

**Industry:** Paper and Pulp

**Application:** Gas Cooling

**Product Description:** Custom length wall mount NF and TF

**Situation:** One of BETE's customers, a paper mill, wanted to retrofit the quench section of their flue gas duct. The existing arrangement had the nozzles mounted through a mounting block and into the ductwork. Each nozzle connected to its mounting block with straight pipe threads and was held in place via a locking nut.

While the spray pattern was a simple flat fan, the increased length and special straight pipe threads on the nose required a customized design. Additionally, the customer wanted to use a nickel alloy material due to corrosion occurring with the existing 316 stainless steel nozzles.

**BETE's solution:** BETE's custom design and machining capabilities allowed our Applications Engineers to offer a direct replacement design to the existing nozzles within a few days. Then, going the extra step, BETE Applications Engineers performed a quench analysis using customer-supplied data. The analysis indicated good agreement with the amount of water used, but showed that the drop-size produced by the fan nozzles was too large, leading to loss of efficiency. To solve this problem, an alternate spiral design was submitted. It retained the same mounting features of the original nozzle, but the spiral design produced droplets 45% smaller than the flat fan at equivalent flow. In this case, the spiral design would allow the gas to be cooled to a temperature well below what the customer had achieved in the past. BETE's in-house foundry and its ability to cast nickel alloys resulted in the custom spiral nozzle having the same lead time as the custom flat fan.

### Technical Questions?

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