



Gas Cell User's Guide

NICOLET™ ANTARIS IGS™

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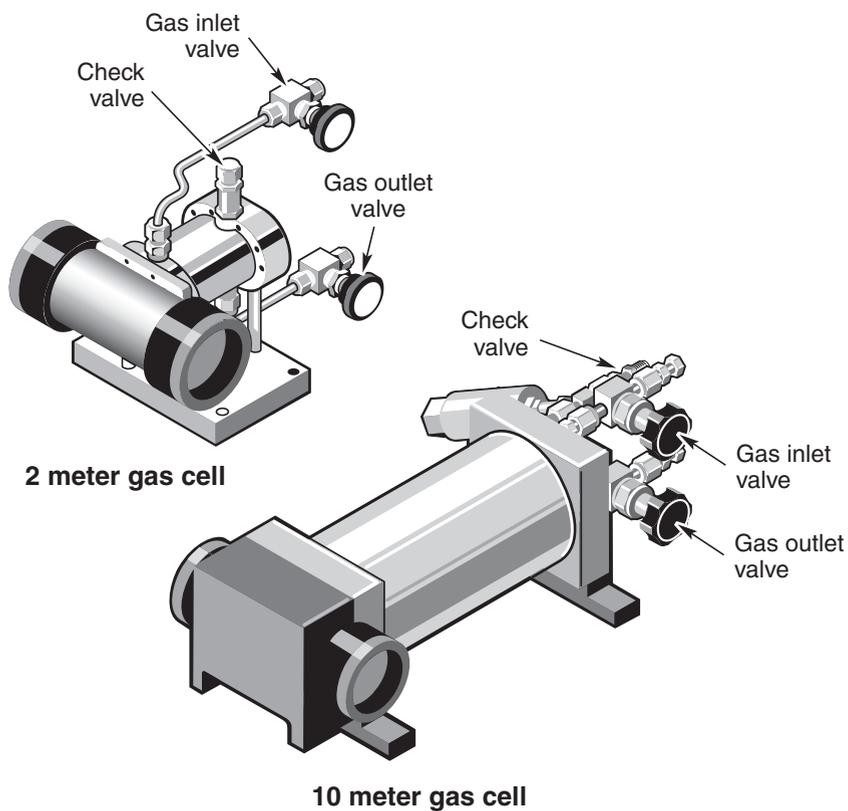
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Introduction

The Thermo Electron 10- and 2-meter fixed-pathlength gas cells for the Nicolet Antaris IGS are general purpose, low-pressure gas cells, designed to be used with a variety of gases and sampling environments. Thermo Electron's exclusive design guarantees repeatable optical performance.



The 10- and 2-meter gas cells fit in the sample beam path of a Nicolet Antaris IGS analyzer. These cells are suitable for use in both ambient and elevated temperature conditions, operating reliably at temperatures up to 185°C (365°F). The gas cells can be fitted with potassium bromide (KBr), barium fluoride (BaF₂) or zinc selenide (ZnSe) sample windows to accommodate a variety of spectral ranges and sampling needs. The gas cell windows can be replaced with optional sample windows. Contact your sales representative for information about optional windows.

The gas cells include two valves (for gas inlet and outlet) and one auto-resetting check valve. Check valve settings depend on gas cell size and the type of windows installed in the gas cell. See the list of specifications at the back of this document for details.

The 10- and 2-meter gas cells and plumbing fixtures are designed and manufactured to comply with ASTM standard G93-03, which means they are suitable for use in oxygen-enriched environments. However, special precautions must be taken for gas analysis applications that involve oxidizing, corrosive, or toxic gases.

 Danger

Use caution when sampling oxidizing, corrosive, or toxic gases with the Antaris IGS. Improper sampling techniques could result in injury or damage to the instrument and gas cell.

Thermo Electron offers gas cell heating option kits that let you operate the cell at elevated temperatures. The kits include a heating jacket and temperature sensor. Temperature controllers, some with an optional pressure sensor, are also available. Use the documentation that ships with your heating kit, temperature controller, and pressure sensor to install and use the kit and any optional accessories.

About this manual

This manual describes how to install and use the Thermo Electron 10- and 2-meter gas cells in a Nicolet Antaris IGS analyzer. It also contains instructions for replacing the gas cell windows and performing gas cell service and maintenance. Read this manual before you attempt to install or use your gas cell. If you have any questions or concerns after reading the manual, contact Thermo Electron Technical Support for assistance. Outside the U.S.A., call your local service office.

Conventions used in this manual

The following conventions are used in this manual to draw your attention to important information.

Note Notes contain helpful supplementary information.

Important Follow instructions labeled “Important” to avoid damaging the system hardware or losing data.

⚠ Caution Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

⚠ Warning Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ Danger Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Questions or concerns

In case of emergency, follow the procedures established by your facility. If you have questions or concerns about safety or need assistance with operation, repairs or replacement parts, use the information below to contact Thermo Electron. Outside the U.S.A., contact the local Thermo Electron sales or service representative.

Phone: 1-800-642-6538 (U.S.A.) or
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Installing the Gas Cell

This manual is not intended as a design handbook for your gas sampling system. Gas sampling systems require careful and specialized design considerations. You must exercise competent engineering judgment when setting up your system. If necessary, obtain the assistance of a qualified professional who can tailor your design to your particular sampling needs. Your gas supplier should be able to offer assistance or refer you to a consultant who can provide the necessary assistance.

The Thermo Electron 10- and 2-meter fixed pathlength gas cells are designed to be installed in the sample beam path of your Nicolet Antaris IGS analyzer. To install the gas cell, you need only a few minutes and a couple of wrenches. The cell's pinned-in-place alignment feature provides a precise pathlength that never requires adjustment. Since the gas cell's transfer optics are prealigned at the Thermo Electron factory, no adjustment is necessary to maintain optimum throughput.

Important Use care unpacking and handling the gas cell. Do not open the transfer optics compartment. Do not touch or bump the mirrors or adjustment screws for the transfer optics on the gas cell. If you do touch or bump the mirrors, you must contact Thermo Electron Technical Support and determine whether you need to have the cell realigned before you can use it. ▲

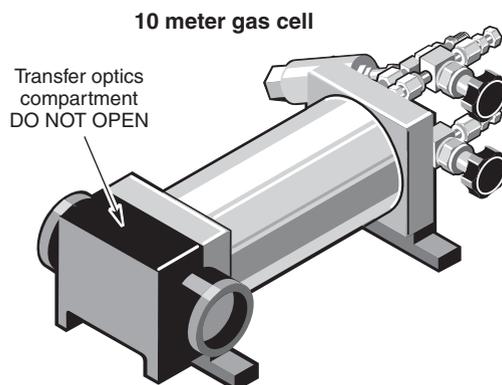
Unpacking the gas cell

The cell is sealed in plastic to protect the windows from being damaged by moisture. Save the packaging and the plastic wrap. You can use them to store your gas cell when you're not using it.

