

DICOM Correction Item

Correction Number		CP- 617
Log Summary: Support for Patient Positioner Pitch and Roll Angles		
Type of Modification	Name of Standard	
Addition	PS 3.3 2006	
Rationale for Correction:		
<p>The motion of modern patient support devices is no longer limited to rotations around the Z-axis in the IEC Fixed Coordinate system. The latest generation of patient support tables can perform additional rotations – rolling around the longitudinal axis and pitching around the transverse axis. Another possibility is a robotic arm, that may have 3 rotational and 3 translational degrees of freedom. Furthermore, it is quite common in proton therapy to use a treatment chair, where the patient can be rotated and tilted, while the beamline has a fixed direction.</p>		
Sections of documents affected:		
Part 3 (Information Object Definitions), Section C.8.8.2 (RT Image Module) Section C.8.8.11 (RT Tolerance Table Module) Section C.8.8.14 (RT Beams Module) Section C.8.8.21 (RT Beams Session Record Module)		
Correction Wording:		

In Part 3.3, Section C.8.8.2, Table C.8-38 (RT Image Module Attributes), add the following attributes after Table Top Eccentric Angle (300A,0125):

Attribute Name	Tag	Type	Attribute Description
<u>Table Top Pitch Angle</u>	<u>(300A,0140)</u>	<u>3</u>	<u>Table Top Pitch Angle, i.e. the rotation of the IEC TABLE TOP coordinate system about the X-axis of the IEC TABLE TOP coordinate system (degrees). See C.8.8.25.6.2</u>
<u>Table Top Roll Angle</u>	<u>(300A,0144)</u>	<u>3</u>	<u>Table Top Roll Angle, i.e. the rotation of the IEC TABLE TOP coordinate system about the Y-axis of the IEC TABLE TOP coordinate system (degrees). See C.8.8.25.6.2</u>

In Part 3.3, Section C.8.8.14, Table C.8-50 (RT Beams Module Attributes), add the following attributes after Table Top Eccentric Rotation Direction (300A,0126):

Attribute Name	Tag	Type	Attribute Description
Beam Sequence	(300A,00B0)	1	Introduces sequence of treatment beams for current RT Plan. One or more items may be included in this sequence.
...			

Attribute Name	Tag	Type	Attribute Description
>Control Point Sequence	(300A,0111)	1	Introduces sequence of machine configurations describing treatment beam. Two or more items may be included in this sequence. See C.8.8.14.5 and C.8.8.14.6.
...			
>> Table Top Pitch Angle	(300A,0140)	1C	Table Top Pitch Angle, i.e. the rotation of the IEC TABLE TOP coordinate system about the X-axis of the IEC TABLE TOP coordinate system (degrees). If required by treatment delivery device, shall be present for first item of Control Point Sequence. If required by treatment delivery device and if Table Top Pitch Angle changes during Beam, shall be present in all subsequent items of Control Point Sequence. See C.8.8.25.6.2
>> Table Top Pitch Rotation Direction	(300A,0142)	1C	Direction of Table Top Pitch Rotation when viewing the table along the positive X-axis of the IEC TABLE TOP coordinate system, for segment following Control Point. If required by treatment delivery device, shall be present for first item of Control Point Sequence. If required by treatment delivery device and if Table Top Pitch Rotation Direction changes during Beam, shall be present in all subsequent items of Control Point Sequence. See C.8.8.14.8 and C.8.8.25.6.2. Enumerated Values: CW = clockwise CC = counter-clockwise NONE = no rotation
>> Table Top Roll Angle	(300A,0144)	1C	Table Top Roll Angle, i.e. the rotation of the IEC TABLE TOP coordinate system about the IEC Y-axis of the IEC TABLE TOP coordinate system (degrees). If required by treatment delivery device, shall be present for first item of Control Point Sequence. If required by treatment delivery device and if Table Top Roll Angle changes during Beam, shall be present in all subsequent items of Control Point Sequence. See C.8.8.25.6.2
>> Table Top Roll Rotation Direction	(300A,0146)	1C	Direction of Table Top Roll Rotation when viewing the table along the positive Y-axis of the IEC TABLE TOP coordinate system, for segment following Control Point. If required by treatment delivery device, shall be present for first item of Control Point Sequence. If required by treatment delivery device and if Table Top Roll Rotation Direction changes during Beam, shall be present in all subsequent items of Control Point Sequence. See C.8.8.14.8 and C.8.8.25.6.2. Enumerated Values: CW = clockwise CC = counter-clockwise NONE = no rotation

