

Ion Chef™ System

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This guide contains the information needed to prepare your site for installation of the Ion Chef™ System (Cat. No. [4484177](#)).

Site preparation workflow

A Thermo Fisher Scientific representative will contact you to schedule the installation. When the installation is scheduled:

1. Receive and inspect the shipment (see “Receive and inspect the shipment” on page 13).
2. Move the crated instrument to the installation site (see “Move the crated instrument to the installation site” on page 14).
3. Complete the site preparation checklist (see “Site preparation checklist” on page 2).
4. Ensure:
 - The site preparation checklist is complete.
 - The purchase order for the installation and training materials is complete.

Installation timeline and training

After the Ion Chef™ System is uncrated, installation and testing of the Ion Chef™ System takes 4–6 hrs.

During and/or after installation, the service representative reviews data and provides some basic operator training. For additional training and reference information, see the user documents provided with the Ion Chef™ System.

Site preparation checklist


IMPORTANT! Complete all activities below before the scheduled installation date. If the activities are not complete when the service representative arrives, the scheduled installation may be postponed.

- Review the customer responsibilities and assign personnel (see “Customer responsibilities” on page 2).
- Identify an installation site that meets all requirements in this guide:
 - Space and clearance (see “Instrument clearances” on page 4).
 - Environmental (see “Electrical requirements for the Ion Chef™ System” on page 11).
 - Ventilation and waste collection (see “Ventilation and waste collection requirements” on page 9).
 - Electrical (see “Electrical requirements” on page 10).
 - Network (see “Network configuration” on page 11).
 - Safety (see “Safety requirements” on page 12).
- Confirm that all materials needed for installation and operation are available (see “Materials for installation and training” on page 13).
- Confirm that the product was received and inspected (see “Receive and inspect the shipment” on page 13):
 - All items on the shipping list are the same items ordered at the time of purchase.
 - Any damage to shipping containers was reported to field service.
 - Any damage or mishandling was recorded on the shipping documents.
 - The reagents box was unpacked and stored as specified.
- Confirm the installation site is cleared and ready for instrument installation (“Move the crated instrument to the installation site” on page 14).
- Confirm the crated instrument and other shipping containers have been moved to the installation site (see “Move the crated instrument to the installation site” on page 14).

Customer responsibilities

Personnel	Responsibilities
Site preparation/ installation coordinator	<ul style="list-style-type: none"> • Reviews the site preparation guide for safety information and instrument requirements. • Coordinates personnel and tasks. • Chooses the site. • Reviews checklists with applicable personnel, then with the service representative to verify that the site is properly prepared. • Receives and inspects the Ion Chef™ System. • Stores the reagents box according to the specifications indicated in the product inserts. • Schedules the installation and informs personnel of the installation day. • Ensures that the site is clear of unnecessary material on the installation day. • Is available to assist the service representative throughout installation.

(continued)

Personnel	Responsibilities
Laboratory safety representative	<ul style="list-style-type: none"> • Reviews the site preparation guide for safety information. • Ensures that the required safety practices and equipment are in place. • Is in the vicinity and available to the service representative at all times while the service representative is at the customer's facility.
Laboratory personnel/ primary users	<ul style="list-style-type: none"> • Review safety information. • Ensures that all customer-provided materials for installation are present at the site. • Ensures that primary users (responsible for training other users) are available during the installation, so that they can be trained on the instrument.
Facilities personnel	<ul style="list-style-type: none"> • Ensures that the installation requirements are met for: <ul style="list-style-type: none"> – Space at the installation site – Building clearances – Temperature and humidity – Waste collection – Electrical supply – Computer – Safety and installation materials • If possible, moves the crated Ion Chef™ System to the site before the installation date. • Is available to assist service representative and laboratory personnel throughout installation. • If applicable, ensures that at least two people are available to help the service representative move and position the instrument.
Network or IT specialist (if the instrument will be connected to a network)	<ul style="list-style-type: none"> • Ensures that active, tested local area network (LAN) connections are in place before the scheduled installation date. • Ensures that network hardware is compatible with an RJ45-type connector. • If necessary, supplies additional cables. • Is available during installation to connect the Ion Chef™ System to the network. • If applicable, provides and installs a network or dedicated printer. <p> CAUTION! Do not attempt to connect the Ion Chef™ System components to the network before the service representative arrives.</p>

Site requirements

Dimensions and weights

To prepare for installation, provide space for receipt and configuration of the following components. This section provides dimensions and weights for the crates and packages you will receive, and it describes the dimensions of the Ion Chef™ System after it has been installed and configured.