Important Do not remove the gas cell from the plastic bag for at least 24 hours. If you break the seal before the cell has had at least 24 hours to warm to room temperature, moisture from the surrounding air can condense and cause immediate and permanent damage to the cell windows.

Important Use care when unpacking and handling the gas cell. Do not touch or bump the mirrors in the transfer optics compartment.

Important Do not open the transfer optics compartment on the 10-meter gas cell.



If you touch or bump the mirrors for the transfer optics, contact Thermo Electron Technical Support to determine whether you need to have the cell realigned before you can use it. ▲

To unpack the gas cell:

1. Examine the shipping carton for damage.

Report any damage to the shipper.

2. Lift the gas cell out of the carton and do not open the plastic bag.

Leave the gas cell in the sealed plastic bag for at least 24 hours before you install it. This allows the cell to warm slowly to room temperature and prevents condensation from damaging the cell windows.

3. After 24 hours, carefully open and remove the plastic bag from the gas cell.

Installing the gas cell

Your gas cell assembly includes special transfer optics and a baseplate or base brackets that allow you to install it directly in line with the sample beam path compartment of your Nicolet Antaris IGS analyzer.

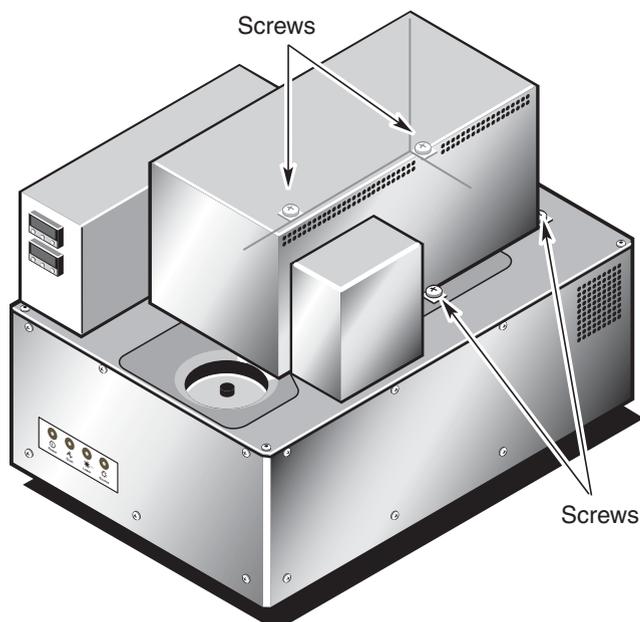
To install the gas cell you need a 5/32-inch hex wrench.

Important

Use care unpacking and handling the gas cell. Do not touch inside the transfer optics compartment. If you touch or bump the mirrors for the transfer optics, you must contact Thermo Electron Technical Support to determine whether you need to have the cell realigned before you can use it. ▲

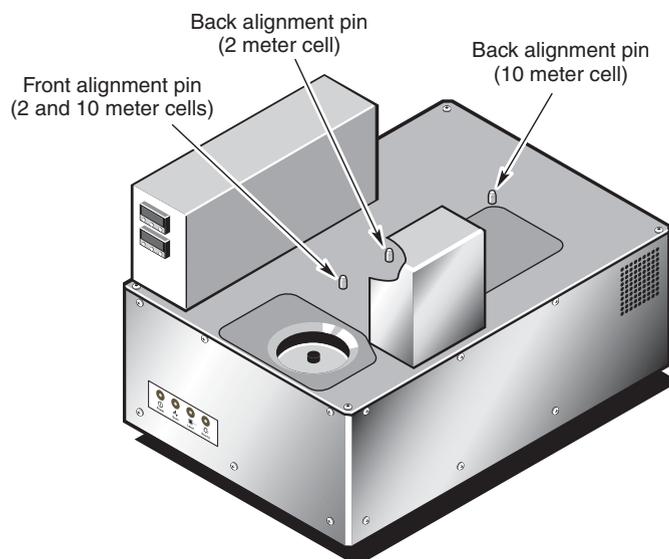
1. Remove the stainless steel gas cell cover.

Use a Phillips screwdriver to loosen the screws holding the stainless steel cover in place.

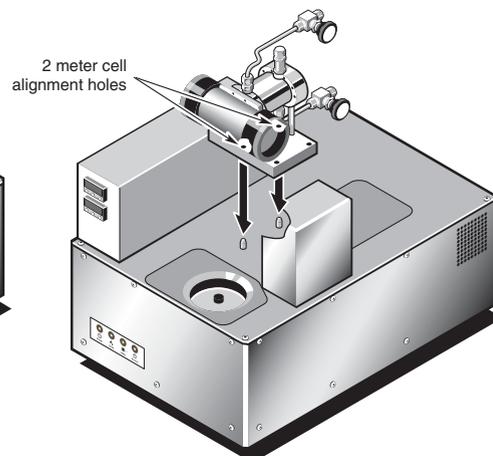
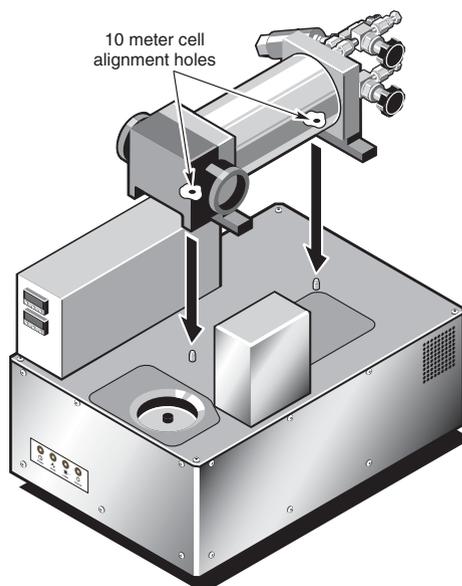


2. Place the gas cell assembly into position in the sample beam path.

Important Make sure the alignment pins on the top of the analyzer are placed in the correct alignment holes on the instrument for the type of cell you are installing. Both sizes use the same front hole. The 2-meter gas cells use the center hole for the back alignment pin, while the 10-meter gas cells use the rear-most hole for the back alignment pin. If the pins are not in the correct holes for your gas cell, move the pins by grasping firmly and pulling up. Place the pins firmly into the correct holes.



