

AUTOCHEM[®] HP 2950

AUTOMATED HIGH PRESSURE CATALYST CHARACTERIZATION SYSTEM



PRE-INSTALLATION INSTRUCTIONS AND CHECKLIST

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ABOUT THIS MANUAL

The following icons may be found in this manual:



NOTE - Notes contain important information applicable to the topic.



CAUTION - Cautions contain information to help prevent actions that may damage the analyzer or components.



WARNING - Warnings contain information to help prevent actions that may cause personal injury.

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PRE-INSTALLATION DOCUMENT OVERVIEW



If a Micromeritics Service Technician performs this installation, additional charges apply. Please see [Contact Us on page i](#) for information on how to contact Micromeritics.

This document describes how to prepare a site for installation of the AutoChem HP 2950. When the enclosed procedures have been completed, signed, and dated, return the document to Micromeritics as outlined in [Commitment Statement and Signature on page 16](#).

The document is organized into two sections:

- **Section 1 - Pre-installation Instructions.** Contains information to help analyze the site and answer the questions in the checklist contained in Section 2 of this document.
- **Section 2 - Pre-installation Checklist.** Contains questions and a checklist about analyzer location and the laboratory environment, equipment, and supplies.

SECTION 1 - PRE-INSTALLATION INSTRUCTIONS

UNPACKING AND INSPECTION

When the equipment is received, unpack and inspect the contents of the shipping container(s). Use the packing list to verify that all products, accessories, software (if applicable), and documentation are received intact and in the correct quantity. The shipping containers(s) and contents should be inspected within a few days of receipt in the event damage or loss has occurred. Sort through all packing material before declaring missing equipment or parts.



Micromeritics recommends saving all shipping containers until installation of the analyzer is complete. If space is available, it is recommended that all shipping containers be saved and stored for future use in the event of return to factory for repair. All shipping containers where equipment is to be declared as damaged or lost must be examined by the claims investigator prior to completion of the inspection report.

SHIPPING DAMAGE

If equipment is damaged or lost in transit, you are required to make note of the damage or loss on the freight bill. The freight carrier, not Micromeritics, is responsible for all damage or loss occurring during shipment. If damage or loss of equipment is discovered during shipment, report the condition to the carrier immediately. Insurance claims **MUST** be made with the freight carrier, **NOT** Micromeritics.

- Keep all software, manuals, and accessories with the equipment.
- Report any shipping damage immediately to the carrier and follow their directions.
- Report missing or wrong parts to Micromeritics, in addition to any shipping damage, only after filing a claim with the carrier.
- **Micromeritics will NOT file a claim for shipping damage.**
- **Do not discard shipping boxes and containers until installation is complete. If space is available, it is recommended that shipping containers be saved for future use in the event of return to factory for repair.**

ANALYZER SPACE

An unobstructed lab work space that will accommodate the following specifications is needed:



- **Physical**

Height	62 cm (24.5 in.)
Width	66 cm (26 in.)
Depth	58 cm (22.75 in.)
Weight	60 kg (130 lbs.)

- **Computer and Printer**

Width	96.5 cm (38 in.) Approx
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- **Gas Supply**

1 square ft (0.1 square m) for each gas cylinder needed for installation.

INSTALLATION CONFIGURATION

Standard installation requires the use of 1/8 in. copper or stainless steel gas supply lines, located in the instrument accessories kit.

A nonstandard installation will be created if another gas supply line is used or if the gas cylinders cannot be placed within 6 ft (2 m) of the analyzer. There may be additional costs associated with a nonstandard installation. Please contact the Micromeritics Service Department at 1-770- 662-3666 to discuss a nonstandard installation.

COMPUTER SYSTEM

We recommend that the computer be purchased from Micromeritics. Micromeritics thoroughly tests operating systems with the Micromeritics applications and offer technical support and maintenance for the computers we provide. For analyzers not installed by Micromeritics, please note:



- The labor and expense costs associated with delays traceable to a computer system not purchased from Micromeritics are not part of a standard installation.
- Micromeritics is not responsible for providing assistance for the connection to a company network or LIMS.
- During installation, Administrator rights will be required to make changes to the Ethernet settings. If access cannot be granted to the Service Technician, an IT representative must be readily available to make these changes or additional charges may apply.

The computer system to be used with the analyzer must meet the following minimum requirements:

- **Operating System.** Windows 7 Professional or higher operating system is recommended for the best user experience.
- **Desktop Installation Required.** The application should not be installed on a network drive with shared access. Multiple users cannot operate the application at the same time.
- **10 Base T or 100 Base T Ethernet Port.** If the computer is to be connected to a network, two Ethernet ports are required. If more than one Ethernet based unit is connected to the same computer, an Ethernet switch will also be required.
- **Read / Write Permissions.** All users of the application will need Read/Write permission to all directories and subdirectories where the application is installed.
- **Drives.** CD-ROM drive and USB port.

