

CAPE-OPEN Update in PRO/II v9.2 and Patch1



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Agenda



- ❑ Support for VLLE thermo through CAPE-OPEN in PRO/II v9.2 with Demo
- ❑ Enhancements in PRO/II v9.2 Patch1

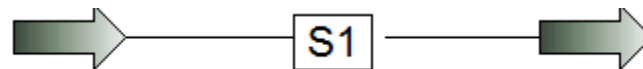
New features added in PRO/II v9.2



- ❑ Support for VLLE Thermo through CAPE-OPEN
 - ❑ Material objects using Property Package of CAPE-OPEN thermo v1.0 and v1.1
 - ❑ Material objects using native PRO/II thermo
 - ❑ Predicts Liquid1 and Liquid2 phases if the property package / native PRO/II thermo supports VLLE.

New features added in PRO/II v9.2

Example: Stream using Multiflash CAPE-OPEN thermo v1.1 Property Package



PRO/II - Stream Data

UOM Range Help Tag Overview Status Notes

Stream: Description:

To Unit: (Product Stream)

Stream Type

- Composition Defined**
- Petroleum Assay
- Spiral CrudeSuite
- Referenced to Stream
- Solids Only Stream

Thermal Condition

First Specification:

kPa

Second Specification:

Fraction

Thermodynamic System:

Push to bring up the flowrate and composition window

Stream Data - Flowrate and Composition

UOM Range Help Tag

Specify flowrate and composition for stream S1

Fluid Flowrate Specification:

- Total Fluid Flowrate: kg-mol/hr Total LV or GV rate on an Adjusted Standard Basis
- Individual Component Flowrates
- Component Concentrations kg-mol/hr

Copy	Component	Composition Mole
Paste	H2O	0.25000
	DEG	0.25000
	C12H26	0.25000
	ETHANOL	0.25000

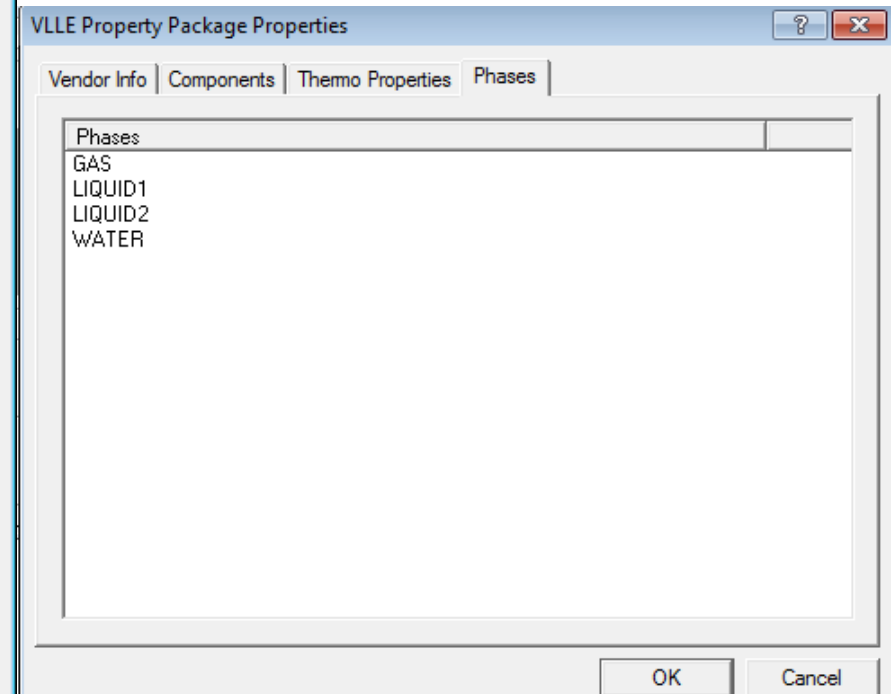
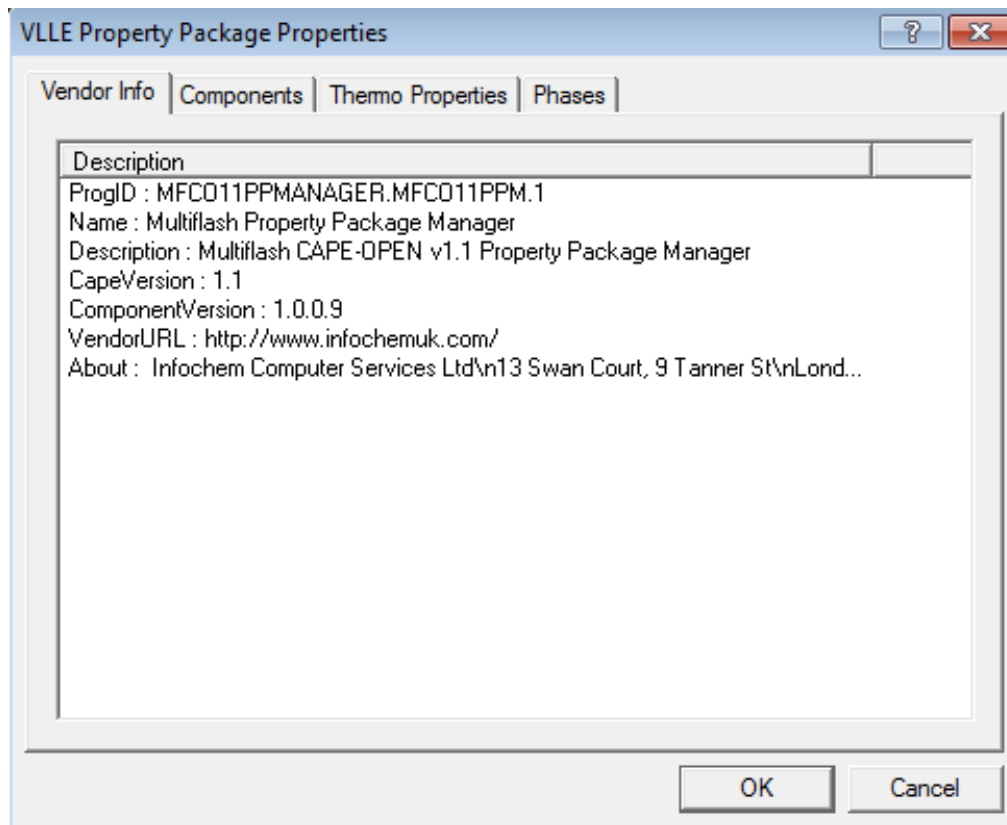
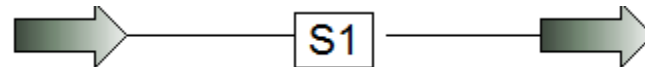
Total: 1.0000