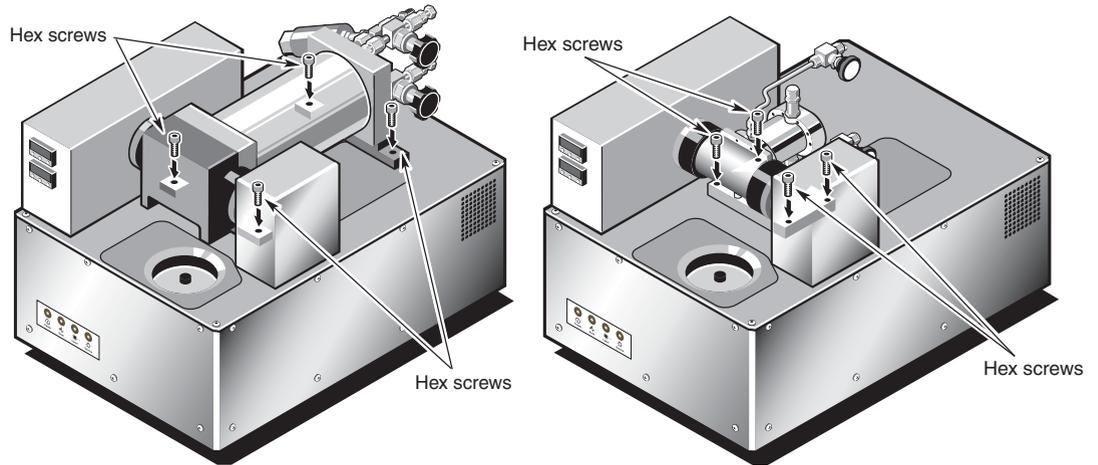
Make sure the holes on the gas cell baseplate are aligned with the alignment pins on the top of the analyzer.



3. Secure the gas cell baseplate or brackets to the top of the analyzer using the hex screws that were included with your gas cell.

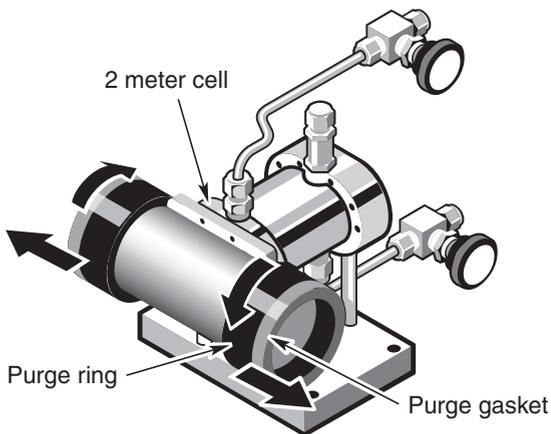
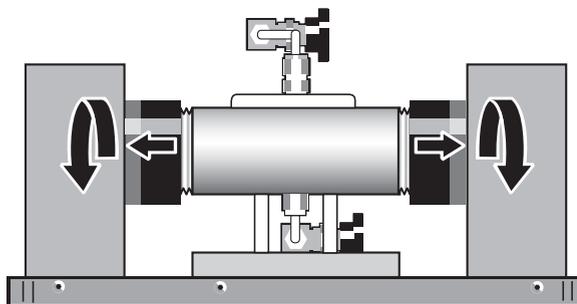
Turn the screws until they are snug; there is no need to over-tighten them.

Be sure to use all four screws to secure the gas cell assembly.



4. **Slowly turn the purge rings until the purge gaskets seal against the walls of the sample beam path compartment.**

Do not over-tighten the purge rings. Once the gasket touches the sample compartment wall, you need only turn the ring another 1/4 turn to seal the gasket.



Plumbing the gas cell

The gas cells include two valves for gas inlet and outlet and one auto-resetting check valve. Follow the instructions below to install the valves on a 10-meter gas cell. Skip this section if you have a 2-meter gas cell. Its inlet/outlet valve and check valve were installed at the factory.

Use plumbing appropriate to your sample gas. If you need assistance, contact a qualified professional from a competent source. Your gas supplier should be able to provide design assistance or direct you to a competent consultant. The liability associated with an improperly designed gas sampling system can far outweigh the cost of professional design assistance.

Note Your gas cell ships with imperial plumbing. Metric conversion adapters are included with the gas cell plumbing in the event that your gas supply plumbing is metric. Each gas cell kit provides two 1/4-inch to 6 mm adaptors.

To install the valves:

- 1. Remove the protective covers from the valve ports on the top of the gas cell.**

Important On the 10-meter gas cell, do not change the location of the adapters. Relocating the adapters voids the leak-tight assurance. If you need to relocate the adapters, contact Thermo Electron Technical Support. ▲

Important Your gas cell was pressure tested with the adapters in place. As shipped from Thermo Electron, the cell has a leak rate of less than 0.1 torr per minute.

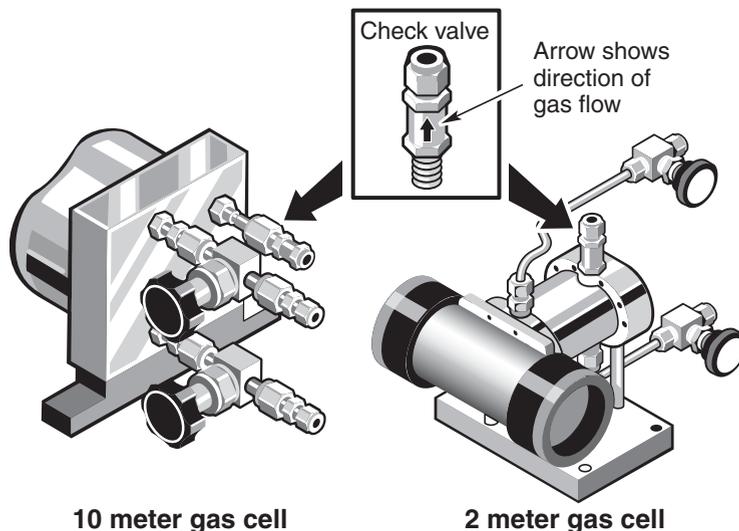
▲ Danger

Avoid explosion hazard. Always install the check valve before using the gas cell. Make sure the check valve is installed with the arrow pointing in the direction of gas flow. In the example shown in the illustration in step 2, the direction of flow is away from the gas cell, toward the vent.

