

46. Sim Minerals Processing Unit Models

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46.1. Minerals Processing Unit Model Library

HSC Sim 8 includes a library of process models covering a wide range of unit operations in mineral processing. In HSC Sim the process models for the unit operations are called **unit models** while the process flowsheet calculation blocks are **units**. All the calculations are performed using *solids*, *liquid*, and *gas* phases, where the solids are always defined as *mineral particles* for minerals processing applications. Thus the model calculations are performed with an HSC Sim **Particles** type model.

To define a feed stream for Particles models in HSC Sim, the **Stream Set-up** (see Chapter 45 *Sim Minerals Processing*) tool is used. Mineral processing units can also be connected to other process unit model types (e.g. hydrometallurgical and pyrometallurgical units) by using the stream conversion block between them (see Chapter 47).

To create your own custom unit models, programmed as DLL files, please refer to Chapter 50.

Table 1 summarizes the HSC Sim minerals processing unit model library:

Table 1. HSC Sim minerals processing unit models.

| Technology | Type Code | Model | Description |
|----------------------|-----------|----------------------------|--|
| Concentrator General | MU-110-10 | Perfect Mixer | Mixes all input material from one or several streams and passes it equally to one or several outputs |
| Separation General | MU-120-10 | Efficiency Curve (Whiten) | Whiten efficiency curve. Supports separation by mineral and inclusion of the 'fish-hook' effect |
| | MU-120-11 | Mass Distributor | Distributes solids and water to several outputs with given ratios |
| | MU-120-12 | Mineral Splitter | Mineral by size split of the feed into the concentrate and tails streams, and optionally into a middlings stream |
| Comminution General | MU-130-10 | Fixed PSD (Rosin-Rammler) | Fixed Particle Size Distribution, calculated by using Rosin-Rammler or Gaudin-Schuhmann equations |
| Screens | MU-230-10 | Whiten Efficiency Curve | Whiten screen efficiency curve |
| | MU-230-11 | Karra Efficiency Curve | Karra screen efficiency curve |
| | MU-230-12 | Batterham Efficiency Curve | Batterham screen efficiency curve |
| Hydrocyclones | MU-240-10 | Plitt | Separation in hydrocyclone according to the Plitt model. Supports separation by mineral. Indicates if underflow discharge is roping |
| Flotation | MU-310-10 | Conditioner | Conditioning of particles by setting the flotation kinetic parameters based on the selected calculation model. Recycle stream is directed through without changes in the kinetics |
| | MU-310-11 | Flotation Cell | Recovery of minerals based on flotation kinetics. Feed stream particles and liquid are separated to concentrate and tails. Launder water inlet and gas inlet/outlet streams are optional |
| Thickeners | MU-510-10 | Thickener (General) | General thickening model. Produces given underflow solids percentage and overflow water clarity |
| Filters | MU-520-10 | Filter (General) | General filtering model. Produces given cake moisture and filtrate clarity, supports optional inlet/outlet streams for technical waters |