



HOW TO PICK A CT SCANNER

- A guide to your next system

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TOPICS TO BE COVERED

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Introduction

In this guide, we offer a comprehensive overview of the factors you may consider when purchasing a CT scanner.

So, how to choose the right one?

You need to consider a variety of factors:

- When to use MRI vs CT scanners
- Brand
- How many slices
- Applications
- How much does a CT cost
- X-ray tube and tube count
- Air vs Water cooled CT scanner

Each of which has a chapter in this e-book.

CT scanners are used to capture images within the human body. To produce these images, CT scanners utilize X-rays.

This exposes the patients to small amount of radiation. However, the benefits of a CT scan weigh up the little harm of the radiation.

CT scanners are often compared to MRI scanners. Therefore, the first subject we will cover in this guide is CT vs MRI, to check that you actually need a CT rather than an MRI.



Main Differences Between

CT Scanner	MRI Scanner
Diagnose injuries from trauma	Diagnose tendon and ligament injury
Determine location and size of a tumor	Detect and evaluate spinal cord issue
Determine cancer stages	Evaluate soft tissue in more detail
Diagnose infections	Monitor brain tumors
Detect location of blood clots	Examine complicated abnormalities of the abdomen
Diagnose conditions of lungs and heart	
Identify vague abdominal problems	

Frequently, CT and MRI are used to image the same body area. However, each provides different information about the region of interest.

Bone imaging is a good example. To examine bones, you typically use a regular X-ray that creates 2D images or a CT scanner when you need to do a 3D bone imaging.

However, when examining bone marrow, MRI scanners will be the best at detecting abnormalities.

With MRI scanners, radiologists can detect bone marrow issues and distinguish between yellow (fatty) marrow and red (hematopoietic) marrow, thanks to the water and fat separation ability of the MRI.

In some cases, doctors may recommend an MRI scan if the CT scan is unable to provide all the needed information.

For example, in case of some cancers, like cervical or bladder cancer, an MRI may better show how deep the tumor has grown into body tissues.

Another difference between the two is examination speed. A CT exam is faster, typically 1 to 20 minutes. On the contrary, MRI examinations range from 5 minutes and up to an hour. Furthermore, MRIs are noisy, and patients generally find them uncomfortable. And their deeper tube can be claustrophobic.

We hope you got an answer to what the benefits of a CT scanner and differences between MRI and CT scan machines are.

Coming up is CT scanner brands.



Premium CT Brands

A brief overview of the main CT manufacturers

The main brands are Canon (former Toshiba), Siemens, GE, and Philips.

All these brands have been supplying high quality CT scanners for years and the value of their used systems is high.

CT scanners from these brands are installed worldwide and for this reason, you should be able to find a local service provider. Some countries have a strong presence of a certain OEM and that should be a consideration when choosing between brands.

If you, at some point, need a spare part, you can easily find it, as long as you have a CT scan from one of the main brands.

In many cases, we have the part in stock, or we will be able to get it through our trusted network within 1-3 days.

Remember to tell, if you are used to working with a specific model or simply have a strong personal brand preference. Then you make sure to get the best guidance.

Some of the most common CT scanner series on the used market are Aquilion and Activion from Toshiba, Somatom Emotion, Sensation, and Definition from Siemens, BrightSpeed, Discovery, LightSpeed, and Optima from GE, and finally, Ingenuity and Brilliance from Philips.



CT Scanner Slices

How many do you need?

