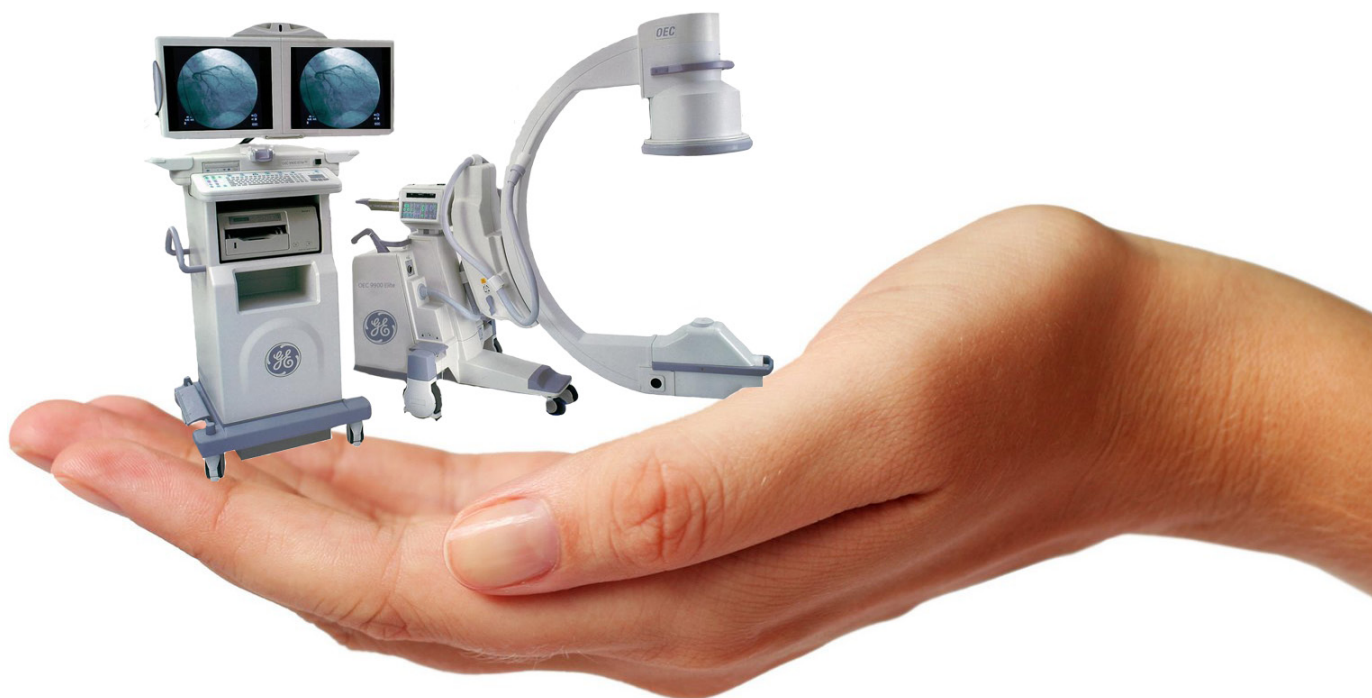




C-Arm 101



Everything you ever need to know!
Guide to C-Arms



Sensible Solutions for Refurbished Radiology

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C-Arms 101

Welcome to the Atlantis Worldwide Buyers Guide. This guide is designed to help you learn all you need to know about C-Arms. When you are finished reading this guide you will know all the right questions to ask and what type of C-Arm will meet your requirements. Atlantis Worldwide has been selling refurbished C-Arms since 1993 and our expert knowledge and experience with C-arms is unsurpassed. Even if you are not ready to purchase a C-Arm you can keep this handy guide as a reference. This guide is very easy to learn.

So raise your hands if you are ready!



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C-Arm Overview

A C-Arm is an x-ray imaging system that is mobile and can be used in confined spaces. The arm is shaped like a “C” hence a C-Arm. The arm can be moved and adjusted to different settings based on the procedure. The C-Arm can also work in conjunction with a table that is designed for C-Arms.



