



## Brilliance iCT configuration

The Brilliance iCT enables clinical excellence through the optimal combination of speed, power, coverage and dose utility. It sets a benchmark in full coverage whole body scanning while simultaneously setting new standards for advanced cardiovascular imaging. The Brilliance iCT can improve image quality across a wide range of examinations and uses advanced techniques to reduce radiation dose.

Leveraging the power of Essence technology, this configuration truly empowers new discoveries in clinical science. The unique Essence technology is at the core of the Brilliance iCT scanner. Consisting of proprietary X-ray tube, detector and reconstruction advancements to improve image quality and reliability, Essence technology provides the inner workings that enable new levels of clinical performance. In synergy with Essence are technologies focused on reducing dose such as the breakthrough Eclipse DoseRight collimator.

**PHILIPS**

# Essence technology

The Brilliance iCT scanner utilizes Essence technology to provide the diagnostic confidence required by clinicians to support high levels of patient care.

Essence technology is an optimal combination of x-ray tube, detector and reconstruction innovations.

X-Ray Tube Features	Clinical Value
Spiral Groove Bearing	Anode rotation stability for virtually motion-free, focal spot for better image clarity
Segmented Anode	12 individual anode segments compensate for heating and cooling cycles for higher reliability
Smart Focal Spot	Dynamic focal spot motion doubles the number of projections to yield 256 slices and improves in-plane spatial resolution

Nano-Panel Detector Features	Clinical Value
TACH 2 Detector Electronics	Second generation of TACH technology further reduces the electronic noise enabling improved image quality at low radiation doses
Ultra High Resolution (up to 24 Lp/cm spatial resolution)	High spatial resolution means better definition of small structures

RapidView Reconstruction Features	Clinical Value
3D Cone Beam Reconstruction Algorithm (COBRA)	COBRA provides high image quality without cone beam artifacts
Adaptive Multicycle Reconstruction	Part of the Rate Response CV Toolkit for cardiac CT imaging, these features optimize every voxel for the optimal temporal resolution
Ultra High Resolution Matrices	768 <sup>2</sup> and 1024 <sup>2</sup> reconstruction matrices take advantage of high resolution imaging
Quad Core processors	Philips utilizes innovations in computer technology to continuously improve reconstruction performance



iMRC X-Ray Tube



Nano-Panel Detectors



RapidView reconstruction with  
Quad Core Processors

# Brilliance iCT highlights

The Brilliance iCT is offered in three designed-around-you configurations capable of achieving rotational speeds up to 0.27 seconds to enhance image quality for emerging applications such as cardiac imaging and can improve patient experience for a variety of general radiology protocols through shortened examination times.

The Brilliance iCT's outstanding rotational speed is supported by up to 120kW of instantaneous power to maximize image quality of the shortest scans.

The ability to perform short scan, high power imaging is enhanced through an extended longitudinal coverage realizing up to 256 slices - enabling the efficient collection of cardiac, perfusion, pediatric, and whole body imaging.

This powerful combination of speed, power, and coverage is further enhanced through new dose management technologies. Unique to Philips iCT is the Eclipse DoseRight collimator eliminating excess dose during helical scanning.

As customary in Philips CT products, the iCT offers high-quality imaging, fast reconstructions, task automation, and an array of features to minimize radiation doses.

Philips iMRC X-ray tube featuring an advanced spiral groove bearing and segmented anode enabling direct cooling to effectively deliver 30 MHU equivalent performance compared to conventional X-ray tubes.

