

Wetted-wall Column

Winter 2007

TO: Engineering Development Branch

FROM: Engineering Division

SUBJECT: Wetted-wall Column

A small plant is being designed for a remote desert location. Within the plant, a stream of 10 gpm of chemically treated water must be cooled from 100°C to 50°C before entering another process. A local engineer has suggested that some surplus 1 inch and 1 3/8 inch wetted wall columns already at the plant site could be used to evaporatively cool the water. Another engineer has expressed concern that too much of the feed water stream (valued at \$0.06 per gallon) would be lost in the process.

Please determine the mass transfer coefficient for the water into air over as wide a range of air velocities as possible, and compare with values reported in the literature. Based on your results, design a system that provides optimal cooling from the columns, and then estimate the percent of mass lost in the process and the cost of the lost water. Should we go with the wetted wall cooling process? If not what do you suggest?

See Transport Phenomena by Bird, Stewart, and Lightfoot