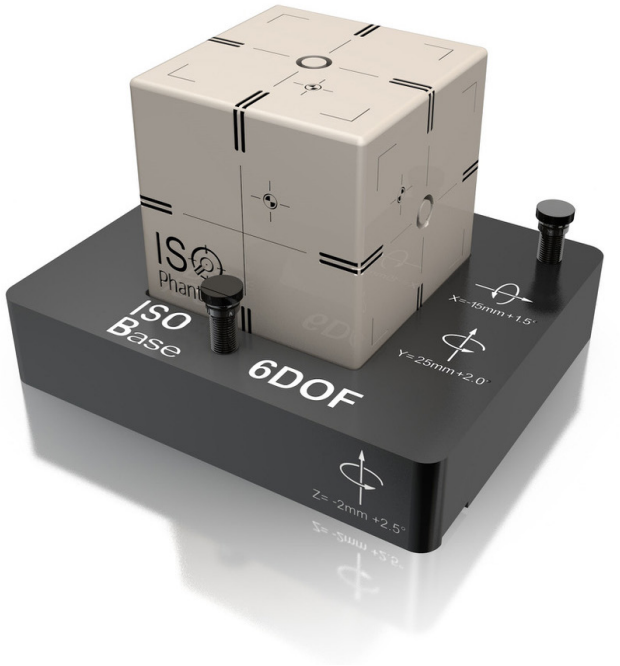
6DOF ISO Base

Model 023-08



QUICKLY ASSESS ROTATION AND TRANSLATION SHIFTS

The CIRS 6DOF ISO Base, Model 023-08 is an optional accessory of ISO phantom. It is designed for positioning and leveling of the ISO phantom and quick calculation of complex 3D shifts of RT treatment systems with an integrated robotic couch.

There are two milled pockets on the CIRS 6DOF ISO Base. The ISO alignment pocket can be used to position and level the ISO phantom on the treatment couch. It contains a set of four Tungsten spheres that are used by ISO Analyze™ Software to calculate the actual Pixel Size for both the MV and kV image detectors.

When positioned in the shifted 6DOF pocket, internal structures of the ISO phantom allow for the calculation of rotation and translation shifts. The shifted 6DOF pocket is machined with the mechanical limits of commercially available couches in mind, which can correct for pitch, roll and yaw of +/- 3 degrees of rotation. The 6DOF pocket is rotated within the IEC 61217 Coordinate System, +1.5º about X-axis, +2.0º about Y-axis and +2.5º about Z-axis and translated -15 mm on X-axis and +25 mm on Y-axis. The translations about the X and Y-axes are applied with respect to the ISO center of ISO phantom. Having rotational shifts smaller than the mechanical limits of the robotic couches allows the user to determine if there are errors on either side of the induced shift.

Both the ISO alignment pocket and the 6DOF pocket are CNC machined in a single setup. The 6DOF ISO Base is also assembled as a single piece to minimize cumulative assembly errors.

Benefits

- Fully compatible with all ISO phantom and ISO Analyze Software
- 6DOF ISO Base pockets allow easy position of ISO phantom for ISO Center and Couch shift checks
- Compute kV and MV pixel size with embedded BBs
- Machined in single set up to minimize setup errors
- Integrated leveling feet allow fine alignment adjustments
- Milled slot enables indexing with most localization bars

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Tissue Simulation & Phantom Technology

