

# **MOISTURE ACCUMULATION AND MOULD GROWTH FOR 7 STAR HOUSING IN VICTORIA**

## **Research Report 2**

### *Appendices*

# Moisture accumulation and mould growth for 7 Star housing Research Report 2

## Appendix 01: Detailed hygrothermal input data Revision 3 (09/12/2022)



## 1. Hygrothermal simulation software variables

The hygrothermal and bio-hygrothermal software used in this research has been developed in Germany and is in common use through Europe, Canada, the United States, United Kingdom, New Zealand and Japan. Due to this field of research being in its infancy in Australia, there is no Australian construction materials database and some physical properties differ from what is known about Australian construction materials. Additionally, some of the interior conditions in Australian homes are different to the expectations in other developed nations. This section describes the informed choices made in this research.

### 1.2 Pliable building membranes

The National Construction Code 2022 includes a requirement that new Class 1 and Class 2 buildings in NCC climate zones 2 to 8, include a pliable building membrane outside the insulation layer, with a vapour permeability of AS4200 Class 4 or higher. The Australian Standard for pliable building membranes, AS4200.1 [1], shows vapour permeance classifications in  $1.1403 \mu\text{g}/\text{N}/\text{s}$  (micrograms/newton/second), as shown in Table 1. As such, in this research report, the vapour permeance properties of the pliable building membrane were set at Class 4 vapour permeance value of  $1.1403 \mu\text{g}/\text{N}/\text{s}$ .

Table 1: Pliable membrane vapour permeance classifications

| CLASS   | VCM category     | Min ( $\geq$ ) | Max ( $<$ ) |
|---------|------------------|----------------|-------------|
| Class 1 | Vapour barrier   | 0.0000         | 0.0022      |
| Class 2 | Vapour barrier   | 0.0022         | 0.1429      |
| Class 3 | Vapour permeable | 0.1429         | 1.1403      |
| Class 4 | Vapour permeable | 1.1403         | no maximum  |

Within the hygrothermal simulation software, the physical property attributed to water vapour diffusion resistance was “*water vapour diffusion resistance factor*”. To convert the vapour permeance value to a water vapour diffusion resistance factor, the following mathematical method was used [2].

Step 1: Vapour permeance (P)  $\mu\text{g}/\text{N}/\text{s}$  (Micro gram per Newton seconds) =  $1/\text{Vapour resistance (MN.s/g)}$  (MegaNewton seconds per gram)

Step 2: Water vapour diffusion resistance factor ( $\mu$ -value) = Vapour resistance (MN.s/g) x vapour permeability of still air ( $0.2 \text{ g.m}/\text{MN.s}$ ) (grams meters per Mega Newton seconds / material thickness (meters))

$0.2 \text{ g.m}/\text{MN.s}$  is a typical value in the United Kingdom for the vapour permeability of still air, and converts the vapour resistance to the “equivalent air layer thickness” [3].



### 1.3 Other physical properties

All construction materials have physical properties for conductivity, density and thermal capacitance. To establish values for each element selected in the hygrothermal simulation software, a staged approach was taken, as discussed below.

#### Thermal conductivity

1. Establish a materials thermal resistance value from the NatHERS database [4].
2. Convert the thermal resistance value to a conductivity value (i.e., 6mm compressed fibre cement sheet with an R-value of in NatHERS of 0.012 equates to a conductivity value of 0.5)
3. Within the hygrothermal simulation software materials database, select a similar material with a similar conductivity value. (i.e., compressed fibre cement sheet with a conductivity value calculated from NatHERS of 0.5, and the north American compressed fibre cement sheathing that has a conductivity of 0.245)
4. Un-lock the material within the software database.
5. Modify the materials conductivity to that which came from the NatHERS database.
6. This material was then modified further as per below.

#### Density

The material that had been identified above then had the density modified to match that of the NatHERS database and/or an Australian manufacturer's material data.

### 1.4 Hygrothermal simulation software input variables

#### Exterior surface conditions

Orientation: each wall system was simulated in the four cardinal orientations – North, South, East, West.

Wall inclination: 90 degrees.

Rain load calculation: Included (this method considers the wind driven rain effect on the façade system as described in ASHRAE Standard 160P [5]).

Rain exposure: 1.0, Building height <10m, Medium (referring to a low rise building in a semi-urban environment).

Rain depositing factor: Walls below a low slope roof (wall with eaves). This method was selected as many new homes have an eave which provides some rain protection, and will provide a conservative simulation result in comparison to homes that have no eaves for rain protection.

Exterior surface air film resistance: External wall 0.0588 [6].

Exterior surface Sd value: material dependent as per Table 2 below.

Short-wave radiation value: material dependent as per Table 2 below.

Ground reflectivity: Green grass (0.26).

Rain adhering factor: for painted surfaces = No absorption, for unpainted surfaces = 0.7 absorption.

*Table 2: Wall Sd and short-wave radiation values*

| Wall system                       | Sd Value exterior        | Short wave radiation |
|-----------------------------------|--------------------------|----------------------|
| Weatherboard                      | 0.3 acrylic façade paint | DIN4108 medium (0.6) |
| Compressed fibre cement sheet     | 0.3 acrylic façade paint | DIN4108 medium (0.6) |
| Brick veneer                      | No coating               | Brick red            |
| Concrete block                    | 0.3 acrylic façade paint | DIN4108 medium (0.6) |
| Cavity clay masonry               | No coating               | Brick red            |
| Externally insulated clay masonry | 0.3 acrylic façade paint | DIN4108 medium (0.6) |
| Precast concrete                  | 0.3 acrylic façade paint | DIN4108 medium (0.6) |
| XPS                               | No Coat (acrylic render) | DIN4108 medium (0.6) |
| EPS                               | No Coat (acrylic render) | DIN4108 medium (0.6) |
| Hebel                             | No Coat (acrylic render) | DIN4108 medium (0.6) |
| Sheet-metal                       | No coating               | DIN4108 medium (0.6) |
| Aluminium                         | No coating               | DIN4108 medium (0.6) |

### Interior surface conditions

Interior surface air film resistance: Interior wall 0.125 [6].

Interior surface Sd value: No Coating (due to air leakage around lining system).

### Initial material condition

Initial moisture: Constant across component.

Initial temperature: Constant across component.

Initial RH: 0.8 (80%).

Initial temp: 20.0 (NatHERS min).

### Calculation period

Calculation period: ten years (01/04/2020 to 01/04/2030).

Calculation time steps: 1 hour.

### Exterior climate

NatHERS climate files as per Table 3 below. This is discussed further in the main report document.

*Table 3: NatHERS climates*

| NatHERS climate number | Number of Victorian postcodes | NCC pliable membrane classification |
|------------------------|-------------------------------|-------------------------------------|
| 21                     | 94                            | Permeable                           |
| 22                     | 211                           | Permeable                           |
| 27                     | 149                           | Permeable                           |
| 60                     | 199                           | Permeable                           |
| 61                     | 30                            | Permeable                           |
| 63                     | 68                            | Permeable                           |
| 64 (& 62)              | 419                           | Permeable                           |
| 66                     | 512                           | Permeable                           |

### Interior climate

Heating and cooling: The NCC classes Victoria as a heating only climate. However, NatHERS includes heating and cooling [7]. In this report the simulations were completed based on heating only. Future research to be reported in Research Report 3 will include heating and cooling.

Floating temperature: Based on difference between Heating min (20°C) and cooling thermostat setting within NatHERS (24°C) [4].

### Building data

Bedrooms/ Water vapour load: 4 bedrooms (as per house plan).

Air Exchange rate: The software uses the Air Exchange Rate (1h) value. However, the building sealing verification method within the NCC refers to a maximum ACR@n50 of 10. This method refers to a 50 Pascal air pressure difference created between the interior and exterior of the building. This method normally uses a blower door test system. Persily and Kronwall [8, 9] established that if the ACR@n50 value was divided by 20, it provided a very similar value to ACH or AER (1h). Within this context the maximum allowable building leakage for a 'code' compliant 7 Star home would be  $10 \text{ ACR@n50} / 20 = 0.5 \text{ AER (1h)}$ . Hence, the baseline simulations adopt an ACR of 10 and an AER(1h) of 0.5. Additionally, AS 1668 [10] requires a minimum building leakage rate of AER(1h) of 5.0 unless mechanical ventilation is installed. This provides the second tier of simulation results – ACR 5.0 / AER(1h) 0.25.

Building volume: 366m<sup>3</sup> (as per house plan).

### 1.5 Air Spaces

Within the wall system data in the following pages, there is an occasional note of #1. The #1 refers to NCC allowance for an air space to have an R-value subject to the reflectance properties of pliable membranes that include a reflective surface. These values depend on the size of the air space and the stillness of air. However, many construction scenarios have a wall frame filled with insulation, which does not provide a reflective still air space. That is, the reflective surface, foil, product is hard against an R 2.0 batt that fully occupies the 90mm timber framing space.

This results in a reflective face that is in direct contact with the insulation, negating any reflective insulation benefit. This is an area for regulatory discussion.

## 2. Wall 1 – Weatherboard

### 2.1 Weatherboard wall data

| NatHERS Climates               | 21                                                     | 22                                                    | 27                                                    | 60                                                    | 61                                                  | 63                                                    | 64 (&62)                                            | 66                                                    |
|--------------------------------|--------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|
| 7 Star 27% glass to floor area | R2.7 wall batts                                        | R2.7 wall batts                                       | R3.5 wall batts                                       | R3.5 wall batts                                       | R3.5 wall batts                                     | R3.2 wall batts                                       | R3.2 wall batts                                     | R3.2 wall batts                                       |
|                                | R6.0 Ceiling batt                                      | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R8.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                     |
|                                | Insul Partition<br>Garage/Living<br>Laundry/Living     | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    |
|                                | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 | Habitable<br>AL DG 4/10/4EA<br>U = 3.7, SHGC = 0.53 | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53   | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 |
|                                | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58         | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58      | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58      | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        |
| 7 Star 21% glass to floor area | R2.7 wall batts                                        | R2.7 wall batts                                       | R2.0 wall battsl                                      | R2.0 batts in wall                                    | R2.5 batts in wall                                  | R2.7 batts in wall                                    | R2.7 batts in wall                                  | R2.7 batts in wall                                    |
|                                | R4.2 Ceiling batt                                      | R4.2 Ceiling batt                                     | R5.0 Ceiling batt                                     | R5.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                     |
|                                | Insulated Partition<br>Garage/Living<br>Laundry/Living | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    |
|                                | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53      | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 |
|                                | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10Ar/4<br>U = 4.1, SHGC = 0.57        | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        |
|                                |                                                        |                                                       |                                                       |                                                       | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57 |                                                     |                                                       |

## 2.2 Weatherboard hygrothermal input data 7 Star 21% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI               |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|--------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)      | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588             |                      |                                 |                                          |                                         |
| 2. | Weatherboard (Hardwood)               | 0.019         | 0.119                      | 677                  | 2090                            |                         | Generic hardwood [11]            | 0.146              | 650                  | 1400                            | 65                                       | Fraunhofer hardwood unlocked            |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001  | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                    | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.7                 | CZ22 R-2.7           | CZ27 R-2.0                      | CZ60 R-2.0              | CZ61 R-2.5                       | CZ63 R-2.7         | CZ64 R-2.7           | CZ66 R-2.7                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061 | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125              |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                    |                      |                                 |                                          |                                         |

## 2.3 Weatherboard hygrothermal input data 7 Star 27% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI               |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|--------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)      | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588             |                      |                                 |                                          |                                         |
| 2. | Weatherboard (Hardwood)               | 0.019         | 0.119                      | 677                  | 2090                            |                         | Generic hardwood [11]            | 0.146              | 650                  | 1400                            | 65                                       | Fraunhofer hardwood unlocked            |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001  | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                    | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.7                 | CZ22 R-2.7           | CZ27 R-3.5                      | CZ60 R-3.5              | CZ61 R-3.5                       | CZ63 R-3.2         | CZ64 R-3.2           | CZ66 R-3.2                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061 | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125              |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                    |                      |                                 |                                          |                                         |

### 3. Wall 2 – Compressed fibre cement sheet

#### 3.1 Compressed fibre cement sheet wall data

| NatHERS Climates               | 21                                                     | 22                                                    | 27                                                    | 60                                                    | 61                                                  | 63                                                    | 64 (&62)                                            | 66                                                    |
|--------------------------------|--------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|
| 7 Star 27% glass to floor area | R2.7 wall batts                                        | R2.7 wall batts                                       | R3.5 wall batts                                       | R3.5 wall batts                                       | R3.5 wall batts                                     | R3.2 wall batts                                       | R3.2 wall batts                                     | R3.2 wall batts                                       |
|                                | R6.0 Ceiling batt                                      | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R8.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                     |
|                                | Insul Partition<br>Garage/Living<br>Laundry/Living     | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    |
|                                | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 | Habitable<br>AL DG 4/10/4EA<br>U = 3.7, SHGC = 0.53 | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53   | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 |
|                                | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58         | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58      | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58      | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        |
| 7 Star 21% glass to floor area | R2.7 wall batts                                        | R2.7 wall batts                                       | R2.0 wall battsl                                      | R2.0 batts in wall                                    | R2.5 batts in wall                                  | R2.7 batts in wall                                    | R2.7 batts in wall                                  | R2.7 batts in wall                                    |
|                                | R4.2 Ceiling batt                                      | R4.2 Ceiling batt                                     | R5.0 Ceiling batt                                     | R5.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                     |
|                                | Insulated Partition<br>Garage/Living<br>Laundry/Living | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    |
|                                | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53      | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 |
|                                | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10Ar/4<br>U = 4.1, SHGC = 0.57        | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        |
|                                |                                                        |                                                       |                                                       |                                                       | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57 |                                                     |                                                       |



### 3.2 Compressed Fibre Cement Sheet hygrothermal input data 7 Star 21% Glass to floor area

|    | Layer                                 | Thickness (m)        | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI                |                      |                                 |                                          |                                         |
|----|---------------------------------------|----------------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|---------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |                      | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)       | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |                      | 0.0588                     |                      |                                 |                         |                                  | 0.0588              |                      |                                 |                                          |                                         |
| 2. | Compressed fibre cement sheet         | 0.0045 – 0.012 (6mm) | 0.006 / 0.5 = 0.012        | 1270 – 1560          | 840                             |                         | [12]                             | 0.006/0.245 = 0.025 | 1380                 | 840                             | 990.9                                    | Fibre cement sheathing                  |
| 3. | Pliable membrane (Vapour impermeable) | 0.001                | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001   | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na                   | As per NatHERS simulations |                      |                                 |                         |                                  |                     | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |                      | CZ21 R-2.7                 | CZ22 R-2.7           | CZ27 R-2.0                      | CZ60 R-2.0              | CZ61 R-2.5                       | CZ63 R-2.7          | CZ64 R-2.7           | CZ66 R-2.7                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010                | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061  | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |                      | 0.125                      |                      |                                 |                         |                                  | 0.125               |                      |                                 |                                          |                                         |
|    | Total                                 |                      | 2.366                      |                      |                                 |                         |                                  |                     |                      |                                 |                                          |                                         |

### 3.3 Compressed Fibre Cement Sheet hygrothermal input data 7 Star 27% Glass to floor area

|    | Layer                                 | Thickness (m)        | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI                |                      |                                 |                                          |                                         |
|----|---------------------------------------|----------------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|---------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |                      | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)       | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |                      | 0.0588                     |                      |                                 |                         |                                  | 0.0588              |                      |                                 |                                          |                                         |
| 2. | Compressed fibre cement sheet         | 0.0045 – 0.012 (6mm) | 0.006 / 0.5 = 0.012        | 1270 – 1560          | 840                             |                         | [12]                             | 0.006/0.245 = 0.025 | 1380                 | 840                             | 990.9                                    | Fibre cement sheathing                  |
| 3. | Pliable membrane (Vapour impermeable) | 0.001                | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001   | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na                   | As per NatHERS simulations |                      |                                 |                         |                                  |                     | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |                      | CZ21 R-2.7                 | CZ22 R-2.7           | CZ27 R-3.5                      | CZ60 R-3.5              | CZ61 R-3.5                       | CZ63 R-3.2          | CZ64 R-3.2           | CZ66 R-3.2                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010                | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061  | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |                      | 0.125                      |                      |                                 |                         |                                  | 0.125               |                      |                                 |                                          |                                         |
|    | Total                                 |                      | 2.366                      |                      |                                 |                         |                                  |                     |                      |                                 |                                          |                                         |

## 4. Wall 3 – Clay masonry veneer

### 4.1 Clay masonry veneer wall data

| NatHERS Climates               | 21                                                     | 22                                                    | 27                                                    | 60                                                    | 61                                                  | 63                                                    | 64 (&62)                                            | 66                                                    |
|--------------------------------|--------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|
| 7 Star 27% glass to floor area | R2.7 wall batts                                        | R2.7 wall batts                                       | R3.5 wall batts                                       | R3.5 wall batts                                       | R3.5 wall batts                                     | R3.2 wall batts                                       | R3.2 wall batts                                     | R3.2 wall batts                                       |
|                                | R6.0 Ceiling batt                                      | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R8.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                     |
|                                | Insul Partition<br>Garage/Living<br>Laundry/Living     | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    |
|                                | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 | Habitable<br>AL DG 4/10/4EA<br>U = 3.7, SHGC = 0.53 | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53   | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 |
|                                | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58         | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58      | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58      | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        |
| 7 Star 21% glass to floor area | R2.7 wall batts                                        | R2.7 wall batts                                       | R2.0 wall batts                                       | R2.0 batts in wall                                    | R2.5 batts in wall                                  | R2.7 batts in wall                                    | R2.7 batts in wall                                  | R2.7 batts in wall                                    |
|                                | R4.2 Ceiling batt                                      | R4.2 Ceiling batt                                     | R5.0 Ceiling batt                                     | R5.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                     |
|                                | Insulated Partition<br>Garage/Living<br>Laundry/Living | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    |
|                                | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4-12Ar-4ET<br>U = 3.1, SHGC = 0.49 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53      | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 |
|                                | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10Ar/4<br>U = 4.1, SHGC = 0.57        | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG<br>U = 5.4, SHGC = 0.58        |
|                                |                                                        |                                                       |                                                       |                                                       | Non habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57 |                                                     |                                                       |

## 4.2 Clay masonry veneer hygrothermal input data 7 Star 21% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                     | WUFI                             |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|-------------------------------------|----------------------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                   | R-value (K/W)                    | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                     | 0.0588                           |                      |                                 |                                          |                                         |
| 2. | Brickwork: extruded brick (generic)   | 0.110         | 0.179 [12]                 | 1820                 | 959                             |                         | [11]                                | 0.11/0.6 = 0.183                 | 1820                 | 959                             | 9.5                                      | Solid brick, extruded unlocked          |
| 3. | 40 mm cavity                          | 0.040         | 0.242 [13] #1              |                      |                                 |                         | Non-reflective (0.9/0.9; E = 0.82)) | Air gap vertical 40 mm ventilate | 0.04/0.23 = 0.174    | 1.3                             | 1000                                     | 0.38                                    |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                     | 0.001/0.5 = 0.001                | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                     |                                  | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.7                 | CZ22 R-2.7           | CZ27 R-2.0                      | CZ60 R-2.0              | CZ61 R-2.5                          | CZ63 R-2.7                       | CZ64 R-2.7           | CZ66 R-2.7                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11]    | 0.01/0.163 = 0.061               | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                     | 0.125                            |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                     |                                  |                      |                                 |                                          |                                         |

#### 4.3 Hygrothermal input data 7 Star 27% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                     | WUFI                             |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|-------------------------------------|----------------------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                   | R-value (K/W)                    | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                     | 0.0588                           |                      |                                 |                                          |                                         |
| 2. | Brickwork: extruded brick (generic)   | 0.110         | 0.179 [12]                 | 1820                 | 959                             |                         | [11]                                | 0.11/0.6 = 0.183                 | 1820                 | 959                             | 9.5                                      | Solid brick, extruded unlocked          |
| 3. | 40 mm cavity                          | 0.040         | 0.242 [13] #1              |                      |                                 |                         | Non-reflective (0.9/0.9; E = 0.82)) | Air gap vertical 40 mm ventilate | 0.04/0.23 = 0.174    | 1.3                             | 1000                                     | 0.38                                    |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                     | 0.001/0.5 = 0.001                | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                     |                                  | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.7                 | CZ22 R-2.7           | CZ27 R-3.5                      | CZ60 R-3.5              | CZ61 R-3.5                          | CZ63 R-3.2                       | CZ64 R-3.2           | CZ66 R-3.2                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11]    | 0.01/0.163 = 0.061               | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                     | 0.125                            |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                     |                                  |                      |                                 |                                          |                                         |

## 5. Wall 4 – Concrete block masonry

### 5.1 Concrete block masonry wall data

| NatHERS Climates               | 21                                                           | 22                                                               | 27                                                 | 60                                                           | 61                                                    | 63                                                    | 64 (&62)                                              | 66                                                     |
|--------------------------------|--------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------|
| 7 Star 27% glass to floor area | R3.0 wall batts                                              | R3.0 wall batts                                                  | R4.0 wall batts                                    | R4.0 batts in wall                                           | R2.5 batts in wall                                    | R3.2 wall batts                                       | R3.0 wall batts                                       | R4.0 wall batts                                        |
|                                | R6.0 Ceiling batt                                            | R8.0 Ceiling batt                                                | R8.0 Ceiling batt                                  | R8.0 Ceiling batt                                            | R8.0 Ceiling batt                                     | R7.0 Ceiling batt                                     | R7.0 Ceiling batt                                     | R6.0 Ceiling batt                                      |
|                                | Insul Partition<br>Garage/Living<br>Laundry/Living           | Insul Partition<br>Garage/Living<br>Laundry/Living               | Insul Partition<br>Garage/Living<br>Laundry/Living | Insul Partition<br>Garage/Living<br>Laundry/Living           | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living     |
|                                | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53        | Beds<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53                 | AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53             | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53           | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50 |
|                                | Non-habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Living & Non-habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53 |                                                    | Beds & Non-habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    |
| 7 Star 21% glass to floor area | R2.5 wall batts                                              | R2.5 wall batts                                                  | R2.5 wall battsl                                   | R2.5 batts in wall                                           | R2.5 batts in wall                                    | R2.7 batts in wall                                    | R2.5 batts in wall                                    | R3.0 batts in wall                                     |
|                                | R6.0 Ceiling batt                                            | R6.0 Ceiling batt                                                | R6.0 Ceiling batt                                  | R6.0 Ceiling batt                                            | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                      |
|                                | Insulated Partition<br>Garage/Living<br>Laundry/Living       | Insul Partition<br>Garage/Living<br>Laundry/Living               | Insul Partition<br>Garage/Living<br>Laundry/Living | Insul Partition<br>Garage/Living<br>Laundry/Living           | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living     |
|                                | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53           | Beds<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53                 | AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53             | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53           | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53    | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53    | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53    | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  |
|                                | Beds & Non-habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57 | Living & Non-habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53 |                                                    | Beds & Non-habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57 | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57          | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57          | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57          | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    |
|                                |                                                              |                                                                  |                                                    |                                                              | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   |                                                        |

## 5.2 Concrete block masonry hydrothermal input data 7 Star 21% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI                |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|---------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)       | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588              |                      |                                 |                                          |                                         |
| 2. | Concrete block                        | 0.190         | 0.151 [12]                 |                      | 880                             |                         |                                  | 0.190/0.733 = 0.259 | 2315                 | 800                             | 86.7                                     | Concrete brick unlocked                 |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001   | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                     | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.5                 | CZ22 R-2.5           | CZ27 R-2.5                      | CZ60 R-2.5              | CZ61 R-2.5                       | CZ63 R-2.7          | CZ64 R-2.5           | CZ66 R-3.0                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061  | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125               |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                     |                      |                                 |                                          |                                         |

### 5.3 Concrete block masonry hygrothermal input data 7 Star 27% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI                |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|---------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)       | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588              |                      |                                 |                                          |                                         |
| 2. | Concrete block                        | 0.190         | 0.151 [12]                 |                      | 880                             |                         |                                  | 0.190/0.733 = 0.259 | 2315                 | 800                             | 86.7                                     | Concrete brick unlocked                 |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001   | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                     | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-3.0                 | CZ22 R-3.0           | CZ27 R-4.0                      | CZ60 R-4.0              | CZ61 R-2.5                       | CZ63 R-3.2          | CZ64 R-3.0           | CZ66 R-4.0                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061  | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125               |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                     |                      |                                 |                                          |                                         |



## 6 Wall 5 – Externally insulated clay masonry

### 6.1 Externally insulated clay masonry wall data

| NatHERS<br>Climates               | 21                                                              | 22                                                    | 27                                                         | 60                                                  | 61                                                  | 63                                                  | 64 (&62)                                              | 66                                                           |
|-----------------------------------|-----------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------|
| 7 Star 27% glass<br>to floor area | R2.5 wall batts                                                 | R2.7 wall batts                                       | R2.70 wall batts                                           | R3.0 batts in wall                                  | R2.5 batts in wall                                  | R3.0 batts in wall                                  | R3.0 batts in wall                                    | R4.0 wall batts                                              |
|                                   | R6.0 Ceiling batt                                               | R6.0 Ceiling batt                                     | R6.0 Ceiling batt                                          | R7.0 Ceiling batt                                   | R6.0 Ceiling batt                                   | R7.0 Ceiling batt                                   | R7.0 Ceiling batt                                     | R8.0 Ceiling batt                                            |
|                                   | Insul Partition<br>Garage/Living<br>Laundry/Living              | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living         | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living           |
|                                   | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53           | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53         | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53           |
|                                   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66             | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57               | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Non-habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57 | Beds & Non-habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57 |
|                                   |                                                                 |                                                       | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66        | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 |                                                       |                                                              |
| 7 Star 21% glass<br>to floor area | R2.5 wall batts                                                 | R2.7 wall batts                                       | R2.5 wall battsl                                           | R2.5 batts in wall                                  | R2.5 batts in wall                                  | R2.5 batts in wall                                  | R2.5 batts in wall                                    | R2.7 batts in wall                                           |
|                                   | R6.0 Ceiling batt                                               | R6.0 Ceiling batt                                     | R4.0 Ceiling batt                                          | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                     | R7.0 Ceiling batt                                            |
|                                   | Insulated Partition<br>Garage/Living<br>Laundry/Living          | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living         | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living           |
|                                   | Living & Bed 1<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57          | Habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57     | Living<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57             | Habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57   | Habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57   | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53    | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53           |
|                                   | Bed 2/3/4 & Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Beds & Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57          | Beds & Non-habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57 |
|                                   |                                                                 |                                                       |                                                            |                                                     |                                                     | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   |                                                              |

## 6.2 Externally insulated clay masonry hygrothermal input data 7 Star 21% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                               | WUFI               |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|-----------------------------------------------|--------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                             | R-value (K/W)      | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                               | 0.0588             |                      |                                 |                                          |                                         |
| 2. | Weatherboard (Hardwood)               | 0.019         | 0.119 [12]                 | 677 [11]             | 2090 [11]                       |                         |                                               | 0.019/0.13 = 0.146 | 650                  | 1400                            | 65                                       | Fraunhofer hardwood unlocked            |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                               | 0.001/0.5 = 0.001  | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                               |                    | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.5                 | CZ22 R-2.7           | CZ27 R-2.5                      | CZ60 R-2.5              | CZ61 R-2.5                                    | CZ63 R-2.5         | CZ64 R-2.5           | CZ66 R-2.7                      |                                          |                                         |
| 5. | Air gap vertical 40 mm                | 0.040         | 0.133 [12]                 |                      |                                 |                         | ventilated non-reflective (0.9/0.9; E = 0.82) | 0.04/0.23 = 0.174  | 1.3                  | 1000                            | 0.38                                     | Air layer 40 mm                         |
| 6. | Brickwork:extruded brick (generic)    | 0.110         | 0.179 [12]                 | 1820 [11]            | 959                             |                         |                                               | 0.183              | 1650                 | 850                             | 9.5                                      | Solid brick, extruded                   |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                               | 0.125              |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                               |                    |                      |                                 |                                          |                                         |

### 6.3 Externally insulated clay masonry hygrothermal input data 7 Star 27% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                               | WUFI               |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|-----------------------------------------------|--------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                             | R-value (K/W)      | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                               | 0.0588             |                      |                                 |                                          |                                         |
| 2. | Weatherboard (Hardwood)               | 0.019         | 0.119 [12]                 | 677 [11]             | 2090 [11]                       |                         |                                               | 0.019/0.13 = 0.146 | 650                  | 1400                            | 65                                       | Fraunhofer hardwood unlocked            |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                               | 0.001/0.5 = 0.001  | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                               |                    | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.5                 | CZ22 R-2.7           | CZ27 R-2.7                      | CZ60 R-3.0              | CZ61 R-2.5                                    | CZ63 R-3.0         | CZ64 R-3.0           | CZ66 R-4.0                      |                                          |                                         |
| 5. | Air gap vertical 40 mm                | 0.040         | 0.133 [12]                 |                      |                                 |                         | ventilated non-reflective (0.9/0.9; E = 0.82) | 0.04/0.23 = 0.174  | 1.3                  | 1000                            | 0.38                                     | Air layer 40 mm                         |
| 6. | Brickwork:extruded brick (generic)    | 0.110         | 0.179 [12]                 | 1820 [11]            | 959                             |                         |                                               | 0.183              | 1650                 | 850                             | 9.5                                      | Solid brick, extruded                   |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                               | 0.125              |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                               |                    |                      |                                 |                                          |                                         |

## 7 Wall 6 – Extruded polystyrene cladding (XPS)

### 7.1 Extruded polystyrene cladding wall data

| NatHERS<br>Climates               | 21                                                     | 22                                                  | 27                                                  | 60                                                  | 61                                                  | 63                                                  | 64 (&62)                                              | 66                                                     |
|-----------------------------------|--------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------|
| 7 Star 27% glass<br>to floor area | R1.3 EPS + R2.5 wall<br>Batts                          | R1.3 EPS + R4.0 wall<br>Batts                       | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.5 wall<br>Batts                       | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.5 wall<br>Batts                         | R1.3 EPS + R2.5 wall<br>Batts                          |
|                                   | R7.0 Ceiling batts                                     | R8.0 Ceiling batts                                  | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                   | R8.0 Ceiling batt                                   | R6.0 Ceiling batt                                     | R6.0 Ceiling batts                                     |
|                                   | Insul Partition<br>Garage/Living<br>Laundry/Living     | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living     |
|                                   | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | ALL<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53       | All<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50    | Living<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50 | Living<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50 | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50 |
|                                   | Non-habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57  |                                                     |                                                     | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    |
|                                   |                                                        |                                                     |                                                     | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 |                                                     |                                                       |                                                        |
| 7 Star 21% glass<br>to floor area | R1.3 EPS + R2.5 wall<br>Batts                          | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.5 wall<br>Batts                       | R1.3 EPS + R2.5 wall<br>Batts                       | R1.3 EPS + R2.0 wall<br>Batts                         | R1.3 EPS + R2.5 wall<br>Batts                          |
|                                   | R6.0 Ceiling batts                                     | R6.0 Ceiling batts                                  | R6.0 Ceiling batts                                  | R7.0 Ceiling batts                                  | R6.0 Ceiling batts                                  | R7.0 Ceiling batts                                  | R6.0 Ceiling batts                                    | R7.0 Ceiling batts                                     |
|                                   | Insulated Partition<br>Garage/Living<br>Laundry/Living | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living     |
|                                   | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53     | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57   | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53    | All<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53          |
|                                   | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57           | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57          |                                                        |
|                                   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 |                                                     | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   |                                                        |

## 7.2 Extruded polystyrene cladding hygrothermal input data 7 Star 21% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI                      |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|---------------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)             | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588                    |                      |                                 |                                          |                                         |
| 2. | Acrylic Render K0.67                  | 0.002         | 0.003                      | 1900                 |                                 | g/m2d 15 < V2 ≤ 150     |                                  | K 0.67 Atlas acrylic [14] | 0.003                | 1900                            | 840                                      | 67.3                                    |
| 3. | XPS clad K.041                        | 0.050         | 1.219                      | 19                   |                                 |                         |                                  | unitex                    | 1.219                | 19                              | 1500                                     | 125                                     |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001         | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                           | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.5                 | CZ22 R-2.7           | CZ27 R-2.7                      | CZ60 R-2.7              | CZ61 R-2.5                       | CZ63 R-2.5                | CZ64 R-2.0           | CZ66 R-2.5                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061        | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125                     |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                           |                      |                                 |                                          |                                         |

### 7.3 Extruded polystyrene cladding hygrothermal input data 7 Star 27% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI                      |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|---------------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)             | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588                    |                      |                                 |                                          |                                         |
| 2. | Acrylic Render K0.67                  | 0.002         | 0.003                      | 1900                 |                                 | g/m2d 15 < V2 ≤ 150     |                                  | K 0.67 Atlas acrylic [14] | 0.003                | 1900                            | 840                                      | 67.3                                    |
| 3. | XPS clad K.041                        | 0.050         | 1.219                      | 19                   |                                 |                         |                                  | unitex                    | 1.219                | 19                              | 1500                                     | 125                                     |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001         | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                           | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.5                 | CZ22 R-4.0           | CZ27 R-2.7                      | CZ60 R-2.7              | CZ61 R-2.5                       | CZ63 R-2.7                | CZ64 R-2.5           | CZ66 R-2.5                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061        | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125                     |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                           |                      |                                 |                                          |                                         |

## 8 Wall 7 - Expanded polystyrene cladding (EPS)

### 8.1 Expanded polystyrene cladding wall data

| NatHERS<br>Climates               | 21                                                     | 22                                                  | 27                                                  | 60                                                  | 61                                                  | 63                                                  | 64 (&62)                                              | 66                                                     |
|-----------------------------------|--------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------|
| 7 Star 27% glass<br>to floor area | R1.3 EPS + R2.5 wall<br>Batts                          | R1.3 EPS + R4.0 wall<br>Batts                       | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.5 wall<br>Batts                       | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.5 wall<br>Batts                         | R1.3 EPS + R2.5 wall<br>Batts                          |
|                                   | R7.0 Ceiling batts                                     | R8.0 Ceiling batts                                  | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                   | R6.0 Ceiling batt                                   | R8.0 Ceiling batt                                   | R6.0 Ceiling batt                                     | R6.0 Ceiling batts                                     |
|                                   | Insul Partition<br>Garage/Living<br>Laundry/Living     | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living     |
|                                   | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | ALL<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53       | All<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50    | Living<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50 | Living<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50 | Habitable<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50 |
|                                   | Non-habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57  |                                                     |                                                     | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    |
|                                   |                                                        |                                                     |                                                     | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 |                                                     |                                                       |                                                        |
| 7 Star 21% glass<br>to floor area | R1.3 EPS + R2.5 wall<br>Batts                          | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.7 wall<br>Batts                       | R1.3 EPS + R2.5 wall<br>Batts                       | R1.3 EPS + R2.5 wall<br>Batts                       | R1.3 EPS + R2.0 wall<br>Batts                         | R1.3 EPS + R2.5 wall<br>Batts                          |
|                                   | R6.0 Ceiling batts                                     | R6.0 Ceiling batts                                  | R6.0 Ceiling batts                                  | R7.0 Ceiling batts                                  | R6.0 Ceiling batts                                  | R7.0 Ceiling batts                                  | R6.0 Ceiling batts                                    | R7.0 Ceiling batts                                     |
|                                   | Insulated Partition<br>Garage/Living<br>Laundry/Living | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living     |
|                                   | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53     | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57   | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53    | All<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53          |
|                                   | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57           | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57          |                                                        |
|                                   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 |                                                     | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   |                                                        |

## 8.2 Expanded polystyrene cladding hygrothermal input data 7 Star 21% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI               |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|--------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)      | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588             |                      |                                 |                                          |                                         |
| 2. | Acrylic Render K0.67                  | 0.002         | 0.003                      | 1900                 |                                 | g/m2d 15 < V2 ≤ 150     | K 0.67 Atlas acrylic [14]        | 0.003              | 1900                 | 840                             | 67.3                                     | Acrylic Stucco - unlocked               |
| 3. | EPS clad K0.0385                      | 0.050         | 1.299                      | 20                   |                                 | 520 µg/m2s- AS2498.5    | Masterwall                       | 1.299              | 19                   | 1500                            | 125                                      |                                         |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001  | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                    | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.5                 | CZ22 R-2.7           | CZ27 R-2.7                      | CZ60 R-2.7              | CZ61 R-2.5                       | CZ63 R-2.5         | CZ64 R-2.0           | CZ66 R-2.5                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061 | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125              |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                    |                      |                                 |                                          |                                         |



### 8.3 Expanded polystyrene cladding hygrothermal input data 7 Star 27% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI               |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|--------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)      | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588             |                      |                                 |                                          |                                         |
| 2. | Acrylic Render K0.67                  | 0.002         | 0.003                      | 1900                 |                                 | g/m2d 15 < V2 ≤ 150     | K 0.67 Atlas acrylic [14]        | 0.003              | 1900                 | 840                             | 67.3                                     | Acrylic Stucco - unlocked               |
| 3. | EPS clad K0.0385                      | 0.050         | 1.299                      | 20                   |                                 | 520 ug/m2s- AS2498.5    | Masterwall                       | 1.299              | 19                   | 1500                            | 125                                      |                                         |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001  | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                    | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 R-2.5                 | CZ22 R-4.0           | CZ27 R-2.7                      | CZ60 R-2.7              | CZ61 R-2.5                       | CZ63 R-2.7         | CZ64 R-2.5           | CZ66 R-2.5                      |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061 | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125              |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                    |                      |                                 |                                          |                                         |

## 9 Wall 8 – Autoclaved aerated concrete (AAC) cladding

### 9.1 Autoclaved aerated concrete (AAC) cladding wall data

| NatHERS<br>Climates               | 21                                                     | 22                                                  | 27                                                  | 60                                                    | 61                                                    | 63                                                    | 64 (&62)                                              | 66                                                          |
|-----------------------------------|--------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------|
| 7 Star 27% glass<br>to floor area | R2.7 wall Batts                                        | R2.7 wall Batts                                     | R2.7 wall Batts                                     | R2.7 wall Batts                                       | R2.0 wall Batts                                       | R2.5 wall Batts                                       | R2.5 wall Batts                                       | R2.5 wall Batts                                             |
|                                   | R7.0 Ceiling batts                                     | R8.0 Ceiling batts                                  | R8.0 Ceiling batt                                   | R8.0 Ceiling batt                                     | R8.0 Ceiling batt                                     | R8.0 Ceiling batt                                     | R7.0 Ceiling batt                                     | R7.0 Ceiling batts                                          |
|                                   | Insul Partition<br>Garage/Living<br>Laundry/Living     | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living          |
|                                   | Habitable<br>DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53     | Habitable<br>DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Living<br>AL DG 4/16/4CSClR<br>U = 2.8, SHGC = 0.50 | Habitable<br>DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53    | Habitable<br>DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53    | Habitable<br>DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53    | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Living & Bed 1<br>AL DG 4/16/4CSClR<br>U = 2.8, SHGC = 0.50 |
|                                   | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66    | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66 | Beds<br>AL DG 4/16Ar/4<br>U = 3.2, SHGC = 0.53      | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66   | Bed 2, 3 & 4<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53    |
|                                   |                                                        |                                                     | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66 |                                                       |                                                       |                                                       |                                                       | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66         |
| 7 Star 21% glass<br>to floor area | R2.7 wall Batts                                        | R2.7 wall Batts                                     | R2.7 wall Batts                                     | R2.0 wall Batts                                       | R2.5 wall Batts                                       | R2.7 wall Batts                                       | R2.7 wall Batts                                       | R2.7 wall Batts                                             |
|                                   | R8.0 Ceiling batts                                     | R7.0 Ceiling batts                                  | R7.0 Ceiling batts                                  | R6.0 Ceiling batts                                    | R5.0 Ceiling batts                                    | R5.0 Ceiling batts                                    | R5.0 Ceiling batts                                    | R8.0 Ceiling batts                                          |
|                                   | Insulated Partition<br>Garage/Living<br>Laundry/Living | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living  | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living          |
|                                   | Habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57      | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53  | Habitable<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57   | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53       |
|                                   | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66    | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57        | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66 | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66         |
|                                   |                                                        | Non-habitable<br>AL SG 3ClR<br>U = 6.5, SHGC = 0.66 |                                                     |                                                       |                                                       |                                                       |                                                       |                                                             |

## 9.2 Autoclaved aerated concrete (AAC) cladding hygrothermal input data 7 Star 21% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI               |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|--------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)      | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588             |                      |                                 |                                          |                                         |
| 2. | Acrylic Render K0.67                  | 0.002         | 0.003                      | 1900                 |                                 | g/m2d 15 < V2 ≤ 150     | K 0.67 Atlas acrylic [14]        | 0.009              | 1900                 | 840                             | 67.3                                     | Acrylic Stucco - unlocked               |
| 2. | AAC panel                             | 0.050         | 0.3876                     | 510                  | 1104                            |                         | AAC Hebel K 0.029 [15]           | 0.385              | 510                  | 850                             | 8                                        | AAC unlocked                            |
| 3  | Vented air space reflective           | 24            | 0.236 [4]                  |                      |                                 |                         | (0.4/0.9; E = 0.38)              | 0.154              | 1.3                  | 1000                            | 0.51                                     | 25mm air layer (K 0.155)                |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001  | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                    | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 2.7                   | CZ22 2.7             | CZ27 2.7                        | CZ60 2.0                | CZ61 2.5                         | CZ63 2.7           | CZ64 2.7             | CZ66 2.7                        |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061 | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125              |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                    |                      |                                 |                                          |                                         |

### 9.3 Autoclaved aerated concrete (AAC) cladding hygrothermal input data 7 Star 27% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI               |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|--------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)      | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588             |                      |                                 |                                          |                                         |
| 2. | Acrylic Render K0.67                  | 0.002         | 0.003                      | 1900                 |                                 | g/m2d 15 < V2 ≤ 150     | K 0.67 Atlas acrylic [14]        | 0.009              | 1900                 | 840                             | 67.3                                     | Acrylic Stucco - unlocked               |
| 2. | AAC panel                             | 0.050         | 0.3876                     | 510                  | 1104                            |                         | AAC Hebel K 0.029 [15]           | 0.385              | 510                  | 850                             | 8                                        | AAC unlocked                            |
| 3  | Vented air space reflective           | 24            | 0.236 [4]                  |                      |                                 |                         | (0.4/0.9; E = 0.38)              | 0.154              | 1.3                  | 1000                            | 0.51                                     | 25mm air layer (K 0.155)                |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001  | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                    | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 2.7                   | CZ22 2.7             | CZ27 2.7                        | CZ60 2.7                | CZ61 2.0                         | CZ63 2.5           | CZ64 2.5             | CZ66 2.5                        |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061 | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125              |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                    |                      |                                 |                                          |                                         |

# 10Wall 11 – Sheet-metal cladding

## 10.1 Sheet-metal cladding wall data

| NatHERS<br>Climates               | 21                                                     | 22                                                    | 27                                                     | 60                                                    | 61                                                    | 63                                                    | 64 (&62)                                              | 66                                                     |
|-----------------------------------|--------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------|
| 7 Star 27% glass<br>to floor area | R3.5 wall Batts                                        | R2.7 wall Batts                                       | R3.0 wall Batts                                        | R2.7 wall Batts                                       | R2.5 wall Batts                                       | R2.7 wall Batts                                       | R2.7 wall Batts                                       | R3.0 wall Batts                                        |
|                                   | R8.0 Ceiling batts                                     | R8.0 Ceiling batts                                    | R8.0 Ceiling batt                                      | R7.0 Ceiling batt                                     | R7.0 Ceiling batt                                     | R6.0 Ceiling batt                                     | R7.0 Ceiling batt                                     | R8.0 Ceiling batts                                     |
|                                   | Insul Partition<br>Garage/Living<br>Laundry/Living     | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living     | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living     |
|                                   | Habitable<br>DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53     | Living<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50   | Habitable<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50 | Living<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50   | Living<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50   | Living<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50   | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50 |
|                                   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    | Beds<br>DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53         | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    | Beds<br>DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53         | Beds<br>DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53         | Beds<br>DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53         | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    |
|                                   |                                                        | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   |                                                        | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   |                                                       |                                                        |
| 7 Star 21% glass<br>to floor area | R2.7 wall Batts                                        | R2.7 wall Batts                                       | R2.7 wall Batts                                        | R2.5 wall Batts                                       | R2.7 wall Batts                                       | R2.7 wall Batts                                       | R2.7 wall Batts                                       | R2.7 wall Batts                                        |
|                                   | R7.0 Ceiling batts                                     | R7.0 Ceiling batts                                    | R7.0 Ceiling batts                                     | R8.0 Ceiling batts                                    | R6.0 Ceiling batts                                    | R7.0 Ceiling batts                                    | R7.0 Ceiling batts                                    | R8.0 Ceiling batts                                     |
|                                   | Insulated Partition<br>Garage/Living<br>Laundry/Living | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living     | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living    | Insul Partition<br>Garage/Living<br>Laundry/Living     |
|                                   | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53     | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Living<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53     | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Habitable<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53 | Living<br>AL DG 4/16/4CSClr<br>U = 2.8, SHGC = 0.50    |
|                                   | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57           | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Beds<br>AL DG 4/10/4<br>U = 4.2, SHGC = 0.57           | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66   | Beds<br>AL DG 4/10Ar/4EA<br>U = 3.5, SHGC = 0.53       |
|                                   | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    |                                                       | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    |                                                       |                                                       |                                                       |                                                       | Non-habitable<br>AL SG 3Clr<br>U = 6.5, SHGC = 0.66    |

## 10.2 Sheet-metal cladding hygrothermal input data 7 Star 21% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI               |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|--------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)      | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588             |                      |                                 |                                          |                                         |
| 2. | Sheet metal clad                      | 0.0012        | 0.000                      | 7830                 | 500                             |                         |                                  | 0.385              | 510                  | 850                             | 8                                        | AAC unlocked                            |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4 1.1403          |                                  | 0.001/0.5 = 0.001  | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                    | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21 2.7                   | CZ22 2.7             | CZ27 2.7                        | CZ60 2.5                | CZ61 2.7                         | CZ63 2.7           | CZ64 2.7             | CZ66 2.7                        |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061 [12]                 | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163 = 0.061 | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125              |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                    |                      |                                 |                                          |                                         |

### 10.3 Sheet-metal cladding hygrothermal input data 7 Star 27% Glass to floor area

|    | Layer                                 | Thickness (m) | NatHERS or Manufacturer    |                      |                                 |                         |                                  | WUFI                  |                      |                                 |                                          |                                         |
|----|---------------------------------------|---------------|----------------------------|----------------------|---------------------------------|-------------------------|----------------------------------|-----------------------|----------------------|---------------------------------|------------------------------------------|-----------------------------------------|
|    |                                       |               | R-value (K/W)              | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Vapour permeance µg/N.s | Material selected                | R-value (K/W)         | Bulk density (kg/m³) | Specific heat capacity (J/kg.K) | Water vapour diffusion resistance factor | Material selected                       |
| 1. | Exterior surface film coefficient     |               | 0.0588                     |                      |                                 |                         |                                  | 0.0588                |                      |                                 |                                          |                                         |
| 2. | Sheet metal clad                      | 0.0012        | 0.000                      | 7830                 | 500                             |                         |                                  | 0.385                 | 510                  | 850                             | 8                                        | AAC unlocked                            |
| 3. | Pliable membrane (Vapour impermeable) | 0.001         | 0.002                      |                      |                                 | Class 4<br>1.1403       |                                  | 0.001/0.5<br>= 0.001  | 260                  | 1000                            | 175.4                                    | Vapour retarder unlocked                |
| 4. | Insulated timber frame                | na            | As per NatHERS simulations |                      |                                 |                         |                                  |                       | 26.2                 | 840                             | 1.2                                      | Thermalin ISO glass fibre batt unlocked |
|    |                                       |               | CZ21<br>3.5                | CZ22<br>2.7          | CZ27<br>3.0                     | CZ60<br>2.7             | CZ61<br>2.5                      | CZ63<br>2.7           | CZ64<br>2.7          | CZ66<br>3.0                     |                                          |                                         |
| 6. | Paper faced plasterboard              | 0.010         | 0.061<br>[12]              | 880                  | 1050                            |                         | Plasterboard (Gypsum board) [11] | 0.01/0.163<br>= 0.061 | 880                  | 1050                            | 6                                        | Gypsum Board (USA) unlocked             |
| 7. | Interior surface film coefficient     |               | 0.125                      |                      |                                 |                         |                                  | 0.125                 |                      |                                 |                                          |                                         |
|    | Total                                 |               | 2.366                      |                      |                                 |                         |                                  |                       |                      |                                 |                                          |                                         |

## 11. References

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# Moisture accumulation and mould growth for 7 Star housing Research Report 2

## Appendix 2: Hygrothermal simulation results- Timber cladding with insulated timber frame (Wall 1)

Revision 02 (09/12/2022)

## 1. Climate zone 21 - NCC CZ6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

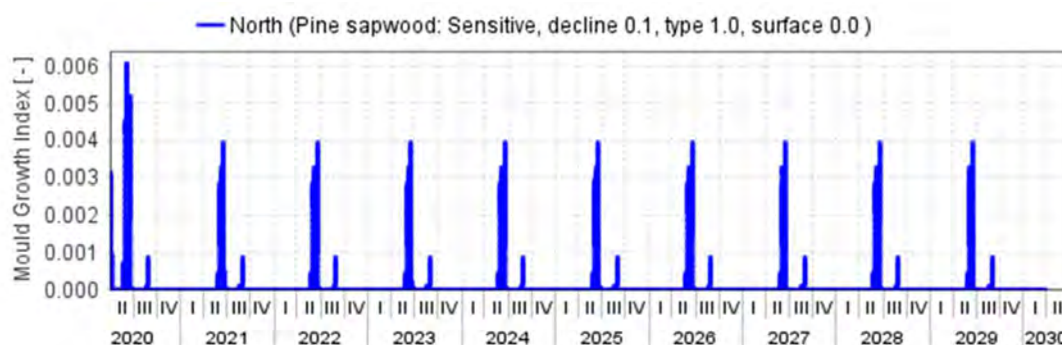


Figure 1: NatHERS CZ 21 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fifth year. This wall type requires further investigation.

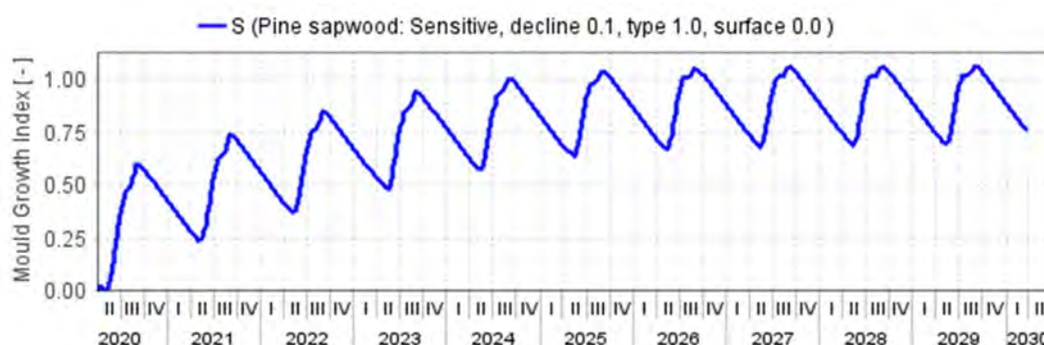


Figure 2: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

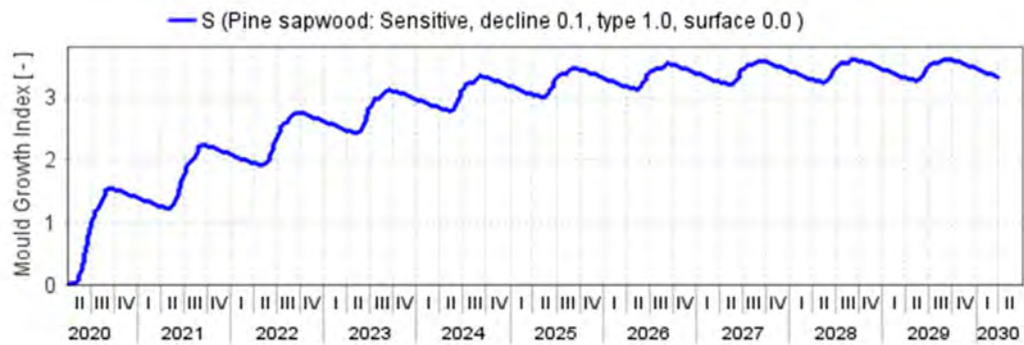


Figure 3: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

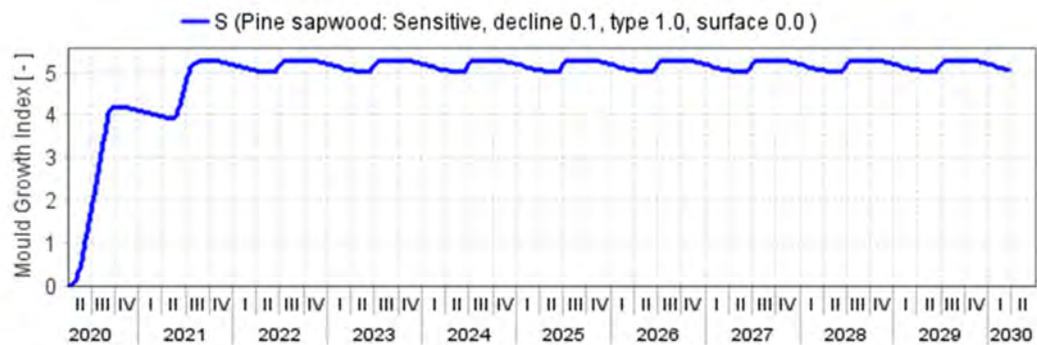


Figure 4: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

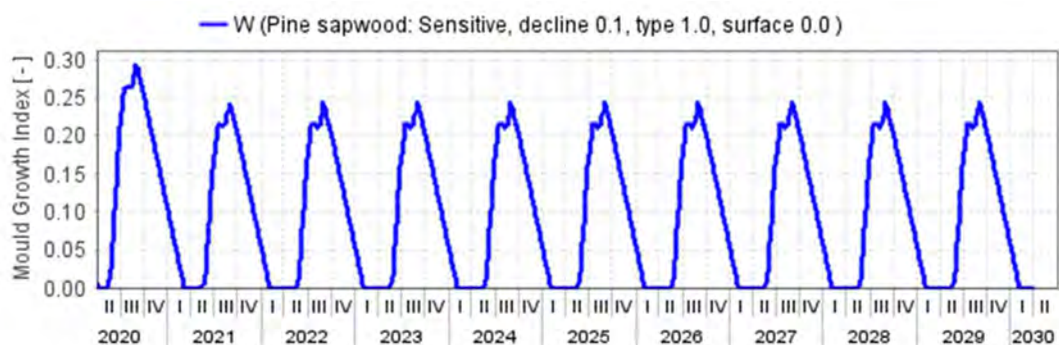


Figure 5: NatHERS CZ 21 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

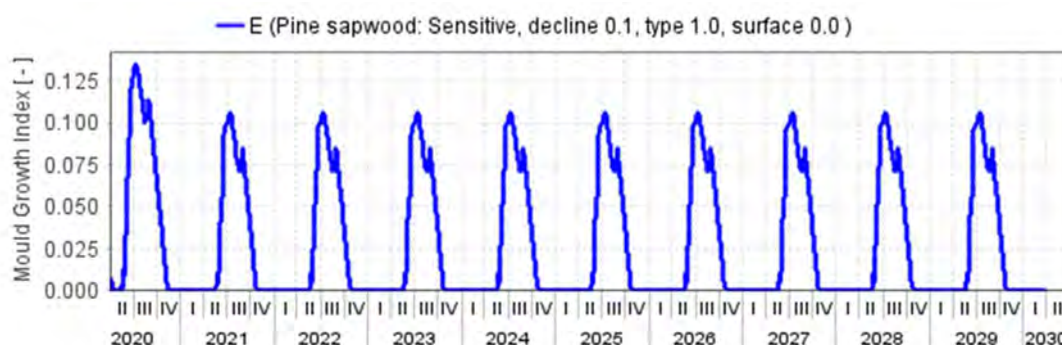


Figure 6: NatHERS CZ 21 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 2. Climate zone 22 - NCC CZ6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

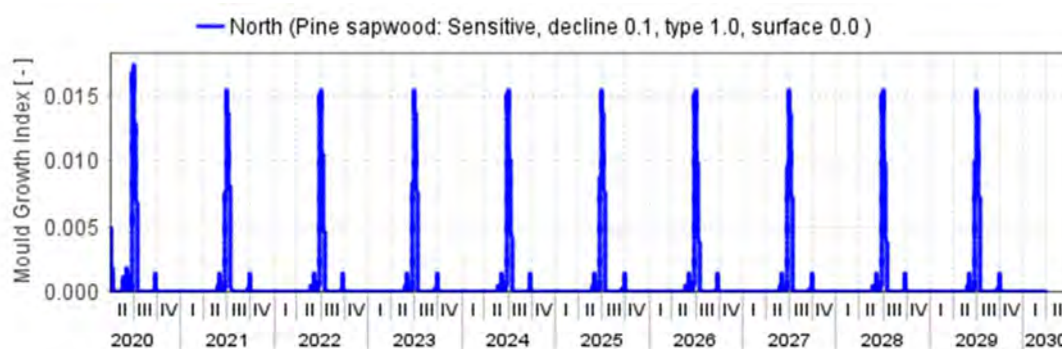


Figure 7: NatHERS CZ 22 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the ninth year.

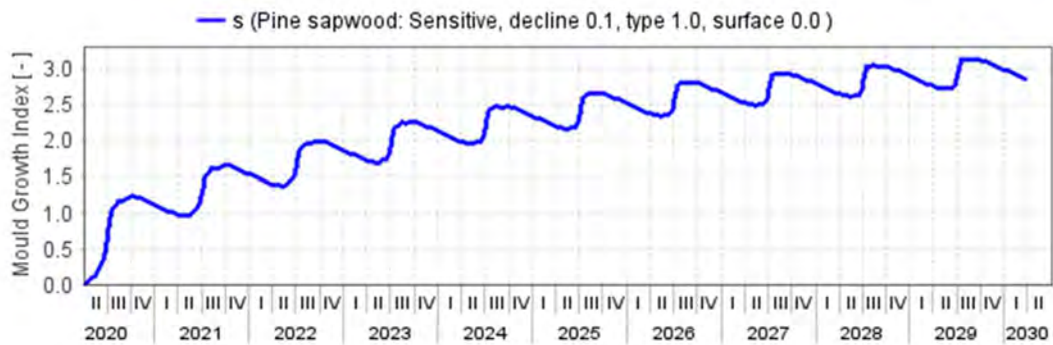


Figure 8: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

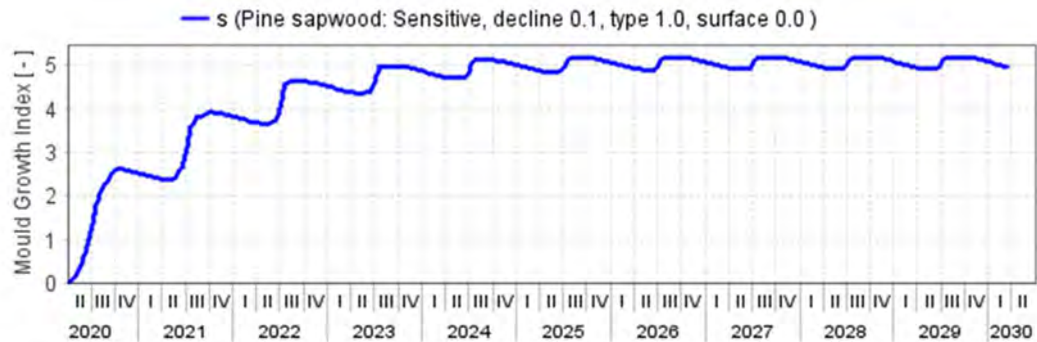


Figure 9: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

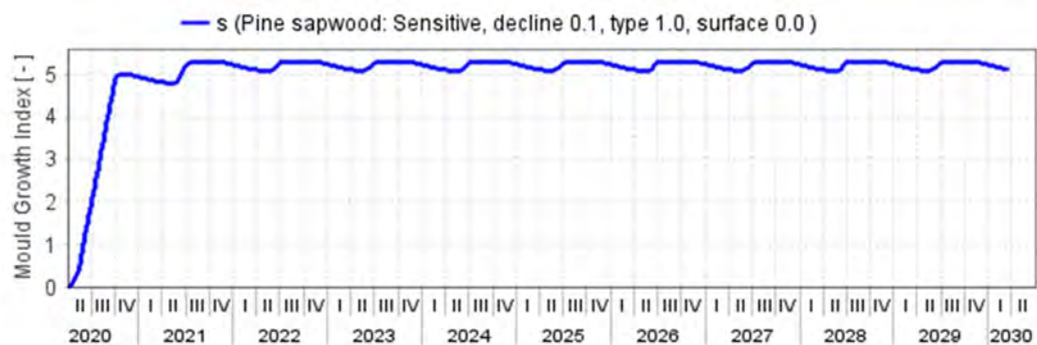


Figure 10: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fourth year. This wall type requires further investigation.

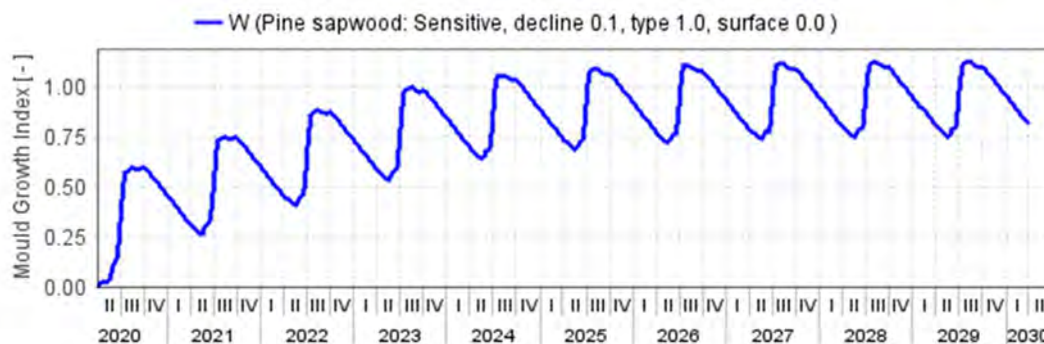


Figure 11: NatHERS CZ 22 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

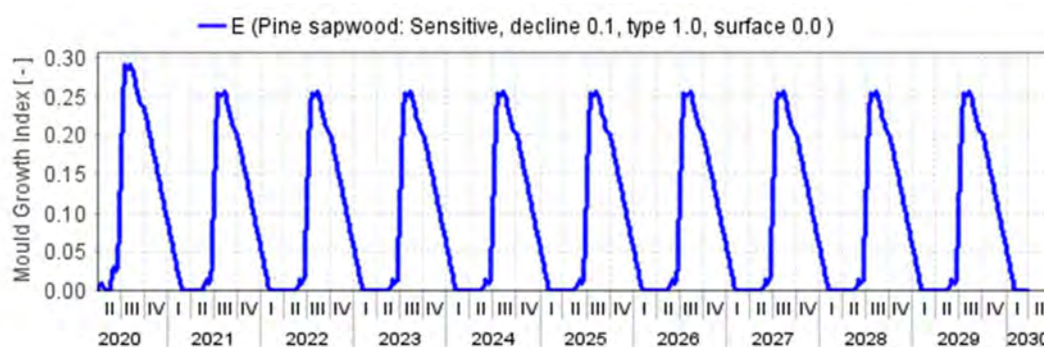


Figure 12: NatHERS CZ 22 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

### 3. Climate zone 27 - NCC CZ6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

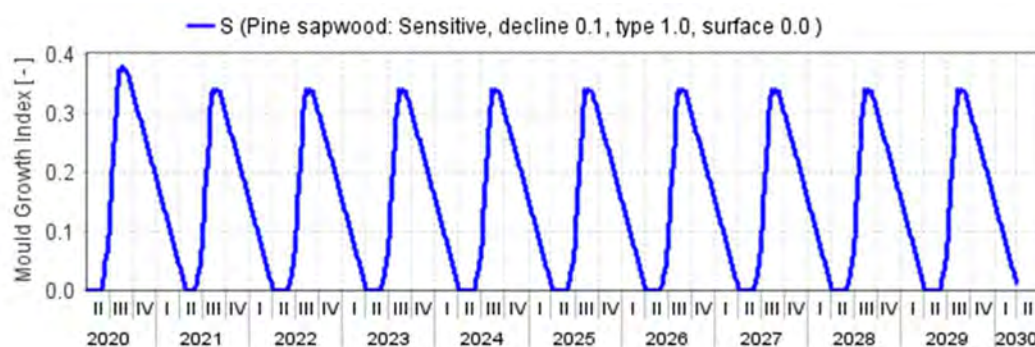


Figure 13: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the ninth year.

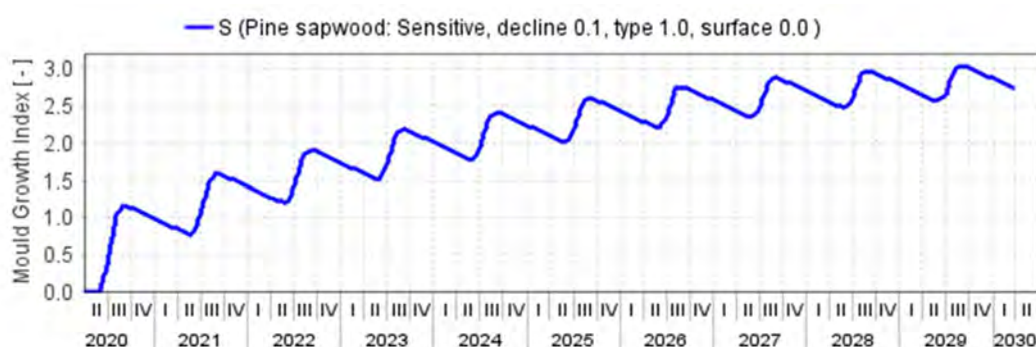


Figure 14: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

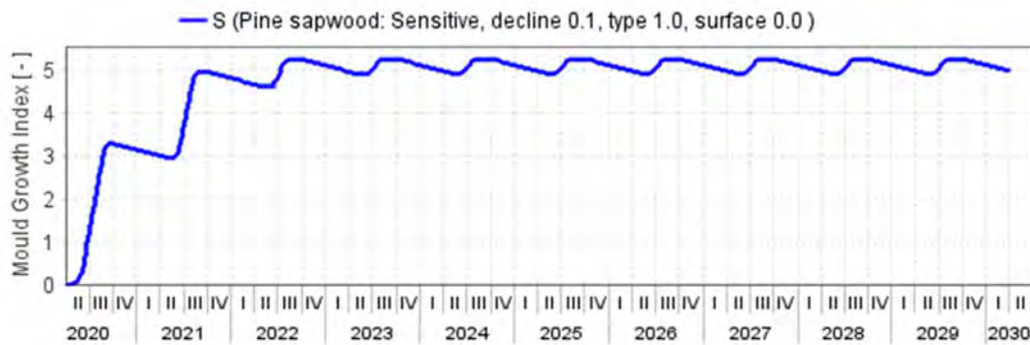


Figure 15: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

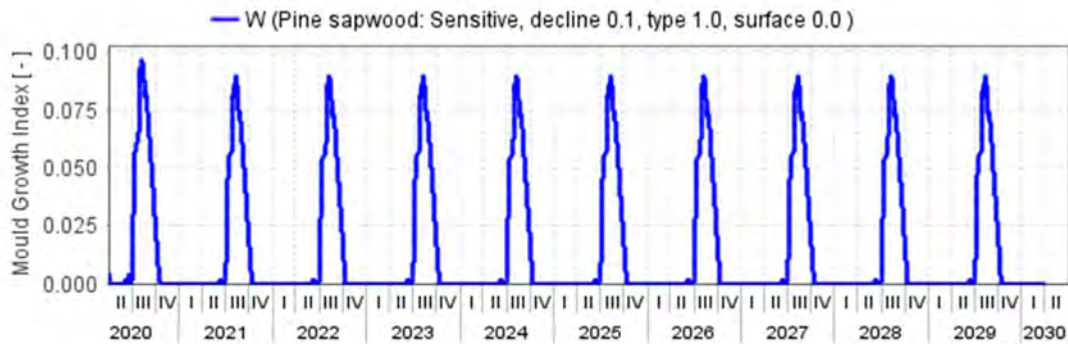


Figure 16: NatHERS CZ 27 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

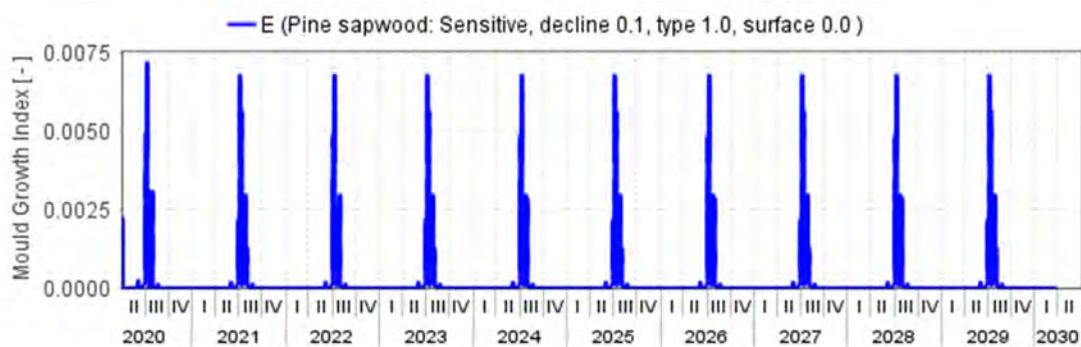


Figure 17: NatHERS CZ 27 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame



#### 4. Climate zone 60 - NCC CZ6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

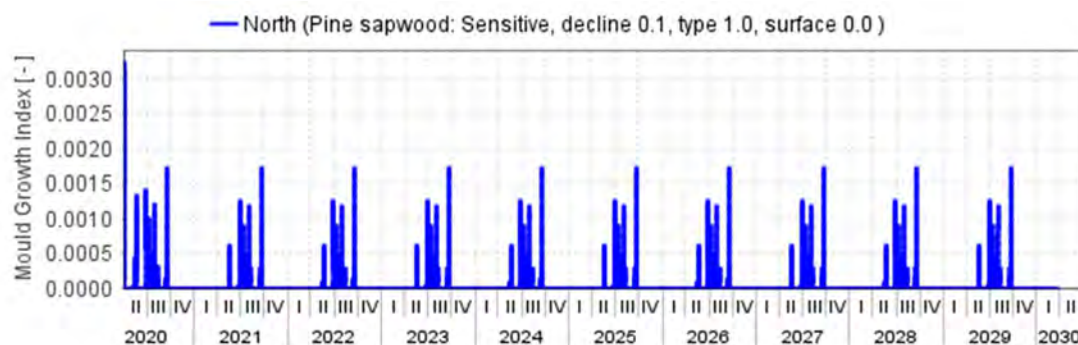


Figure 18: NatHERS CZ 60 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

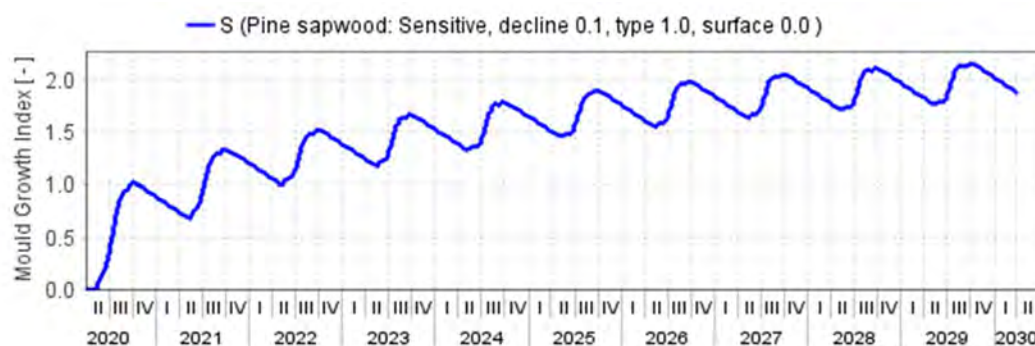


Figure 19: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

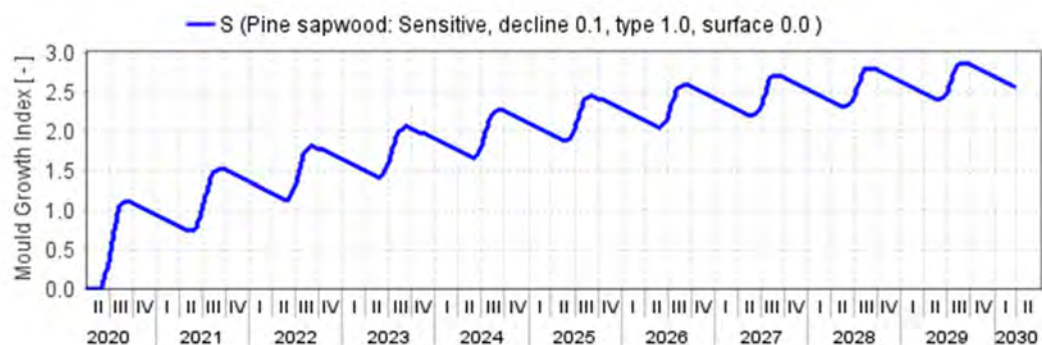


Figure 20: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

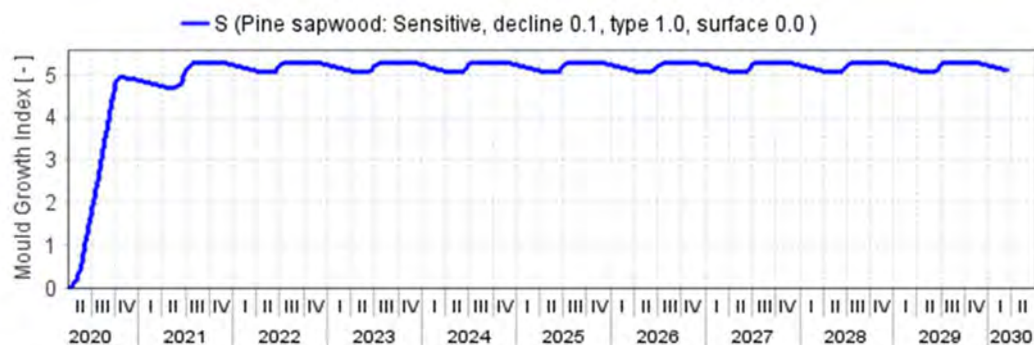


Figure 21: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

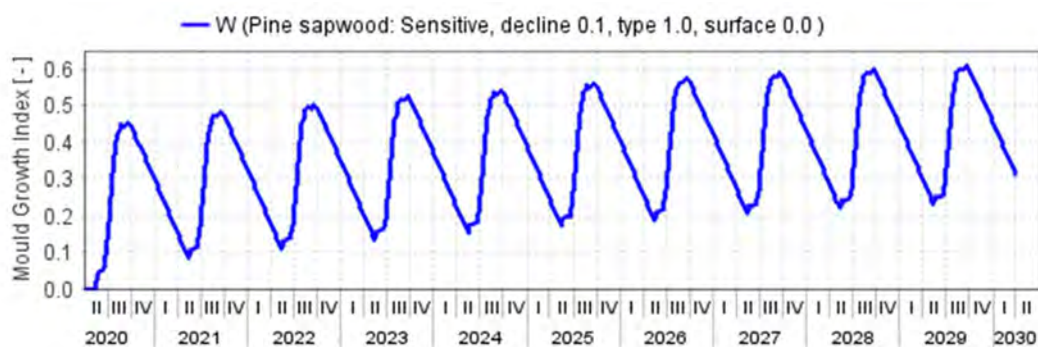


Figure 22: NatHERS CZ 60 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

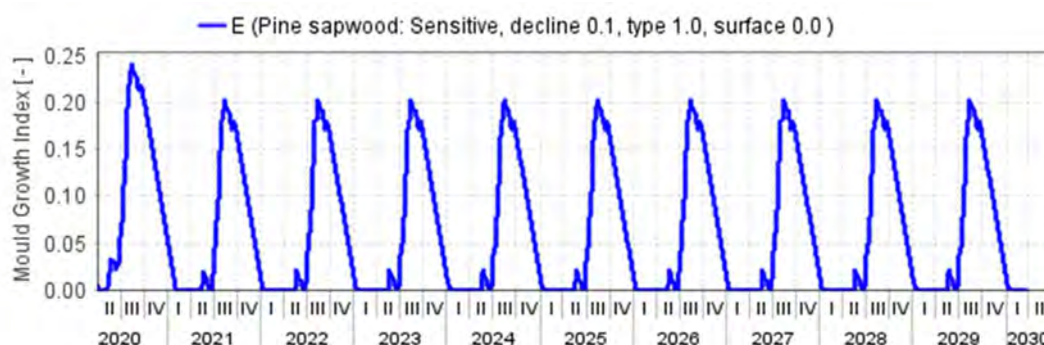


Figure 23: NatHERS CZ 60 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 5. Climate zone 61 - NCC CZ6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

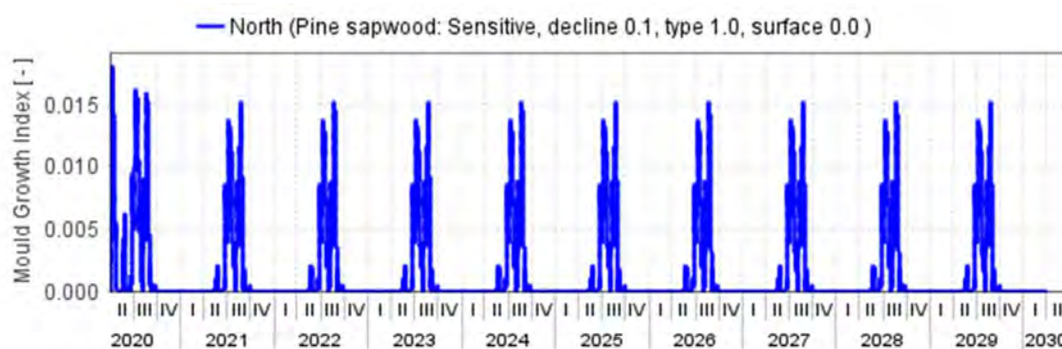


Figure 24: NatHERS CZ 61 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

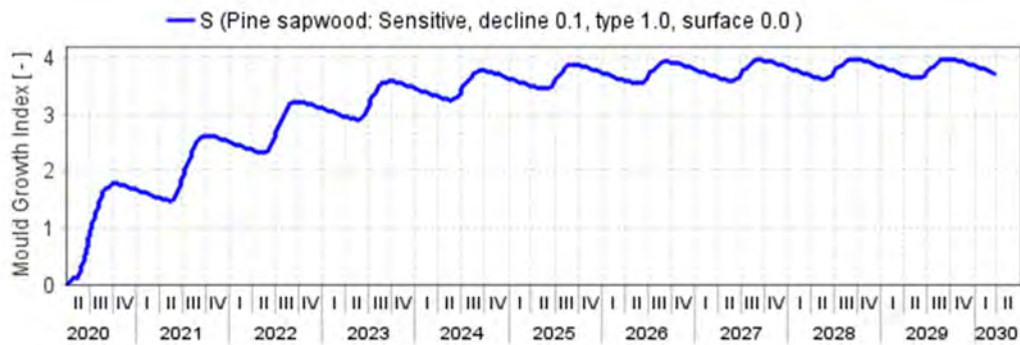


Figure 25: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

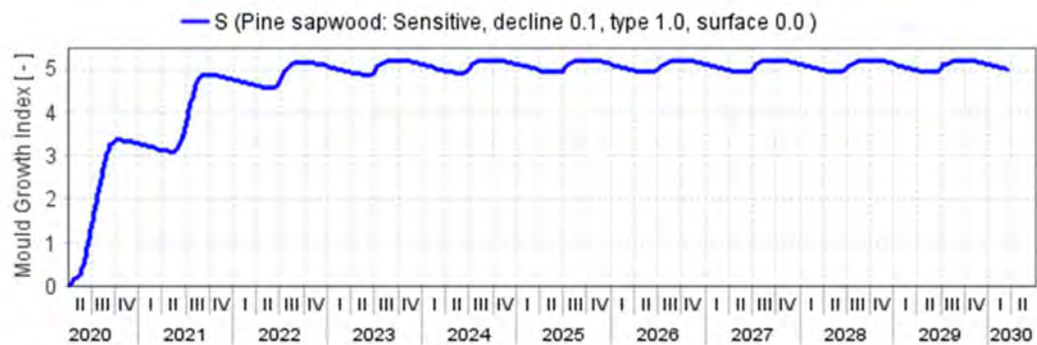


Figure 26: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

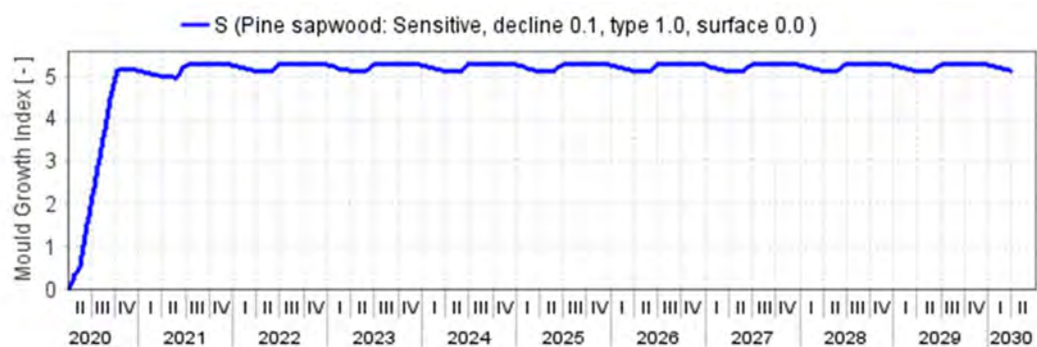


Figure 27: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



#### Western orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

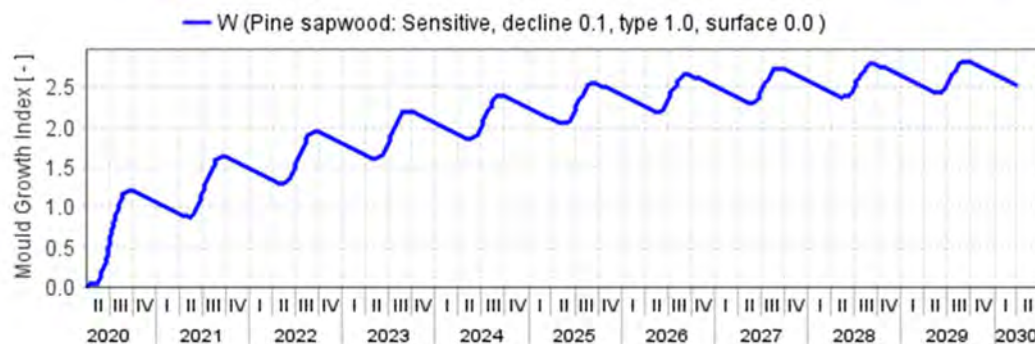


Figure 28: NatHERS CZ 61 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the third year. This wall type requires further investigation.

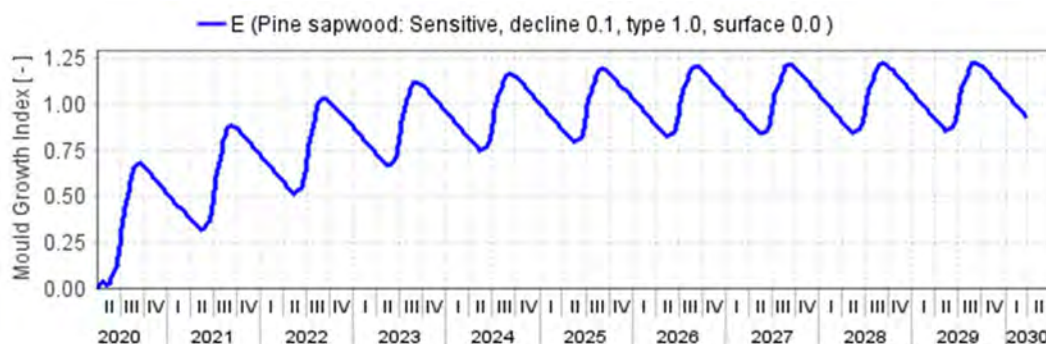


Figure 29: NatHERS CZ 61 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 6. Climate zone 63 - NCC CZ6-8

#### Northern orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

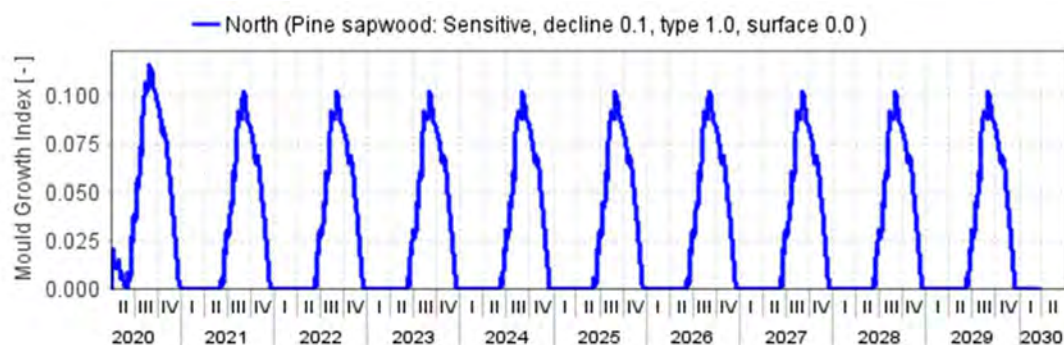


Figure 30: NatHERS CZ 63 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

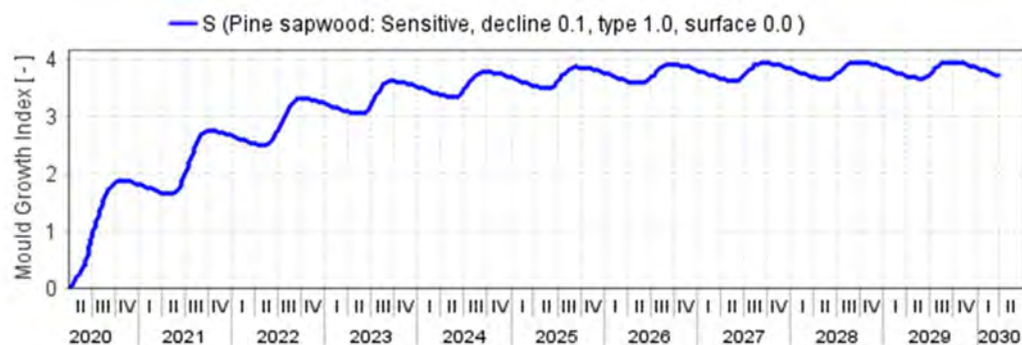


Figure 31: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

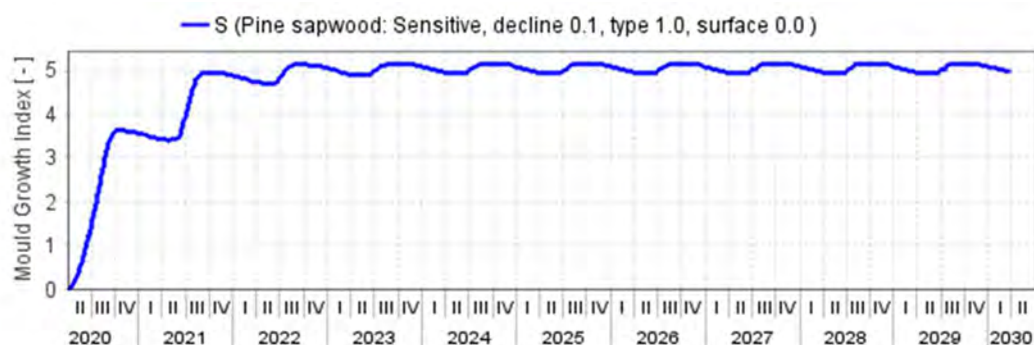


Figure 32: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

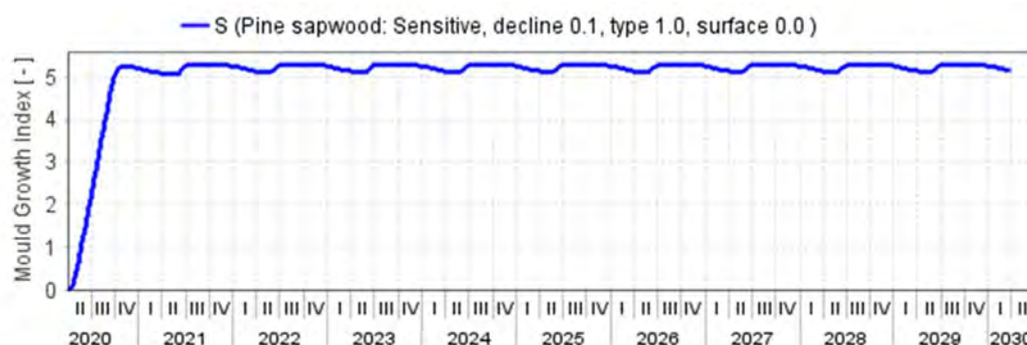


Figure 33: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

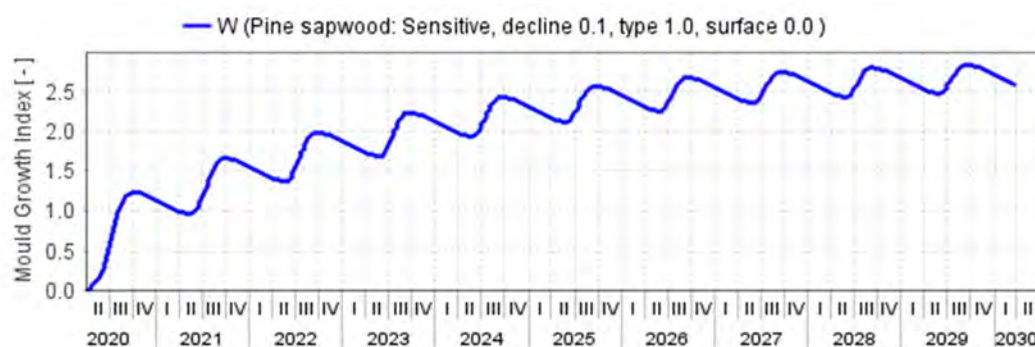


Figure 34: NatHERS CZ 63 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

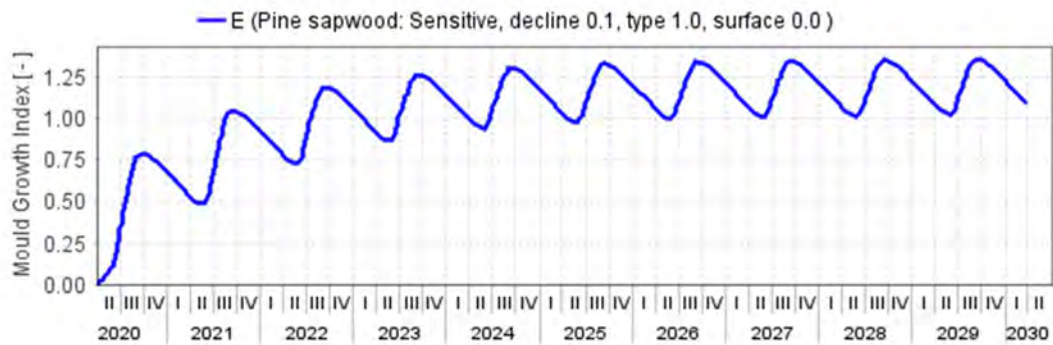


Figure 35: NatHERS CZ 63 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 7. Climate zone 64 - NCC CZ6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

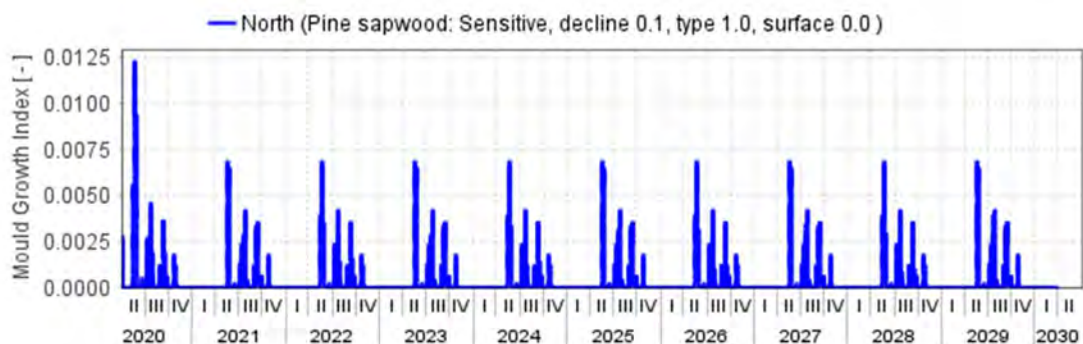


Figure 36: NatHERS CZ 64 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.



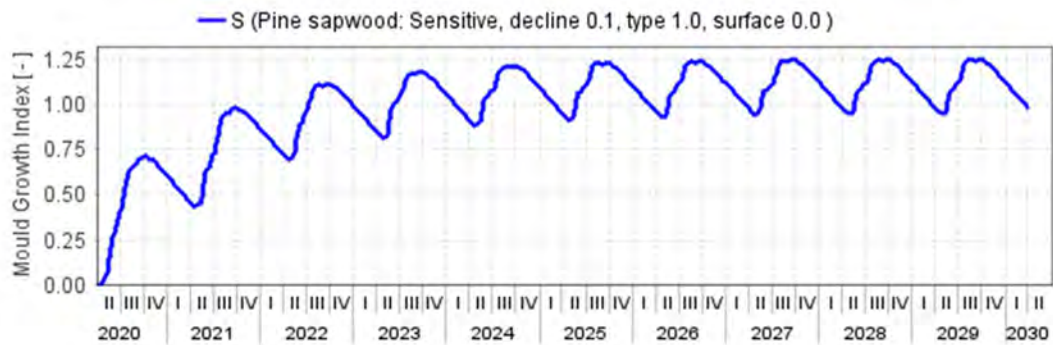


Figure 37: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

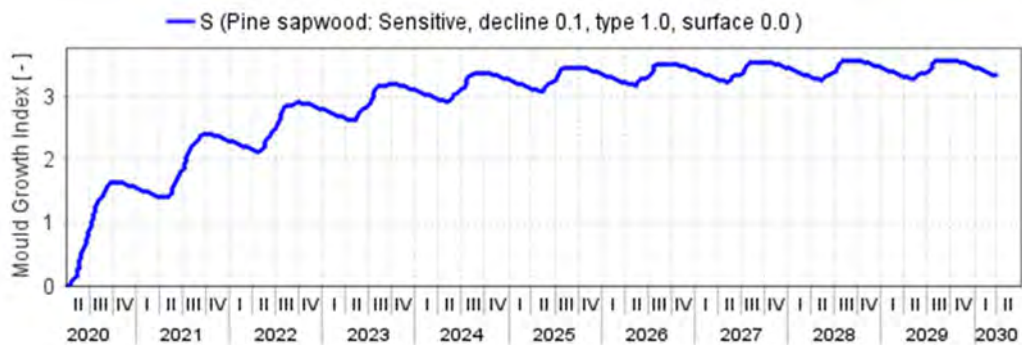


Figure 38: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

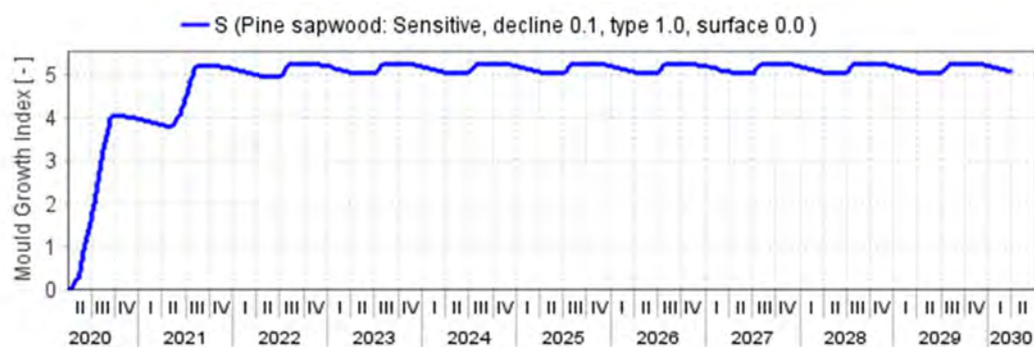


Figure 39: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

## Western orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

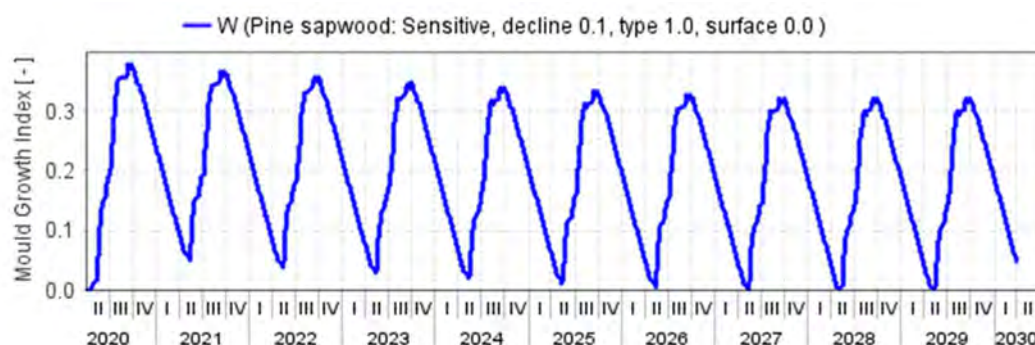


Figure 40: NatHERS CZ 64 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

## Eastern orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

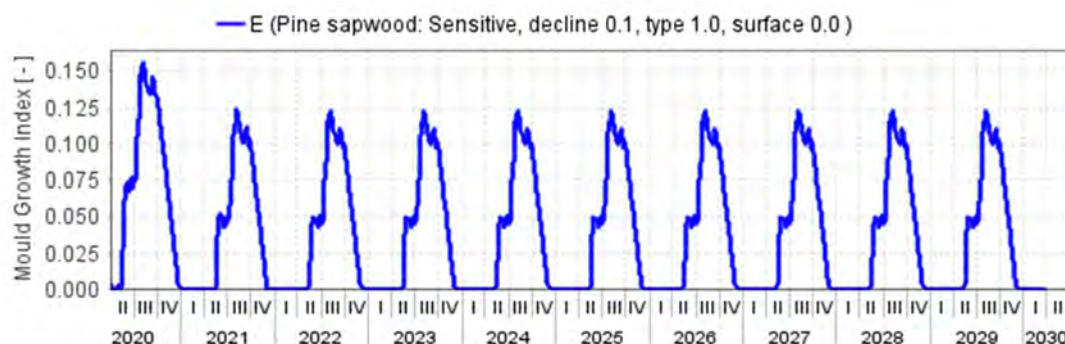


Figure 41: NatHERS CZ 64 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 8. Climate zone 66 - NCC CZ6-8

### Northern orientation ACR 10

#### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the ninth year. This wall type requires further investigation.

