
Chapter 1 – Introduction to Site Preparation

1.1 Overview

This manual will help to bring often overlooked details to the attention of the Project Coordinator. It will also simplify the task of site preparation for a first time Infinia Project Coordinator by outlining the planning procedures required prior to installation and assist the site preparation team with the following:

- Planning the site
- Ensuring adequate accessibility to the site
- Physical layout
- Providing construction, mechanical, electrical and environmental specifications
- Cables routing
- Connectivity
- Time Schedule
- Site Safety

This manual also provides the electrical, mechanical and environmental specifications necessary to determine construction requirements and cost evaluation.

It is important that the information contained herein is used in conjunction with the drawings prepared specifically for each site. The equipment and tools required to unpack, convey and install the Imaging System are detailed further on in this Manual.

1.1.1 Purpose

The purpose of this manual is to simplify the site preparation process and to provide the purchaser (or the purchaser's contractor) with the information necessary to prepare the site for the installation of a Infinia system

This information is also essential to the architects, construction engineers, electrical contractors, and all other personnel involved in the site preparation process.

Important

Good site preparation is essential for a smooth and efficient installation. Poor site planning may compromise usability and/or patient comfort.

1.1.2 Prerequisites

Verify all aspects of site configuration **before** construction is started. Once building operations have been completed, it may be difficult and/or costly to make changes.

It is advisable to use workers experienced in medical suite installations. Personnel with only general construction experience may not have the expertise to complete the required tasks within the designated time frame.

Important

Since this equipment involves the use of radioactive isotopes, compliance with Nuclear Regulatory Commission regulations, or similar regulatory requirements (depending on the country), must be adhered to.

In most situations, this must be done prior to acquiring any source materials. This includes calibration sources which may have fairly long delivery lead times. These calibration sources may also have a short half life, and it may not be advisable to store them over long periods of time.

Regulatory compliance should be arranged early in the site planning process.

1.1.3 Project Coordination

To insure a successful installation, it is preferable to have one person (a project coordinator) manage the entire project. The project coordinator should be involved in every phase of the installation, from conceptual planning through to system start up.

Ideally, the project coordinator should be thoroughly familiar with construction procedures and have a background in medical suite construction. If such a person is not available from existing staff, it is recommended that the services of a local Site Planner or Construction Manager be secured.

This person will be the primary contact and liaison between the purchaser and GE Medical Systems.

Note

The purchaser is responsible for assigning this post and providing GE with the relevant contact information.

The project coordinator should keep in close contact with all of the contractors, sub-contractors, GE Medical Systems, and administrative personnel, as well as the planners and architects. Keeping a schedule (and adjusting that schedule if necessary) is part of the project coordinators responsibility.

GE can provide a site planing service to assist the purchaser / project coordinator with the site planning. Please contact your local GE representative should any such assistance be required. GE personnel are willing and well qualified to help ensure that your installation is a successful one.

1.1.4 Purchaser's Responsibility

The purchaser is responsible for all site preparation, unless a special agreement has been entered into with GE Medical Systems.

Such preparation may include, but is not limited to the following tasks:

- Cost analysis, construction, renovation or alterations and modifications when not specifically provided for in the contract.
- Procurement of all the material required to carry out the work.
- Safe storage of the system and equipment prior to and during installation.
- Fitting of cable trays and troughs.
- Installation of lighting.
- Air-conditioning and ventilation, suitable for the Infinia System.
- Fitting of adequate thermal protection devices.
- Installation of electrical conduit, junction boxes, ducting and outlets as required.
- Installation of special leaded wall covering (Hawkeye Option).
- Facility input power supplies and wiring.
- Demolition, debris removal and cleaning of construction site.
- Fire control devices as may be required by local codes.
- Permits, inspections, radiation licensing etc.
- Installation of any required networking materials which are external to the system's internal sub-net.
- Removal of packing and shipping material.
- Floor tile removal and replacement in area of table and gantry.
- Floor Requirements

1.2 Manpower Requirements

All personnel participating in unpacking, conveying and installing the camera must be suitably qualified and approved. Specific manpower requirements for the various installation stages of the camera are shown in [Table 1–1](#) and [Table 1–2](#).

Table 1–1: Manpower Requirements - Unpacking, Conveying

Component	Task and Manpower
Gantry	Unpacking: at least 4 persons
	Conveying (with transport wheels) - at least 4 persons: <ul style="list-style-type: none"> • 1 person to direct the operation • 3 persons (at least) to push the Gantry
Patient Table	Conveying with integral wheels - 2 persons
Collimator Cart	Unpacking: at least 2 persons
	Conveying: at least 2 persons
Hawkeye	Unpacking: 1 person
	Conveying: 1 person
	Installing: 2 persons

Table 1–2: Manpower Requirements - Installation

Procedure	Manpower
System Installation	1 qualified Field Engineer and at least 1 assistant
System Calibration	1 qualified Field Engineer
Acceptance Test	1 qualified Field Engineer
Hawkeye Installation	1 qualified Field Engineer (1 extra hand for X-ray Tube installation)
Hawkeye Acceptance	1 qualified Field Engineer

1.3 Additional Considerations

1.3.1 Information

Below is a list of information which must be obtained and recorded *prior* to commencement of the system setup.

