# Model definition

After the information to the raw material composition are completed, the model has to be set up (Figure 1(a)). If in the storage is already an instant of a model, the user is asked whether to keep the model (Figure 1(b)). For example this might be the case if an optimization failed in the subsequent process step and the user wants to place differing bounds for the raw materials. Then the user might return to the 'Batch bounds definition' from the 'Optimization error' dialog and after defining new bounds, the user would have to define the model entirely new which can be skipped by keeping the model.
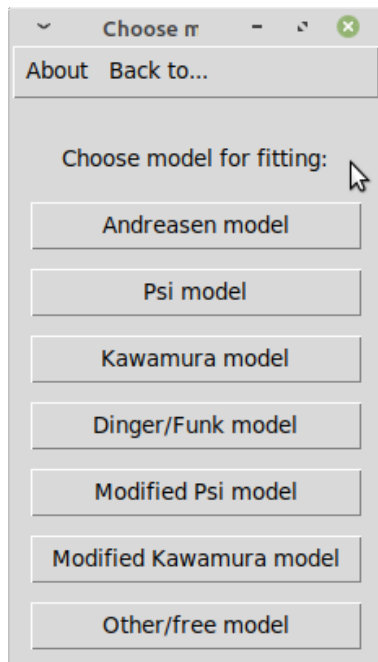


(a) Choose model
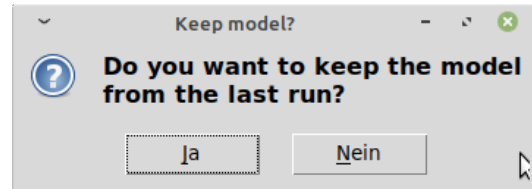
(b) Keep model?

Figure 1: Choose or keep model

Possible models to be set up are the models described in the Methodology Documentation and a 'Free/other model'. For the models from the literature, by clicking on them the user is asked to input the required parameters to define the model completely (Figure 2(a)). The preset values which can be also returned to by clicking 'Reset' are for the maximum particle size one that is calculated from the given raw materials (taken the component sizes of the database into consideration as well as the percentage of oversized grains specified in the Settings accessible from the Main Window Menu). The other parameters' preset values are the standard values from the Settings accessible from the Main Window Menu for the model in question. If in these settings no minimum particle size was chosen for models including such, the preset value is the smallest component size from the database. It is checked if all parameters were defined (Figure 2(b)), but not if the input values are within reasonable ranges or in reasonable relations (e.g. minimum particle size smaller maximum particle size).

The 'Free/other model' gives the user the possibility to define a model by its CPFT($d$)-values. Thus, the software can be also used for models different from the six ones chosen from the literature. It is firstly asked if such a free model is saved and only has to be opened, cf. Figures 3(a) and 3(b). If the free model was not prepared in a file, but will be given manually, the user is asked to specify a name for the model (Figure 3(c)) and then to input the CPFT($d$) values for all component sizes $d$
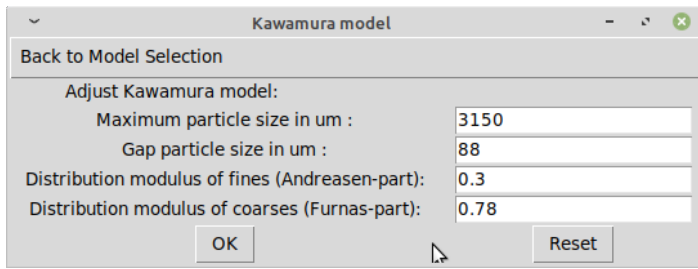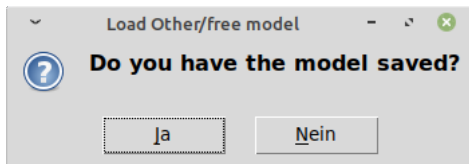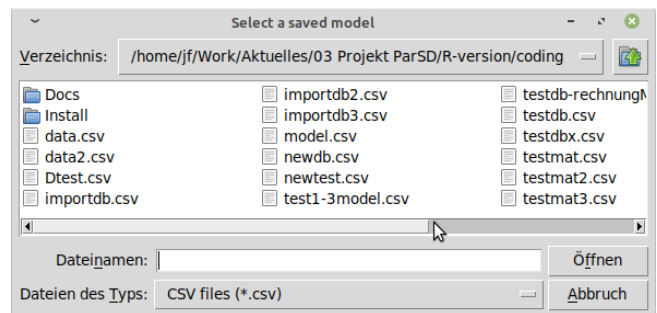
(a) Define model parameters of chosen model
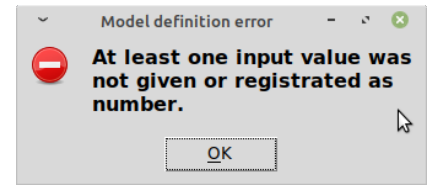


