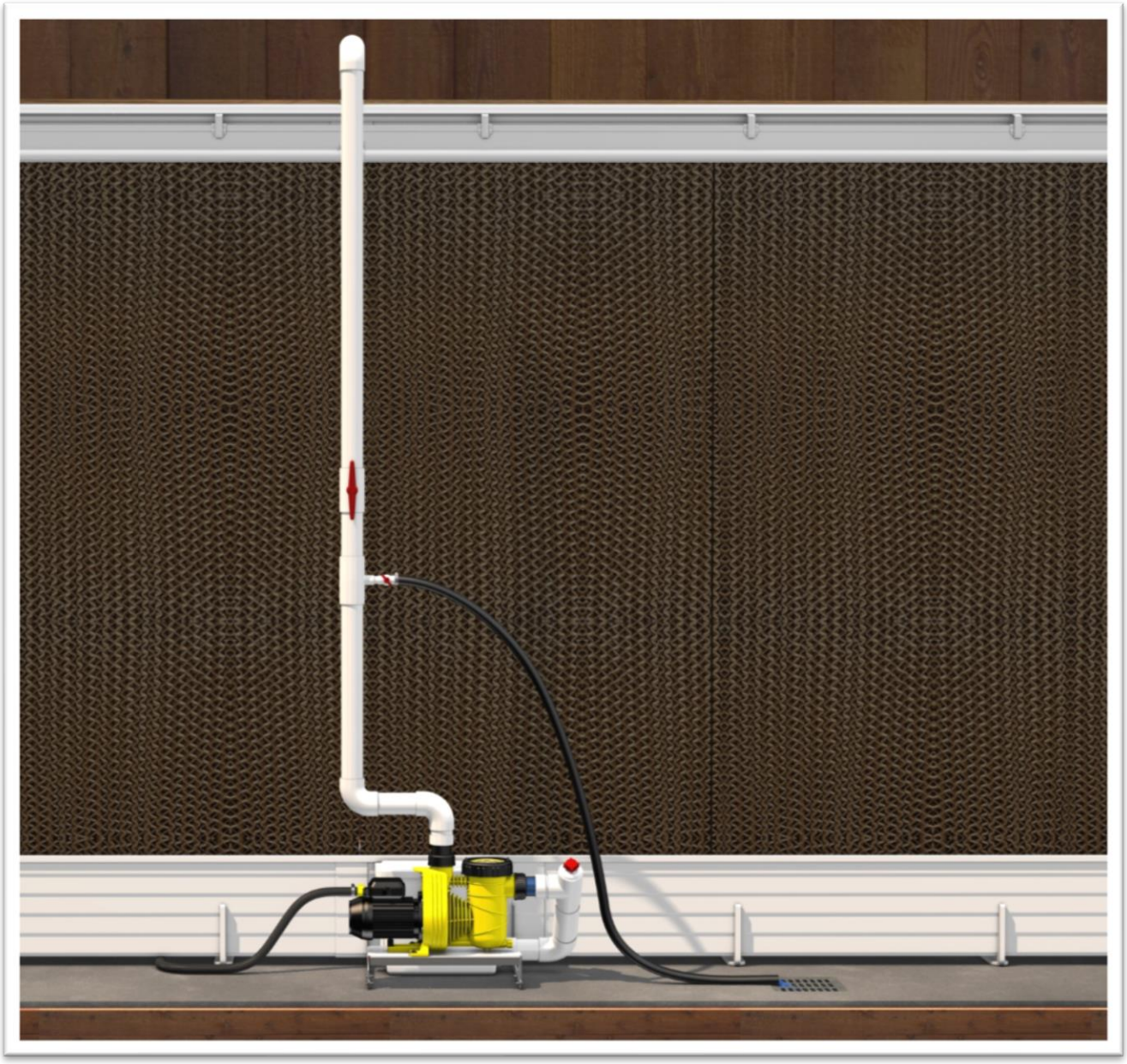
EAGAN
MANUFACTURING CO., INC.



PAD Climate System

Assembly Instruction and Operating Manual

Double Pump System

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Version: 1.5.0

Manufacturer's Information:

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Service information:

Table of Contents

1. Introduction

1.1. Short description Pad-Climate-System

The Pad-Climate-System is a cooling and humidifying system for agricultural buildings for animal breeding and greenhouse complexes.
The system essentially comprises a pump that pumps water into a spraying pipe. Water is sprinkled against a deflector at certain intervals. This leads to optimal water distribution across the pads. The water flows through the pads in cascades, with part of the water evaporating. The excess water collects in the water trough and is recirculated by a pump. A float valve keeps the water level even.

1.2. Preface for the manual

This manual facilitates use of the Pad-Climate-System and indicates the intended use of the system. The manual contains important notes for safe, proper and economic operation of the system. Your attention will help avoid dangers and reduce repair costs and downtimes while increasing reliability and the service life of the system. The manual should be supplemented by the applicable national provisions on accident prevention and environmental protection. The manual must be at hand for viewing at all times in the location of the work.

The manual must be read and used by everyone who works on the system or installs the system, e.g. at

- operation, including preparation, troubleshooting in the course of work, cleaning, care, disposal of operating and auxiliary substances
- maintenance (servicing, inspection, repair) and/or
- deactivation

In addition to the manual, the statutory provisions on accident prevention in the country of use and at the location of use, as well as the accepted technical provisions for safety and professional processing shall apply.

2. General information

2.1. Warnings and symbols

The following instructions use the following symbols.

	Warns of a general danger
	Warns of dangerous electrical current
	Warns of cold
	Warns of corrosive substances
	Warns of flammable substances
	Substances hazardous to health
	General requirement sign
	Requirement sign with protective gloves

2.2. Intended use

The Pad-Climate-System is only intended for agricultural buildings for animal breeding and greenhouse complexes.

Any other use is deemed non-intended. The manufacturer shall not be liable for any damage. This danger shall be assumed by the user alone.

Indicate use shall also include that:

- all information in the operating manual is read and
- all service and maintenance work are to be performed as required.

Pad-Climate-Systems must only be operated, serviced and used by personnel familiar with such measures and dangers.

2.3. General safety directives - purpose

This operating manual contains the most important information for safe operation of the pad air conditioning system.

	The relevant provisions on accident prevention and any other generally accepted technical safety and health provisions for the workplace must be observed.

Check that the safety and functional equipment works safely and correctly:

- previous commissioning
- at the corresponding intervals
- after conversion or maintenance.

Also observe the specifications provided by the water and power supply companies.

The system is intended for cooling/air conditioning only. Any other use, e.g. for pumping other liquids than water, is deemed non-intended. The manufacturer/supplier shall not be responsible for any damage resulting from this. This risk shall be borne by the user alone.
Proper use shall also include the manual and compliance with the inspection and maintenance provisions.

2.4. Obligations

	Information in the operating instructions must be observed

Knowledge of the basic safety and safety directives shall be a basic requirement for safe handling and smooth operation of this pad air conditioning system. This operating manual and specifically the safety notes must be observed by all persons working on the pad air conditioning system. Additionally, all provision and directives on accident prevention and for the respective site must be observed.

The Pad-Climate-System must only be used when it is in an impeccable technical condition. Any problems that may impair safety must be removed without delay.

Organizational measures:

All parts and devices must be reviewed at regular intervals.

2.5. Warranty and liability

Generally, our "general and delivery terms" shall apply.
Warranty and liability claims in case of injury and property damage shall be excluded if they are due to one or several of the following causes:

- Non-intended use of the pad air conditioning system,
- Improper assembly, commissioning, operation and service of the system,
- Operation of the system in spite of defective safety equipment or safety and protective equipment that is defective or not functional,
- Non-observation of the information in the operating manual regarding transport, storage, assembly, commissioning, operation, service and equipment of the system,
- Independent structural changes to the system,
- Defective monitoring of wear parts,
- Incorrectly performed repairs,
- Disaster due to foreign bodies and force majeure.

2.6. Electrical system

	Always interrupt power supply before performing any work on the electrical system.

Any tasks exceeding the scope of system maintenance must only be performed by qualified staff.

Always insulate the power supply when working on the device and secure it against unauthorized reactivation by other persons. Check electrical cables for visible damage before commissioning. Replace any damaged cables before taking the device into operation. Damaged or destroyed plug-in units must be replaced by a qualified electrician. Do not pull any plugs from the sockets by pulling the cable. Covering electrical parts may cause high temperatures that in turn may destroy the equipment and cause fires.

3. Assembly

3.1. Assembly information

Please read the following pages with care. The instructions in this manual shall apply to various Pad-Climate-System designs. For this reason, please select and use the sections that apply to you.

When using this manual for standard versions, please observe any changes to and/or deviations from the scope of delivery.

3.2. Installation position in the building

For poultry or animal husbandry, the pad area should be designed for the maximum cooling required. The pads should be at one end of the building, except where the resulting air speed would exceed the level of comfort for the animals kept there. In such cases, the pads should be placed on both ends of the building with the fans at the center on both sides.