- 2. Remove the check valve from its protective packaging and install it in the female adapter.**

Important

With the VCR® fittings that use a metal washer, use a new sealing washer each time you install a valve. Do not reuse sealing washers or attempt to secure the fitting without a sealing washer. Tightening the fitting without a new sealing washer can damage the fitting and prevent the cell from sealing properly. The parts list provided with your gas cell contains information about obtaining sealing washers. ▲



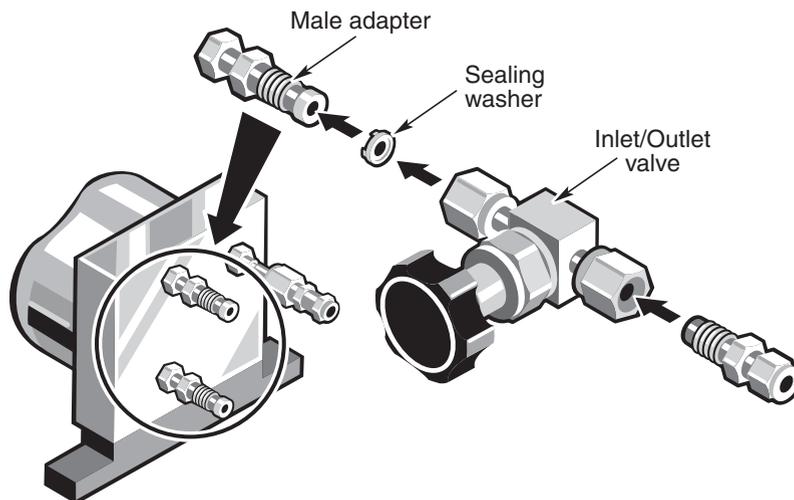
Check valve settings depend on the gas cell size and the type of windows installed in the gas cell. The check valve provided with your gas cell has been factory set at the appropriate auto-reset value for the gas cell configuration you ordered.

Important If you change the gas cell window material you may require a new check valve. The auto-reset value is printed on the check valve. Be sure you use the appropriate auto-reset value for your gas cell and window material.

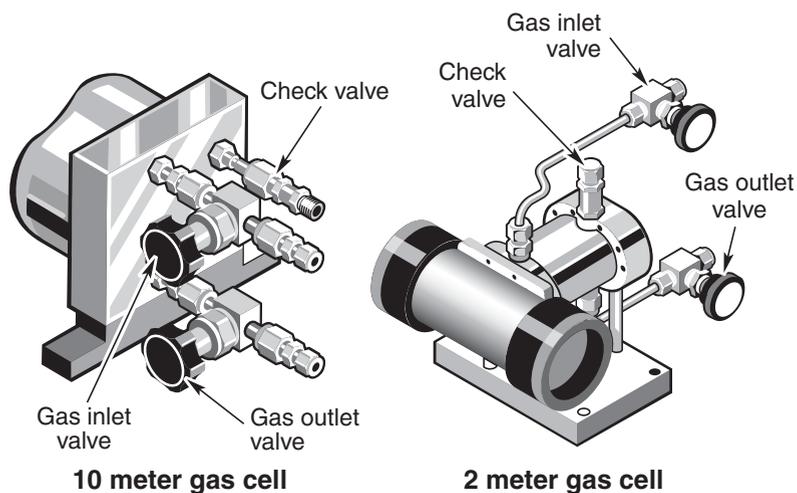
The table below lists the appropriate auto-reset values for different gas cell combinations.

<i>Gas cell size</i>	<i>Window material</i>	<i>Check valve auto-reset value</i>
2 meter	KBr	25
	BaF ₂	25
	ZnSe	25
10 meter	KBr	10
	BaF ₂	25
	ZnSe	25

- 3. Remove the valves from their protective packaging, and install them on the gas cell inlet and outlet connections.**



- 4. Connect the sample gas to the gas inlet valve.**



⚠ Danger

If you are sampling hazardous, noxious, toxic, reactive, or asphyxiant gases, vent the gas outlet and check valve to a fume hood using sample transfer lines. If the sample gas is flammable, you must provide an active venting system that is free of spark and other ignition sources and prevents flammable vapors from collecting in the atmosphere surrounding the analyzer. Contact the agency that regulates environmental safety at your location if you need assistance.

5. Connect the gas outlet valve to an appropriate vent for your sample gas.

6. Connect the check valve to an appropriate vent for your sample gas.

⚠ Danger

Never install a cap or valves that can be closed in the line between the vent and the check valve. The gas cell windows can explode if the gas cell is overpressurized and the check valve malfunctions.

Using a two-zone purge option

The Antaris IGS provides an optional two-zone purge to purge the sample beam path through the gas cell and protect the instrument from gas cell window failure. If your analyzer is equipped with an optional two-zone purge kit, the sample beam path compartment, which includes the gas cell, is isolated from the analyzer compartment by ZnSe windows.

Follow the instructions for installing the two-zone purge option in the *Nicolet Antaris IGS User's Guide* provided with your instrument.

Using the Gas Cell

The Thermo Electron 10- and 2-meter fixed pathlength gas cells for the Nicolet Antaris IGS are general-purpose, low-pressure gas cells, designed to be used with a variety of sample gases and sampling environments.

Compatible samples

The gas cell and gas cell windows are the defining elements for compatibility with various sample materials. The Thermo Electron 10- and 2-meter gas cells are available with three different window materials: KBr (potassium bromide), BaF₂ (barium fluoride) and ZnSe (zinc selenide). Select the most appropriate material based on the requirements of your application. See “Selecting sample windows” in this document for more information.

The 10- and 2-meter gas cells and plumbing fixtures are designed and manufactured to comply with ASTM standard G93-03, which means they are suitable for use in oxygen-enriched environments. Solvents were used to remove organic and particulate material that (when combined with oxidizing, corrosive or toxic gases) could cause injury or damage the cell. Thermo Electron factory technicians confirmed the cleaning with a visual inspection of the cell under a polarized light. Contact Thermo Electron Technical Support if you need more information about the cleaning specification.

Danger

Sample gases may be hazardous, noxious, toxic, reactive, and asphyxiant. Be sure to read and follow the safety information found in the Material Safety Data Sheet or other documentation that accompanied the sample before you plumb the gas inlet line. Use a suitable gas cell and plumbing and vent hazardous, noxious, toxic, reactive, and/or asphyxiant gases using sample transfer lines.

Operating environment

As shipped from the factory, the gas cell carries a leak-tight assurance, with a leak rate of less than 0.1 torr/minute. It will operate reliably under a broad range of sampling conditions:

- Temperatures ranging from 25° to 185°C (77° to 365°F) for the 10-meter cell and from 20° to 185°C (68° to 365°F) for the 2-meter cell.
- Sample gas (absolute) pressures up to 20 psi (1034 torr) for the 10-meter gas cell with KBr windows. All other gas cell window combinations accommodate absolute pressures up to 35 psi (1809 torr).
- Vacuum down to 100 torr (absolute) or greater for the 10-meter gas cell with KBr windows. All other gas cell window combinations can be fully evacuated.
- Humidity ranging from 20% to 80% noncondensing.

Caution

Avoid gas cell failure. Before you attempt pressures close to the maximum, examine your sample windows. Any damage to the cell windows reduces the maximum pressure for safe operation of your cell. The “Installing optional sample windows” section contains complete instructions for removing the windows from the gas cell. Examine the windows carefully for scratches, corrosion or degradation due to exposure to aqueous sample gases or uncontrolled humidity in your laboratory environment. Replace windows that have any sign of damage or degradation.