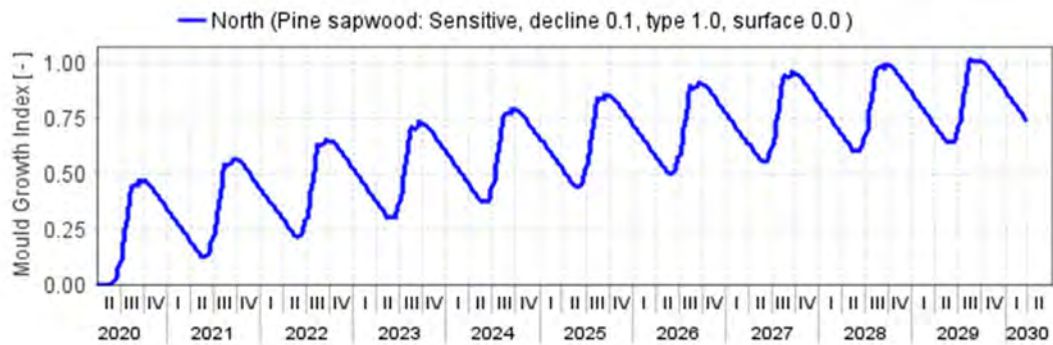


Figure 42: NatHERS CZ 66 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

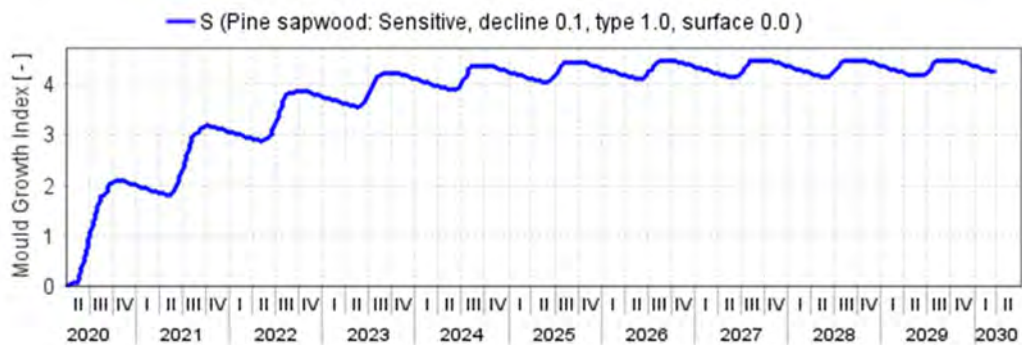


Figure 43: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

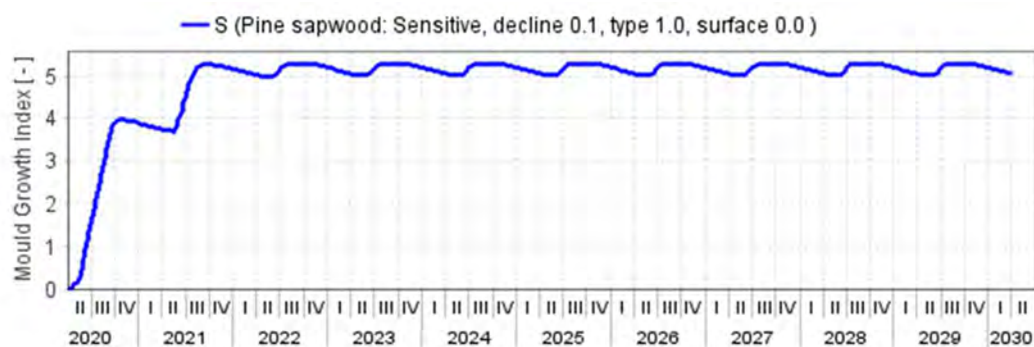


Figure 44: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

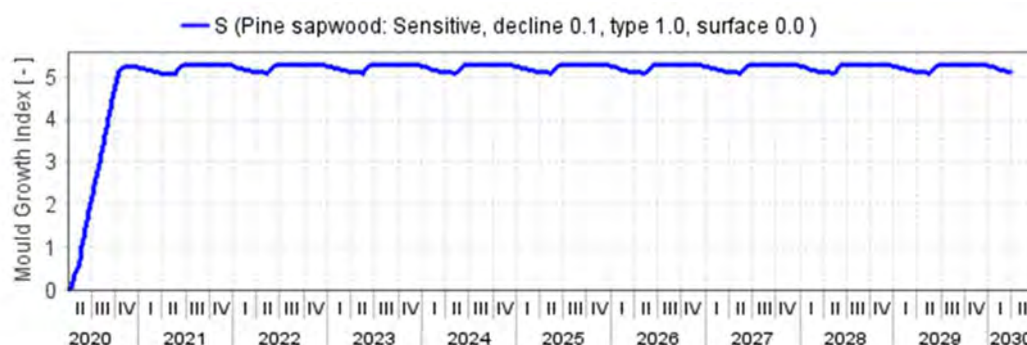


Figure 45: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

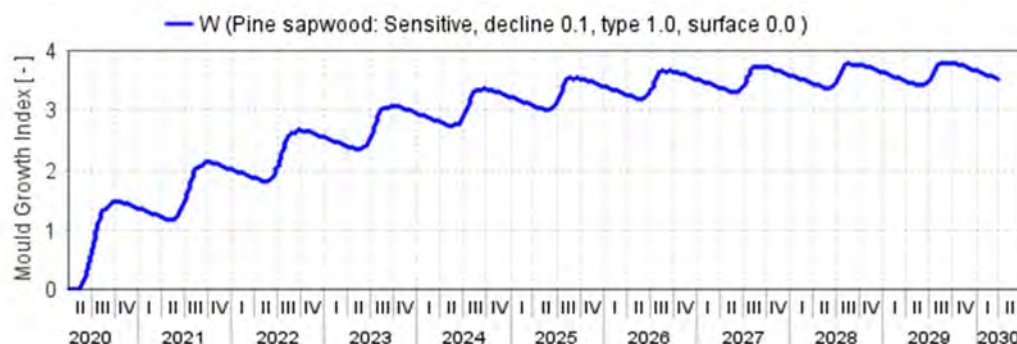


Figure 46: NatHERS CZ 66 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the ninth year.

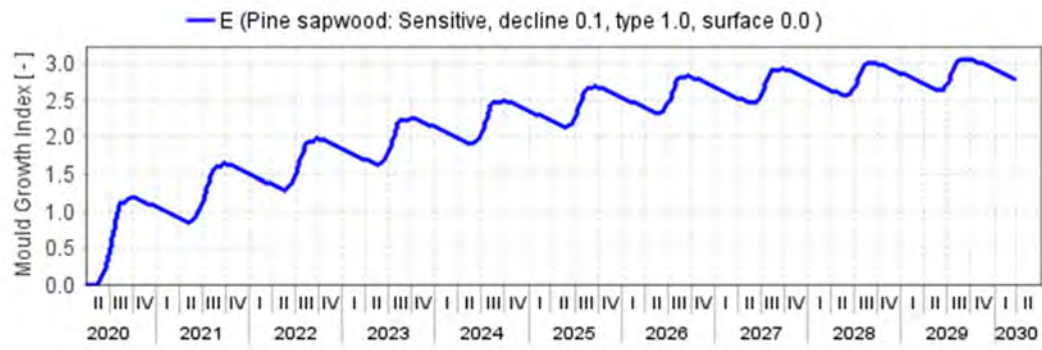


Figure 47: NatHERS CZ 66 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame



## 9. Climate zone 27 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

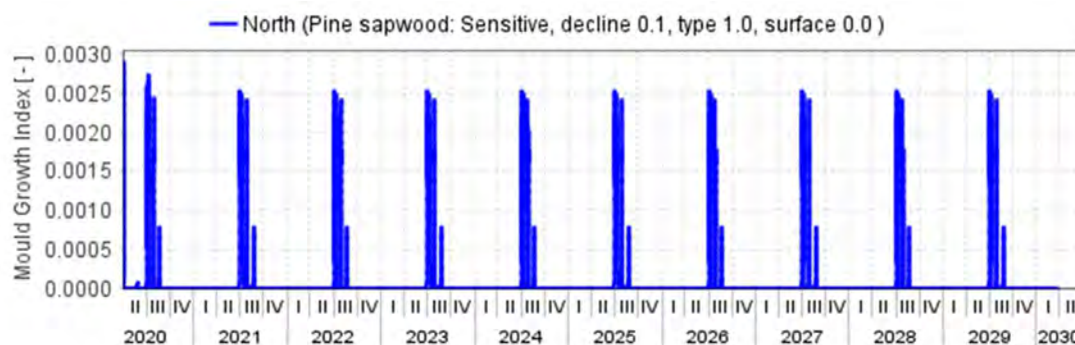


Figure 48: NatHERS CZ 27 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fourth year. This wall type requires further investigation.

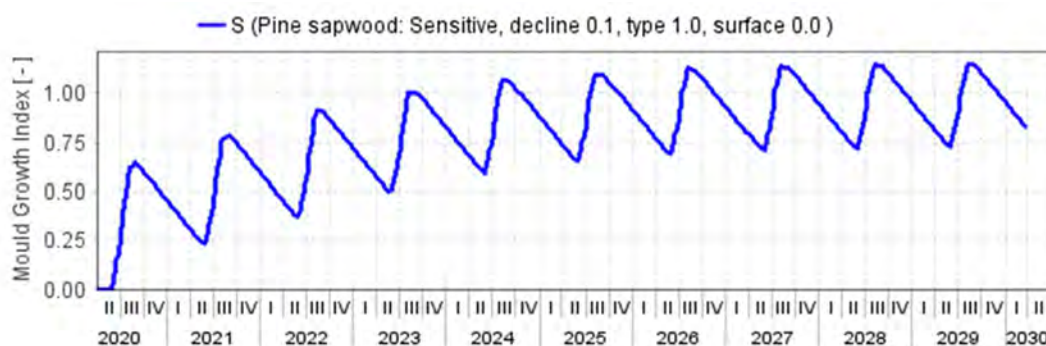


Figure 49: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

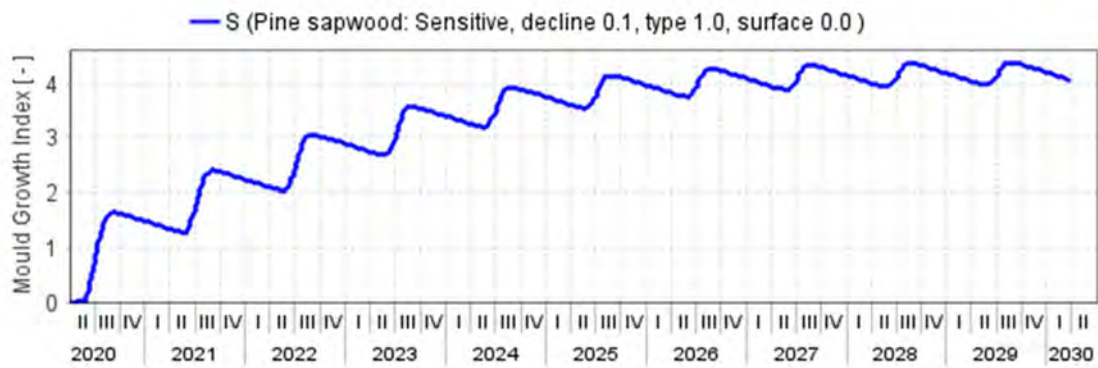


Figure 50: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

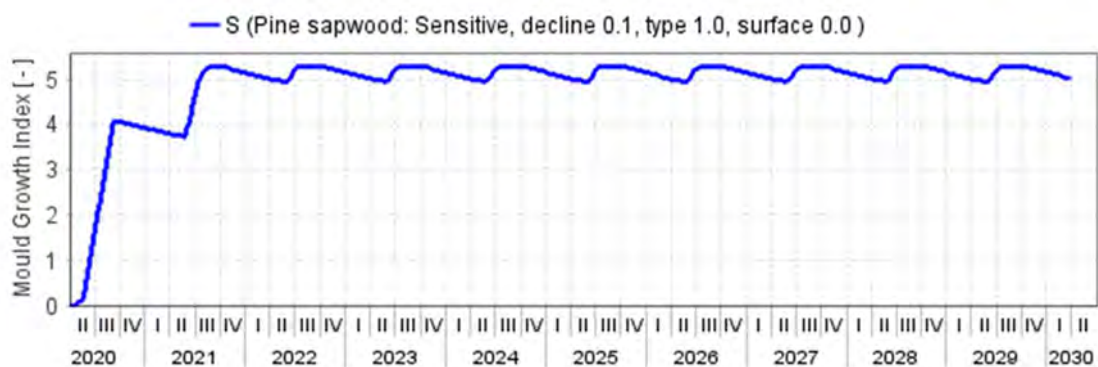


Figure 51: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

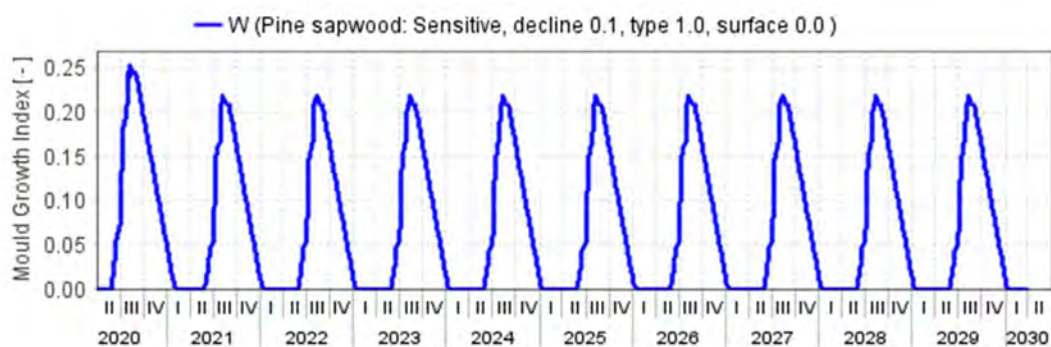


Figure 52: NatHERS CZ 27 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

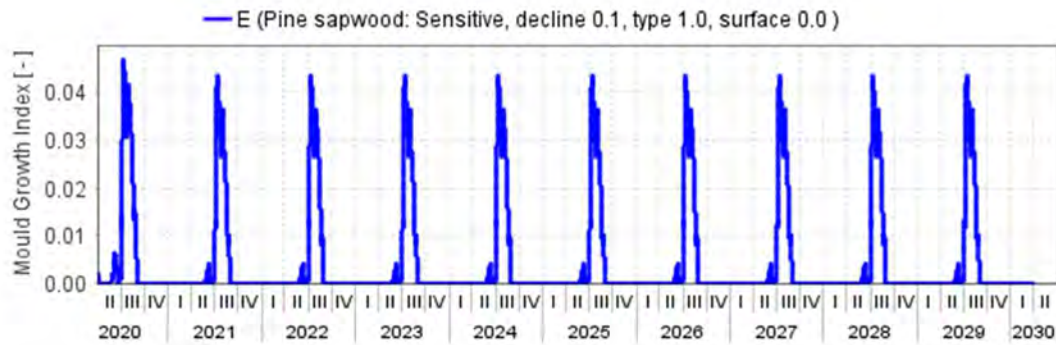


Figure 53: NatHERS CZ 27 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 10. Climate zone 61 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

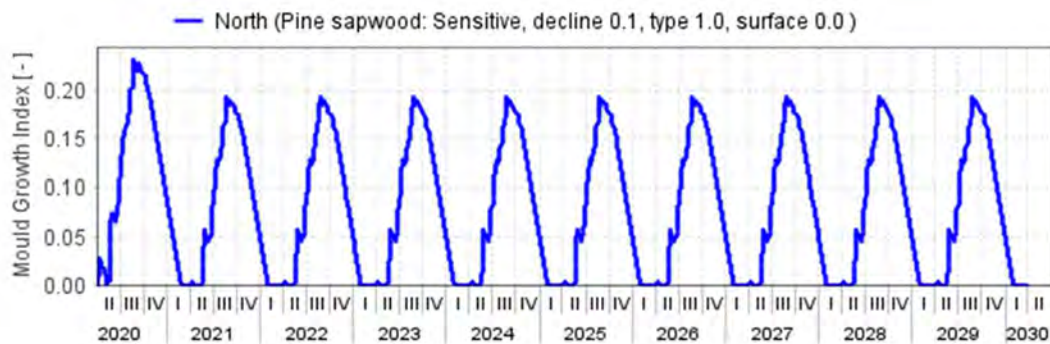


Figure 54: NatHERS CZ 61 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.



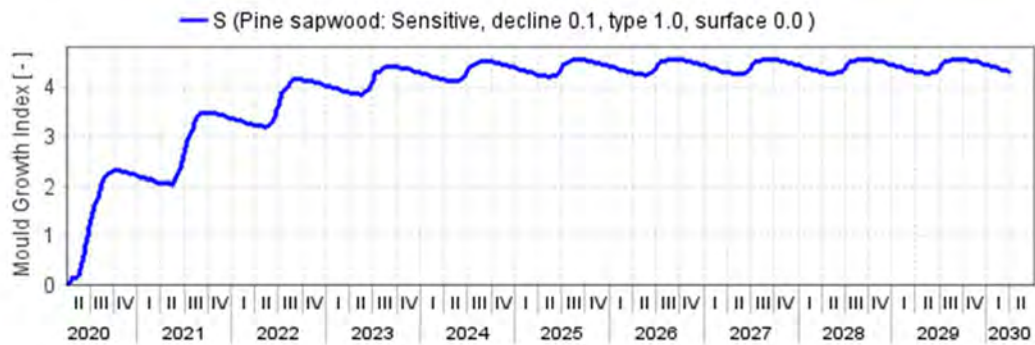


Figure 55: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

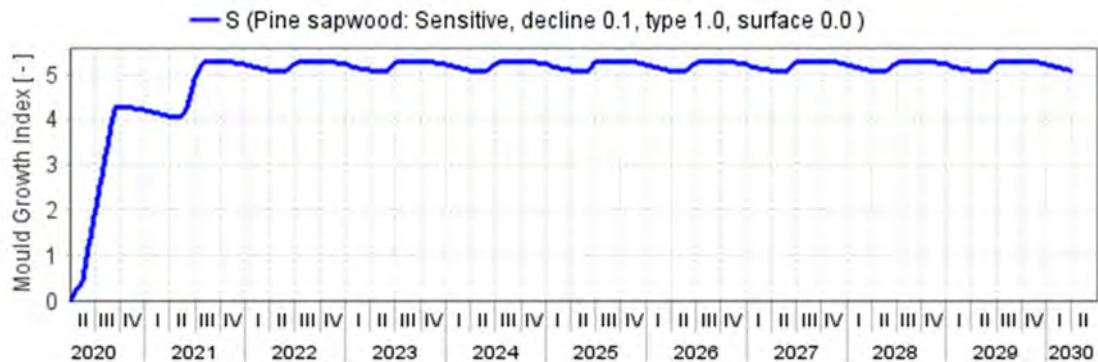


Figure 56: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

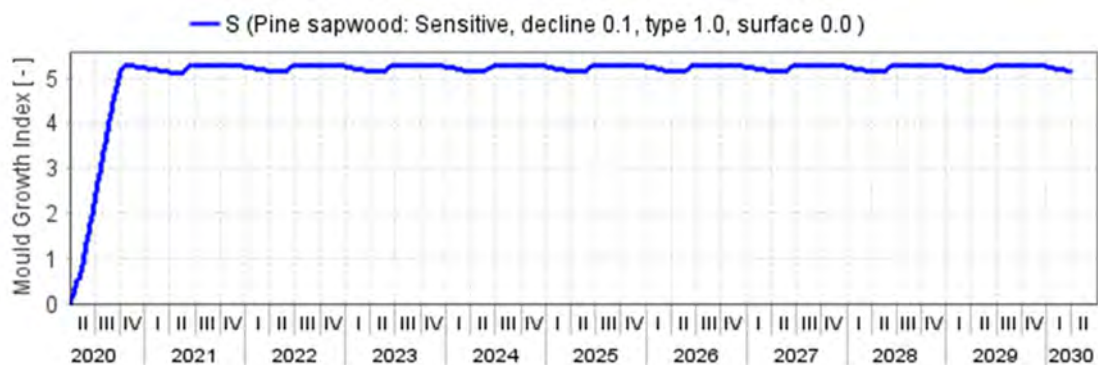


Figure 57: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

## Western orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

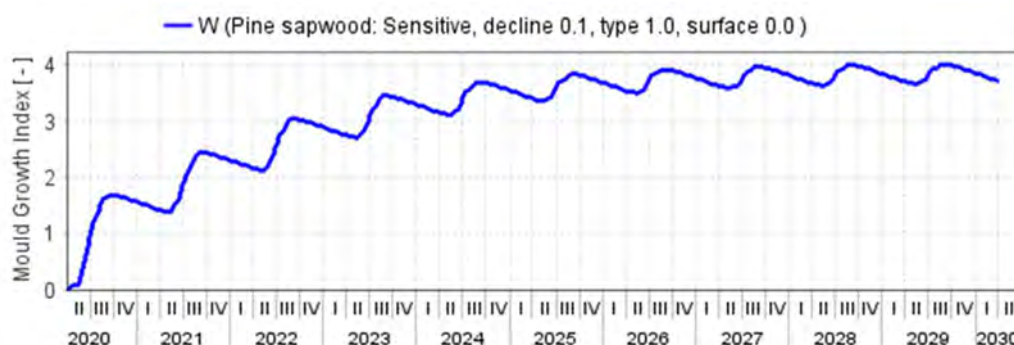


Figure 58: NatHERS CZ 61 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

## Eastern orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

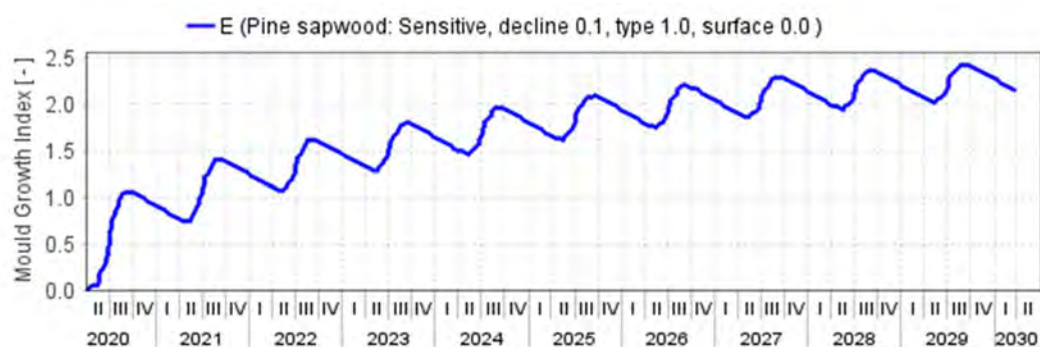


Figure 59: NatHERS CZ 61 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 11. Climate zone 66 - NCC CZ4

### Northern orientation ACR 10

#### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

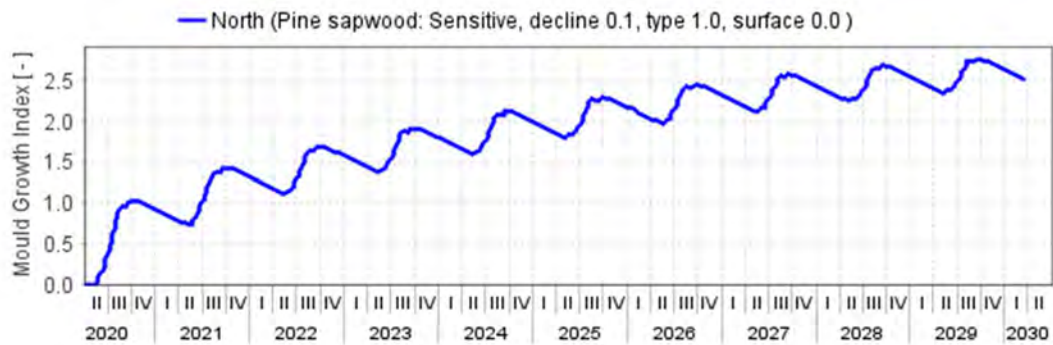


Figure 60: NatHERS CZ 66 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

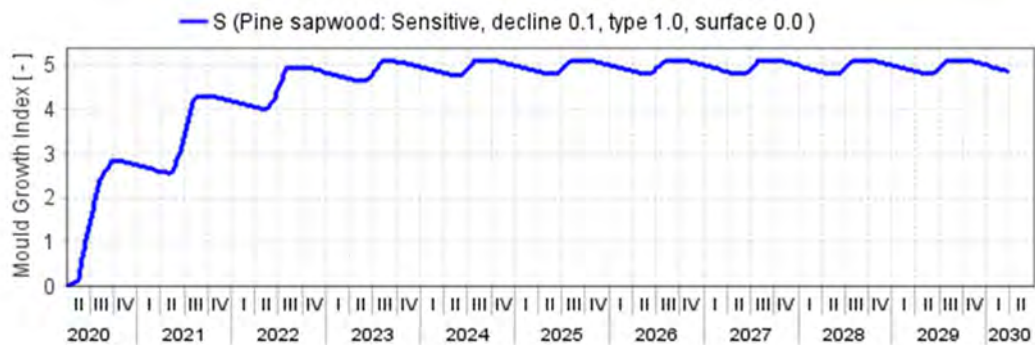


Figure 61: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

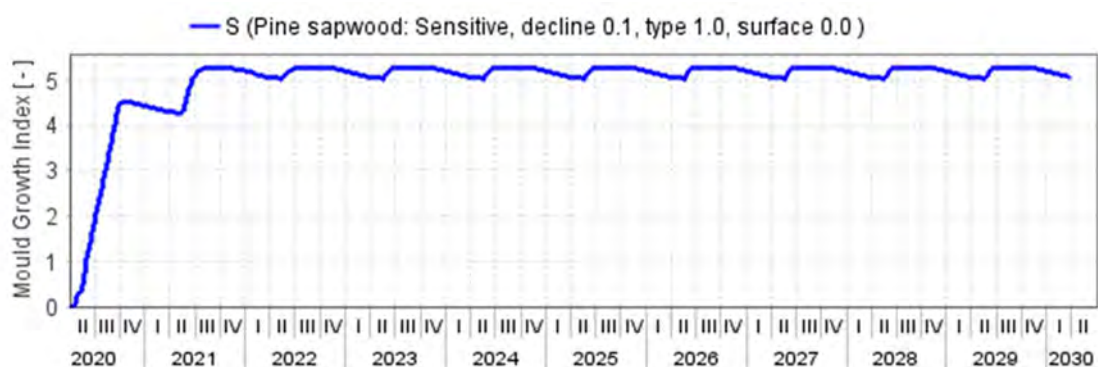


Figure 62: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

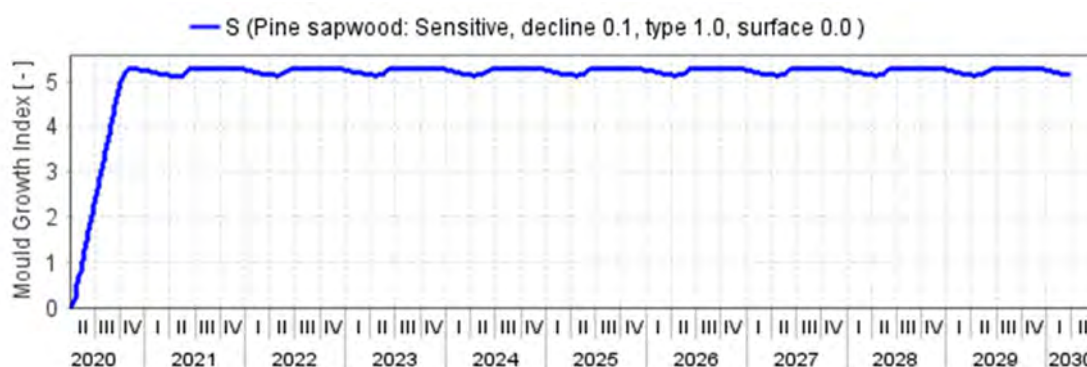


Figure 63: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

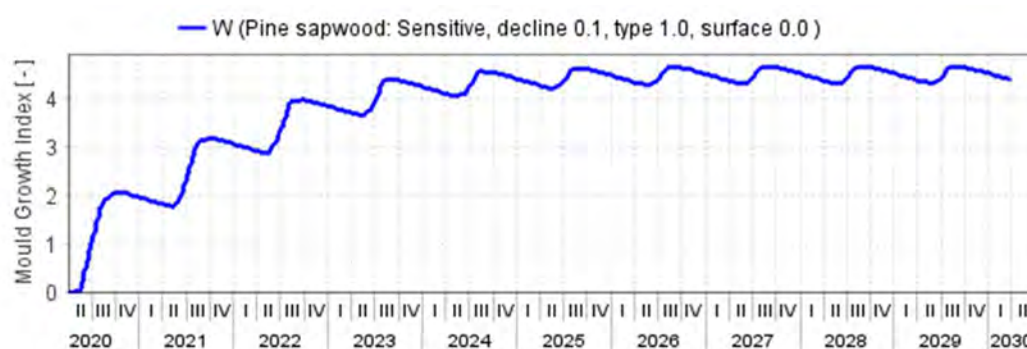


Figure 64: NatHERS CZ 66 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

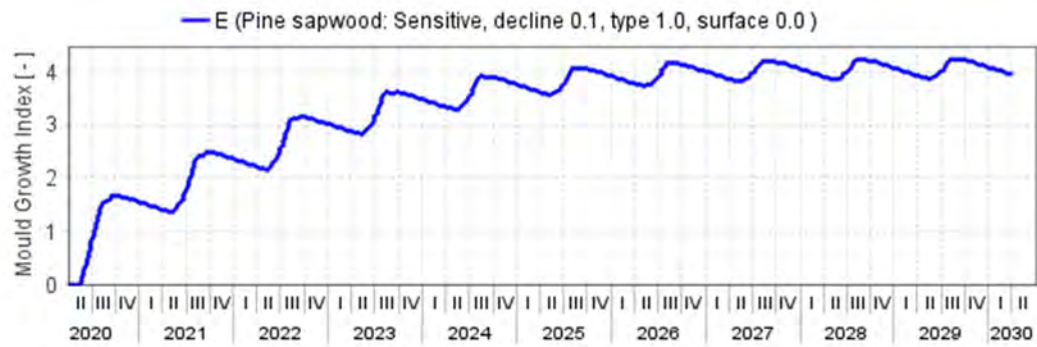


Figure 65: NatHERS CZ 66 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

# Moisture accumulation and mould growth for 7 Star housing Research Report 2

## Appendix 3: Hygrothermal simulation results – Compressed Fibre Cement Sheet with insulated timber frame (Wall 2) Rev 02 (09/12/2022)



## 1. Climate zone 21 – NCC CZ6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

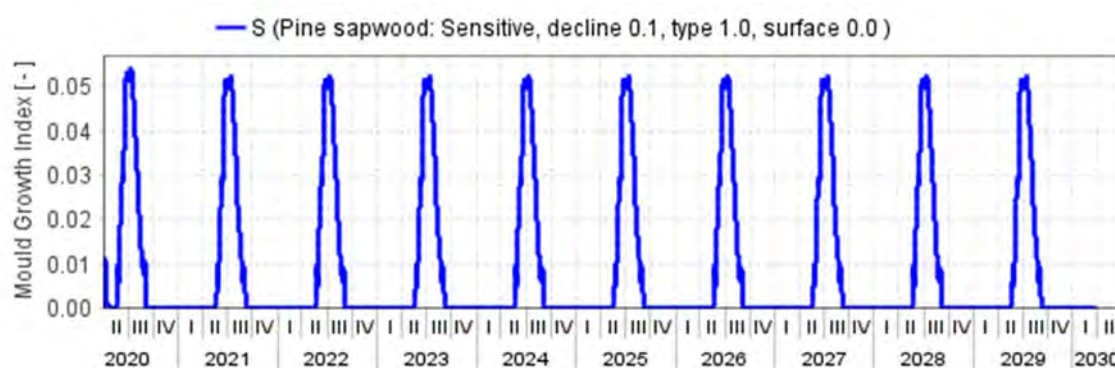


Figure 1: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

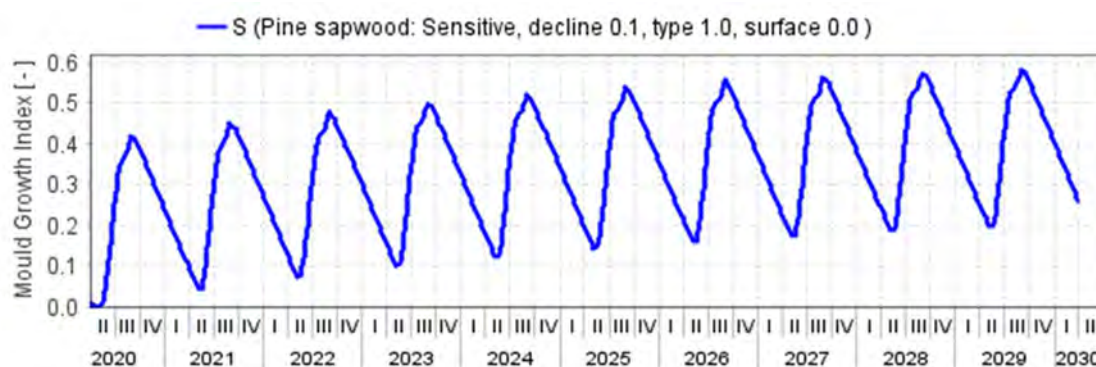


Figure 2: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.



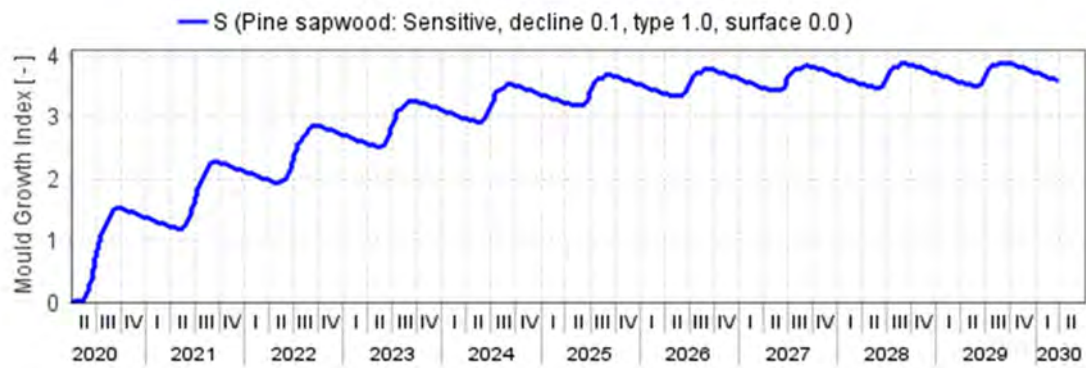


Figure 3: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

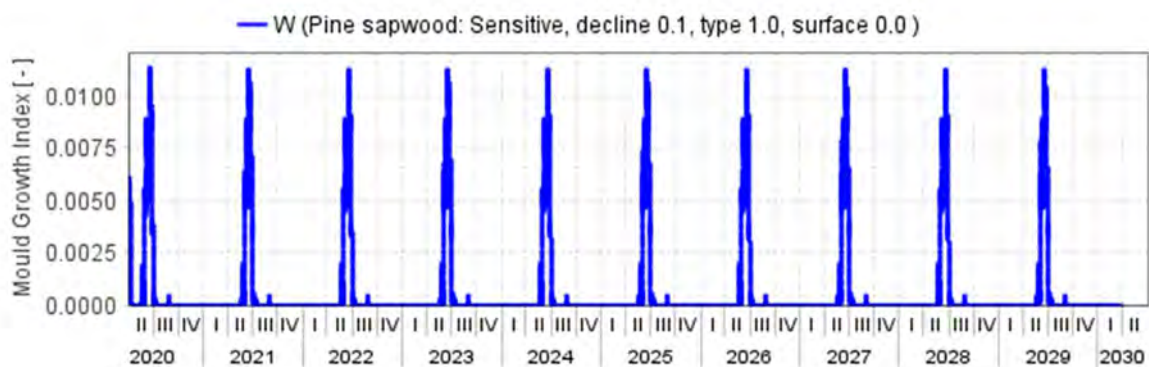


Figure 4: NatHERS CZ 21 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

## 2. Climate zone 22 – NCC CZ6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

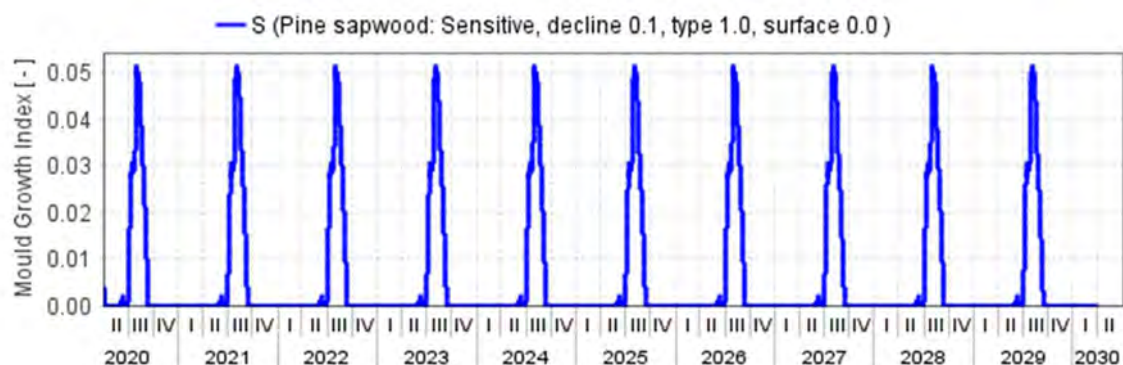


Figure 5: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

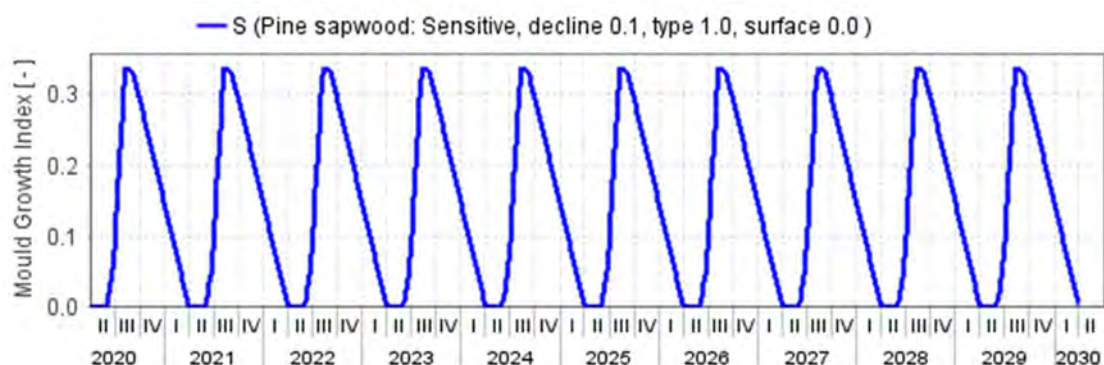


Figure 6: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 7.5- mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fifth year.

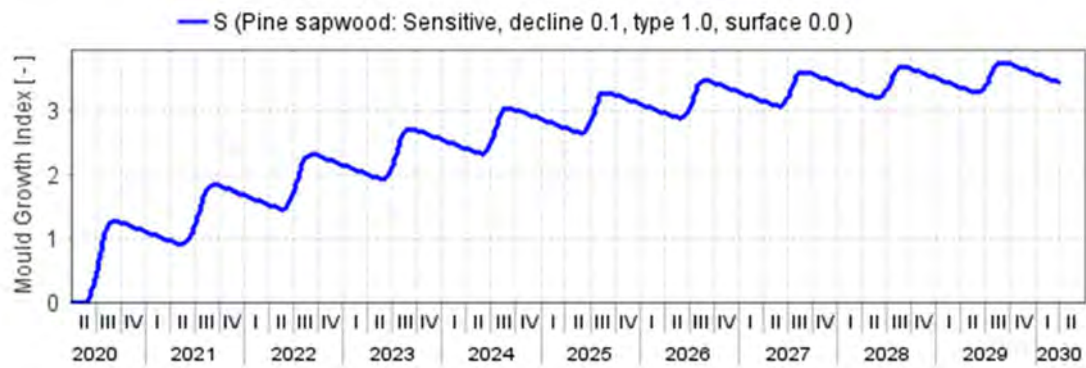


Figure 7: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

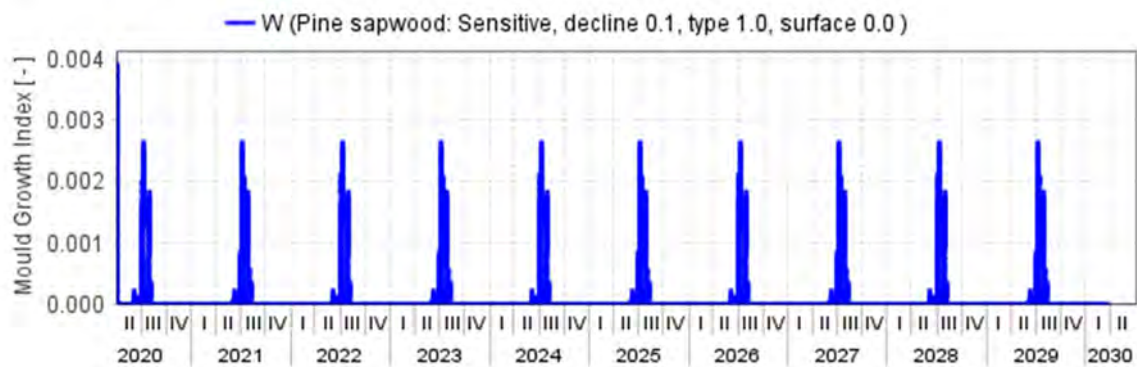


Figure 8: NatHERS CZ 22 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

### 3. Climate zone 27 – NCC CZ6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

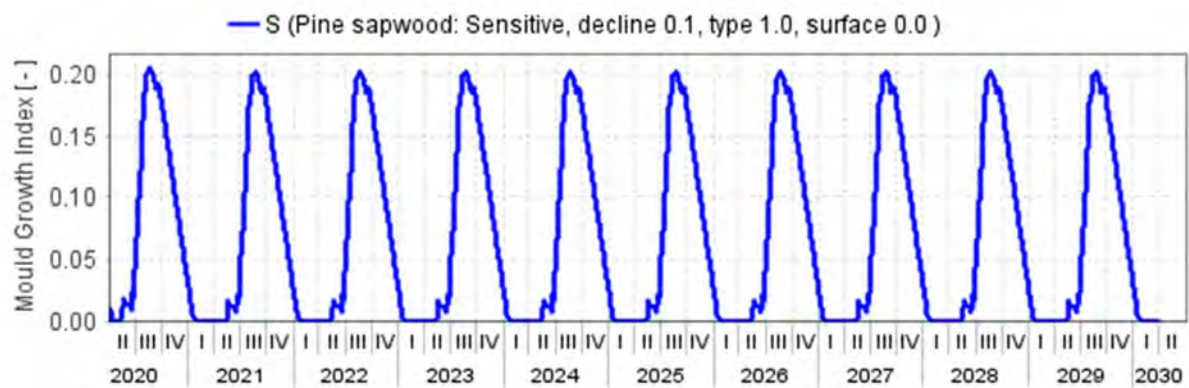


Figure 9: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

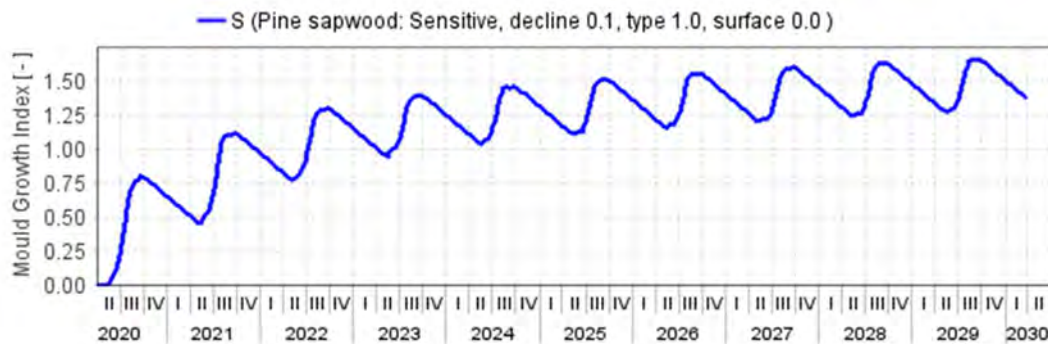


Figure 10: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.



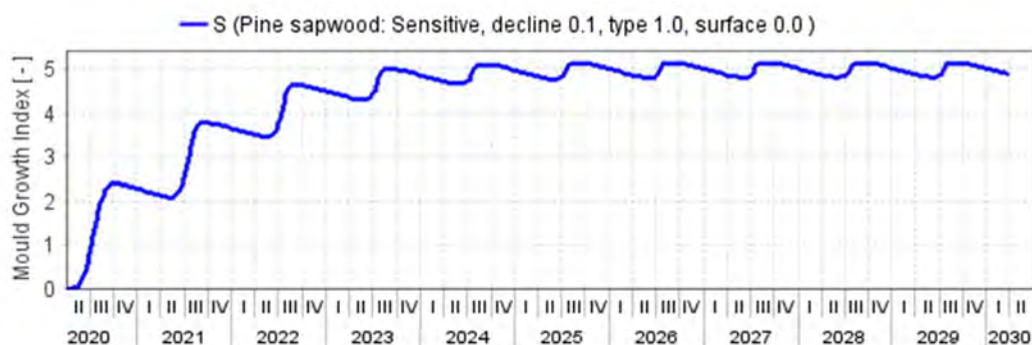


Figure 11: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

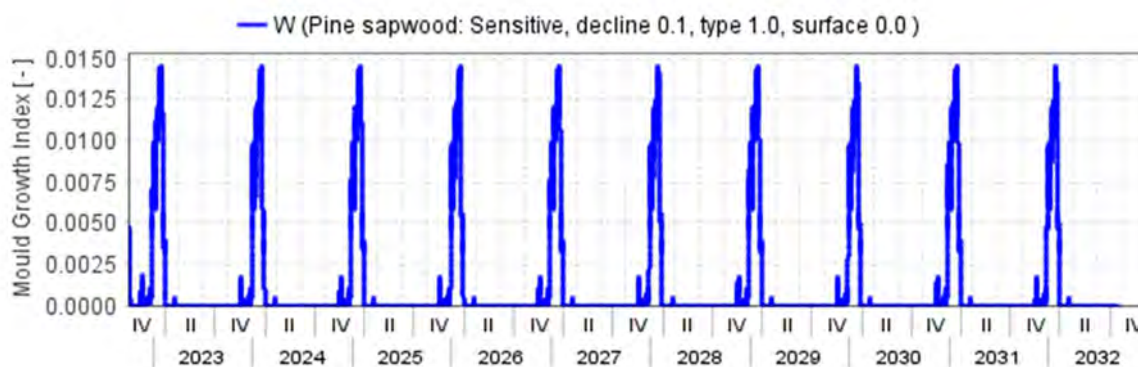


Figure 12: NatHERS CZ 27 - NCC CZ6-8 western orientation ACR 10.0 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

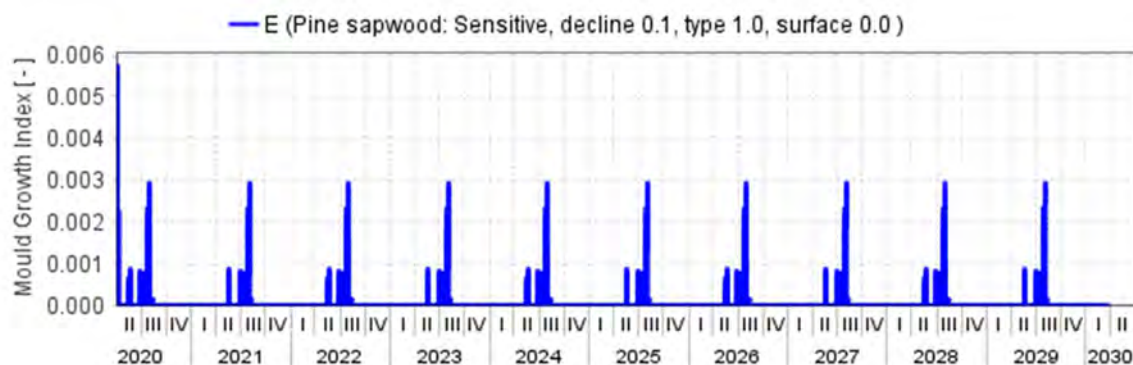


Figure 13: NatHERS CZ 27 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

#### 4. Climate zone 60 – NCC CZ6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

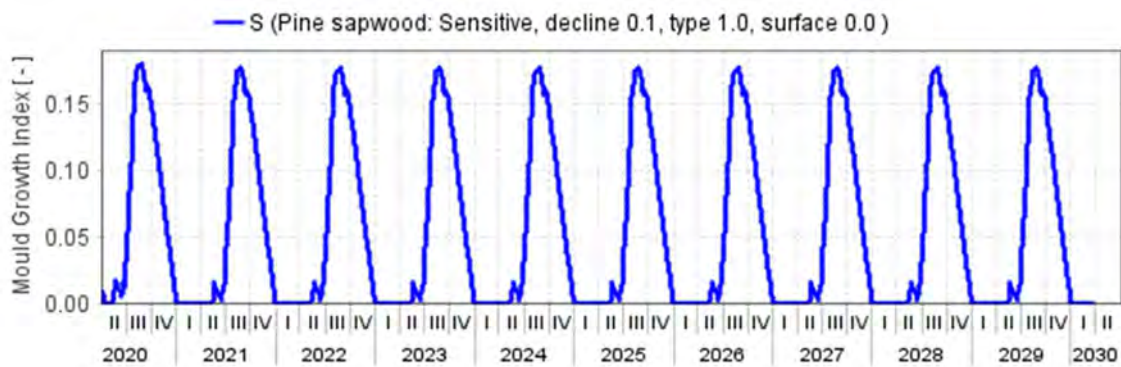


Figure 14: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

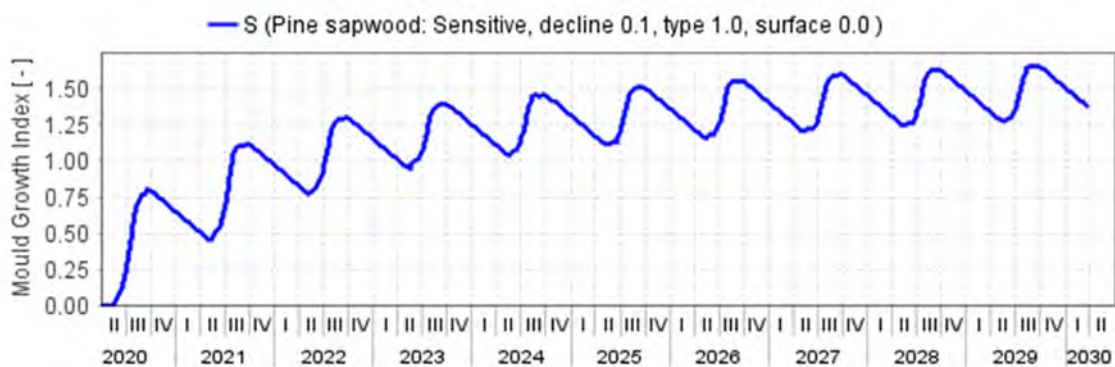


Figure 15: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

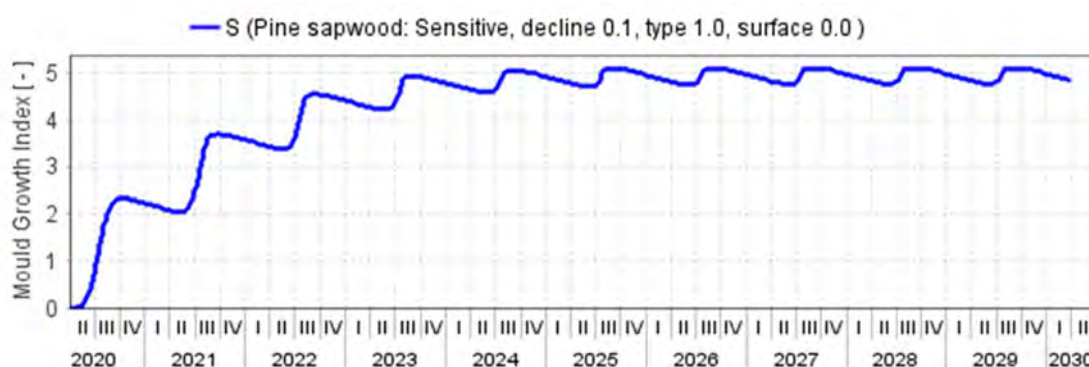


Figure 16: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

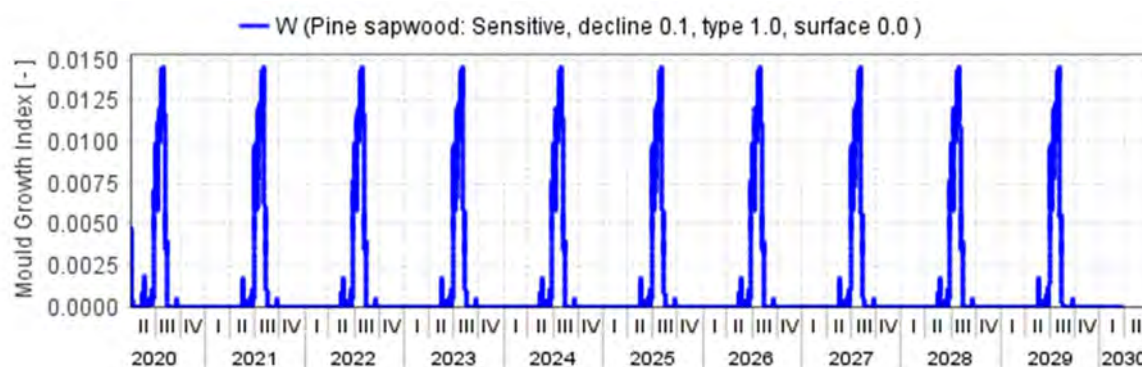


Figure 17: NatHERS CZ 60 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



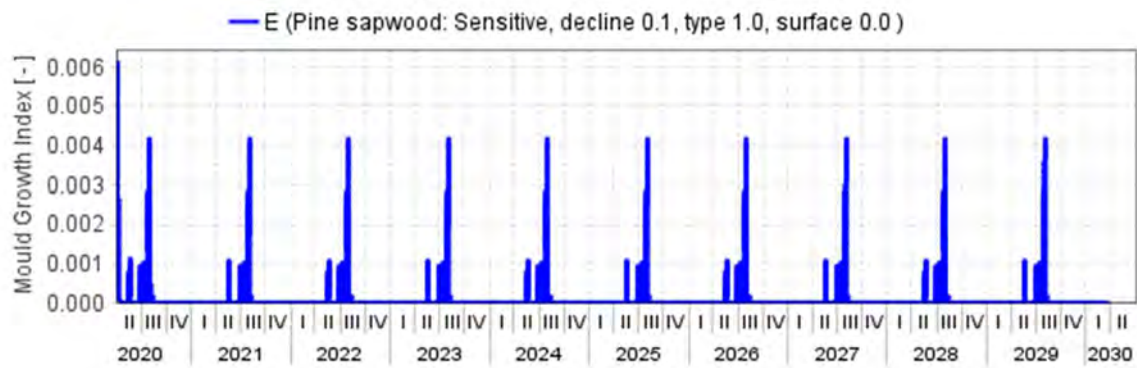


Figure 18: NatHERS CZ 60 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 5. Climate zone 61 – NCC CZ6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

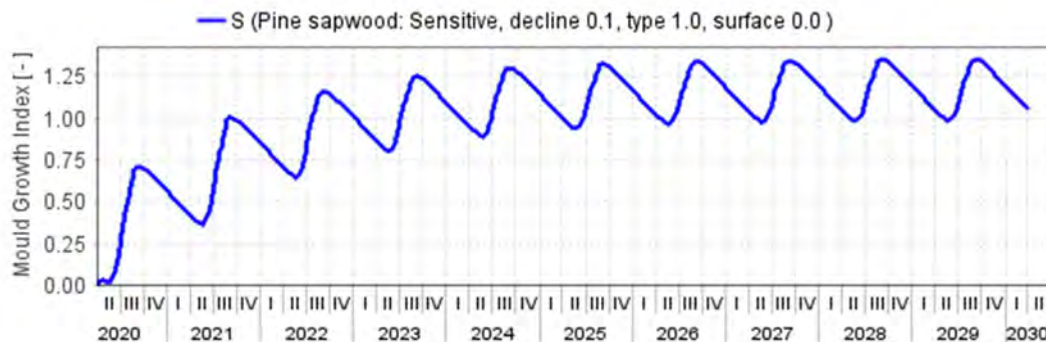


Figure 19: NatHERS CZ 61- NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

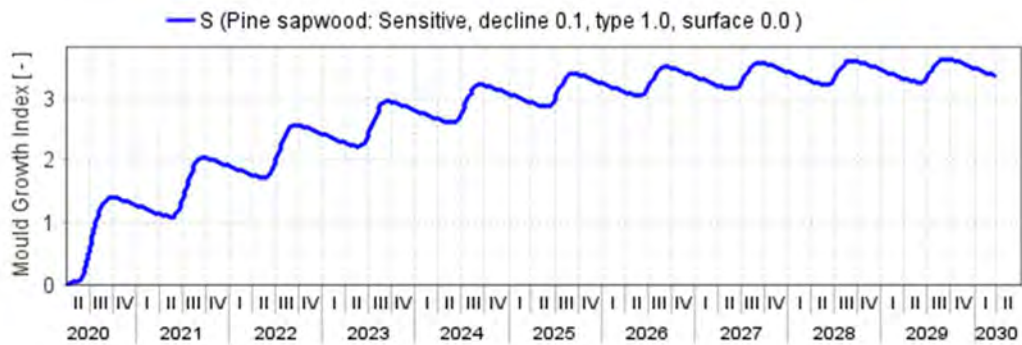


Figure 20: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

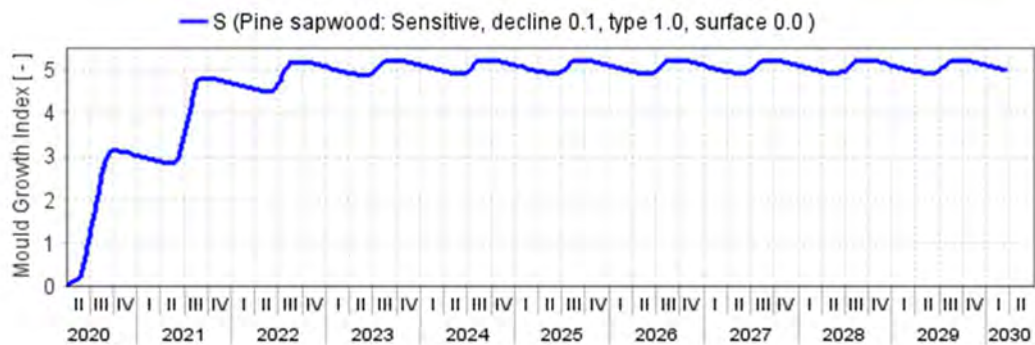


Figure 21: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

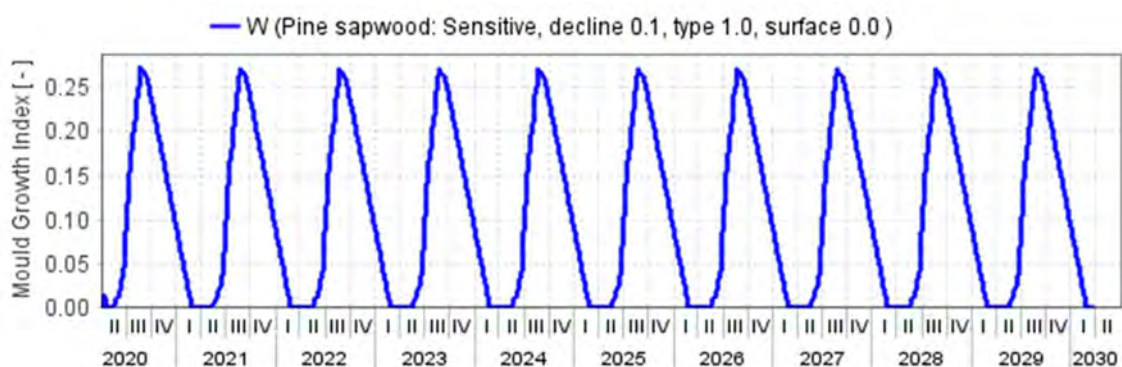


Figure 22: NatHERS CZ 61 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

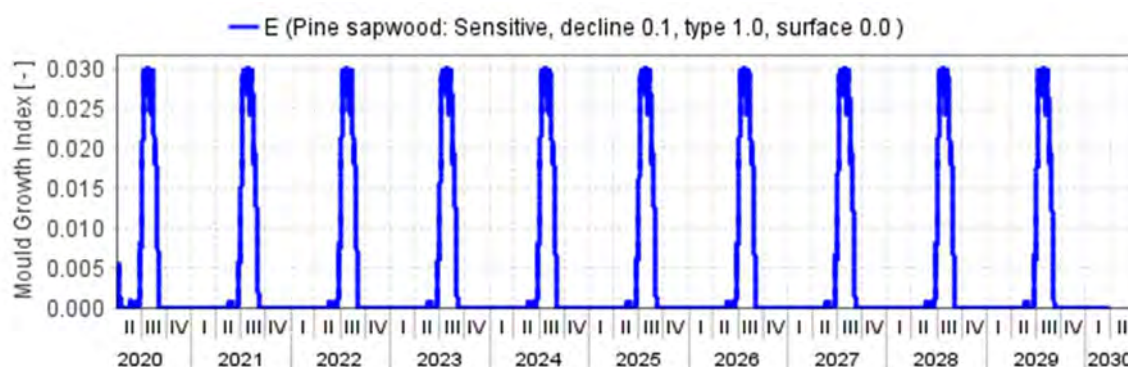


Figure 23: NatHERS CZ 61 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 6. Climate zone 63 – NCC CZ6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the third year. This wall type requires further investigation.

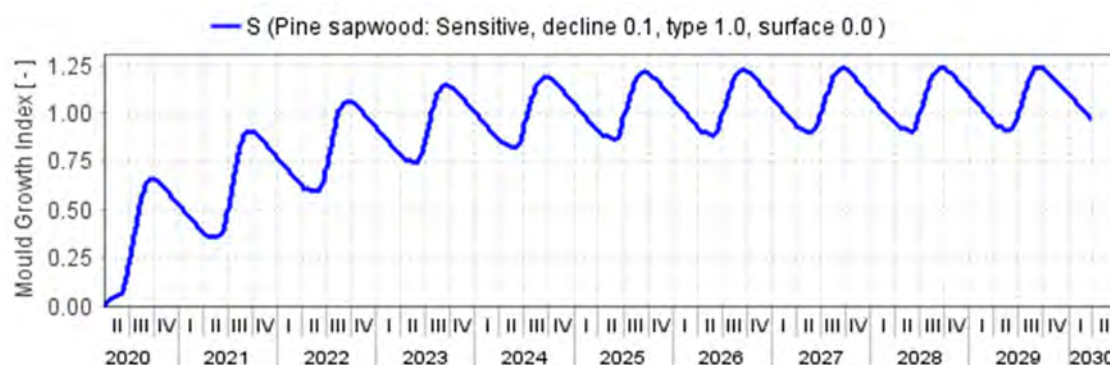


Figure 24: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fifth year.

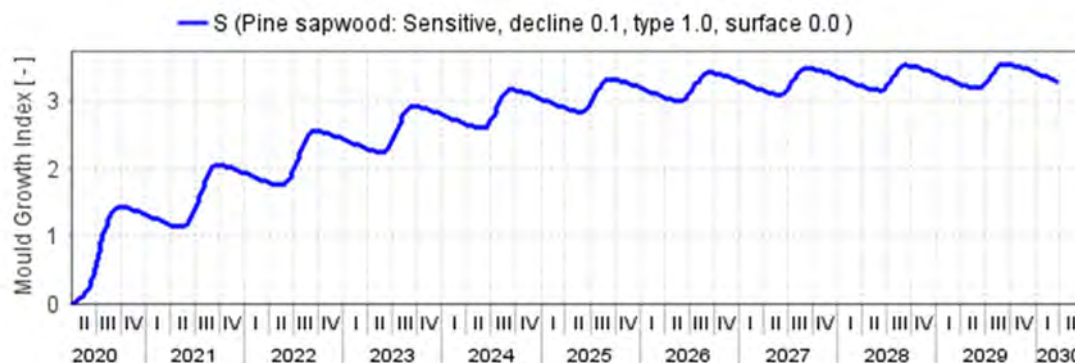


Figure 25: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

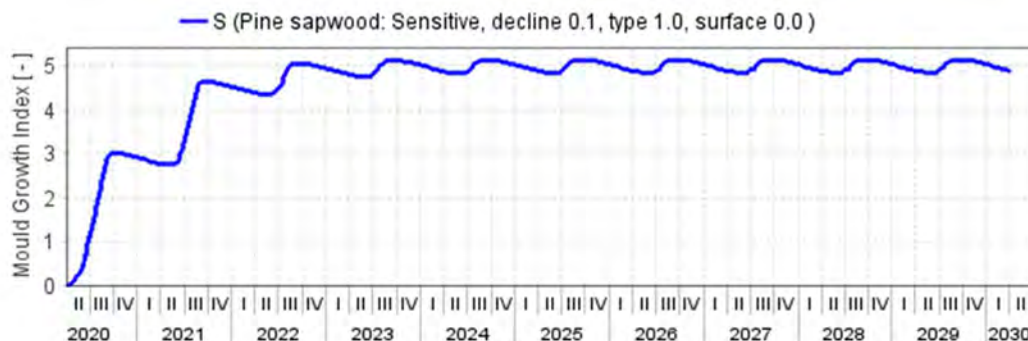


Figure 26: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



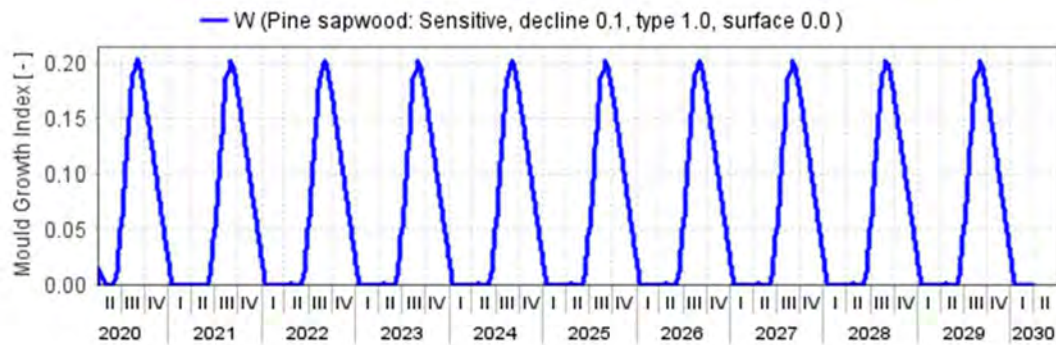


Figure 27: NatHERS CZ 63 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

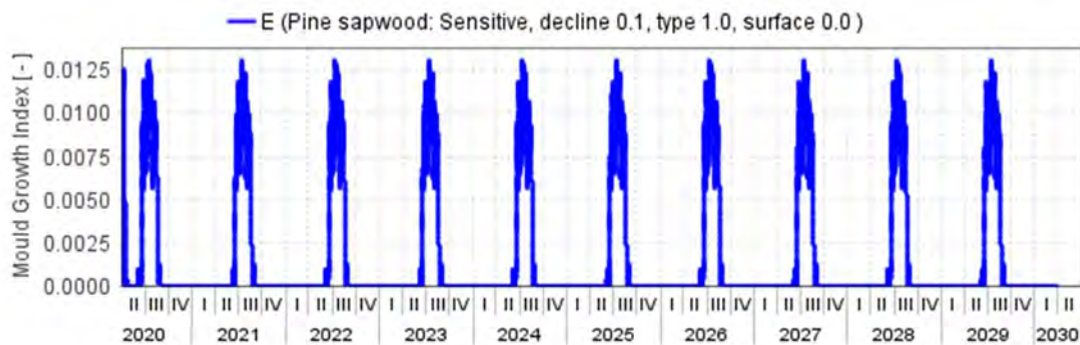


Figure 28: NatHERS CZ 63 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 7. Climate zone 64 – NCC CZ6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

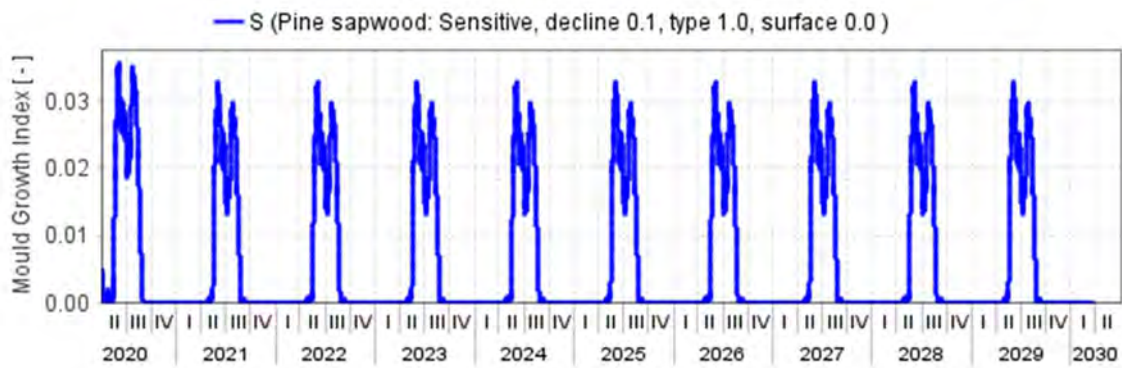


Figure 29: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

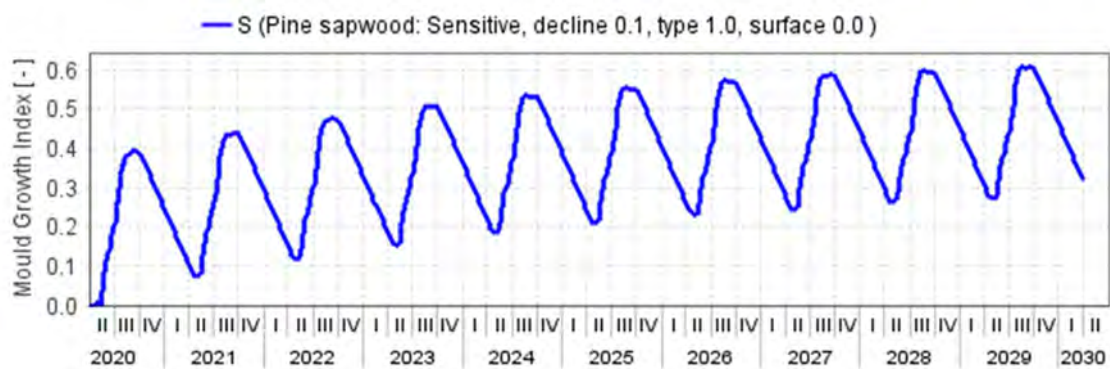


Figure 30: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the sixth year.

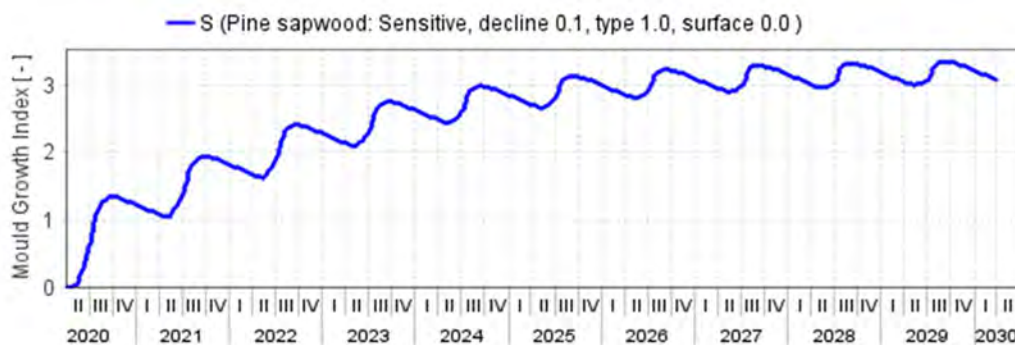


Figure 31: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

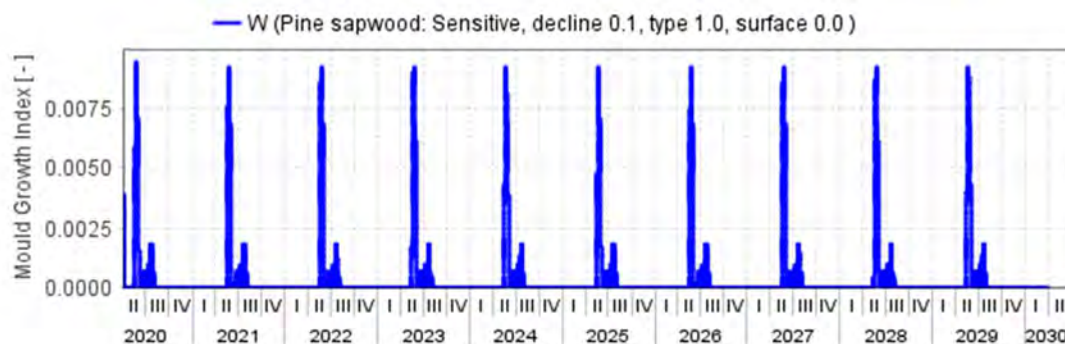


Figure 32: NatHERS CZ 64 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

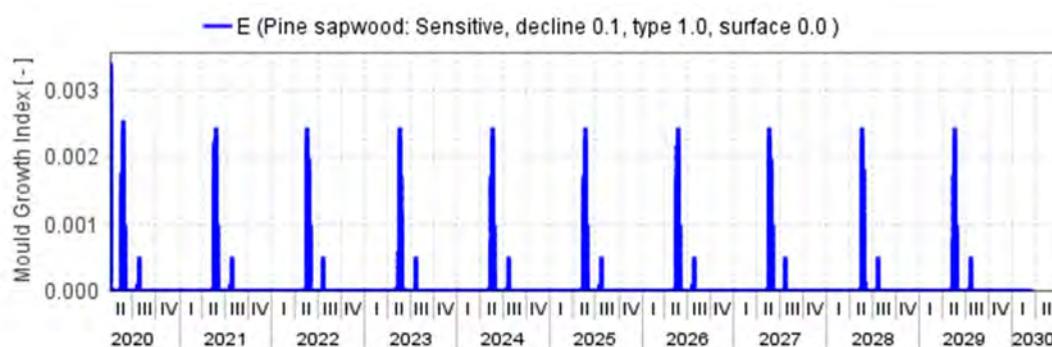


Figure 33: NatHERS CZ 64 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 8. Climate zone 66 – NCC CZ6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



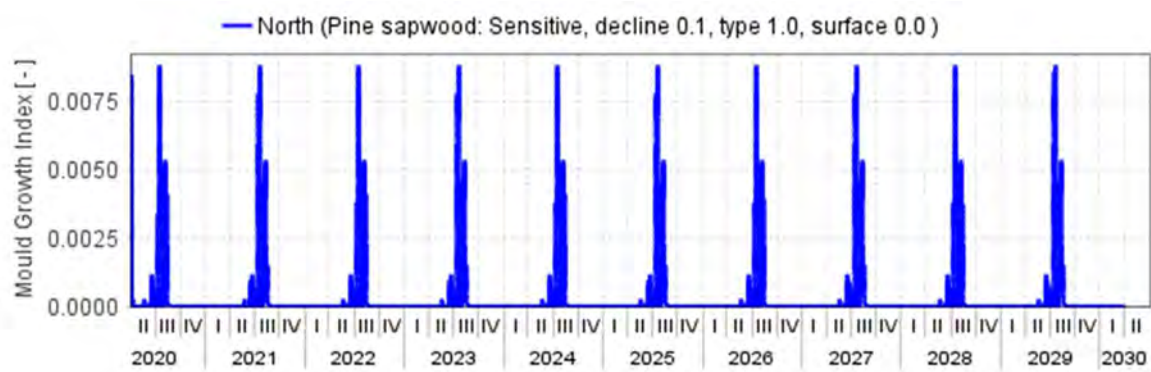


Figure 34: NatHERS CZ 66 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

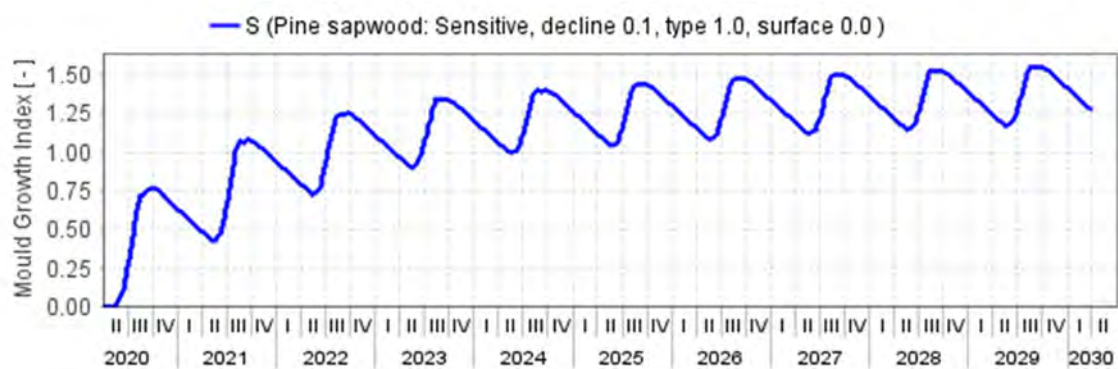


Figure 35: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

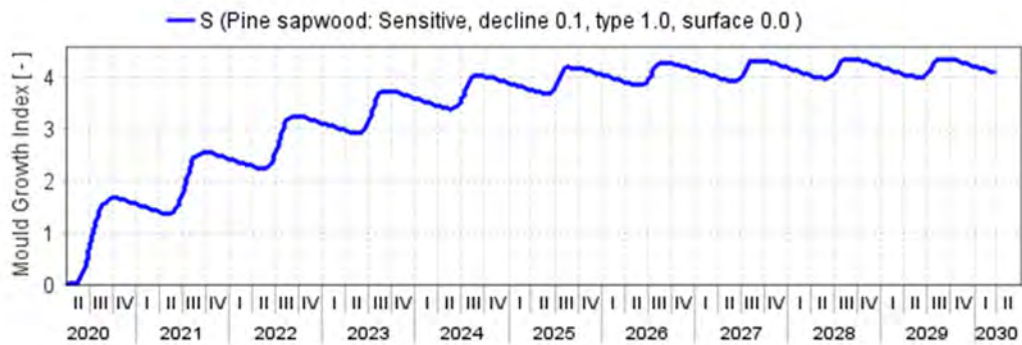


Figure 36: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

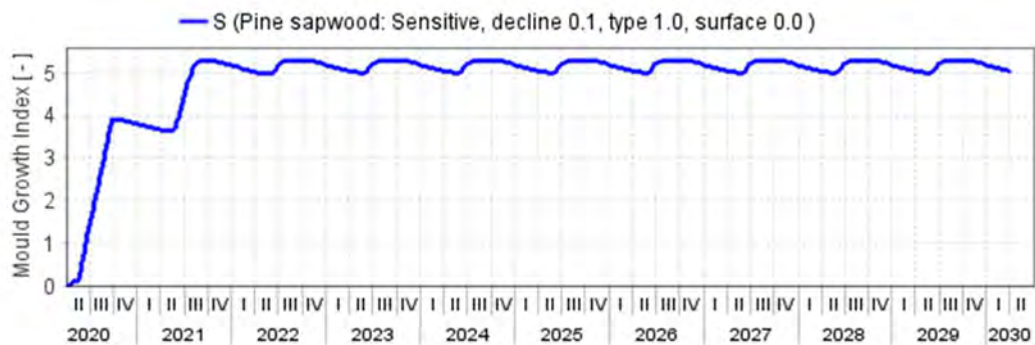


Figure 37: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

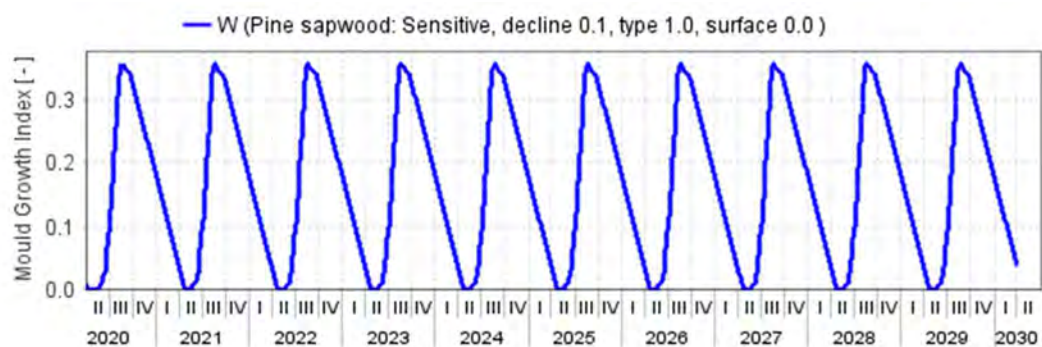


Figure 38: NatHERS CZ 66 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

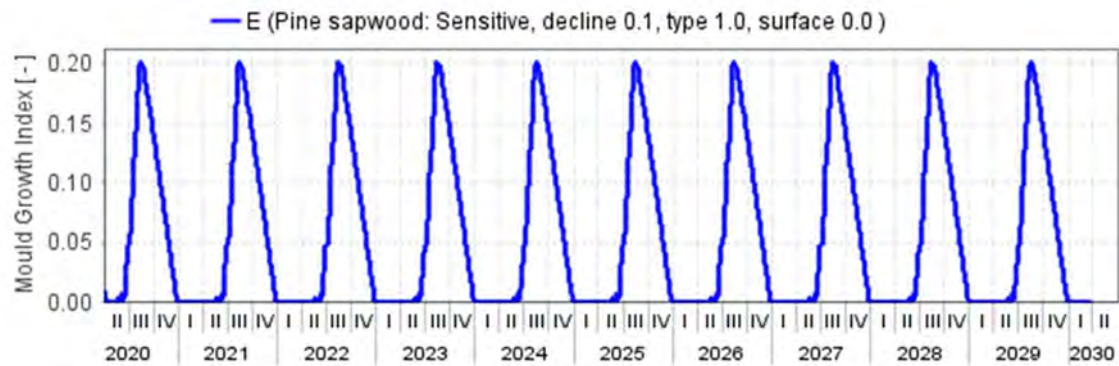


Figure 39: NatHERS CZ 66 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 9. Climate zone 27 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

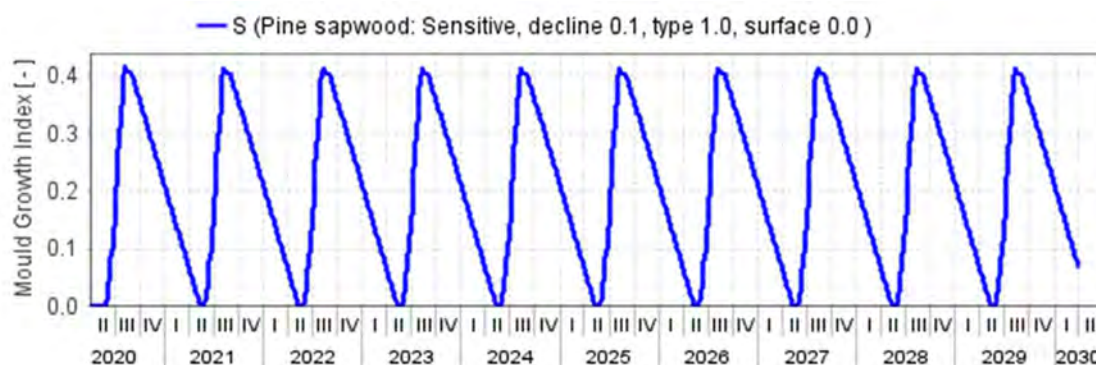


Figure 40: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the eighth year.

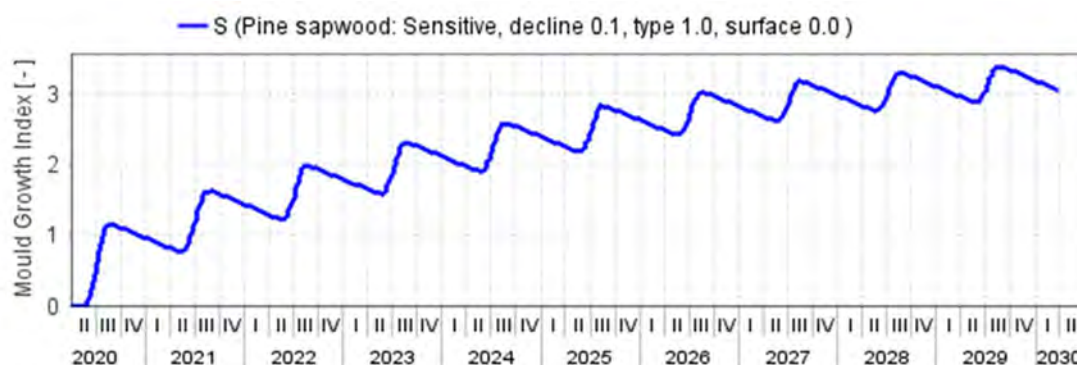


Figure 41: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil



Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

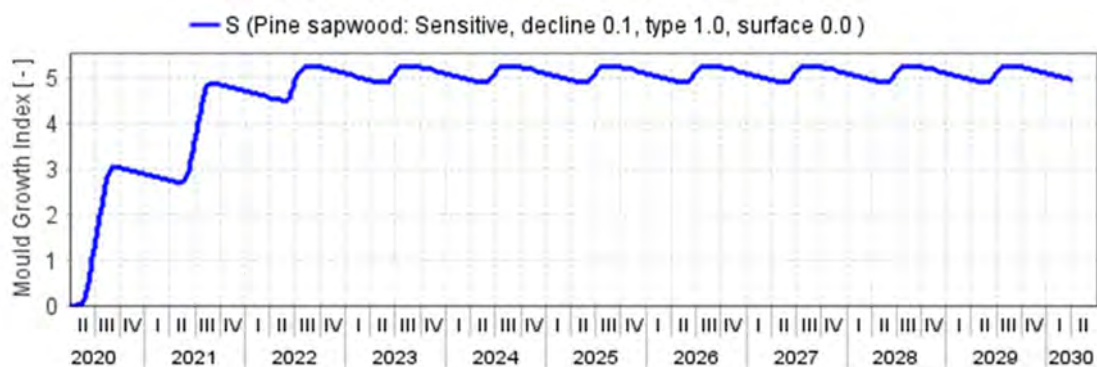


Figure 42: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

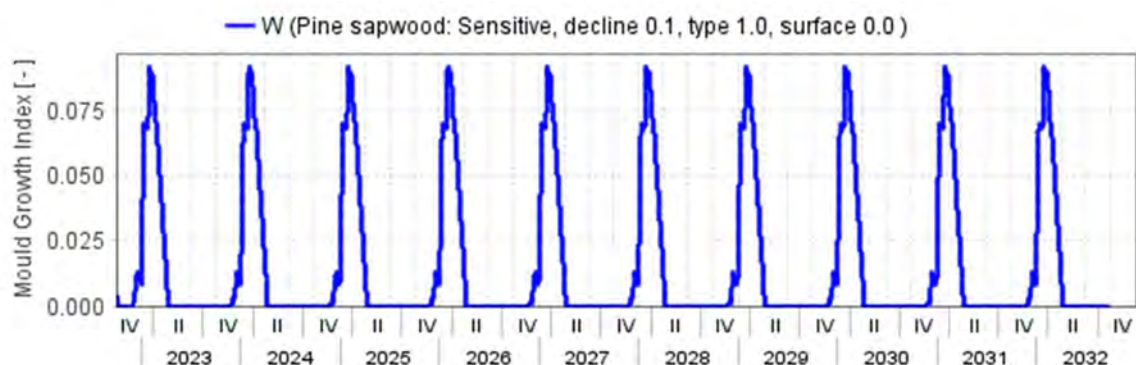


Figure 43: NatHERS CZ 27 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

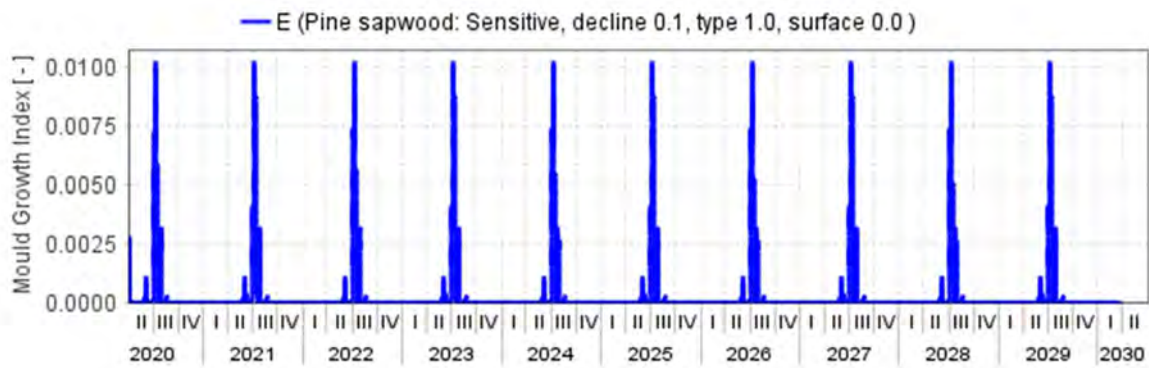


Figure 44: NatHERS CZ 27 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 10. Climate zone 61 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

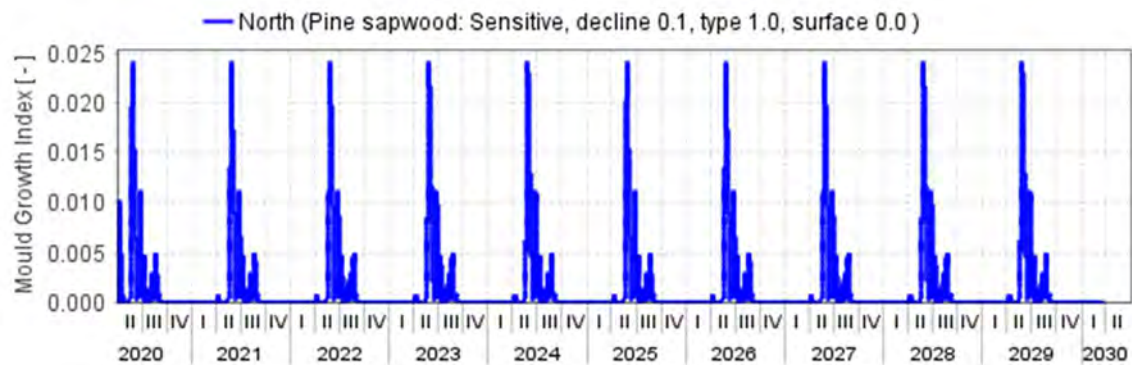


Figure 45: NatHERS CZ 61 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.



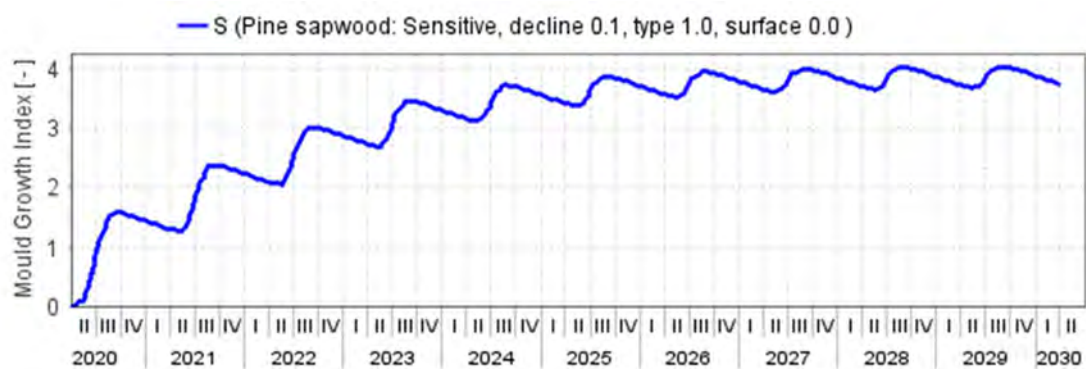


Figure 46: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

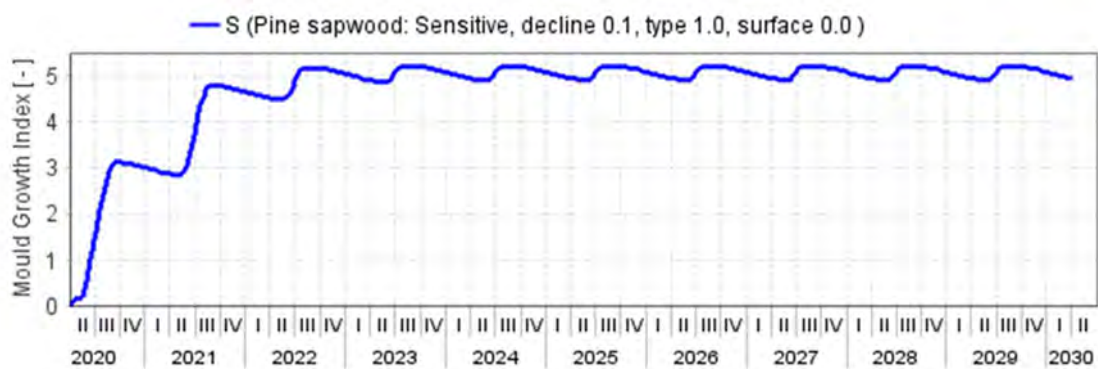


Figure 47: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

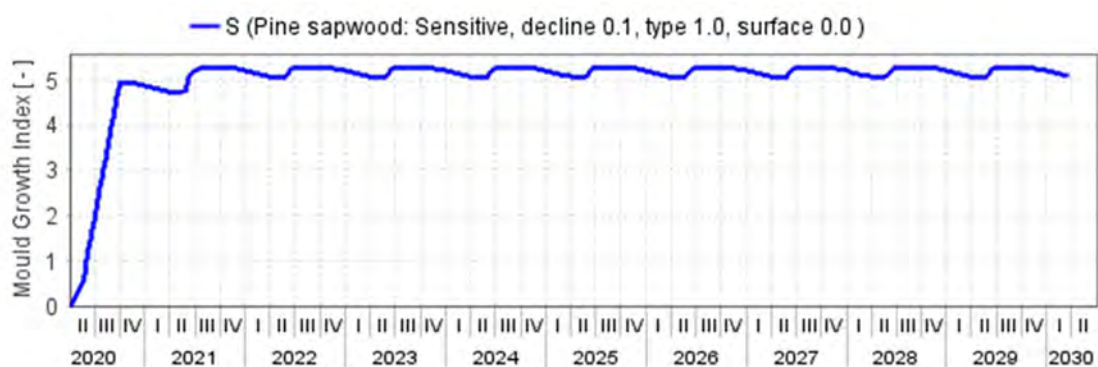


Figure 48: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

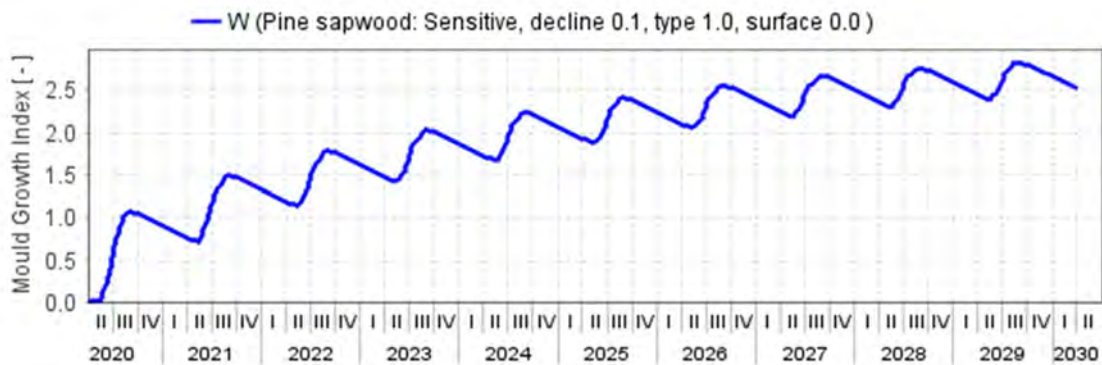


Figure 49: NatHERS CZ 61 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

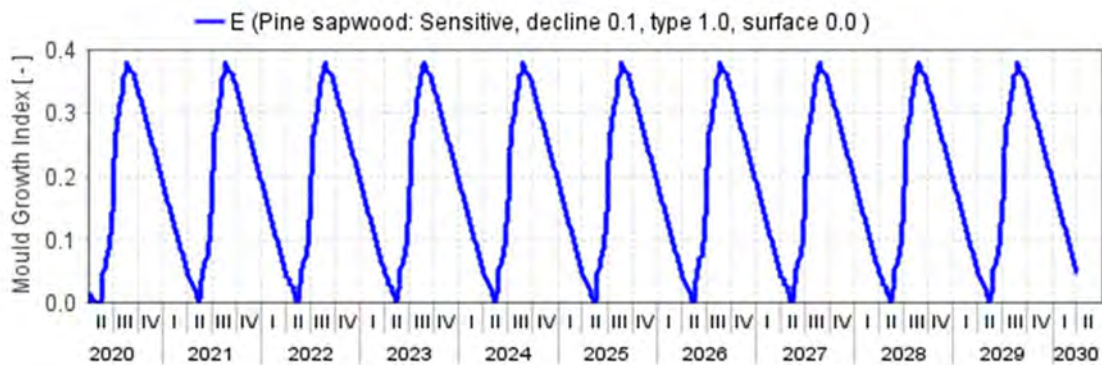


Figure 50: NatHERS CZ 61 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 11. Climate zone 66 - NCC CZ4

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

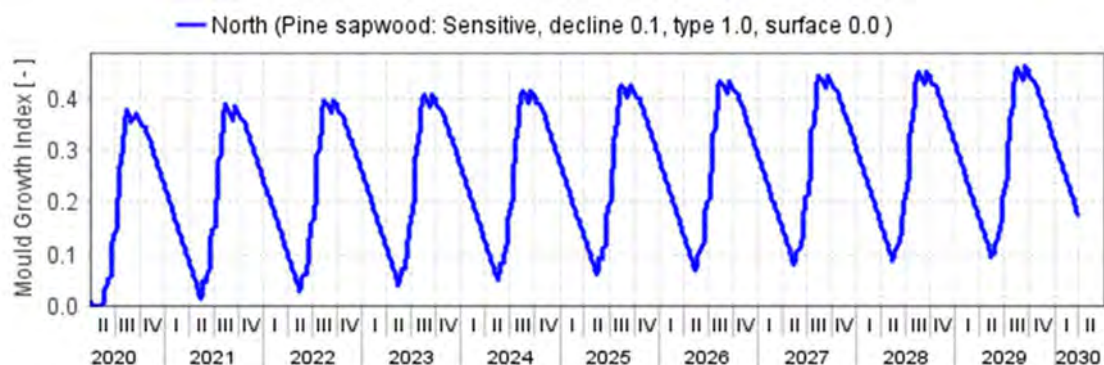


Figure 51: NatHERS CZ 66 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

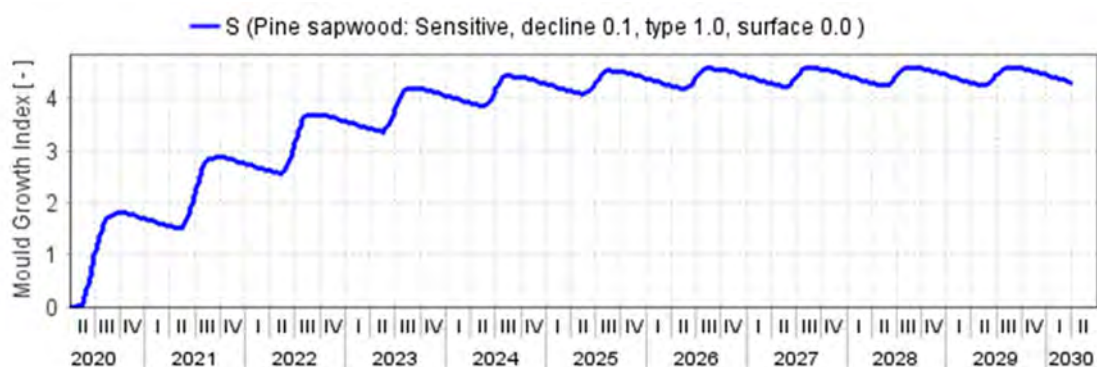


Figure 52: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

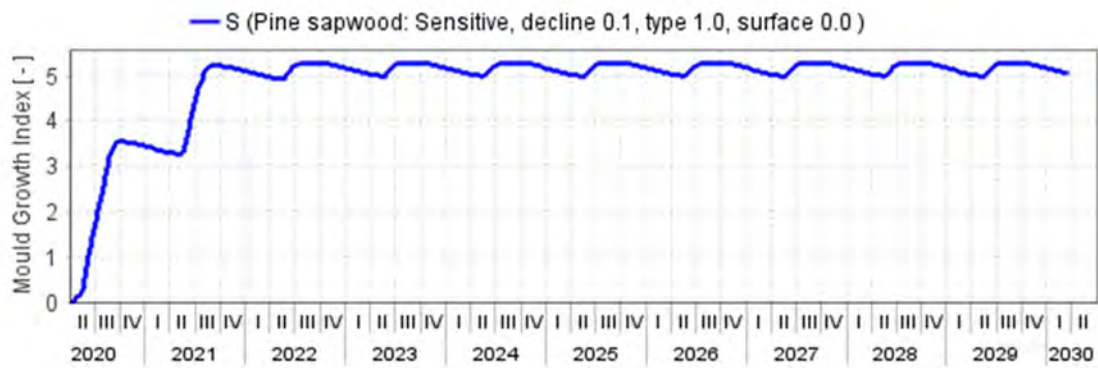


Figure 53: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

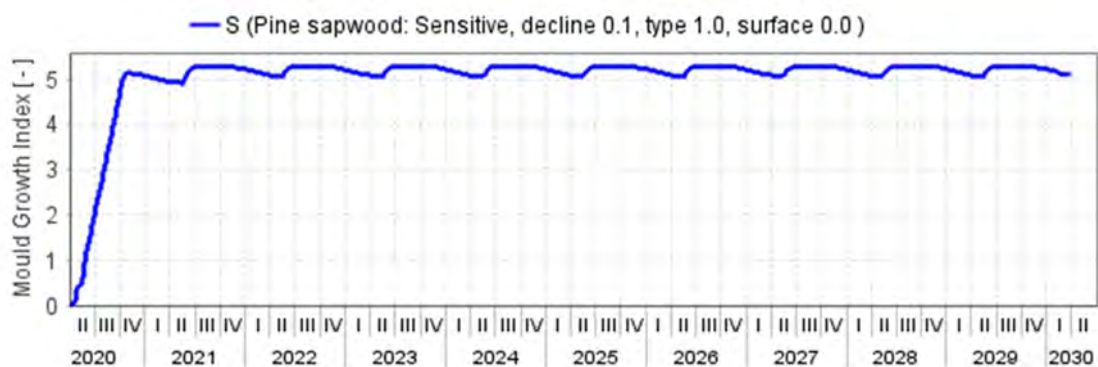


Figure 54: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fifth year.

