

Daily

Procedure		Machine Type Tolerance			Performed by DoseLab Pro?	Test Description	
		non-IMRT	IMRT	SRS/SBRT			
Dosimetry	X-Ray Output Constancy (all energies)					D-1A	
	Electron Output Constancy (weekly, except for machines with unique e-monitoring requiring daily)		3%			D-1A	
Mechanical	Laser Localization	2.0 mm	1.5 mm	1.0 mm		D-1B	
	Optical Distance Indicator (ODI) @ iso	2.0 mm	2.0 mm	2.0 mm		D-1B	
	Collimator Size Indicator	2.0 mm	2.0 mm	1.0 mm		D-1B	
Safety	Door Interlock (beam off)		Functional			D-1C	
	Door Closing Safety		Functional			D-1C	
	Audiovisual Monitor(s)		Functional			D-1C	
	Stereotactic Interlocks (lockout)	N/A	N/A	Functional		D-1C	
	Radiation Area Monitor (if used)		Functional			D-1C	
	Beam On Indicator		Functional			D-1C	
MLC	Qualitative Test (i.e. matched segments, aka "picket fence")	Visual inspection for discernable deviations such as an increase in interleaf transmission			✓	W-1A	
		non-SRS/SBRT		SRS/SBRT			
Planar kV and MV (EPID) Imaging							
Imaging	Collision Interlocks		Functional	Functional		D-3A	
	Positioning / Repositioning	≤ 2 mm	≤ 2 mm	≤ 1 mm	✓	D-3B	
	Imaging and Treatment Coordinate Coincidence (single gantry angle)	≤ 2 mm	≤ 2 mm	≤ 1 mm	✓	D-3B	
	Cone-Beam CT (kV and MV)						
	Collision Interlocks		Functional	Functional		D-3A	
	Imaging and Treatment Coordinate Coincidence	≤ 2 mm	≤ 2 mm	≤ 1 mm	✓	D-3B	
	Positioning / Repositioning	≤ 1 mm	≤ 1 mm	≤ 1 mm	✓	D-3B	
Wedges	Morning Check-Out Run for One Angle	Dynamic	Universal	Virtual		D-2A	
		Functional					

Monthly

Procedure	Machine Type Tolerance			Performed by DoseLab Pro?	Test Description	
	non-IMRT	IMRT	SRS/SBRT			
Dosimetry	X-Ray Output Constancy				M-1A	
	Electron Output Constancy		2%		M-1A	
	Backup Monitor Chamber Constancy				M-1A	
	Typical Dose-Rate Output Constancy	N/A	2%	2%	M-1A	
	Photon Beam Profile Constancy		1%		✓ M-1B & M-2A	
	Electron Beam Profile Constancy		1%		M-1B	
	Electron Beam Energy Constancy		2% / 2.0 mm		M-1A	
Mechanical	Light / Radiation Field Coincidence		2.0 mm or 1% on side	✓	M-2A	
	Light / Radiation Field Coincidence (Asymmetric)		1.0 mm or 1% on side	✓	M-2A	
	Distance Check Device for Lasers Compared with Front Pointer		1.0 mm		M-2B	
	Gantry / Collimator Angle Indicators (@ cardinal angles, digital only)		1°		M-2C	
	Accessory Trays (i.e. port film graticule tray)		2.0 mm		M-2D	
	Jaw Position Indicators (Symmetric)		2.0 mm		M-2A	
	Jaw Position Indicators (Asymmetric)		1.0 mm		M-2A	
	Cross-Hair Centering (Walkout)		1.0 mm		M-2E	
	Treatment Couch Position Indicators	2 mm / 1°	2 mm / 1°	1 mm / 0.5°	M-2F	
	Wedge Placement Accuracy		2.0 mm		M-2G	
	Compensator Placement Accuracy		1.0 mm			
	Latching of Wedges, Blocking Tray		Functional		M-2H	
	Localizing Lasers	± 2.0 mm	± 1.0 mm	<± 1.0 mm	M-2B	
Safety	Laser Guard-Interlock Test		Functional			
Respiratory Gating	Beam Output Constancy		2%			
	Phase, Amplitude Beam Control		Functional			
	In-room Respiratory Monitoring System		Functional			
	Gating Interlock		Functional			
MLC	Setting vs Radiation Field for Two Patterns (Non-IMRT)		2 mm	✓	M-2A	
	Backup Diaphragm Settings (Elekta only)		2 mm			
	Travel Speed (IMRT)		Loss of Leaf Speed > 0.5 cm/s	✓	W-1A	
	Leaf Position Accuracy (IMRT)		1 mm for leaf positions of an IMRT field for four cardinal gantry angles. (<i>Picket fence</i> may be used, test depends on clinical planning-segment size)	✓	W-1A	
Imaging	Planar MV Imaging (EPID)		non-SRS/SBRT	SRS/SBRT		
	Imaging and Treatment Coordinate Coincidence (four cardinal angles)	≤ 2 mm	≤ 1 mm	✓	D-3B	
	Scaling	≤ 2 mm	≤ 2 mm	✓	M-3A	
	Spatial Resolution	Baseline	Baseline	✓	M-3A	
	Contrast	Baseline	Baseline	✓	M-3A	
	Uniformity and Noise	Baseline	Baseline	✓	M-3A	
	Planar kV Imaging					
	Imaging and Treatment Coordinate Coincidence (four cardinal angles)	≤ 2 mm	≤ 1 mm	✓	D-3B	
	Scaling	≤ 2 mm	≤ 1 mm	✓	M-3B	
	Spatial Resolution	Baseline	Baseline	✓	M-3B	
	Contrast	Baseline	Baseline	✓	M-3B	
	Uniformity and Noise	Baseline	Baseline	✓	M-3B	
	Cone-Beam CT (kV and MV)					
	Geometric Distortion	≤ 2 mm	≤ 1 mm	✓	M-3C	
	Spatial Resolution	Baseline	Baseline	✓	M-3C	
	Contrast	Baseline	Baseline	✓	M-3C	
	HU Constancy	Baseline	Baseline	✓	M-3C	
Uniformity and Noise	Baseline	Baseline	✓	M-3C		
Wedges	Wedge Factor for all energies	Dynamic	Universal	Virtual		
		C.A. axis 45° or 60° WF (within 2%)	C.A. 45° or 60° WF (within 2%)	5% from unity, otherwise 2%	M-4A	