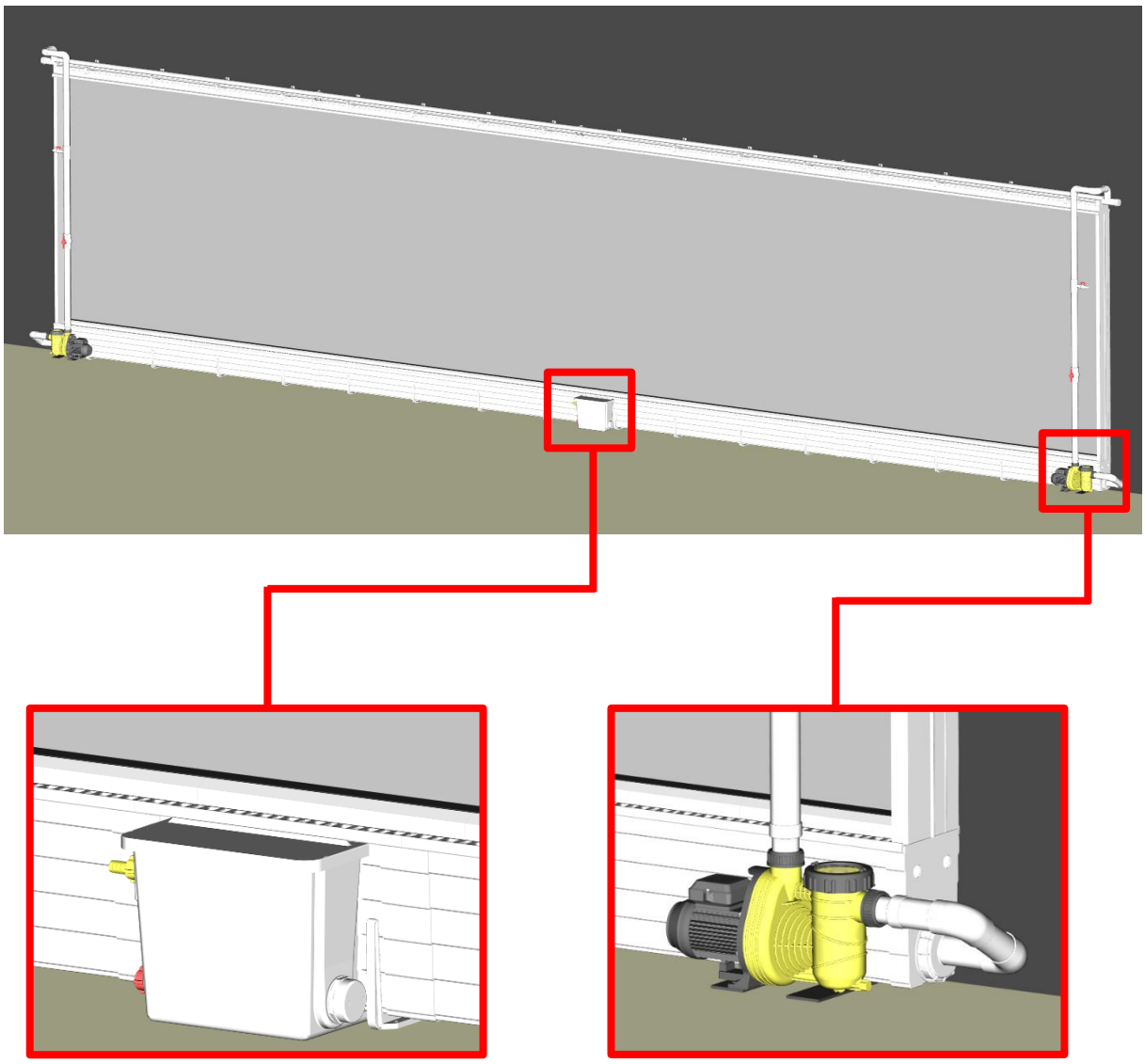
3.3. Assembly instructions

Use the table of contents to find the desired assembly section. The assembly section describes the individual work steps in the assembly order. Individual components are applied with item numbers in the drawings.

3.4. Recommended tools

Find a list of tools below that are needed to install your Pad-Climate-System:
measuring tape, hand saw, chalk line/cord, jig saw or circular saw, spirit level, cordless screwdriver, socket wrench (for clamps), ladder/stilts, cutter knife

3.5. Description Single Components Double Pump Systems



Supply Unit

Float Valve with water supply for ¾" hose

2" Drain Opening

¾" Drain opening

BA Pump (one each system side)

BA4 up to 85' system length

BA11 up to 140' system length

Rising pipe with bleed off

Watergutter with overflow protection

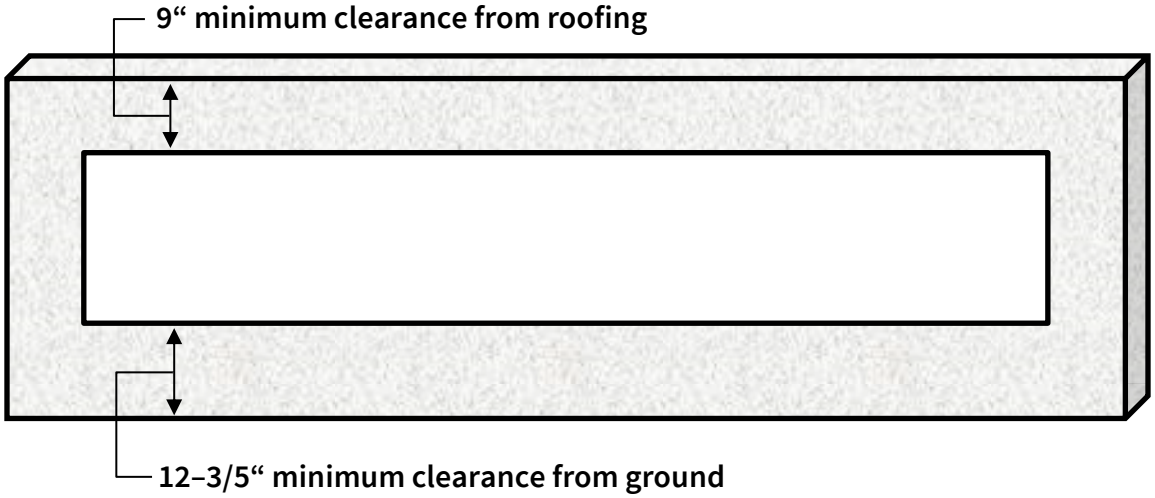
3.6. Installation procedure for Double Pump Systems

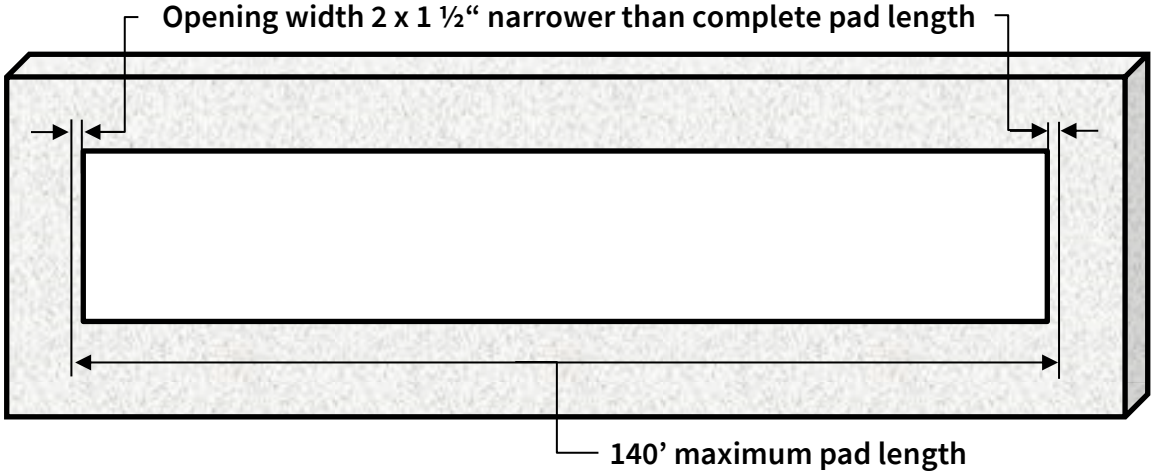
The opening in the building should have a wood frame of water-proof wood. For systems up to 45' length, the supply unit may be placed at the end of the system. For longer sys-tems and generally, the supply unit should always be positioned at the center of the sys-tem.

3.6.1. Preparation of the opening

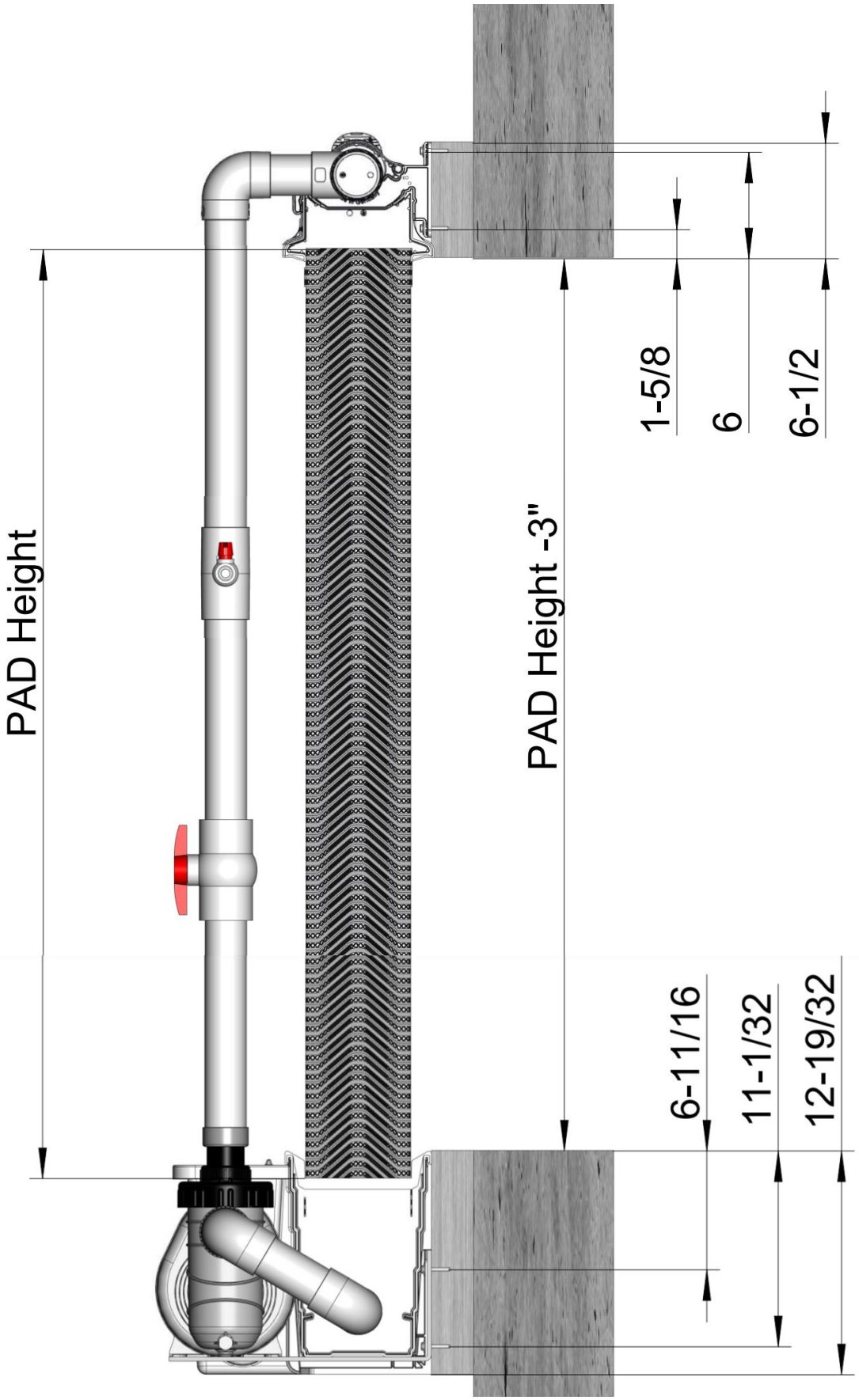
The opening should be 3" narrower than your selected pad height and your complete pad length.
Example Pad length 80' → opening = 79-¾'
Example Pad height 5' → opening = 4-¾'