C-Arm Movement

We have a video to demonstrate the swivel, swing and circling of the C-arm. Please **click here** to watch the 2 minute video (or) follow this link: <http://info.atlantisworldwide.com/blog/bid/275720/C-Arm-Movement-Swivel-Swing>

C-Arm Applications

C-Arms are used for the following procedures:

- General Surgery
- Pain Management
- Aneurysm Repair
- Catheter Placement
- Cardiac
- Pacemaker Implantation
- Hip Replacement
- Interventional Neuroradiology
- Neurosurgery
- Trauma Care
- Lap Band Surgery
- Needle Biopsy



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C-Arm Components

A C-Arm has 4 main components:

- Image Intensifier
- X-Ray Source
- Imaging System
- Workstation

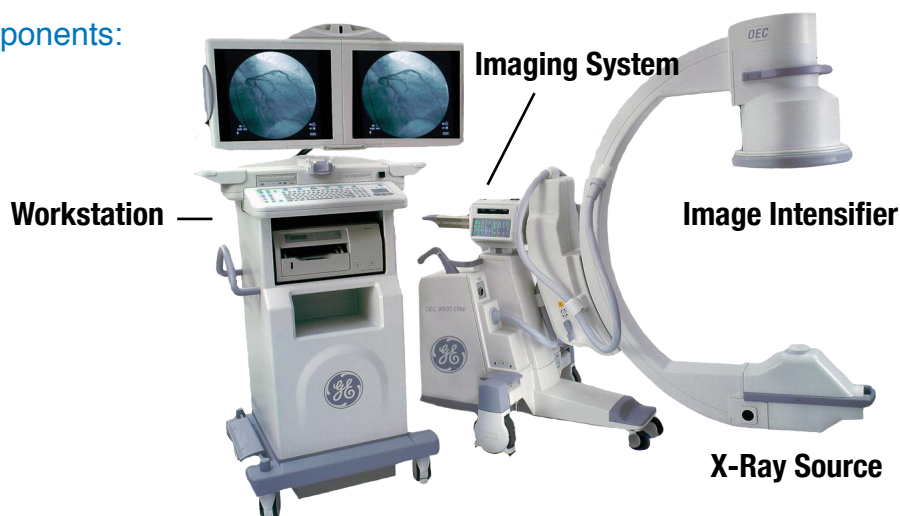


Image Intensifier

We have a video to demonstrate the image intensifier of the C-arm. **Please click here to watch the 2 minute video.** (or) follow this link : <http://info.atlantisworldwide.com/blog/bid/268330/C-Arm-Image-Intensifier-9-or-12-Size>

The size of the Image Intensifier is generally either 9" and 12" in diameter. Siemens makes their Image Intensifiers in either 7" or 13". The image intensifier is referred to as the ii.

9" is the most popular and is less expensive. Magnification in the 9" is usually 9/6/4.5. The following studies are usually done with a 9" ii:

- Pain management
- General surgery
- Orthopedics
- Sports medicine
- Pacemaker placements
- Cardiac
- Needle Biopsy

12" is obviously bigger and tends to cost more than the 9" system. Magnification in the 12" is usually 12/9/6. The following studies are usually done with a 12" ii:

- Orthopedics
- Neurovascular
- Vascular



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C-Arm Components

X-Ray Generator

The x-ray generator is where the power to penetrate the body comes from. A 15 kW generator will penetrate deeper than a 7.5 kW generator. The benefits for increased power are:

- Greater flexibility for imaging while reducing exposure times
- Less risk for error
- Easier to do shots on obese patients

X-Ray Tubes

The two types are:

- Fixed anode - stationary anode or monoblock
- Rotating anode - allows for longer fluoro times and larger patient volume as it will cool faster. Also will enable a longer tube life.