Normalize Component Flowrates Based on Specified Fluid Flowrate

Exit the window after saving all data

New features added in PRO/II v9.2

Example: Stream using Multiflash CAPE-OPEN thermo v1.1 Property Package



New features added in PRO/II v9.2



Stream Physical Properties

	Total	Vapor	Liquid 1	Liquid 2
Rate, KG-MOL/HR	1.0000	0.4426	0.2209	0.3365
Temperature, K	400.00	400.00	400.00	400.00
Pressure, KPA	101.50	101.50	101.50	101.50
Molecular Weight	85.1370	43.0391	169.6130	85.0430
Fraction		0.4426	0.2209	0.3365
Enthalpy, KJ/KG-MOL	-17249.0221	7416.6382	-18779.5037	-48690.7370
Cp, KJ/KG-K	2.4727	1.8884	2.5048	2.8196

New features added in PRO/II v9.2

Molar Flowrates, KG-MOL/HR

Comp No.	Component	Total	Vapor	Liquid 1	Liquid 2
1	H ₂ O	0.2500	0.1896	5.6813E-04	0.0599
2	DEG	0.2500	3.6258E-03	4.0978E-05	0.2463
3	C ₁₂ H ₂₆	0.2500	0.0302	0.2198	1.3795E-10
4	ETHANOL	0.2500	0.2192	5.7669E-04	0.0302

Molar Compositions

Comp No.	Component	Total	Vapor	Liquid 1	Liquid 2
1	H ₂ O	0.2500	0.4283	2.5714E-03	0.1780
2	DEG	0.2500	8.1922E-03	1.8547E-04	0.7321
3	C ₁₂ H ₂₆	0.2500	0.0683	0.9946	4.0999E-10
4	ETHANOL	0.2500	0.4952	2.6102E-03	0.0899