3.6.2. Opening size



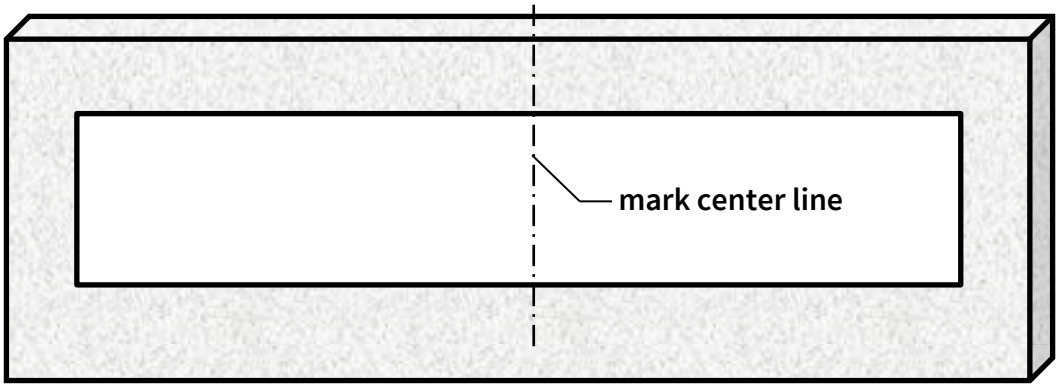


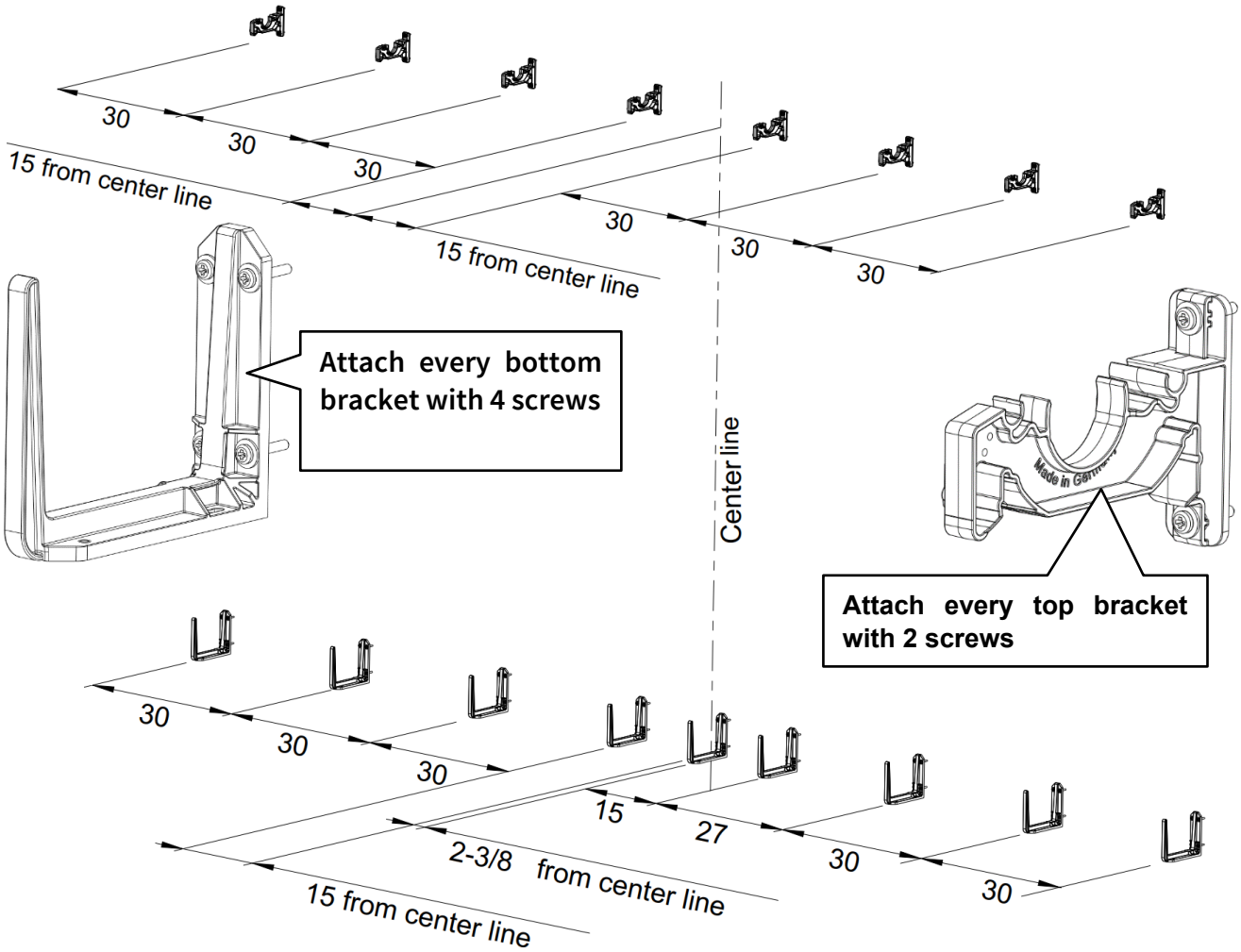
3.6.3. Installation cross section



3.6.4. Assembly of the supply unit and top/bottom brackets

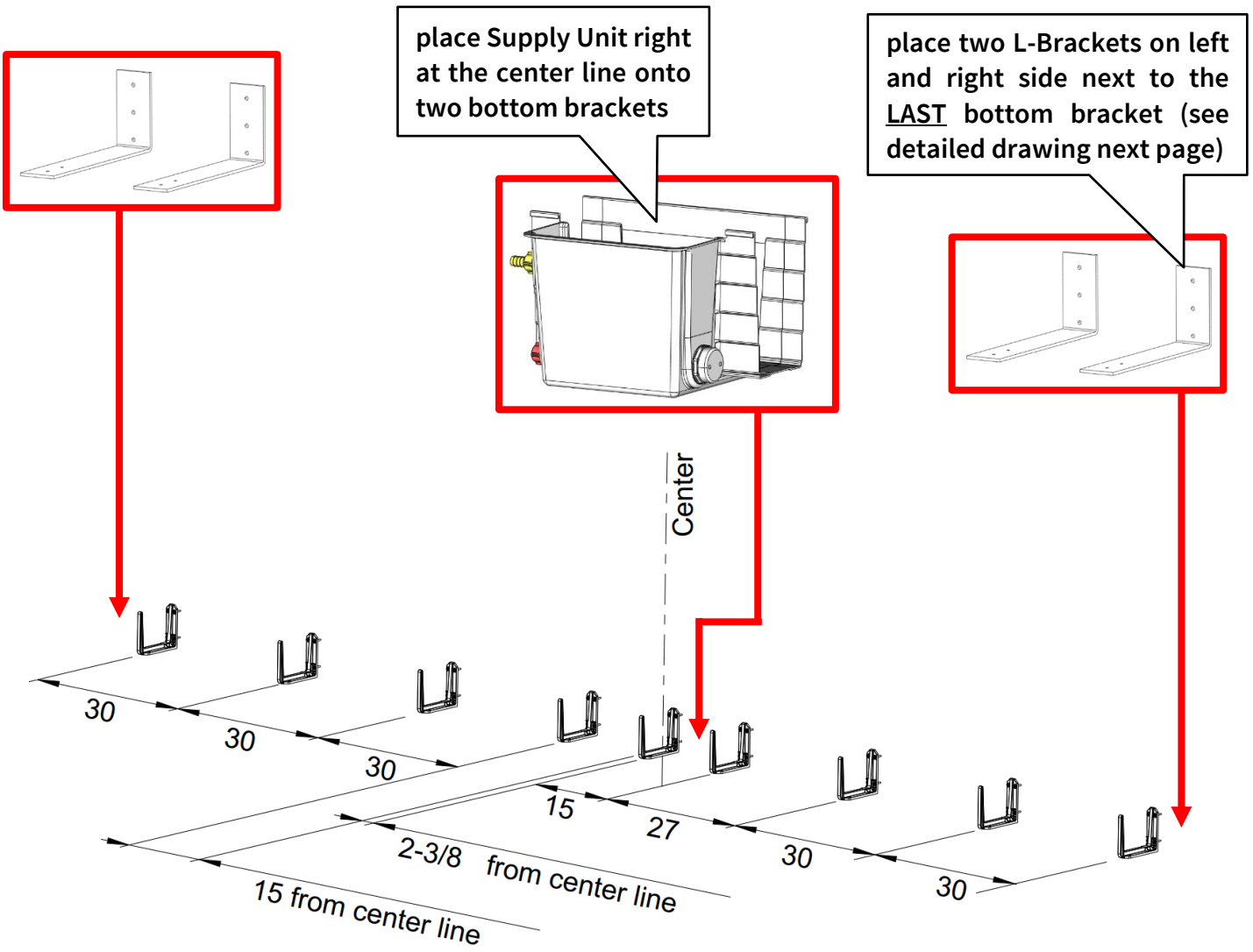
Start assembly by installing from the center. Mark the center with a line at the top and the bottom section. For positioning of the brackets, see the illustrations below (dimensions in inches).



