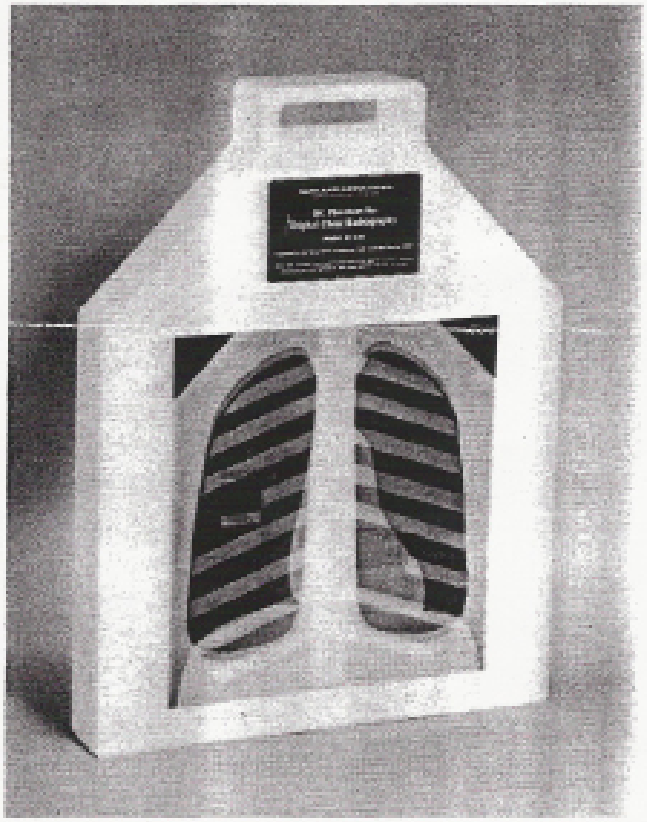
INSTRUCTION MANUAL

QC Phantom for Digital Chest Radiography*

Model 07-646

(CR) Portable Chest Exam and Thoravision System



*Developed at the Department of Radiology, Duke University Medical Center.

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(CR) PORTABLE CHEST EXAM

Baseline Definition Worksheet

Baseline tests performed by _____Date _____

EXPOSURE

Make three independent radiographs of the phantom as follows:
CR ST-V imaging plates, 14" x 17", lead-backed cassettes.
Plates scheduled and processed as "Portable CXR, Transverse AP".
X-ray tube head (anode?) oriented to top, 48" FFD.
Careful alignment, full-field exposure (collimate to phantom front face).
80 kVp, 3.0 mAs (100 mA, 30 mS), large focal spot size.

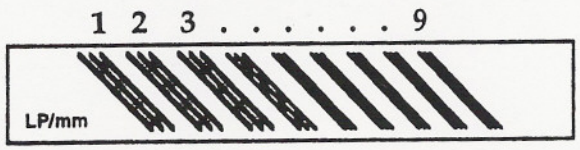
FILM ANALYSIS (Compute averages of values obtained from the three films.)

1. PCR: Record the <u>average L and S values</u> printed at the bottom of the film.
   "L" value: _____ (Transfer this value ± 0.10 to Results Log)
   "S" value: _____ (Transfer this value ±~25% to Results Log)
   Note: If any "L" value is significantly different, repeat that exposure.

2. Measure the <u>average optical density</u> (OD) within each of the 3 rings.
   "Lung" OD: _____ (Transfer this value ± 0.10 to Results Log)
   "Hearty" OD: _____ (Transfer this value ± 0.07 to Results Log)
   "Abdomen" OD: _____ (Transfer this value ± 0.05 to Results Log)

3. Examine the rows of circles in the <u>regional test objects</u>, and compute the <u>average total number of circles</u> that are visible in each chest region. On each film, estimate to the nearest 0.5 circles (count as o.5 if a circle is only partially visible):
   # circles in "Lung": _____ (Transfer value less 3.0 to Results Log)
   # circles in "Heart": _____ (Transfer value less 3.0 to Results Log)
   # circles in "Abdomen": _____ (Transfer value less 3.0 to Results Log)

4. In each film image, examine the line-pair phantom (below) and determine the <u>last visible line pattern</u> (1 through 9, counting from left). A line pattern should be counted as visible if both dark and light lines are discernable and separable over at least half their length (50%). Use a magnifying glass or loupe, if desired.



Last visible patterns: ___ ___ ___ (Transfer smallest value to Results Log)

<u>Photocopy the new Results Log and use copies to record future system QC tests.</u>
<u>Save all baseline films for future reference.</u>

Results Log for (CR) Portable Chest Exam
(Target values derived from Baseline Worksheet)

Tested by _____ Test Date _____

EXPOSURE

Make a radiograph of the phantom as follows:
CR ST-V imaging plates, 14" x 17" inch, lead-backed cassettes.
Plates scheduled and processed as "Portable CXR, Transverse AP".
X-ray tube head (anode?) oriented to top, 48" FFD.
Careful alignment, full-field exposure (collimate to cassette edges).
80 kVp, 3.0 mAs (100 mA, 30 mS), large focal spot size.

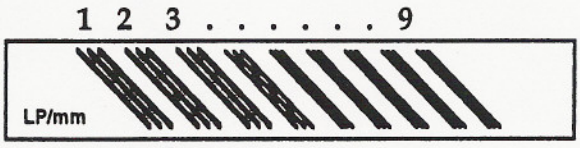
FILM ANALYSIS (Compare each result with accepted range and draw a check "✓" if okay.)