IMPORTANT! We do not install, service, or repair instruments in areas designated BioSafety Level 3 (BSL-3) or BioSafety Level 4 (BSL-4).

Crate dimensions and weight

Crate	Height	Length (depth)	Width	Weight
Ion Chef™ System	71.1 cm (28 in)	86.4 cm (34 in)	86.4 cm (34 in)	134.0 kg (295.0 lbs)

Components dimensions and weights

Component	Height		Length (depth)	Width	Weight
	Open	Closed			
Ion Chef™ System	83.9 cm (33.0 in)	56.1 cm (22.1 in)	70.0 cm (27.6 in)	71.4 cm (28.1 in)	68.2 kg (150 lbs)

Instrument clearances

During instrument setup and maintenance, it is necessary to access the back and sides of the instrument. If the back of the instrument faces a wall, it will be necessary to have enough space to rotate the instrument on the bench for access.

IMPORTANT! For safety, the power outlet used for powering the instrument must be accessible at all times.

Component	Top	Front	Left	Right	Back
Ion Chef™ System	35.6 cm (14 in)	17.0 cm (6.7 in)	10.0 cm (4.0 in)	10.0 cm (4.0 in)	10.0 cm (4.0 in)

Placement of the instruments and server

If you will connect the Ion Chef™ System directly to the Torrent Server, the installation room must accommodate both the Ion Chef™ System, Ion Sequencer, and Torrent Server. If the components will be placed on a stationary or mobile bench, verify that the bench meets the requirements in “Dimensions and weights” on page 4.

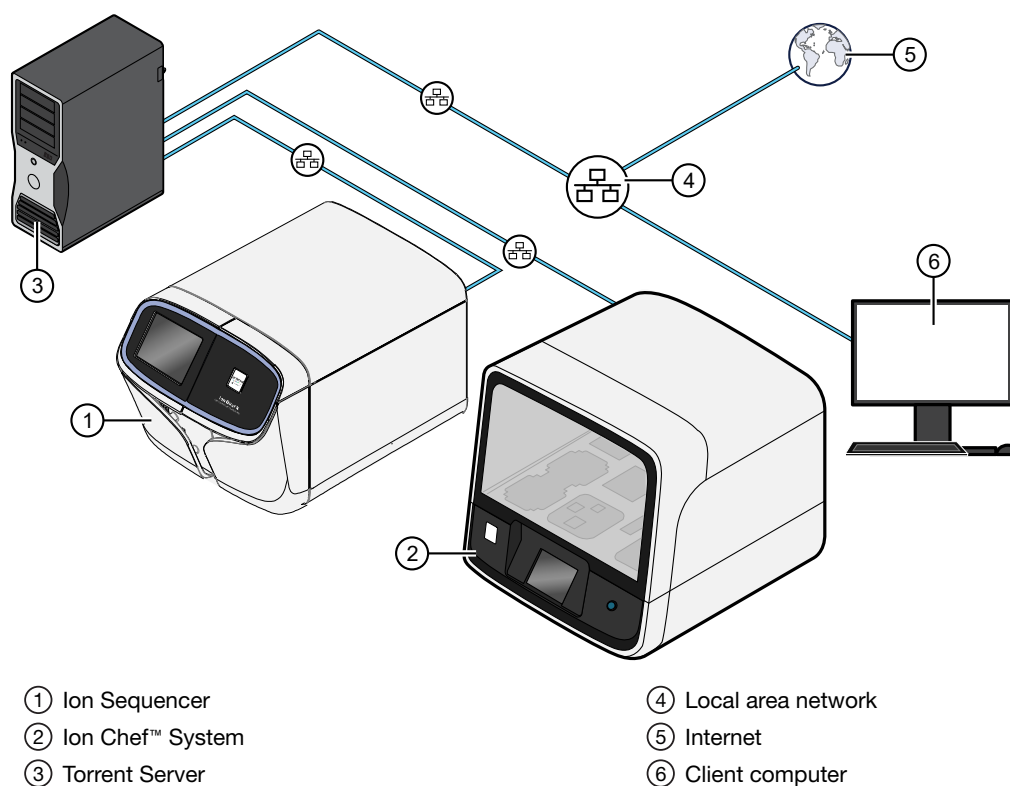
IMPORTANT! The Ion Chef™ System and Ion Sequencer:

