

# Application Data Sheet

## No. 173

## System Gas Chromatograph

### Detailed Hydrocarbon Analysis of Naphtha Nexis GC-2030PONA2

A representative sample of the Naphtha is introduced into a gas chromatogram equipped with a methyl silicone bonded phase fused silica capillary column. Helium carrier gas transports the vaporized sample through the column in which the components are separated. Components are sensed by a FID as they elute from the column. Each eluting peak is identified and by comparing its retention index to a table of retention indices and by visual matching with a standard chromatogram. The mass concentration of each component is determined by area normalization with response factors. Peaks eluting after n-nonane are summed and reports as C<sub>10</sub><sup>+</sup>.

#### Analyzer Information

##### System Configuration:

One SPL Injector / one capillary column / one FID

##### Sample Information:

Methane  
 Ethane  
 Propane  
 Isobutane  
 n-Butane  
 Neopentane  
 Isopentane  
 n-Pentane  
 2,2-Dimethylbutane  
 Cyclopentane  
 2,3-Dimethylbutane  
 2-Methylpentane  
 3-Methylpentane  
 n-Hexane  
 2,2-Dimethylpentane  
 Methylcyclopentane  
 2,4-Dimethylpentane  
 2,2,3-Trimethylbutane  
 Benzene  
 3,3-dimethylpentane  
 Cyclohexane  
 2-Methylhexane  
 2,3-Dimethylpentane  
 1,1-Dimethylcyclopentane  
 3-Methylhexane

##### Concentration Range:

No.	Name of Compound	Concentration Range	
		Low Conc.	High Conc.
1	Methane	100 ppm	-
2	Ethane	100 ppm	-
3	Propane	100 ppm	-
4	Isobutane	100 ppm	-
5	n-Butane	100 ppm	-
6	Neopentane	100 ppm	-
7	Isopentane	100 ppm	-
8	n-Pentane	100 ppm	-
9	2,2-Dimethylbutane	100 ppm	-
10	Cyclopentane	100 ppm	-
11	2,3-Dimethylbutane	100 ppm	-
12	2-Methylpentane	100 ppm	-
13	3-Methylpentane	100 ppm	-
14	n-Hexane	100 ppm	-
15	2,2-Dimethylpentane	100 ppm	-
16	Methylcyclopentane	100 ppm	-
17	2,4-Dimethylpentane	100 ppm	-
18	2,2,3-Trimethylbutane	100 ppm	-
19	Benzene	100 ppm	-
20	3,3-dimethylpentane	100 ppm	-
21	Cyclohexane	100 ppm	-
22	2-Methylhexane	100 ppm	-
23	2,3-Dimethylpentane	100 ppm	-
24	1,1-Dimethylcyclopentane	100 ppm	-
25	3-Methylhexane	100 ppm	-

**Sample Information:**

cis-1,3-Dimethylcyclopentane  
trans-1,3-Dimethylcyclopentane  
3-Ethylpentane  
trans-1,2-Dimethylcyclopentane  
2,2,4-Trimethylpentane  
n-Heptane  
Methylcyclohexane + cis-1,2-Dimethylcyclopentane  
1,1,3-Trimethylcyclopentane + 2,2-Dimethylhexane  
Ethylcyclopentane  
2,5-Dimethylhexane + 2,2,3-Trimethylpentane  
2,4-Dimethylhexane  
1,trans-2,cis-4-Trimethylcyclopentane  
3,3-Dimethylhexane  
1,trans-2,cis-3-Trimethylcyclopentane  
2,3,4-Trimethylpentane  
Toluene + 2,3,3-Trimethylpentane  
1,1,2-Trimethylcyclopentane  
2,3-Dimethylhexane  
2-Methyl-3-ethylpentane  
2-Methylheptane  
4-Methylheptane + 3-Methyl-3-ethylpentane  
3,4-Dimethylhexane  
1,cis-2,trans-4-Trimethylcyclopentane + 1,cis-2,cis-4-Trimethylcyclopentane  
cis-1,3-Dimethylcyclohexane  
3-Methylheptane + 1,cis-2,trans-3-Trimethylcyclopentane  
3-Ethylhexane + trans-1,4-Dimethylcyclohexane  
1,1-Dimethylcyclohexane  
2,2,5-Trimethylhexane + trans-1,3-Ethylmethylcyclopentane  
cis-1,3-Ethylmethylcyclopentane

