

Clarus 400 GC Safety and Preparing Your Laboratory Guide

Translations of this Guide into various languages are available in the Clarus 400 GC Manuals CD that is shipped as part of the Shipping Kit with your instrument.

Release History

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Any comments about the documentation for this product should be addressed to:

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U.S.A.

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Introduction **1**



About This Manual

This quick installation guide is divided into following chapters:

Chapter 1 Introduction

This chapter contains a brief introduction on the instrument, the conventions and warnings used in the manual.

Chapter 2 Safety Practices

Important safety information for the Clarus 400 GC is provided in this chapter.

Chapter 3 Preparing Your Laboratory

The preparation of your laboratory needed for the Clarus 400 GC laboratory requirements for the instrument are reviewed in this chapter.

Conventions Used in this Manual

Normal text is used to provide information and instructions.

Bold text refers to button or tab page that is displayed on keypad

All eight digit numbers are PerkinElmer part numbers unless stated otherwise.

Notes, cautions and warnings

Three terms, in the following standard formats, are also used to highlight special circumstances and warnings.

NOTE: *A note indicates additional, significant information that is provided with some procedures.*

CAUTION

*We use the term CAUTION to inform you about situations that could result in **serious damage to the instrument** or other equipment. Details about these circumstances are in a box like this one.*



WARNING

*We use the term WARNING to inform you about situations that could result in **personal injury** to yourself or other persons. Details about these circumstances are in a box like this one.*

Customer Service

PerkinElmer, Inc.
710 Bridgeport Avenue
Shelton, CT 06484-4794 U.S.A

Tel: 1 (800) 762-4000 or (203) 762-4000
Internet: <http://www.perkinelmer.com>

Electromagnetic Compatibility (EMC)

United States (FCC)

This product is classified as a digital device used exclusively as industrial, commercial, or medical test equipment. It is exempt from the technical standards specified in Part 15 of the FCC Rules and Regulations, based on Section 15.103 (c).

European Union

All information concerning EMC standards will be in the Declaration of Conformity and these standards will change as the European Union adds new requirements.

European Union Industrial Environment

The 230 V/50 Hz. Clarus GC manufactured for use in the European Union is intended for the industrial environment. The instrument is to be connected to a mains power network supplied from a high or medium-voltage transformer dedicated for the supply of an installation feeding a manufacturing or similar plant.

Industrial environments are characterized by the existence of one or more of the following conditions:

- industrial, scientific and medical (ISM) apparatus are present
- heavy inductive or capacitive loads are frequently switched
- currents and associated magnetic fields are high

These are the major contributors to the industrial electromagnetic environment and as such distinguish the industrial from other environments. The instrument is not intended for connection to a public mains network supplying residential, commercial and light-industrial locations.

Susceptibility to RF Interference

With the exception of the Flame Ionization Detector (FID), a RF field strength of 10 V/m between 80 MHz. and 1000 MHz. with 80% modulation at 1 kHz. may cause a deflection on the chromatographic detector baseline that exceeds its normal pattern. This implies that if a transmitting device, such as a walkie-talkie carried by a security guard, is used near the detector, a spike or peak on the chromatographic baseline may occur. If you are concerned that such an event may occur, PerkinElmer recommends that walkie-talkie restriction notices be posted in the vicinity. Cell phones, beepers, and other similar devices operate in a much higher frequency range and do not cause interference.

Warning Signs on the Instrument



Alternating current.



Protective conductor terminal.



Off position of the main power source.



On position of the main power source.



Warning, hot surface



Warning, risk of electric shock.



Caution, risk of danger.
Documentation must be consulted to determine the nature of the potential hazard and any actions which have to be taken.



This unit contains protective circuitry. Contact PerkinElmer qualified service personnel before performing any AC line tests.



Caution

If the instrument top is opened, the alignment of the Autosampler tower must be verified. Refer to your Clarus 400 Manual.

(The CAUTION above is only visible if detector compartment door is open.)



Warning

Disconnect AC power cord from the outlet before removing any covers or parts. Do not operate the instrument with any cover or parts removed.

(The WARNING above is only visible if detector compartment door is open.)



Warning

Grounding circuit continuity is vital for safe operation of equipment. Never operate equipment with grounding conductor disconnected.



Caution

This unit contains protective circuitry. Contact PerkinElmer qualified service personnel before performing an AC line tests.



Warning

Shut off hydrogen and cap unused flame detector fittings to prevent accumulation of hydrogen in oven and possible explosion.

(The WARNING above is only visible if detector compartment door is open.)



Warning

Shut off hydrogen and cap unused flame detector fittings to prevent accumulation of hydrogen in oven and possible explosion.

