



Innovators in Engineering Education Technology

INVESTING IN TOMORROW'S PROCESS TECHNOLOGISTS

The Process Technology (PTEC) program at Los Medanos College in Northern California is one of more than 50 programs nationwide that are preparing students to be the operators in refineries, chemical plants, and related industries. "Industry and societal expectations for safety and environmental stewardship in the process industry have never been higher than they are today. Advance process technology education for operators will take us to the next step toward zero safety and environmental incidents," said David Kail, Director for the PTEC program.

The award-winning Los Medanos College program is modeled on a curriculum that is currently taught at community colleges and universities around the United States and two international colleges. LMC is the only college in Northern California to offer this program, and is considered to be in the top 10 of all the institutes preparing students for a PTEC degree. Despite the LMC program being developed just 5 years ago, the college has built an excellent collection of hi-tech equipment, with the help of a government grant.

Distillation is at the heart of refining and many chemical manufacturing operations. LMC teaches distillation to PTEC students in three ways. First, students are introduced to the equipment and high-level theory of separation of compounds by boiling point differences in the classroom. Next, they perform a distillation experiment using an Armfield UOP3CC Computer-Controlled Continuous Distillation Column in the laboratory to see theory put into practice. Finally, students utilize a high-fidelity computer simulation program to run a full-scale distillation column in the virtual world, which simulates large industry technologies.

Students at LMC are getting real-life hands-on experience in distillation using Armfield's UOP3CC which has direct application to the process industry. Students start up the column using a set of operating instructions. They then apply distillation principles learned in the classroom using the Armfield control module. Armfield UOP3CC allows students to establish a temperature profile across the column and monitor the column differential pressure.

Equally important, students are able to demonstrate an energy balance on the condenser by adjusting cooling water flow rate and observing the temperature changes in the outlet water temperature.

When students start up the Armfield UOP3CC, the thermocouples throughout the entire unit allow them to visualize each separation tray getting hot and monitor the temperature profile across the column, ensuring students have validation of what they are taught in lectures. The column also enables students and instructors to look behind the insulation lagging to investigate how distillation occurs on each of the trays.

It is critically important that the theory and skills students learn can be applied once they become fully-fledged process technicians. Oil refineries take crude oil and use distillation to separate out components such as propane/butane/LPG, gasoline, diesel, and other fractions by boiling point differences. The LMC laboratory uses water and propylene glycol in the UOP3CC, but it separates by boiling point in the same way.



LMC student working with UOP3CC

Find out about Armfield UOP3CC's unique features overleaf!

www.discoverarmfield.com

heat transfer | fluid mechanics | mechanical engineering | chemical engineering | food technology | geoscience
fluid machines | hydraulics & hydrology | water treatment | thermodynamics | process control | unit operations



armfield > learn more!

Even though students will scale up from a 2" column to 20" column, the principles they learn are identical.

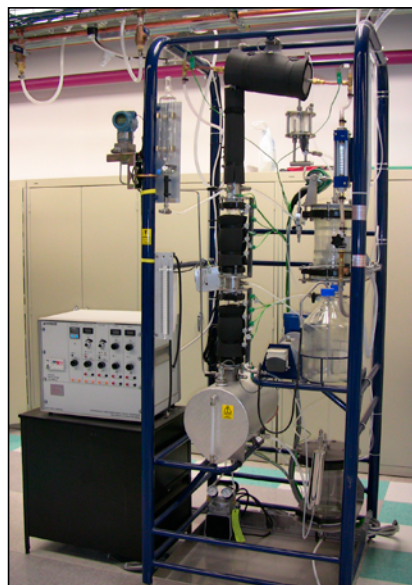
When LMC researched requirements for a distillation column, it was imperative that the unit provided true to life experiences, was large enough to get a number of students around, and constructed with glass so flooding inside the distillation column was easily visible.

LMC considered two other comparable units, but chose the Armfield UOP3CC Distillation Column as it was the only intrinsically safe unit – this was critical in an area where there could be no question of fire safety. The striking UOP3CC was selected partly due to the external control panel, which allowed LMC to perform exactly what they needed.

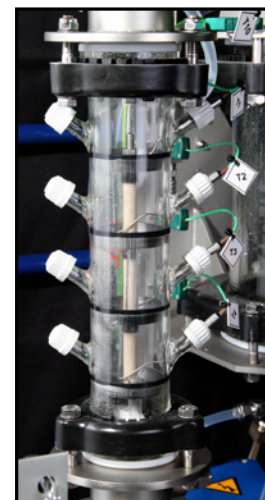
In addition to UOP3CC, LMC, purchased a true-to-life outdoor pilot unit consisting of two 300 gallon tanks of water and 3 centrifugal pumps. The laboratory includes cut-away models, process control trainers and pump, high fidelity simulators, and analytical instruments, making it one of the best equipped facilities of its kind in the United States.

“Students remember their hands-on laboratory experiences more than any other part of their education”, said David Kail. “The memories that they take with them from working with the UOP3CC Computer-Controlled Continuous Distillation Column will stay with them for their entire working career”.

Read more at www.discoverarmfield.com/data/uop3
www.losmedanos.edu/departments/ptech/default.asp



LMC's UOP3CC with console



Unique sampling features

Fitted as standard, or available as a retrofit to existing units, UOP3CC has been enhanced with sampling ports on each of the trays. Other distillation columns need to have the thermocouple removed in order to take a sample.

The new sampling ports enable vapor or liquid samples to be drawn from each of the sieve plates by simply inserting a hypodermic needle into the septum seal while the distillation is in full, continuous operation.

Armfield UOP3CC is the only unit on the market with this sampling capability, and the column is unique in that it can use flammable solvents. If you already use Armfield's UOP3CC, and would like a quote for the improved column, please email info@armfieldinc.com.

Complete fluid mechanics laboratory | Five new or improved products!

F1-29 Fluid Statics & Manometry | F1-30 Properties of Fluids | F1-31 Pascal's Apparatus |

F1-32 Francis Turbine | C7 MkII Pipe Surge & Water Hammer Apparatus

www.armfield.co.uk/f1

armfield > learn more!



New & improved CEXC | Computer control & data logging as standard
New chemical reactors | CEY Plug Flow | CEZ Laminar Flow
www.armfield.co.uk/cexc

