

# C1 System

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## About This Guide

**IMPORTANT** Read and understand the safety guidelines in this document. Failure to follow these guidelines may result in undesirable effects, injury to personnel, and/or damage to the instrument or to property. For complete safety information, see [Appendix A](#).

For more information on instrument operation and safety, see the C1™ System User Guide (PN 100-4977).

### Safety Alert Conventions

Fluidigm documentation uses specific conventions for presenting information that may require your attention. Refer to the following safety alert conventions.

#### Safety Alerts for Chemicals

For hazards associated with chemicals, this document follows the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and uses indicators that include a pictogram and a signal word that indicates the severity level:

Indicator	Description
	Pictogram (see example) consisting of a symbol on a white background within a red diamond-shaped frame. Refer to the individual safety data sheet (SDS) for the applicable pictograms and hazards pertaining to the chemicals being used.
<b>DANGER</b>	Signal word that indicates more severe hazards.
<b>WARNING</b>	Signal word that indicates less severe hazards.

#### Safety Alerts for Instruments

For hazards associated with instruments, this document uses indicators that include a pictogram and signal words that indicate the severity level:

Indicator	Description
	Pictogram (see example) consisting of a symbol on a white background within a black triangle-shaped frame. Refer to the instrument user guide for the applicable pictograms and hazards pertaining to instrument usage.
<b>DANGER</b>	Signal word that indicates an imminent hazard that will result in severe injury or death if not avoided.
<b>WARNING</b>	Signal word that indicates a potentially hazardous situation that could result in serious injury or death if not avoided.
<b>CAUTION</b>	Signal word that indicates a potentially hazardous situation that could result in minor or moderate personal injury if not avoided.
<b>IMPORTANT</b>	Signal word that indicates information necessary for proper use of products or successful outcome of experiments.

## Safety Data Sheets

Read and understand the SDSs before handling chemicals. To obtain SDSs for chemicals ordered from Fluidigm, either alone or as part of this system, go to [fluidigm.com/sds](https://fluidigm.com/sds) and search for the SDS using either the product name or the part number.

Some chemicals referred to in this user guide may not have been provided with your system. Obtain the SDSs for chemicals provided by other manufacturers from those manufacturers.

## Introduction

Fluidigm technical support will schedule a time to install the C1 system at your site and train your staff to use the system. Before a Fluidigm service representative arrives to install the system, you need to choose and prepare your site according to the instructions in this document.

Notify Fluidigm technical support if special shipping arrangements are necessary at your site, or if you need assistance in placing the C1 system.

## Installation Time Estimate

Installation of the C1 system is estimated to take one day. Site issues and other factors may delay or extend the installation time.

## Site Preparation Workflow

To select and prepare your site for the C1 system:

- 1 Review this guide.
- 2 Review the equipment lists.
- 3 Select a site for the C1 system.
- 4 Stock the site.
- 5 Receive the system.
- 6 Place the system at the site.

## Step 1: Review This Guide

Read and understand this guide for information on all C1 system site requirements, including safety, environmental, electrical, and space requirements.

## Step 2: Review the Equipment Lists

Review the following lists of required equipment based on your application of interest.

For a complete list of reagents and consumables used with the C1 system, see the appropriate protocol. For a list of protocols, see [Ancillary Equipment on page 6](#).

### Required Equipment for All Applications

<input checked="" type="checkbox"/>	Product	Source	Part Number
<input type="checkbox"/>	96-well PCR plate thermal cycler	Major laboratory supplier (MLS)	—
<input type="checkbox"/>	C1 system with latest software*	Fluidigm	Inquire
<input type="checkbox"/>	Three centrifuges: one picofuge, one for 1.5 mL microtubes and one for 96-well PCR plates	MLS	—
<input type="checkbox"/>	Two hoods: DNA and DNA-free	MLS	—
<input type="checkbox"/>	Vortexer	MLS	—

\* See the C1 System User Guide (PN 100-4977).

