Agilent
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Quick Reference Guide

Gas Chromatography Detectors

	Detector	Description	Linear Dynamic Range	Destructive	Analytes
 FID	Flame Ionization Detector	The FID is the most commonly used general-purpose GC detector. As the sample exits the column, it is burned in a hydrogen/air flame and ionized particles are measured as an electrical current.	$>10^7$ (±10%)	Yes	Most organic compounds
 TCD	Thermal Conductivity Detector	A TCD is considered a universal detector that can measure any GC sample component having a thermal conductivity different than the carrier gas. It uses a single filament in a constant current DC power supply. It requires only one gas type to operate (the carrier), which can be helium, argon, nitrogen, or hydrogen.	$>10^5$ (±5%) 10^5 (±10%) for 8860 GC	No	Permanent gases, light hydrocarbon gases, fatty acids, flavors, and fragrances
 NPD	Nitrogen-Phosphorus Detector	The Agilent 8890/8860 NPD uses a Blos bead (glass). The bead is electrically heated in the presence of hydrogen and air, which forms a plasma around the bead. A collector uses a positive DC voltage to collect the electrons formed when compounds with N-C or P-C bonds contact the hot bead. For nitrogen-containing compounds, selectivity is 25,000:1 for 8890 and 8860 GCs. For phosphorus-containing compounds, selectivity versus hydrocarbons is 200,000:1 for the 8890 and 75,000:1 for 8860.	$>10^5$ N, $>10^5$ P $>10^4$ N, $>10^4$ P for 8860 GC	Yes	Phosphorous-containing compounds (e.g., pesticides) Nitrogen-containing compounds (e.g., drugs)
 ECD	Micro-Electron Capture Detector	The micro-ECD is very sensitive and selective for halogenated compounds. It uses a low-level radioactive beta emitter in a carrier/makeup gas stream of nitrogen or argon-methane. The electrons emitted from the radioactive source collide with molecules of the makeup gas resulting in many more free electrons, which are then accelerated towards an anode that is polarized with a variable frequency, constant-current voltage. As the sample is carried into the detector by the carrier gas, electron-absorbing analyte molecules capture electrons and the anode voltage frequency is increased to keep the current constant. The analyte concentration is proportional to the degree of electron capture.	$>5 \times 10^4$ $>10^4$ for 8860 GC	No	Halogenated organic compounds, aromatic compounds, other analytes with high electron affinity (e.g., organometallics, nitriles, or nitro compounds)
 FPD+	Flame Photometric Detector	An FPD detects organic compounds containing sulfur or phosphorus. Samples are burned in a hydrogen/air flame producing light. An optical filter is used to make the detector specific to sulfur compounds or phosphorous compounds. The filtered light is detected using a photomultiplier tube. Sulfur generally responds to the square of the sulfur atom concentraion. Phosphorous response is more linear.	$>10^3$ S, 10^4 P	Yes	Sulfur and phosphorus-containing organic compounds (e.g., pesticides, petroleum streams)

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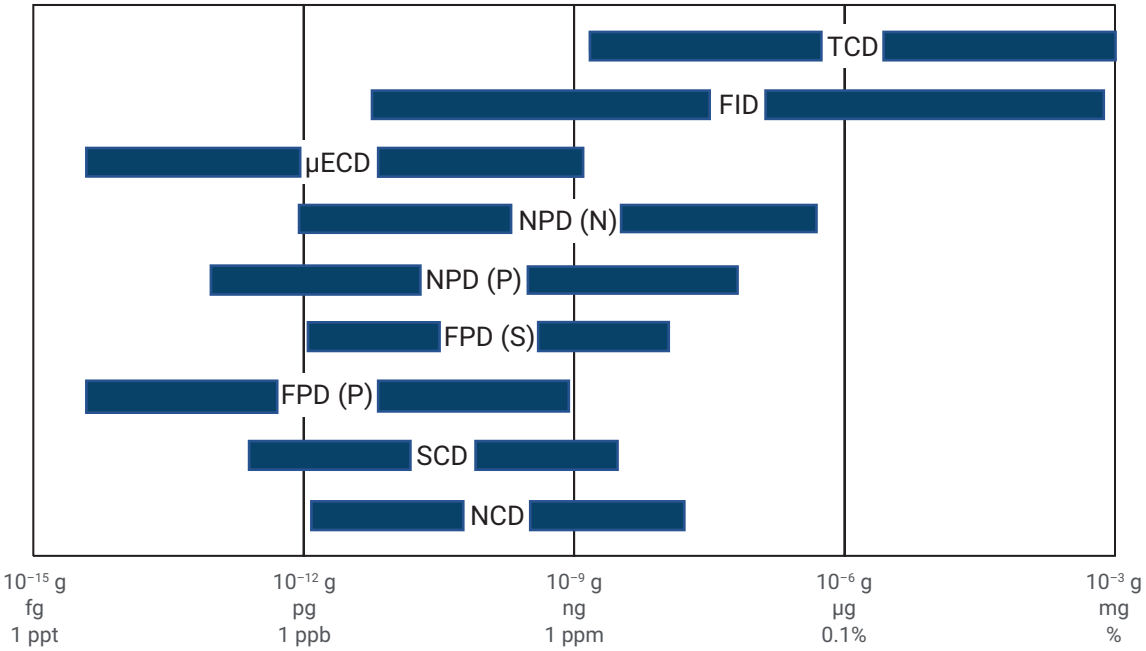
NCD	Nitrogen Chemiluminescence Detector	Operation of the Agilent NCD is based on the light-producing reaction of ozone with nitric oxide produced from combustion of the analytes in the sample. Reacting nitric oxide with ozone results in the formation of electronically excited nitrogen dioxide that emits light in the red and infrared regions of the electromagnetic spectrum. The light emitted is directly proportionally to the amount of nitrogen in the sample. The light emitted by the chemical reaction is optically filtered and detected by a photomultiplier tube. The signal from the photomultiplier tube is amplified for display or output to a data system.	$>10^4$	Yes	Nitrogen-containing compounds (e.g., chemicals, environmental pollutants, foods and beverages, fuels, gases, pesticides and herbicides, petrochemicals, polymers, nitrosamines in pharmaceuticals)
SCD	Sulfur Chemiluminescence Detector	The Agilent SCD is based on the light-producing reaction of ozone with sulfur monoxide produced from combustion of the analytes in the sample. A vacuum pump pulls the combustion products into a reaction cell at low pressure, where excess ozone is added. Light produced from the subsequent reaction is optically filtered and detected with a blue-sensitive photomultiplier tube and the signal is amplified for display or output to a data system.	$>10^4$	Yes	Sulfur-containing compounds such as light petroleum feeds and products, monomers (ethylene and propylene), fuels (natural gas, LPG, gasoline, kerosene, jet and diesel fuels), foods, beverages, flavors and fragrances, atmospheric gases (e.g., from animals, vegetation, soils, and volcanoes), industrial sources (e.g., from refineries, smelters, and power generators)

Relative sensitivity of GC detectors*



*** Actual detection limits and ranges will depend on compound structure and analytical conditions. See GC data sheets for actual specifications.**

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This information is subject to change without notice.

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