1. Record the L and S values printed at the bottom of the film.
   "L" value: _____ (Range _____ to _____) **Okay?** ____
   "S" value: _____ (Range _____ to _____) **Okay?** ____
   Note: If "L" value is out of range, a problem exists. Repeat that exposure.

2. Measure the optical density (OD) within each of the 3 rings.
   "Lung" OD: _____ (Range _____ to _____) **Okay?** ____
   "Hearty" OD: _____ (Range _____ to _____) **Okay?** ____
   "Abdomen" OD: _____ (Range _____ to _____) **Okay?** ____

3. Examine the rows of circles in the regional test objects, and count the total number of circles that are visible in each chest region. Estimate to the nearest 0.5 circles (count as 0.5 if circle is only partially vilsible):
   # circles in "Lung": _____ (Must be greater than _____) **Okay?** ____
   # circles in "Heart": _____ (Must be greater than _____) **Okay?** ____
   # circles in "Abdomen": _____ (Must be greater than _____) **Okay?** ____

4. Examine the line-pair phantom and determine the last visible line pattern (1 through 9, counting from left). A line pattern should be counted as vilsible if both dark and light lines are discernable and separable over at least half their length (50%). Use a magnifying glass or loupe, if desired:



Last line pattern: _____ (Must be at least _____) **Okay?** ____

If any test results above are NOT "okay," please notify service personnel.

THORAVISION SYSTEM

Baseline Definition Worksheet

Baseline tests performed by _____Date _____

EXPOSURE

Make three independent PA radiographs of the phantom as follows:
Careful alignment, "portrait" mode, no additional collimation.
Routine PA exposures - 120 kVp, phototimed.

FILM ANALYSIS (Compute averages of values obtained from the three films.)

1. Record the <u>average mAs value</u> from the values printed on the 3 films.

   Avgerage mAs value: _____ (Transfer this value ± 15% to Results Log)

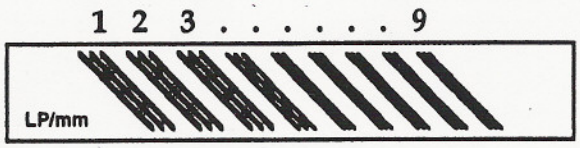
2. In each film image, measure the optical density (OD) within each of the 3 rings and compute the <u>average optlical density</u> for each region.

   Avg. "Lung" OD: _____ (Transfer this value ± 0.10 to Results Log)
   Avg. "Hearty" OD: _____ (Transfer this value ± 0.07 to Results Log)
   Avg. "Abdomen" OD: _____ (Transfer this value ± 0.04 to Results Log)

3. In each film, examine the rows of circles in the regional test objects and determine the <u>total number of circles</u> that are visible in each chest region. A circle should be counted as visible if at least 50% of it can be seen:

   # circles in "Lung": _____ (Transfer smallest value to Results Log)
   # circles in "Heart": _____ (Transfer smallest value to Results Log)
   # circles in "Abdomen": _____ (Transfer smallest value to Results Log)

4. In each film image, examine the line-pair phantom (below) and determine the <u>last visible line pattern</u> (1 through 9, counting from left). A line pattern should be counted as visible if both dark and light lines are discernable and separable over at least half their length (50%). Use a magnifying glass or loupe, if desired.



Last visible patterns: ___ ___ ___ (Transfer smallest value to Results Log)

<u>Photocopy the new Results Log and use copies to record future system QC tests.</u>
<u>Save all baseline films for future reference.</u>

Results Log for Thoravision System

Tested by _____ Test Date _____

EXPOSURE

Make a routine PA radiograph of the phantom as follows:
Careful alignment, "portrait" mode, no additional collimation.
Routine PA exposures-120 kVp, phototimed.

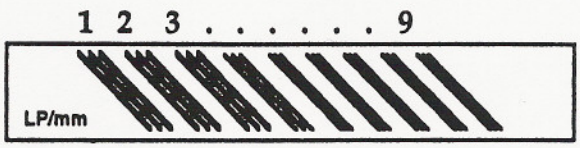
FILM ANALYSIS (Compare each result wilth accepted range and draw a check "✓" if okay.)

1. Record the mAs value printed on the film.
   mAs: _____ (Range _____ to _____) **Okay?** ____

2. Measure the optical density (OD) within each of the 3 rings.
   "Lung" OD: _____ (Range _____ to _____) **Okay?** ____
   "Hearty" OD: _____ (Range _____ to _____) **Okay?** ____
   "Abdomen" OD: _____ (Range _____ to _____) **Okay?** ____

3. Count the number of circles that are visible in the contrast-detail matrix in each chest region. A circle should be counted as visible if at least 50% of it can be seen:
   # circles in "Lung": _____ (Must be at least _____) **Okay?** ____
   # circles in "Heart": _____ (Must be at least _____) **Okay?** ____
   # circles in "Abdomen": _____ (Must be at least _____) **Okay?** ____

4. Examine the line-pair phantom and determine the last visible line pattern (1 through 9, counting from left). A line pattern should be counted as vilsible if both dark and light lines are discernable and separable over at least half their length (50%). Use a magnifying glass or loupe, if desired:



Last line pattern: _____ (Must be at least _____) **Okay?** ____

If any test results above are NOT "okay," please notify service personnel.