- Must be installed on level surfaces.
 - Should be located in close proximity for workflow convenience.
-

Note: Thermo Fisher Scientific is not responsible for any damage caused by using a laboratory bench that does not meet the minimum weight capacities requirements.

System components

The Ion Chef™ System must be connected to the Torrent Server either directly using a category 6 Ethernet cable, or indirectly through a local area network that has been configured to permit HTTP-443, SSH-22, and FTP-20/21 traffic. Unlike the Ion Sequencer, the Ion Chef™ System does not require a robust network connection to the Torrent Server and can accommodate standard network connection speeds.



Planning the installation

In preparation for the Ion Chef™ System installation, you must plan the layout of your laboratory to accommodate library and template preparation activities, in addition to those related to chip preparation and sequencing. This section describes the stations involved in the sequencer workflow and the basic laboratory layouts.

Laboratory layout

When designing your PCR laboratory layout, follow good laboratory practices to help achieve reliable and contamination-free PCR results. Pay particular attention to the need to separate the areas for pre- and post-PCR activities. Isolating the amplicon source, separating pre-PCR from post-PCR activities, and dedicating laboratory supplies and/or equipment to each space can significantly reduce the potential for contamination.

As shown in the illustrations below, the Ion Sequencer and Ion Chef™ Instrument can be deployed in both one- and two-room laboratory configurations. The two-room layout is highly recommended due to the protection that it affords against contamination; however, the sub-optimal one-room layout will produce acceptable results if proper precautions are observed.

Note: The positions of the stations in the pre- and post- PCR rooms are not important.

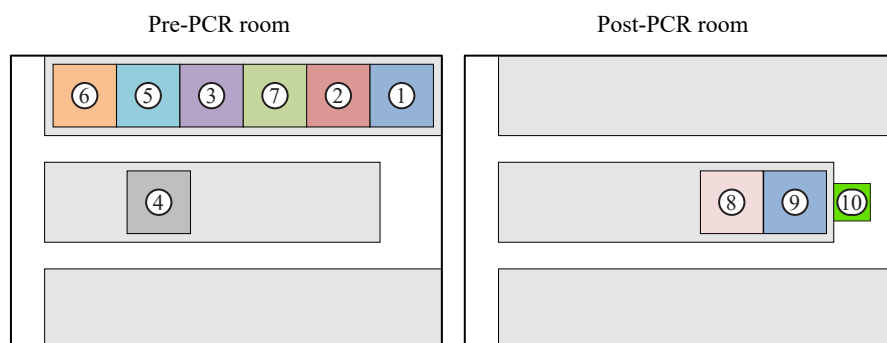


Figure 1 Two-room layout

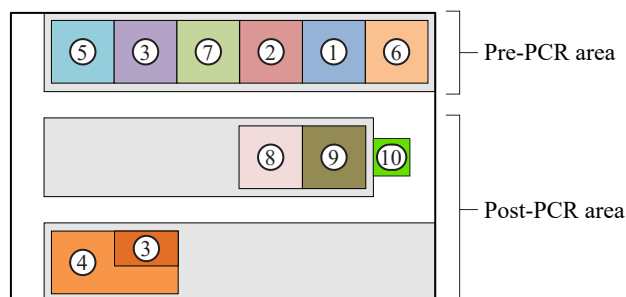


Figure 2 One-room layout

- | | |
|---|--------------------------------------|
| ① Agilent® 2100 Bioanalyzer® instrument | ⑥ Pipettes |
| ② (Optional) Bioruptor® system | ⑦ (Optional) Pippen Prep™ instrument |
| ③ Centrifuge | ⑧ Ion Chef™ System |
| ④ Amplification mixture setup hood | ⑨ Ion Sequencer and Torrent Server |
| ⑤ Library area setup hood | ⑩ Gas cylinder |

Laboratory workstations

The following table describes the workstations associated with the generic laboratory layout for the Ion Sequencer and Ion Chef™ Instrument. The stations are categorized in terms of their involvement pre- and post-PCR activities.

