Recommendation for Mobile Installation of PoC CRs

Dec 11, 2008

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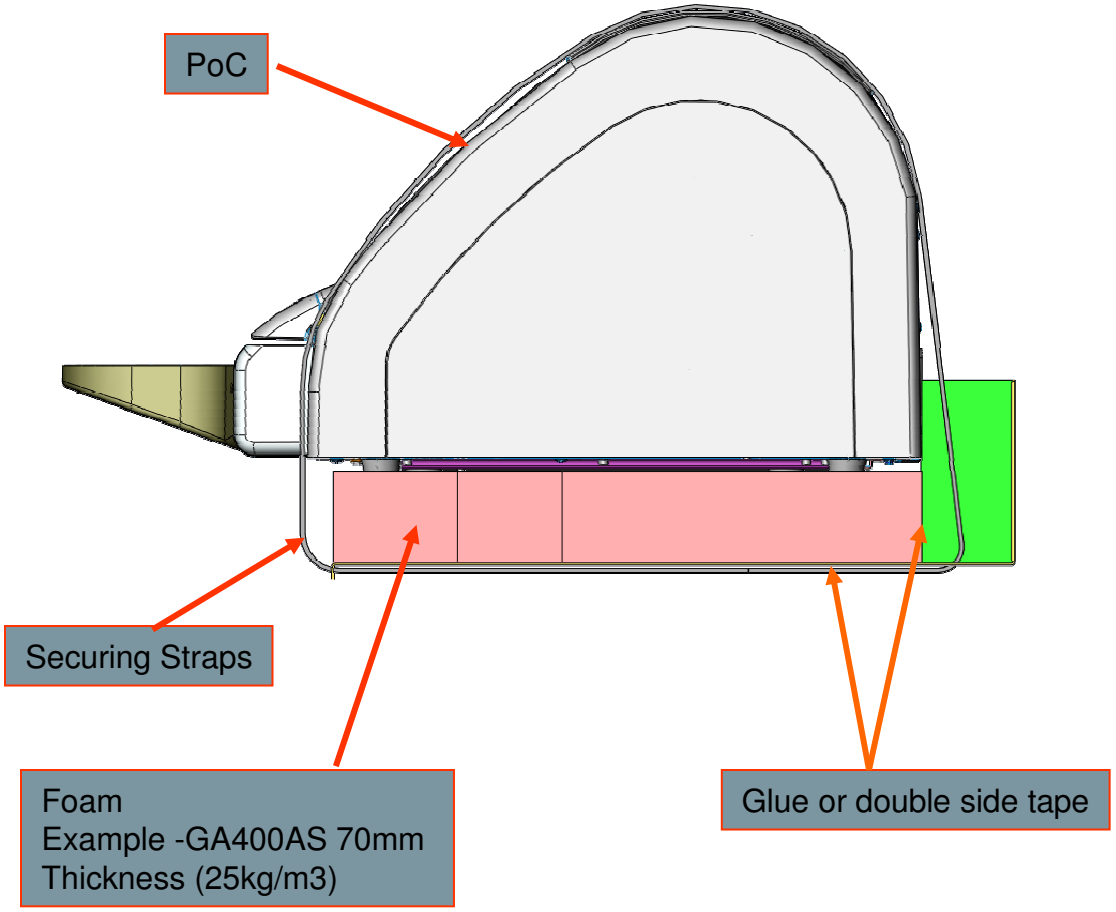
Overview

- The PoC CR is a sophisticated electronic medical device. While it has an outstanding history of being able to work in mobile environments, care must be taken to ensure the device is installed properly to ensure optimum performance.
  - Mounting the CR directly to a support device with inadequate cushioning will cause excessive vibration and shock to the CR, shortening the life of the components and the overall operability of the system.
  - Improper wiring, or inadequately specified inverters/UPS's may result in damaged electronics or image artifacts.
  - Operating and STORING the CR outside of the specified environmental conditions could lead to malfunction and/or damage to system components
- Each of these installation items is critical to the overall performance of the PoC CR. Therefore Carestream is enclosing detailed recommendations for each of these, to ensure the best installation for your mobile use.
- Systems installations that do not adhere to the recommendations listed within this document, could have their manufacture's warranty revoked by Carestream.

