

Test of Laminate Floating Floor Heated with ECOFILM F

1. Purpose of the Test

Identify the dynamics of temperature rise on the floor surface and immediately on the film surface. Measure maximum temperature on the floor and heating foil surfaces. Measure the difference of the floor surface temperatures above the heating foil and above the joint between the heating foil strips.

2. Description of Samples

Dimension approx. 1 sqm (1x1m), composition:

- laminate floating floor, 7mm thick
- PE foil (moisture stop)
- ECOFILM F608/55 heating foil – 80 W/sqm, 2 strips 1m long (place so that non-heating edges overlap – a 2.5cm gap must remain between copper electrodes)
- Extrupor floor thermal insulation (6mm thick extruded polystyrene from Saapor)
- NTC HC 10 thermostat – a probe inserted in a groove in the insulation under the ECOFILM foil heating part
- base – preferably concrete or pavement, possibly chipboard (approx. 30mm)

3. Temperature Rise Dynamics of the Floor Surface

- measuring instrument: COMETHERM – continuous recording
- point of measurement: centre of area of one installed foil strip

3.1 Unlimited by a thermostat. Output state:

- ambient temperature 18-20 °C
- floor temperature = ambient temperature

3.2 Course of cooling down to ambient temperature. Output state:

- warmed floor with stabilized temperature

3.3 Limited by a thermostat. Limit temperature set to 27 °C. Output state:

- ambient temperature 18-20 °C
- floor temperature = ambient temperature

Evaluation:

- curves of temperature rise (drop) to stabilized temperature
- max. values of stabilized temperatures

4. Course of the Floor Surface Temperature Across the Gap Between Heating Films

- measuring instrument: a thermometer with a contact probe (measuring of the same contact time)
- points of measurement: approx. 12 points on the floor surface distant 1cm from one another, situated on a line going transversely above the gap between the heating foil, symmetrically from the gap centre

4.1 Unlimited by a thermostat. Output state:

- warmed floor with stabilized temperature

Evaluation:

- plotting and evaluation

5. Temperature Rise Dynamics of the Heating Film

- measuring instrument: COMETHERM – continuous recording
- point of measurement: a groove for a probe cut out in the insulation under the heating film, the probe sensor fixed with aluminium tape to the film heating part

5.1 Unlimited by a thermostat. Output state:

- ambient temperature 18-20 °C
- floor temperature = ambient temperature

5.2 Limited by a thermostat. Limit temperature set to 27 °C. Output state:

- ambient temperature 18-20 °C
- floor temperature = ambient temperature

Evaluation:

- curves of temperature rise (drop) to stabilized temperature
- max. values of stabilized temperatures

Test of Laminate Floating Floor Heated with ECOFILM F

Description of Testing

To carry out the test, a laminate floating floor which composition complied with the conditions of assignment was built in a test room.

1. Concrete base plate 30 mm thick
2. POLYPLAN base insulation, 6 mm thick
3. ECOFILM F 608/55 heating foil – 80W/sqm
4. PE foil as a moisture stop
5. Laminate floating floor, 7 mm thick

The heating foil was installed, all the gaps were made and temperature sensors were installed according to the assignment.

Used Measuring Instruments:

1. Double-channel registration thermometer COMMETER type TZ 2, ser. no. 9620033
2. Contactless temperature sensor C-1000 ser. no. 010127

Points of Measurement

The ECOFILM heating foil temperature is scanned in the middle of one half of the foil, the sensor of the measuring instrument is fixed with aluminium tape to the heating foil. The sensor which scans the floor temperature is situated above the centre of the second half of the foil and is also fixed with aluminium tape to the floor. The thermostat sensor scanning the floor temperature is situated freely in a groove under the heating foil according to the assignment.

Ambient Temperature

The ambient temperature in a test room was controlled by a room thermostat maintaining the temperature at 20 °C.

Test

The test was divided into two parts:

1. The floor was laid freely and unloaded. We monitored the time in which the floor surface would reach the maximum stabilized temperature. The floor heating was set to full power without any limitation by a thermostat. The stabilized temperature of 28.7 °C and 29.9 °C was reached on the floor and heating foil, respectively. The startup time and temperature are given in Graph 1.
When the stabilized temperature was reached, the heating was turned off and the floor was cooled down to the ambient temperature. These temperatures are also plotted in Graph 1.
2. The floor was loaded with a weight of 30 kg situated on a tripod to ensure a free admission of air to the floor. The positions of all sensors remained the same. The floor heating was uncontrolled and set to full power. The maximum temperature of 28.4 °C and 28.9 °C was reached on the floor surface and heating foil, respectively. The temperature rise and subsequent cooling down are given in Graph 2.