#	Station	Location	Description/requirements
1	Agilent™ 2100 Bioanalyzer™ Instrument	Pre-PCR area	<p>The Agilent™ 2100 Bioanalyzer™ Instrument is used to perform library construction quality control, providing yield and size characterization. When planning the instrument placement, consider isolating the Agilent™ 2100 Bioanalyzer™ Instrument from the sequencer, preferably in a room dedicated for library preparation, to minimize contamination.</p> <p>Note: If necessary, a qPCR instrument can be substituted for the Agilent™ 2100 Bioanalyzer™ Instrument. In general, qPCR does not yield size distribution but does provide more accurate counts.</p>
2	(Optional) Bioruptor™ System	Pre-PCR area	<p>If required, the Bioruptor™ Instrument performs acoustic shearing/fragmentation of DNA samples for library preparation. DNA shearing can be accomplished through the use of a Covaris™ Focused-Ultrasonicator or Shear™ DNA fragmentation (part of the Ion Xpress™ Library Kit), both of which are acceptable substitutes for the Bioruptor™ Instrument. Mechanical shearing is recommended (using Bioruptor™ or Covaris™ instruments), but enzymatic shearing is acceptable and can be less expensive.</p> <p>When planning Bioruptor™ or Covaris™ instrument placement:</p> <ul style="list-style-type: none"> • Consider placing the Bioruptor™ or Covaris™ instrument in an isolated room to minimize the noise hazard. • Consider isolating the instrument from the sequencer, preferably in a dedicated room for library preparation, to minimize contamination.
3	Centrifuge	Pre-PCR areas	<p>The centrifuges is used during library preparation. When planning centrifuge placement, place it in a convenient location.</p>
4	Amplification mixture setup hood	Pre-PCR area	<p>Whenever possible, amplification mixture preparation should be performed within a dedicated hood.</p> <p>When selecting a location for amplification mixture preparation:</p> <ul style="list-style-type: none"> • The amplification mixture setup station requires a set of dedicated pipettes. • If only one hood is available within the pre-PCR area, dedicate the hood for amplification mixture preparation and perform library preparation elsewhere. • If a hood is unavailable within the pre-PCR area, select a bench that is sterilized regularly and preferably isolated from the neighboring stations. <p>IMPORTANT! Separation of the amplification mixture preparation area from the other stations is critical to preventing contamination.</p> <p>IMPORTANT! If possible, physically separate the library and amplification mixture setup areas.</p>

(continued)

#	Station	Location	Description/requirements
5	Library area setup hood	Pre-PCR area	<p>Whenever possible, library preparation should be performed within a dedicated hood. The use of a dedicated hood allows for UV treatment of the library preparation area and minimizes contamination from post-PCR material containing adaptors.</p> <p>When selecting a location for library preparation:</p> <ul style="list-style-type: none"> • In a one-room laboratory layout, the use of a dedicated hood for library preparation is highly recommended, but not required. • The library area setup station requires a set of dedicated pipettes. • If a dedicated hood is unavailable, select a bench that is preferably isolated from the neighboring stations.
6	Pipettes	Pre-PCR areas	Both the pre- and post-PCR areas require a complete set of dedicated pipettes. If necessary, the pipettes can be shared between neighboring stations, except for the amplification mixture and library setup stations, both of which require dedicated sets of pipettes.
7	(Optional) Pippin Prep™ Instrument	Pre-PCR area	<p>If required, the Pippin Prep™ Instrument is used to perform automated size selection prior to template preparation. Use of the Pippin Prep™ Instrument is necessary only if size selection is required for your sample type.</p> <p>Note: Size selection can also be accomplished through the use of the Invitrogen E-Gel® Agarose Gel Electrophoresis and Documentation System, an acceptable substitute for the Pippin Prep™ Instrument.</p>
8	Ion Chef™ Instrument	Post-PCR area	<p>When planning the placement of the Ion Chef™ Instrument, confirm that the location meets all clearance and environmental requirements described in this document.</p> <p>Note: If possible, install the Ion Sequencer and Ion Chef™ Instrument to a dedicated power outlet.</p>
9	Ion Sequencer and Torrent Server	Post-PCR area	<p>When planning the placement of the Ion Sequencer and Torrent Server, confirm that the location meets all clearance and environmental requirements described in the <i>Site Preparation Guide</i> for your Ion Sequencer. The sequencer requires a constant supply of nitrogen gas, typically provided by a gas cylinder located within 3 m (10 ft) of the instrument.</p> <p>IMPORTANT! The gas cylinder must be chained to a wall or bench.</p> <p>IMPORTANT! The Ion Sequencer is sensitive to both electrical noise and temperature changes.</p> <p>Note: Because the Torrent Server requires a direct connection to the Ion Sequencer via a category 6 Ethernet cable, the server is typically installed to the bench directly beneath the instrument.</p>

