

Natural Gas Analyzer Selection Guide

Overview

The basic principles of a Natural Gas Analyzer (NGA) are well understood. Each analyzer reports concentrations of the saturated light hydrocarbons. While this is a straightforward requirement, each NGA may also be used to provide additional information or to analyze different sample types.

Examples of additional information of interest are:

- liquid sample analysis
- full range hydrogen and/or helium analysis
- oxygen and nitrogen separation
- heavy hydrocarbon component speciation
- natural and doping sulfur compound analysis

The NGA Family

Arnel and PerkinElmer manufactures more than 30 standard NGA configurations. This large family of analyzers is provided so that an analyzer could be ordered that exactly matches your needs. This document provides a simple selection summary to help guide you in identifying the NGA model you need.

How to Use This Guide

Eight base model NGA's are available from Arnel and PerkinElmer (Table 1). Select the most appropriate base model using the feature descriptions provided. With the best base model information identified, proceed to Tables 2 through 6, which list minimum and maximum volume percent by component for all NGA's. This should give you the best model to meet your needs. Complete analyzer descriptions are available for each of the base models in Product Briefs.

Model 3062 Heat Content Calculation Software

Model 3062 Software is a Microsoft Excel workbook that includes a modifiable, demonstration heat content calculation macro program.

PerkinElmer Turbochrom or TotalChrom data, along with all header information, from one or multiple channels are automatically imported into this workbook. Once in the workbook, the full power of Excel is available to perform heat content calculation meeting ISO 6976, ASTM D3588, and GPA 2172 methodology.

Model 3062 is available at no cost for multiple detector NGA's and for a nominal cost for single detector NGA's. Model 3062 can also merge two detector outputs into a single report and, additionally, translate any report into the local language.

Custom Analyzers for Other Requirements

If one of the standard NGA analyzers does not specifically meet your needs, we would be happy to configure an analyzer to your requirements. Examples of custom analyzers include:

- C₇+ backflush
- Adding two liquid sampling valves

An Application/Engineering Questionnaire (AEQ) should be completed for consideration.

Base Model	Analysis Time (min)	Combined O ₂ -N ₂ Peak	Separated O ₂ -N ₂ Peak	C ₆ + Composite	Capillary Column	Comments
2000	15			X		Often used for heat content
2001	15	X		X		Classic two column analyzer
2002	25	X		X		Large Air-CH ₄ -CO ₂ separations, Ar separation
2003	15		X	X		Separates O ₂ and N ₂
2006	30	X		X	X	Adds C ₆ + separation to 2001
2008	30		X	X	X	Adds C ₆ + separation to 2003
2009	7		X		X	Highest speed
2010	15	X		X		Analyzers wet samples

Table 1

Table 2 - NGA Model Analysis Details

The 20XX family of NGAs offers low cost solutions to natural gas analysis

Compound(s)	Model 2000		Model 2001		Model 2002		Model 2003		Model 2006		Model 2008		Model 2009		Model 2010	
	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Ar	-	-	-	-	0.1	4	-	-	-	-	-	-	-	-	-	-
N ₂	-	-	-	-	-	-	0.01	20	-	-	0.01	20	0.01	20	-	-
O ₂	-	-	-	-	-	-	0.01	10	-	-	0.01	10	0.01	10	-	-
CO ₂	-	-	0.01	20	0.01	100	0.01	100	0.01	20	0.01	100	0.1	100	0.01	20
H ₂ S	-	-	0.1	25	0.10	5	0.1	5	0.1	25	0.1	5	0.1	5	0.1	25
C ₁ through C ₅	0.005	100	0.01	100	0.01	100	0.01	100	0.01	100	0.01	100	0.01	100	0.01	100
C ₅ through C ₁₀	-	-	-	-	-	-	-	-	0.001	100 ²	0.001	100 ²	0.001	100 ²	-	-
O ₂ /N ₂	-	-	0.01	20	0.01	100	-	-	0.01	20	-	-	-	-	0.01	20
C ₆ +	0.005	10	0.01	10	0.01	10	0.01	10	0.01	10	0.01	10	-	-	0.001	100
Analysis time	15 minutes		15 minutes		25 minutes		15 minutes		30 minutes		30 minutes		30 minutes		15 minutes	
Detector(s)	FID		TCD		TCD		TCD		FID/TCD		FID/TCD		FID/TCD		FID/TCD	
Sample types	Gas		Gas		Gas		Gas		Gas		Gas		Gas		Gas	

Notes:

1. min and max levels are in percent (%).
2. Detection levels depend upon the capillary injection port split ratio setting.