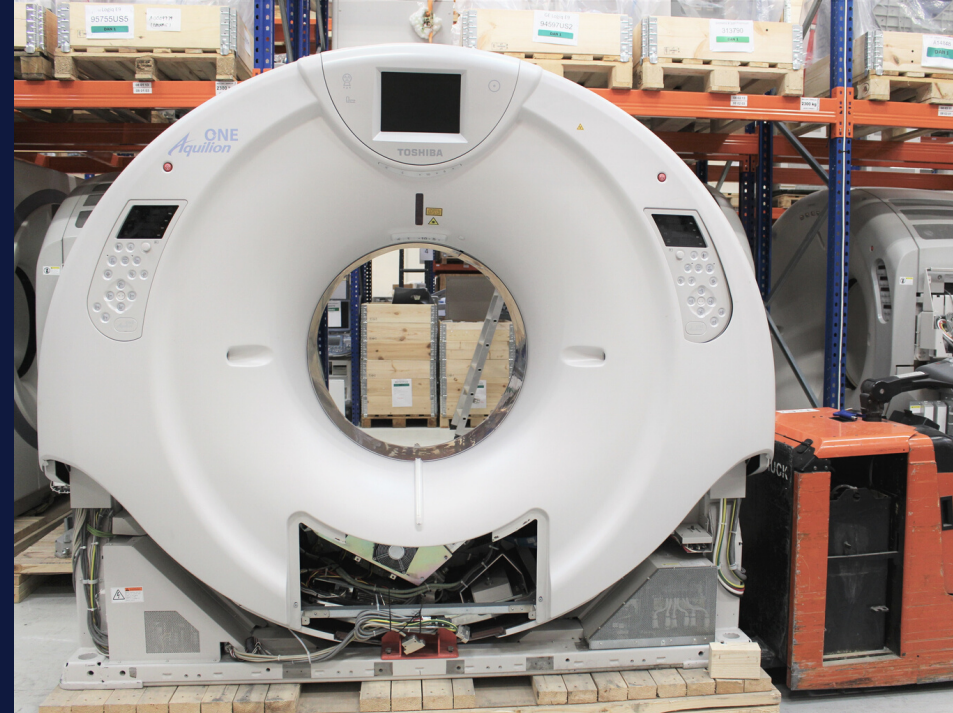
This is a more in-depth overview of number of slices.

A specification that is usually relevant very early in the purchasing process, as number of slices is closely linked to the type of exams that can be performed.

In the used market, the most common available slice counts include 16, 32, 64, and 128.

More and more we also see CT scanners with 256, and 320-slices.

Systems with 4 to 8-slices are still found in the used market but they are now becoming increasingly rare, as they are not widely produced anymore.



The main effect of the slice count is on the time it takes to perform a CT scan.

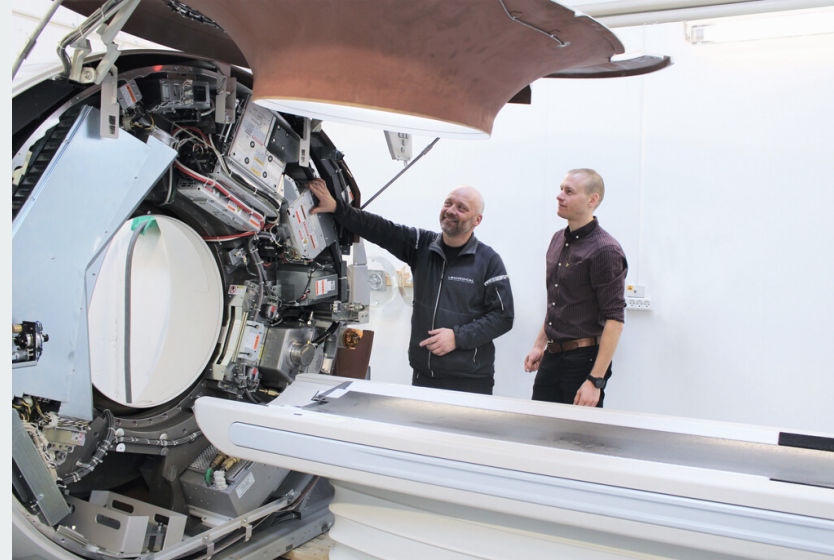
The pros of a CT scanner with a higher number of slices are:

- Reduced scan times
- Higher patient throughput
- Lower radiation doses
- More detailed images with less artifacts
- Better for advanced imaging, such as cardiac

Nevertheless, higher number of slices also means higher price. And if you only perform routine studies, the extra cost is most likely not worth it. For many facilities, a lower slice count model with lower cost is a sound investment.

