

The Daily ACR QC should be performed prior to the first clinical scan of the day. After the images are acquired, the technologist should verify that the images are free of artifacts and perform simple measurements to ensure that the system performance is within the action limits prior to the first clinical scan of the day.

The QC scan protocol consists of an Axial protocol (Routine Brain), a Helical protocol (Routine Abdomen) and one or more Axial scans designed to increase the sensitivity of artifact analysis. All images generated by the QC must be visually inspected for artifacts.

The QC protocol should be used to scan the manufacturer's water phantom. A quantitative measurement is performed by placing a 400mm<sup>2</sup> Region of Interest (ROI) in the center of the image. The mean water value and standard deviation are recorded on the included forms.

You do not need to measure both the Axial and Helical datasets each day. The quantitative analysis may be performed by alternating the measurement of the Axial and Helical datasets.

The mean CT number for water must be within -5 HU to 5 HU. The standard deviation must be within 20% of the established baseline values. The worksheet below will aid in the computation of the allowable ranges for water standard deviation.

## Establishing Water Standard Deviation Baseline Value

### Axial

Measurement 1 \_\_\_\_\_

Measurement 2 \_\_\_\_\_

Measurement 3 \_\_\_\_\_

Measurement 4 \_\_\_\_\_

Measurement 5 \_\_\_\_\_

Sum of Above \_\_\_\_\_

Baseline = Sum  $\div$  5

The formula for the upper limit is: Baseline  $\times$  1.2

The formula for the lower limit is: Baseline  $\times$  0.8

Range: \_\_\_\_\_ to \_\_\_\_\_  
lower limit upper limit

### Helical

Measurement 1 \_\_\_\_\_

Measurement 2 \_\_\_\_\_

Measurement 3 \_\_\_\_\_

Measurement 4 \_\_\_\_\_

Measurement 5 \_\_\_\_\_

Sum of Above \_\_\_\_\_

Baseline = Sum  $\div$  5

Range: \_\_\_\_\_ to \_\_\_\_\_  
lower limit upper limit

Please copy the allowable ranges to the top of the Daily QC record page for reference.

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU (-5 to 5)	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

Facility: \_\_\_\_\_ Room #: \_\_\_\_\_ Unit ID: \_\_\_\_\_

# CT EQUIPMENT QUALITY CONTROL (Water Phantom)

Axial Baseline: \_\_\_\_\_

Helical Baseline: \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Range: \_\_\_\_\_ to \_\_\_\_\_

Month: Day:	ROI ~ 400 mm <sup>2</sup>	Water HU ( -5 to 5 )	Pass or Fail	Water SD ± 20%	Pass or Fail	Artifacts Y/N	Notes
1	Axial						
2	Helical						
3	Axial						
4	Helical						
5	Axial						
6	Helical						
7	Axial						
8	Helical						
9	Axial						
10	Helical						
11	Axial						
12	Helical						
13	Axial						
14	Helical						
15	Axial						
16	Helical						
17	Axial						
18	Helical						
19	Axial						
20	Helical						
21	Axial						
22	Helical						
23	Axial						
24	Helical						
25	Axial						
26	Helical						
27	Axial						
28	Helical						
29	Axial						
30	Helical						
31	Axial						

Axial and helical phantom acquisitions can be alternated every other day if desired. If either the mean CT number or the noise (standard deviation) is not within the Pass/Fail limit for 3 days in a row or 3 times within a 7-day period, corrective action should be taken by reporting the problem to service representatives for corrective repair. If any artifacts are observed, service must be contacted immediate to initiate corrective action.