Table 3 - NGA Model Analysis Details

The 21XX family of NGAs adds a chromatography channel for full range helium and hydrogen analysis to the features of the 20XX family of NGA's

Compound(s)	Model 2100		Model 2101		Model 2102		Model 2103		Model 2106		Model 2108		Model 2109		Model 2110	
	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
H ₂ and He	0.005	100	0.001	100	0.001	100	0.001	100	0.01	100	0.01	100	0.01	100	0.01	100
Ar	-	-	-	-	0.1	4	-	-	-	-	-	-	-	-	-	-
N ₂	-	-	-	-	-	-	0.01	20	-	-	0.01	20	0.01	20	-	-
O ₂	-	-	-	-	-	-	0.01	10	-	-	0.01	10	0.01	10	-	-
CO ₂	-	-	0.01	20	0.01	100	0.01	100	0.01	20	0.01	100	0.1	100	0.01	20
H ₂ S	-	-	0.1	25	0.1	5	0.1	5	0.1	25	0.1	5	0.1	5	0.1	25
C ₁ through C ₅	0.005	100	0.01	100	0.01	100	0.01	100	0.01	100	0.01	100	0.01	100	0.01	100
C ₅ through C ₁₀	-	-	-	-	-	-	-	-	0.001	100 ²	0.001	100 ²	0.001	100 ²	-	-
O ₂ /N ₂	-	-	0.01	20	0.01	100	-	-	0.01	20	-	-	-	-	0.01	20
C ₆ +	0.005	10	0.01	10	0.01	10	0.01	10	0.01	10	0.01	10	-	-	0.001	100
Analysis time	15 minutes		15 minutes		25 minutes		15 minutes		30 minutes		30 minutes		30 minutes		15 minutes	
Detector(s)	FID/TCD		TCD/TCD		TCD/TCD		TCD/TCD		TCD/TCD/FID		TCD/TCD/FID		TCD/TCD/FID		TCD/TCD/FID	
Sample types	Gas		Gas		Gas		Gas		Gas		Gas		Gas		Gas	

Notes:

1. min and max levels are in percent (%).
2. Detection levels depend upon the capillary injection port split ratio setting.

Table 4 - NGA Model Analysis Details

The 22XX family of NGA's adds liquid and pressurized liquid sample analysis capability with the addition of a liquid sampling valve and liquid sampling accessories to the features of the 20XX family of NGAs

	Model 2200		Model 2201		Model 2202		Model 2203		Model 2206		Model 2208		Model 2209		Model 2210	
Compound(s)	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Ar	-	-	-	-	0.1	4	-	-	-	-	-	-	-	-	-	-
N ₂	-	-	-	-	-	-	0.01	20	-	-	0.01	20	0.01	20	-	-
O ₂	-	-	-	-	-	-	0.01	10	-	-	0.01	10	0.01	10	-	-
CO ₂	-	-	0.01	20	0.01	100	0.01	100	0.01	20	0.01	100	0.1	100	0.01	20
H ₂ S	-	-	0.1	25	0.1	5	0.1	5	0.1	25	0.1	5	0.1	5	0.1	25
C ₁ through C ₅	0.005	100	0.01	100	0.01	100	0.01	100	0.01	100	0.01	100	0.01	100	0.01	100
C ₅ through C ₁₀	-	-	-	-	-	-	-	-	0.001	100 ²	0.001	100 ²	0.001	100 ²	-	-
O ₂ /N ₂	-	-	0.01	20	0.01	100	-	-	0.01	20	-	-	-	-	0.01	20
C ₆₊ (gas)	0.005	10	0.01	10	0.01	10	0.01	10	0.01	10	0.01	10	-	-	0.001	100
C ₆₊ (liquid)	0.005	40	0.01	40	0.01	40	0.01	40	-	-	-	-	-	-	-	-
Analysis time	15 minutes		15 minutes		25 minutes		15 minutes		30 minutes		30 minutes		30 minutes		15 minutes	
Detector(s)	FID		TCD		TCD		TCD		FID/TCD		FID/TCD		FID/TCD		TCD/FID	
Sample types	Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid	

Notes:

1. min and max levels are in percent (%).
2. Detection levels depend upon the capillary injection port split ratio setting.

