

# Upgrading and substitution of air humidification system in growth rooms at NIBIO Særheim

## Current situation

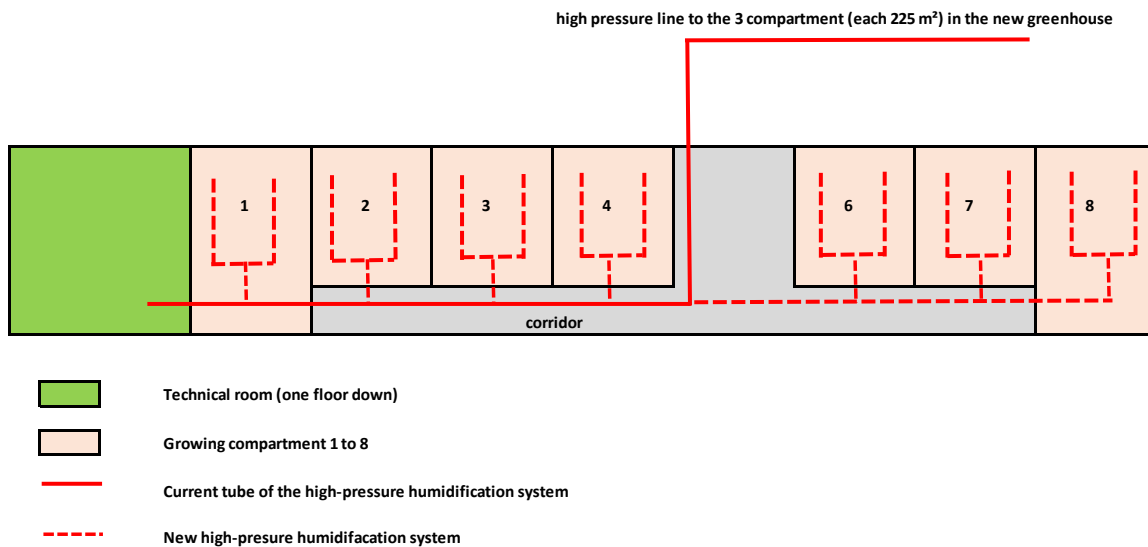
At NIBIO Særheim Research Station, our old research greenhouse (built in 1988) has 7 compartments, each with approximately 70 m<sup>2</sup>, and in a modern greenhouse (2018) we have 3 compartments, each with 225 m<sup>2</sup>. Additionally, we have 8 growth chambers, each with an area of 9 m<sup>2</sup> and a volume of 22m<sup>3</sup>.

In the 7 old greenhouse compartments and in the 8 growth chambers, NIBIO wants to replace the existing air humidification system with a high-pressure humidification system. The greenhouse compartments which were built in 2018, has a high-pressure humidification system. This existing system (Pro Air) has a capacity of 780 liter/hour and currently we use 307 liter/hour. Thus, this system can probably be connected to the other compartments which today only have a low-pressure system.

