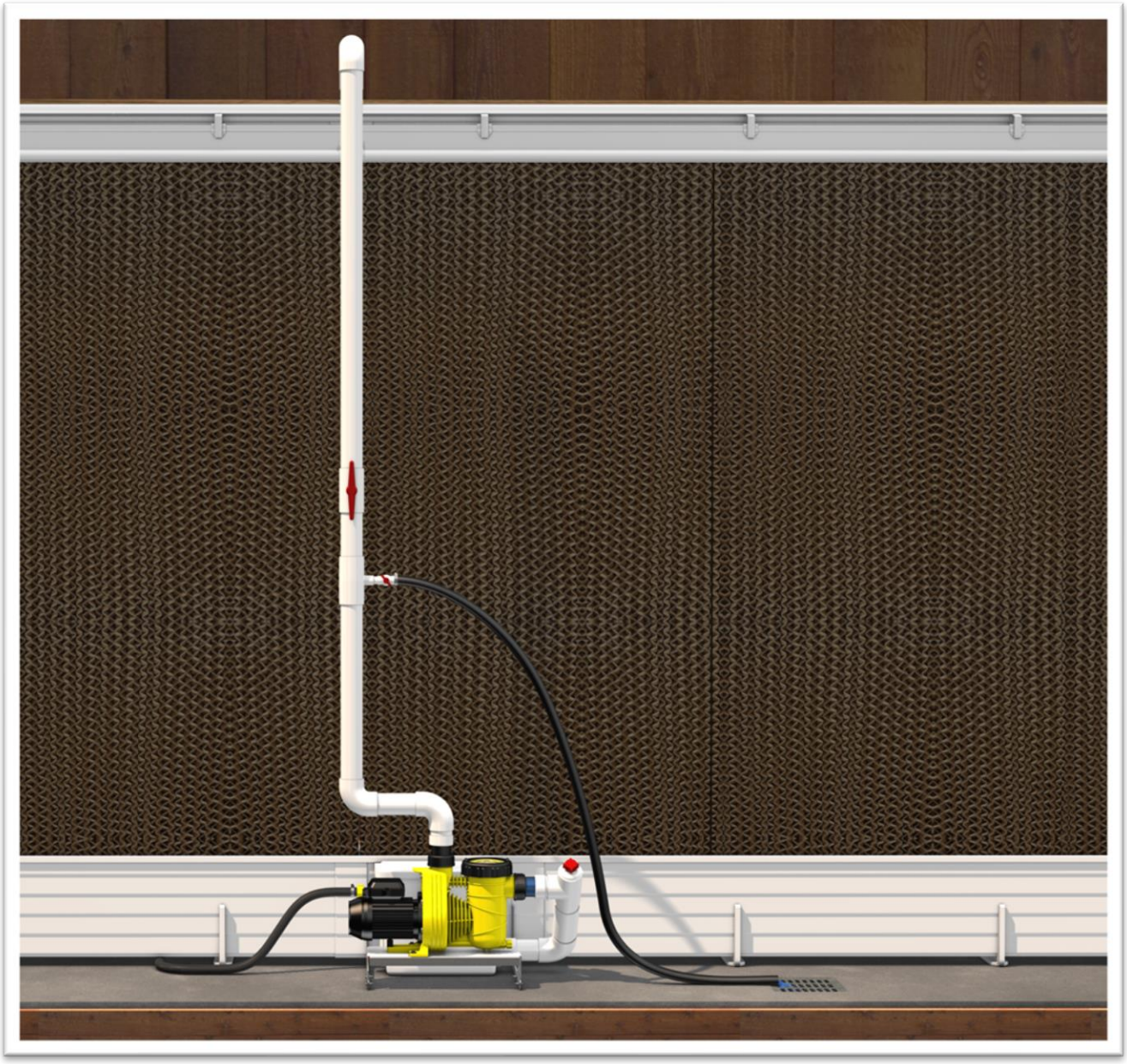
LUBING



PAD CLIMATE SYSTEM

Assembly and operating instruction

Status: June 2020
Version: 4.0

Manufacturer's Information:

LUBING Maschinenfabrik GmbH & Co. KG
Lubingstraße 6
D-49406 Barnstorf
Phone: +49 (0) 5442 / 9879 - 0
Fax: +49 (0) 5442 / 9879 - 66

- Email: info@lubing.de
- Internet: www.lubing.de

Change notice

Version	Page	Date	Change
2.2.1	28	01/22/2018	Table "Technical data pump BA4/BA11" replaced
3.0	various	03/13/2018	Various changes made
4.0	various	June 2020	General revision, various changes

Table of Contents

1. INTRODUCTION
1.1. Short Description LUBING Pad Climate System 4
1.2. Preface for the Manual 4
2. GENERAL INFORMATION
2.1. Warnings and Symbols 5
2.2. Intended Use 6
2.3. General safety directives - purpose 6
2.4. Obligations 7
2.5. Warranty and liability 7
2.6. Electrical system 8
3. ASSEMBLY
3.1. Assembly information 8
3.2. Installation position in the building 8
3.3. Preparation of the Attachment Opening 9
3.4. Assembly instructions 9
3.5. Recommended tools 9
3.6. Installation Procedure 9
3.6.1. Installation of the pipe, bottom, and bracket holders 10
3.6.2. Assembly of the supply unit and holder for the water trough 10
3.6.3. Assembly of the pipe holders 11
3.6.4. Glue connections 12
3.6.5. Glue instructions 15
3.6.6. Bonding of the water trough 16
3.6.7. Assembly of the riser 17
3.6.8. Assembly and alignment of the spraying pipe 18
3.6.9. Assembly of the deflector 18
3.6.10. Installation of the guide rail 19
3.6.11. Assembly of the couplings 19
3.6.12. Covers of the water trough 21
3.6.13. End cover/end cap for the water trough 22
3.6.14. End cover of deflector 22
3.6.15. Splash protection 23
3.6.16. Insertion of the pads 24
3.6.17. Opening of the guide rail 24
3.6.18. Instructions for the bleed off function 25
3.6.19. End cover with overflow 25
4. OPERATING INSTRUCTIONS
4.1. Concept of evaporation cooling 26
4.2. Initial commissioning 26
4.3. Operation of the system 27
4.4. Notices on national/international regulations 28
4.5. Troubleshooting 28
5. TECHNICAL DATA OF THE PUMP
5.1. BARKU AQUA 4 / BARKU AQUA 11 29
5.2. BARKU Top S25 35

1. Introduction

1.1. Short Description LUBING Pad Climate System

The LUBING Pad Climate System is a cooling and humidifying system for agricultural buildings for animal breeding and for industrial 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 in the water trough.

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 is part of the pad climate system. It must be kept accessible throughout the service life of the pad climate system and must remain with the system even if the system is sold.

The manual must be read and used by everyone who works on the system or installs the system:

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

The manual is part of the pad climate system. It must be kept accessible throughout the service life of the pad climate system and must remain with the system even if the system is sold.

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

These 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 LUBING Pad Climate System is only intended for cooling stables.

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 is to be performed as required.

LUBING pad air conditioning systems must only be operated, serviced, and used by personnel familiar with such measures and dangers.

2.3. General safety directives - purpose

This 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:

- before commissioning
- at the corresponding maintenance 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 directives shall be a basic requirement for safe handling and smooth operation of this pad air conditioning system. This 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

The “general terms and conditions and delivery terms” of LUBING Maschinenfabrik shall generally 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.

Turn off the power supply and secure it against reactivation when work on the device is to be performed. 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 LUBING standard versions, please observe any changes to and/or deviations from the scope of delivery.

3.2. Installation position in the building

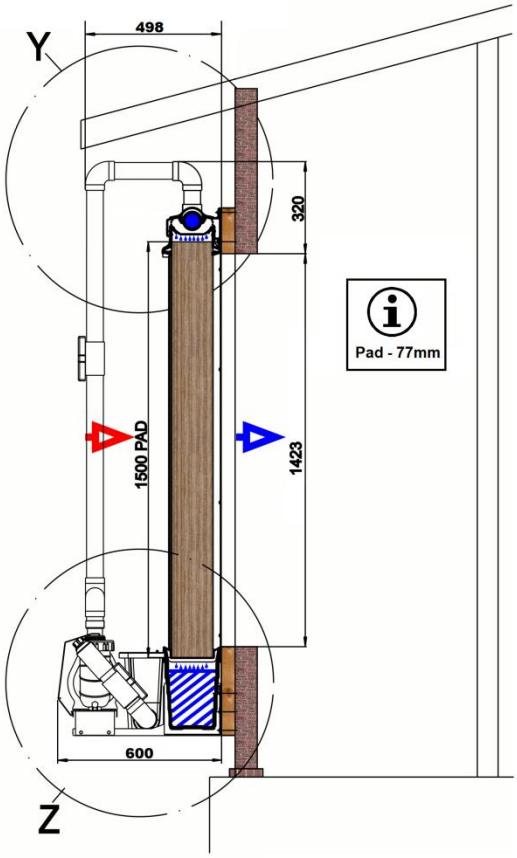
The pad surface design should be designed based on the maximal required cooling. The system should be attached to the building in order to best avoid detriments air swirls or air leaks. Additionally, the resulting air speed should not exceed the comfort level for the animals kept.

3.3. Preparation of the Attachment Opening

The attachment opening should have a height of "pad height (max 2,500 mm) minus 77 mm" and a length of "pad length minus 60 mm". (e.g.: Pad length 24,000 mm → opening = 23,940 mm)

3.4. 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.



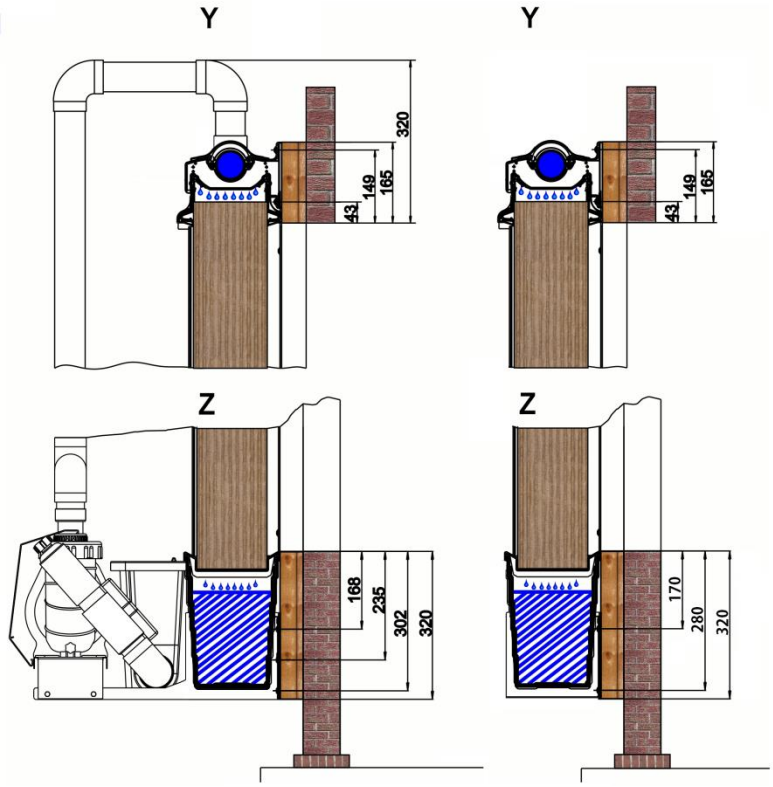
3.5. Recommended tools

Find a list of tools below that are needed to install your LUBING pad air conditioning 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

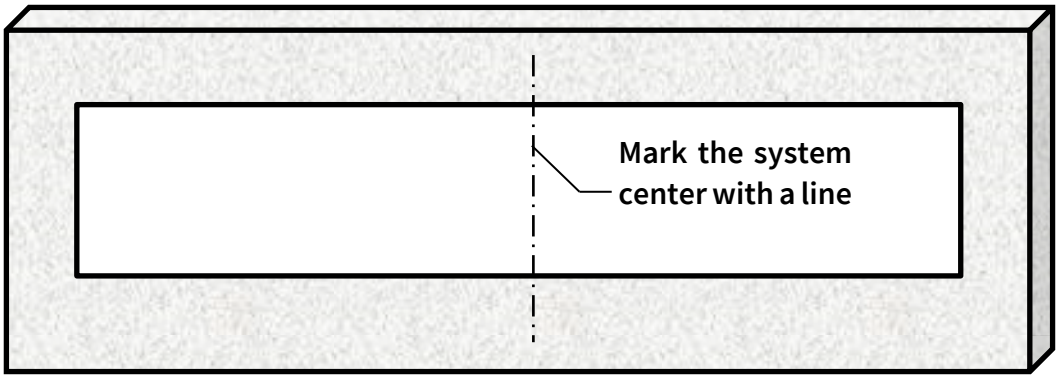
3.6. Installation Procedure

The opening in the stable should have a wood frame of water-proof wood.
For systems <12 m / 40 ft. in length, the supply unit may be placed at the end of the system. For longer systems and generally, the supply unit should always be placed at the center of the frame.