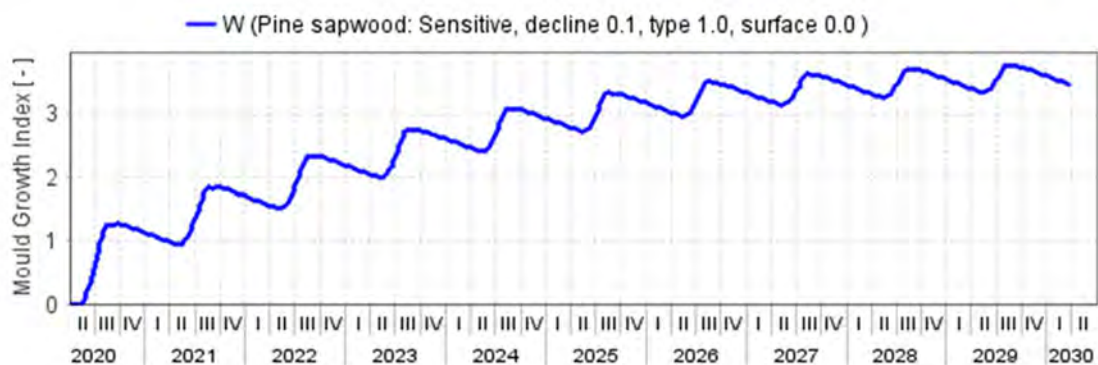




Figure 55: NatHERS CZ 66 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

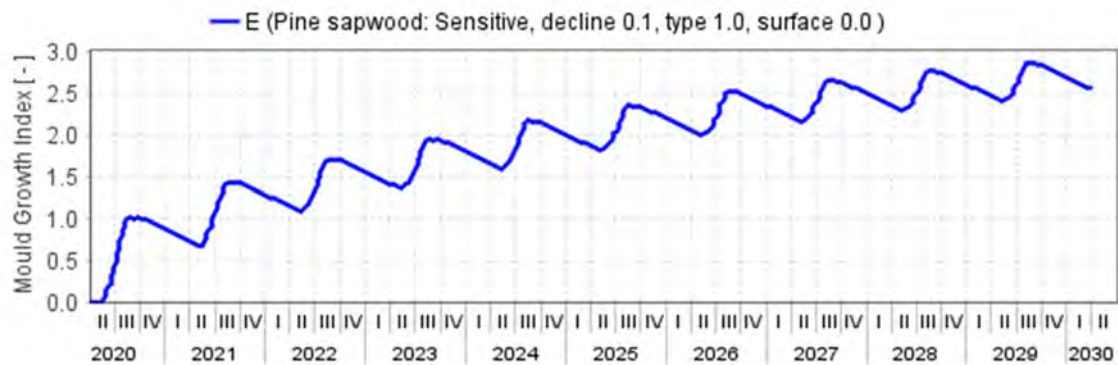


Figure 56: NatHERS CZ 66 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## Moisture accumulation and mould growth for 7 Star housing Research Report 2

### Appendix 4: Hygrothermal simulation results – Clay masonry veneer with insulated timber framing (Wall 3) Rev 02 (12/09/2022)



## 1. Climate zone 21 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

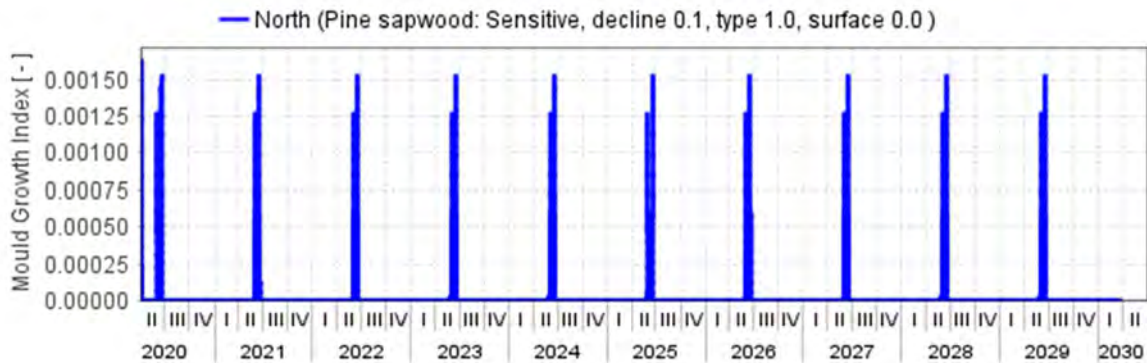


Figure 1: NatHERS CZ 21 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

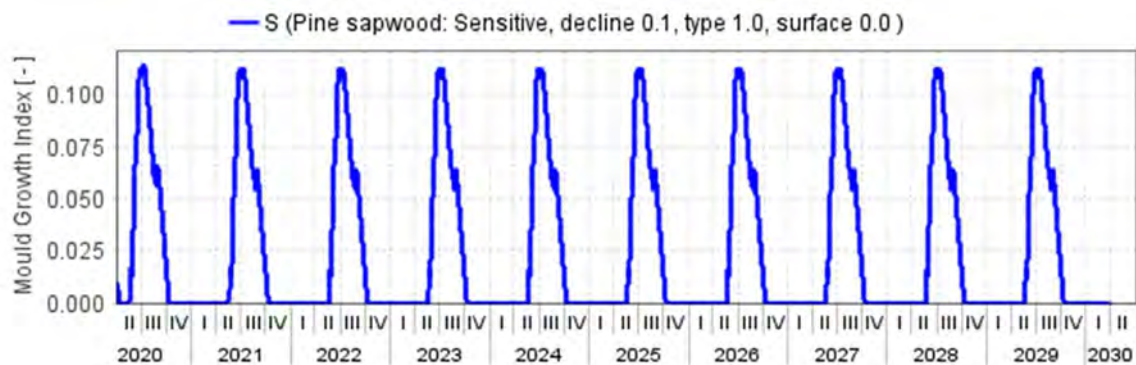


Figure 2: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the third year. This wall type requires further investigation.

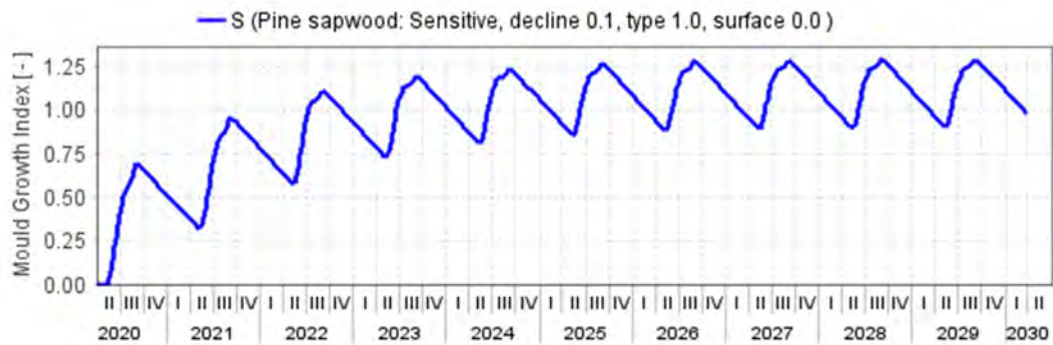


Figure 3: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

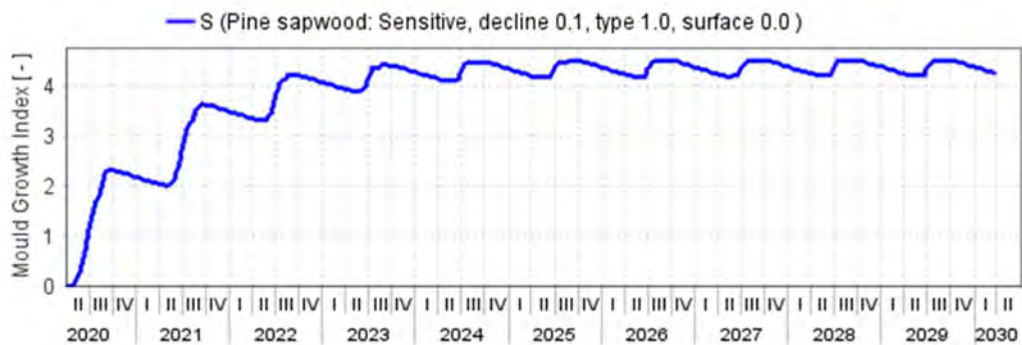


Figure 4: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

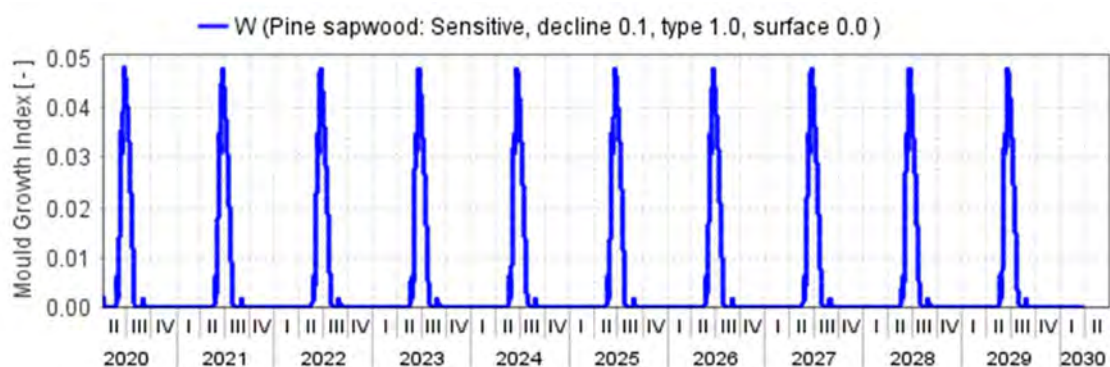


Figure 5: NatHERS CZ 21 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

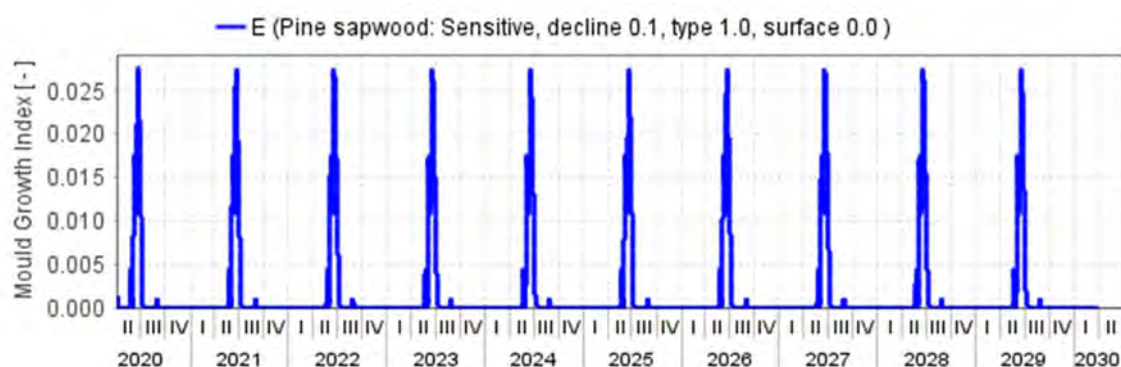


Figure 6: NatHERS CZ 21– NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 2. Climate zone 22 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

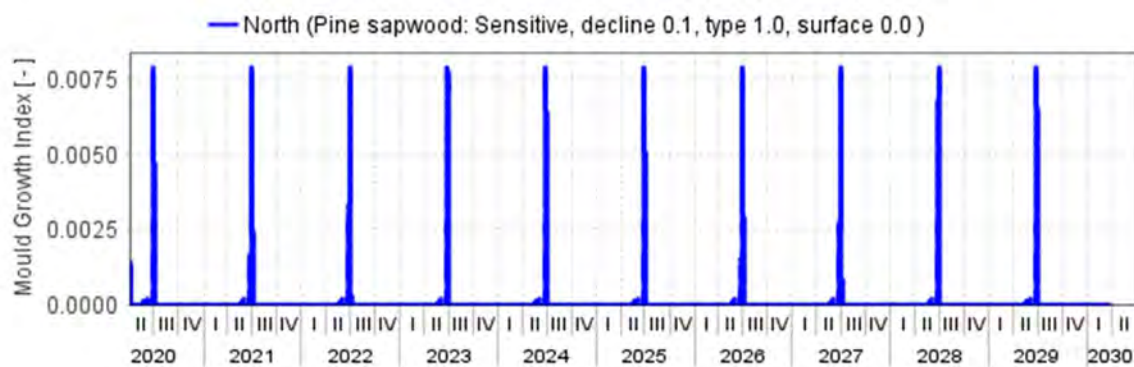


Figure 7: NatHERS CZ 22 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fifth year. This wall type requires further investigation.

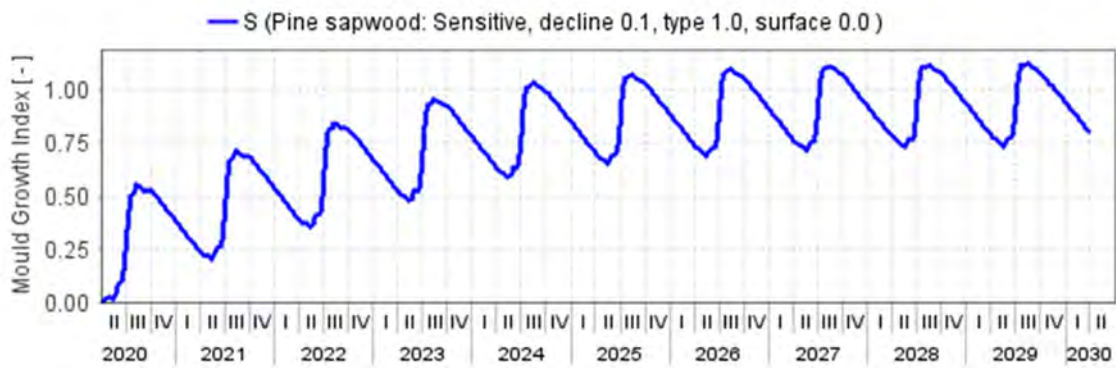


Figure 8: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fifth year.

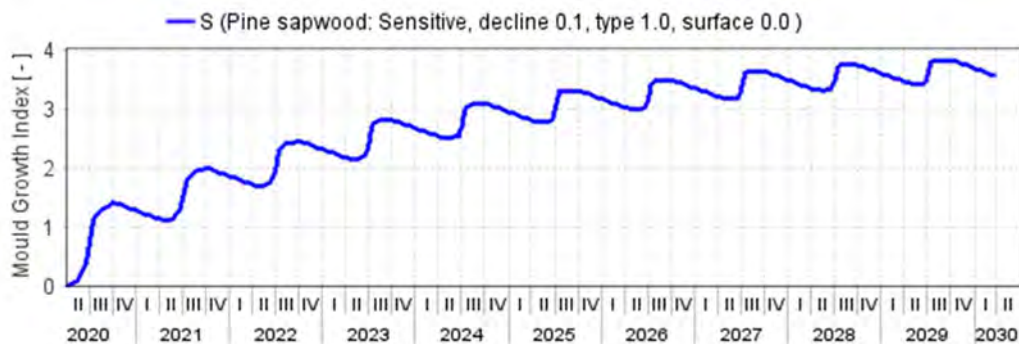


Figure 9: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

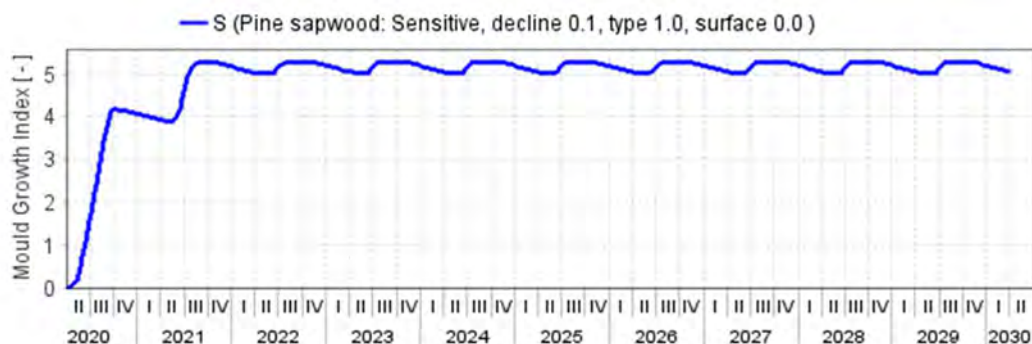


Figure 10: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

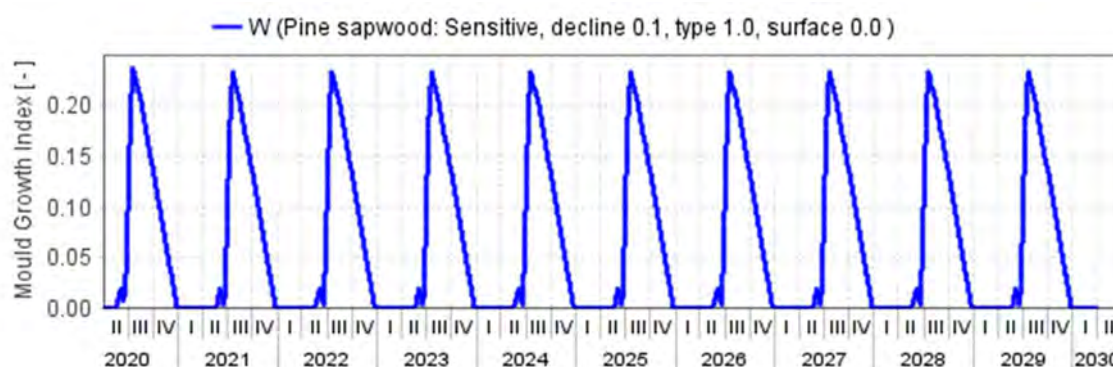


Figure 11: NatHERS CZ 22 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

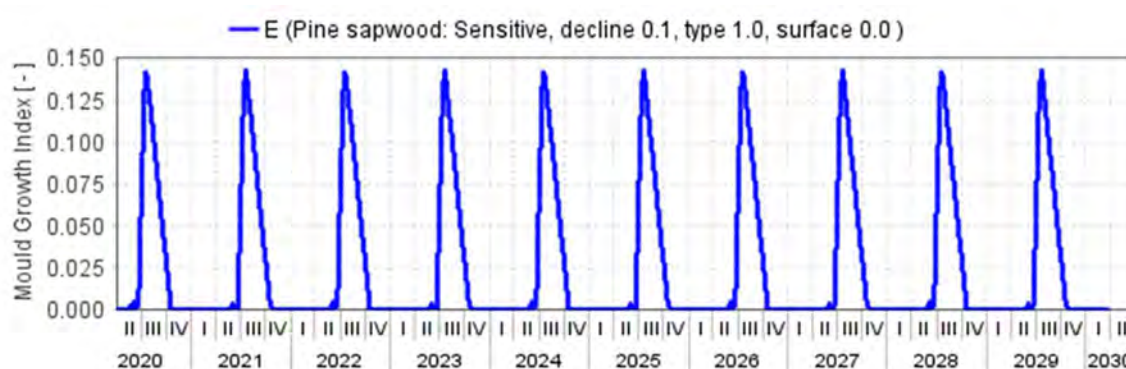


Figure 12: NatHERS CZ 22 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

### 3. Climate zone 27 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

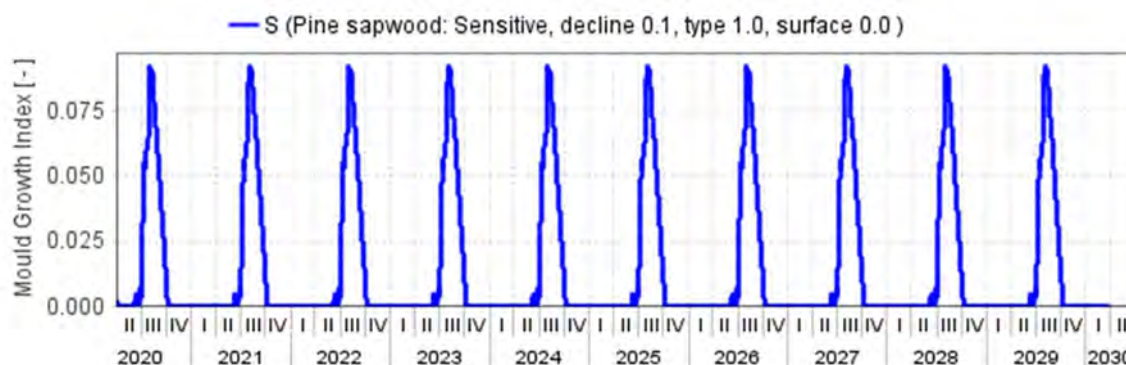


Figure 13: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the seventh year. This wall type requires further investigation.

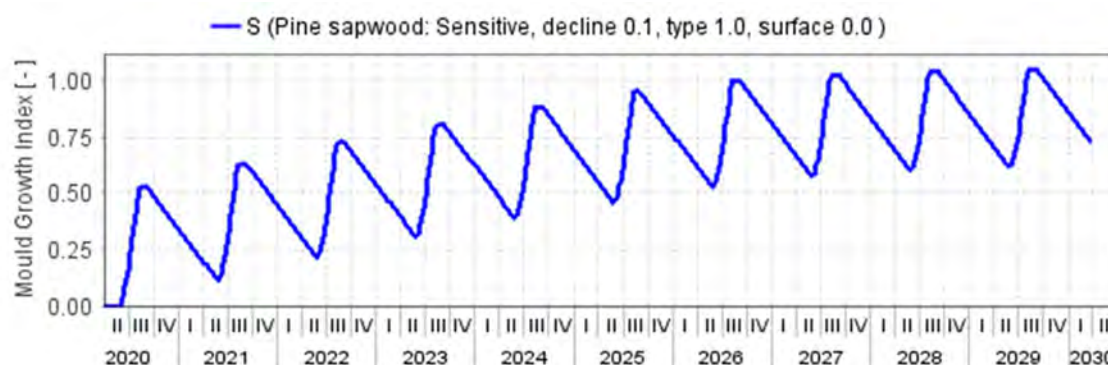


Figure 14: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.



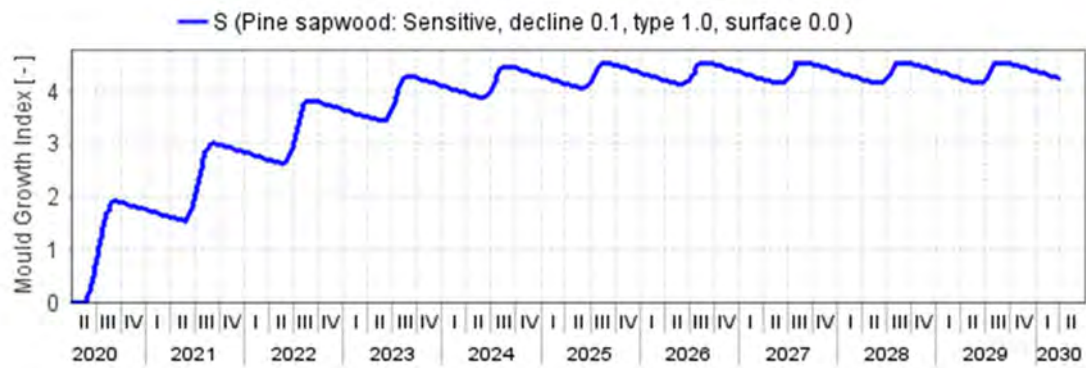


Figure 15: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

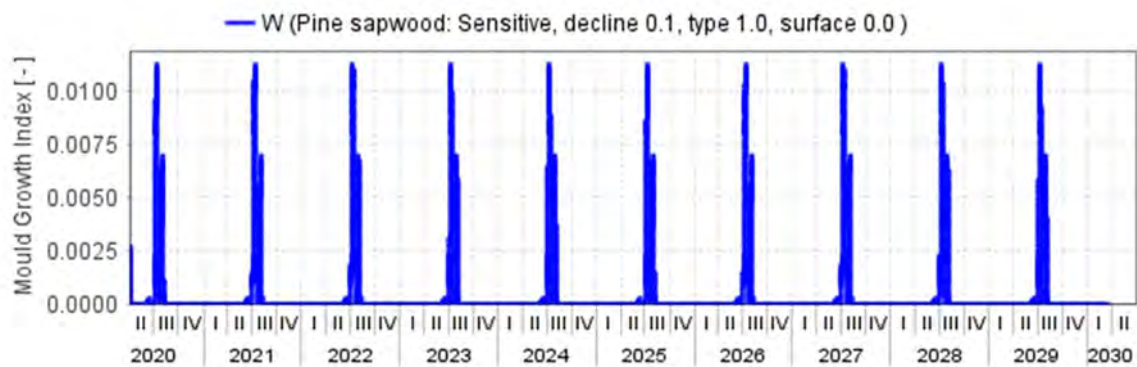


Figure 16: NatHERS CZ 27 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

#### 4. Climate zone 60 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

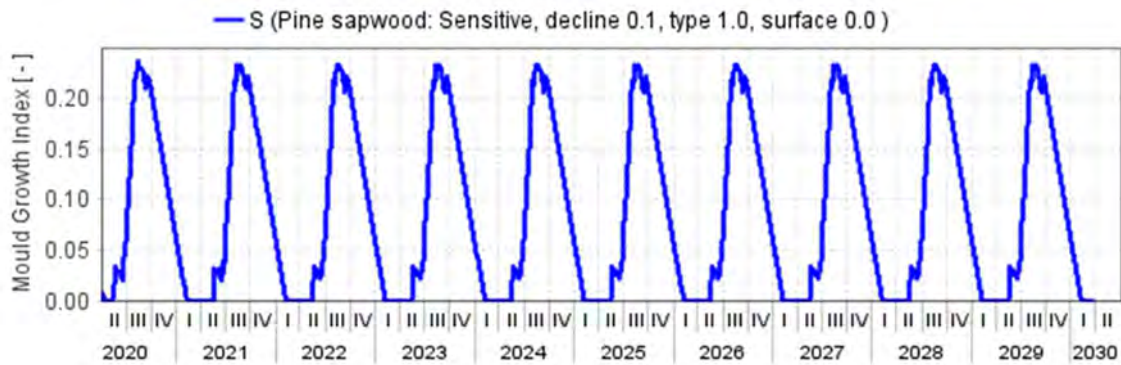


Figure 17: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

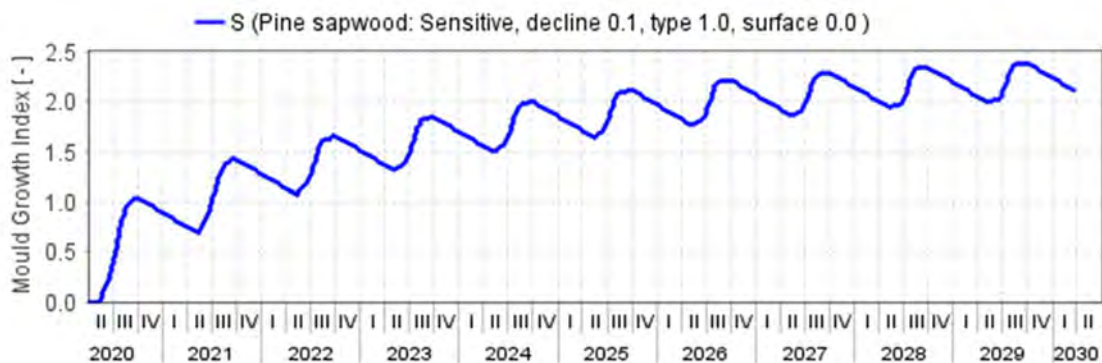


Figure 18: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

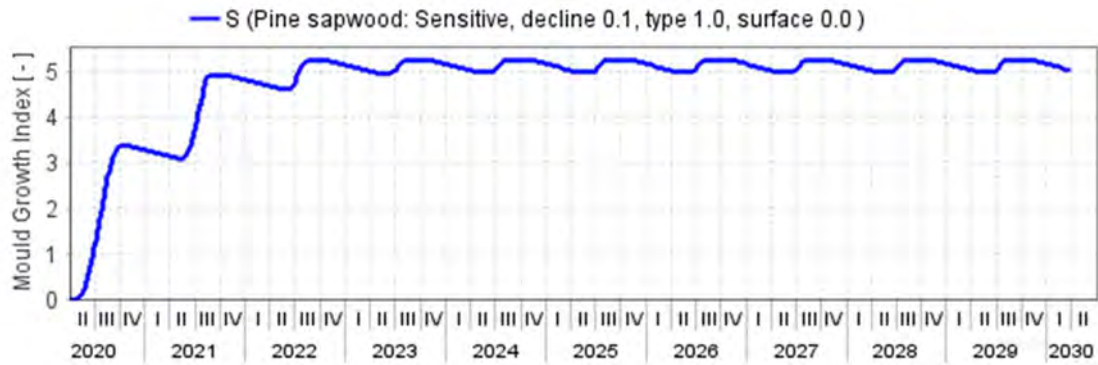


Figure 19: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

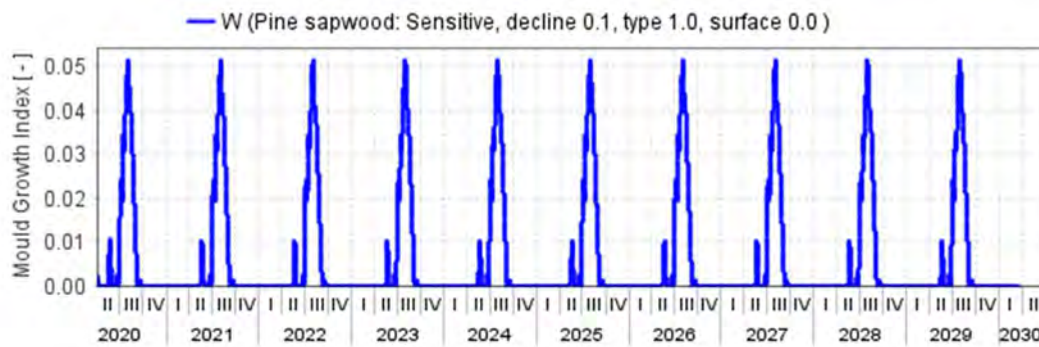


Figure 20: NatHERS CZ 60 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

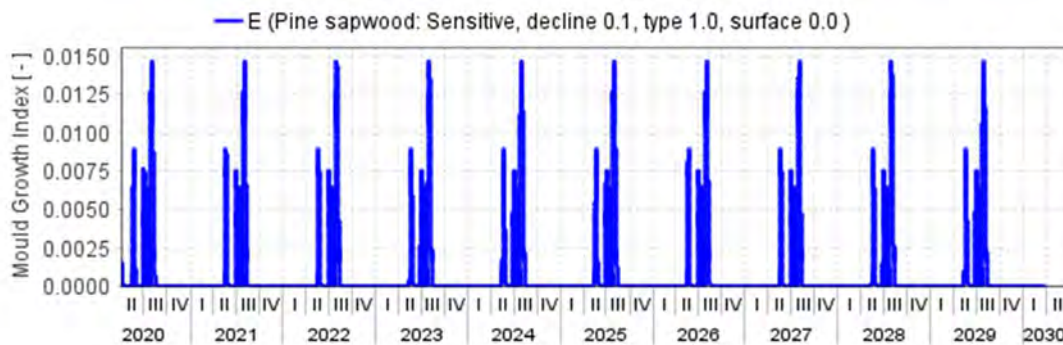


Figure 21: NatHERS CZ 60 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 5. Climate zone 61 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

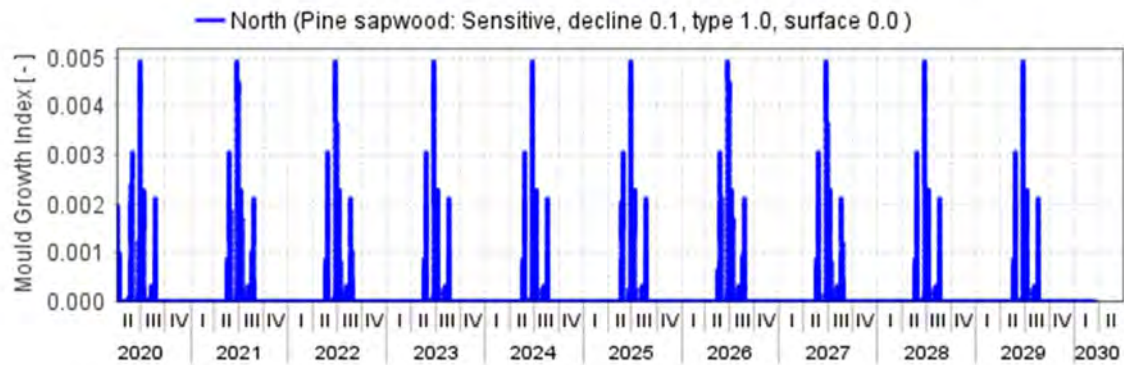


Figure 22: NatHERS CZ 61 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

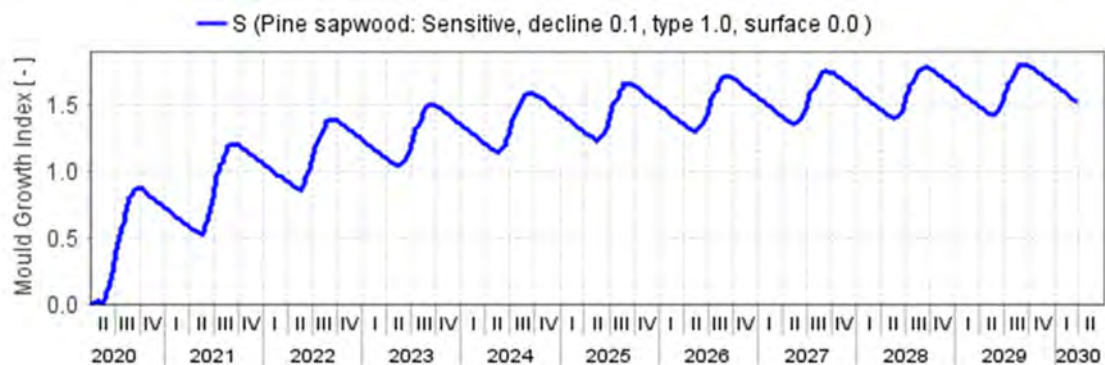


Figure 23: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.



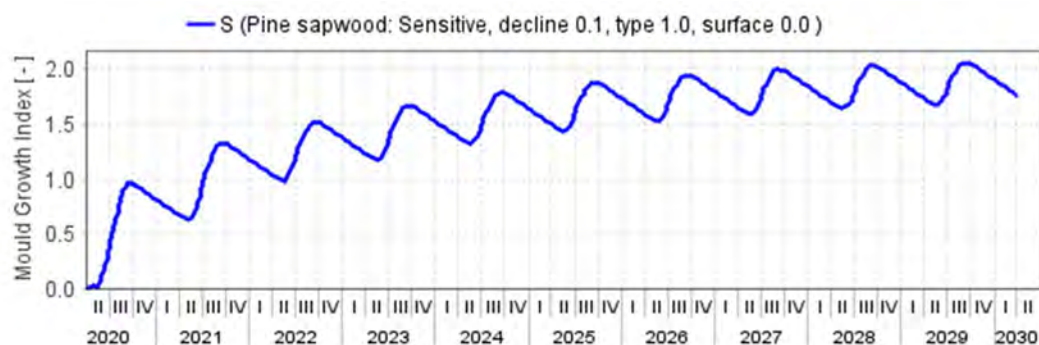


Figure 24: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

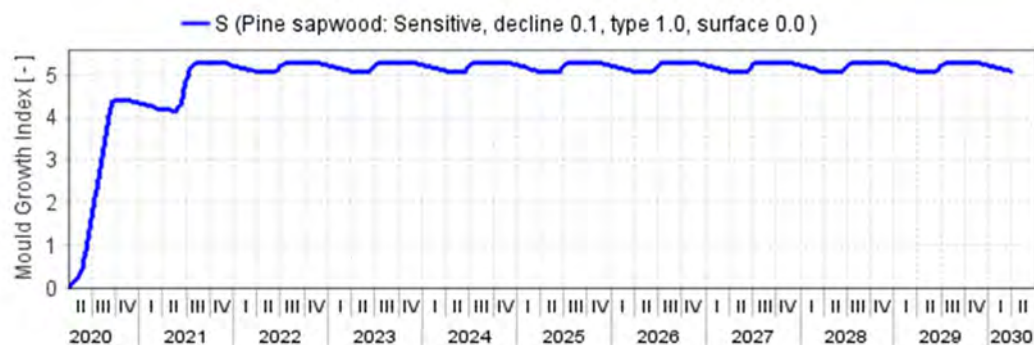


Figure 25: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the third year. This wall type requires further investigation.

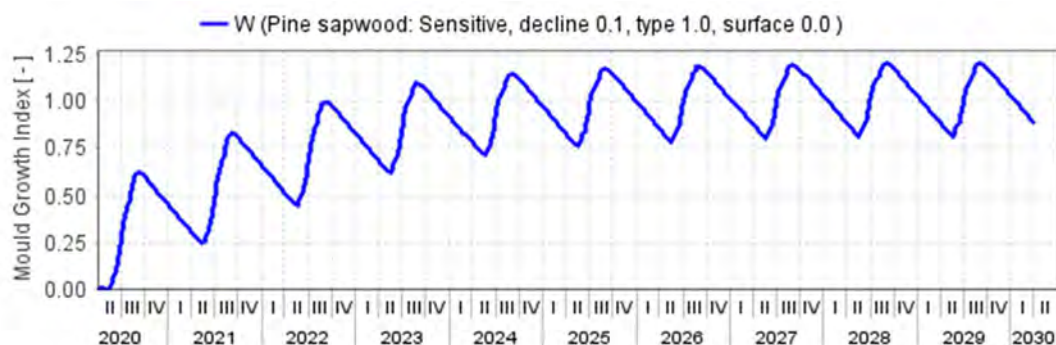


Figure 26: NatHERS CZ 61 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

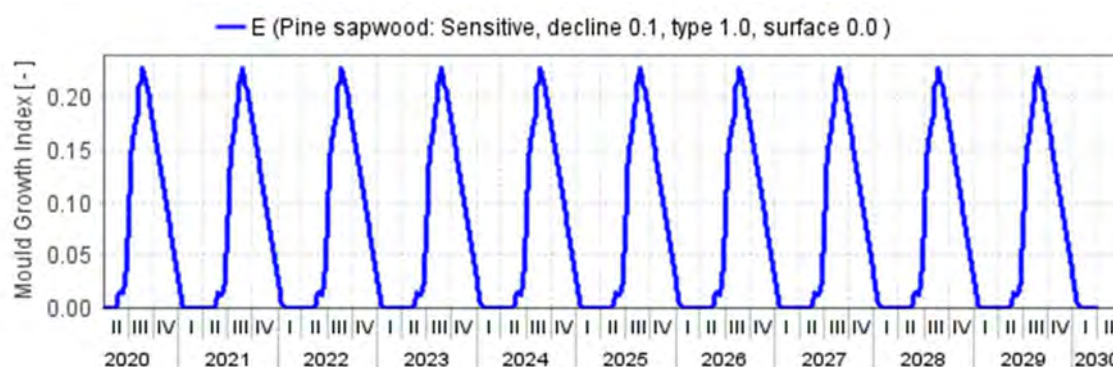


Figure 27: NatHERS CZ 61 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 6. Climate zone 63 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

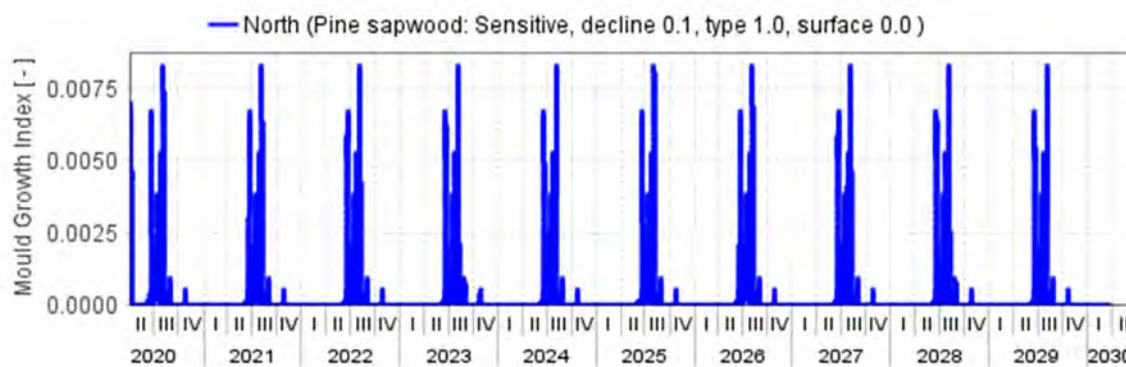


Figure 28: NatHERS CZ 63 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 within the second year. This wall type requires further investigation.



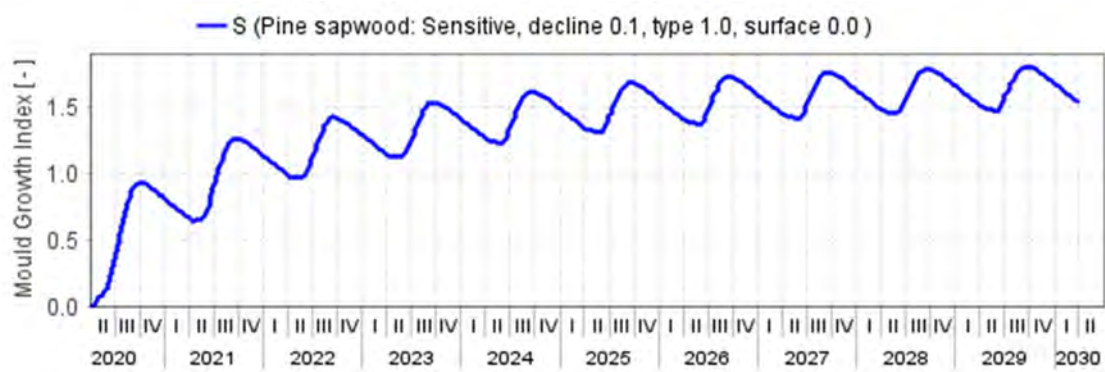


Figure 29: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

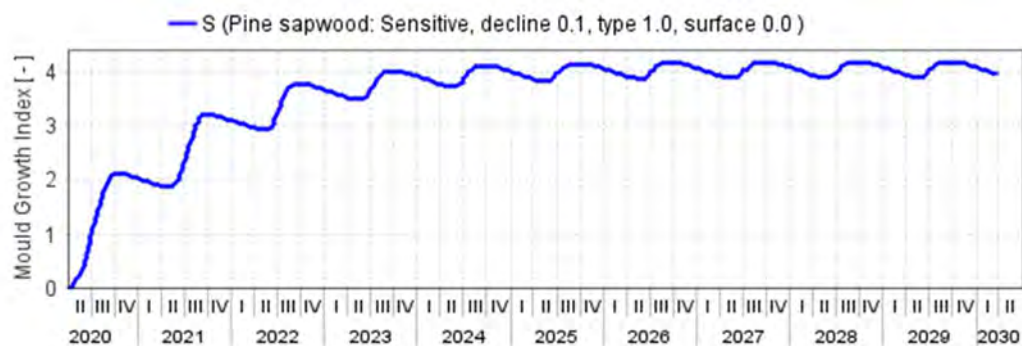


Figure 30: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

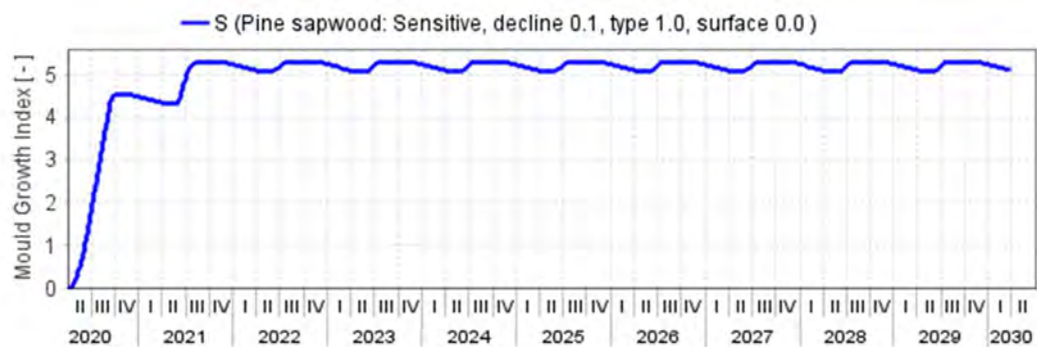


Figure 31: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

## Western orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 within the ten-year period. This wall type requires further investigation.

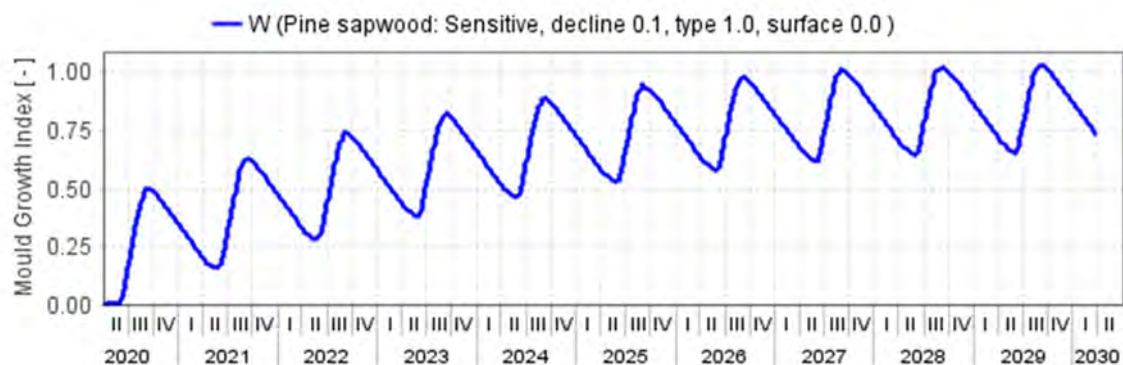


Figure 32: NatHERS CZ 63 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

## Eastern orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

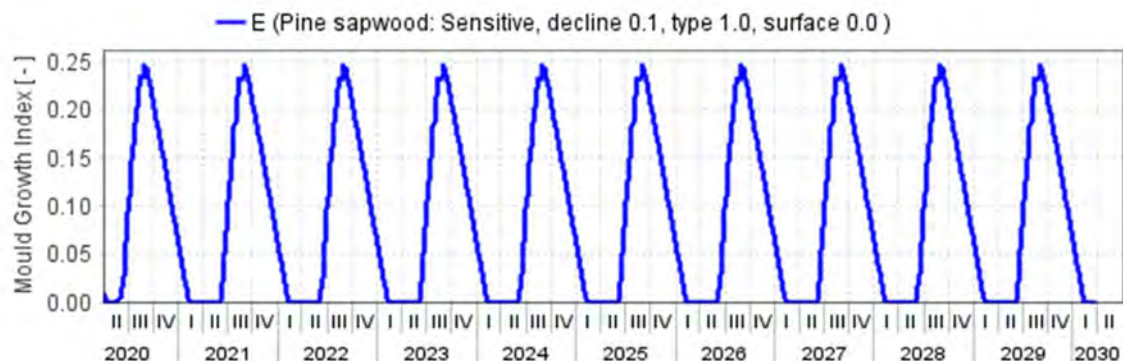


Figure 33: NatHERS CZ 63 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 7. Climate zone 64 – NCC CZ 6-8

### Northern orientation ACR 10

#### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

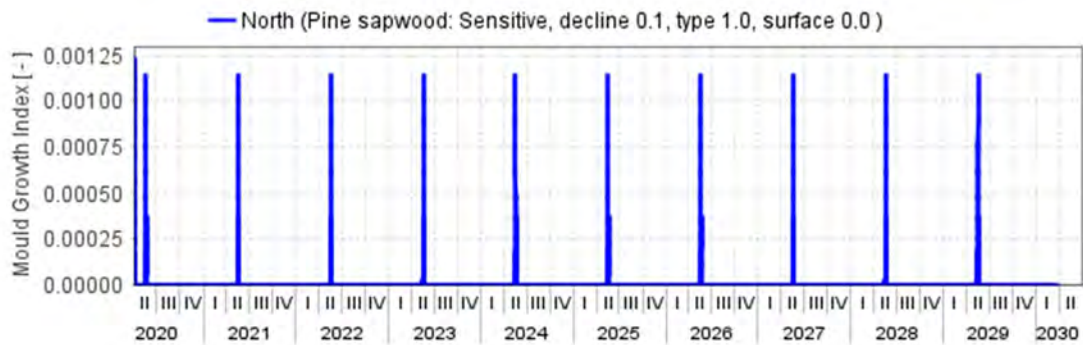


Figure 34: NatHERS CZ 64 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

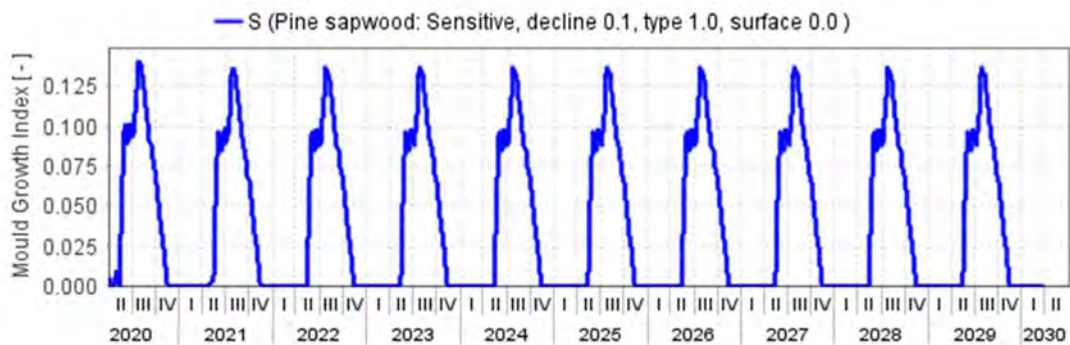


Figure 35: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

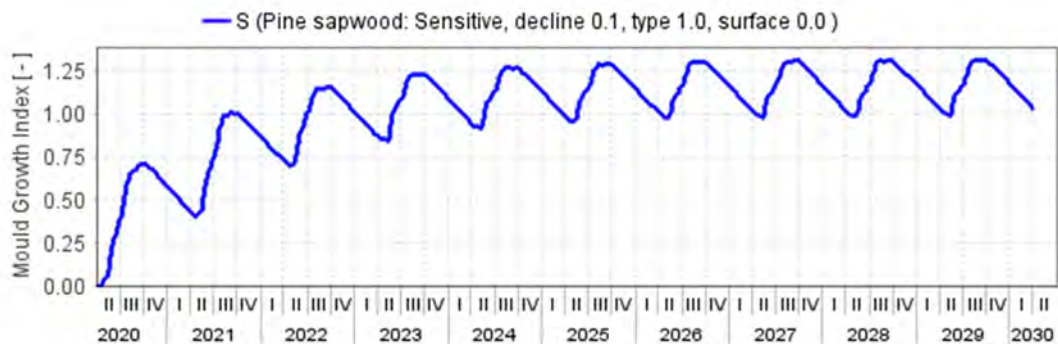


Figure 36: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

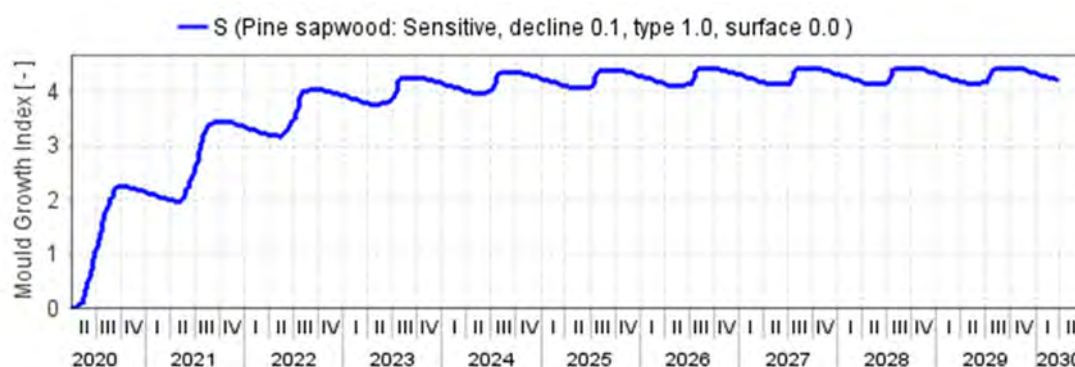


Figure 37: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

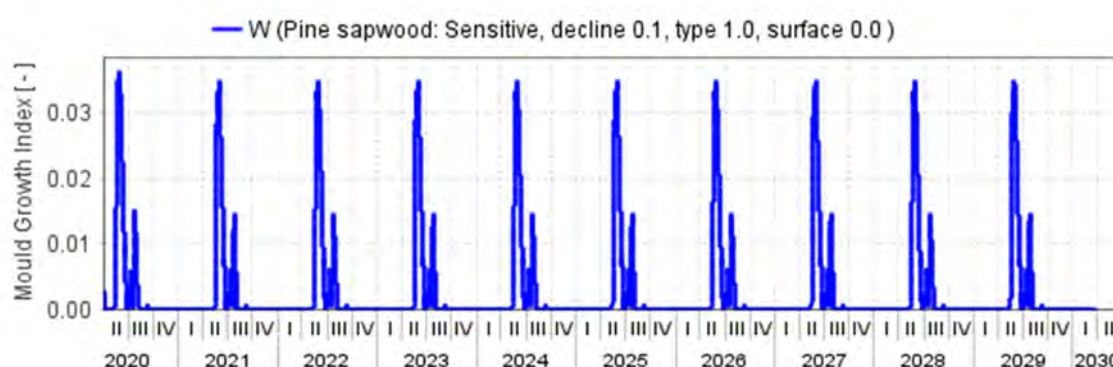


Figure 38: NatHERS CZ 64 – NCC CZ6-8 west orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



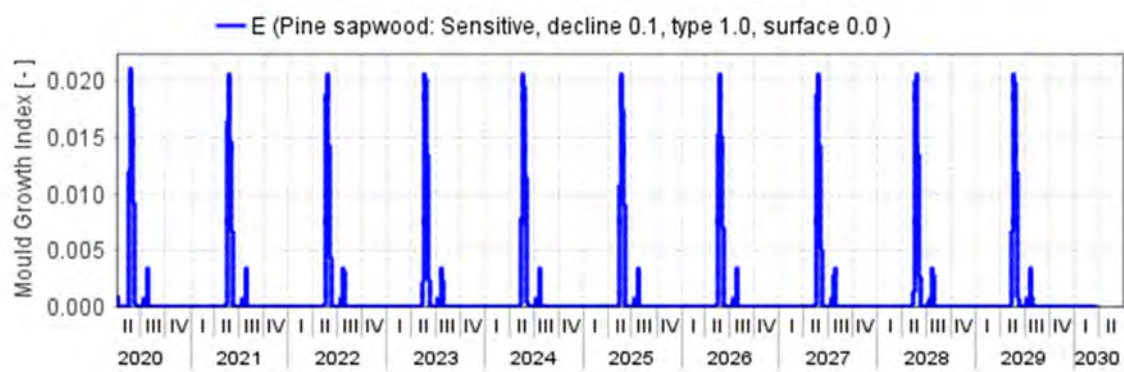


Figure 39: NatHERS CZ 64 – NCC CZ6-8 east orientation ACR 10 - mould growth within insulated timber frame

## 8. Climate zone 66 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

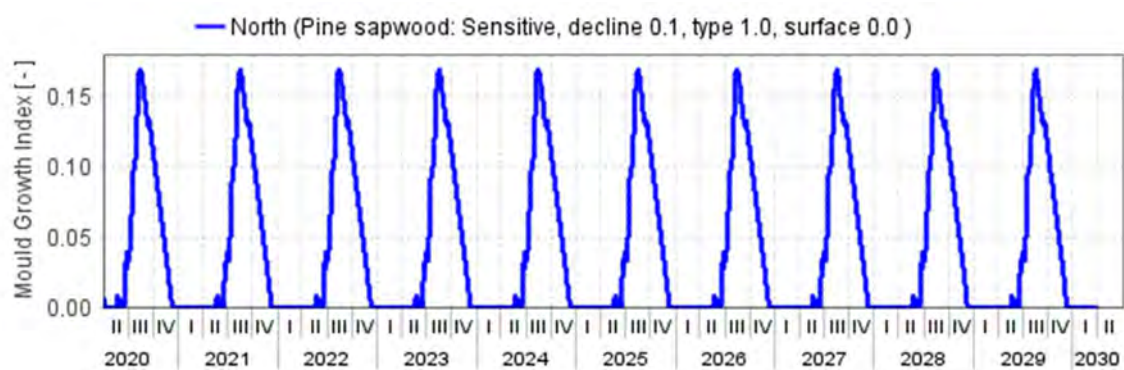


Figure 40: NatHERS CZ66 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

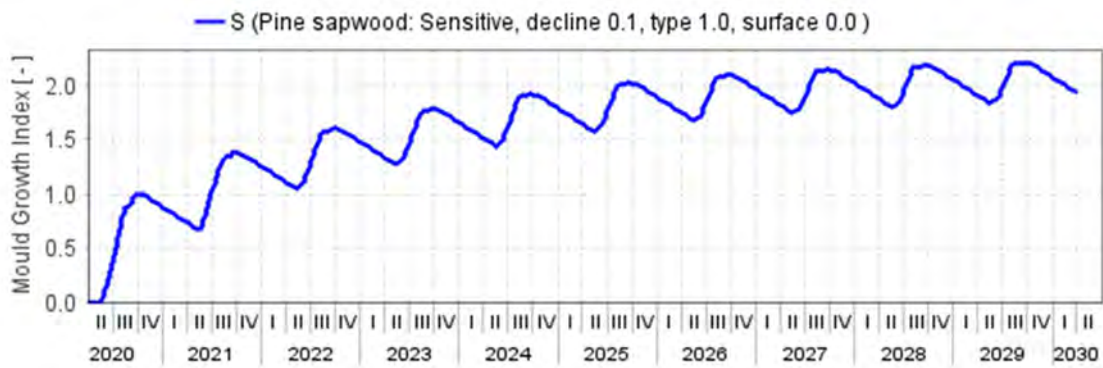


Figure 41: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

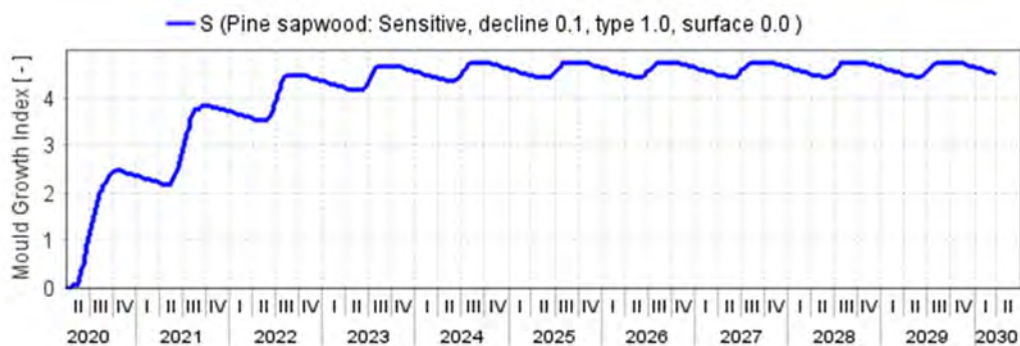


Figure 42: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

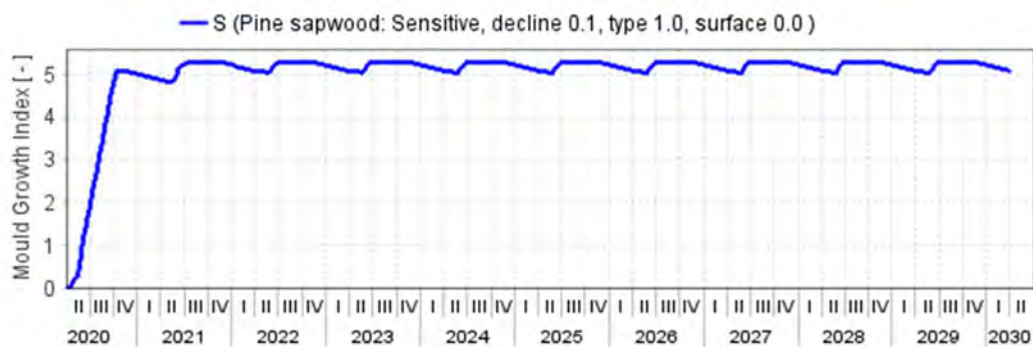


Figure 43: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



#### Western orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

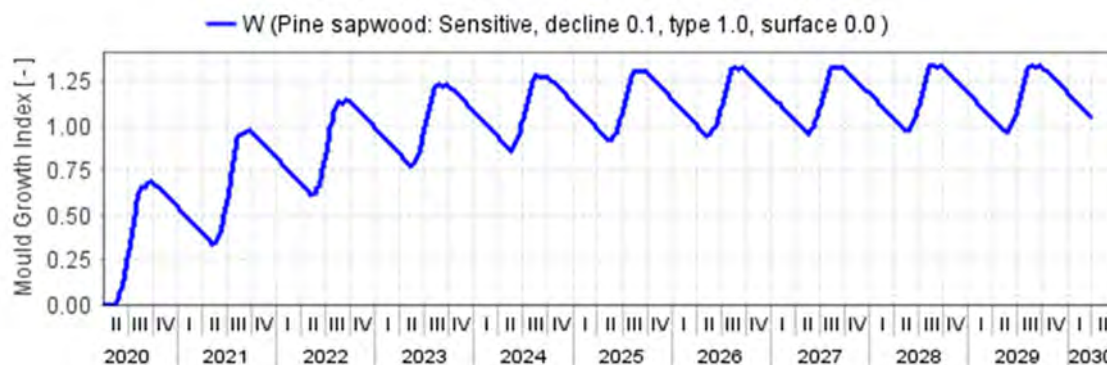


Figure 44: NatHERS CZ 66 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the seventh year. This wall type requires further investigation.

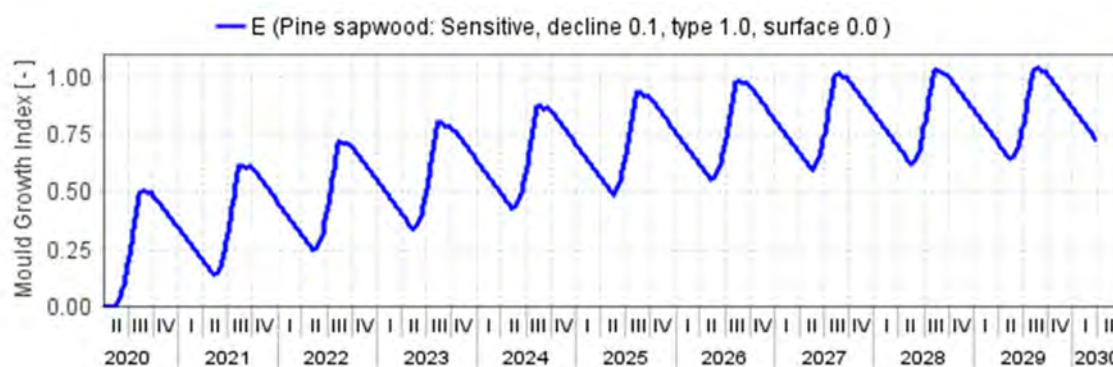


Figure 45: NatHERS CZ 66 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 9. Climate zone 27 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

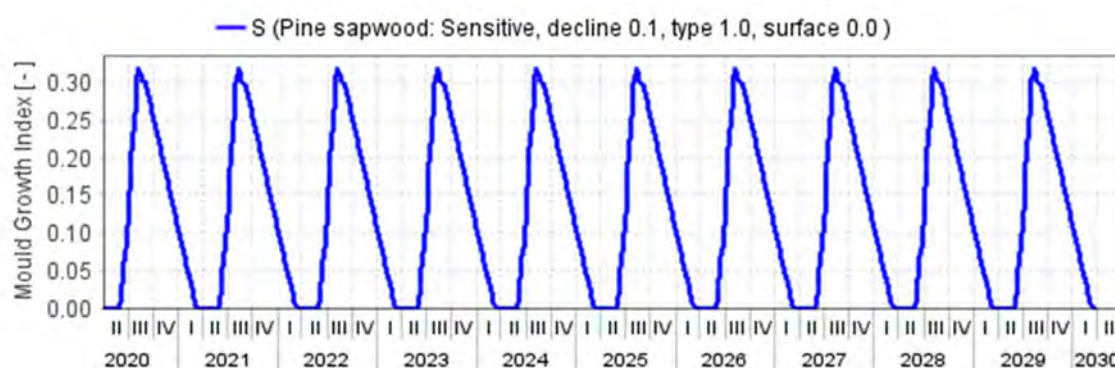


Figure 46: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

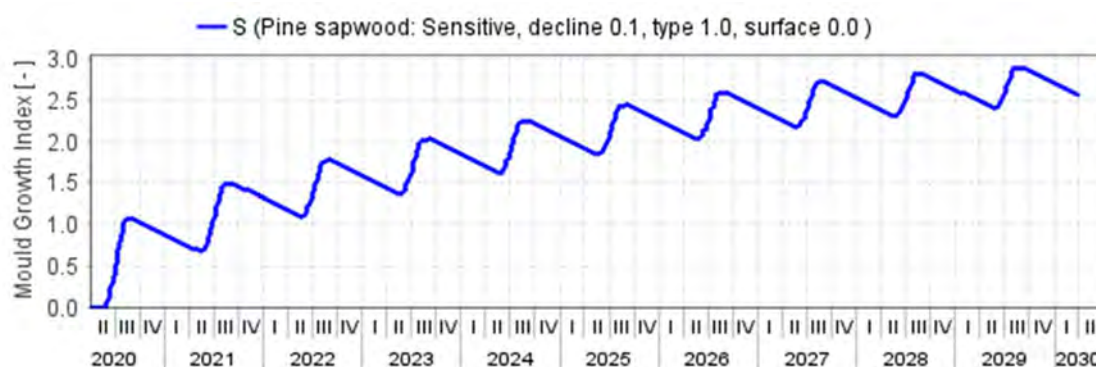


Figure 47: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

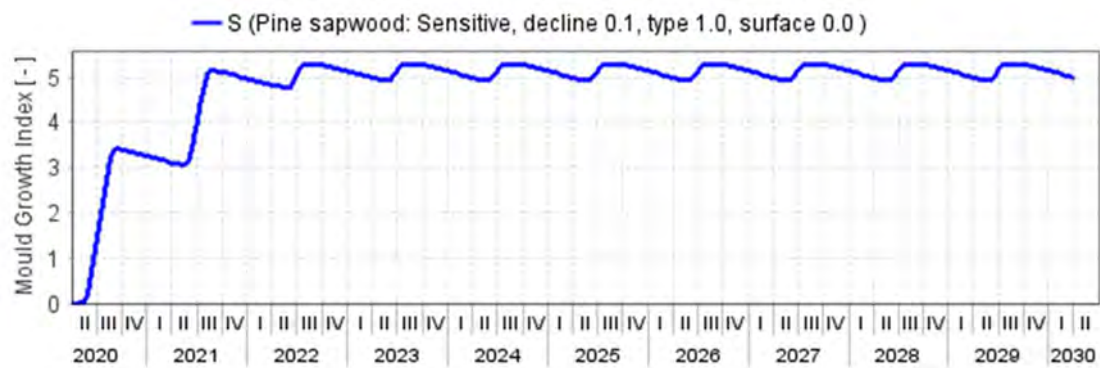


Figure 48: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

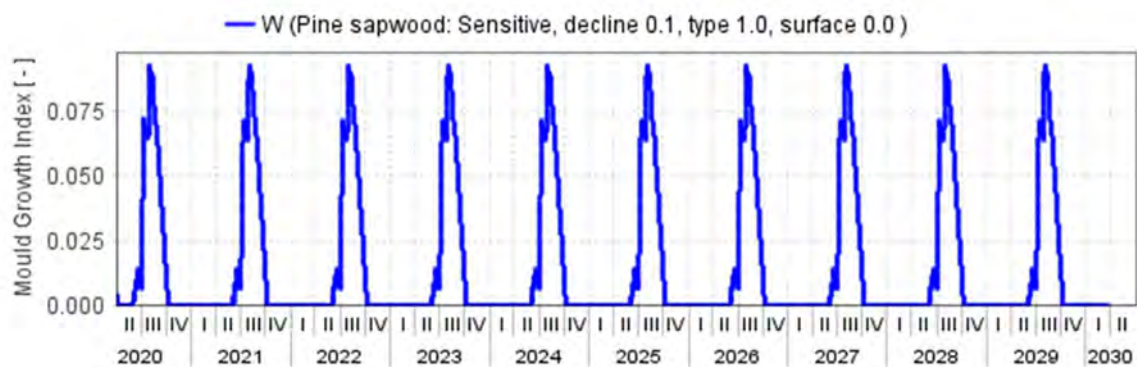


Figure 49: NatHERS CZ 27 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

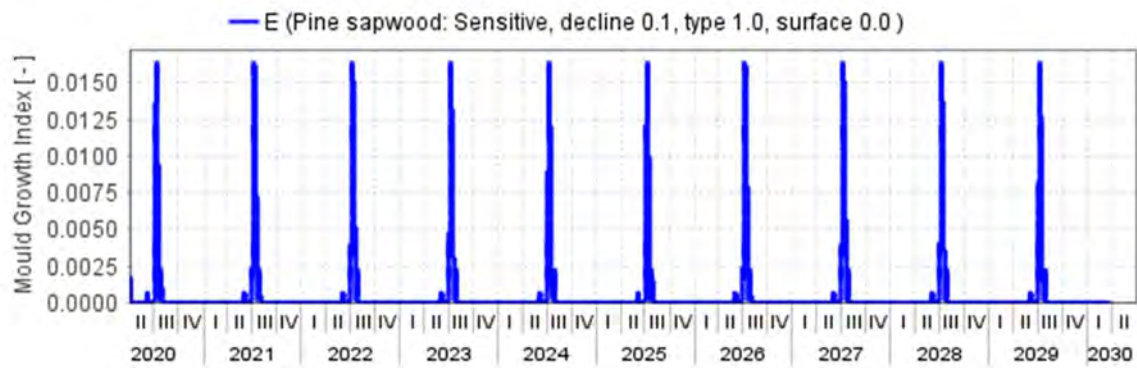


Figure 50: NatHERS CZ 27 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 10. Climate zone 61 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

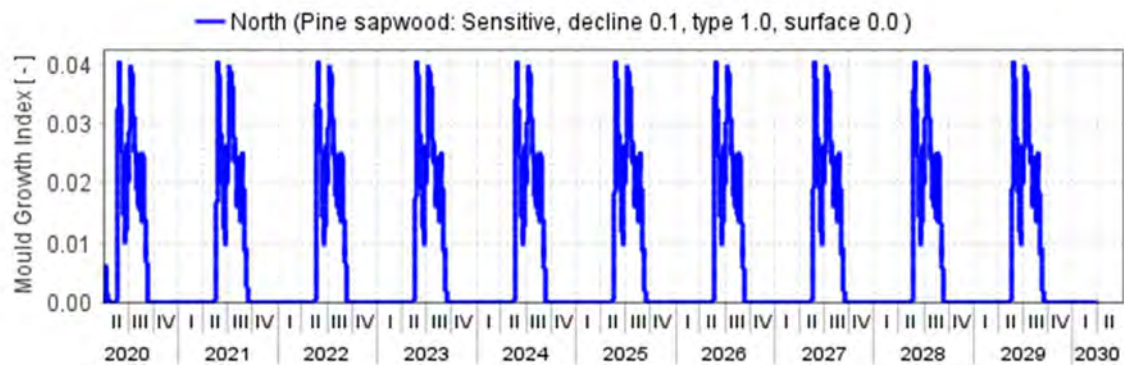


Figure 51: NatHERS CZ 61 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.



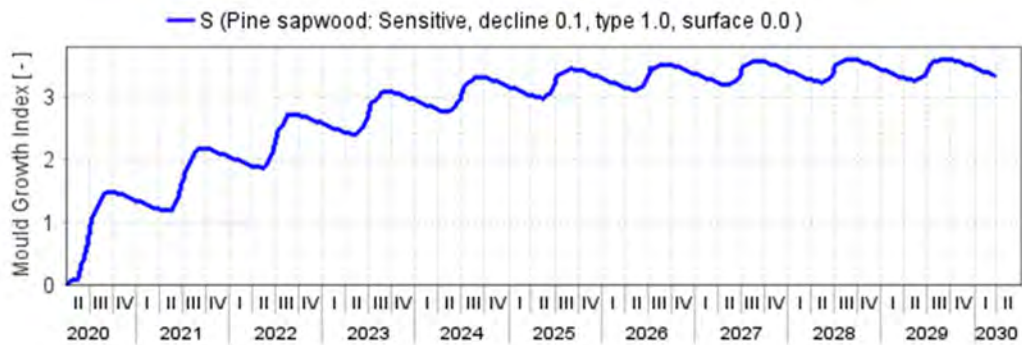


Figure 52: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

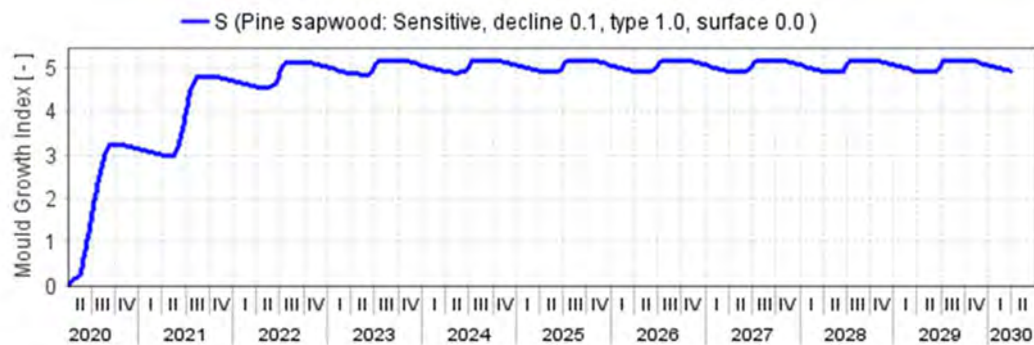


Figure 53: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

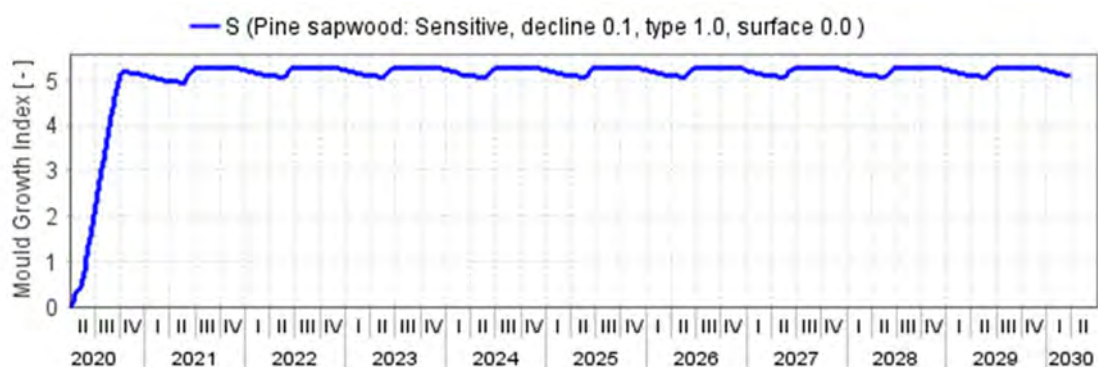


Figure 54: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame



## Western orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

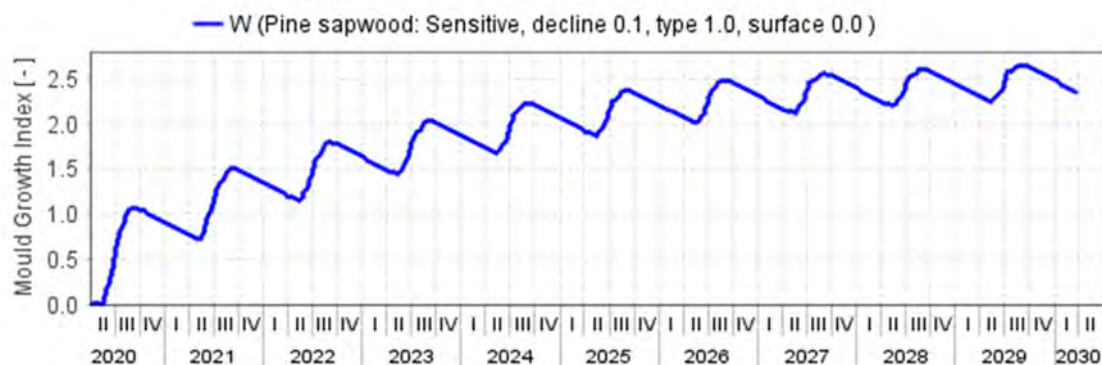


Figure 55: NatHERS CZ 61 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

## Eastern orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fourth year. This wall type requires further investigation.

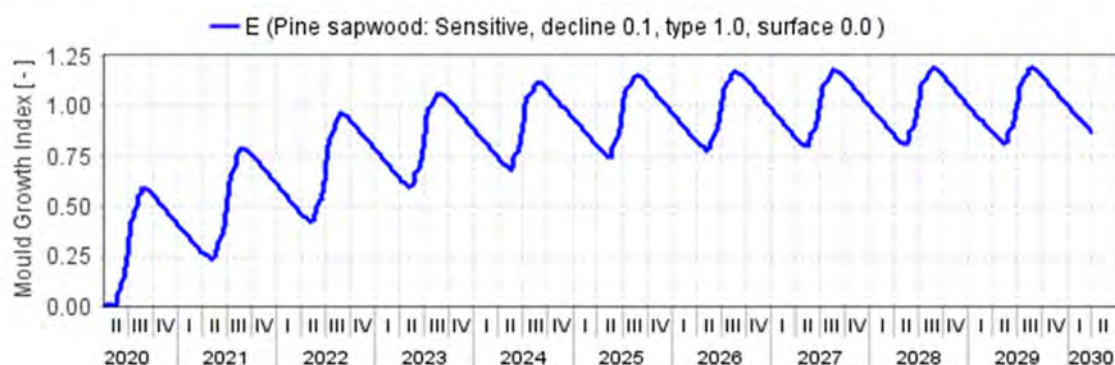


Figure 56: NatHERS CZ 61 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 11. Climate zone 66 - NCC CZ4

### Northern orientation ACR 10

#### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the sixth year. This wall type requires further investigation.

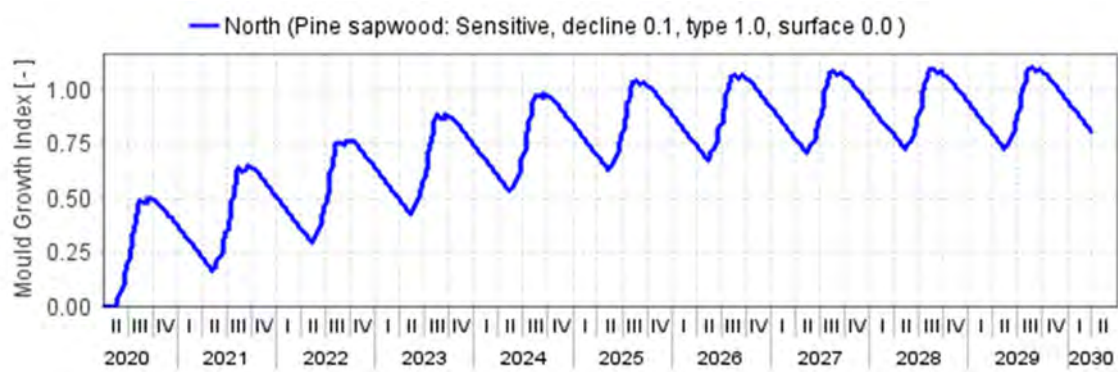


Figure 57: NatHERS CZ 66 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

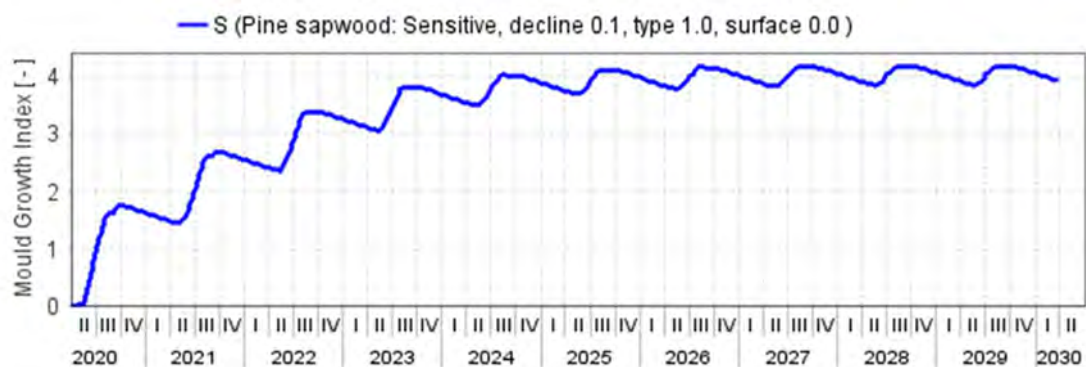


Figure 58: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

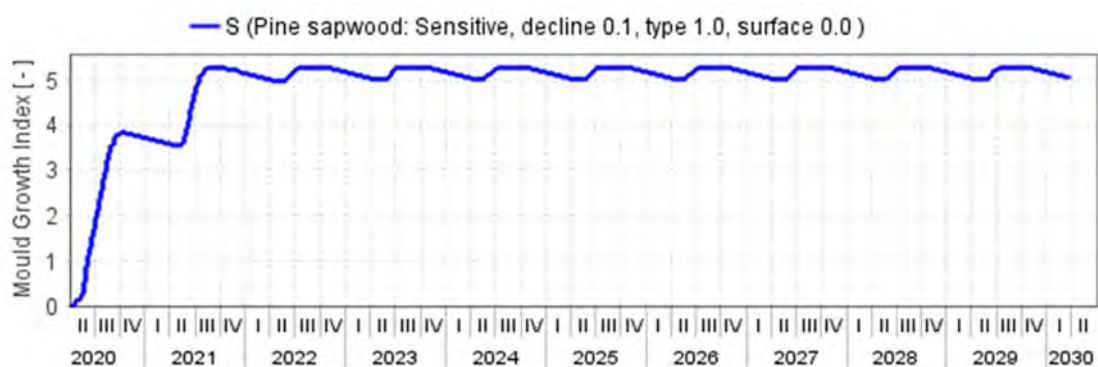


Figure 59: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

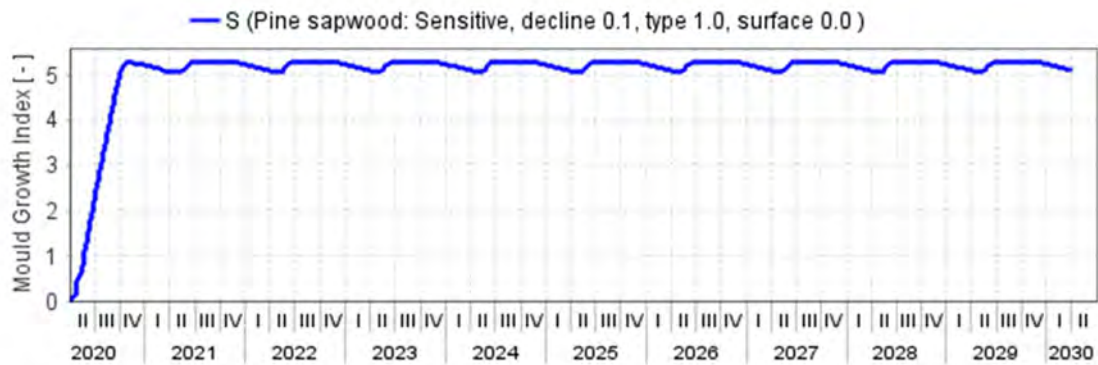


Figure 60: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the sixth year.

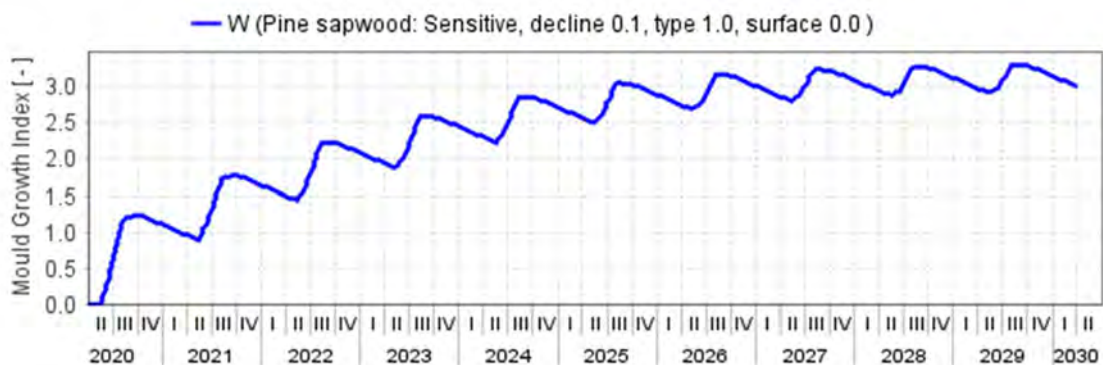


Figure 61: NatHERS CZ 66 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

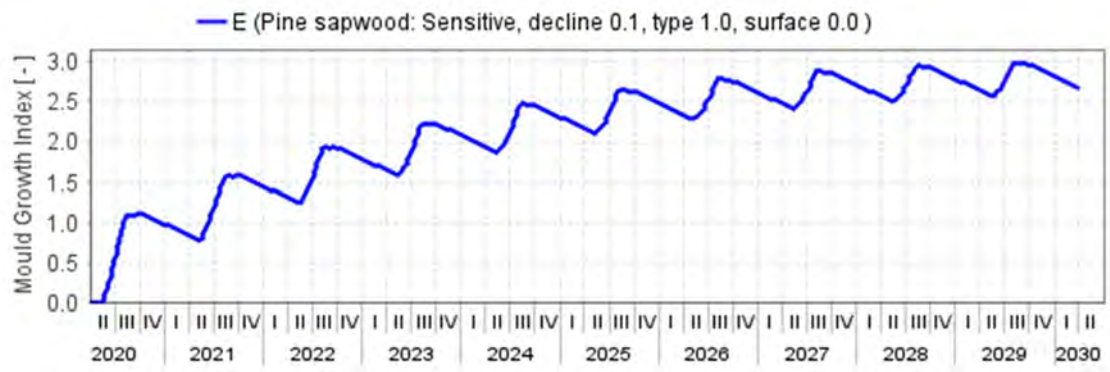


Figure 62: NatHERS CZ 66 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

# Moisture accumulation and mould growth for 7 Star housing Research Report 2

## Appendix 5: Hygrothermal simulation results – Concrete block internally insulated (Wall 4) Rev02 (12/09/2022)



## 1. Climate zone 21 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

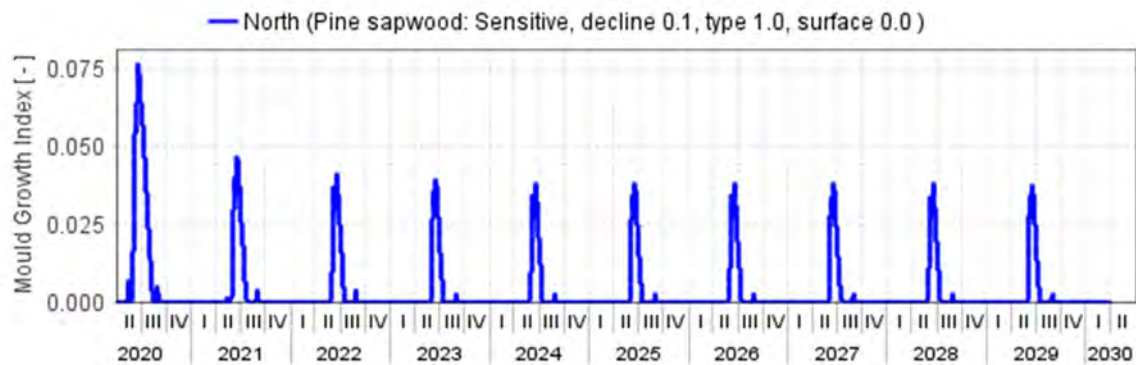


Figure 1: NatHERS CZ 21 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fourth year. This wall type requires further investigation.

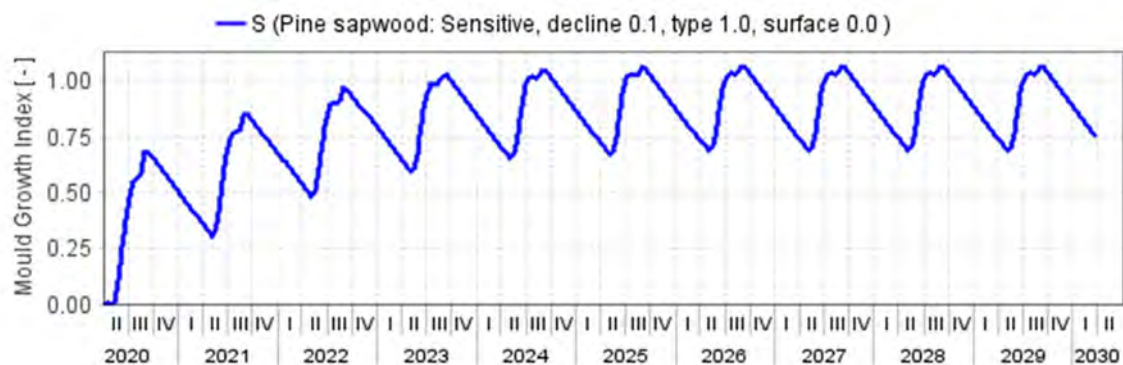


Figure 2: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

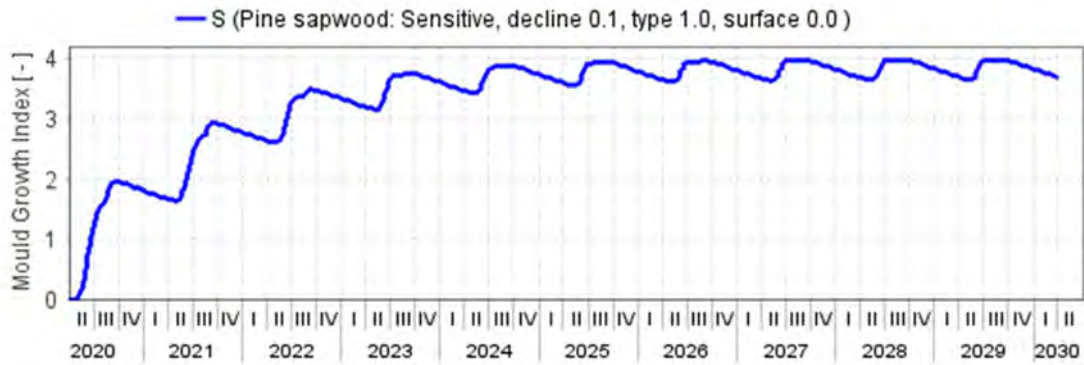


Figure 3: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

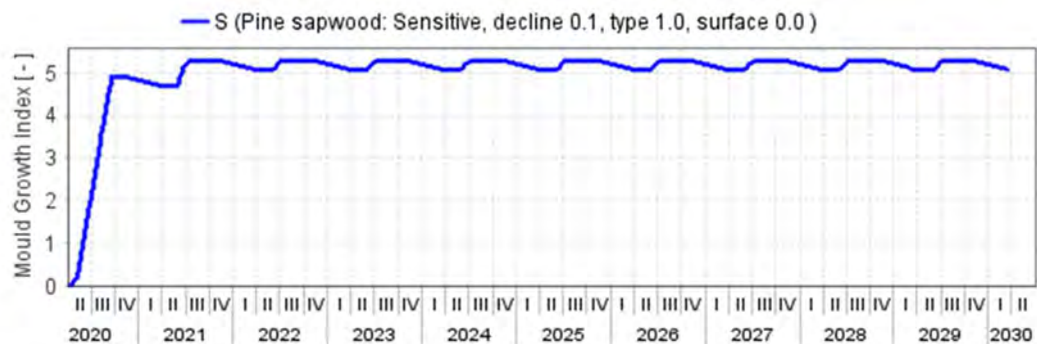


Figure 4: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

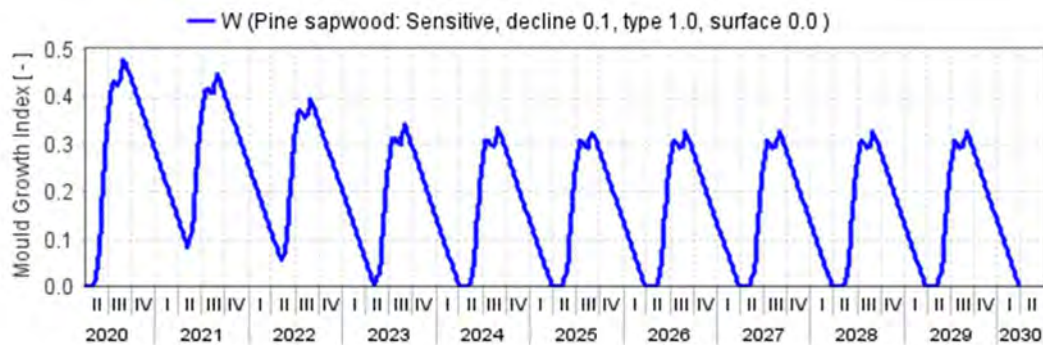


Figure 5: NatHERS CZ 21 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

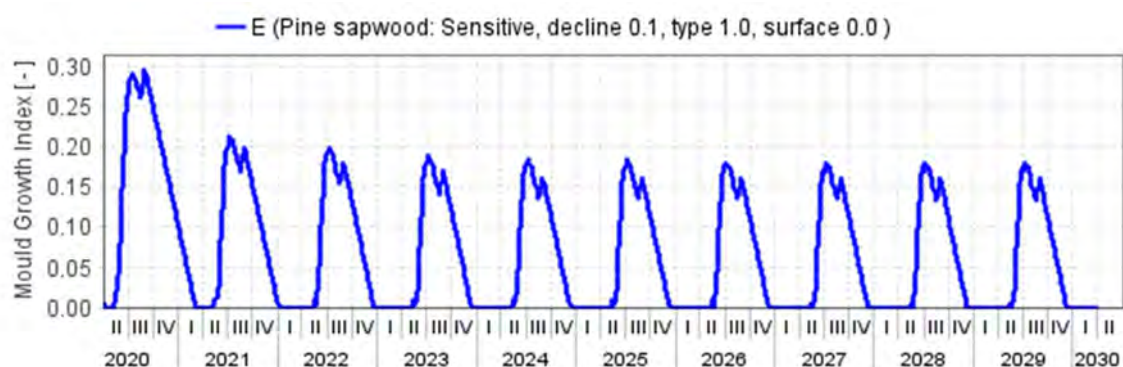


Figure 6: NatHERS CZ 21 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 2. Climate zone 22 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

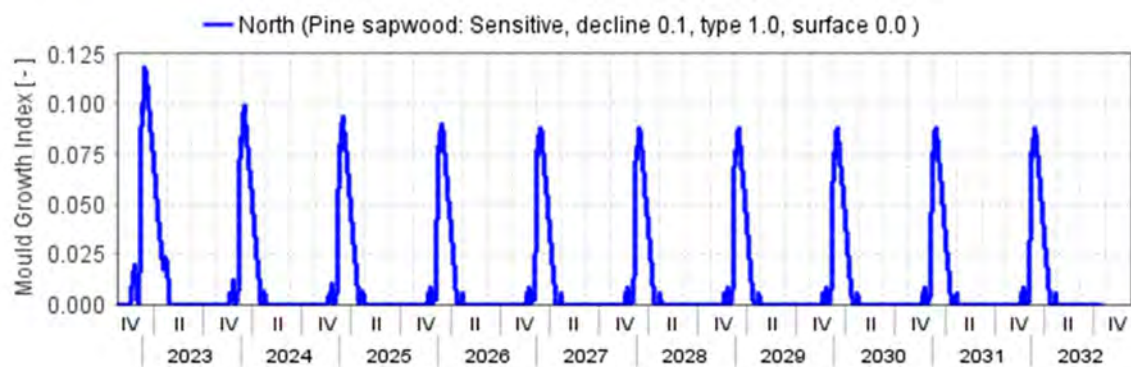


Figure 7: NatHERS CZ 22 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

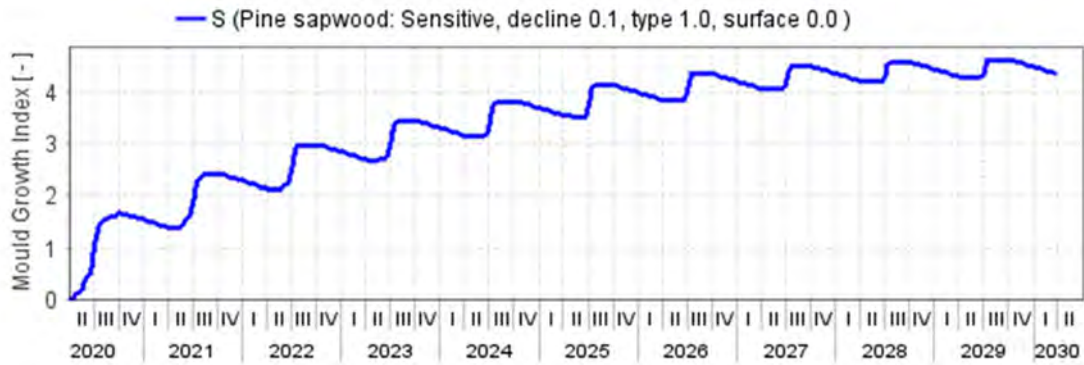


Figure 8: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

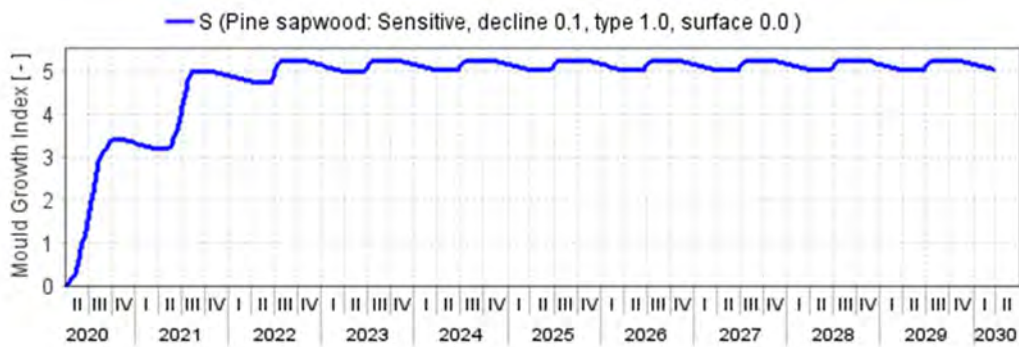


Figure 9: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

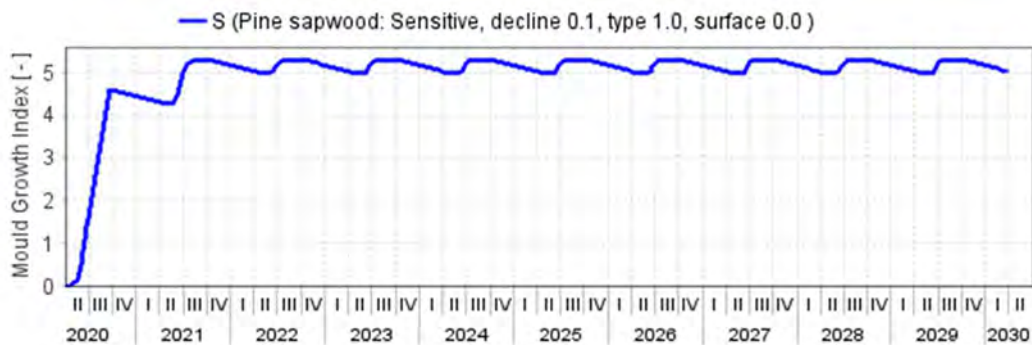


Figure 10: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

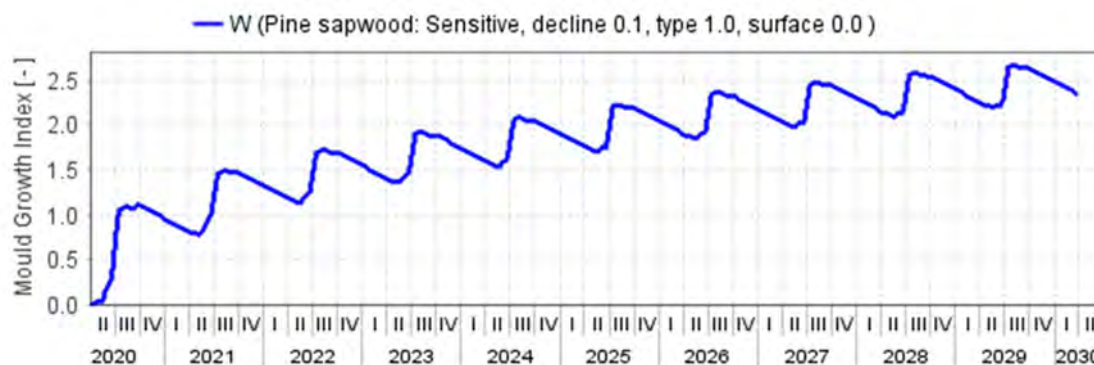


Figure 11: NatHERS CZ 22 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the third year. This wall type requires further investigation.

