



# Saphyr<sup>®</sup> Site Preparation Guide

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## Chapter 1: Introduction

This document provides guidelines and specifications to prepare your site for installation and operation of the Bionano Genomics<sup>®</sup> Saphyr<sup>™</sup> System.

Authorized Bionano personnel will assist you through the installation and sample preparation process. The Field Service Engineer (FSE) will perform the full installation and qualification of the Saphyr system. The Field Application Scientist (FAS) will train you on preparing your samples, performing runs on the instrument, and reviewing data output.

Please review the information in this guide before preparing your site.

The site preparation process has four stages:

Preparation Stage	Description
Planning	<ul style="list-style-type: none"> <li>• Hardware and software requirements</li> <li>• Network, file storage, and electrical requirements</li> <li>• Coordination of requirements between the research team, IT Operations, security groups, and any other governance parties.</li> <li>• User-supplied materials and equipment</li> </ul>
Preparing for Arrival	<ul style="list-style-type: none"> <li>• Installation guidelines</li> <li>• Laboratory guidelines</li> <li>• Environmental considerations</li> </ul>
Preparing for Implementation	<ul style="list-style-type: none"> <li>• Site preparation checklists</li> <li>• Crate contents</li> <li>• Accessory and Qualification kits</li> <li>• Installation and training schedule</li> </ul>
Post Installation Follow-Up	<ul style="list-style-type: none"> <li>• Preparing for follow-up review</li> </ul>

## Chapter 2: Planning

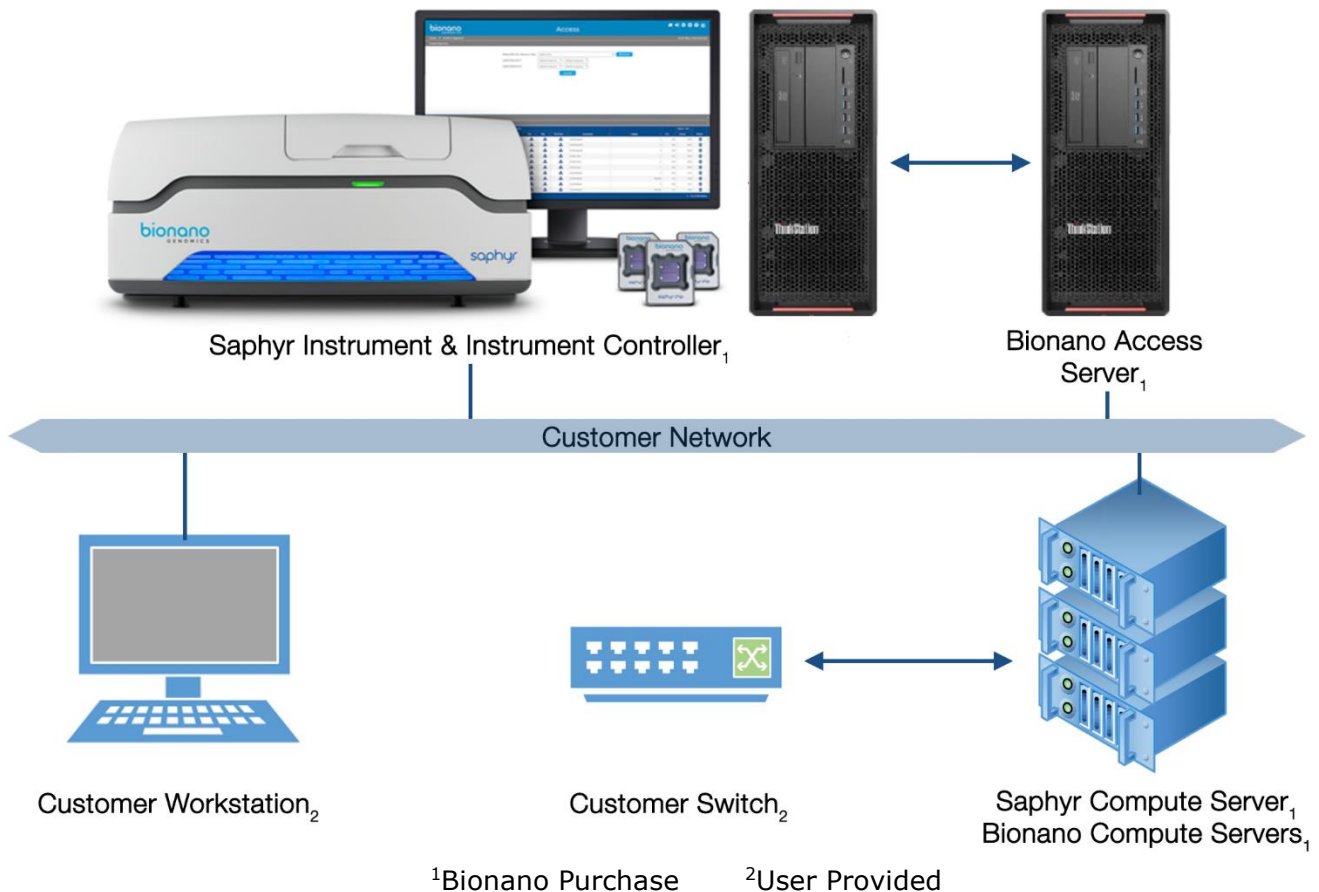
The planning stage provides guidelines for configuration, network security, and file storage. These guidelines explain the required infrastructure for a successful implementation of the Saphyr system within your organization.

