

Supplementary material for: Optimizing Steam flux for Energy efficiency in Ammonia Recovery during Sodium carbonate production

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A-TEMPERATURE

The effects of temperature, pressure, and mass flow rate variations on the temperature the main equipment of the ammonia regeneration process are presented in Figures A.1, A.2 and A.3, respectively. The temperature results of the system's vapor streams were normalized with respect to the temperature obtained when the analyzed variable was at its maximum value. In addition, the results highlight the effect of reducing the analyzed variable on system behavior; therefore, in Figures A.1, A.2 and A.3, the x-axis is presented from the highest to the lowest value of the variable.

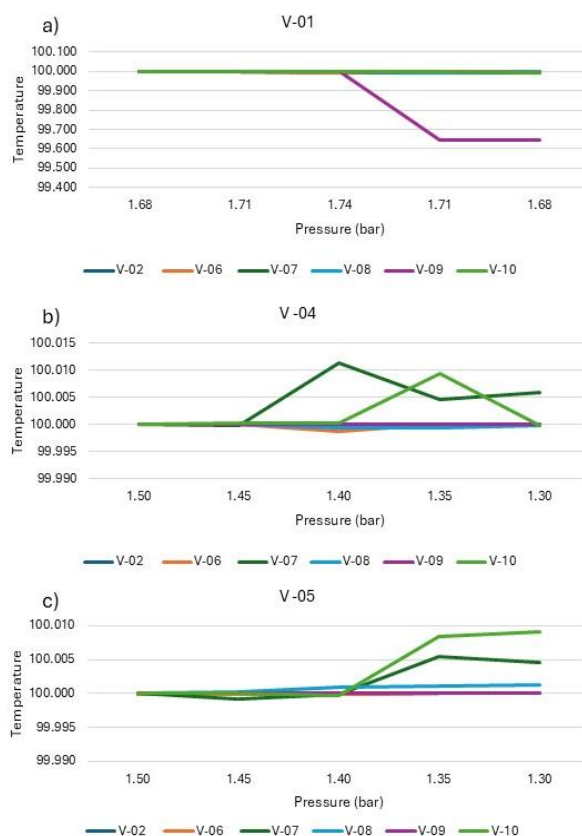


Figure A.1. Influence of vapor pressure input on the vapor temperature for different vapor outputs of equipment: a) vapor input V-01, b) vapor input V-04, and c) vapor input V-05.

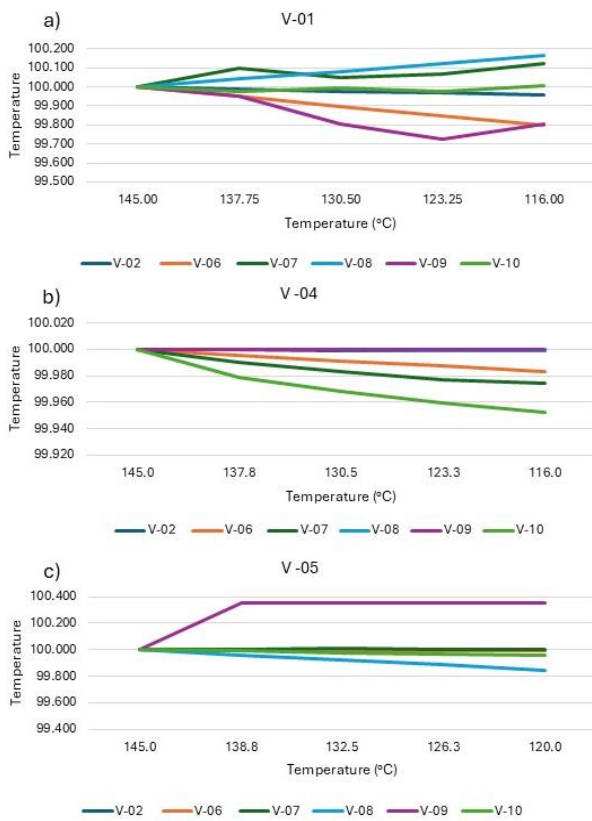


Figure A.2. Influence of vapor temperature input on the vapor mass flow rate for different vapor outputs of equipment: a) vapor input V-01, b) vapor input V-04, and c) vapor input V-05.

