

## Document CANON 3 Alphenix

### 23.2 Checking the 3D Image Quality

To confirm that 3D image reconstruction processing is performed appropriately, check the image quality using the image quality check phantom.

After the system is installed, this check is required every two weeks in order to detect degradation of image quality due to change of quality wobble during C-arm rotation. In normal cases, the calibration images for correcting for this influence must be updated every 3 months. However, the C-arm, FPD, or tube may interfere with the table or other units, resulting in mechanical displacement in rare cases. In order to correct for any changes in this phenomenon between the update intervals, checks are required every 2 weeks.

The calibration procedure below must be performed by 2 engineers.

(1) Registering a patient for checking the image quality

- (a) Register a patient using the system console and select Neuro or Abdominal, whichever is used more frequently in clinical application.
- (b) Start the study.

(2) Selecting an acquisition program

- (a) Select a 3D-DSA acquisition program.  
Select an acquisition program satisfying the following conditions.

Acquisition sequence	MRC (Mask-Return-Contrast)
DSA acquisition matrix	: 1024
Acquisition trigger	: 2°/frame

- (b) Set the following values for the radiographic conditions.

DSAdose	: 2.63 [ $\mu$ Gy]
Contrast delay time	: 20 [s]

- (c) Set "Vessel Quality" for the 3D transfer function.

(3) Setting the image quality check phantom

Place the image quality check phantom on the tabletop. Remove the image quality check phantom from the case and place the phantom on the tabletop so that the following conditions are satisfied.

The numeric characters on the phantom should be legible on the image from the lateral direction (LAO 90°/CRA 0°).

The comb section of the phantom and the longitudinal axis of the tabletop should be parallel.

(4) Setting the SID/FOV

Select the FOV that is used most frequently in clinical application. If all of the FOVs are used equally, select the largest FOV.

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- (5) Adjusting the position and height of the table
- (a) While performing fluoroscopy, adjust the tabletop position in the longitudinal, lateral, and vertical directions so that the image quality check phantom is near the image center.
  - (b) Perform checks from 2 directions: From the LAO/RAO 0° and CAU/CRA 0° position  
From the LAO 90° or RAO 90° and CAU/CRA 0° position
- (6) Adjusting the radiographic conditions
- (a) Perform fluoroscopy from the patient front and the patient side directions to determine the image acquisition conditions. If the tube current is less than 50 mA, set the HOLD button on the Radiography tab in Acquisition mode to ON so that the X-ray conditions are within the following range.
    - Tube current     80 mA to 125 mA
    - Tube voltage   : 70 kV to 80 kV
- (7) Preparing for radiography
- (a) Select the [Confirm Gond.] button from the menu.
  - (b) Hold down the START key on the joystick control panel. The C-arm automatically moves from the rotation end position to the rotation start position to confirm that no objects are placed within the C-arm rotation range.
- (8) Radiography
- (a) For 3D-DSA
    - <1> Remove the image quality check phantom from the tabletop of the catheterization table. Since this phantom is used during contrast image acquisition, mark the position of the phantom on the tabletop using tape or other appropriate means.
    - <2> Confirm that the delay time until contrast image acquisition starts is set to 20 [s].
    - <3> Press the X-ray exposure handswitch to start radiography. Hold down the handswitch until acquisition of mask images and contrast images is completed. After mask image acquisition terminates, the C-arm returns to the start position.
    - <4> After confirming that the C-arm stops at the start position, place the phantom at the original position again. This operation must be performed within 20 seconds after the C-arm stops at the start position. Contrast image acquisition does not start during this period.
    - <5> When 20 seconds have elapsed after the C-arm stops, contrast image acquisition starts. When contrast image acquisition is completed and the C-arm stops at the end position, release the X-ray exposure handswitch.
  - (b) For AlphaCT
 

Press the X-ray exposure handswitch to start radiography. Hold down the handswitch until contrast image acquisition is completed. When the C-arm stops at the end position, release the X-ray exposure handswitch.

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(9) Checking acquired radiographie images

Play back acquired radiographie images to confirm that there are no abnormalities. Abnormalities include the following: one or more of the teeth in the comb section disappears due to halation, image brightness changes across frames, or a part of the image quality check phantom is outside the screen. **In** these cases, readjust the conditions and then perform radiography again.

(10) Transferring images

Because image transfer is performed immediately after image acquisition, it is not necessary to perform steps (a) and (b). However, if automatic image transfer is not performed, steps (a) and (b) are required.

- (a) Switch the tab to the [Exam] tab and display the image quality check phantom images acquired while switching the cuts.
- (b) **In** the same manner as for normal 3D transfer, press the transfer switch to start image transfer. Select Detail mode (512 mode) as the transfer mode.

(11) Checking the image quality

- (a) After reconstruction images are displayed, switch the display to MPR (multiplanar reconstruction).
- (b) Confirm that the 0.7-mm comb teeth are clearly separated.
- (c) If the 0.7-mm comb teeth cannot be seen clearly, perform radiography using the image quality check phantom again or perform calibration again. Check the background noise to determine whether radiography or calibration should be performed. If the background noise is large, increase the radiographie dose and perform radiography. If the background noise is small, perform calibration again.