Measuring of the Floor Surface Temperature Across the Gap Between ECOFILM F Heating Foil Strips

The temperatures were measured after the maximum floor surface temperature was reached, with and without limitation by a thermostat. The measuring of temperatures was made above the gap between the heating foil strips, the other points of measurement situated on a line going through the gap centre were distant 1 cm from one another.

The measurement was made with a contactless thermal sensor C-1000.

It was found out that the temperature rose by 1 °C per 1 cm from the gap centre. With the stabilized floor temperature 29°C, the temperature rose in the direction from the gap as follows:

left side ...29°C 28°C 27°C 26°C 26°C 26°C 27°C 28°C 29°C... right side

The same results were reached for the loaded as well as unloaded floor, the floor temperature control did not influence the measurement, either.

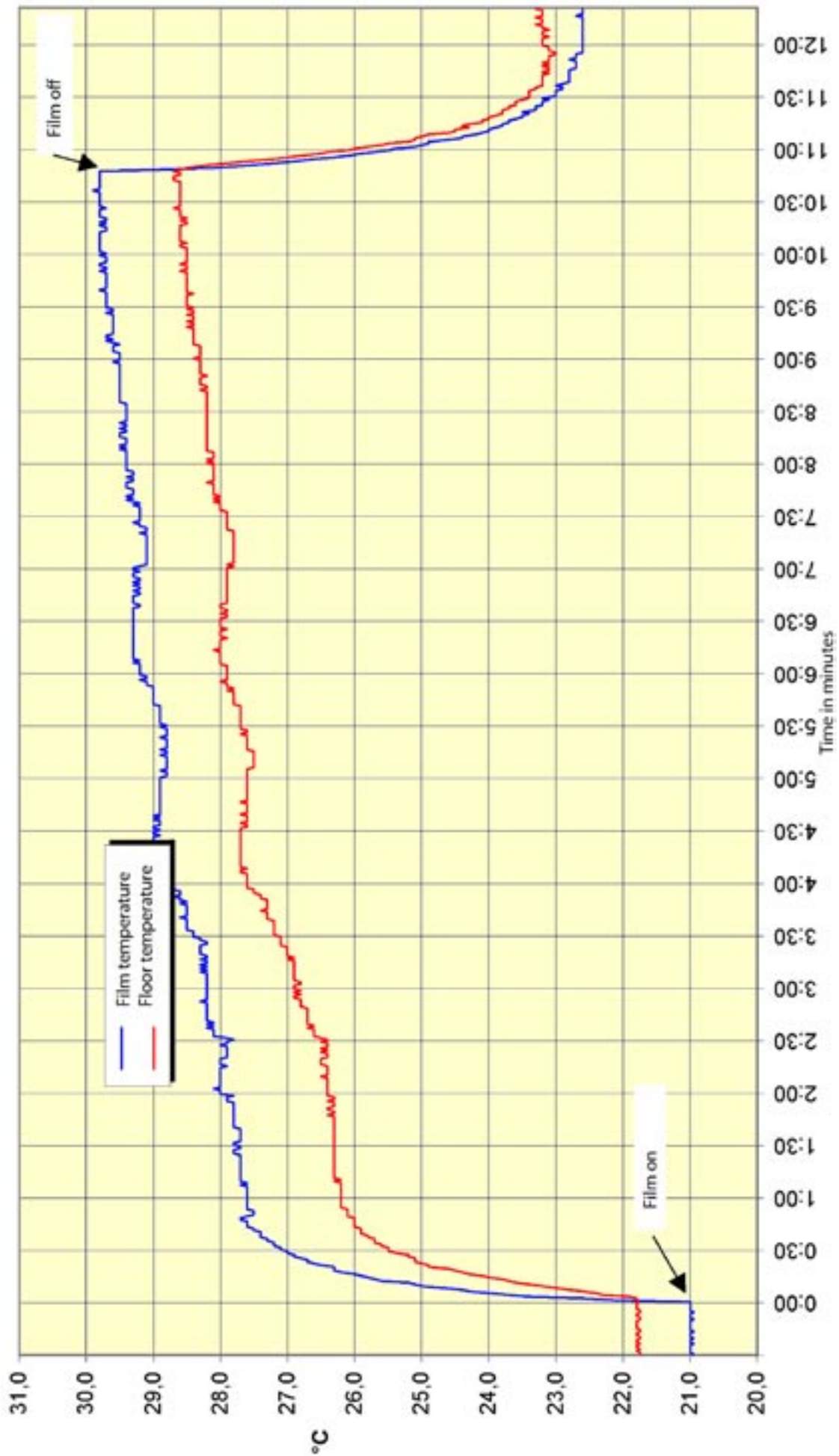
Measuring of the Floor Surface Temperature Limited by a Thermostat