Therefore, when deciding on a CT slice count, make sure to keep the balance between your clinical needs, your patient flow targets, and your budget.

Let's look into the detail at the individual slice counts, from 4-slice to 320-slice CT scanners.



Slice and Model Overview

4 and 8 slices

A 4- or 8-slice CT scanner is a good choice if you run a veterinarian clinic or a department with a low number of patients and do not have a big need for fast diagnosis.

These scanners are among the cheapest on the market, but also perform scans slower than CTs with higher slices. That is because they can scan and detect only a small part of the body.

Furthermore, they are less powerful. And thus, they have a slightly reduced sensitivity in their diagnostic capabilities – but are suitable for follow-up procedures where time is not a factor.

16 slices

The 16-slice is a commonly used CT scanner. It is the first choice of many clinics and radiology departments where patient flow is steady. These units are great for general studies.

A scan performed by a 16-slice CT scanner is faster than the 4- or 8-slice. That makes the 16-slice suitable for urgent care centers and ERs where time is a factor – but also for busy imaging facilities.

32 and 40 slices

The 32- and 40-slice scanners are usually found in similar situations and facilities as the 16-slice.

The difference is that the 32- and 40-slice scanners provide more coverage per gantry rotation, and thus, reduce scan times compared to the 16-slice. Therefore, the image is not influenced by motion artifacts to the same extent.

However, the price of a 32- and 40-slice is a bit higher.

64 slices

A 64-slice CT is standard for hospitals and imaging centers. Thanks to the reduced scan times and progressive technology, advanced studies, such as cardiac, can be performed.

The speed and accuracy that comes with the 64-slice scanner makes it suitable for practices with moderate to high patient throughput.

Regarding cardiology, a 64-slice can perform CT angio that does not require cardiac catheterization. Therefore, the system can save the facility valuable time and money. The downside is the increased initial cost of the machine.

+128 slices

The top-notch models, ranging from 128 to 320 slices, can provide whole body scans in merely seconds, while providing an incredibly sharp 3D image of any organ.

The capabilities of these scanners are often excessive in a general imaging facility. Therefore, they are usually found supporting specialty practices, such as cardiac departments, research facilities, or where the volume of patients is high.



Slice Sum Up

Knowing the procedures, your system will perform will help you determine what CT is best for you.

All CTs can perform general imaging procedures, eg. abdominal, chest and head exams, as well as scanning for fractures. Hence, if you want to do general imaging, you can use any CT scanner.

However, certain exams, like cardiac, rely on higher slice counts to deliver sufficient image quality.

Therefore, if you do cardiac exams or advanced brain studies, get a CT scanner with a greater number of slices, starting at 64-slice CT scanners.

Be aware that more slices will increase image quality but also the cost of purchasing these models.

For an easy overview of applications in relation to slices see this table:

	4-8	16-32	64	128	256+	
General Imaging	●	●	●	●	●	● Yes
Trauma	–	Basic	●	●	●	– No
Vascular	Limited	●	●	●	●	
Cardio	–	Limited	Basic	●	Excellent	

How Much Does a CT Scanner Cost?

Prices of used CT scanners varies greatly. It does have a strong correlation to a number of slices, but other important factors are demand, age, and more.

The cost of a CT on the used market ranges from 35.000 to more than 250.000 euros. Get an overview in the table below.

