

Table 3. Performance characteristics for the current commercial clinical PET scanners

| | CTI ECAT Exact (922) | CTI ECAT HR+ | CPS Accel | GE Advance | GE Discovery LS PET/CT | GE Discovery ST PET/CT | C-PET | CPS BGO PET/CT | CPS LSO PET/CT | Philips Allegro/ Gemini PET/CT ^a |
|---|-------------------------|-----------------|--------------|---------------|---------------------------|---------------------------|----------------------|-------------------|-------------------|--|
| Crystal | BGO | BGO | BGO | BGO | BGO | BGO | NaI:TI | BGO | LSO | GSO |
| Patient port | 56.2 cm | 56.2 cm | 56.2 cm | 58 cm | 59 cm | 70 cm | 62 cm | 70 cm | 70 cm | 56.5 cm |
| Total no. of blocks | 144 | 288 | 144 | 168 | 168 | 280 | N/A | 288 | 144 | 28 |
| No. of crystal detectors/block | 8×8 | 8×8 | 8×8 | 6×6 | 6×6 | 6×6 | N/A | 8×8 | 8×8 | 22×29 |
| Crystal size | | | | | | | | | | |
| Transaxial | 6.39 mm | 4.39 mm | 6.45 mm | 4.0 mm | 4.0 mm | 6.2 mm | 47 cm circum. | 4.39 mm | 6.45 mm | 4 mm |
| Axial | 6.39 mm | 4.05 mm | 6.45 mm | 8.0 mm | 8.0 mm | 6.2 mm | 30 cm | 4.05 mm | 6.45 mm | 6 mm |
| Radial | 20 mm | 30.0 mm | 25 mm | 30.0 mm | 30.0 mm | 30.0 mm | 2.54 cm | 30.0 mm | 25 mm | 20 mm |
| No. of detector rings | 24 | 32 | 24 | 18 | 18 | 24 | N/A | 32 | 24 | |
| Detector ring diameter (cm) | 82.4 | 82.4 | 82.4 | 92.7 | 92.7 | 88.0 | 62.0 | 82.4 | 82.4 | 90 |
| Total no. of detectors | 9,216 | 18,432 | 9,216 | 12,096 | 12,096 | 10,080 | Six curved NaI:TI | 18,432 | 9,216 | 17,864 |
| Transaxial field of view (cm) | 58.5 | 58.5 | 58.5 | 50 | 55 | 60 | 57.6 | 58.5 | 58.5 | 57.6 |
| Axial field of view (cm) | 16.2 | 15.5 | 16.2 | 15.2 | 15.2 | 15.2 | 25.6 | 15.5 | 16.2 | 18 |
| Slice thickness (mm) | 3.375 | 2.46 | 3.375 | 4.25 | 4.25 | 3.23 | 4.0 (body) | 2.43 | 3.4 | 2 |
| No. of slices | 47 | 63 | 47 | 35 | 35 | 47 | 64 | 63 | 47 | 90 |
| Coincidence timing window (ns) | 12 | 12 | 6 | 12 | 12.5 | 11.7 | 8 | 12 | 6 | 8 |
| Coincidence timing resolution (ns) | 6 | 6 | 3 | 6 | 6 | 6 | | 6 | 3 | 4 |
| Energy window width (keV) | 350–650 | 350–650 | 350–650 | 300–650 | 300–650 | 300–650 | 435–665 | 350–650 | 350–650 | |
| Sensitivity 2D trues, NEMA 94 phantom (keps $\mu\text{Ci}^{-1} \text{cc}^{-1}$) | 180 | 200 | 200 | 217 | 146 | 300 | N/A | N/A | N/A | N/A |
| Sensitivity 2D trues + scatter, NEMA 94 phantom (keps $\mu\text{Ci}^{-1} \text{cc}^{-1}$) | 214 | 244 | 238 | 238 | 159 | 348 | N/A | N/A | N/A | N/A |
| Sensitivity 3D trues, NEMA 94 phantom (keps $\mu\text{Ci}^{-1} \text{cc}^{-1}$) | 780 | 900 | 925 | 1,261 | 838 | 1,280 | 444 | 1,049 | 999 | >700 |
| Sensitivity 3D trues + scatter, NEMA 94 phantom (keps $\mu\text{Ci}^{-1} \text{cc}^{-1}$) | 1,218 | 1,406 | 1,445 | 1,941 | 1,297 | 1,800 | 592 | 1,586 | 1,514 | >1,000 |
| 2D axial resolution (mm) | | | | | | | N/A | N/A | N/A | N/A |
| FWHM at 0 cm | 4.5 | 4.2 | 4.3 | 4.2 | 4.0 | 5.0 | | | | |
| FWHM at 10 cm | 5.9 | 5.0 | 6.0 | 5.5 | 5.4 | 6.5 | | | | |
| FWHM at 20 cm | N/A | 6.8 | N/A | 7.4 | 6.6 | N/A | | | | |
| 3D axial resolution (mm) | | | | | | | | | | |
| FWHM at 0 cm | 4.6 | 3.5 | 4.7 | 6.0 | 6.0 | 5.0 | 6.2 | 4.2 | 5.8 | 4.2 |
| FWHM at 10 cm | 6.5 | 5.3 | 7.1 | 6.3 | 6.3 | 6.5 | 6.9 | 5.7 | 7.1 | 5.6 |
| FWHM at 20 cm | N/A | 7.8 | N/A | 6.6 | 6.6 | N/A | 8.0 | N/A | N/A | N/A |