For ECD Instruments only the following certificate appears:

| | | | |
|---|--|--|--|
| <p>CERTIFICATE ⁶³Ni Electron Capture Detector _____ N6100134 _____ N61000063</p> <p style="text-align: center;">Save for proof of tests.</p> <p>The attached source complies with the requirements of ANSI N542 (ISO 2919) Classification C42211. This source has been leak tested and is certified to have less than 0.005 µCi, 180 Bq of removable contamination.</p> | | | |
| Serial Number | | | |
| Assembly Number | | | |
| Isotope ⁶³ Ni Activity: 15 mCi | | | |
| Pressurization test at 30 psi N ₂ : Passed: | | | |
| Initial Test Performed by: | | | |
| Wipe Test Date | | | |

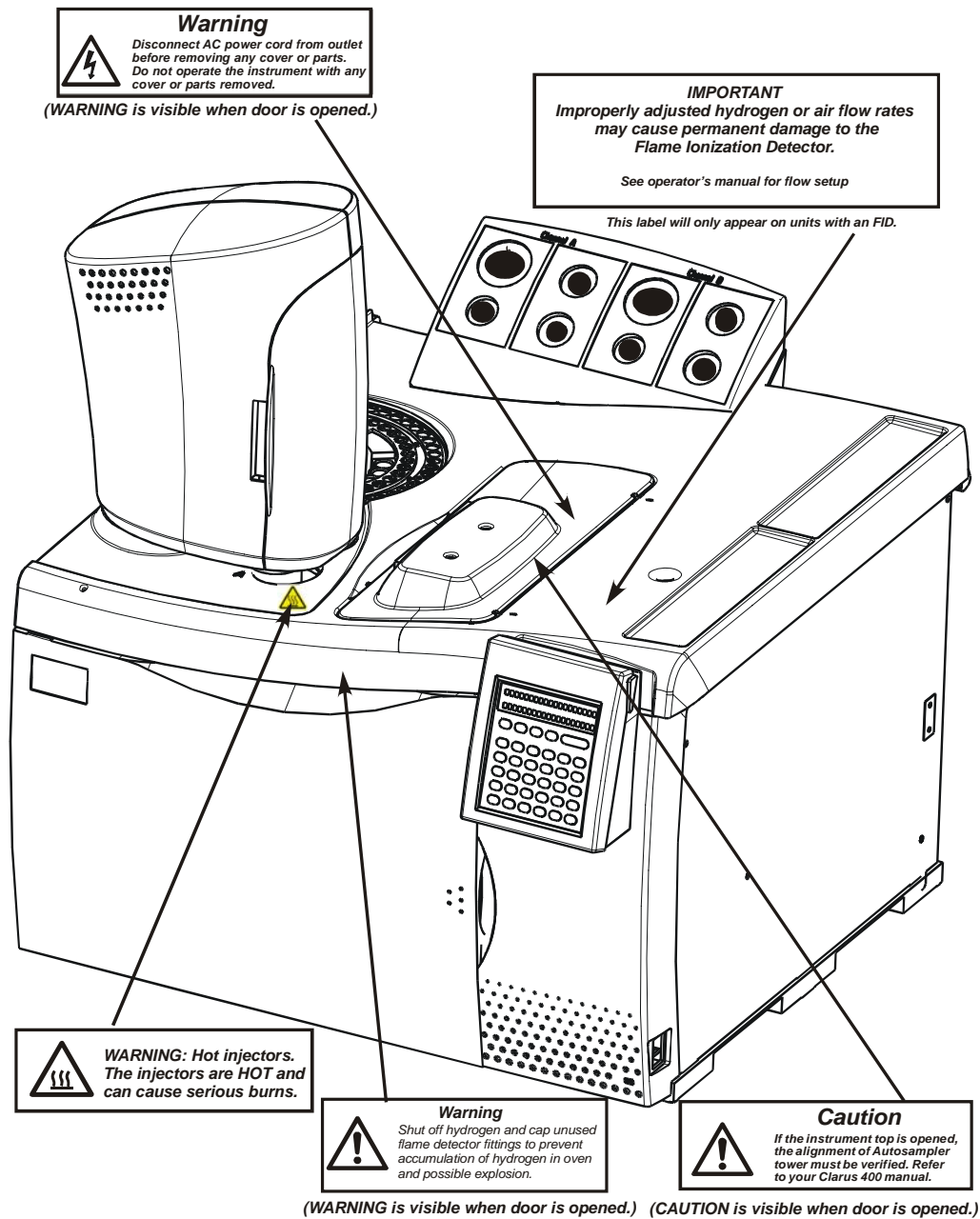
Introduction

Translations of the word “Air” are provided in the following table.

| Language | Air |
|-----------------|------------|
| German | Luft |
| French | Air |
| Danish | Luft |
| Finnish | Ilma |
| Greek | ΑΕΡΑΣ |
| Italian | Aria |
| Dutch | Lucht |
| Norwegian | Luft |
| Portuguese | Ar |
| Spanish | Aire |
| Swedish | Luft |

