

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	60	60	75
Thorax Routine	CTDI _{vol} [mGy]	15	10	30	21
Abdomen Routine	CTDI _{vol} [mGy]	15	15	35	25

Default Siemens Protocol		Standard values*	Standard IR values ^{*/**/***/****}	Study values ^{**}	Put your current values here
Head Routine	CTDI _{vol} [mGy]	53.45	41.69	45 ⁵	
Thorax Routine	CTDI _{vol} [mGy]	7.42	4.45	1.5 ⁶	
Abdomen Routine	CTDI _{vol} [mGy]	14.17	9.92	6.5 ⁷	

- 1 Bundesamt für Gesundheit (Merkblatt R-06-06, Diagnostische Referenzwerte in der Computertomographie, 01.04.2010).
- 2 Bundesamt für Strahlenschutz (Diagnostische Referenzwerte für diagnostische und interventionelle Röntgenanwendungen vom 22. Juni 2016).
- 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, Amended 2014).
- 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 VA48A and an average sized patient of 1.75 m and 75 kg

**Iterative Reconstruction e.g. SAFIRE or ADMIRE 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.

****In clinical practice, the use of ADMIRE 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. Image quality as defined by low contrast detectability using a model observer method for evaluation. Equivalent low contrast detectability can be achieved with 80% to 85% less dose using ADMIRE at highest strength level for thin (0.6 mm) reconstruction slices in measured and simulated body and head phantoms for low contrast objects with different contrasts. See ADMIRE data sheet for further information.

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