

The CONTACTOR[™]

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The ProTreat[®] COM Interface

Most software packages used in chemical engineering run on the same Windows platforms but they are all separate applications running independently and completely unconnected from each other. It often happens that the computed results from one application need to be used in another to perform different computations. It would be nice if these applications could “talk” to, or interface with, each other and obviate the need for operator or engineer intervention to transfer data manually.

Another frequent occurrence is the need to use a thermodynamic model or a unit operation that either is not available in the simulator of choice or is better done by an in-house model or one available in another more specialized simulator.

CAPE-OPEN (Computer Aided Process Engineering OPEN simulation environment) is a software interfacing technology that was first standardized in 1995. It allows a chemical engineering Process Modeling Environment (PME), i.e., a process flow sheeting package, to interface in a completely plug-and-play fashion with a Process Modeling Component (PMC). This obviates the need for the engineer to write computer code to enable intercommunication. A PME is typically a fully flexible flow-sheeting package with its own built in unit operations modules, thermodynamic models, and solution procedures. A PMC is a component such as a thermodynamic model or a unit operation. CAPE OPEN is a standard for an interface between the PME and the PMC, specifically in chemical engineering..

An interface marks a clear boundary between code that calls a method (e.g., a PME) and code that implements the method (e.g., a PMC). CAPE OPEN is an example. It is based, in part, on Microsoft's Component Object Model (COM) framework. COM is the foundation technology behind Microsoft's OLE (object linking and embedding) and ActiveX (internet enabled components). Put simplistically, COM allows an application to expose a programming interface to users who wish to control features of that application programmatically.

ProTreat is a fully flexible flowsheeting package with its own thermodynamics, methods, and unit operations models currently specialized to gas treating and sulphur recovery. It is not a PMC; it is a specialized PME. Over the years, we've had feedback from a number of customers to allow the ProTreat[®] simulator itself to be customized or controlled from another application. This is now possible through Microsoft's Component Object Model (COM) framework that is implemented in ProTreat.

A COM programming interface is more general than CAPE OPEN, and it allows the user to write a program or script that can:

- Open flowsheets,
- Make changes to many flowsheet inputs,
- Run flowsheets,
- Mine **all** ProTreat simulation results data.

Since these actions are programmable with COM, a wide range of new uses is now possible with ProTreat. For example:

- Complex case studies to evaluate process unit performance dependencies, new control systems can be conducted
- Unit monitoring: compare calculated to measured performance, reconcile plant data, and benchmark performance
- Generate custom reports
- Automatically transfer ProTreat output to a third party program (HTRI, Icarus, etc.)

In this issue of the Contactor, we show an extremely simple example of using a COM interface. This certainly not intended to be a tutorial on how to set up and write a COM interface. Rather, we will show how to utilize ProTreat's COM interface to generate a simple vapor pressure curve for a rich amine stream. Such data might be useful for sizing a control valve, for example, and the data may need to be transferred to another sizing utility program.

Figure 1 shows the simple flowsheet with the rich amine stream in question along with the original

simulation input parameters. For the sake of demonstration, a **Solver** block is used to adjust the pressure of *Material Stream 1* until the vapor fraction is a suitably small value (0.001) to put the stream at essentially its vapor pressure.

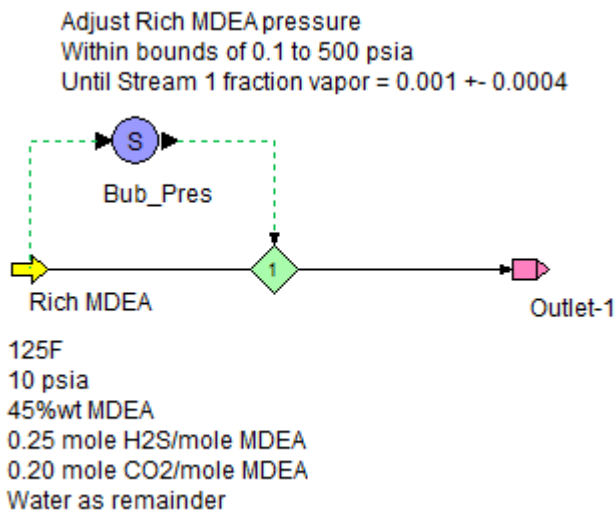


Figure 1 Determining Bubble Point Pressure

As a demonstration, Microsoft Excel was used to drive ProTreat via the COM interface to calculate vapor pressures over the range 80-140°F at 10°F intervals. (Note: we could have used ProTreat's **Case Study** feature to determine the corresponding vapor pressures, but the objective here is demonstrate the COM interface.)