The Philips Advantage	Clinical Value
iMRC X-ray tube	iMRC tube features Smart Focal Spot, Segmented Anode, and Double Supported Spiral Groove Bearing to improve image definition and scanning with no waiting at the highest instantaneous energy output.
120 kW generator	Improved image quality through ample photon delivery regardless of patient habitué, organ motility, and ability to comply.
RapidView reconstruction with Quad-Core Processors and Fast Preview	Faster reconstruction of cone beam data means higher throughput and less waiting for large volume datasets.
Flexible slice acquisition modes	Up to 256 slices over a full 500mm FOV for faster and more complete whole body imaging.
Subsecond 360° Rotation Time (down to 0.27 sec with Rate Responsive Toolkit)	Improved patient compliance and image quality through faster rotation times and less susceptibility to motion artifacts with sub-millimeter image quality for visualization of subtle abnormalities. Rotation speed without compromise for sharp, precise and virtually motion free images of the coronaries and whole body structures during pediatric, non-compliant patient, and trauma scanning.
Nano-Panel Tile Detectors with TACH 2 technology	Philips patented ASIC chip provides virtually noise-free signal conversion for better image quality.
2D Anti-Scatter	Enhanced image quality over larger z-axis coverage. Improved Hounsfield uniformity to improve visualization of low-contrast structures and improve image quality.
Smart Focal Spot	Improves image definition and image quality through the generation of 256 slices.
Up to 24 Lp/cm spatial resolution	High spatial resolution means better definition of small structures.
DoseWise	The Philips system-wide approach to radiation dose management focusing on lowering patient dose while providing diagnostic image quality.
Eclipse DoseRight collimator	Lowers patient exposure during helical scanning.
Clinical applications on console	Nearly all of the Philips Extended Brilliance Workspace and Brilliance Workspace Portal applications are available on the console.

# The CT user environment

Brilliance is a flexible, scalable CT work environment for planning, scanning, visualization, and archiving. The Brilliance Workspace offers a range of clinical applications at the scanner console. The Extended Brilliance Workspace\* delivers advanced clinical applications to a dedicated PC. And finally, the Brilliance Workspace Portal\* makes it possible for users to work efficiently with extremely large data sets from a typical laptop or home computer, wherever they are.

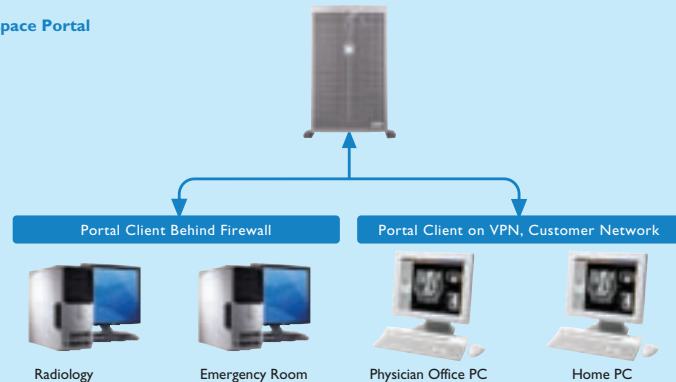
Brilliance CT Workspace



Extended Brilliance Workspace



Brilliance Workspace Portal



## Console

The console runs Brilliance Workspace on a Dell PC with dual monitors (1,280 × 1,024 Flat Panel LCD each). An optional slave monitor can display the images from the main console at a remote location, such as the radiology reading room.

Standard Applications	Optional Applications
AVA-Stenosis	Virtual Colonoscopy
CT Viewer	AVA-Stent Planning
MPR	CT Perfusion
SSD 3D	Advanced Brain Perfusion
MIP	Lung Nodule Assessment
Volume Rendering	Lung Emphysema
CT Endoscopy	CT Reporting
Q-CTA	CT/MR Image
Test Injection	Dental Planning
Combine Images	Cardiac Viewer
Scan Tools Pro:	Heartbeat-CS
DICOM Modality Worklist	Cardiac CT Angio
Split Study	LV/RV Analysis
Prefetch Study	EP Planning
Automatic Procedure Selection	Stereotaxis
Bolus Tracking	
Spiral Auto Start	

\* Optional

# Gantry and table

## Gantry

Feature	Specification
X-ray tube and Detectors Architecture	Rotate-rotate
Air Bearing Rotor	Whisper quiet and stable operation at 220rpm.
Rotation Times	0.27* & 0.3*, 0.33, 0.375, 0.4, 0.5, 0.75, 1, 1.5 seconds for full 360° scans; 0.18* seconds for partial angle 240° scans.
Gantry Aperture, mm	700mm
Intercom System	Two-way connection between the gantry and console areas.
Breathing Lights	Visual patient communication to improve study compliance.
Operator Controls located on Gantry (left and right, front and back)	Front side LCD with touchscreen activation of Couch In/Out, Couch Up/Down, Emergency Stop, X-Ray Indicator and visual display of ECG wave and heart rate.
Controls located at Operator's Console	Couch In/Out, Couch Up/Down, Emergency Stop, X-ray Indicator, Start Scan, Pause.
Eclipse DoseRight Collimation	Lowers patient exposure during helical scanning.
Integrated ECG	Eliminates ECG monitor & Cart
Focus-detector distance	1040mm
Focus-isocenter distance	570mm

