



Short Path Evaporator (SPE) 2nd Stage Process Guide (Optional)

1. Purpose
 - a. Additional stages can be added to a WFE system to perform further refinement or separate additional components out of a compound in a continuous flow operation.
 - b. Additional stages increase throughput of multiple separations/refinements and are ideal for higher volume operations.
 - c. Distillate from 2nd stage can be fed into a 3rd stage as well.
2. Fed Product
 - a. Either the distillate or residue derived from the WFE 1st Stage (or previous SPE stage), are introduced into the SPE as a feed stream for additional processing.
 - b. A pump from the 1st stage will introduce product into the 2nd stage WFE.
 - c. The operation of the 2nd stage evaporator is similar to the 1st stage evaporator.
 - i. The feed comes from the previous stage and is fed directly to the top plate of the rotating wiper basket.
 - ii. This spinning disk distributes the liquid evenly around the wall of the evaporator as in previous stages.
 - iii. The fed product will flow down the heated wall of the evaporator.
 - iv. As in the first stage, temperatures can typically be set to maintain 50-350°C using the jacketed hot oil system.
3. Evaporation
 - a. The lighter (lower boiling point) portion of the fed material will be vaporized.
 - b. The heavier (higher boiling point) portion flows down the evaporator in a liquid state, to be collected in a receiver.
4. Condensation
 - a. The vaporized product will be condensed using the appropriate process coolant.
 - b. The liquid distillate will be discharged through the intermediate receiver.
 - c. The distillate receiver operates under vacuum and is discharged by the use of a vacuum rated gear pump.
 - d. The distillate is then pumped to additional downstream stages, processing equipment, or packaging containers as the process requires.
 - e. The residue portion flows into a residue receiver, operating under vacuum.
 - i. The receiver is equipped with an isolation valve for maintenance purposes.
 - ii. A vacuum rated gear pump is used to pump the residue from the receiver to additional downstream stages, process equipment, or packaging containers as the process requires.
5. The 2nd /3rd stage evaporators run sequentially, and typically operate at higher Atmospheric Equivalent Temperatures (AET's) than the 1st stage evaporator. They typically discharge both a distillate and a residue, both of which may have higher average boiling point ranges than achieved in the previous stage.