Heating the gas cell

Thermo Electron offers a gas cell heating option kit that lets you operate the cell at elevated temperatures. The kit includes a heating jacket and temperature sensor. An optional temperature controller, which can be ordered with an optional pressure sensor, is also available. Use the documentation that ships with your heating kit, temperature controller, and pressure gauge to install and use the kit and any optional accessories.

Important Avoid cell failure. The heating option kit may be capable of heating the gas cell to temperatures above 185°C (365°F). Do not heat the gas cell to temperatures above 185°C (365°F). If you damage the endplate seals, you must contact your Thermo Electron service representative to have them replaced before you can safely use the gas cell again.

Important When heating the gas cell, the gas cell must have a positive flow of purge gas (dry air or nitrogen) or sample gas through the cell so that molecules are not burned into the windows, mirrors, and cell walls.

Use the documentation that ships with your heating option to install and use the kit.

Purging the gas cell transfer optics

If your analyzer is equipped with a two-zone purge option, the sample beam path and gas cell transfer optics are sealed and purged for added protection if a gas cell window seal fails during an experiment. This option is recommended for gas analysis applications that involve oxidizing, corrosive, or toxic gases. Purging (forcing dried air or nitrogen through the analyzer to eliminate water vapor and other airborne contaminants) will better protect the system's internal components under those conditions. Purging also minimizes spectral interference from sample components that are present in the atmosphere.

We provide instructions for selecting a purge gas and installing the purge source and connectors in the *Nicolet Antaris IGS Site and Safety Information Guide* included with your system. Instructions on installing and using the two-zone purge option is included in the *Nicolet Antaris IGS User's Guide* (see "Installing the two-zone purge option" in "Section 4 System Maintenance and Service"). For information about setting purge pressure and flow, see "Chapter 3 Getting Started" in your *Nicolet Antaris IGS User's Guide*.

Flushing the cell between samples

It is important to flush the cell between samples of corrosive gases and before taking background measurements. Nitrogen or helium may be used to flush the cell between samples. See the *Nicolet Antaris IGS User's Guide* for instructions.

Maintaining and Servicing the Gas Cell

This section describes the gas cell maintenance and service that can be performed by the customer.

Removing the gas cell from the instrument

The gas cell is designed to be installed on the instrument and should only be removed for maintenance and servicing. The gas cell should be reinstalled on the instrument immediately following maintenance or service procedures.

If the gas cell must be stored away from the instrument, follow the instructions in “Storing the gas cell” to ensure that the windows and transfer optics are not damaged during storage.

Caution

If your gas cell has an optional heater installed, allow the gas cell to cool to ambient temperature and pressure before attempting to service it. Failure to allow the gas cell to cool and depressurize completely could result in severe injury.

Important

Oils from your fingerprints will absorb infrared energy. To preserve the integrity of your data, be sure to wear latex gloves and handle the windows by the edges only. Do not touch the optical surface of the windows. ▲

To remove the gas cell from the instrument:

1. Disconnect the power supply to the instrument.

See the *Antaris IGS User's Guide* for complete instructions.

2. Remove the stainless steel gas cell cover.

Loosen the four screws that secure the gas cell cover to the instrument. Lift the cover off the instrument.

3. Loosen the gas cell gaskets.

Slowly unscrew the gaskets away from the sample beam compartments.

4. Use a 5/32-inch hex wrench to remove the screws securing the gas cell to the analyzer.

Save the screws to reinstall the gas cell when finished.

5. Lift the gas cell base plate or brackets off the alignment pins.

If the gas cell has an optional heater installed, remove the insulator from the gas cell. See the documentation included with the heater assembly for complete instructions.

Checking gas cell windows

Your Thermo Electron gas cell was provided with factory-installed windows. If the windows become scratched, broken, or fogged, you may need to replace them. If your sampling requirements or environmental conditions change, you may require gas cell windows of a different material.

If you experience low throughput, check the condition of the gas cell windows. Dirty or corroded windows can reduce throughput.

To check the gas cell windows, follow the replacement instructions to access the gas cell windows for visual inspection. If the windows are cracked or broken, replace them.

Replacing gas cell windows

The sample windows transmit infrared light while maintaining a high quality seal on the gas cell. Three sample window materials are available from Thermo Electron: the standard potassium bromide (KBr), barium fluoride (BaF₂) and anti-reflection-coated zinc selenide (ZnSe).

In general, gas cell windows are replaced for one of the following reasons:

- To change the window material, if specific requirements call for a different window material.
- To replace damaged windows. If the gas cell windows are damaged in some way, replacement is required for safe operation and meaningful results.

Selecting sample windows

Many factors determine the best window material for your gas cell. Chemical resistance and spectral range are two of the factors to consider. KBr windows are more susceptible to water vapor damage than are BaF₂ windows, and ZnSe windows are impervious to water. If you analyze samples with a high degree of moisture, ZnSe windows are probably best suited for your system. You may also want to obtain ZnSe windows if you have difficulty controlling the humidity in your laboratory and are not purging the cell and transfer optics compartment with a dry purge gas. However, ZnSe windows are not recommended for corrosive conditions.

See the “Specifications” section at the end of this document for information on the spectral ranges of the different window materials.

Installing sample windows

Each sample window is located in a window chamber inside the gas cell cylinder. To install windows, you need clean latex gloves, a 5/32-inch hex wrench if you have a 10-meter cell or a 9/64-inch hex wrench if you have a 2-meter cell, and a Phillips screwdriver.

Warning

If your gas cell has an optional heater installed, allow the gas cell to cool to ambient temperature and pressure before attempting to service it. Failure to allow the gas cell to cool and depressurize completely could result in severe injury.

Important

Oils from your fingerprints will absorb infrared energy. To preserve the integrity of your data, be sure to wear latex gloves and handle the windows by the edges only. Do not touch the optical surface of the windows. ▲

Important

Your gas cell was specially cleaned during assembly. Changing the sample windows voids your special cleaning assurance. If you need to replace the sample windows and want to maintain the cleaning assurance, you must return the gas cell to Thermo Electron for window replacement. ▲

Important

Your gas cell was leak tested with the window chambers installed and has a leak rate of less than 0.1 torr per minute. Changing the sample windows voids your leak-tight assurance. ▲

To install optional windows:

- 1. Disconnect the sample gas from the gas cell and allow the cell to reach ambient temperature and pressure.**

Important

Use care when removing the gas cell. If you touch or bump the transfer optics mirrors or adjustment screws when removing the gas cell, contact Thermo Electron Technical Support to determine whether you must have the cell realigned before you can use the cell again. ▲

