Example Calculation – Flat Plate Fin

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| **Air Properties** | |
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| **Flat Plate Fin – Example Calculation** | | |
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| **Formula** | **Calculation** | **Answer** |
| **Corrected Velocity** | | |
| Step 1 – Using Bernoulli’s Principle, calculate correct velocity due to area reduction. | | |
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| **Finding the Heat Transfer Coefficient** | | |
| Step 2 – Calculate Reynolds number of Air at 300 K | | |
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| Step 3 – Calculate Prandtl Number of Air at 300k | | |
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| Step 4 – Calculate Nusselt Number by referring to Chapter 5 of Holman (Heat Transfer, McGraw-Hill). The appropriate Nusselt equation has been selected on the following restrictions. | | |
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| Step 5 – Rearrange the standard Nusselt Number equation to make the subject, with representing the characteristic length of the fin (0.1). Standard equation is as follows: | | |
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| Step 6 – Calculate average heat transfer co-efficient ) to be used in heat dissipation calculations | | |
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| **Find Out What Type of Fin it is & Calculate Heat Dissipation** | | |
| Step 7 – Calculate Perimeter of Fin | | |
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| Step 8 – Calculate Cross-sectional Area of Fin | | |
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| Step 9 – Calculate | | |
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| Step 10 – Convert Type 2 Fin to Type 3 using the correct length | | |
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| Step 11 – Calculate Heat Dissipated from Fin | | |
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| **Heat Dissipation for Base Plate Section** | | |
| Step 12 – Using the same value, calculate single section of exposed base plate | | |
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| **Total Heat Dissipation** | | |
| Step 13 – Multiply fin value by number of fins | | |
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| Step 14 – Multiply flat plate value by number of flat plate sections | | |
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| Step 15 – Calculate total heat dissipation for heat sink | | |
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