Successful planning requires a comprehensive coordination between all relevant parties at the site, such as the research team, IT Operations, security groups, and any other governance parties. It is essential to involve compliance teams in the process as early as possible to ensure efficient installation.

### Saphyr System Overview

The **Saphyr Instrument** captures .tiff images of labeled DNA molecules from the **Saphyr Chip**. These images are saved on the **Saphyr Instrument Controller** and transferred to the **Bionano Access Server** automatically during scanning via a direct static IP network connection. The **Bionano Access Server** converts the .tiff files into molecule data files (.bnx) and provides realtime metrics. The completed molecule data files are then automatically imported into **Bionano Access** web application. The molecule data files can then be used to perform various bioinformatics operations such as generating *de novo* assemblies. The **Customer Switch** isolates traffic for the **Compute Servers** which are designed to work together as a cluster to process bioinformatics jobs submitted from the **Bionano Access** web application. This application monitors the progress of each computation job, captures the output, notifies the user of completion, and allows them to inspect the results in their browser on the **Customer Workstation**.

**Figure 1: Saphyr System Connectivity Diagram**



## Computing Requirements

The Saphyr System is a collection of components, each of which fulfills an essential function.

Component	Function	Provided By
Saphyr Instrument	Performs the scanning of samples	Bionano
Saphyr Instrument Controller	Controls the function of the Saphyr Instrument	Bionano
Bionano Access Web Server	Web Server for Bionano Access Software	Bionano
Saphyr Compute Server	Serves as computing head node	Bionano
Bionano Compute Server	Performs bioinformatics analysis	Bionano
Browser	Used to interact with Bionano Access	Customer
Switch	Isolates traffic for the compute servers	Customer

Currently, Bionano Genomics does not support configuration or troubleshooting of compute servers that are not provided by Bionano Genomics. Furthermore we cannot guarantee performance, nor assist in setup, of these systems at this time.

## Hardware Requirements and Specifications

We recommend that all Saphyr components (Instrument, Saphyr Instrument Controller, Bionano Access and Compute Servers) be connected to a user-supplied uninterruptible power supply (UPS). This recommendation is for line conditioning and ensuring sufficient power supply.

### Saphyr Instrument

Type	Requirements
Provided By	Bionano
Space	<ul style="list-style-type: none"> <li>Height: 38 cm (15 in)</li> <li>Width: 86 cm (34 in)</li> <li>Depth: 71 cm (28 in)</li> </ul>
Power	<ul style="list-style-type: none"> <li>100-240 VAC at 50-60 Hertz</li> <li>Power Consumption <math>\leq</math> 300 Watts</li> <li>The instrument is shipped with a United States power cord.</li> </ul>

### Saphyr Instrument Controller (included with instrument purchase)

The Instrument Controller is designed to sit adjacent to the Saphyr Instrument. The two systems are directly teathered for controlling the instrument and direct data transfer of image files.

Type	Requirements
Provided By	Bionano
Software	<ul style="list-style-type: none"> <li>• SaphyrICS</li> <li>• Chrome</li> <li>• GoToAssist Client</li> </ul>
Hardware	32 GB Ram
Data Storage	7 TB (D drive), 256 GB (C drive)
Network	10 GB 4 port
Space	<ul style="list-style-type: none"> <li>• Height: 46 cm (18 in)</li> <li>• Width: 18 cm (7 in)</li> <li>• Depth: 47 cm (18.5 in)</li> </ul>
Power	<ul style="list-style-type: none"> <li>• 100-240 VAC at 50-60 Hertz</li> <li>• Power Consumption ≤ 300 Watts</li> <li>• The Instrument Controller is shipped with a United States power cord.</li> </ul>

### Bionano Access Web Server (included with instrument purchase)

The webserver is designed to sit adjacent to the Saphyr Instrument Controller. The two systems are directly teathered for direct data transfer of image files.