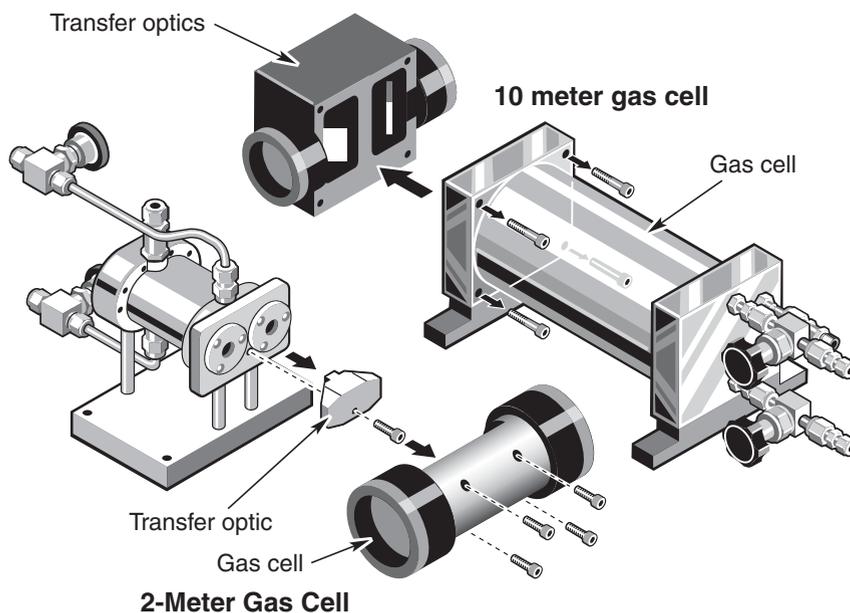
2. Remove the gas cell from the transfer optics.

On a 10-meter gas cell, use a 5/32-inch hex wrench to remove the four screws and locking washers that secure the gas cell to the transfer optics. Save the screws; you will need them to reassemble the gas cell. Lift the gas cell off the transfer optics and lay the cell on its side.

On a 2-meter gas cell, use a 9/64-inch hex wrench to remove the four screws from the purge tube and the screw from the transfer optics. Be careful not to touch the two mirror surfaces that reflect light into and out of the gas cell.

Important Be careful not to touch the two mirror surfaces of the transfer optics of the 2-meter gas cell. ▲

See the following illustration for the locations of the parts.

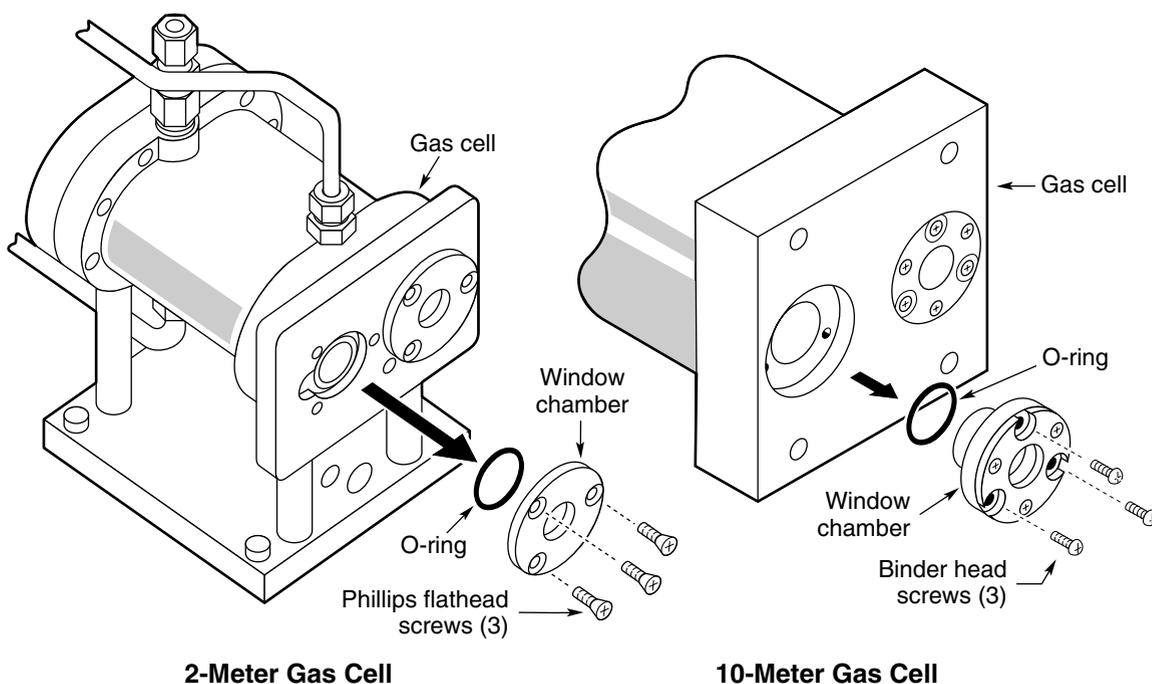


Important Be sure that the cell has reached ambient temperature and pressure before you remove the window chamber. If you attempt to remove the window chamber while the cell is not at room temperature and pressure, you may damage the gas cell. ▲

3. Remove one of the window chambers from the gas cell.

Remove the screws that secure the first window chamber to the gas cell. Save the screws; you will need them to reassemble the gas cell.

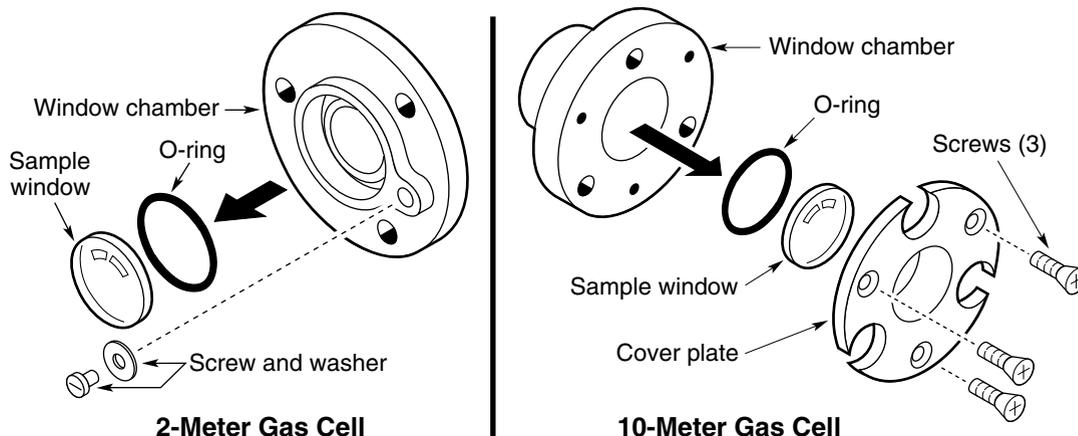
Lift the window chamber out of the gas cell. If necessary, use a small flat-blade screwdriver and carefully pry between the window chamber and the gas cell to break the seal. Discard the old O-ring that is seated in the retaining groove on the window chamber. Use a new O-ring to reassemble the gas cell.