### Required Equipment for Targeted Pre-amplification

<input checked="" type="checkbox"/>	Product	Source	Part Number
<input type="checkbox"/>	Biomark™ or Biomark HD system with latest software for gene expression analysis*	Fluidigm	Inquire
<input type="checkbox"/>	Pipette capable of measuring 0.1–2 µL or 0.1–3 µL in 0.002 µL increments†	MLS	—

\* See the Biomark HD Data Collection Software User Guide (PN 100-2451).

† Recommended: Rainin® Pipet-Lite® XLS model.

### Required Equipment for mRNA Sequencing

#### Equipment for mRNA Seq

<input checked="" type="checkbox"/>	Product	Source	Part Number
<input type="checkbox"/>	Agilent 2100 Bioanalyzer®	Agilent Technologies	G2940CA
<input type="checkbox"/>	Fluorometer for Quant-IT™ PicoGreen assay	MLS	—
<input type="checkbox"/>	Magnetic stand for microtubes*	MLS	—

\* Recommended: DynaMag™-2 magnet, Thermo Fisher Scientific (PN 12321D).

## Equipment for mRNA Seq HT

<input checked="" type="checkbox"/>	Product	Source	Part Number
<input type="checkbox"/>	Agilent® 2100 Bioanalyzer*	Agilent Technologies	G2940CA
<input type="checkbox"/>	Qubit® 3.0 Fluorometer	Thermo Fisher Scientific	Q33216
<input type="checkbox"/>	Magnetic stand for microtubes†	MLS	—
<input type="checkbox"/>	Select the appropriate magnet for your 96-well PCR plate: <ul style="list-style-type: none"> <li>• DynaMag™-96 Side Magnet (recommended) – for use with semi-skirted plates and with non-skirted plates</li> <li>• DynaMag™-96 Side Skirted Magnet – for use with full-skirted plates</li> </ul> NOTE PCR plates may vary. Make sure to test your plate for compatibility before use.	Thermo Fisher Scientific	<ul style="list-style-type: none"> <li>• 12331D</li> <li>or</li> <li>• 12027</li> </ul>

\* Recommended: At least two Bioanalyzers to minimize the time required to complete this protocol.

† Recommended: DynaMag-2 magnet, Thermo Fisher Scientific (PN 12321D).

## Required Equipment for DNA Sequencing

### Equipment for Targeted Sequencing

<input checked="" type="checkbox"/>	Product	Source	Part Number
<input type="checkbox"/>	Access Array™ system with latest software*	Fluidigm	Inquire
<input type="checkbox"/>	Agilent 2100 Bioanalyzer	Agilent Technologies	G2940CA
<input type="checkbox"/>	Fluorometer for Quant-IT PicoGreen® assay	MLS	—
<input type="checkbox"/>	Magnetic stand for microtubes†	MLS	—
<input type="checkbox"/>	Water bath at 37 °C‡	MLS	—

\* See the Fluidigm Access Array System for Illumina Sequencing Systems User Guide (PN 100-3770).

† Recommended: DynaMag-2 magnet, Thermo Fisher Scientific (PN 12321D).

‡ Required only if you use frozen cells.

### Equipment for Whole Genome Sequencing (WGS)

<input checked="" type="checkbox"/>	Product	Source	Part Number
<input type="checkbox"/>	Agilent 2100 Bioanalyzer	Agilent Technologies	G2940CA
<input type="checkbox"/>	Fluorometer for Quant-IT PicoGreen assay	MLS	—
<input type="checkbox"/>	Magnetic stand for 96-well PCR plate	MLS	—
<input type="checkbox"/>	Magnetic stand for microtubes*	MLS	—

\* Recommended: DynaMag-2 magnet, Thermo Fisher Scientific (PN 12321D).

## Equipment for Whole Exome Sequencing (WES)

<input checked="" type="checkbox"/>	Product	Source	Part Number
<input type="checkbox"/>	Agilent 2100 Bioanalyzer	Agilent Technologies	G2940CA
<input type="checkbox"/>	Fluorometer for Quant-IT PicoGreen assay	MLS	—
<input type="checkbox"/>	Laboratory rotator	MLS	—
<input type="checkbox"/>	Magnetic stand for 96-well PCR plate	MLS	—
<input type="checkbox"/>	Magnetic stand for microtubes*	MLS	—
<input type="checkbox"/>	Thermoshaker	MLS	—

\* Recommended: DynaMag-2 magnet, Thermo Fisher Scientific (PN 12321D).

