

**Canon**

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# PET/CT:

System features that put patient comfort first.

## Celesteion™ PET/CT Performance Specifications

PET Performance		
<b>Scan</b>	Number of Crystals	30720
	Crystal Size	4 mm x 4 mm
	Crystal Material	Lu-based
	Gantry Aperture	88 cm
	Transaxial FOV	70 cm
	Axial FOV	19.6 cm
	System Energy Resolution	11.2% typical
	TOF Timing Resolution	394 ps typical
<b>Count-rate</b>	Effective System Sensitivity	13.5 cps/kBq (D=20 cm)* 23.7 cps/kBq (D=35 cm)
	Effective Peak Noise Equivalent Count Rate (NECR)	≥ 172 kcps (D=20 cm)** ≥ 302 kcps (D=35 cm)
<b>Spatial Resolution</b>	NEMA-2012 Resolution FWHM @ 1 cm	≤ 5.1 mm
<b>PSF Reconstruction Spatial Resolution***</b>	Radial: FWHM@10 cm	1.98 mm
	Radial: FWHM@20 cm	1.96 mm
	Radial: FWHM@30 cm	2.05 mm
	Tangential: FWHM@10 cm	2.04 mm
	Tangential: FWHM@20 cm	2.02 mm
	Tangential: FWHM@30 cm	2.08 mm
	Axial: FWHM@10 cm	2.01 mm
	Axial: FWHM@20 cm	1.98 mm
Axial: FWHM@30 cm	1.93 mm	

CT Performance		
Scan	Gantry Aperture	90 cm
	Scan FOV	70 cm (85 cm Ext. FOV)
	Rotation Rate	0.5 sec
	PUREVISION CT Detector	16-row (3.2 cm)
	Slice Thickness	0.5 mm
	Number of Slices	32 with coneXact
	Tube Current Modulation	SUREExposure™ 3D
	X-ray Tube Maximum Output	72 kW
	X-ray Tube Heat Capacity	7.5 MHU
Dose	Dose Reduction Functions	AIDR 3D****
	Dose Management	<ul style="list-style-type: none"> <li>• XR-29 Compliant</li> <li>• Dose Check (NEMA XR-25)</li> <li>• DICOM SC Exposure Summary</li> <li>• DICOM SR Compliant Dose Report</li> </ul>
Image Quality	Reconstruction Method	<ul style="list-style-type: none"> <li>• Cone Beam</li> <li>• Fan Beam</li> <li>• SEMAR™ (Single Energy Metal Artifact Reduction)</li> </ul>
	Image Noise (Standard Deviation)	Less than 0.7%
	Spatial Resolution @ Cut Off	18 lp/cm For Reference
	High-Contrast Resolution	0.35 mm
	Low-Contrast Detectability	2 mm @ 0.3% at 14.4 mGy 3 mm @ 0.3% at 7.2 mGy
Patient Couch		
	Maximum Allowable Load	205 kg (450 lb)
	Couch-Top Width	47 cm

**NOTE:**

\* Calculated based on TOF sensitivity gain=(SNR gain)<sup>2</sup>=D/Δx, D: patient size, Δx: TOF spatial uncertainty.

(Δx=cΔt/2, c=speed of light=3x10<sup>10</sup> cm/sec, Δt=TOF FWHM =450ps=3.94x10<sup>-10</sup>sec, Δx =5.91cm. NEMA sensitivity =4.0 cps/kBq,

For D=20cm, (SNR gain)<sup>2</sup> =20/5.91=3.4, effective sensitivity =4.0x3.4=13.5 cps/kBq

For D=35cm, (SNR gain)<sup>2</sup> =35/5.91=5.9, effective sensitivity =4.0x5.9=23.7 cps/kBq)

System energy resolution, TOF timing resolution, effective system sensitivity and PSF reconstruction spatial resolution are all typical values.

\*\* Effective Peak NECR: based on NEMA (non-TOF) Peak NECR and TOF SNR gain calculated above.

(NEMA Peak NECR≥51 kcps, effective peak NECR=NEMA peak NECR x (TOF sensitivity gain) ≥ (51x3.4)=172 kcps with D=20cm and (51x5.9)=302 kcps with D=35cm)

\*\*\*Option

\*\*\*\*AIDR 3D stands for Adaptive Iterative Dose Reduction

**REFERENCES**

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4. Mettivier, Giovanni, et al. "Signal-to-noise gain at variable randoms ratio in TOF PET." *Nuclear Science, IEEE Transactions on* 59.5 (2012): 1948-1957.

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