# Glossary

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| Adiabatic | Describes a process which exchanges no energy with its surroundings. |
| Ammonia slip | Unreacted ammonia that escapes the catalyst vessel to the stack and out to the atmosphere. |
| ASPEN Plus | Advanced System for Process Engineering (ASPEN) Plus. |
| catalyst module | Box-shaped construction of the three-dimensional structured SCR catalyst. |
| catalyst vessel | SCR reaction vessel housing the catalyst modules. |
| column | NOx absorption column. |
| column efficiency | The ratio of the number of equilibrium stages divided by the actual stages. |
| demister | Mist elimination tank located on the vapor outlet of the scrubber/absorber. |
| dimerization | The chemical coupling of two molecules, usually a fast-reversible reaction. |
| direct-fired heater | Heat exchanger located after the feed/effluent heat exchanger which uses natural gas combustion to warm the fume stream to the required SCR reaction temperature. |
| economizer | Feed/effluent heat exchanger. |
| efficiency | A fraction (usually between zero and one) which gauges the effectiveness of a process to that which is possible or desirable. |
| electrolyte NRTL | The NRTL model adjusted to handle electrolyte solutions, the thermodynamic model used to model the vapor-liquid equilibrium within the scrubber/absorber. |
| empirical | Data and information arrived at through experience, observation, and/or experimentation. |
| EPA | Environmental Protection Agency. |
| equilibrium | Characterized by no spatial or temporal gradients. |
| equilibrium stage | A stage within the scrubber absorber where the two exiting streams exist in thermal, vapor-liquid equilibrium, and chemical equilibrium with each other. |
| equilibrium-stage assumption | The assumption that the actual stages within the scrubber/absorber produce exiting streams that exist in thermal, vapor-liquid equilibrium, and chemical |

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| | equilibrium with each other. |
| feed/effluent heat exchanger | Heat exchanger located after the steam preheater which uses outlet of the catalyst vessel to further warm the fume stream |
| honeycomb | Three-dimensional form of the SCR catalyst. |
| linters, cotton | Waste product from the harvest of cotton, used in the production of nitrocellulose. |
| mechanism | The notional representation of the actualy physical sub-processes by which chemical reactions proceed. |
| model | A theoretical analogy extended to the explanation of a real process. |
| model accuracy | The ability of a model to simulate the actual process. |
| model precision | The consistency of a model under small changes or perturbations. |
| Murphree efficiency | Usually defined stagewise for the vapor stream, $E_M = (y_{i-1}-y_i^*)/(y_{i-1}-y_i^{eq})$, the ratio of the actual change in average vapor composition accomplished by a given plate to the change in average vapor composition if the vapors leaving the plate were in equilibrium with the liquid leaving the plate. |
| NOx removal efficiency | The molar fraction of NOx species removed from the stream of interest, (Moles NOx,in - Moles NOx,out / Moles NOx,in). |
| point efficiency | Defined the same as the Murphree efficiency, except for distinct points on a stage. |
| reactive-distillation | The combination of the reaction and distillation processes, chiefly carrying out a reaction within some form of distillation or absorption column. |
| robustness | Refers to the stability of a model during simulation. Small changes in input variables do not cause such a model to fail or return erroneous results. |
| scrubber/absorber | NOx absorption column utilizing upper absorption trays and a lower spray-scrubber section. |
| sensitivity test | Sensitivity analysis is a tool for determining how a process reacts to varying key operating and design variables. |
| simulation | A model becomes a simulation after input is processed and output is available. |
| stage | Division within scrubber/absorber. |
| steam preheater | Heat exchanger located after the demister which uses steam to initially warm the fume stream. |

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| stoichiometry | The conservation of mass expressed by chemical reaction equations. |
| thermodynamic model | A set of equations and data that attempts to relate measurable variables (T, P, concentrations) to other variables within a system in order to characterize the equilibrium state of that system. |
| tower | NOx absorption column. |
| tray | Actual stage in the absorption section of the NOx absorption column. |
| tray efficiency | The Murphree efficiency of a single stage. |
| unit operations | The most popular current approach to solving chemical engineering problems using empirical data and equations to describe individual equipment and chemical processes. |
| vaporization efficiency | An alternate method to the Murphree efficiency, $E_v = y_i^*/y_i^{eq}$, defined as the ratio of the actual vapor composition of the $i^{th}$ component over its equilibrium vapor composition. |
| vapor-liquid equilibrium | A subset of overall equilibrium where the compositions of the components in the vapor exist in equilibrium with those in liquid. |
| vent gas fan | Fume feed blower feeding to bottom of scrubber/absorber. |
| vent stack | Stack which releases treated fumes to the atmosphere. |