Imaging System

The imaging system can perform many different movements. Please watch our video on Swival, Swing & Movement of the C-Arm. **Click here** to watch or paste this link into your browser: <http://info.atlantisworldwide.com/blog/bid/275720/C-Arm-Movement-Swival-Swing>

Workstation

The operation of the C-Arm is navigated at the workstation and includes the following:

- Power Switch
- Exposure switch
- Cable hanger & Interconnect Cables
- Break Pedal
- Controls Radiographic Settings
- Fluoroscopic Settings
- Hard Disk
- Optical Disk
- Writer/Rewriter
- DVD- R/RW - PACS
- Advanced Image Quality Enhancement Software
- Noise reduction
- Zoom Control
- Save & Swap Images
- Single or Dual Monitors



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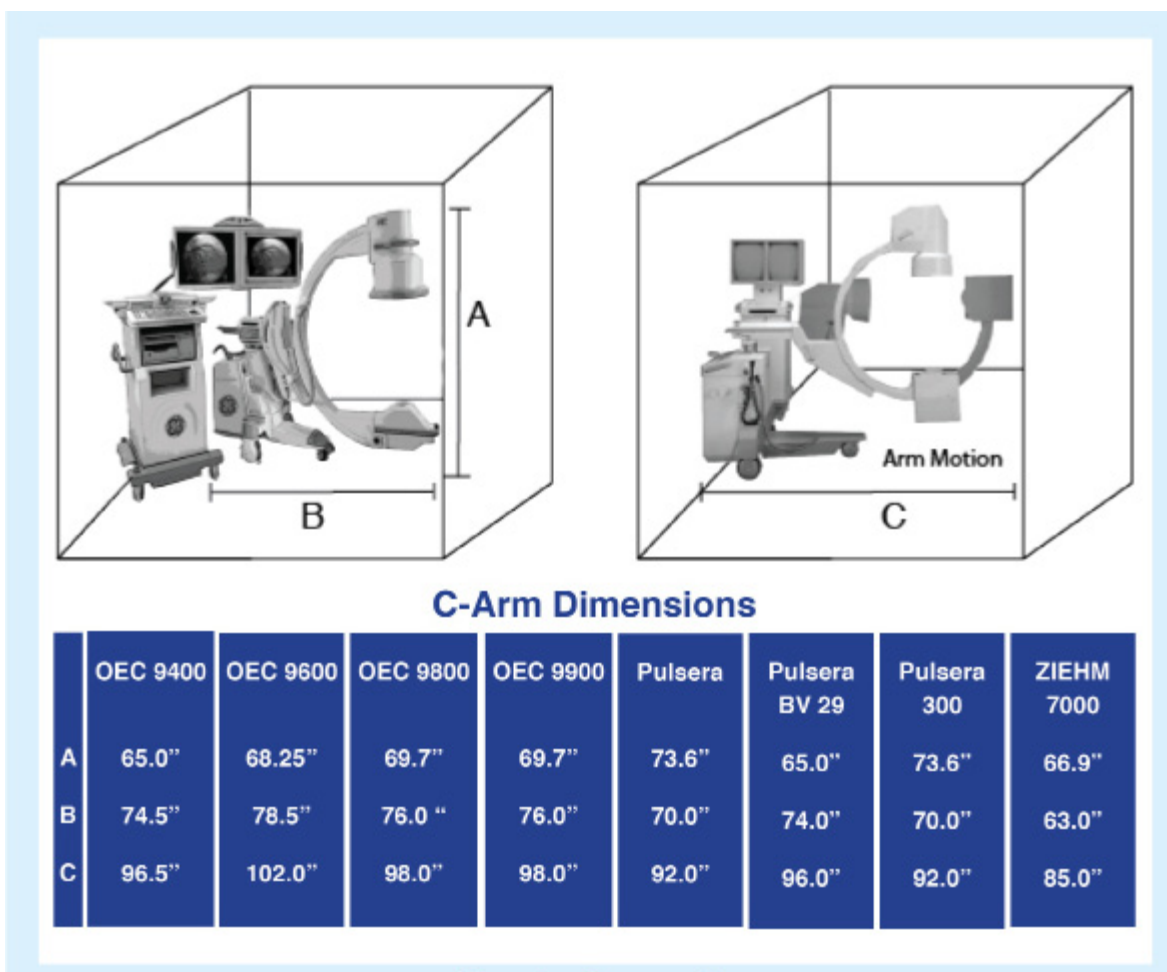
C-Arm Size

ROOM - Size Does Matter

If you do not have a C-arm yet, but are planning on purchasing one soon, you should consider where the C-Arm procedures will be best performed.

