

# VLXE THERMODYNAMIC SOLUTIONS

VLXE Excel Add in gives access to the calculations and databases with in Excel

**VLXE - Characterization**

Names	Molar mass [g/mole]	Feed [Molefraction]
N2	28.013	0.002330
CO2	44.01	0.005890
H2S	34.082	0.001510
C1	16.043	0.183200
C2	30.07	0.039970
C3	44.097	0.057500
i-C4	58.123	0.005940
n-C4	58.123	0.029160
i-C5	72.146	0.013510
n-C5	72.146	0.023440
Oil C6	84	0.040470
C7	98	0.034730
C8	107	0.026950
C9	119	0.055970
C10	144	0.033030
C11+	474	0.446400
Oil C12	161	
Oil C13	175	
Oil C14	190	
Oil C15	206	

Molar mass [g/mole]	Feed [Molefraction]
203.8740	0.281200
368.4025	0.155600
562.2657	0.102000
982.4343	0.058300

T [Kelvin]	T [Celsius]	P [Bar]	Viscosity [cP]	Density [g/cm3]
390.45	117.32	343.2328	17.372	0.8599
390.45	117.32	294.1995	16.277	0.8561
390.45	117.32	245.1663	15.182	0.8519
390.45	117.32	196.1330	14.087	0.8476
390.45	117.32	147.0998	12.991	0.843
390.45	117.32	98.0666	11.896	0.838
390.45	117.32	88.34907	11.677	0.8364

Temperature [Celsius]	Pressure [Bar]	Density g/cm3
117.3200	343.232750	0.8599
117.3200	294.199500	0.8561
117.3200	245.166250	0.8519
117.3200	196.133000	0.8476
117.3200	147.099750	0.843
117.3200	98.066500	0.838
		0.8364

## VLXE for Oil and Gas Module

Offers wide range of calculations for standard systems from setting up of project sheets to linkage of flash units

# VLXE APS

# VLXE

## ADVANTAGES and MODELS

---

*VLXE offers broad variety of computations for*

### Calculations

### Applications

#### Characterization of Oil Mixture

- Characterization of oil mixture on the basis of pseudo components.
- Fitting of saturation temperature and pressure.
- Fitting of viscosity and density data.
- Setting up of project sheets with calculated parameters.
- Calculation of molar and mass fraction

#### General Oil and Gas Calculations

- Differential Depletion.
- Constant Volume Depletion.
- Separator Test.
- Constant Mass Expansion.
- Thermal Conductivity.

#### Create Flow Simulator Input Files

- Input files for OLGA.
- Input files for PIPEPHASE.
- Input files for IPM.

### Thermodynamic Models

All phase equilibria calculations performed in VLXE are based on the use of cubic equations of state (EOS). Five EOS are included in VLXE. Depending on the EOS a different number of mixing rules are included.

#### Equation of States

- Peng/Robinson
- Soave/Redlick/Kwong
- Sanchez/Lacombe (Original)
- Sanchez/Lacombe (Ideal Gas Limit)
- PC-SAFT

#### Models For Ideal Gas Heat Capacity

- DIPPR
- Polynomial Expression

# VLXE For Excel Add in

Setting up of Project from Original Oil and Gas Data is Simple and Robust  
Due To Excel Add in Features

Names	Molar mass [g/mole]	Feed [Molefraction]
N2	28.013	0.002330
CO2	44.01	0.005890
C1	34.082	0.001510
C2	16.043	0.183200
C3	30.07	0.039970
C4	44.097	0.057500
n-C4	58.123	0.005940
i-C4	58.123	0.029160
n-C5	72.146	0.013510
i-C5	72.146	0.023440
Oil C6	84	0.040470
Heavy 1	98	0.034730
C8	107	0.026950
C9	119	0.055970
C10	144	0.033030
C11+	474	0.446400
Oil C12	161	
Oil C13	175	
Oil C14	190	
Oil C15	206	

