# Heat Exchanger Lab

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**Table 1a.** Characteristics table of the shell and tube heat exchanger experiment. The three left columns show different cases of hot and cold fluid flow rates in kilograms per second while the top row shows heat exchanger characteristics in SI units such as fluid temperature difference in degrees Celsius, overall heat transfer coefficient in watter per meter squared kelvin, and heat transfer rates in watts.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Case | Flow Rate (kg/s) | | Temperature (oC) | | Ui (W/Km2) | Heat Transfer Rate (kW) | | |
|  |  |  |  | qc | qh | (%) |
| 1a | 0.2395 | 0.2876 | 5.1667 | 6.7778 | 187.5551 | 6.8035 | 6.2106 | 5.9833 |
| 1b | 0.2332 | 0.1875 | 7.000 | 6.7778 | 165.6806 | 6.6250 | 5.4878 | 12.1376 |
| 2a | 0.2017 | 0.3250 | 4.000 | 7.1667 | 163.9095 | 6.0579 | 5.4346 | 7.1032 |
| 2b | 0.2143 | 0.1875 | 6.8889 | 7.0000 | 162.7889 | 6.2876 | 5.4000 | 9.8760 |

**Table 1b.** Characteristics table of the shell and tube heat exchanger experiment. The three left columns show different cases of hot and cold fluid flow rates in kilograms per second while the top row shows heat exchanger characteristics in SI units such as heat capacities, non-dimensional number of transfer units, and heat transfer effectiveness.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Case | Flow Rate (kg/s) | | Cr | NTU |  | | |
|  |  | measured | Theory | (%) |
| 1a | 0.2395 | 0.2876 | 0.8351 | 0.0205 | 0.0201 | 0.0201 | 0.0961 |
| 1b | 0.2332 | 0.1875 | 0.8021 | 0.0232 | 0.0227 | 0.0227 | 0.1882 |
| 2a | 0.2017 | 0.3250 | 0.6222 | 0.0213 | 0.0209 | 0.0209 | 0.1201 |
| 2b | 0.2143 | 0.1875 | 0.8727 | 0.0228 | 0.0223 | 0.0223 | 0.1597 |

[copy and paste your figure 1c here – 2 subplots]

**Figure 1c.** Zoomed out plot of theoretical curves of effectiveness on the y-axis and number of transfer units on the x-axis (Left). The blue circles represent calculated measured effectiveness and the black crosses represent calculated theoretical effectiveness. Zoomed in plot of theoretical curves of effectiveness on the y-axis and number of transfer units on the x-axis (Right).

Short-Answer Questions

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2a. [insert your response here]

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2b. [insert your response here]

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2c. [insert your response here]