The room should be no less than 10' x 12'. While a C-Arm will fit in this room, it will be a tight fit with a standard size C-Arm and table. The bigger the space the more comfortable you and your patient will be.

Here is a list of popular standard C-Arms and there sizes:



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Other Considerations:

C-Arms operate on 110V, 12-15 Amps so a standard outlet is all you need. We also advise that you do not plug anything else into the outlet except the C-Arm to alleviate potential power spikes.

Another thing you will need to consider when planning your room is lighting. Where the light fixtures are located is important to be able to see clearly during the procedure.

C-Arms can also get hot during Fluoro and should have adequate cooling for the space.

Lead Shielding

If the walls of the procedure room are adjacent to a waiting room, you may want to consider shielding that wall.

Some states even require lead shielding for C-arm use. Regulations regarding the level of lead shielding vary from state to state. In some states portable shields and aprons are sufficient, in others drywall of 1/32 square inch is required. Leaded drywall in the OR might also be needed.

You should research radiation protection policies for your state. It is a good idea to have an evaluation of your site.



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Types of C-Arms

C-Arms come in different sizes!



Mini C-Arms

Mini C-Arms are one-piece systems. They are the smallest systems and generally equipped with a dual mode 6" / 4" image intensifier (ii). A mini C-Arm is used for orthopedic and podiatric imaging for the extremities like the hand or foot.

Compact C-Arms

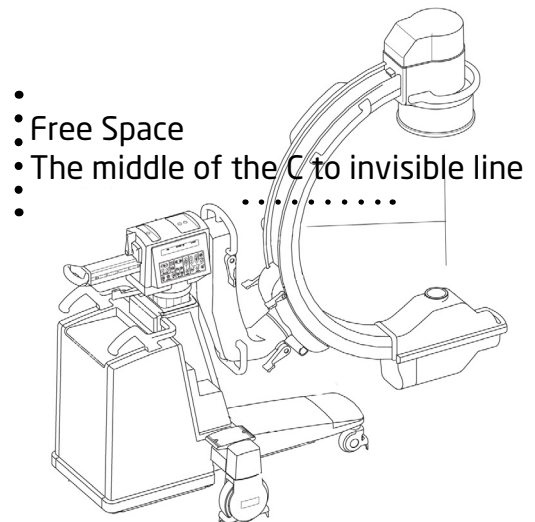
Compact C-Arms are smaller C-Arm where a major benefit is that the C-Arm is easier to move and can fit in smaller rooms. Compact C-Arms are either two-piece C-Arms that are smaller in size than a normal C-Arm or it's a one-piece system where the monitor(s) is attached to the C-Arm. These C-Arms generally have a tri-mode 9" image intensifier.

Full size C-Arms

Full size C-Arms tend to be the most sought after because you can do just about any type of procedure. Depending on the make and model of the C-Arm the depth of "C" can range from 24" to 28".

Super "C" C-Arms

And last, but not least, is the Super "C" C-Arm. A Super "C" C-Arm gives you more "free space", See Diagram. This extra space allows for additional room to accommodate larger or obese patients. Depending on the make and model of the C-Arm the depth of "C" can range from 31" to 33".



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Refurbishing a C-Arm

Refurbishing a C-Arm Inside and Out:

Purchasing a refurbished C-Arm is a great investment for a private practice that is just starting out, a cost-conscious hospital looking to upgrade their radiology equipment, or any medical facility that is looking for a sensible solution while maintaining a high quality of care. The catch in this market is what “refurbished” actually means. The definition to one company may be different from what “refurbished” means to another. Some companies say they refurbish C-Arms, but in reality all they do is what we call a “spray and pray” where they give the C-Arm a paint job and pray nothing goes wrong with it. There is much more to a refurb than just the cosmetics. So before you get to the buying stage make sure you read this article. We will clearly outline all the things you should know and expect from a refurbished C-Arm.