Define the  
Original Data

Transfer the Data  
to VLXE and  
Characterize

T [Kelvin]	T [Celsius]	P [Bar]	Viscosity [cP]	Density [g/cm3]	
390.45	117.32	343.2328	17.372	0.8599	
390.45	117.32	294.1995	16.277	0.8561	
390.45	117.32	245.1663	15.182	0.8519	
390.45	117.32	196.133	14.087	0.8476	
390.45	117.32	147.0998	12.991	0.843	
390.45	117.32	98.0665	11.896	0.838	
(Saturation point)	390.45	117.32	88.34907	11.677	0.8364

Temperature [Celsius]	Pressure [Bar]	Density [g/cm3]
117.3200	343.232750	0.8599
117.3200	294.199500	0.8561
117.3200	245.166250	0.8519
117.3200	196.133000	0.8476
117.3200	147.099750	0.843
117.3200	98.066500	0.838
		0.8364

Fit Density  
Data

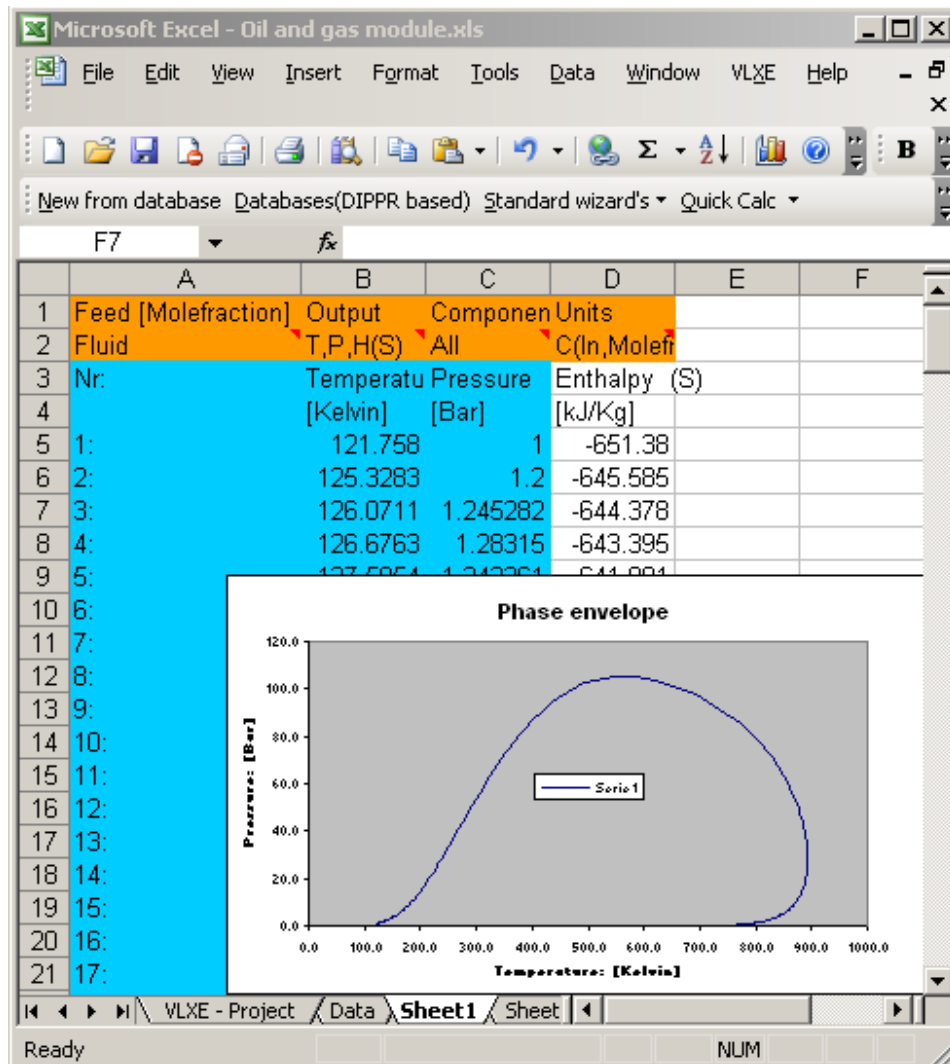
Generate  
Report

	Pc [Bar]	Ace
17	126.2	33.98
18	304.12	73.74
19	373.4	89.63
20	190.56	45.99
21	305.32	48.72
22	369.83	42.48
	407.85	36.4
	425.12	37.96
	460.39	33.81
	469.7	33.7
	509.84	28.61
	693.8967131	20.85437394
	818.2281728	13.60640886