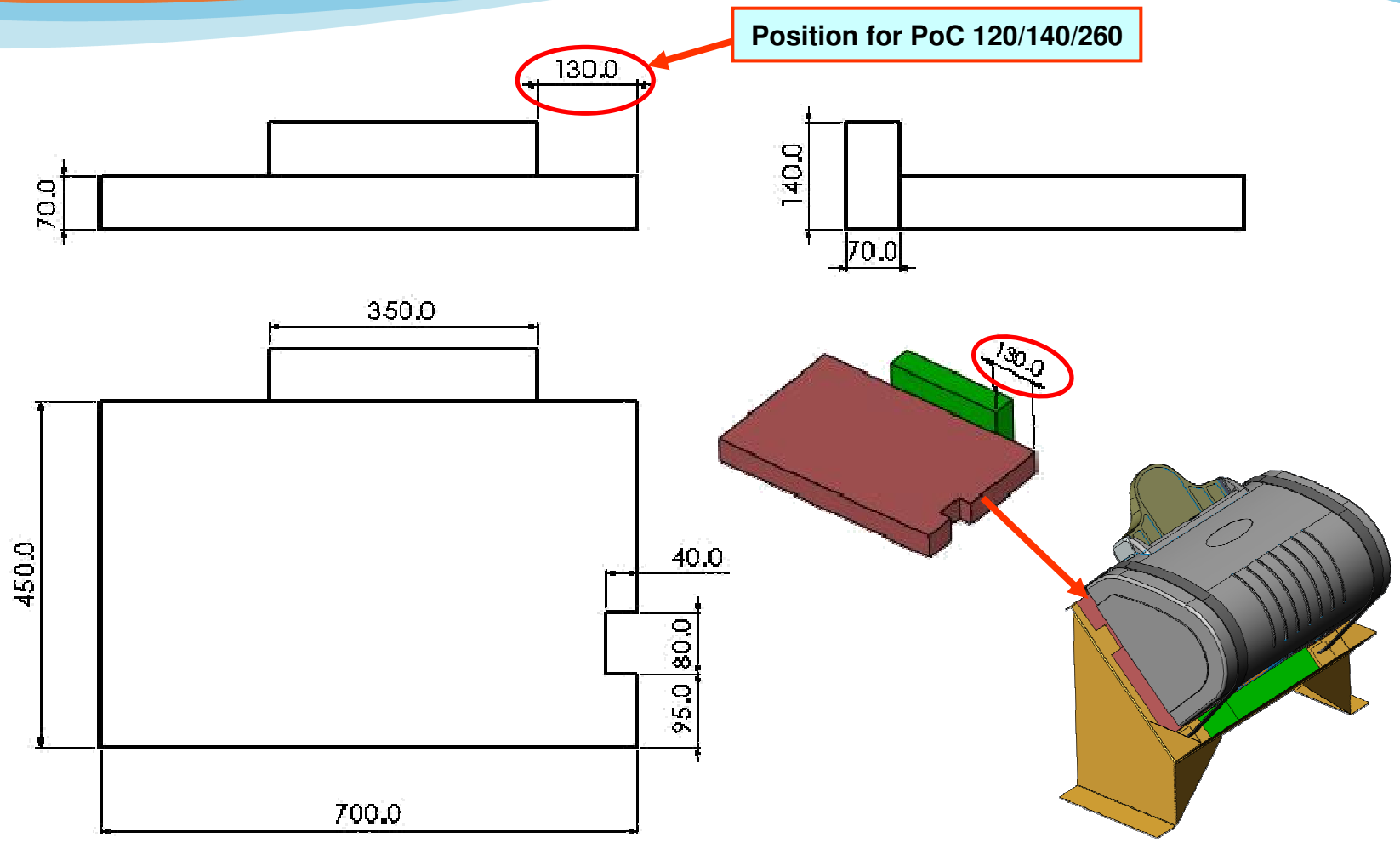
Mechanical Installation Recommendations

Mechanical Installation – Foam Cushioning



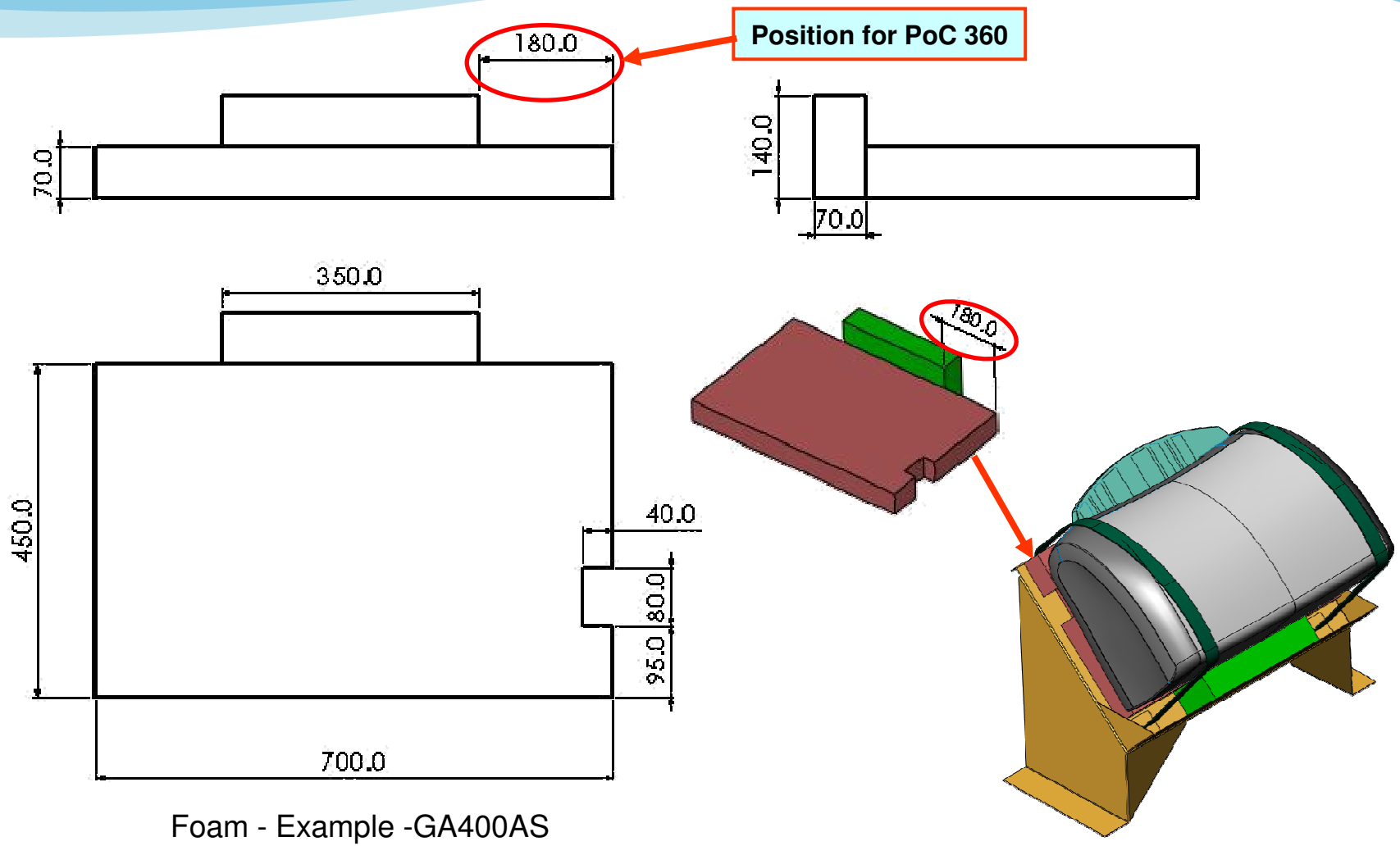
- The PoC CR should never be mounted directly to any support structure without proper padding.
- Below the machine, should be at least 70mm of thicker foam, preferably GA00AS (25kg/m3).
- To prevent slipping, the foam and stand should be glued or adhered with double sided tape
- The foam should be cut to ensure access to power, usb ports, and any venting on the CR (see next slide for detailed drawing).
- The CR can be mounted horizontally on a low, elevated or inclined stand (at 60 degrees), as long as it mounted with the above recommendations.