This is usually carried out on the fifth day of Installation.

Failing to acquire the information beforehand may cause serious delays in completing the system installation.

The required information is divided into four groups:

1. System parameters - to be decided in consultation with the customer.
2. Local Area Network (LAN) information - provided by the local network administrator.
3. Wide Area Network (WAN) information - to be decided in consultation with the local network administrator as well as with the network administrators of the remote network.

1.3.2 Unloading Area

A suitable unloading area must be allocated. The unloading area must be large enough to accommodate the packed units, with additional space to allow for some of the system components to be unpacked.

The Weight and Dimensions of the shipped packages are given in Chapter 2 [Table 2-1.to 2-6](#)

From the unloading site, there must be a free path to wheel the units into the installation room or into a lift which will carry them to the installation site. The path specifications are given in [Section 3.2](#). Special facilities must be provided if the units are to be transferred from an unloading site outside the building.

1.3.3 Cleaning

The computer hardware is cooled with small cooling fans mounted in various locations in the equipment. The equipment is sensitive to dust and dirt that may be drawn into the electronics by the cooling fans. Therefore, special attention should be given to cleaning the room. All dust and residue should be removed as an ongoing activity, and as a last step in the preparation process before bringing any of the equipment into the suite area. All such debris must be removed as it accumulates. The best cleaning method for removing dust and dirt, particularly fine dust is to use of a vacuum cleaner, not sweeping.

Note

Just before the equipment is set in place is a good time to perform a thorough cleaning and sanitizing of the site. There may never again be an opportunity to execute such a detailed cleaning of these areas.

1.3.4 Work Scheduling

The preparation of a Infinia Suite is much like that of other modalities that involve the installation of a Gantry, Patient Table, and Acquisition Computer.

One way to tackle a construction project of this complexity is to divide it into smaller, more easily managed tasks. Each task, now becomes a smaller project. At this point, the primary challenge is to coordinate all of these small projects in such a way as to have the entire project completed properly, and on time.

This document will help to bring the often overlooked details the attention of the Project Coordinator. It will also simplify the task of site preparation for the first time Infinia Project Coordinator.

Check lists are provided in [Appendix A](#) to assure that nothing is overlooked.

1.4 Regulatory Requirements

Every effort must be made to assure safe and efficient installation, and proper operation of the Infinia suite. Prepare the site, and install the equipment in close compliance with all local regulatory requirements.



CAUTION

Infinia uses radioisotopes which are regulated by various governing agencies. You will need to obtain all pertinent permits and licenses to comply with local regulations.

Stringent laws and standards apply to the installation and operation of any equipment that involves the use of radioactive isotopes. This section has been designed to alert the responsible personnel to the need for regulatory compliance. The purchaser is solely responsible for keeping the Infinia facility in compliance during preparation, installation and operation.

It is not practical to include all of the regulatory information that might apply in all situations. The purpose of this chapter is to serve as a guideline only, and is not intended to be used as a regulatory standard in any manner. Government agencies are charged with the responsibility of protecting the general public from hazardous materials. For radioactive sources in the United States of America, that agency is the Nuclear Regulatory Commission (NRC)

The NRC monitors the activity of all industries that are engaged in the use and handling of hazardous radioactive materials and licenses organizations to make use of such material. The installation of a PET imaging system falls into the category of a facility that must be regulated and monitored by this agency.

Some states have signed agreements with the NRC, allowing that state to regulate the use of radioactive material within the confines of their borders. The NRC can supply a list of the agreement states, with addresses. Installation of projects in those states which have not signed such an agreement, require an application to the NRC for licensing. Request for application should be made to:

United States Nuclear Regulatory Commission
Washington, D.C. 20555

1.5 Time Schedule

1.5.1 Site Preparation

Time is a very important dimension for a project of this sort. If specific tasks are not completed in a timely manner, other tasks can be slowed, or even halted. It is important to allow the appropriate amount of time to accomplish each task. Before any work is started, it is advisable to secure commitments from contractors with respect to time requirements.

1.5.2 Job Progression

It is rarely advisable to have several trades working together at the same time. Generally speaking, the work should progress in the following manner:

1. Application to Regulatory Agencies for Site License.
2. Planning and preliminary design work.
3. Review of plans.
4. Revision of plans.
5. Drafting of final plans.
6. Application for construction permits.
7. Demolition (if required).
8. Structural revisions and framing.
9. Heating Ventilation and Air Conditioning (HVAC) rough-in.
10. Electrical rough-in.
11. Rough-in inspection.
12. Dry wall and wall covering.
13. Heating Ventilation and Air Conditioning (HVAC) trim.
14. Electrical trim.
15. Flooring, trim and painting.
16. Cleaning.
17. Final inspection.
18. Equipment installation.