ENVIRONMENTAL FACTORS

POWER

The AutoChem is designed to operate with a universal input power supply (85 to 265 VAC) at 50 or 60 Hz. Noise-free power of the correct voltage and frequency, with a safety earth ground, should be available through a standard wall receptacle. The power outlet should be able to supply 15 amps @ 100 or 115 VAC \pm 10% or 7.5 amps @ 230 VAC \pm 10%. These requirements can be checked by using a circuit analyzer (available at most hardware or electronic supply houses) or a multimeter. There should also be sufficient outlets for the computer, monitor, and printer and any other peripheral devices.



The analyzer and peripheral devices **must** be installed on their own dedicated power line. Other devices — such as motors, generators, or ovens — **should not** be placed on the same power line.

TEMPERATURE AND HUMIDITY

Temperature and humidity must be controlled to within:

- **Temperature:** 15 to 35 °C (59 to 95 °F) operating; 0 to 50 °C (32 to 122 °F) nonoperating
- **Humidity:** 20 to 80% relative, non-condensing

Do Not:

- Allow room temperature or humidity to exceed limits.
- Install the analyzer where it is exposed to direct sunlight.
- Locate the analyzer near air conditioning or heating vents.

HAZARDS AND PRECAUTIONS

Inform Micromeritics of any on-site conditions that may present hazards to Micromeritics employees or equipment. Advise Micromeritics of any precautions that need to be taken.

SAFETY MEASURES

Inform Micromeritics of any safety equipment, requirements, or procedures necessary for Micromeritics employees to enter and install the system at your facility.

GAS SUPPLY

GAS CYLINDERS AND GAS SUPPLY LINES

See [Gas for Analyzer Test on page 9](#) for the analytical gases needed during installation. Gas cylinders must be placed within 6 ft (2 m) of the analyzer inlet valves.

- The customer is required to ensure the purity of gases.
- It is required that the 1/8 in. × 6 ft (2 m) single piece copper gas line in the analyzer accessories kit is used. Stainless steel gas lines are available from Micromeritics for use with gases that are not compatible with copper.



Gas supply lines made of materials other than copper or stainless steel may cause operational problems.

- **Do not** use gas cylinders with less than 500 psig (3549 kPag) pressure.
- **Do not** use any other gas lines to connect the gas supply to the analyzer except those supplied in the accessories kit. Use of other gas lines will result in a nonstandard installation. See [Installation Configuration on page 3](#).
- **Do not** use gas purifiers; they can cause operational problems. Oxygen traps are preferred.

GAS SUPPLY HARDWARE

Micromeritics recommends the gas regulators to be used with the analyzer be purchased from Micromeritics. The regulators Micromeritics provides have been carefully evaluated and tested to provide superior performance.



If purchased from a source other than Micromeritics, please keep in mind that many commercially available gas regulators lack key features which are required for gas adsorption measurements. These vital criteria must be met:

- **Cleanliness.** Clean regulators designed specifically for high-vacuum service are required. Other regulators often contain elastomeric material or oils which can contaminate the gas.
- **High stability.** Excess pressure at the gas inlet ports to the analyzer can interfere with accurate gas dosing and flow rates. The combined change in the outlet pressure from the gas regulator, as the gas cylinder pressure decreases or as the flow rate stops, should not change more than 5 psig (34.4 kPag) from the selected setting. When the analyzer is idle for an extended period of time, such as 8 to 10 hours, this same stability of gas delivery pressures should be achieved.
- **Range of Pressure.** For high pressure experiments, the regulator output must be able to operate from 0 to 1000 psig (6890 kpag). For low pressure experiments, the regulator must operate from 0 to 30 psig (207 kpag).
- **Suitable sub-assemblies.** The regulator must have a shutoff or outlet isolation valve compatible with 1/8 in. or 1/4 in. Swagelok[®] compression fittings.

REGULATOR EXPANSION KITS

It is sometimes beneficial to attach more than one analyzer, and/or accessory device, or different inlet ports to a single gas supply. Any time this is done, it is critically important that there be a means of isolating, or shutting-off, each device attached to the gas supply regulator. Micromeritics recommends the use of a vacuum rated shutoff/isolation valve for this purpose.

This shutoff/isolation valve is required in order to prevent problems when changing gas cylinders or servicing any of the devices attached to the gas supply.