## New situation

### 1. Extension of the current high-pressure humidification system

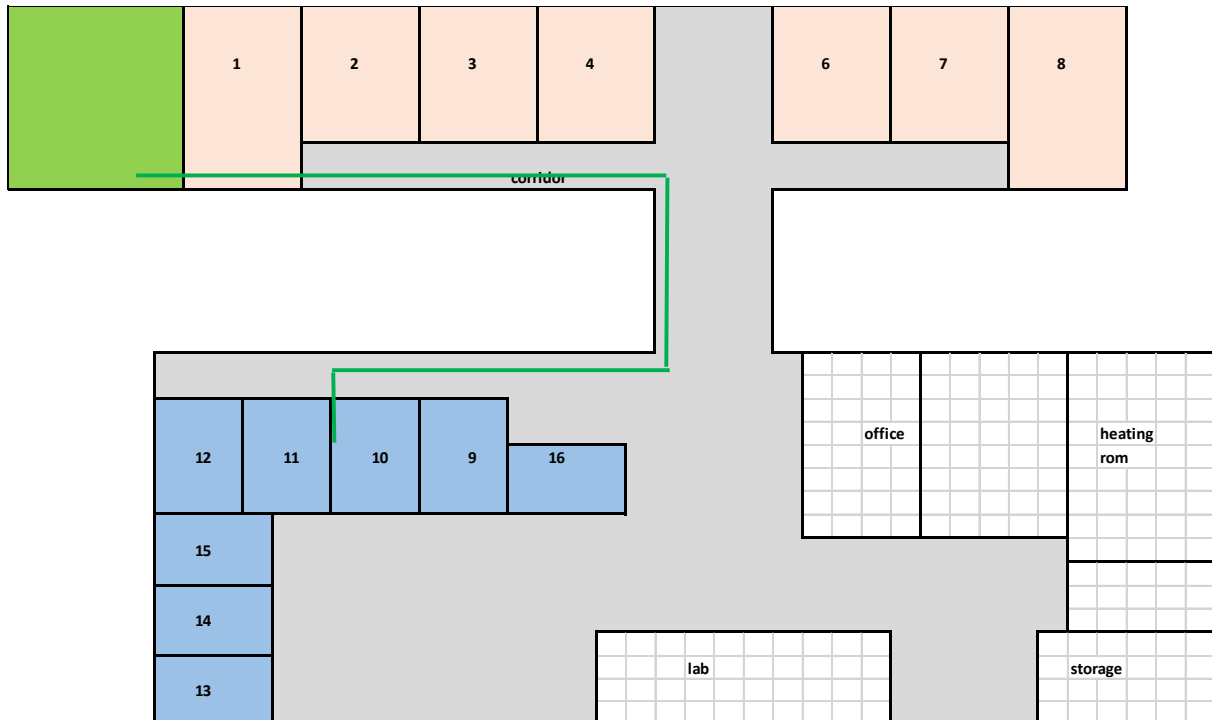
In the 7 greenhouse compartments we want to use the existing high-pressure humidification system



Drawing 1: The tube from the existing system is 12 mm in diameter (EN10217-7TC1). NIBIO wants in each of two compartments; 1 and 8 (each of 12 m\*8 m), 12 nozzles with a capacity of approximately 4 liter/hour and in compartment 2, 3, 4, 6 and 7 (10\*7 m), 10 nozzles in each compartment. The distance from compartment 4 to 8 is about 28 meters.

## 2. High-pressure humidification system for the growth chambers.

In the humidification system has a capacity of 4 liters/hour/chamber and the nozzles are mounted in the air treatment cabinet, located on the second floor, above the growth chambers. The new nozzles must be mounted in the same place as today. The current capacity is 4 liter/hour/chamber and there are 8 chambers (9, 10, 11, 12, 13, 14, 15 and 16, see drawing 2) and the new system must have at least the same capacity, preferably with a bit higher, but maximum 6 liters/hour. The system must be regulated and logged for air humidity in each separated chamber, independently from the other chambers. If an extra pump unit is required to this system, this unit must be placed in the same rom (technical rom on drawing 1 and 2)



It is calculated that total length of the tube is about 120 m.

We made pictures of the current situation and the are at the end of this document

Bid makers can eventually visit the greenhouse to look at the project before giving bid. However, we encourage that we use an electronic conference (Teams, Zoom) with the bid-maker, answering to details in the works we want to be made. In such a meeting we can also show the situation by live PC-cameras, if wanted. In this way, we hope to avoid visits to our greenhouse, due to Covid 19 considerations.

## 3. Resume

- Installing in compartment 1, 2, 3, 4, 6, 7, and 8; high-pressure humidification system, using the existing high-pressure system, installing 10 or 12 nozzles in each compartment. In compartments 1 and 8, two extra nozzles must be installed in each compartment.
- Installing high-pressure humidification in the air treatment cabinets for compartment 9, 10, 11, 12, 13, 14, 15 and 16. Here the capacity must be between 4 and 6 liter/hour/compartment.
- The price given must include all costs related to the installation and testing of the system
- Expected guarantee; 5 years on the materials



Picture 1. Existing high-pressure humidification unit in the technical rom



Picture 2. Pro Air number of the installation



Picture 3: type name. 3G3MX"-D4022-EC





Picture 4: rom on the second floor, where the air treatment cabinets have been placed



Picture 5: the black tube puts CO2 in the cabinet and the white and red tube is used for the existing humidity system (white is air and red is water). These 2 last ones must be replaced by the new high-pressure humidity system



Picture 6. Inside the air treatment cabinet where the old system must be replaced for the new system