Table 5 - NGA Model Analysis Details

The 23XX family of NGA's adds both a chromatography channel for full range helium and hydrogen analysis and liquid and pressurized liquid sample analysis capability with the addition of a liquid sampling valve and liquid sampling accessories to the features of the 20XX family of NGA's.

	Model 2300		Model 2301		Model 2302		Model 2303		Model 2306		Model 2310	
Compound(s)	min	max	min	max	min	max	min	max	min	max	min	max
H ₂ and He	0.001	100	0.001	100	0.001	100	0.001	100	0.01	100	0.01	100
Ar	-	-	-	-	0.1	4	-	-	-	-	-	-
N ₂	-	-	-	-	-	-	0.01	20	-	-	-	-
O ₂	-	-	-	-	-	-	0.01	10	-	-	-	-
CO ₂	-	-	0.01	20	0.01	100	0.01	100	0.01	20	0.01	20
H ₂ S	-	-	0.1	25	0.1	5	0.1	5	0.1	25	0.1	25
C ₁ through C ₅	0.005	100	0.01	100	0.01	100	0.01	100	0.01	100	0.01	100
C ₅ through C ₁₀	-	-	-	-	-	-	-	-	0.001	100 ²	-	-
O ₂ /N ₂	-	-	0.01	20	0.01	100	-	-	0.01	20	0.01	20
C ₆₊ (gas)	0.005	10	0.01	10	0.01	10	0.01	10	0.01	10	0.001	100
C ₆₊ (liquid)	0.005	40	0.01	40	0.01	40	0.01	40	-	-	-	-
Analysis time	15 minutes		15 minutes		25 minutes		15 minutes		30 minutes		15 minutes	
Detector(s)	FID/TCD		TCD/TCD		TCD/TCD		TCD/TCD		TCD/TCD/FID		TCD/TCD/FID	
Sample types	Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid		Gas, Liquid, Press. Liquid	

Notes:

1. min and max levels are in percent (%).
2. Detection levels depend upon the capillary injection port split ratio setting.

Table 6 - NGA Model Analysis Details

Model 2406 adds liquid sampling capability with the addition of a liquid sampling valve and liquid sampling accessories to the helium/hydrogen channel of the Model 2306. The 25XX family of NGA's adds a trace sulfur analysis FPD channel to the features of the 20XX family of NGA's.

Compound(s)	Model 2406		Model 2500		Model 2501		Model 2502		Model 2503	
	min	max	min	max	min	max	min	max	min	max
He and H ₂	0.001	100	-	-	-	-	-	-	-	-
Ar	-	-	-	-	-	-	0.1	4	-	-
N ₂	-	-	-	-	-	-	-	-	0.01	20
O ₂	-	-	-	-	-	-	-	-	0.01	10
CO ₂	-	-	-	-	0.01	20	0.01	100	0.01	100
H ₂ S and COS	0.1	25	0.1 ^{2,3}	1000 ^{2,3}	0.1 ^{2,3}	1000 ^{2,3}	0.1 ^{2,3}	1000 ^{2,3}	0.1 ^{2,3}	1000 ^{2,3}
Mercaptans	-	-	0.2 ^{2,3}	1000 ^{2,3}	0.2 ^{2,3}	1000 ^{2,3}	0.2 ^{2,3}	1000 ^{2,3}	0.2 ^{2,3}	1000 ^{2,3}
C ₁ through C ₅	0.01	100	0.005	100	0.01	100	0.01	100	0.01	100
C ₅ through C ₁₀	0.001	100 ⁴	-	-	-	-	-	-	-	-
O ₂ /N ₂	0.01	20	-	-	0.01	20	0.01	100	-	-
C ₆ +	0.01	10	0.005	10	0.01	10	0.01	10	0.01	10
Analysis time	30 minutes		15 minutes		15 minutes		25 minutes		15 minutes	
Detector(s)	TCD/TCD/FID		FID/FPD		TCD/FPD		TCD/FPD		TCD/FPD	
Sample types	Gas, Liquid, Press. Liquid		Gas		Gas		Gas		Gas	

Notes:

1. min and max levels are in percent (%) unless otherwise noted.
2. min and max levels are in ppm.
3. For Flame Photometric Detector (FPD) only.
4. Detection levels depend upon the capillary injection port split ratio setting.

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