# VLXE Examples

## Phase Envelope

All the standard calculations are available for oil systems



Phase Envelope

# VLXE Examples

## Differential Depletion

*In addition to the standard calculations all the common oil and gas calculations are also available.*

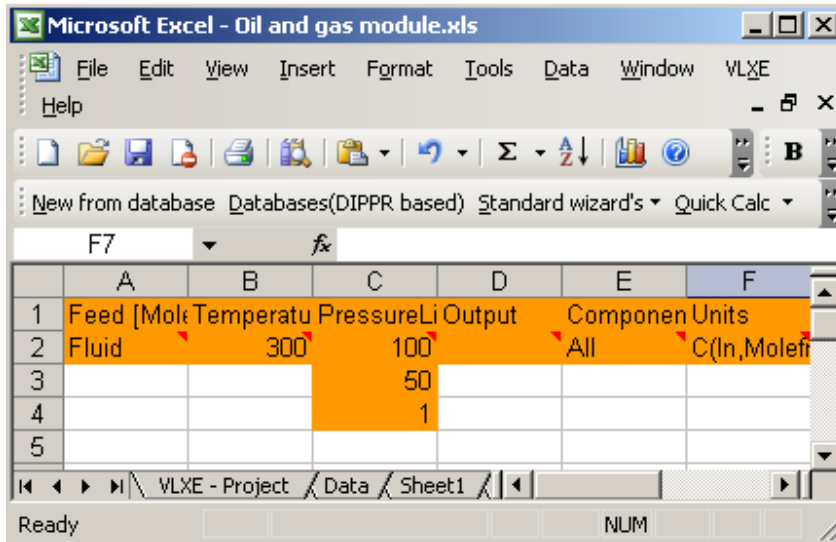
1	Feed [Mole]	Temperature	Pressure	Output	Component Units	Property	Flash: 1	Flash: 2	Flash: 3				
2	Fluid	300	100	Fixed 2D	All	C(In, Molefr)	Pressure [	100	50	1			
3			50			Temperature	573.15	573.15	573.15				
4			1				Feed	Heavy	Light	Heavy	Light	Heavy	Light
5						N2 [Molefr:	0.00233	0.002153	0.011064	0.000775	0.007722	2.68E-06	0.001407
6						CO2 [Mole	0.00589	0.005645	0.017978	0.002882	0.016812	1.85E-05	0.005223
7						H2S [Mole	0.00151	0.001475	0.003241	0.000941	0.003634	9.73E-06	0.001702
8						C1 [Molefr:	0.183196	0.174248	0.625053	0.082036	0.546976	0.000452	0.148724
9						C2 [Molefr:	0.039969	0.03892	0.091773	0.023992	0.099262	0.000232	0.043413
10						C3 [Molefr:	0.057499	0.056655	0.099191	0.040938	0.120182	0.000595	0.073915
11						i-C4 [Mole:	0.00594	0.00589	0.008385	0.00468	0.010783	9.12E-05	0.008431
12						n-C4 [Mole:	0.029159	0.028986	0.03771	0.023856	0.049724	0.000522	0.04293
13						i-C5 [Mole:	0.01351	0.013498	0.014094	0.012035	0.019413	0.000358	0.02158
14						n-C5 [Mole:	0.02344	0.023443	0.023287	0.021237	0.032356	0.000675	0.038046
15						Oil C6 [Mo	0.040469	0.040672	0.030452	0.039945	0.04361	0.001895	0.071049
16						Heavy 1 [In	0.281194	0.286165	0.035726	0.345175	0.047648	0.15874	0.497571
17						Heavy 2 [In	0.155597	0.158708	0.001957	0.197521	0.001826	0.383799	0.045252
18						Heavy 3 [In	0.101998	0.104062	8.8E-05	0.129794	5.24E-05	0.287651	0.000757
19						Heavy 4 [In	0.058299	0.059479	2.13E-07	0.074195	4.92E-08	0.164961	1.76E-07
20													
21						Phase frac		0.980151	0.019849	0.801668	0.198332	0.449771	0.550229
22						Phase frac		0.99721	0.00279	0.968521	0.031479	0.745308	0.254692