In Part 3.3, Section C.8.8.21, Table C.8-57 (RT Beams Session Module Attributes), add the following attributes after Table Top Eccentric Rotation Direction (300A,0126):

Attribute Name	Tag	Type	Attribute Description
Treatment Session Beam Sequence	(3008,0020)	1	Introduces sequence of Beams administered during treatment session. The sequence may contain one or more items.
...			
>Control Point Delivery Sequence	(3008,0040)	1	Introduces sequence of beam control points for current treatment beam. The sequence may contain one or more items. See C.8.8.21.1.
...			
>> Table Top Pitch Angle	(300A,0140)	1C	Table Top Pitch Angle, i.e. the rotation of the IEC TABLE TOP coordinate system about the X-axis of the IEC TABLE TOP coordinate system (degrees). If required by treatment delivery device, shall be present for first item of Control Point Sequence. If required by treatment delivery device and if Table Top Pitch Angle changes during Beam Delivery, shall be present in all subsequent items of Control Point Sequence. See C.8.8.25.6.2
>> Table Top Pitch Rotation Direction	(300A,0142)	1C	Direction of Table Top Pitch Rotation when viewing the table along the positive X-axis of the IEC TABLE TOP coordinate system, for segment following Control Point. If required by treatment delivery device, shall be present for first item of Control Point Sequence. If required by treatment delivery device and if Table Top Pitch Rotation Direction changes during Beam Delivery, shall be present in all subsequent items of Control Point Sequence. See C.8.8.14.8 and C.8.8.25.6.2. Enumerated Values: CW = clockwise CC = counter-clockwise NONE = no rotation
>> Table Top Roll Angle	(300A,0144)	1C	Table Top Roll Angle, i.e. the rotation of the IEC TABLE TOP coordinate system about the Y-axis of the IEC TABLE TOP coordinate system (degrees). If required by treatment delivery device, shall be present for first item of Control Point Sequence. If required by treatment delivery device and if Table Top Roll Angle changes during Beam Delivery, shall be present in all subsequent items of Control Point Sequence. See C.8.8.25.6.2

Attribute Name	Tag	Type	Attribute Description
>> Table Top Roll Rotation Direction	(300A,0146)	1C	Direction of Table Top Roll Rotation when viewing the table along the positive Y-axis of the IEC TABLE TOP coordinate system, for segment following Control Point. If required by treatment delivery device, shall be present for first item of Control Point Sequence. If required by treatment delivery device and if Table Top Roll Rotation Direction changes during Beam Delivery, shall be present in all subsequent items of Control Point Sequence. See C.8.8.14.8 and C.8.8.25.6.2. Enumerated Values: CW = clockwise CC = counter-clockwise NONE = no rotation

In PS 3.3, Section C.8.8.11, Table C.8-47 (RT Tolerance Tables Module Attributes), add the following attributes after Table Top Eccentric Angle Tolerance (300A,004E):

Attribute Name	Tag	Type	Attribute Description
Tolerance Table Sequence	(300A,0040)	3	Introduces sequence of tolerance tables to be used for delivery of treatment plan. One or more items may be included in this sequence. See Note 1.
...			
> Table Top Pitch Angle Tolerance	(300A,004F)	3	Maximum permitted difference (in degrees) between the planned and delivered Table Top Pitch Angle.
> Table Top Roll Angle Tolerance	(300A,0050)	3	Maximum permitted difference (in degrees) between the planned and delivered Table Top Roll Angle.