## Ancillary Equipment

For a complete list of reagents, consumables, and ancillary equipment for your application, see the following protocols:

Application	Protocol	Part Number
Targeted preamplification	Using the C1 System to Capture Cells from Cell Culture and Perform Preamplification Using Delta Gene™ Assays	100-4904
	Using the C1 System to Capture Cells from Cell Culture and Perform Preamplification Using TaqMan® Assays	100-6117
	Using the C1 System to Capture Cells from Cell Culture and Perform Preamplification of MicroRNA Species with TaqMan Assays	100-6667
mRNA sequencing	Using the C1 System to Generate Single-Cell cDNA Libraries for mRNA Sequencing	100-7168
	Generate cDNA Libraries with the C1 Single-Cell mRNA Seq HT IFC and Reagent Kit v2	101-4964
DNA sequencing	Using the C1 System to Generate Single-Cell Libraries for DNA Sequencing	100-7135

## Step 3: Select a Site for the C1 System

To operate the C1 system, your site must meet the following requirements:

- Harmonized standards
- Environmental conditions
- System dimensions and laboratory bench requirements
- Electrical requirements
- (Optional) In-house air supply



**WARNING** The installation location cannot be done at a site designated BioSafety Level 3 (BSL-3) or BioSafety Level 4 (BSL-4). Fluidigm does not install, service, or repair the C1 system in areas designated BSL-3 or BSL-4.

### Harmonized Standards

The following directives and harmonized standards were used to evaluate the safety and performance of the C1 system:

General Regulations and Requirements	Harmonized Standards
<ul style="list-style-type: none"> <li>• 2014/35/EU European Parliament Low Voltage Directive</li> <li>• 2014/30/EU European Parliament Directive: Electromagnetic Compatibility</li> </ul>	<ul style="list-style-type: none"> <li>• IEC/EN 61326-1</li> <li>• IEC/EN 61010-1</li> <li>• IEC/EN 61010-2-010</li> <li>• IEC/EN 61010-2-081</li> <li>• UL Standard Number 61010-1 2nd Edition</li> <li>• CAN/CSA-C22.2 No. 61010-1-04</li> <li>• CAN/CSA-C22.2 No. 61010-2-101</li> </ul>

### Environmental Conditions

C1 system is for indoor use only and should be used in an environment that meets these conditions:

Conditions	Requirements
Altitude	C1 system is for use in altitudes not exceeding 2,000 m (6,562 ft) above sea level. If your facility is located above this elevation, call technical support.
Humidity	20–80%, non-condensing
Pollution	Pollution Degree 2 rating, whereby only non-conductive pollution occurs for electrical and laboratory equipment. C1 system conforms to standard laboratory environments. Do not install the system where conductive pollutants are present.
Electrical installation	Category II

Conditions	Requirements
Temperature	Ambient between 15–28 °C (59–82 °F), stable <b>IMPORTANT</b> Do not locate the system next to heat sources or cooling ducts, or in direct sunlight or extreme ambient lighting. Temperature extremes can cause system instability.
Ventilation	Ensure your lab space is ventilated using non-recirculating air exchanges. Maintain at least 10 cm (4 in) of clearance at the exhaust grill exit. C1 system produces only hot air exhaust (no fumes or vapors). The exhaust grill exit is at the back of the instrument, and the air intake is on the bottom of the instrument. <b>IMPORTANT</b> Do not place paper or any object underneath the instrument.

## System Dimensions and Laboratory Bench Requirements

### IMPORTANT

- During a run, be certain that the instrument is on a sturdy, immobilized laboratory bench that is away from vibration-generating lab equipment (such as shakers, vortexers, centrifuges, or instruments with heavy fans) and from doors that might generate vibrations when opening or closing.
- Position the system so the power cord can be easily disconnected.
- There must be provisions to address seismic concerns, such as straps or other devices to secure the system to a bench.

