Sigmafine® App for LNG, LPG & NGL

For use with the OSIsoft® PI System®
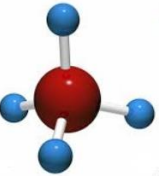
Product Overview
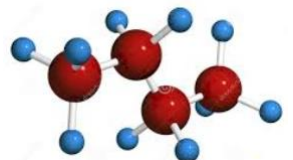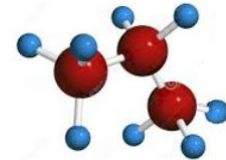
Scope of the Sigmafine App

- LNG - **Liquefied** Natural Gas (Predominantly methane)
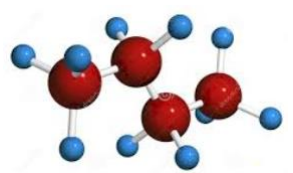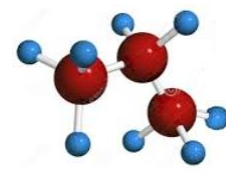 - Liquefaction
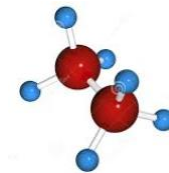 - Regasification
  - Both

- LPG – **Liquefied** Petroleum Gases (Mainly propane and butane)
  - LPG Terminal
  - Refinery Storage

- NGL – Natural Gas **Liquids** (Ethane, propane, butane, others)
  - Gas Plant
  - NGL Terminal & Pipeline

Supported Calculations

- Density Calculation (Klosek McKinley)

$$Density = \frac{\sum (Xi * MWi)}{\sum (Xi * MVi) - Xm * \left(k1 + \frac{(k2 - k1) * Xn}{0.0425} \right)}$$

- Compressibility

$$Z = 1 - P_{std} \left(\sum_{i}^{n} (X_{ind} * b_i)^2 \right)$$

- Tank Energy

$$Tank\ Energy = Volume\ *\ Density\ *\ Mass\ Calorific\ Value$$

Supported calculations(Cont'd)

- Wet to Dry Basis Conversion

$$(N.\,Mole\%)_i\,(Dry\;Basis) = \frac{X_i}{1 - X_{water}}$$

- Normalization

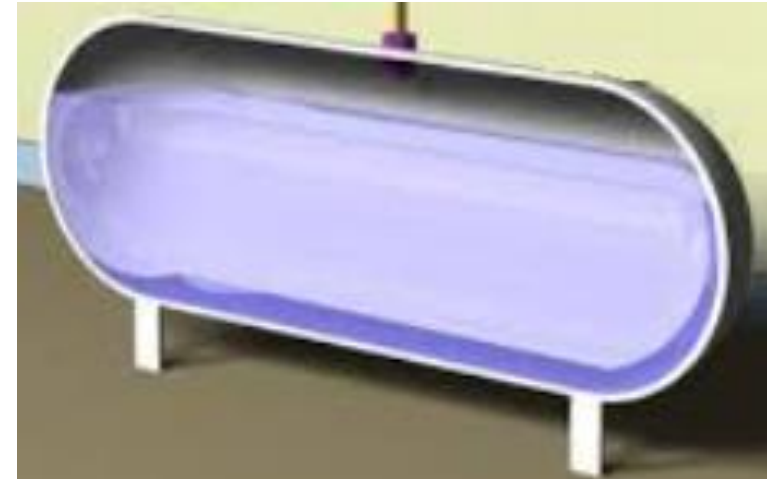$$X_{in} = (N.\,Mole\%)_i = \frac{(Mole\%)_i}{Total\;Mole\%}$$

- Mass Calorific Value

$$Mass\;calorific\;value = \frac{\sum X_{in} * MW_i * H_i}{\sum X_{in} * MW_i}$$

Supported Calculations (cont'd)

- Implementation of GPA TP-27 (24E)

- Covers the following:
  - Liquid phase
  - Temperatures from -51 to 200 °F
  - Densities from ethane to n-heptane
  - Temperature correction only
  - Saturation pressure assumption

Input & Output

Input & Output (cont'd)

- Read Temperature

- Read Density

- Interpolate critical properties

- Perform calculations based on the standard

☐	🔲 i3_VCF	0.96579833342697508
☐	🔲 i3_VCF_Vapor	0.0430134756317569

Propane Calculation

Option
- ● Liquid Volume VCF   ○ Gas Volume VCF

Input Attributes

Material   Material

Temp   i3_Temp

Density   i3_Density

Calculated Attribute Information

Caculated Attribute Name: i3_VCF

Unit of Measure Class: <Dimensionless>

Element Name: TC Stock - C3

OK   Cancel

PIMSOFT
INNOVATIVE SOLUTIONS