In PS 3.3, add Section C.8.8.25.6.2:

C.8.8.25.6.2 Table Top Pitch Angle and Table Top Roll Angle

Pitch and Roll Angles of the Table Top are not defined in IEC 61217. These angles are defined in the DICOM standard in a way compatible with the current notion of IEC by introducing them as rotations of the IEC Table Top System as indicated below.

The Table Top Pitch Angle is defined as the rotation of the coordinate axes Yt, Zt about axis Xt by an angle ψ_t ; see figure 1 below. An increase in the value of angle ψ_t corresponds to the clockwise rotation of the Table Top as viewed from the Table Top coordinate system origin along the positive Xt axis.

The Table Top Roll Angle is defined as the rotation of the coordinate axes Xt, Zt about axis Yt by an angle ϕ_t ; see figure 2 below. An increase in the value of angle ϕ_t corresponds to the clockwise rotation of the Table Top as viewed from the Table Top coordinate system origin along the positive Yt axis.

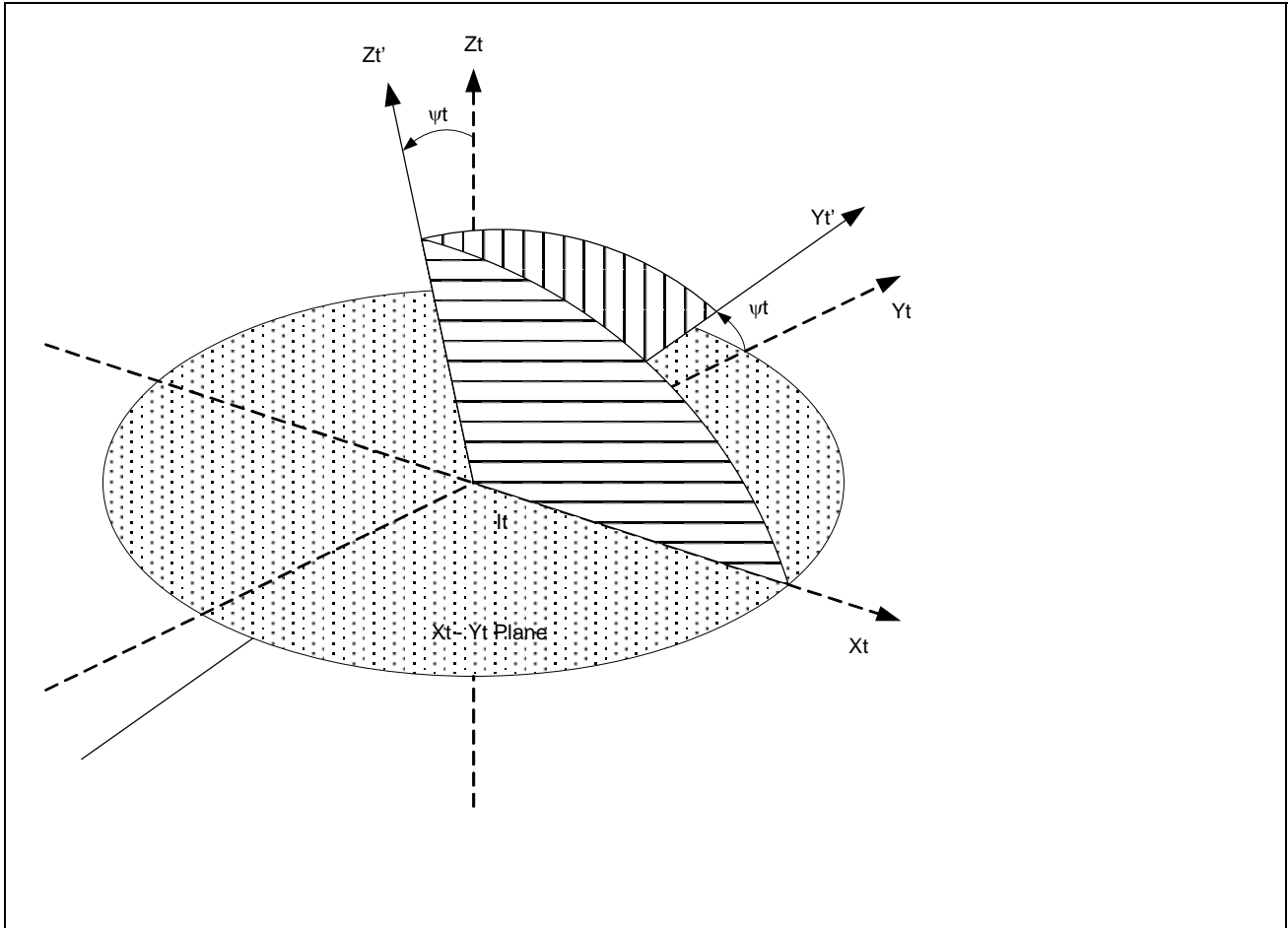


Figure 1: Table Top Pitch Angle

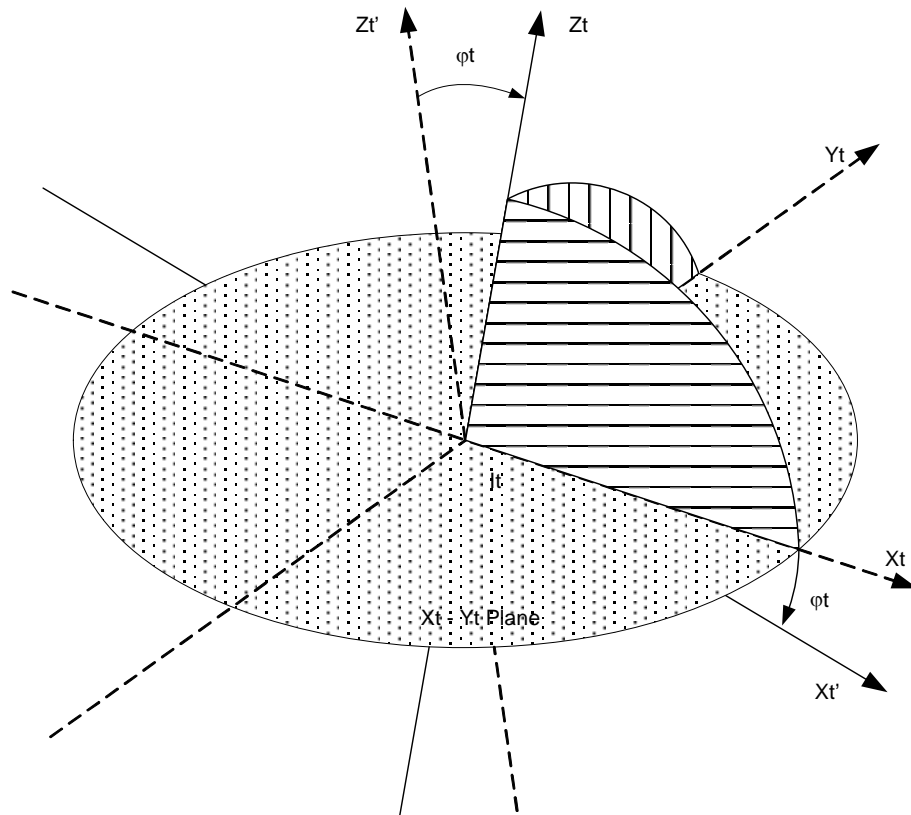


Figure 2: Table Top Roll Angle