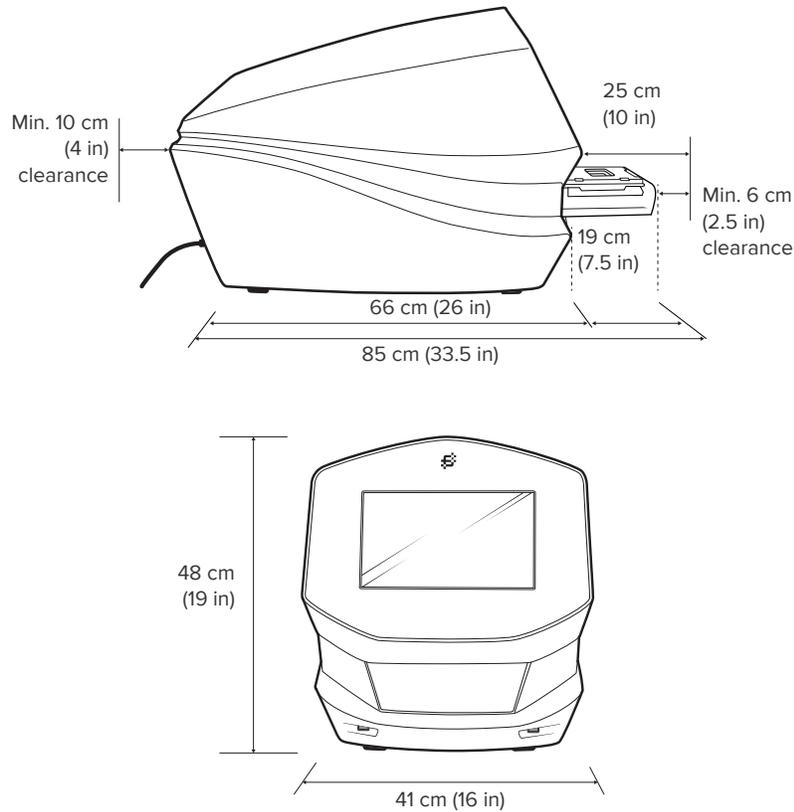
The C1 system is a bench top instrument. Provide a work surface that can accommodate the instrument dimensions and weight as shown below. To accommodate one instrument, we recommend a laboratory bench with the following minimum dimensions.

Dimensions	Height	Width	Depth	Weight
Instrument	48 cm (19 in)	41 cm (16 in)	66 cm (26 in)	45 kg (99 lb)
Laboratory bench (minimum)	—	76 cm (30 in)	101 cm (40 in)	91 kg (200 lb)

To allow for adequate air circulation and maintenance, the recommended instrument clearance is as follows:

	Top	Sides	Front	Back
Minimum clearance	46 cm (18 in)	18 cm (7 in)	25 cm (10 in)	10 cm (4 in)

**IMPORTANT** At least 1 m (3 ft) of total “service area” clearance should be available on either side of the C1 system so that it can be rotated 360 degrees if required. The clearance need not be retained at all times. However, any ancillary equipment occupying that space should be easily movable.



## Electrical Requirements

The C1 system requires one grounded electrical AC power outlet. Power consumption is variable due to ambient conditions at your location, such as temperature and humidity extremes, operating frequency, and mode of operation. Normal system operation values for various locations are as follows.

Customer Location	Voltage (V)	Frequency (Hz)	Maximum Current (A)	Average Power Consumption (W)
U.S., Canada	115	50–60 ±1%	8.0	Idle: 40 Operating: 175
Japan	100	50–60 ±1%	8.0	Idle: 40 Operating: 175
Europe, Australia	240	50–60 ±1%	3.7	Idle: 40 Operating: 175

**IMPORTANT** Supply voltage fluctuation must not exceed 10% of the normal value. If the voltage fluctuation exceeds normal value, see [Uninterruptible Power Supply Recommendation on page 10](#).

## Power Cord Requirements

Fluidigm provides a country-specific power cord.

Customer Location	Minimum Wire Gauge (AWG)	Maximum Length (m)	Instrument End Plug	Receptacle End Plug
US, Canada, Japan	14	2	IEC C13	Country-specific
Europe, Australia	16	2	IEC C13	Country-specific

## Receptacle Requirements

When connecting this instrument to a receptacle, check with your facilities manager to make sure the circuit will not be overloaded. If you are connecting multiple instruments to the same electrical receptacle or circuit, be sure the sum of all the instruments' maximum current draw is within the circuit's current limit. Receptacles must be grounded.