Label locations on the instrument

Front of Instrument



Back of Instrument

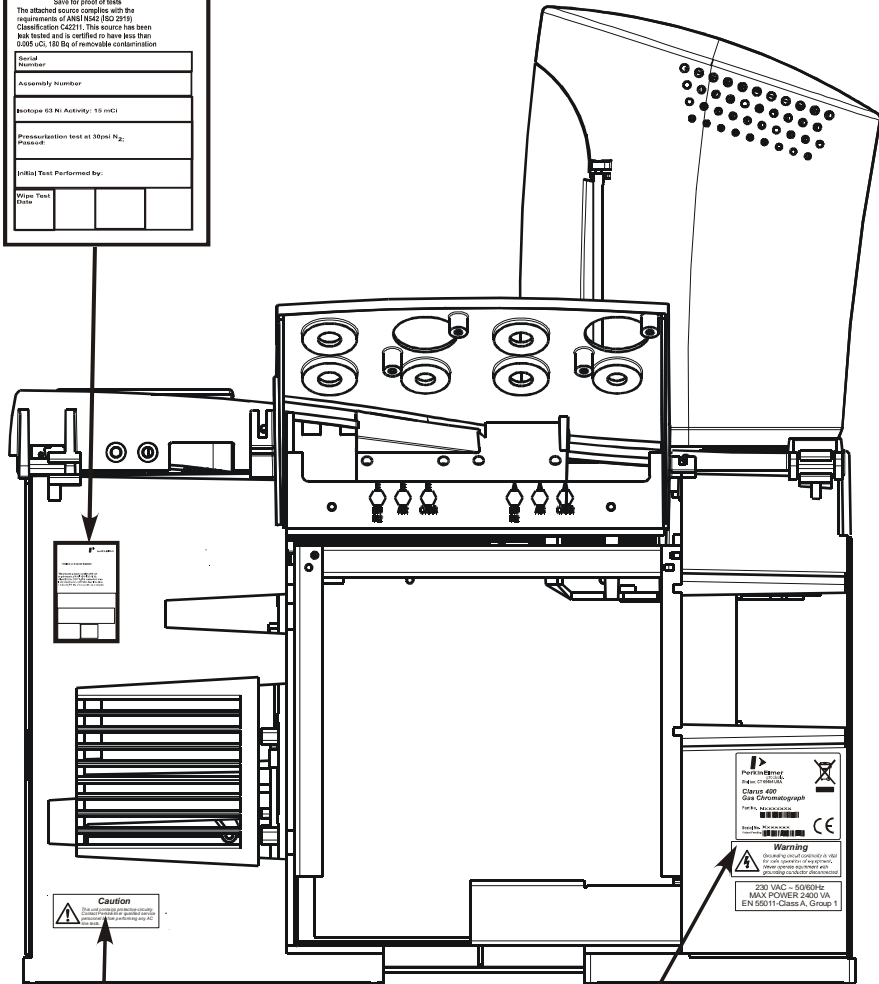
CERTIFICATE
⁶³Ni Electron Capture Detector

Net100000 Net100002

Save for proof of tests
 The attached source complies with the requirements of ANSI N422 (ISO 2919) Classification C42211. This source has been leak tested and is certified to have less than 0.005 uCi, 181 Bq of removable contamination

Serial Number: _____
 Assembly Number: _____
 Isotope: ⁶³Ni Activity: 15 mCi
 Pressurization test at 30psi N₂: Passed
 Initial Test Performed by: _____
 Wipe Test Date: _____

(This label is provided only for instruments with an ECD detector.)



Caution
 This unit contains protective circuitry. Contact PerkinElmer qualified service personnel before performing any AC line tests.

Warning
 Grounding circuit continuity is vital for safe operation of equipment. Never operate equipment with grounding conductor disconnected

***Safety Practices* 2**



Chapter Overview

This chapter describes the general safety practices and precautions that must be observed when operating the Clarus 400 GC.

This advice is intended to supplement, not supersede, the normal safety codes in the user's country. It is also a supplement to the PerkinElmer standard Safety and Health Policy. The information provided does not cover every safety procedure that should be practiced. Ultimately, maintenance of a safe laboratory environment is the responsibility of the analyst and the analyst's organization.

Please consult all manuals supplied with the Clarus 400 GC and accessories before you start working with the instrument. Carefully read the safety information in this chapter and in the other manuals supplied. When setting up the instrument or performing analyses or maintenance procedures, strictly follow the instructions provided. The Clarus 400 GC should be used in accordance with the instructions provided in this manual. If used otherwise, the protection provided by the instrument may be impaired.

Generic Warnings

Before installing or operating the Clarus 400 GC, read the following information concerning hazards and potential hazards. You should ensure that anyone involved with installation and/or operation of the Clarus 400 GC is knowledgeable in both general safety practices for the laboratory and safety practices for the Clarus 400 GC. Get advice from your safety engineer, industrial hygienist, environmental engineer, or safety manager before you install or use this instrument.

Heated Zones

Heated zones should be treated with caution, for example, injector caps and detectors. Avoid physical contact with the injector caps. The detector cover may get hot, especially if flame ionization detectors are operated at high temperatures. As a general rule, allow heated zones to cool before attempting to work in the oven, injector, or detector areas.

CAUTION

THERMAL RUNAWAY PROTECTION: *The Clarus 400 GC software shuts down the instrument if any heated zone exceeds 470 °C. Should this occur, the following error message is displayed:*

INSTRUMENT SHUTDOWN

xxx THERM RUNAWAY where xxx is the heated zone

Call your PerkinElmer Representative.

Instrument shutdown also occurs if there is a PRT (Platinum Resistance Thermometer) or MPU (Micro Processor Unit) failure. In these cases the following error message is displayed:

INSTRUMENT SHUTDOWN

xxx PRT ERROR where xxx is the failed zone.

Call your PerkinElmer Representative.

Precautions



WARNING

Be sure that all instrument operators read and understand the precautions listed below. It is advisable to post a copy of the precautions near or on the instrument shelf.

CAUTION

The protection provided by this equipment may be impaired if the equipment is used in a manner not specified by PerkinElmer.