Type	Requirements
Provided By	Bionano
Software	<ul style="list-style-type: none"> <li>• CentOS 7.3</li> <li>• Bionano Access</li> <li>• Bionano Tools</li> <li>• PostgreSQL 9.6</li> <li>• Nodejs 8.9.4</li> </ul>
Hardware	128 GB Ram
Data Storage	40 Terabytes with RAID Controller
Network	10 GB 4 port
Space	<ul style="list-style-type: none"> <li>• Height: 46 cm (18 in)</li> <li>• Width: 18 cm (7 in)</li> <li>• Depth: 47 cm (18.5 in)</li> </ul>
Power	<ul style="list-style-type: none"> <li>• 100-240 VAC at 50-60 Hertz</li> <li>• Power Consumption ≤ 300 Watts</li> <li>• The server is shipped with a United States power cord.</li> </ul>

### Saphyr Compute Server (additional purchase)


The Saphyr Compute Server is recommended to perform de novo assembly, variant annotation, hybrid scaffolding, and other bioinformatics pipeline functions that utilize the Bionano Compute Servers. It acts as a head node and so must be implemented before adding additional Bionano Compute Servers.

Type	Specifications
Provided By	Bionano (additional purchase)
Software	<ul style="list-style-type: none"> <li>CentOS 7.3</li> <li>Python 2.7.5</li> <li>R 3.3.1</li> <li>Son of Grid Engine (SGE) 8.1.9</li> </ul>
Hardware	4 Node 6028TP-HC1R Server
Space	<ul style="list-style-type: none"> <li>2U rackmount server (to be provided by customer)</li> <li>Rails and cords supplied with server</li> </ul>
Power	<ul style="list-style-type: none"> <li>Dual 2000 W power supplies (Recommended: APC Smart-UPS 3000VA LCD RM 2U UPS - rack mounted)</li> <li>2 6' NEMA 5-15P to IEC320-C13 power cables</li> </ul>
Network	4 X 1 GB Ethernet connection

### Bionano Compute Servers (additional purchase)

Our recommended configuration includes one Bionano Compute server. You must have at least one Saphyr Compute before adding any Bionano Compute systems (one compute server per assembly to be performed on a 2 flowcell chip).

Type	Specifications
Provided By	Bionano (additional purchase)
Software	<ul style="list-style-type: none"> <li>CentOS 7.3</li> <li>Python 2.7.5</li> <li>R 3.3.1</li> <li>Son of Grid Engine (SGE) 8.1.9</li> </ul>
Hardware	4 Node 6028TP-HC1R Server
Space	<ul style="list-style-type: none"> <li>2U rackmount server (to be provided by customer)</li> <li>Rails and cords supplied with server</li> </ul>
Power	<ul style="list-style-type: none"> <li>Dual 2000 W power supplies (Recommended: APC Smart-UPS 3000VA LCD RM 2U UPS - rack mounted)</li> <li>2 6' NEMA 5-15P to IEC320-C13 power cables</li> </ul>
Network	4 X 1 GB Ethernet connection

 **CAUTION:** Do not attach the power cord to an extension cord, power strip or surge protector.

### Switch (customer provided)

Type	Requirements
Provided By	Customer
Hardware	<ul style="list-style-type: none"> <li>24-port GB, Layer 2+ Switch</li> <li>Rack-mountable</li> <li>NETGEAR switch is recommended (p/n, GSM7228S-100NES) or equivalent</li> </ul>



## Network Requirements

The components in the Saphyr system require network connectivity to communicate with each other. Poor network reliability or throughput can affect the performance of your Saphyr system. Please consider the following network requirements:

The Bionano Access Server is designed to be connected to the Saphyr Instrument Controller. They need to be close enough to run a network cable between them.

Originating From	Target	Protocol
Saphyr Instrument Controller	Bionano Access Server	SSH (port 22)
Saphyr Instrument Controller	Saphyr Compute server	CIFS
Bionano Access Web Server	Compute servers	SSH (port 22)
Bionano Access Web Server	Email server	SMTP (port 25)
Instrument Controller, workstations, and compute servers	Bionano Access Server	HTTP (default port 80)

Bionano Access is installed on the Bionano Access Server and is accessible via standard web browsers from workstations connected to the same network. Users can perform various activities, such as generating experiments, monitoring instrument and run status, performing and sharing analyses (when properly configured with Bionano computation servers), by logging into Bionano Access via a web browser. Our recommended web browser is Chrome. The Saphyr Instrument Controller should be accessible externally to Bionano if unattended support is desired.

