

DICOM Correction Item

Correction Number		CT-781
Log Summary: CT Exposure Time for Spiral Scan		
Type of Modification	Name of Standard	
Correction	PS3.3 – 2007	
Rationale for Correction		
The definition of the “Exposure Time in ms (0018,9328)” for Spiral Scan is not precise and shall be adapted. Within a SPIRAL acquisition the effective exposure time of a frame shall be calculated by means of the Rotation Time divided by the Pitch Factor.		
Sections of documents affected		
PS 3.3 C.8.15.3.8		
Correction Wording:		

Change to PS 3.3 2006 Table C.8-124 EXPOSURE MACRO ATTRIBUTES

C.8.15.3.8 CT Exposure Macro

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**Table C.8-124
 CT EXPOSURE MACRO ATTRIBUTES**

Attribute Name	Tag	Type	Attribute Description
...			
> Exposure Time in ms	(0018,9328)	1C	Duration of exposure for this frame in milliseconds. <u>If Acquisition Type (0018,9302) equals SPIRAL the duration of exposure shall be weighted the exposure time for this frame shall be the Revolution Time (0018,9305) divided by the Spiral Pitch Factor (0018,9311). See C.8.15.3.8.1.</u> Required if Frame Type (0008,9007) Value 1 of this frame is ORIGINAL. May be present otherwise.
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Add new section to PS 3.3 2006 C.8.15.3.8

C.8.15.3.8.1 Exposure Time in ms Attribute (Informative)

An example how the value of Exposure Time in ms (0018,9328) can be calculated:

The Exposure Time $T_{\text{exposuretime}}$ of a volume shall be the time of the X-ray radiation in position with this volume. It depends on the travel speed and the total collimation width.

$T_{\text{exposuretime}}$ of the volume represented by a distinguished frame of a Spiral Scan can be calculated as follows:

$$T_{\text{exposuretime}} = N \times S / V_{\text{travelspeed}}$$

$$CT_{\text{pitchfactor}} = DD / N \times S$$

$$V_{\text{travelspeed}} = DD / T_{\text{revolutiontime}}$$

From this the exposure time can be derived:

$$T_{\text{exposuretime}} = N \times S \times T_{\text{revolutiontime}} / DD = T_{\text{revolutiontime}} / CT_{\text{pitchfactor}}$$

Legend:

DD =	Table Feed per Rotation (0018,9310) in mm distance moved by the patient support in the z direction per 360° revolution in Spiral scanning
S =	collimation of a single slice in mm
N =	number slices
N x S =	Total Collimation Width (0018, 9307) in mm
$V_{\text{travelspeed}}$ =	Table Speed (0018,9309) in mm/second, travel speed of the patient table
$T_{\text{revolutiontime}}$ =	Revolution time (0018,9305) in seconds
$CT_{\text{pitchfactor}}$ =	Spiral Pitch Factor (0018,9311)