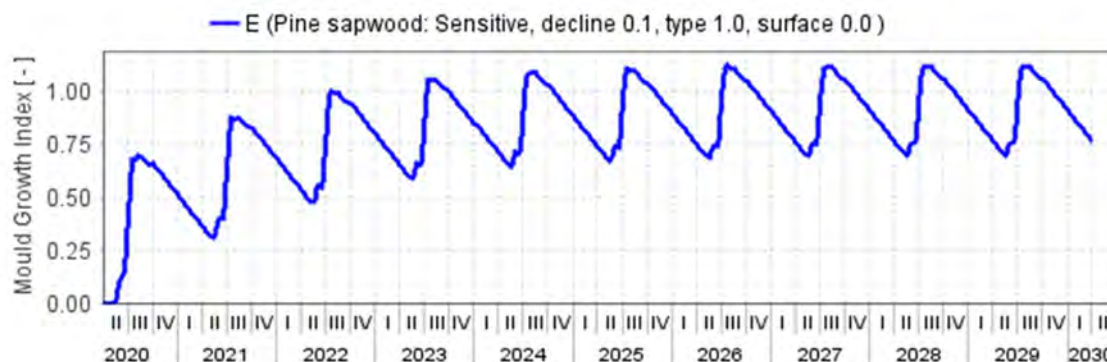


Figure 12: NatHERS CZ 22 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

### 3. Climate zone 27 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil



#### Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the third year. This wall type requires further investigation.

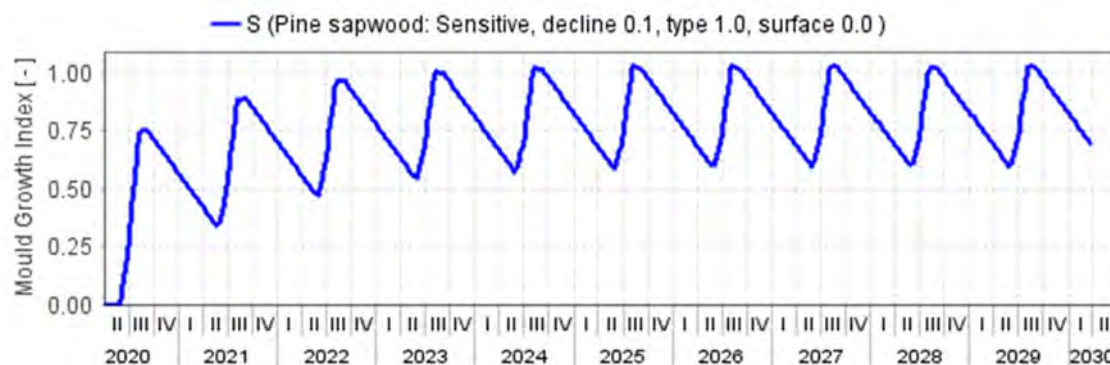


Figure 13: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

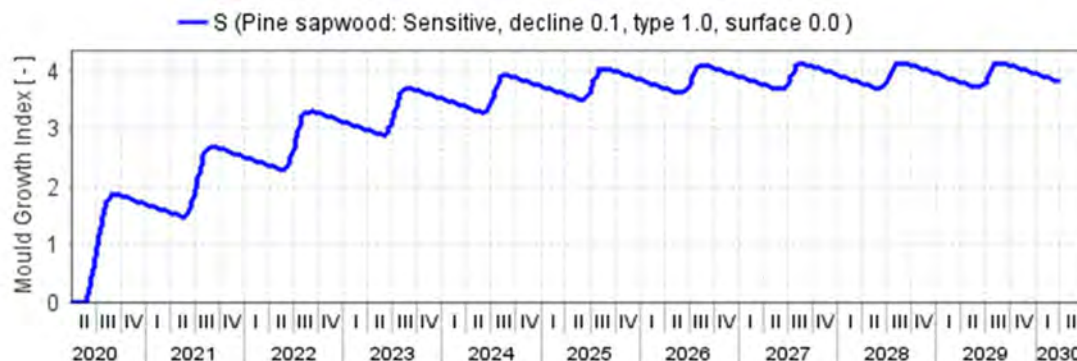


Figure 14: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

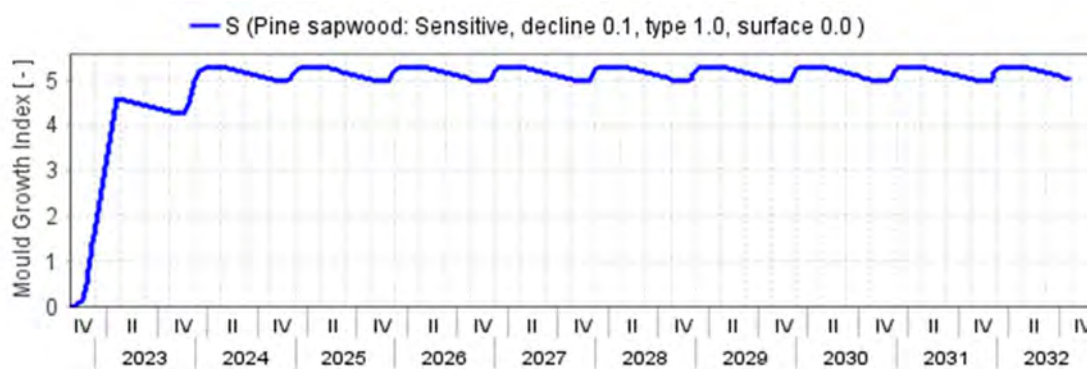


Figure 15: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

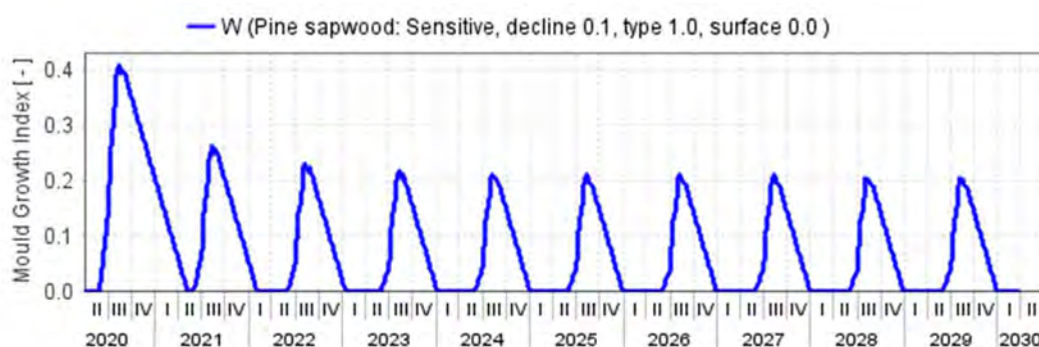


Figure 16: NatHERS CZ 27 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

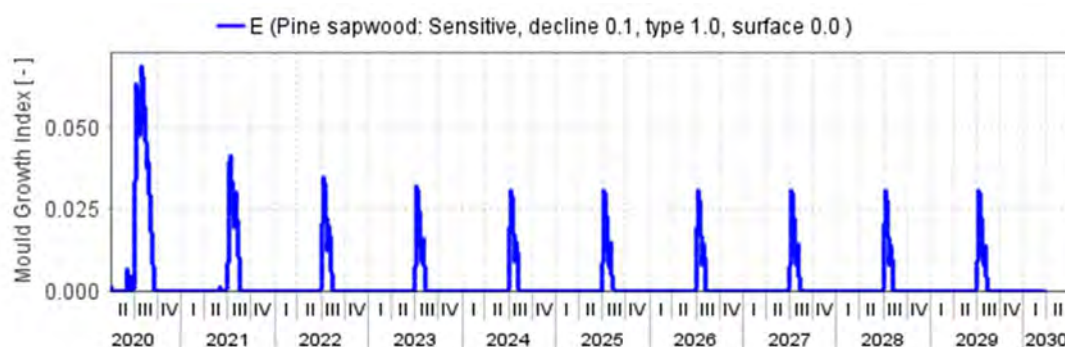


Figure 17: NatHERS CZ 27 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

#### 4. Climate zone 60 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

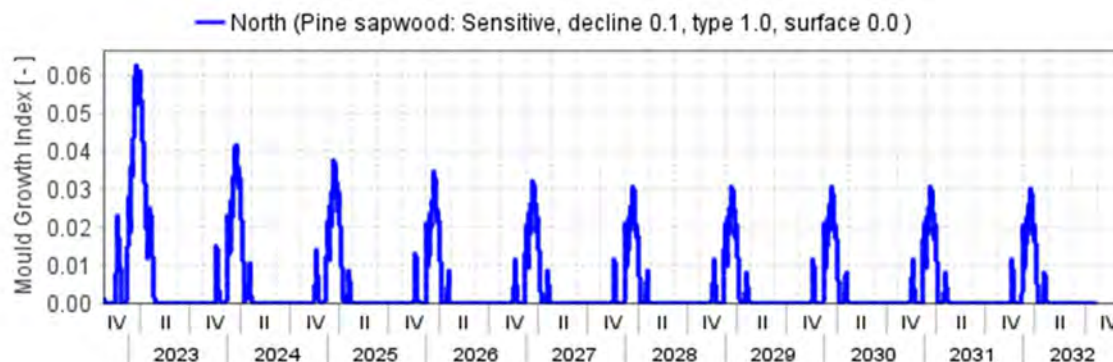


Figure 18: NatHERS CZ 60 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the ninth year.

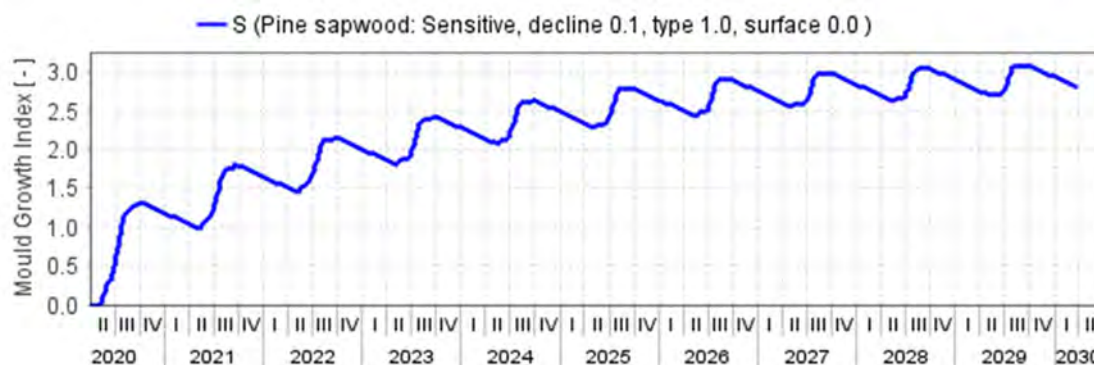


Figure 19: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

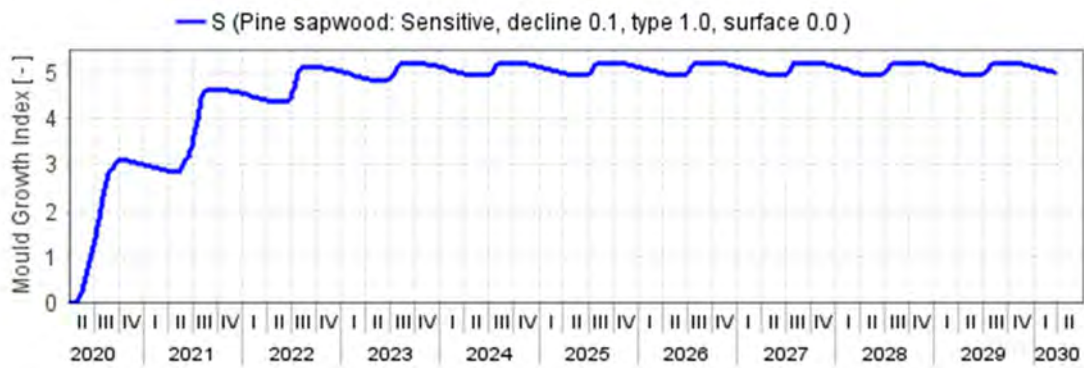


Figure 20: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

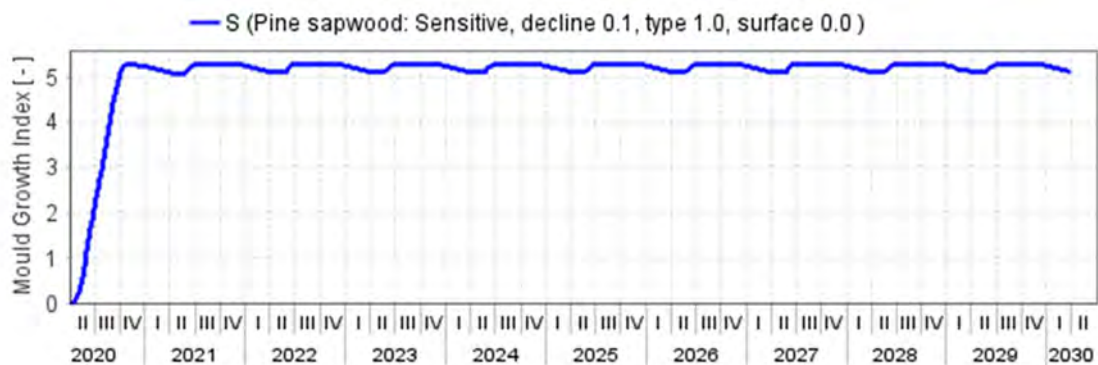


Figure 21: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.



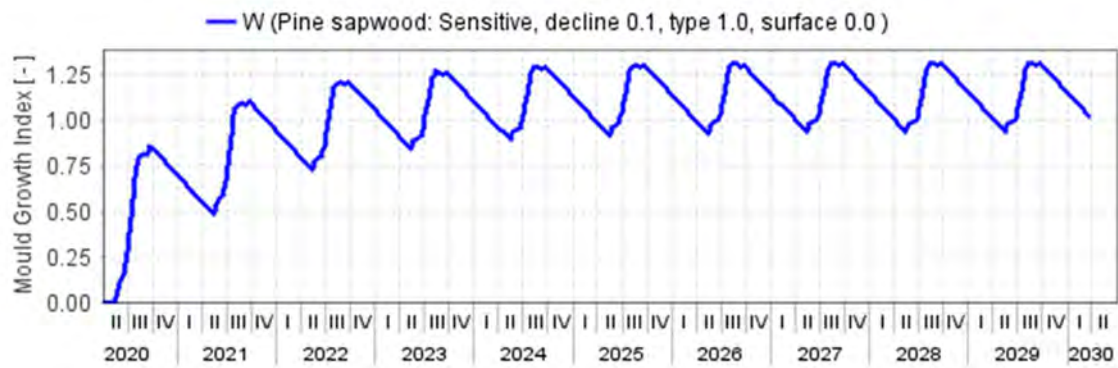


Figure 22: NatHERS CZ 60 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

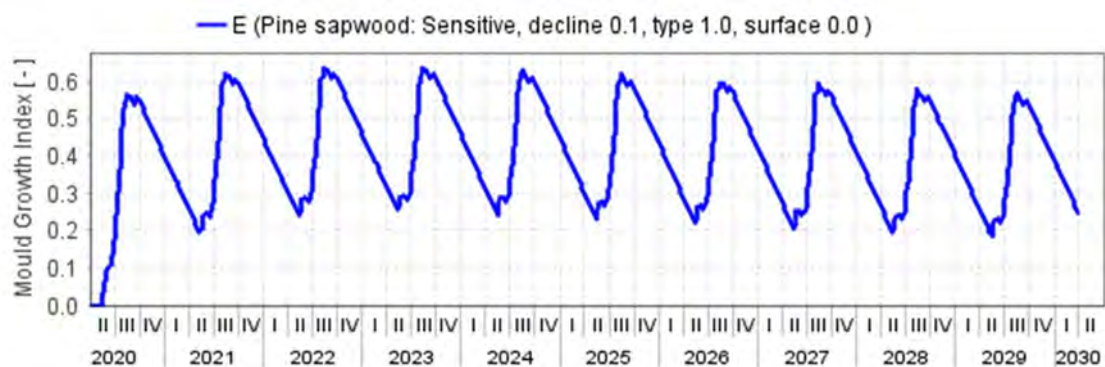


Figure 23: NatHERS CZ 60 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 5. Climate zone 61 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



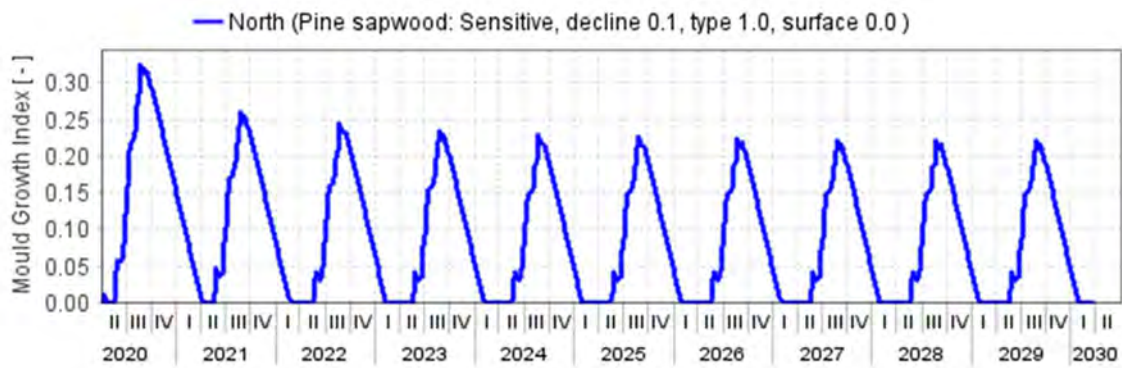


Figure 24: NatHERS CZ 61 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

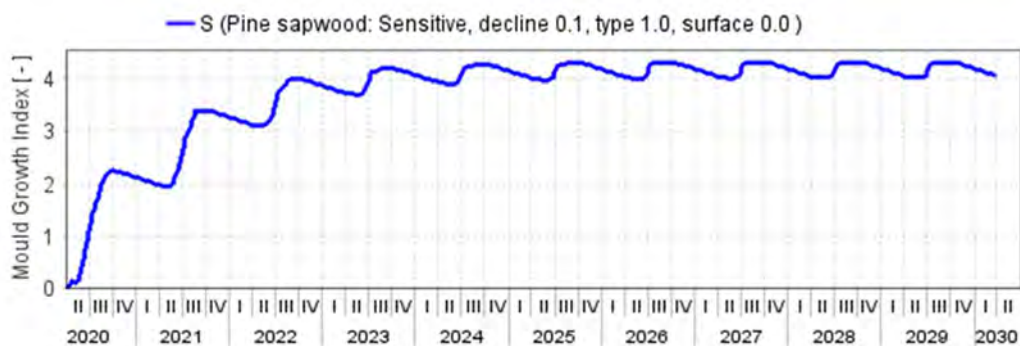


Figure 25: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

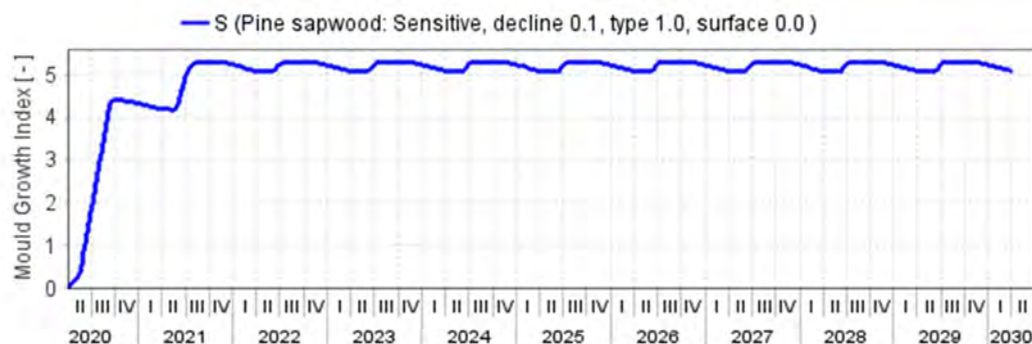


Figure 26: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

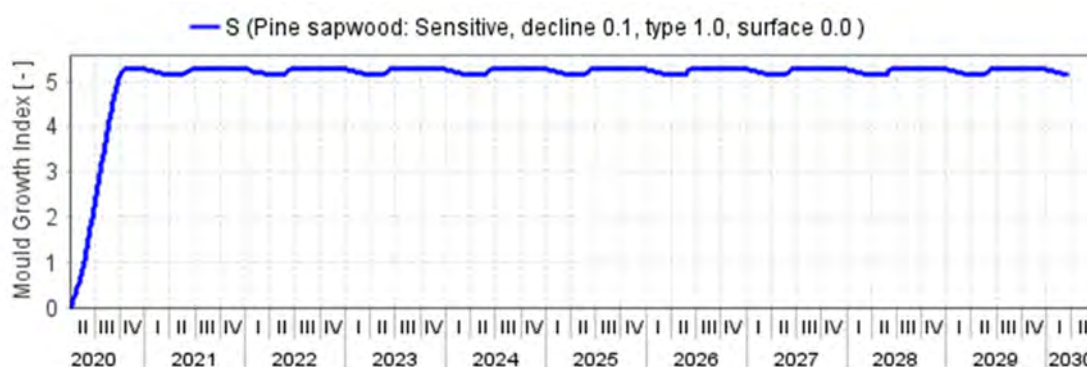


Figure 27: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

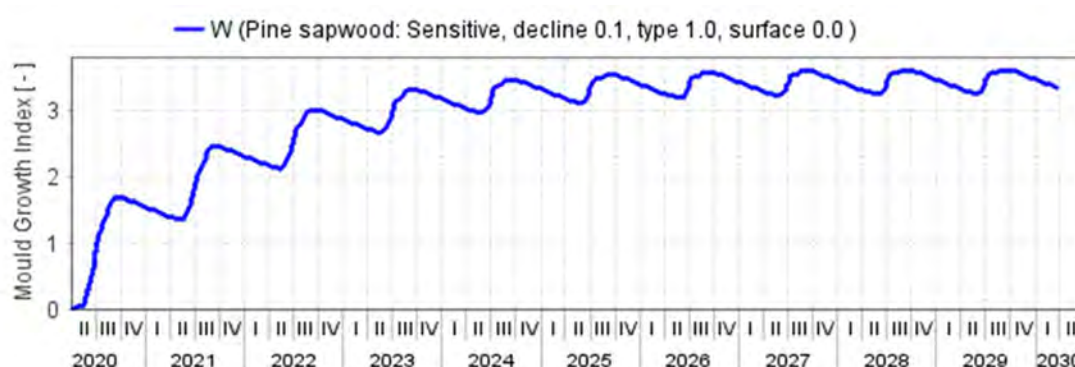


Figure 28: NatHERS CZ 61 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

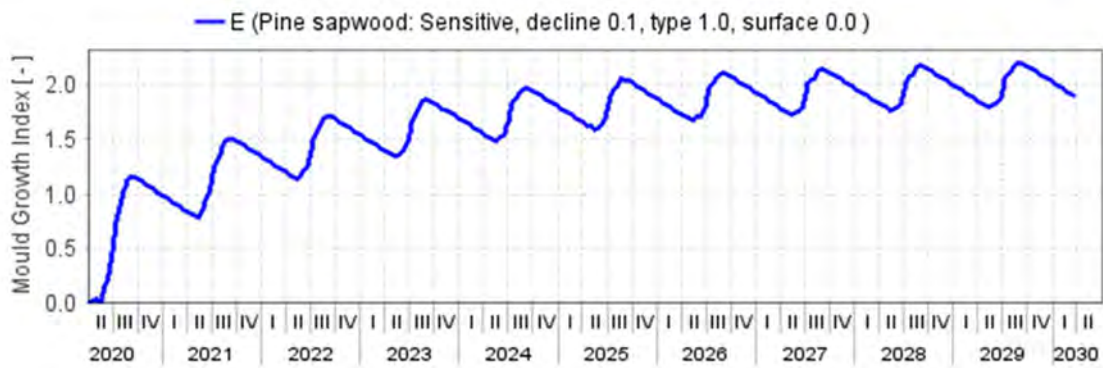


Figure 29: NatHERS CZ 61 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 6. Climate zone 63 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

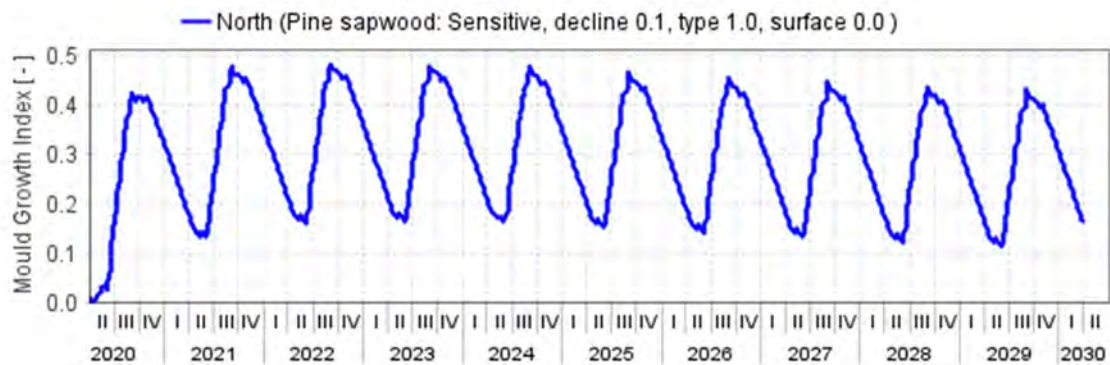


Figure 30: NatHERS CZ 63 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

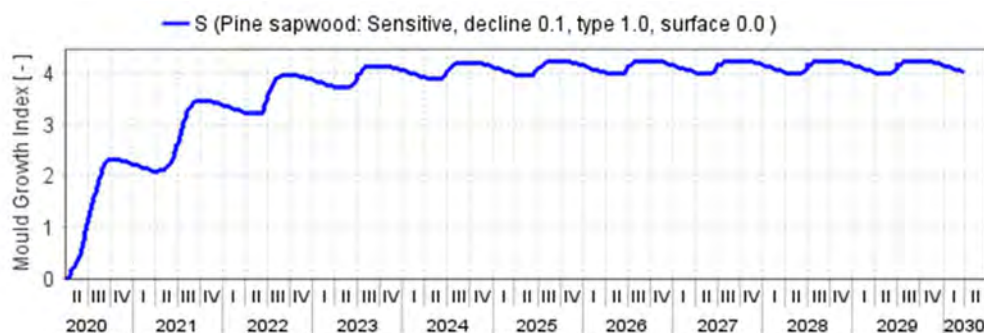


Figure 31: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

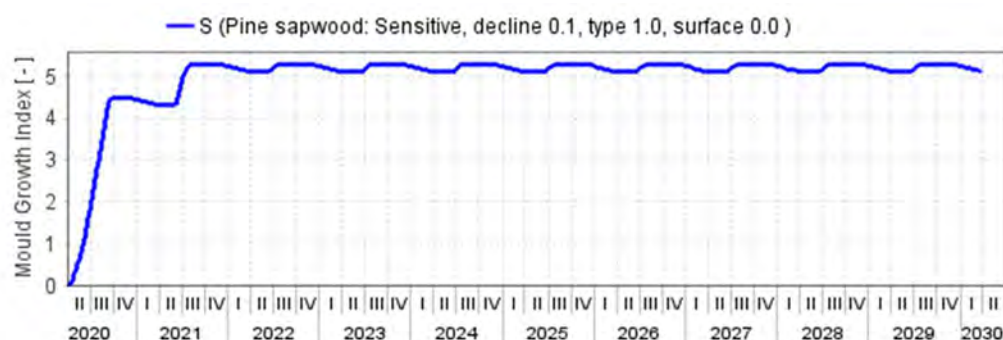


Figure 32: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

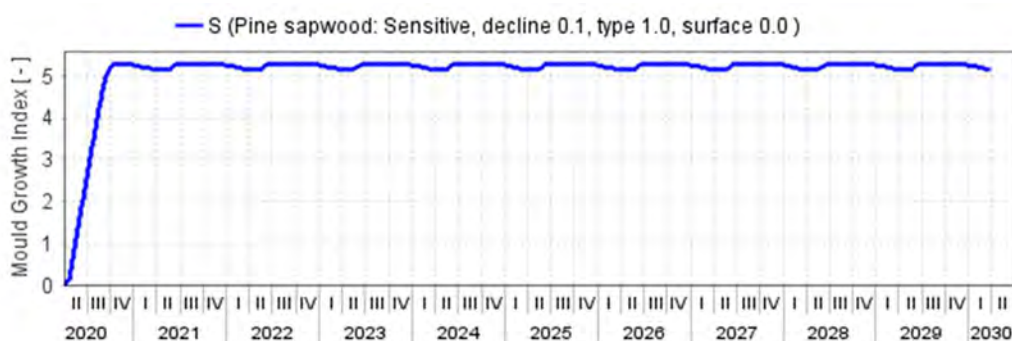


Figure 33: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



## Western orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

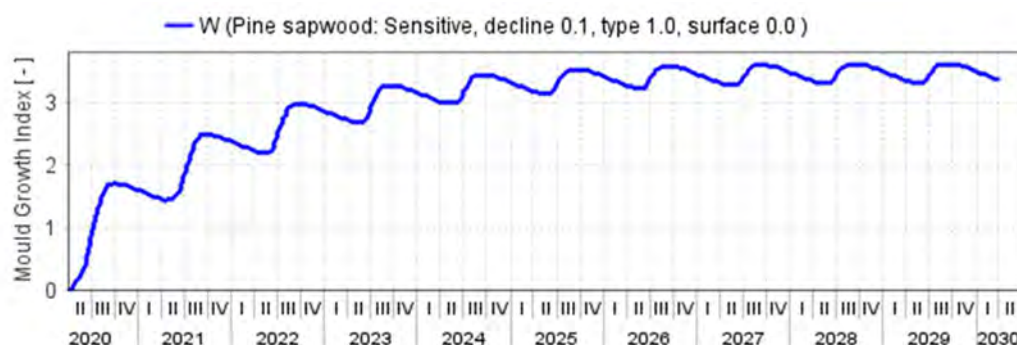


Figure 34: NatHERS CZ 63 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

## Eastern orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

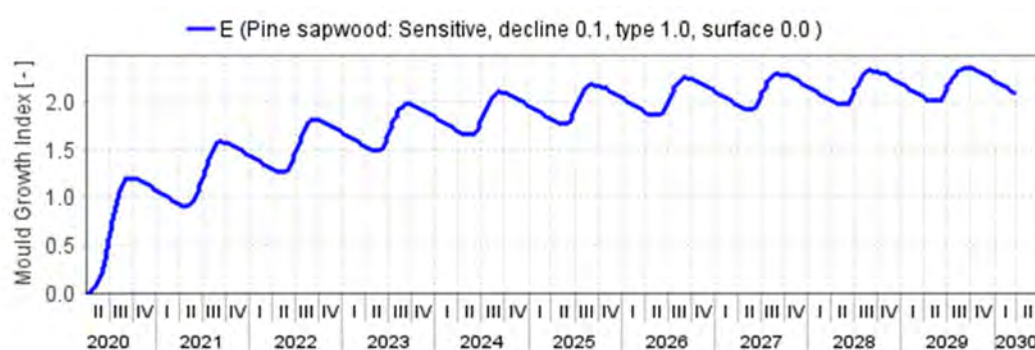


Figure 35: NatHERS CZ 63 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 7. Climate zone 64 – NCC CZ 6-8

### Northern orientation ACR 10

#### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



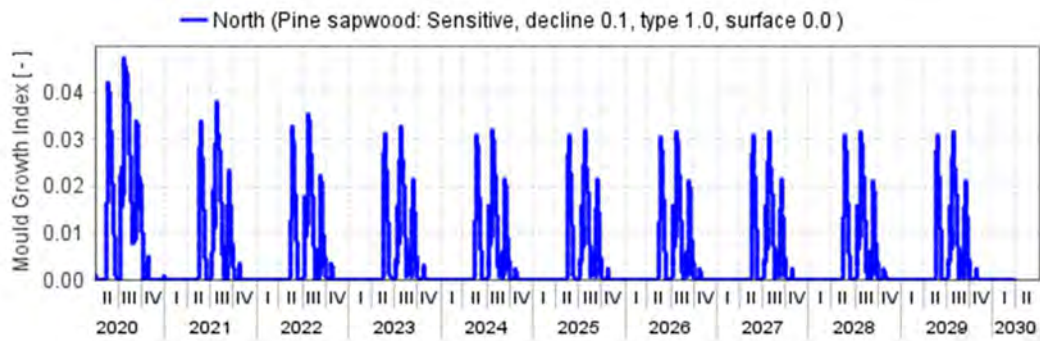


Figure 36: NatHERS CZ 64 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

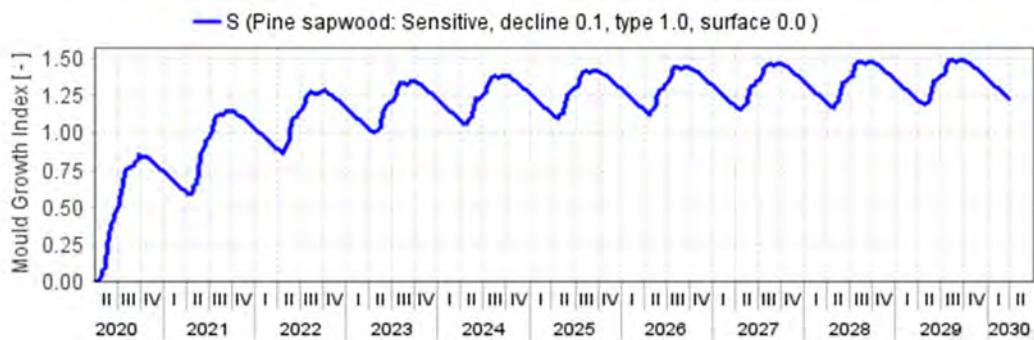


Figure 37: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

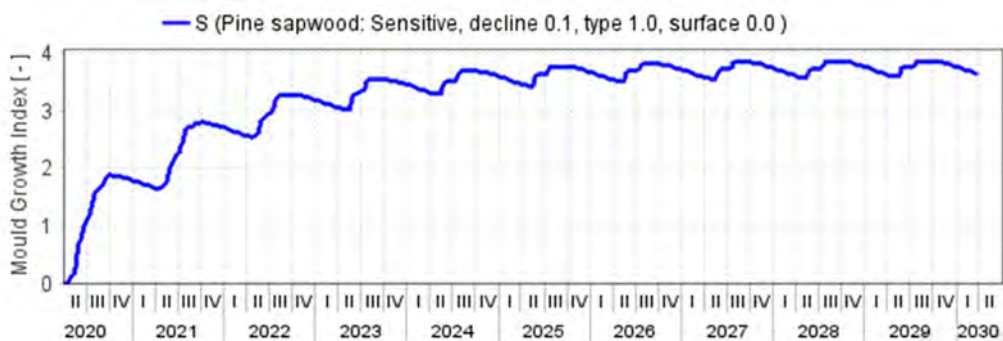


Figure 38: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

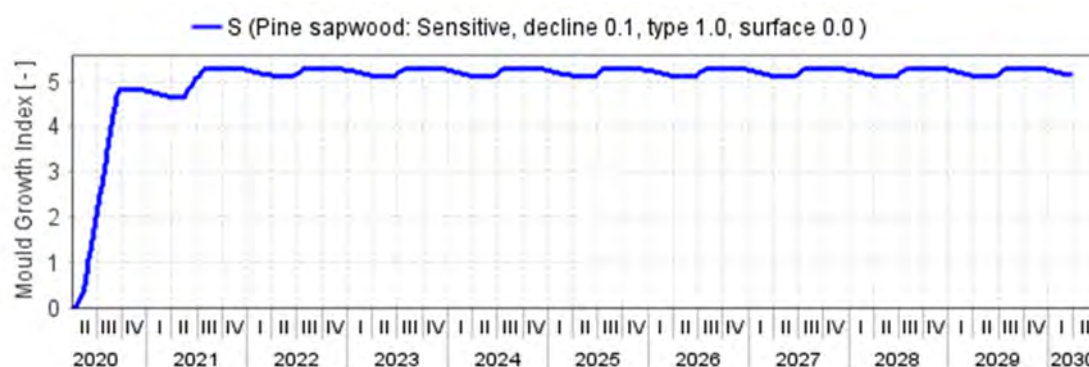


Figure 39: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

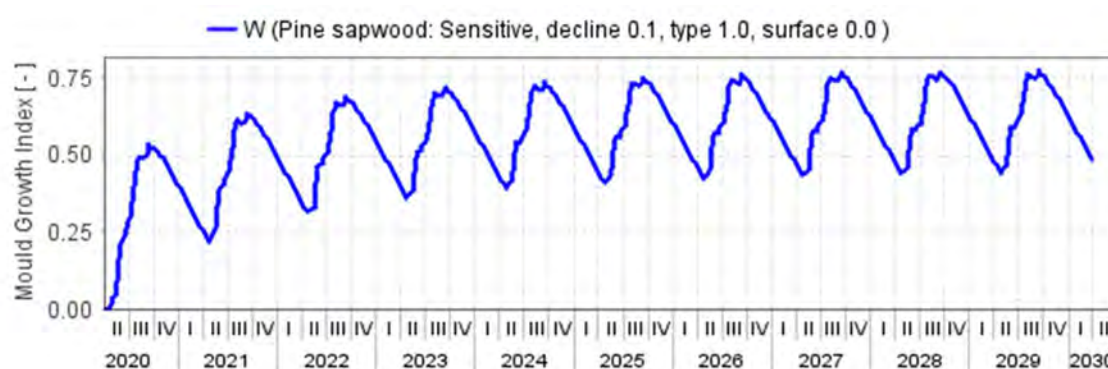


Figure 40: NatHERS CZ 64 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

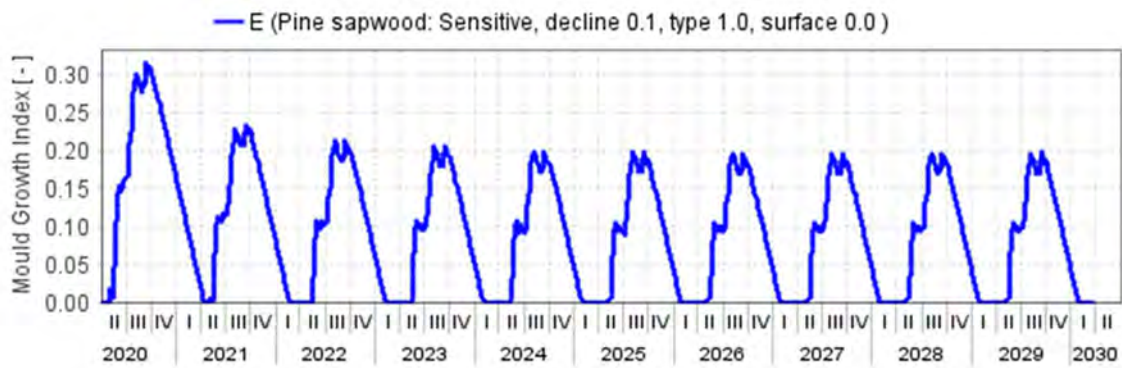


Figure 41: NatHERS CZ 64 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 8. Climate zone 66 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

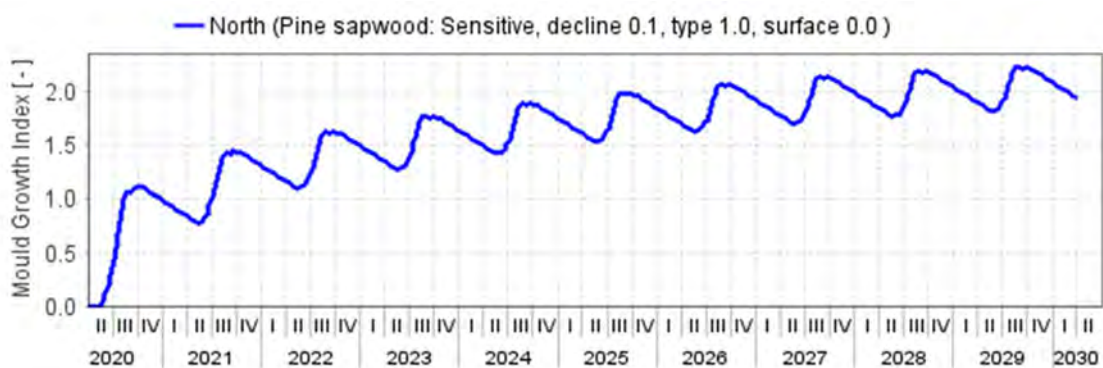


Figure 42: NatHERS CZ 66 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

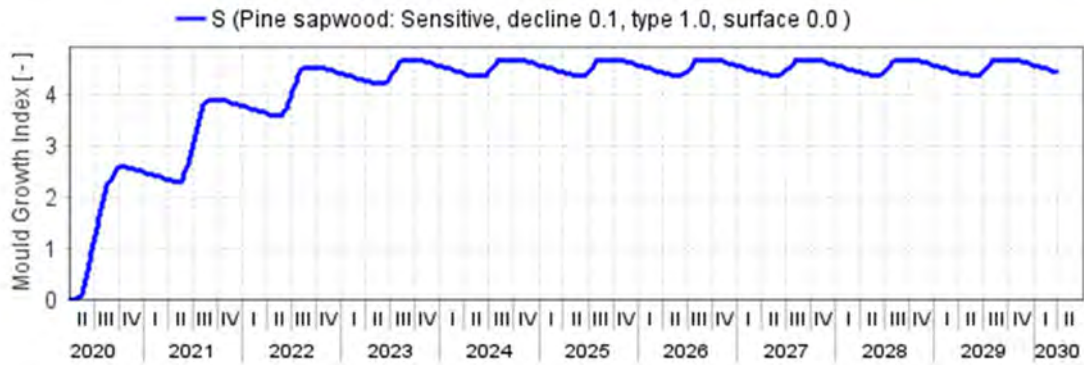


Figure 43: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

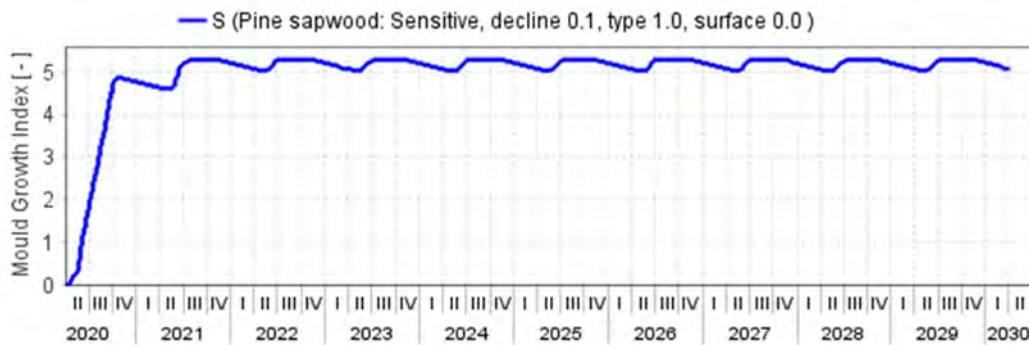


Figure 44: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

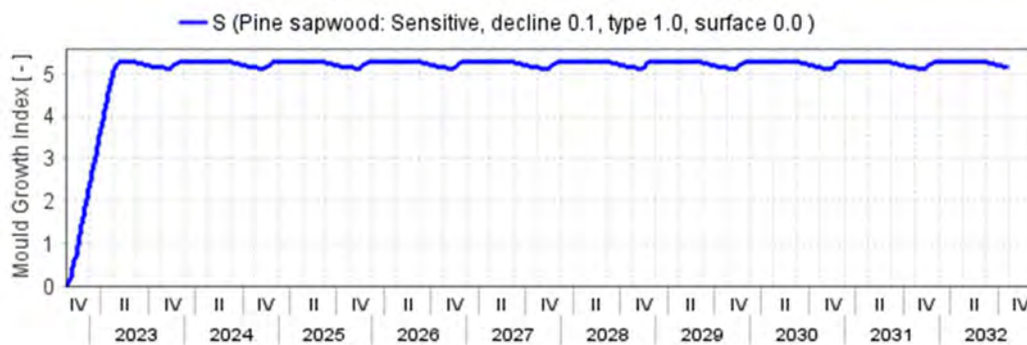


Figure 45: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



# Western orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

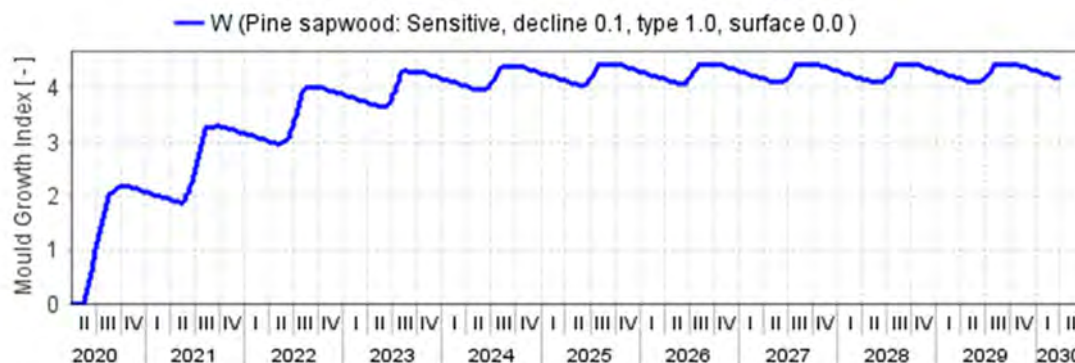


Figure 46: NatHERS CZ 66 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

# Eastern orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

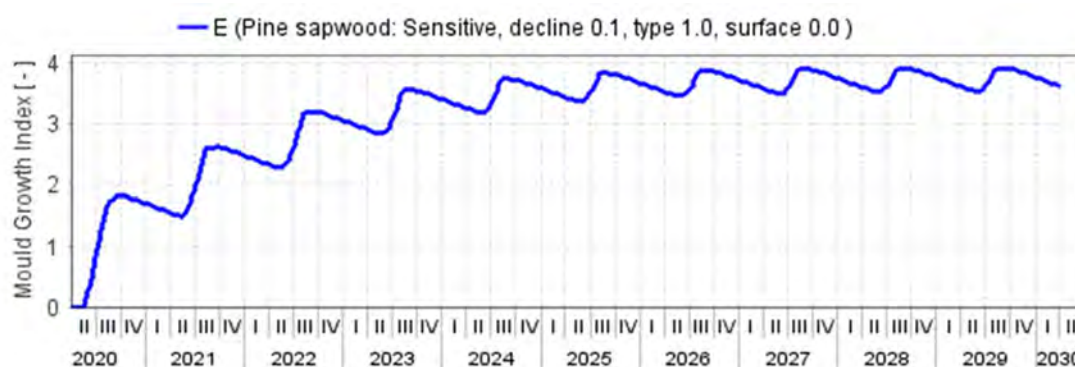


Figure 47: NatHERS CZ 66 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame



## 9. Climate zone 27 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

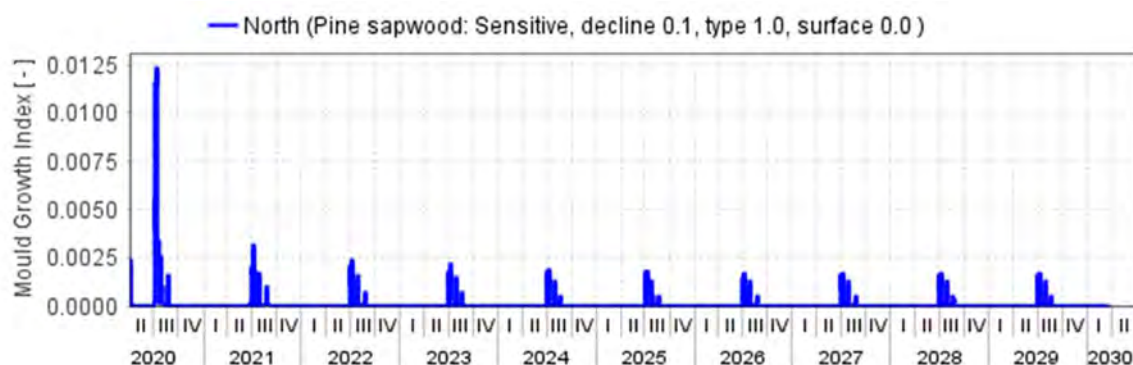


Figure 48: NatHERS CZ 27 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

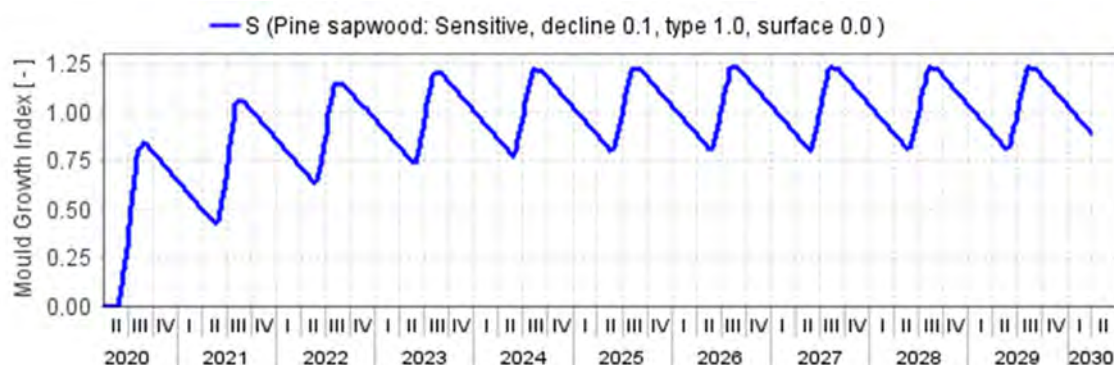


Figure 49: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

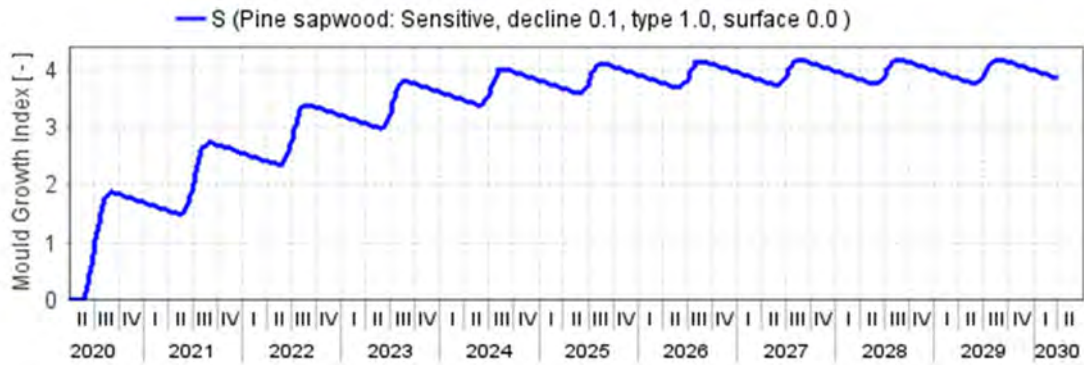


Figure 50: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

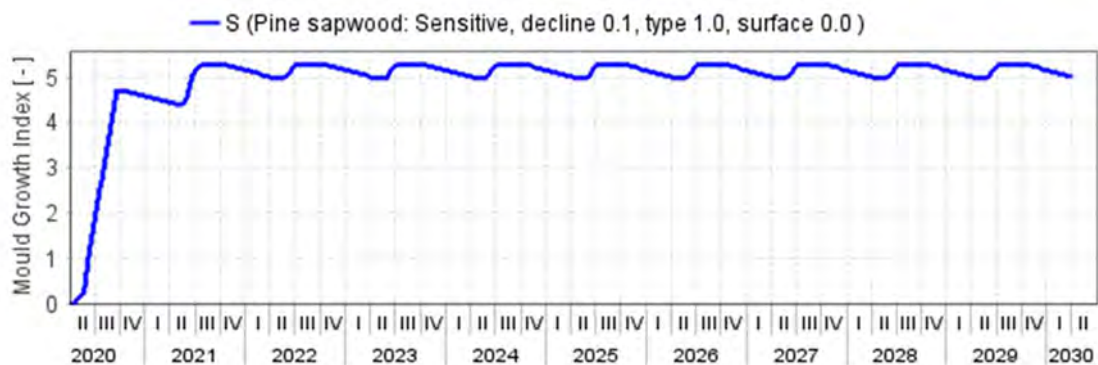


Figure 51: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

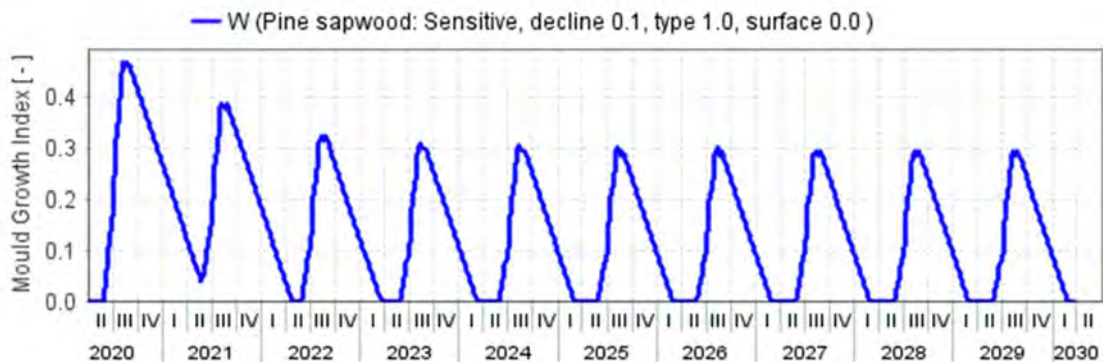


Figure 52: NatHERS CZ 27 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

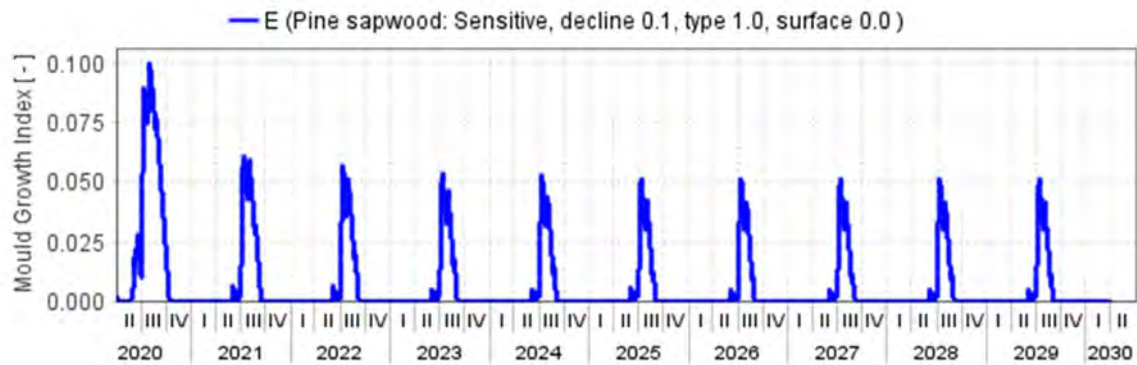


Figure 53: NatHERS CZ 27 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 10. Climate zone 61 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

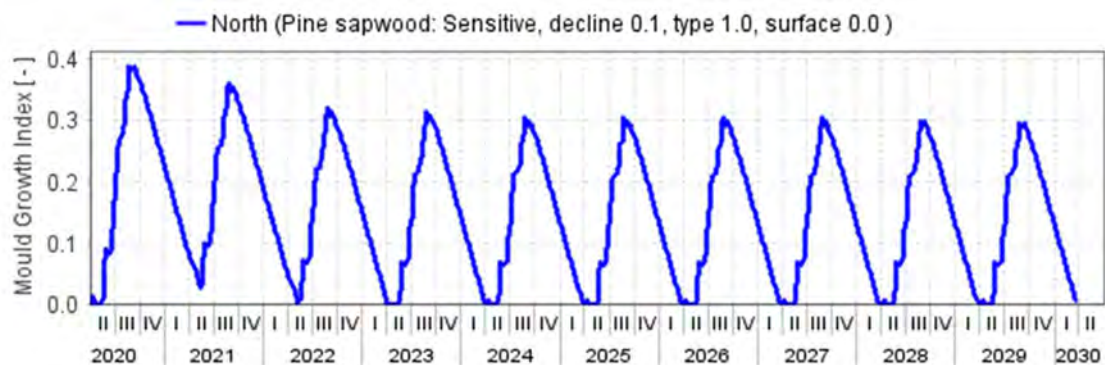


Figure 54: NatHERS CZ 61 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

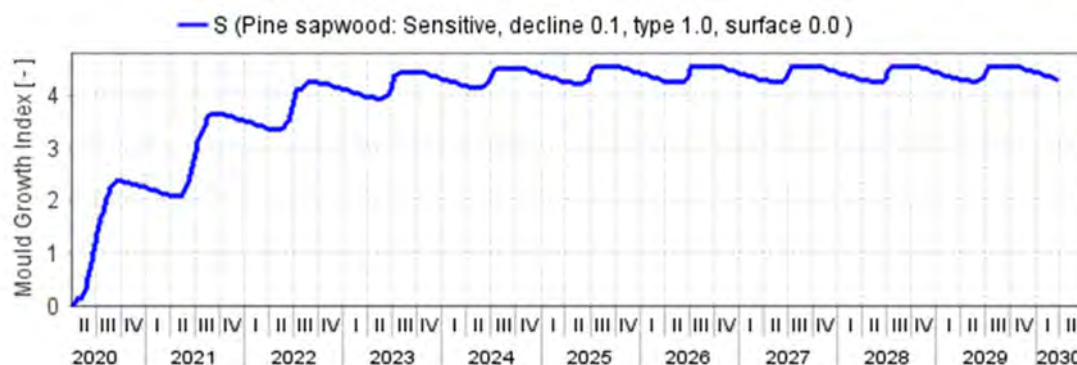


Figure 55: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

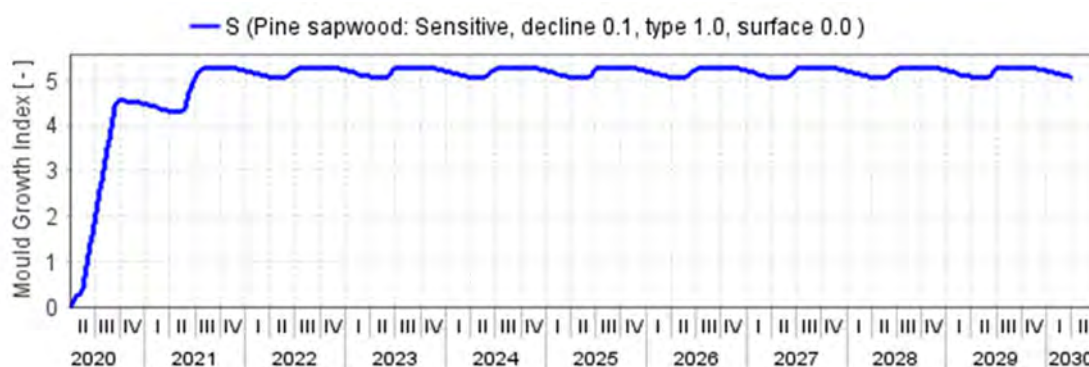


Figure 56: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.



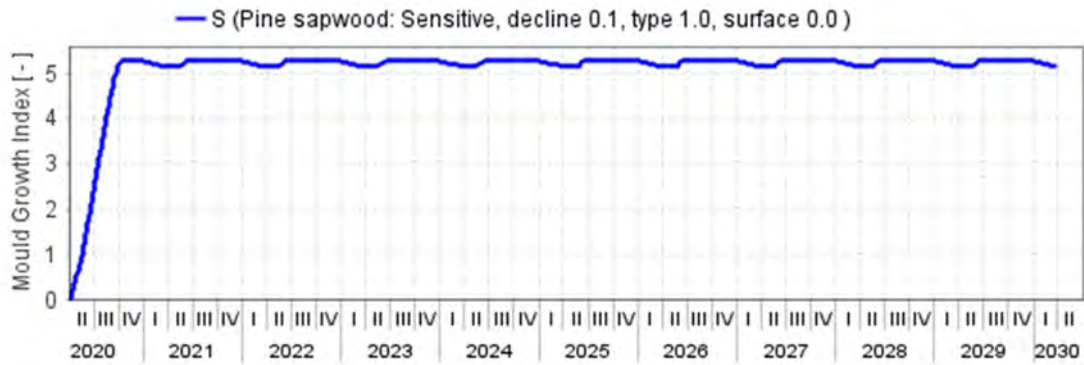


Figure 57: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

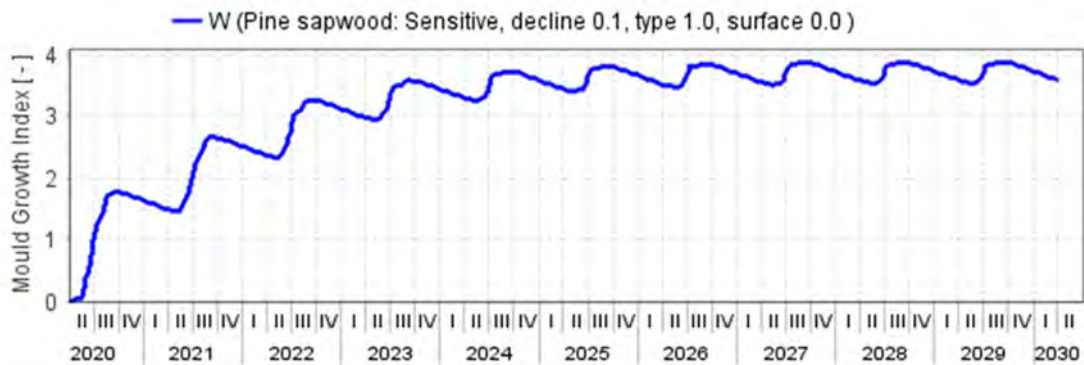


Figure 58: NatHERS CZ 61 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the third year. This wall type requires further investigation.

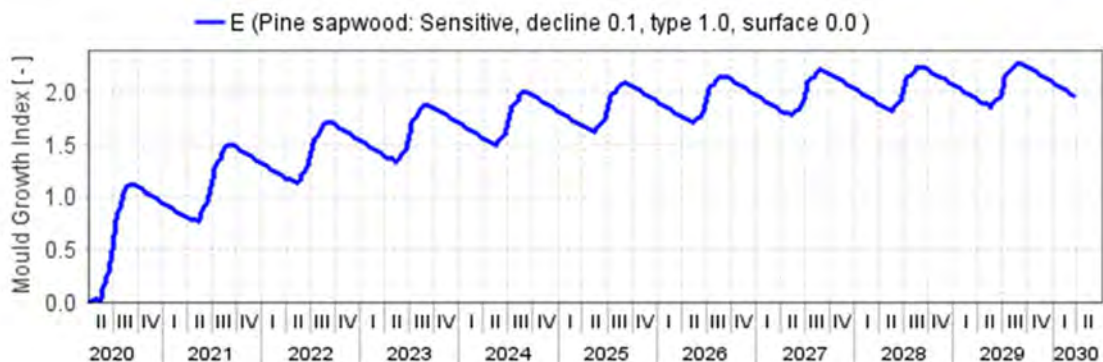




Figure 59: NatHERS CZ 61 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 11. Climate zone 66 - NCC CZ4

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

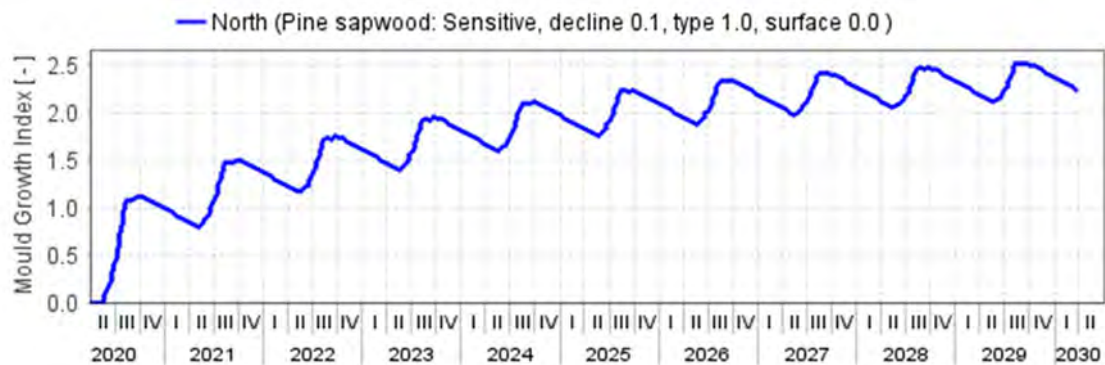


Figure 60: NatHERS CZ 66 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

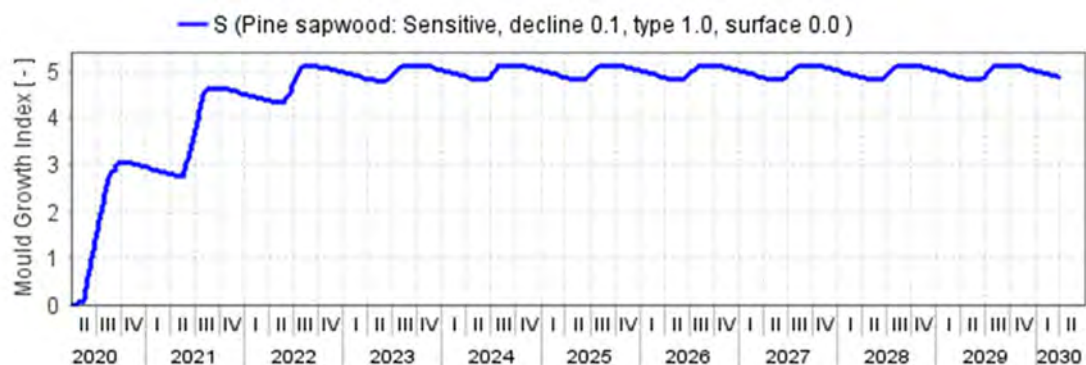


Figure 61: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

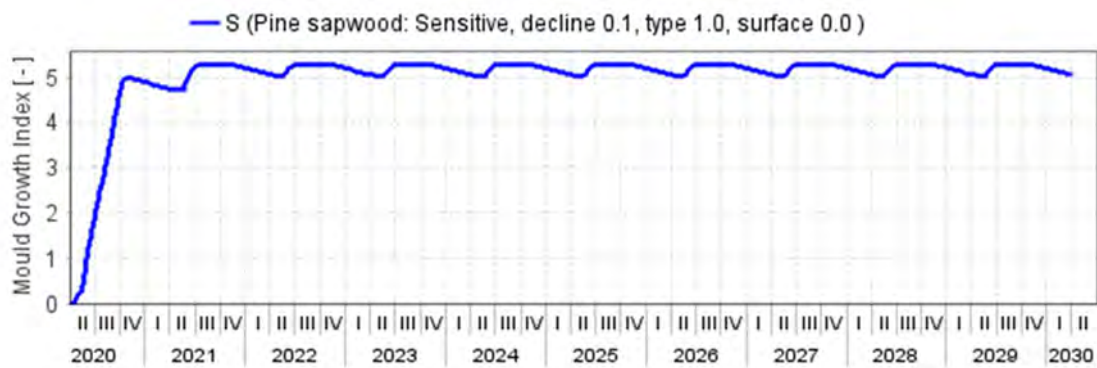


Figure 62: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

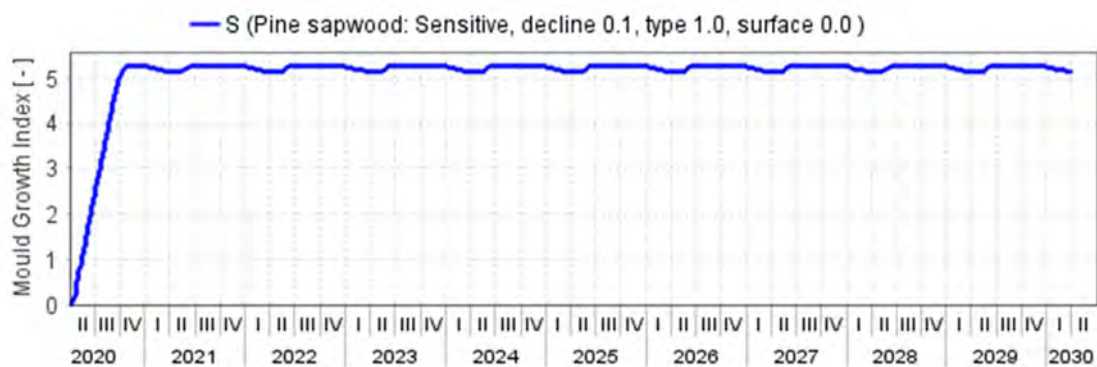


Figure 63: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

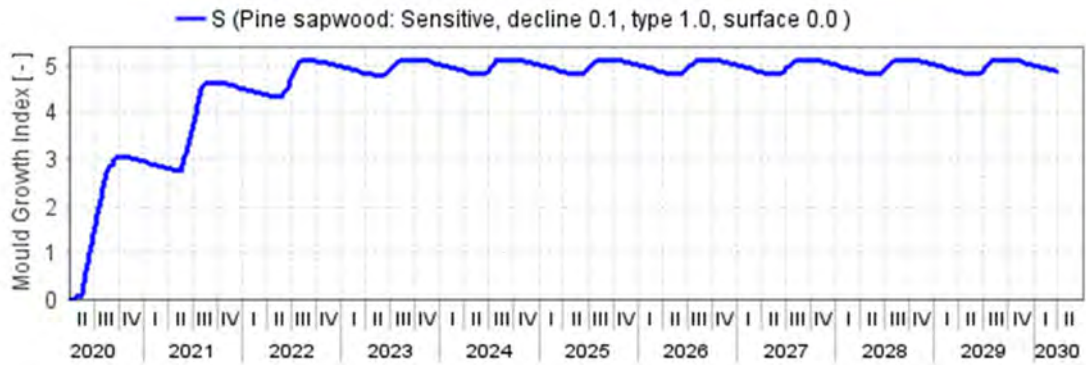


Figure 64: NatHERS CZ 66 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

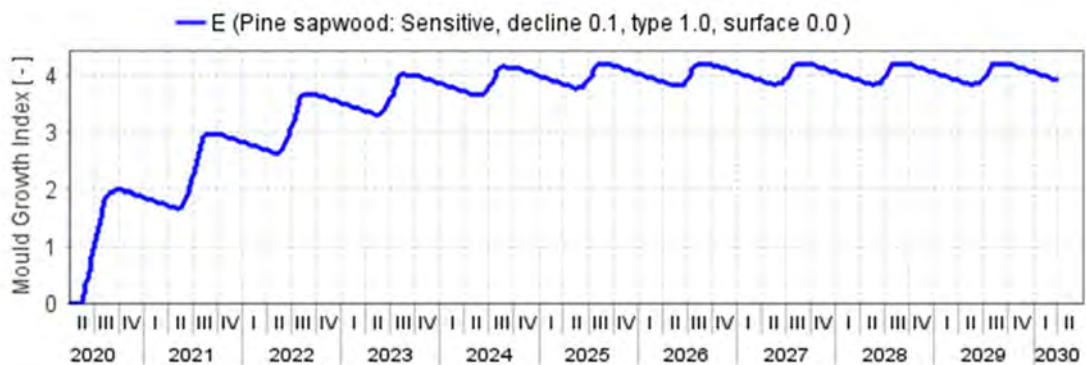


Figure 65: NatHERS CZ 66 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

# Moisture accumulation and mould growth for 7 Star housing Research Report 2

## Appendix 6: Hygrothermal simulation results – Externally insulated clay masonry (reverse brick veneer) (Wall 5) Rev02 (12/09/2022)

## 1. Climate zone 21 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

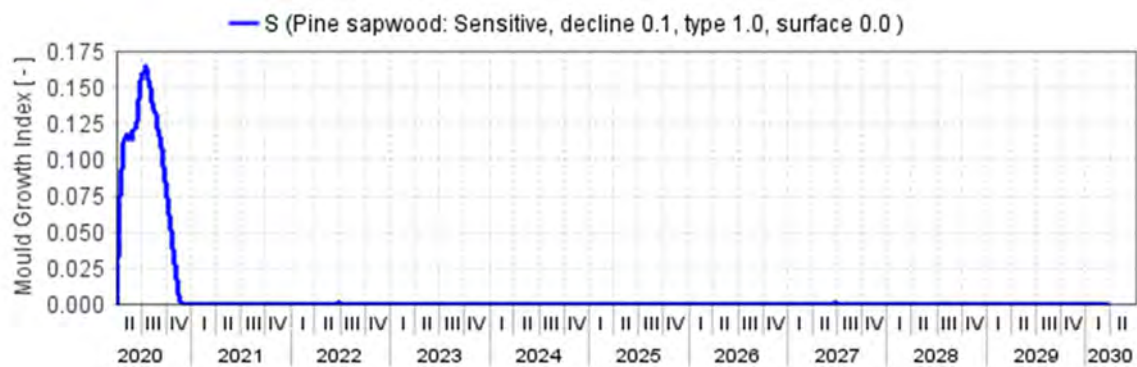


Figure 1: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

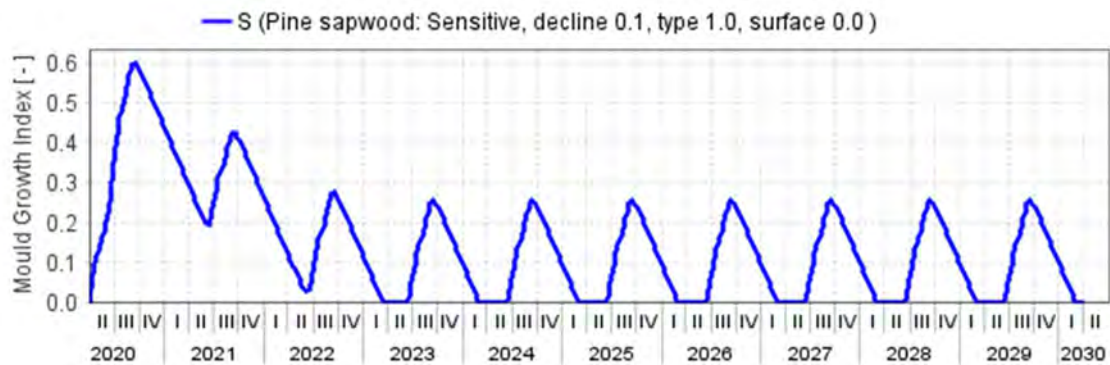


Figure 2: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 5 - mould growth within insulated timber frame



Western orientation ACR 10  
Moisture Accumulation – Nil  
Mould Growth – Nil

Eastern orientation ACR 10  
Moisture Accumulation – Nil  
Mould Growth – Nil

## 2. Climate zone 22 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil  
Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

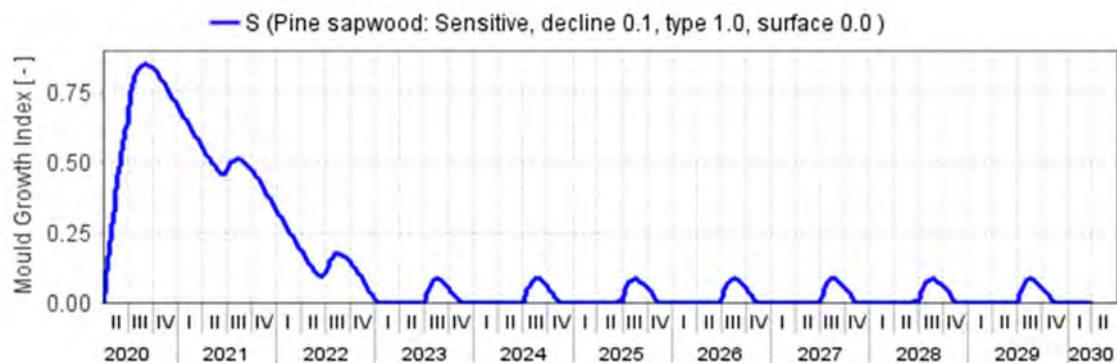


Figure 3: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

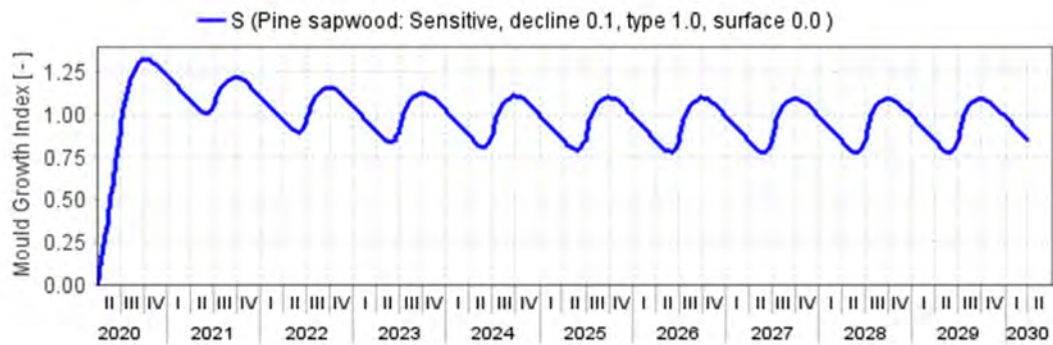


Figure 4: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

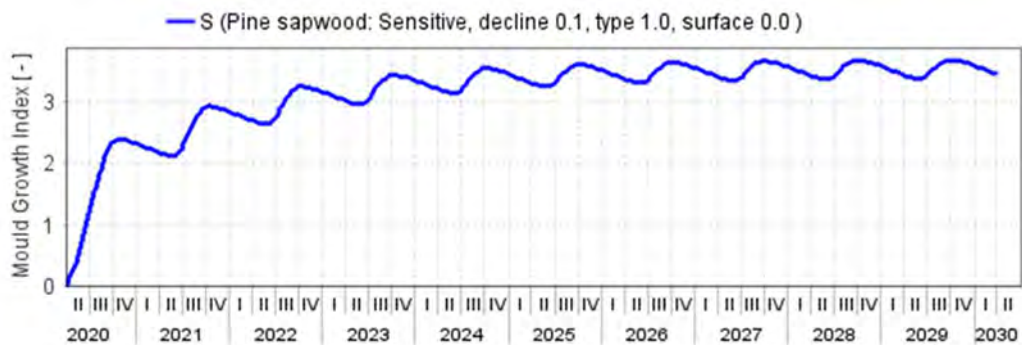


Figure 5: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 5 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

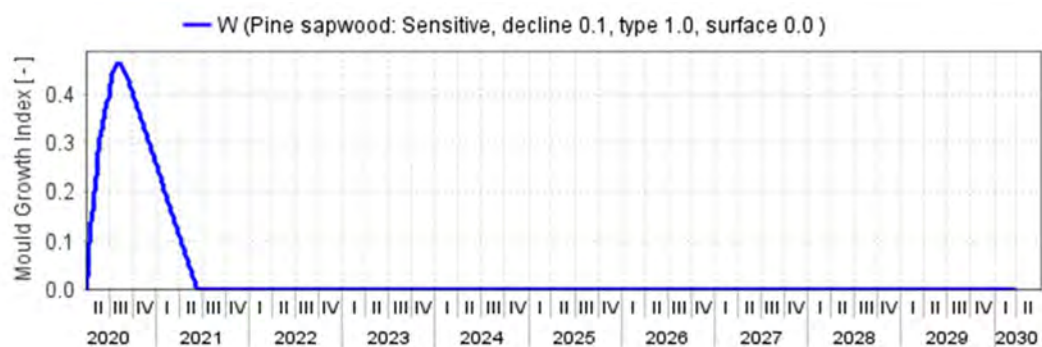


Figure 6: NatHERS CZ 22 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

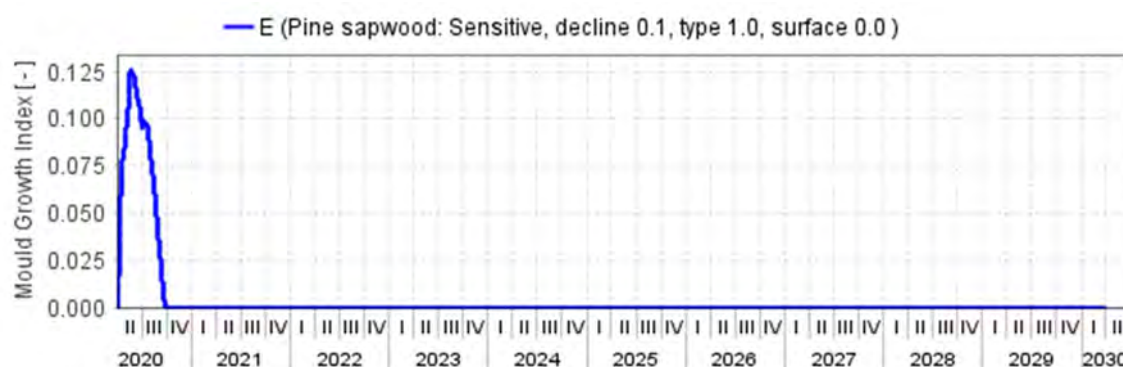


Figure 7: NatHERS CZ 22 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

### 3. Climate zone 27 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

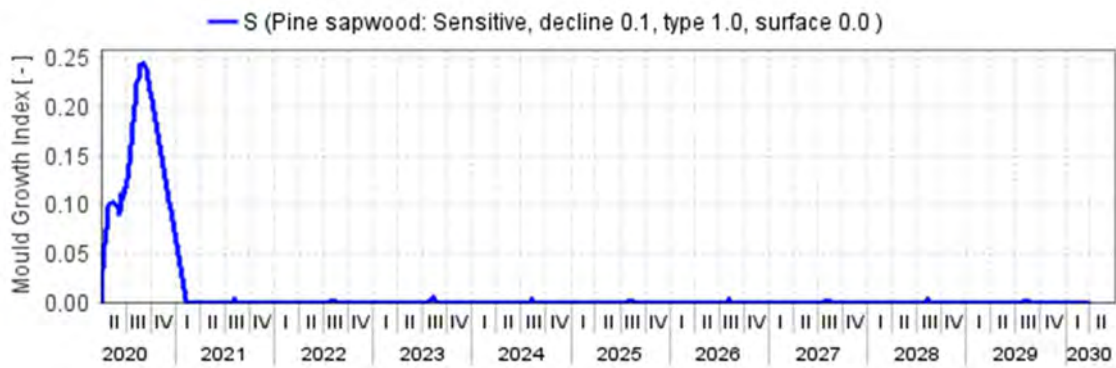


Figure 8: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

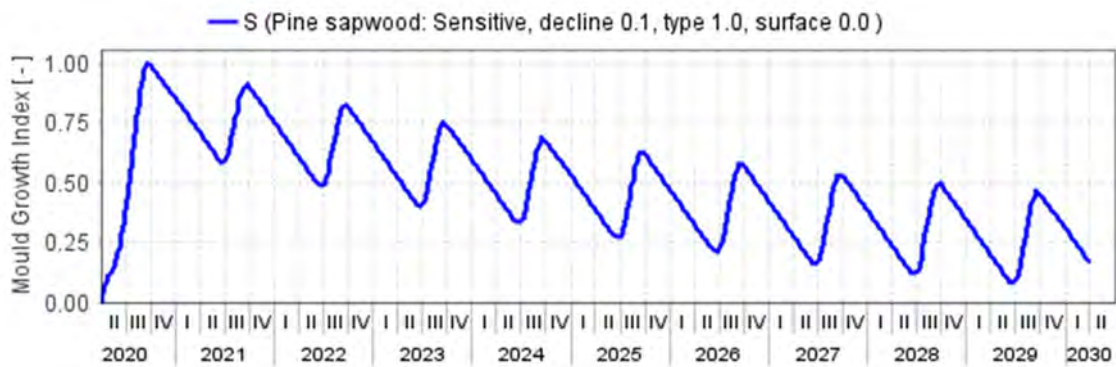


Figure 9: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 5 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

#### 4. Climate zone 60 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

#### Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

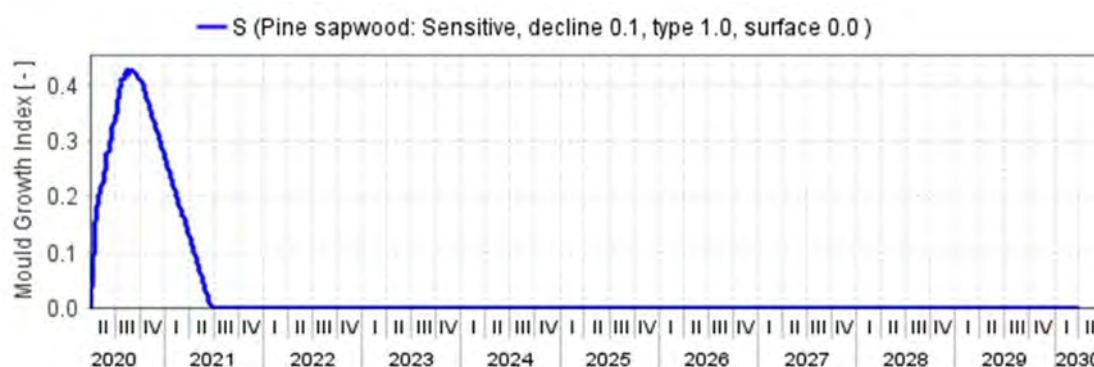


Figure 10: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

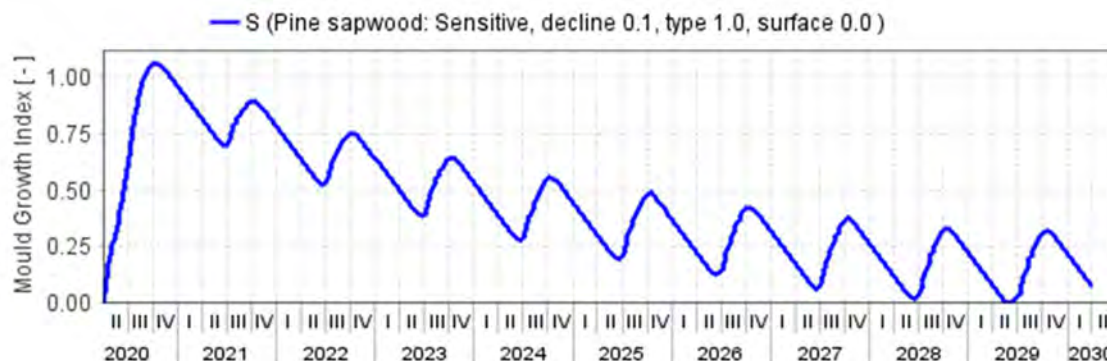


Figure 11: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.



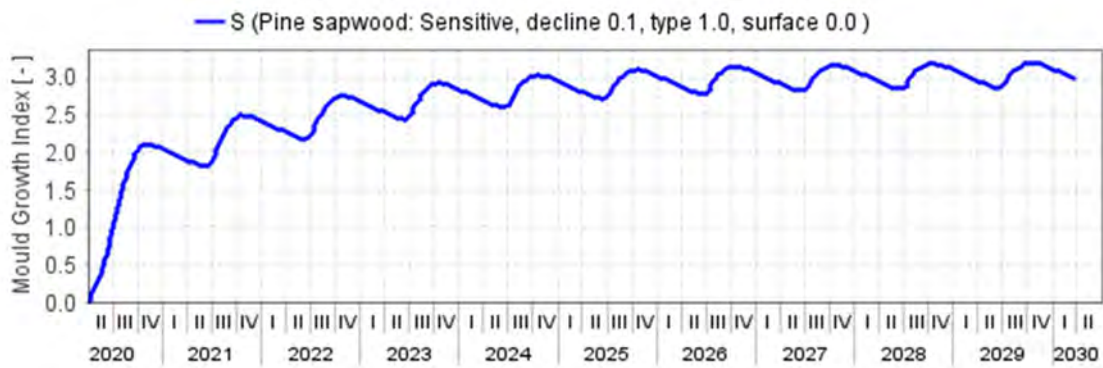


Figure 12: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 5 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

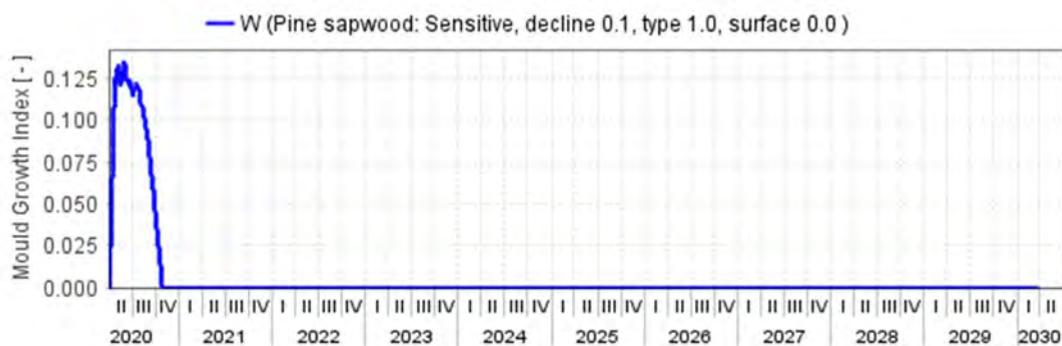


Figure 13: NatHERS CZ 60 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

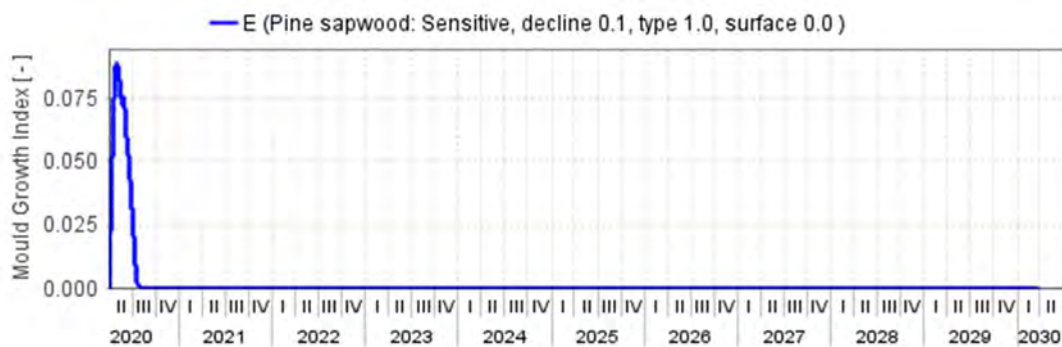


Figure 14: NatHERS CZ 60 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 5. Climate zone 61 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

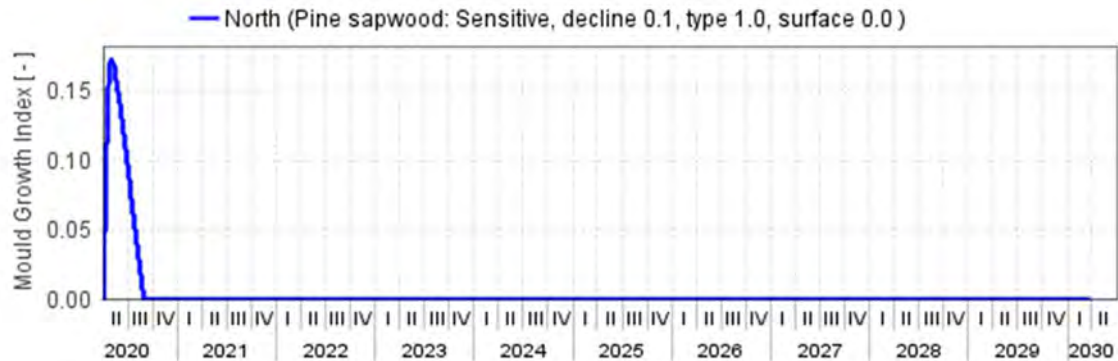


Figure 15: NatHERS CZ 61 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

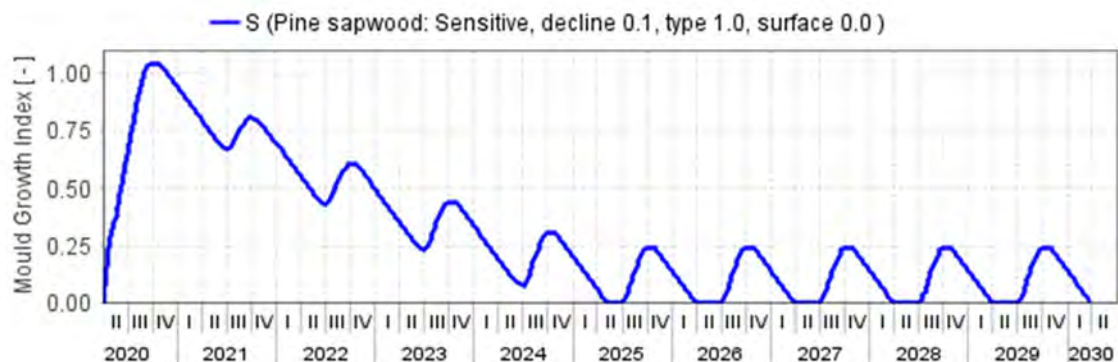


Figure 16: NatHERS CZ 61– NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

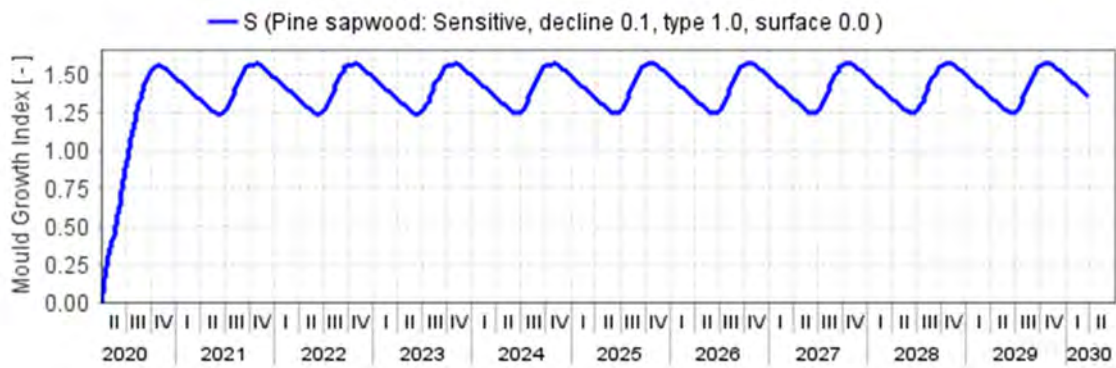


Figure 17: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

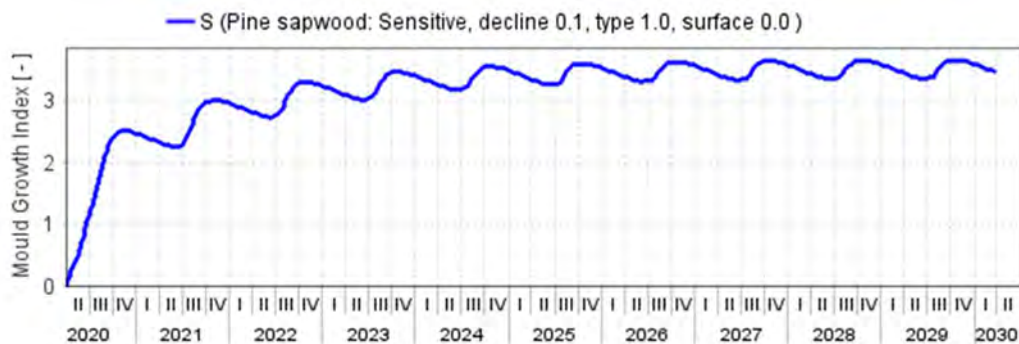


Figure 18: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 5 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

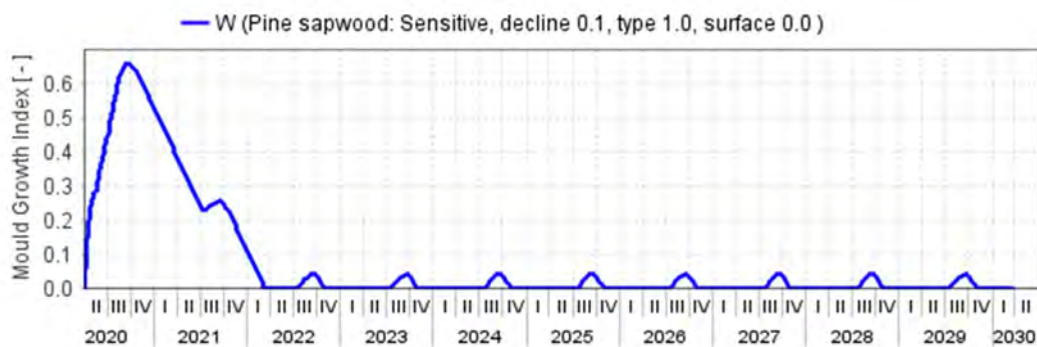


Figure 19: NatHERS CZ 61 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

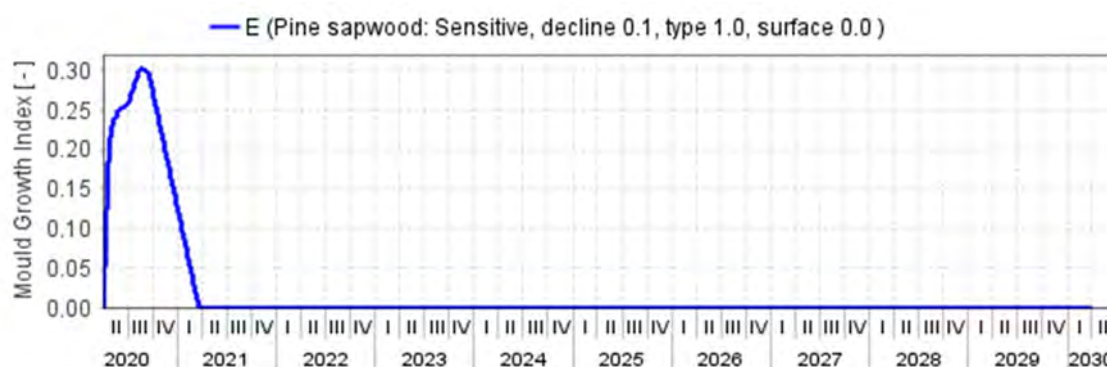


Figure 20: NatHERS CZ 61 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 6. Climate zone 63 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

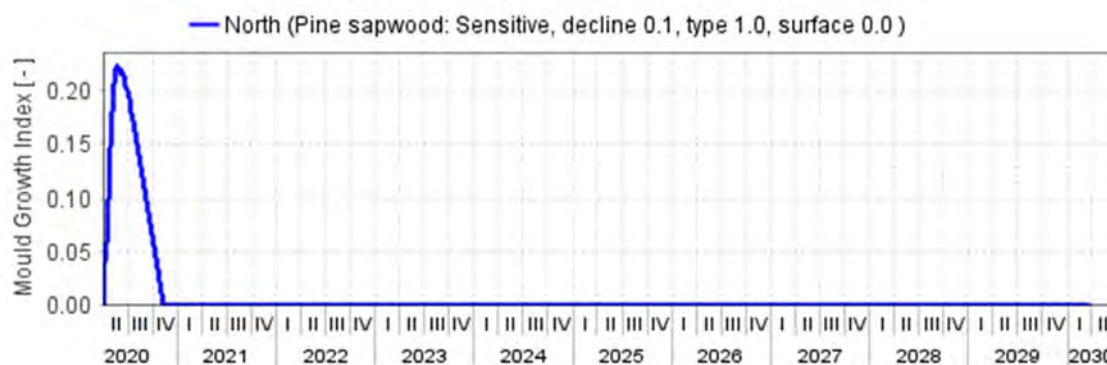


Figure 21: NatHERS CZ 63 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.