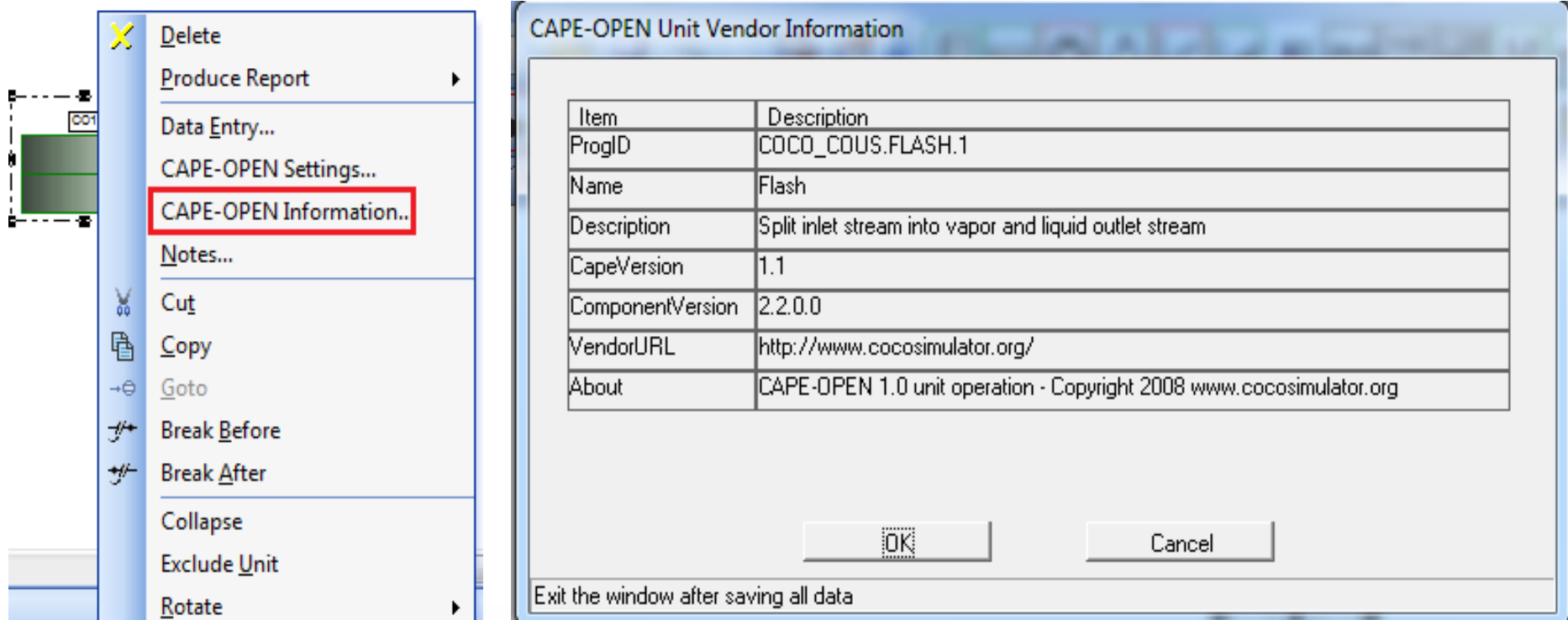
New features added in PRO/II v9.2

Live demonstration of VLLE support through CAPE-OPEN in PRO/II

- ❑ ***Stream using MultiFlash thermo v1.0 & v1.1 Property package***
- ❑ ***COCO Flash unit using PRO/II native thermo***

Enhancements added in PRO/II v9.2 Patch1

- CAPE-OPEN Unit information: Right click on CAPE-OPEN unit operation gives the option "CAPE-OPEN Information..." which display the vendor information such as ProgID, Name, Description, CapeVersion, VendorURL and About etc



The image shows a screenshot of the PRO/II software interface. On the left, a context menu is open over a CAPE-OPEN unit, with the "CAPE-OPEN Information..." option highlighted in red. On the right, a dialog box titled "CAPE-OPEN Unit Vendor Information" is displayed, containing a table with the following data:

Item	Description
ProgID	COCO_COUS.FLASH.1
Name	Flash
Description	Split inlet stream into vapor and liquid outlet stream
CapeVersion	1.1
ComponentVersion	2.2.0.0
VendorURL	http://www.cocosimulator.org/
About	CAPE-OPEN 1.0 unit operation - Copyright 2008 www.cocosimulator.org