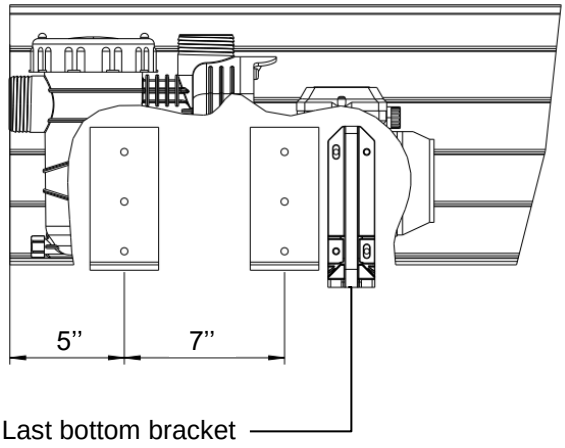


3.6.1. Supply Unit and pump bracket position at double pump systems

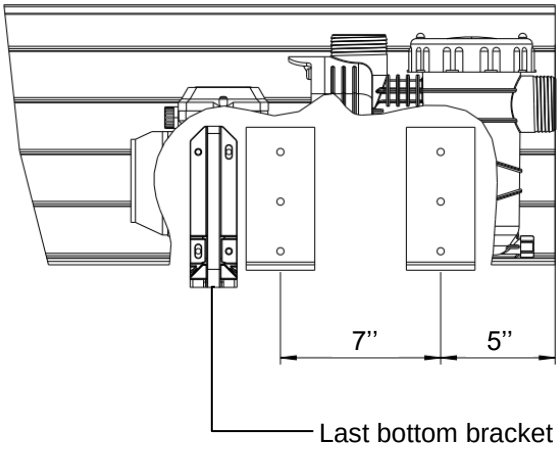
The housing of the supply unit should always be placed at the center of the entire system if possible. The impact edge of the plastic housing should be centered on the frame.



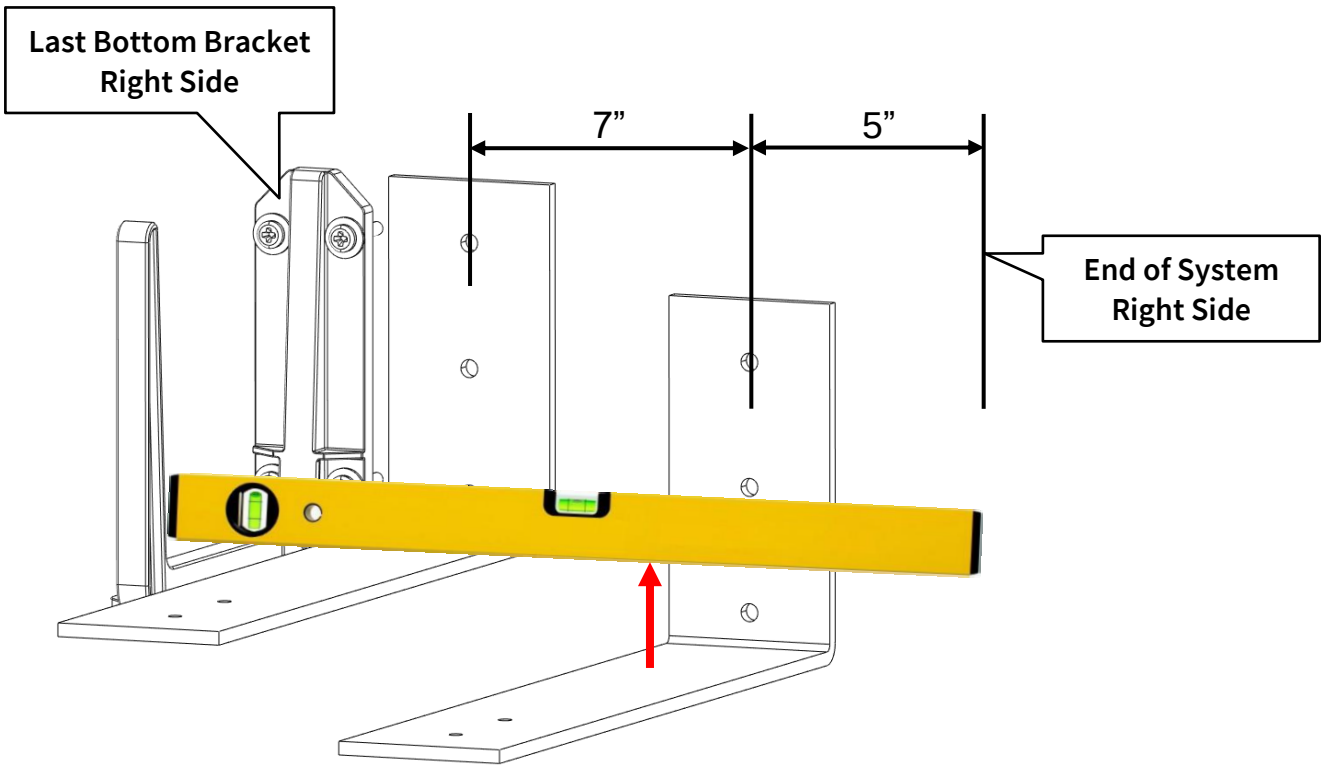
end of system LEFT side



end of system RIGHT side



Mount the Metal L-Brackets at both ends of the system on the same level as the Bottom Brackets. Make sure no Trough Coupler or Trough End Cap are placed on the Metal L-Brackets. Make sure Metal L-Brackets are on the same level as the Bottom Brackets.

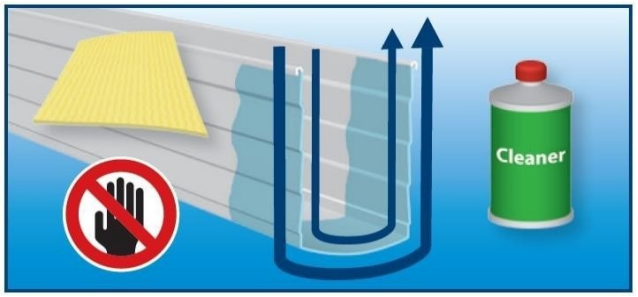


3.6.2. Glue connections

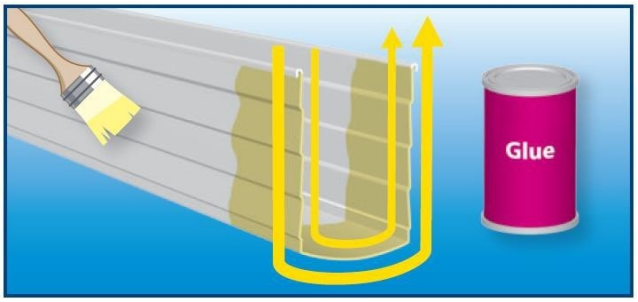
Provided by glue manufacturer

3.6.3. Glue instructions

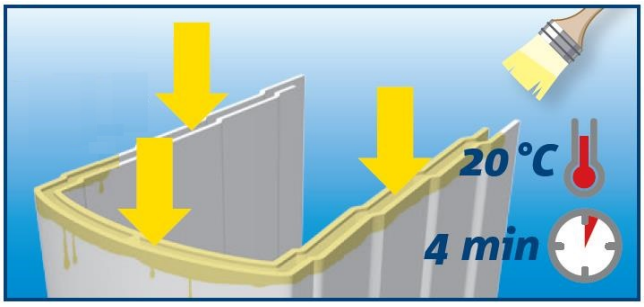
1. Clean all glue areas thoroughly with cleaner! The cleaned areas must remain free of fat, dirt and moisture – do not touch them again after cleaning.



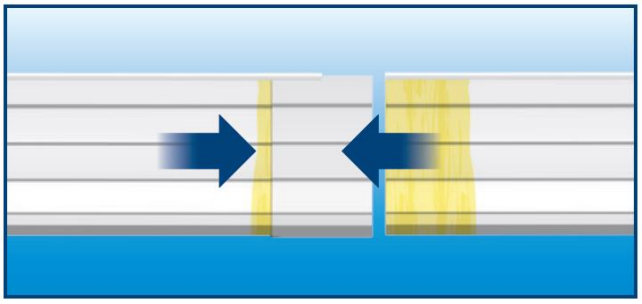
2. Coat the glue points of the water trough with glue.



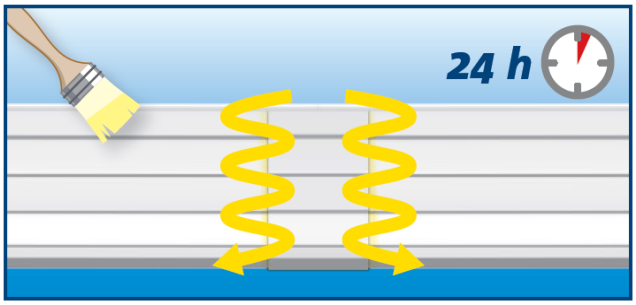
3. Fill the gap of the coupling (bilateral)/end piece with glue.



4. When joining the parts, glue must protrude from the gap to produce a connection without any leaks.



5. Spread protruding glue with a brush at the transfers. Ready for drying!



Required materials and tools:

Cleaner

Glue

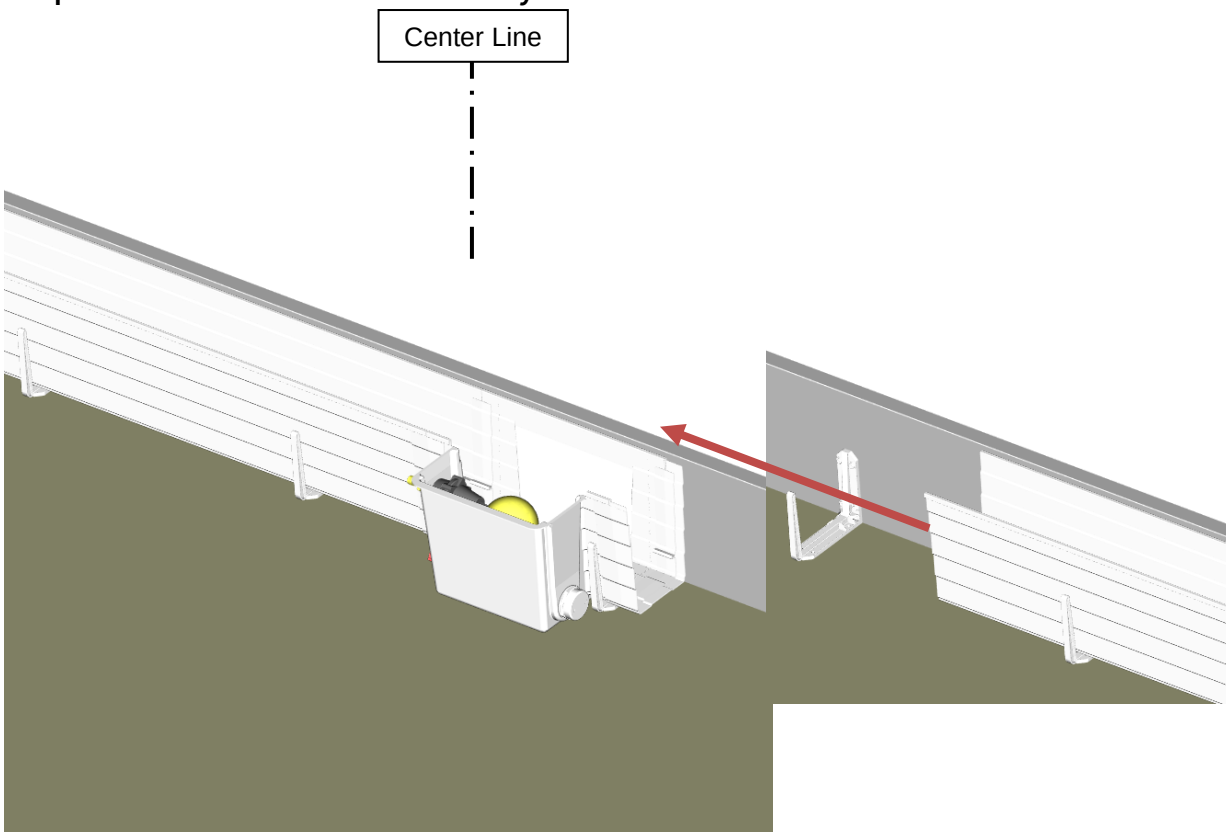
Rag


Brush

Attention! Adhesive areas must dry for 24 hours!

