



# Diablo Analytical, Inc.

A Technology and Development Company

## EZReporter 4.0 Natural Gas Liquids Module

The EZReporter Natural Gas Liquids (NGL) Module is designed to perform standard Natural Gas Liquids extended analysis and reporting based on the GPA 2186-02 and GPA 2186-14 (and related) standards. The results from these calculations are available for reporting, monitoring, trend plotting, and exporting.

### Extended Analysis Calculation Methods

There are several different methods defined in the GPA 2186-02 and GPA 2186-14 methods to calculate extended (Hexanes Plus) analysis results. EZReporter 4.0 supports the following calculation methods:

**Separate:** The TCD and FID extended analysis results are each calculated and reported separately. The TCD results, including C6+, are used to generate the total sample results, while the FID results are used to generate the average extended fraction results.

**Combined/Bridging:** The TCD and FID extended analysis results are combined into a common report with the option of applying "bridge" factors to normalize the relative response from each detector. The C6+ results in the total sample report are derived from the individual combined FID extended component calculated results.

**Allocation:** The individual FID extended component amounts are first adjusted so that the total FID C6+ amount is equal to the total TCD C6+ amount. The C6+ results in the total sample report are then derived from the individual combined FID extended component calculated results.

### Additional Extended Fractions

Typically the extended fraction is based on C6+ components. However, with EZReporter's flexible configuration editor you can define the extended fraction to include whatever component range is needed. In addition, you can also define additional extended fractions to report along side the C6+.

#	Include	Component
19	<input type="checkbox"/>	3-Methylpentane
20	<input type="checkbox"/>	n-Hexane
21	<input checked="" type="checkbox"/>	2,2-Dimethylpentane
22	<input type="checkbox"/>	Methylcyclopentane
23	<input checked="" type="checkbox"/>	2,4-Dimethylpentane
24	<input checked="" type="checkbox"/>	2,2,3-Trimethylbutane
25	<input type="checkbox"/>	Benzene
26	<input checked="" type="checkbox"/>	3,3-Dimethylpentane
27	<input type="checkbox"/>	Cyclohexane
28	<input checked="" type="checkbox"/>	2-Methylhexane
29	<input checked="" type="checkbox"/>	2,3-Dimethylpentane
30	<input checked="" type="checkbox"/>	1,1-Dimethylcyclopentane

### Results Calculated for Extended Fractions

The following "average" results are calculated for the extended fraction:

- Gross Heating Value (BTU / ideal cu. ft.)
- Gross Heating Value (BTU / lbm)
- Gross Heating Value (BTU / gal.)
- Average Molecular Weight
- Vapor Pressure (psia or psig)
- Liquid Density (lbm / gal. and lbm / bbl)
- Relative Liquid Density
- Gas Density (lbm / cu.ft.)
- Volume (cu.ft. / gal.)
- API Gravity

### Extended Calculation Configuration

**Define Extended Fraction Components:**

Last Component in TCD/Total Report: Hexanes Plus

First Component in FID/Extended Report: 2,2-Dimethylbutane

C6+ Combined Component: Hexanes Plus

**Extended Report Calculation Method:** Combined/Bridging

Enable bridging

**Raw Amount Correction (Bridging Factors):**

Apply Correction To:

FID/Extended Components

TCD/Total Components (GPA 2186-14)

**Bridge Factor 1:** TCD/Total Component #1: i-Pentane; FID/Extended Component #1: i-Pentane\*

**Bridge Factor 2:** TCD/Total Component #2: n-Pentane; FID/Extended Component #2: n-Pentane\*



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### Example NGL C6+ Extended Report

The NGL report can be easily customized to add or remove results from the report, change the titles, captions, labels, and fonts.

