

# Building energy simulation

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# Introduction

Building energy simulation tools may use different window modeling approaches:

- Simplified thermal and optical properties
  - . U-value of the window
  - . g-value of the glazing
- Detailed modeling of each component, layer by layer
  - . Frame and spacer thermal characteristics
  - . Optical properties of each layer of the glazing

→ **WIS can provide data for both situations!**

# Simplified simulation tools

Window system characteristics given by WIS

The screenshot displays the WIS software interface for a window system. The window title is "Window\_system". The main area shows the following data:

Results	
U-value:	1.91 W/(m2K)
area frame:	0.511 m2
area transparent system:	1.309 m2
perimeter length:	4.604 m
solar factor (g):	0.46 -
solar direct transmittance:	0.40 -
light transmittance:	0.58 -
UV transmittance:	0.00 -

Below the results, there are buttons for "Return", "Calc", and "Report".

**Dimensions:**

height:	1.48 m
width:	1.23 m

**Composition:**

Frame:	Reynaers CS6E	Select
PSI edge:	0.05 W/(m.K)	Select
Transparent_syst:	IP plus nr S 4-1	Select
Environment:	Te/Ti=0/20 de	Select

At the bottom, there is a "Select window system:" dropdown menu with the selected value "high perf. Low e dble glaz with alu frame". Below this is a "Record:" section with navigation buttons and the text "1 of 3".

# Detailed simulation tools

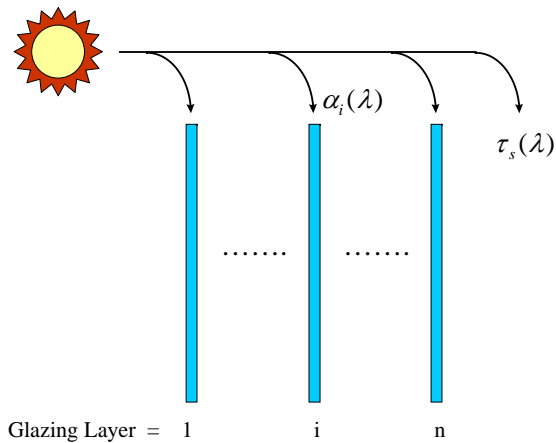
Detailed window system characteristics:

- Frame and spacer thermal transmittance
- Thermal characteristics of the glazing
- Solar and visual characteristics of the glazing
- Angular dependent optical properties of the glazing

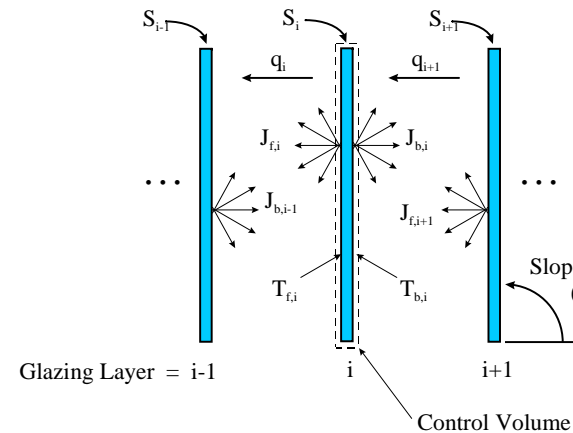
# Detailed simulation tools

## Detailed glazing system model

Optical model



Thermal model



# Detailed simulation tools

## WIS output data report file (txt)

--- Registered WIS user ---

Registered organisation : WindatTest

Registered user name : test\_user

--- Report transparent system : 2IV (4/14Ar/4E4 ---

--- Basics (key thermal and solar properties) ---

name transparent system : 2IV (4/14Ar/4E4

U-value : 1.14 [W/(m2.K)]

solar factor (g) : 0.645 [-] (total solar energy transmittance)

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# Output data conversion

## Example for TRNSYS (Multi Band Calculation)

Unit System : SI

Name : TRNSYS 14.2 WINDOW LIB

Desc : Waermeschutzglas, 0.7, Krypton

Window ID : 4001

Tilt : 90.0

Glazings : 3

Frame : 11 2.270

Spacer : 1 Class1 2.330 -0.010 0.138

Total Height: 1219.2 mm

Total Width : 914.4 mm

Glass Height: 1079.5 mm

Glass Width : 774.7 mm

Mullion : None

Gap	Thick	Cond	dCond	Vis	dVis	Dens	dDens	Pr	dPr		
1 Krypton	8.0	0.00860	2.800	2.280	7.500	3.740	-0.0137	0.660	0.00002		
2 Krypton	8.0	0.00860	2.800	2.280	7.500	3.740	-0.0137	0.660	0.00002		
3	0	0	0	0	0	0	0	0	0		
4	0	0	0	0	0	0	0	0	0		
5	0	0	0	0	0	0	0	0	0		
Angle	0	10	20	30	40	50	60	70	80	90	Hemis
Tsol	0.268	0.270	0.263	0.253	0.243	0.223	0.183	0.116	0.042	0.000	0.207
Abs1	0.327	0.330	0.339	0.345	0.347	0.351	0.367	0.380	0.313	0.001	0.347
Abs2	0.066	0.066	0.067	0.068	0.070	0.071	0.070	0.064	0.051	0.000	0.067
Abs3	0.108	0.110	0.112	0.113	0.110	0.107	0.101	0.082	0.041	0.000	0.100