It Keeps Going, Until It Doesn't

At the very least, a refurbished C-Arm should have all the batteries replaced. There are different working parts to a C-Arm that require different batteries, so when you purchase your refurbished C-Arm all of these batteries should be of equal strength. Also key to a refurbished C-Arm is the installation of new cathode ray tubes (CRTs) into the monitor. Original CRTs tend to have burn in and can affect the image quality of your picture. If you want your refurbished C-Arm to work “like new,” insist on new CRTs. That being said, if you are purchasing a C-Arm with Flat screen monitors, they generally do not need to be replaced.



For Your Eyes Only:

A key step in the refurbishing process is the deletion of all prior data from the machine. The Health Insurance Portability and Accountability Act (HIPAA) was designed in 1996 to protect private medical information for all patients. HIPAA established strict guidelines for record keeping, record storage, and communication in the medical and health insurance fields. This relates to C-Arm records as well and the law requires that all patient information must be removed prior to the resale of a C-Arm.



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Refurbishing a C-Arm

Looks As Good As It Works

It's important to clean, test, replace parts and update a C-Arm both inside and out. A refurbished C-Arm should be made to look as good as new. Exterior pieces should be sanded as necessary to ensure that all dents and other imperfections are addressed. After a primer coat has been painted on and has dried, two coats of high quality polyurethane paint should be applied before reassembly.

Check Each Step

The following 5 steps are crucial if you are looking for a refurbished C-Arm that will last.



- The C-Arm should be dismantled, cleaned and disinfected during the refurbishment process
- While the C-Arm is dismantled, all circuit boards and cables should be checked and replaced as needed
- Any fasteners that were corroded should be replaced with stainless steel hardware
- The C-Arm collimator should be calibrated at a dose output set to meet current FDA regulations. Regulations are amended and updated from time to time so it's crucial to make sure updates are current
- The Image Intensifier should be checked and calibrated to specifications

Always Know Before You Go

Finally every company should have a detailed list of their specific process for refurbishing a C-Arm. Review the list and make sure all the key elements we mention are performed so you know the C-ARM you choose works as good on the inside as it may look to you on the outside. Click below for the step-by-step process that Atlantis Worldwide follows when we refurbish our high quality C-Arms :<http://www.atlantisworldwide.com/maintain-equipment/refurbished-c-arm/>



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C-Arm System Options

Variety of Software and Applications for an OEC C-Arm

	Common Features	Common Use
General Surgery Package	Edge Enhancement, Digital Spot, Pulsed Fluoro, Averaging	Ortho, Pain Management, Basic Surgery, Sports Medicine
Extended Surgery Package	Digital Zoom & Roam, General Surgery Features + More Image Storage	Ortho, Pain Management, Basic Surgery, Sports Medicine
Vascular	Roadmapping, Extended Surgery Features + DSA, 15fps Cine	Peripheral Vascular, Pacemaker Placement, Angio
Neurovascular	Vascular Features + 30 fps Cine	Peripheral Vascular, Pacemaker Placement, Angio
Cardiac	Vascular Features + 30 fps Cine	Peripheral Vascular, Pacemaker Placement, Angio

The information listed above is general information that is common in most C-Arms, however since there are so many different models and manufacturers some of the terms might be slightly different. We can help you sort that out when the time comes!



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C-Arm Options

PACS * DICOM * IMAGES * MEDICAPTURE

No one likes to keep hard copy records these days. Everyone wants to store electronic records. Most C-Arms have the ability to store images, but hard drives have limited storage.

Your C-Arm can be hooked up to a printer and you can print the patients record with their name, facility or doctor's name, and date. There are many printers available from inexpensive to top of the line.

DICOM

DICOM enables you to transfer your images to a separate viewing station as long as you have a PACS network set up. Most C-Arms manufactured after 2001 will have DICOM built into them. For older C-Arms a DICOM box is required.

PACS

Picture Archiving and Communication System (PACS) is a medical imaging technology which provides economical storage of, and convenient access to, images from multiple modalities. The universal format for PACS image storage and transfer is DICOM.

Image Capture Devices, such as MediCapture, are commonly being used at facilities that do not have a PACS network.