The following precautions must be observed when using the Clarus 400 GC:

- Be sure that the power line voltage of the Clarus 400 GC corresponds to the voltage used in your laboratory.
- Never remove the side panels of the Clarus 400 GC without shutting down the instrument and disconnecting the instrument power cord from line power.
- Do not immerse the purge gas exit line in a liquid, as the liquid may be drawn back into the sample holder.
- Only high quality purge gases should be used with the Clarus 400 GC. Minimum purity of 99.995% is recommended. A high quality filter-dryer accessory is recommended for the removal of any moisture from the purge gases.

Environmental Conditions

Operating Conditions

CAUTION *The Clarus 400 GC is designed for indoor use only.*

Do not operate in a Cold Room or a refrigerated area. The Clarus 400 GC operates most efficiently under the following conditions:

CAUTION

- *Ambient temperature is 10 °C to 35 °C (50 °F to 95 °F). The GC will operate safely between 5 °C and 40 °C (41 °F and 104 °F).*
- *Ambient relative humidity is 20% to 80% non-condensing.*
- *Operating altitude is in the range of 0 to 2 000 m.*



WARNING

The Clarus 400 GC is not designed for operation in an explosive environment.

Pollution Degree

The Clarus 400 GC will operate safely in environments that contain nonconductive foreign matter up to Pollution Degree 2 in EN/IEC 61010-1.

Clarus 400 GC Keypad

For optimum performance, the Clarus 400 GC's keypad may require periodic re-calibration. The interval between re-calibration may be affected by exposure to combined heat and humidity conditions (ambient conditions between 30 °C / 50% RH and 35 °C / 80% RH).

Storage Conditions

The Clarus 400 GC may be stored under the following conditions:

- ambient temperature is -20 °C to +60 °C (-4 to 140 °F)
- ambient relative humidity is 20 to 80%, non-condensing
- altitude is in the range 0 to 12 000 m.

Cleaning the Instrument

Exterior surfaces may be cleaned with a soft cloth, dampened with a mild detergent and water solution. Do not use abrasive cleaners or solvents.

Decontamination

If the instrument or an accessory requires decontamination before repair, maintenance, warranty or trade-in purposes at PerkinElmer, the responsible body should read the procedure and complete the certificate which is available on the PerkinElmer public website:

<http://las.perkinelmer.com/OneSource/decontamination.htm>

Follow the “Decontamination of Instrumentation and Associated Sub-assemblies” procedure and complete the “Certificate of Decontamination.” The certificate is used to certify the decontamination process was completed before equipment can be returned to PerkinElmer.

General Laboratory Safety

Your laboratory should have all equipment ordinarily required for the safety of individuals working with chemicals (fire extinguishers, first-aid equipment, safety shower and eye-wash fountain, spill cleanup equipment, etc.).

Electrical Safety

The Clarus 400 GC contains high voltage. To prevent the risk of shock, unplug the line cord from the AC outlet and wait at least one minute before opening or removing any instrument panels.

The instrument has been designed to protect the operator from potential electrical hazards. This section describes some recommended electrical safety practices.

CAUTION

This unit contains protective circuitry. Contact PerkinElmer Service before performing any AC line tests.



WARNING

Connect the GC to an AC line power outlet that has a protective ground connection. To ensure satisfactory and safe operation of the GC, it is essential that the protective ground conductor (the green/yellow lead) of the line power cord is connected to a true electrical ground. Any interruption of the protective ground conductor, inside or outside the GC, or disconnection of the protective ground terminal may impair the protection provided by the GC.



WARNING

Do not operate the GC with any covers or parts removed.



WARNING

To avoid electrical shock, disconnect the power cord from the AC outlet before servicing. Servicing on the GC is to be performed only by a PerkinElmer service representative or similarly trained and authorized person.



WARNING

Do not attempt to make adjustments, replacements or repairs to this GC except as described in the user documentation.



WARNING

For protection against fire hazard, only replace fuses with the same type and rating. Servicing on the GC is to be performed only by a PerkinElmer service representative or similarly trained and authorized person.


CAUTION

To ensure adequate cooling of the instrument electronics, do not obstruct the gap at the base of the GC, and leave at least a 6-inch clearance between instruments.


Ensure that the power cord is correctly wired and that the ground leads of all electrical units (for example, recorders, integrators) are connected together via the circuit ground to earth. Use only three-prong outlets with common earth ground connections.

For customers in the United Kingdom, the power plug provided with the Clarus 400 GC contains a 13 Amp fuse mounted within the plug body. This fuse complies with standard BS1362 and has a breaking capacity of 6000 Amps at 250 VAC. Any replacement fuse must be of the same type and amperage rating.

Servicing of incoming AC line components in your laboratory should be performed only by a licensed electrician.

| | |
|---|--|
|  WARNING | <p><i>Lethal voltages are present at certain areas within the instrument. Installation and internal maintenance of the instrument should only be performed by a PerkinElmer service engineer or similarly authorized and trained person. When the instrument is connected to line power, opening the instrument covers is likely to expose live parts. Even when the power switch is off, high voltages can still be present. Capacitors inside the instrument may still be charged even if the instrument has been disconnected from all voltage sources.</i></p> |
|---|--|

The instrument must be correctly connected to a suitable electrical supply. The supply must have a correctly installed protective conductor (earth ground) and must be installed or checked by a qualified electrician before connecting the instrument.

| | |
|---|--|
|  WARNING | <p><i>Any interruption of the protective conductor (earth ground) inside or outside the instrument or disconnection of the protective conductor terminal is likely to make the instrument dangerous. Intentional interruption is prohibited.</i></p> |
|---|--|

When working with the instrument:

- Disconnect the instrument from all voltage sources before opening it for any adjustment, replacement, maintenance, or repair. If afterwards, the opened instrument must be operated for further adjustment, maintenance, or repair, this must only be done by a PerkinElmer Service engineer.
- Whenever it is possible that the instrument is no longer electrically safe for use, make the instrument inoperative and secure it against any unauthorized or unintentional operation. The electrical safety of the instrument is likely to be impaired if, for example, the instrument shows visible damage, has been subjected to prolonged storage under unfavorable conditions, or has been subjected to severe stress during transportation.