No.	Name of Compound	Concentration Range	
		Low Conc.	High Conc.
26	cis-1,3-Dimethylcyclopentane	100 ppm	-
27	trans-1,3-Dimethylcyclopentane	100 ppm	-
28	3-Ethylpentane	100 ppm	-
29	trans-1,2-Dimethylcyclopentane	100 ppm	-
30	2,2,4-Trimethylpentane	100 ppm	-
31	n-Heptane	100 ppm	-
32	Methylcyclohexane + cis-1,2-Dimethylcyclopentane	100 ppm	-
33	1,1,3-Trimethylcyclopentane + 2,2-Dimethylhexane	100 ppm	-
34	Ethylcyclopentane	100 ppm	-
35	2,5-Dimethylhexane + 2,2,3-Trimethylpentane	100 ppm	-
36	2,4-Dimethylhexane	100 ppm	-
37	1,trans-2,cis-4-Trimethylcyclopentane	100 ppm	-
38	3,3-Dimethylhexane	100 ppm	-
39	1,trans-2,cis-3-Trimethylcyclopentane	100 ppm	-
40	2,3,4-Trimethylpentane	100 ppm	-
41	Toluene + 2,3,3-Trimethylpentane	100 ppm	-
42	1,1,2-Trimethylcyclopentane	100 ppm	-
43	2,3-Dimethylhexane	100 ppm	-
44	2-Methyl-3-ethylpentane	100 ppm	-
45	2-Methylheptane	100 ppm	-
46	4-Methylheptane + 3-Methyl-3-ethylpentane	100 ppm	-
47	3,4-Dimethylhexane	100 ppm	-
48	1,cis-2,trans-4-Trimethylcyclopentane + 1,cis-2,cis-4-Trimethylcyclopentane	100 ppm	-
49	cis-1,3-Dimethylcyclohexane	100 ppm	-
50	3-Methylheptane + 1,cis-2,trans-3-Trimethylcyclopentane	100 ppm	-
51	3-Ethylhexane + trans-1,4-Dimethylcyclohexane	100 ppm	-
52	1,1-Dimethylcyclohexane	100 ppm	-
53	2,2,5-Trimethylhexane + trans-1,3-Ethylmethylcyclopentane	100 ppm	-
54	cis-1,3-Ethylmethylcyclopentane	100 ppm	-

**Sample Information:**

trans-1,2-Ethylmethylcyclopentane  
 2,2,4-Trimethylhexane +  
 1,1-Ethylmethylcyclopentane  
 trans-1,2-Dimethylcyclohexane  
 1,cis-2,cis-3-Trimethylcyclopentane  
 trans-1,3-Dimethylcyclohexane + cis-1,4-Dimethylcyclohexane  
 n-Octane  
 Isopropylcyclopentane + 2,4,4-Trimethylhexane  
 cis-1,2-Ethylmethylcyclopentane + 2,3,5-Trimethylhexane  
 2,2-Dimethylheptane  
 cis-1,2-Dimethylcyclohexane  
 2,2,3-Trimethylhexane  
 2,4-Dimethylheptane  
 4,4-Dimethylheptane  
 Ethylcyclohexane + n-Propylcyclopentane  
 2-Methyl-4-ethylhexane  
 2,6-Dimethylheptane  
 1,1,3-Trimethylcyclohexane  
 2,5-Dimethylheptane + 9P  
 3,5-Dimethylheptane + 3,3-Dimethylheptane  
 Ethylbenzene  
 Unidentified Naphthene + 2,3,4-Trimethylhexane  
 m-Xylene  
 p-Xylene  
 2,3-Dimethylheptane  
 3,4-Dimethylheptane + N  
 3,4-Dimethylheptane  
 4-Ethylheptane + N  
 4-Methyloctane  
 2-Methyloctane  
 3-Ethylheptane + N