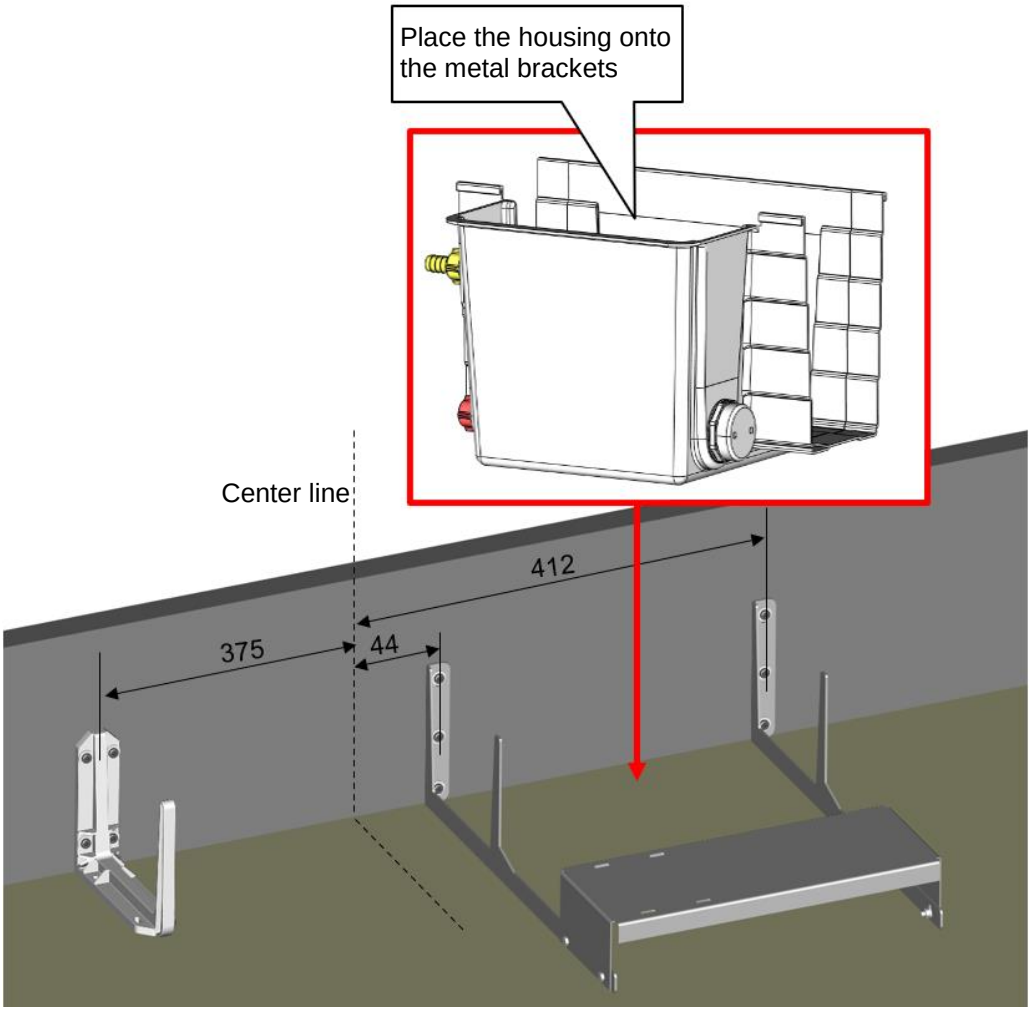
3.6.1. Installation of the pipe, bottom, and bracket holders

Start assembly from the center. Mark the center with a line at the upper and lower section. You can find the holder positioning points in the following figures.



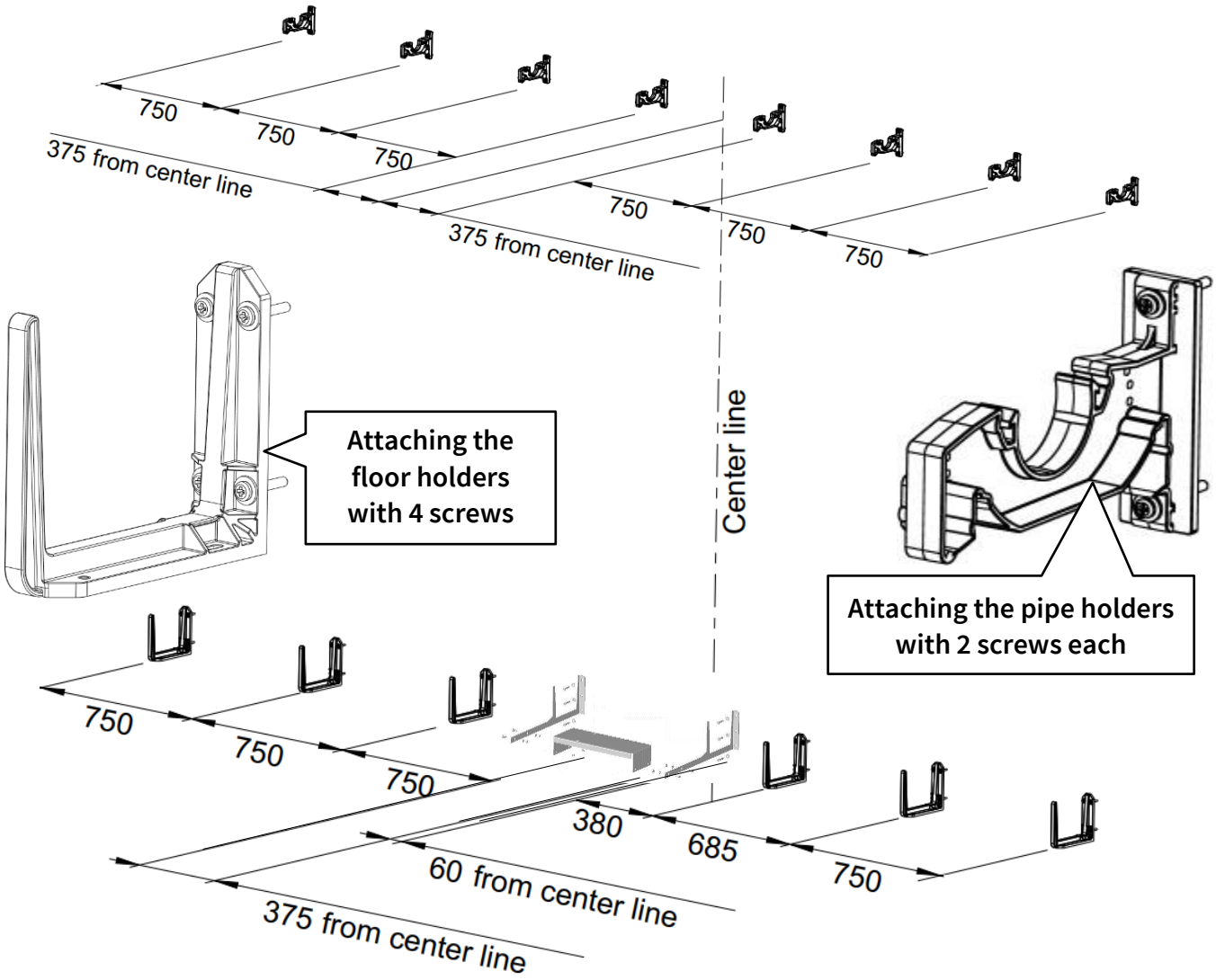
3.6.2. Assembly of the supply unit and holder for the water trough

Start assembly by installing the supply unit. The supply unit should always be placed at the center of the entire frame if possible. The impact edge of the plastic housing should be precisely centered on the frame. For positioning of the bracket holders, see the illustration below.



3.6.3. Assembly of the pipe holders

Measure and mark the distance for the upper holder above the supply unit. Measure and mark the distance for the upper holder at the end. Then mark the horizontal connection between these points with a chalk line. Attach the upper holders at a distance of max. 75 cm (30 in). The distance from the end should be 37.5 cm (15 in). Attach every upper holder with two screws and washers.



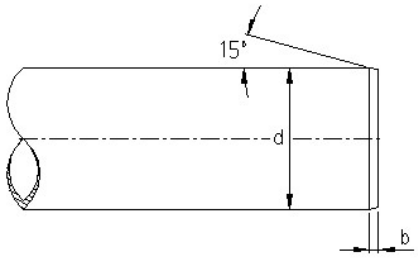
The holders for the water trough must be placed horizontally at even intervals of max. 75 cm, and in the horizontal alignment. For further distances, see the illustration below. Recommended tools for installation are a chalk cord and a cordless drill.

	The load from the system after start of operation is 75 kg / m (165 lb / m)! The load may vary depending on pad type.

3.6.4. Glue connections

LUBING recommends “Tangit” glue for glue connections.

Preparation of the parts:
The pipe ends must be cut off rectangular, chamfered and deburred to 15°. Missing or improper pipe chamfers will prevent permanently tight connections.



Outer pipe diameter (mm)	dimensions for b in mm bonding with fittings (approx.)
up to 15	2
20-50	3
63-110	5
125-200	5
225-310	5

Pre-treatment of the adhesive surfaces:
Clean the adhesive surfaces (pipe end and water trough outside, fittings and couplings inside) of gross dirt first. Remove any adhering ice by heating (hand-warm). Then the adhesion length of the fitting must be marked on the pipe end so that the required glue application and complete insertion of the pipe can be reviewed. Fine cleaning takes place with Tangit cleaner. For this, a white, lint-free roll-crepe paper is soaked with cleaner and used to clean the surfaces to be bonded thoroughly to make them grease- and dirt-free. The paper must be replaced after each cleaning process. The surfaces cleaned with Tangit cleaner must be dried before application of glue.

Processing:
Stir Tangit well before use. The glue should flow off slowly from a rod held diagonally and form a kind of glue vane. Apply an even, uninterrupted glue layer inside the sleeve and then on the pipe in the axial direction. Thinly coat the inside of the sleeve with Tangit in order to avoid detrimental bead formation in the pipe; apply it thickly to the pipe end. Tangit PVC-U can be used to bridge tolerances up to +0.6 mm according to DIN EN 14814.

Push together the pipe ad sleeve to the stop or to the full sleeve depth at once without twisting/canting against each other and hold them in this position for a few seconds until the glue has cured.

