CMGT 235 – Mechanical and Electrical Systems

Homework #8 – Air Distribution Systems Design - ACCA Manual D

**Show all work for full credit.**

Due: 9/20

20 points

Solution

**Name**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The values shown in Table 1 are for the Blower System installed in the home used in HW#5.

|  |  |  |
| --- | --- | --- |
| Blower | Heating (iwc) | Cooling (IWC) |
| Total External Static Pressure | 0.50 | 0.50 |
| Pressure Losses in the System: |  |  |
| Coil | 0 | 0.05 |
| Heat Exchanger | 0.03 | 0.03 |
| Supply Diffusers | 0.03 | 0.03 |
| Return Grilles | 0.03 | 0.03 |
| Filter | 0.15 | 0.15 |
| Balancing Damper | 0.03 | 0.03 |
| Total Pressure Loss in the System | 0.27 | 0.32 |

Table 1

1. Determine the Available Static Pressure for Heating

ASP = 0.50 – 0.27 = 0.23 iwc

1. Determine the Available Static pressure for Cooling

ASP = 0.50 – 0.32 = 0.18 iwc

1. The values shown Table 2 are for the Trunk and Branch Duct System installed in the home used in HW#5.

|  |  |  |
| --- | --- | --- |
| Trunk and Branch Duct System | Supply (ft) | Return (ft) |
| Measured Length of Run-Out | 12 | 7 |
| Measured length of trunk | 60 | 0 |
| Equivalent length of fitting | 60 | 30 |
| Total length | 132 | 37 |

Table 2

132 + 37 = 169 ft

1. Determine the Total Effective Length (TEL) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Determine the Friction Rate for Heating (in/100 ft)

FR = ASP / TEL = (0.23 iwc / 169 ft) x 100 = 0.136

1. Determine the Friction Rate for Cooling (in/100 ft)

FR = ASP / TEL = (0.18 iwc / 169 ft) x 100 = 0.107

1. Using the Flexible Duct chart shown and HW#7, complete the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Trunk Duct | FR (iwc/100ft) | CFM | Duct Size (in) | FPM |
| SA1 | 0.11 | 850 | 14” | 700 |
| SA2 | 0.11 | 550 | 12” | 600 |
| Return | 0.11 | 1400 | 16” | 800 |

