



Expect Service

Radiation Products Design Inc

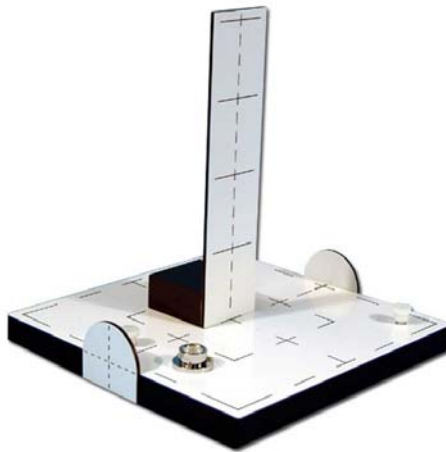
INSTRUCTIONS

RPD INFORMATION

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RPD PRODUCT INFORMATION

Item Number	Description
710-040	T.A.D. Therapy Alignment Device



INTRODUCTION

The T.A.D. Therapy Alignment Device provides a quick means of verifying the alignment of the geometric parameters of an accelerator, simulator or a CT scanner. This device will facilitate adjustments to re-align the geometric parameters if needed. The T.A.D is a beneficial tool for any department's quality assurance program.

ACCELERATOR TESTS

1. Central Axis Crosshair Test with Collimator Light
2. Collimator Rotation Readout Test
3. Collimator Rotation Test with 90° Gantry Rotation using Collimator Light
4. Light Field vs. Radiation Field,
10 cm x 10 cm and 20 cm x 20 cm Using Divergent Pins
5. Gantry Rotation and Readout Test Using Film or Image Receptor
6. Laser Test: Side, Overhead and Sagittal Lasers
7. Optical Distance Indicator Check Over a 20 cm Range
8. Couch Movements and Scales Test Over 20 cm Range
9. Couch Vertical Travel Wander
10. Couch Rotation Scale Test

ACCELERATOR TEST SET UP

Set the Accelerator gantry to a vertical position and all angles (gantry, collimator and treatment couch) should be set to 0° rotation. Set the couch left/right position to zero and the in/out position so the gantry end of the couch is 30 cm past isocenter. Set couch top to isocenter.

Set a 20 cm x 20 cm field size.

Place the T.A.D. base plate on the couch with the half-moon sides towards the side lasers. Level base plate and align base plate markings to the Central Axis crosshairs and side lasers. Lower the couch to set isocenter distance to the top of the base plate.

ACCELERATOR TESTING

1. Central Axis Crosshair Test with Collimator Light

With gantry vertical, rotate collimator 180° and back to zero, central axis crosshair should remain on center hole of base plate.

2. Collimator Rotation Readout Test

Rotate collimator 90° CW and CCW using collimator readout, crosshairs should align with 90° marks on base plate.

3. Collimator Rotation Test with 90° Gantry Rotation using Collimator Light

Rotate gantry 90° CW, crosshairs should be on center cross on the half-moon side plate. Rotate collimator 180° and back to zero, crosshairs should remain on center cross on the half-moon side plate. Rotate gantry 90° CCW and repeat.

4. Light Field vs. Radiation Field: 10 cm x 10cm and/or 20 cm x 20cm

Rotate gantry and collimator to 0° making sure top of the base plate is set to isocenter. Set a 10 cm x 10 cm or 20 cm x 20 cm field size. If using film place film under base plate and re-align and set isocenter to top of base plate. The extra tungsten pin can be placed in the center hole if desired. Make exposure through the base plate exposing film or image receptor. The four divergent tungsten pins set in the corners of the fields will show if radiation and light field are in agreement. If using the center tungsten pin, this will show central axis crosshair to be accurate. Remove film, realign base plate and set isocenter to top of base plate.

5. Gantry Rotation and Readout Test Using Film or Image Receptor

Rotate gantry CW to 90°. Make an exposure through the base plate to expose a lateral film or the image receptor. The tungsten pins will be visible as one tungsten pin over the other for true 90°. Check gantry readout for accuracy. Repeat in CCW direction.

6. Laser Test: Side, Overhead and Sagittal Lasers

Lasers should all intersect on the cross marks of the base plate and half-moon side plate.