Remove excessive glue with the cleaning paper directly after joining. Due to the quick curing of the glue, the joined parts must be pushed together within 4 minutes after application of the glue commences.
The open time of Tangit, i.e. the time from starting to apply glue to joining of the parts, depends on the film thickness of the glue and/or the ambiance temperature.
At a film thickness of 1 mm, the processor will have the following times depending on the processing temperature:

Temperature	Processing time	Adhesive film thickness
20 °C (68 °F)	4 min.	1 mm
25 °C (77 °F)	3 min.	1 mm
30 °C (86 °F)	2 min.	1 mm
40 °C (104 °F)	1 min.	1 mm
> 40 °C (>104 °F)	< 1 min.	1 mm

Waiting times/pressure test:
The pipes must not be moved during the first five minutes after bonding. For temperatures below +10 °C, this time will increase to at least 15 minutes.
The lines should only be filled, and pressure tests up to a test pressure of 1.5 x PN should only be performed 24 hours after the last bonding. It is recommended to flush lines that are not taken into operation at once well and to let them stand filled with water.
Note:
Before commissioning, flush the pipes thoroughly in order to remove any remaining solvent vapors. Tangit PVC-U is ready for use and therefore must never be diluted. Tangit PVC-U and Tangit cleaner affect PVC-U. Plastic parts therefore must be kept away from any spilled glue/cleaner.
Close any containers not in use well at once in order to avoid solvent loss and thickening. Remove any glue skin. Wipe off any thickened glue adhering to the brush with dry fleece paper. Cleaned brushes must be dry before reuse.

Installation notes:
Installation at lower temperatures requires extreme care. Pipes and fittings tend to be more sensitive to impact (brittling) at temperatures below +5 °C, so that long-term effects of solvent vapors, as it occurs, e.g., when closing the lines during the drying phase, may damage the system.
Furthermore, the strength development may be severely delayed since the Tangit PVC-U cures physically.

The minimum durability of Tangit PVC-U in the unopened original package at 20 °C is at least 24 months from the manufacturing date.
The manufacturing date and batch number can be found on the edge of the can or on the fold of the pipe and the insertion tab of the folding box.

Protective measures:
Tangit PVC-U and Tangit cleaner are fire-hazardous. The solvent vapors are heavier than air, may collect on the floor and form explosive vapors. Therefore, ensure sufficient ventilation and venting in processing and drying, also after bonding.

In the working area: Do not smoke!

Do not weld! Do not use open light and fire; avoid any spark formation under all circumstances. Before performing any welding work, remove any collections of solvent vapors and explosive mixtures. Fill pipes with water, flush them and blow them out well. Do not

close lines during the drying phase. Extended inhalation of the solvent vapors may damage health.

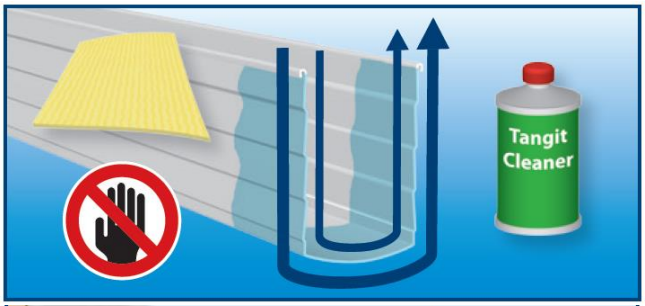
Keep used cleaning paper in closed containers (e.g. buckets with lids), in order to keep the stress from solvent vapors low.
We recommend preventive use of protective gloves to avoid skin contact and greatest cleanliness (wash hands in between and apply greasing skin protection cream or emulsion). After contact with the eyes, rinse thoroughly with water and seek medical advice. Change clothing contaminated with glue. Provisions and rules of the trade associations and information in the safety data sheet must be observed. For detailed information on safety-technical and work-hygienic questions for handling of Tangit PVC-U, see the leaflet "Handling of Tangit".

The safety data sheet is available at https://mysds.henkel.com/index.html.

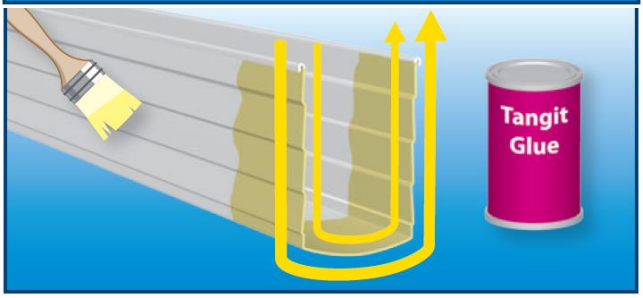
Disposal:
Fully fried product residue may be disposed of in the household waste/commercial waste. Dispose of large amounts separately. Waste key/ EAK code on request. Recycle empty packaging.

3.6.5. Glue instructions

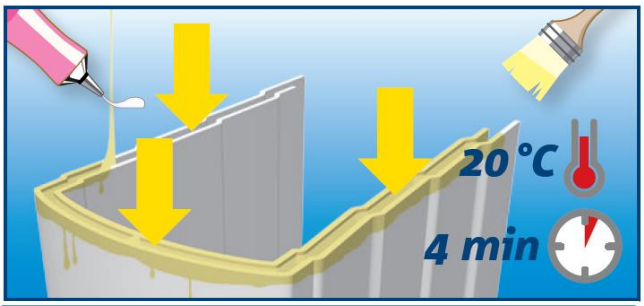
1. Clean all glue areas thoroughly with Tangit cleaner! The cleaned areas must remain free of fat, dirt, and moisture – do not touch them again after cleaning.



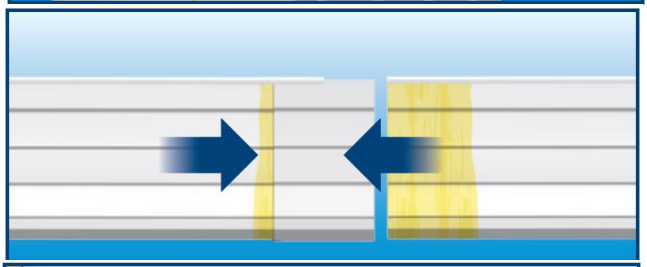
2. Coat the glue points of the water trough with Tangit glue.



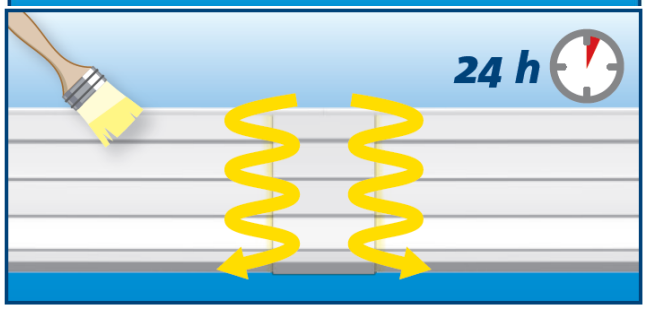
3. Fill the gap of the coupling (bilateral)/end piece with Tangit glue. Observe the general notes on handling of Tangit in chapter 0 (in particular the processing time: 4 min. at 20 °C).



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



5. Spread escaping Tangit glue with a brush at the transfers. Ready for drying! Please note the drying times in chapter 0!



Required materials and tools:



Tangit cleaner



Tangit glue

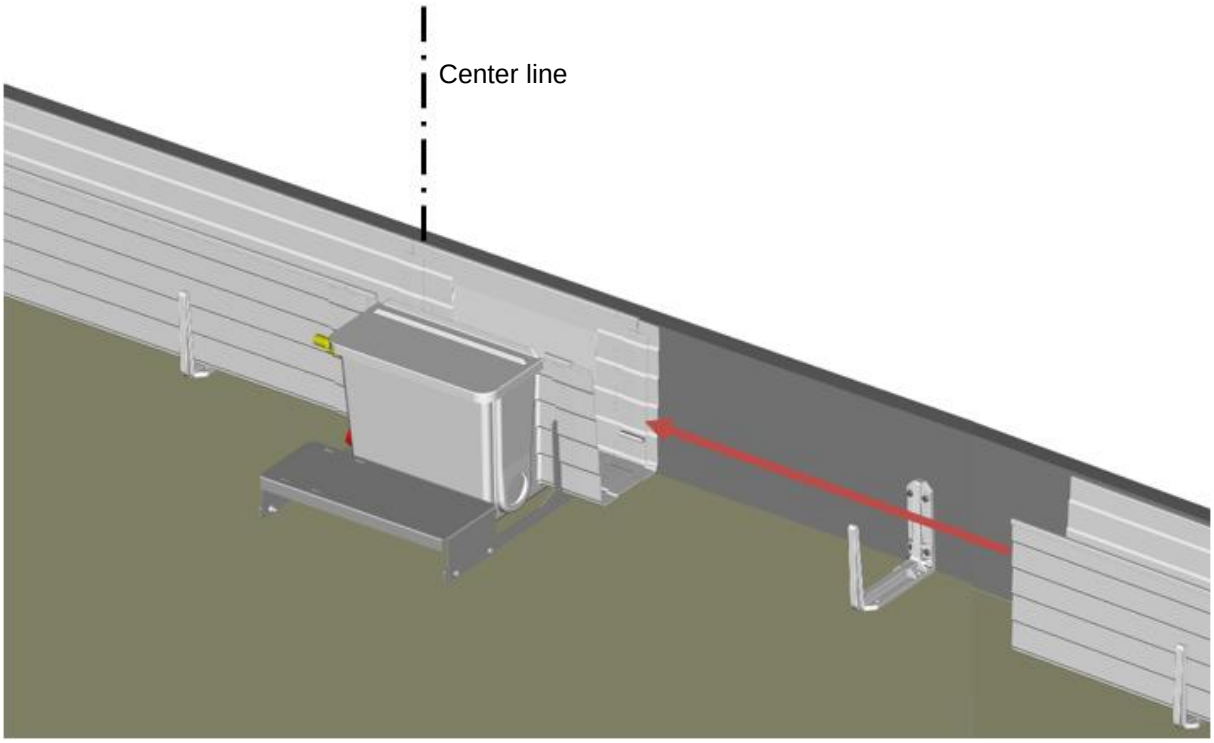
Rag


Brush

Attention! Adhesive areas must dry for 24 hours!

3.6.6. 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 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 3.6.5.

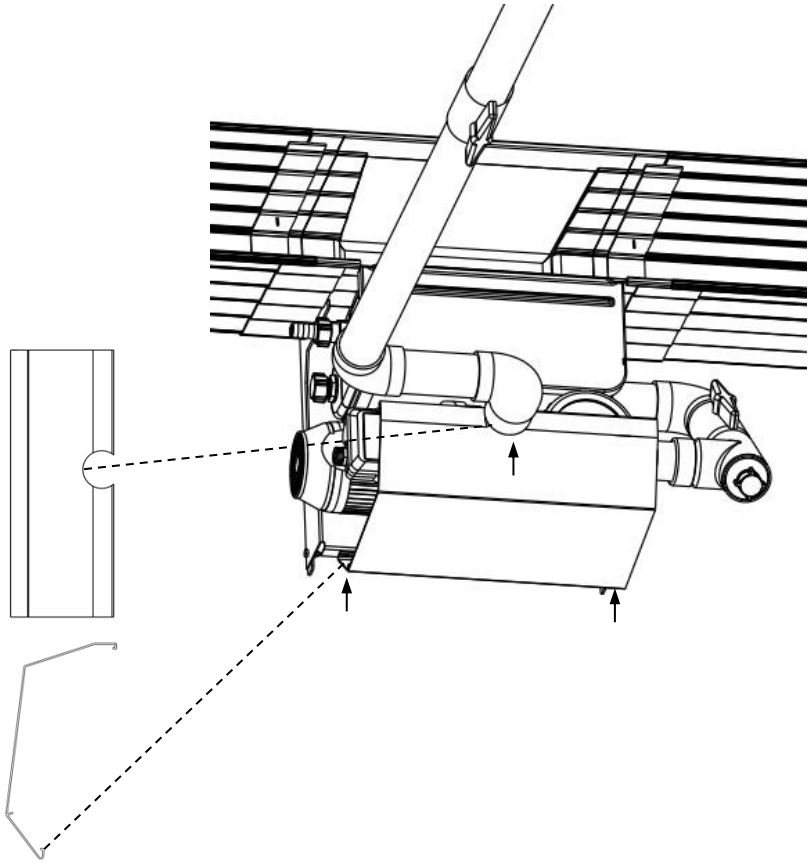


3.6.7. Assembly of the riser

Connect the pump to the spraying pipe. The enclosed 2.5-m-long 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 figure.