3.6.4. Bonding of the water trough

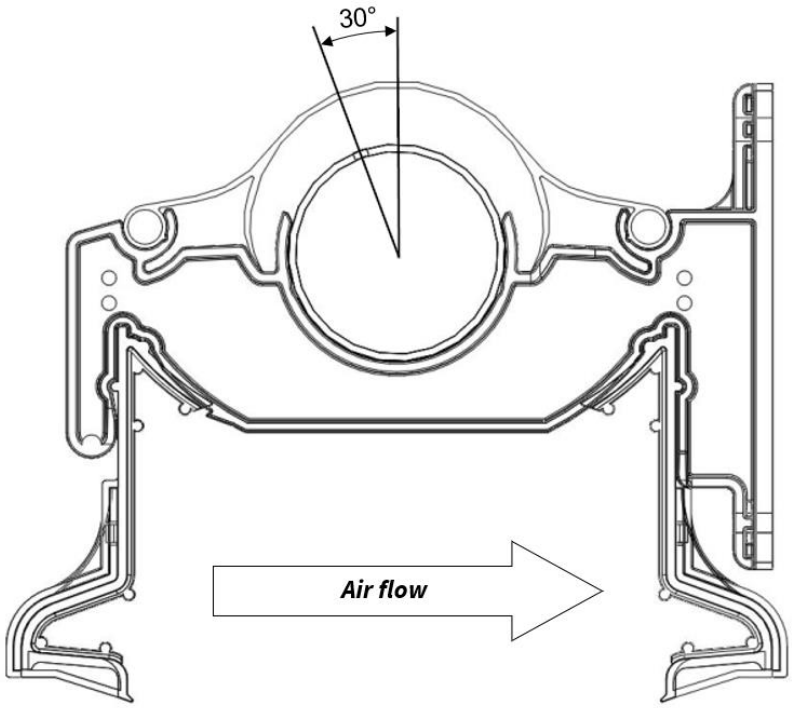
Start bonding of the water trough from the position of the supply unit. From there, glue the troughs to each other until the ends. The float valve in the housing should be connected to the pressurized water at a later time, so that the system won't be filled, yet. Ensure that the float of the valve can move freely. The end cover is glued on at the end of the system instead of a coupling. Bonding of the water trough is described in detail in chapter 3.7.3. Adhesive areas must dry for 24 hours!



3.6.5. Assembly and alignment of the spraying pipe

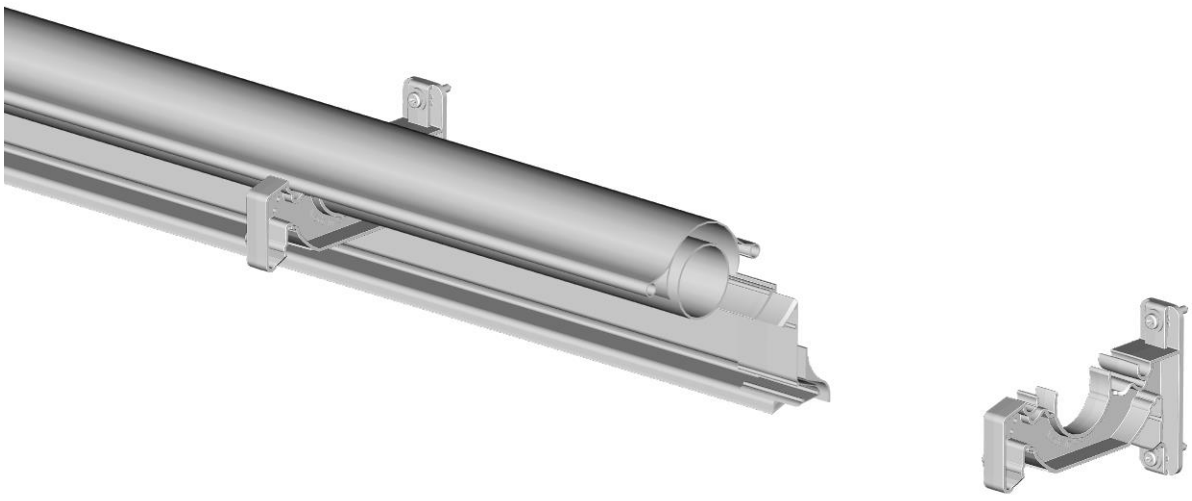
Start with gluing on the spraying pipe together with the T-glue coupler of the rising pipe. Starting at the tee, glue on the riser down to the pump.

Attention! The holes of the spray pipe must be at an angle of 30 degrees against the air flow from the outside.



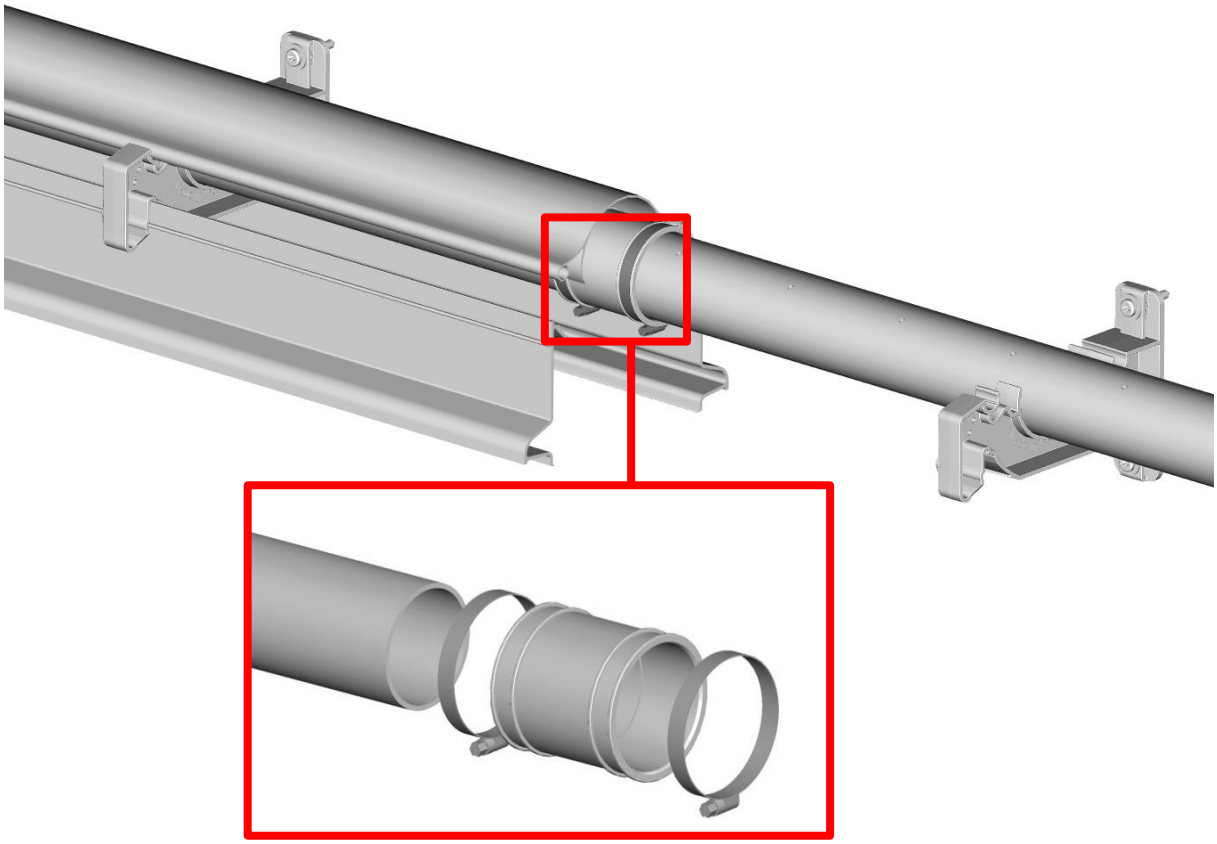
3.6.6. Assembly of Guide Rail

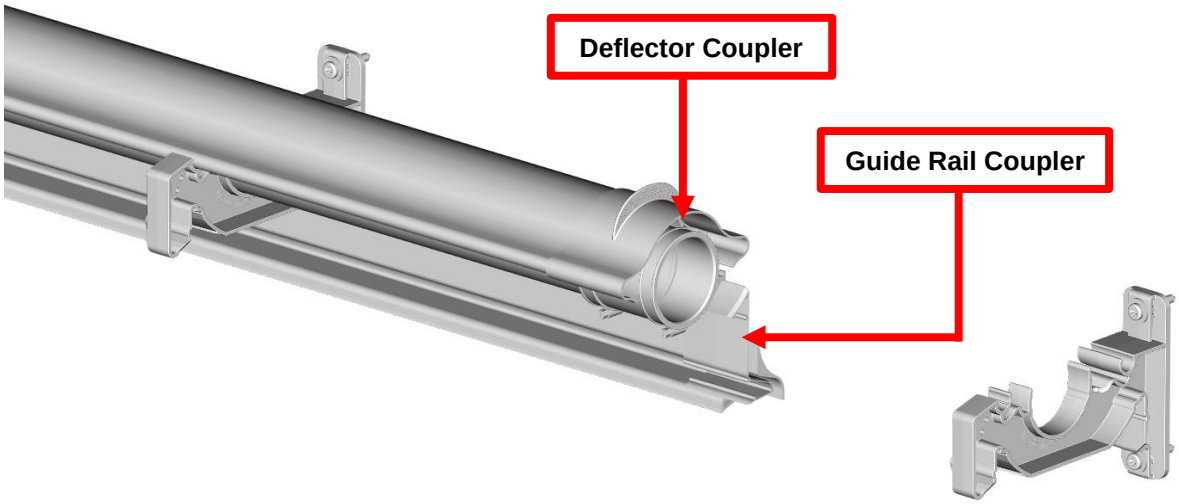
Attach the guide rail on the wall side by attaching it to the pipe holder.