7. Optical Distance Indicator Check Over a 20 cm Range

Place the ODI Scale on the leveling base plate with the scale facing the ODI light source and the front edge of ODI scale aligned with central axis on base plate. ODI readings will be visible from 100 cm to 80cm. Lower or raise couch for more readings.

8. Couch Movements and Scales Test Over 20 cm Range

Set Isocenter to top of base plate. Place the ODI Scale on the leveling base plate with the scale facing a side laser. Lower couch 5 cm and verify couch scale, repeat to 20 cm.

Raise couch to set isocenter to top of base plate. Remove ODI Scale, collimator gantry and couch rotation should all be at 0°, turn on the collimator light. The cross hairs should align to the center of the base plate. Couch movement and scales can be checked in four directions using the 5 cm and 10 cm marks on the base plate.

9. Couch Vertical Travel Wander

Set Isocenter to top of base plate. Make sure gantry, collimator and couch rotation are set to 0°, turn on the collimator light. The cross hairs should align to the center of the base plate. Raise and lower the couch, visually checking to make sure the cross hairs remain in the center hole of the base plate.

Another way to do this test is to place the ODI Scale on the leveling base plate and align the center line of the ODI scale with a side laser. Lower couch over 20 cm. Laser must stay on center line of ODI scale, if laser moves off of the center line, the couch is not traveling vertical.

10. Couch Rotation Scale Test

Move couch to set isocenter to top of base plate and turn on the collimator light. Rotate the couch CW and CCW 90°, the cross hairs should intersect on the center hole of the base plate.

CT TESTS

1. CT Couch Vertical Scale and Travel Test
2. CT Laser Vertical Travel Test Over 20 cm
3. CT Cut to Laser Line Test
4. Review CT Cut for Couch Center Alignment and Height
5. Review CT Cut to Horizontal Distance Scale
6. CT Gantry Vertical Test

CT TEST SET UP

Set the CT gantry to a vertical position. Place the T.A.D. base plate on the couch with the half-moon sides towards the head and foot end of the couch, 30 cm from the head end and in the center L and R of couch. Level the base plate. Align base plate with side and sagittal lasers.

CT TESTING

1. CT Couch Vertical Scale and Travel Test

Place the ODI Scale on the leveling base plate and align the center line of the ODI scale with a side laser. Lower couch over 20 cm stopping at 5 cm marks and verify couch scales are reading correctly. Laser must stay on center line. If laser moves off center line, couch is not traveling vertical.

2. CT Laser Vertical Travel Test Over 20 cm

Place the ODI Scale on the leveling base plate and align the center line of the ODI scale with a side Laser. Raise the laser over 20 cm stopping at 5 cm marks and verify laser scales are reading accurately.

3. CT Cut to Laser Line Test

Lower the couch to set isocenter distance to the top of the base plate with the side lasers intersecting the center line on the base plate. Move the couch into the CT so the gantry laser line aligns with the center line on the base plate. Take a CT cut at this position. All four $\frac{3}{4}$ mm aluminum balls should appear on this cut.

4. Review CT Cut for Couch Center Alignment and Height

Review CT cut to check that the balls and the center hole are in the center of the couch.

5. Review CT Cut to Horizontal Distance Scale

CT horizontal distance scale can be checked at 0 cm, 8 cm, 13 cm, and 21 cm; as the $\frac{3}{4}$ mm Aluminum Balls are spaced with the inside balls 2.5 cm off center (5 cm apart) and the outside balls are spaced at 10.5 cm off center (21 cm apart).

6. CT Gantry Vertical Test

Keeping the base plate in the same position as Step 3. Raise the couch in the CT scanner as high as feasible. The laser should remain on the center line during the movement; take a CT cut at this position. Lower the couch as low as feasible and take another CT cut. All four $\frac{3}{4}$ mm aluminum balls should appear on both cuts indicating that the CT Gantry is vertical.

TESTING RESULTS

Tolerance of the testing results of all geometric parameters are typically 1 to 2 mm. Awareness of each machine's specifications from the manufacturer is very important in acceptance of testing results. The T.A.D can be utilized for proper alignment if adjustments are needed.

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