Mechanical Installation – PoC 120/140/260 Foam Drawing



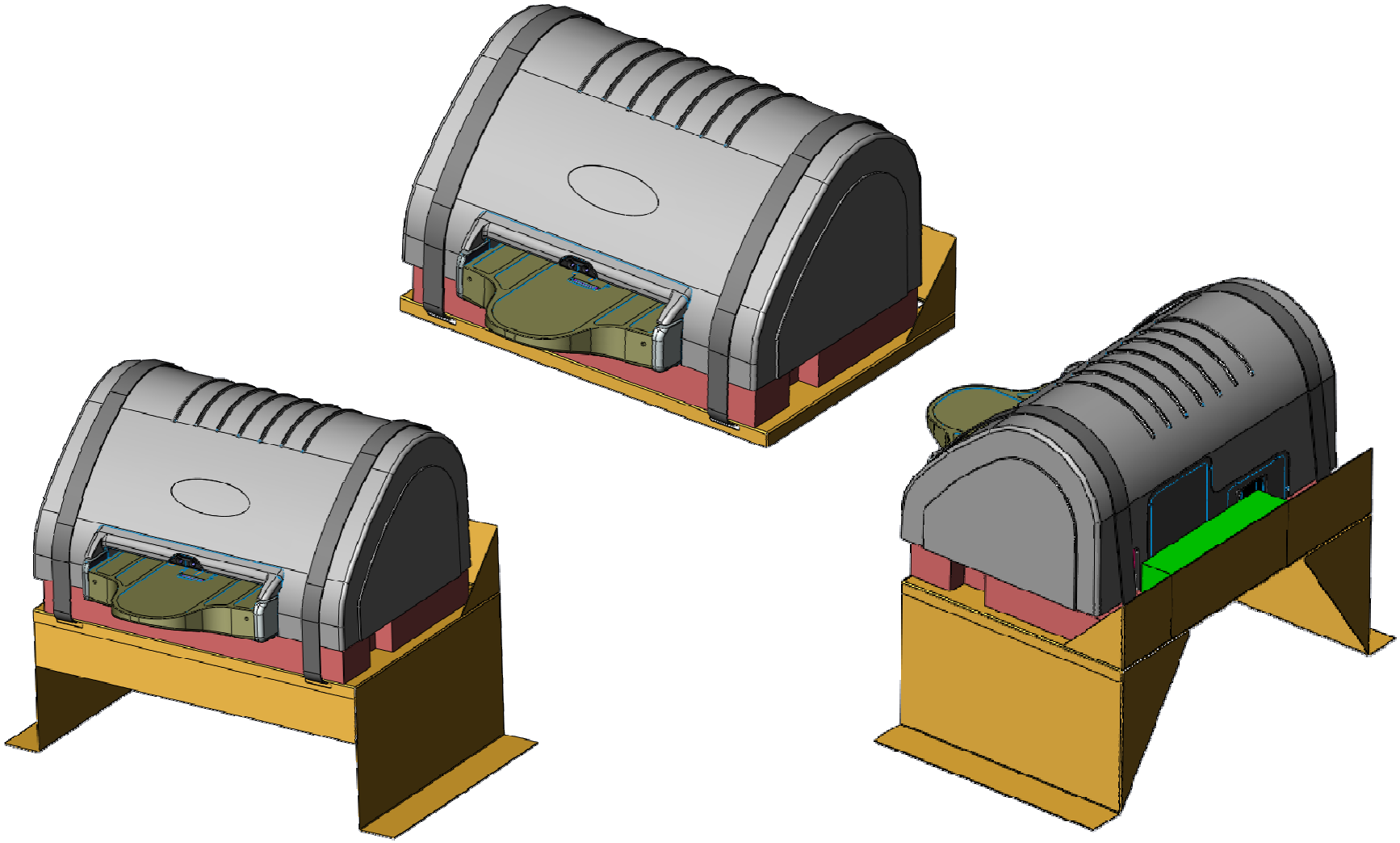
Foam - Example -GA400AS
70mm Thickness (25kg/m3)

