

Absolute Dose Values in Computed Tomography

SOMATOM Definition Flash

Reference values		Switzerland ¹	Germany ²	European Union ³	USA ⁴
Head Routine	CTDI _{vol} [mGy]	65	65	60	75
Thorax Routine	CTDI _{vol} [mGy]	15	12	30	n.a.
Abdomen Routine	CTDI _{vol} [mGy]	15	20	35	25

Default Siemens Protocol		Standard values*	Standard SAFIRE values***	Study values**	Comparable value
Head Routine	CTDI _{vol} [mGy]	59	41	45 ⁵	
Thorax Routine	CTDI _{vol} [mGy]	7.4	4.4	1.5 ⁶	
Abdomen Routine	CTDI _{vol} [mGy]	14	10	6.5 ⁷	

- 1 Bundesamt für Gesundheit (Merkblatt R-06-06, Diagnostische Referenzwerte in der Computertomographie, 01.04.2010)
- 2 Bundesamt für Strahlenschutz (Bekanntmachung der aktualisierten diagnostischen Referenzwerte für diagnostische und interventionelle Röntgenuntersuchungen. Vom 22. Juni 2010)
- 3 European Guidelines on Quality Criteria for Computed Tomography (<http://www.dr.dk/guidelines/ct/quality/htmlindex.htm>)
- 4 American College of Radiology (CT Accreditation Program Requirements, Clinical Image Quality Guide, 13.04.2012)
- 5 Becker HC et al. Radiation exposure and image quality of normal computed tomography brain images acquired with automated and organ-based tube current modulation multiband filtering and iterative reconstruction. Invest Radiol. 2012 Mar;47(3):202-7.
- 6 Baumüller S et al. Low-dose CT of the lung: potential value of iterative reconstructions. Eur Radiol. 2012 Jun 15. [Epub ahead of print] CTDI_{vol} for the protocol using 100 kV.
- 7 May MS et al. Dose reduction in abdominal computed tomography: intraindividual comparison of image quality of full-dose standard and half-dose iterative reconstructions with dual-source computed tomography. Invest Radiol. 2011 Jul;46(7):465-70. CTDI_{vol} for abdominal CT calculated according to the conclusion.

* Values are based on the default protocols of the SOMATOM Definition Flash with syngo CT 2012B and an average sized patient of 1.75 m and 75 kg

** Iterative Reconstruction is used

*** In clinical practice, the use of SAFIRE may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task. The following test method was used to determine a 54 to 60% dose reduction when using the SAFIRE reconstruction software. Noise, CT numbers, homogeneity, low-contrast resolution and high contrast resolution were assessed in a Gammex 438 phantom. Low dose data reconstructed with SAFIRE showed the same image quality compared to full dose data based on this test. Data on file.