1.5.3 System Installation

The optimal installation time of the basic system, assuming that *all* system parts arrived in proper working conditions, and assuming proper site preparation and acceptable site temperature, is three working days plus one additional day for installing the Hawkeye option.

Important

The presence of the Field Engineer is mandatory for the entire time period.

1.5.4 System Options

The installation time for system options are covered separately in the Service Manuals specific to each option.

1.6 Site Safety

1.6.1 Site Management

- Continually gather up and remove debris to keep the work site orderly.
- Plan for the disposal of scrap, waste and surplus materials.
- Keep the work area and all equipment tidy. Designate areas for waste materials and provide suitable containers.
- Keep stairways, passageways and gangways free of material, supplies and obstructions.
- Remove or bend over nails protruding from lumber.
- Do not allow rubbish to fall freely from any level of the project. Use chutes or other approved devices to dispatch the materials.
- Do not throw tools or other materials.
- Do not raise or lower any tool or equipment by its own cable or supply hose.

1.6.2 Flammable Material Storage

- Store flammable or explosive materials such as gasoline, oil and cleaning agents apart from other materials.
- Keep flammable and explosive materials in proper containers with contents clearly marked.
- Post signs prohibiting smoking, open flames and other ignition sources in areas where flammable and explosive materials are stored.
- Ventilate all storage areas properly.
- Ensure that all electric fixtures and switches are explosion-proof where flammable materials are stored.

1.6.3 Head Protection

Head protection (hard hats) must be worn in areas where there is a possible danger of head injuries from impact, flying or falling objects.

1.6.4 Fire Protection

Fire fighting equipment and fire warning systems should be installed on the site, in accordance with local regulations.

Fire fighting equipment must be strategically located, clearly marked and readily accessible at all times. The fire extinguishers must be periodically inspected, and maintained in operating conditions.

Important**Never throw water on an electrical fire**

Water is an excellent conductor of electricity, and if water is thrown on an electrical fire, it will only spread the fire. For electrical fires a chemical fire extinguisher is recommended.

1.6.4.1 Using a Fire Extinguisher

1. Hold the fire extinguisher upright and pull the pin out.
2. Stand back at least 10 feet and aim the nozzle at the base of the fire.
3. Squeeze the lever or handle to release the extinguishing agent.
4. Sweep the nozzle from side to side.

1.6.4.2 Types of Fire Extinguishers

Class A Extinguishers will put out fires in ordinary combustibles, such as wood and paper.

Class B Extinguishers should be used on fires involving flammable liquids, such as grease, gasoline, oil, etc.

Class C Extinguishers are suitable for use on electrically energized fires.

Class D Extinguishers are designed for use on flammable metals and are often specific for the type of metal in question.

Important

Before trying to extinguish a Class C fire, you must first remove the electrical power source.

1.6.5 Electrical Protection

1.6.5.3 Power Tools

- Switch tools OFF before connecting them to a power supply.
- Disconnect power supply before making adjustments, fitting attachments or changing blades.
- Ensure tools are properly grounded or double-insulated. The grounded tool must have an approved 3-wire cord with a 3-prong plug and plugged into a properly grounded 3-pole outlet.
- Do not bypass the switch and operate the tools by connecting and disconnecting the power cord.
- Do not use electrical tools in wet conditions or damp locations unless tool is connected to a GFCI.
- Do not clean tools with flammable or toxic solvents.
- Do not operate tools in an area containing explosive vapors or gases.
- Keep power cords clear of tools during use.
- Suspend power cords over aisles or work areas to eliminate stumbling or tripping hazards.
- Do not carry electrical tools by the power cord.
- Do not tie power cords in tight knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.
- Check the insulation around the power cord to make sure it is in good condition. You should not see any exposed wires or frayed ends. Power cords in poor condition should be replaced, never taped or spliced.

1.6.5.4 Outlets and Extension Cords

- Make sure all electrical outlets are three-hole, grounded outlets. If there is water in the area, there should be a GFI or Ground Fault Interrupter outlet.
- There should be ample electrical capacity to run equipment without tripping circuit breakers or blowing fuses.
- Minimize extension cord use. Never place them under rugs. Use extension cords sparingly and check them periodically
- Don't use extension cords in areas that receive a lot of traffic because not only will it cause someone to trip, but constant traffic will wear out the insulating rubber cover.

1.6.6 Eye and Face Protection

Eye and face protection must be provided when machines or operations present potential for eye or face injury.