	Ensure straight cuts when sawing the pipes. Then clean the front of the pipes and deburr them to 15°. Contamination or splinters in the hose system may considerably reduce the system's efficiency and/or cause damage!

Cut and bond the entire piping system from the pump to the spraying pipe. Then place the pump cover on the supply unit in order to prevent dirt and splashing water at the pump. Observe the arrangement of the construction units as in the sketch.

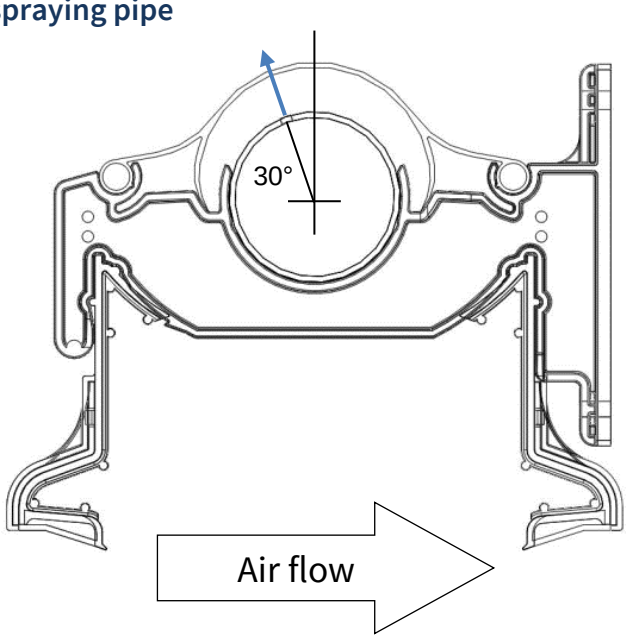


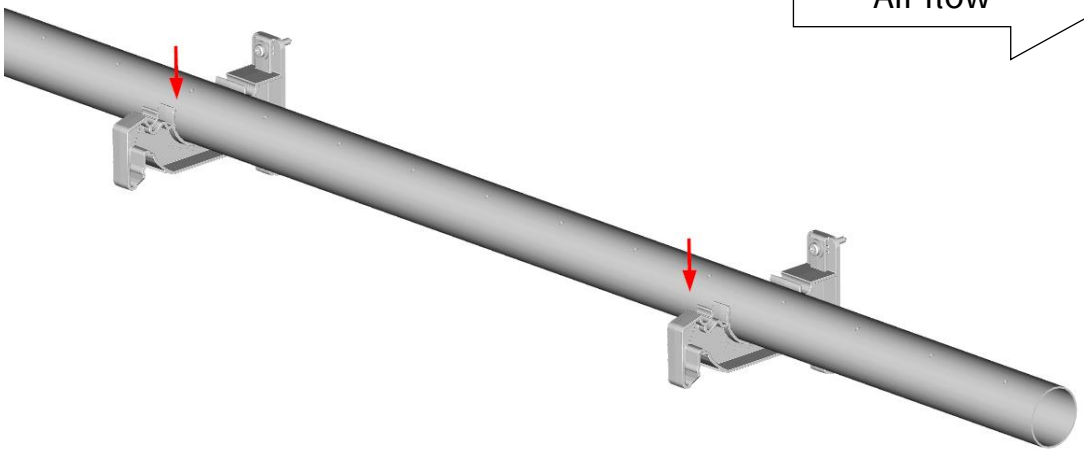
The float valve in the housing should be connected to the pressurized water at a later time, so that the system will not be filled by accident. Ensure that the float of the valve can move freely.

3.6.8. Assembly and alignment of the spraying pipe

Start with gluing on the spraying pipe together with the T-adhesive coupling of the riser. The tee should be centered here on the system center. Starting at the tee, glue the riser on up to the pump.

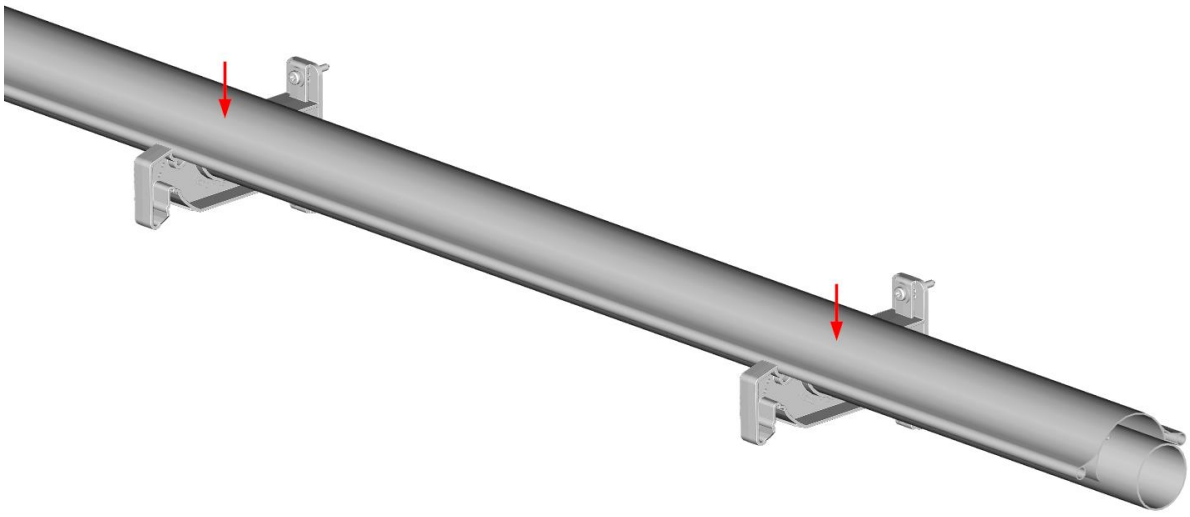
Attention! The holes of the spraying pipe must be at an angle of 30 degrees against the air flow from the outside, as illustrated in the adjacent figure.





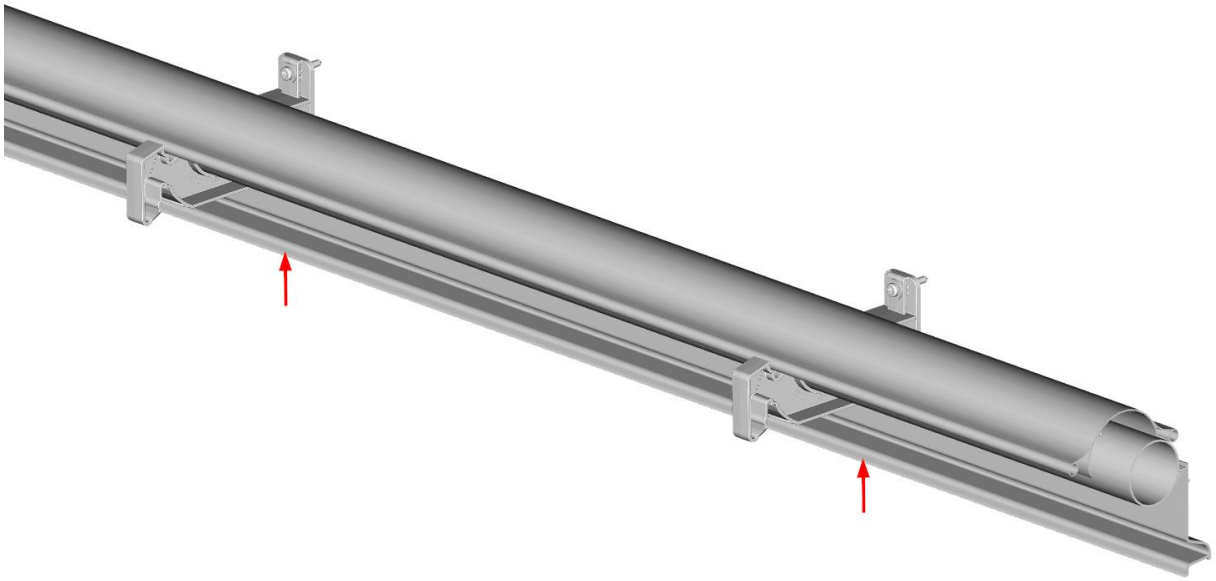
3.6.9. Assembly of the deflector

Click the deflector onto the pipe holders. Ensure that the deflector is correctly installed in all pipe holders.



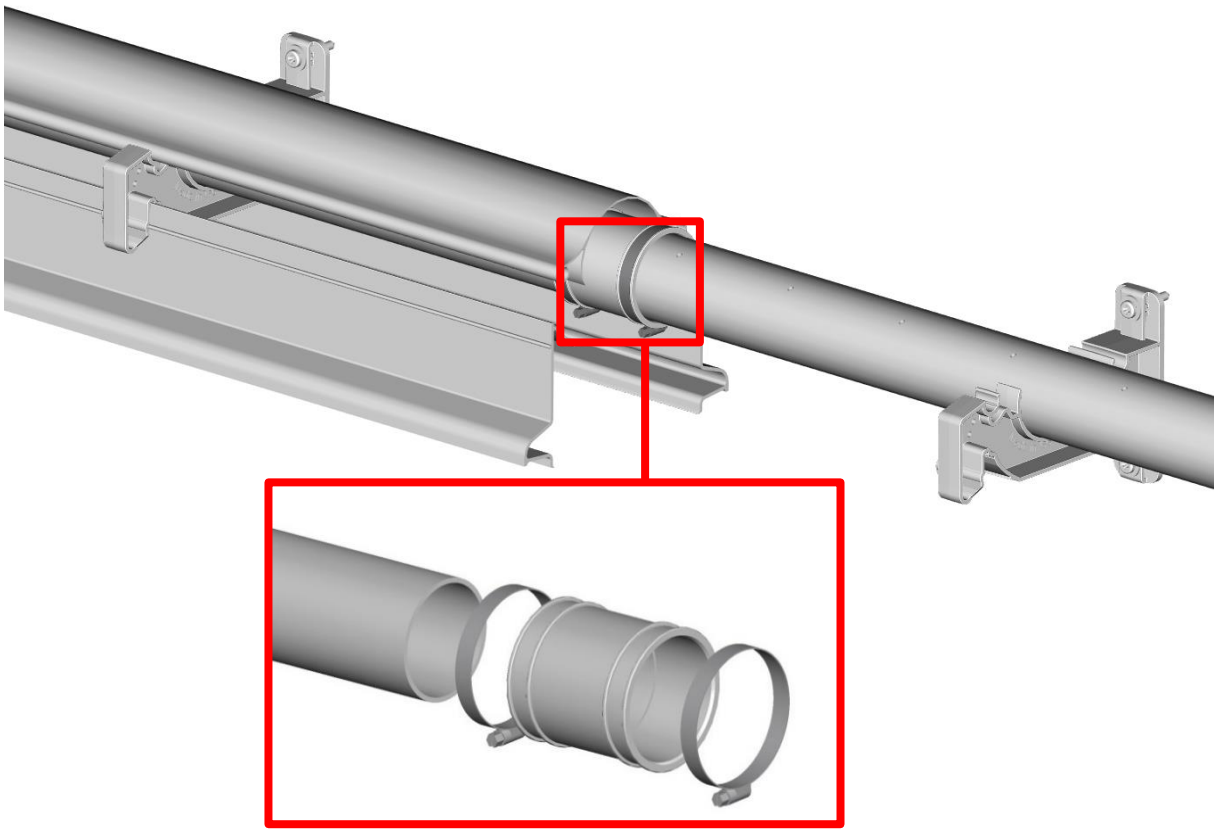
3.6.10. Installation of the guide rail

Attach the guide rail on the wall side by attaching it to the pipe holder. Make sure that the guide rail is correctly installed in all pipe holders.