The default configuration requires two static IP addresses. One is for the Bionano Access Server in the lab and one is for the Saphyr1a Compute Node in the data center. Sometimes the lab and the data center are on different subnets. The two IP addresses provided need to be accessible to each other. The remaining compute nodes will be on a separate custom subnet. The Saphyr1a node will be dual homed. It will have one static IP accessible to the Bionano Access server and one IP address on the subnet with the other compute nodes. IP routing will be used on Saphyr1a to direct responses from the compute nodes back to the Bionano Access Server. Each compute node also has an separate IPMI port. If you want to have your IPMI traffic on a separate network plan for an additional connection for each compute node. Each compute server has four nodes.

## File Storage Recommendations

A Saphyr Chip® run generates approximately 2 terabytes of image data when doing a single sample workflow (one color). The raw images are saved on the Saphyr Instrument Controller until they are deleted or transferred manually. The Instrument Controller has approximately 8 terabytes of disk space which can store up to 36 hours' worth of image data (.tiff) at 100% rate of use of the Saphyr instrument. If you want to archive or retain raw images for a period of time, we recommend that you archive images to a file server after each run. The customer is responsible for archiving and backing up raw images from the Saphyr Instrument Controller if desired (but this is not required).

The Bionano Access Server will store result files such as molecule data files and *de novo* assemblies. This data will continue to grow over time. The Bionano Access Server has been configured to have sufficient file storage for several years. We highly recommend that the data files and PostgreSQL database on the Bionano Access Server are backed up on a regular basis. Depending on system utilization you may need to transition to an enterprise storage solution if you exceed the capacity of the Bionano Access Server. Alternatively, users can export and archive unused projects periodically.

## User-Supplied Materials

The following user-supplied materials are required for sample preparation training. Confirm with your FAS when you have all the consumables and equipment available before scheduling your training. Additional, sample-specific, consumables are listed on subsequent pages.

### User-Supplied Equipment

Equipment	Supplier
Bath Sonicator	Branson, catalog # CPX 952-119R (or similar)
Orbital shaker, 12 in x 12 in Platform	Cole-Parmer, catalog # EW-51820-30
ThermoMixer C (heated and intermittent mixing)	Eppendorf, catalog # 5382000023
SmartBlock, 50 ml, conical tubes	Eppendorf, catalog # 5365000028
Qubit Fluorometer	ThermoFisher, catalog # Q33216 (or similar)
Positive-Displacement Pipette MR-10 (recommended)	Rainin, catalog # 17008575
Microcentrifuge, refrigerated	General lab supplier
2 Heat Blocks for 1.5 ml tubes, or 2 Water Baths	General lab supplier
Pipettes (2, 10, 20, 200, and 1000 µl)	General lab supplier
Forceps for Membrane Placement	TDI International # TDI-2A-SA or Similar
Ice bucket and ice	General lab supplier
Vortexer	General lab supplier
Thermal Cycler with Heated Lid (10 °C above block temp)	General lab supplier
4 °C refrigerator and -20 °C freezer	General lab supplier
-20 °C Enzyme Block*	General Lab Supplier
4 °C Aluminum Cooling Tube Block*	Sigma Aldrich Catalog # Z740270 or similar
HulaMixer Sample Mixer *	Thermo Fisher, Catalog # 15920D

\*Required for DLS Labeling Process

### User-Supplied Consumables

Consumable	Supplier
2% CleanCut Agarose (12 ml)	Bio-Rad, Catalog # 1703594
Plug Molds, Disposable (5 x 50 plugs)	Bio-Rad, Catalog # 1703713
Screened caps, green, for 50 ml conicals (get 4)	Bio-Rad, catalog # 1703711
MF-Millipore membrane filter, 0.1 µm	Millipore, catalog # VCWP04700
Proteinase K enzyme, Puregene, 5 ml	Qiagen, catalog # 158920
RNase A solution, 5 ml	Qiagen, catalog # 158924
Agarase enzyme, 100 Units, 0.5 U/µl	ThermoFisher, catalog # EO0461
Conical centrifuge tubes, 15 ml and 50 ml	ThermoFisher, catalog # 14-959-53A and 14-432-22
PCR tubes, thin-walled, DNase-free, 0.2 ml	ThermoFisher, catalog # AM12225 or equivalent
Petri dishes, sterile, 60 x 15 mm	ThermoFisher # 1431160N or VWR # 28384-092
Qubit Broad Range (BR) dsDNA Assay Kit	ThermoFisher, catalog # Q32853
Qubit High Sensitivity (HS) dsDNA Kit (recommended)	ThermoFisher, catalog # Q32851
Qubit Assay Tubes	ThermoFisher # Q32856 or Axygen # 10011-830
TE pH 8.0 solution, 500 ml	ThermoFisher, catalog # AM9849
UltraPure nuclease-free water	ThermoFisher, catalog # 10977015
Microcentrifuge tubes, 0.5 ml, amber, nuclease-free	USA Scientific, catalog # 1605-0007