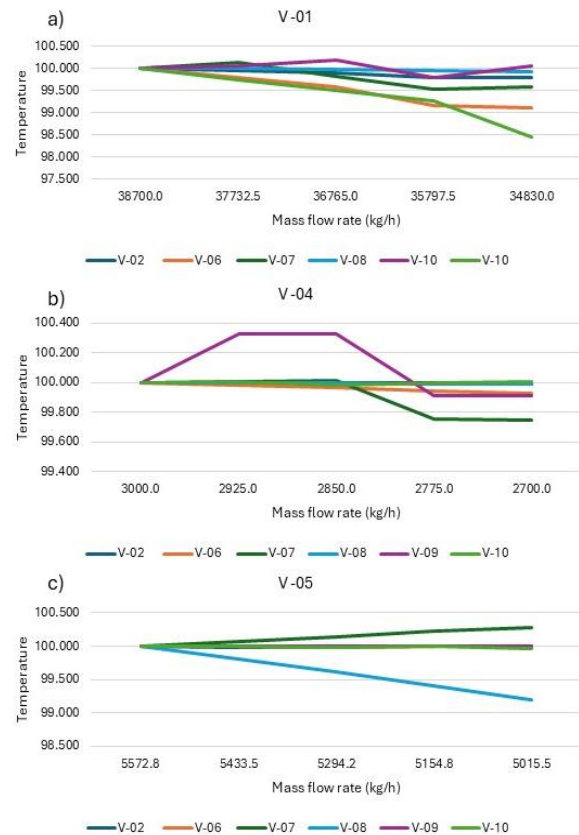


Figure A.3. Influence of vapor mass flow rate input on the temperature for different vapor outputs of equipment: a) vapor input V-01, b) vapor input V-04, and c) vapor input V-05.

A-MASS FLOW RATE

The effects of temperature, pressure variations on the mass flow rate the main equipment of the ammonia regeneration process are presented in Figures B.1, and B.2, respectively. The mass flow rate results of the system's vapor streams were normalized with respect to the mass flow rate obtained when the analyzed variable was at its maximum value. In addition, the results highlight the effect of reducing the analyzed variable on system behavior; therefore, in Figures B.1, and B.2, the x-axis is presented from the highest to the lowest value of the variable. The mass flow rate V-14 NH₃, represent the mass flow rate of ammonia entering the absorption column.

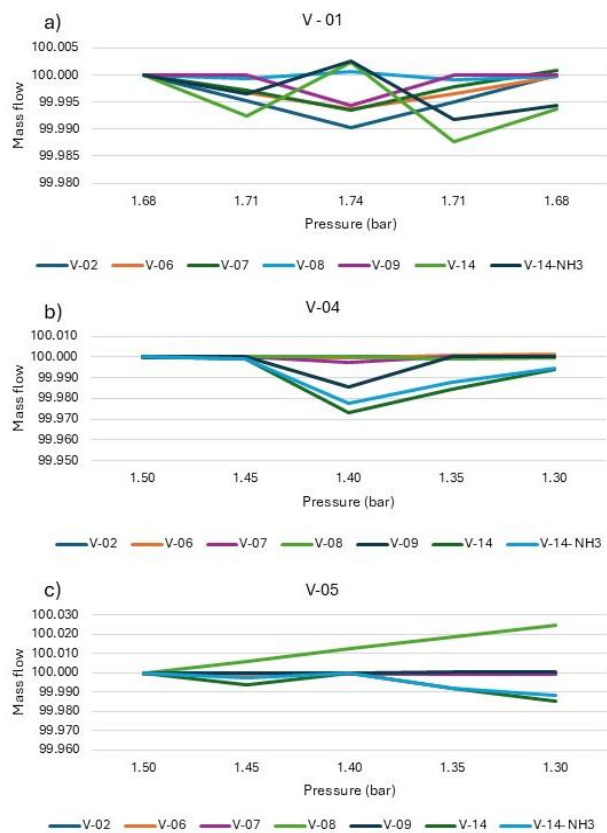


Figure B.1. Influence of vapor pressure input on the vapor mass flow rate for different vapor outputs of equipment: a) vapor input V-01, b) vapor input V-04, and c) vapor input V-05.

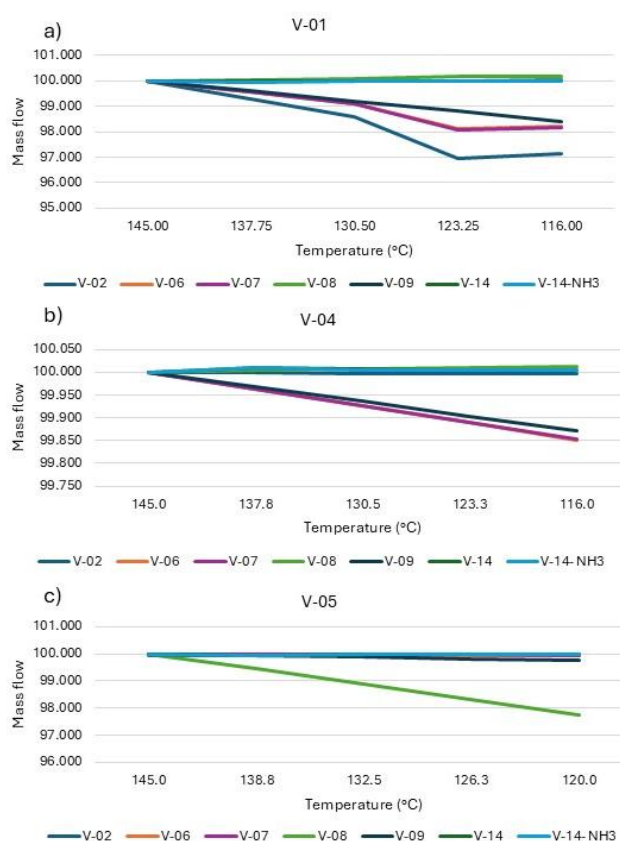


Figure 3. Influence of vapor temperature input on the vapor mass flow rate for different vapor outputs of equipment: a) vapor input V-01, b) vapor input V-04, and c) vapor input V-05.