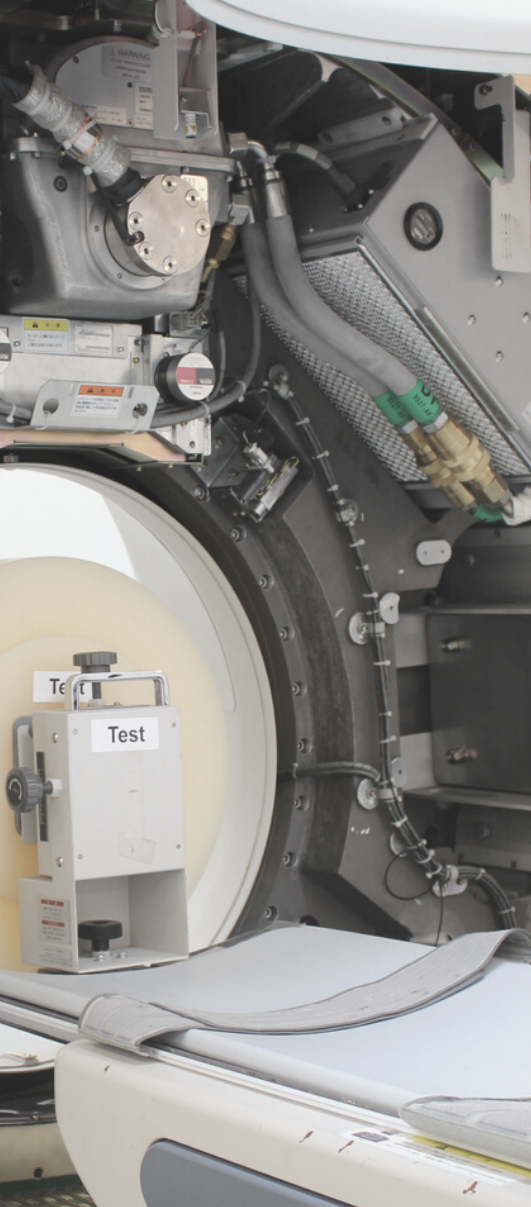
Some of the other factors influencing the CT prices are:

- Brand
- Age
- Tube count
- Accessories such as workstation and injector
- Installation and warranty

Price Overview

Prices are in euros, for used systems, and for systems only - do not include warranty, installation, etc.

	4-8 slices	16-32 slices	64 slices	128 slices	256+ slices
Price	35-60.000	60-100.000	90-130.000	120-180.000	150 -250.000+



Tube Count

An X-ray tube is a crucial part of a CT scanner, and costly to replace. A new tube can cost from 50.000 to 150.000 euro.

Therefore, tube condition influences CT price. A system is cheaper with a more heavily used tube, but also has a bit higher risk of an impending cost. A newer tube equals less risk and a higher price.

Tube condition is generally assessed with tube count, which can be measured in the following ways:

- Total patient exams
- Clicks/counts
- Scan seconds
- mAs (milliampere seconds)

Learn more about each in our [dedicated blog.post](#).

X-ray tubes are defined by the amount of heat they can withstand, measured in MHU (Mega Heat Unit). The larger the MHU, the more exams it can perform.

MHU assists in estimating how long a CT tube will last. A 7 MHU tube can last more than 150 million mAs, while a 4 MHU tube lasts approximately 70-100 million mAs. These are average figures and may vary depending on the manufacturer.

Next chapter is on differences between air-cooled and water-cooled CT scanners.

A Good Tip

Before you begin your CT scanning schedule, do a tube warm up. This will raise the temperature in the tube gradually, prevent damage due to temperature shock, and hereby increase tube life.

Air-Cooled vs Water-Cooled

Another factor to consider when choosing a CT scanner is its type of cooling system. There are many moving parts inside, and thus, heat is generated quickly. CTs are generally designed to handle approximately 100 kW of power in the tube and a high patient load. And their cooling system is important to ensure that the system is running optimally.

There are two types of cooling systems. The most widely used is air cooling, but you can also get water-cooled models, mainly from Siemens and Philips. An example of water-cooled systems is the Siemens Sensation line.

Whether you decide to go for a water-cooled or air-cooled system, make sure that the room environment meets the load, temperature, and humidity specifications listed in the CT scanner manual.



Air-cooled CT scanners

In an air-cooled system, heat is dissipated to the surrounding air through the outer covers of the gantry by a fan. This is the cooling system on most available CT scanner.