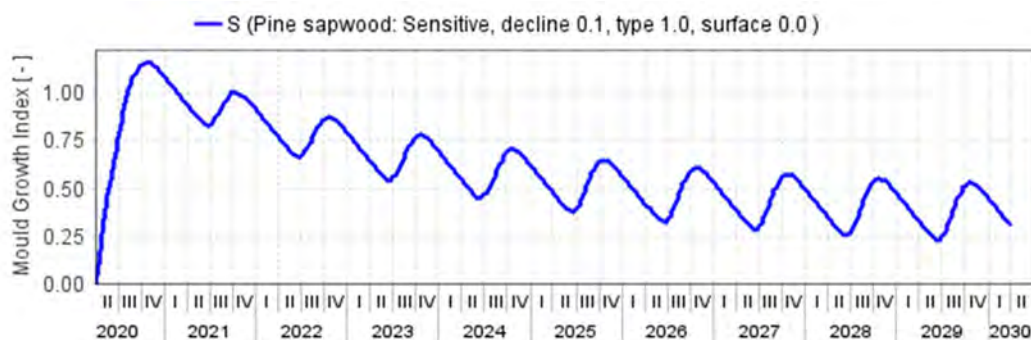


Figure 22: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

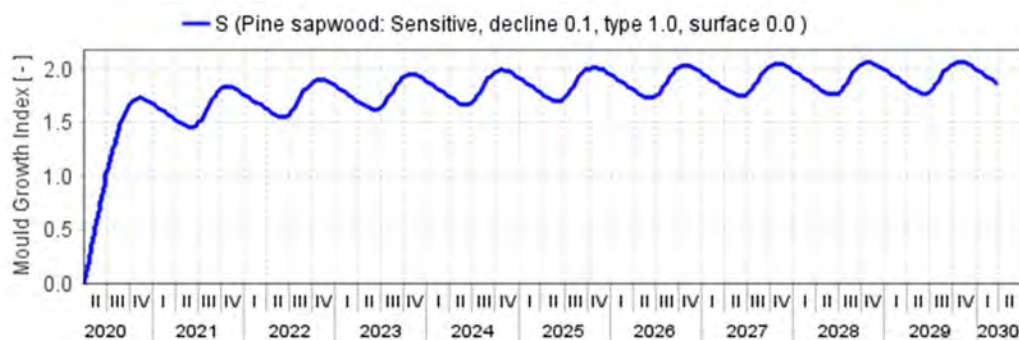


Figure 23: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

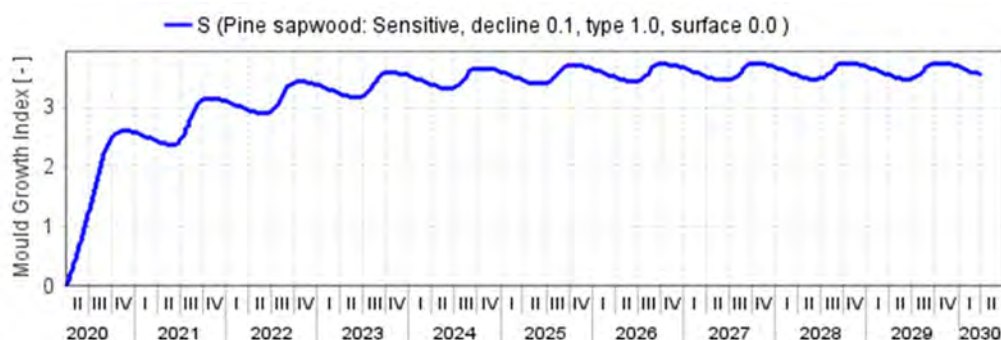


Figure 24: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 5 - mould growth within insulated timber frame



Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

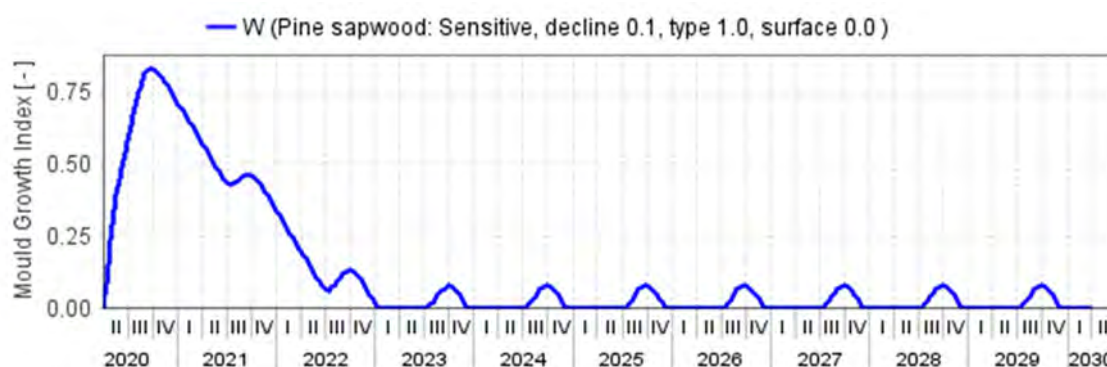


Figure 25: NatHERS CZ 63 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

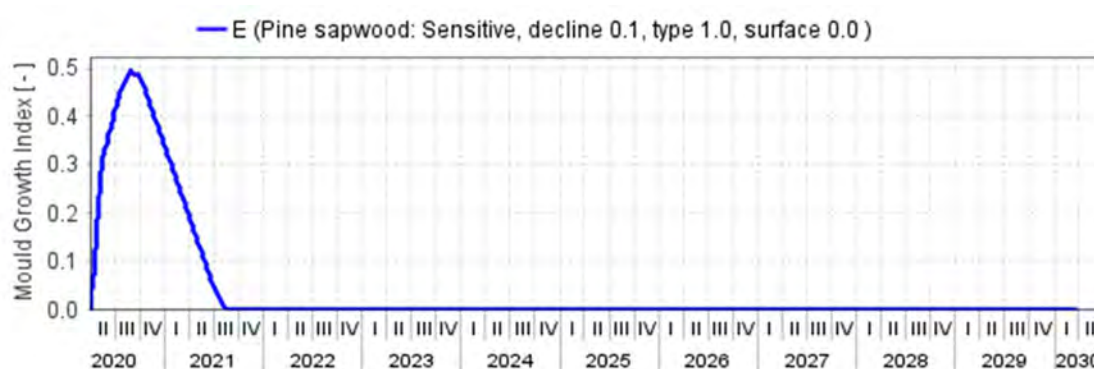


Figure 26: NatHERS CZ 63 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 7. Climate zone 64 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

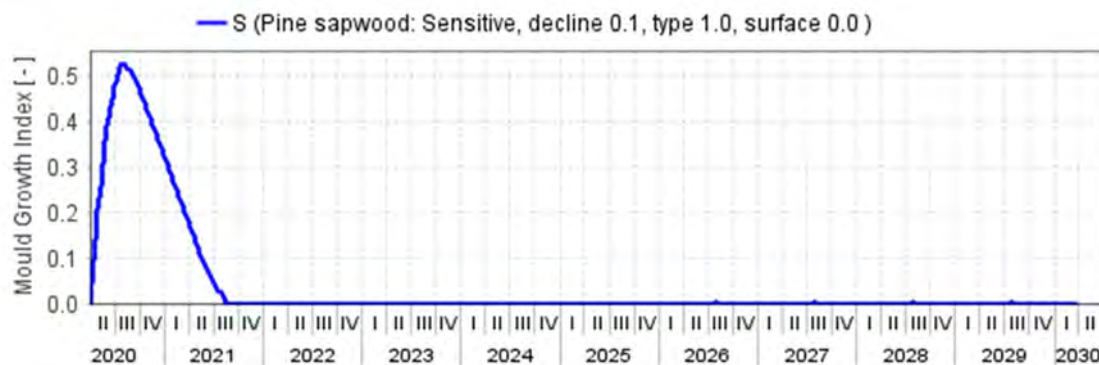


Figure 27: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

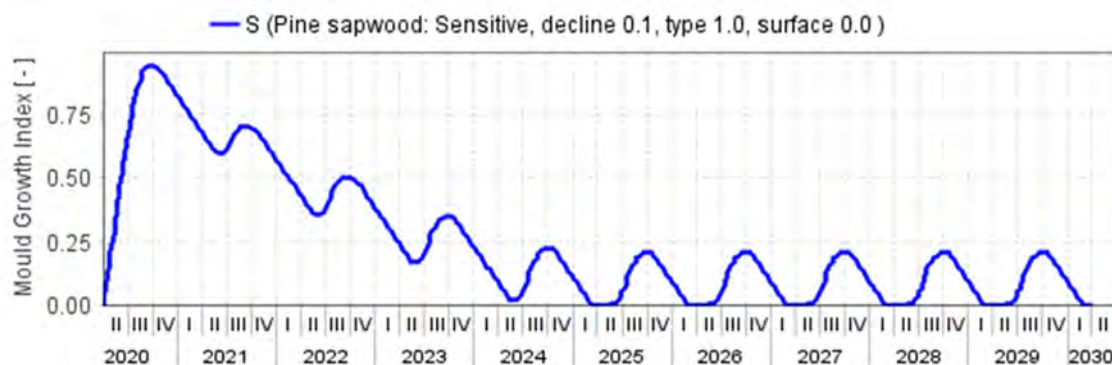


Figure 28: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

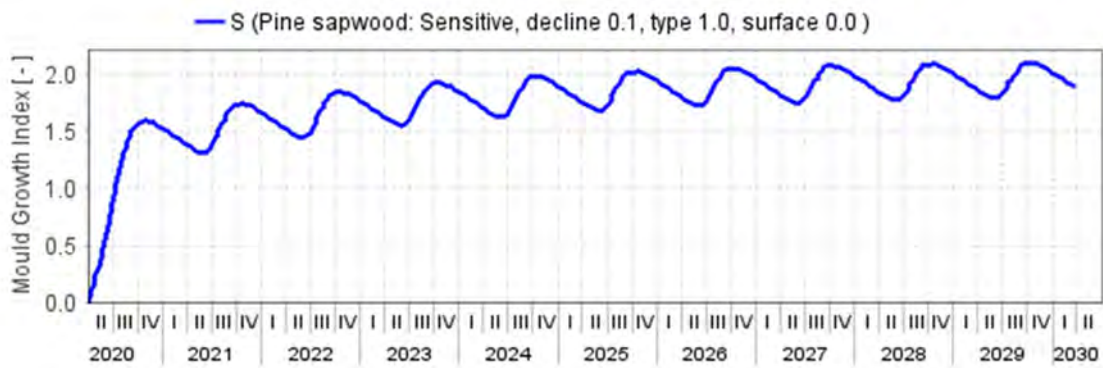


Figure 29: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 5 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

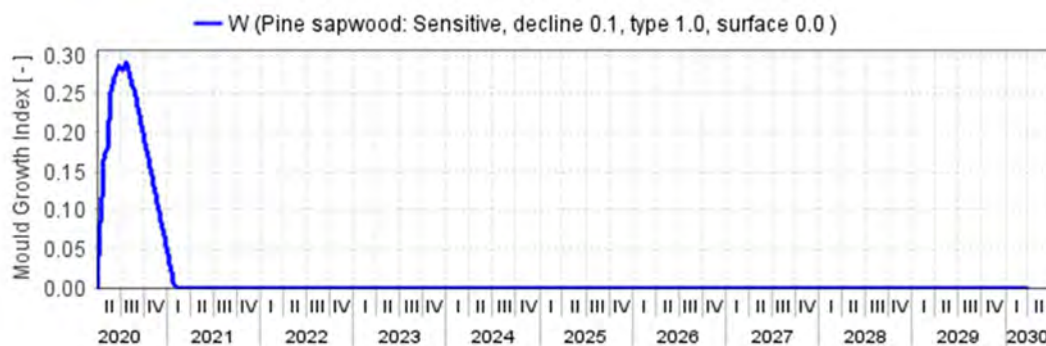


Figure 30: NatHERS CZ 64 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

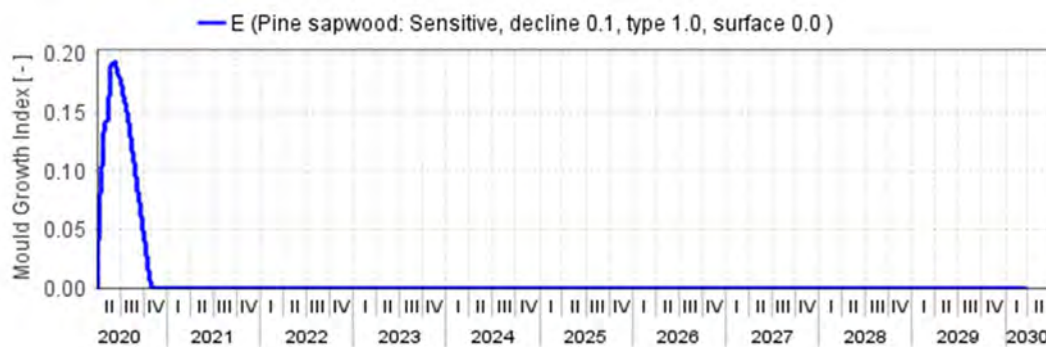


Figure 31: NatHERS CZ 64 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 8. Climate zone 66 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

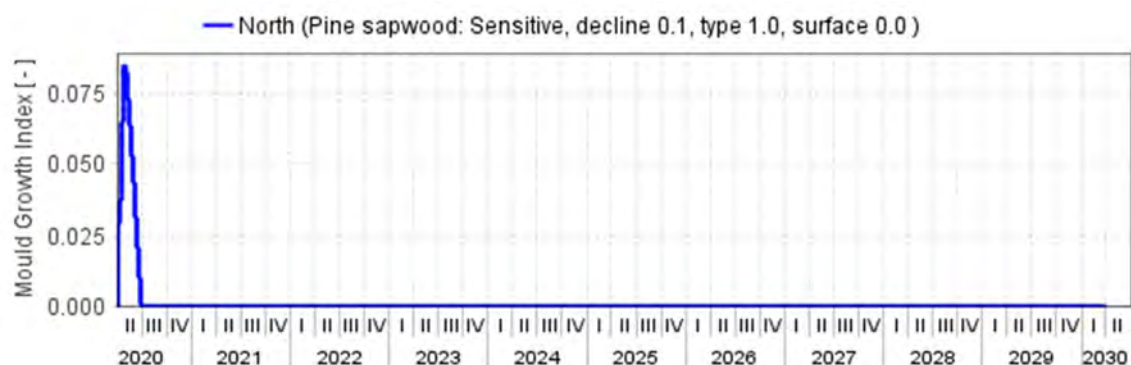


Figure 32: NatHERS CZ 66 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

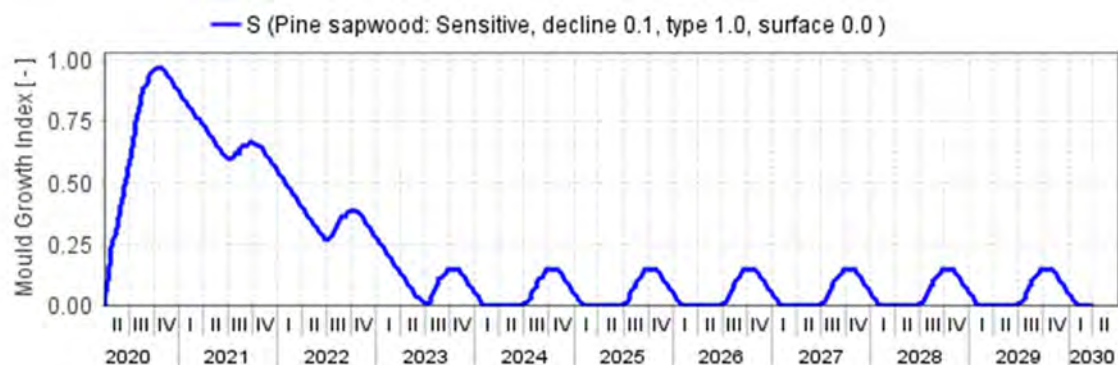


Figure 33: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.



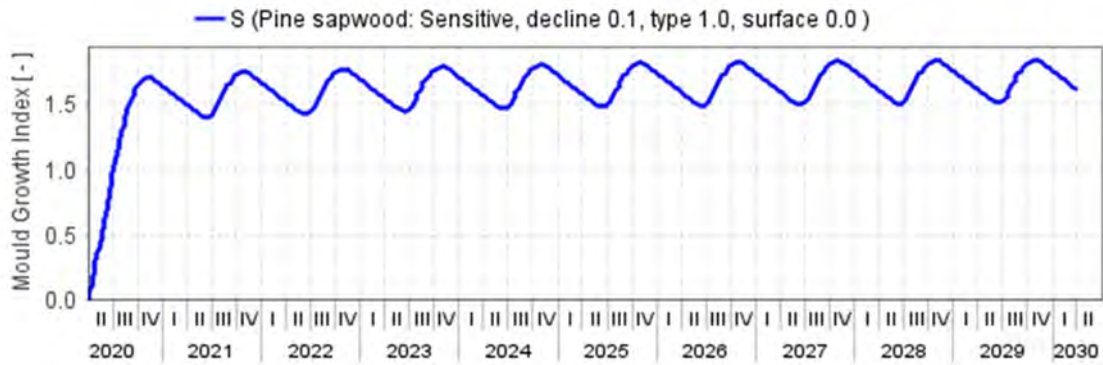


Figure 34: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

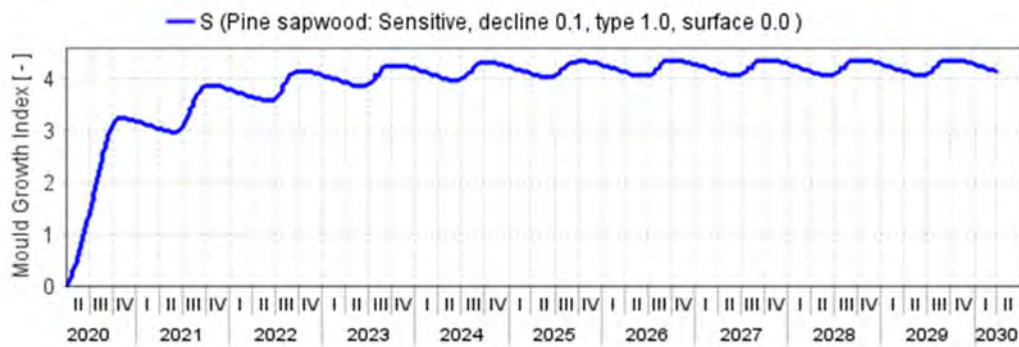


Figure 35: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 5 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

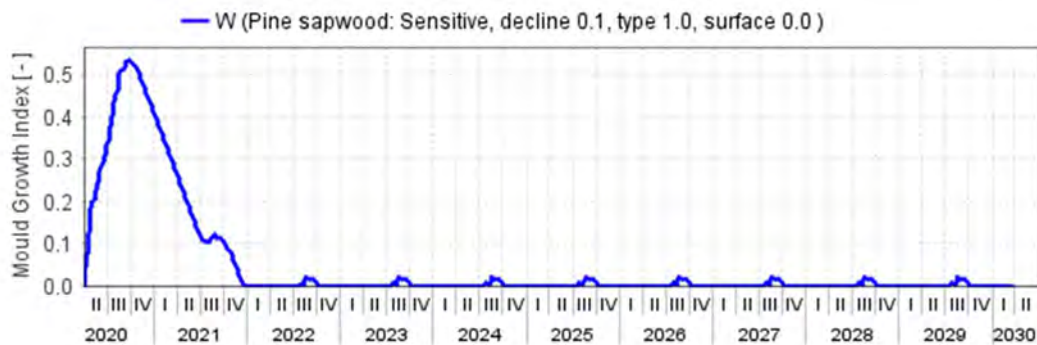


Figure 36: NatHERS CZ 66 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame



Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

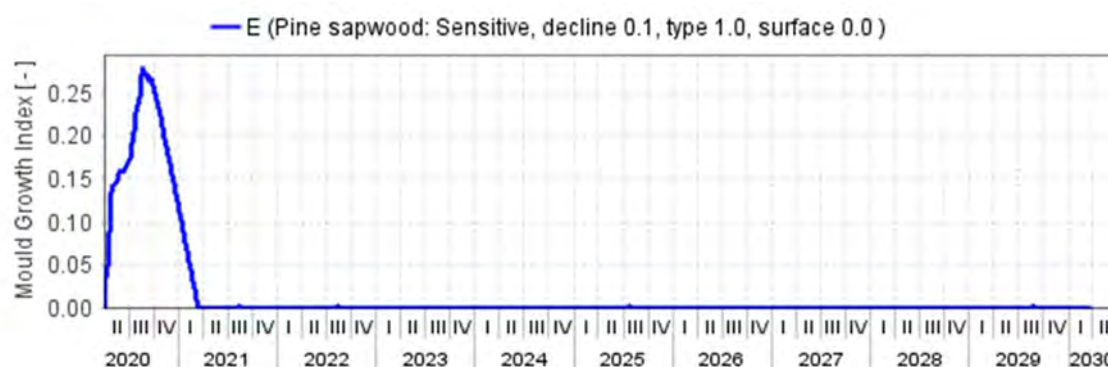


Figure 37: NatHERS CZ 66 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 9. Climate zone 27 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

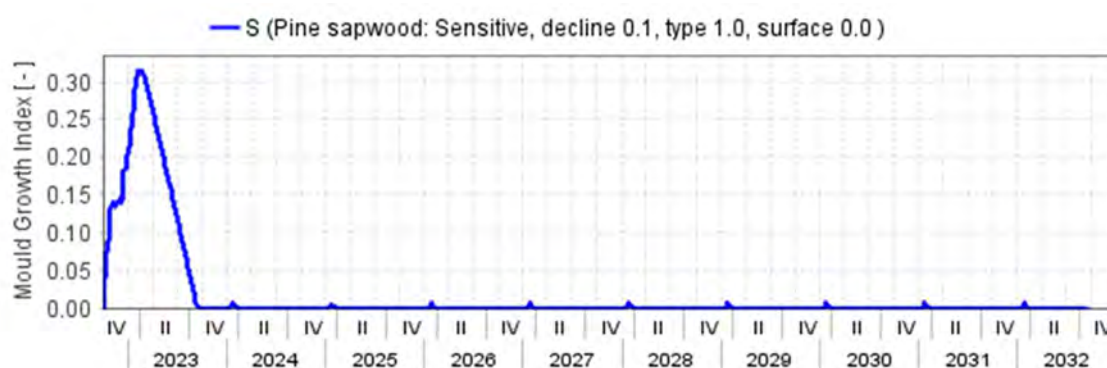


Figure 38: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

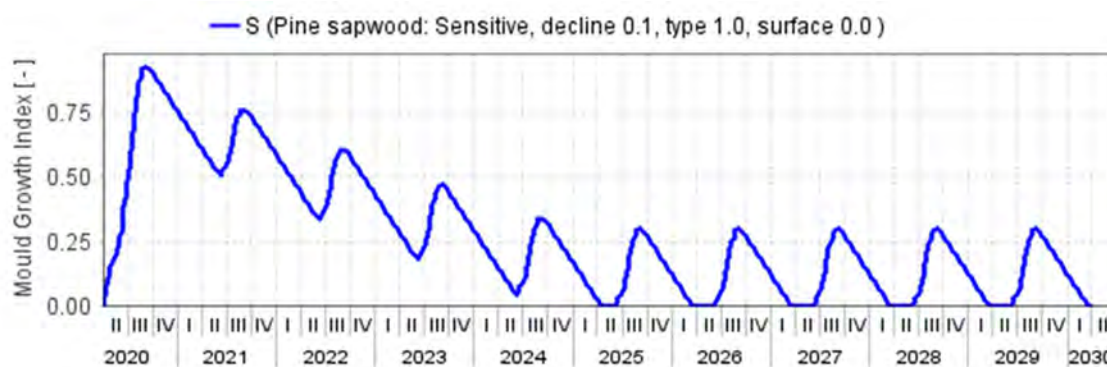


Figure 39: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

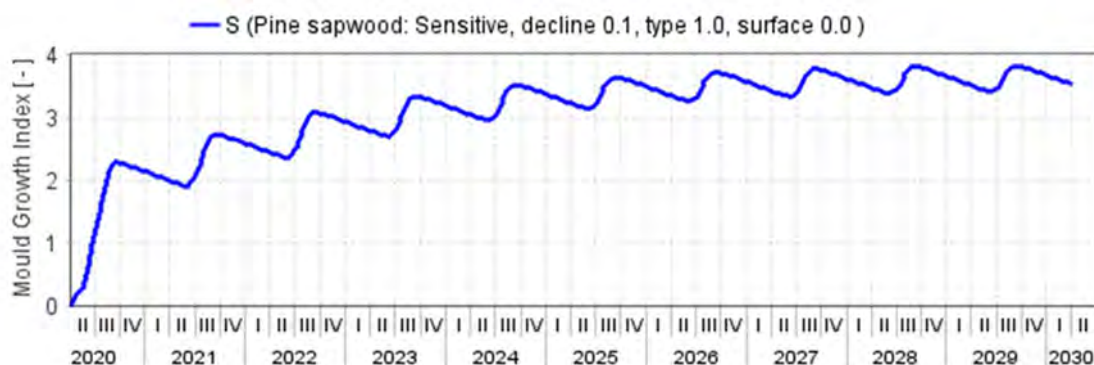


Figure 40: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 5 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

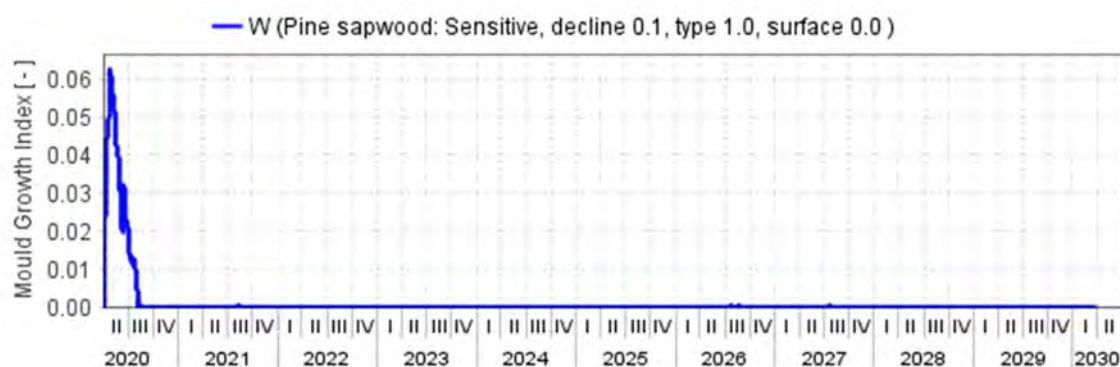


Figure 41: NatHERS CZ 27 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

## 10. Climate zone 61 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

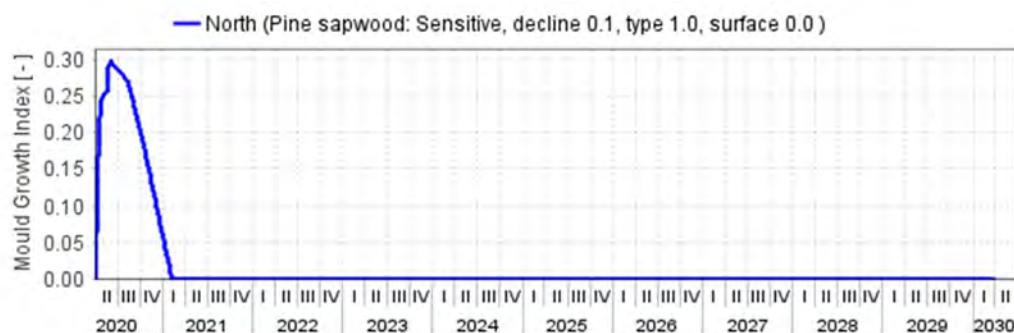


Figure 42: NatHERS CZ 61 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

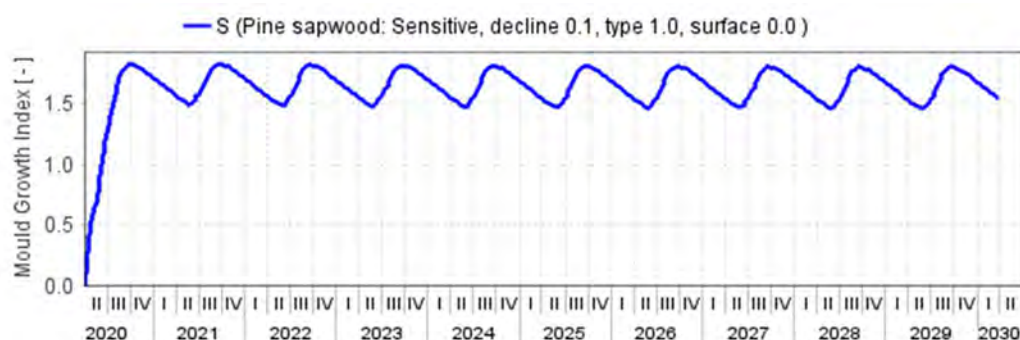


Figure 43: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

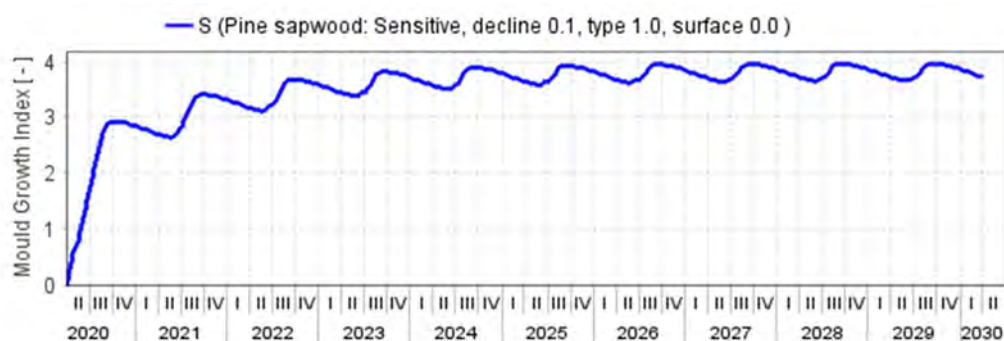


Figure 44: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

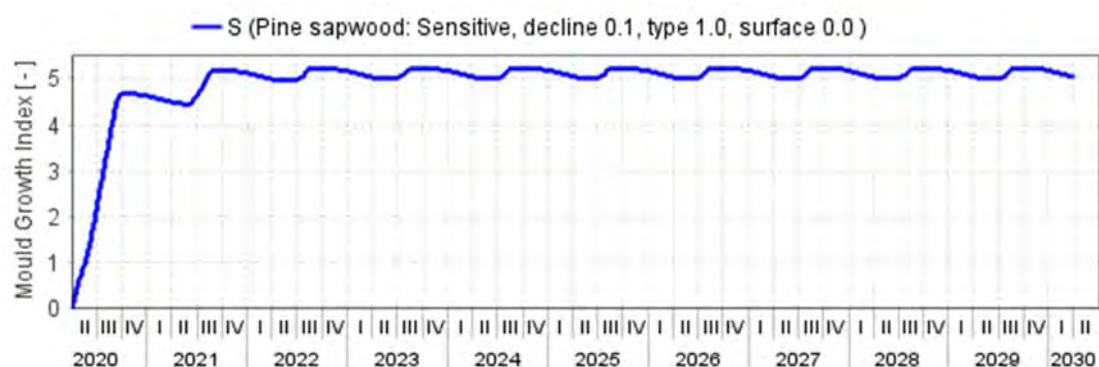


Figure 45: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 5 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

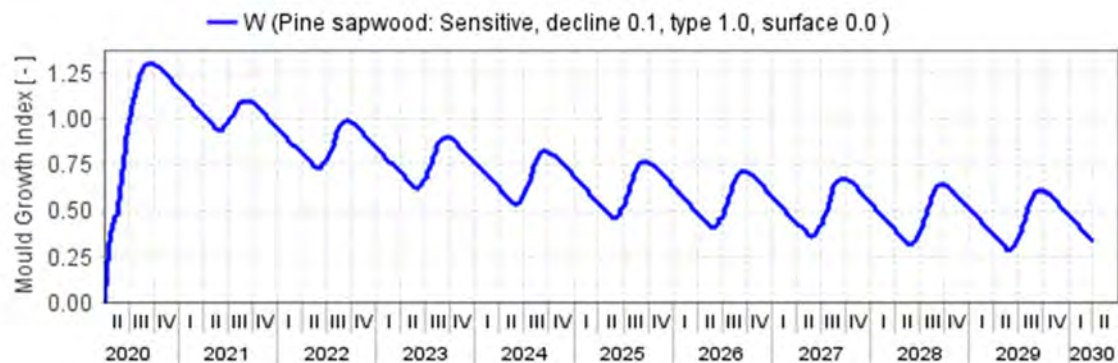


Figure 46: NatHERS CZ 61 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



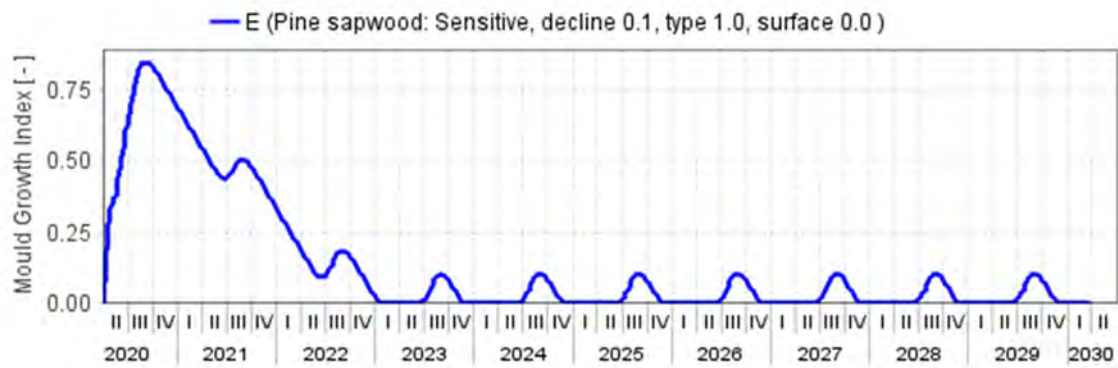


Figure 47: NatHERS CZ 61 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 11. Climate zone 66 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

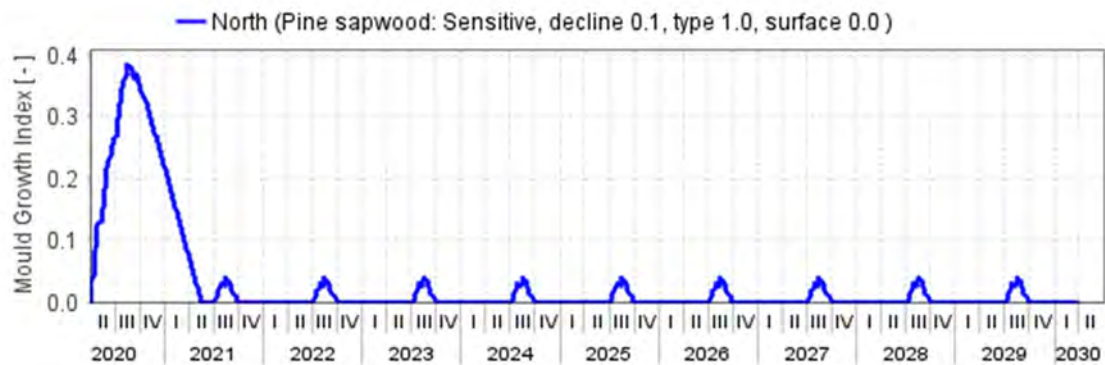


Figure 48: NatHERS CZ 66 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 1.0 in the first year.

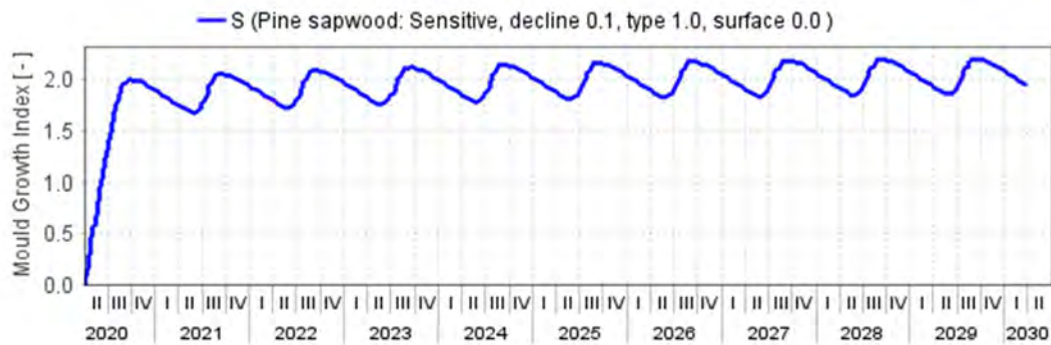


Figure 49: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

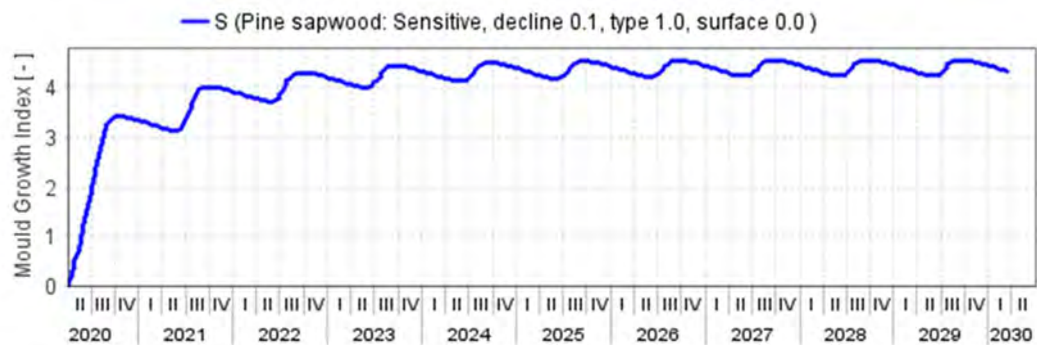


Figure 50: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

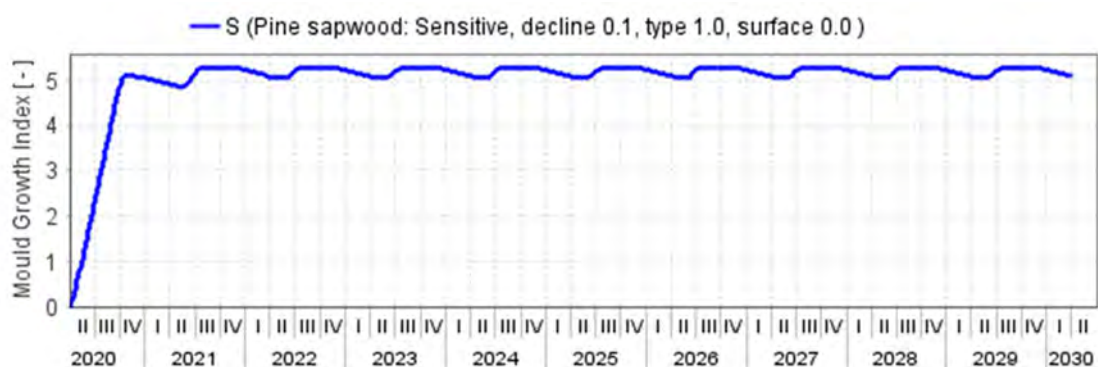


Figure 51: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 5 - mould growth within insulated timber frame

# Western orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that only exceeds 1.0 in the first year.

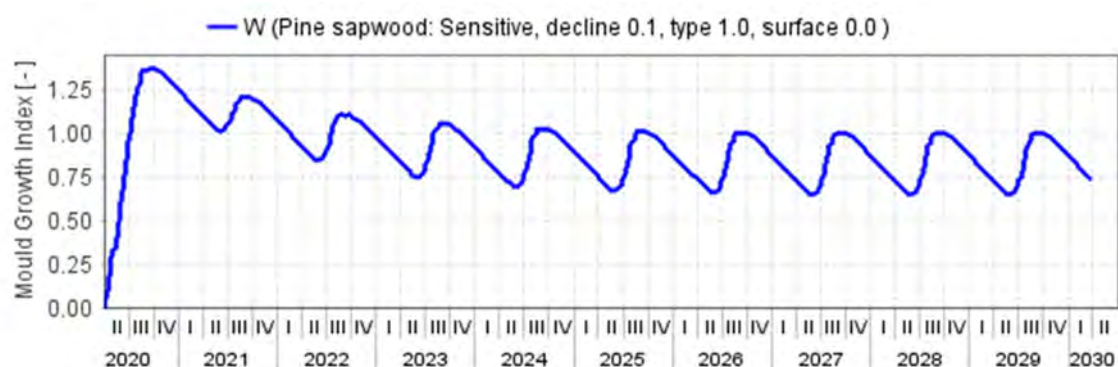


Figure 52: NatHERS CZ 66 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

# Eastern orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index does not that exceed 1.0.

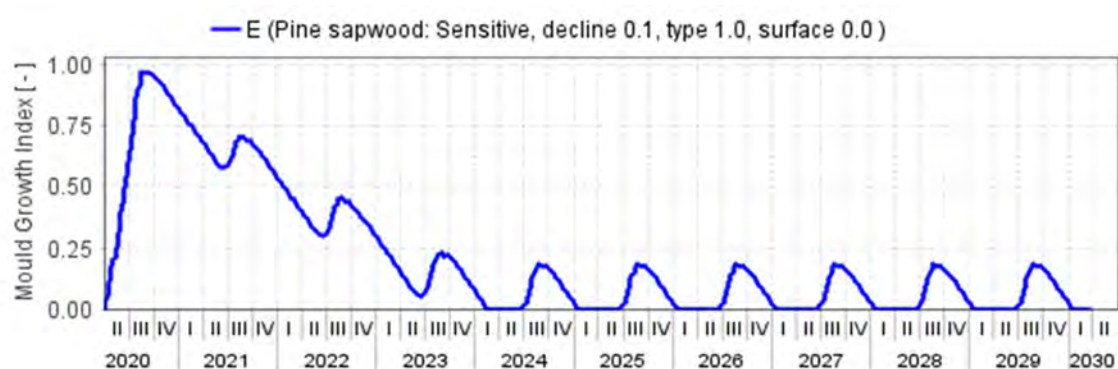


Figure 53: NatHERS CZ 66 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

# Moisture accumulation and mould growth for 7 Star housing Research Report 2

## Appendix 7: Hygrothermal simulation results – Extruded polystyrene (XPS) cladding with insulated timber frame (Wall 6) Rev02 (12/09/2022)

## 1. Climate zone 21 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

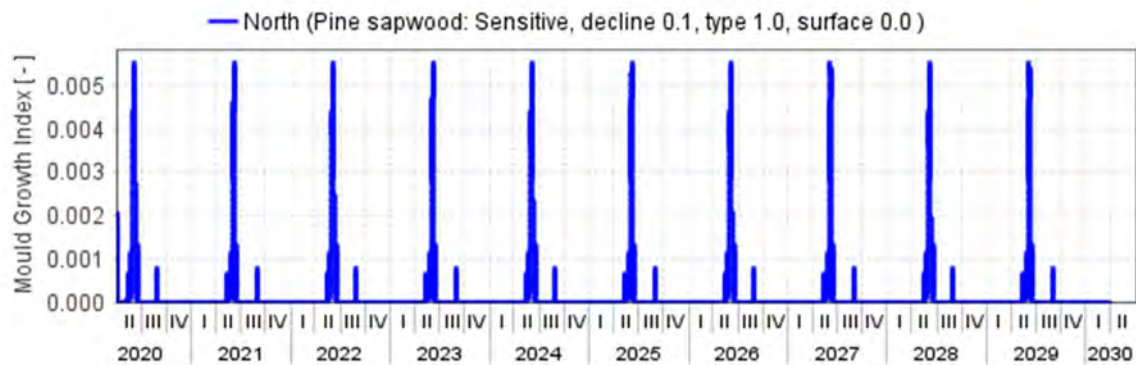


Figure 1: NatHERS CZ 21 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

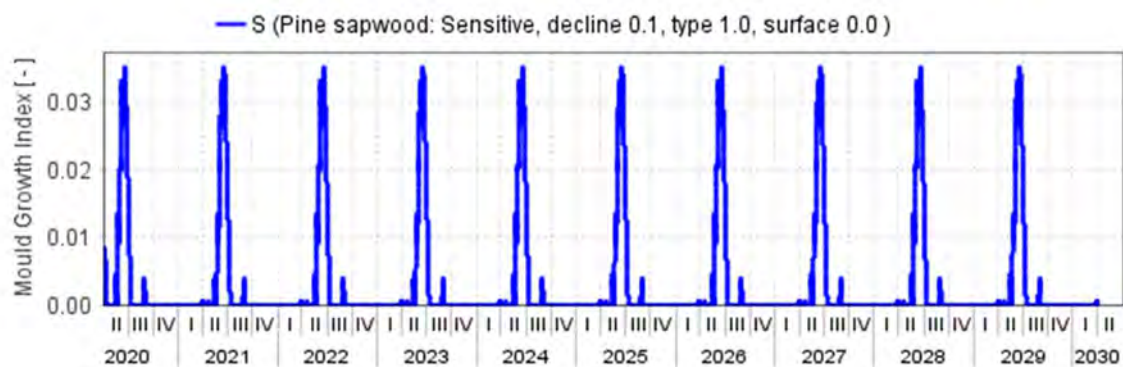


Figure 2: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



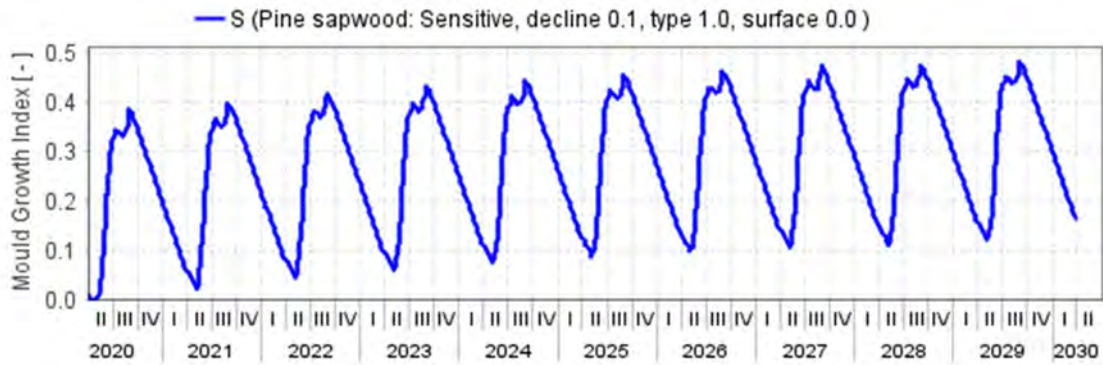


Figure 3: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

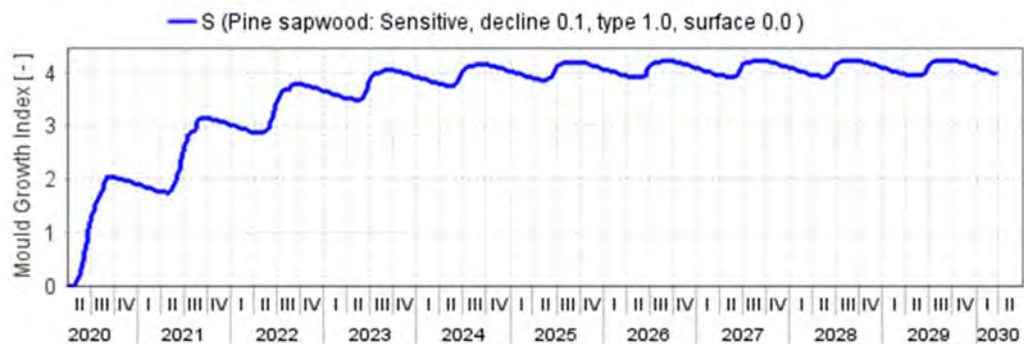


Figure 4: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

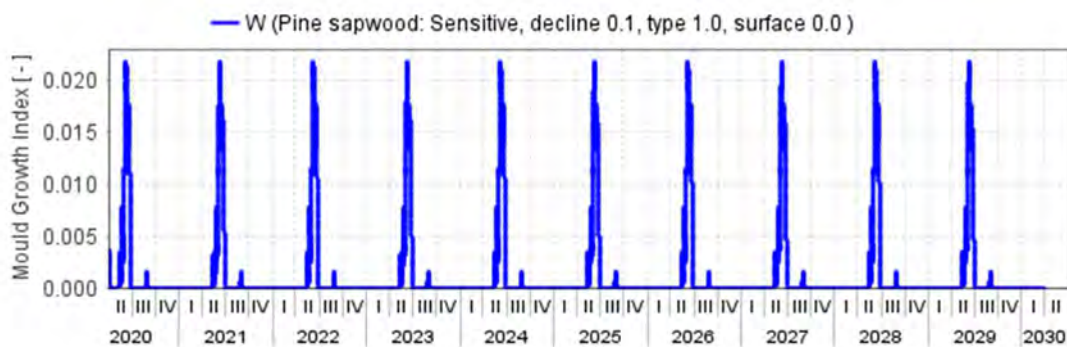


Figure 5: NatHERS CZ 21 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

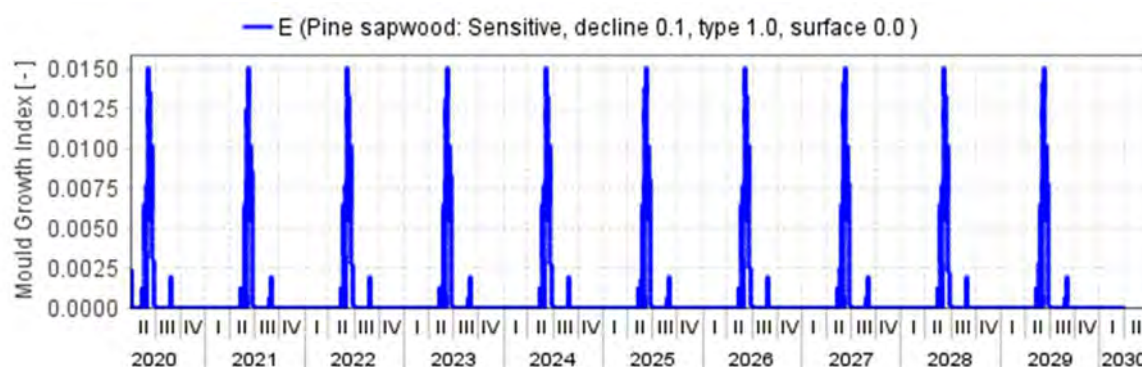


Figure 6: NatHERS CZ 21 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 2. Climate zone 22 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

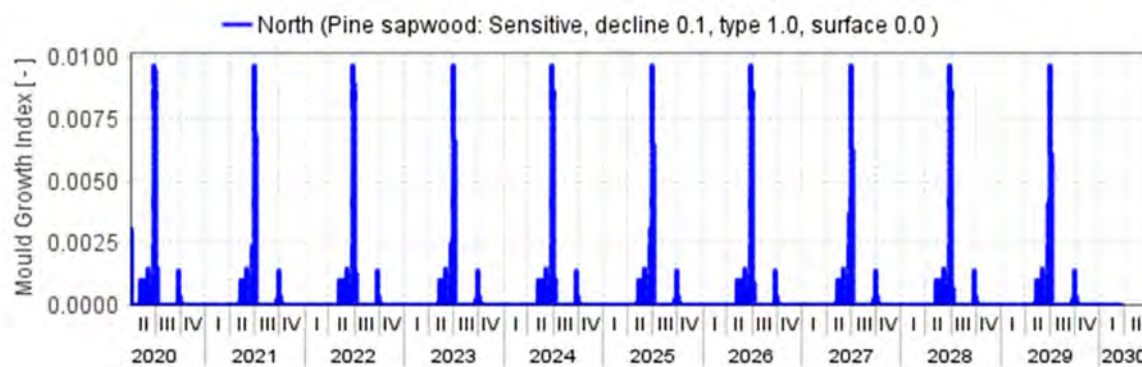


Figure 7: NatHERS CZ 22 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

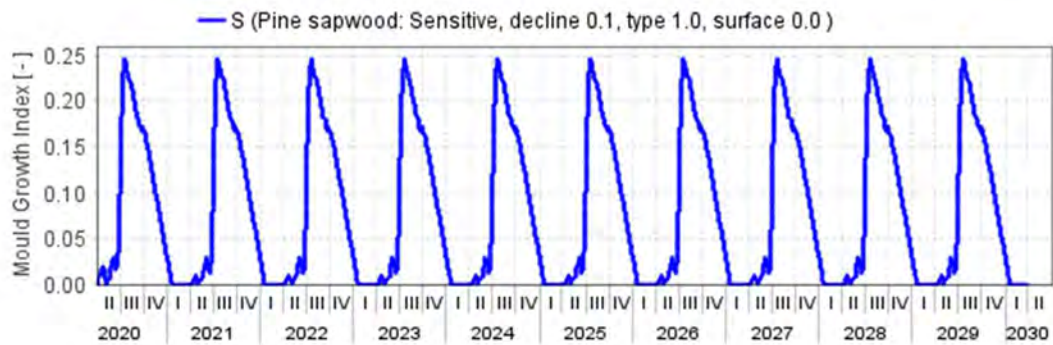


Figure 8: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

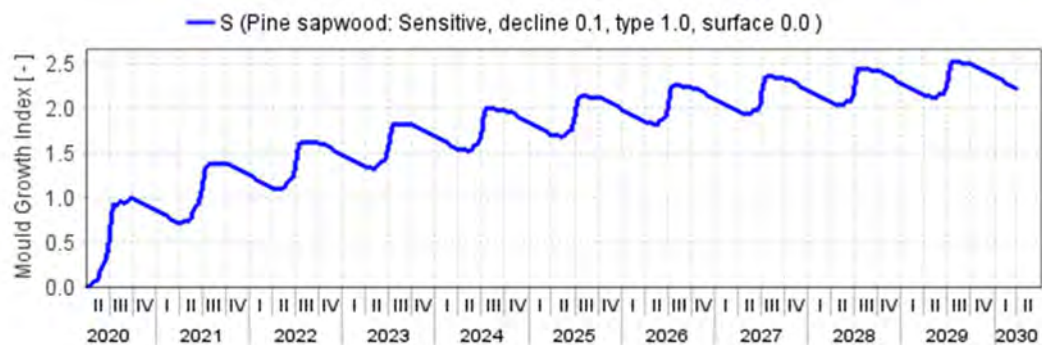


Figure 9: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

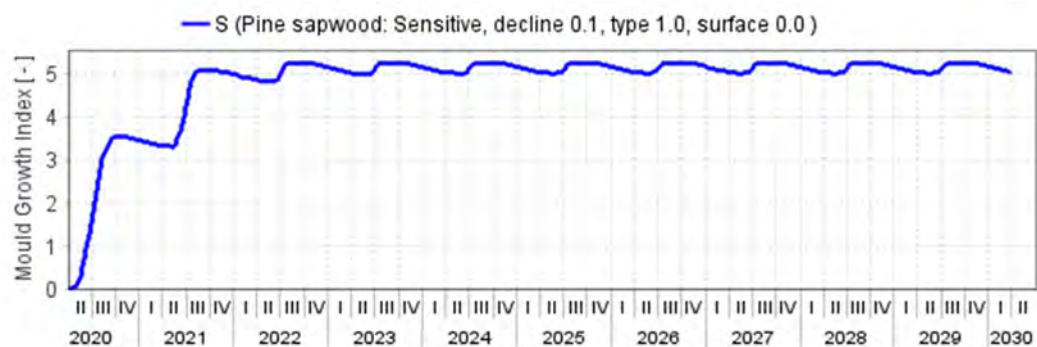


Figure 10: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

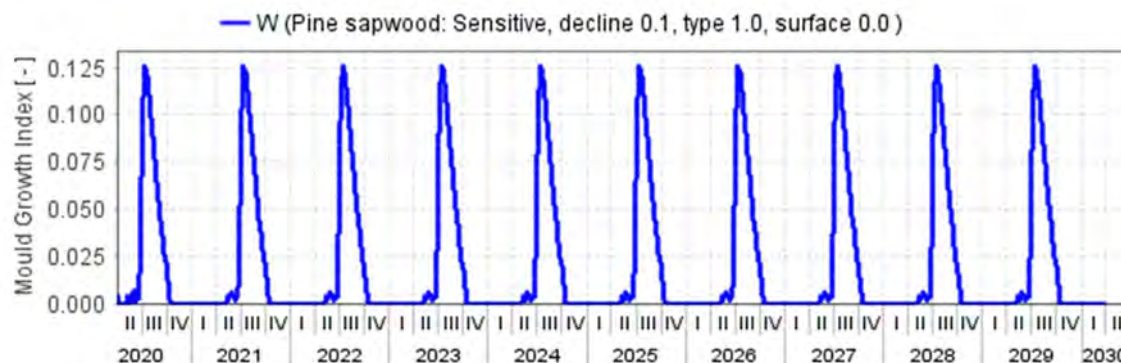


Figure 11: NatHERS CZ 22 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

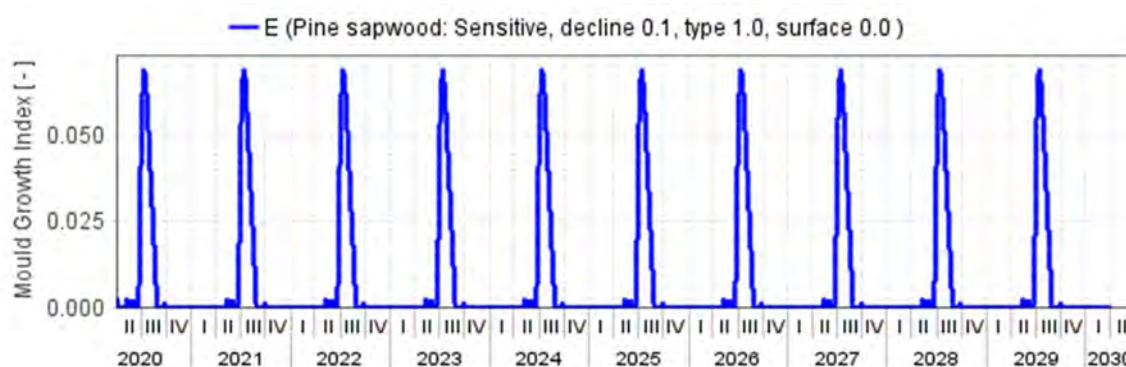


Figure 12: NatHERS CZ 22 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

### 3. Climate zone 27 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

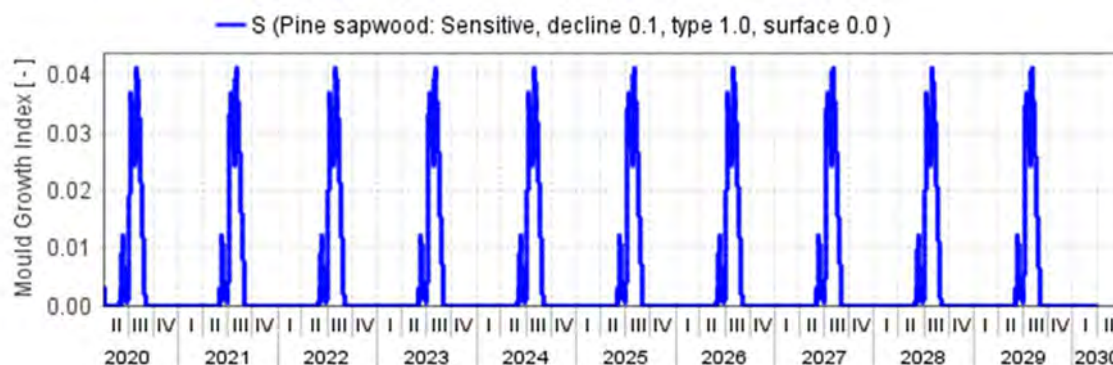


Figure 13: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

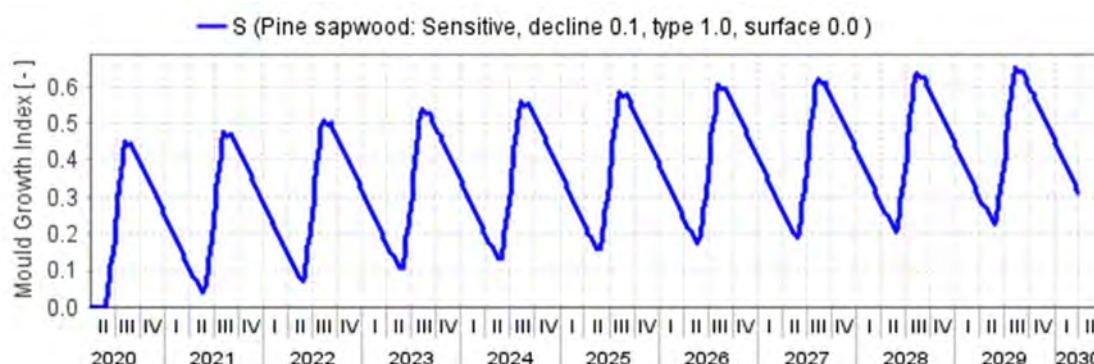


Figure 14: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.



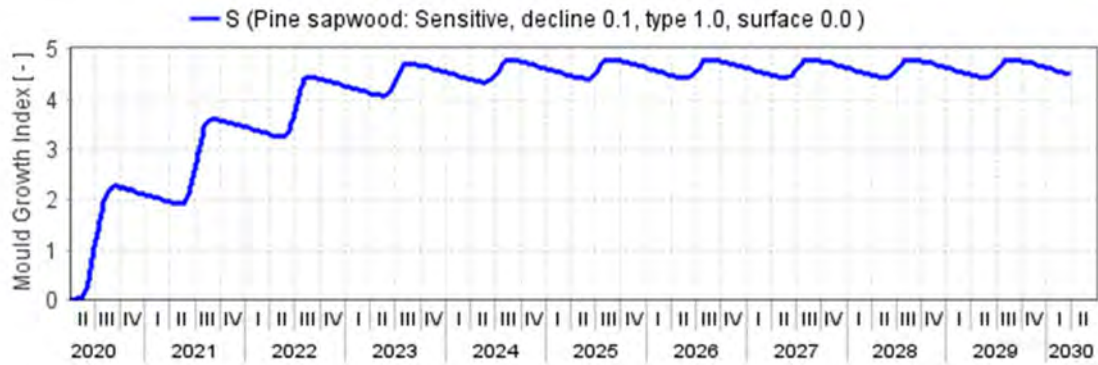


Figure 15: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

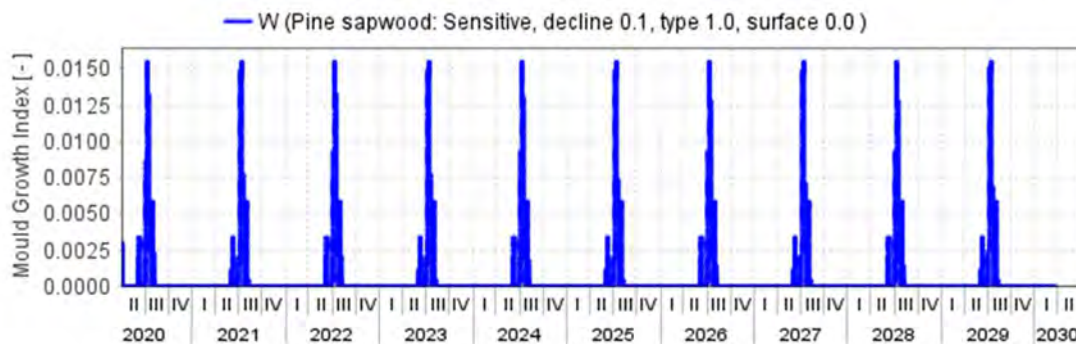


Figure 16: NatHERS CZ 27 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

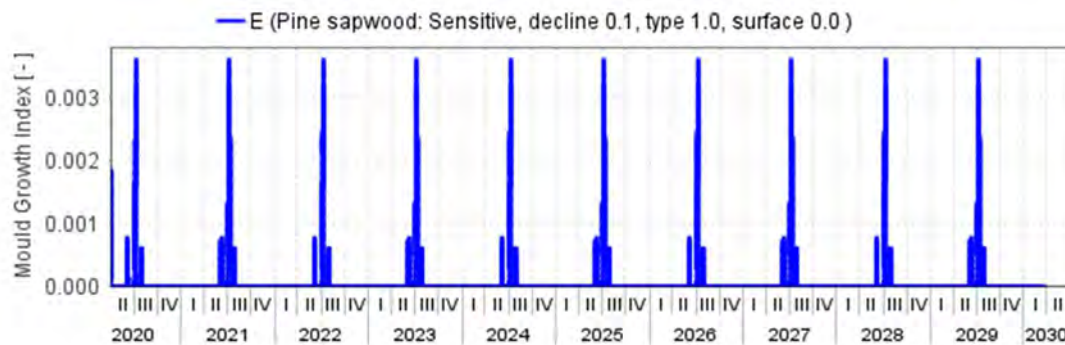


Figure 17: NatHERS CZ 27 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

#### 4. Climate zone 60 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

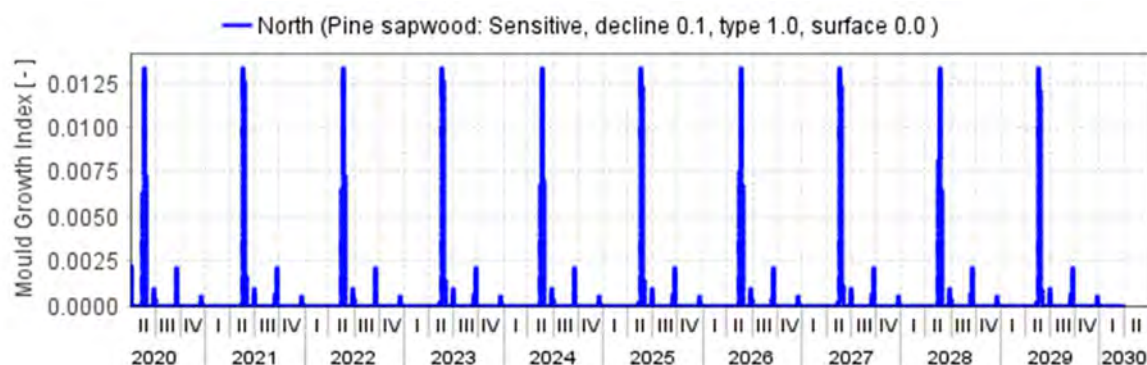


Figure 18: NatHERS CZ 60 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

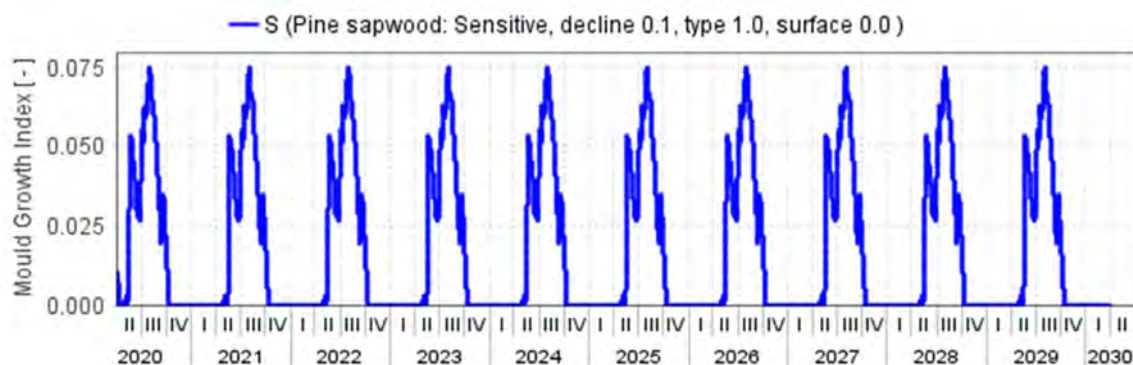


Figure 19: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

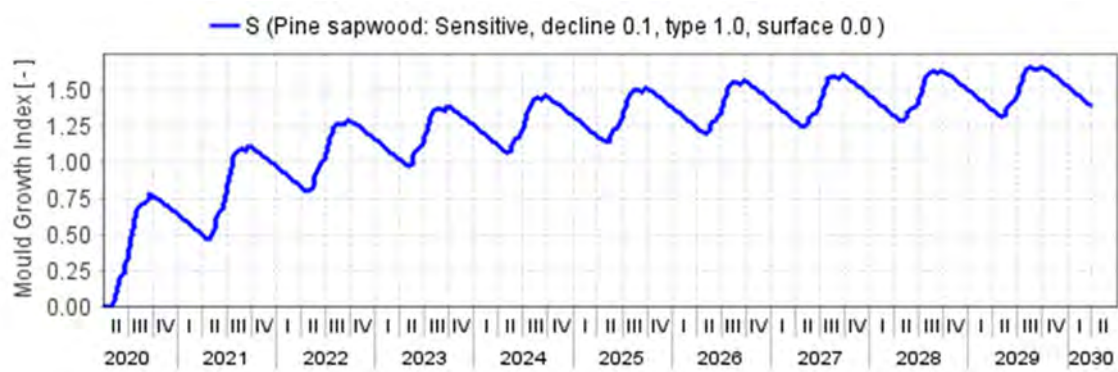


Figure 20: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

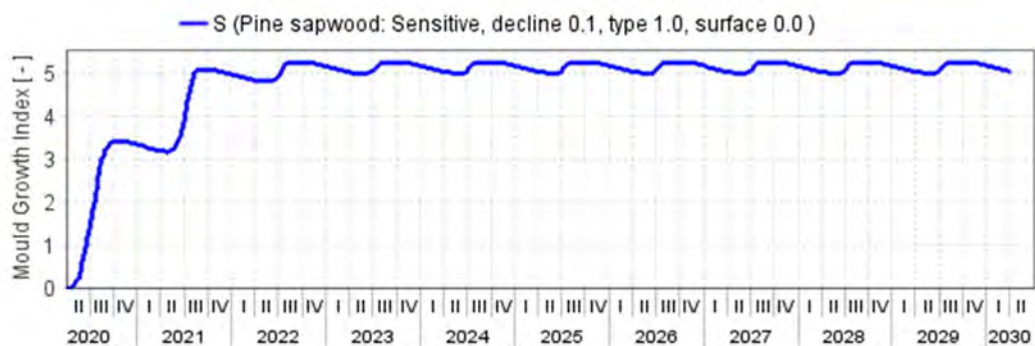


Figure 21: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

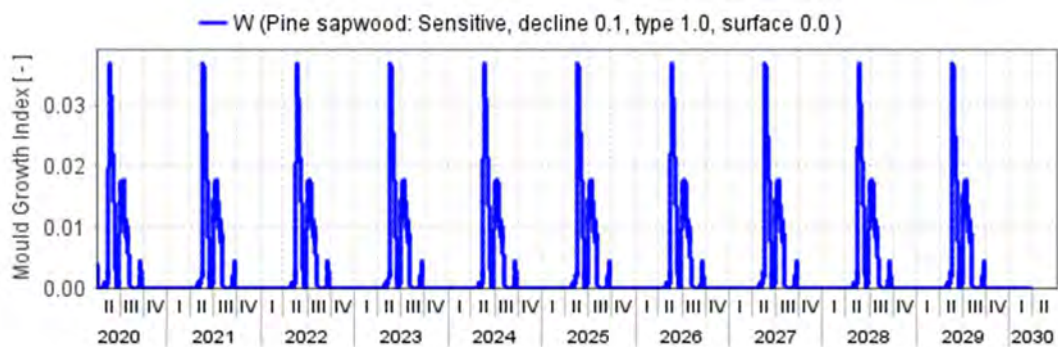


Figure 22: NatHERS CZ 60 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame



Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

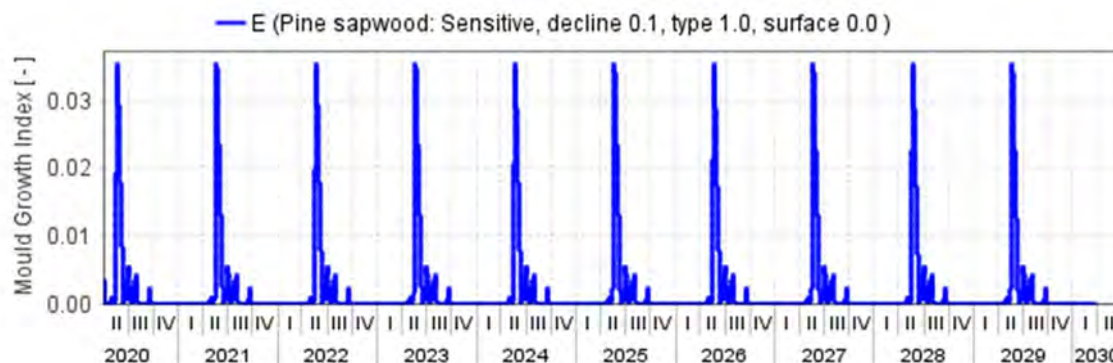


Figure 23: NatHERS CZ 60 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 5. Climate zone 61 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

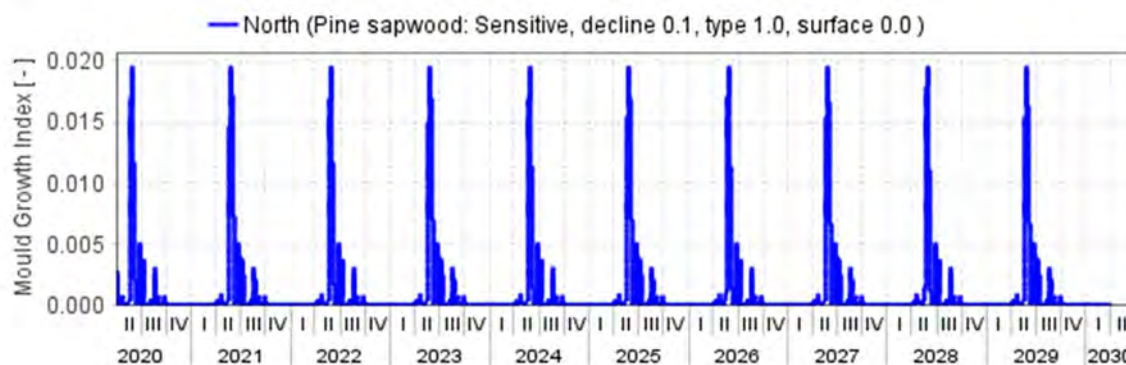


Figure 24: NatHERS CZ 61 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

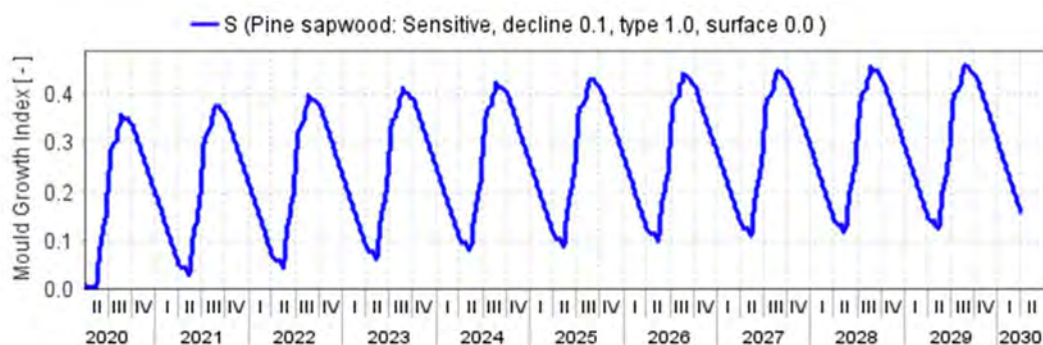


Figure 25: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

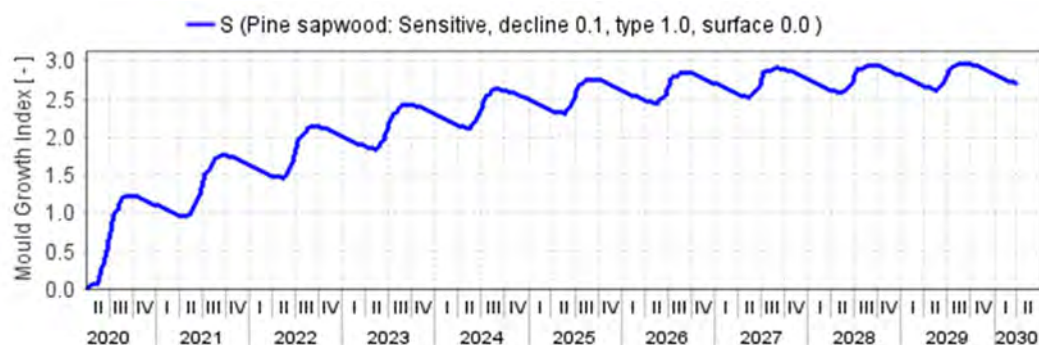


Figure 26: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

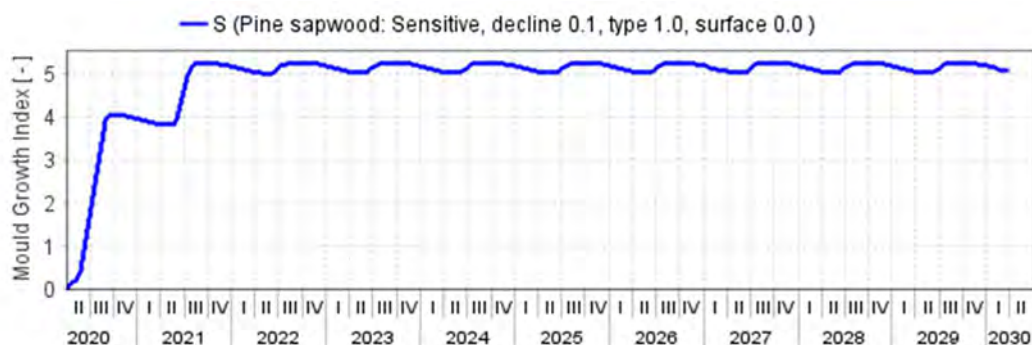


Figure 27: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

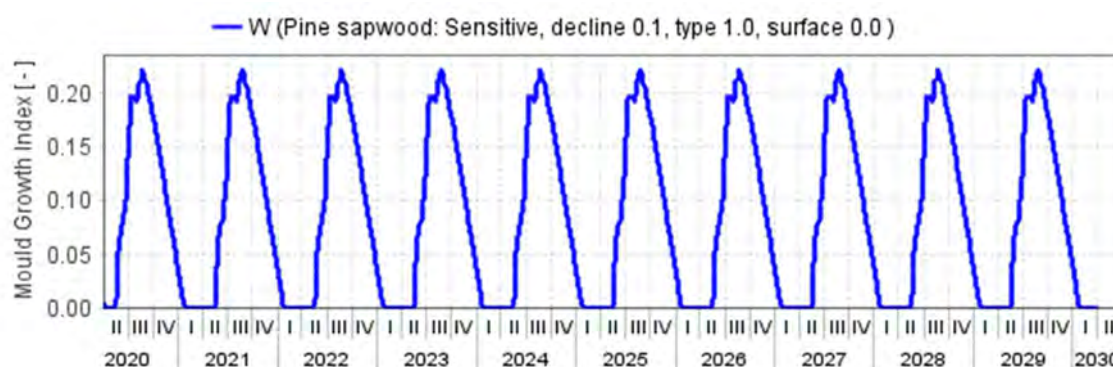


Figure 28: NatHERS CZ 61 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

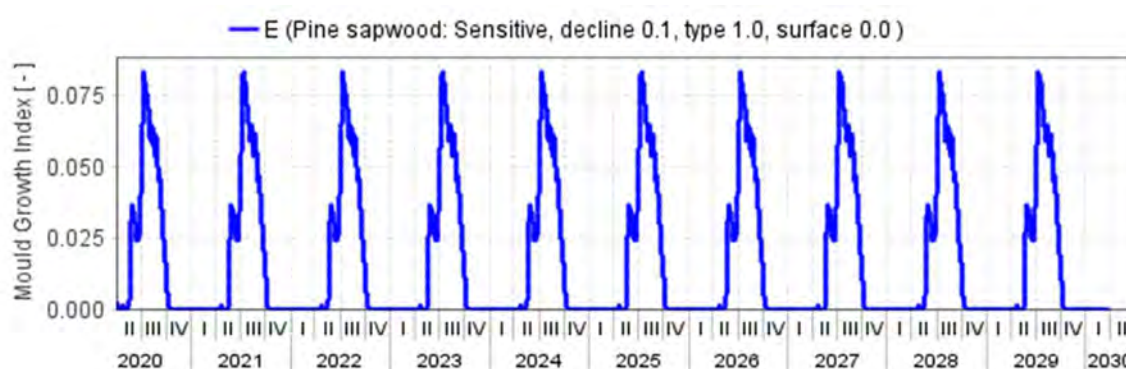


Figure 29: NatHERS CZ 61 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 6. Climate zone 63 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer (2.8 kg/m<sup>3</sup>)

| Water Content [kg/m³]                                 |       |       |      |        |
|-------------------------------------------------------|-------|-------|------|--------|
| Layer/Material                                        | Start | End   | Min. | Max.   |
| *Acrylic Stucco - unlocked VBA                        | 96.93 | 99.73 | 8.66 | 123.74 |
| *Polystyrene, extruded - unlocked VBA 50mm R1         | 0.21  | 0.19  | 0.09 | 0.23   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4         | 0.00  | 0.00  | 0.00 | 0.00   |
| *thermalan iso / swisswool iso / tirolwool iso - unlo | 3.34  | 2.65  | 1.40 | 3.34   |
| *Gypsum Board (USA) - UTAS -VBA                       | 6.19  | 4.86  | 2.43 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

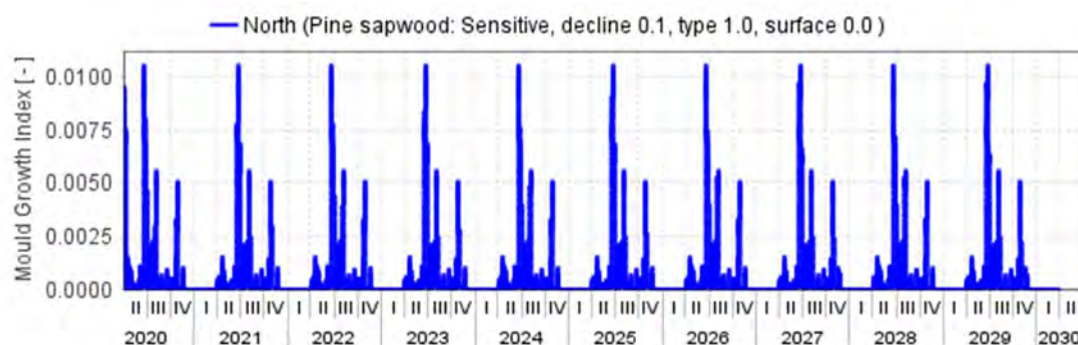


Figure 30: NatHERS CZ 63 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 10

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer (7.89 kg/m³)

| Water Content [kg/m³]                                 |       |        |      |        |
|-------------------------------------------------------|-------|--------|------|--------|
| Layer/Material                                        | Start | End    | Min. | Max.   |
| *Acrylic Stucco - unlocked VBA                        | 96.93 | 104.82 | 9.14 | 129.10 |
| *Polystyrene, extruded - unlocked VBA 50mm R1         | 0.21  | 0.19   | 0.11 | 0.25   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4         | 0.00  | 0.00   | 0.00 | 0.01   |
| *thermalan iso / swisswool iso / tirolwool iso - unlo | 3.34  | 2.81   | 1.50 | 3.34   |
| *Gypsum Board (USA) - UTAS -VBA                       | 6.19  | 4.92   | 2.46 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

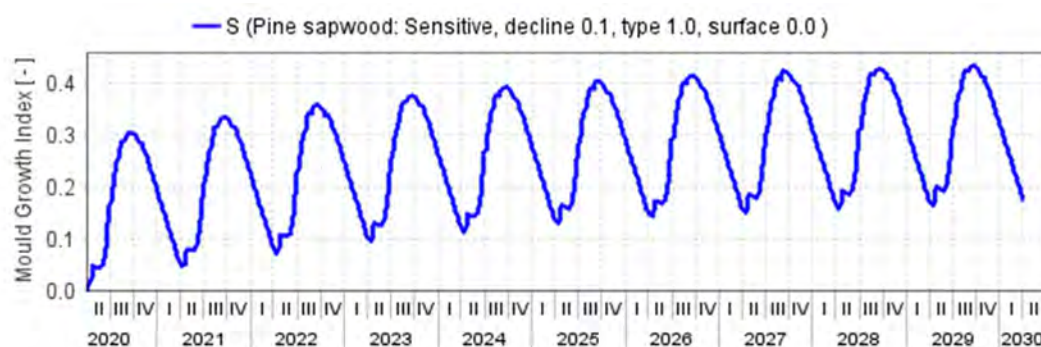


Figure 31: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

### Southern orientation ACR 7.5

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer (7.92 kg/m<sup>3</sup>)

| Water Content [kg/m³]                                     |       |        |      |        |
|-----------------------------------------------------------|-------|--------|------|--------|
| Layer/Material                                            | Start | End    | Min. | Max.   |
| *Acrylic Stucco - unlocked VBA                            | 96.93 | 104.85 | 9.16 | 129.19 |
| *Polystyrene, extruded - unlocked VBA 50mm R1.3           | 0.21  | 0.19   | 0.11 | 0.27   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4             | 0.00  | 0.00   | 0.00 | 0.01   |
| *thermalan iso / swisswool iso / tirolwool iso - unlocked | 3.34  | 2.84   | 1.58 | 3.43   |
| *Gypsum Board (USA) - UTAS -VBA                           | 6.19  | 4.93   | 2.64 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 3.0 in the final year. This wall type requires further investigation.

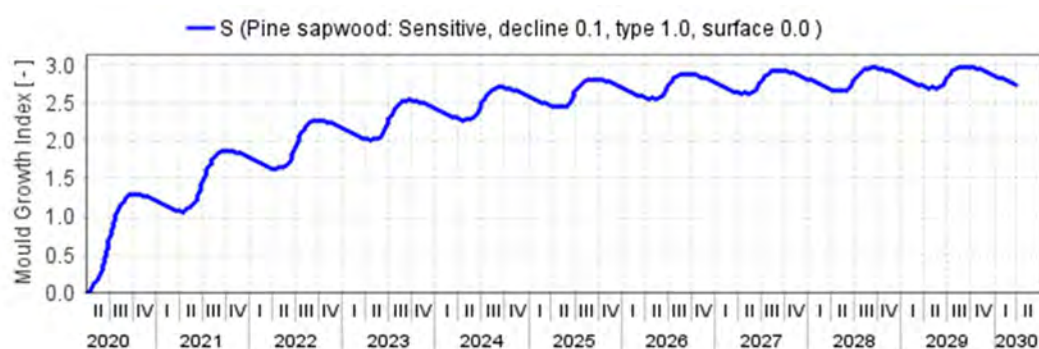


Figure 32: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

### Southern orientation ACR 5.0

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer (7.94 kg/m<sup>3</sup>)

| Water Content [kg/m³]                                     |       |        |      |        |
|-----------------------------------------------------------|-------|--------|------|--------|
| Layer/Material                                            | Start | End    | Min. | Max.   |
| *Acrylic Stucco - unlocked VBA                            | 96.93 | 104.87 | 9.18 | 129.23 |
| *Polystyrene, extruded - unlocked VBA 50mm R1.3           | 0.21  | 0.19   | 0.11 | 0.35   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4             | 0.00  | 0.00   | 0.00 | 0.04   |
| *thermalan iso / swisswool iso / tirolwool iso - unlocked | 3.34  | 2.87   | 1.78 | 4.48   |
| *Gypsum Board (USA) - UTAS -VBA                           | 6.19  | 4.95   | 2.90 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.



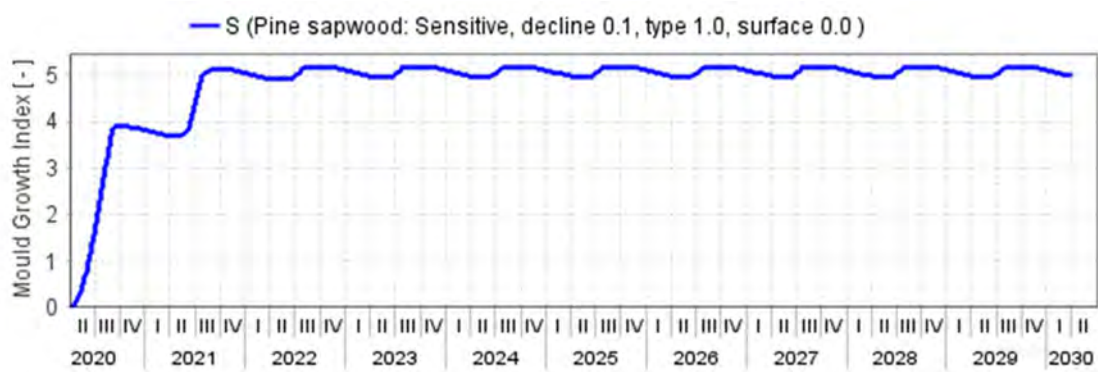


Figure 33: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer ( $5.75 \text{ kg/m}^3$ )

| Water Content [ $\text{kg/m}^3$ ]                     |       |        |      |        |
|-------------------------------------------------------|-------|--------|------|--------|
| Layer/Material                                        | Start | End    | Min. | Max.   |
| *Acrylic Stucco - unlocked VBA                        | 96.93 | 102.68 | 7.49 | 125.55 |
| *Polystyrene, extruded - unlocked VBA 50mm R1         | 0.21  | 0.19   | 0.09 | 0.24   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4         | 0.00  | 0.00   | 0.00 | 0.00   |
| *thermalan iso / swisswool iso / tirolwool iso - unlo | 3.34  | 2.74   | 1.42 | 3.34   |
| *Gypsum Board (USA) - UTAS -VBA                       | 6.19  | 4.89   | 2.42 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

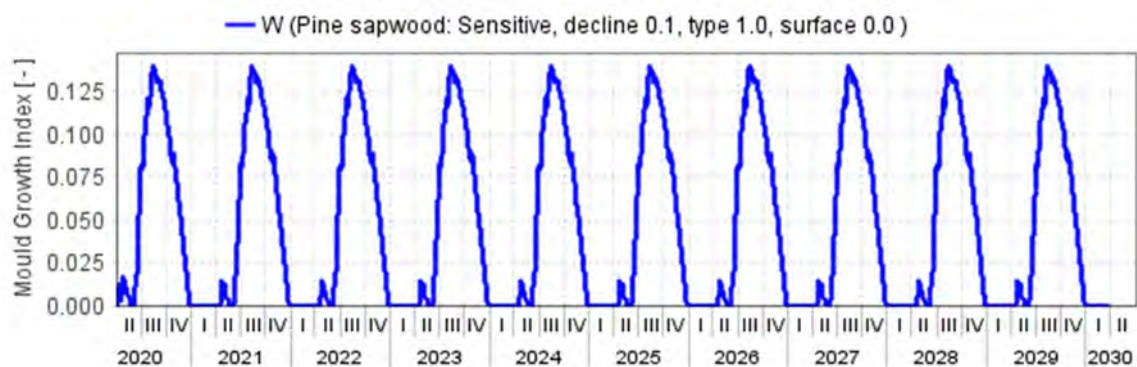


Figure 34: NatHERS CZ 63 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer ( $5.08 \text{ kg/m}^3$ )

| Water Content [kg/m³]                                 |       |        |      |        |
|-------------------------------------------------------|-------|--------|------|--------|
| Layer/Material                                        | Start | End    | Min. | Max.   |
| *Acrylic Stucco - unlocked VBA                        | 96.93 | 102.01 | 7.54 | 125.14 |
| *Polystyrene, extruded - unlocked VBA 50mm R1         | 0.21  | 0.19   | 0.07 | 0.23   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4         | 0.00  | 0.00   | 0.00 | 0.00   |
| *thermalan iso / swisswool iso / tirolwool iso - unlo | 3.34  | 2.68   | 1.33 | 3.34   |
| *Gypsum Board (USA) - UTAS -VBA                       | 6.19  | 4.86   | 2.40 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

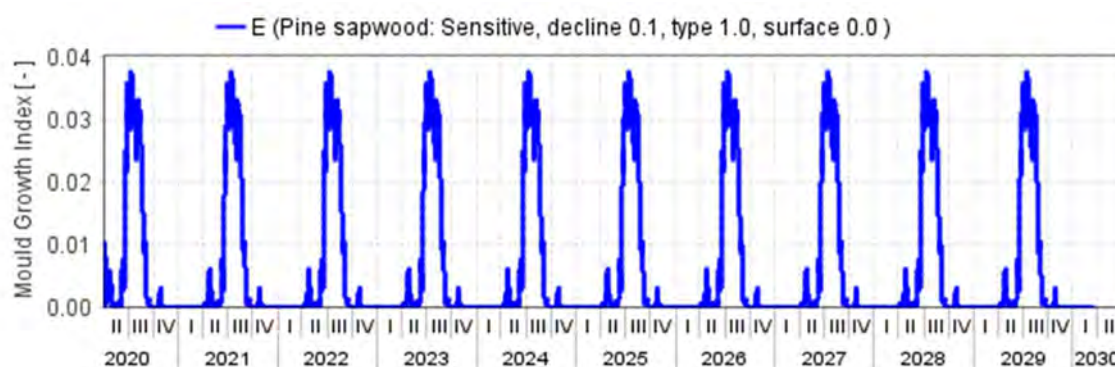


Figure 35: NatHERS CZ 63 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 7. Climate zone 64 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

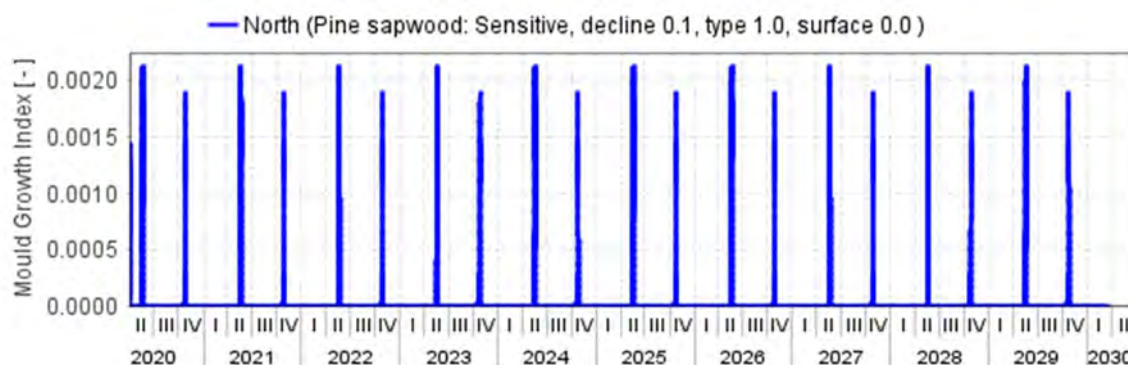


Figure 36: NatHERS CZ 64 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame



#### Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

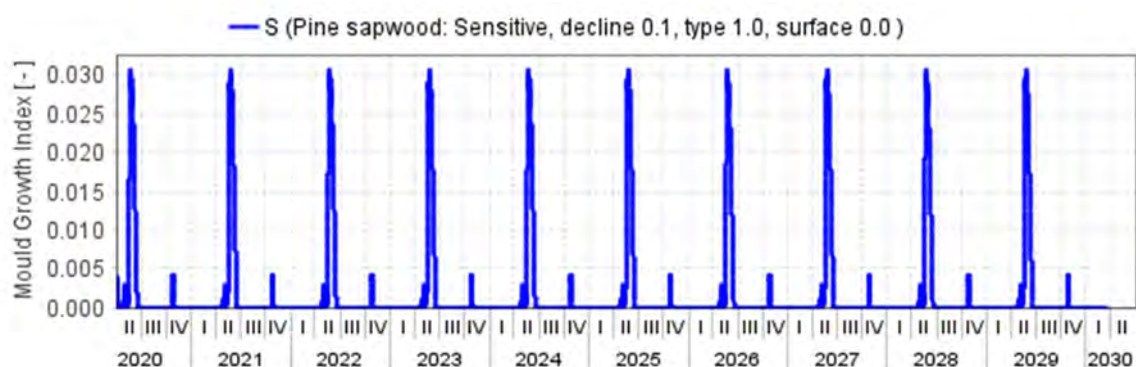


Figure 37: NatHERS CZ 64 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

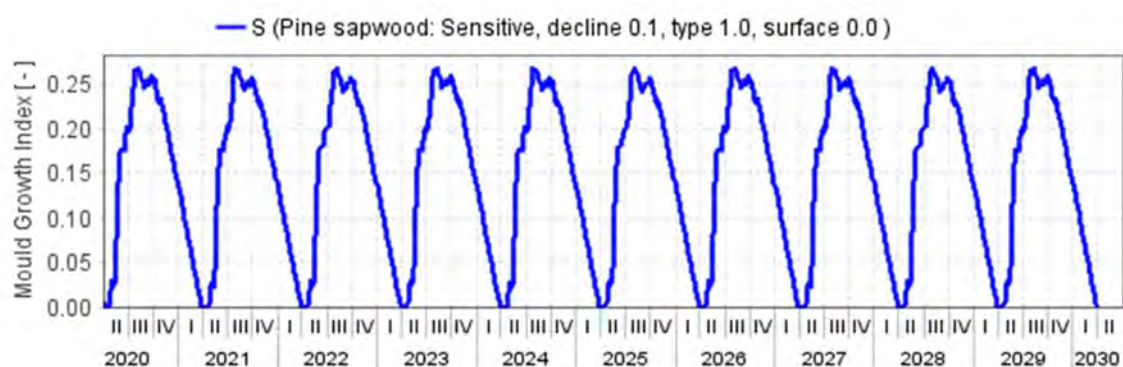


Figure 38: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

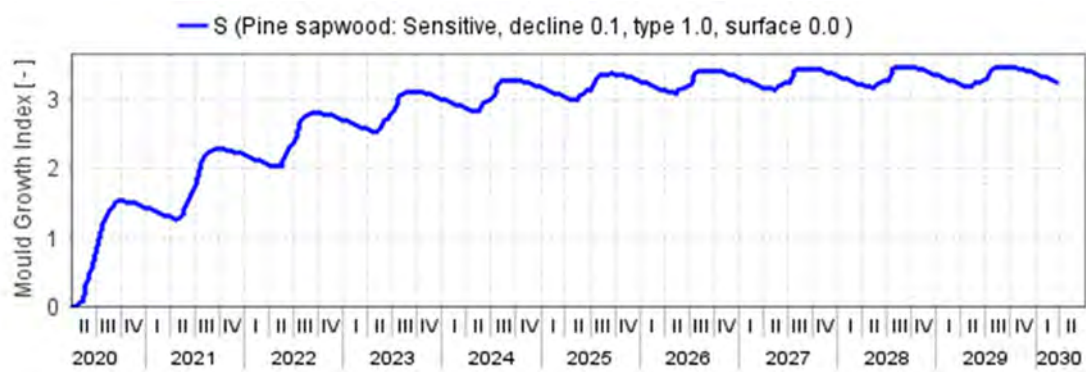


Figure 39: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

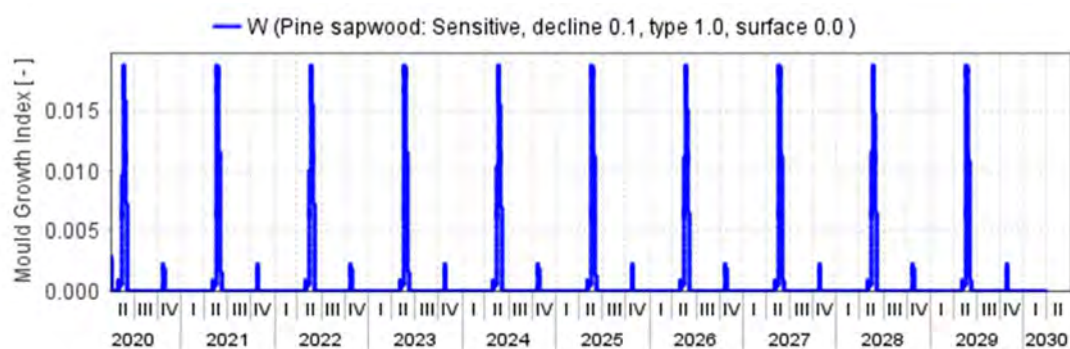


Figure 40: NatHERS CZ 64 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

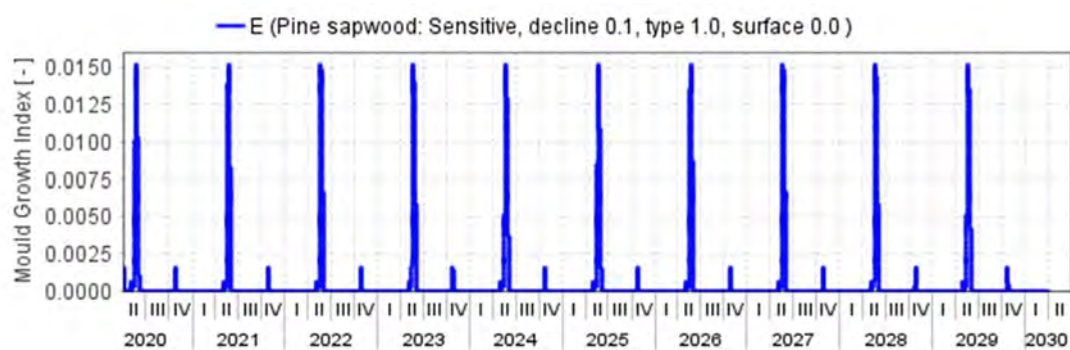


Figure 41: NatHERS CZ 64 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 8. Climate zone 66 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

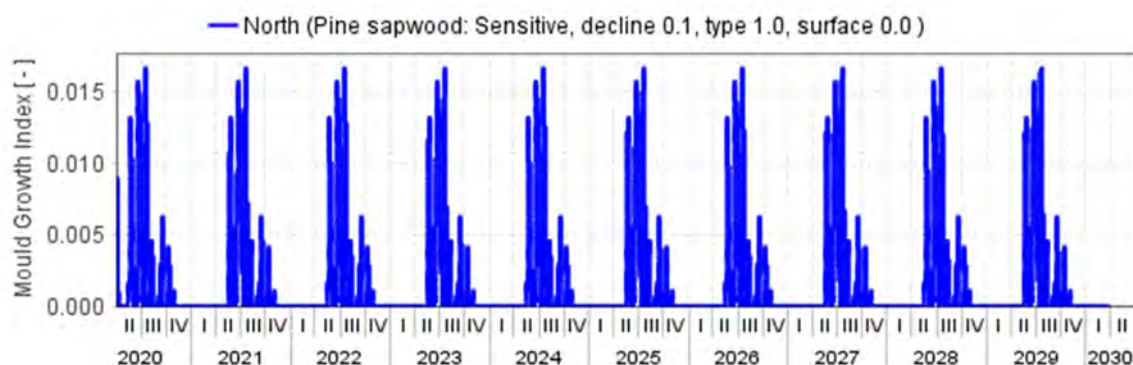


Figure 42: NatHERS CZ 66 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

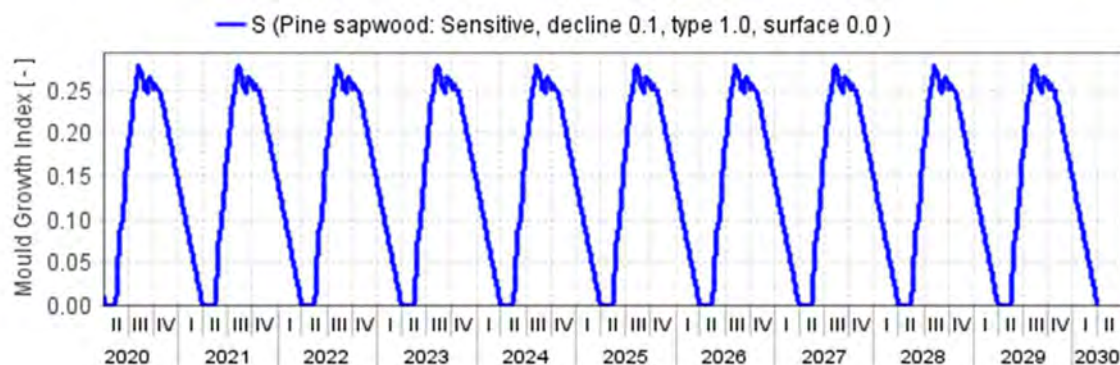


Figure 43: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 3.0 in the final years. This wall type requires further investigation.