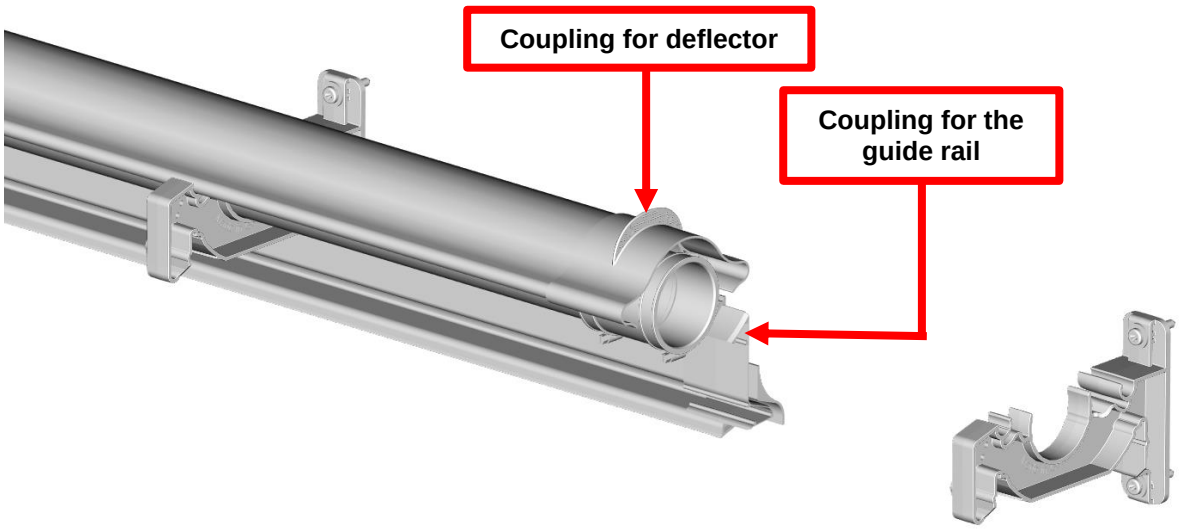


3.6.11. Assembly of the couplings

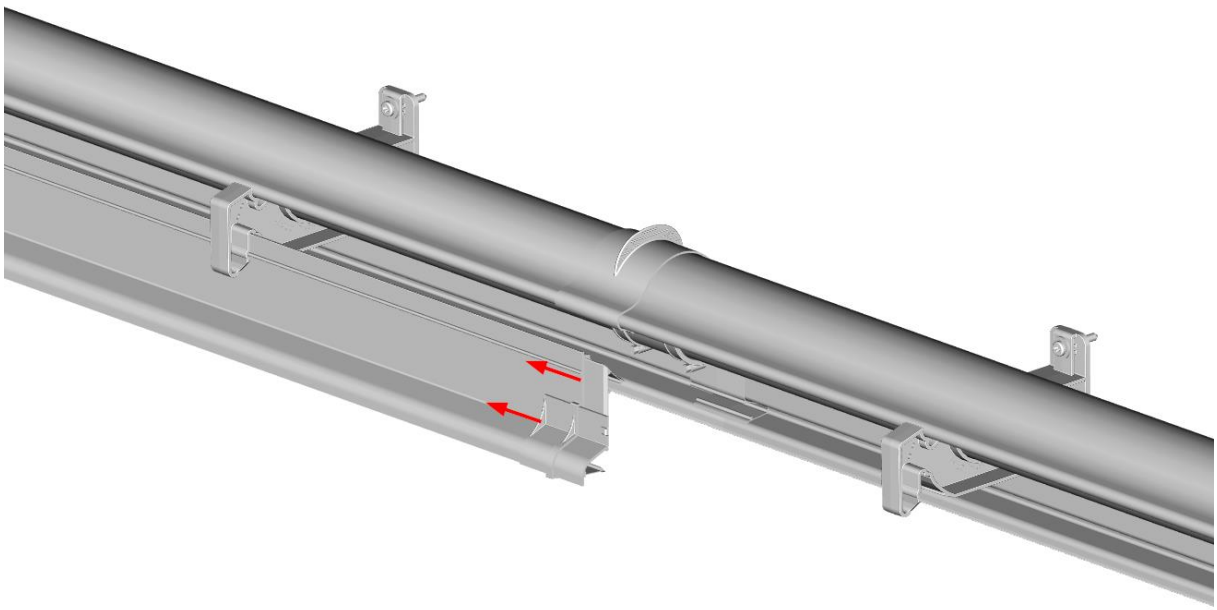
The spraying pipes are connected by soft PVC couplings. Then the spraying pipes are connected to each other with the couplings and screw-thread clamps.



Push the coupling for the deflector onto the deflector. Do not use any glue for this, in order to permit removal of the coupling for disassembly (e.g. when cleaning).

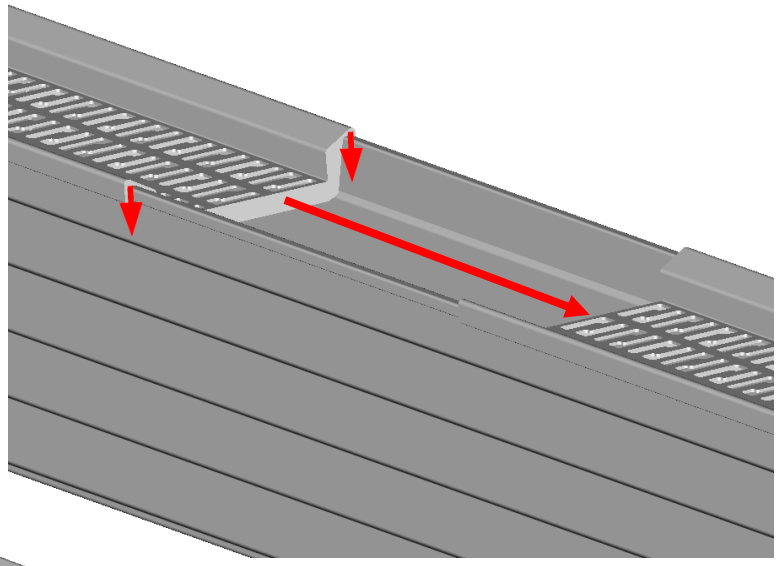


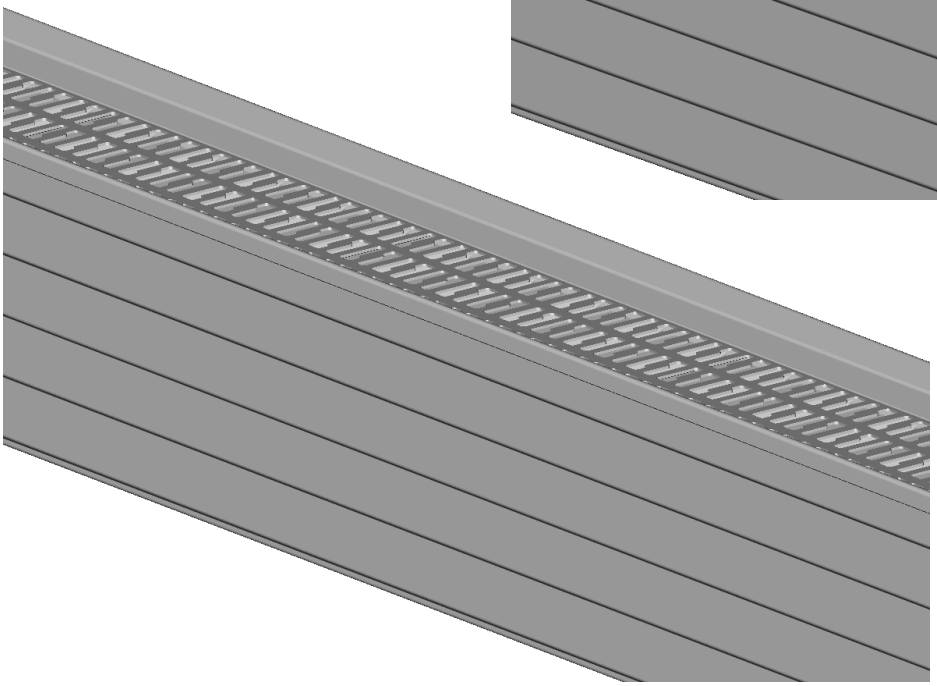
Use the slider coupling to connect the guide rails. It can be opened and closed with the slider, e.g. to remove the pads or to clean the system.



3.6.12. Covers of the water trough

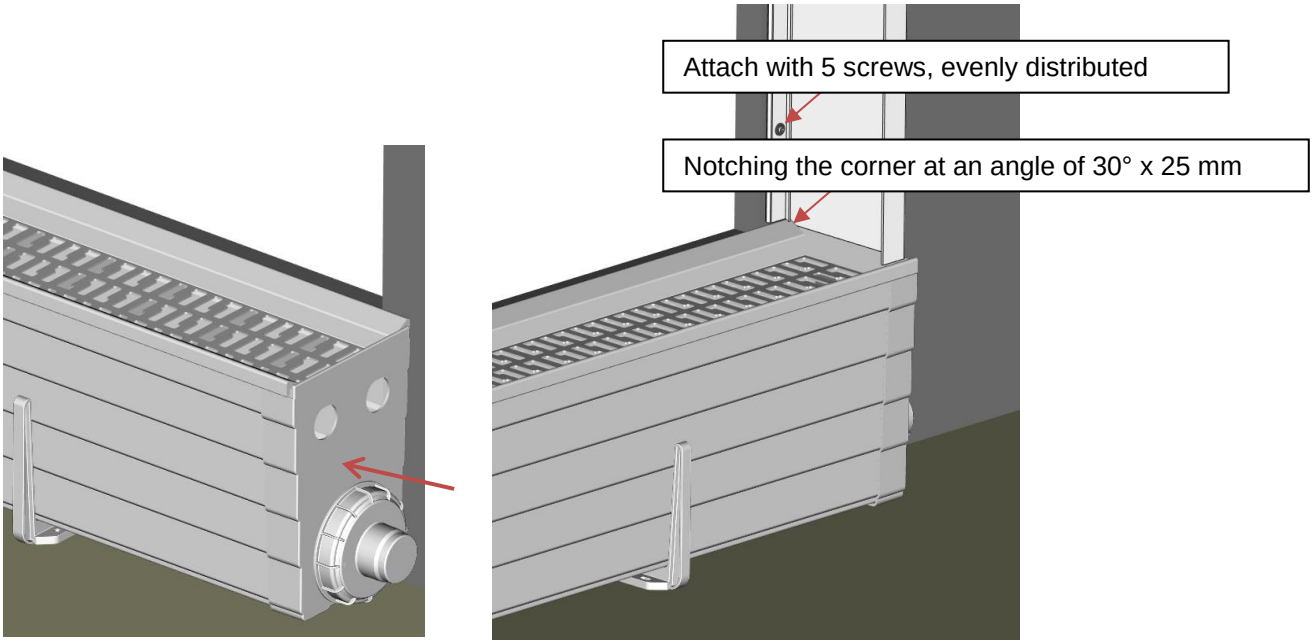
After the required drying time for all glue connections, install the covers on the water trough. The covers should be placed flush on top of each other.





