TRNSYS 18
Complex Fenestration Systems

New add-on for multizone building model (Type 56)

Innovative glazing layers are complemented with elements for effective use of daylight, reduction of unwanted solar gains as well as the avoidance of glare effects. These complex fenestrations systems (CFS) place higher demands on modeling.

Particularly the bidirectional scattering of radiation which e.g. occurs in slat systems or honeycomb structures and their interaction with other layers should be depicted when modeled. Furthermore, opening areas of individual layers influence convection and long wave radiation.
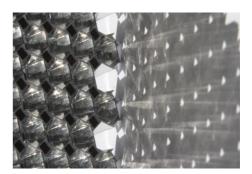
A key aspect when creating the model, on the one hand, was flexibility to allow the user to portray any combination of shading/glazing in detail. On the other hand, it was important to enable the user to easily generate inputs from manufacturer information.
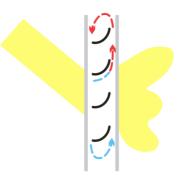
As in the existing window model in TRNSYS, the calculation of optical properties of the CFS occurs in the external program Window 7 (LBNL). This program not only includes a large product database, but also algorithms to calculate different shading systems like horizontal or vertical slat systems, perforated screens or woven layers, etc. and offers the option to import own data.
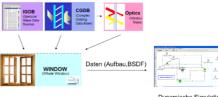
The main features of the new CFS model are:
- definition of up to six layers with different gas mixtures in between
- large variety of shading layers
- modeling of IR transparent layers
- natural convection of shading layers
- mechanical ventilation gaps
- optical model based on so-called "Bidirectional Scattering Distribution Function" (BSDF)
- thermal model representing the glazing system and shading elements based on a comparatively complex model of the ISO 15099, 2003.

Dynamische Simulation mit Trnsys (Type56)