Mechanical Installation – PoC 360 Foam Drawing



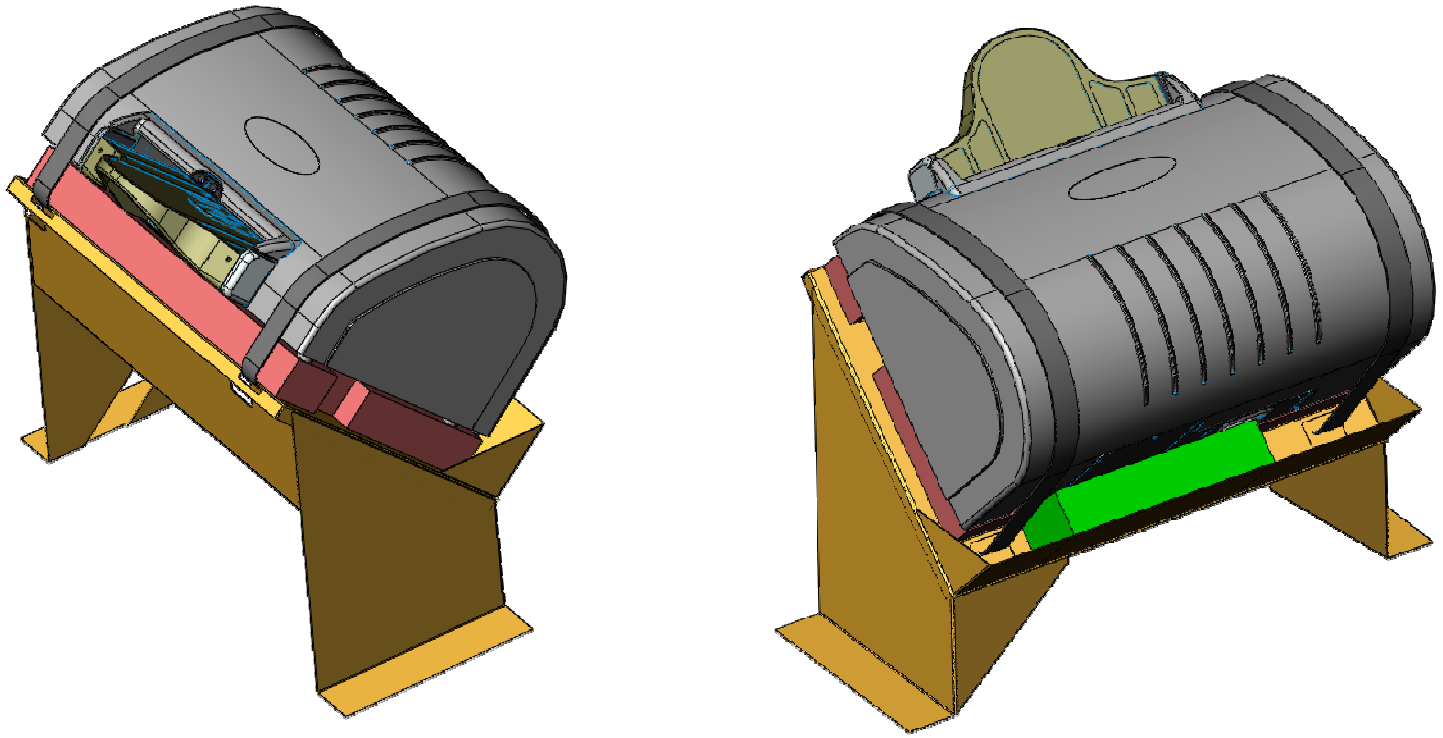
Foam - Example -GA400AS
70mm Thickness (25kg/m3)

Mechanical Installation – Horizontal Mounting



Mechanical Installation – Angle Mounting

- Carestream recognizes that mounting of the PoC CR at an angle is often desired. In these instances, it is recommended that the angle should be set at 60 degrees, otherwise you risk having improper feeding or jammed cassettes/screens.



Electronic Installation Recommendations

Electrical Installation - General

- Proper electrical installation is crucial to optimum performance of the CR system.
- In general, Carestream recommends:
  - Using a power inverter with True sine wave output, and a power rating of 600W (800W surge).
  - An online UPS
  - Proper grounding to the chassis of the vehicle
  - Wiring of appropriate gauge
- Each of the above will be discussed in detail in the following slides.

Electrical Installation - Recommended Inverter (12V input)

- Below are recommended specifications for the inverter. In the appendix is one example of a inverter (by Cotek) that meets all of these specifications, but you are free to use any inverter that is comparable.