4. Remove the cover plate from the window chamber.

On a 10-meter gas cell, use a Phillips screwdriver to remove the screws that secure the cover plate to the window chamber as shown in the following illustration. Save the screws; you will need them to reassemble the gas cell. Gently pull the cover plate off the chamber housing. Be careful not to lose the O-ring that is seated in the retaining groove on the end of the cover plate. You will need the O-ring to reassemble the gas cell.

On a 2-meter gas cell, remove the screw and washer from the window chamber using a flat-blade screwdriver as shown in the following illustration.



Important Oils from your fingerprints will absorb infrared energy. To preserve the integrity of your data, be sure to wear latex gloves and handle the sample windows by the edges only. Do not touch the optical surface of the windows.

5. Remove the sample window from the chamber.

The sample window sits on top of an O-ring inside the chamber housing. Discard the old O-ring; use a new O-ring to reassemble the window chamber.

If you have difficulty removing the window from the chamber housing, turn the window chamber upside-down and gently tap it on a clean, padded table top or against your gloved hand. This should dislodge the window. Store the window in protective packaging.

Important Use care removing the sample window from the chamber. Make sure that the window does not fall out unprotected. Use clean, soft toweling on a table top or your gloved hand to protect the window from damage.

6. Install the new sample window.

Inspect the new O-rings to be sure that they are free of loose particles.

Seat the bottom O-ring in the window chamber.

Place the new sample window on top of the O-ring.

On a 10-meter gas cell, seat the top O-ring in the retaining groove on the cover plate. Replace the cover plate. Secure the cover plate with the flat-top Phillips-head screws and locking washers you removed earlier. Tighten all three screws one turn at a time to compress the O-rings evenly.

On a 2-meter gas cell, replace the screw and washer.

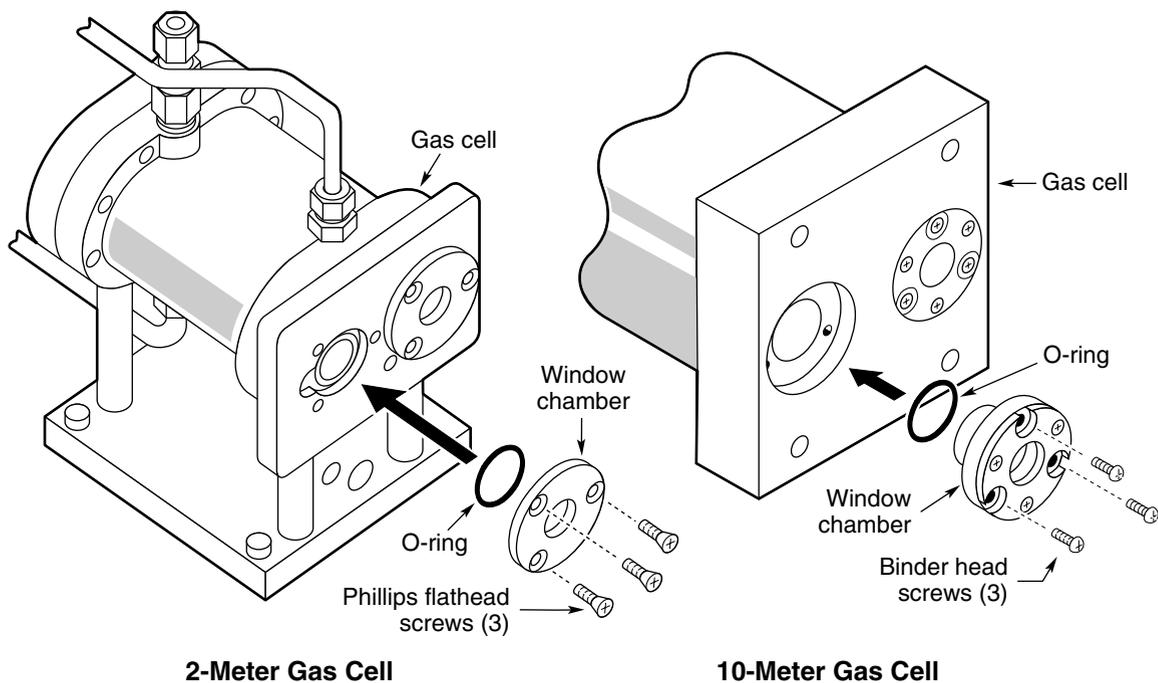
7. Reinstall the window chamber in the gas cell.

Make sure that the O-ring on the window chamber is properly seated in the retaining groove.

Slide the window chamber into the gas cell.

Secure the chamber with three of the binder-head screws you removed earlier. Tighten all three screws one turn at a time to evenly compress the O-ring.

If you installed a new sample window in the second window chamber, go to step 9.



- 8. Remove the second window chamber from the gas cell cylinder and install the new sample window.**

Repeat steps 3 through 7.

- 9. If your system is plumbed with a vacuum pump, test the gas cell to see if it holds a vacuum.**

If the cell fails to hold a vacuum, most likely the O-rings are not seated properly or were not compressed evenly. Try reseating all of the O-rings.

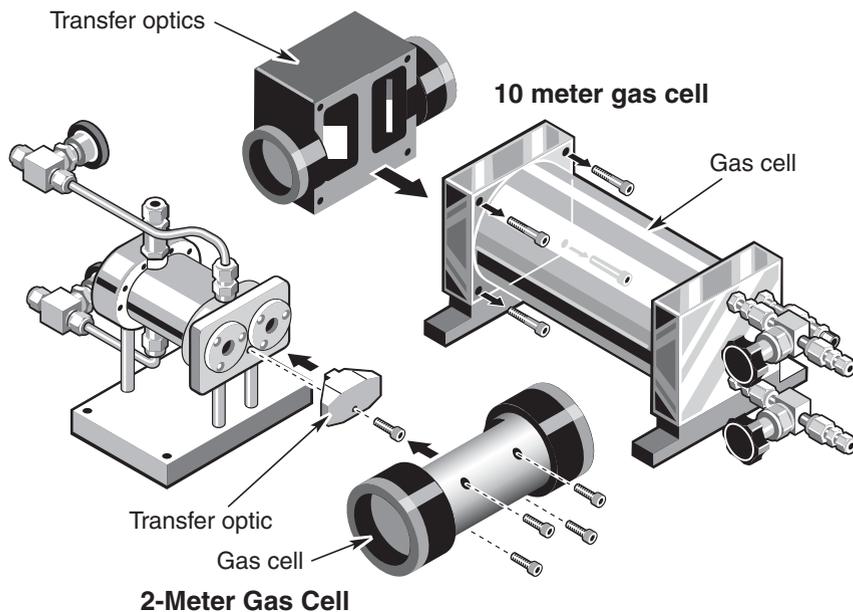
If the cell still fails to hold a vacuum, contact your service representative. The O-rings may have been damaged during installation and may need to be replaced.

