

The ABCs of Flood Floor Construction

1. HOW FLOOD FLOORS WORK

Flood Floors combine three growing tools:

- A **concrete floor** provides versatility, easy sanitation, and durability.
- **Floor heat** promotes a controlled microclimate for the root zone.
- **Flood irrigation** supplies even watering, while keeping the foliage dry.

The floors are divided into watering sections of 1,000 - 6,000 square ft. These sections usually correspond with the greenhouse bays.

Each section can be flooded and drained through underground feed and return pipes. While one floor section fills, the previous one drains. Depth of flooding is 1/2 - 2", depending on the crop's needs. Watering time per floor is 6-8 minutes.

The water in each section is contained by thin rubber barriers, inserted into saw cuts in the floor, or by concrete or brick curbs.

All water is fully re-circulated. Usually, the crop absorbs less than 10% of the flood water, while the rest returns to the tank system. The returning water is basically unchanged in its nutrient content and pH. Standard fertilizer injection equipment is sufficient to re-supply the system.

Multiple solution tanks offer easy switching between different nutrient solutions or fresh water.

The re-circulated water is filtered at the end of an irrigation program. Continuous filtration is possible on demand. Experience shows that disease transfer through Flood Floor water is very unlikely, especially with short watering periods.

Flood Floor controls can be independent or integrated with greenhouse computer systems. Operation is simple and flexible.

Safety features protect the crops, as well as the system itself.

Examples: In case of power loss the floors drain automatically. The flood control valves also act as pressure relief valves in case the pumps are turned on manually while no flood control valve is open.

2. DESIGN AND PLANNING PHASE

The grower and BioTherm discuss the project, looking at the operation's specific layout and needs. Preliminary design proposals and costing help to make decisions.

The grower has the option to provide as much labor and project management as desired. BioTherm can accommodate anything from a turn-key job to an advisory role.

System Features and Options which should be discussed:

- How will the system be laid out? How large will the floor sections be?
- Should the water supply tanks be in or above ground?
- Where will the tank system be located?
- How many tanks (water / fertilizer solutions to choose from) are needed?
- Will the water on the floors be contained by rubber strips, concrete curbs, or a combination of both?
- Will the floors be outside and need rainwater drainage and frost protection?
- Should the Flood Floor controls be integrated with a greenhouse computer system, or be independent?
- To what degree should the fertilizer mixing system be automated?

Concrete Work

Pouring the concrete floors and related work account for about 75% of the Flood Floor cost.

Some growers pour the floors with their own crews. More often a regional concrete contractor is hired. The choice of the right contractor is crucial; system quality and cost depend on it as much as on the design itself.

BioTherm closely cooperates with the concrete contractor and his people to ensure every step is done properly.

Materials and Components

Custom designed components, such as the pneumatic water valves, filter units and tank control panels are supplied by BioTherm.

Piping materials and pumps can be bought locally by the grower, or be supplied by BioTherm, depending on where the prices are best. Detailed materials lists are provided as part of the design process.

Work organization

Good coordination between greenhouse builders, heating system installers, Flood Floor contractors, and other crews is essential.

Under most circumstances it is advisable to build the greenhouse first, then pour the floors inside, where they are protected from the elements.

The floor heat system, if it is not part of the greenhouse package, can be designed and supplied by an independent heat system contractor, or by BioTherm.

3. CONSTRUCTION PHASE

BioTherm can provide on-site assistance or installation services to the degree desired by the grower.

A brief sequence of steps:

1. Grading of the site within an inch.
2. Trenches for main lines. Installing piping and valves. Back-fill.
3. Pour main walks / aisles.
4. Install spur lines. Fine grading.
5. Lay out re-bar or concrete mesh. Install floor heat tubing.
6. Preparation for floor pouring:
 - Set up concrete forms and rails for power screed
 - Pour concrete around spur lines
 - Pressurize heat tubing.
7. Pour and finish floors.
 - Concrete delivery by pumping, with buggies or boom truck.
 - Check for floor quality during and after pouring.
 - Keep checking!
8. Saw control joints.
9. Saw-cuts for rubber strips. Pour concrete curbs where applicable.
10. Drill access holes through floor into spur lines.
11. At any time during construction: Pour / install tank system.
12. Installation of:
 - Pumps and tank system plumbing
 - Flood valve internal parts
 - Control panels and wiring
 - Air lines and pneumatic components
 - Power supply, water supply and fertilizer mixing system.

4. OPERATION AND MAINTENANCE

After the system has been flushed to eliminate the concrete dust, it is ready to operate with plants. The pH may be elevated during the first few watering cycles.

BioTherm flood floors are based on technology that is easily understood and managed by operators and maintenance personnel.

No regular technical maintenance is required.

Over the months, some sludge will collect at the bottom of the tanks. It should be removed periodically to maintain optimum sanitation.

If you have questions, please contact us:

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