Pipette tips, 200 µl, nonfiltered	USA Scientific, # 1111-1810 or Rainin Equivalent
Pipette tips, wide-bore, filter, aerosol, 200 µl	VWR, catalog # 46620-642 or Rainin Equivalent
Round/tapered spatula, metal	VWR, catalog # 82027-530
Microcentrifuge tubes, 1.5 ml	VWR, catalog # 87003-294
Pipette tips, aerosol-resistant 2, 10, 20 and 200 µl	General lab supplier
Nickase, Nb.BssSI (20 U/µl) (recommended for NLRs)	NEB, catalog # R0681S
Pipette tips, 10 µl, C-10 for positive displacement (recommended)	Rainin, catalog # 17008604

## Additional User-Supplied Materials for DNA Isolation

The following materials are required for extracting DNA from varying sources. Ensure that you have the appropriate materials available on training day.

### Human Cell Culture

The following user-supplied material is required for the [human cell culture DNA extraction](#).

Material	Supplier
Bionano Prep Blood and Cell Culture DNA Isolation Kit **	Bionano, part # 80004

\*\* The isolation kit will come with the User Training Kit that you request in Chapter 4.

### Human Blood

The following user-supplied materials are required for the [human blood DNA extraction](#).

Material	Supplier
Bionano Prep Blood and Cell Culture DNA Isolation Kit **	Bionano, part # 80004
Hemocue and cuvettes *	Hemocue, catalog # W1214 and 113003
QIAamp DNA Blood Mini Kit *	Qiagen, catalog # 51104
RBC lysis solution, 450 ml	Qiagen, catalog # 158902
Vari-Mix test tube rocker, or equivalent	ThermoFisher, catalog # M48725
Ethanol, 96-100% *	Sigma Aldrich, catalog # E7023
Centrifuge, Swing-bucket Refrigerated, 15 ml Tube Adapters	Eppendorf 5804R or equivalent

\* You can use either Hemocue or QIAamp for the human blood DNA extraction, although we recommend using Hemocue. If you use QIAamp, you also need to purchase ethanol (96–100%).

\*\* The isolation kit will come with the User Training Kit that you request in Chapter 4.

### Animal Soft Tissue

The following user-supplied materials are used for the [animal soft tissue DNA extraction](#). If your workflow requires dissecting and archiving tissues, all optional items are strongly recommended.

Material	Supplier
Bionano Prep Animal Tissue DNA Isolation Kit **	Bionano, part # 80002
Tissue Grinder - Dounce (7 ml) or Tenbroek (1 ml)	VWR, catalog # 62400-620 or 14231-358
Ethanol, 96-100%	Sigma Aldrich, catalog # E7023
-80 °C freezer	General lab supplier
Dissecting forceps	VWR, catalog # 89259-946
Razor blade or scalpel	General lab supplier
Weigh boats	General lab supplier

Milligram Scale	General lab supplier
Liquid Nitrogen or Dry Ice	General lab supplier
Conical bottom cryogenic vial (optional)	General lab supplier
Chillable dissecting surface (optional)	General lab supplier

\*\* The isolation kit will come with the User Training Kit that you request in Chapter 4.

### Animal Fibrous Tissue

The following user-supplied materials are used for the [animal fibrous tissue DNA extraction](#). If your workflow necessitates dissecting and archiving tissues, we strongly recommend all optional items listed.