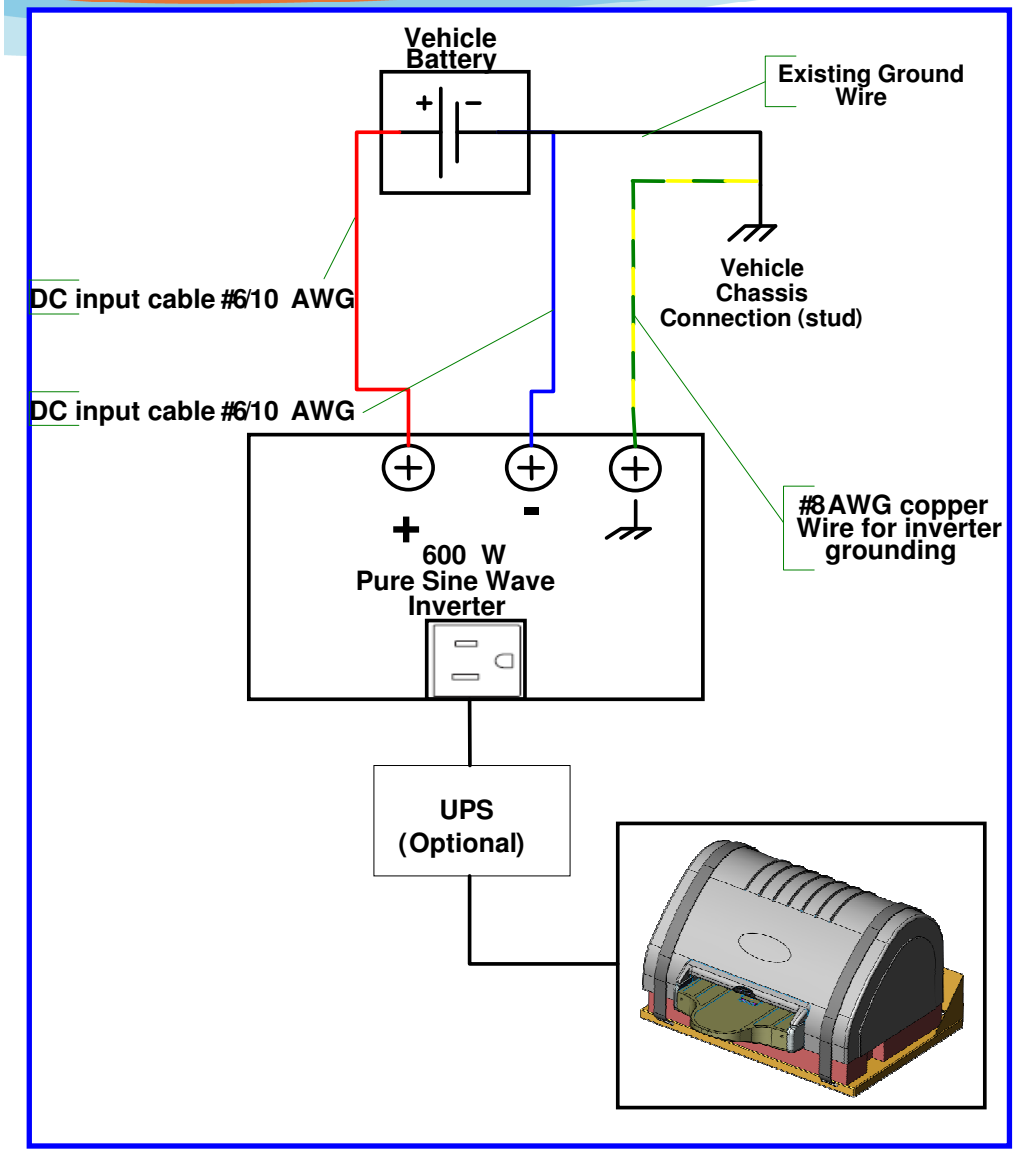
- **Recommended Inverter specifications**
  - True sine wave output (THD < 3%).
  - Rated power: 600W.
  - Surge power: 800W.
  - Input voltage range: 10.5V ÷ 15V
  - Bat. Low alarm: 11V
  - Bat. Low shut down: 10.5V
  - Over Temperature: shut down output voltage.
  - Output short: shut down output voltage.
  - Working temperature: 0 ÷ 40°C.
  - Working Humidity: 20% ÷ 90% non condensing.

- **Other considerations**
  - The Inverter should be positioned at least 0.5 meters from the reader.
  - Allow at least one inch of clearance around the inverter for air flow.
  - Ensure ventilation openings are not obstructed.
  - Make sure that the environmental temperature conditions are not violated as the internal temperature protection may trip and disconnect the CR power supply while the CR is scanning
    - The inverter fan should keep working to cool the inverter. When it has cooled below the trip set point the inverter AC output will be active again.

Electrical Installation – Optional UPS

- Carestream recommends that an on-line UPS be connected between the inverter and the PoC CR.
- UPS Recommendations
  - UPS should be on-line UPS, 700VA with backup batteries for 10 minutes.
  - UPS should be positioned at least 0.5 meters from the reader.
  - When using the UPS batteries there is no need to start the vehicle engine in order to charge the batteries.
    - The 10 minute backup batteries should be sufficient to perform between 2 to 4 scans.
    - The UPS batteries can be re-charged by starting the vehicle after performing the scans.

Electrical Installation – Connection Diagram



- Make sure that the inverter chassis ground terminal is connected to the vehicle chassis. It is most preferable that this terminal is connected to the same vehicle chassis stud connected to the battery (-) terminal.
- Connect chassis ground terminal to vehicle chassis using #8 AWG wire.
- DC input cables should be as short as possible, ideally less than 10 feet (3 meters). Cables that are too long will cause voltage drop that may cause the inverter low voltage protection to trip.
- For 12V battery input use DC input cables with gauge of #6 AWG. For 24V battery input use input cables with gauge of #10 AWG. Cables with too small cross section may cause the inverter low voltage protection to trip.
- Make sure all the screw connections on the DC input terminals are tight in accordance with the manufacturer instructions.

Environmental Conditions

Environmental Conditions: Specifications

- The PoC CR is a complex MEDICAL device, and must only be operated and stored within the allowed specifications. Exceeding these specifications will void your manufacture's warranty.

Operating conditions:

- 15 to 30 deg C (59 to 86 deg F)
- 15 to 76 % RH (Non condensing)
- Inverter should be over 20 cm from the scanner cover
- Once the scanner is within acceptable operation temperature(15-30 deg C), wait an additional 10 minutes before scanning.

Storage conditions:

- -23 to 66 deg C (-9 to 150 deg F)
- 5 to 86% RH (Non condensing)
- If the CR could be exposed to extreme conditions (out of the range from above) you will need to store the vehicle in a shelter capable of maintaining the above specifications.
- When stored, Carestream recommends that you cover the scanner and the cassette storage compartment.