\*0.18, 0.27 & 0.3 optional

## AutoVoice

A standard set of commands for patient communication before, during, and after scanning is available in the following languages:

- English
- Hebrew
- French
- Spanish
- Georgian
- Italian
- Japanese
- Arabic
- Russian
- German
- Swedish
- Danish

Customized messages can also be created.

## Patient Table

Feature	Specification
Vertical Range, mm	610 to 1080mm with 1.0 mm increment
Manual Longitudinal Stroke, mm	1900mm
Scannable Range, mm	1750mm
Z Position Accuracy	±0.25mm
Longitudinal Speed, mm/s	0.5 – 185mm/s
Max Load Capacity with Accuracy, lb	450 lbs (204 kg) with 0.25mm Z-axis accuracy 650 lbs (295 kg) with Bariatric Patient Support*
Floating tabletop	Carbon-fiber table top with foot pedal and hand control for easy positioning and quick release.

\* Optional and included with Rate Responsive CV Toolkit

# Scan and image acquisition

Brilliance iCT features additional dose management enhancements through the introduction of new wedge and IntelliBeam filters, Eclipse DoseRight collimators, and Step & Shoot Cardiac scanning protocol. Three new wedge filters reduce skin dose for infants, cardiac, body and head imaging through the absorption of unwanted X-rays.

Two new IntelliBeam filters optimize image quality and dose delivery for cardiac, head, trauma, and body imaging. Eclipse DoseRight collimator lowers patient exposure during helical scanning. Step & Shoot Cardiac improves dose efficiency during axial scanning.

## Generator

Feature	Specification
Output capacity	Up to 120 kW
kV	80, 120, 140 kVp
mA	10-1,000 mA; 1 mA increments

## X-ray Tube

Feature	Specification
Focal Spot – Smart Focal Spot	X & Z deflection
Focal spot (IEC)	Large: 1.1 × 1.2 Small: 0.6 × 0.7
Anode Diameter	200mm
Anode Rotation Speed	10,800rpm
Spiral Groove Bearing	Double supported, direct cooling
Target Angle	8°, Segmented

## Collimator

Feature	Specification
Wedge Filters	Small, Medium, Large
IntelliBeam Filters	2
Eclipse DoseRight collimator	Reduces dose up to 30% during helical scans.

## Detector

Feature	Specification
Slices	256 × 0.625
Material	Solid-State GOS with 86,016 elements
Slip Ring	5.3 Gbps transfer rate
Data Sampling Rate	Up to 4,800 views/revolution/element
Collimations Available (Channels × mm)	2 - 128 rows × 0.625 - 1.25mm; fused combinations for axial
Slice Thickness (Spiral mode)	0.625 - 10mm variable
Slice Thickness (Axial mode)	0.625 - 10mm variable
Scan Angles	240°, 360°, 420°
Scan Field of View	250mm (UHR), 500mm

## Image Quality

Feature	Specification
Spatial resolution - Ultra high mode	24.0 Lp/cm @ cut-off
Spatial resolution - High mode	16.0 Lp/cm @ cut-off
Spatial resolution - Standard mode	13.0 Lp/cm @ cut-off
Noise	0.27%
Low contrast resolution	4.0mm @ 0.3%
Absorption range	-1024 to + 3072 Hounsfield units

# Scanning modes

## Spiral Scanning

- Multiple contiguous slices acquired simultaneously with continuous table movement during scans
- Multiple, bidirectional acquisitions
- Spiral exposure: Up to 100 seconds
- Spiral pitch: 0.04 to 1.0 and user-selectable

## Axial Scanning

- Multiple-slice scan with up to 256 slices acquired with incremental table movement between scans
- Fused modes for reconstructing partial volume virtually artifact-free thick slices from thin slice acquisition.

# Clinical enhancements

## Test Injection Bolus Timing

Using a test injection, delay time is calculated to provide optimal contrast enhancement and reduce contrast usage—ideal for CTA.