Material	Supplier
Bionano Prep Animal Tissue DNA Isolation Kit **	Bionano, part # 80002
Formaldehyde 36.5%– 38% in H <sub>2</sub> O	Sigma Aldrich, catalog # F8775
Rotor-stator homogenizer	Qiagen, catalog # 9001271
Disposable rotor-stator probes	Qiagen, catalog # 990890
-80 °C freezer	General lab supplier
Dissecting forceps	VWR, catalog # 89259-946
Razor blade or scalpel	General lab supplier
Weigh boats	General lab supplier
Milligram Scale	General lab supplier
Liquid Nitrogen or Dry Ice	General lab supplier
Conical bottom cryogenic vial (optional)	General lab supplier
Chillable dissecting surface (optional)	General lab supplier

\*\* The isolation kit will come with the User Training Kit that you request in Chapter 4.

### Plant Tissue

The following user-supplied materials are required for the [plant tissue DNA extraction](#).

Material	Supplier
Bionano Prep Plant DNA Isolation Kit	Bionano, part # 80003
Cell strainers, 40 µm and 100 µm	Corning, catalog # 352340 and 352360
Refrigerated centrifuge and swinging bucket (4,500 x g) for 50 ml conical tubes	Eppendorf, catalog # 5804R with A-4-44 Rotor
Rotor-stator homogenizer <u>and</u> disposable probes	Qiagen, catalog # 9001271 <u>and</u> 990890
Formaldehyde 36.5% – 38% in H <sub>2</sub> O	Sigma Aldrich, catalog # F8775
β-MercaptoEthanol (BME)	Sigma Aldrich, catalog # M6250
Spermidine trihydrochloride	Sigma Aldrich, catalog # S2501
Spermine tetrahydrochloride	Sigma Aldrich, catalog # S1141
Petri dish, square, 12 cm x 12 cm	Sigma Aldrich, catalog # Z617679
Glass centrifuge tubes, 15-16 ml	VWR, catalog # 46100-832
Rubber adapters	VWR, catalog # 46100-830
Plastic spatula	VWR, catalog # 82027-534
Dissecting forceps	VWR, catalog # 89259-946
Razor blade, scalpel, or scissors	General lab supplier
Weigh boats (recommended)	General lab supplier
Milligram Scale	General lab supplier

Small paint brush, all plastic	General supplier
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\*\* The isolation kit will come with the User Training Kit that you request in Chapter 4.

### Bacterial


The following user-supplied material is required for the bacterial DNA extraction.

Material	Supplier
Bacterial DNA Module Kit (Lysozyme and Buffer)	Bio-Rad, catalog # 1703597

## Chapter 3: Preparing for Arrival

### Installation Guidelines

An authorized service provider delivers the system. Make sure that the crate is stored securely near the installation lab bench.

 **CAUTION:** Only a Bionano Field Service Engineer can uncrate and install the instrument.

- At least three weeks before installation, confirm with your Field Application Scientist (FAS) that you have the required consumables and equipment.
- Ensure that the lab space and bench are ready for installation.
- Ensure that you have a pallet jack to support the crate and instrument.
- Ensure there are at least three people to assist the FSE with lifting Saphyr instrument.
- Ensure server configuration and setup with Bionano Access Web Server is complete before install date is scheduled. \*\*\*Remote Access should be available\*\*\*

### Dimensions

Measurement	Instrument	Crate
Height	38 cm (15 in)	70 cm (28 in)
Width	86 cm (34 in)	173 cm (68 in)
Depth	71 cm (28 in)	82 cm (32 in)
Weight	103 kg (227 lb)	68 kg (150 lb) [crate] 272 kg (600 lb) [crate + instrument, controller, monitor, server, and accessory kit]


### Laboratory Guidelines

- Prepare a clean, level surface such as a sturdy lab bench for the instrument.
- Keep the instrument away from direct sunlight or heat source.
- Do not place the instrument on a lab bench that has liquids or chemicals.
- Do not place any other equipment on the bench that could produce vibrations.
- Do not place objects on top of the instrument.

### Lab Bench Layout

Position the instrument to allow proper ventilation and access to the power switch and power outlet.

Access	Minimum Clearance
Lab Bench Space	Allow at least 150 cm (59 in) wide by 81 cm (32 in) depth.
Top	Allow at least 93 cm (37 in) above the instrument.
Back	Allow at least 5 cm (2 in) behind the instrument.
Sides	Allow at least 15 cm (6 in) on each side of the instrument.
Connections	4 standard electrical outlets (100~240 VAC) and two 1 GB Ethernet port

-  **CAUTION:** Moving the instrument can compromise data integrity.
- Insufficient overhead clearance can damage the stage access door and affect run performance.

- The Saphyr Instrument Controller must be placed within 3 feet of the instrument.
- The network cable between the Bionano Access Server and the Saphyr Instrument Controller must be no longer than 20 feet.