Moving the Clarus 400 GC

The Clarus 400 GC weighs 53.5 kg (118 lb). Improper lifting can cause injury to the back. If the instrument must be moved, we recommend that at least two people carefully lift the instrument in order to move it.

ECD Radioactive Hazards



WARNING

To assure that removable radioactive contamination on the external parts of the ECD remains at a safe level, the United States Nuclear Regulatory Commission requires that:

- *The ECD be wipe tested at least once every six months.*
- *A record of the results must be maintained for NRC inspection.*

United States Government Regulations for ECDs

NOTE: *To repair an Electron Capture Detector cell requires a specific license issued by the U.S. Nuclear Regulatory Commission (NRC) and/or in some states by the equivalent state agency. For further information on obtaining a license, contact the Customer Service Department at PerkinElmer, Shelton, Connecticut, or the NRC Material Branch, Office of Nuclear Materials, Safety and Safeguards, Washington, DC 20555.*

All USNRC regulations can be obtained through the internet at www.nrc.gov/reading-rm/

NOTE: *These instructions are for ECD cell purchasers who are not specifically licensed to handle radioactive materials.*

The Clarus 400 GC Electron Capture Detector model (P/N N610-0063) contains a maximum of 15 mCi of Nickel 63 (Ni 63), a radioactive material. Your possession and use of this detector is governed by 10 C.F.R. Section 31.5 which is reproduced in Appendix I. Under the provisions of that regulation you are deemed a "General Licensee."

Your possession and use of the detector cell may also be regulated by the state where you are located. The requirements of state regulatory agencies are substantially similar to those contained in NRC regulation 10 C.F.R. Section 31.5, but they may differ in some respects. It is suggested that you procure a copy of the regulations of your particular state. (Supplement 2 in Appendix I contains a list of the "Agreement States" which have been granted authority by the U.S. Nuclear Regulatory Commission to regulate the possession and use of radioactive material.)

It is required that you be familiar with regulation 10 C.F.R. Section 31.5 (Appendix 1 in the Clarus 400 Hardware Guide 0993-6811). Following are summaries of its requirements.

Labels

Do not remove any of the labels attached to the ECD cell or any of the labels attached to your Clarus 400 Gas Chromatograph that refer to the ECD cell. Follow all instructions and abide by all precautions provided by the labels and in user instruction manuals referred to by the labels.

Leak Testing

You are obligated under U.S. federal and state regulations to make certain that the ECD cell is wipe-tested for leakage of radioactive materials at intervals of no longer than six months, and that the analysis of these wipe tests is conducted by a person specifically licensed to do so, either by the U.S. Nuclear Regulatory Commission or by an Agreement State. The analyses can be performed by the firm listed below:

National Leak Test Center
P.O. Box 486
North Tonawanda, New York 14120

ECD Cell Failure or Damage

If a leak test detects more than 0.005 μCi (microcurie) of removable radioactive material on the surface of an ECD cell, or if the cell itself is damaged in such a way as to indicate that it may no longer adequately shield the radioactive material inside, you must immediately suspend operation of your chromatograph until the cell has been repaired or disposed of by *a person specifically licensed to do so*. Any such incident must be reported by you to the Regional Office, Inspection and Enforcement, U.S. Nuclear Regulatory Commission.

Reporting Radiation Incidents, Theft or Loss

Please read Regulation 10 C.F.R. Section 20.2201 and 20.2202. These describe your duties should the radioactive material (Ni 63) in the ECD cell be lost, stolen, or released, or should any person be exposed to radiation.

Other ECD Requirements

Regulation 10 C.F.R. Section 31.5 (see Appendix I) does not permit you to abandon the ECD cell or export it. It may not be transferred except to a person specifically licensed to receive it. Within thirty days of such a transfer, you must report to the Director of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, the name and address of the transferee. However, no report is needed to transfer a defective ECD cell to PerkinElmer in order to obtain a replacement.

You may transfer the ECD cell to another general licensee, like yourself, only when it remains at the same location to which it was shipped by PerkinElmer. Give the transferee a copy of these instructions and the regulations in Appendix I, and report to the commission as required in Regulation C.F.R. Section 31.5.



WARNING

NEVER DISMANTLE THE ECD CELL!!

You can remove the ECD cell from the GC for repair by a person specifically licensed to do so..