6DOF ISO BASE

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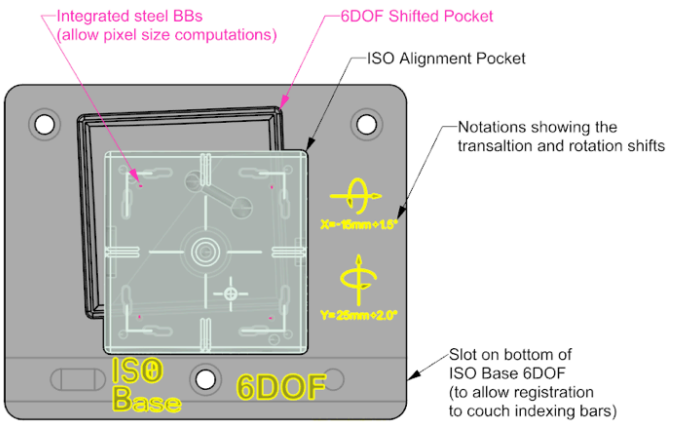
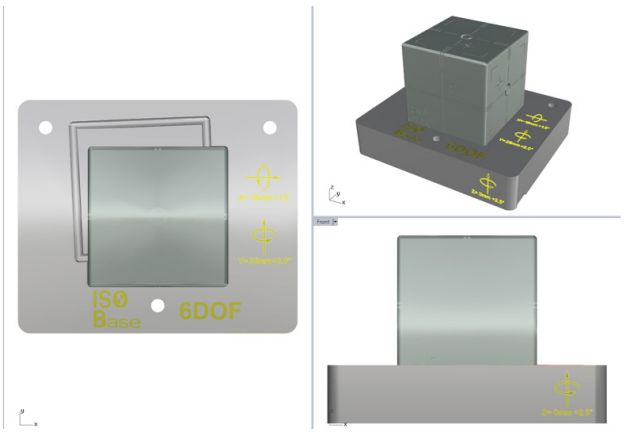
1. Acquire Image Reference Set



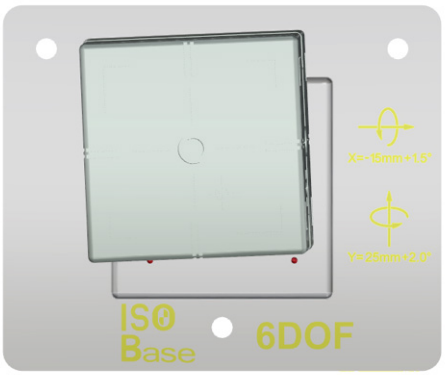
Align the ISO phantom to the imaging system that is to be used to acquire the image reference set. To do this, place the ISO base on the couch of the imaging system (CT) and register it to an indexing bar. Use a high quality spirit level and level it. Place the ISO Phantom in the ISO alignment pocket.

2. Transfer Reference to R&V



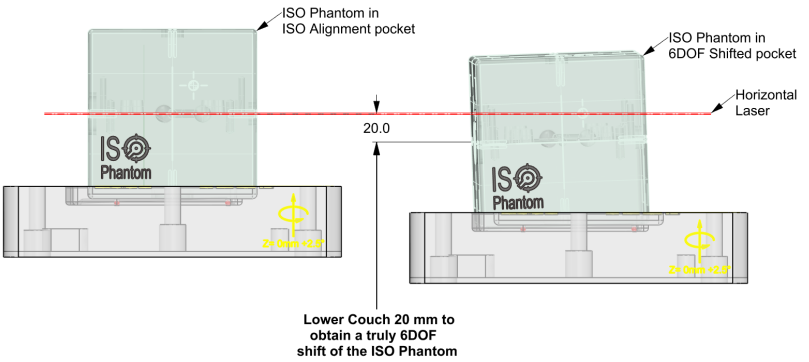
Once the reference image set is acquired, the user can make a plan, simulation CT and DRRs based on it and transfer them to the R&V software suite for creation of a daily imaging QA patient.

3. Daily QA Shifts Setup



For daily QA checks of the degrees of freedom shifts the ISO base is registered to an indexing bar of the Linac couch and leveled. The ISO phantom is then placed in the ISO alignment pocket and the whole assembly is aligned to the Linac's light field and lasers by translating only the couch about the orthogonal axes. Providing that the MV and kV pixel size is to be calculated, acquire the corresponding planar images that were defined in the ISO Analyze software for these two parameters. Remove the ISO phantom from the ISO Alignment pocket and carefully place it in the 6DOF shifted pocket. Make sure the ISO phantom rests firmly against the bottom of the 6DOF shifted pocket and against the sides of the deepest corner of this pocket.

4. 6DOF Shifts Calculations



Take a set of images that are to be used by the system to calculate the rotation and translation shifts. Apply the calculated couch shifts and take another set of images, which now should produce shifts that are close to zero. The difference between zero and the actual values for each individual shift should be within the setup tolerances.

Publication: 023-08 DS 120418

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