Environmental requirements

Ensure that the installation room is maintained under correct environmental conditions. Avoid placing the sequencer or server adjacent to heaters, cooling ducts, or in direct sunlight. Place the sequencer at least a meter away from major sources of electronic noise such as refrigerators or microwaves. Fluctuations between day and night temperatures can cause system instability.

Component	Acceptable range
Altitude	Located between sea level and 6500 ft (2000 m) above sea level
Humidity	Relative humidity 40–60%, noncondensing
Operating Temperature	20–25°C (68–77°F)
Vibration	Install the Ion Chef™ System on benches that are free of vibration and have no contact with equipment that causes vibration (freezers, pumps, and similar equipment). Significant vibration during sequencing can add noise and reduce the quality of the sequencing measurements.
Pollution	The Ion Chef™ System has a Pollution Degree rating of II (2). It can be installed in an environment that has nonconductive pollutants such as dust particles or wood chips. Typical environments with a Pollution Degree II (2) rating are laboratories and sales and commercial areas.
Overvoltage category	The Ion Chef™ System has an installation (overvoltage) category of II (2), and is classified as portable equipment.
Other conditions	For indoor use only. The Ion Chef™ System is away from any vents that could expel particulate material on the system components.

Ventilation and waste collection requirements



WARNING! The instrumentation must be installed and operated in a well-ventilated environment as defined as having a minimum airflow of 6–10 air changes per hour. Contact your environmental health and safety coordinator to confirm that all instruments are installed and operated in an environment with sufficient ventilation.

Ventilation requirements

Allow at least 10 cm (4 in) of clearance around the Ion Chef™ Instrument for ventilation.

Cleaning or decontamination

See the user documentation for your Ion Chef™ System for information on how to clean or decontaminate the instrument.

Wear appropriate protection, including gloves, laboratory goggles, and coat whenever you work with the fluids that are used on this instrument, or parts that may come into contact with these fluids.

Use only the cleaning agents as described in the user documentation for your Ion Chef™ System. Use of cleaning agents that are not described in user documentation can impair the instrument. Contact Technical Support if you have questions.

Wipe off any liquid on or near the instrument using a lint-free tissue.

Disposing of waste



WARNING! CHEMICAL HAZARD. Refer to Safety Data Sheets (SDSs) and local regulations for handling and disposing of plastic consumables. Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of plastic consumables.



WARNING! CHEMICAL HAZARD. Before handling chemicals, refer to the Safety Data Sheet (SDS) provided by the manufacturer, and observe all relevant precautions.



WARNING! CHEMICAL HAZARD. All chemicals in the instrument, including liquid in the lines, are potentially hazardous. Always determine what chemicals have been used in the instrument before changing reagents or instrument components. Wear appropriate eyewear, protective clothing, and gloves when working on the instrument.



WARNING! CHEMICAL HAZARD. Waste produced by instruments can be hazardous and can cause injury, illness, or death.

