# Gas Grade Recommendations

## Analytical Method/ Carrier and

**Detector Support Gases**

**Gas Chromatography**

**TCD** N2

(Thermal Conductivity Detector) He H2

Ar

**FID** He

(Flame Ionization Detector)

## Carriers N2

Ar

**Combustion Gases** H2

40% H 2 in He

40% H 2 in N 2

Air

**ECD** He

(Electron Capture Detector)

N2

## Type of Analysis

Impurity Considerations

## Universal Detector

Atmospheric contaminants can oxidize the detector ﬁlament giving rise to negative peaks and reduced sensitivity.

## Organic Compounds

Hydrocarbons in carrier and fuel gases can give rise to baseline noise and reduced detector sensitivity. Oxygen and water cause column deterioration and affect retention time on critical separations.

## Halogenated Compounds

Detector response and column life are reduced by oxygen and water. Hydrocarbons and halocarbons can produce baseline noise, negative peaks and

5% CH

4 in

plumbing contamination.

Ar-ECD (P-5)

10% CH 4 in Ar-ECD (P-10)

**HID** He

(Helium Ionization Detector) He Purge

**FPD** He

(Flame Photometric Detector) N2

H2

Air

**PID** He

(Photo Ionization Detector) N2

**GC/MS** He

(Mass Spectrometer) N2

Ar

**DID** He

(Discharge Ionization Detector) He Purge

**USD** Ar

(Ultrasonic Detector)

He

## Universal Detector

Atmospheric impurities can cause baseline noise signal polarity and reduced detector stability and sensitivity.

## Sulfur or Phosphorous Compounds

Organics can yield baseline noise and carbon dioxide can suppress detector response.

**Selective Detector Dependent on UV Source** Organics can yield baseline noise and carbon dioxide can suppress detector response.

## All Compounds

Organics can yield baseline noise and carbon dioxide can suppress detector response.

## Universal Detector

Atmospheric impurities can cause baseline noise signal polarity and reduced detector stability and sensitivity.

## Universal Detector

Atmospheric impurities can cause baseline noise signal polarity and reduced detector stability and sensitivity

# Gas Grade Recommendations



## Analytical Method/ Carrier and

**Detector Support Gases**

**Optical Spectometry – Adsorption**

**NDR**(Non-dispersive Infrared) Air N2

**IR** (Dispersive Infrared)

**-FTIR** Ar

(Fourier Transform Infrared)

## -FG/GFC N2

(Correlation)

**AA** (Atomic Absorption) C 2H2

**Combustion Gases** n-C 4H10

H2

N2O

Air

Ar (Flameless) N2

**NMR** LHe

(Nuclear Magnetic Resonance) LN 2

## Type of Analysis

Impurity Considerations

## Polyatomic and Heteroatomic Compounds Polyatomic and Heteroatomic Compounds

During matrix isolation, oxygen can oxidize a sample. Moisture interfers with IR spectra. Impurities coinciding with quantified peaks can cause inaccuracies.

## Elemental Analysis

Impurites can cause the flame to discolor or burn unevenly. Furnace atmospheres require low oxygen and moisture levels to maintain instrument sensitivity.

## Analysis of Molecular Structure

**Legend**

**AA –** Atomic Absorption

**UH–** Ultra High Purity

**RS –** Research/Chromatographic

**Z –** Zero

**UZ –** Ultra Zero

**IS –** Instrument

**OF –** Oxygen Free

**TG –** Trace Analytical

**EC –** Electron Capture Detector

# Gas Grade Recommendations

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| --- | --- | --- |
| **Analytical Method/ Detector** | **Carrier and Support Gases** | **Type of Analysis**Impurity Considerations |
| **Optical Spectrometry – Emission** |
| **Atomic Emission****- ICP** (Inductive Coupled Plasma) | Ar | **Elemental Analysis** |
| LAr |
| N2 |
| H2 |
| **Arc or Spark Emission** | Ar | **Elemental Analysis** |
| H2 |
| 5% Ar in H 2 |
| **Chemiluminescence** | Air | **NO-NO2 -NOX Hydrides and O3** |
| N2 |
| O2 |
| **Fluorescence UV** | Air | **SO2-H2S-Organic Compounds** |
| N2 |
| **XRF (Fluorescence X)** | 10% CH 4 in Ar | **Elemental Analysis** |
| 1.3% n-C 4H10in He |
| 0.95% i-C 4H10in He |
| LN 2 |
| **Mass Spectrometry** |
| **MS** (Under Vacuum) |  | **All Compounds** |
| N2 |
| He |

**Legend**

**UH –** Ultra High Purity

**RS –** Research

**IC –** Inductive Coupled Plasma

**CE –** Continuous Emissions Monitoring (See Pure Gas Section for correct definition)

**TG –** Trace Analytical

**Z –** Zero

**VC –** Volatile Organic Compound Free

**UZ –** Ultra Zero

# Gas Grade Recommendations

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| --- |
| **Analytical Method/ Carrier and Type of Analysis****Detector Support Gases** Impurity Considerations |
| **Others** |
| **Nuclear Counter** | 10% CH 4 in Ar | **Measurement of Radioactivity** |
| 1.3% n-C 4H10in He |
| 0.95% i-C 4H10in He |
| **Hydrometer** | Air | **Moisture in All Gas** |
| N2 |
| **Paramagnetic Analyzer** | N2 | **Oxygen in All Gas** |
| O2 in N2 |  |  |
|  |
| **Carbon and Sulfur in Steel** Ar He N2O2 |  | **Analysis of Carbon, Sulfur and Gases (N2-H2-O2) in Steel** |
|  |
|  |

**Instrumentation Mixture Summary**

## Product Mixture

**Description Application**

40% H 2 in He (FID Fuel) Fuel Gas for GC-FID (THC < 0.5 ppm)

40% H 2 in He UHP (FID Fuel) Fuel Gas for GC-FID (THC < 0.1 ppm)

40% H 2 in N 2 (FID Fuel) Fuel Gas for GC-FID (THC < 0.5 ppm)

40% H 2 in N 2 UH (FID Fuel) Fuel Gas for GC-FID (THC < 0.1 ppm)

5% CH 4 in Argon-ECD (P-5) Make-up Gas for GC-ECD

10% CH 4 in Argon-ECD (P-10) Make-up Gas for GC-ECD

10% CH 4 in Ar (P-10) XRF (Fluorescence X)

1.3% n-C 4H10 in He XRF (Fluorescence X)

0.95% i-C 4H10 in He XRF (Fluorescence X)

5% CH 4 in Ar (P-5) Carrier Gas for Proportional Counters

10% CH 4 in Ar (P-10) Carrier Gas for Proportional Counters

1.3% n-C 4H10 in He Quench Gas

0.95% i-C 4H10 in He Carrier Gas for Geiger-Muller

5% Ar in H 2 Spark Emission