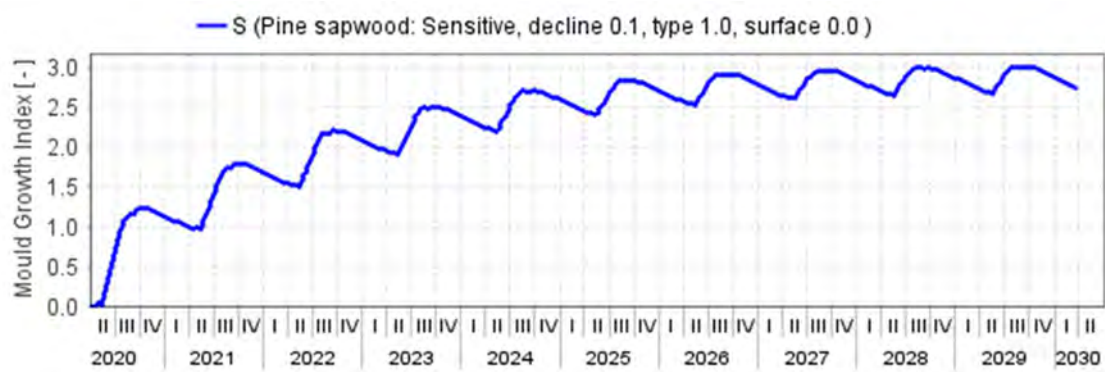


Figure 44: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

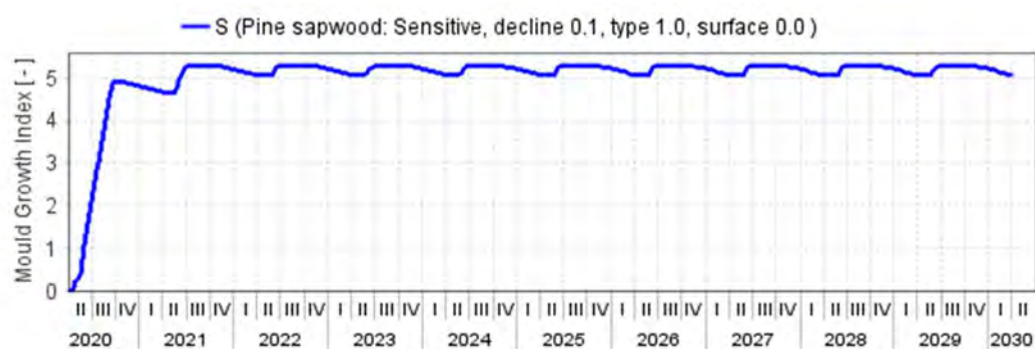


Figure 45: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

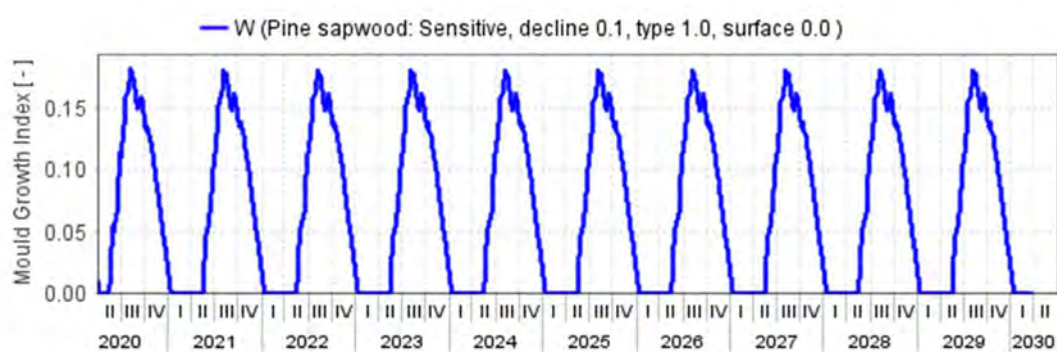


Figure 46: NatHERS CZ 66 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

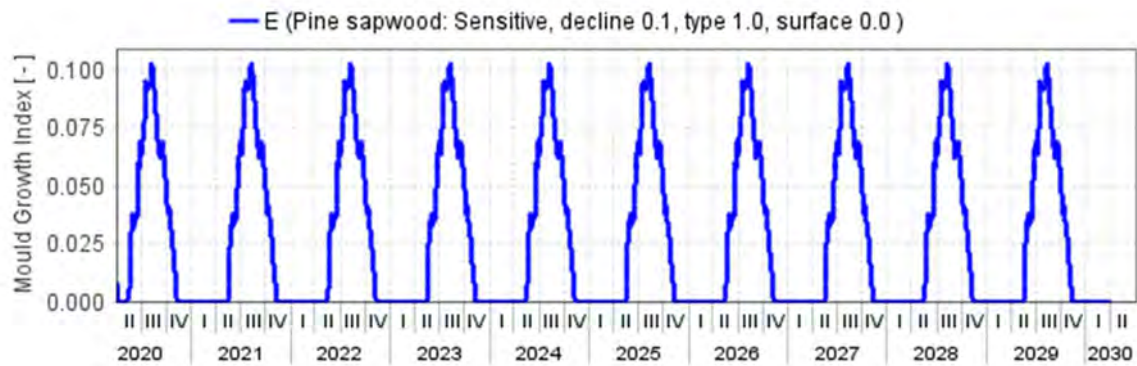


Figure 47: NatHERS CZ 66 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame



## 9. Climate zone 27 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

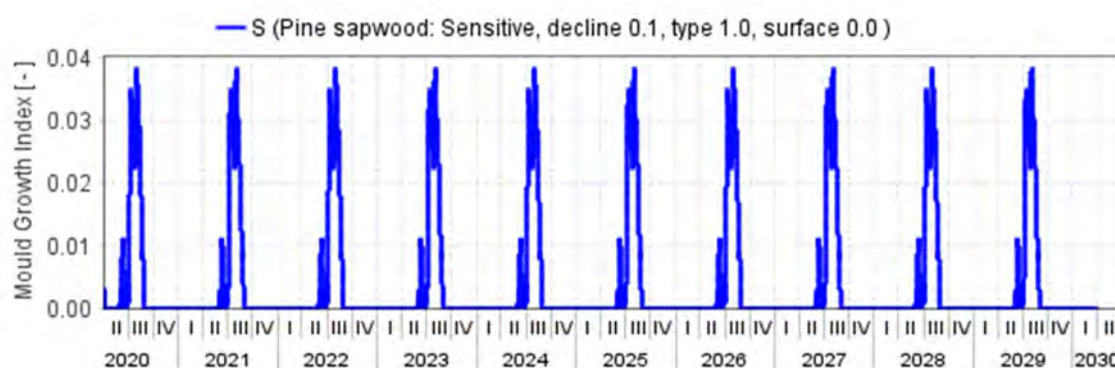


Figure 48: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

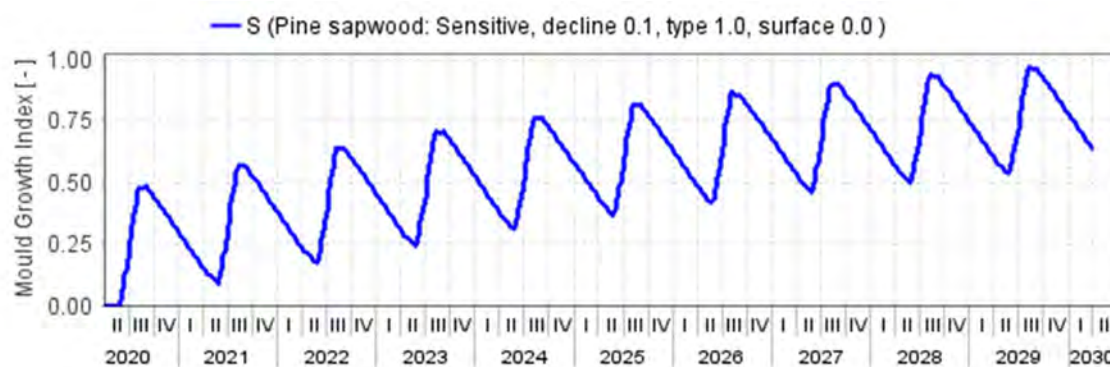


Figure 49: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

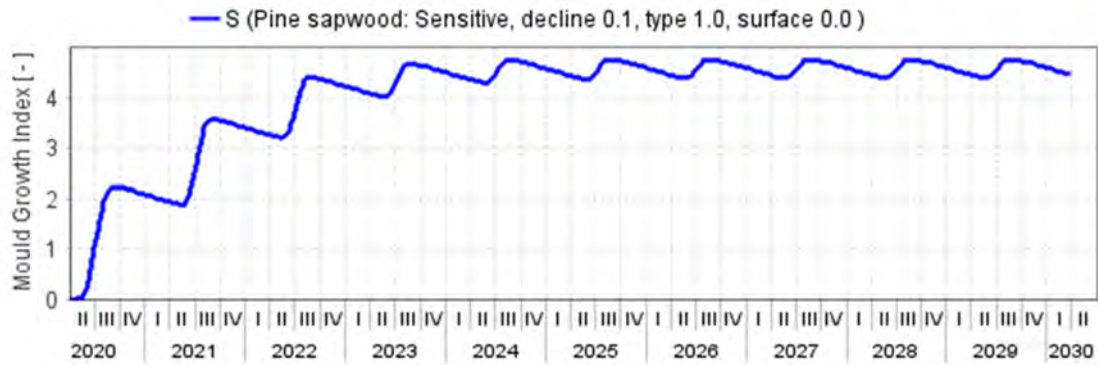


Figure 50: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

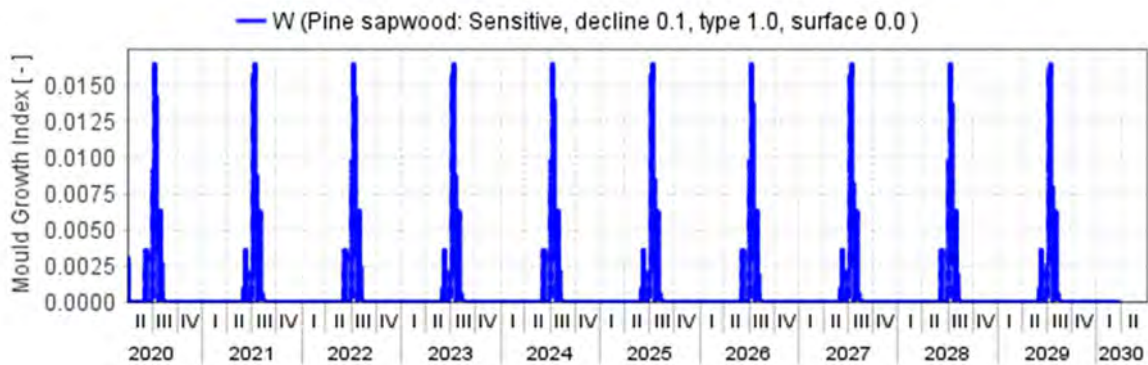


Figure 51: NatHERS CZ 27 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

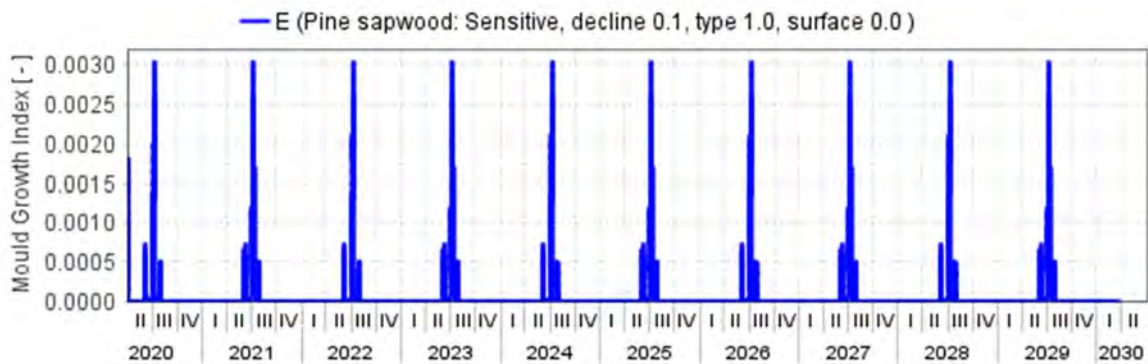


Figure 52: NatHERS CZ 27 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 10. Climate zone 61 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

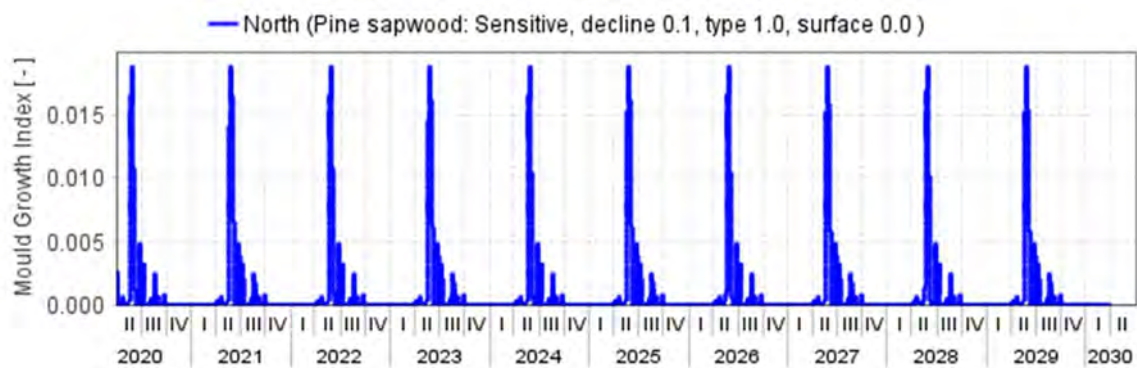


Figure 53: NatHERS CZ 61 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

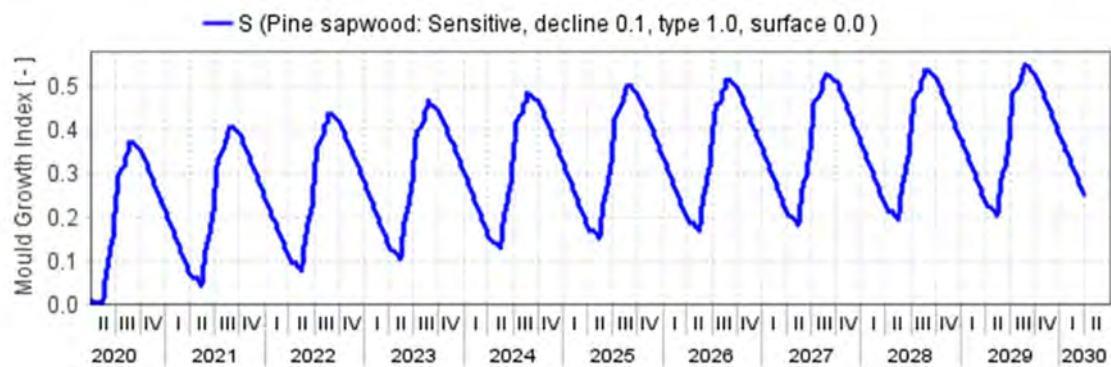


Figure 54: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the eighth year.



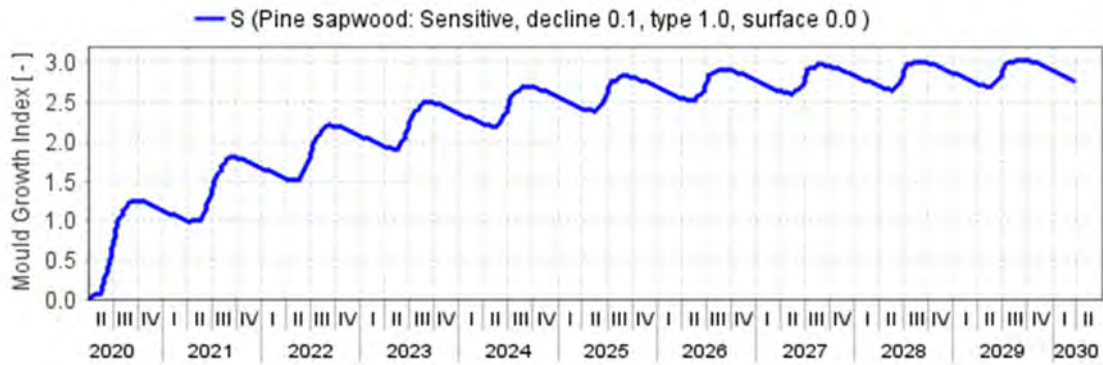


Figure 55: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

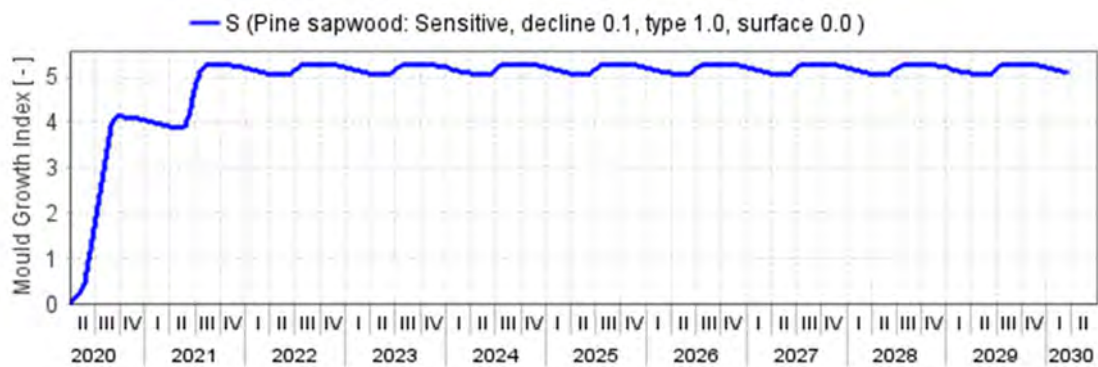


Figure 56: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

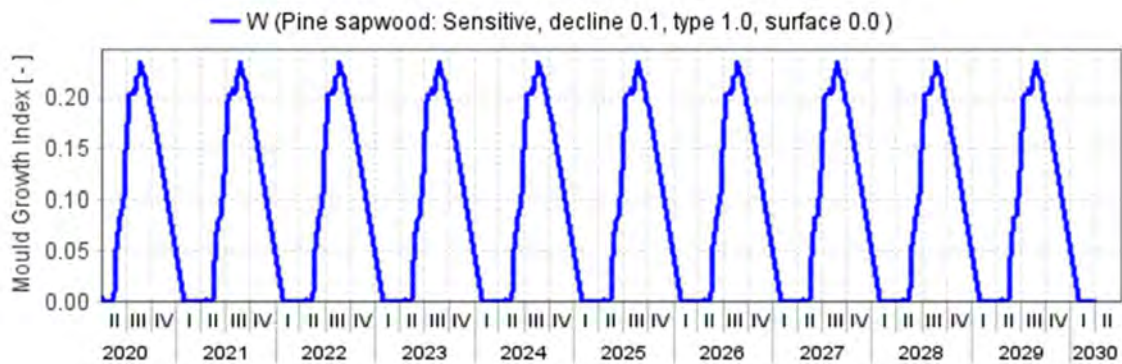


Figure 57: NatHERS CZ 61 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

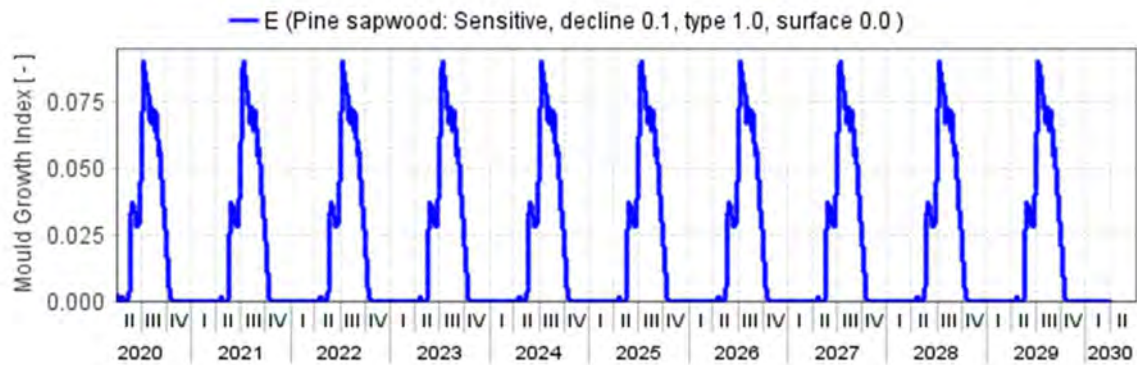


Figure 58: NatHERS CZ 61 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 11. Climate zone 66 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

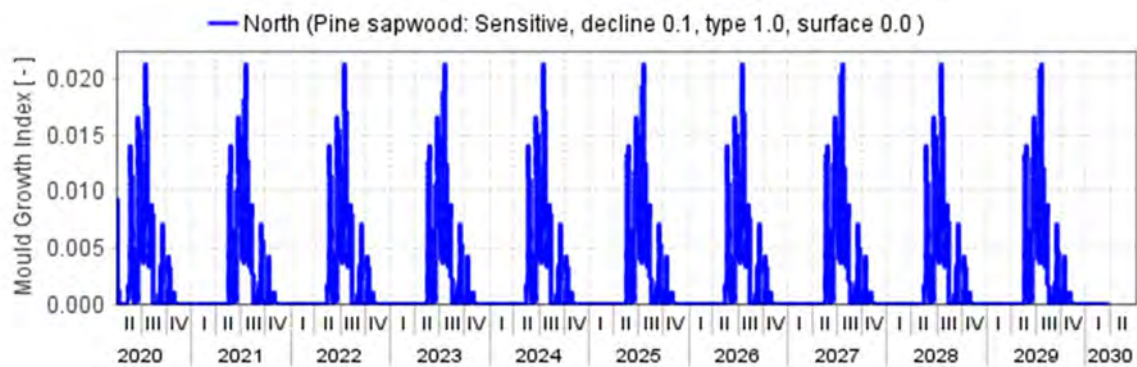


Figure 59: NatHERS CZ 66 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



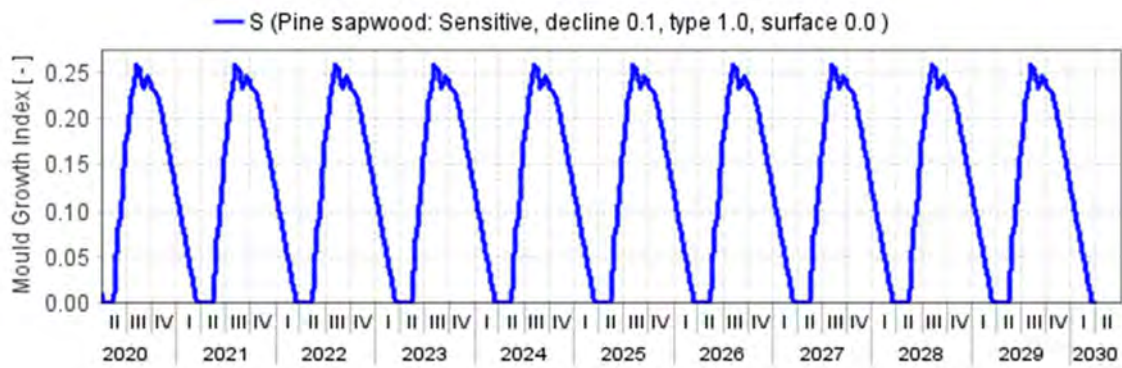


Figure 60: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the sixth year.

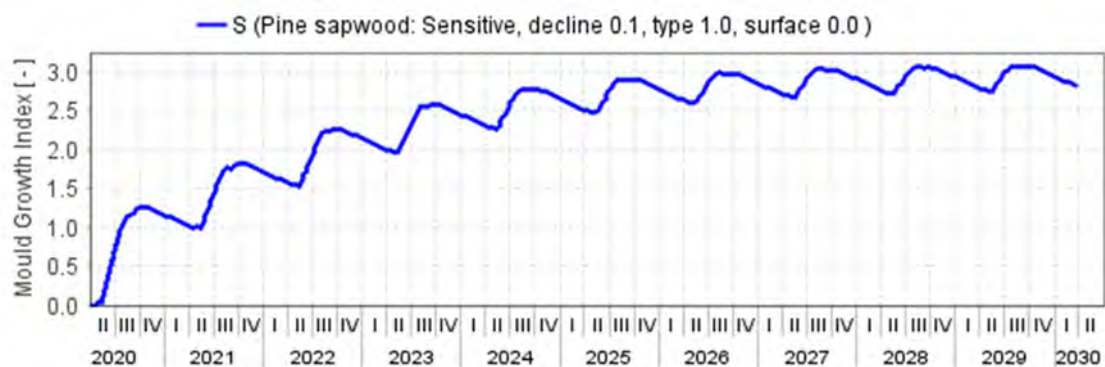


Figure 61: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

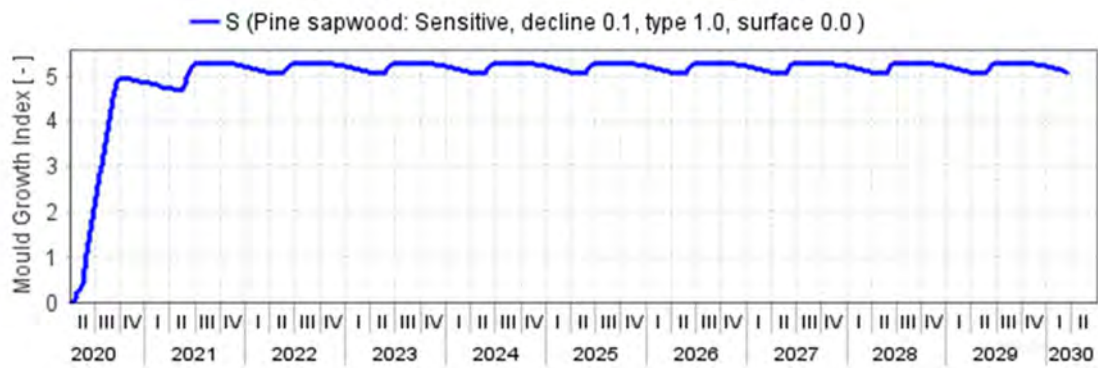


Figure 62: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

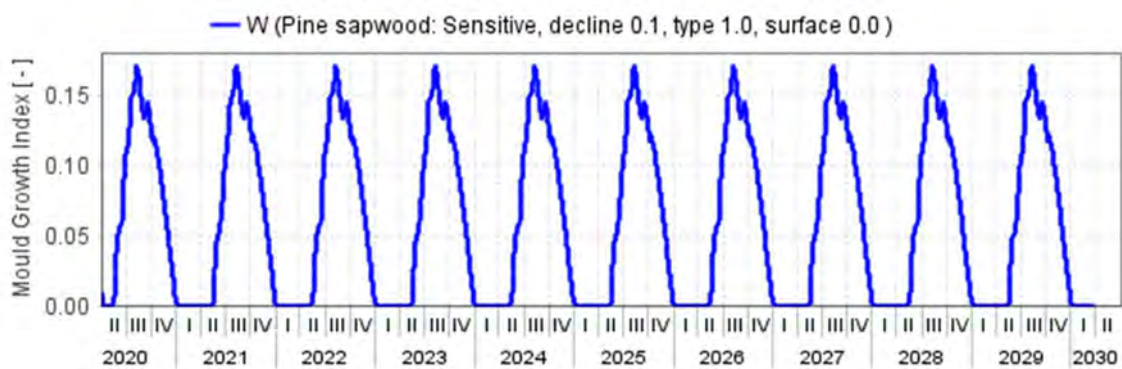
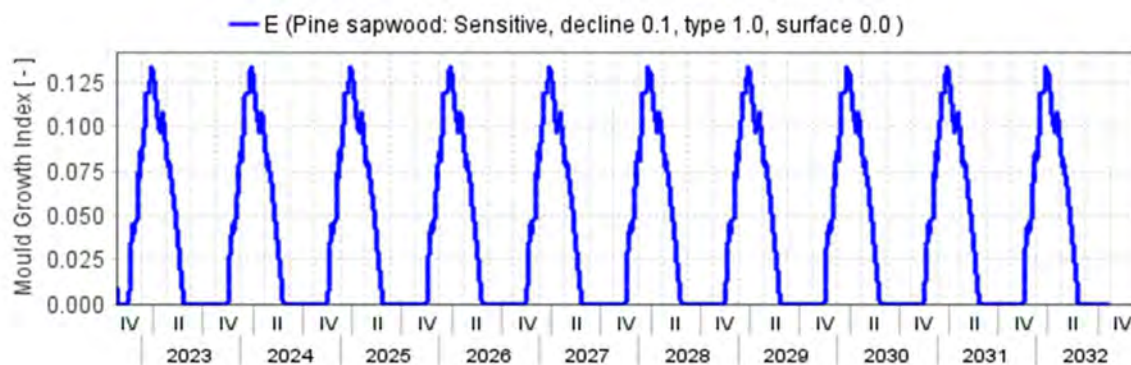


Figure 63: NatHERS CZ 66 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



*Figure 64: NatHERS CZ 66 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame*

# Moisture accumulation and mould growth for 7 Star housing Research Report 2

## Appendix 8: Hygrothermal simulation results – Expanded Polystyrene (EPS) cladding with insulated timber frame (Wall 7) Rev02 (09/12/2022)

## 1. Climate zone 21 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

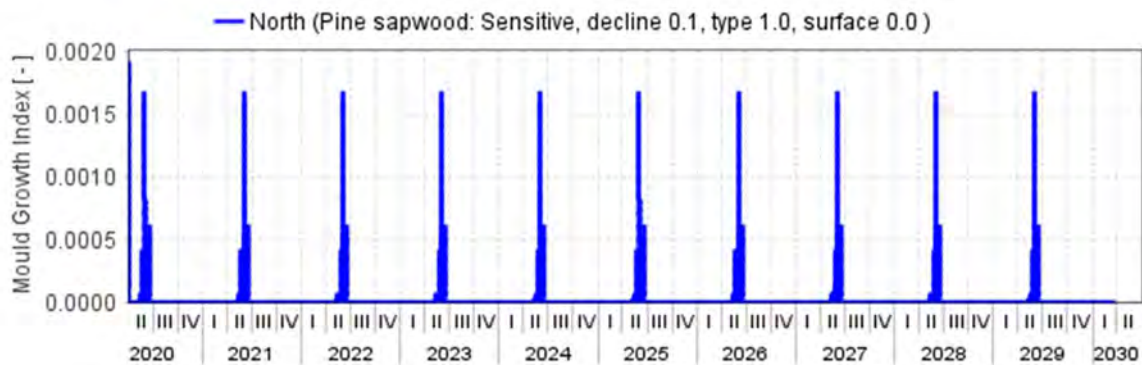


Figure 1: NatHERS CZ 21 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

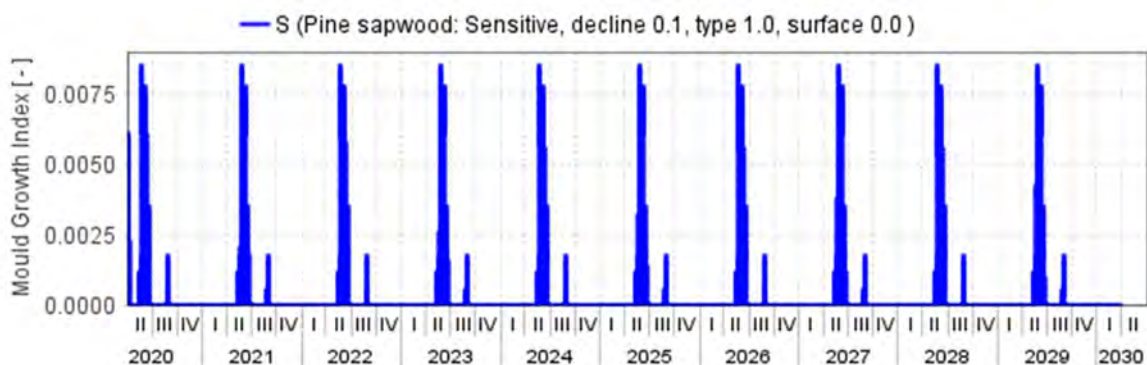


Figure 2: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



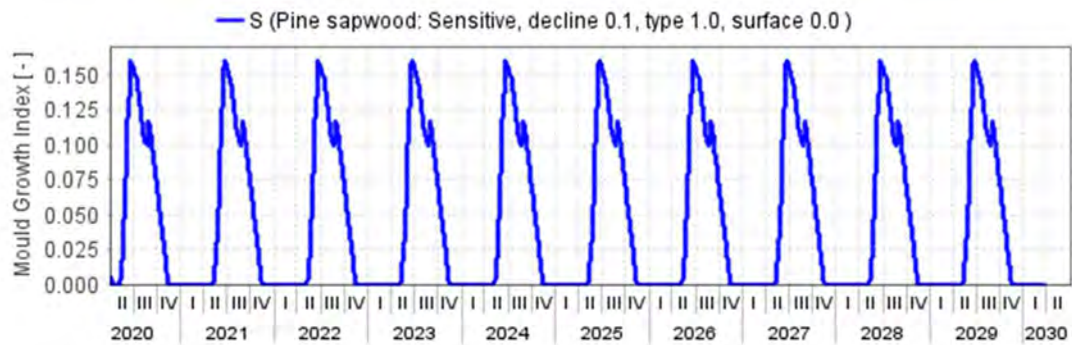


Figure 3: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 3.0 in the final years.

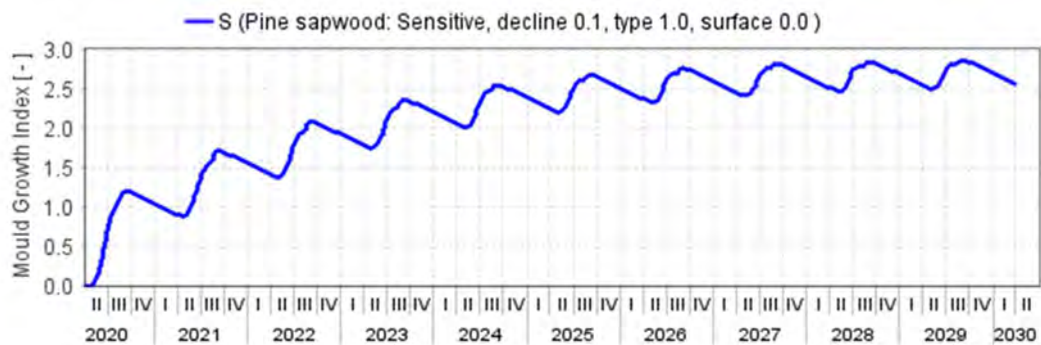


Figure 4: NatHERS CZ 21 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

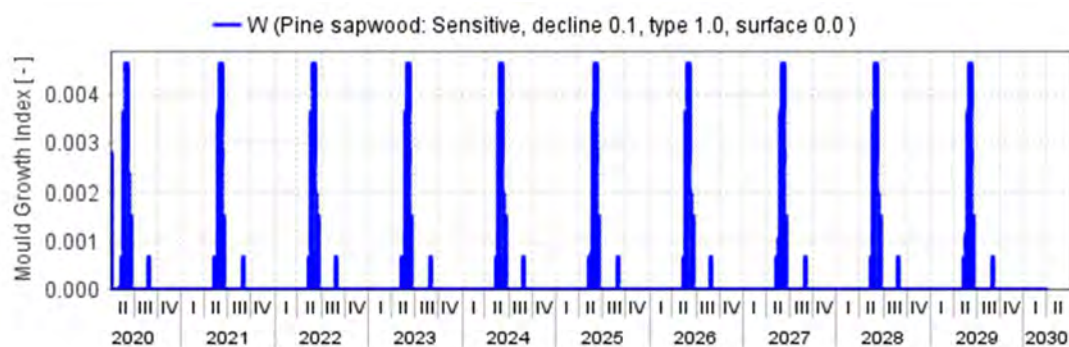


Figure 5: NatHERS CZ 21 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

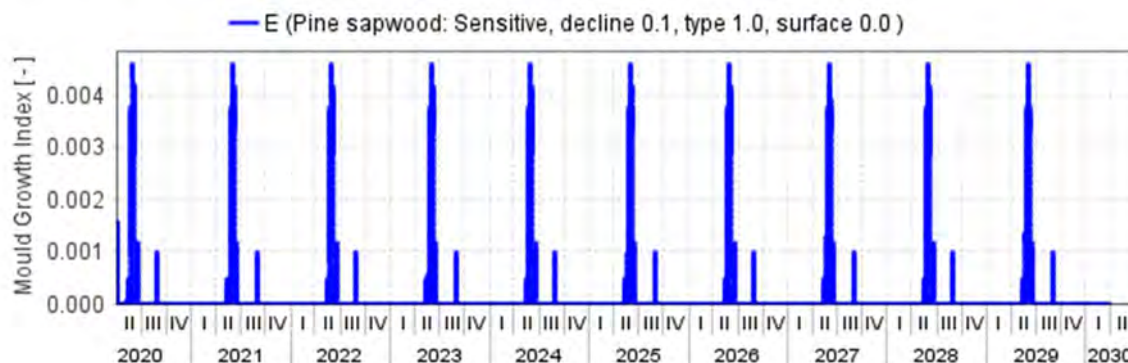


Figure 6: NatHERS CZ 21 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 2. Climate zone 22 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

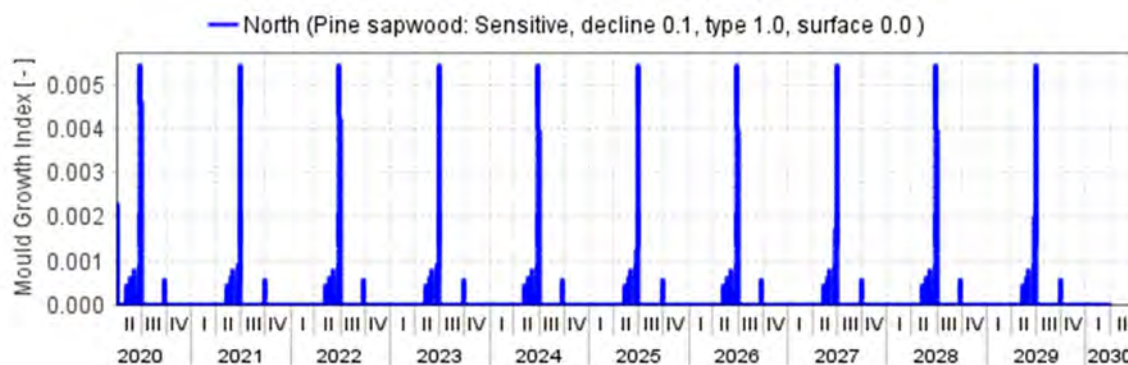


Figure 7: NatHERS CZ 22 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

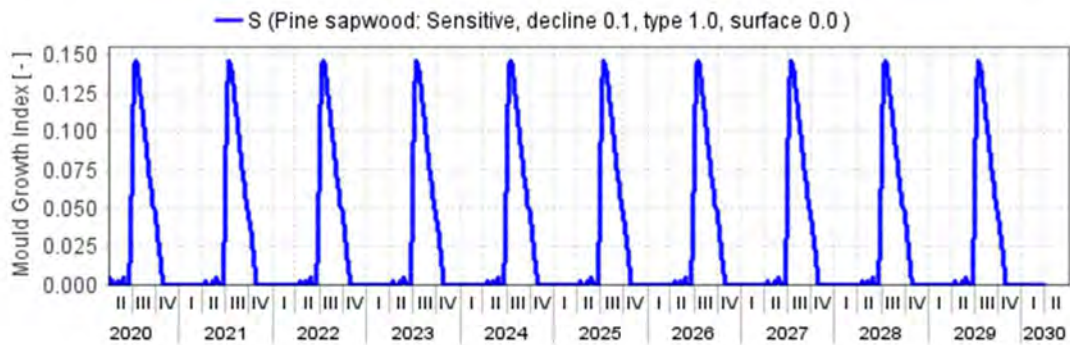


Figure 8: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fourth year. This wall type requires further investigation.

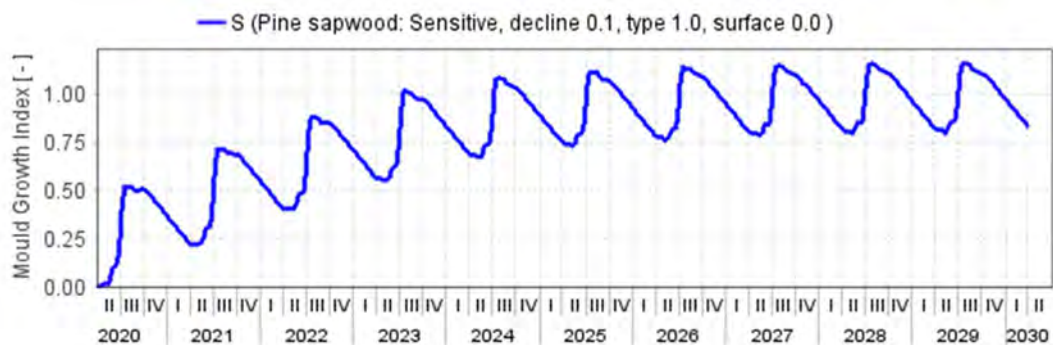


Figure 9: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

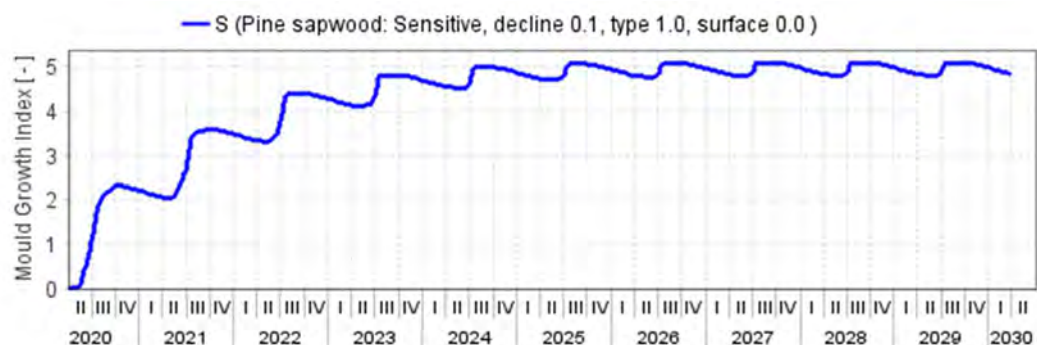


Figure 10: NatHERS CZ 22 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

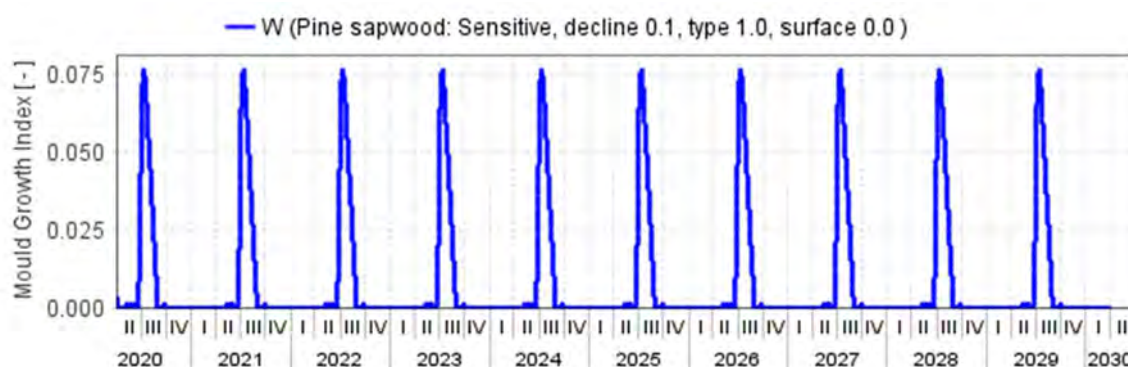


Figure 11: NatHERS CZ 22 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

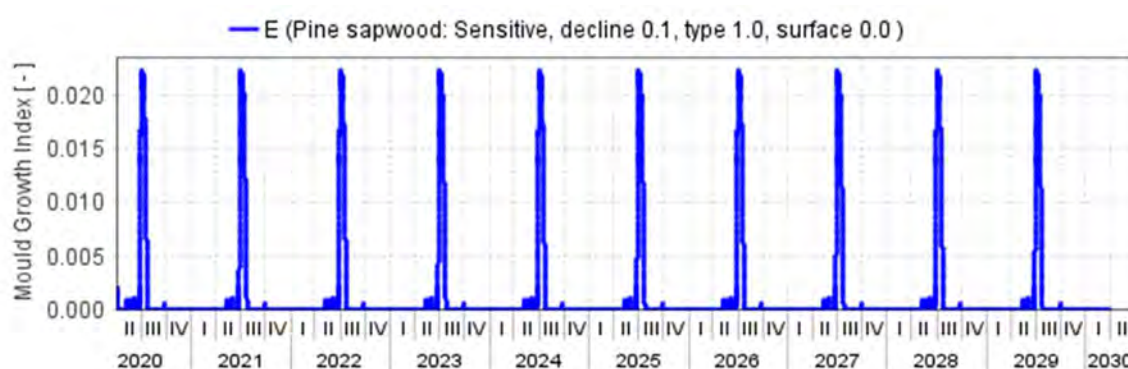


Figure 12: NatHERS CZ 22 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

### 3. Climate zone 27 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

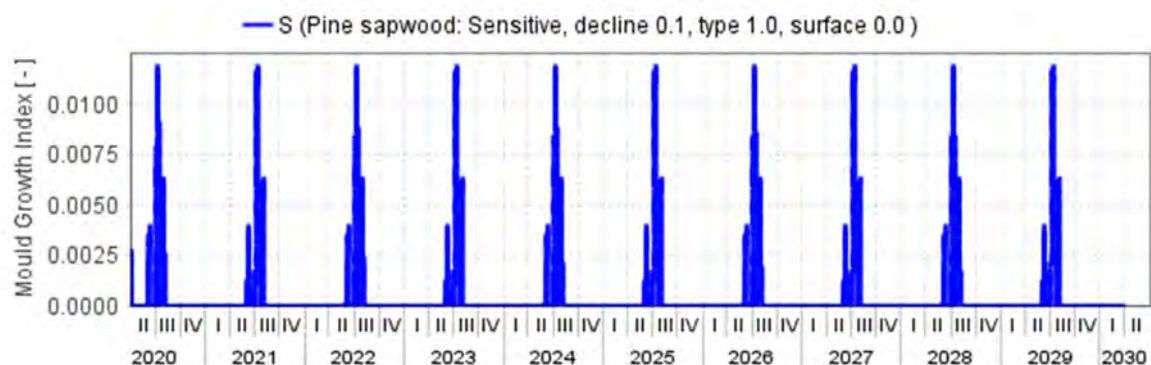


Figure 13: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

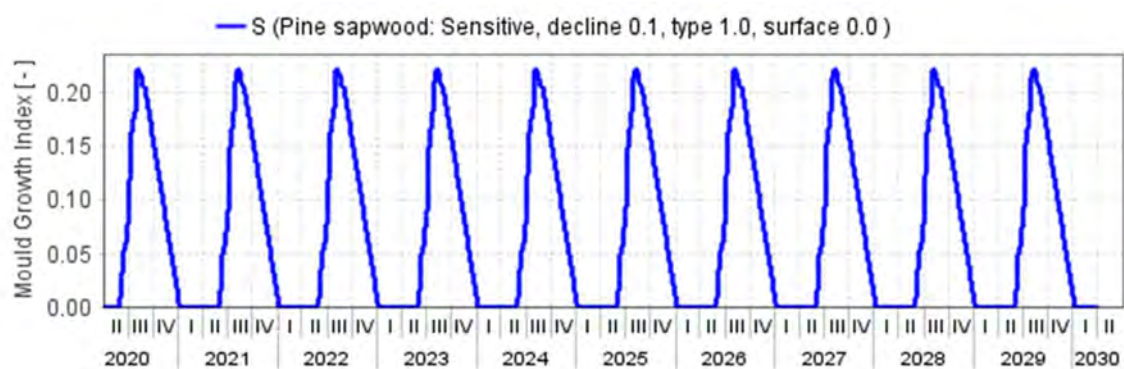


Figure 14: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.



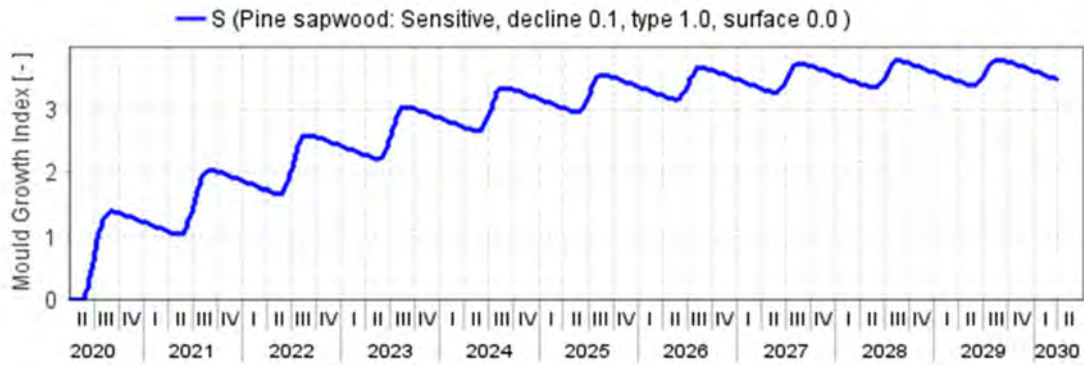


Figure 15: NatHERS CZ 27 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

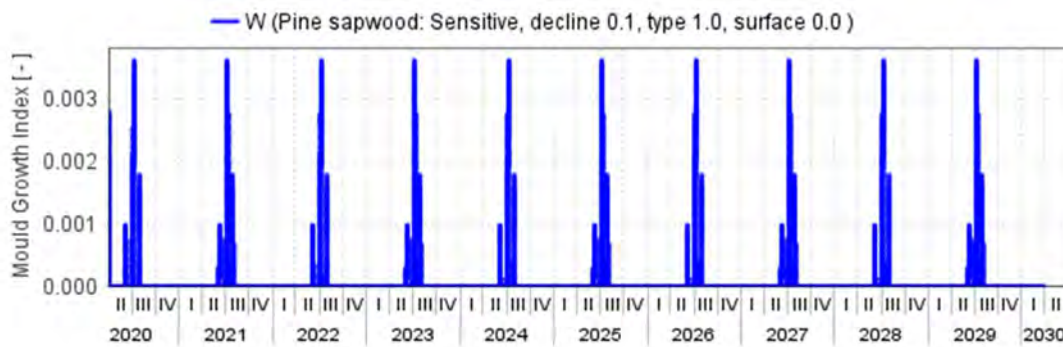


Figure 16: NatHERS CZ 27 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

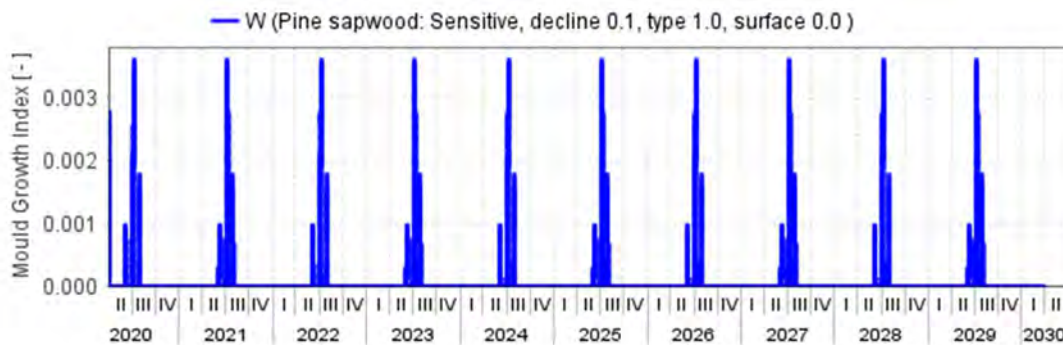


Figure 17: NatHERS CZ 27 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

#### 4. Climate zone 60 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

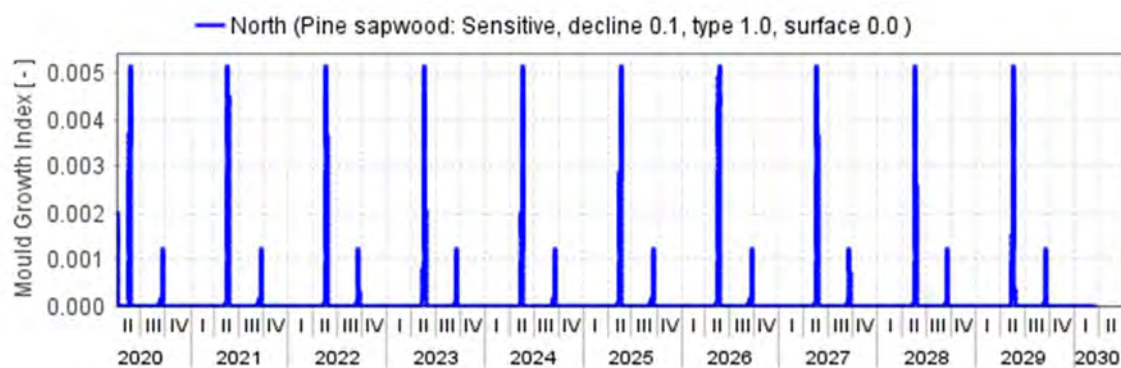


Figure 18: NatHERS CZ 60 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

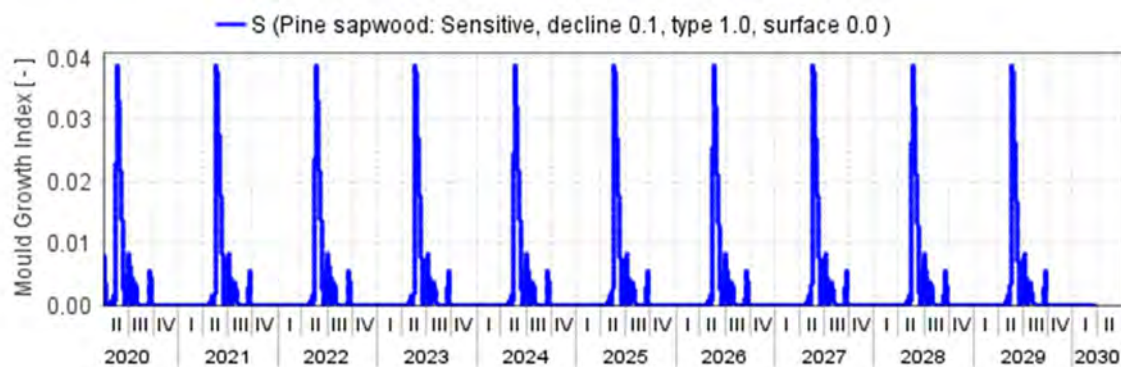


Figure 19: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

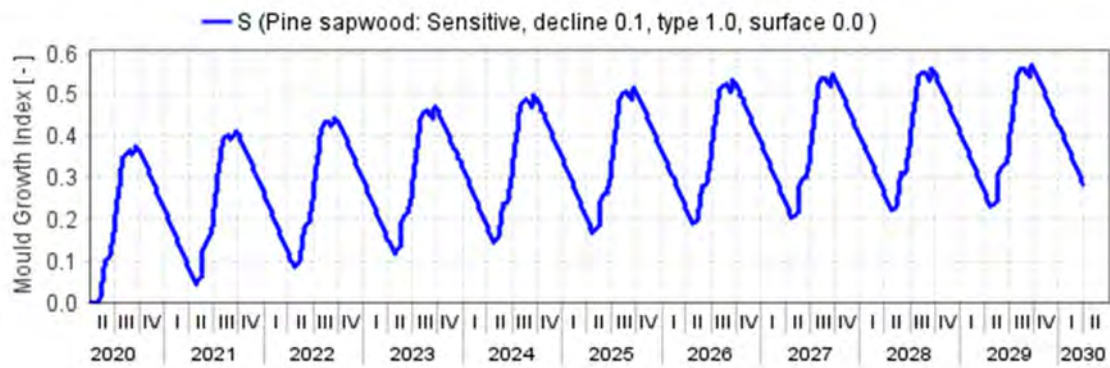


Figure 20: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

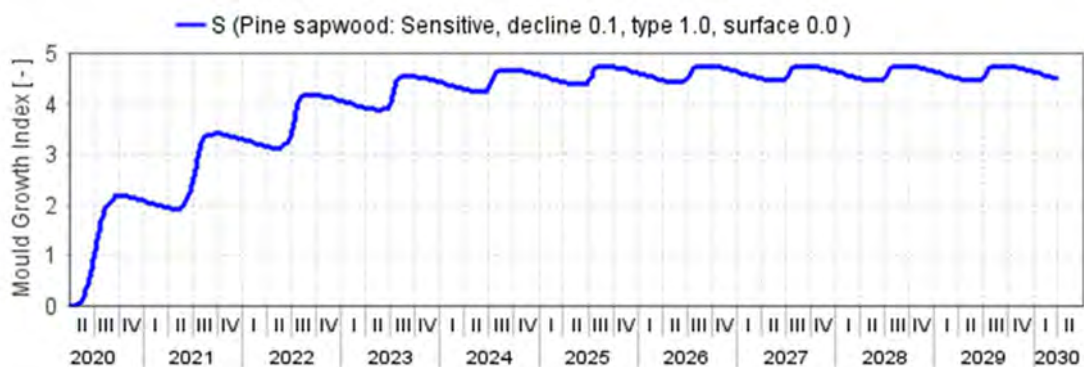


Figure 21: NatHERS CZ 60 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

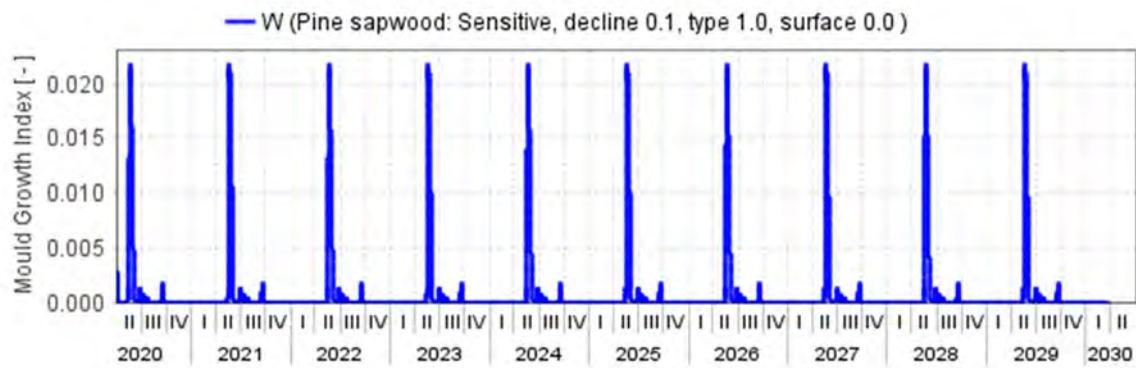


Figure 22: NatHERS CZ 60 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

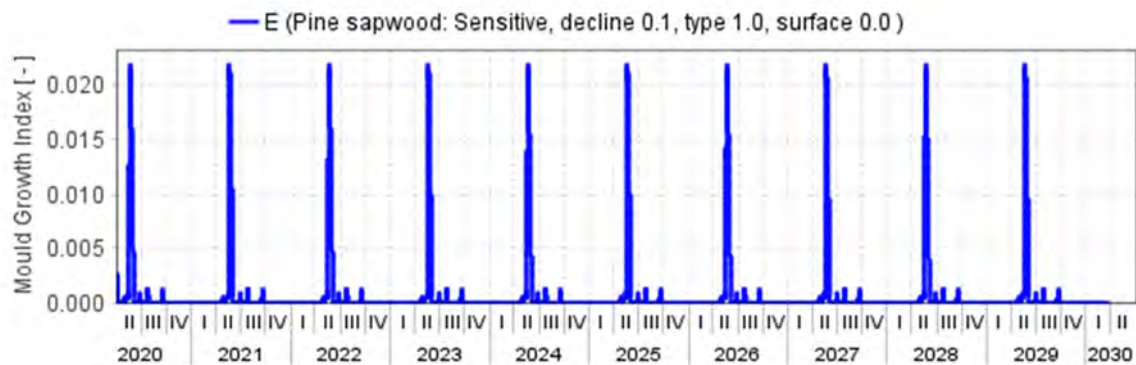


Figure 23: NatHERS CZ 60 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 5. Climate zone 61 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



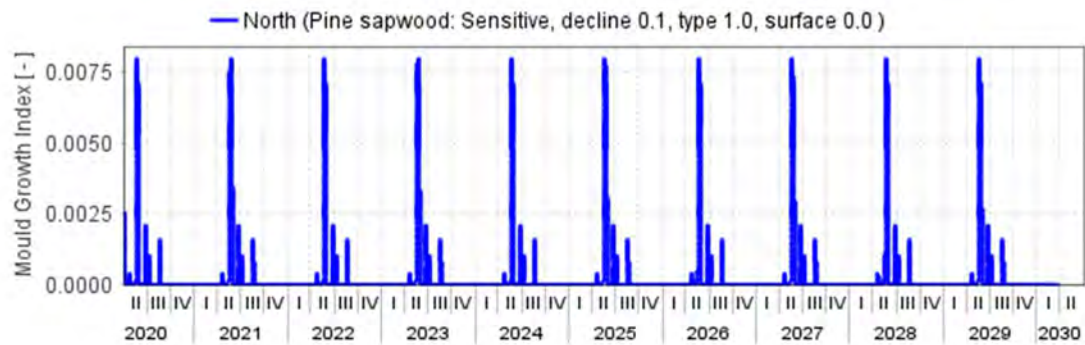


Figure 24: NatHERS CZ 61 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

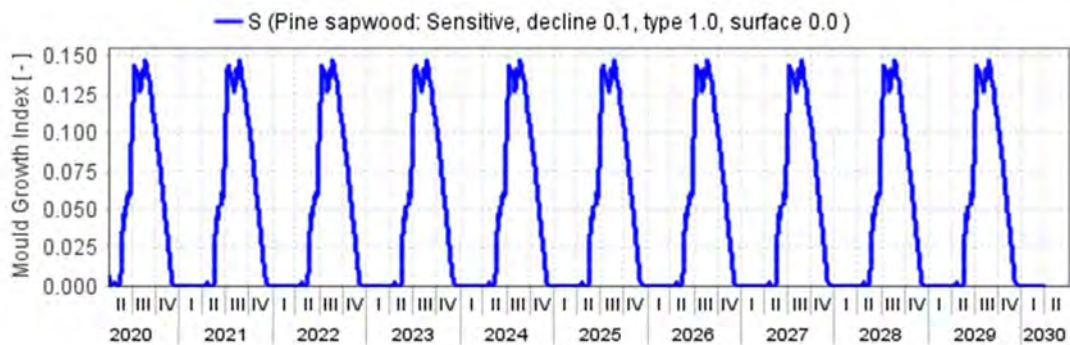


Figure 25: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

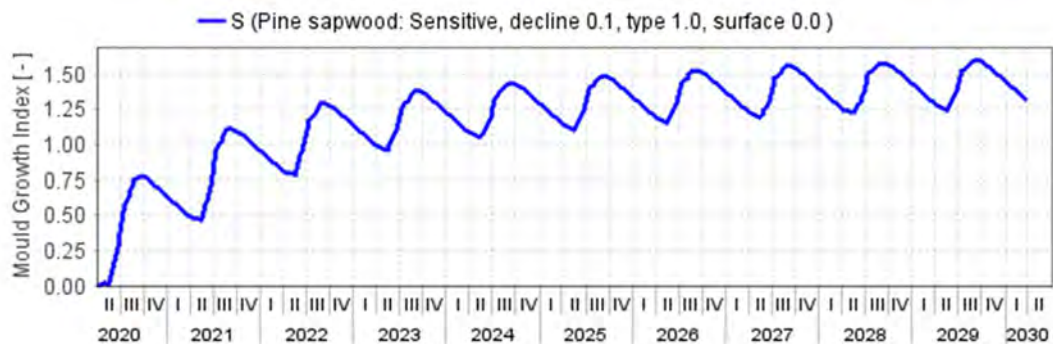


Figure 26: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame



#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

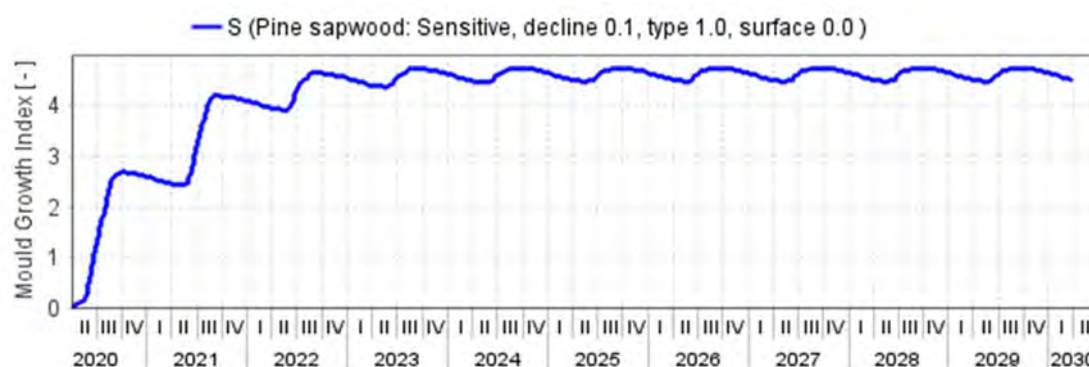


Figure 27: NatHERS CZ 61 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

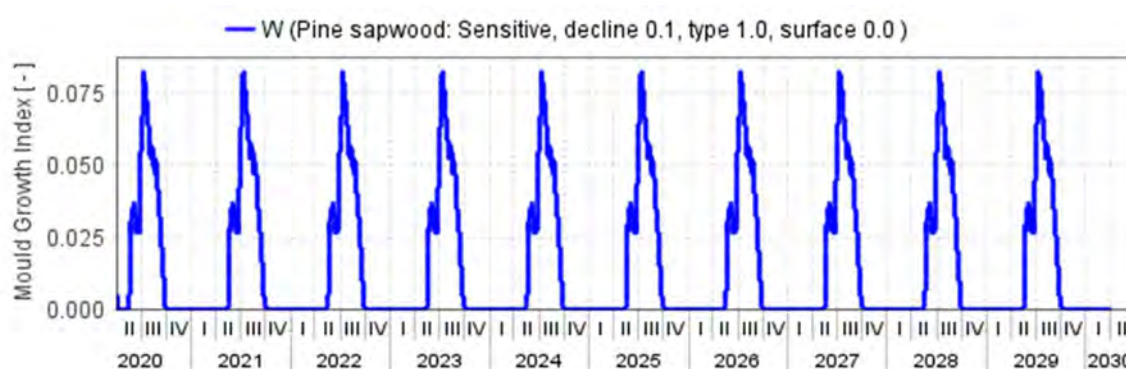


Figure 28: NatHERS CZ 61 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

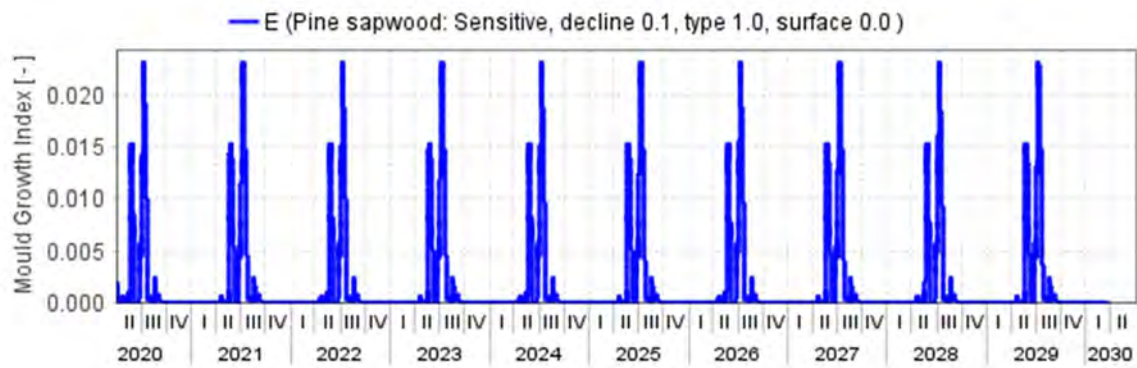


Figure 29: NatHERS CZ 61 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 6. Climate zone 63 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer ( $3.14 \text{ kg/m}^3$ )

| Water Content [kg/m <sup>3</sup> ]                    |       |        |      |        |
|-------------------------------------------------------|-------|--------|------|--------|
| Layer/Material                                        | Start | End    | Min. | Max.   |
| *Acrylic Stucco - unlocked VBA                        | 96.93 | 100.07 | 9.33 | 125.03 |
| *Polystyrene, expanded - unlocked VBA 50mm R          | 0.18  | 0.17   | 0.07 | 0.20   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4         | 0.00  | 0.00   | 0.00 | 0.00   |
| *thermalan iso / swisswool iso / tirolwool iso - unlo | 3.34  | 2.62   | 1.38 | 3.34   |
| *Gypsum Board (USA) - UTAS -VBA                       | 6.19  | 4.85   | 2.42 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

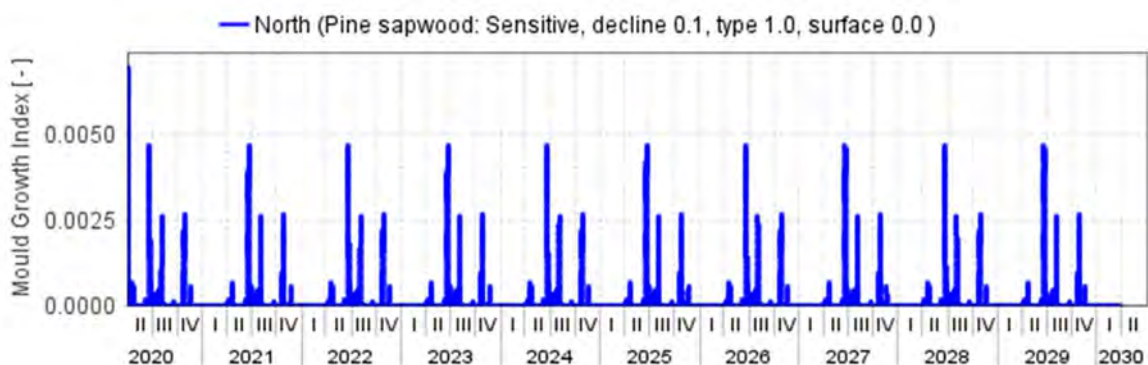


Figure 30: NatHERS CZ 63 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer ( $8.28 \text{ kg/m}^3$ )

Water Content [kg/m³]

| Layer/Material                                        | Start | End    | Min. | Max.   |
|-------------------------------------------------------|-------|--------|------|--------|
| *Acrylic Stucco - unlocked VBA                        | 96.93 | 105.21 | 9.83 | 129.15 |
| *Polystyrene, expanded - unlocked VBA 50mm R          | 0.18  | 0.17   | 0.08 | 0.23   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4         | 0.00  | 0.00   | 0.00 | 0.00   |
| *thermalan iso / swisswool iso / tirolwool iso - unlo | 3.34  | 2.77   | 1.47 | 3.34   |
| *Gypsum Board (USA) - UTAS -VBA                       | 6.19  | 4.90   | 2.43 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

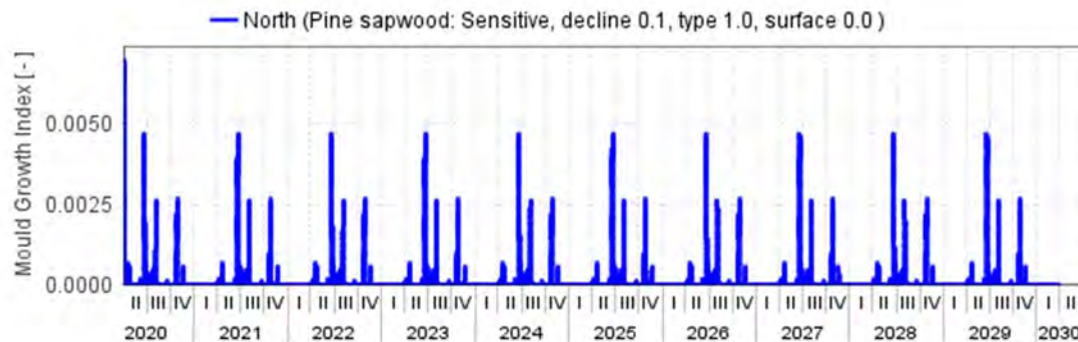


Figure 31: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer (8.32 kg/m³)

Water Content [kg/m³]

| Layer/Material                                        | Start | End    | Min. | Max.   |
|-------------------------------------------------------|-------|--------|------|--------|
| *Acrylic Stucco - unlocked VBA                        | 96.93 | 105.25 | 9.92 | 129.81 |
| *Polystyrene, expanded - unlocked VBA 50mm R1         | 0.18  | 0.17   | 0.08 | 0.25   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4         | 0.00  | 0.00   | 0.00 | 0.01   |
| *thermalan iso / swisswool iso / tirolwool iso - unlo | 3.34  | 2.79   | 1.55 | 3.34   |
| *Gypsum Board (USA) - UTAS -VBA                       | 6.19  | 4.91   | 2.62 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

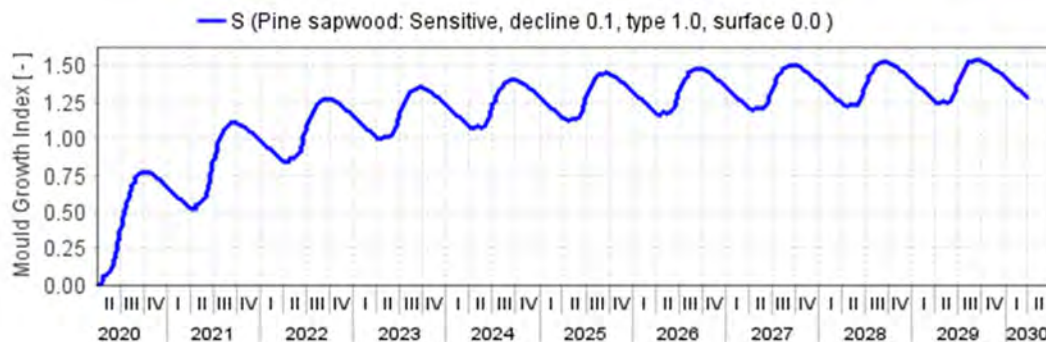


Figure 32: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame



### Southern orientation ACR 5.0

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer ( $8.37 \text{ kg/m}^3$ )

| Water Content [ $\text{kg/m}^3$ ]                      |       |        |       |        |
|--------------------------------------------------------|-------|--------|-------|--------|
| Layer/Material                                         | Start | End    | Min.  | Max.   |
| *Acrylic Stucco - unlocked VBA                         | 96.93 | 105.30 | 10.05 | 129.43 |
| *Polystyrene, expanded - unlocked VBA 50mm R1          | 0.18  | 0.17   | 0.09  | 0.29   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4          | 0.00  | 0.00   | 0.00  | 0.02   |
| *thermalan iso / swisswool iso / tirolwool iso - unloc | 3.34  | 2.81   | 1.73  | 3.89   |
| *Gypsum Board (USA) - UTAS -VBA                        | 6.19  | 4.92   | 2.88  | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

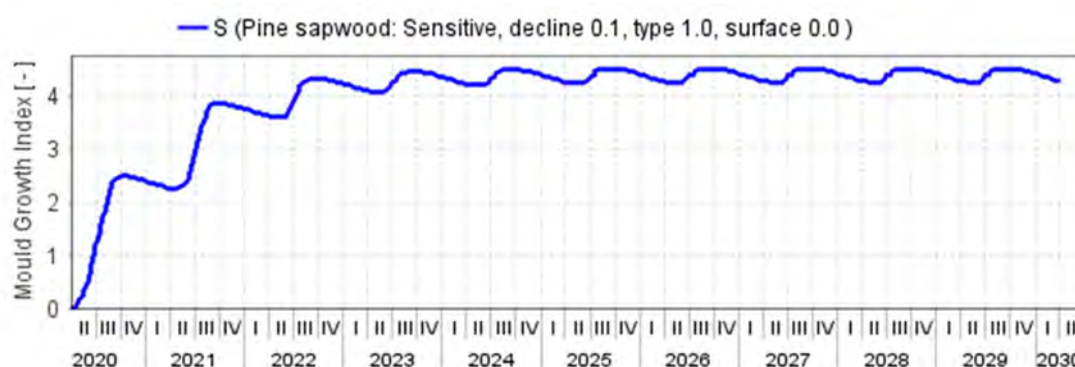


Figure 33: NatHERS CZ 63 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

### Western orientation ACR 10

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer ( $6.09 \text{ kg/m}^3$ )

| Water Content [ $\text{kg/m}^3$ ]                      |       |        |      |        |
|--------------------------------------------------------|-------|--------|------|--------|
| Layer/Material                                         | Start | End    | Min. | Max.   |
| *Acrylic Stucco - unlocked VBA                         | 96.93 | 103.02 | 8.09 | 126.76 |
| *Polystyrene, expanded - unlocked VBA 50mm R1          | 0.18  | 0.17   | 0.07 | 0.22   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4          | 0.00  | 0.00   | 0.00 | 0.00   |
| *thermalan iso / swisswool iso / tirolwool iso - unloc | 3.34  | 2.71   | 1.39 | 3.34   |
| *Gypsum Board (USA) - UTAS -VBA                        | 6.19  | 4.88   | 2.40 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

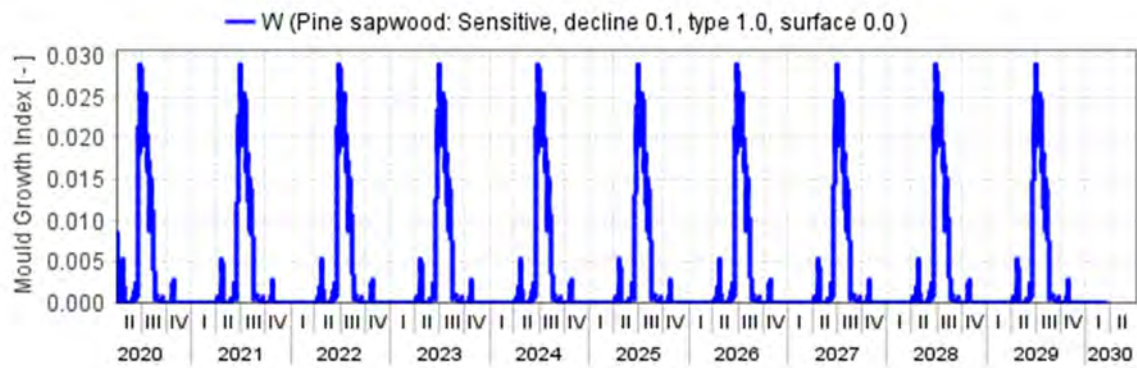


Figure 34: NatHERS CZ 63 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Moisture accumulates in the Acrylic Stucco layer (5.44 kg/m<sup>3</sup>)

| Water Content [kg/m <sup>3</sup> ]                    |       |        |      |        |
|-------------------------------------------------------|-------|--------|------|--------|
| Layer/Material                                        | Start | End    | Min. | Max.   |
| *Acrylic Stucco - unlocked VBA                        | 96.93 | 102.37 | 7.75 | 126.36 |
| *Polystyrene, expanded - unlocked VBA 50mm R          | 0.18  | 0.17   | 0.05 | 0.21   |
| *vapour retarder (sd=1m) - unlocked VBA 175.4         | 0.00  | 0.00   | 0.00 | 0.00   |
| *thermalen iso / swisswool iso / tirolwool iso - unlo | 3.34  | 2.65   | 1.30 | 3.34   |
| *Gypsum Board (USA) - UTAS -VBA                       | 6.19  | 4.85   | 2.38 | 6.19   |

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

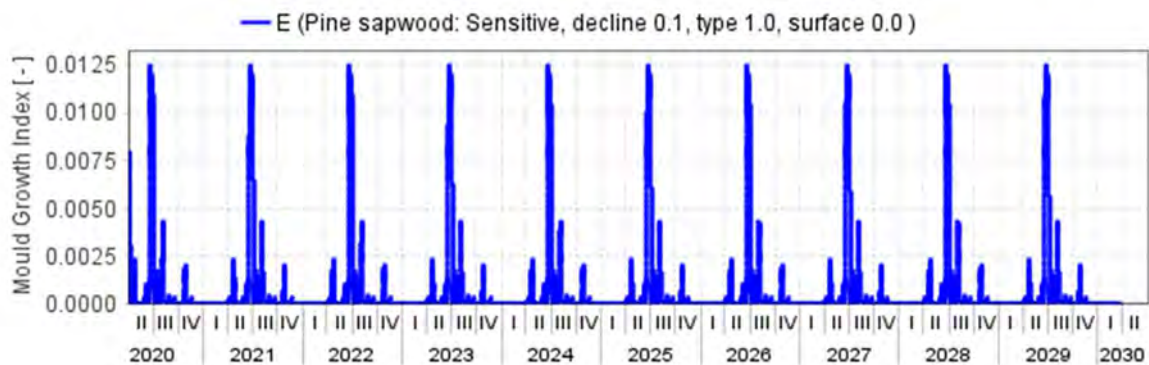


Figure 35: NatHERS CZ 63 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 7. Climate zone 64 – NCC CZ 6-8

#### Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



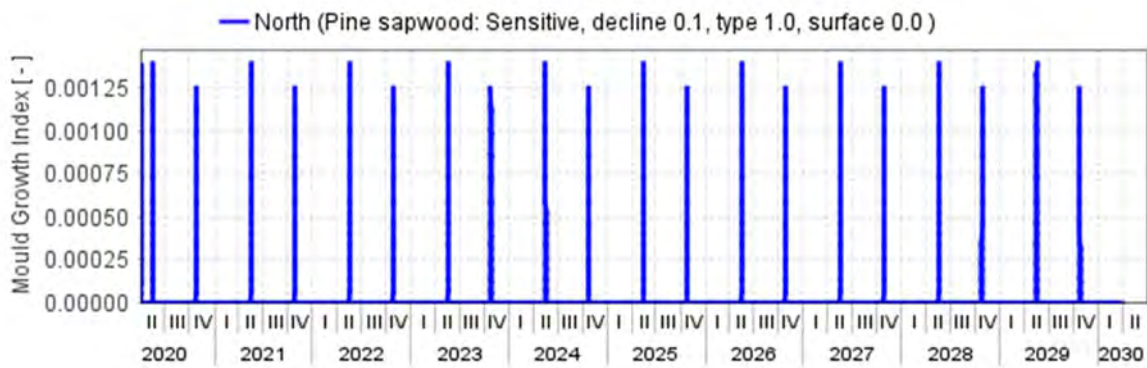


Figure 36: NatHERS CZ 64 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

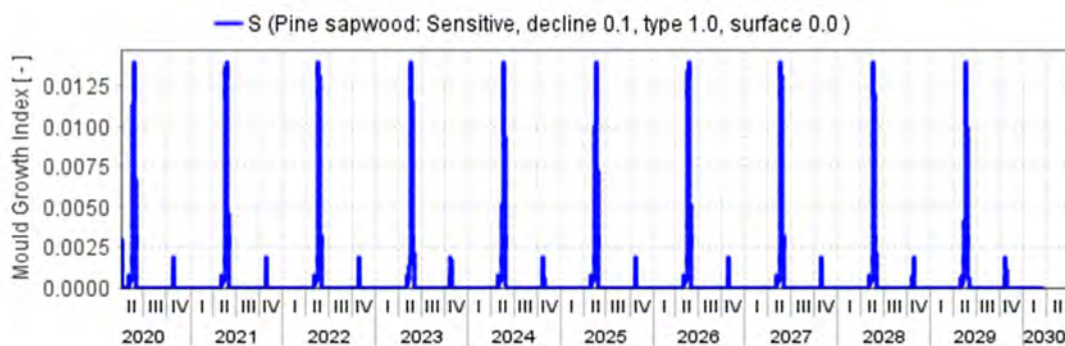


Figure 37: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

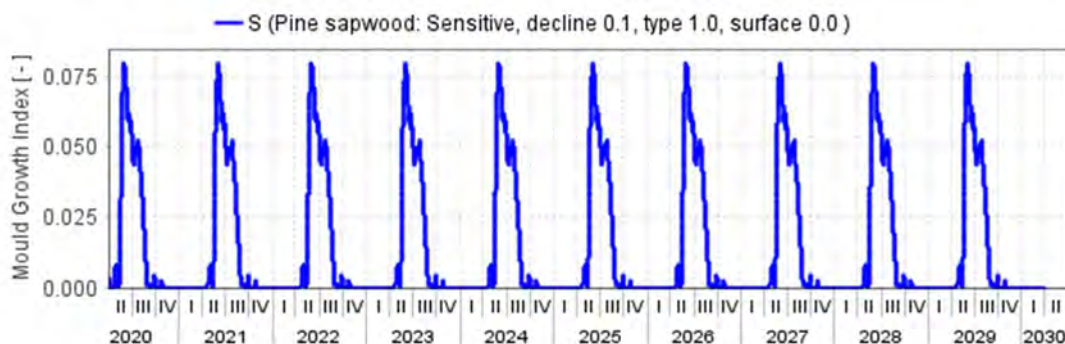


Figure 38: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

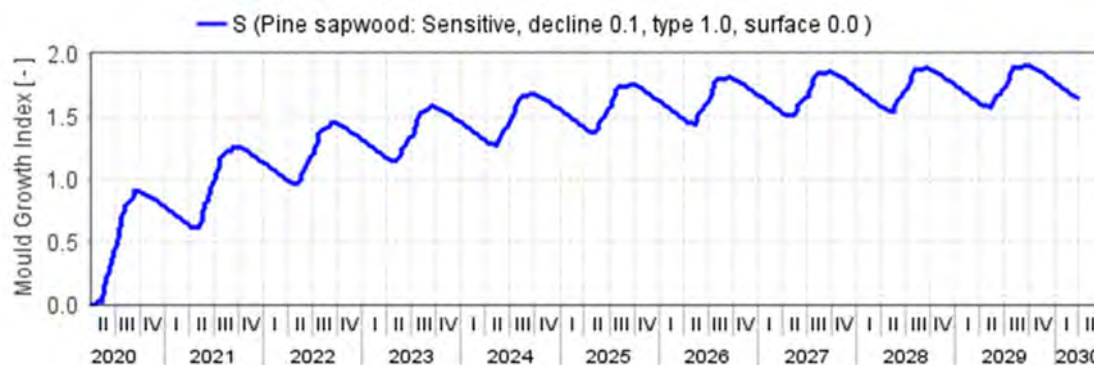


Figure 39: NatHERS CZ 64 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

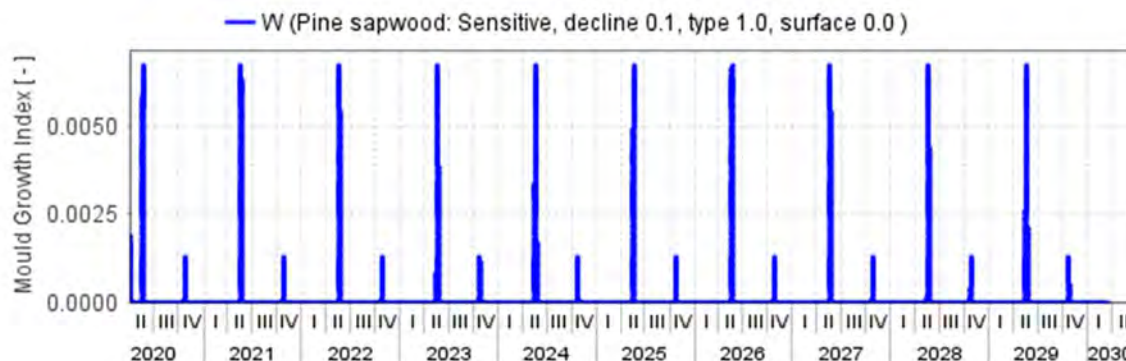


Figure 40: NatHERS CZ 64 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

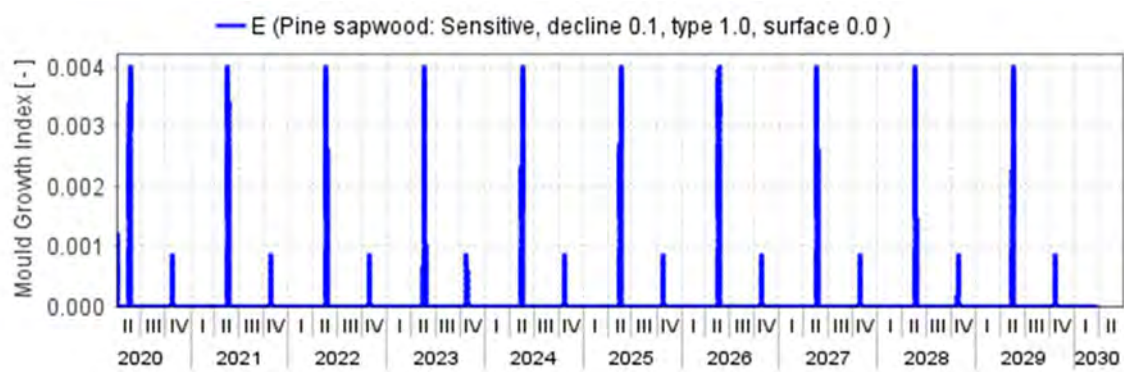


Figure 41: NatHERS CZ 64 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 8. Climate zone 66 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

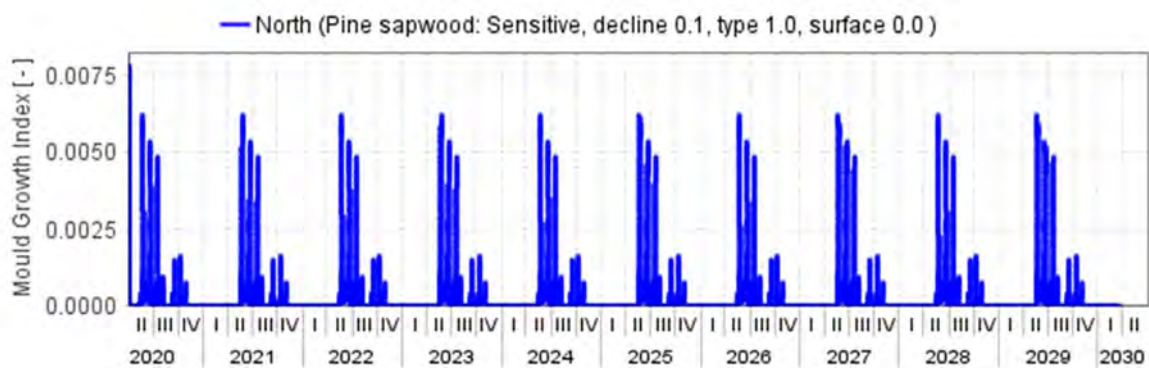


Figure 42: NatHERS CZ 66 - NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

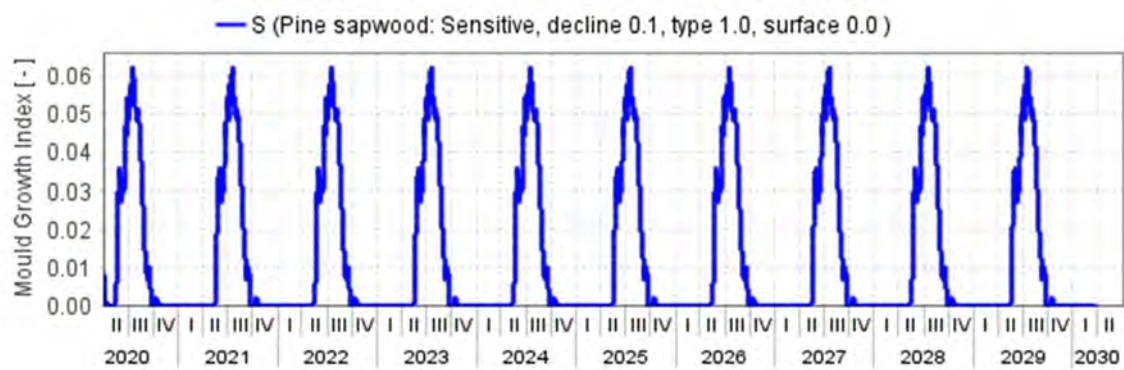


Figure 43: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

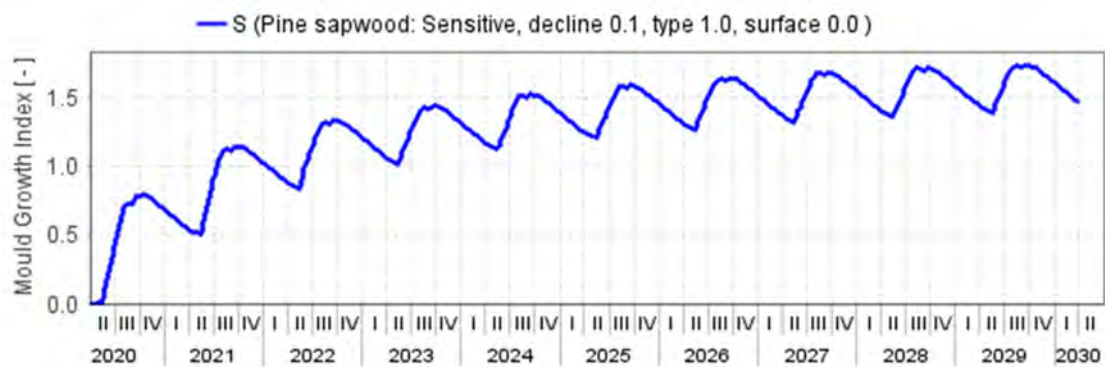


Figure 44: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.