MEDICAPTURE

A MediCapture box is a recording and storage device that allows you to easily save digital images and videos to a USB flash drive.

Installation is pretty simple, too. All you do is plug the MediCapture box into your C-Arm and either press the Record button, use the footswitch or pull the trigger. Your images and videos will then be downloaded to the flash drive found inside the Mediacapture box. From there, just remove the flash drive from the MediCapture box and plug it into computer so you can view your images and videos.

There are three different MediCapture boxes to on the market. The MediCap 170 is the basic model, which allows you to record only still images in standard definition. The MediCap 200 is the next model up and allows you to record both images and videos in standard definition. The MediCap 300 is the high-end model, which enables you to record both images and videos in high definition.

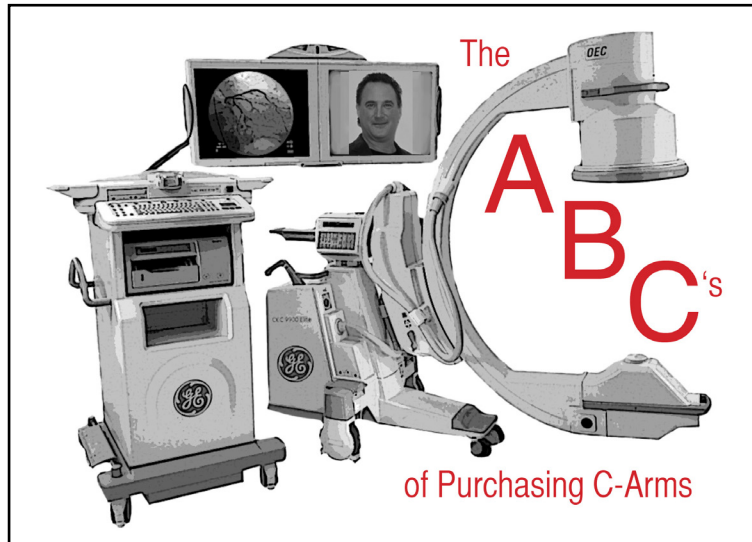


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The A, B, C's of Purchasing the Right C-Arm

Deciding to purchase a C Arm for your practice is easy enough, but choosing which one is appropriate for you can be a little more complicated. To simplify things, we've outlined the questions you should ask and ideas to keep in mind while you shop. Follow this guideline, and you will be pleased with your purchase.



1. Size does matter:

Knowing the size of the Image Intensifier you need is always a good first step. For example, 9" or 12" are two options available to you. Also know the size of your power generator and that it is strong enough for your procedures. A 15 kW generator will penetrate deeper than a 7.5 kW generator.

2. Room with a view:

Make sure the room that you will be using for procedures is sized correctly for the C Arm. Also make sure you have room to maneuver the C-Arm so as to avoid bumps and bruises.

3. Free space:

Confirm there is the correct free space for the area between the Image Intensifier and the X-Ray Tube. You'll need to be able to adjust it for the best possible image output.



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The A, B, C's of Purchasing the Right C-Arm

4. Great image.

Now what? Taking great images won't mean anything unless you have the correct storage device for image capture, so make sure to add that into your purchase. Printer, Mediacapture or Dicom are all great options.

5. Software for your hardware:

Depending on the procedures you perform, you will need specific software packages. For instance, if you are doing procedures that involve veins you will need a vascular package.

6. Apples to Apples (This is important)

Make sure you know everything that is included with the purchase. Installation, set up, training, shipping, and the length of warranty as well as what components are covered by the warranty.

7. What's old is now new:

If you're shopping for a refurbished C-Arm ask to get a full list of what parts were replaced and repaired and the process the unit went through to be refurbished. You should insist that the CRT monitors and batteries are replaced.

8. Round and Round:

If the system you are looking for will be heavily used then you will need a C-Arm with rotating anode tube. This also applies if you deal with a large (no pun intended) number of obesity cases in your practice.

That about covers it. See, not so bad. Follow this checklist, so you will end up with the most optimal C-Arm for your practice and most likely avoid the common pitfalls we've seen when people purchase imaging equipment. And if you have any questions we can help. So feel free to contact us at any time.