- 10. Reinstall the gas cell cylinder on the transfer optics.**

On a 10-meter gas cell, use a 5/32-inch hex wrench to secure the cell with the four locking washers and screws you removed earlier.

On a 2-meter gas cell, use a 9/64-inch hex wrench to secure the transfer optics and purge tube with the five screws you removed earlier. The transfer optics screw is slightly longer than the other four screws.

Important Be careful not to touch the mirror surfaces of the gas cell transfer optics. ▲



Replacing gas cell gaskets

The gaskets on the gas cell are designed to fit tightly against the sample beam path compartment. If the gaskets no longer fit tightly or if the gasket material is corroded, damaged or uneven, the gaskets should be replaced.

To replace gaskets:

- 1. Disconnect the sample gas from the gas cell and allow the cell to reach ambient temperature and pressure.**

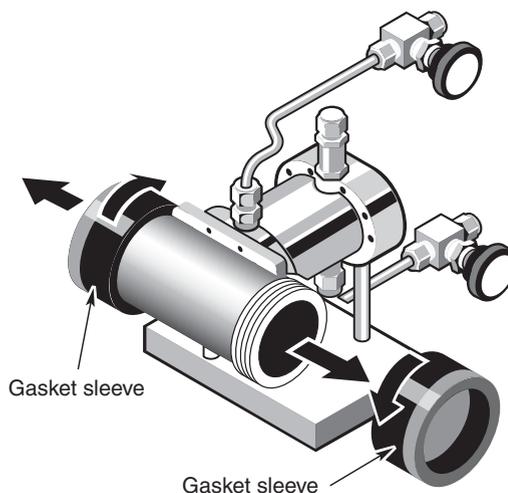
Important

Use care when removing the gas cell. If you touch or bump the transfer optics mirrors or adjustment screws when removing the gas cell, you must contact Thermo Electron Technical Support to have the cell realigned before you can use the cell again. ▲

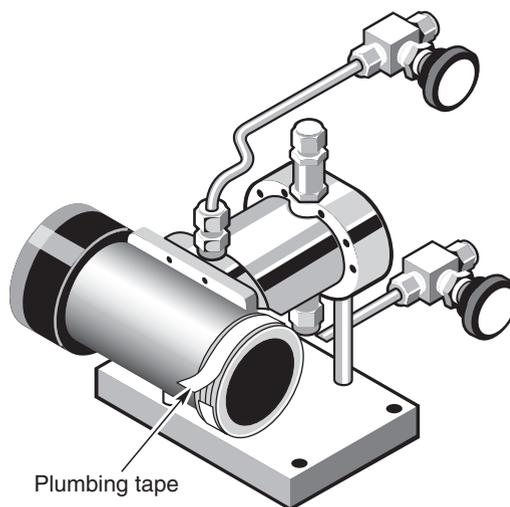
- 2. Remove the gas cell from the instrument.**

See “Removing the gas cell” for instructions.

- 3. Unscrew the old gasket sleeve from the gas cell.**



- 4. Place plumbing tape around the gas cell threads.**



- 5. Screw the new gasket sleeves onto the gas cell.**

- 6. Replace the gas cell on the instrument.**

See “Installing the gas cell” for instructions.

Aligning gas cell optics

If your gas cell optics become misaligned, your gas cell must be realigned by Thermo Electron. Contact Thermo Electron Technical Service for additional information. Possible indications of misalignment include low throughput, peak shifting, or quantification errors.

Flushing the gas cell sample compartment

Whenever you are not actually analyzing a sample gas, you should flush the cell with nitrogen or helium. This protects the cell windows from damage due to humidity or trace contaminants. It is also important to flush the cell between samples of corrosive gases and before taking background measurements. Nitrogen or helium may be used to flush the cell between samples. See the *Nicolet Antaris IGS User's Guide* for instructions.

Cleaning the gas cell

Impurities in your spectra may indicate that your gas cell needs cleaning. Your gas cell must be returned to Thermo Electron for cleaning. Contact Thermo Electron Technical Support for additional information and specific instructions.

Storing the gas cell

If possible, the gas cell should be stored installed on the instrument. This provides the best protection against damage by moisture or excess movement.

Before storing the gas cell, evacuate the cell and clear and close all valves.

If the gas cell must be stored away from the instrument, it must be sealed in plastic to protect the windows from being damaged by moisture. The original shipping material, packaging and plastic wrap should be used to store the gas cell.

Important

Use care when packing and handling the gas cell. Do not touch or bump the mirrors in the transfer optics compartment.

For additional information about storing the gas cell or to obtain replacement shipping and packaging material, contact your local Thermo Electron representative.

Gas Cell Specifications

<i>Item</i>	<i>Description</i>
Construction	Nickel-coated aluminum
Mirrors	Gold-coated
Sample windows	For 10-meter cell: 25 mm by 4 mm KBr 25 mm by 4 mm ZnSe 25 mm by 4 mm BaF ₂ For 2-meter cell: 19 mm by 3 mm KBr 19 mm by 3 mm ZnSe 19 mm by 3 mm BaF ₂
Spectral range	KBr window: 10,000 to 400 cm ⁻¹ BaF ₂ window: 10,000 to 750 cm ⁻¹ ZnSe window: 10,000 to 550 cm ⁻¹
Connectors	1/4-inch VCO [®]
Valves	Nupro [®] , H series bellows sealed valve
Seals	Viton [®]
Volume	10-meter cell: 2.0 L 2-meter cell: 200 mL
Pressure relief	10 psi pressure differential self-seating check valve for 10-meter cell with KBr windows 25 psi pressure differential self-seating check valve for all other gas cell/window combinations
Maximum pressure for gas sampling	20 psi (1034 torr) absolute pressure for 10-meter cell with KBr windows 35 psi (1809 torr) absolute pressure for all other gas cell/window combinations
Maximum vacuum	100 torr for 10-meter cell with KBr windows All other gas cell/window combinations can be fully evacuated
Vacuum leak rate	Less than 0.1 torr per minute
Maximum flow rate	50 liters per minute

<i>Item</i>	<i>Description</i>
Operating temperature	10-meter cell: 25° to 185°C (77° to 365°F) 2-meter cell: 20° to 185°C (68° to 365°F)
Cleaning	Solvent removal of organic and particulate matter. Confirmation with visual inspection under polarized light.
Thermo Electron instruments	Antaris® IGS. Contact your Thermo Electron representative for use with other systems.

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