



Application Brief: Petroleum Distillation and Sulfonation

*New control system improves
product quality and makes process
data accessible*

OPTO 22
Automation made simple.

Opto 22

43044 Business Park Drive • Temecula • CA 92590-3614

Phone: 800-321-6786 or 951-695-3000

Pre-sales Engineering is free.

Product Support is free.

www.opto22.com

Form 2074-180717

© 2013–2018 Opto 22. All rights reserved. Dimensions and specifications are subject to change. Brand or product names used herein are trademarks or registered trademarks of their respective companies or organizations.

APPLICATION BRIEF: PETROLEUM DISTILLATION AND SULFONATION

New control system improves product quality and makes process data accessible

At its facility near Houston, Texas-based Allied Petrochemical produces familiar petroleum-based distillates like naphtha kerosene and diesel fuel. The company also produces sulfonates, also called sulfonic acids, which are used primarily as additives for coatings, greases, oils, and water-soluble detergents.

The refinery depends on Opto 22 SNAP PAC hardware and software products to reliably and accurately control the distillation towers, reactors, storage tanks, and auxiliary equipment, such as pumps and valves, that are needed to produce these petroleum-based products.

CHALLENGES

Joey Kessel, Manager at Allied Petrochemical, describes the plant as consisting of two sides: refining and additives.

- On the refining side, two vacuum distillation towers separate petroleum distillates to produce naphtha kerosene, diesel, and residual fuel oil.
- The additive side has three reactor units in which high-molecular-weight alkylates are sulfonated to produce Allied Petrochemical's signature additive products SA-320, SA-470, and SA-490. These products are subsequently neutralized and carbonated to create both neutral- and overbase calcium sulfonate products.



Sulfonation is a rapid and highly exothermic reaction, and the reaction mass must be cooled continually. Along with temperature control, the amount of sulfur trioxide (SO_3) added to the process must be precisely controlled to avoid side reactions and unwanted carbon from forming.

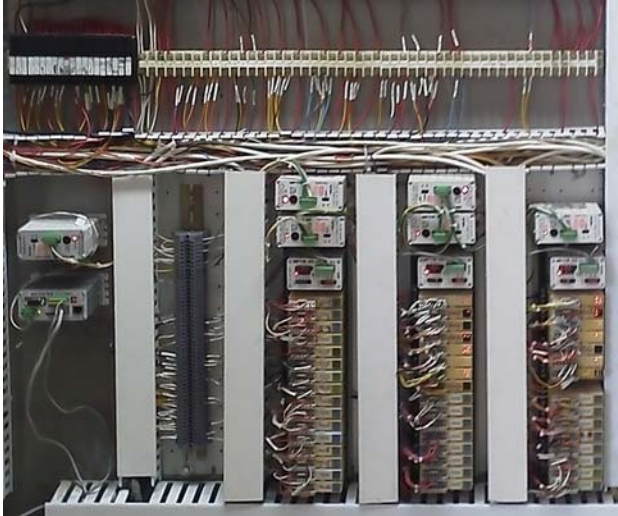
Before installing the Opto 22-based control system, Allied Petrochemical manually controlled refining. Of course this required many hours of workers' time and introduced the opportunity for human error. Controlling these processes manually also made it difficult to increase production and expand the business.

SOLUTIONS

After researching the automation marketplace, Kessel selected Opto 22 products to build a control system for the refining operations. Much of this choice, he says, was due to the ease with which control points could be mapped and changed in the PAC Control controller programming software. The affordability of the products and the long-held reputation of Opto 22 products for reliable operation were factors that also contributed to his choice.

The control system Kessel installed incorporates Opto 22 SNAP PAC S- and R-series controllers, I/O processors (or "brains"), and I/O modules. PAC Display HMI (human-machine interface) software provides operator interfaces at control stations, and monitoring and control

Application Brief: Petroleum Distillation and Sulfonation



Multiple racks of SNAP I/O modules wired to field devices throughout the refinery are connected to a SNAP PAC controller running a control program.

at a central location. Equipment is connected over an Ethernet network that runs throughout the plant.

RESULTS

Changing distillation from manual to automatic control delivered several benefits. It's now easier, for example, to achieve and maintain the quality of the final distillate products. The instrumentation added for the control system makes extensive process data available for production and regulatory purposes, while new equipment monitoring and logging capabilities allow preventive maintenance that keeps downtime to a minimum.

Having the control system in place reduced by half the number of personnel needed to operate the plant. Operators are needed at the plant 24 hours a day, so this resulted in significant savings. It also gives company staff time to fine-tune production processes, maintain equipment, and scale up production for company growth.

New equipment monitoring and logging capabilities allow preventive maintenance that keeps downtime to a minimum.

ABOUT OPTO 22

Opto 22 was started in 1974 by a co-inventor of the solid-state relay (SSR), who discovered a way to make SSRs more reliable.

Opto 22 has consistently built products on open standards rather than on proprietary technologies. The company developed the red-white-yellow-black color-coding system for input/output (I/O) modules and the open Optomux® protocol, and pioneered Ethernet-based I/O.

In early 2013 Opto 22 introduced *groov* View, an easy-to-use IoT tool for developing and viewing mobile operator interfaces—mobile apps to securely monitor and control virtually any automation system or equipment.

Famous worldwide for its reliable industrial I/O, the company in 2018 introduced *groov* EPIC® (edge programmable industrial controller). EPIC has an open-source Linux® OS and provides connectivity to PLCs, software, and online services, plus data handling and visualization, in addition to real-time control.

All Opto 22 products are manufactured and supported in the U.S.A. Most solid-state SSRs and I/O modules are guaranteed for life.



The company is especially trusted for its continuing policy of providing free product support, free training, and free pre-sales engineering assistance.

For more information, visit opto22.com or contact **Opto 22 Pre-Sales Engineering:**

Phone: **800-321-6786** (toll-free in the U.S. and Canada) or **951-695-3000**

Email: systemseng@opto22.com

PAGE 4
Form 2074-180717



OPTO 22 www.opto22.com
43044 Business Park Dr. Temecula, CA 92590-3614

SALES sales@opto22.com
800-321-6786 • 1-951-695-3000

SUPPORT support@opto22.com
800-835-6786 • 1-951-695-3080