The subject matter of further testing was to verify the temperature control by a thermostat. The following type of thermostat was used for testing:

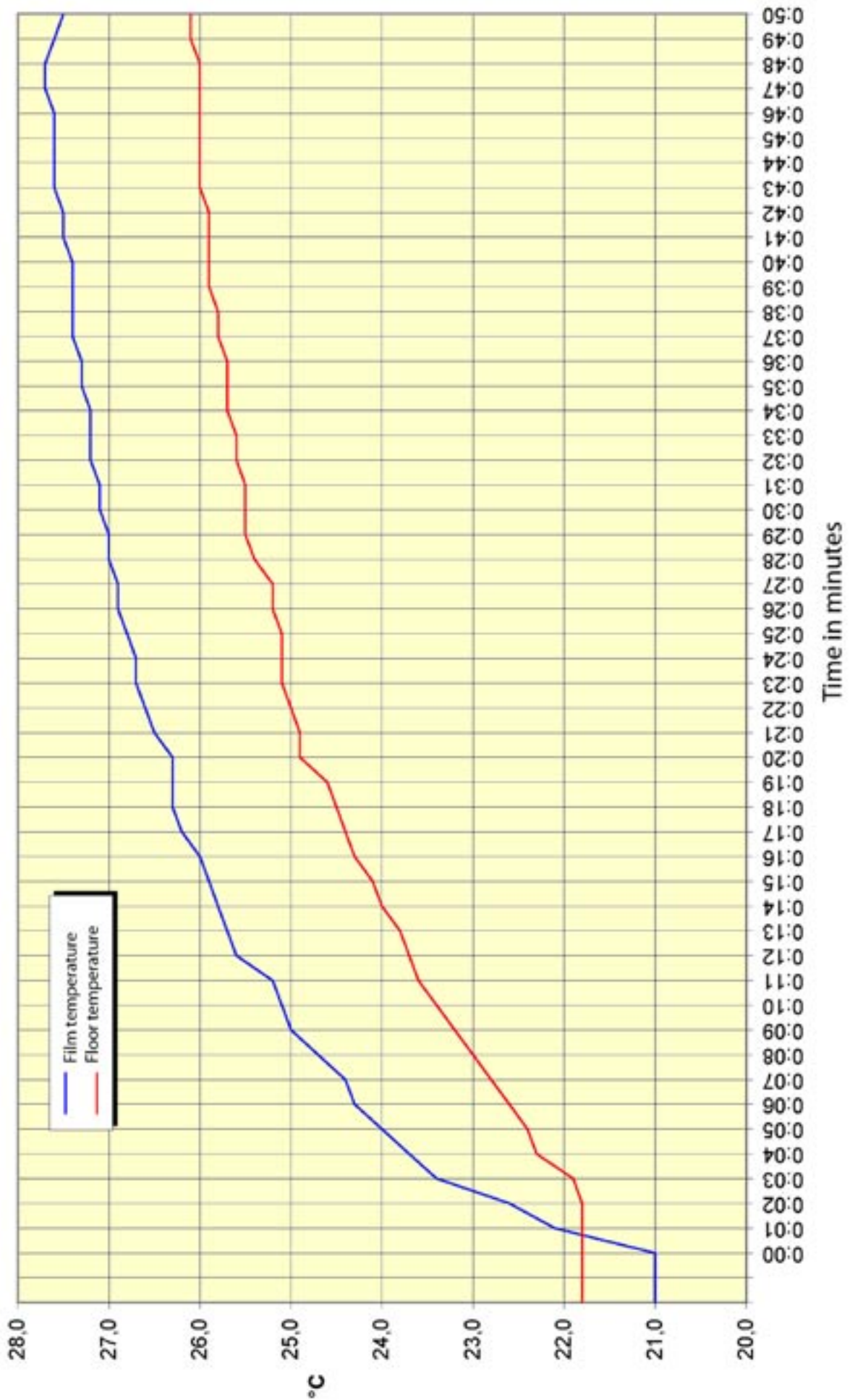
NTC HEAT CONTROL 10 – Graph 3

The control by this thermostat is quite balanced, the temperature varied by approx. 1 °C.

