

Appendix E: Questionnaire completed for the program VA114

GENERAL

- 1 **Program name and version number** VA114 – version 2.25
- 2 **Name of organization performed the simulations** VABI Software bv
- 3 **Name of person performed simulations and contact information** A. Wijsman
Email: a.wijsman@vabi.nl
- 4 **Program status**
☐ Freeware
☒ Commercial
☐ Other, please specify
- 5 **Time convention for weather data: first interval in the weather input lasts 00:00-01:00, climate is assumed constant over the sampling interval**
☒ Yes
☐ No, please specify

CALCULATION OF BOUNDARY CONDITIONS

- 6 **Please specify the solar model for calculation of incident solar radiation**
See appendix D to this Modeller report
- 7 **Transmission of the direct solar radiation into zone 1**
☐ Calculated with the constant solar heat gain coefficient (g-value)
☐ Calculated with the g-value as a function of incidence (function of incidence is fixed within code)
☐ Calculated with the g-value as a function of incidence (function of incidence is user defined)
☒ Other, please specify: Calculated with Transmission (as a function of incidence – user defined) and Absorption in the pane;
- 8 **Transmission of the direct solar radiation into zone 2**
☐ Treated as diffuse solar radiation and calculated with the constant g-value
☐ Calculated with the g-value as a function of incidence (function of incidence is fixed within code)
☐ Calculated with the g-value as a function of incidence (function of incidence is user defined)
☒ Other, please specify: Calculated with Transmission and Absorption in the panes; properties at angle of incidence of 45 degree
- 9 **Transmission of the diffuse solar radiation into zone 1**
☐ Calculated with the solar heat gain coefficient at the solar incidence 60°
☒ Other, please specify: Calculated with Transmission (at solar incidence of 58 °) and Absorption in the pane.

10 Distribution of solar radiation to the surfaces in the zone 1

- ☐ Distributed equally to all surfaces
☐ Calculated according surface area weighting
☐ Calculated according to solar path and view factors
X Other, please specify: Different treatment for Direct and Diffuse solar radiation. Distribution of Direct solar is calculated by solar path; partly absorbed and partly diffuse reflected at surfaces that are hit. Distribution of Diffuse solar and Diffuse reflected Direct solar is calculated by absorption factors (based on view factors and absorption coefficients of the surfaces that are hit)

11 Distribution of solar radiation to the surfaces in the zone 2

- ☐ Distributed equally to all surfaces
☐ Calculated according surface area weighting
☐ Calculated according to solar path and view factors
X Other, please specify: same as distribution in zone 1

MODEL DEFINITIONS

12 Air temperature in the zone 1 is calculated as:

- X One node temperature
☐ Few zones are stacked on the top of each other and the air temperature in each of zones is calculated, please specify number of stacked zones
☐ Other, please specify

13 Air temperature in the zone 2 is calculated as:

- X One node temperature
☐ Few zones are stacked on the top of each other and the air temperature in each of zones is calculated, please specify number of stacked zones
☐ Other, please specify

HEAT EXCHANGE WITH EXTERIOR

14 External heat transfer coefficients

- X Split radiative/convective
☐ Combined radiative/ convective
☐ Other, please specify

15 External heat transfer coefficients are calculated with identical assumptions for all surfaces (window frame, window glazing, walls etc.)

- ☐ Yes
X No, please specify : External heat transfer coefficients are not calculated (see external convection and external radiative heat exchange)

16 External convection

- ☐ Constant coefficients fixed within code
X User-specified constant coefficients
☐ Calculated within code as a function of orientation
☐ Calculated within code as a function of wind speed
☐ Calculated within code as a function of wind speed and direction
☐ Other, please specify

17 External radiative heat exchange

- ☐ Assumed to be ambient temperature
☒ Assumed to be sky temperature
☐ Other, please specify

HEAT TRANSFER WITHIN ZONES

18 Internal heat transfer coefficients

- ☒ Split radiative/convection
☐ Combined radiative/ convective
☐ Other, please specify

19 Internal heat transfer coefficients are calculated with identical assumptions in all zones and for all surfaces (window frame, window glazing, walls etc.)

- ☐ Yes
☐ No, please specify : Internal heat transfer coefficients are not calculated (see internal convection and internal radiative heat exchange)

20 Internal convection

- ☐ Constant coefficients fixed within code
☒ User-specified constant coefficients
☐ Calculated within code as a function of orientation (vertical/horizontal)
☐ Calculated within code as a function of temperature difference
☐ Calculated within code as a function of air velocity in the zone
☐ Calculated within code as a function of surface finishes
☐ Other, please specify

21 Longwave radiation exchange within zone

- ☐ Constant linearized coefficients
☐ Linearized coefficients based on view factors
☒ Linearized coefficients based on view factors and surface emissivities
☐ Nonlinear treatment of radiation heat exchange
☐ Other, please specify

WINDOW

22 Window

- ☒ Window frame and glazing are modelled as separate elements of construction; properties are user defined
☐ Window frame and glazing are modelled as separate elements of construction, but the total U-value is calculated within the code
☐ Window frame and glazing are modelled as separate elements of construction, but the total U-value and g-value are calculated within the code
☐ Other, please specify

23 Glazing temperature

- ☐ Calculated for 1 nodal point on the basis of fixed resistance
☒ Calculated dynamically, using the same scheme as for opaque elements
☐ Other, please specify

AIRFLOW MODEL

24 Discharge coefficient

- X Fixed within the code
- ☐ User-specified fixed value
- ☐ Calculated by code, please specify what are the parameters involved in code calculations
- ☐ Other, please specify

25 Pressure difference coefficients

- ☐ Fixed within the code, identical for all openings sharing the same surface
- X User-specified, identical for all openings sharing the same surface
- ☐ User-specified for every opening
- ☐ Other, please specify

26 Calculated mass flow rate in the model is a function of

- X Buoyancy force
- X Wind pressure
- X Wind fluctuations
- ☐ Other, please specify