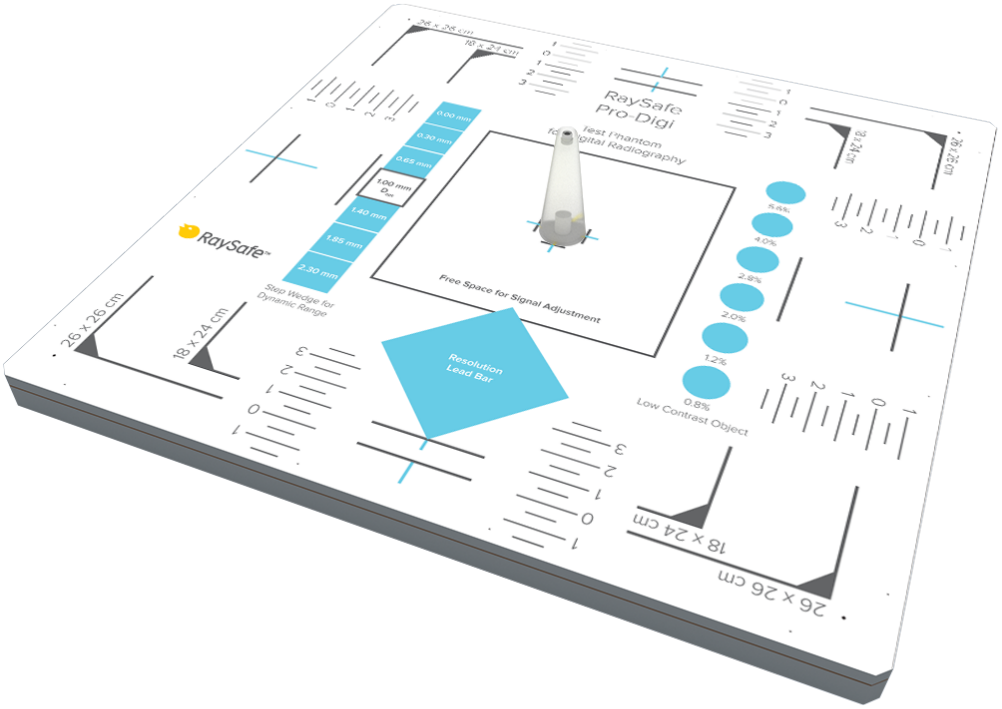
USER MANUAL

Pro-Digi Phantom



RaySafe™

ABOUT THE PRO-DIGI PHANTOM

The Pro-Digi phantom is dedicated for acceptance and constancy tests of digital radiography equipment. It can be used to measure:

- collimation and beam alignment
- position and size of the effective radiation field
- dynamic range
- spatial resolution
- contrast resolution
- homogeneity

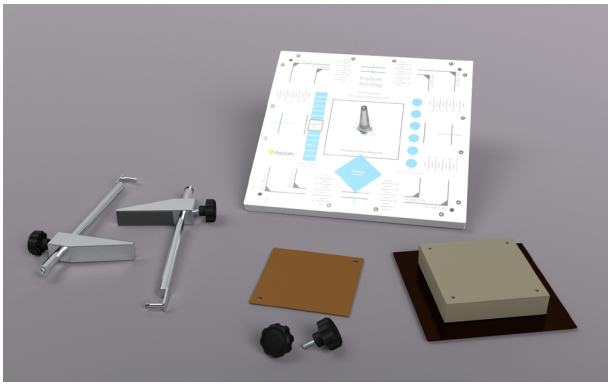


Figure 1. Phantom with accessories.

SPECIFICATIONS

Phantom size	308 × 308 × 12 mm (12.1 × 12.1 × 0.47 in)
Phantom weight	2.46 kg (5.42 lbs)
Features	• 1 mm thick copper plate embedded in PMMA • 7-step copper wedge • 6 low contrast elements • free area for signal calibration • markings to determine the size and position of the effective radiation field • pattern for the line pair resolution evaluation (from 0.6 to 5.0 LP/mm) • cone for control of beam perpendicularity within ± 1.5° • mounting for bucky
Standard	Complies with IEC 61223-3-1, DIN 6868-58 and DIN 6868-13. CE certified.

