

Dosimetric properties of MacroMedics products

MacroMedics develops dedicated state-of-the-art carbon fiber products for radiotherapy departments using the latest production techniques. Usability, functionality, hygiene and strength for the more and more heavy patient become more important, while the influence of build-up effect decreases by the use of multi-beam techniques.

MacroMedics has asked the radiotherapy department of the UMC Utrecht (University Medical Center Utrecht) to perform measurements on dosimetry, the transmission factor and skindose.

Test set-up and equipment:

The transmission factors are determined under 2 different gantry angles (0 and 45 degrees) and at 4 different fieldsizes. (3x3, 5x5 and 10x10 cm) These measurements are performed in a cylindrical perspex phantom at a depth of 5 cm. By choosing a cylindrical phantom, measurements can be performed from different angles and the path length in the phantom will stay the same.

The dose build-up on the skin is determined by measuring the dose in a solid water RW3-phantom on a large number of depths (0,1,2, 3, 5, 7, 10, 15, 20, 30, 50, 100 mm). From this a percentage depth dose (PDD) graph is made. By creating this PDD-graph without material and with material on a phantom block, the influence of the material on the dose on the skin (depth 0 mm) can be determined.

A summary of the results can be found on the next page.

The specified numbers for absorption factors are measured at a perpendicular radiation and where of importance valid for the thicker part of the material.

The specified buildup of the skindose is an average of the values for 6 and 10 MV.

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Provided values are for reference only. For more information about the measurements and results, please contact Mr. Drenth:

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Note 1: To complete the overview, we have added measurement results of other MacroMedics devices from other hospitals

Note2: Use the provided values only as a guidance. Perform measurements in your hospital and equipment to verify these results.

MacroMedics products Dosimetric Properties (1/2)				
		Absorption Factor		Skin Buildup (mm H ₂ O EQ)
		6MV (%)	10MV (%)	
Thermoplastics				
1	Thermoplast: MacroCast Fine-Perfo (non-stretched)	0,9	0,7	2,33
2	DSPS Facial mask (RayPro)	<0,2	<0,2	NA
3	DSPS Occipital mask (RayOc)	0,7	0,7	2,36
	DSPS Mask Profiles	4,5	3,6	NA
4	DSPS Carbon Fiber Cradle			
	DSPS CF Cradle Bottom Plate	0,6	-	NA
	DSPS CF Cradle Rim	0,6-0,9	-	NA
	DSPS CF Cradle vertical columns	1,1-2,1	-	NA
Baseplates				
5	15 mm carbon fiber baseplates (Exafix-3, Exafix-5, Lungboard baseplate)	1,4	1,2	3,92
6	24 mm carbon fiber ThoraxSupport (similar to EAMIS & SSPS baseplates, LEX-Ultra CF-parts)	2,2	1,7	6,18
7	26 mm Exafix-IMRT baseplate	2,2	1,6	6,09
8	24 mm OmniBoard Baseplate (measured in Duisburg)	1,5	0,9 at 15MV	6 mm at 6 MV
9	23 mm OmniBoard Breast Treatment Module (similar to BreastBoard LX topboard, measured in Duisburg)	2,2	1,7 at 15 MV	-
Pelvic and lower extremities				
10	18 mm LEX-Ultra baseplate (PP foam)	2,9	2,3	7,52
11	Pelvic Prone Board, Prostate area	1,6	1,3	4,42

MacroMedics products Dosimetric Properties (2/2)				
		Absorption Factor		Skin Buildup (mm H ₂ O EQ)
		6MV (%)	10MV (%)	
Headsupports, blocks and wedges				
12	PE Head supports, MaxSupport 5 (same as type 6, 7)	0,4	0,2	1,55
13	Smooth coated head supports, MaxSupport 2 (Same as type 1,3,4)	3,6	2,8	8
14	Block High (similar to carbon fiber MaxSupports type 25,35,45)	1,1	0,9	3,05
Miscellaneous				
15	Vacuum cushions, under vacuum, 5 cm thick	0,9	0,8	2,8
16	ExaFlex Bolus with skin (10mm)	4	3,4	10,17
17	24 mm carbon fiber insert (similar to CT couchtop, measured in Amsterdam)	0,8	0,7	-
18 OmniBoard*				
	24 mm OmniBoard Baseplate (measured in Duisburg)	1,5	0,9 at 15MV	6 mm at 6 MV
	23 mm OmniBoard Breast Treatment Module (measured in Duisburg)	2,2	1,7 at 15 MV	-
	Skindose Carbon fiber baseplate (Relative to the open field)	1,9	2,4	
<p>● * = measurement location.</p> 				