United Kingdom Regulations

In the U.K., registration is required under the Radioactive Substances Act of 1960, for anyone keeping or using radioactive materials. Application should be made to any one of the following governing bodies:

ENGLAND Department of the Environment
Queen Anne's Chambers
Tothill Street
London, SW1H 9J4

SCOTLAND Scottish Development Department
21 Hill Street
Edinburgh, EH2 3J4

WALES Welsh Office
Cathay's Park
Cardiff, CF1 3NG

NORTHERN IRELAND Ministry of Development
Parliament Building
Storemont
Belfast, Northern Ireland

Safe Handling of Gases

When using hydrogen, either as the combustion gas for a flame ionization detector or as a carrier gas, special care must be taken to avoid buildup of explosive hydrogen/air mixtures. Ensure that all hydrogen line couplings are leak-free and do not allow hydrogen to vent within the oven.

Ventilation

Adequate ventilation must be provided. When analyzing hazardous compounds, such as pesticides, it may be necessary to arrange for venting of detector effluent into a fume hood.

Using Hydrogen



WARNING

*Flame Ionization Detectors (FID) uses hydrogen as fuel. If the hydrogen is turned on without a column attached to the injector and detector fittings inside the oven, hydrogen could diffuse into the oven creating the possibility of an explosion. To avoid possible injury, **DO NOT TURN ON THE HYDROGEN UNLESS A COLUMN IS ATTACHED AND ALL JOINTS HAVE BEEN LEAK TESTED.***

*Before disconnecting a column, make certain that the hydrogen has been turned **OFF**.*

If two FIDs are installed and only one has a column attached to it, make certain that you cap off the unused detector inlet fitting with a 1/8-inch stainless steel plug (P/N N930-0061).



WARNING

Contact the gas supplier for a material safety data sheet (MSDS) containing detailed information on the potential hazards associated with the gas. Carefully use, store, and handle compressed gases in cylinders. Gas cylinders can be hazardous if they are mishandled.

NOTE: *The permanent installation of gas supplies is the responsibility of the user and should conform to local safety and building codes.*

Consult the following references for more detailed information and additional guidelines about gas cylinders.

- Compressed Gas Association (USA), "Safe Handling of Compressed Gases in Containers," pamphlet no. P-1, 1984.
- Compressed Gas Association (USA), "The Inert Gases – Argon, Nitrogen and Helium," pamphlet no. P-9, 1992.

Identification of Gas Cylinders

- Legibly mark cylinders to identify their contents. Use the chemical name or commercially accepted name for the gas.

Storing Gas Cylinders

Review the following precautions with the customer to ensure the safe use and storage of gas cylinders.

- Cylinders should be stored in accordance with the regulations and standards applicable to the customer's locality, state, and country.

- When cylinders are stored indoors in storage rooms, the storage room should be well ventilated and dry. Ensure that the ventilation is adequate to prevent the formation of dangerous accumulations of gas. This is particularly important in small or confined areas.
- Do not store cylinders near elevators, gangways, or in locations where heavy moving objects may strike or fall against them.
- Use and store cylinders away from exits and exit routes.
- Locate cylinders away from heat sources, including heat lamps. Compressed gas cylinders should not be subjected to temperatures above 52 °C (126 °F).
- It is recommended that gas cylinders be stored and placed outside the laboratory and connected to the instrument through copper lines.

Handling of Gas Cylinders

- Do not allow ignition sources in the storage area and keep cylinders away from readily ignitable substances such as gasoline or waste, or combustibles in bulk, including oil.
- Store cylinders standing upright, fastened securely to an immovable bulkhead or permanent wall.
- When storing cylinders outdoors, they should be stored above ground on a suitable floor and protected against temperature extremes (including the direct rays of the sun).
- Arrange gas hoses where they will not be damaged or stepped on and where things will not be dropped on them.
- Take care not to kink or stress the gas lines. For safety, cylinders should be firmly clamped in position.
- If it becomes necessary to move the cylinders, do so with a suitable hand truck after insuring that the container cap is secured and the cylinder is properly fastened to the hand truck.
- Use only regulators, tubing and hose connectors approved by an appropriate regulatory agency.
- Do not refill cylinders.
- Check the condition of pipes, hoses and connectors regularly. Perform gas leak tests at all joints and seals of the gas system regularly, using an approved gas leak detection system.
- When the equipment is turned off, close all gas cylinder valves tightly at the cylinder. Bleed the remainder of the line before turning the exhaust vent off.

Hazardous Chemicals

Before using samples, you should be thoroughly familiar with all hazards and safe handling practices. Observe the manufacturer's recommendations for use, storage and disposal. These recommendations are normally provided in the Material Safety Data Sheets (MSDS) supplied with the solvents.

Be aware that the chemicals that you use in conjunction with the GC may be hazardous. **DO NOT** store, handle, or work with any chemicals or hazardous materials unless you have received appropriate safety training and have read and understood all related Material Safety Data Sheets (MSDS). MSDSs provide information on physical characteristics, precautions, first aid, spill clean up and disposal procedures. Familiarize yourself with the information and precautions contained in these documents before attempting to store, use or dispose of the reagents. Comply with all federal, state, and local laws related to chemical storage, handling, and disposal.

You must work under a suitable hood when handling and mixing certain chemicals. The room in which you work must have proper ventilation and a waste collection system. Always wear appropriate safety attire (full-length laboratory coat, protective glasses, gloves, etc.), as indicated on Material Safety Data Sheets.