Annual

Procedure	Machine Type Tolerance			Performed by DoseLab Pro?	Test Description	
	non-IMRT	IMRT	SRS/SBRT			
Dosimetry	X-Ray Flatness Change From Baseline		1%	✓	M-1B	
	X-Ray Symmetry Change From Baseline		± 1%	✓	M-1B	
	Electron Flatness Change From Baseline		1%	✓	M-1B	
	Electron Symmetry Change From Baseline		± 1%	✓	M-1B	
	SRS Arc Rotation Mode (Range: 0.5 - 10 MU/deg)	N/A	N/A	1 MU or 2%	A-1A	
	X-Ray / Electron Output Calibration {TG-51}		± 1% (Absolute)		A-1B	
	Spot Check of Field-Size Dependent Output Factors for X-Ray (2 or more field sizes)	2% for field sizes < 4 × 4 cm ² ; 1% for field sizes ≥ 4 × 4 cm ²			A-1C	
	Output Factors for Electron Applicators (spot check of one applicator / energy)		± 2% from baseline		A-1C	
	X-Ray Beam Quality (PDD ₁₀ or TMR _{20:10})		± 1% from baseline		A-1D	
	Electron Beam Quality (R ₅₀)		± 1 mm		A-1D	
	Physical Wedge Transmission Factor constancy		± 2%		A-1C	
	X-Ray Monitor Unit Linearity (Output Constancy)	± 2% ≥ 5 MU	± 5% (2- 4) MU, ± 2% ≥ 5 MU	± 5% (2- 4) MU, ± 2% ≥ 5 MU	A-1E	
	Electron Monitor Unit Linearity (Output Constancy)		± 2% ≥ 5 MU		A-1E	
	X-Ray Output Constancy vs Dose-Rate		± 2% from baseline		A-1E	
	X-Ray Output Constancy vs Gantry Angle		± 1% from baseline		A-1F	
	Electron Output Constancy vs Gantry Angle		± 1% from baseline		A-1F	
	Electron and X-Ray Off-Axis Factor Constancy vs Gantry Angle		± 1% from baseline		A-1F	
	Arc Mode (expected MU, degrees)		± 1% from baseline		A-1A	
	TBI / TEST Mode		Functional			
	PDD or TMR and OAF Constancy		1% (TBI) or 1.0 mm PDD shift (TSET) from baseline			
TBI / TSET Output Calibration		± 2% from baseline				
TBI / TSET Accessories		± 2% from baseline				
Mechanical	Collimator Rotation Isocenter		± 1 mm from baseline	✓	A-2A	
	Gantry Rotation Isocenter		± 1 mm from baseline	✓	A-2A	
	Couch Rotation Isocenter		± 1 mm from baseline	✓	A-2A	
	Electron Applicator Interlocks		Functional		A-2B	
	Coincidence of Radiation and Mechanical Isocenter	± 2 mm from baseline	± 2 mm from baseline	± 2 mm from baseline	✓	A-2C
	Table Top Sag		± 2 mm from baseline		A-2D	
	Table Angle		1°		A-2E	
Table Travel Maximum Range Movement In All Directions		± 2 mm		M-2F		
Stereotactic Accessories, Lockouts, etc.	N/A	N/A	Functional			
Safety	Follow Manufacturer's Test Procedures		Functional			
Respiratory Gating	Beam Energy Constancy		2%			
	Temporal accuracy of phase/amplitude gate on		100 ms of expected			
	Calibration of surrogate for phase/amplitude		100 ms of expected			
	Interlock testing		Functional			
MLC	MLC Transmission (average of leaf and interleaf transmission), all energies		± 0.5% from baseline		✓	A-3A
	Leaf Position Repeatability		± 1.0 mm		✓	A-3B & W-1A
	MLC Spoke Shot		≤ 1.0 mm radius		✓	A-3C
	Coincidence of Light Field and Radiation Field (all energies)		± 2.0 mm		✓	M-2A
	Segmental IMRT (step and shoot) test	< 0.35 cm max error RMS, 95% of error counts < 0.35 cm			✓	W-1A
	Moving Window IMRT (four cardinal gantry angles)	< 0.35 cm max error RMS, 95% of error counts < 0.35 cm			✓	W-1A
Imaging	Planar MV Imaging (EPID)		non-SRS/SBRT	SRS/SBRT		
	Full Range of Travel SDD		± 5 mm	± 5 mm	A-4A	
	Imaging Dose		Baseline	Baseline		
	Planar kV Imaging					
	Beam quality / energy		Baseline	Baseline		
	Imaging Dose		Baseline	Baseline		
Cone-Beam CT (kV and MV)						
Imaging Dose		Baseline	Baseline			
Wedges	Check of Wedge angle for 60°, full field and spot check for intermediate angle, field size		Dynamic	Universal	Virtual	
			Check of off-center ratios at 80° field width at 10 cm depth to be within 2%		A-5A	