## Bolus Tracking

An automated injection planning technique to monitor actual contrast enhancement and initiate scanning at a predetermined level. Combine with SAS for full automation and efficacy.

## Spiral Auto Start (SAS)

Spiral Auto Start integrates the injector with the scanner, allowing the technologist to monitor the contrast injection and to start and stop the scan (with the predetermined delay) while in the scan room.

## Step & Shoot 50cm Thorax for iCT\*

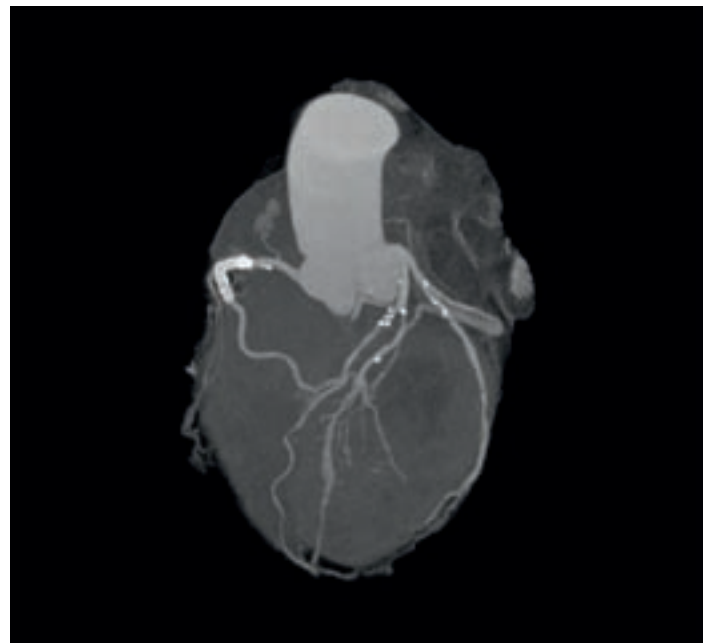
- Step & Shoot Thorax enables low dose, axial CT imaging for the chest. This axial prospective ECG-gated acquisition technique uses large collimations and full 50 cm Field of Views to acquire and reconstruct datasets of the chest.
- 50cm gated FOV
- Enhancing visualization of coronary, mediastinal, and thoracic structures.

## Rate Responsive CV Toolkit\*

Includes ECG Retrospective Tagging for cardiac imaging with 0.18, 0.27 & 0.3 rotation times. The scanner acquires a volume of data while recording the patient's ECG. The acquired data is tagged and reconstructed at the desired phase(s) of the cardiac cycle with Philips patented Beat-to-Beat Variable.