WARNING

Some chemicals used with this GC may be hazardous or may become hazardous after completion of an analysis. The responsible body (for example, the Lab Manager) must take the necessary precautions to ensure that the GC operators and the surrounding workplace are not exposed to hazardous levels of toxic substances (chemical or biological) as defined in the applicable Material Safety Data Sheets (MSDS) or OSHA, ACGIH, or COSHH documents. Venting for fumes and disposal of waste must be in accordance with all national, state and local health and safety regulations and laws.

Definitions in Warning for Hazardous Chemicals

Responsible body. “Individual or group responsible for the use and maintenance of equipment, and for ensuring that operators are adequately trained.” [per EN/IEC 61010-1].

Operator. “Person operating equipment for its intended purpose.”
[per EN/IEC 61010-1].

OSHA: Occupational Safety and Health Administration (United States)

ACGIH: American Conference of Governmental Industrial Hygienists

COSHH: Control of Substances Hazardous to Health (United Kingdom)

WEEE Instructions for PerkinElmer Products



or



A label with a crossed-out wheeled bin symbol and a rectangular bar indicates that the product is covered by the Waste Electrical and Electronic Equipment (WEEE) Directive and is not to be disposed of as unsorted municipal waste. Any products marked with this symbol must be collected separately, according to the regulatory guidelines in your area.

The objectives of this program are to preserve, protect and improve the quality of the environment, protect human health, and utilize natural resources prudently and rationally. Specific treatment of WEEE is indispensable in order to avoid the dispersion of pollutants into the recycled material or waste stream. Such treatment is the most effective means of protecting the customer's environment.

Requirements for waste collection, reuse, recycling, and recovery programs vary by regulatory authority at your location. Contact your local responsible body (e.g., your laboratory manager) or authorized representative for information regarding applicable disposal regulations. Contact PerkinElmer at the web site listed below for information specific to PerkinElmer products.

Web address:

<http://las.perkinelmer.com/OneSource/Environmental-directives.htm>

For Customer Care telephone numbers select "Contact us" on the web page.

Products from other manufacturers may also form a part of your PerkinElmer system. These other producers are directly responsible for the collection and processing of their own waste products under the terms of the WEEE Directive. Please contact these producers directly before discarding any of their products.

Consult the PerkinElmer web site (above) for producer names and web addresses.

***Preparing Your
Laboratory*** **3**



Chapter Overview

The items shown in the following checklist need to be considered when preparing the laboratory for the instrument.

- Environmental Conditions
- Exhaust Vent Requirements
- Laboratory Space Requirements
- Cooling Water Requirements (if required)
- Electrical Requirements

Preparing the Laboratory

The following sections describe the laboratory requirements in detail for the Clarus 400 GC.

Environmental Conditions

The laboratory in which the Clarus 400 GC is located must meet the following conditions:

- A corrosive-free environment.
- The instrument will operate with a laboratory temperature between 10 and 35 °C (50 - 95 °F). For optimum instrument performance, the room temperature should be controlled at 20° ± 2 °C.
- The environment should be relatively dust-free to avoid sample and instrument contamination problems.
- Free of excessive vibration.

The Clarus 400 GC has been designed for indoor use. Do not use the instrument in an area where explosion hazards may exist.

Exhaust Vent Requirements

Exhaust venting is important for the following reasons.

- It protects laboratory personnel from toxic vapors that may be produced by some samples.
- It helps to protect the instrument from corrosive vapors that may originate from the sample(s).
- It removes dissipated heat produced by the instrument and power supply.



WARNING

The use of Clarus 400 GC without adequate ventilation to outside air may constitute a health hazard.

NOTE: *Local electrical codes do not allow PerkinElmer Service Engineers to install the blower and vent assembly.*

The blower capacity depends on the duct length and number of elbows or bends used to install the system. If an excessively long duct system or a system with many bends is used, a stronger blower may be necessary to provide sufficient exhaust volume at the instrument.

Alternatively, smooth stainless-steel tubing should be used instead of flexible stainless steel tubing where flexibility is not required to reduce system friction loss or "drag." If smooth stainless steel is used, there must be a way to move the vent hood out of the way for servicing. A length of smooth stainless steel ducting has 20-30% less friction loss than a comparable length of flexible ducting. When smooth stainless steel tubing is used, elbows must be used to turn corners. These elbows should turn at a centerline radius of 150mm with a maximum bend angle of 45 degrees to reduce friction losses, and the number of elbows should be minimized.

Additional recommendations on the venting system include the following items.

- Make sure the duct casing is installed using fireproof construction. Route ducts away from sprinkler heads.
- The duct casing and venting system should be made of materials suitable for temperatures greater than 70 °C (158 °F). It should be installed to meet local building code requirements.
- Locate the blower as close to the discharge outlet as possible. All joints on the discharge side should be airtight, especially if toxic vapors are being carried.
- Equip the outlet end of the system with a back draft damper and take the necessary precautions to keep the exhaust outlet away from open windows or inlet vents. In addition, extend it above the roof of the building for proper dispersal of the exhaust.
- Equip the exhaust end of the system with an exhaust stack to improve the overall efficiency of the system.

Preparing Your Laboratory

- Make sure the length of the duct that enters into the blower is a straight length at least ten times the duct diameter. An elbow entrance into the blower inlet causes a loss in efficiency.
- Provide make-up air in the same quantity as is exhausted by the system. An "airtight" lab will cause an efficiency loss in the exhaust system.
- Ensure that the system is drawing properly by using an air flow meter.
- Equip the blower with a pilot light located near the instrument to indicate to the operator when the blower is on.

