

Gas Purification Systems

Agilent Gas Clean Filters

- Deliver clean gases for accurate analyses
- Fast, leak-free filter replacement reduces downtime
- Economical, with immediate payback
- Highly sensitive filter indicators provide maximum instrument protection

The Agilent Gas Clean Filter System delivers clean gases, reducing the risks of column damage, sensitivity loss, and instrument downtime. Inserting a Gas Clean Filter System in the gas line immediately before the instrument inlet greatly reduces the level of impurities, thus improving trace analysis. Contaminants entering your GC column will also be reduced, which is critical for high temperature analysis and essential for longer column lifetime.

Replacing the filters when they have reached absorption capacity ensures maximum protection of your GC columns and analytical hardware. The sensitive indicators change color, alerting you that the filter needs to be replaced.

A Gas Clean Filter System allows you to use 99.996% (4.6) pure helium instead of the more expensive 99.999% (5.0) or 99.9999% (6.0) grade, while still yielding high quality analytical results. The expected cost savings are 30%.



The unique connection design allows fast, leak-free replacement of the Gas Clean Filter

TIPS & TOOLS



Learn best practices for GC troubleshooting with the Agilent GC Troubleshooting video series – view at www.agilent.com/chem/GCtroubleshooting



Gas Management

Gas Purification

Impure gases can cause installation delays, premature instrument failure, and flawed results. Purification is one of the most important steps you can take to optimize your system performance.

Agilent brings the highest performance of gas purifiers to gas chromatographers. We manufacture purifiers in a variety of sizes and configurations to remove oxygen, moisture, and hydrocarbons. We recommend that each gas chromatograph use a gas purification system with removable cartridges such as Gas Clean or Renewable. These systems ensure the highest quality gas and contain indicators to allow for timely replacement before other consumables, like columns and liners, are damaged and sensitivity decreases. Agilent Gas Purifiers are a cost effective safety and preventive measure to assure the supply of the highest purity gas to your GC and GC/MS instrumentation with considerable savings in laboratory gas costs. We also carry a line of in-line purifiers to provide high capacity or economy solutions for customers. Please refer to the Gas Purifier Selection Guide to determine which gas purifiers you should use, see page 95.

Carrier Gas Purification

The Carrier Gas Purification illustration on the next page shows the most common gas purification configurations used in gas chromatography.

Regardless of which purification system is employed, proper installation and maintenance are required to achieve optimal performance. A purifier that is not maintained will eventually expire and become ineffective, or worse, a source of contamination.

Helpful Hints for Purification Success

- Keep number of fittings in gas line to a minimum
- Install purifiers in a convenient location close to the GC
- Use purifier log books to determine maintenance and cartridge replacement schedules
- Use indicating traps closest to the GC so you can determine when to change the traps that are upstream



Gas Clean Filters

TIPS & TOOLS

View the latest Agilent J&W GC column focused applications, products and educational resources at www.agilent.com/chem/mygccolumns

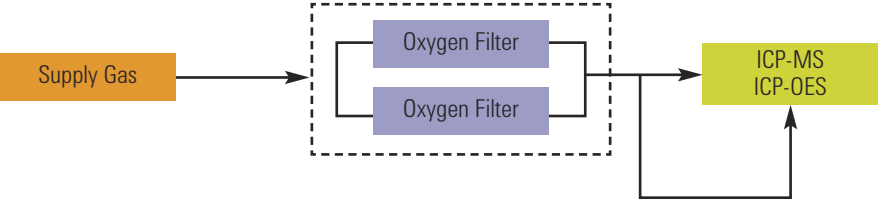
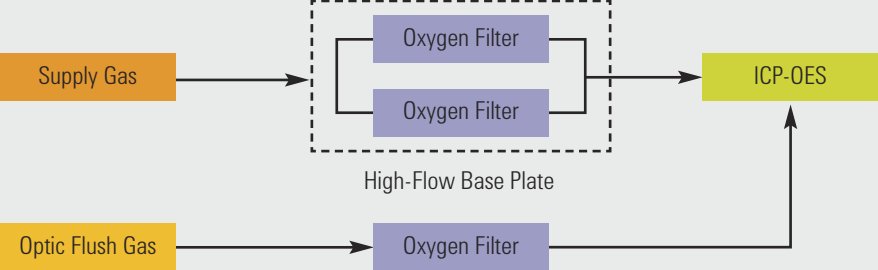




