CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

From the experimental results discussed in the previous chapters the following conclusions can be drawn.

1. The optimum fill ratio of Freon-113 is in the range of 9.3-18.5%. In the case of Freon-22, the 30% fill ratio gives better performance than the 16.4% fill ratio.

2. In terms of the effective conductivity, the optimum tilt angle has been found to be around 50 degrees for both types of working fluids.

3. To study the effect of external flow rates, either the hot or cold water flow rate is varied in each run. The experimental results show that the effective thermal conductivity of the heat pipes is not significantly affected by the Reynolds number of either stream.

4. The preferable temperatures of the hot and cold streams for the conditions investigated are 35 ^{o}C and 30 ^{o}C, respectively.

5. The effective thermal conductivity of the heat pipes in this study ranges from 60,000 W/m^{o}C to 1.2x10^{7} W/m^{o}C or 163-30,000 times that of an equivalent copper rod. The corresponding overall heat transfer coefficient based on the outside surface area ranges from 800 to 40,000 W/m^{2} ^{o}C

6. The obtained heat transfer correlations in the evaporator and the condenser sections are good within the range of experimental conditions used. The calculated internal resistances of the heat pipes

also agree well with the experimental results.

7.2 Recommendation

The future investigation is recommended to study the effects, if any, of the heat pipe length, diameter and length to diameter ratio, i.e. the effects of the container geometry.