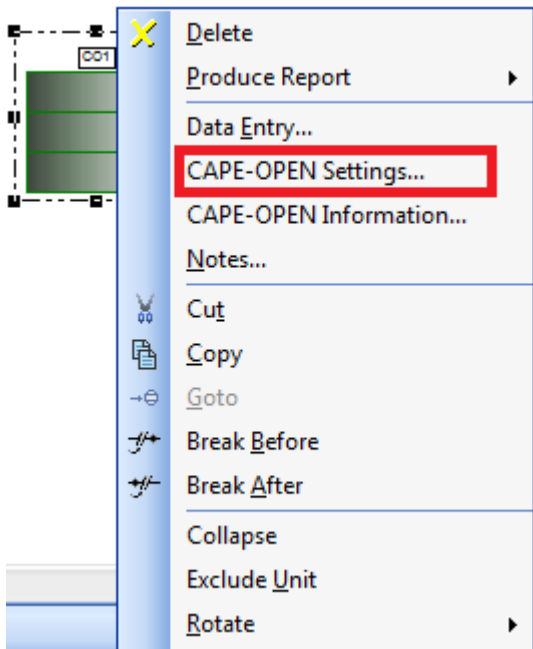
At the bottom of the dialog box, there are "OK" and "Cancel" buttons, and a note that says "Exit the window after saving all data".

Enhancements added in PRO/II v9.2 Patch1



- ❑ CAPE-OPEN Default GUI improvements:
 - ❑ The display of CAPE_OPTION parameters is supported. A list box with all the options is displayed.
 - ❑ The display of CAPE_ARRAY parameters (real, integer, boolean and option) is supported. Each array element is displayed in a separate row.
 - ❑ The display of Boolean parameter is changed to check box.
 - ❑ The range is added for integer parameter widget.

Enhancements added in PRO/II v9.2 Patch1



PRO/II - CAPE-OPEN Unit

UOM Define Range Help Overview Status Notes

Unit: Description:

CAPE-OPEN Unit Ports:

Name	Direction	Stream	Thermodynamic System
FEED_1	inlet	Not connected	
FEED_2	inlet	Not connected	
FEED_3	inlet	Not connected	
PRODUCT_1	outlet	Not connected	Default
PRODUCT_2	outlet	Not connected	Default

CAPE-OPEN Unit Parameters:

Name	Mode	Value	UOM
MO_DIAGNOSTICS	in	<input type="checkbox"/>	
SPLIT_FRACTION[1]	in	0.00000	
SPLIT_FRACTION[2]	in	0.00000	
SPLIT_FRACTION[3]	in	0.00000	
HEAT_INPUT	in	0.00000	x 10 ⁶ BTU/hr
IntegerInput	in	20	
BooleanInput	in	<input checked="" type="checkbox"/>	
OptionInput	in	BLUE	

OptionInput dropdown menu:

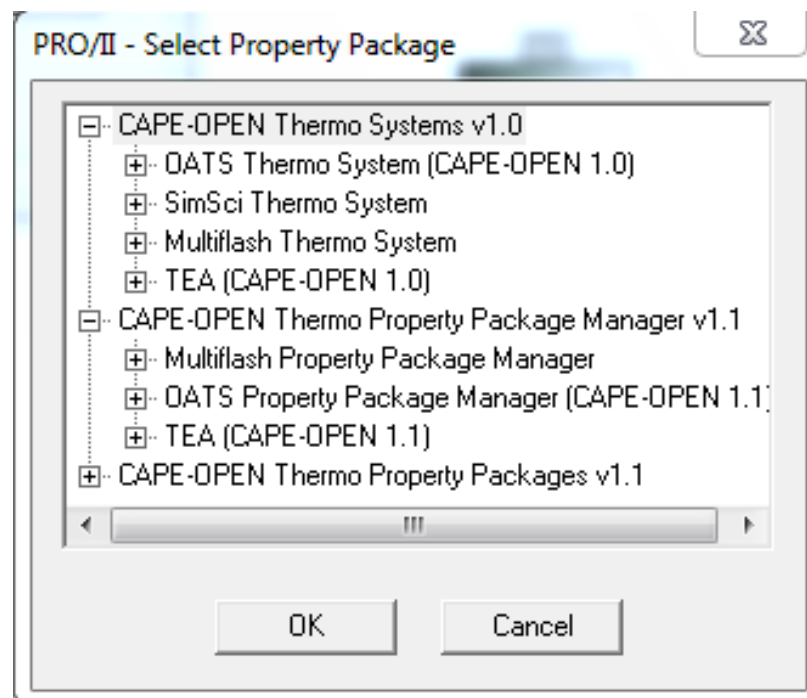
- RED
- BLUE
- GREEN

OK

Select the option for this parameter

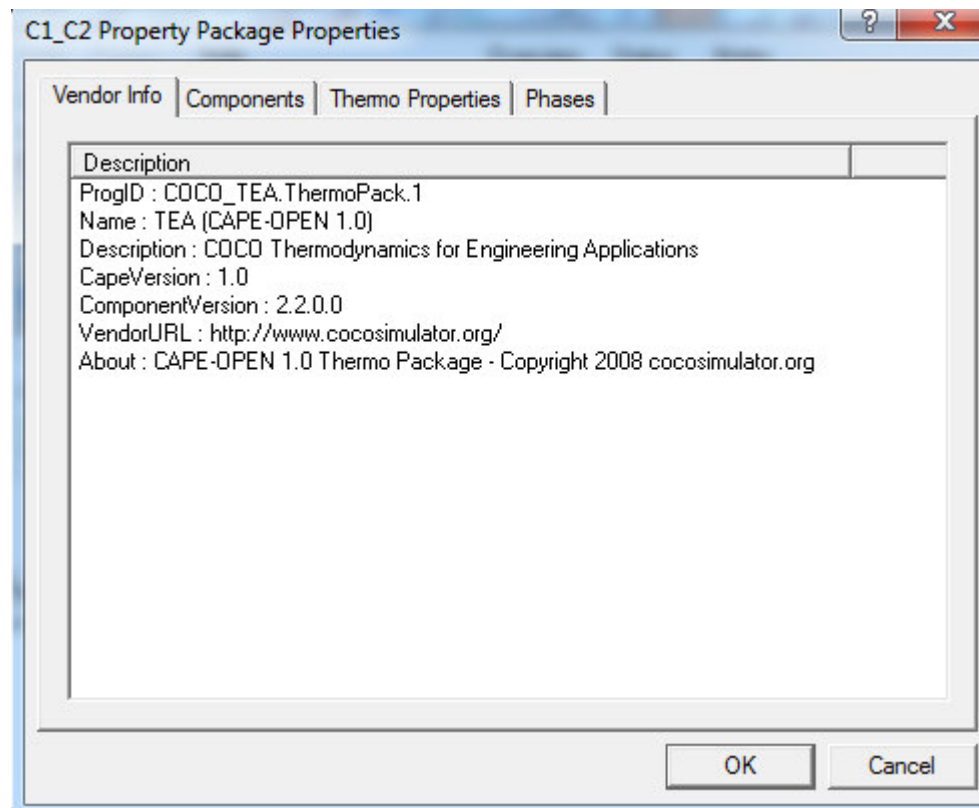
Enhancements added in PRO/II v9.2 Patch1

- CAPE-OPEN Thermo System and Property Package Managers List: Clicking on CAPE-OPEN thermo display all the registered CAPE-OPEN Thermo Systems (v1.0) and Property Package Managers (v1.1) by name instead of ProgID.



Enhancements added in PRO/II v9.2 Patch1

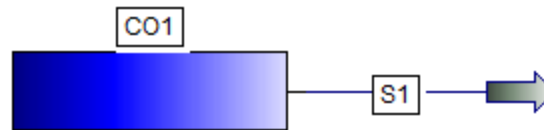
- CAPE-OPEN Thermo Information: ProgID and Name are added to the Vendor Info. Click on "View" display the Vendor Info.



Enhancements added in PRO/II v9.2 Patch1



- CAPE-OPEN unit with no feed stream: This is supported starting with version 9.2.1. XFlowLoader unit is a feed-block. Having a feed stream to it does not make sense as this is the purpose of the unit.



Enhancements added in PRO/II v9.2 Patch1

- ❑ Support for Pressure-Entropy and Temperature-Entropy flash types:
 - ❑ Material objects using CAPE-OPEN thermo Property Package of v1.0 & v1.1
 - ❑ Material objects using native PRO/II thermo

Thank you...

Q&A?