**APPENDIX A**

**MATLAB Code for Air Supply Calculations**

m\_wood=500\*(1-0.10); %kg dry wood / 4 Hrs MW\_wood= (6\*12+10+16\*5)\*1e-3; %kg/mole MW\_O2=32e-3; %kg/mole MW\_CO2= (12+32)\*1e-3; %kg/mole MW\_H2O=18e-3; %kg/mole MW\_N2=14e-3; %kg/mole

%Calculation of needed air supply

n\_wood=m\_wood/MW\_wood;%moles of wood per batch n\_O2=6\*n\_wood; %moles of O2 required according to C6H10O5 + 6O2 --> 6CO2 + 5H2O m\_O2=n\_O2\*MW\_O2; %kg stoichiometric amount of O2 needed for one batch m\_CO2=6\*n\_wood\*MW\_CO2; %kg from combustion m\_H2O=5\*n\_wood\*MW\_H2O; %kg from combustion m\_air\_tot=m\_O2/0.231; %kg stoichiometric amount of air needed for one batch m\_N2=0.79\*m\_air\_tot ; %kg inert m\_xs\_air=2\*m\_air\_tot ; %kg 100% excess air m\_vapor=500\*0.10; %kg the moist in the wood evaporates m\_total=m\_CO2+m\_H2O+m\_N2+m\_xs\_air+m\_vapor; %kg per batch m\_total\_inlet=m\_total/(4\*3600); %kg/s

**APPENDIX B**

**TABLE B-1 MODELS AND RESULTS OF CHANGE IN THE FIREWALL HEIGHT**

|  |  |
| --- | --- |
| **Case 1** | **Results** |
| Ansys Model 1  **Firewall Height 2 m**  model.jpg Left Side View  left1.jpg | Static Temperature Profile (K)  temp2.jpgTemperature contours on the Surface of wares  Right Side view  velocity1.jpgright.jpg  Velocity Profile (m/s) |

**Table B-1** (Continued)

|  |  |
| --- | --- |
| **Case 2** | **Results** |
| Ansys Model Ⅱ  **model.jpgFirewall Height 1.75 m**  left.jpg  Left Side view | Static Temperature Profile (K)  flow2.jpg  Temperature Contours on the Surface of wares    right.jpg Right Side View  velocity2.jpgVelocity Profile (m/s) |

**Table B-1** (Continued)

|  |  |
| --- | --- |
| **Case 3** | **Results** |
| Ansys Model Ⅲ  mo.jpg  **left.jpg Firewall Height 1.5 m**  Left Side view | flow2.jpgStatic Temperature Profile (K)  right.jpgTemperature contours on the surface of wares  velocity1.jpg Right Side view  Velocity Profile (m/s) |

**Table B-1** (Continued)

|  |  |
| --- | --- |
| **Case 4** | **Results** |
| model.jpgAnsys Model Ⅳ  **Firewall Height 1.25 m**    left.jpg Left Side view | flow1.jpgStatic Temperature Profile (K)  Temperature contours on the surface of wares  Right Side view  right.jpg  Velocity profile (m/s)  velocity1.jpg |

**Table B-1** (Continued)

|  |  |
| --- | --- |
| **Case 5** | **Results** |
| **model.jpg**Ansys Model Ⅴ  **left.jpgFirewall height 1 m**  Left Side view | flow2.jpgStatic Temperature profile (K)  right.jpgTemperature contours on the surface of wares    Right Side view  velocity1.jpg Velocity profile (m/s) |

**Table B-1** (Continued)

|  |  |
| --- | --- |
| **Case 6** | **Results** |
| model.jpgAnsys model Ⅵ  left.jpg **Firewall height 0.75 m**  Left Side view | flow1.jpgStatic Temperature profile (K)  right.jpg  Temperature contours on surface of the wares  Right Side view  Velocity profile (m/s)  velocity1.jpg |