

## Experimental Study on Dehumidification Performance of Supersonic Nozzle

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**Abstract :** Supersonic nozzles are commonly used to purify natural gas in gas processing technology. As an innovated technology, it is employed to overcome the deficit of the traditional method, related to gas dynamics, thermodynamics and fluid dynamics theory. An indoor test rig is built to study the dehumidification process of moisture fluid. Humid air was chosen for the study. The working fluid was circulating in an open loop, which had provision for filtering, metering, and humidifying. A stainless steel supersonic separator is constructed together with the C-D nozzle system. The result shows that dehumidification enhances as NPR increases. This is due to the high intensity in the turbulence caused by the shock formation in the divergent section. Such disturbance strengthens the centrifugal force, pushing more particles toward the near-wall region. In return return, the pressure recovery factor, defined as the ratio of the outlet static pressure of the fluid to its inlet value, decreases with NPR.

**Keywords :** supersonic nozzle, dehumidification, particle separation, nozzle geometry

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