Electrical requirements



CAUTION! Do not unpack or plug in any components until the Field Service Engineers (FSEs) have configured the system for the proper operating voltage.



WARNING! For safety, the power outlet used for powering the instrument must be accessible at all times. See “Instrument clearances” on page 4 for information about the space needed between the wall and the instrument. In case of emergency, you must be able to immediately disconnect the main power supply to all the equipment. Allow adequate space between the wall and the equipment so that the power cords can be disconnected in case of emergency.

- Electric receptacle required: 2-prong with ground pin
- Mains AC line voltage tolerances must not be greater than $\pm 10\%$ percent of nominal voltage

Device	Rated voltage ^[1]	Rated frequency	Rated current ^[2]
Ion Chef™ System	100–240 VAC	50/60 Hz	12A

^[1] If the supplied power fluctuates beyond the rated voltage, a power line regulator may be required. High or low voltages can adversely affect the electronic components of the instrument.

^[2] Based on rated current at minimum input voltage.

Electrical requirements for the Ion Chef™ System

- Facility to supply via building code compliant 15A circuit.
- Use an approved UL Listed detachable power supply cord, as supplied, to connect the system to the wall.

Network requirements

The instrument is factory-configured for IPv4 TCP/IP communication and includes a fast Ethernet adapter (10/100/1000 Mbps) with a RJ45-type connector for integrating the device into a local area network (LAN). If the instrument will be connected to a LAN, an active, tested network jack must be in place before the scheduled installation date. Also, a representative from your information technologies department must be available during the installation to help connect the instrument to your network.

Network configuration

If you plan to connect the Ion Chef™ Instrument to your network, then the following requirements must be met before the installation can take place. Discuss any discrepancies with your concierge representative prior to the visit.

- If necessary, an information technologies resource must be available to assist with the network connection on the date of the Ion Chef™ Instrument installation.
- The room in which the Ion Chef™ Instrument will be installed must contain at least one active network jack.
- If the Ion Chef™ Instrument will be located more than 10 feet from the network jack, you must provide a standard Category 6 Ethernet cable of sufficient length.
- If dynamic network configuration (DHCP) is not available or will not be used, a static IP address must be reserved for the Ion Chef™ Instrument.
- The onsite domain name system (DNS) server must be configured to resolve the URL of the Torrent Server to be accessed by the Ion Chef™ Instrument.
- The Ion Chef™ Instrument can see only one Torrent Server. Planned Run sharing will need to be enabled to see multiple Torrent Servers connected to a LAN. Refer to the *Ion Chef™ Instrument Network Connection User Guide* (Pub. No. MAN0013444) for information on enabling Planned Run sharing.
- If your network employs a firewall that restricts traffic between devices, it must be configured to permit HTTPS-443, SSH-22, and FTP-20/21 communication between the Ion Chef™ Instrument and the Torrent Server.
- The Ion Chef™ Instrument requires outbound internet access through HTTPS-443 and SSH-22 to allow remote support via the remote monitoring feature. The instrument includes the remote monitoring feature to assist you in maintaining your instrument and to provide timely technical support.

At minimum, whitelist the following outbound addresses for the instrument:

- `drm.appliedbiosystems.com` on HTTPS-443
- `rssh.iontorrent.net` on SSH-22

IMPORTANT! Without access through HTTPS-443 and SSH-22, we cannot support your Ion Chef™ Instrument in a timely fashion and we may forego remote support for your site altogether at our discretion.

Note: The remote monitoring feature is already in use on many of our products to perform instrument diagnostics, preventive maintenance, failure prediction, and proactive notification. The feature does not collect any sequencing reports, results, or data.

- If the Ion Chef™ Instrument will use Network Time Protocol (NTP) for date/time synchronization, the instrument must have outbound Internet access through UDP-123 to the server pool at `pool.ntp.org`.

Safety requirements

Safety practices

A safety representative from your facility must ensure that:

- Personnel establish and follow all applicable safety practices and policies to protect laboratory personnel from potential hazards.
- All applicable safety devices and equipment are available at all times.

Required safety equipment

Your laboratory has specific safety practices and policies designed to protect laboratory personnel from potential hazards that are present. Follow all applicable safety-related procedures at all times.