3.6.1. Installation of the top part couplers

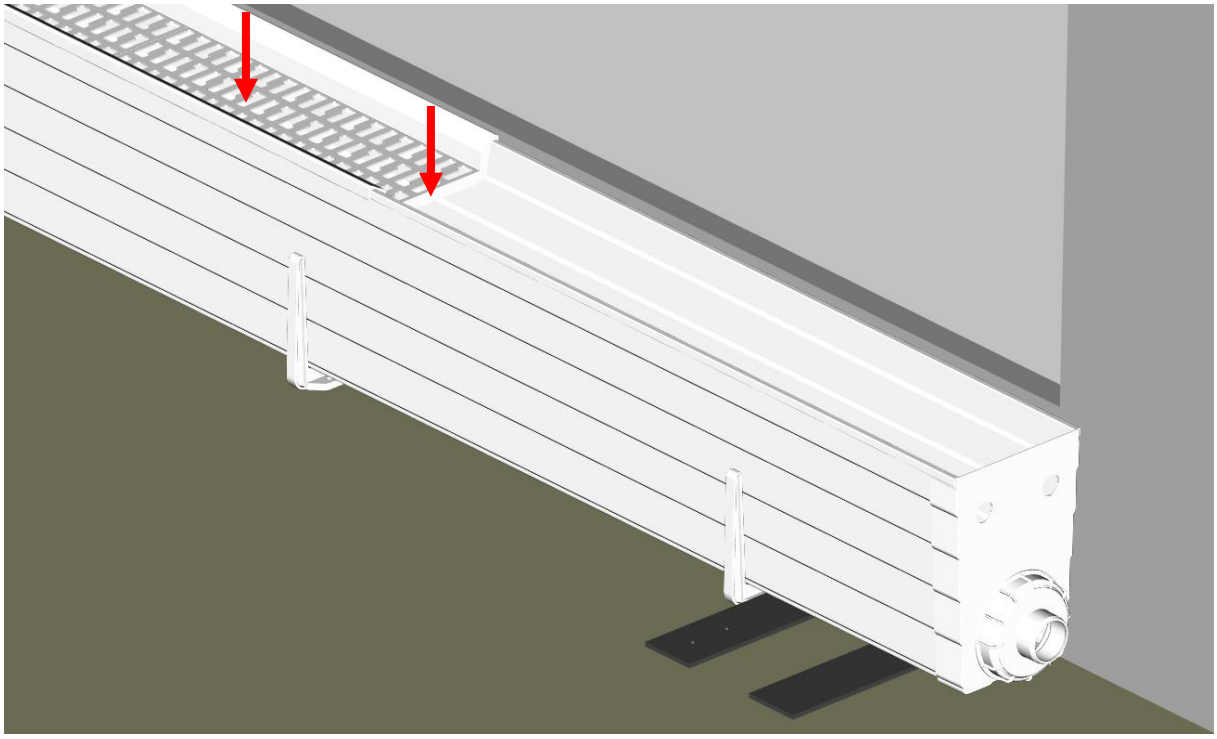
Spray pipes are connected to each other with the couplings and screw-thread clamps. For this, ensure that the screw heads of the clamps point down. This has the advance that the screw head will be accessible after installation. E.g. to adjust or clean the spray pipes.



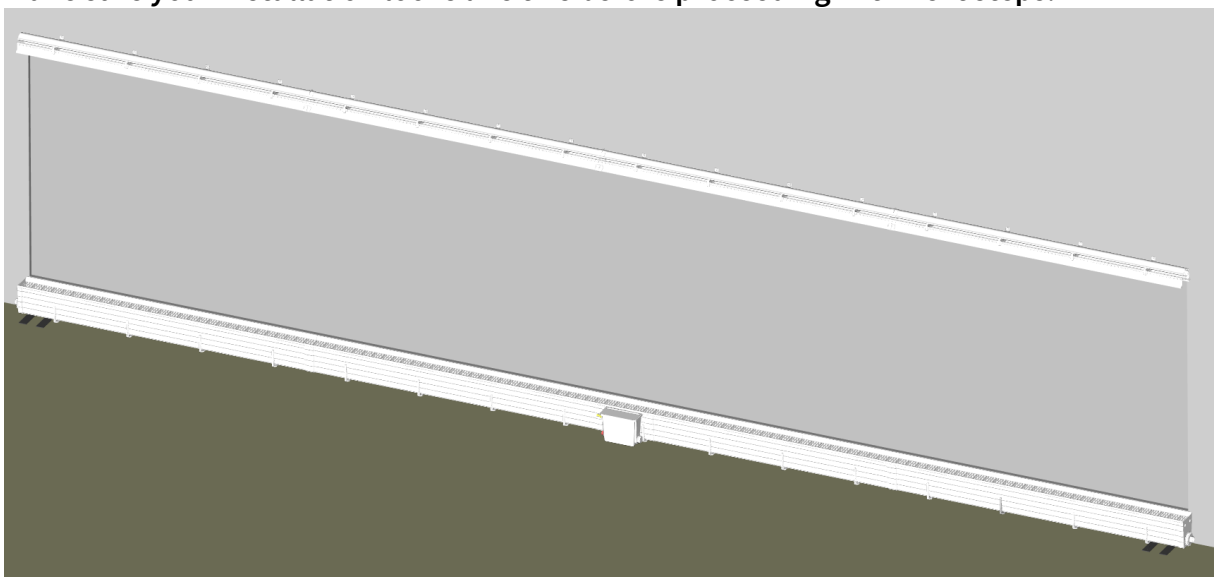


3.6.2. Covers of the watergutter

After the required drying time for all glue connections, install the covers on the water trough. The covers should be placed flush on top of each other.

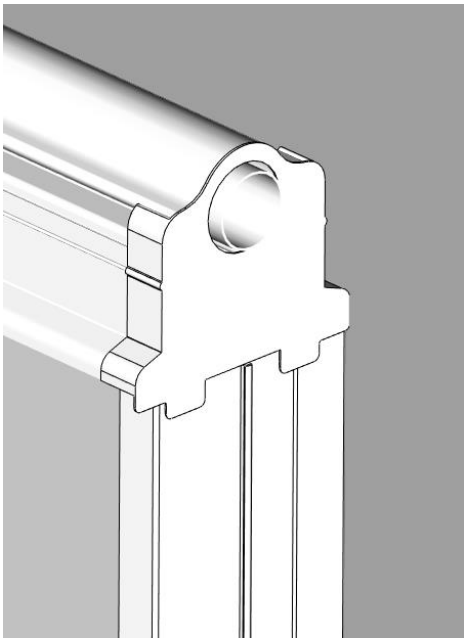


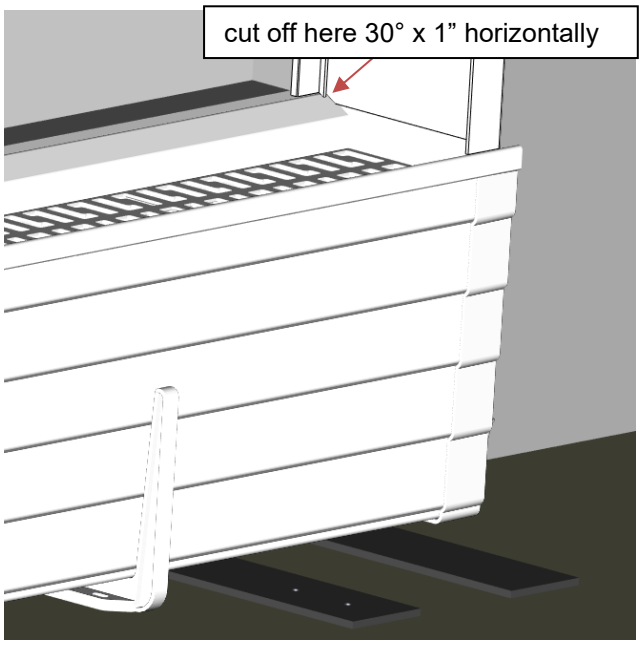
Make sure your installation looks like this before proceeding with next steps.



3.6.3. End cover

For adjustment of the end cover, first cut the end cover to the desired length. The maximum length of the end cover is 8'. The rule of thumb for cutting the end cover is: Pad height minus 2". Then cut the lower corner facing the wall to 30° from the end cover (see figure below).

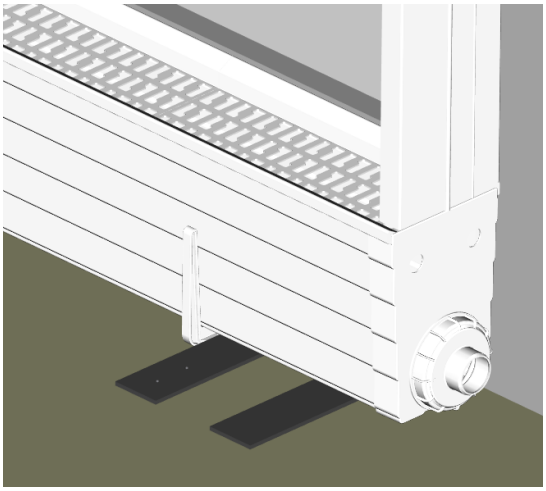


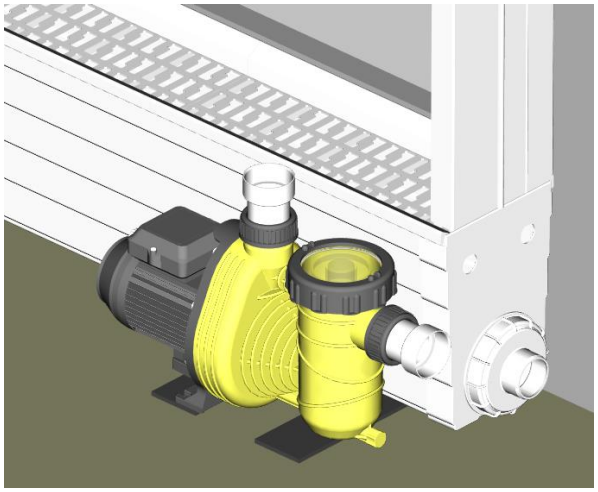


Then attach the end covers with 5 screws each spread evenly across the length.