Connection Diagrams for Common Detectors

Detector	Connection Diagrams
<p>ECD Electron Capture Detector</p>	<pre> graph LR CG[Carrier Gas] --> OF1[Oxygen Filter] N2[Nitrogen] --> OF2[Oxygen Filter] OF1 --> MF1[Moisture Filter] OF2 --> MF2[Moisture Filter] MF1 --> Col[Column] MF2 --> APG[Anode Purge Gas] MF2 --> MUG[Make-Up Gas] Col --> ECD[ECD] APG --> ECD MUG --> ECD </pre>
<p>FID Flame Ionization Detector (Carrier Gas = Make-Up Gas)</p>	<pre> graph LR CG[Carrier Gas] --> OF[Oxygen Filter] OF --> MF[Moisture Filter] MF --> Col[Column] H2[Hydrogen] --> CF1[Charcoal Filter] Air[Air] --> CF2[Charcoal Filter] CF1 --> FID[FID] CF2 --> FID Col --> FID </pre>
<p>FID Flame Ionization Detector (Carrier Gas differs from Make-Up Gas)</p>	<pre> graph LR CG[Carrier Gas] --> GCMF[GC/MS Filter] GCMF --> Col[Column] MUG[Make-Up Gas] --> CF1[Charcoal Filter] H2[Hydrogen] --> CF2[Charcoal Filter] Air[Air] --> CF3[Charcoal Filter] Col --> FID[FID] CF2 --> FID CF3 --> FID </pre>

Detector	Connection Diagrams
<p>FPD Flame Photometric Detector</p> <p>PFPD Pulsed Flame Photometric Detector</p>	
<p>MS (ITD, MSD) Ion Trap Detector, Mass Selective Detector</p> <p>Two Possibilities (see diagrams to the right)</p>	
<p>NPD, PND Nitrogen-Phosphorus Detector</p> <p>TID, TSD Thermionic Detector (Carrier Gas = Make-Up Gas)</p>	
<p>TCD Thermal Conductivity Detector</p>	

Connection Diagrams Analyzers and Generators

Detector	Connection Diagrams
<p>ICP-OES/ICP-MS</p> <p>Inductively Coupled Plasma-Optical Emission Spectrometry/Mass Spectrometry</p> <p>(Plasma Gas = Nebulizer Gas)</p>	
<p>ICP-OES</p> <p>Inductively Coupled Plasma-Optical Emission</p> <p>(Different Optic Flush Gas)</p>	
<p>Total Organic Carbon (TOC) Analyzer</p>	
<p>Zero-Air Generator</p>	

Key:

GC/MS Filter: A triple filter that removes oxygen, moisture, and hydrocarbons

Oxygen Filter: A filter that removes oxygen

Moisture Filter: A filter that removes water

Charcoal Filter: A filter that removes hydrocarbons

CO₂ Filter: A filter that removes carbon dioxide

Benefits of Using Gas Clean Filters

Technique	Filters	Benefit
GC/MS	GC/MS filter	Higher data accuracy and less maintenance
GC column	Moisture filter and oxygen filter or a GC/MS filter	Longer lifetime
ECD detector	GC/MS Filter	Greater sensitivity
TCD detector	Moisture filter and oxygen filter or a GC/MS filter	Greater sensitivity and less maintenance
Process GC	Process moisture filter	Long term stability
FID detector	Two charcoal filters (for air and hydrogen)	Greater sensitivity
PID detector	Oxygen filter and charcoal filter	Greater sensitivity
PFPD or FDP detector	Charcoal filter, CO ₂ filter and moisture filter	Greater sensitivity
TSD or NPD detector	Charcoal filter, CO ₂ filter and moisture filter	Greater sensitivity
Total organic carbon	CO ₂ filter and moisture filter	Greater sensitivity
Zero-air generator	CO ₂ filter and moisture filter	Cleaner gas
ICP-OES, ICP-MS	High flow connection unit with two oxygen filters	Greater sensitivity

Gas Clean Filters Technical Specifications

Description	Function	Indicator Color Change	Capacity	Outlet Concentration (at operating flow of 1-10 L/min)
Oxygen Filter	Removes oxygen as well as traces of sulfur and chlorine compounds from carrier gas	From green to gray	150 mL oxygen	< 50 µg/L
Moisture Filter/Process Moisture Filter	Removes water, oil, and other foreign material from the carrier gas	From green to pale brown	7.2 g water	< 0.1 mg/L
Charcoal Filter	Removes organic compounds from gas streams	No indicator	Approximately 7 g, depending on impurities	< 0.1 mg/L
GC/MS Filter	Single combination filter, removes water, oxygen, and organic compounds	Oxygen, from green to gray; Moisture, from green to pale brown	100 mL oxygen, 1 g water, organics depending on impurities	Oxygen < 50 µg/L Moisture < 0.1 mg/L Organics < 0.1 mg/L
CO₂ Filter	Removes CO ₂ from the gas stream; use with moisture filter	From white to violet	9 g CO ₂	< 1 mg/L



