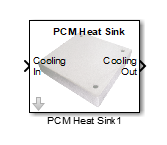
PCM Module Thermophysical Properties



The Simulink ‘PCM Heat Sink’ block calculates the temperature dynamics of a rectangular PCM heat sink. To do so, it needs the following phase change material properties:

|  |  |
| --- | --- |
| Property | Symbol |
| Thermal Conductivity | **K** |
| Melt temperature | **T\_melt** |
| Latent heat | **L** |
| Density | **ρ** |
| Specific Heat | **Cp** |
| Volumetric Thermal Expansion Coefficient | **β** |
| Kinematic Viscosity | **ν** |

These properties have been found and recorded for three different PCMs: generic paraffin wax, n-eicosane, and RT28HC. These properties can be found in the Excel spreadsheet named “PCM Thermophysical Properties.xlsx”, with references (some properties are approximated).

* RT28HC is a paraffin wax made by Rubitherm. This manufacturer produces [several different paraffin waxes](https://www.rubitherm.eu/en/index.php/productcategory/organische-pcm-rt) with similar thermophysical properties but different melting temperatures. Modeling these Rubitherm paraffin waxes can thus be achieved by selecting RT28HC as the phase change material and then hard coding the melting temperature to whichever value is desired.

The ‘Convert\_PCM\_Props.m’ script reads this spreadsheet and saves the property data into the ‘PCMProps.mat’ structure. This structure is then used by the Simulink block for simulations.

* To add properties for another material into ‘PCMProps.mat’:
  + First add the properties into “PCM Thermophysical Properties.xlsx” in a new column. In row 2, input a name for the material that is a valid MATLAB variable name. Save the spreadsheet.
  + Then run ‘Convert\_PCM\_Props.m’. Uncomment line 25.
  + Read the commented instructions at the end of ‘Convert\_PCM\_Props.m’ to update the Simulink block.