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

Date of review

# CT QUALITY CONTROL VISUAL CHECKLIST

PERFORMED MONTHLY

Facility: \_\_\_\_\_ Room # \_\_\_\_\_ Unit: \_\_\_\_\_

		Month	1	2	3	4	5	6	7	8	9	10	11	12
		Day												
(Year)	Technologist's Initials													
Gantry	Table height indicator													
	Table Position Indicator													
	Angulation indicator													
	Laser localization light													
	High voltage cable/other cables													
	Smoothness of table motion													
	X-Ray on indicator													
Control Console	Exposure switch													
	Display window width/level													
	Panel switches/lights/meters													
	X-Ray on indicator													
	Door interlocks													
	Warning labels													
	Intercom switch													
Other (add as deemed appropriate)	Postings													
	Service records													
Pass = √ Fail = F Does not apply = NA														

Reviewed by: \_\_\_\_\_

Qualified Medical Physicist

\_\_\_\_\_ Date of review

Provided by: Radiation Services, Inc.

# Display Monitor Image Quality Evaluation

PERFORMED MONTHLY

Facility: \_\_\_\_\_ Room # \_\_\_\_\_ Unit: \_\_\_\_\_

Month		1	2	3	4	5	6	7	8	9	10	11	12
Day													
(Year)	Technologist's Initials												
<b>SMPTE Pattern Check:</b>													
Is each gray level step of the pattern distinguishable from the adjacent step?													
0%-5% low contrast target discernible?													
95%-100% low contrast target discernible?													
Are the alphanumeric characters sharp and in focus?													
Are the high-contrast line-pair images in each of the corners and center distinguishable and sharp?													
<b>Analysis of Glass and Screen Defects:</b>													
No visible scratches?													
No visible black points?													
No visible non-uniformities?													
Other?													

Pass = v ; Fail = F;

Does not apply = NA

Window Width: 100

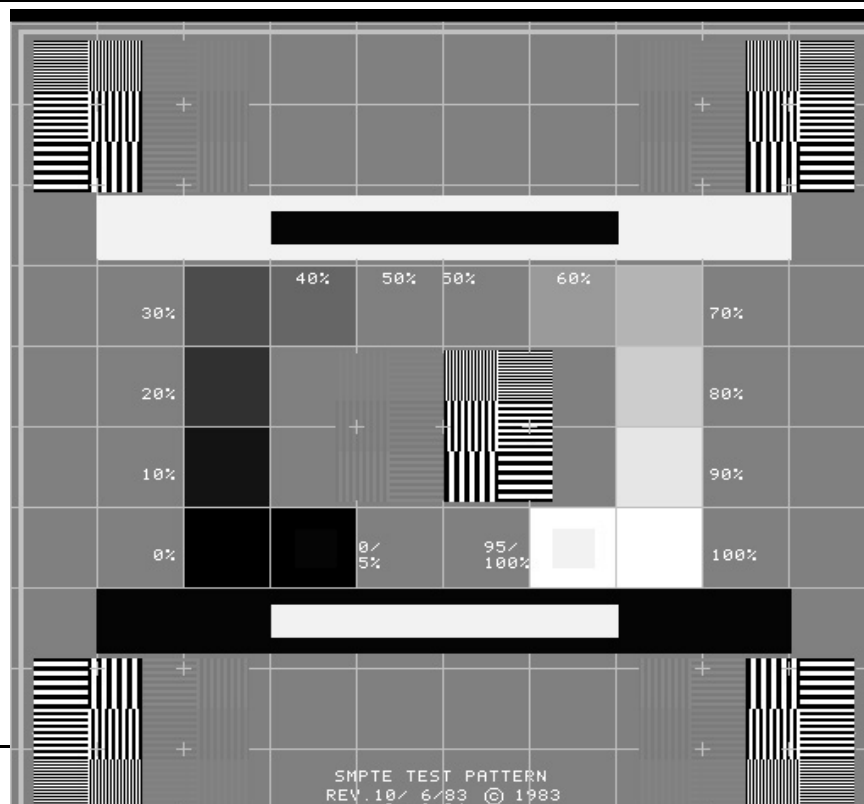
Window Level 1024

Otherwise, Manufacturer's recommended values should be used.

**Reviewed by:**

\_\_\_\_\_  
Qualified Medical Physicist

\_\_\_\_\_  
Date of Review



Provided by: Radiation Services, Inc.