The cooler itself is a bit more expensive and air cooled systems are hereby slightly more expensive than the water cooled ones.

Water-cooled CT scanners

If your facility has a ready water source, such as a cooling tower or a factory chilled water system, then water cooling could be suitable.

You can also use a water cooling system if the facility does not have a sufficient water source, but then it will require an external chiller.

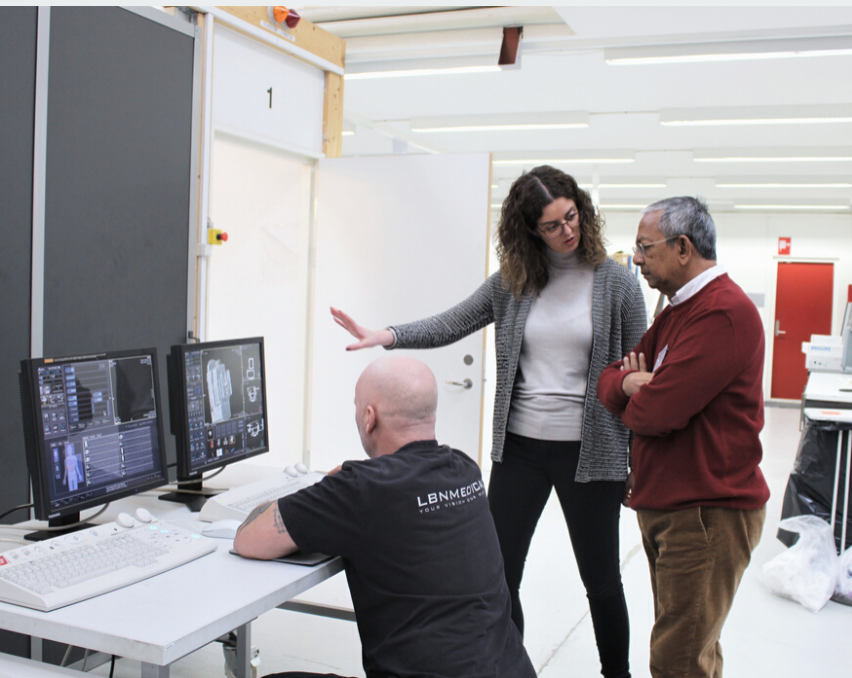
Pros and Cons of Air- and Water-Cooled

Air-Cooled	Water-Cooled
Less preventive maintenance	Almost zero noise
No water quality concerns	Cleaner - no dust and dirt from fans
No need for an external chiller	No additional HVAC system per room
Require less space and is easier to install	Lower purchasing price
A long term cheaper cooling system with smaller footprint	Good for rooms with inconsistent humidity and temperature control

CT Scanner

Workstation

Almost done, just a few more things to decide on. One is whether to acquire a workstation. A workstation is an option for most medical imaging equipment.



Since it is independent of the main modality console, you can process and analyze images while still allowing patients come in for examinations. Furthermore, it enables doctors to analyze the images long after they have been taken.

If you plan to perform image analysis yourself, getting a workstation is necessary. On the other hand, if you plan to send the images in a DICOM file to a PAC system located in a specialized clinic focused on diagnosing and interpreting medical images, you do not need a workstation.

Used Refurbished or New

When we talk about used, refurbished, and new CT scanners we refer to the condition of the CT.

So how do you choose between these three categories?