Dust

- When exposed to a dusty environment, a plastic cover is recommended to protect the scanner and cassette from collecting dirt or dust (which could negatively impact performance).

Environmental Conditions: Other Considerations

Placing equipment on the Reader cover

- Never place any electronic equipment on the reader. This may cause electrical interference that will affect the PMT tube or cause mechanical vibration that will result in image artifacts.

Direct Sunlight

- Direct Sunlight on the scanner and the cassettes should be avoided.

Exposing the vehicle to extreme weather conditions.

- Avoid exposing the system to extreme weather conditions. This may negatively affect the CR performance. Please note that the temperature inside a vehicle can vary greatly from the temperature outside.

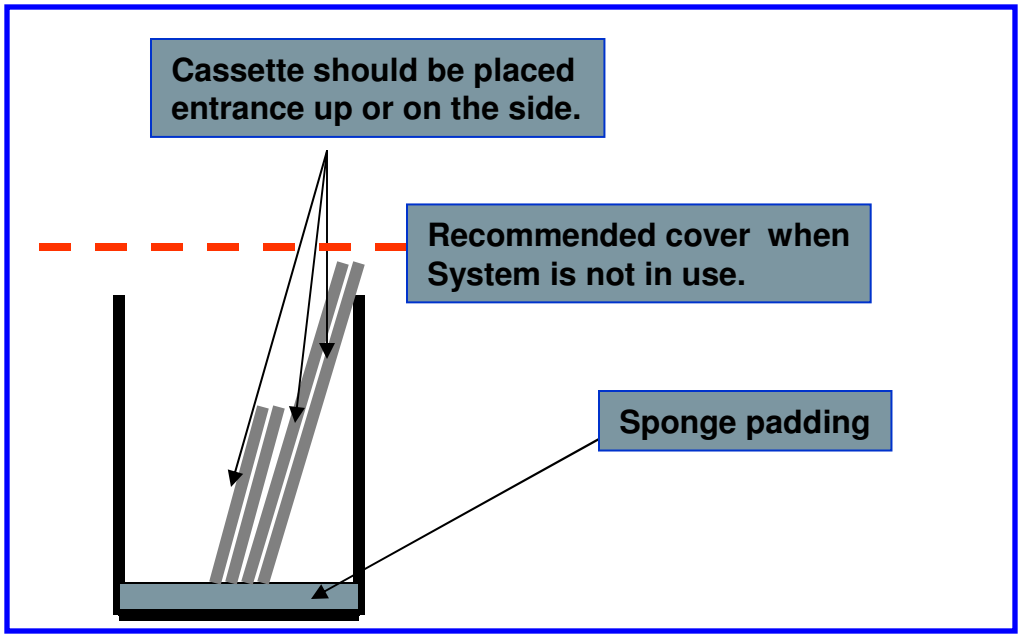
Other

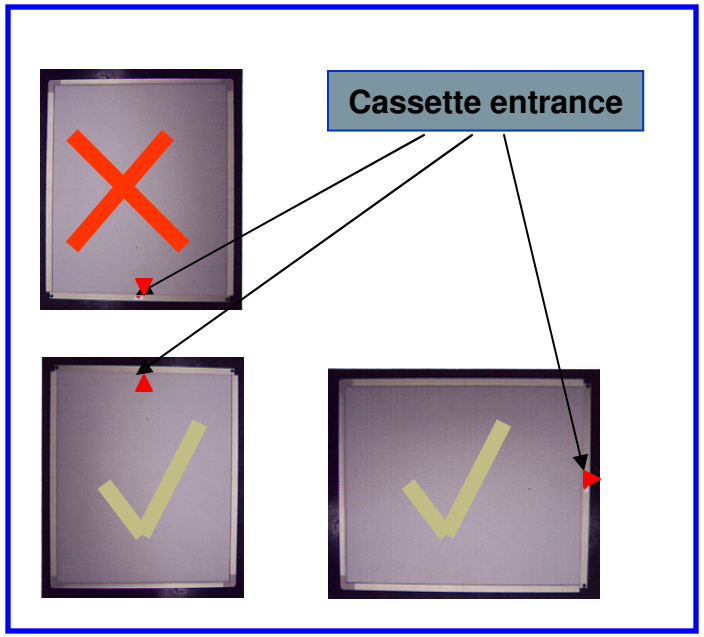
- Do not slam the vehicle doors when the reader is scanning. This may cause line artifacts in the image.
- To avoid image artifacts, do not start the engine, air conditioning or any other source of vibration inside the vehicle while scanning.

Cassette Storage Recommendations

Cassette Storage Recommendations

- Cassettes can be stored in a separate container, but care should be taken to ensure they are not damaged or subjected to environmental debris.
- Carestream recommends:
  - A soft sponge padding, at least 30mm thick be placed in the bottom of the container (see appendix for one recommend type of padding).
  - A cover be placed over the container when the cassettes are not in use.
  - Don not place the cassette with the entrance facing down (up or side are ok).





Appendix
Examples of Recommend Products

Example for Recommended “egg sponge” padding

TECHNICAL
PRODUCT
FUNCTION
SHEET

Foamex

Cushioning Functions *Gasketing . Sealing*
Case Liner . Packaging . Drainable Seating

General Description

Foamex flexible cellular plastics are high technology polyurethane foams designed to perform a variety of specifically engineered cushioning functions when fabricated into parts, as well as other cushioning-related functions including gasketing, sealing, positioning and spacing applications. For maximum utility, the manufactured foam capabilities can be extended by increasing density and/or the addition of functional characteristics through post-processing, including reticulation, coating, laminating, felting and other special techniques.