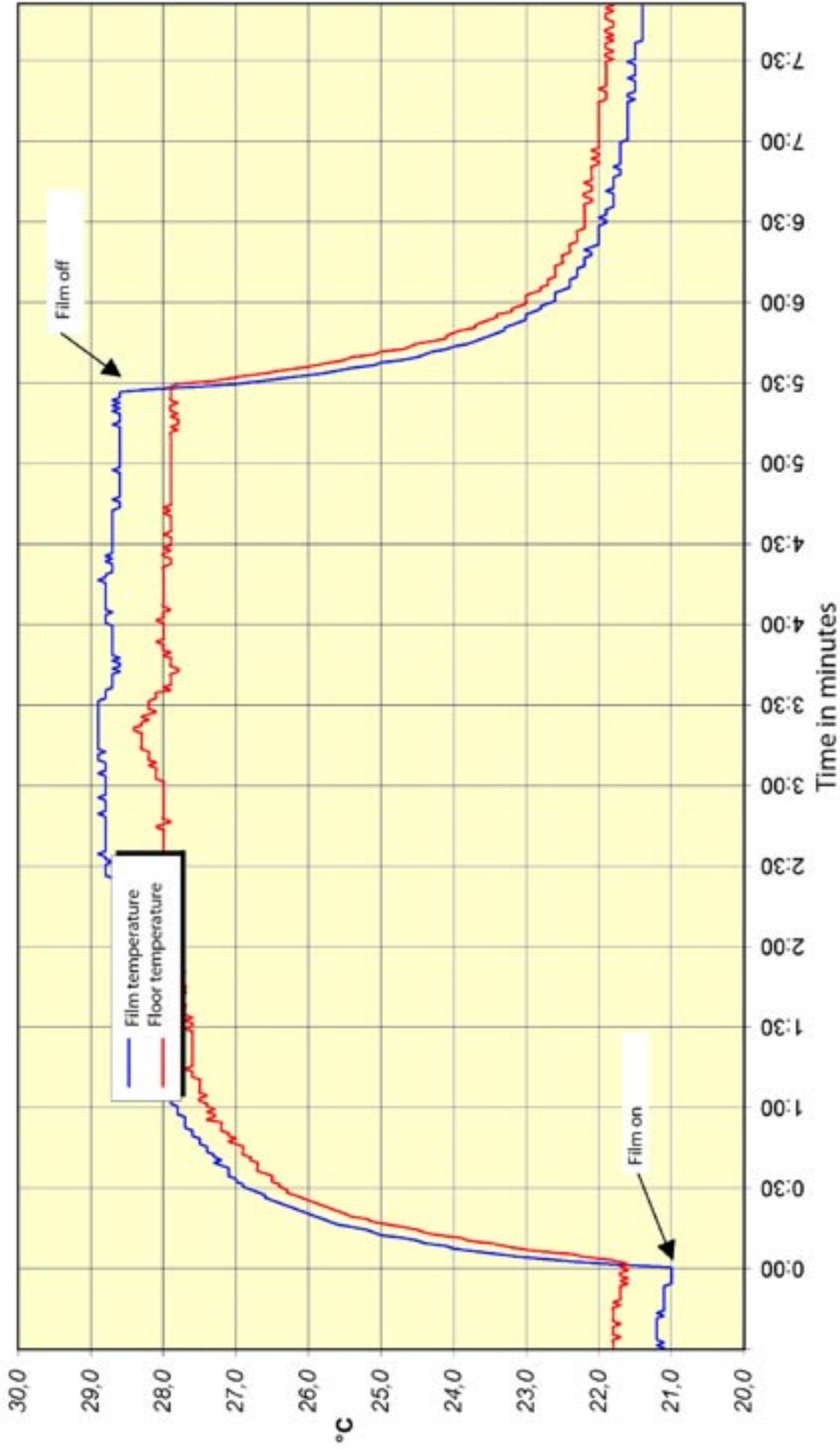
GRAPH 1
Temperature rise and drop – unloaded floor without control