Figure 2 shows a snapshot of the spreadsheet temperature, temperature step layout. Input size, and number of temperature steps to take. The **Run Study** button executes the code of subroutine *StepTemperatureAndTabulateResults* which supplies the input data to ProTreat. This is the simplest possible example of how meaningful calculations can be done directly from a spreadsheet simply by entering the data into the spreadsheet and launching calculations via the button **Run Study** to execute the code of *StepTemperatureAndTabulateResults*. This subroutine accesses the COM interface both of ProTreat and of Microsoft Excel to work them in tandem.

The COM interface was added for user convenience and is provided free of charge to all licensed ProTreat customers. All that is required is to contact info@protreat.com or call +1 281 970 2700 to have your ProTreat key reprogrammed for automation. A User Manual and several examples can be furnished if requested, and OGT Applications Engineers are available to help you.

To learn more about this and other aspects of gas treating, plan to attend one of our training seminars. Visit www.protreat.com/seminars for details.

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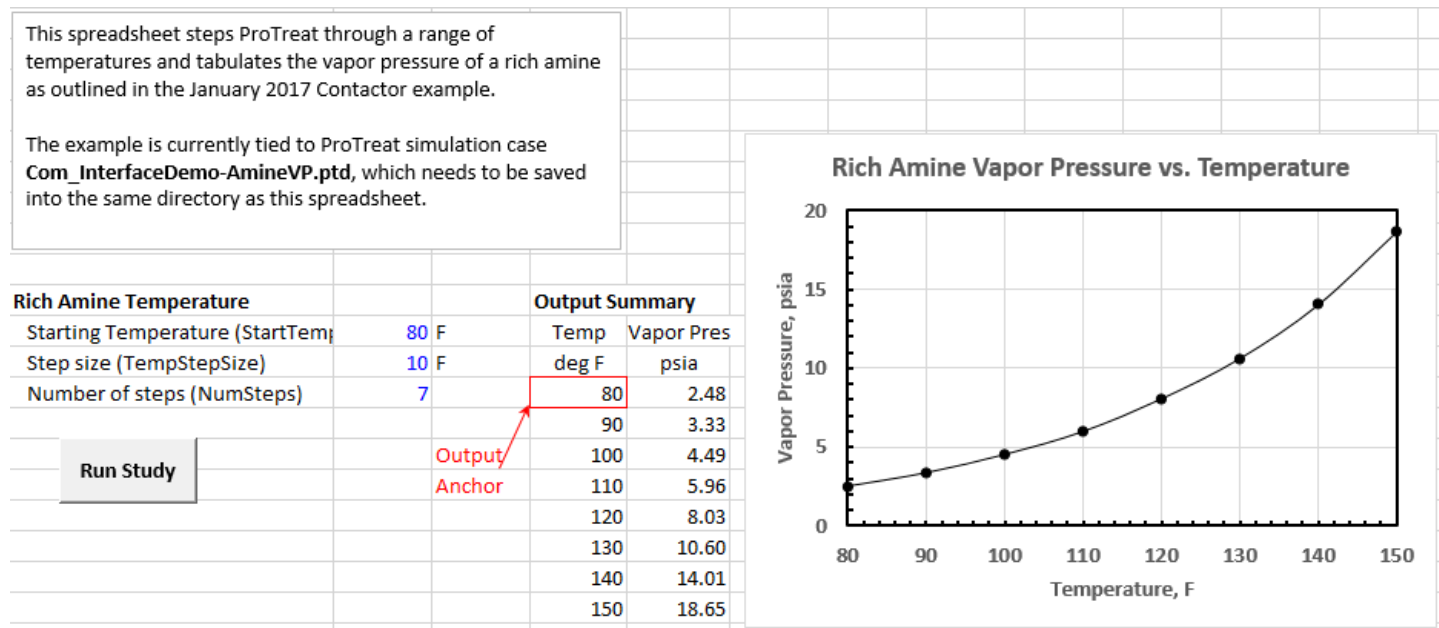


Figure 2 Excel Spreadsheet Used to Drive ProTreat Calculations of Stream Vapor Pressure