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C-Arm: Safety Tips

C-Arm fluoroscopy is used in many areas and you should be aware how to protect your surgeons, patients and staff from the invisible dangers of radiation. Time, distance and shielding are the basic guides for safely using radiation.

Here are some guidelines & tips:

1. Achieve the lowest possible dose of radiation – As Low As Reasonably Achievable (ALARA)
2. Take images using the low-dose setting.
3. Use pulsed fluoroscopy to capture intermittent images - the shorter the fluoro beam-on time, the lower the patients exposure.
4. Exposure can be reduced by positioning the patient as far as possible from the x-ray tube and close as possible to the image intensifier.
5. Decreasing the x-ray field size can also reduce patient exposure.

Lead Aprons & Shields

1. Use lead aprons to guard against a significant amount of radiation
2. Lead shields protect only part of the body
3. Protective eyewear with lead lining and thyroid shields should be worn
4. C-Arm drape helps reduce the danger of scatter

Monitor Exposure

1. Use monitor tags for staff members to wear on their lead aprons
2. Your Radiation Safety officer should monitor the staff tags to make sure the exposure is not increasing month to month. If there is a big jump it might indicate the C-Arm needs to be recalibrated

Evaluate your C-Arm Unit

1. C-arm units are required by law to be evaluated by a radiation physicist at least once a year
2. If you are using it daily it is wise to have it checked twice a year
3. The older model C-Arms might increase or decrease the output as they age
4. Knowing the radiation output and having the necessary adjustments is key

Educate

1. Education is a major factor in monitoring and reducing exposure
2. A qualified expert such as a radiologist, radiological physicist, or health physicist should conduct training for your staff.



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Buy a C-Arm on eBay? You've Got to Be Kidding!

Over the years we have spoken to thousands of doctors looking to open a new office and want to purchase a C-Arm. More than a few times we have spoken to people whose first instinct was to go to eBay and check out the cost of C-Arms. They tell us that they don't have a lot of money in their budgets since they are just starting out on their own... which brings them to eBay.

They look on eBay or other websites and see a C-Arm between \$15,000 - \$18,000 and they are thinking of purchasing that C-Arm. What a bargain!

You've Got To Be Kidding@

Here are Six Reasons not to buy a C-Arm on eBay:

- 1) You can not inspect the C-Arm!
- 2) There is no warranty on the C-Arm!
- 3) The software functionalities on the C-Arm are not always disclosed!
Example: Non Vascular or Vascular
- 4) Can be damaged during shipment!
- 5) There is no FDA 2579 Form that comes with the system (Doctors needs this to register with their state so they can use the system.)
- 6) Past patient information is usually still on the hard drive of the system and that is a HIPPA violation.



You essentially get what you paid for- but can you return it? Don't think so-

Atlantis Worldwide has several solutions for doctors that are just starting out.

- Rent to Buy
- Used, Refurbished & New C-Arms
- Rental Programs
- Easy Flexible Financing Programs



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C-Arm Services!

Make Sure you get a Service Plan With Warranty

A service plan with a warranty is an absolute must. When the time comes to discuss the coverage of your warranty plan, make sure it includes parts and labor as well as travel time. Also be aware that not all warranties cover everything. Some plans exclude the X-Ray Tube and Image Intensifier, which just so happen to be the two most expensive parts to replace. Others pro-rate the X-Ray Tube and Image Intensifier. It's important to know that just like other expensive pieces of equipment there will need to be service done on the system at some point. Whether it is a routine preventative maintenance or a larger issue that needs to be repaired, make sure there are local service engineers that can come out to work on your system in a timely manner.

Renting/Financing Options

Like buying a home or car there are many finance options available. At Atlantis equipment financing is available based on your budget and needs. Our knowledgeable staff will help you determine and obtain appropriate financing options. <http://www.atlantisworldwide.com/maintain-equipment/financing/financing-options/>

Still Have Questions:

We may have not answered all of your questions in the 101 C-Arm Guide but we at Atlantis are always available if you need more information. We would be more than happy to help you with your questions and concerns.

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