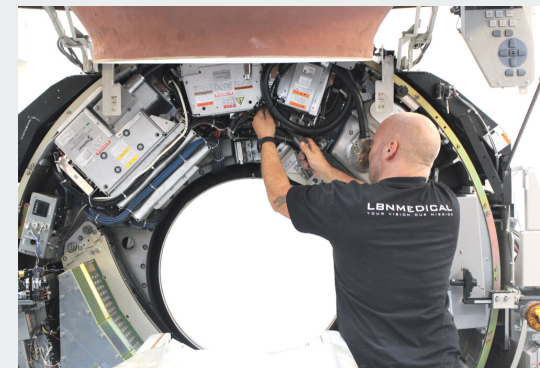
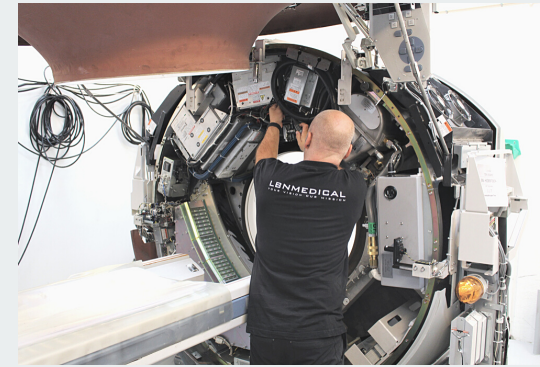
Used is used. Meaning that it has been used in another clinical setting. The condition of used depends on the number of patients, how well it has been taken care of, but also of the supplier your purchase it from. As different resellers have different standards for what they do with the system before they resell.

LBN Medical, for instance, test and check all incoming systems before they are put up for sale. When buying used, the price is lower up-front than for new and for refurbished. And if you buy a quality system, you will get good value for money.

Refurbished can either be seller refurbished, ISO refurbished or OEM refurbished. Seller refurbished is defined by the seller from system to system, usually on request on the buyer. It can be cosmetic or technical refurbishment.

ISO refurbished is a more defined process, and OEM refurbished is the OEMs performing a very specific refurbishment process on selected systems. And of course with refurbished equipment, you pay for that extra effort.

New is simply brand new, from factory. Which you can buy from the OEMs.



Main Points

Sum Up

We hope you have gained valuable insights from this guide.

Let us do a quick recap of the decision process in purchasing a CT:

What CT brand is the best for your practice?

You have many different options, although we recommend one of the following: GE, Siemens, Philips or Canon Medical (former Toshiba). They are all known for providing high quality.

Pick a brand based on access to service in your area.

What type of studies will you perform?

The answer to this question will be essential to knowing what type of scanner you require. And whether you need a CT or maybe rather an MRI scanner?

Crucial factors like slice count, software packages, and accessories all revolve around knowing which procedures you do.

What slice count do you need?

The commonly available slice counts include 16, 32, 64, 128, 256, and 320-slice CT scanners.

When choosing a CT, be sure it is suitable for the studies you want to do. At the same time, you should have a sufficient budget and be clear on your patient flow targets.

What type of CT scanner cooling is better?

There are two main variables to take into account – your facility and climate conditions.

If you have a water source ready in your facility and the temperateness and humidity tend to be inconsistent, a water-cooled CT scan machine is an option.

On the other hand, if your space is limited, you might want to go with the more popular air-cooled CT scanner.

Furthermore, most manufacturers today focus only on producing air-cooled CTs since this technology is more advanced.



How much does a CT cost?

On the used market, the price of a CT scanner goes from 35.000 euros up to 250.000 euros, sometimes even more. There are multiple factors in play, such as age, number of slices, demand, model, tube count and others.

Make sure that you match your budget with your specific needs.

See more specific price ranges in the CT scanner pricing section.

What about tubes?

Tube condition is an important factor in CT pricing and the purchasing decision process.

The condition is based on tube count.

Depending on the manufacturer, you can use one of the following measures:

- Total patient exams
- Clicks/counts
- Scan seconds
- mAs (milliampere seconds)

Do I need a workstation?

Yes, if you are going to do image analysis yourself.

However, if you send the images to a clinic specialized in diagnosing and interpreting medical images, you do not need to get a workstation.

Thank you for reading this far.

If you still have questions you can email us at sales@lbnmedical.com. Or visit our website lbnmedical.com

"We bought a CT Scanner from LBN Medical and we are 100% satisfied, David and LBN Medical do not only sell you a system but also provide post-sales support to make sure you are satisfied, and the system was as expected. I highly recommend them."

- Martin purchased a GE - CT750 HD

