

APPENDIX B

CSTR Mixing Test (Original Reactor Design)

To determine whether the reactor (original design) was completely mixed in a reasonable amount of time, the author conducted a mixing test using conductivity as an indicator. The conductivity meter used was a Fisher Scientific Model 09-327 conductivity and resistivity meter (Pittsburgh, PA). The meter was calibrated at 100.9 micromhos/cm.

The author conducted the test by introducing 0.5 mL of a 4.65 M KCl solution into the reactor previously filled with 10 liters of deionized water. When completely mixed, the KCl concentration in the reactor would be 0.000232 M. From Table 2510:I of Standard Methods (APHA, 1998), this concentration corresponds to a conductivity of 34.44 micromhos/cm. The conductivity of the deionized water used was 1.0 - 1.2 micromhos/cm. The conductivity of the reactor solution was recorded at 10-minute intervals, and the results are as plotted in Figure B-1. As may be seen, the conductivity reached its maximum value, which was slightly lower than the theoretical value, within 5 hours. It may be concluded from the result that the mixing power provided by the 4-RPM motor and 1-3/4-inch impeller can thoroughly mix the reactor within 5 hours.

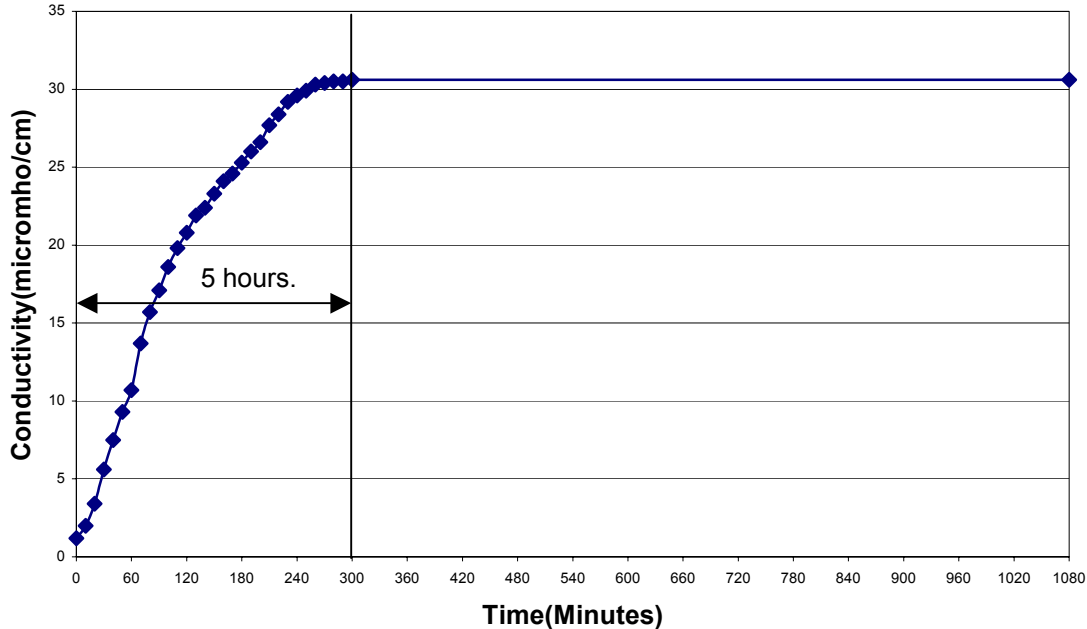


Figure B-1. Time series plot of the mixing test data