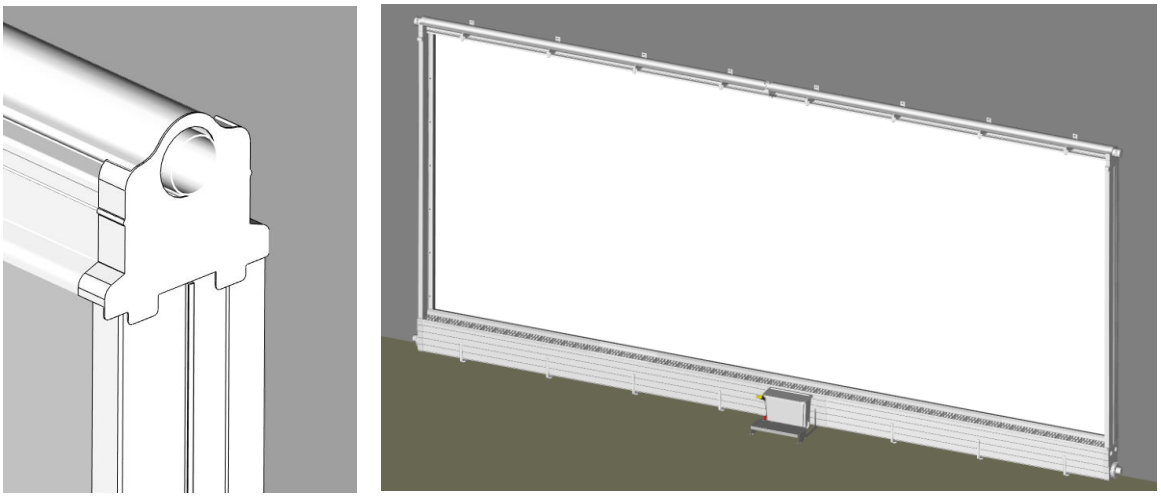
3.6.13. End cover/end cap for the water trough

Glue the end cap onto the end of the water trough. For adjustment of the end cover, first cut the end cover to the desired length. The maximum length of the end cover is 2,500 mm. The rule of thumb for cutting the end cover is: Length = Pad height minus 50 mm. 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.



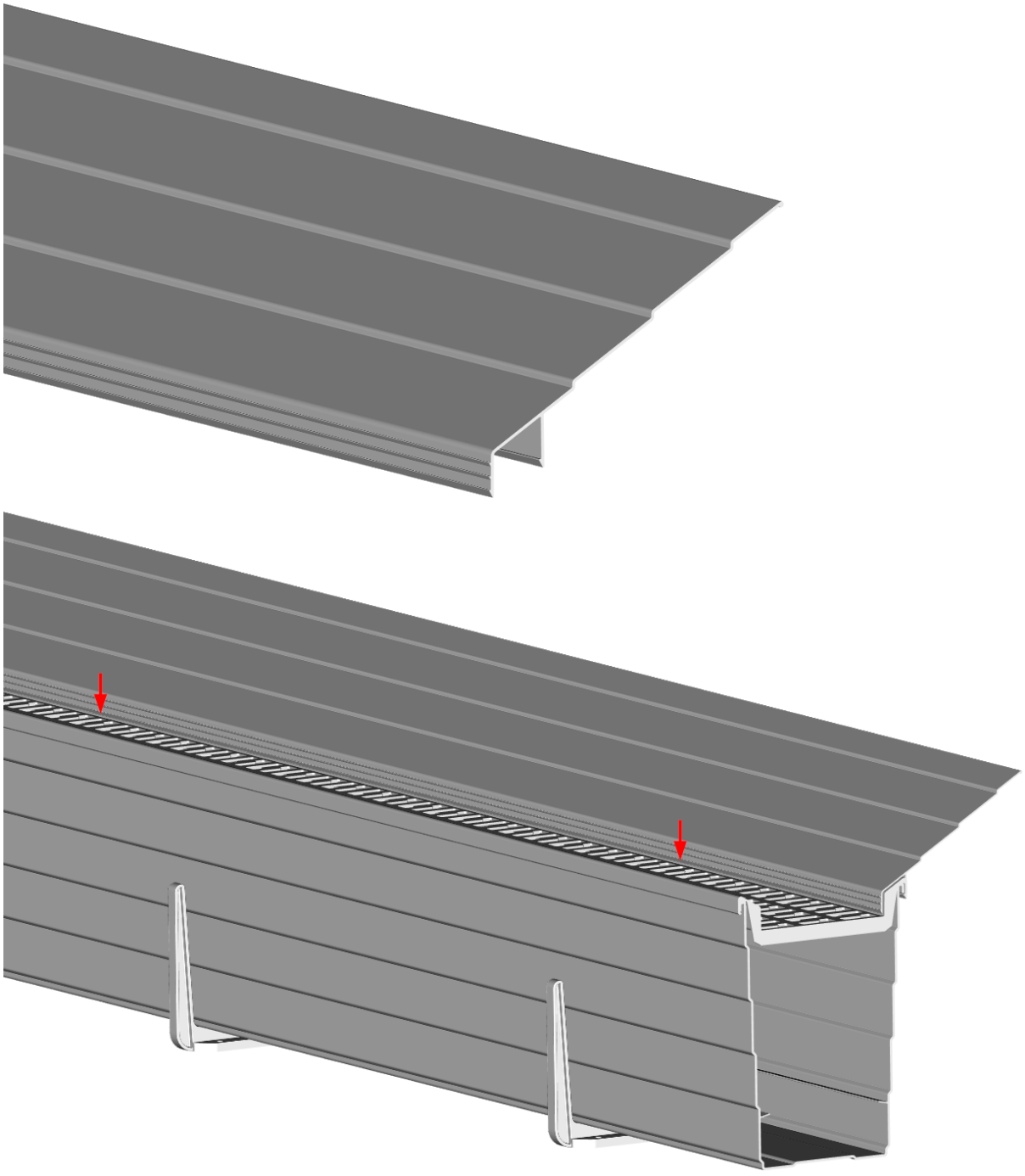
3.6.14. End cover of deflector

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.



3.6.15. Splash protection

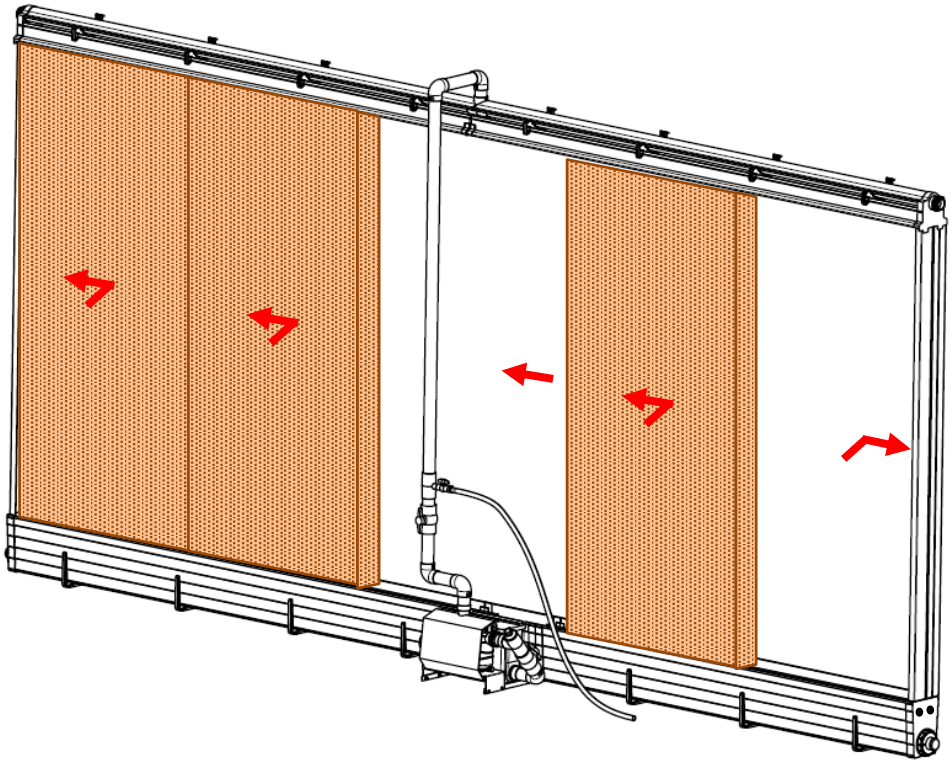
Some pad types/kinds may experience increased splash water. The “splash protection” may be installed optionally if necessary. It is simply plugged in between the trough cover and the pad (see figure below).



This is a plug-in assembly for which no glue is needed. The inserted pads must have a wall thickness of 100 mm ±1 mm (for 4“-systems) or 150 mm ±1 mm (for 6” systems) for a secure plug-in connection at the water trough.

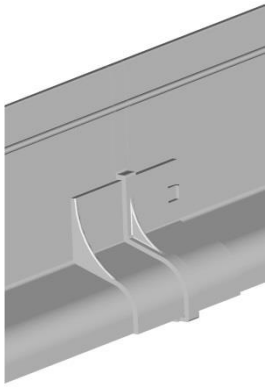
3.6.16. Insertion of the pads

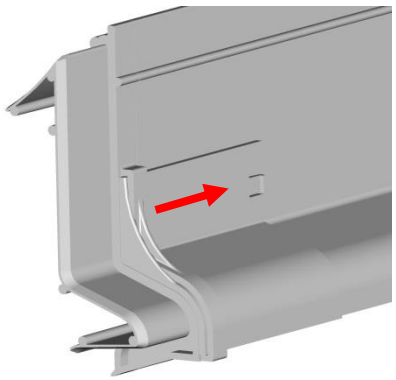
The first pad is pushed into the lateral end cover. Then the following pads are inserted flush against the previous one. The second-to-last pad is pushed into the opposite end cover, so that the last pad can be inserted into the still-open gap.
Once the pads are inserted, the front guide rails should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



3.6.17. Opening of the guide rail

In order to open the guide rail, move the slider sideways. Then the guide rail can be disconnected.





3.6.18. Instructions for the bleed off function



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

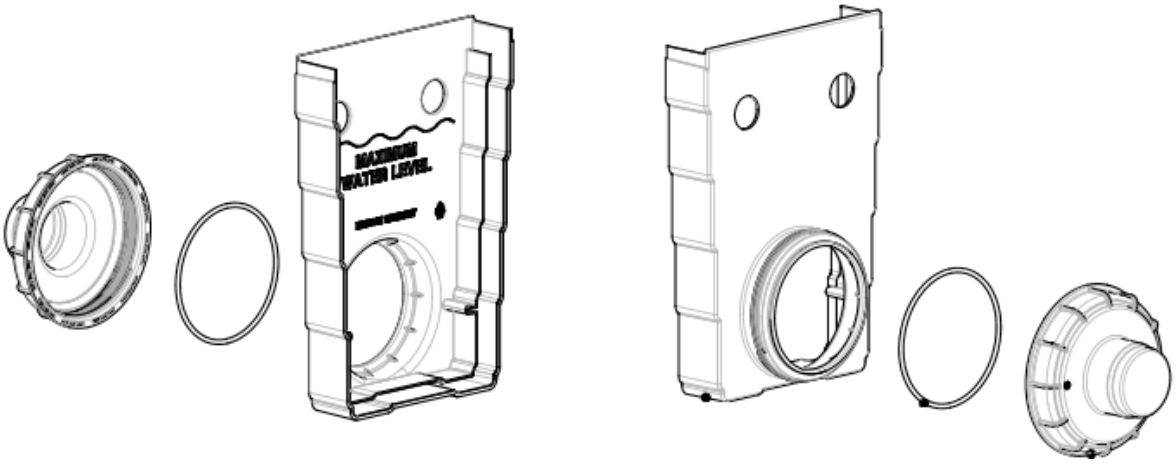
Continually drain 5% of the evaporating water, adjusted to the region and local water quality. This value should be increased at higher mineral contamination.