If the need to attach more than one inlet or one analyzer and/or accessory device is anticipated, one or more of the following regulator expansion kits must be acquired:

- **004-33601-00** – Regulator Expansion Kit (2 outlet, 1000 psi maximum). This kit contains one T fitting, two vacuum rated shutoff valves, and other necessary hardware. This expansion kit allows gas to be provided to two inlets.
- **004-33601-01** – Regulator Expansion Kit (3 outlet, 1000 psi maximum). This kit contains one cross fitting, three vacuum rated shutoff valves, and other necessary hardware. This expansion kit allows gas to be provided to three inlets.
- **004/33601/02** - Regulator Expansion Kit (3 outlet, 3500 psi maximum). This kit contains one cross fitting, three vacuum rated shut-off valves, and other necessary hardware. This expansion kit allows gas to be provided to three inlets.

LABORATORY EQUIPMENT AND SUPPLIES

LIQUID NITROGEN

Ensure liquid nitrogen is available in sufficient quantities. A minimum of 10 liters is required for starting a TPR analysis.

- For installation, there **must** be an adequate supply of liquid nitrogen.
- **Do not** use liquid nitrogen that is either blue (a sign of oxygen contamination) or not clear.

ANALYSIS EQUIPMENT AND SUPPLIES

Since the analysis results are expressed in units of surface area per gram of sample, the true mass of the sample must be known. This requires an analytical balance with the capability of 100 grams measurement and 1 mg readability.

In order to obtain accurate analysis results, the sample tubes must be clean. The following items are suggested for cleaning sample tubes:

- Alconox[®] or similar laboratory detergent
- Brush
- Drying oven
- Isopropyl alcohol
- Sink
- Small plastic tub for detergent solution

HIGH PURITY HOUSE COMPRESSED AIR

A supply of dry, clean, oil free house/compressed air or nitrogen should be available for the KwikCool or KwikCool Vortex. The air pressure should be well regulated at pressures of approximately 20 psig at the outlet for the KwikCool and approximately 100 psig at the outlet for the KwikCool Vortex.

GAS FOR ANALYZER TEST

To verify proper operation and to train users, Micromeritics representatives will analyze the reference material provided in the analyzer accessories.

The following gases are required in order to analyze the reference materials. If these gases are not available, Micromeritics representatives will only be able to perform a limited number of analyzer tests during installation and operator training.



All gases require the indicated purity.

Analyzer Test	Analysis Type	Required Gases	Regulator Fitting	Required Purity
Carrier gas	N/A	Helium	(CGA 580)	99.999%
Instrument tests	N/A	Argon Nitrogen	(CGA 580)	99.999%
Reference Material (either pulse chemisorption or TPR analysis is required)	Pulse chemisorption (preferred method)	10% H ₂ in Argon 10% CO in Helium	(CGA 350)	99.999%
	TPR	10% H ₂ in Argon		
Reference Material (optional)	TPO	10% O ₂ in Helium	(CGA 540)	99.999%
Reference Material (optional)	Single Point BET Surface Area	30% N ₂ in Helium	(CGA 580)	99.999%

Any additional gases that may be used after the installation is complete can be connected by the Micromeritics representative.

APPLICATION RELATED ISSUES

To ensure a thorough installation, it will be helpful for Micromeritics to know which types of samples will be tested. If known, list them in [Application Related Issues Checklist on page 15](#).

Please advise us if your samples require any pretreatment. If required, do you have the proper equipment, such as a vacuum oven or furnace to pretreat your samples?

Micromeritics offers application assistance through our materials analysis laboratory (Micromeritics Analytical Services).

PERSONNEL SECURITY CLEARANCE

If security clearances, insurance certificates, or any other special arrangements are required for Micromeritics employees to enter your facility, see [Personnel Security Clearance Checklist on page 15](#) to explain. Inform Micromeritics how much advance notice you require to obtain clearance.

PROJECTED INSTALLATION DATE

After reading the site preparation requirements in this document, enter a date your site will be prepared and a preferred date for installation. After returning the checklist to Micromeritics, your Micromeritics representative will contact you to confirm an installation date. See [Projected Installation Date on page 16](#).

COMMITMENT STATEMENT / SIGNATURE

Read this document carefully and complete all checklists. If unsure about any part of this document or the checklist, contact the Micromeritics Service Department for clarification. When this Pre-installation Checklist has been completed, see [Commitment Statement and Signature on page 16](#). Sign and date the form, then send it to Micromeritics.

Within the United States, send the completed and signed checklist to one of the following:

Service Department/ 1-770- 662-3666

Service.Helpdesk@Micromeritics.com

Micromeritics Instrument Corporation
ATTN: Service Department
4356 Communications Drive
Norcross, GA / USA / 30093-2901

Outside the United States, send the completed and signed checklists to your Micromeritics representative.

