided to the service engineer before the start of testing.			
3. Commissioning will be conducted with the CATPHAN500 phantom and any other phantoms deemed necessary in order to fully understand the functional aspects of this new unit. Do you agree?			
Quality Control			
1. Does the unit come with a quality control phantom?			
2. Does the unit have automated software to keep track of the phantom measurements?			
3. Does the unit come with a luminance meter to keep track of all monitors as per DICOM part 14 requirements?			
4. Does the unit come with any other			

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monitoring devices that would aid in a quality control programme?			
5. If the quality control data is part of the service engineer's log, can the medical physicist have access to the data? This data will become part of a comprehensive Quality Improvement initiative within the WRHA.			