For example: If the float valve conveys 20 liters/minute, about 1 liter/minute should be drained additionally. An additional water dial may be installed in the supply line for measurement through the float valve.

The desired setting should be determined during commissioning by "calibration": With the system running, set the ½" ball valve so that a 5-liter bucket can be filled in 5 minutes (cf. example above).

3.6.19. End cover with overflow

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 20 cm or 7⁴/5 inch. 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

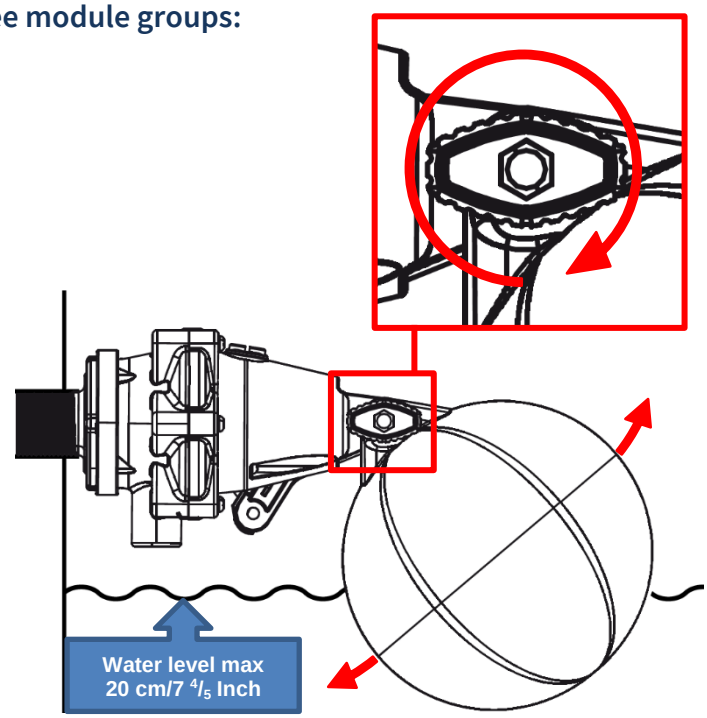
4.1. Concept of evaporation cooling

LUBING pad air conditioning 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. 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, a LUBING Pad Climate System offers the greatest economic use in areas where higher temperatures for longer periods are the default status.

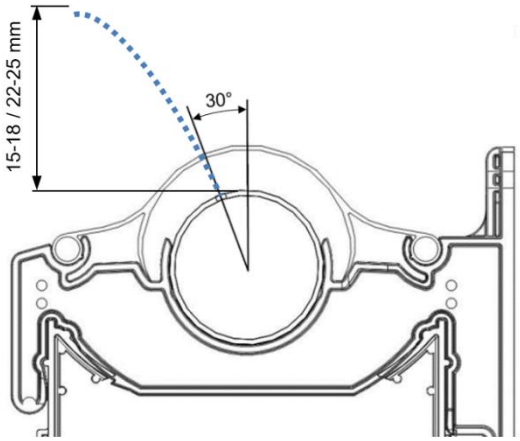
The LUBING Pad Climate System consists of three module groups:

- 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 water trough, measured from the bottom, is no more than 20 cm (7 $^{4}/_{5}$ in).
- 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 of 22 - 25 cm (8 -10 in) (measured from above the spraying pipe) is reached in the case of paper pads. A height of 15 - 18 cm (6 - 7 in) (measured from above the spraying pipe) should be reached in the case of 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. A share of up to 10% of the evaporating water can be continually released by the drain device in order to keep the mineral content within the desired range. The mineral occurrence on the pads generally should be observed. The higher this is, the more water should be replaced continually (on this, also see chapter 3.6.18).

	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 a fungus-resistant additive, which does not, however, reduce algae growth. Chlorine-based algicides (calcium hypochlorinate) may be used to counter algae growth, as they are also used in public pools. 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. ATTENTION! Permanent operation of the pad system causes the pads to soften.
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. Notices on national/international regulations

In accordance with the 42nd regulation on execution of the Federal Immission Protection Act (*Bundesimmissionsschutzgesetz*) (regulation on evaluation cooling systems, cooling towers, and wet separators - 42nd BImSchV), evaporation cooling systems must be subjected to regular inspections.
The precise procedure for this can be found in the corresponding regulation. Further regulations and laws may also be imposed in other countries. Please request information from the competent state authorities in the respective area of use.

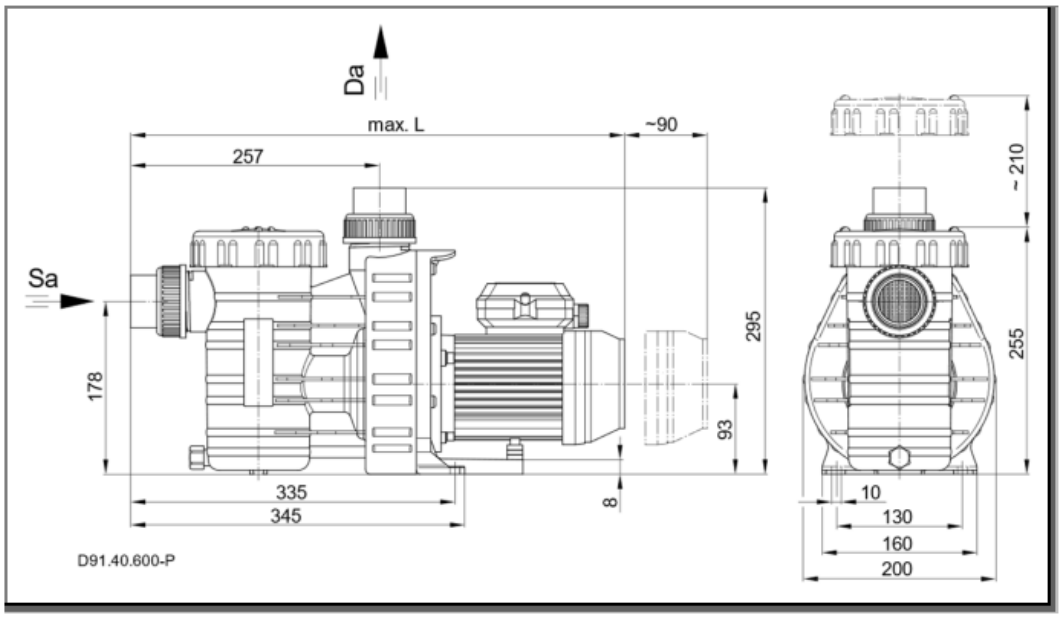
4.5. Troubleshooting

Problem	Possible reasons	Solution
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

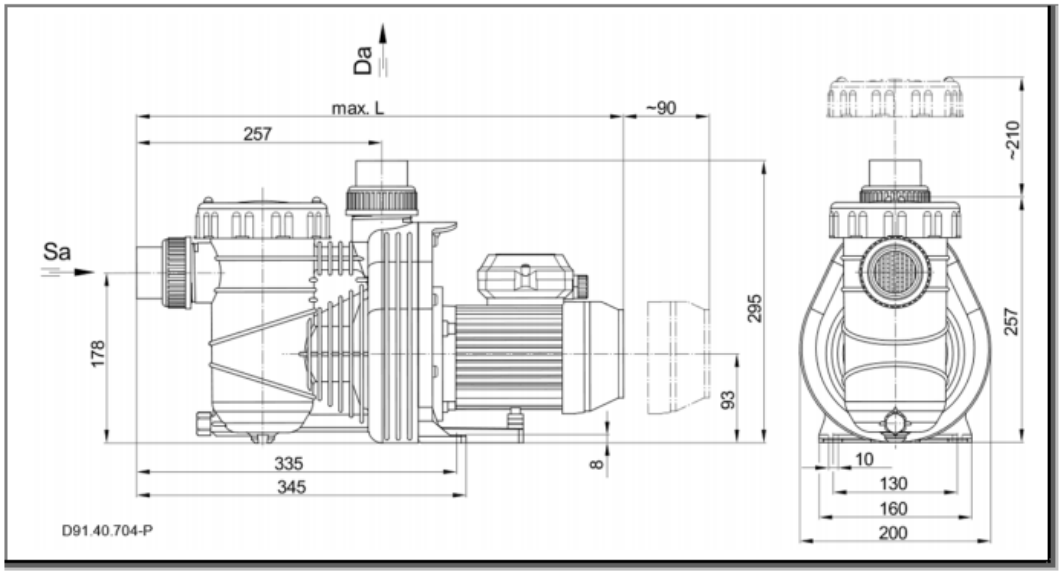
5. Technical data of the pump

5.1. BARKU AQUA 4 / BARKU AQUA 11

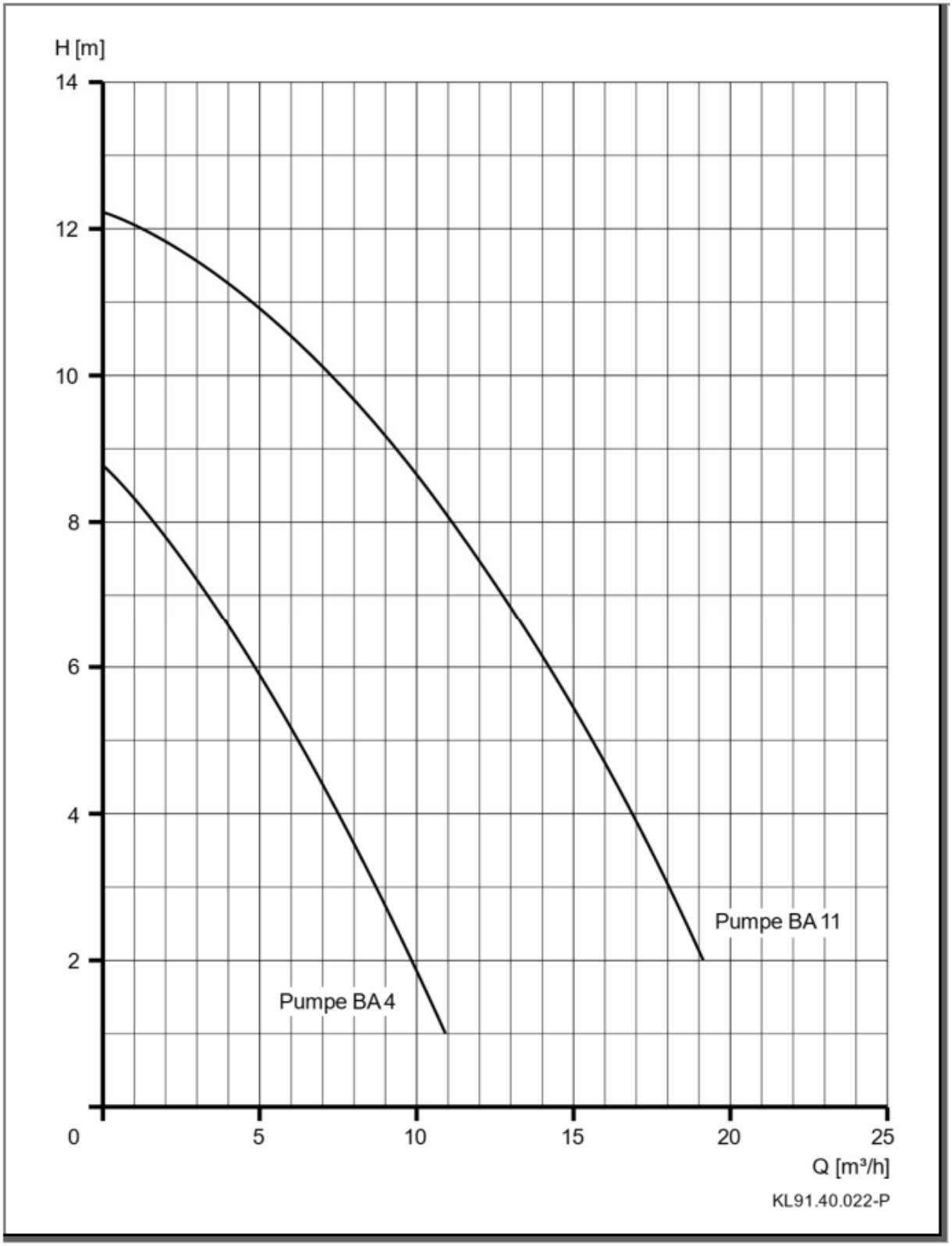
Pumpe BA 4



Pumpe BA 11



Technical changes reserved!