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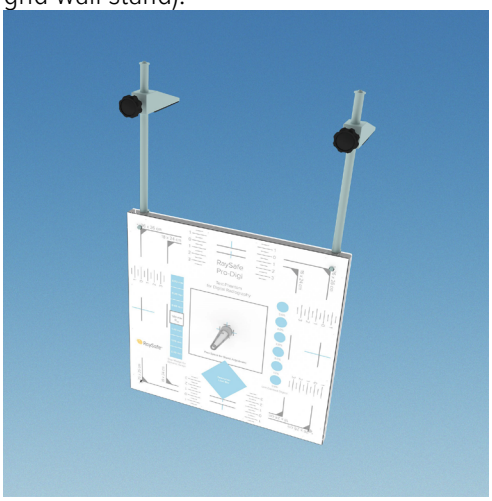
TEST PROCEDURE

1. Place the Pro-Digi phantom on the table. (Bucky holder should be used when performing tests on bucky grid wall stand).



2. Set the distance between the focal spot and the detector (FDD) to at least 1 m. Make a note of the FDD.
3. Position the phantom so its center and main axis align with the light marker of the apparatus.
4. Narrow the light field (which should represent the X-ray field) to the chosen markings on the phantom.
5. It is advised to use an additional 25 mm aluminium filter (patient equivalent) in this test. The Al 25 filter should be mounted in rails under the X-ray tube or placed above the phantom on the Stand. An additional Cu 1 filter should be attached to Al 25 while performing tests above 100kV.
6. Mount the cone if the perpendicularity will be tested. (See “Central beam alignment” on page 5.)
7. Make the exposure. You can use automatic or manual mode to produce desired contrast.
8. For constancy testing, be sure to always use the same generator settings.
9. Send the image to the workstation. All test results should be evaluated using raw images (without any post-processing) and diagnostic quality monitors. Analyze the image and evaluate according to the examples on the following pages.

NOTE! Be sure to comply with your local regulations.