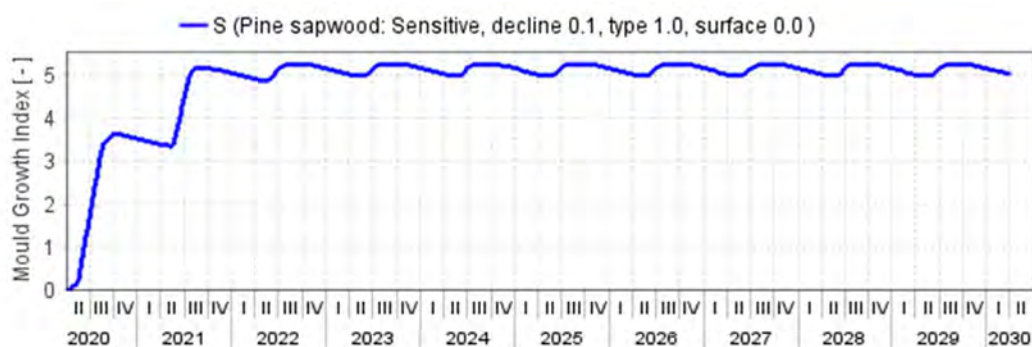


Figure 45: NatHERS CZ 66 - NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

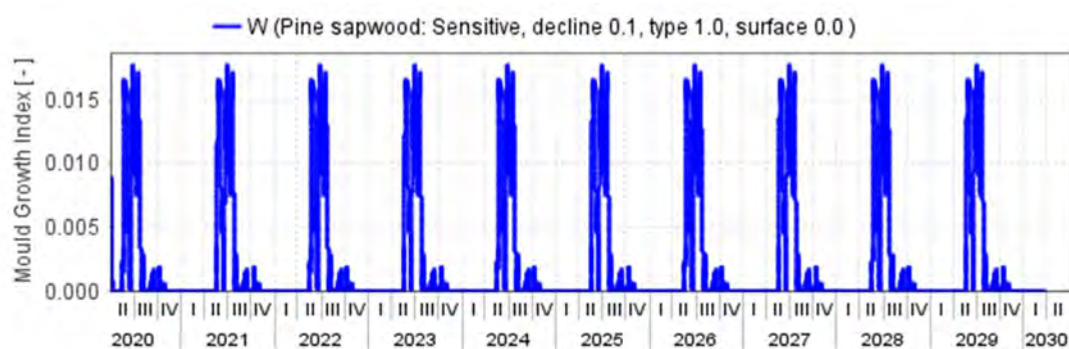


Figure 46: NatHERS CZ 66 - NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

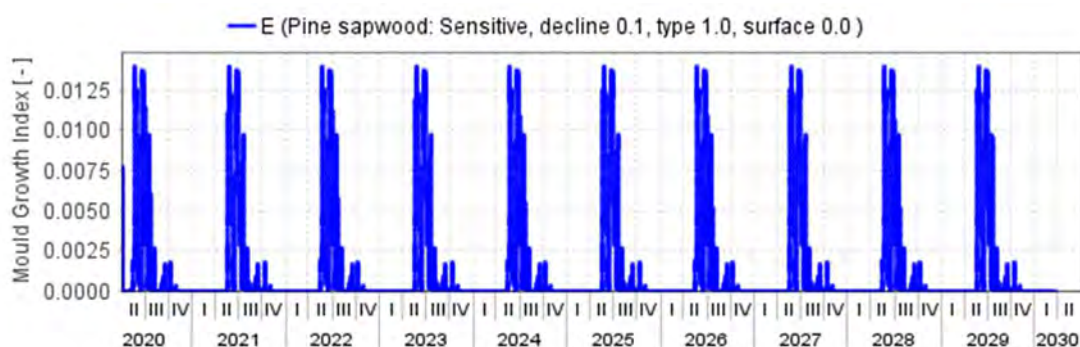


Figure 47: NatHERS CZ 66 - NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame



## 9. Climate zone 27 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

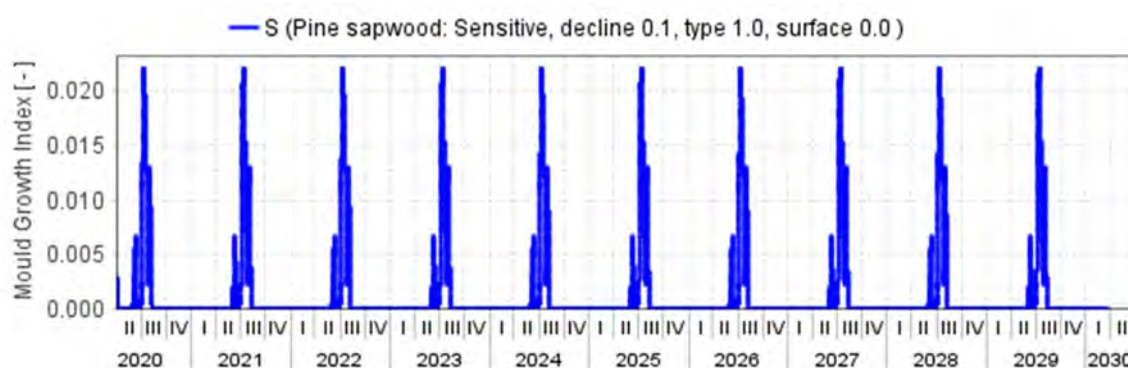


Figure 48: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

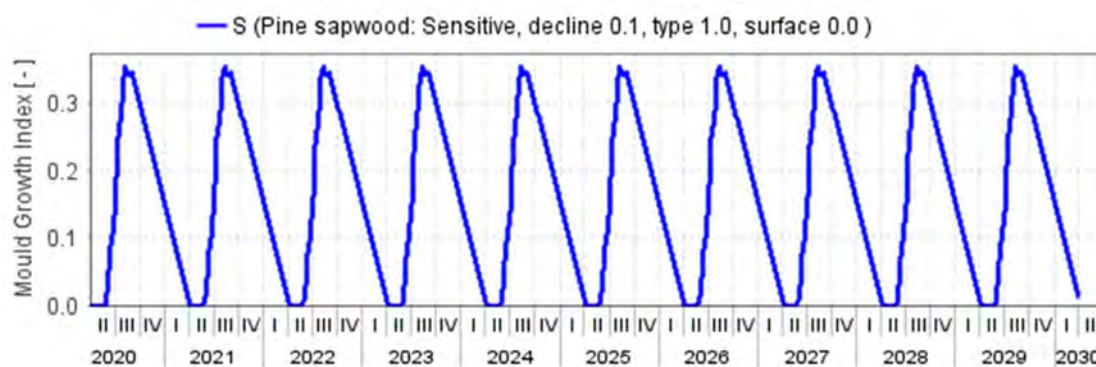


Figure 49: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

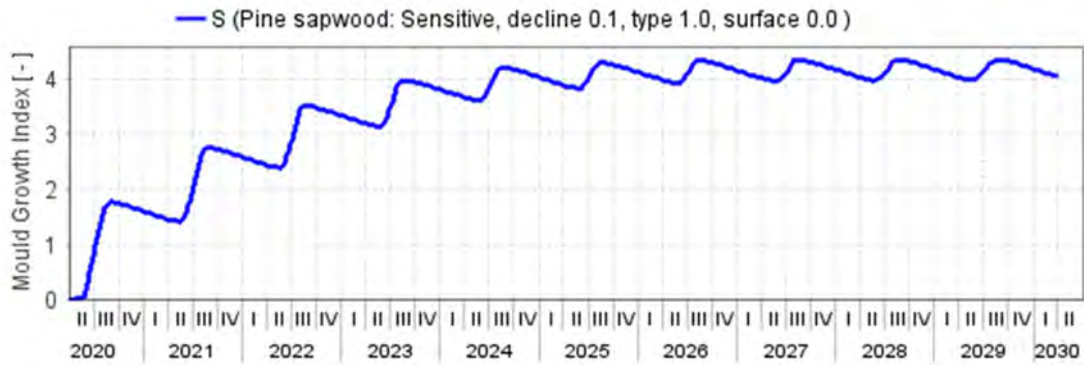


Figure 50: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

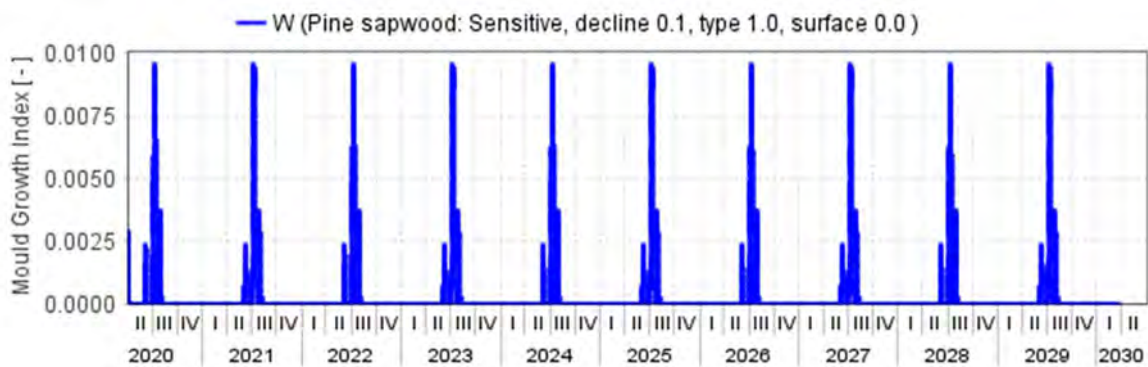


Figure 51: NatHERS CZ 27 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

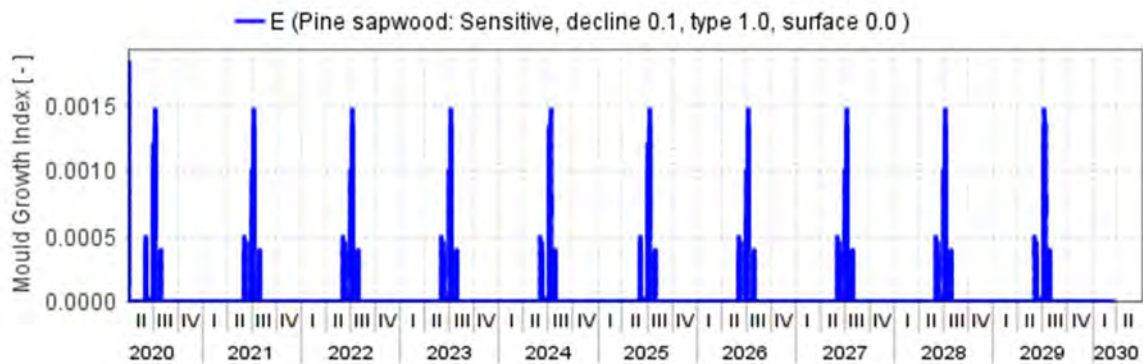


Figure 52: NatHERS CZ 27 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 10. Climate zone 61 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

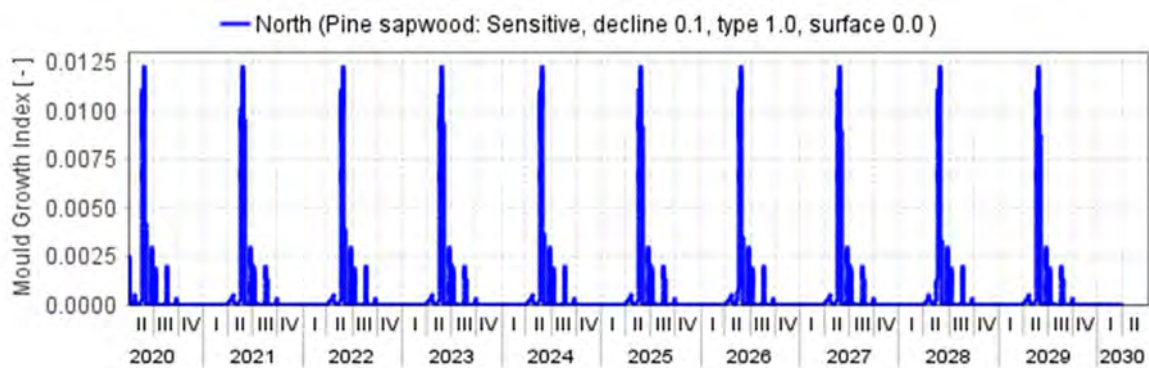


Figure 53: NatHERS CZ 61 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

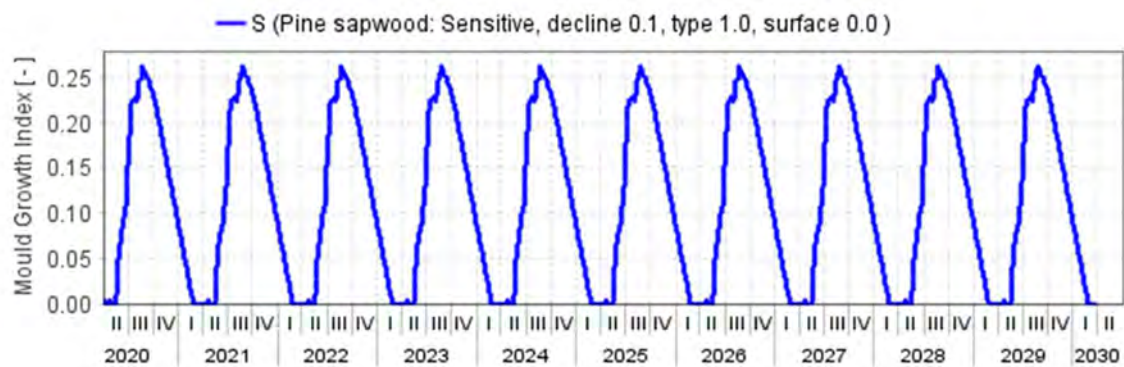


Figure 54: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

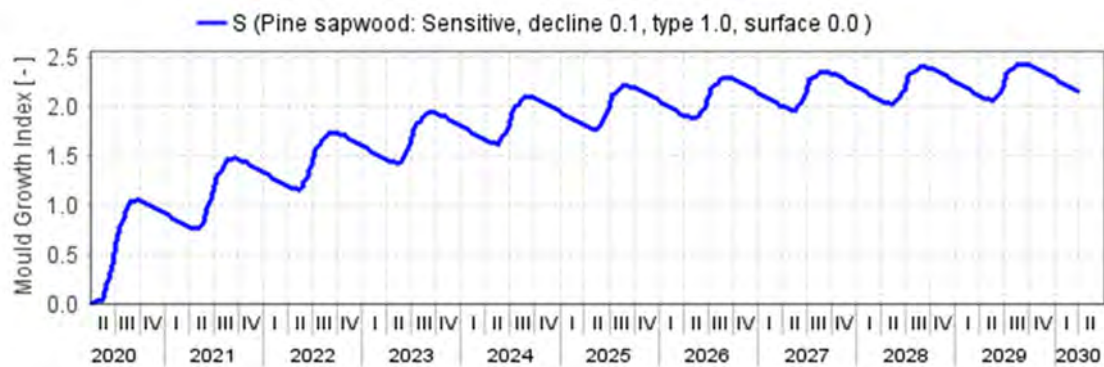


Figure 55: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

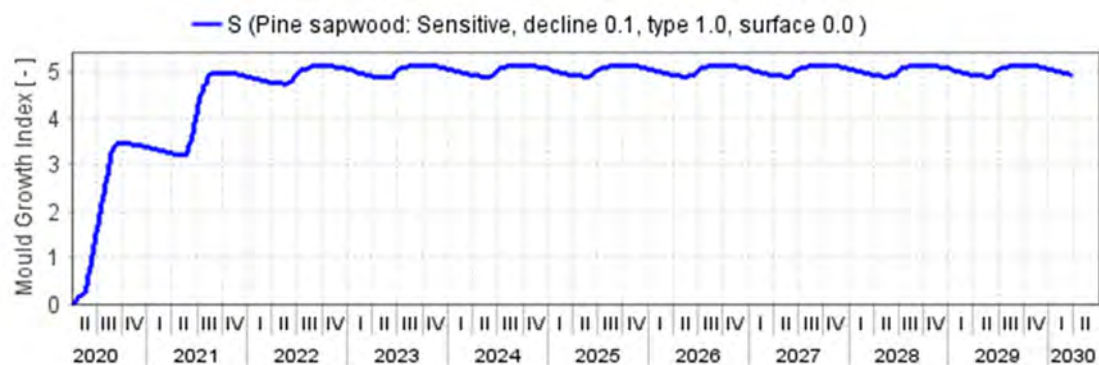


Figure 56: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



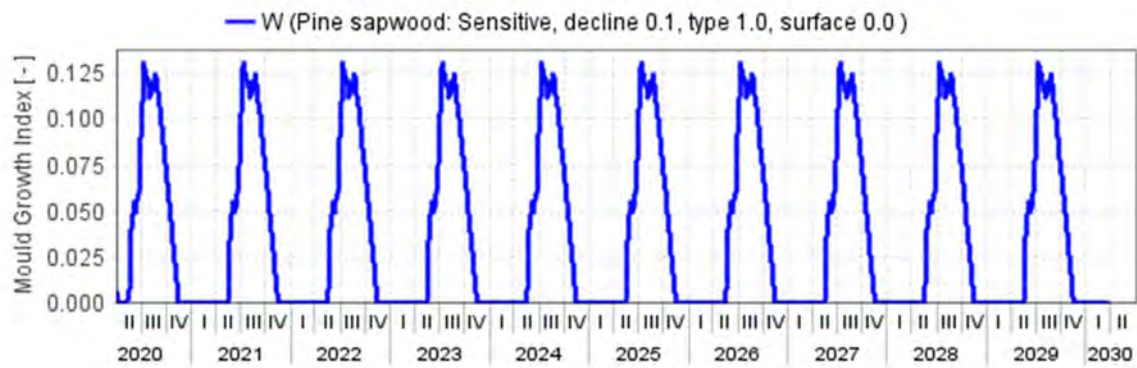


Figure 57: NatHERS CZ 61 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

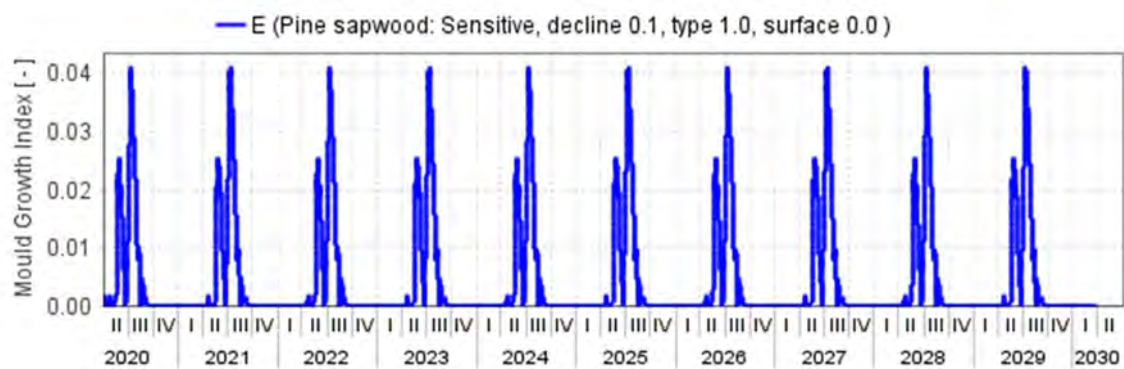


Figure 58: NatHERS CZ 61 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 11. Climate zone 66 - NCC CZ4

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



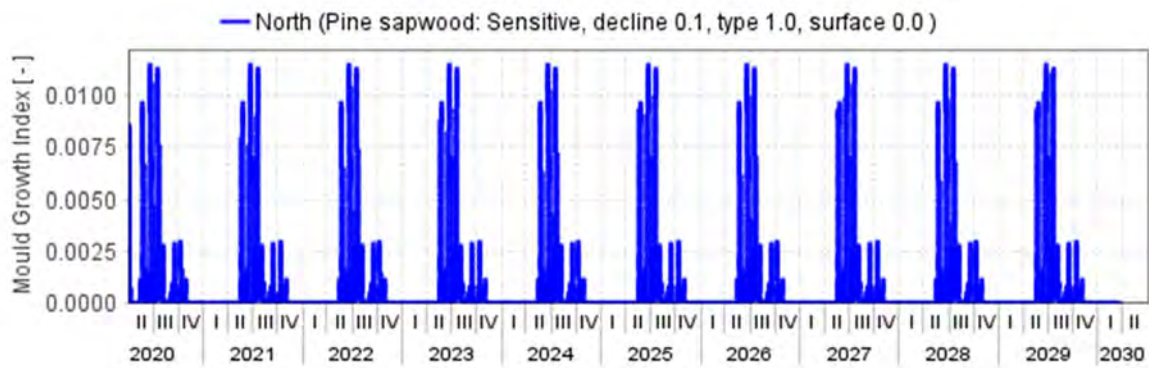


Figure 59: NatHERS CZ 66 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

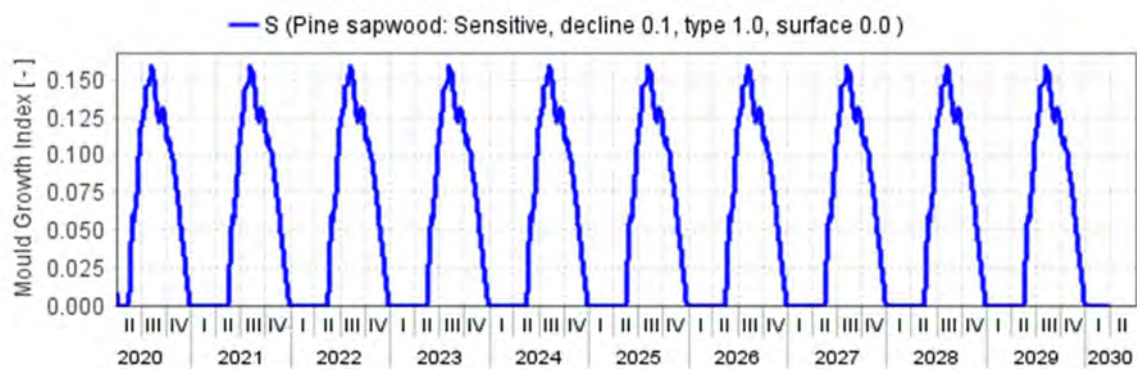


Figure 60: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

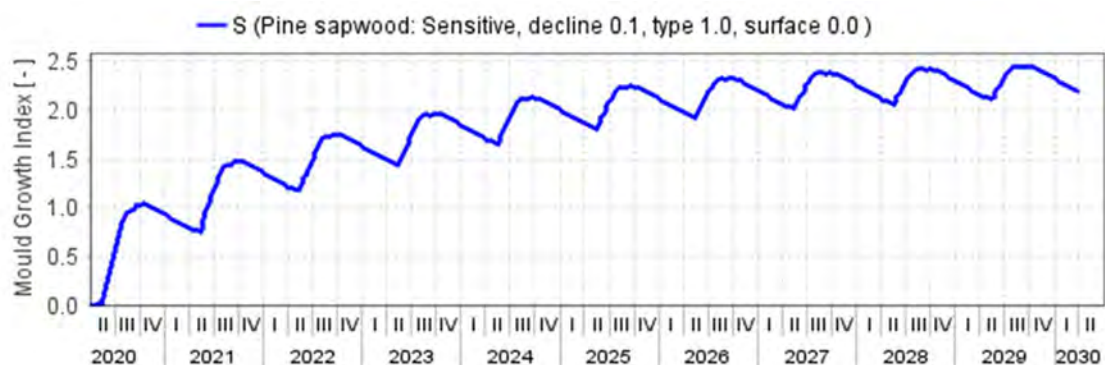


Figure 61: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

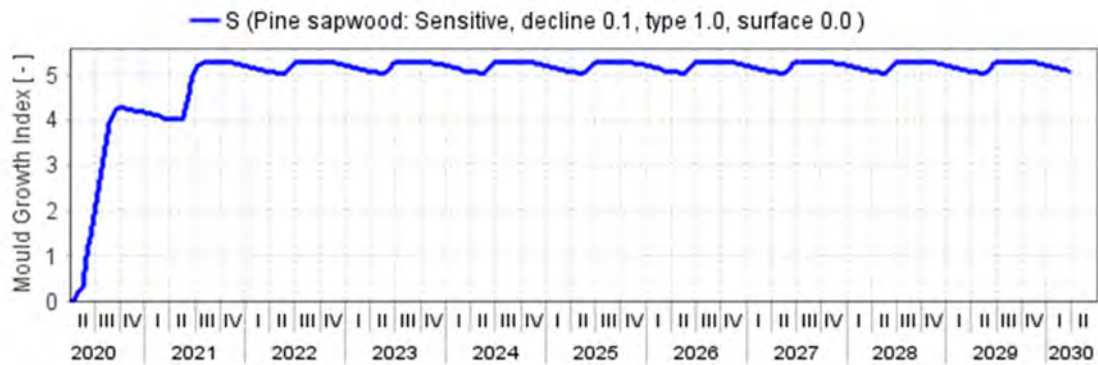


Figure 62: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

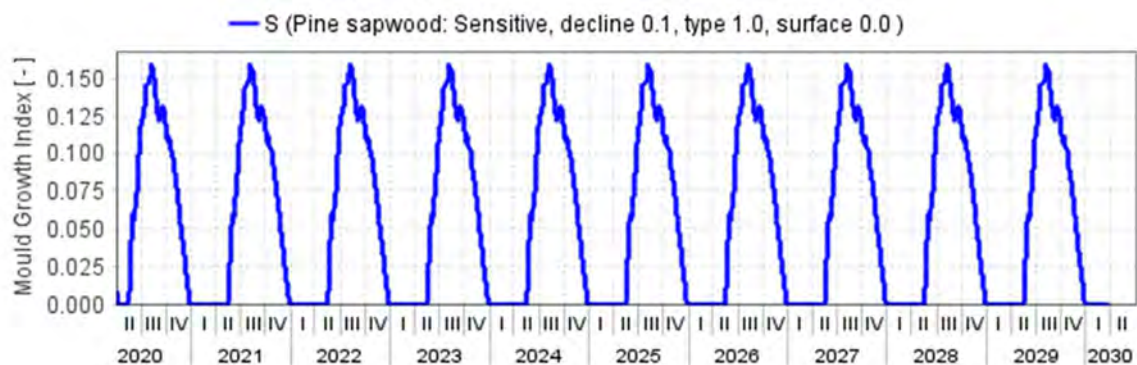


Figure 63: NatHERS CZ 66 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

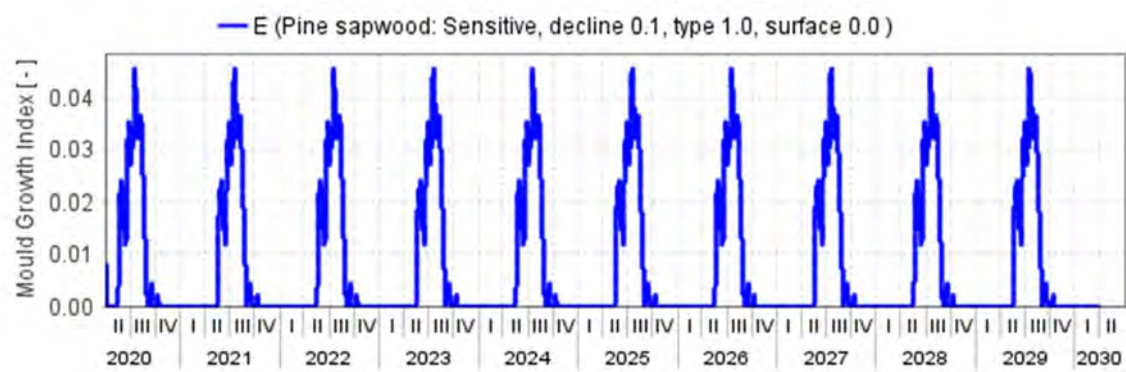


Figure 64: NatHERS CZ 66 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

# Moisture accumulation and mould growth for 7 Star housing Research Report 2

## Appendix 9: Hygrothermal simulation results – Autoclaved aerated concrete cladding with insulated timber frame (Wall 8) Rev 02 (09/12/2022)

## 1. Climate zone 21 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

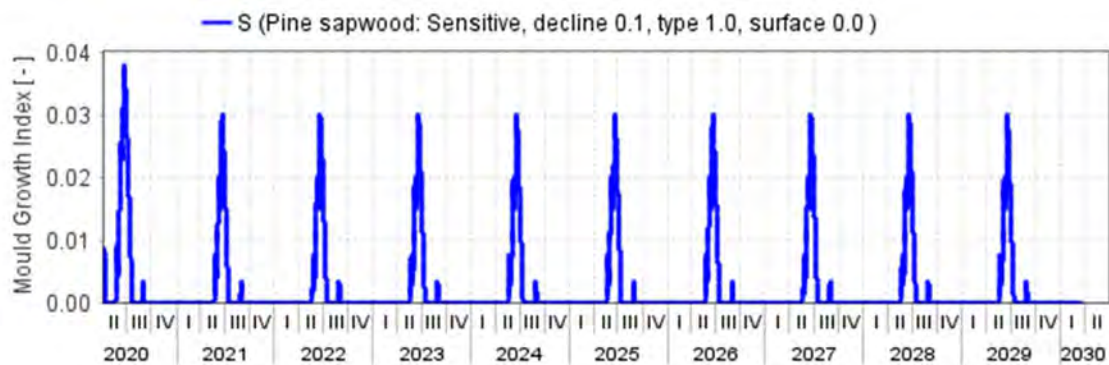


Figure 1: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

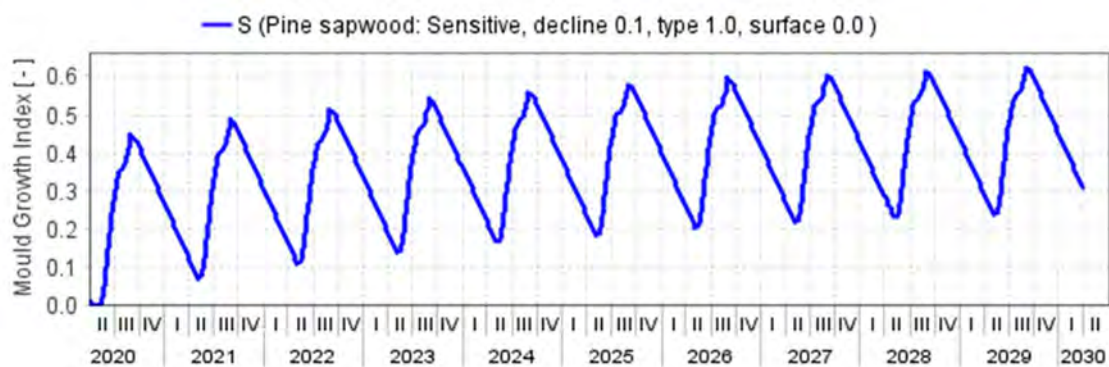


Figure 2: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.



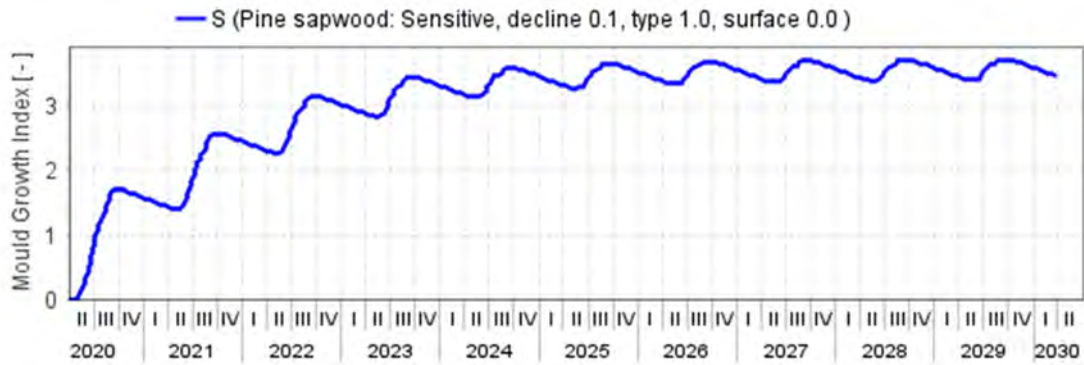


Figure 3: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

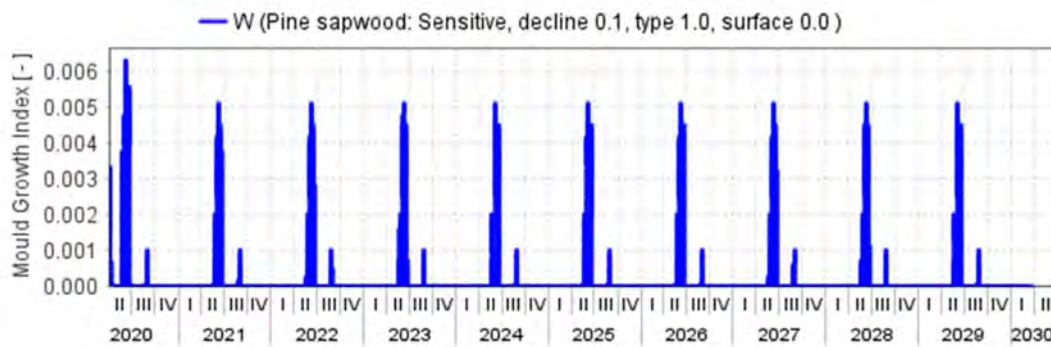


Figure 4: NatHERS CZ 21 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

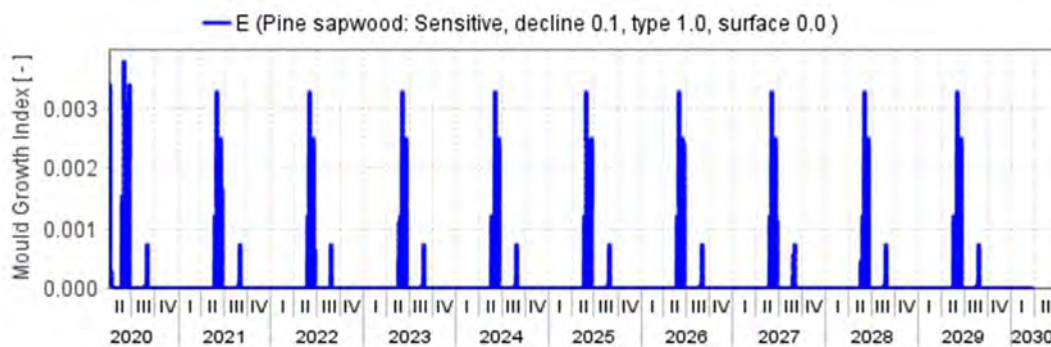


Figure 5: NatHERS CZ 21 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 2. Climate zone 22 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

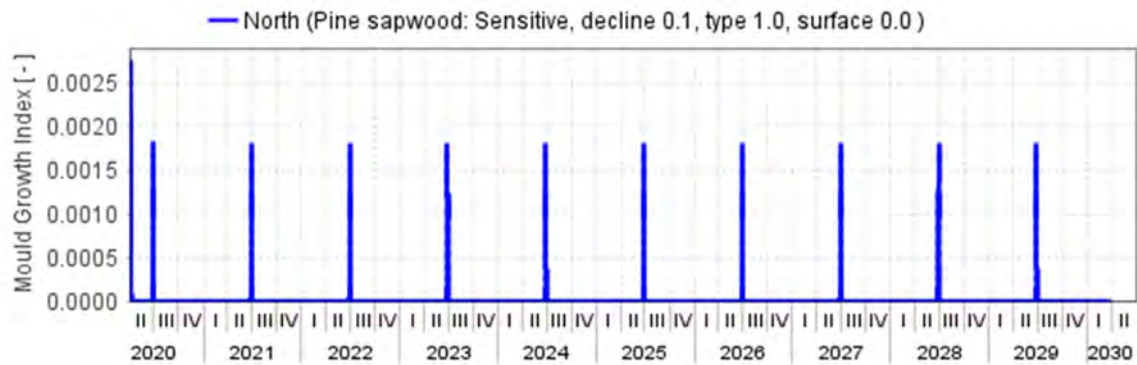


Figure 6: NatHERS CZ 22 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

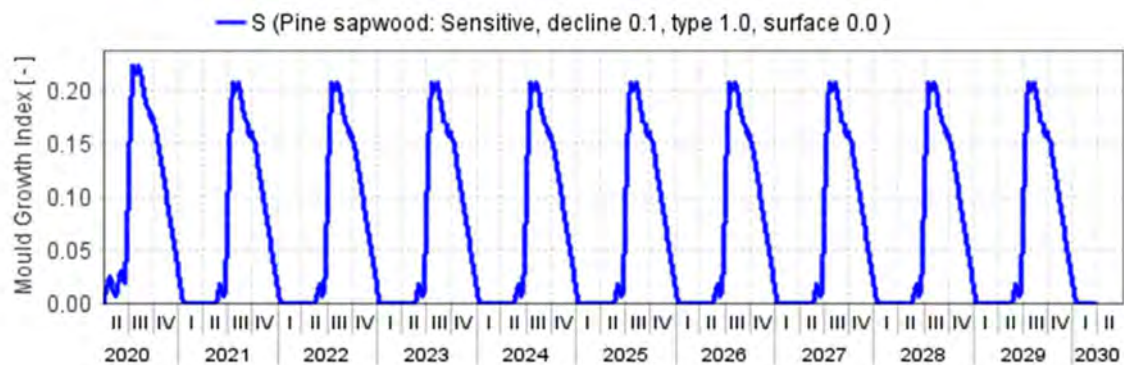


Figure 7: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

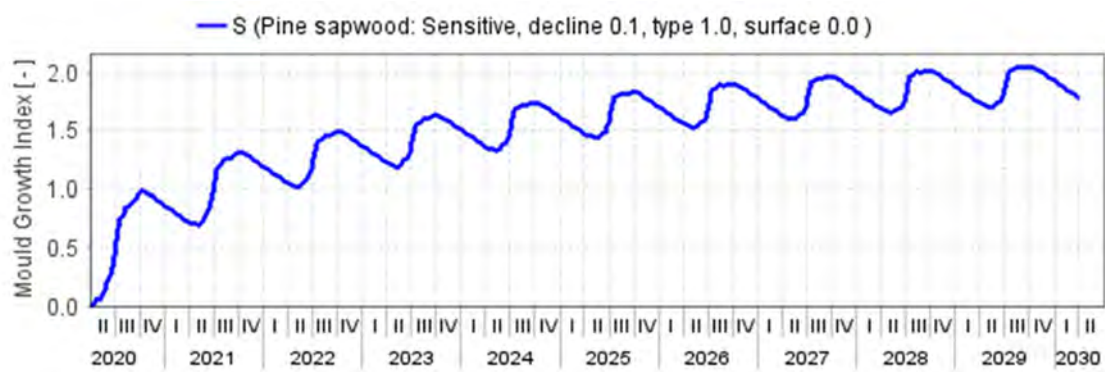


Figure 8: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

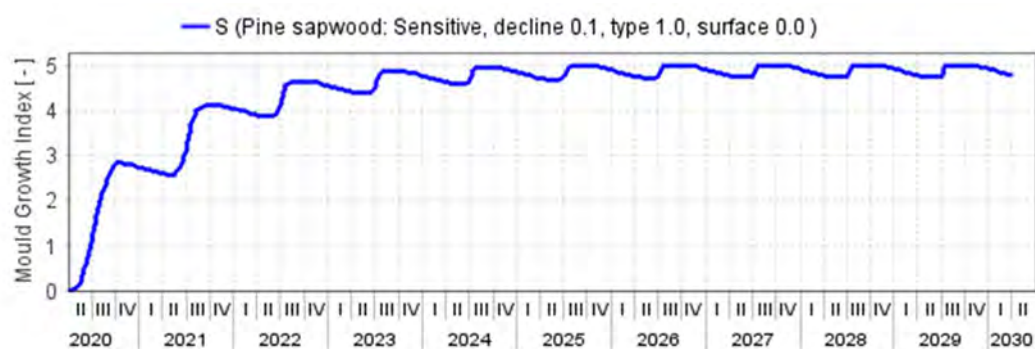


Figure 9: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

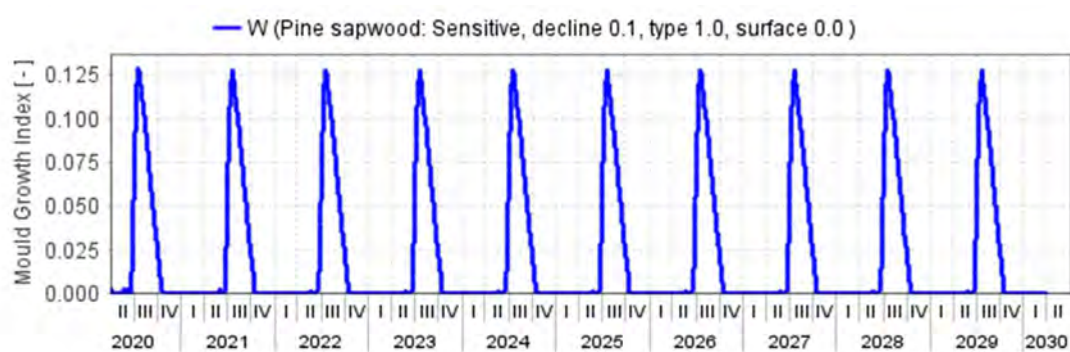


Figure 10: NatHERS CZ 22 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

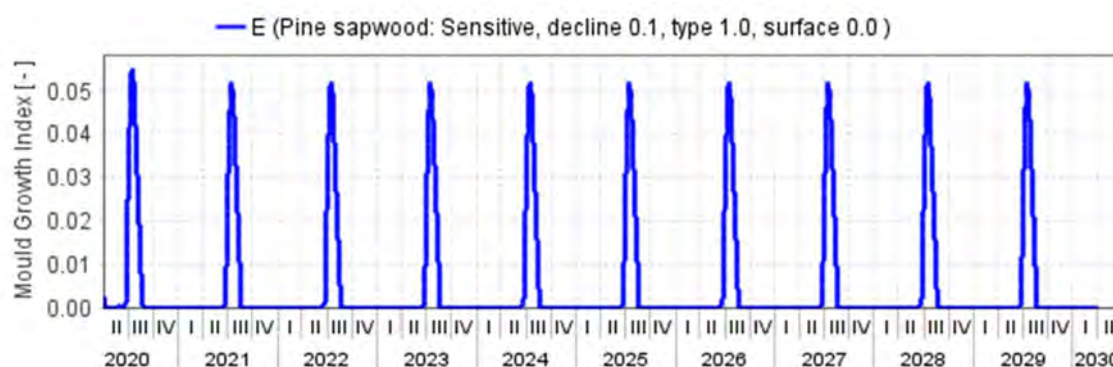


Figure 11: NatHERS CZ 22 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

### 3. Climate zone 27 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

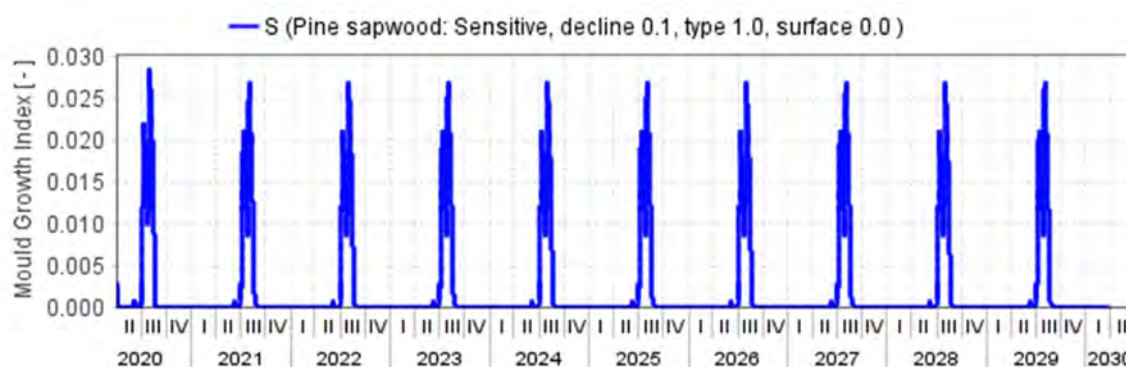


Figure 12: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil



Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

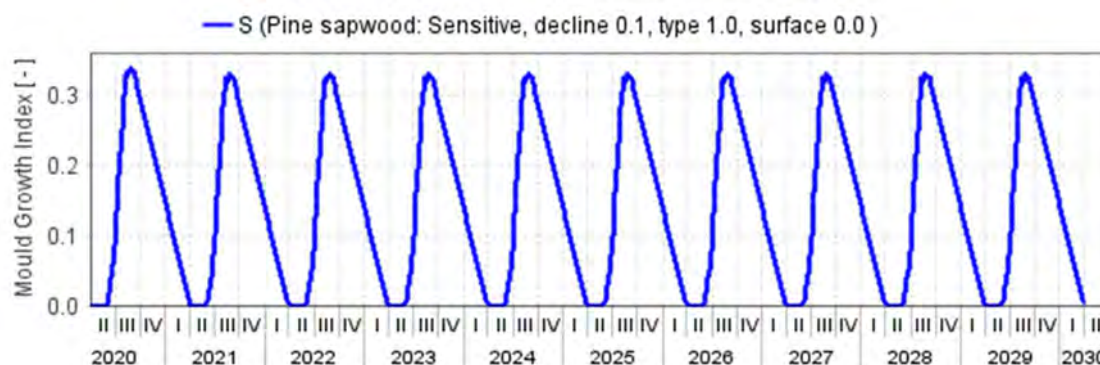


Figure 13: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

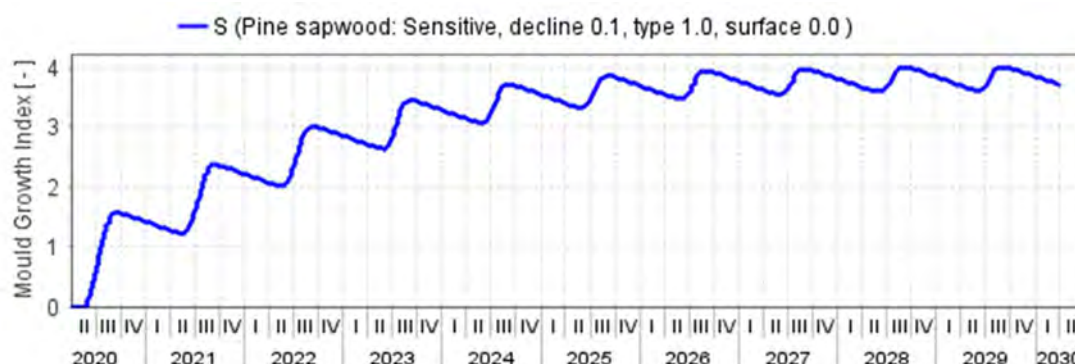


Figure 14: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



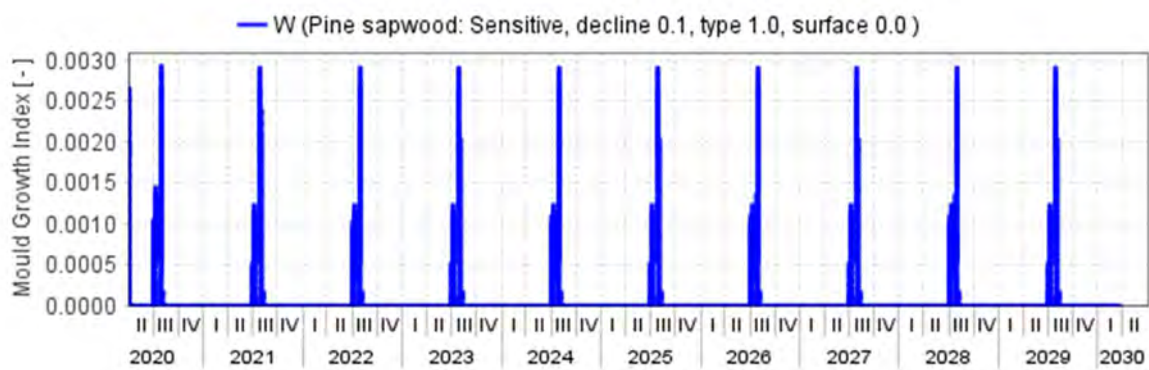


Figure 15: NatHERS CZ 27 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

#### 4. Climate zone 60 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

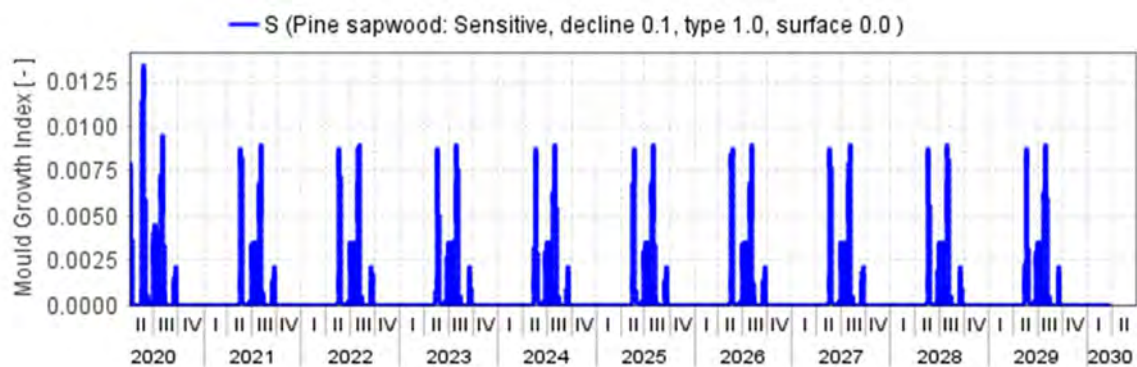


Figure 16: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

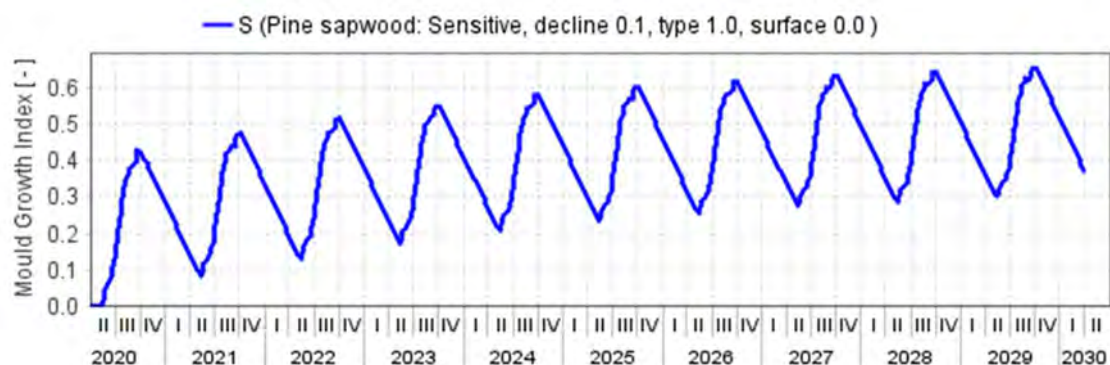


Figure 17: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

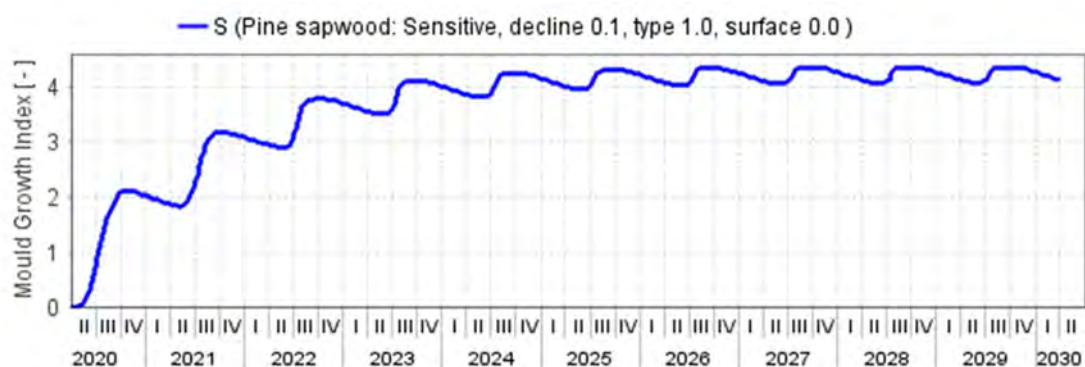


Figure 18: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

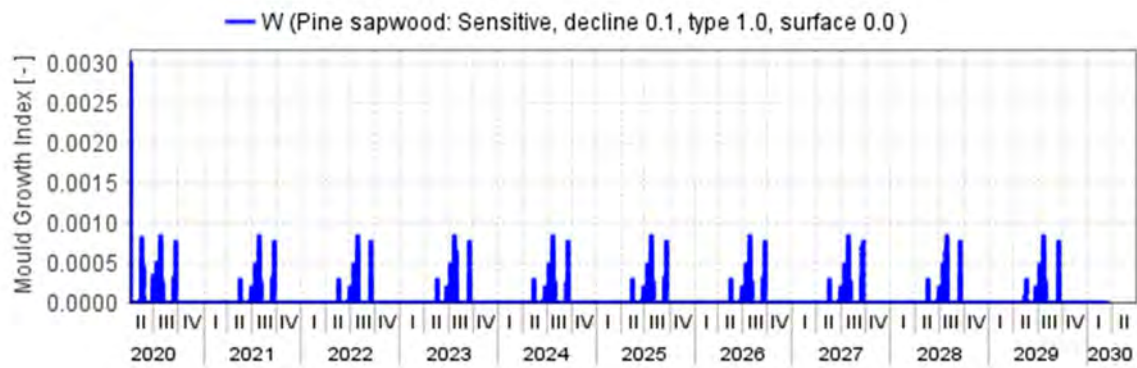


Figure 19: NatHERS CZ 60 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

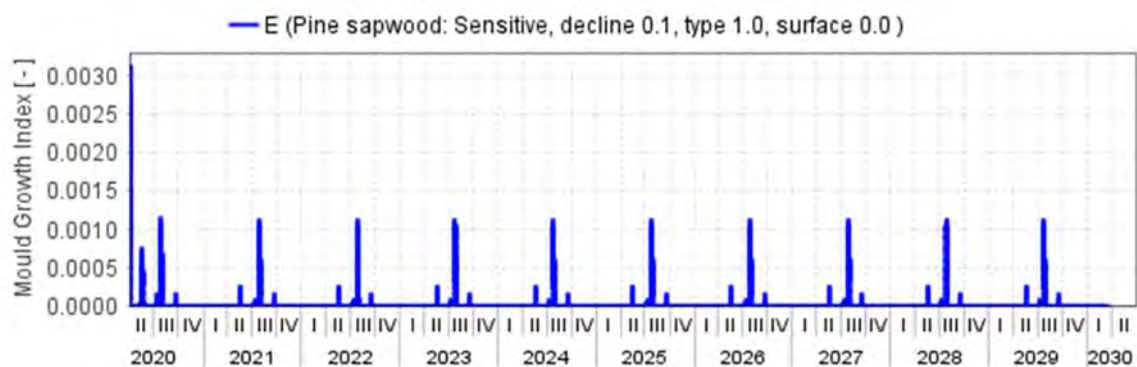


Figure 20: NatHERS CZ 60 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 5. Climate zone 61 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

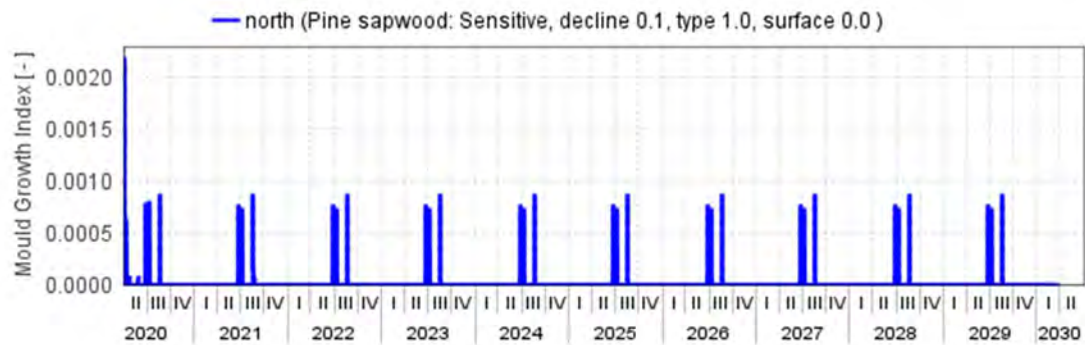


Figure 21: NatHERS CZ 61 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

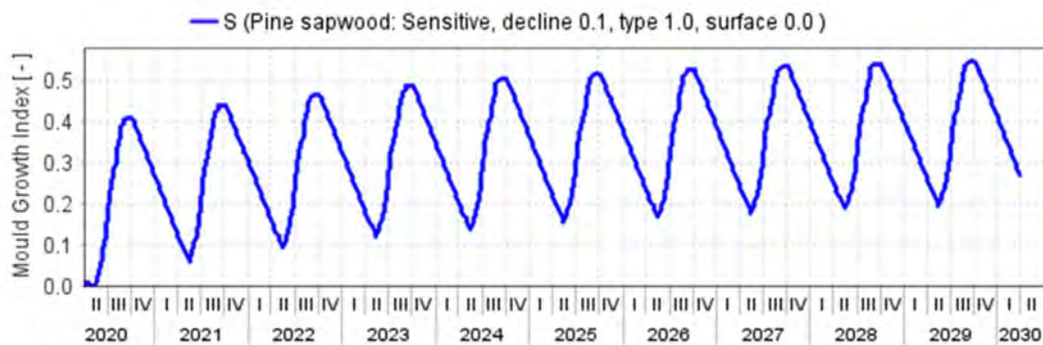


Figure 22: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

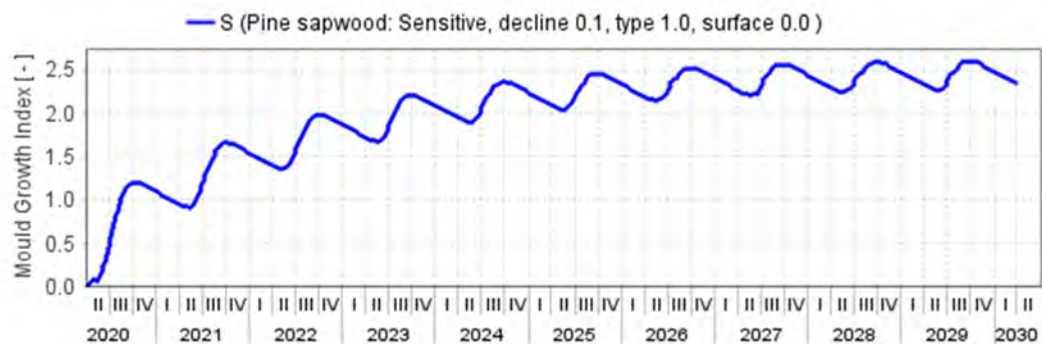


Figure 23: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame



#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

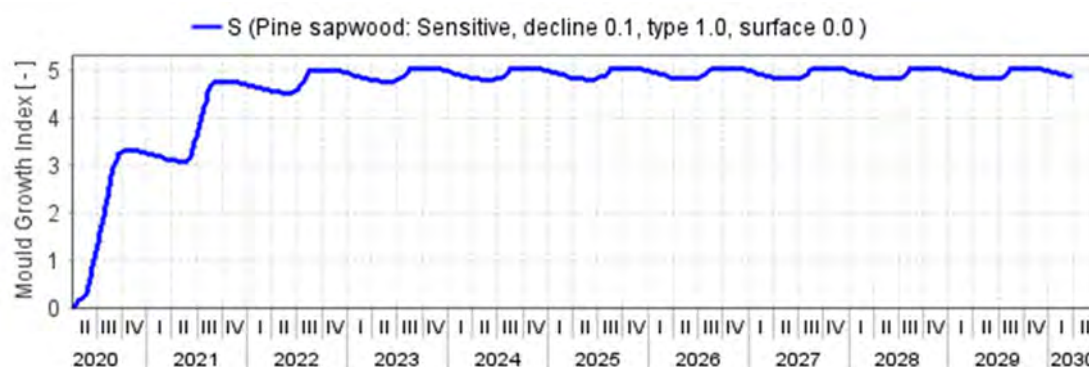


Figure 24: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

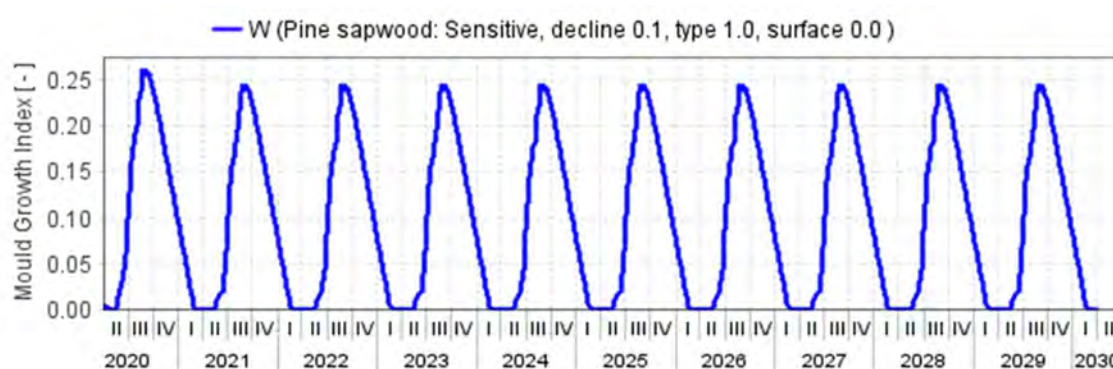


Figure 25: NatHERS CZ 61 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



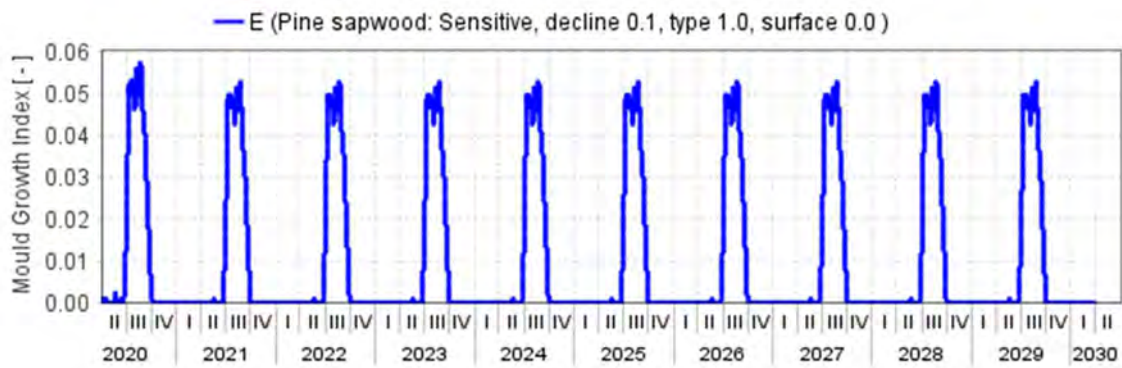


Figure 26: NatHERS CZ 61 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 6. Climate zone 63 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

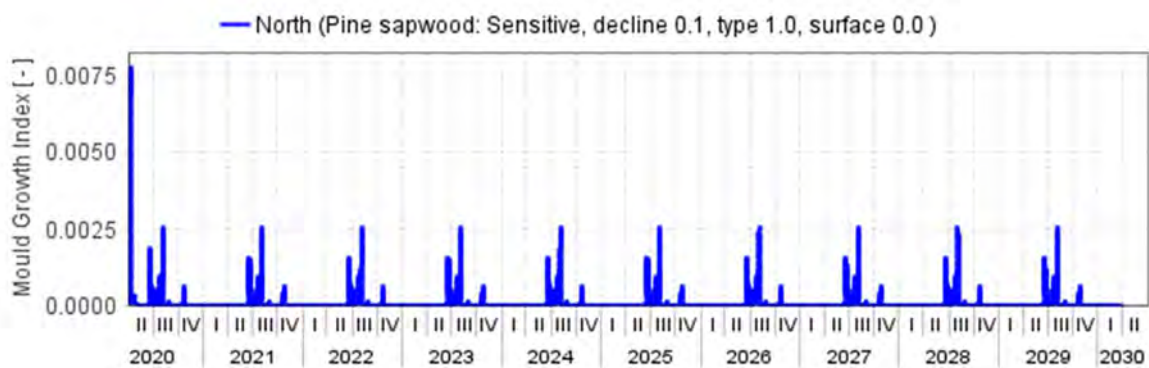


Figure 27: NatHERS CZ 63 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fifth year. This wall type requires further investigation.

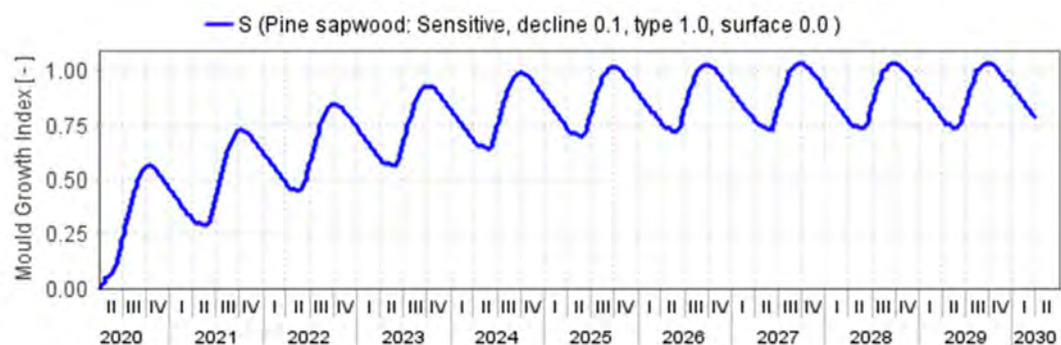


Figure 28: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

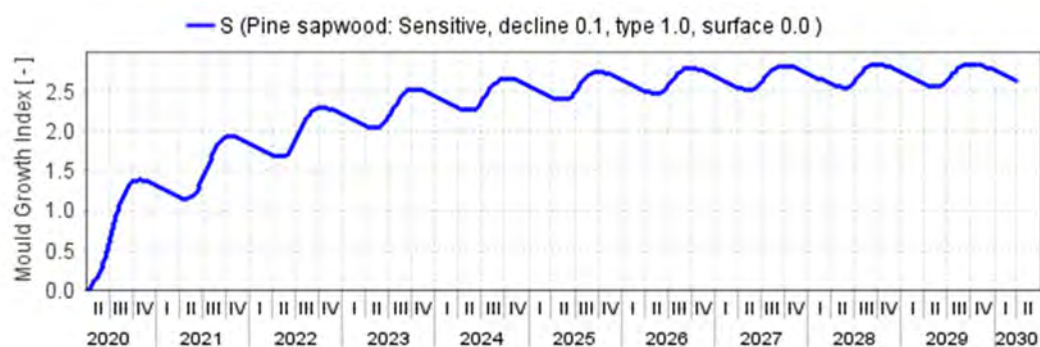


Figure 29: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

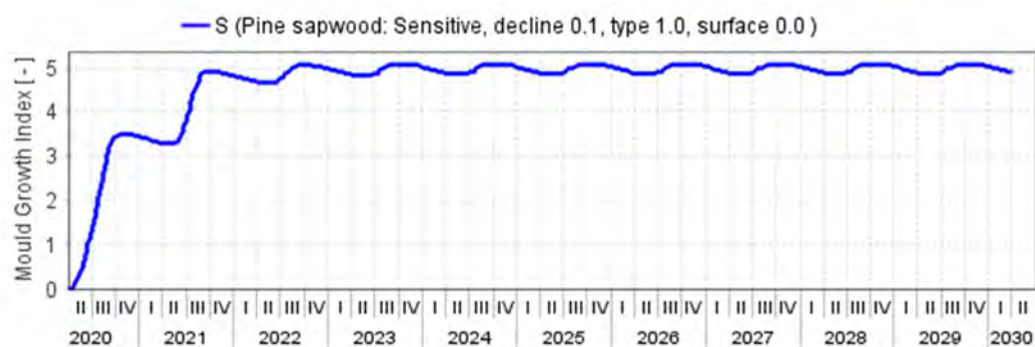


Figure 30: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

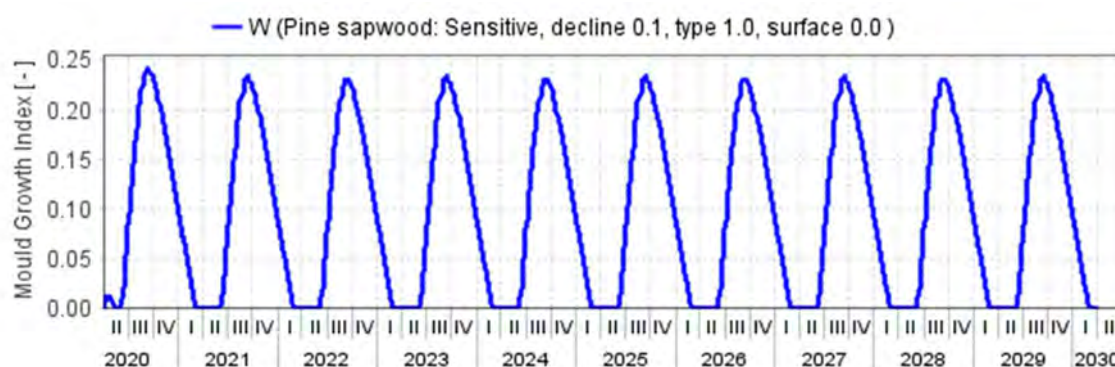


Figure 31: NatHERS CZ 63 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

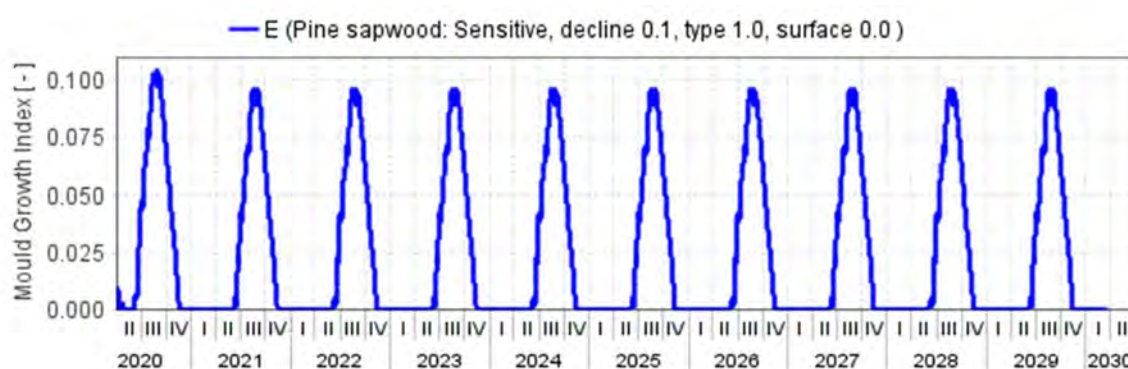


Figure 32: NatHERS CZ 63 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 7. Climate zone 64 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

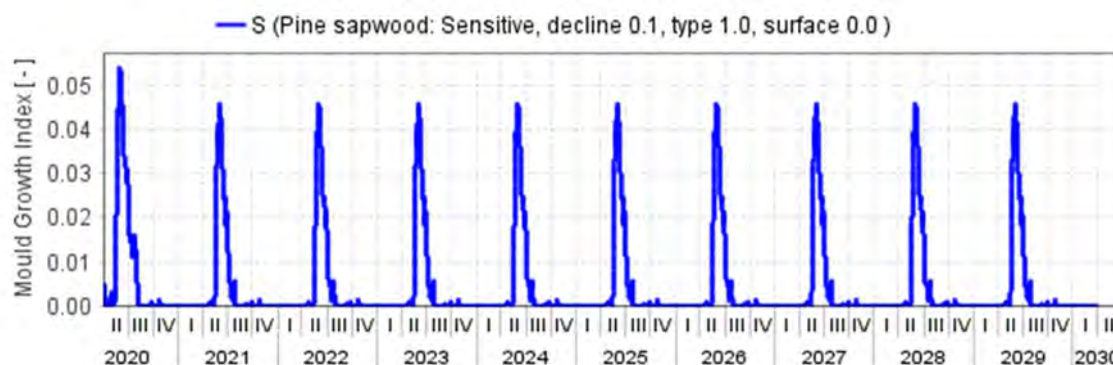


Figure 33: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

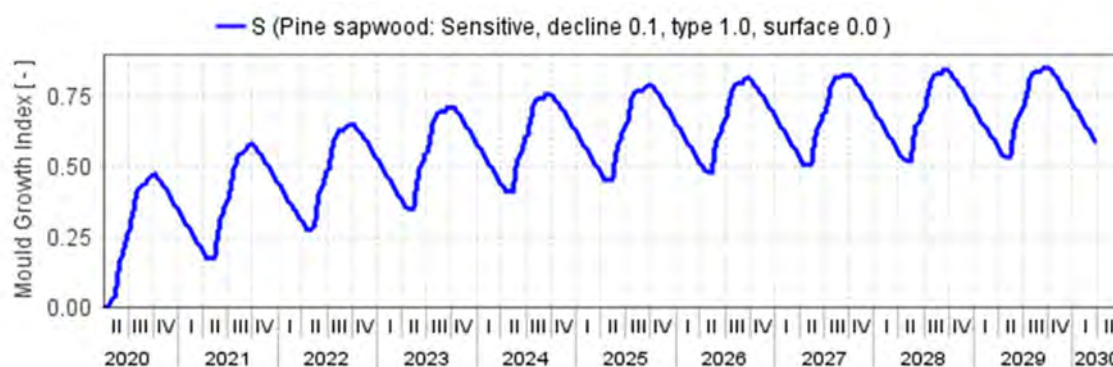


Figure 34: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.



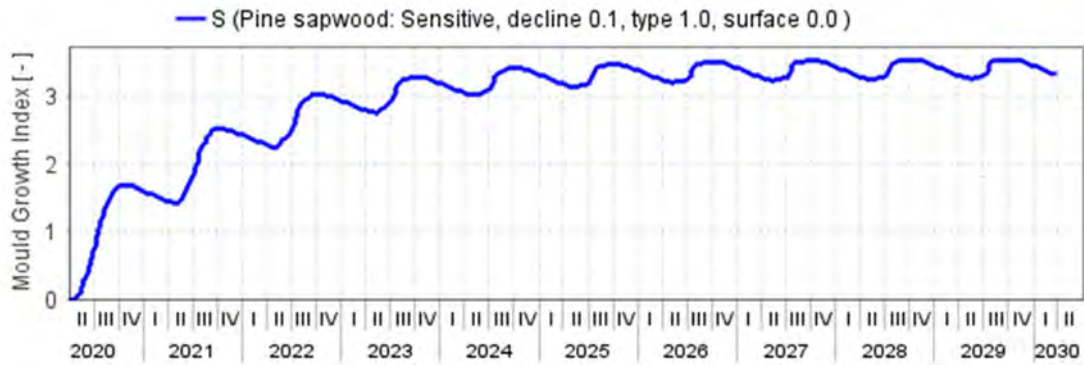


Figure 35: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

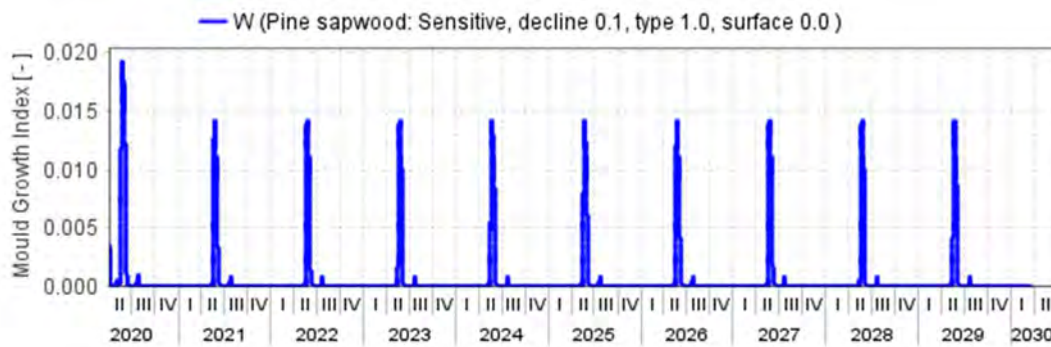


Figure 36: NatHERS CZ 64 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

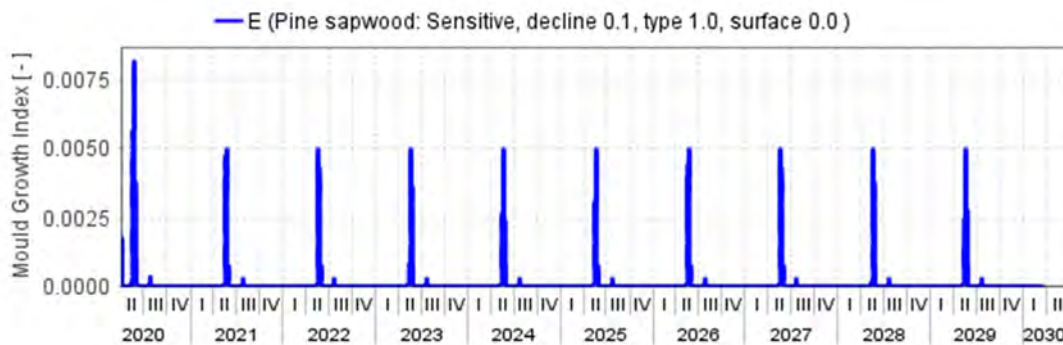


Figure 37: NatHERS CZ 64 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame



## 8. Climate zone 66 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

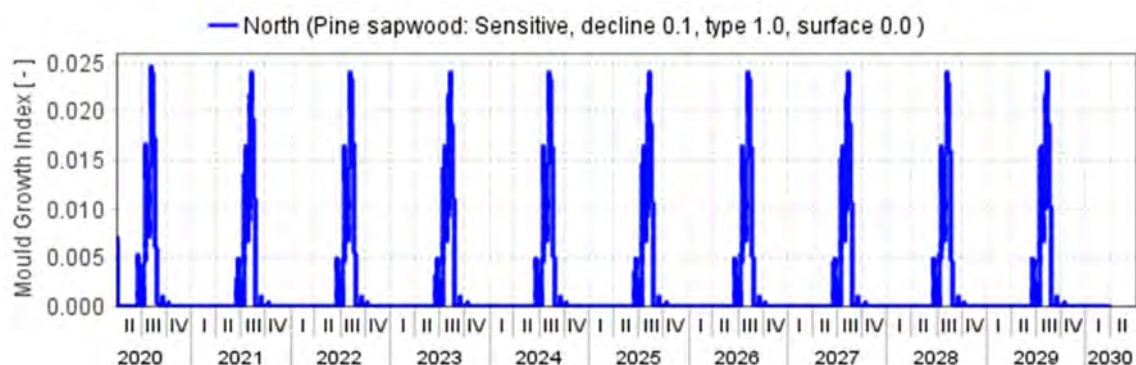


Figure 38: NatHERS CZ 66 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

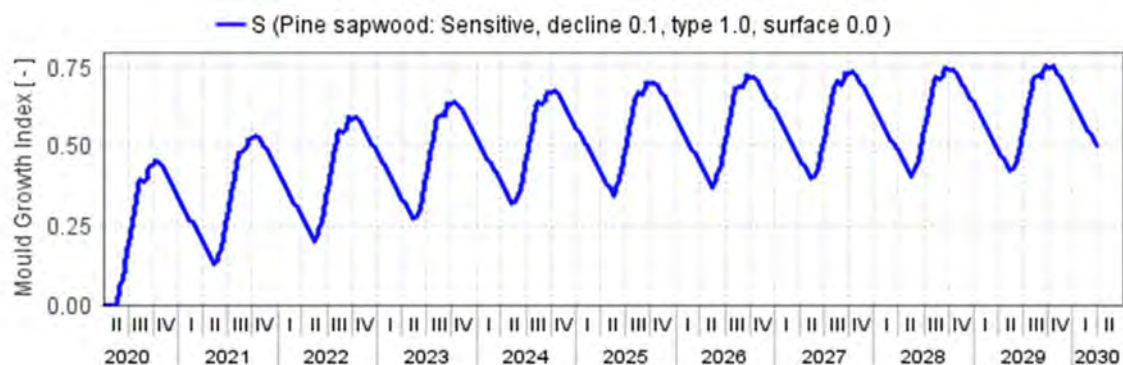


Figure 39: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fifth year.

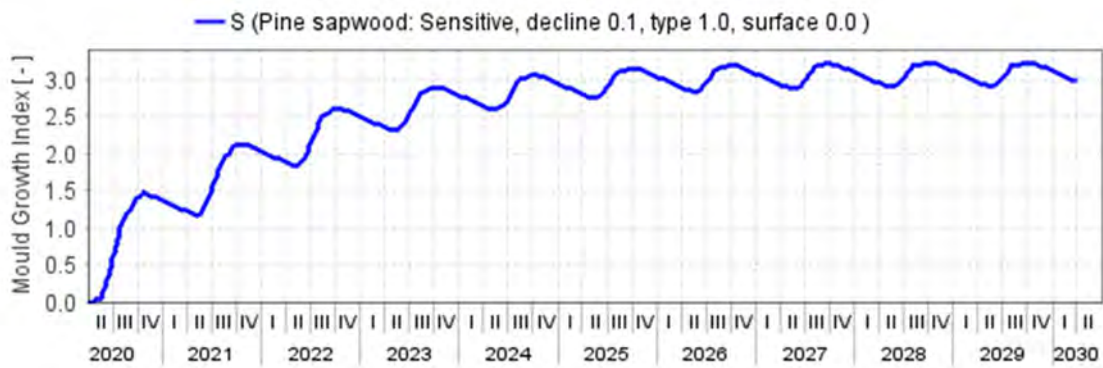


Figure 40: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

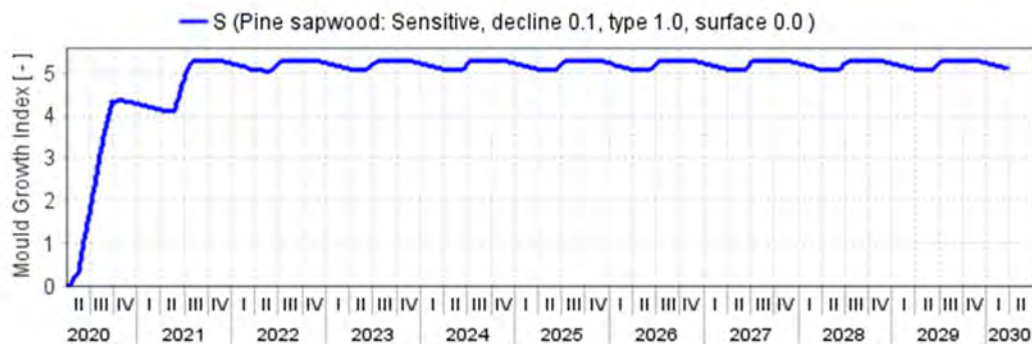


Figure 41: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

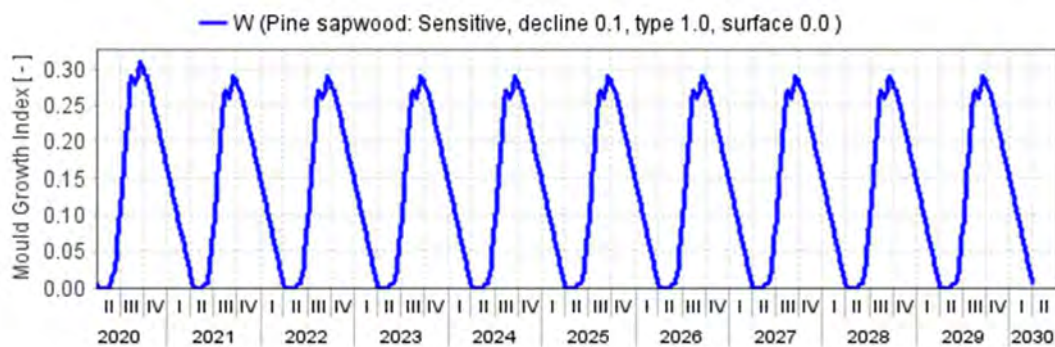


Figure 42: NatHERS CZ 66 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

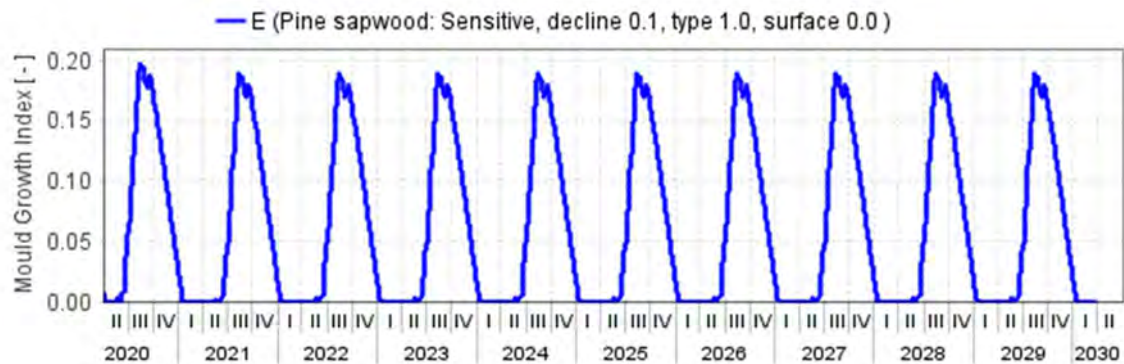


Figure 43: NatHERS CZ 66 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 9. Climate zone 27 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Nil

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

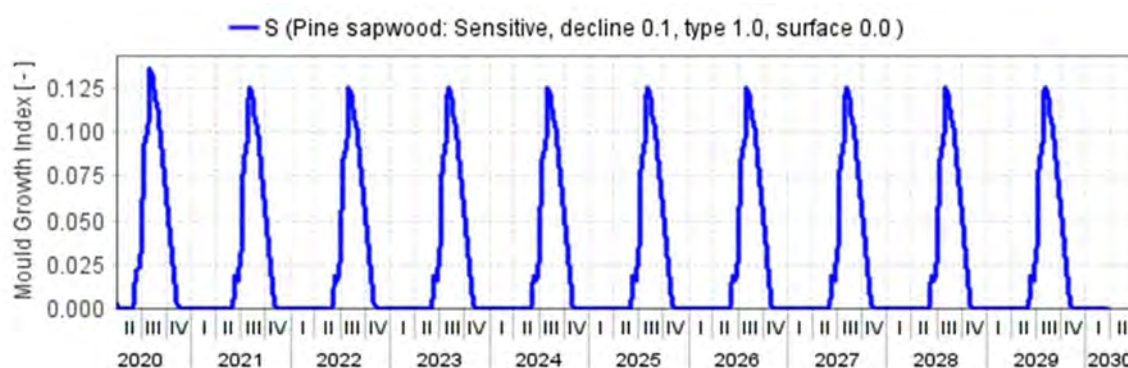


Figure 44: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

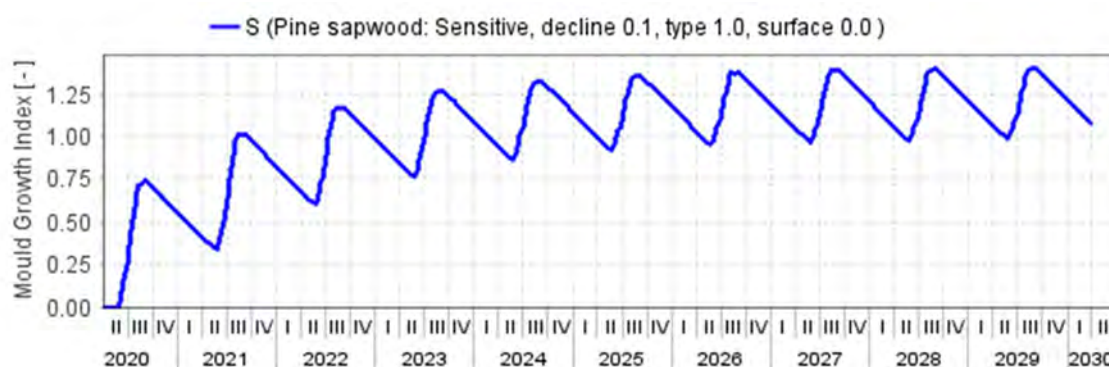


Figure 45: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil



Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

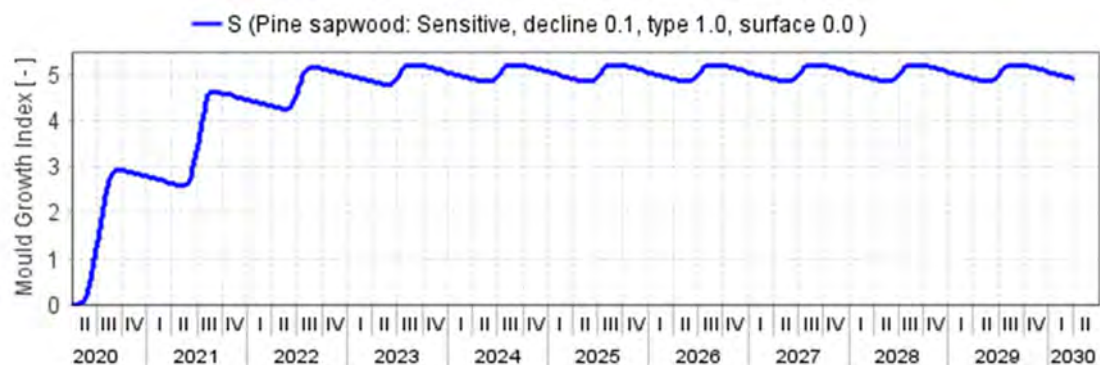


Figure 46: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

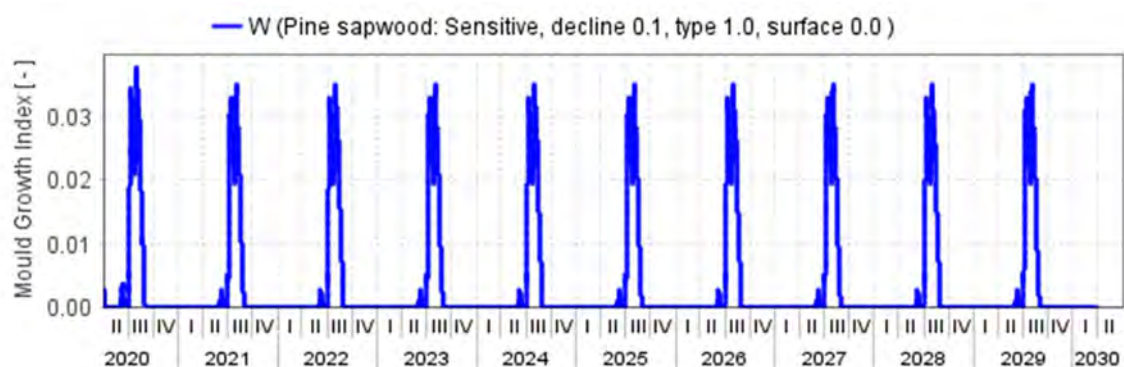


Figure 47: NatHERS CZ 27 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



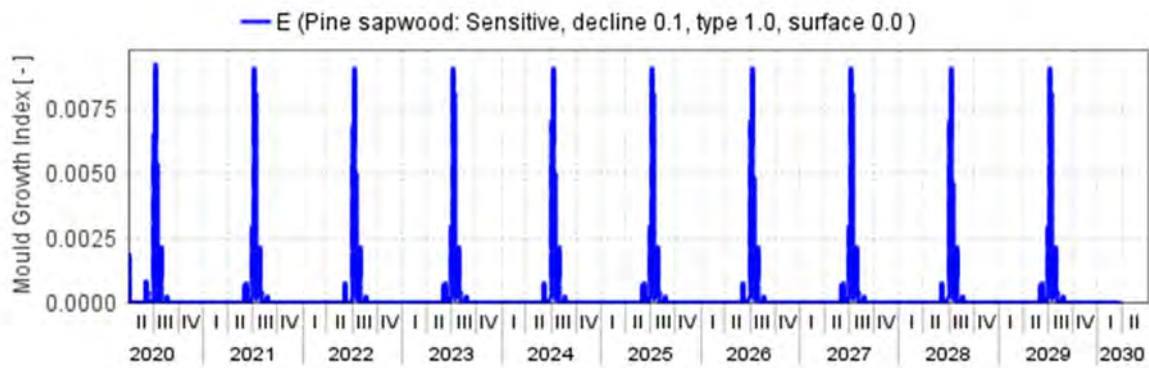


Figure 48: NatHERS CZ 27 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 10. Climate zone 61 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

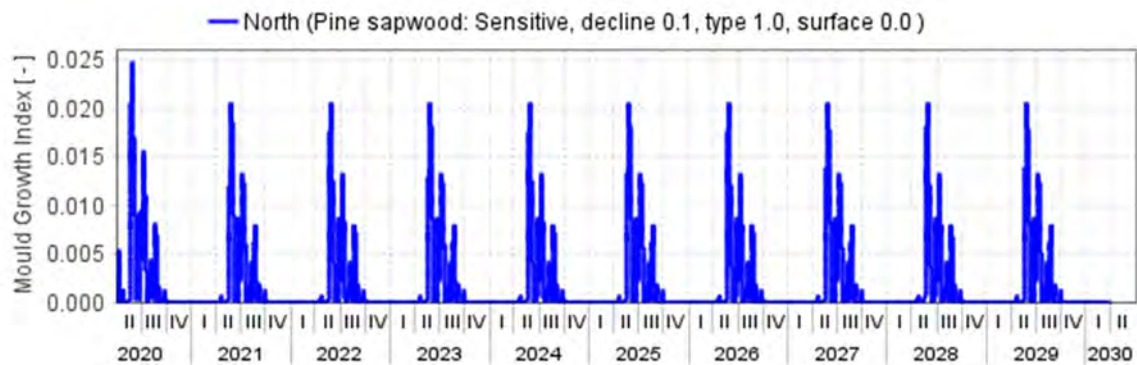


Figure 49: NatHERS CZ 61 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

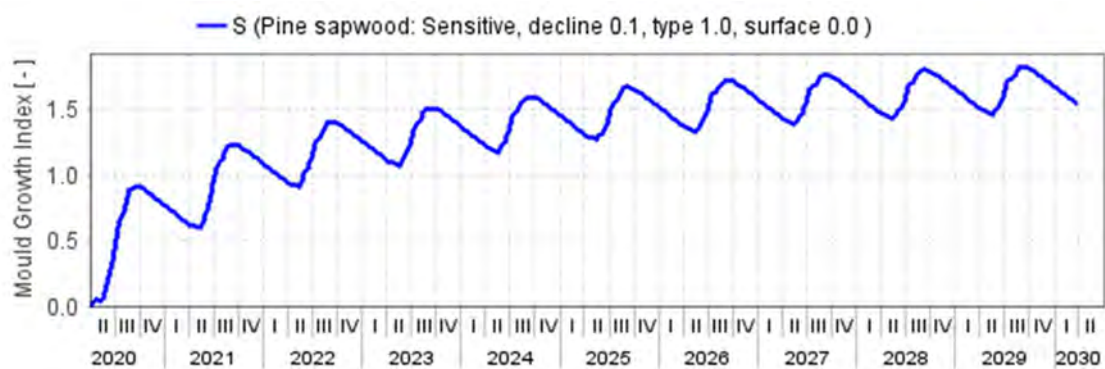


Figure 50: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

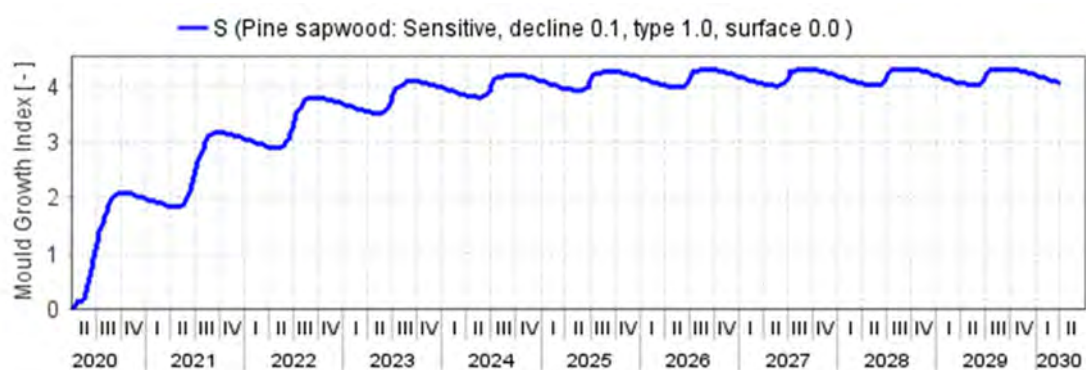


Figure 51: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

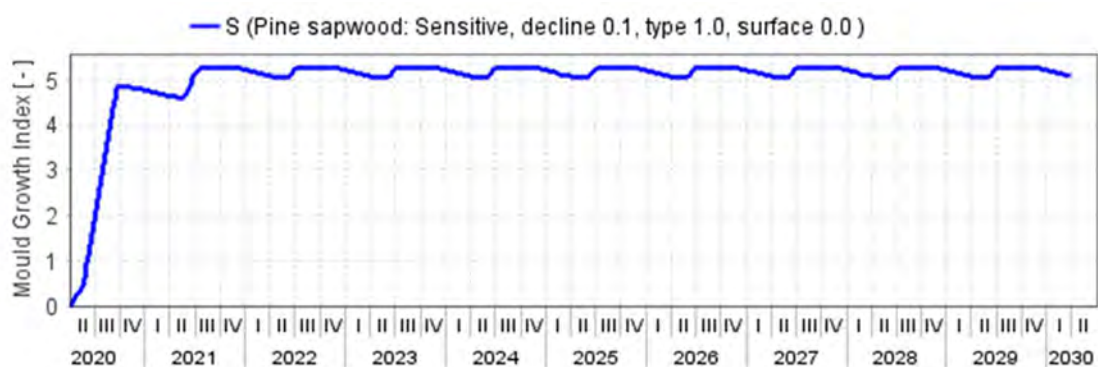


Figure 52: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fourth year. This wall type requires further investigation.

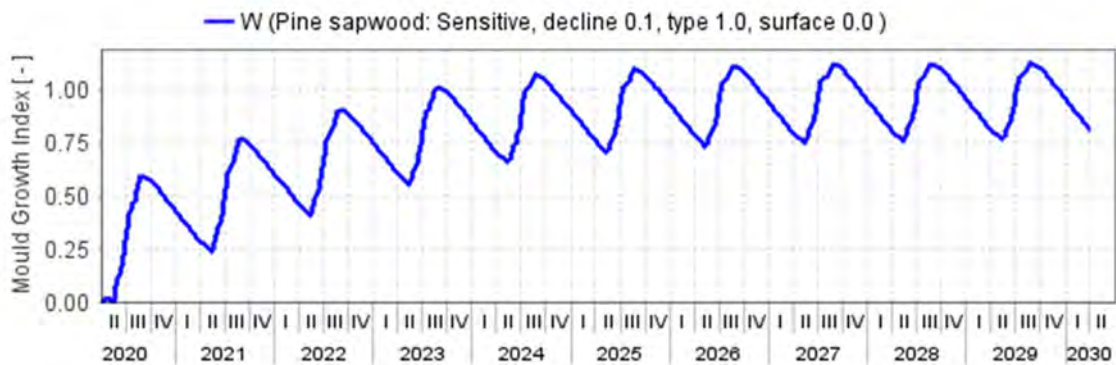


Figure 53: NatHERS CZ 61 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

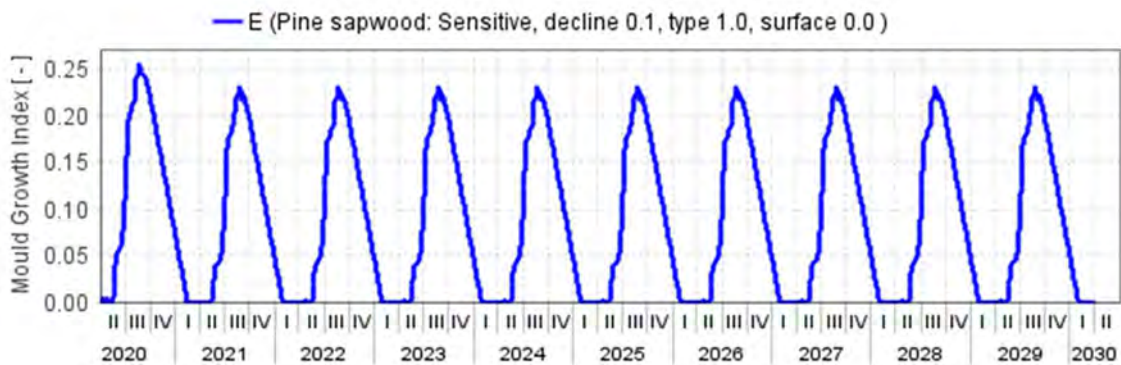


Figure 54: NatHERS CZ 61 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 11. Climate zone 66 - NCC CZ4

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

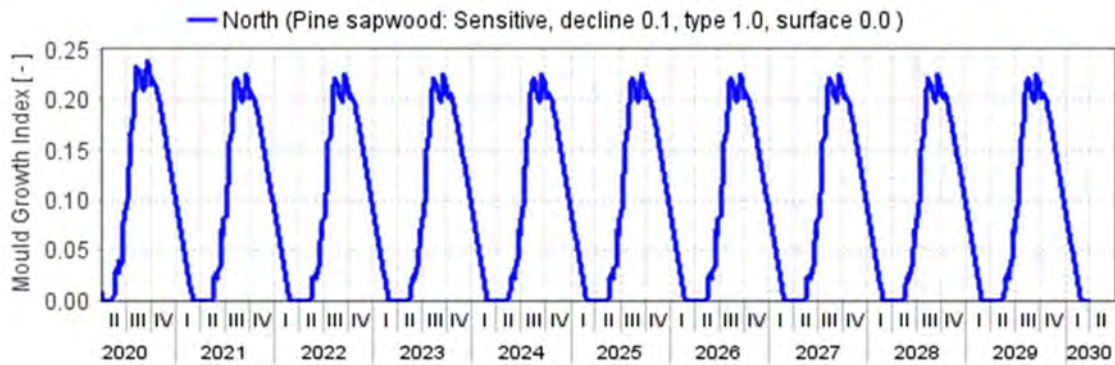


Figure 55: NatHERS CZ 66 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

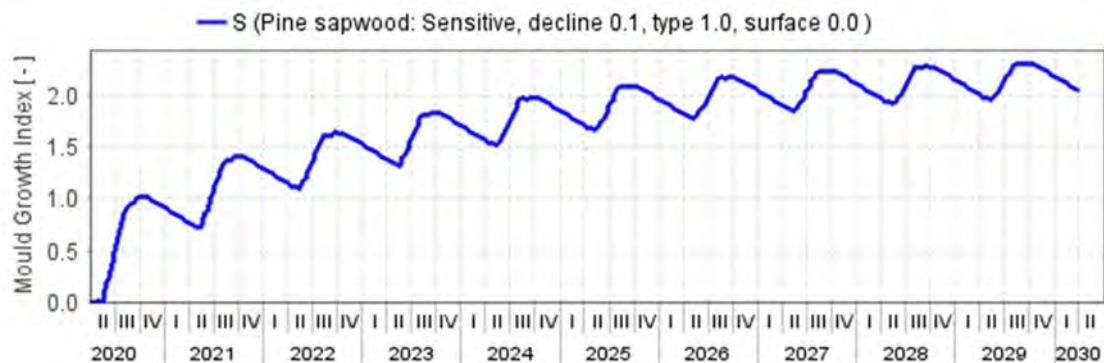


Figure 56: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.