Applications Include: Comfort cushioning for stereo earphones, speaker surrounds, goggles, orthopedic soft goods, and cycle seats; automotive gaskets and seals, sealing and interior trim; carpet anti-skid cushioning and supermarket meat/produce display pads.

Polyurethane foam can also be ideal for low-pressure gasketing and for dust, light, vapor or water seals in appliances, electronic equipment, automobiles, trucks and aircraft.

It is also used as "spring" media for pushbuttons, pressure pads for photographic film packs, copy machine components and friction rollers.

By varying density and/or ILD (indentation load deflection), polyurethane foams can be an effective packaging material.

High-end outdoor furniture and boating manufacturers have found a reticulated, coarse pore polyether foam to offer unsurpassed drainability, durability and comfort in seating applications.

Benefits Include: A wide range of characteristics to meet special needs (i.e., low permeability for seals, controlled permeability for breathable gaskets); ease of fabrication; light weight; functional PVC coating for dielectric sealing; excellent shape retention, resistance to wear and abrasion and Mil spec certification.

Other Foam Functions: Other function sheets for polyurethane foams are available from Foamex. They are:

- Filtering Functions
- Reservoiring & Delivering
- Safety Foam
- Acoustical Functions

Cushioning & Sealing Foams

SIF® Foam

SIF® is a patented, reticulated flexible polyurethane foam, characterized by a three-dimensional skeletal structure of strands which provide a 97 percent void space. With controlled pore sizes ranging from 3 pores per linear inch (coarse and abrasive) to 110 pores per linear inch (soft and downy), it offers outstanding uniformity/predictability.

Applications:

- Stereo Earphone Cushions
- Motorcycle/Ski Goggles
- Metal Limb Splint Padding
- Surgical Head Support
- Breathable Seals
- EKG Pads
- Prosthesis Padding

Custom Foam

Custom Foam is a non-reticulated flexible polyester polyurethane foam also available in 3 to 110 pores per linear inch (ppi) textures. It can be shaped and colored to meet a broad range of requirements.

Custom Foam has a K factor of 0.25 Btu/(hr) (ft2) (°F/ft), and can be used where thermal insulation must be flexible, resilient and lightweight.

Aesthetic Foam is a fine pore, hole free polyether polyurethane with an ester-like look and feel. Aesthetic Foam can be used when the environment demands an ether and appearance is critical.

Applications:

- Case Lining
- Protective Packaging
- Low-pressure Light and Dust Seals
- Weather Stripping
- Automotive Gaskets
- Athletic Equipment Padding
- Electronic Equipment Shock Mounts
- Pushbutton "Spring" Padding
- Film Pack "Pressure Pads"
- Home Permanent Elastic End Wraps
- Appliance Gasketing

UL Recognized Foams

Several grades of UL 94 HF1 recognized foams are available in either polyester or polyether grades. Polyethers and Low Perm should be selected when a more hydrolytically stable product is desired. The advantages of polyester foams include stronger physicals and in the case of Pyrell® Foam, an intumescent system to retard flammability. Samples of Pyrell® have retained their flammability classification even after aging under ambient room conditions for 10 years.

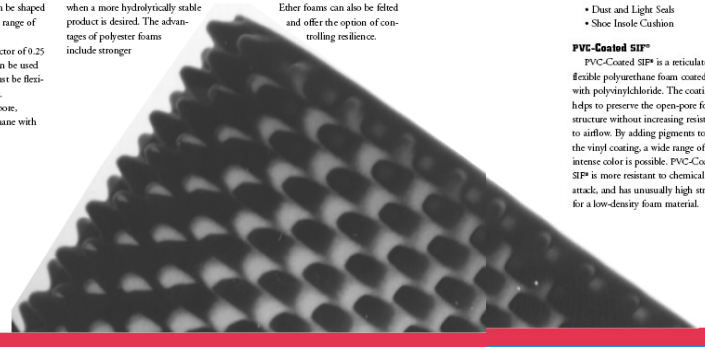
Applications:

- E.D.P. Seals
- Appliance Gaskets
- Thermal Insulation
- Protective Packaging
- Electric Outlet Seals

Custom Felt

Custom Felt is manufactured by compressing (felting) 90 ppi Custom Foam, under heat and pressure to impart a permanent compression set. It is easy to work with, and can be easily cut, glued or shaped into unusual or curved configurations, and offers a wide selection of either firm cushioning material or low-permeability gasketing product.

Ether foams can also be felted and offer the option of controlling resilience.



Typical Physical Properties

	Density (lb/cu ft)	Tensile Strength (psi)	Ultimate % Elongation	Tear Strength (lb/in)	50% Compression Set	Compression Deflection (psi) 25%	65%
Aesthetic	1.5	15	140	1.7	8	0.5	0.7
Custom	2.0	22	210	2.4	10	0.5	0.9
Custom 4#	4.0	23	330	3.4	---	0.6	1.1
Custom 6#	6.0	25	320	3.2	---	0.4	1.25
Dri-Fast®	1.7-2.4	10-20	100 min.	2.5 min.	25 max.	0.3 min.	0.7 min.
LP180	1.8	14	140	N/A	5	0.4	N/A
LP250	2.2	16	140	N/A	5	0.4	N/A
LP280	2.75	14	140	N/A	5	0.4	N/A
PVC-Coated (20 ppi)	3.6	28	250	6.0	26	0.6	1.2
SIF® (all ester grades)	1.6-2.0	17-35	250 min.	3 min.	20 max.	0.2 min.	0.4 min.
Super Seal W	3.3	17	185 min.			0.6	

Tested in accordance with ASTM D 3574. Typical physical properties not to be used as specifications.