### IMPORTANT

- The instrument has a connection to protective earth through the power cord provided by Fluidigm. Ensure that the electrical receptacle provides an earth ground before connecting the power cord.
- Use only power cords provided by Fluidigm or power cords that meet the minimum ratings of 250V/10A, 16AWG and a length not exceed 2 m (6 ft).
- Do not use extension cords.

## Disconnecting Power

In case of emergency, you must be able to immediately disconnect the main power supply to the instrument.

## Uninterruptible Power Supply Recommendation

Fluidigm strongly recommends that you protect your C1 system with an uninterruptible power supply (UPS) with voltage regulating capability, such as an APC Smart-UPS™ (APC, PN SRT3000XLW-IEC or equivalent) with battery power (APC, PN SRT96BP or equivalent), to prevent any damage to the equipment due to power fluctuations. For customers who will connect the instrument to backup power in the event of power loss, Fluidigm recommends purchasing sufficient UPS battery power to support the transition from UPS to backup power at your site.

Conditions	Requirements
UPS type	Double conversion online (AC to DC to AC for cleanest power)
Output power capacity	300 W (400 VA)
Power factor	0.9
Backup time (run time)	7 minutes (for a longer backup time, install additional battery packs)

Conditions	Requirements
APC battery power (optional)	30 minutes
Power draw (load)	175 W

### (Optional) In-House Air Supply

The C1 system has an internal compressor to generate compressed air and draws in ambient air by default. To use in-house compressed air, attach 1/4-inch tubing into the air inlet on the back of the system. The allowable pressure input is listed on the back of the instrument.

For detailed instructions on enabling use of in-house air, see the C1 System User Guide (PN 100-4977).

## Step 4: Stock the Site

**IMPORTANT** Safety personnel at your company must ensure that:

- Safety policies to protect laboratory personnel from potential harm are established and are followed by personnel.
- All necessary safety devices and equipment are in the laboratory or in close proximity.

### Required Safety Equipment

Fluidigm expects your laboratory to have safety policies in place to protect laboratory personnel from potential harm. We expect that appropriate safety practices are followed at all times.

Safety equipment that must be at the installation location includes:

- Adequate ventilation, including vent line/fume hood if available
- Safety shower
- Eyewash station
- Biohazard waste container
- Applicable SDSs
- Protection from potentially infectious biological material, hazardous chemicals, and radiation that may be present in the area where the Fluidigm service representative will be working
- Spill cleanup equipment
- First-aid equipment
- Eye and hand protection
- Fire extinguisher

- You are responsible for providing an appropriate fire extinguisher for use on or near C1 system.
- The fire extinguishers must be appropriate for use on chemical and electrical fires and be approved by your local fire marshal or other authority having jurisdiction in your area.