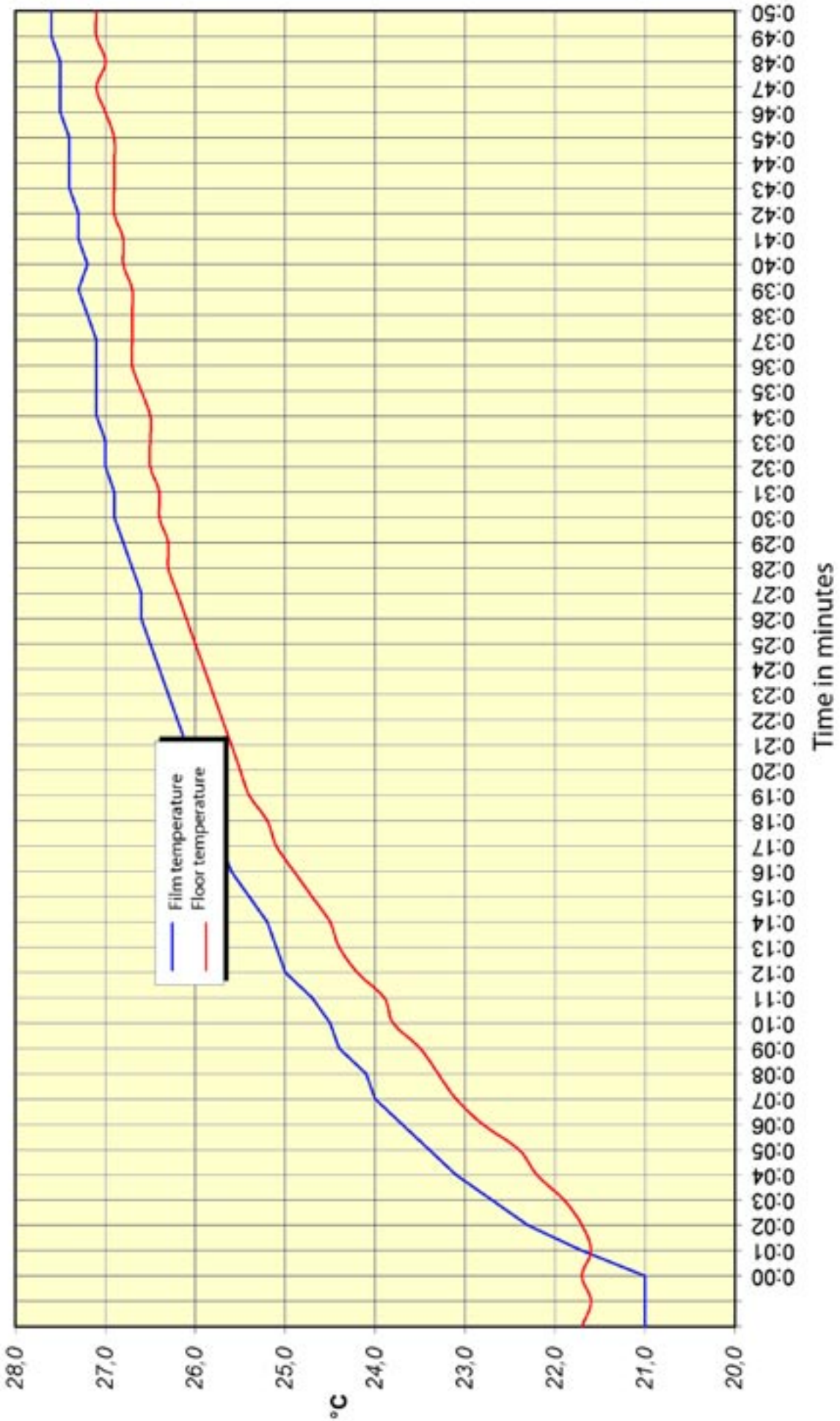
GRAPH 1 – STARTUP IN DETAIL
Temperature rise and drop – unloaded floor without control



GRAPH 2
Temperature rise and drop – loaded floor without control



GRAPH 2 – STARTUP IN DETAIL
Temperature rise and drop – loaded floor without control



GRAPH 3

Temperature rise and drop – loaded floor with control by NTC HC10 thermostat