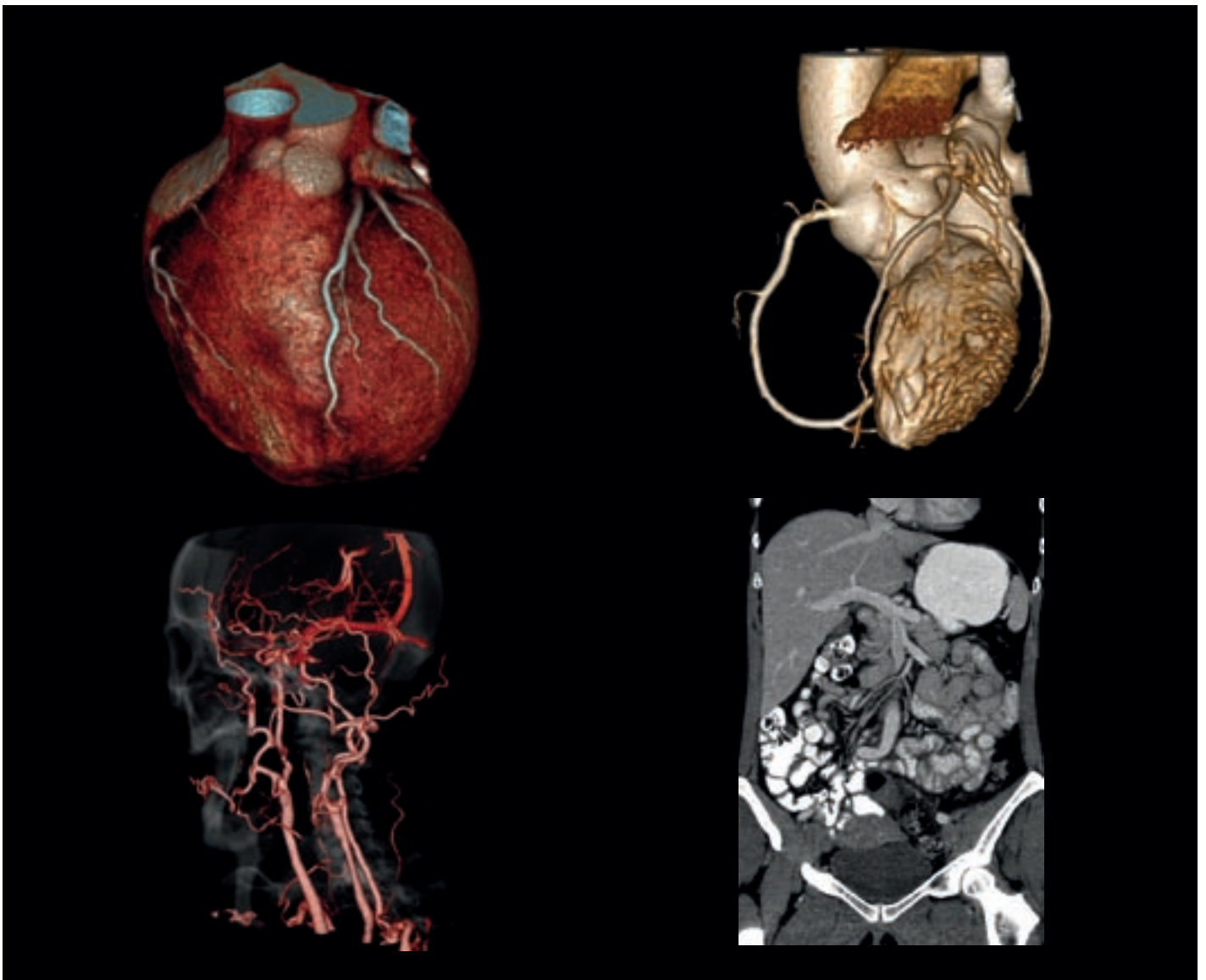
## Jog Scan\*

Jog Scan provides up to 160mm of imaging area for perfusion studies. The scanner acquires two 80mm volumes of interest by translating the couch back and forth – doubling the standard perfusion coverage.



# Clinical examples

Protocol	Detector Coverage	Slices	Rotation (sec)	Pitch	Tube Current (mA)	Scan Length (mm)	Scan Time (sec)
Cardiac CT Angiography	80mm	256	0.27	0.18	662	141	4.69
Step & Shoot Cardiac	80mm	256	0.27	Axial	945	125	3.9
Head & Neck CTA	80mm	256	0.3	1.0	590	130	2.06
Abdomen / Pelvis	80mm	256	0.4	1.0	400	375	3.4





# Dose management

Philips DoseWise philosophy focuses on smart beam management, reducing radiation time, and increasing dosage awareness to reduce the cumulative risk of radiation while obtaining high-quality images.

## DoseWise features

### DoseRight ACS (Automatic Current Selection)

Optimizes the dose for each patient based on the planned scan by suggesting the lowest possible mAs settings to maintain constant image quality at low dose throughout the exam.

### DoseRight D-DOM (Dynamic Dose Modulation)

Automatically controls the tube current rotationally, increasing the signal over areas of higher attenuation (lateral) and decreasing signal over area of less attenuation (AP).

### DoseRight Z-DOM (Longitudinal Dose Modulation)

Automatically controls the tube current, adjusting the signal along the length of the scan, increasing the signal over regions of higher attenuation (shoulders, pelvis) and decreasing the signal over regions of less attenuation (neck, legs).

### Dose Performance Data

CTDI vol	Measurement
Head	13.5 mGy / 100 mAs
Body	6.3 mGy / 100 mAs

Using IEC standard phantoms

# Reconstruction

RapidView Reconstruction generates up to 20 images per second using a 512<sup>2</sup> matrix.