SECTION 2 - PRE-INSTALLATION CHECKLISTS

For each question, circle **Yes** if the condition applies to your laboratory or **No** if it does not. When this *Pre-installation Checklist* has been completed, see [Commitment Statement and Signature on page 16](#). Sign and date the form, then send it to Micromeritics.

UNPACKING AND INSPECTION CHECKLIST

Unpacking and Inspection		
Have the shipping cartons been unpacked and their contents inspected?	Y	N
Was there any shipping damage?	Y	N
If Yes, has a claim been filed with the freight carrier?	Y	N
Were all items listed on the packing list received?	Y	N
If No , has Micromeritics been notified?	Y	N

ANALYZER SPACE CHECKLIST

Analyzer Space		
Can the lab area where the analyzer and computer will be placed accommodate the combined dimensions of the analyzer, accessories, computer, and printer?	Y	N

INSTALLATION CONFIGURATION CHECKLIST

Installation Configuration		
Will 1/8 in. copper gas supply lines (supplied with the analyzer for standard installation) be used?	Y	N
If NO , have 1/8 in. stainless steel gas supply lines been ordered and received from Micromeritics?	Y	N

ENVIRONMENTAL FACTORS CHECKLIST

Environmental Factors		
Is power available with the correct voltage and frequency, and a safety earth ground?	Y	N
Are temperature and humidity controlled within specifications?	Y	N
Are hazards present or precautions necessary in area of installation?	Y	N
If Yes , please explain:		
Are safety measures required?	Y	N
If Yes , please explain:		

COMPUTER SYSTEM CHECKLIST

Computer System		
Was the computer purchased from Micromeritics?	Y	N
If NO , does the computer meet Micromeritics' minimum requirements?	Y	N
Will the computer be connected to the local network?	Y	N
If YES , will two Ethernet ports be available during the installation?	Y	N
Will there be more than one Micromeritics Ethernet based analyzers connected to this computer?	Y	N
If YES , will an Ethernet switch be available during the installation?	Y	N
All application users are required to have Read / Write permission to all directories and subdirectories where the application is installed. Will these permissions be set prior to installation?	Y	N
Will the Micromeritics Service Engineer have Administrator rights to the computer?	Y	N
If NO , will an IT representative be available?	Y	N

GAS SUPPLY CHECKLIST

Gas Supply		
Are gas cylinders located within 6 ft (2 m) of the area where the instrument will be installed?	Y	N
Were gas regulators purchased from Micromeritics?	Y	N
If NO , do your gas regulators meet Micromeritics' specifications?	Y	N
Required Gases		
Are the following required gases available? <u>The installation will not be scheduled until these gases are available:</u>		
• (CGA 580) N ₂ 99.999%	Y	N
• (CGA 580) He 99.999%	Y	N
• (CGA 580) Ar 99.999%	Y	N
Pulse Chemisorption		
• (CGA 350) 10% H ₂ in Argon 99.999%	Y	N
• (CGA 350) 10% CO in Helium 99.999%	Y	N
Optional Gases		
• (CGA 540) 10% O ₂ in Helium 99.999% for TPO analysis	Y	N
• (CGA 580) 30% N ₂ in Helium 99.999% for BET analysis	Y	N
Additional Gases		
Additional gases for use after installation can be connected by the Micromeritics service representative. Please list any gases that will be available for connection during installation.		

LABORATORY EQUIPMENT AND SUPPLIES CHECKLIST

Laboratory Equipment and Supplies		
Are sufficient quantities of liquid nitrogen available?	Y	N
Are sufficient quantities of isopropyl alcohol available?	Y	N
Is a balance available for weighing samples?	Y	N
Is a drying oven or sample degasser available?	Y	N
Is oil and moisture free house compressed air available, regulated at pressures of approximately 20 psig?	Y	N

APPLICATION RELATED ISSUES CHECKLIST

Application Related Issues		
What types of samples will be tested?		
Will these samples require pretreatment?	Y	N
Will any application assistance from Micromeritics Analytical Services be required?	Y	N

PERSONNEL SECURITY CLEARANCE CHECKLIST

Security Clearance		
Are there any special arrangements required concerning security clearance?	Y	N
If Yes, please explain:		

PROJECTED INSTALLATION DATE

When would installation be most convenient? Date: _____ / _____ / _____

(This is not a commitment for a specific installation date.)

COMMITMENT STATEMENT AND SIGNATURE

I have read this document and understand my responsibilities regarding preparations for the installation of our analysis system. I believe this site is ready for the system to be installed.

Signature: _____
Name (Printed): _____
Title (Printed): _____
Company: _____
City / State / Zip: _____
Phone Number: _____ Fax Number: _____
E-mail: _____
Analyzer: _____ Model: _____ Serial Number: _____
Date: _____

Is the Customer Representative also the End User? **Yes** **No**