# Why is distillation used

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Key Takeaways: Distillation

It is a separation technique that can be used to either increase the concentration of a particular component in the mixture or to obtain (almost) pure components from the mixture.

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Distillation is a core process that is fundamental to the economic operation of any process plant. Successful outcomes depend on quality distillation monitoring and troubleshooting, since just about every operation uses some form of distillation equipment or fractionation columns. Despite the need for quality, many operations have forgotten or ignored the importance of distillation. This practice can end up costing big in the long run.

The distillation process is used to separate components based on their boiling points. Chemicals like common gas, diesel, and jet fuel achieve their boiling points at different temperatures. Distillation columns are used to separate mixed feed streams into their own distinct products.

The last 50 years have shown tremendous improvement in our understanding of industrial distillation equipment and systems. Advanced technology is taking over in the design, control, and operation of towers. Tower internal innovation is working better than ever to improve tower efficiency and capacity. All of these innovations would seem to reduce the failure rate in distillation towers. However, the rate of failure in towers is actually on the rise and continuing to grow.

Crude oil has different components with their own sizes, weights and boiling temperatures, which can be separated easily by a process called fractional distillation. Following is the process for fractional distillation:

Use of the wrong fuel/catalyst – Every plant focuses on items such as feed rates and temperatures. Even if these are on point, they don"t mean much if the product molecules are not recovered in the right streams. What good is there in using an expensive FCC catalyst if the extra distillate is being lost in your

fractionators? Using the proper fuel is essential to any refinery distillation process, be it crude, propane, butane, isobutane, etc.

Improper pressure balance – Distillation columns must pressure balance. The fact is often overlooked by operators but remains a key principle. These pressure gradients are essential for separation quality and efficiency. Pressure is also one of the easiest metrics to monitor and is often done with a simple pressure gauge measuring pressure gradients between stages/trays.

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Web: https://www.kary.com.pl/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346