**Methods met:**

ASTM-D5134

No.	Name of Compound	Concentration Range	
		Low Conc.	High Conc.
55	trans-1,2-Ethylmethylcyclopentane	100 ppm	-
56	2,2,4-Trimethylhexane + 1,1-Ethylmethylcyclopentane	100 ppm	-
57	trans-1,2-Dimethylcyclohexane	100 ppm	-
58	1,cis-2,cis-3-Trimethylcyclopentane	100 ppm	-
59	trans-1,3-Dimethylcyclohexane + cis-1,4-Dimethylcyclohexane	100 ppm	-
60	n-Octane	100 ppm	-
61	Isopropylcyclopentane + 2,4,4-Trimethylhexane	100 ppm	-
62	cis-1,2-Ethylmethylcyclopentane + 2,3,5-Trimethylhexane	100 ppm	-
63	2,2-Dimethylheptane	100 ppm	-
64	cis-1,2-Dimethylcyclohexane	100 ppm	-
65	2,2,3-Trimethylhexane	100 ppm	-
66	2,4-Dimethylheptane	100 ppm	-
67	4,4-Dimethylheptane	100 ppm	-
68	Ethylcyclohexane + n-Propylcyclopentane	100 ppm	-
69	2-Methyl-4-ethylhexane	100 ppm	-
70	2,6-Dimethylheptane	100 ppm	-
71	1,1,3-Trimethylcyclohexane	100 ppm	-
72	2,5-Dimethylheptane + 9P	100 ppm	-
73	3,5-Dimethylheptane + 3,3-Dimethylheptane	100 ppm	-
74	Ethylbenzene	100 ppm	-
75	Unidentified Naphthene + 2,3,4-Trimethylhexane	100 ppm	-
76	m-Xylene	100 ppm	-
77	p-Xylene	100 ppm	-
78	2,3-Dimethylheptane	100 ppm	-
79	3,4-Dimethylheptane + N	100 ppm	-
80	3,4-Dimethylheptane	100 ppm	-
81	4-Ethylheptane + N	100 ppm	-
82	4-Methyloctane	100 ppm	-
83	2-Methyloctane	100 ppm	-
84	3-Ethylheptane + N	100 ppm	-

Detection limits may vary depending on the sample. Please contact us for more consultation.

**System Features**

- Single FID channel
- Good repeatability
- PIONA Report by Dragon DHA Software\*

Typical Chromatograms

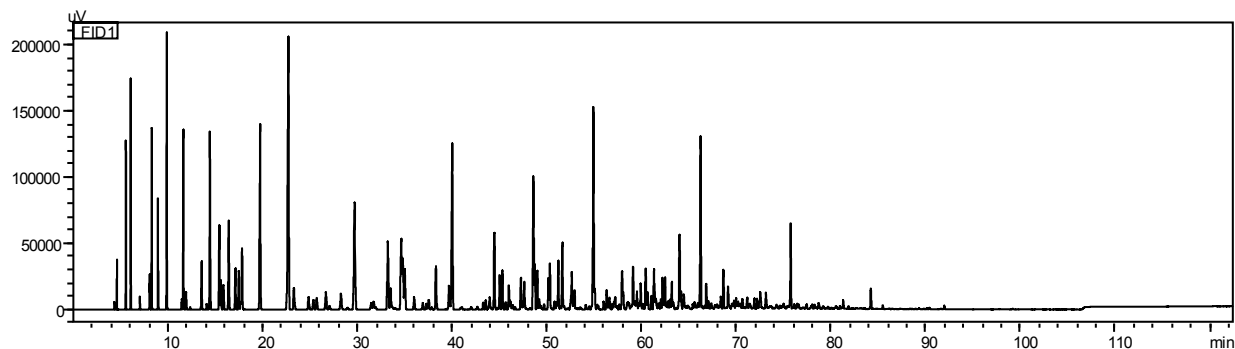


Fig. 1 Chromatogram of FID

SUMMARY REPORT			
Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	16.09	17.27	19.12
I-Paraffins:	19.99	21.17	22.47
Olefins:	0.10	0.10	0.14
Napthenes:	25.26	24.50	30.14
Aromatics:	8.90	8.38	9.92
Total C10+:	28.92	27.84	17.48
Total Unknowns:	0.75	0.73	0.73

Oxygenates:	
Total:	0.00(Mass%) 0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)
Multisubstituted Aromatics:	4.22(Mass%) 3.73(Vol%)
Average Molecular Weight: 119.92	
Relative Density: 0.73	
Reid Vapor Pressure @ 100F: 2.10psi - 14.46kPa	
Calculated Octane Number: 46.5	
Motor Octane Number (Jenkins Calculation): 45.4	
	IBP T10 T50 T90 FBP
BP by Mass (Deg F)	82.11 174.54 258.22 488.66 488.66
BP by Vol (Deg F)	82.11 174.54 258.22 488.66 488.66
Percent Carbon: 85.54	Percent Hydrogen: 14.46
Bromine Number (Calc): 0.15	

Fig. 2 Example of PIONA Report \*

\* Dragon DHA software is registered trademark of Envantage Inc.

First Edition: November,2017