3.6.4. End cover of deflector

Now put on the end cover for the deflector and glue the transfer piece to the spraying tube. After drying of the glue points, the flat seal and closure cap can be attached.





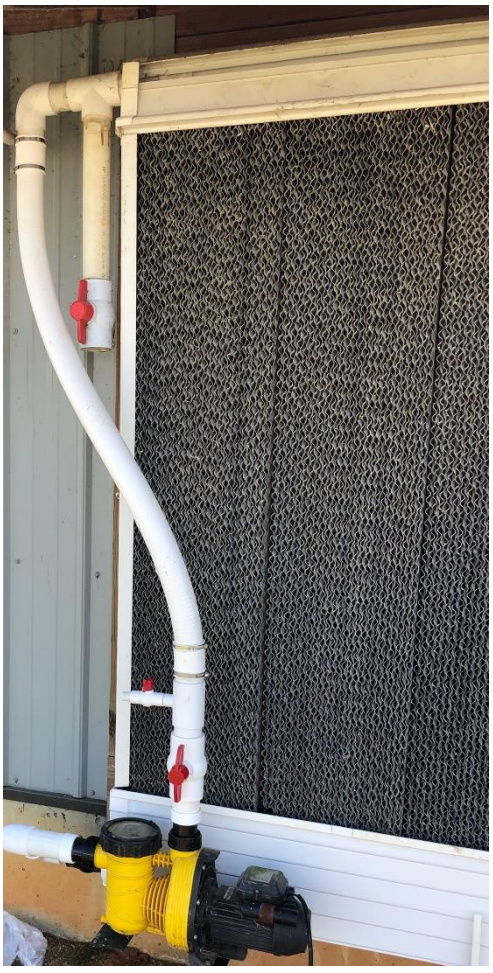
Mount the BA Pump on the two L-Brackets with two bolts.

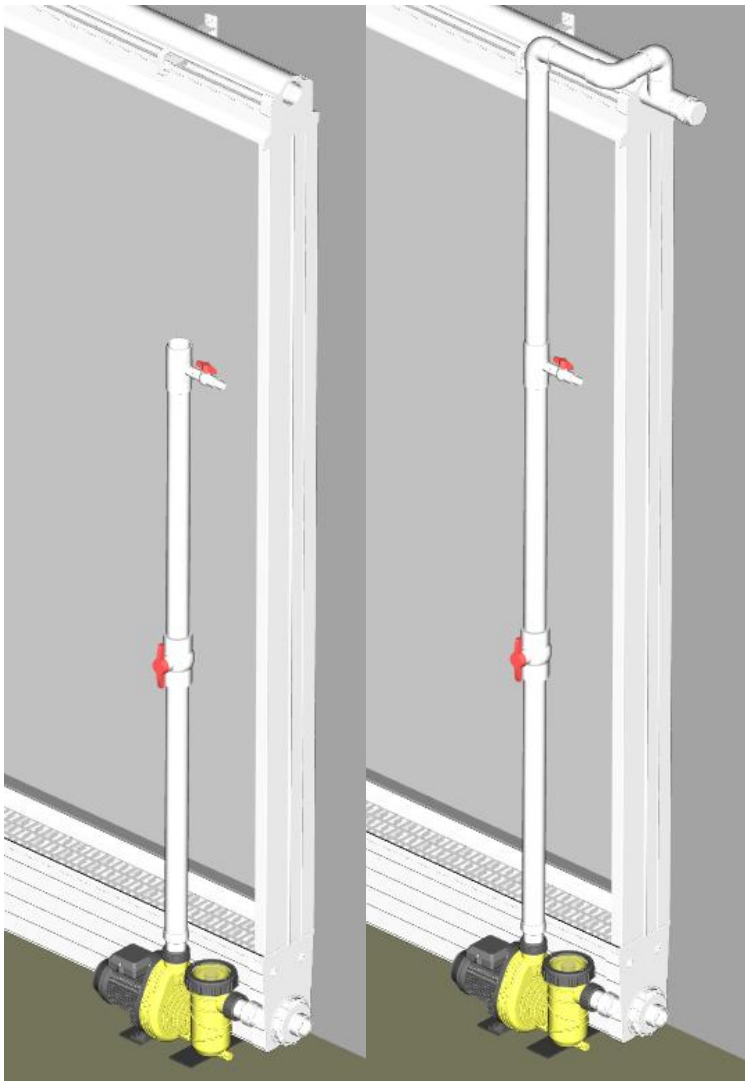
3.6.1. Assembly of the rising pipe and suction line

Connect the pump to the spraying pipe. The enclosed 2” PVC pipe must be cut to the desired length on site. For a recommendation on the length cutting of the individual parts, see the following figures.

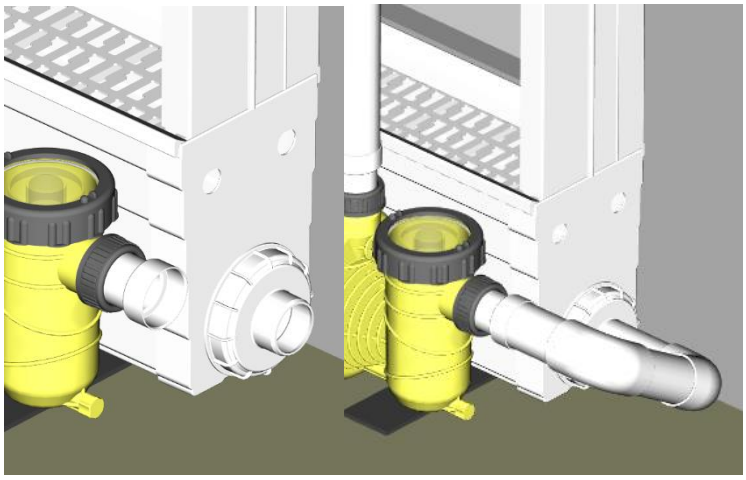
Cut and bond the entire piping system from the pump to the spraying pipe. Observe the arrangement of the construction units as in the sketch.

You may bond the system in the way as shown below but consider the water in the Spray Pipe flows back down the into the watergutter every time the pump turns off.



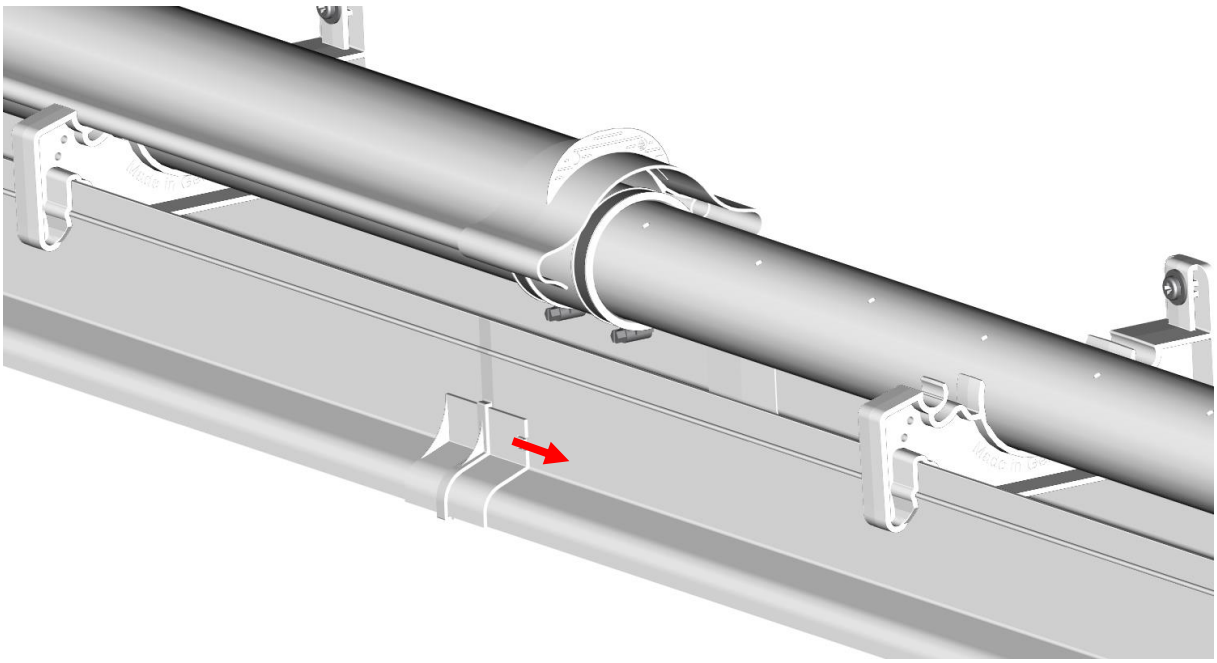


Then cut the tip of the 5” End Cap for adding the Suction Line with a Flexible Coupler and two clamps.



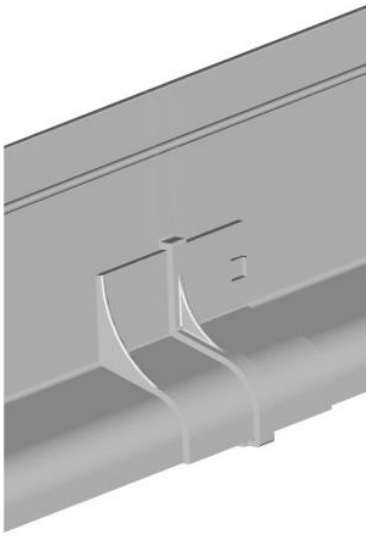
3.6.2. Insertion of the pads

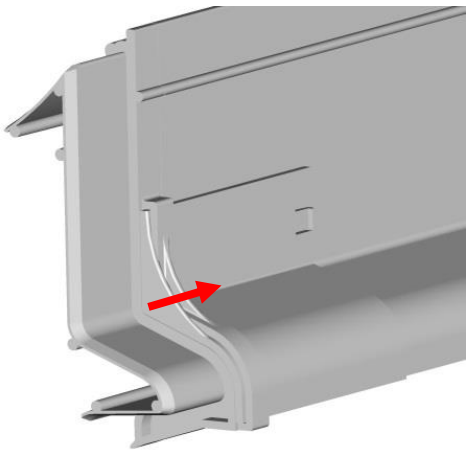
The first pad is pushed into the lateral end cover. Then the following pads are inserted flush against the previous one. The second-to-last pad is pushed into the opposite end cover, so that the last pad can be inserted into the still-open gap.
Once the pads are inserted, the front guide rails should be inserted. The coupling of the guide rail can be opened and closed with the slider.