Applications:

- Copy Machine Gaskets
- Automotive Air/Heater Sockets
- Sanding Block Cushioning
- Automobile Armrest Padding
- Tape Recorder Head "Pressure Pads"
- Dust and Light Seals
- Shoe Insole Cushion

PVC-Coated SIF®

PVC-Coated SIF® is a reticulated flexible polyurethane foam coated with polyvinylchloride. The coating helps to preserve the open-pore foam structure without increasing resistance to airflow. By adding pigments to the vinyl coating, a wide range of intense color is possible. PVC-Coated SIF® is more resistant to chemical attack, and has unusually high strength for a low-density foam material.

Applications:

- Decorative Packaging
- Supermarket Packaged Meat and Produce Displays
- Air Filters

Packaging Applications

Foamex offers a range of polyurethane foams for both Mil P26514E and Mil C26861 requirements. In addition, non-Mil spec packaging /cushioning foams are available. Dynamic cushioning curves can be provided upon request.

Low Permeability Foam

LP Foam has a low air and vapor permeability that can be ideal for many applications requiring low pressure gasketing and where higher priced materials are over-engineered. Applications include air duct damper gaskets and dust and vapor seals for appliances and data processing equipment.

Super Seal Foam offers both resistance to water leakage and an open cell, low compression set foam.

Technical Advisory Service

As specialists in polyurethane foam technology, Foamex Technical Products Group offers the imaginative design engineer a complete functional advisory service. We invite you to write or call us at 1-800-767-4997

http://foamex.com/technical/cushioning2.php

Type -Custom Foam - Density (lb/cu ft)
Custom Foam is a non-reticulated
flexible polyester polyurethane foam

Example for Recommended Inverter

COTEK **600W Pure Sine Wave Inverter**

FEATURES

True sine wave output (THD < 3%)
Power ON-OFF remote control (optional)
Input & output fully isolation
Load control cooling fan
Advanced microprocessor
Input polarity reverse / under voltage / over voltage protections
Output short circuit / overload / over temperature protections
Tri-color indicators display input, output level & failure status
UL / e-13 / CE / FCC approved

	MODEL No.	S600-112	S600-124	S600-148	S600-212	S600-224	S600-248
OUTPUT	AC VOLTAGE	100 / 110 / 120 VAC			220 / 230 / 240 VAC		
	RATED POWER	600W					
	SURGE POWER	800W					
	WAVEFORM	True sine wave (THD < 3%)					
	FREQUENCY	50 / 60 Hz selectable by DIP switch					
	AC REGULATION	± 3%					
	POWER FACTOR ALLOWED	COSθ-90°~ COSθ+90°					
	STANDARD RECEPTACLES	NEMA5-15R / GFCI			Schuko / UK / Australia / universal		
	LED INDICATOR	Input voltage level, output load level and fault status					
INPUT	NO LOAD CURRENT DRAW	0.87A	0.43A	0.23A	0.83A	0.43A	0.22A
	DC VOLTAGE	12VDC	24VDC	48VDC	12VDC	24VDC	48VDC
	VOLTAGE RANGE	10.5~15.0VDC	21.0~30.0VDC	42.0~60VDC	10.5~15.0VDC	21.0~30.0VDC	42.0~60VDC
	EFFICIENCY (Typ.)	87.0%	90.0%	92.0%	90.0%	93.0%	94.0%
	FUSE	35A x 2	20A x 2	10A x2	35A x 2	20A x 2	10Ax 2
PROTECTION	BAT. LOW ALARM	11VDC	22VDC	44VDC	11VDC	22VDC	44VDC
	BAT. LOW SHUTDOWN	10.5VDC	21.0VDC	42.0VDC	10.5VDC	21.0VDC	42.0VDC
	OVER LOAD	Shut off output voltage, re-power on to recover					
	OVER VOLTAGE	15.3VDC	30.6VDC	61.2VDC	15.3VDC	30.6VDC	61.2VDC
	OVER TEMPERATURE	Shut off output voltage, recovers automatically after temperature goes down					
	OUTPUT SHORT	Shut off output voltage, re-power on to recover					
	BAT. POLARITY REVERSE	By fuse open					
ENVIRONMENT	WORKING TEMP.	0 ~ +40°C					
	WORKING HUMIDITY	20% ~ 90% RH non-condensing					
	STORAGE TEMP. & HUMIDITY	-30°C ~ +70°C / -22°F ~ +158°F / 10 ~ 95%					
SAFETY & EMC	SAFETY STANDARDS	UL458 (only for "GFCI" receptades) ----					
	ISOLATION RESISTANCE	I/P ~ O/P: 100M Ohms / 500VDC					
	EMI CONDUCTION & RADIATION	Compliance to FCC class A			Compliance to En55022 dassA		
	EMS IMMUNITY	----			Compliance to EN61000-3-2, 3		
	LVD	----			Compliance to EN60950-1		
	e-MARK	----			Compliance to e-13 * 72/245/EEC, 95/54/EC		
OTHERS	DIMENSION	295 x 180 x 72mm (L x W x H)					
	PACKING	2.7kgs; 6sets / 22kgs / CARTON					
	COOLING	Loading controlled cooling fan					
	APPLICATION	Home and Office appliances, Power tools and Portable equipments, Vehicle, Yacht and Solar power systems ...etc.					


Carestream
HEALTH