Clarus 400 GC Requirements

Laboratory Space Requirements:

| | |
|------------------------------------|---|
| Size | |
| GC: | 54 cm (21 in.) wide x 67 cm (26 in.) high x 72 cm (28 in.) deep |
| Autosampler: | 13 cm (5 in.) wide x 36 cm (14 in.) high x 24 cm (9.5 in.) deep |
| Weight | |
| GC: | 49 kg (108 lb) |
| Autosampler: | 4.5 kg (10 lb) |
| Physical Configuration: | Single unit for use on standard laboratory bench. |
| Bench Space: | <p>The laboratory bench should be sturdy enough to support the full weight of the GC as well as additional equipment. Expect the total weight of the GC and accessory equipment to be at least 91 kg (200 lb).</p> <p>Allow a minimum clearance of 10.2 cm (4 in.) on each side, 15.2 cm (6 in.) at the rear of the GC, and 137.2 cm (54 in.) at the top of the GC. If this is not possible, install the GC on a bench that has wheels.</p> |
| Peripherals, Printers, etc. | Allow at least 61 cm (24 in.) on either side of the GC to accommodate additional equipment. |

Environmental Requirements:

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| Pollution Degree: | This instrument will operate safely in environments that contain nonconductive foreign matter up to Pollution Degree 2 as defined in EN/IEC 61010-1. |
| Laboratory Environment: | <p>Install the GC in an indoor laboratory environment that is clean and is free of drafts, direct sunlight and vibration.</p> <p>The laboratory should be free of flammable, explosive, toxic, caustic, or corrosive vapors or gases and should be relatively free of dust.</p> <p>The ambient laboratory temperature should be between 10 °C and 35 °C (50 °F and 95 °F) with a relative humidity between 20% and 80% with no condensation. The GC will operate safely between 5 °C and 40 °C (41 °F and 104 °F).</p> |

Electrical Power Requirements:

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| Power Consumption: 2400 VA (volt-amps) for the GC. |
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| Power Specification: | <p>All electrical supplies must be smooth, clean, and free of line transients greater than 40 V peak to peak and must meet and remain within the following tolerances:</p> <p>120 VAC ±10% @ 50/60 Hz ±1% 230 VAC ±10% @ 50/60 Hz ±1%</p> <p>Instruments and peripherals should not be connected to circuits with large inductive or large and frequent loads (i.e., large motors, discharge lamps, photocopy systems, radio transmitters, etc.).</p> |
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|-----------------------|---|
| Power Outlets: | A minimum of one dedicated 120 VAC outlet at 20 A or one 230 VAC outlet at 10 A (minimum) is required for the GC. |
|-----------------------|---|

Safety Requirements:

| | |
|--|---|
| Gas Cylinders and Gas Delivery Lines: | All gas cylinders should be firmly clamped to a suitable surface. Care must be taken not to kink or overstress the gas delivery lines. |
| Hydrogen: | Ensure that all hydrogen lines and connections are leak-free. When using a hydrogen tank, install an in-line hydrogen snubber (P/N 0009-0038) between the tank regulator and the delivery tubing. |
| Ventilation: | Always provide adequate ventilation. When analyzing hazardous compounds, such as pesticides, it may be necessary to arrange for venting the detector effluent into a fume hood. |

Gas Requirements:

All gases must have a minimum purity of 99.995%. Gases used with the mass spectrometer require a minimum purity of 99.999%. Gas cylinders should be located outside of the laboratory whenever possible and should always be stored and operated in the vertical position. Always use copper tubing that is free of grease, oil, and organic material for all gases delivered to the Clarus 400 GC.

| | |
|---|---|
| <p>Helium, Nitrogen, 8.5% H₂/91.5% Helium 95% Argon/5% Methane:</p> | <p>A number 1A (200 ft³) gas cylinder should be used for all carrier gases. Filter all gases (except methane) through a moisture filter and/or hydrocarbon trap and de-oxo filter. Argon/methane should be filtered through a moisture filter and a de-oxo filter. Gas delivery pressure to the GC should be 60 – 90 psig (414-621 kPa or 4.1 to 6.2 bar).</p> |
| <p>Air:</p> | <p>A number 1A (200 ft³) gas cylinder of compressed air or an air compressor can be used. All air should be filtered through a moisture filter. Do NOT use "Breathing Air." When using manual pneumatics, gas delivery pressure to the GC must not exceed 30 psi (207 kPa). If this is not possible, secondary regulation will be required.</p> |
| <p>Hydrogen:</p> | <p>A number 2 (62 ft³) gas cylinder or a hydrogen generator can be used. All hydrogen should be filtered through a moisture filter. When using manual pneumatics, gas delivery pressure to the GC must not exceed 30 psi (207 kPa or 2.1 bar). If this is not possible, secondary regulation will be required. .</p> |

Sample Preparation Requirements

Customer Responsibility

Pre-Installation Checklist

Model: _____ Date: _____

Customer: _____

SPO# _____

| Installation Requirements | OK | Needs Prior to Installation |
|---|-----------|------------------------------------|
| Lab Space Requirements Instrument | | |
| Lab Space Requirements Peripherals | | |
| Environmental Requirements | | |
| Power Requirements | | |
| Safety Requirements | | |
| Gas Requirements | | |
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