## Step 5: Receive the System

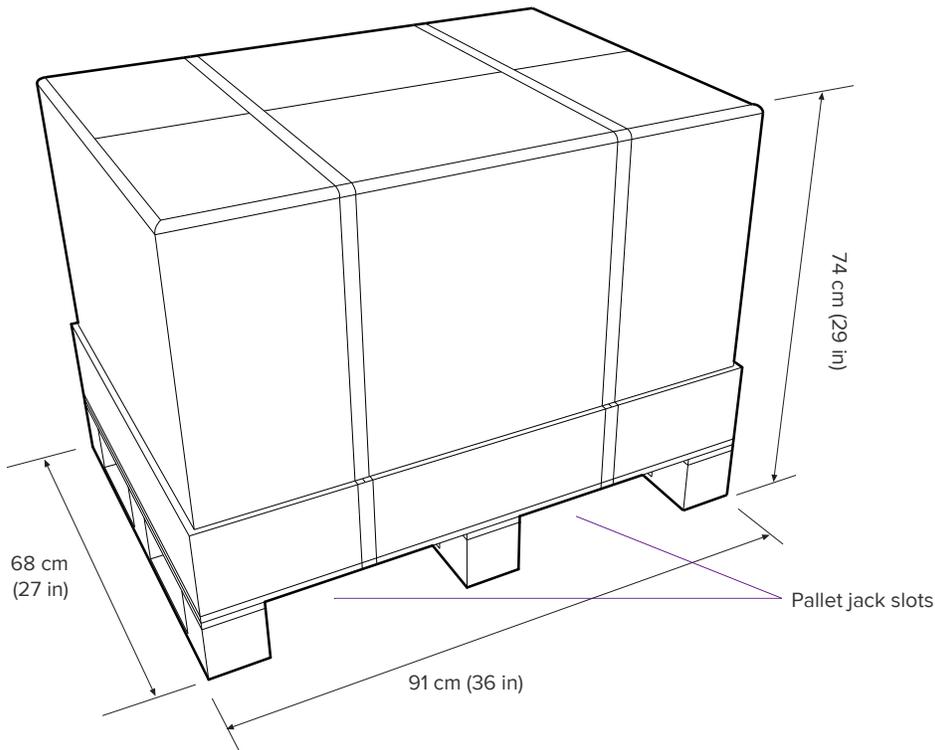
### C1 System Crated Size and Weight



**WARNING** PHYSICAL INJURY HAZARD. Do not attempt to lift or move any boxed or crated items unless you use proper lifting techniques.

Based on the crated measurements for the C1 system, consider where it is going to be delivered and how to get it to and into your laboratory.

Height	Width	Length	Weight
74 cm (29 in)	68 cm (27 in)	91 cm (36 in)	70 kg (155 lb)



## Path Clearances

**IMPORTANT** A clear path from the loading dock to the laboratory bench must be established. The path must accommodate the dimensions of the crate.

Be sure the path to the installation site has the following minimum clearances:

Crate Dimensions	Minimum Clearance
Height	84 cm (33 in)
Width	107 cm (42 in)

## Delivery and System Inspection

For new C1 system installations, you can anticipate receiving:

- C1 system, crated
- Instrument accessories, boxed
- Reagent kit, if ordered

Use this checklist to perform a check of all delivered components:

- Check the packing list against the original order.
- Check all boxes for damage.
- Note any damage and report it to Fluidigm technical support.
- Locate the Reagent Kit (if ordered) and unpack it immediately.
- Store each component at the appropriate temperature according to the instructions.

## Step 6: Place the System at the Site

Before the installation date, be certain that you have done the following:

- Removed all unnecessary materials from the proposed final installation site
- Received the C1 system and performed a visual check of the crate and containers
- Moved the crated equipment from the receiving location to the installation area

Contact Fluidigm technical support if you require assistance with any of these steps. Wait for the Fluidigm service representative to arrive before unpacking the crated equipment.

**IMPORTANT** Do not tip the C1 system on end. Tipping damages the instrument hardware and electronics.

# Appendix A: Safety

## Instrument Safety

The instrument should be serviced by authorized personnel only.



**WARNING** Do not modify this instrument. Unauthorized modifications may create a safety hazard.



**WARNING** PHYSICAL INJURY HAZARD. Do not attempt to lift or move any boxed or crated items unless you use proper lifting techniques. The weight of the crated instrument is 70 kg (155 lb).

If you choose to lift or move the instrument after it has been installed, do not attempt to do so without the assistance of others. Use appropriate moving equipment and proper lifting techniques to minimize the chance of physical injury.

## Electrical Safety

**NOTE** The main power disconnect is on the rear panel of the instrument.



**WARNING** ELECTRICAL HAZARD. DO NOT REMOVE THE COVERS. Electrical shock can result if the instrument is operated without its protective covers. No internal components are serviceable by the user.



**WARNING** ELECTRICAL HAZARD. Plug the instrument into a properly grounded receptacle with adequate current capacity.

## Chemical Safety

The responsible individuals must take the necessary precautions to ensure that the surrounding workplace is safe and that instrument operators are not exposed to hazardous levels of toxic substances. When working with any chemicals, refer to the applicable safety data sheets (SDSs) provided by the manufacturer or supplier.

**For technical support visit [techsupport.fluidigm.com](https://techsupport.fluidigm.com). For general support visit [fluidigm.com/support](https://fluidigm.com/support).**

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