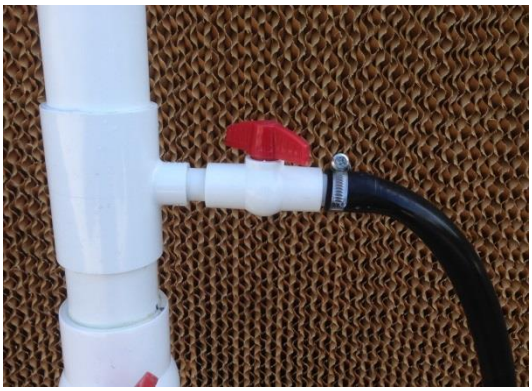
3.6.3. Opening of the guide rail

In order to open the guide rail, move the slider sideways. Then the guide rail can be disconnected. Use the slider coupling to connect the guide rails. It can be opened and closed with the slider. E.g. to remove the pads or to clean the system.





3.6.4. Instructions for the bleed-off function



Use the bled-off function to continually drain water. Continuous drainage of water improves the water quality on demand.

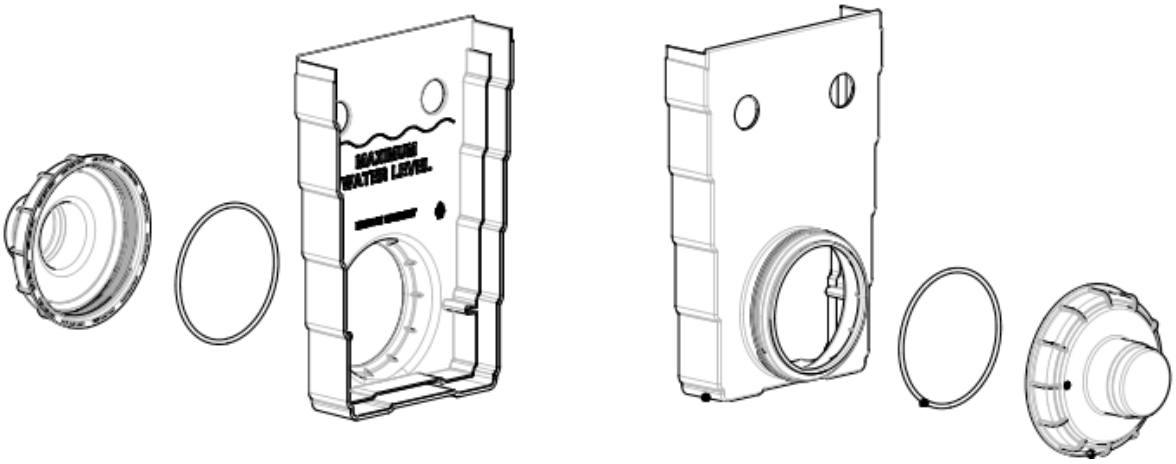
Depending on the region and local water quality, continually drain 5-10 % of the entire water flow rate. This value should be increased at higher mineral contamination.

For example: Water flow rate of 300 liters/min; 5 % of this means 15 liters/min or 5 liters/20 sec.

The desired setting should be determined during commissioning by "calibration": With the system running, set the ½" ball valve so that, e.g., a 5-liter bucket can be filled in 20 seconds.

3.6.5. End cover with overflow protection

In order to prevent a too-high water volume, the end cover of the water trough has overflow bores. The bores must not be clogged, since the function will not be ensured otherwise. The maximum water level should not exceed 7-4/5”. Ensure that the float valve can switch according to its function. Generally, water should not escape from the overflow bores. The bores only serve as an overflow for strong precipitation.



4. Operating instructions

4.1. Concept of evaporation cooling

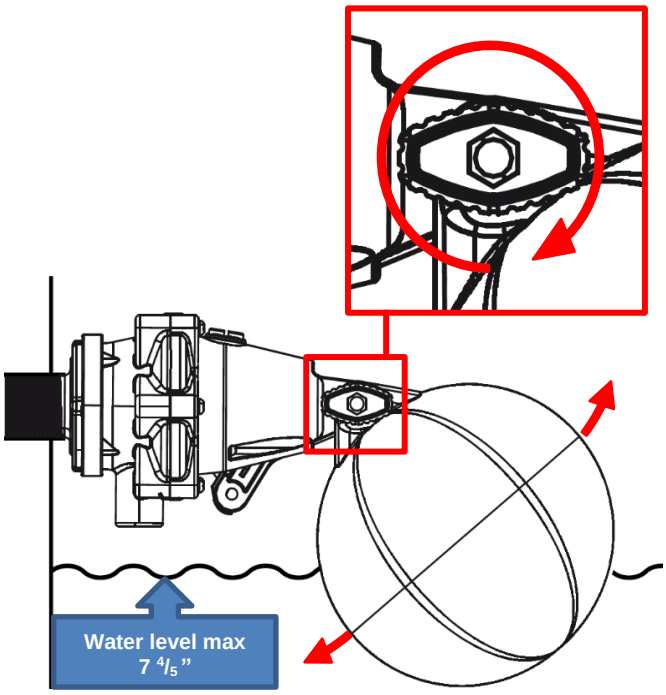
Pad-Climate-Systems are used with great success in order to compensate for extreme temperatures that affect the air inside the building. The advantages of pad cooling are achieved by air exchange in combination with evaporation cooling. Hot, dry air absorbs water. The energy used by this cools off the air. This method of cooling can offer reliable reduction of heat stress in times of extreme temperatures. Suitable for any geographic location, the Pad-Climate-System offers the greatest economic use in areas where higher temperatures for longer periods are the default status.

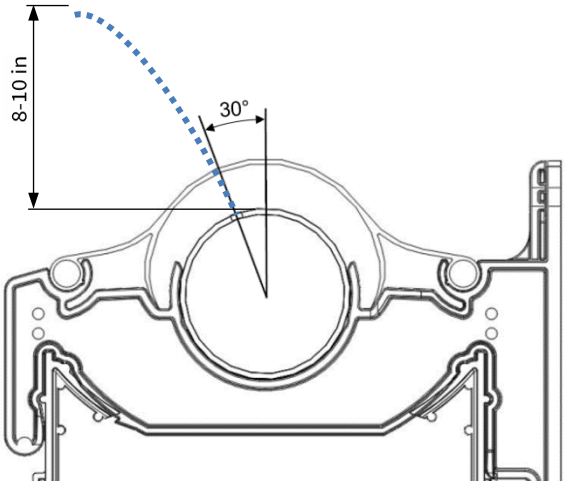
The Pad-Climate-System consists of three module groups:

- Supply unit
- Central element
- End set

4.2. Initial commissioning

- Connect the float valve to a suitable water supply. ATTENTION! Check if all closures are closed before use.
- Adjust the float valve with the adjustment screw so that the height of the water level in the trough, measured from the bottom, is no more than (7 $^{4}/_{5}$ “).
- On connection of the pump, please read the original operating instructions of the manufacturer that are enclosed with every delivery.
- After starting the pump, the water volume must be set. For this, the deflector is removed and the height of the water column is measured (see figure).
- Adjustment of the ball valve in the riser permits readjustment of the water volume. The water column is properly adjusted when a height 8”-10” (measured from above the spraying tube) is reached in paper pads and one of 6”– 7” (measured from above the spraying tube) in plastic pads.





4.3. Operation of the system

Durability of the pad depends on the respective water quality of the location. The Pad-Climate-System circulates and evaporates water in a circle. This causes continuous increase of the mineral and foreign substance concentration of the water. In order to keep the mineral content within the desired level, a share of up to 10% of the circulated water can be continually released by the drain device. The mineral occurrence on the pads generally should be observed. The higher this is, the more water should be exchanged continually (on this, also see chapter 3.6.16).

The pH-value of the recirculated water must be kept between 6 and 9. A pH-value of 7 is neural. A pH-value above 9 or below 6 will drastically reduce the pad's service life.

Algae growth and water bacteria in the pads must be checked. The pads are treated with an anti-fungal additive that will not, however, prevent algae growth. Treat the water with calcium hypo chlorinate as is used for swimming baths. Tablet forms of such algaecides are the most economically efficient form and best for slow release. Keep the water at 1 ppm (parts per million) of chlorine for recirculation. If you can smell the chlorine, too much was added. When algae are growing, tablets must be added. The pH-value and chlorine content should be reviewed every week.
The longevity of the pads and the pad frame depends on proper maintenance.

Clean the pump filter at least once per week or more often if there are any foreign substances in the water system.

Clean the spraying tube at least once per month. This can be simplified by opening the two closure caps while the pump is running and water can flow through.

Always regulate your ventilation system so that the pad system is turned off while all fans are still running. This will dry the pads and kill all algae spores. Do not keep the pads wetted around the clock. This will soften the pads.
Check the pads for dry spots while the pad system is in operation. If dry spots occur, remove the pad cover and check the holes in the tube. Clean all clogged holes with a wire until enough water flows from each hole.

	Please do not put too much water on the pads.

The pads are more efficient when they have just enough water to stay wet. Flood-like sprinkling will soften the pad and render it inefficient.

Empty and clean the water trough as often as necessary to remove dirt or waste so that the water can circulate freely.

	The pump must be drained in time if there is a danger of frost. It is drained through the closure screw. Also empty any lines in danger of frost. The pump must be disconnected from the mains for any maintenance work.

4.4. Troubleshooting

Pads too dry or too wet	The ball valve is not set correctly	Set the ball valve correctly – on this, also see chapter 4.2 "Initial commissioning"
Overflowing water trough	The float valve is not set correctly	Set the float valve correctly – on this, also see chapter 4.2 "Initial commissioning"
Clogged system	Contamination	Clean the system – on this, also see chapter 4.3 "Operation of the system"