We are usually familiar with the sciences Chemical Engineering Processes are based on. However, we hardly pay attention to how art can serve in demonstrating such processes. This will be done by the various paintings demonstrated in the article.

The history of processes begins with the creation of our universe by God, 5700 years ago. Radiation processes began when God said: "Let there be lights..." (Genesis 1:14). Such a process is demonstrated here by Vincent van Gogh’s (1853-1890) painting “Pollard Willows and Setting Sun” (1888).

Rene Magritte (1898-1967), a Belgian, one of the most important Surrealist artists contributes unknowingly two paintings to our subject. His "Heraclitus’ Bridge" (1935) is a powerful demonstration of a Sublimation process by which solids are transformed directly to the vapor state. Here, half of the bridge seems to have been sublimed, although what actually happened is that a patch of dense white cloud which covers half of the bridge creates this illusionist process. Magritte’s other painting, "The Philosophical Lamp" (1936), illuminates a closed circle of smoke with mouth, pipe and nose constituting a single entity. With respect to Engineering Processes, it demonstrates a Cyclic process, for example, the famous Carnot cycle.

Combustion processes, or burning, are very ancient phenomena. The first process, according to Genesis 19:24, took place in Sodom and Gomorrah: "Then the Lord rained down burning sulfur on Sodom and Gomorrah ...". It was only in 1783 that the great French chemist Antoine Lavasier investigated the properties of oxygen and laid the foundation for modern chemistry and combustion. Jacek Yerka (1952), a Polish, demonstrates in a brilliant way a Combustion process in his painting "Eruption" (1990), which shows light streams flowing on and on and off and off, up and down, illuminating the houses on the mountain slopes.

Compression processes have many “faces”: the process of squeezing more data into a smaller storage; to limit dynamic range in music, that is, for example, to make loud parts quieter, where in Chemical Engineering such processes are self evident. Cesar Baldaccini (1921), born in Marseilles, in his statue "Compression" (1970) demonstrates what happens when the components of a bicycle have been squashed into a square block.

Extraction processes may be demonstrated by Mark Rothko’s (1903-1970) painting “White and Greens in Blue” (1957). He was a Russian-born U.S.A painter, one of the leading figures of Abstract Expressionism whose work consisted of large-format paintings of blurred colored rectangles. In the above painting, two stages in the extraction process may be observed. In the upper part of the picture, above the white line in the middle, the two phases are completely mixed, corresponding to one color in the painting. In this region mass transfer takes place, namely, the mixing and extraction stage. In the lower part of the picture, the phase separation stage is demonstrated by two layers of the immiscible liquids having different colors.

Diffusion, Crystallization, Evaporation and Condensation processes are only part of the striking color photographs by Walter Wick, which appear in his astounding book [1997]. In his Diffusion, a drop of blue water enters a jar of clean water, while two states out of nine are shown, demonstrating the progress of the diffusion process. Crystallization is demonstrated by ice crystals which grew into an astonishing six-sided design. His Condensation photograph may be looked upon also as an Extraction process in the following way: The drops are created due to mixing of the two phases above and below the drops while mass transfer takes place in the region of the drops.

Pumping processes are first mentioned in Deuteronomy 11:10; it is said there:“... where you planted your seed and irrigated it by foot ...” Mankind energy, by moving the foot, is used to operate a pump. Leonardo da Vinci’s (1452-1519) drawing "Archimedes Screw and Pumps to Draw up Water" (c. 1480) demonstrates some kind of a combined device, which uses the Archimedes Screw developed about 2000 years ago.

Mixing processes are also not new. Liquids mixing were already mentioned in Isaiah 5:22:“Woe to those who are heroes at drinking wine and champions at mixing drinks.” Here we use the work of art “The Sugar Mill” (1923) by the Mexican painter Diego Rivera (1886-1957) to demonstrate solids mixing.

And finally, Impinging-stream processes [Tamir, 1994]. Here, a unique configuration of a two-phase suspension, gas-solid, is applied for intensifying transfer processes. In this method, two streams of the suspension flowing on the same axis in opposite direction are colliding. If each stream contains particles of a different color, then, while colliding, particles from one stream penetrate into the opposite one; eventually effective mixing will occur yielding as a product a homogeneous mixture of particles.

“Encounter” (1944) by Maurits Cornelis Escher (1898-1972), a Dutch, the greatest graphic artist, illustrates such a process.

According to Escher, a white optimist and a black pessimist meet each other shaking hands while walking in opposite directions one towards the other. Eventually at the back, after good mixing takes place, a “homogeneous solution” is obtained. 

So, in conclusion, does not Chemical Engineering Processes look nicer via Art?!

REFERENCES