## Environmental Considerations

This instrument is designed for indoor use only.

<b>Element</b>	<b>Specification</b>
<b>Temperature</b>	Maintain a lab temperature of 19°C (66°F) to 25°C (77°F).
<b>Humidity</b>	Maintain a noncondensing relative humidity between 20–80%.
<b>Elevation</b>	Place the instrument at an altitude below 2,000 m (6,500 ft).
<b>Ventilation</b>	At least 5 cm (2 in) of clearance behind the instrument to allow proper ventilation and access to power outlet.  Overhead clearance required for installation and service is 93 cm (37 inch).
<b>Air Quality</b>	Operate the instrument in a Pollution Degree II environment or better.
<b>Electrical</b>	Apply category II (CAT II) electrical measurement standards.

## Chapter 4: Preparing for Implementation

### Site Preparation Checklist

- Ensure that your facility is ready for the delivery of the crate.
- Ensure that you have the appropriate equipment to support the crate and instrument (e.g., pallet jack).
- Ensure that all required personnel are present on the scheduled installation day.
- Ensure that you have received and properly stored the contents in the Qualification Kit and Accessory Kit.
- Verify that your site has proper computing, network, file storage and electrical requirements.
- Verify that you have a path for data storage ready for the FSE to connect the instrument to a data management system or remote network location. The FSE can test the data transfer process during installation.

### Crate Contents

Item	Content	Storage Temperature
Instrument	1 each	15–25 °C (59–77 °F)
Monitor	1 each	15–25 °C (59–77 °F)
Keyboard	1 each	15–25 °C (59–77 °F)
Mouse	1 each	15–25 °C (59–77 °F)
Instrument Controller	1 each	15–25 °C (59–77 °F)
Bionano Access Web Server	1 each	15–25 °C (59–77 °F)
Accessory Kit	1 each	15–25 °C (59–77 °F)

Compute Servers will ship in separate crating.

### Accessory Kit

The Accessory Kit is included in the crate.

Item	Content	Storage Temperature
US-Specific Power Cord	3 each	15–25 °C (59–77 °F)
Saphyr Chip Clip	2 clips	15–25 °C (59–77 °F)
Display Port Cable	1 each	15–25 °C (59–77 °F)
Network Cable (Cat 3)	3 each	15–25 °C (59–77 °F)
Serial Cable (M/F)	1 each	15–25 °C (59–77 °F)
USB 2.0 A to B Connector	1 each	15–25 °C (59–77 °F)
USB 3.0 A to B Connector	1 each	15–25 °C (59–77 °F)
Air Filter	3 each	15–25 °C (59–77 °F)
Sparkle, Optical Cleaner	1 each	15–25 °C (59–77 °F)
Lens Cleaning Paper	2 each	15–25 °C (59–77 °F)
Mousepad	1 each	15–25 °C (59–77 °F)



## Qualification Kit (Part # 90011)

The Saphyr System Qualification Kit will be coordinated by your FSE to arrive approximately one to three weeks before installation.

Item	Part #	Content	Storage
Saphyr Chip® 2x320	20319	2 each	4 °C
Saphyr Biological Control A, 100 µl	20337	1 each	4 °C

## User Training Kits (Part # 90012 – 90017)

The Saphyr System User Training Kit will be coordinated by your FAS to arrive approximately one to three weeks before training begins. It will contain a combination of: 1) Saphyr Chips & Control, 2) a DNA Labeling Kit and 3) a DNA Isolation Kit.

Coordinate with your FAS to send the proper Labeling Kit and Isolation Kit combination as listed by referencing one of the part numbers below (90012 – 90017) for delivery :

**Part # 90015 - DLS Labeling + Blood and Cell Culture DNA Isolation**  
**Part # 90016 - DLS Labeling + Animal Tissue DNA Isolation**  
**Part # 90017 - DLS Labeling + Plant Tissue DNA Isolation**

**Part # 90012 - NLRS Labeling + Blood and Cell Culture DNA Isolation**  
**Part # 90013 - NLRS Labeling + Animal Tissue DNA Isolation**  
**Part # 90014 - NLRS Labeling + Plant Tissue DNA Isolation**

### 1) Saphyr Chips and Controls

The contents in this table will be included in every User Training Kit combination above.

Item	Part #	Content	Storage
Saphyr Chip® 2 x 320	20319	2 each	4 °C
Large Genome Labeling Control (3.5 µg)	20276	1 each	4 °C

### 2) Labeling Kit Training Contents: NLRS Kit or DLS Kit

The table indicates the contents to be expected depending on which one of the labeling kits that is requested for training.