Differential Depletion

# VLXE Examples

## Separator Test

---



The screenshot shows a Microsoft Excel window titled "Microsoft Excel - Oil and gas module.xls". The spreadsheet contains a table with the following data:

	A	B	C	D	E	F
1	Feed [Mole	Temperatu	Pressure	Li Output	Componen	Units
2	Fluid	300	100		All	C(In,Molefi
3			50			
4			1			
5						

Separator Test

# VLXE Examples

## Constant Mass Expansion

	A	B	C	D	E	F	G	H	I	J	K
1	Feed [Mole]	Temperature	Pressure	Output	Component	Units	Temperature	Pressure [	Volume [ci]	Relative vo	Comments
2	Fluid	300	100		All	C(ln,Molefr	573.15	105.0449	374.9555	1	Saturation
3			50				573.15	100	382.0336	1.018877	Two phase
4			1				573.15	50	547.7999	1.460973	Two phase
5							573.15	1	32130.86	85.69247	Two phase
6											

Constant  
Mass  
Expansion

# VLXE Examples

## Create Flow Simulator Input Files

---

```

out.txt - Notepad
File Edit Format View Help
|' ENTROPY'                               Agbamí#2  2 16.5_AG_10 SSB  3024A Tuned SRK Pc
3 3
6.000000E+001  4.000000E+002
2.000000E+006  -1.000000E+002
7.575796E+005  1.050448E+007  0.000000E+000  0.000000E+000  1.466575E+000
0.000000E+000
GAS DENSITY (KG/M3)
1.034616E+001  2.152274E+001  6.358039E+001  1.130319E+001  6.154084E+001
1.300259E+002  1.226022E+001  8.921778E+001  -1.172953E+001
LIQUID DENSITY (KG/M3)
8.157150E+002  6.964765E+002  3.241998E+002  8.166208E+002  6.622178E+002
2.444713E+002  8.174607E+002  6.635121E+002  3.577326E+002
DRHOG/DP (S2/M2)
1.444170E+000  1.107284E+000  3.296193E+000  1.442901E+000  7.737339E-001
1.497194E+000  1.441632E+000  6.523555E-001  5.912874E-002
DRHOL/DP (S2/M2)
1.569099E-002  3.371360E-001  1.213142E+001  1.452626E-002  3.629844E-001
2.435843E+000  1.349109E-002  3.052654E-001  1.452485E+000
DRHOG/DT (KG/M3/K)
-6.962353E-002  -4.386259E-002  -1.019879E-001  -5.860679E-002  -1.383604E-001
-1.898406E-001  -4.759005E-002  -8.312616E-002  -8.500399E-002
DRHOL/DT (KG/M3/K)
-2.103806E-001  -6.759940E-001  -2.526819E+000  -2.001212E-001  -7.230620E-001
-5.120235E-001  -1.908136E-001  -6.445444E-001  -5.694163E-001
GAS MASS FRACTION (-)
0.000000E+000  7.214155E-002  1.000000E+000  0.000000E+000  1.426841E-002
1.000000E+000  0.000000E+000  0.000000E+000  0.000000E+000

```

OLGA  
Files

---

*VLXE is accessible on our website and may be downloaded. If you are interested and would like more information please contact VLXE by means of any of the following address*

**Postal Address**

**VLXE ApS  
Dr. Torben Laursen  
Scion-DTU, Building 376  
Diplomvej  
2800 Lyngby  
Denmark**

**Electronic Address**

Phone +45 88 70 81 54  
Cell phone +45 27 20 02 16  
Fax +45 88 70 80 90  
e-mail [info@vlxe.com](mailto:info@vlxe.com)  
Homepage [www.vlxe.com](http://www.vlxe.com)  
Homepage [www.onlinepvt.com](http://www.onlinepvt.com)



*VLXE Thermodynamic Software and Logos are trademarks of VLXE ApS. All right reserved*