### Reconstruction Field of View

- 50 to 500mm continuous
- 25 to 250mm UHR
- 50cm Gated Thorax

### Image Matrix

- 512<sup>2</sup>, 768<sup>2</sup> and 1,024<sup>2</sup>

### Cone Beam Reconstruction

Philips patented Cone Beam Reconstruction Algorithm (COBRA) enables true three dimensional data acquisition and reconstruction in spiral scanning.

### TACH 2

TACH 2 technology improves image quality at reduced doses by virtually eliminating electronic noise.

### IntelliBeam Filters

Two IntelliBeam filters reduce skin dose through the absorption of unwanted X-rays optimizing image quality and dose delivery for cardiac, head, trauma, and body imaging.

### Wedges

Three wedge filters provide a more uniform dose delivery across the field-of-view.

### Eclipse DoseRight collimator

The Eclipse DoseRight collimator overcomes overbeaming found in conventional CT systems through the elimination of dose at the beginning and end of helical scans not contributing to image formation.

### Dedicated Pediatric Protocols

Age and weight-based infant and pediatric protocols can provide high quality images at radiation doses tailored to the patient and the study.

### Adaptive Filtering

Adaptive filters reduce pattern noise (streaks) in non-homogenous bodies, improving overall image quality.

### Adaptive Multicycle Reconstruction

Image data can be prospectively gated or retrospectively tagged. COBRA automatically delivers the best temporal resolution possible (as low as 34mseconds).

### Fast Preview

Real-time 512<sup>2</sup> matrix image reconstruction and 5 x 5 contiguous slice display in step with spiral acquisition or off-line.

### Off-Line Reconstruction

Off-Line (batch) background image reconstruction of user-defined groups of raw data files with automatic image storage.

# Networking

The Brilliance iCT supports 100/1000Mbps (100/1000BaseT) network speeds. For optimal performance, Philips recommends a minimum of 100Mbps network speed (1Gbps preferred) and for the CT network to be segmented from the rest of the hospital network.

## Archiving

The full implementation of the DICOM 3.0 communications protocol in the Brilliance Workspace allows connectivity to DICOM 3.0 compliant scanners, workstations, and printers; supports IHE requirements for DICOM connectivity.

Type	Hard Drive	DVD-RAM	DICOM CD Writer
Capacity	292GB	9.4GB	700MB
Images	500,000**	30,000*	1,200**
Patients***	1,667	100	4

\*Compressed

\*\* 512 x 512 Matrix Uncompressed

\*\*\* Based on 300 images per study

## DVD-RAM Archive

Philips DVD-RAM solution is an archive solution for storing CT and other modality datasets archived from the Brilliance iCT Scanner. The DVD-RAM solution provides an inexpensive, reliable method for high-speed random access recording. Ideally suited for mass storage.

## DICOM CD Writer

A DICOM CD Writer stores DICOM images and associated image viewing software on very low cost CD media. Images on these CDs can be viewed and manipulated on PCs meeting the minimum specifications. Ideally suited for individual result storage and referring physician support.

## Filming

This function allows the user to set up and store filming parameters. Pre-stored protocols can be set to include auto-filming. The operator can film immediately after each image, at the end of a series, or film after the end of a study and review images before printing. The operator can also automatically film the study at three different windows and incorporate "Combine Images" functionality to manage large datasets. Basic monochrome and color DICOM print capability are supported.

## DICOM

Brilliance Workspace supports DICOM connectivity and can work with DICOM 3.0-compliant PACS, scanners, workstations, and printers. It supports IHE requirements for scheduled workflow and other integration profiles as defined in IHE Statement. Brilliance Workspace includes DICOM service classes to communicate with the following modalities:

- CT
- MR
- Nuclear Medicine including PET/CT
- Computed Radiography
- Radiography & Fluoroscopy (R&F)

Brilliance Workspace includes the following DICOM functionality:

- Service Class User & Provider (CT, MR, NM, Secondary Capture)
- DICOM Print User
- DICOM Modality Worklist User
- Query/Retrieve User and Provider
- Modality Performed Procedure Step User
- Storage Commitment User
- Removable Media

# Site planning

Contact the Philips Site Planning department for specific requirements pertaining to optional imaging/viewing/power equipment, floor space and electrical, mechanical, structural or environmental specifications.