The following safety equipment and protection from hazards must be available at the installation site:

- Protection from any sources of hazardous chemicals, radiation (for example, lasers, radioisotopes, radioactive wastes, and contaminated equipment), and potentially infectious biological material that may be present in the area where the service representative will work.
- Appropriate fire extinguisher:
 - You are responsible for providing an appropriate fire extinguisher for use on or near the equipment.
 - The types and sizes of fire extinguishers shall be suitable for use on electrical and chemical fires as specified in current codes, regulations, and/or standards, and with approval of the Fire Marshall or other authority having jurisdiction.
 - The installation of appropriate fire extinguishers shall be in addition to other fire-protection systems and not as a substitute or alternative to them.
- Eyewash
- Safety shower
- Eye and hand protection
- Adequate ventilation, including vent line/fume hood, if applicable
- Biohazard waste container, if applicable
- First-aid equipment
- Spill cleanup equipment
- Applicable Safety Data Sheets (SDSs)

Materials for installation and training

Materials required for installation

Description ^[1]	Supplier ^[2]	Catalog No.	Quantity
Ion Chef™ Install Supplies ^[3]	Thermo Fisher Scientific	4488374	1
Uninterruptible Power Supply ^[4]	MLS	—	1
Isopropyl Alcohol (IPA) Wipes	MLS	—	Varies

^[1] Thermo Fisher Scientific has validated this protocol using this specific material. Substitution may adversely affect system performance.

^[2] Where noted, materials are available from Major Laboratory Suppliers (MLS).

^[3] The Ion Chef™ Install Supplies are provided with the instrument. No separate order is required.

^[4] We recommend using an uninterruptible power supply (UPS) for laboratories that experience frequent power outages or line voltage fluctuations. The UPS must be compatible with 1500 W output or higher. The 1500 VA unit from APCC provides approximately 11 minutes of backup power for an instrument.

Materials required for training

Please refer to the *Ion GeneStudio™ S5 Systems Pre-Installation Checklist* (Pub. No. MAN0013777) for materials required for Ion Chef™ System training.

IMPORTANT! An Ion Sequencer must be available for use by the trainer during Ion Chef™ System training. Please refer to the *Ion GeneStudio™ S5 Systems Pre-Installation Checklist* for the materials required to run the instrument that will be used during training.

Receive and inspect the shipment

1. Verify that the items shown on the shipping list are the same items that you ordered at the time of purchase.
2. Carefully inspect the shipping containers and report any damage to the service representative. Record any damage or mishandling on the shipping documents.

IMPORTANT! Do not unpack Ion Chef™ System shipping containers, to protect yourself from liability if any damage occurred during shipping.

Move the crated instrument to the installation site

1. Clear the installation site of all unnecessary materials.
2. If possible, move the crated instrument and other shipping containers to the installation site. Do not uncrate.



CAUTION! PHYSICAL INJURY HAZARD. Do not attempt to lift or move the instrument without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques. Improper lifting can cause painful and permanent back injury. Depending on the weight, moving or lifting an instrument may require two or more people.



CAUTION! Do not tip the crated instrument on end. Tipping may damage the instrument hardware and electronics.

Note: After installation, retain the crate and instrument packaging in case you need to relocate the instrument.

Related documents and support

Customer and technical support

Visit thermofisher.com/support for the latest service and support information.

- Worldwide contact telephone numbers
- Product support information
 - Product FAQs
 - Software, patches, and updates
 - Training for many applications and instruments
- Order and web support
- Product documentation
 - User guides, manuals, and protocols
 - Certificates of Analysis
 - Safety Data Sheets (SDSs; also known as MSDSs)

Note: For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

Limited product warranty

Life Technologies Corporation and its affiliates warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale at www.thermofisher.com/us/en/home/global/terms-and-conditions.html. If you have questions, contact Life Technologies at www.thermofisher.com/support.

Revision history: MAN0007956 F (English)

Revision	Date	Description
F	5 July 2024	<ul style="list-style-type: none">Updated ethernet adapter information, network configuration, materials required for training, and branding.Removed template and library preparation.

The information in this guide is subject to change without notice.

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