Gas Clean Filters



1-position connecting unit, 1/8 in, CP7988



4-position connecting unit, 1/8 in, CP736520



High flow connecting unit 1/8 in, CP17985

Agilent Gas Clean Filter Starter Kits

Description	Part No.
Agilent Gas Clean FID Filter kit Includes a 4-position 1/8 in connecting unit and two Charcoal filters, one Oxygen filter, and one Moisture filter	CP7995*
Agilent Gas Clean Filter Kit, 1/8 in Includes a 4-position 1/8 in connecting unit and two Charcoal filters, one Oxygen filter, and one Moisture filter	CP736530
Agilent Gas Clean GC/MS Filter kit Includes a 1-position connecting unit 1/8 in and two GC/MS filters	CP17976
Agilent Gas Clean GC/MS Filter kit Includes a 1-position connecting unit 1/4 in and two GC/MS filters	CP17977
Agilent Gas Clean GC/MS Filter Installation kit Includes 1 m copper tubing (P/N CP17976), two nuts and two ferrules, 1/8 in	CP17978
Agilent Gas Clean CO ₂ kit Includes 2-position 1/4 in connecting unit and CO ₂ and moisture filters	CP17982
Agilent Gas Clean CO ₂ kit Includes 2-position 1/8 in connecting unit and CO ₂ and moisture filters	CP17983
Agilent TCD Filter Kit Includes a 2-position 1/8 in connecting unit, one Oxygen filter, and one Moisture filter	CP738408
Agilent GC Installation Kit Includes CP736530 and many useful fittings and accessories.	19199N

*For 1/8 in tube, use reducer 1/8 in x 1/4 in, P/N CP4392

Connecting Units

Description	Part No.
1-position connecting unit, 1/4 in	CP7980
1-position connecting unit, 1/8 in	CP7988
2-position connecting unit, 1/4 in	CP738406
2-position connecting unit, 1/8 in	CP738407
4-position connecting unit, 1/4 in	CP7989
4-position connecting unit, 1/8 in	CP736520
High flow connecting unit, 2-position, 1/4 in	CP17984
High flow connecting unit, 2-position, 1/8 in	CP17985
1-position, stainless steel, 1/4 in tube	CP7980P4
1-position, stainless steel, 1/8 in tube	CP7988P8
1-position, stainless steel, 3 mm tube	CP7988P3
1-position, stainless steel, 6 mm tube	CP7980P6



Replacement Gas Clean Filters

Description	Part No.
Agilent Gas Clean CO ₂ filter	CP17969
Agilent Gas Clean Oxygen filter	CP17970
Agilent Gas Clean Moisture filter	CP17971
Agilent Gas Clean Process Moisture filter	CP17971P
Agilent Gas Clean Charcoal filter	CP17972
Agilent Gas Clean GC/MS filter*	CP17973

*GC/MS filter removes Hydrocarbons, Moisture, and Oxygen, and can be used to purify any GC carrier gas. It is the best filter for protecting your inert consumables.

Accessories and Fittings

Description	Part No.
Wall mounting bracket for connecting unit For CP7980 and CP7988	CP7981
Upper part filter connecting unit	CP7978
Flush head for connecting unit	CP7987
Male connector, 1/4 in with dust filter	CP7986
Male connector, 1/8 in with dust filter	CP82117
Viton O-rings, two sets	CP7983
Male connector, stainless steel, 1/4 in with dust filter	CP7986SS
Male connector, stainless steel, 1/8 in with dust filter	CP82117SS
Male connector, stainless steel, 3 mm with dust filter	CP82117SS3
Male connector, stainless steel, 6 mm with dust filter	CP7986SS6



Agilent Gas Clean GC/MS filter, CP17973



Wall mounting bracket for connecting unit, for CP7980 and CP7988, CP7981



Flush head for connecting unit, CP7987

TIPS & TOOLS

GC/MS filter removes Hydrocarbons, Moisture, and Oxygen and can be used to purify any GC carrier gas. It is the best filter for protecting your inert consumables.