DLS Training Kit Items	Part #	Content	Storage
Bionano Prep DLS Labeling Kit	80005	1 each (10 rxn)	-20°C, 4°C, RT
NLRS Training Kit Items	Part #	Content	Storage
Bionano Prep NLRS Labeling Kit	80001	1 each (10 rxn)	4°C, -20°C
Taq DNA Polymerase, incl. Thermopol Buffer	10065	400 Units	-20 °C
Nickase, Nt.BspQI	10066	1,000 Units	-20 °C
Taq DNA Ligase	10064	2,000 Units	-20 °C
NAD+	10063	0.2 ml	-20 °C

### 3) DNA Isolation Training Kit: Blood & Cell Culture, Animal Tissue or Plant Tissue

Choose one of the DNA isolation kits below to be used during training.

DNA Isolation Training Kits	Part #	Content	Storage
Blood & Cell Culture DNA Isolation Kit	80004	1 each (10 rxn)	RT
Animal Tissue DNA Isolation Kit	80002	1 each (10 rxn)	RT

Plant Tissue DNA Isolation Kit	80003	1 each (5 rxn)	4°C, RT
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## Installation and Training Schedule

Below are example schedules for installation of the Saphyr System (by the FSE) and training on the Saphyr System (by the FAS). Depending on the customers proximity to the FAS, travel time and customer workflow, your training time may differ.

### Installation

An example of a 3-day installation schedule:

Day 1	Day 2	Day 3
<ul style="list-style-type: none"> <li>• Uncrate and move the instrument to installation area</li> <li>• Instrument installation</li> </ul>	<ul style="list-style-type: none"> <li>• Function verification</li> <li>• Optical alignment verification</li> <li>• Network connections</li> </ul>	<ul style="list-style-type: none"> <li>• System operation qualification</li> </ul>

### Training

An example of a 5-day training schedule:

Day 1	Day 2	Day 3	Day 4	Day 5 (optional)
<ul style="list-style-type: none"> <li>• Sample DNA extraction</li> <li>• Saphyr technology presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Sample DNA extraction continues</li> </ul>	<ul style="list-style-type: none"> <li>• DNA labeling</li> <li>• Bionano Access overview</li> </ul>	<ul style="list-style-type: none"> <li>• Set up run</li> <li>• Load chip</li> <li>• Bionano Access—monitor data and view metrics</li> </ul>	<ul style="list-style-type: none"> <li>• Data analysis with Bionano Access</li> <li>• Q &amp; A</li> <li>• Best practices</li> </ul>

## Chapter 5: Post-Installation Follow Up

After you have completed the training, you will have a follow-up review meeting with your FAS. The review meeting is usually in the format of a conference call or WebEx.

For the review, prepare to provide the following:

- Data produced from your first run without the FAS on site.
- List of customization requests for the instrument and software.
- List of questions, concerns, and issues, such as your level of comfort, comprehension, and confidence on using the Saphyr system.

## Additional Resources

The following documentation is available for download from the [Bionano Support](#) page.

Resource	Description
<a href="#">Saphyr System Safety Guide</a> (document # 30144)	Provides information about the instrument safety considerations.
<a href="#">Saphyr System User Guide</a> (document # 30143)	Provides an overview of instrument components and software, proper maintenance, and troubleshooting.
<a href="#">Bionano Access Software User Guide</a> (document # 30142)	Provides an overview of data analysis.

## Glossary

Term	Definition
CIFS	Common Internet File System
Chip run	A chip run generates approximately two terabytes of image data.
FAS	Field Application Scientist
FSE	Field Service Engineer
GB	Gigabyte
HTTP	Hypertext Transfer Protocol
OS	Operating system
SGE jobs	Son of Grid Engine jobs
SSD	Solid-state drive
SFTP	Secure File Transfer Protocol
SMTP	Simple Mail Transfer Protocol
SSH	Secure Shell
TB	Terabyte

## Technical Assistance

For technical assistance, contact Bionano Genomics Technical Support.

You can retrieve documentation on Bionano products, Safety Data Sheet, certificates of analysis, frequently asked questions, and other related documents from the Support page or by request through e-mail and telephone.

Type	Contact
Email	support@bionanogenomics.com
Phone	<b>Hours of Operation:</b> Monday through Friday, 9:00 a.m. to 5:00 p.m., PST US: +1 (858) 888-7600
Website	<a href="http://www.bionanogenomics.com/support">www.bionanogenomics.com/support</a>

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