TEST EVALUATION

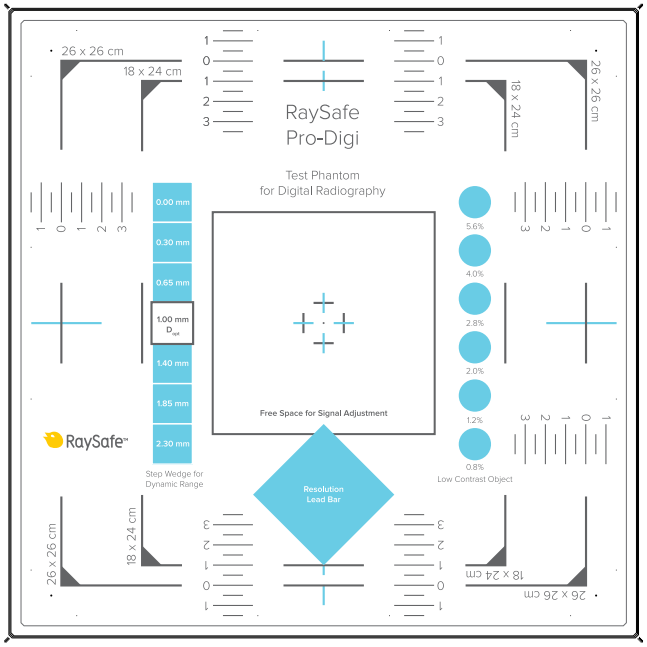


Figure 2. Surface markings for test structures

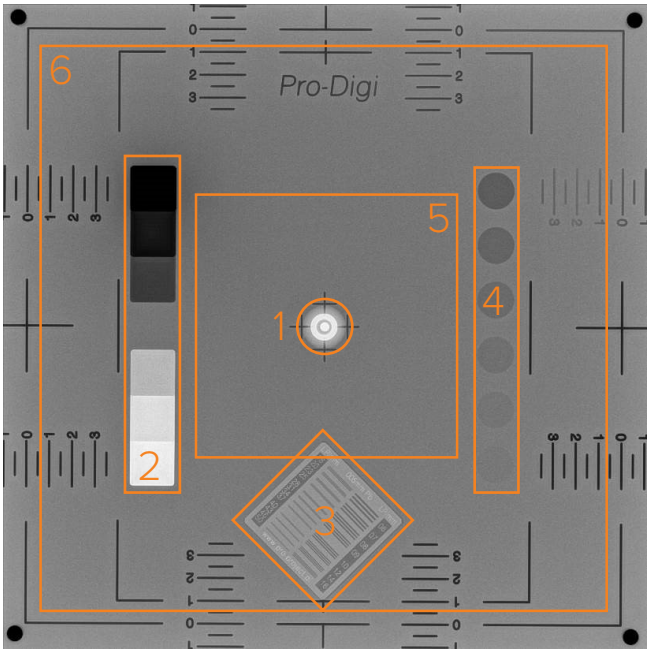


Figure 3. X-ray image of the phantom, with test structures: 1: Central beam alignment, 2: Dynamic range, 3: Spatial resolution, 4: Contrast resolution, 5: Homogeneity, 6: Collimator light field and beam alignment

CENTRAL BEAM ALIGNMENT

Use the center cone to determine if the X-ray beam is perpendicular to the image receptor and centered with respect to the light field.

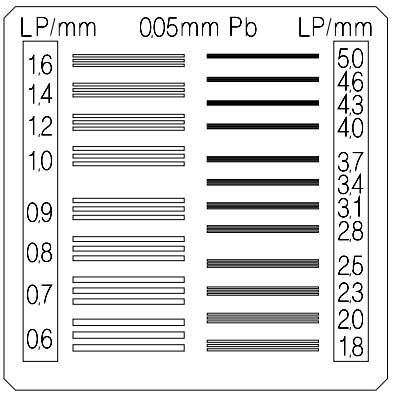
When the dot is inside the circle, the deviation from a perpendicular beam is less than 1.5°.

DYNAMIC RANGE

EXAMPLE *All seven different shades of gray should be visible.*

SPATIAL RESOLUTION

Use the zoom tool on a workstation to determine the line pairs per millimeter resolution. You should be able to distinguish three separate lines.



EXAMPLE *The high contrast resolution should not change over time and should be within the values used in the resolution lead bar.*

CONTRAST RESOLUTION

EXAMPLE *All six low contrast objects should be visible and should not change over time.*

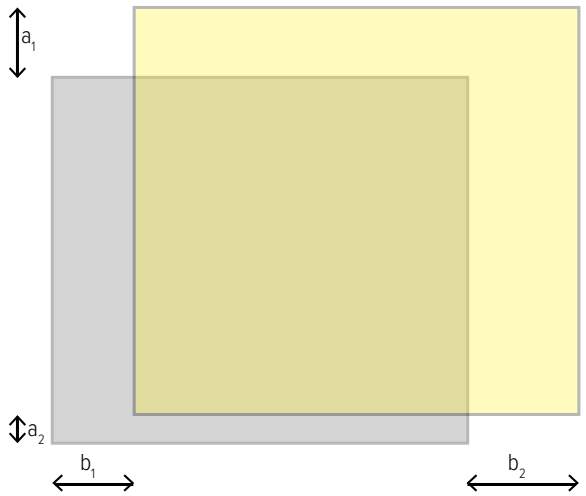
HOMOGENEITY

Structure 5 in Figure 3 on page 4.

EXAMPLE *Free space for signal adjustment in the center of the phantom should be homogeneous and free of any artifacts.*

COLLIMATOR LIGHT FIELD AND BEAM ALIGNMENT

Measure the distance between the light field borders (step 4 of the "Test procedure" on page 3) and the actual X-ray beam borders (structure 6 in Figure 3 on page 4). Use the scale on the phantom. Make a note of the distances (see figure below).



EXAMPLE *The sum of differences between the light and the X-ray field in each direction should be less than 2% of the FDD (focal spot to detector distance)*
$|a_1| + |a_2| \leq 0.02 \times FDD$ *and* $|b_1| + |b_2| \leq 0.02 \times FDD$

WARRANTY

Unfors RaySafe warrants to the original product purchaser that each product it manufactures will be free from defects in material and workmanship under normal use and service. The warranty period is 12 months and begins on the date of delivery.