## Power Requirements

- 380-480 VAC, three-phase, Wye supply
- 225 KVA nominal capacity distribution source
- 50/60 Hz

## UPS for Host and Reconstruction\*

Up to 30 minutes backup power for console monitors, host computer and reconstruction system.

## UPS for Full System\*

Up to 20 minutes backup for entire CT system.

## Environmental Requirements

Temperature:

Gantry Exam Room: 18 to 24 Deg. C (64 to 75 F)

Rest of System: 15 to 24 Deg. C (59 to 75 F)

Humidity:

Entire System: 35% to 70% non-condensing

Storage/Transport: 10% to 90% non-condensing

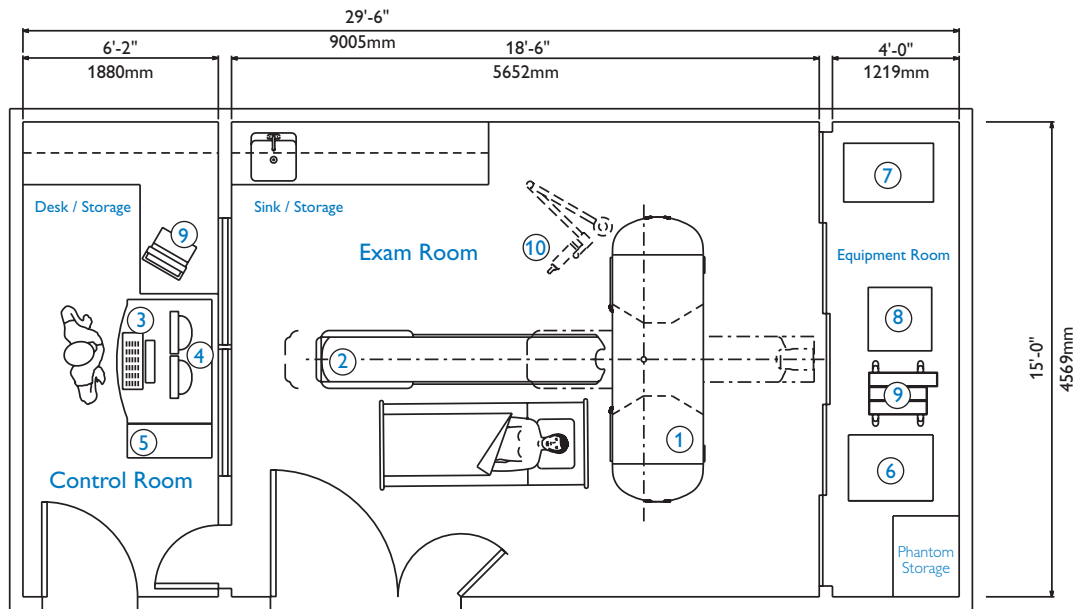
Heat Dissipation:

Control Room: 5,635 BTU/hr

Gantry Exam Room: 32,888 BTU/hr

Equipment Closet: 12,124 BTU/hr

Total System: 57,523 BTU/hr



## Dimensions and weights

	weight	height	width	depth
① Gantry Scanner	2570 kg (5656 lbs.)	198 cm (78")	274 cm (108")	97 cm (38")
② Patient Couch	404 kg (890 lbs.)	112 cm (44")	69 cm (27")	249 cm (98")
③ Operator Console Table*	56 kg (125 lbs.)	76 cm (30")	119 cm (47")	91 cm (36")
④ LCD Monitor ** 19"	10 kg (22 lbs.)	48 cm (19")	48 cm (19")	22 cm (8.7")
⑤ Host Computer	118 kg (260 lbs.)	76 cm (30")	33 cm (13")	91 cm (36")
⑥ Reconstruction Rack	151 kg (332 lbs.)	76 cm (30")	64 cm (25")	91 cm (36")
⑦ System PDU	522 kg (1150 lbs.)	122 cm (48")	58 cm (23")	86 cm (34")
⑧ Air Compressor	171 kg (377 lbs.)	104 cm (41")	61 cm (24")	61 cm (24")
⑨ UPS for Host and Reconstruction*	130 kg (286 lbs.)	46 cm (18")	63 cm (25")	66 cm (26")
⑩ Ceiling Injector and Control pkg.*	—	—	—	—

\* optional

\*\* dimensions and weight for one unit