(b) Model definition error

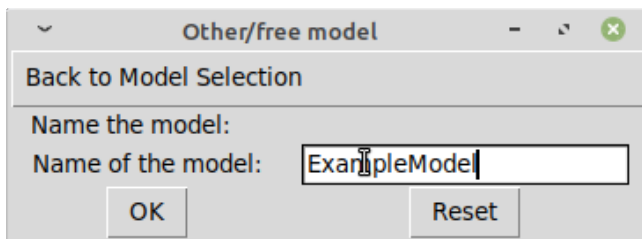Figure 2: Define literature model by its parameters

(Figure 3(d)). Afterwards, it is possible to save the specified free model (Figures 3(e) and 3(f)) as a CSV file.
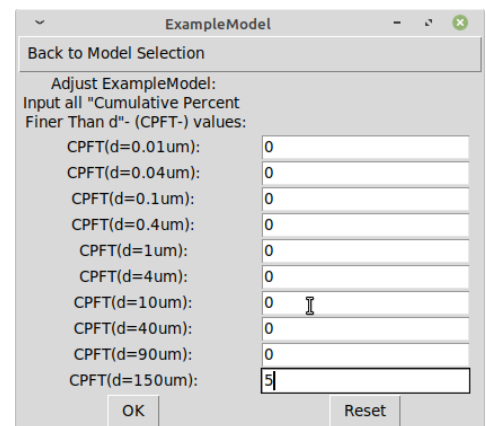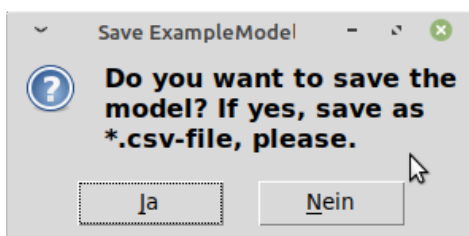


(a) Other model saved?
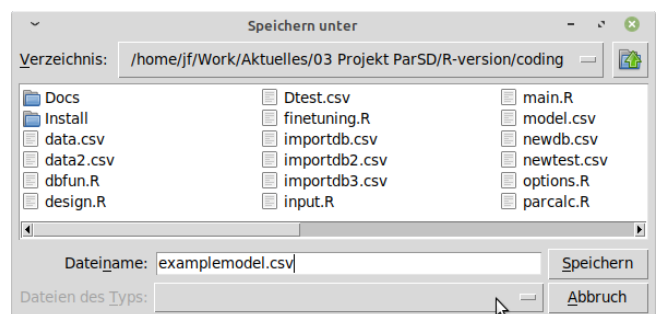


(b) Open other model



(c) Name model



(d) Input CPFT($d$)



(e) Save free model?



(f) Save as CSV file

Figure 3: Define free/other model

A prepared model CSV file (Example in Figure 4 for a raw material database like the one presented in the Technical Documentation) is required to contain two columns of which the first has to be named 'Diameter' and the name of the second specifies the name of the model. In the Diameter-column then all component sizes of the database which contains the batch raw materials have to be listed in ascending order. In the column named after the model-name, for all fields a CPFT value has to be given. Empty fields are not automatically filled and there are also no interpolations done.

| | A | B |
|---|---|---|
| 1 | Diameter | T60_3000-1000-model |
| 2 | 0,01 | 0 |
| 3 | 0,04 | 0 |
| 4 | 0,1 | 0 |
| 5 | 0,4 | 0 |
| 6 | 1 | 0 |
| 7 | 4 | 0 |
| 8 | 10 | 0 |
| 9 | 40 | 0 |
| 10 | 90 | 0 |
| 11 | 150 | 0 |
| 12 | 315 | 0 |
| 13 | 630 | 0,07 |
| 14 | 1000 | 2,83 |
| 15 | 1250 | 9,43 |
| 16 | 2000 | 42,32 |
| 17 | 2500 | 67,85 |
| 18 | 3150 | 96,69 |
| 19 | 4000 | 100 |
| 20 | 5000 | 100 |

Figure 4: Prepared model CSV file

However, there is a work-around implemented. Within the 'Edit material in an existent database' function is the possibility given to save a material as a model. This gives the possibility to define the model for differing diameters/component sizes but also to define it not as CPFT($d$) but as a density curve (retention/passthrough) or retention sum curve, too. For more information please refer to the respective description of this database function in the End User Documentation.