Diablo EZReporter NGL/Extended Report GPA 2186-14 Allocation Method			
Sample Information			
Sample Information			
Sample Name	GPA 2186-14 Table 5D Example Calculation		
Report Date	2015-02-27 14:19:05		
EZReporter Configuration File	NGL Default (WIPct-Extended-Allocation).cfgx		
NGA Phys. Property Data Source	GPA Standard 2145-09 (FPS)		
Component Results			
Component Name	Norm Mole%	Norm Weight%	Norm Volume%
Nitrogen	0.0780	0.0500	0.0300
Methane	3.2209	1.1830	1.9091
Carbon Dioxide	0.1102	0.1102	0.0657
Ethane	36.6242	25.2130	34.2441
Propane	34.5903	34.9209	33.3179
i-Butane	8.3588	11.1230	9.5631
n-Butane	8.6602	11.5240	9.5455
2,2-Dimethylpropane	0.7180	1.1860	0.9615
i-Pentane	0.4438	0.7330	0.5674
n-Pentane	0.7416	1.2250	0.9399
Hexanes Plus	6.4540	12.7311	8.8558
Total:	100.0000	100.0000	100.0000
Results Summary			
Result	Dry	C6+	
Total Normalized Mole%	100.0000		
Total Normalized Weight%	100.0000		
Total Normalized Liquid Volume%	100.0000		
Gross Heating Value (BTU / lbm)	21565	20517	
Gross Heating Value (BTU / gal.)	87000	118998	
Total Molecular Weight	43.678	86.159	
Total Vapor Pressure (psia)	535.89	5.35	
Total Relative Liquid Density	0.4839	0.6957	
Total Liquid Density (lbm / gal.)	4.034	5.900	
Total Volume (cu.ft. / gal.)	35.0515	25.5466	
API Gravity	160.9	71.9	
C6+ Fraction: Total Raw Amount		12.7310	

Diablo EZReporter NGL/Extended Report

### Optional Modules

The following optional modules can be added to the Natural Gas Liquids Edition to provide additional capability.

- **Results Database Module:** Allows you to capture all results and save them in a local SQLite database. Results in the database can be searched by sample name and date range and can be batch re-processed for printing, exporting or trend plotting.

### Total Components Report

You can choose to print a Total Component Results report in addition to the standard report.

Total Component Results			
Component	Weight%	Mole%	Volume%
Nitrogen	0.0500	0.0780	0.0300
Methane	1.1830	3.2209	1.9091
Carbon Dioxide	0.1110	0.1102	0.0657
Ethane	25.2130	36.6242	34.2441
Propane	34.9209	34.5903	33.3179
i-Butane	11.1230	8.3588	9.5631
n-Butane	11.5240	8.6602	9.5455
2,2-Dimethylpropane	1.1860	0.7180	0.9615
i-Pentane	0.7330	0.4438	0.5674
n-Pentane	1.2250	0.7416	0.9399
2,2-Dimethylbutane	0.6605	0.3348	0.4886
2,3-Dimethylbutane	0.6689	0.3390	0.4856
Cyclopentane	0.9256	0.5764	0.5969
2-Methylpentane	1.1891	0.6027	0.6739
3-Methylpentane	1.0220	0.5180	0.7387
n-Hexane	5.4075	2.7408	3.9405
Benzene	0.9188	0.5138	0.5023
n-Heptane	0.4852	0.2115	0.3412
Toluene	0.7936	0.3762	0.4402
n-Octane	0.3844	0.1470	0.2633
n-Nonane	0.2755	0.0938	0.1846
Total:	100.0000	100.0000	100.0000

### Export to Flow Calculators

EZReporter's flexible Export Template technology allows you to create templates to export results to flow calculators like Flow-Cal and PGAS and most any other flow calculator or database that can import data from text files.

### Monitor Important Results

You can set high/low alarm limits for important results like the Total Un-normalized Amount to monitor the quality of your data.

### Supported Data Systems

EZReporter 4.0 currently supports automatic processing of results from the following chromatography data systems\*

- Agilent Technologies EZChrom (Elite, SI, and OpenLab)
- Agilent Technologies GC/LC ChemStation ("Classic" and OpenLab)
- INFICON EZ IQ
- INFICON Micro GC Fusion

\*Please contact Diablo Analytical regarding support for other chromatography data systems.



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