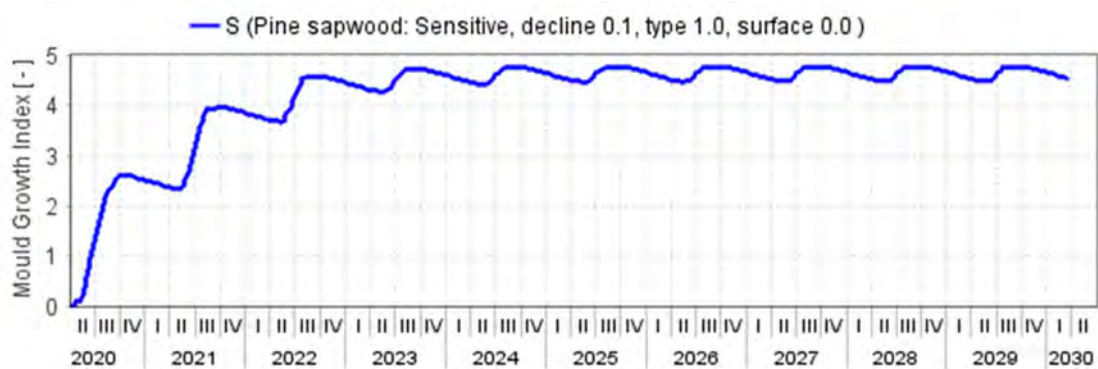


Figure 57: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

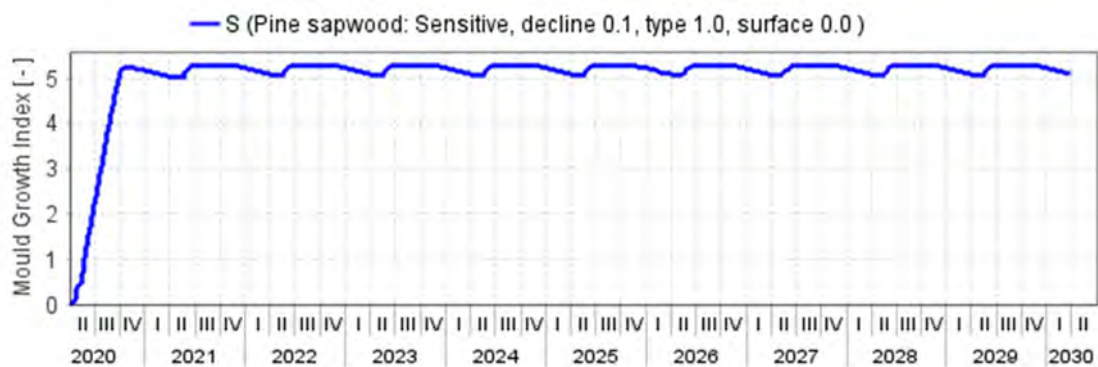
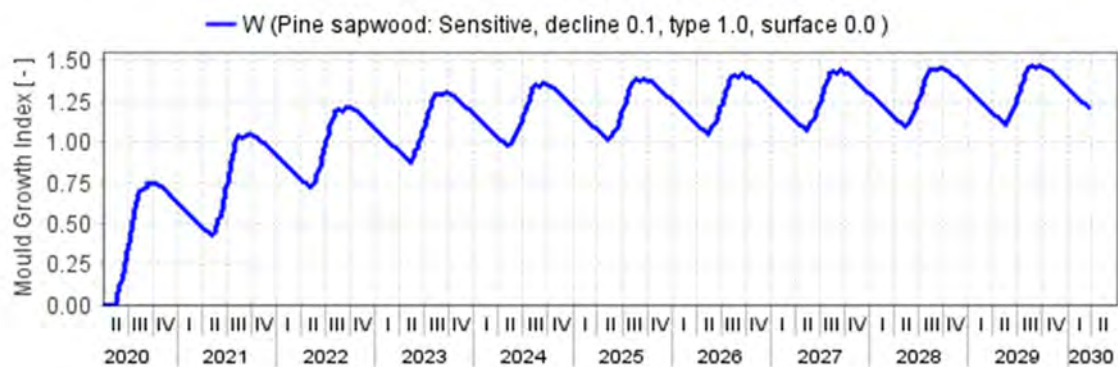


Figure 58: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.



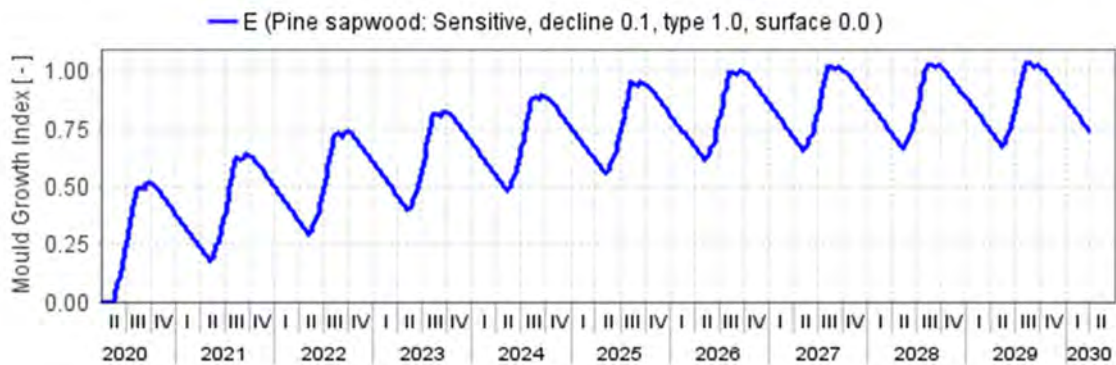


*Figure 59: NatHERS CZ 66 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame*

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the seventh year. This wall type requires further investigation.



*Figure 60: NatHERS CZ 66 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame*

## Moisture accumulation and mould growth for 7 Star housing Research Report 2

### Appendix 10: Hygrothermal simulation results – Flat metal sheet cladding with insulated timber frame (Wall 9) Rev02 (09/12/2022)

## 1. Climate zone 21 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

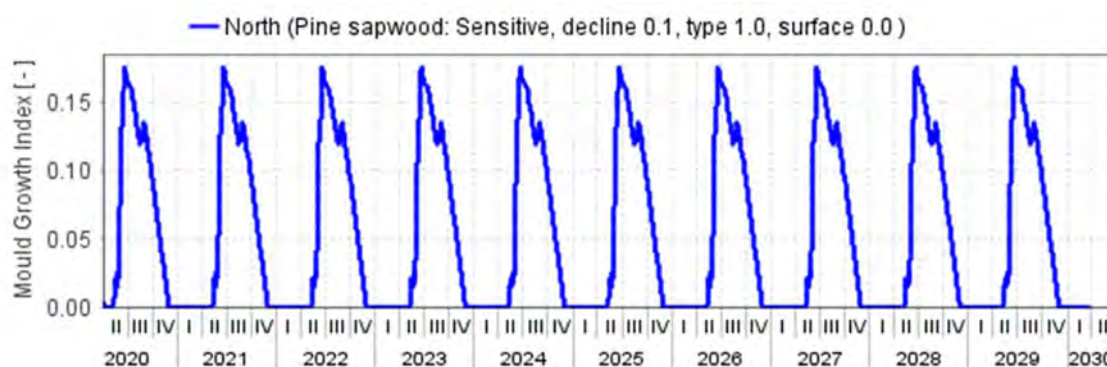


Figure 1: NatHERS CZ 21 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the sixth year.

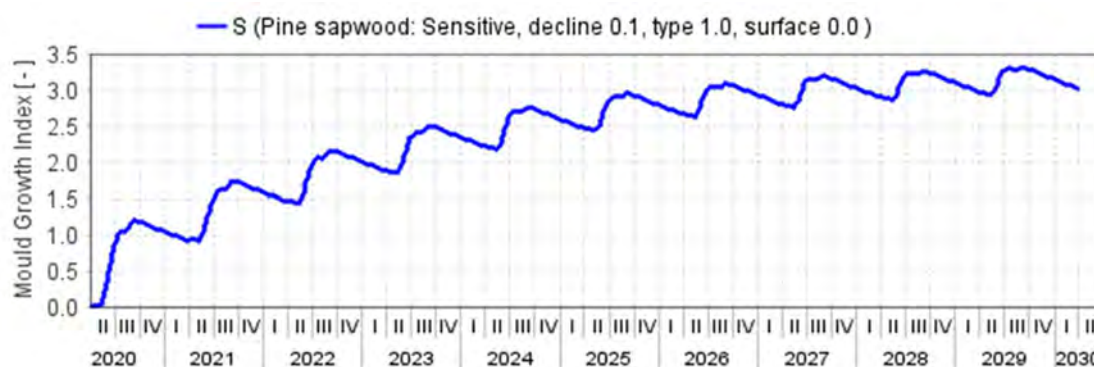


Figure 2: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

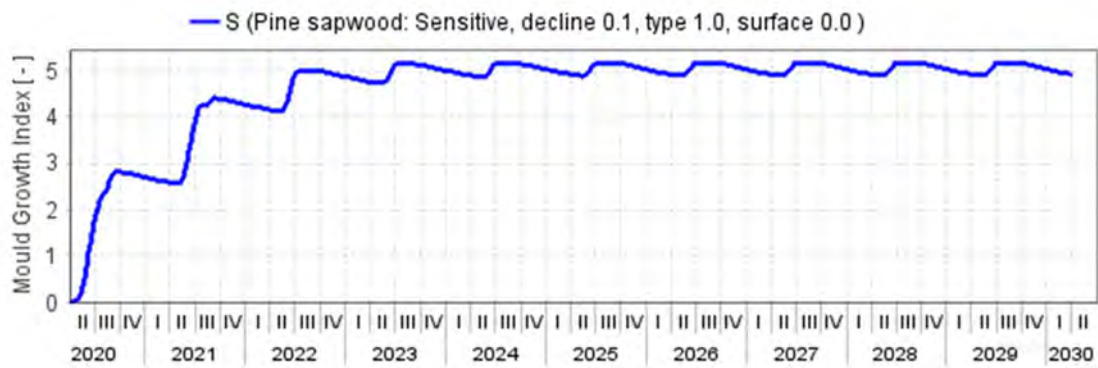


Figure 3: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Moisture accumulates in the Insulation layer ( $0.01 \text{ kg/m}^3$ )

| Water Content [kg/m <sup>3</sup> ]                     |       |      |      |       |
|--------------------------------------------------------|-------|------|------|-------|
| Layer/Material                                         | Start | End  | Min. | Max.  |
| Metal Deck, unperforated                               | 0.00  | 0.00 | 0.00 | 0.02  |
| *vapour retarder (sd=1m) - unlocked VBA 175.4          | 0.00  | 0.00 | 0.00 | 0.05  |
| *thermalan iso / swisswool iso / tirolwool iso - unloc | 3.34  | 3.35 | 1.28 | 10.37 |
| *Gypsum Board (USA) - UTAS -VBA                        | 6.19  | 5.08 | 2.23 | 6.19  |

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

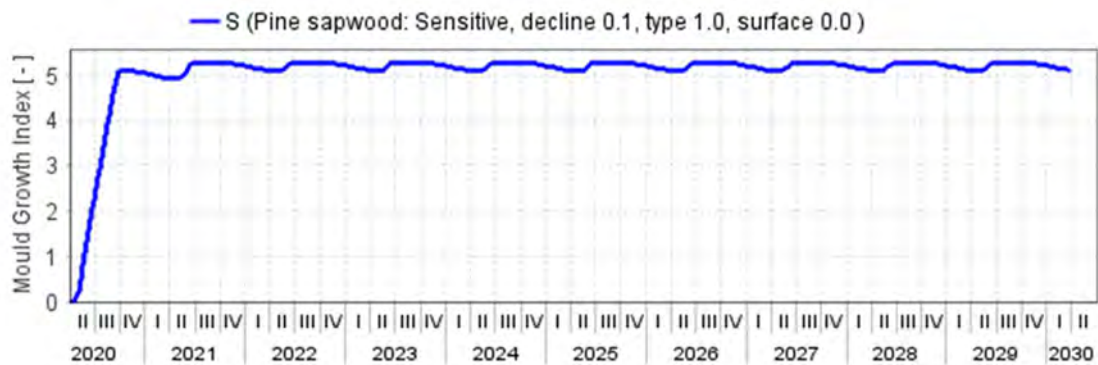


Figure 4: NatHERS CZ 21 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

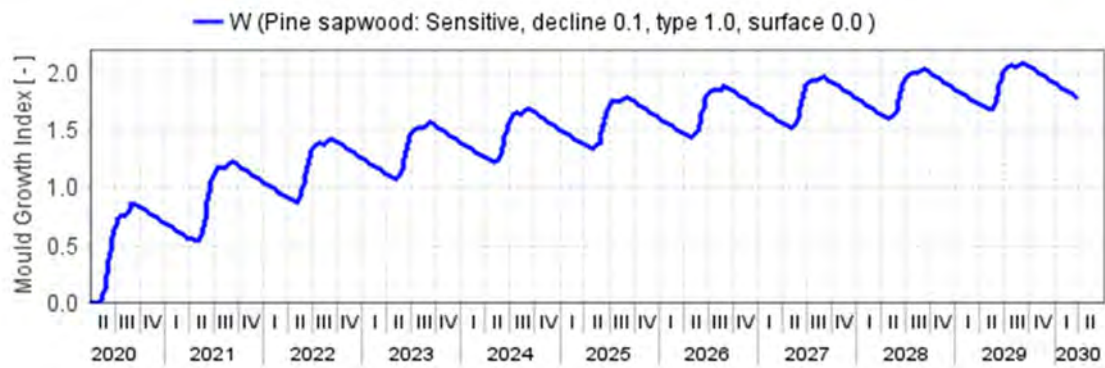


Figure 5: NatHERS CZ 21 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the third year. This wall type requires further investigation.

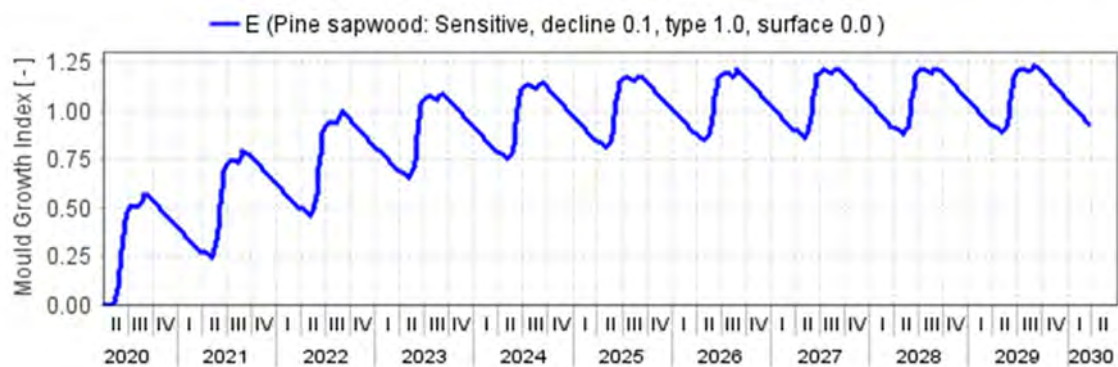


Figure 6: NatHERS CZ 21 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 2. Climate zone 22 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



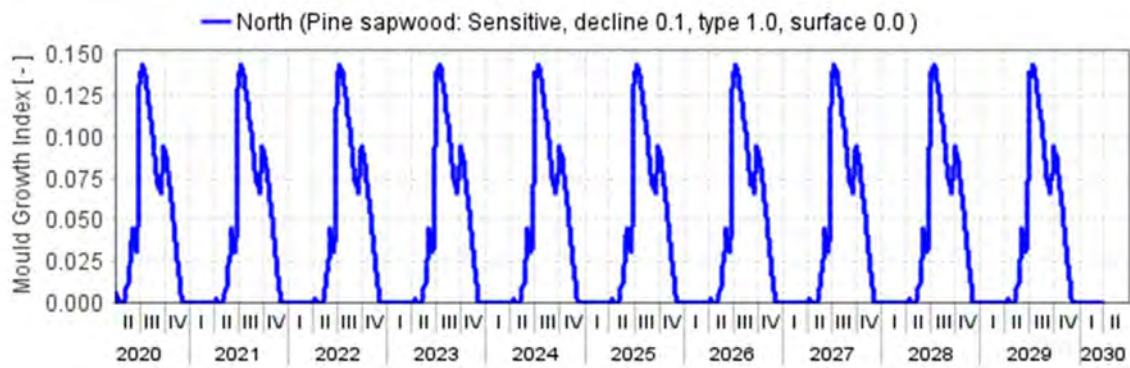


Figure 7: NatHERS CZ 22 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

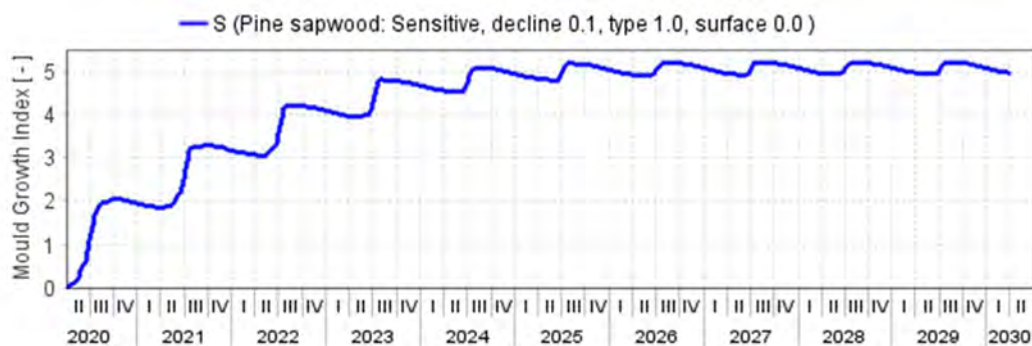


Figure 8: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

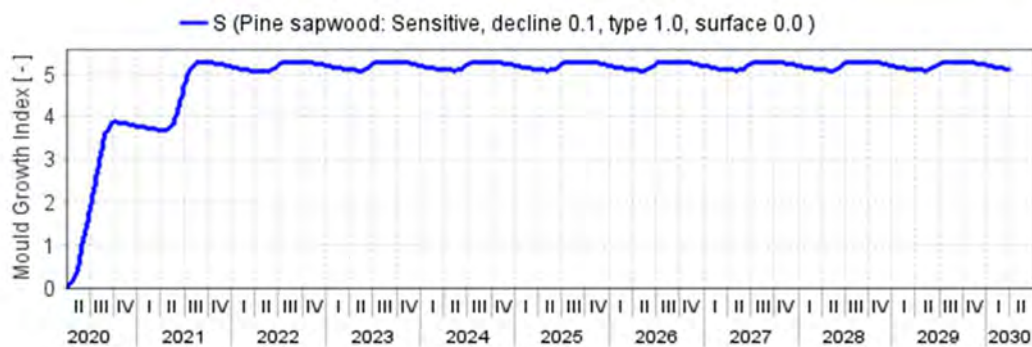


Figure 9: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

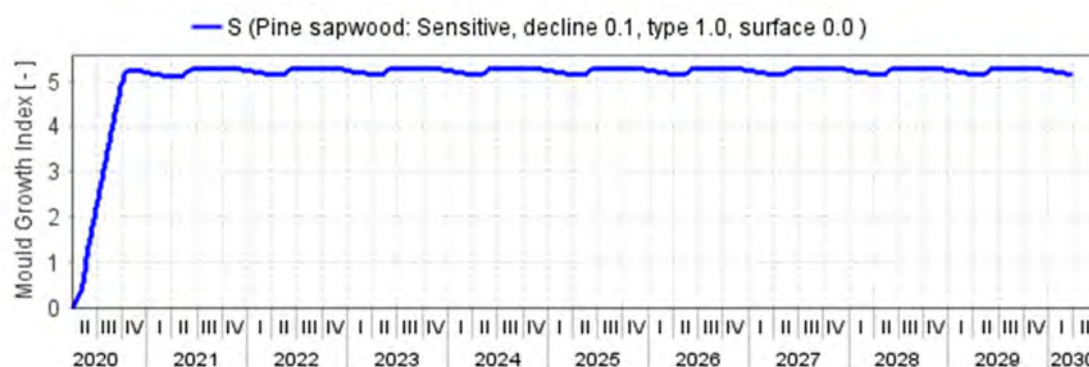


Figure 10: NatHERS CZ 22 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

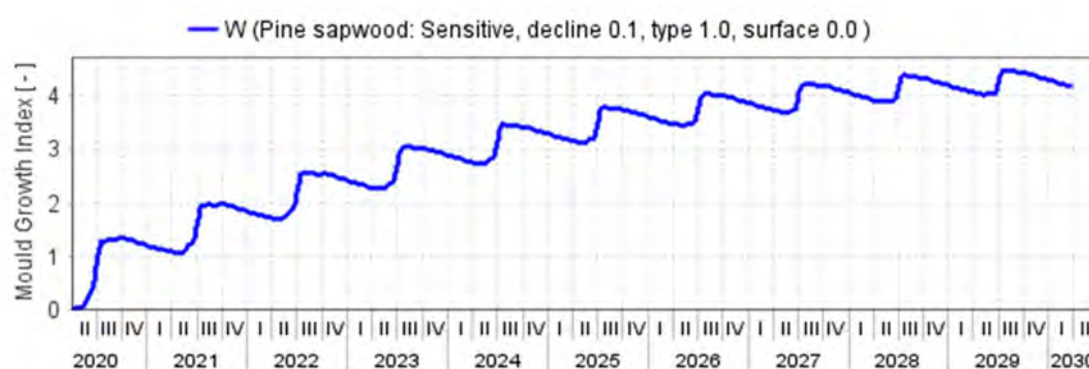


Figure 11: NatHERS CZ 22 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

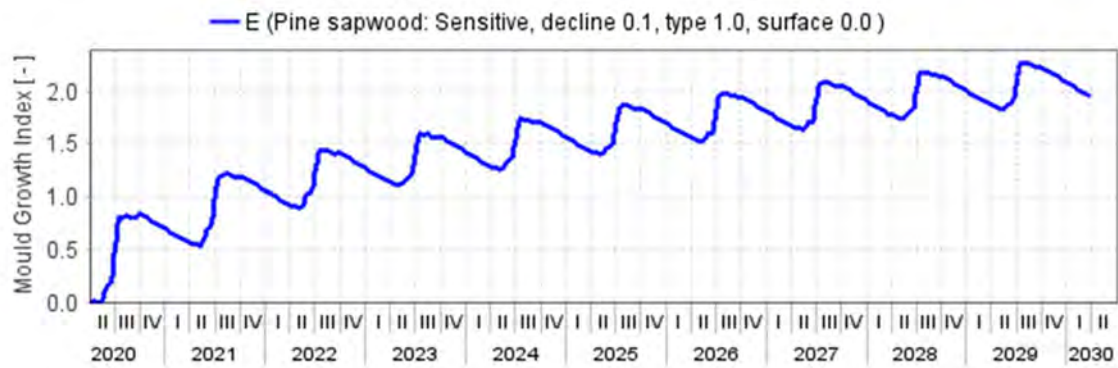


Figure 12: NatHERS CZ 22 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

### 3. Climate zone 27 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

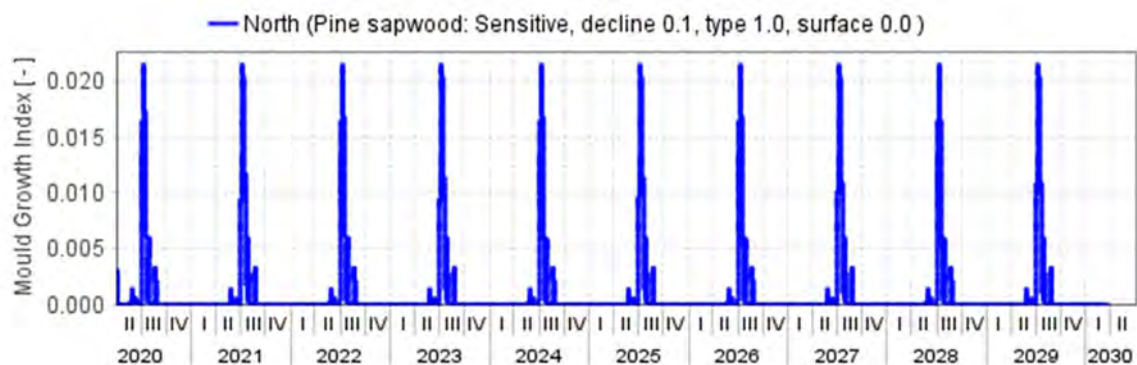


Figure 13: NatHERS CZ 27 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the eighth year.

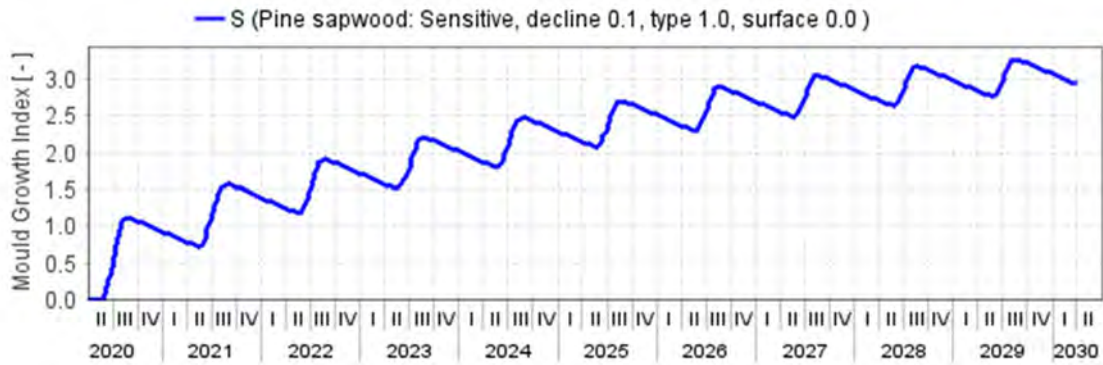


Figure 14: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

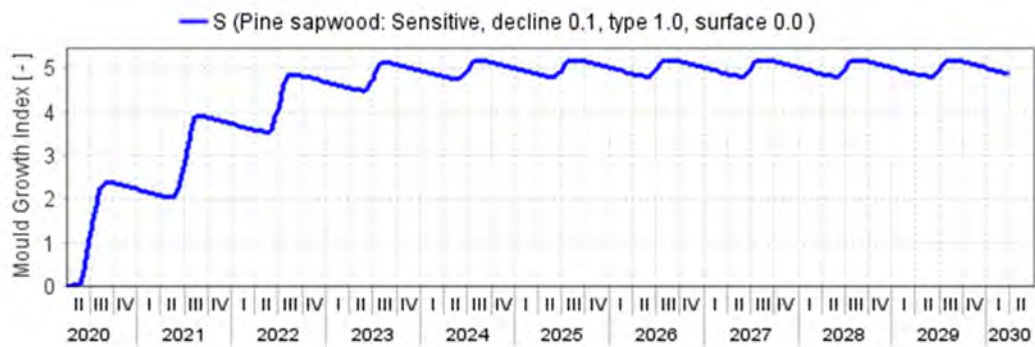


Figure 15: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

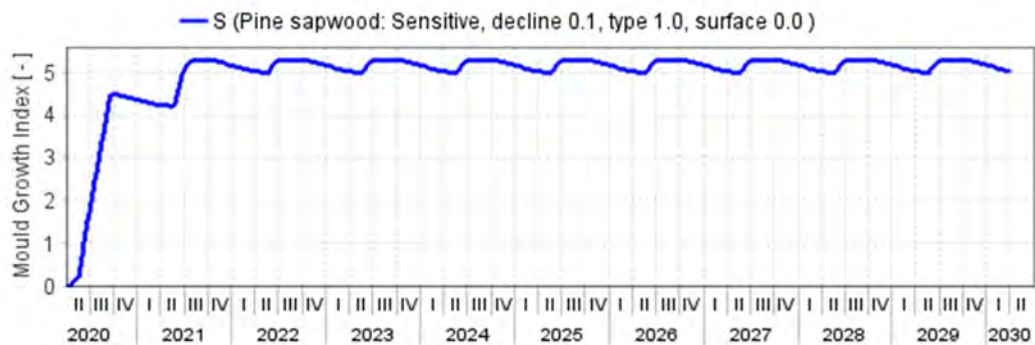


Figure 16: NatHERS CZ 27 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



#### Western orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fourth year. This wall type requires further investigation.

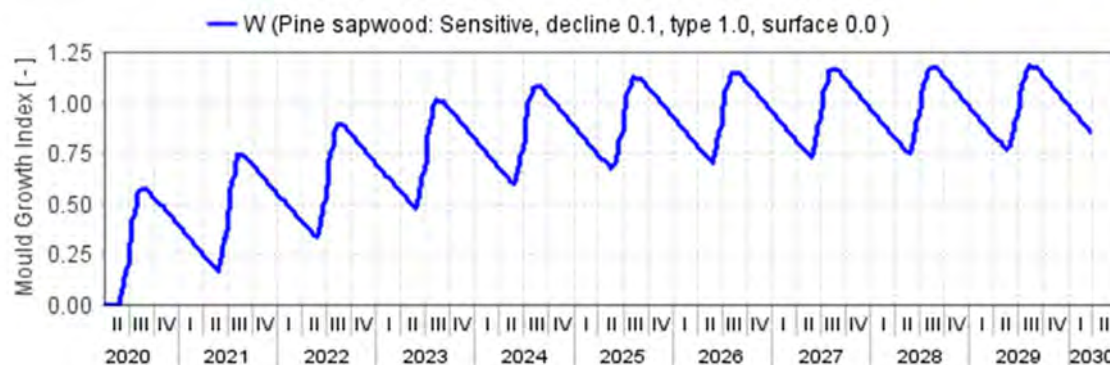


Figure 17: NatHERS CZ 27 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

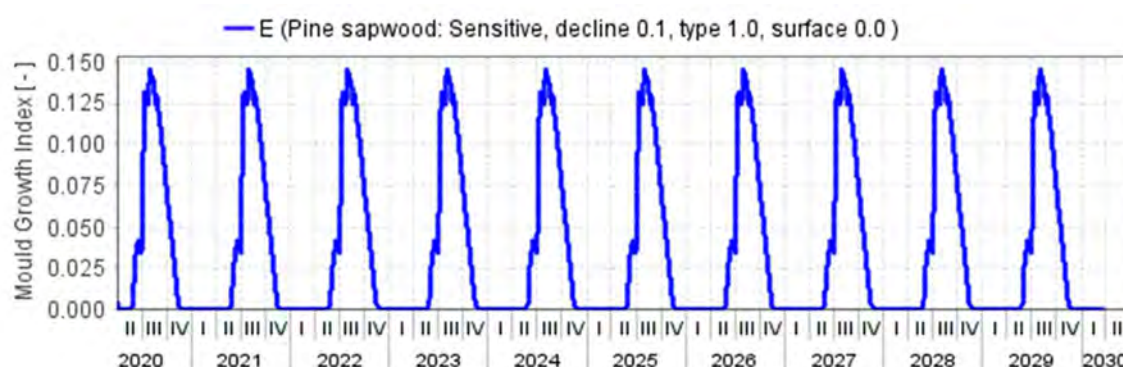


Figure 18: NatHERS CZ 27 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

### 4. Climate zone 60 – NCC CZ 6-8

#### Northern orientation ACR 10 Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.



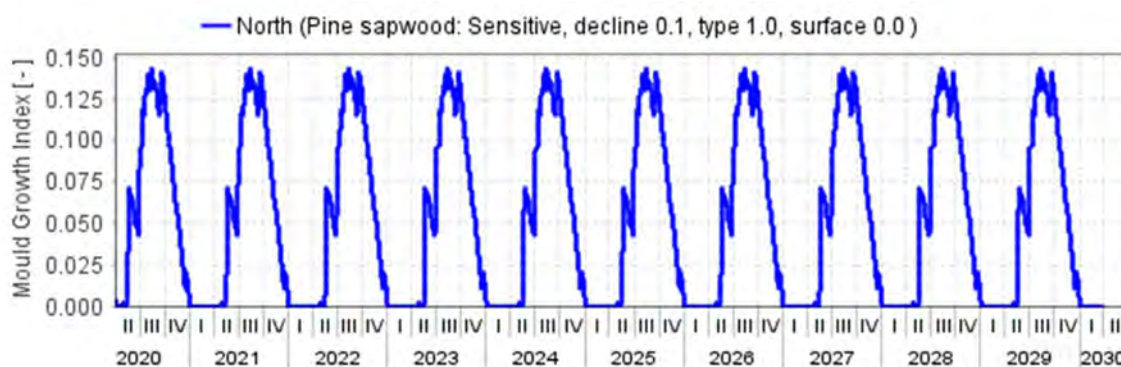


Figure 19: NatHERS CZ 60 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

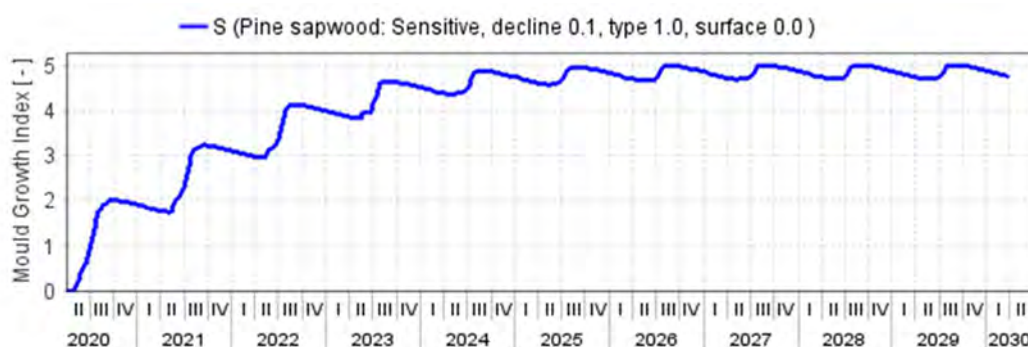


Figure 20: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

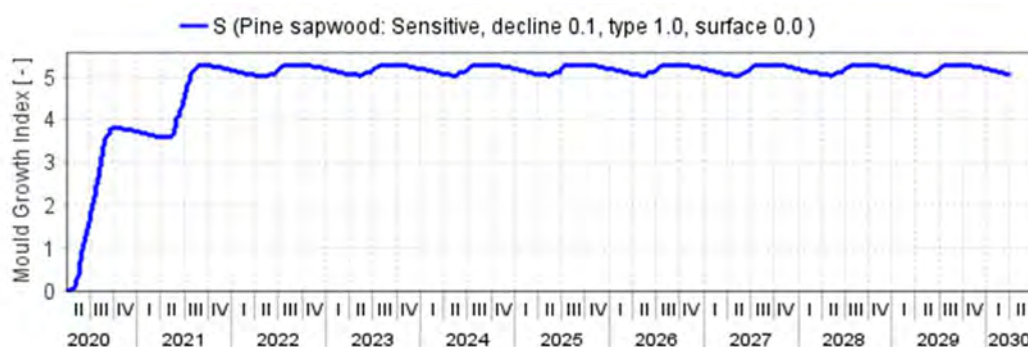


Figure 21: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

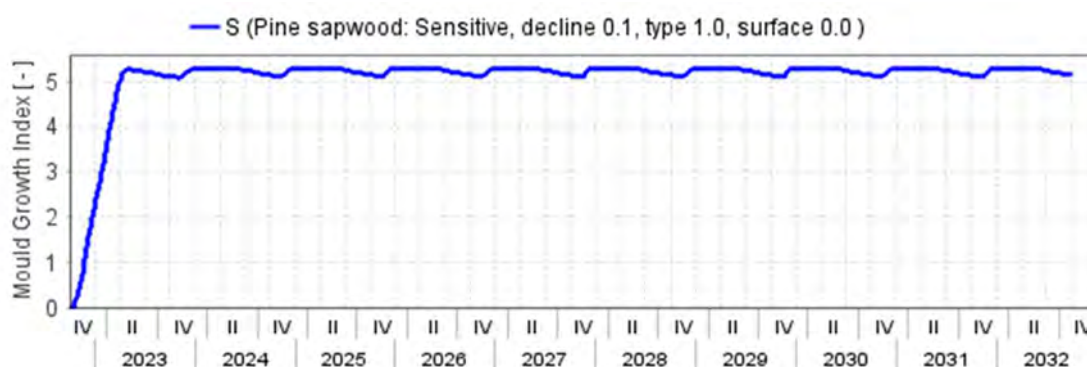


Figure 22: NatHERS CZ 60 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fifth year.

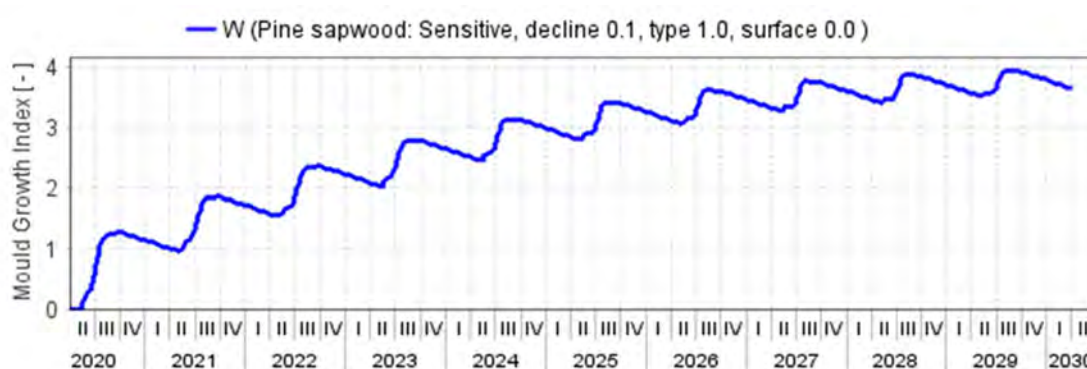


Figure 23: NatHERS CZ 60 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

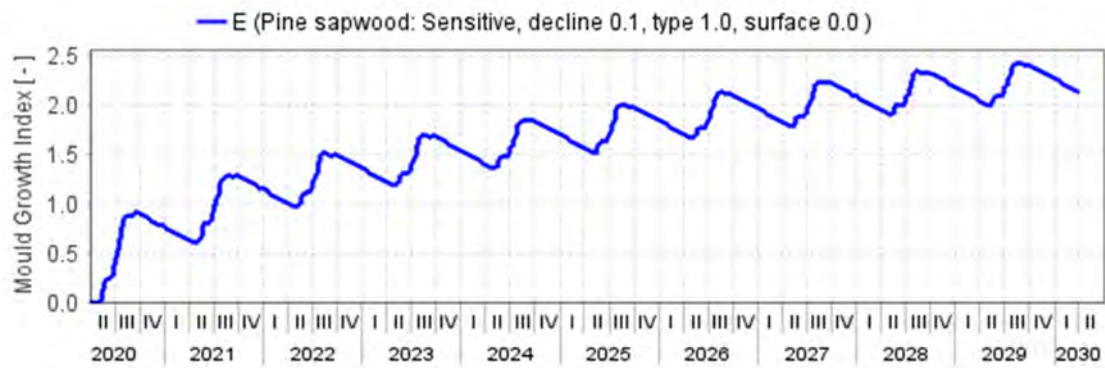


Figure 24: NatHERS CZ 60 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 5. Climate zone 61 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the eighth year. This wall type requires further investigation.

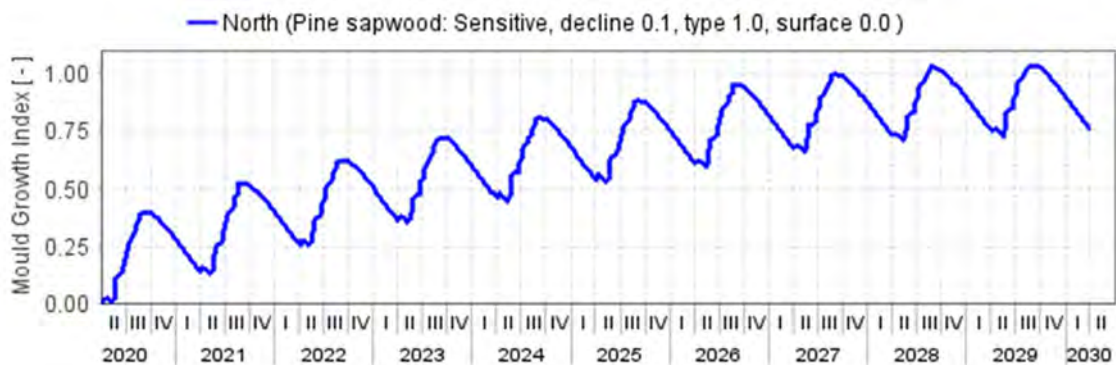


Figure 25: NatHERS CZ 61 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

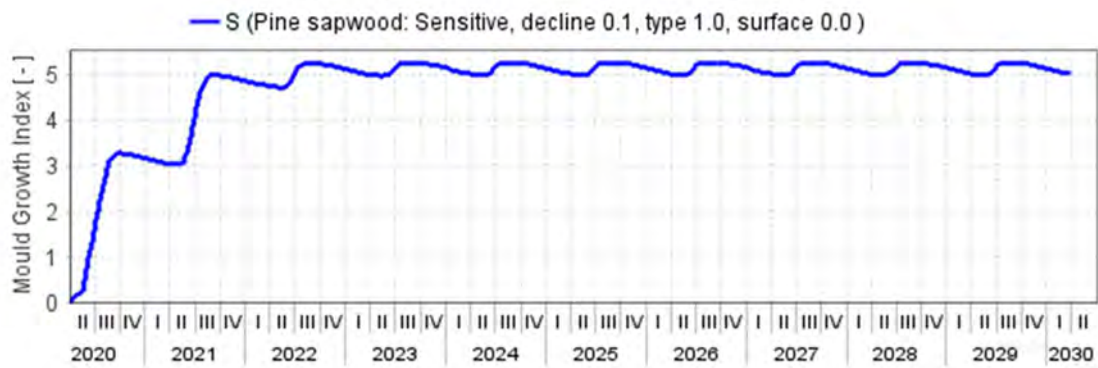


Figure 26: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

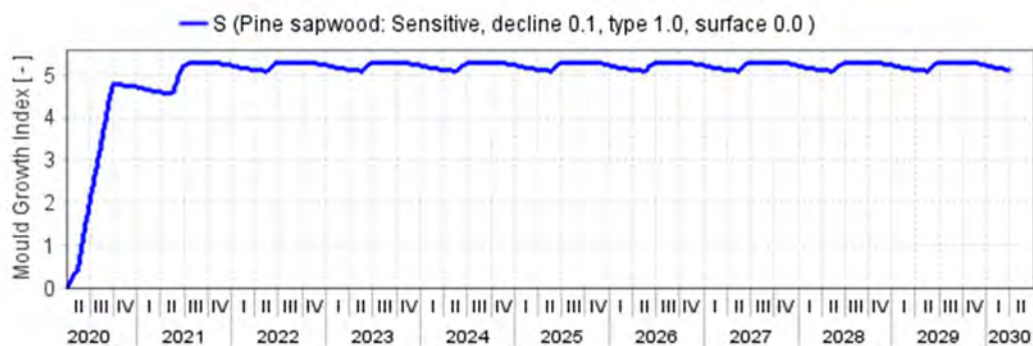


Figure 27: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

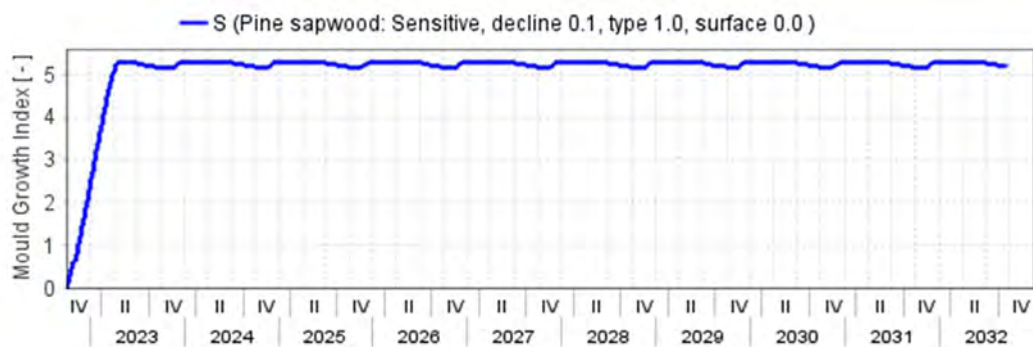


Figure 28: NatHERS CZ 61 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

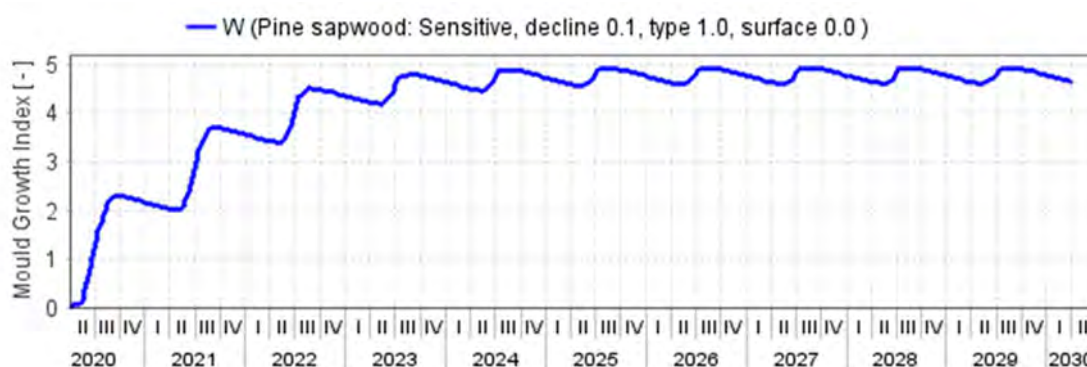


Figure 29: NatHERS CZ 61 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

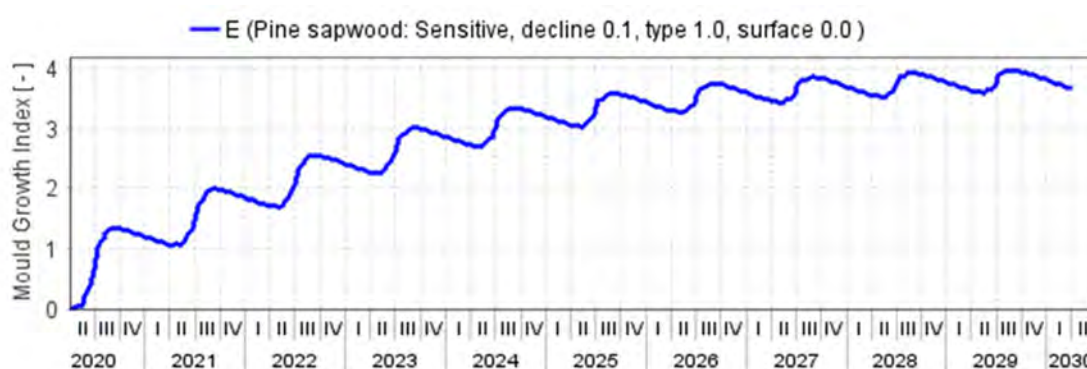


Figure 30: NatHERS CZ 61 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 6. Climate zone 63 – NCC CZ 6-8

Northern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.



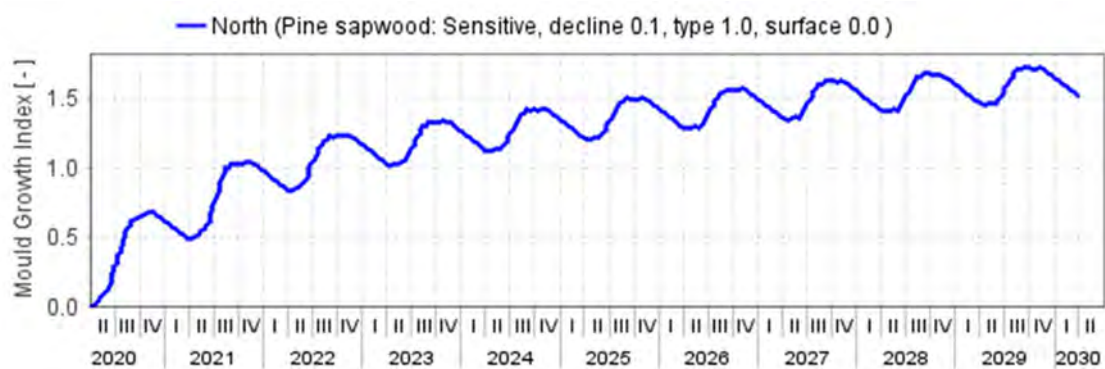


Figure 31: NatHERS CZ 63 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

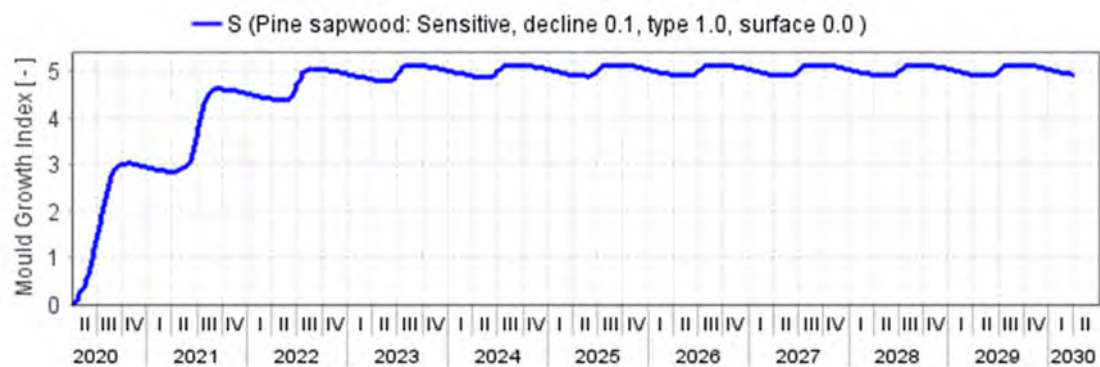


Figure 32: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

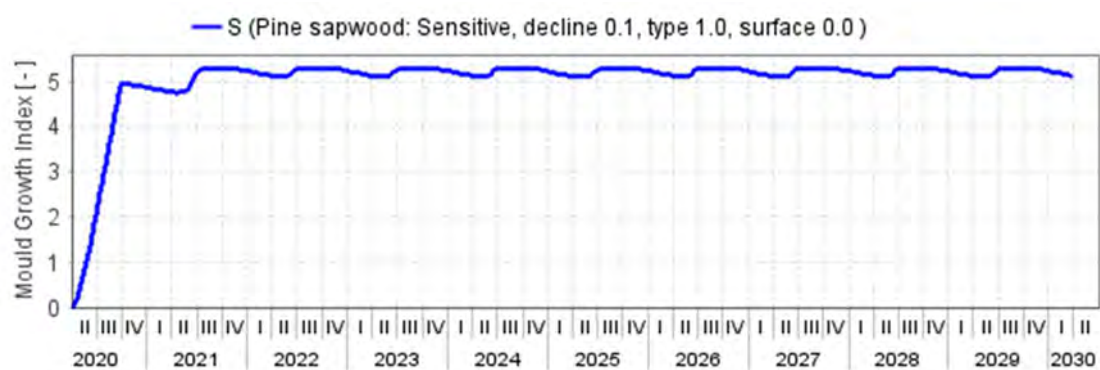


Figure 33: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

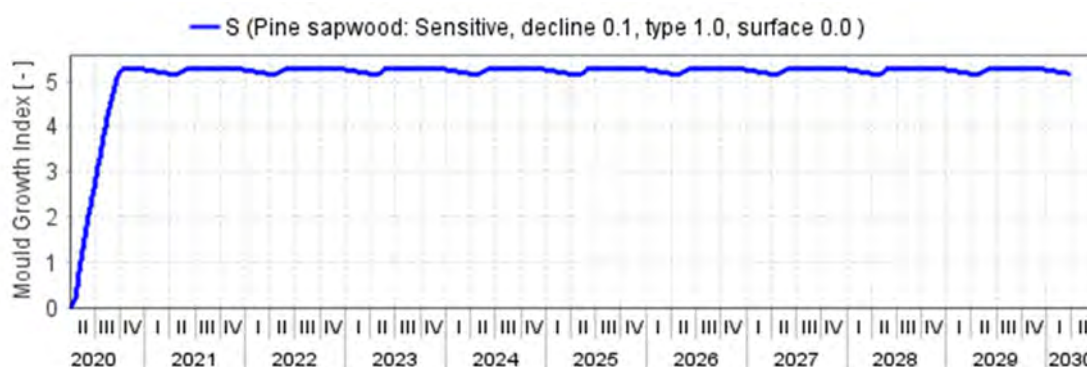


Figure 34: NatHERS CZ 63 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

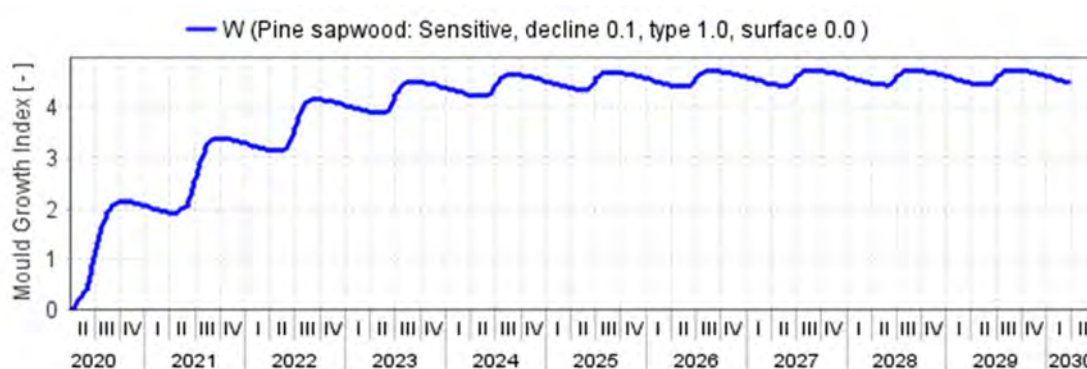


Figure 35: NatHERS CZ 63 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

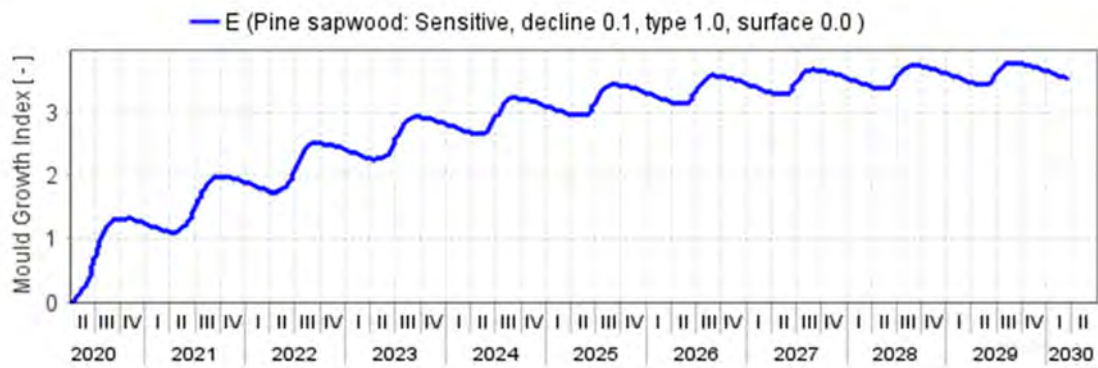


Figure 36: NatHERS CZ 63 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 7. Climate zone 64 – NCC CZ 6-8

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

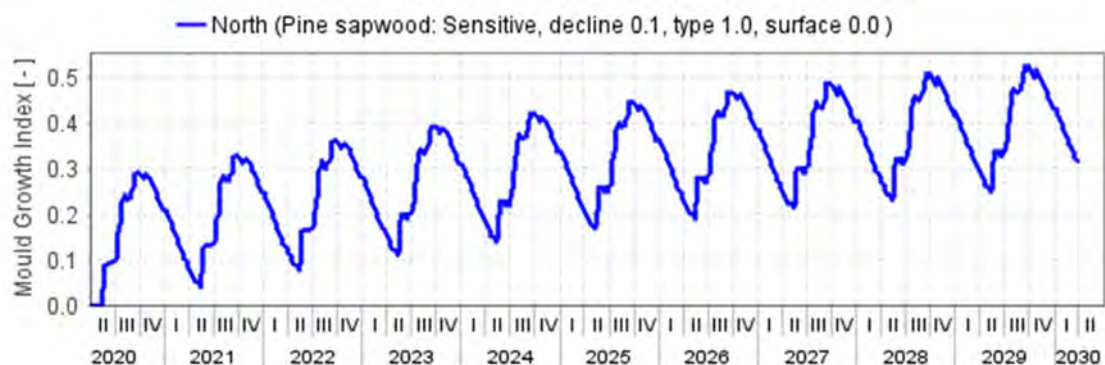


Figure 37: NatHERS CZ 64 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

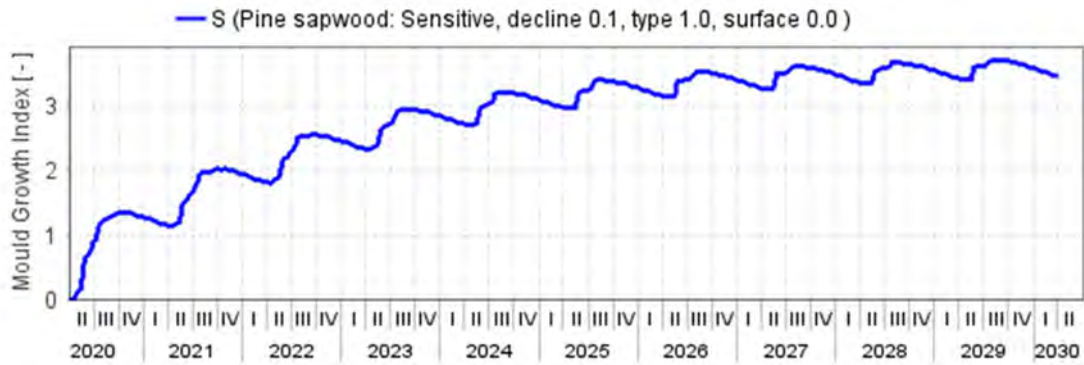


Figure 38: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

#### Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

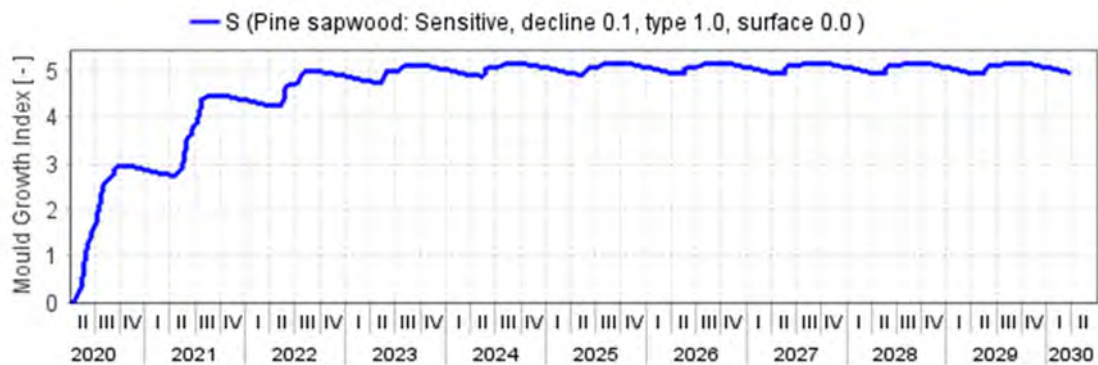


Figure 39: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

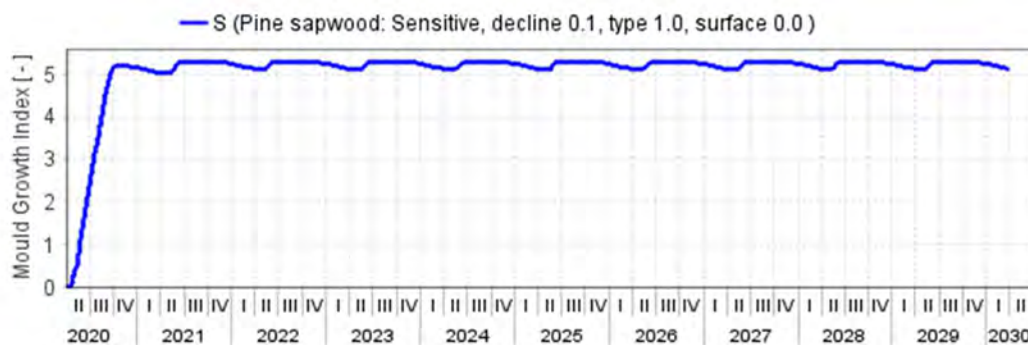


Figure 40: NatHERS CZ 64 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame



## Western orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the first year. This wall type requires further investigation.

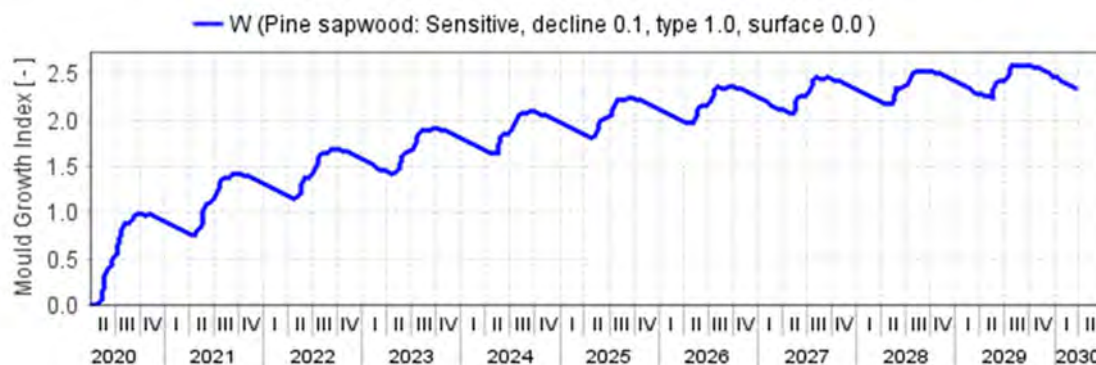


Figure 41: NatHERS CZ 64 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

## Eastern orientation ACR 10

### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the second year. This wall type requires further investigation.

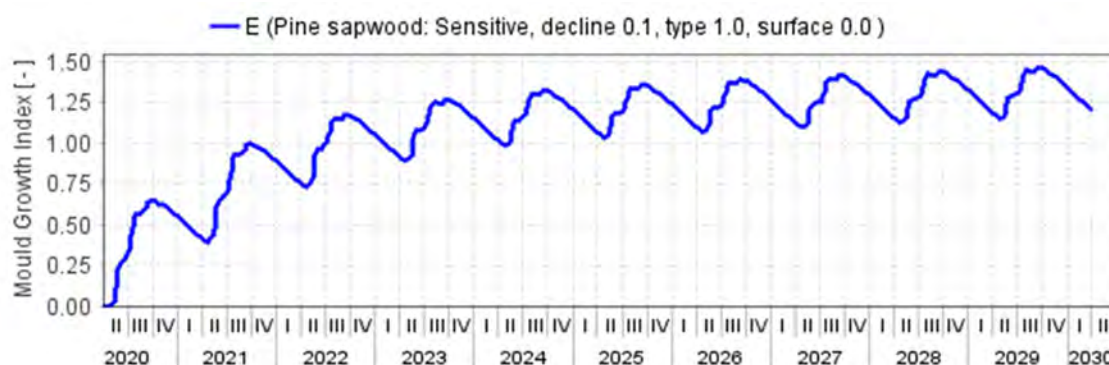


Figure 42: NatHERS CZ 64 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 8. Climate zone 66 – NCC CZ 6-8

### Northern orientation ACR 10

#### Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.



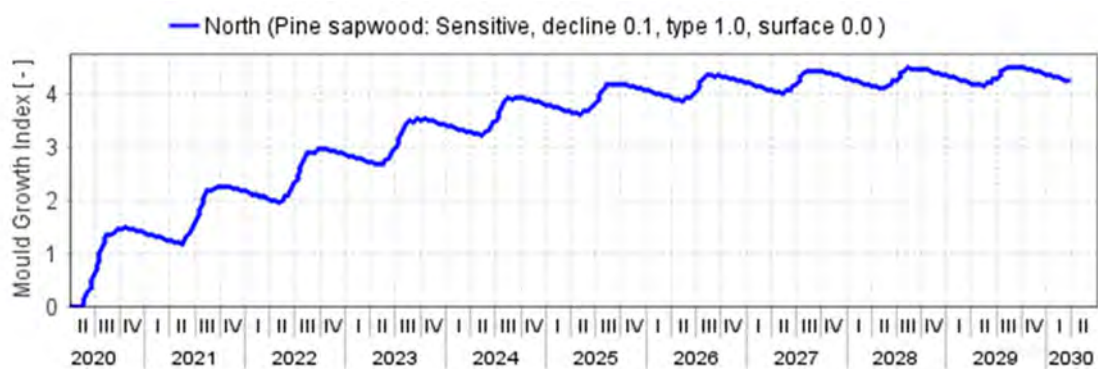


Figure 43: NatHERS CZ 66 – NCC CZ6-8 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

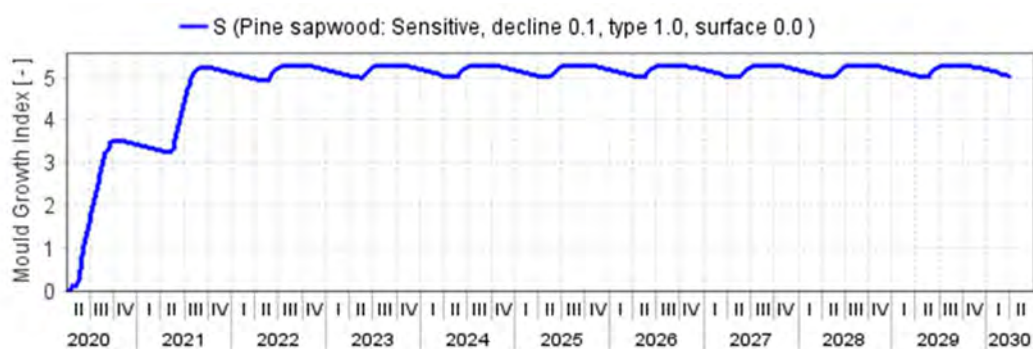


Figure 44: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

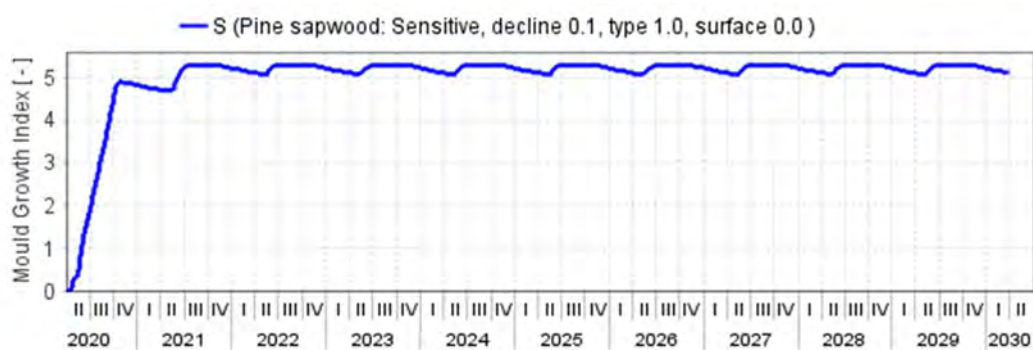


Figure 45: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

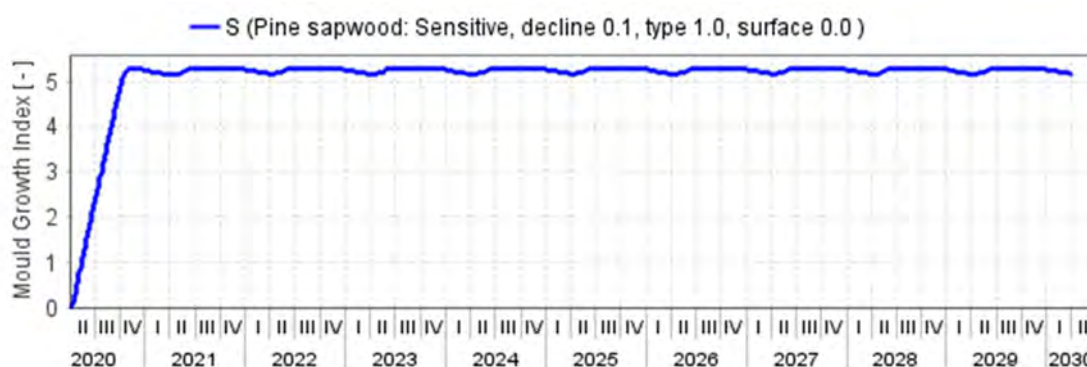


Figure 46: NatHERS CZ 66 – NCC CZ6-8 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

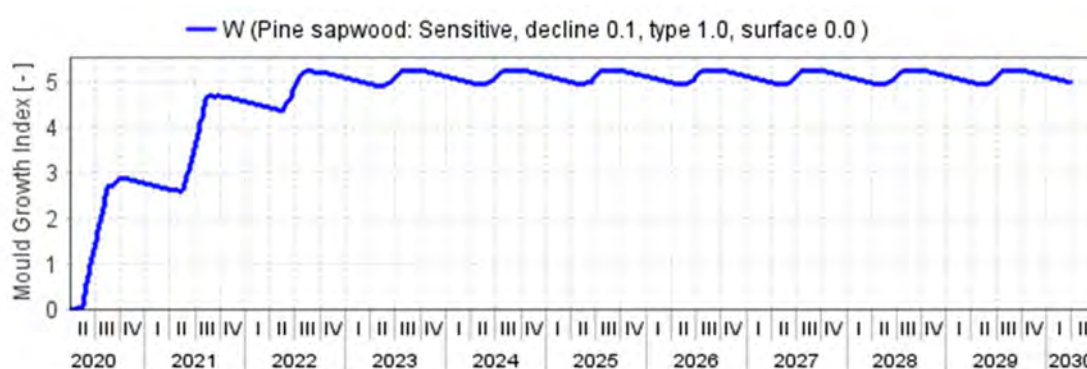


Figure 47: NatHERS CZ 66 – NCC CZ6-8 western orientation ACR 10 - mould growth within insulated timber frame

#### Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

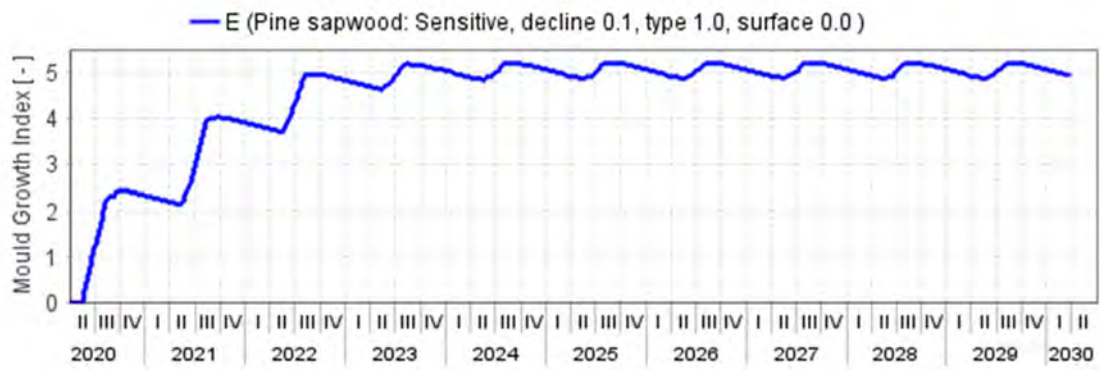


Figure 48: NatHERS CZ 66 – NCC CZ6-8 eastern orientation ACR 10 - mould growth within insulated timber frame

## 9. Climate zone 27 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

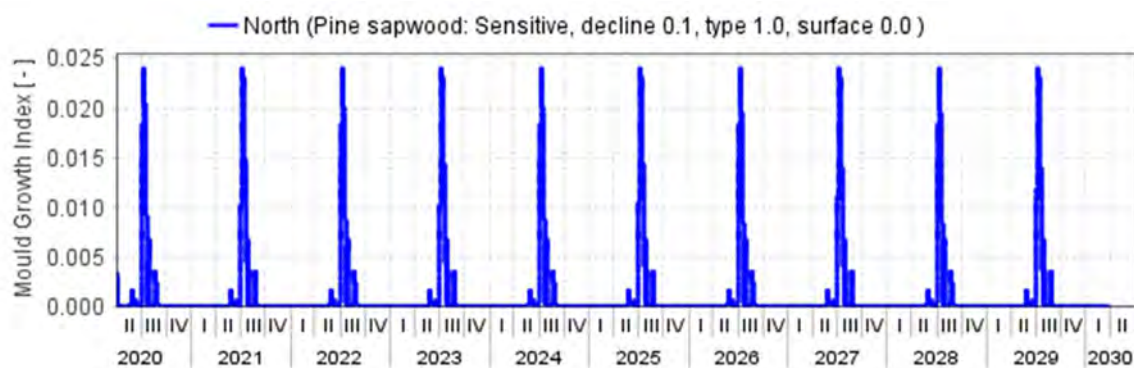


Figure 49: NatHERS CZ 27 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the seventh year.

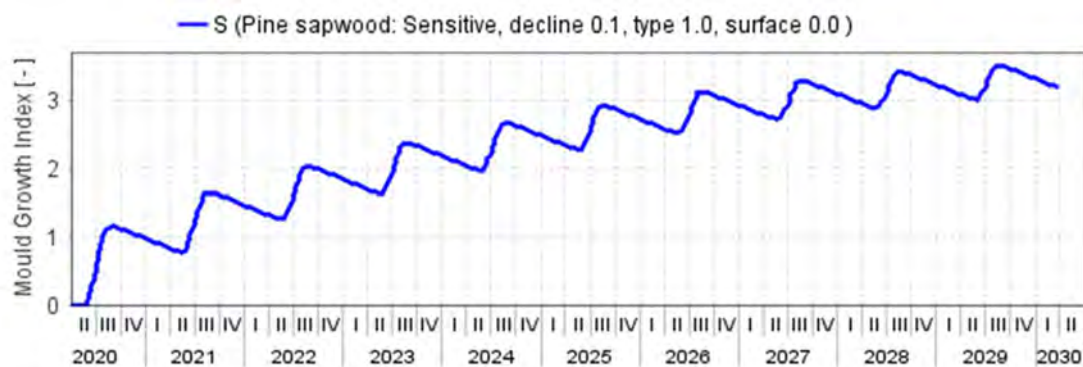


Figure 50: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

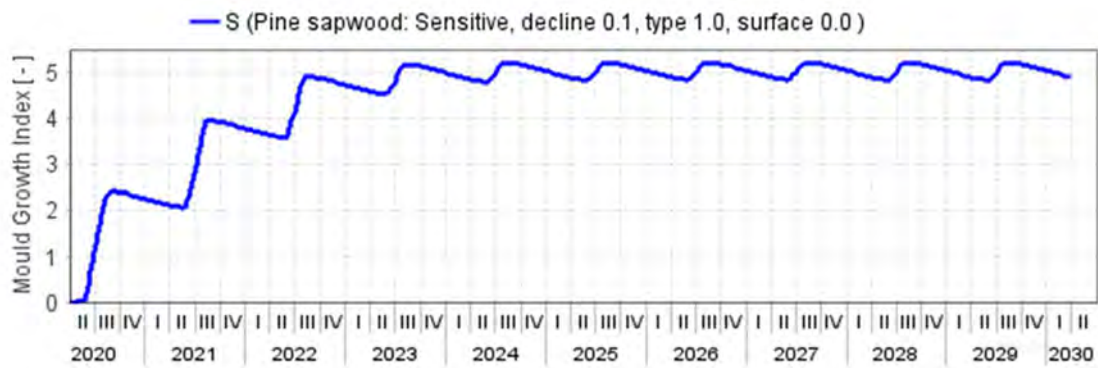


Figure 51: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

#### Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

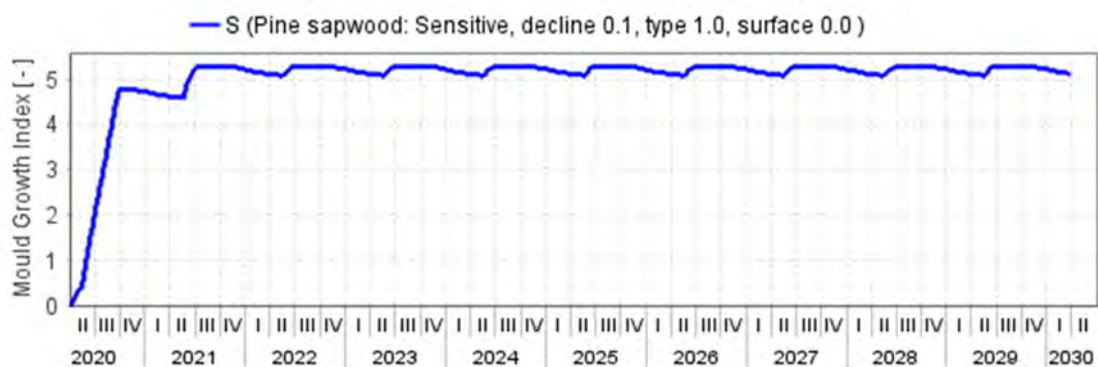


Figure 52: NatHERS CZ 27 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

#### Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fifth year. This wall type requires further investigation.

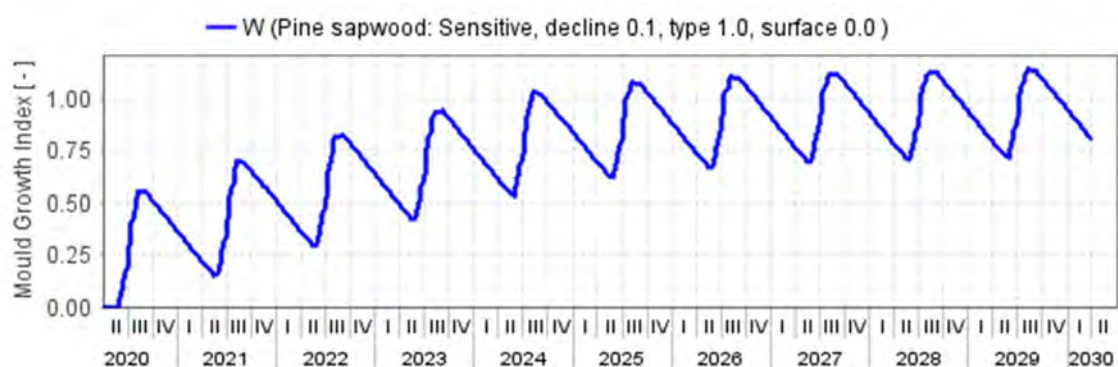




Figure 53: NatHERS CZ 27 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index does not exceed 1.0.

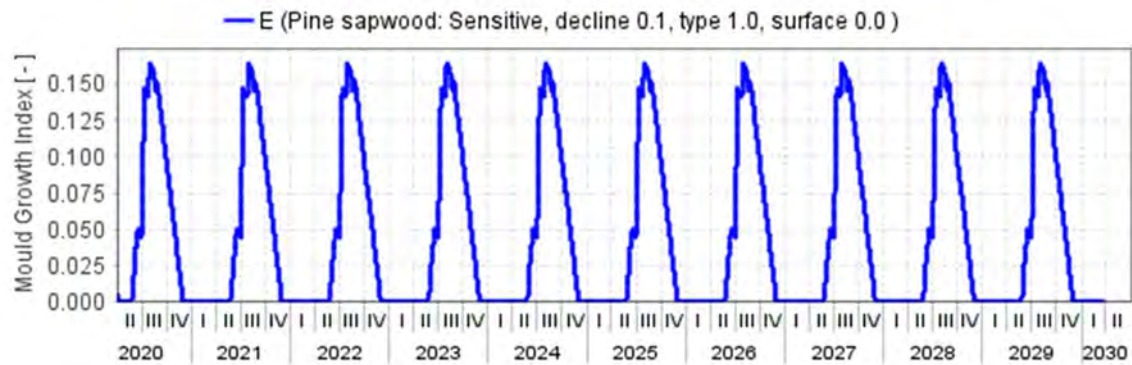


Figure 54: NatHERS CZ 27 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 10. Climate zone 61 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame. However, the Mould Growth Index exceeds 1.0 in the fifth year. This wall type requires further investigation.

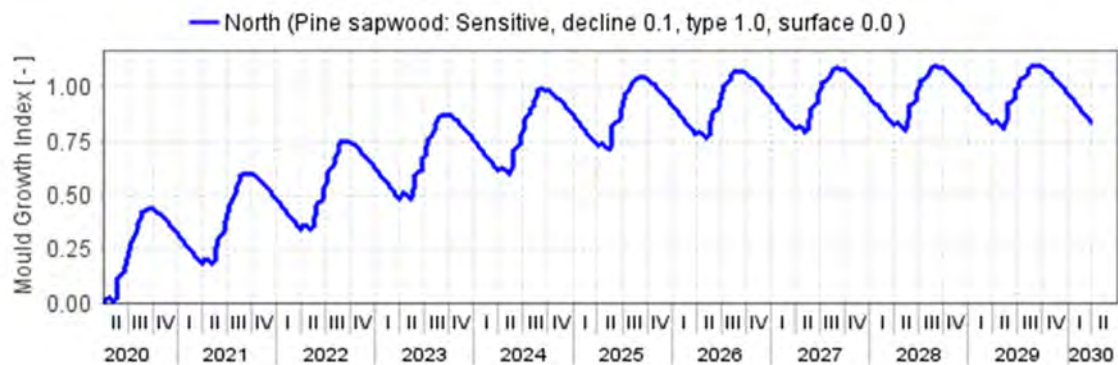


Figure 55: NatHERS CZ 61 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

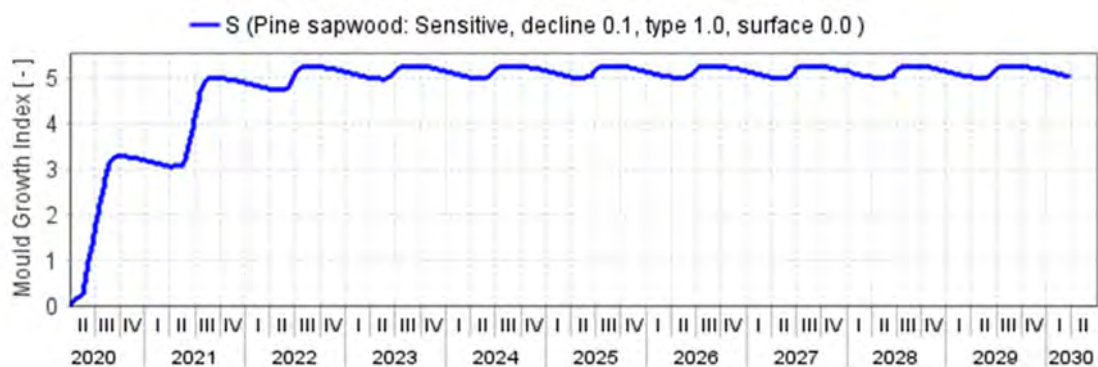


Figure 56: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

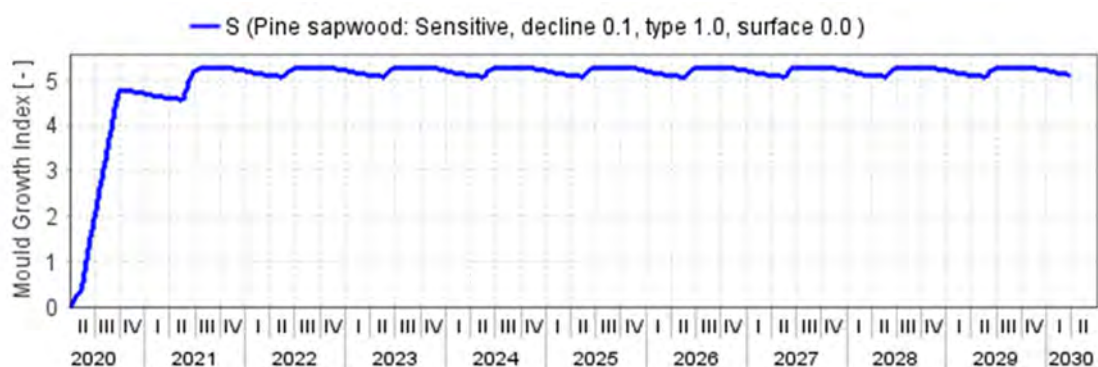


Figure 57: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

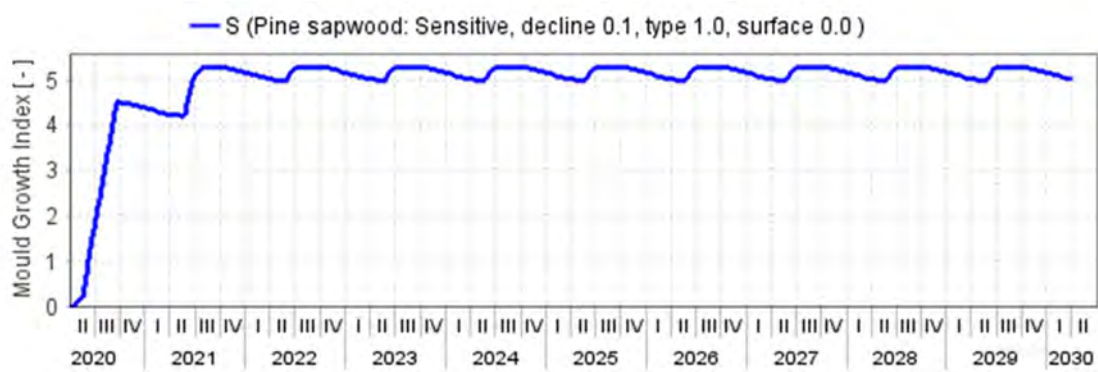


Figure 58: NatHERS CZ 61 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

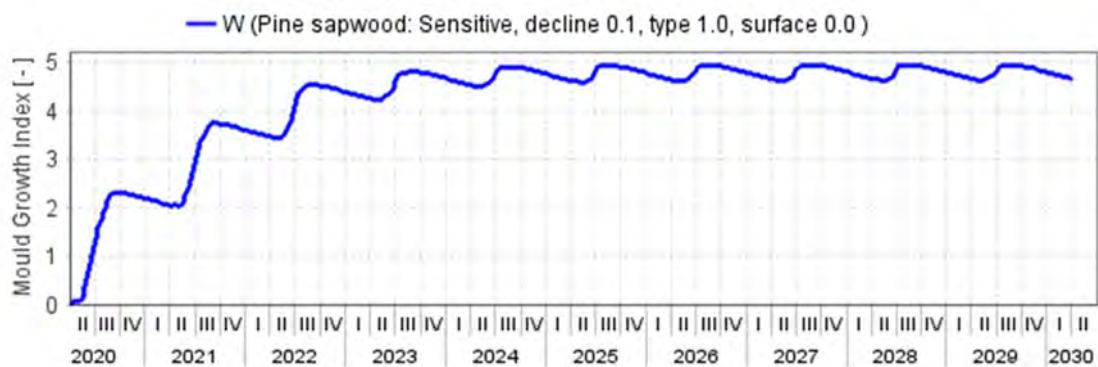


Figure 59: NatHERS CZ 61 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10  
Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the fourth year.

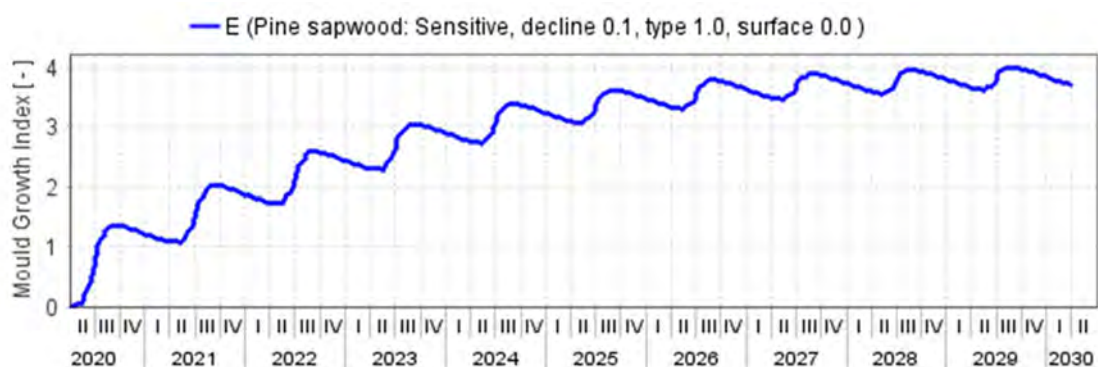


Figure 60: NatHERS CZ 61 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame

## 11. Climate zone 66 - NCC CZ4

Northern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the third year.

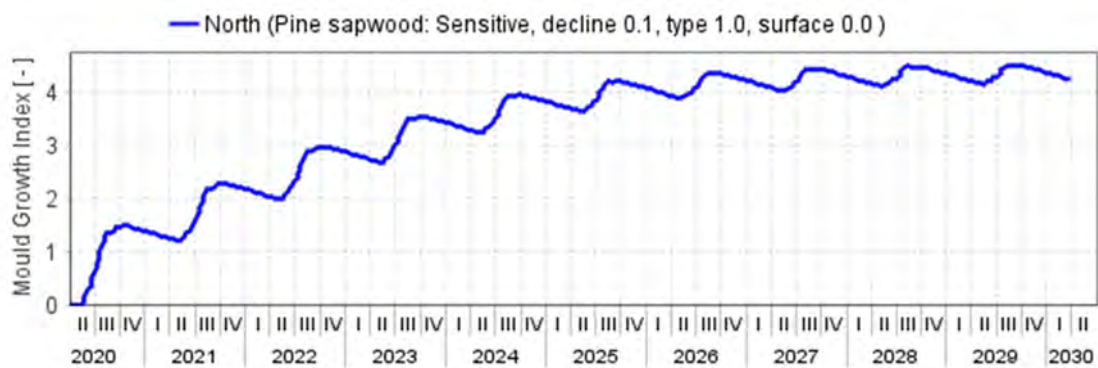


Figure 61: NatHERS CZ 66 - NCC CZ4 northern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

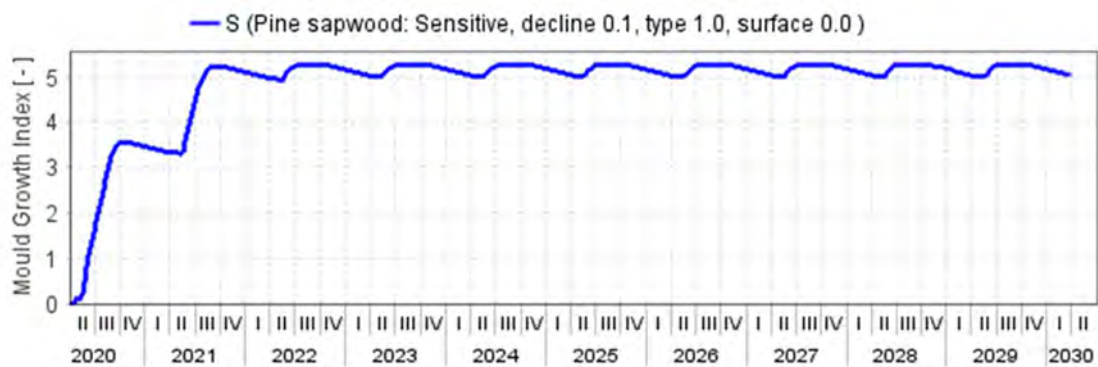


Figure 62: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 10 - mould growth within insulated timber frame

Southern orientation ACR 7.5

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.



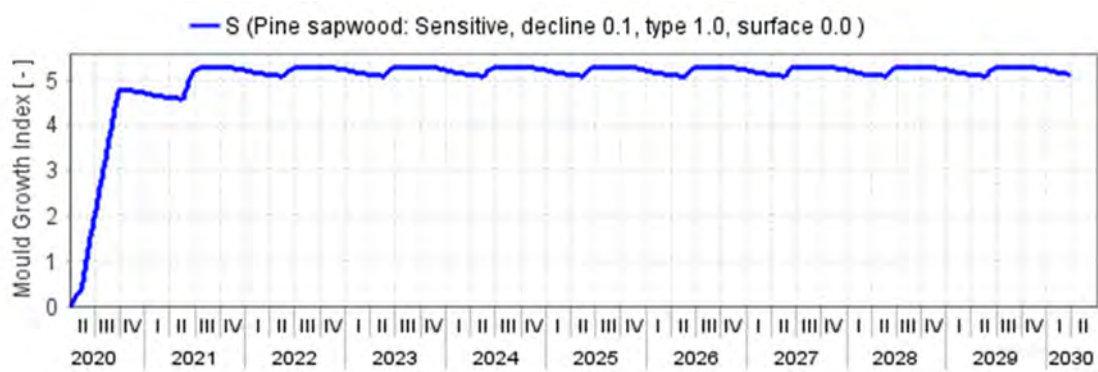


Figure 63: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 7.5 - mould growth within insulated timber frame

Southern orientation ACR 5.0

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

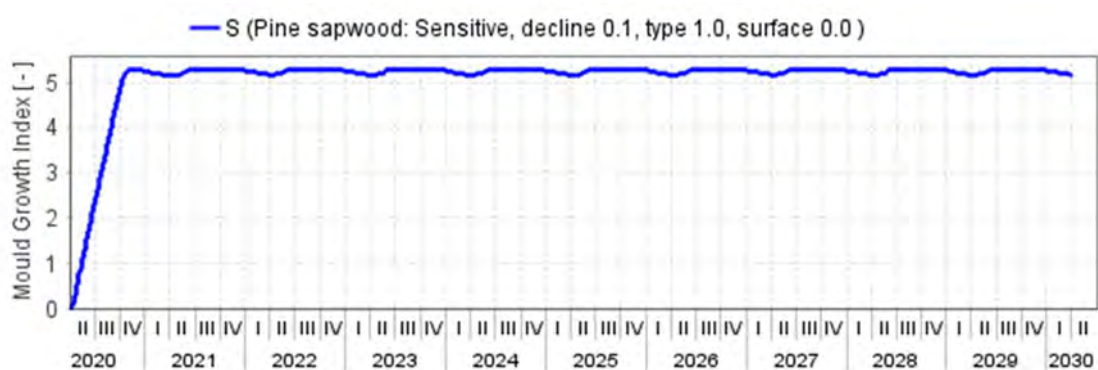


Figure 64: NatHERS CZ 66 - NCC CZ4 southern orientation ACR 5.0 - mould growth within insulated timber frame

Western orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the first year.

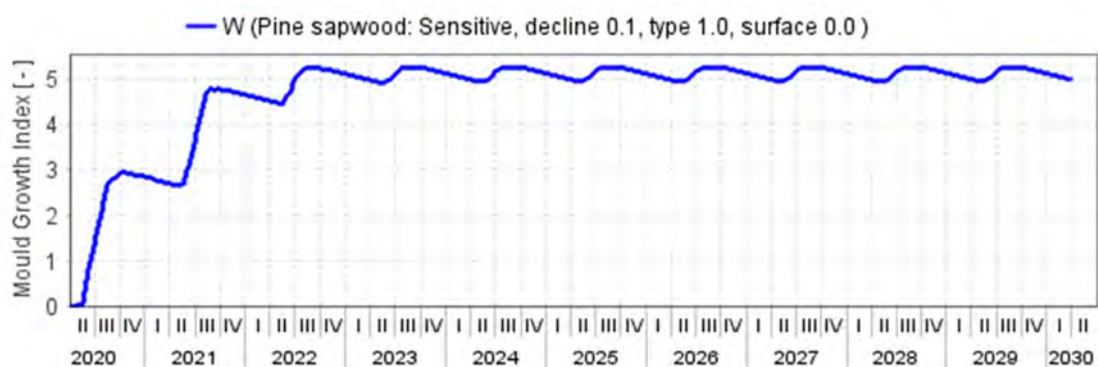




Figure 65: NatHERS CZ 66 - NCC CZ4 western orientation ACR 10 - mould growth within insulated timber frame

Eastern orientation ACR 10

Moisture Accumulation – Nil

Mould Growth – Mould growth occurs within the insulated timber frame, with a Mould Growth Index that exceeds 3.0 in the second year.

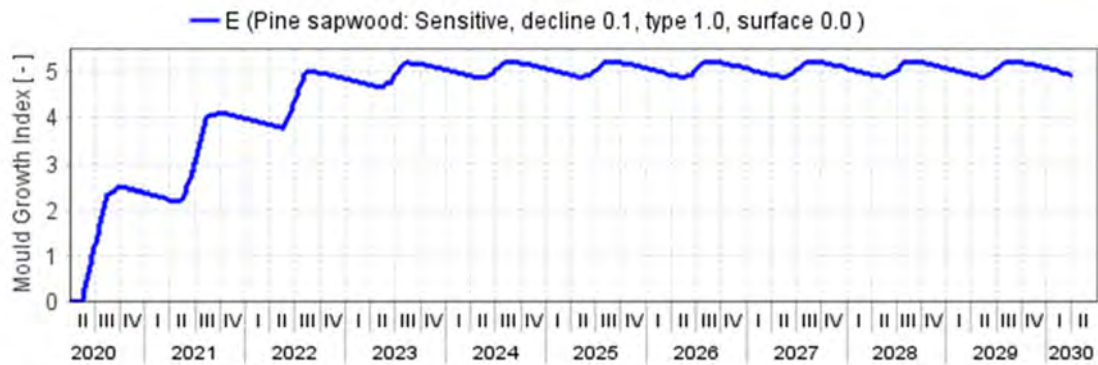


Figure 66: NatHERS CZ 66 - NCC CZ4 eastern orientation ACR 10 - mould growth within insulated timber frame