H [m]
14
12
10
8
6
4
2
0
5
10
15
20
25
Q [m³/h]
Pumpe BA 11
Pumpe BA 4
KL91.40.022-P

TD 50 Hz	Sa [mm]	Da [mm]	d-Saug [mm]	d-Druck [mm]	max. L 1~/3~ [mm]
Pumpe BA 4	50	50	50	40	495/536

1~ 230 V

TD 50 Hz	P_1 [kW]	P_2 [kW]	I [A]	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BA 4	0,35	0,18	1,95	-	-	6,50	●/○

3~ 400/230 V

TD 50 Hz	P_1 [kW]	P_2 [kW]	I [A] 3~ Y/Δ 400/230 V	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BA 4	0,38	0,18	0,80/1,40	-	-	9,10	○/○

TD 50 Hz	$H_{max.}$ [m]	SP	Hs [m]	Hz [m]	IP	W-Kl	n [min^{-1}]	T [°C]	P-GHI [bar max.]
Pumpe BA 4	8,80	●	2	3	55	F	2840	40(60)	2,5

TD 60 Hz	Sa [mm]	Da [mm]	d-Saug [mm]	d-Druck [mm]	max. L 1~/3~ [mm]
Pumpe BA 4	50	50	50	40	495/536

1~ 230 V

TD 60 Hz	P_1 [kW]	P_2 [kW]	I [A]	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BA 4	0,35	0,18	1,80	-	-	6,50	●/○

3~ 400/230 V

TD 60 Hz	P_1 [kW]	P_2 [kW]	I [A] 3~ Y/Δ 400/230 V	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BA 4	0,45	0,18	0,80/1,40	-	-	9,10	○/○

TD 60 Hz	$H_{max.}$ [m]	SP	Hs [m]	Hz [m]	IP	W-Kl	n [min^{-1}]	T [°C]	P-GHl [bar max.]
Pumpe BA 4	8,80	●	2	3	55	F	3430	40(60)	2,5

TD 50 Hz	Sa [mm]	Da [mm]	d-Saug [mm]	d-Druck [mm]	max. L 1~/3~ [mm]
Pumpe BA 11	50	50	50	40	510/536

1~ 230 V

TD 50 Hz	P_1 [kW]	P_2 [kW]	I [A]	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BA 11	0,69	0,45	3,20	-	-	7,60	●/○

3~ 400/230 V

TD 50 Hz	P_1 [kW]	P_2 [kW]	I [A] 3~ Y/Δ 400/230 V	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BA 11	0,68	0,45	1,25/2,15	-	-	9,10	○/○

TD 50 Hz	$H_{max.}$ [m]	SP	Hs [m]	Hz [m]	IP	W-Kl	n [min^{-1}]	T [°C]	P-GHI [bar max.]
Pumpe BA 11	12,2	●	2	3	55	F	2840	40(60)	2,5

TD 60 Hz	Sa [mm]	Da [mm]	d-Saug [mm]	d-Druck [mm]	max L [mm] 1~ 230 V	max L [mm] 3~ 400/230 V	max L [mm] 1~ 115 V	max L [mm] 3~ 346/200 V
Pumpe BA 11	50	50	50	40	510	536	510	536

1~ 230 V

TD 60 Hz	P_1 [kW]	P_2 [kW]	I [A]	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BA 11	0,69	0,45	3,00	-	-	7,60	●/○

3~ 400/230 V

TD 60 Hz	P_1 [kW]	P_2 [kW]	I [A] 3~ Y/Δ 400/230 V	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BA 11	0,68	0,45	1,10/1,90	-	-	9,10	○/○

1~ 115 V

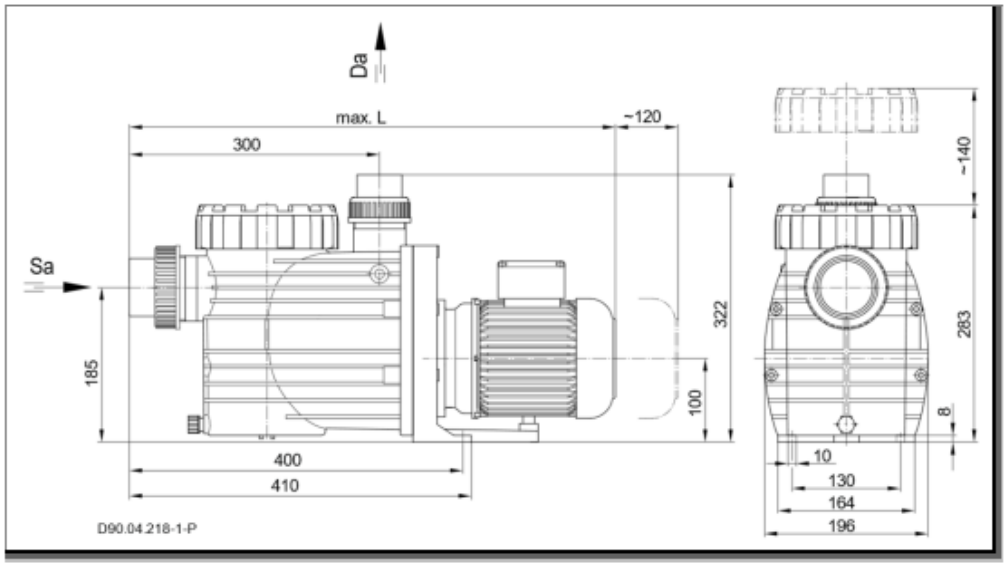
TD 60 Hz	P_1 [kW]	P_2 [kW]	I [A]	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BA 11	0,95	0,55	10,0	-	-	8,10	○/○

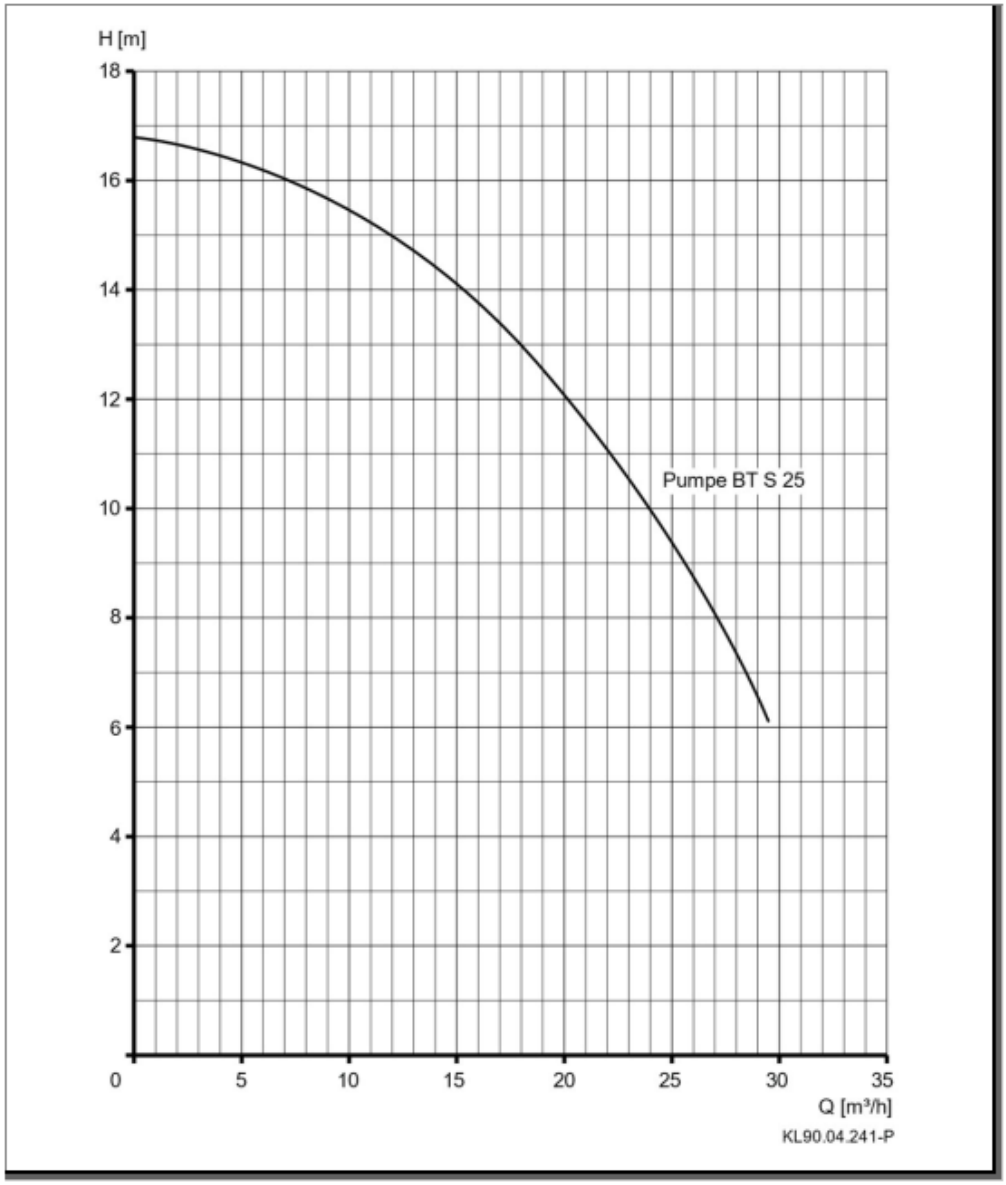
3~ 346/200 V

TD 60 Hz	P_1 [kW]	P_2 [kW]	I [A] 3~ Y/Δ 346/200 V	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BA 11	0,69	0,45	1,40/2,40	-	-	10,1	○/○

TD 60 Hz	$H_{max.}$ [m]	SP	Hs [m]	Hz [m]	IP	W-Kl	n [min^{-1}]	T [°C]	P-GHl [bar max.]
Pumpe BA 11	12,2	●	2	3	55	F	3430	40(60)	2,5

5.2. BARKU Top S25





TD 50 Hz	Sa [mm]	Da [mm]	d-Saug [mm]	d-Druck [mm]	max. L 1~/3~ [mm]
Pumpe BT S 25	63	50	63	50	615/635

1~ 230 V

TD 50 Hz	P_1 [kW]	P_2 [kW]	I [A]	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BT S 25	1,70	1,30	7,40	-	-	16,5	●/○

3~ 400/230 V

TD 50 Hz	P_1 [kW]	P_2 [kW]	I [A] 3~ Y/Δ 400/230 V	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BT S 25	1,65	1,30	3,20/5,54	-	-	15,0	○/○

TD 50 Hz	$H_{max.}$ [m]	SP	Hs [m]	Hz [m]	IP	W-Kl	n [min^{-1}]	T [°C]	P-GHl [bar max.]
Pumpe BT S 25	16,8	●	3	3	55	F	2840	40(60)	2,5

TD 60 Hz	Sa [mm]	Da [mm]	d-Saug [mm]	d-Druck [mm]	max. L 1~/3~ [mm]
Pumpe BT S 25	63	50	63	50	615/635

1~ 230 V

TD 60 Hz	P_1 [kW]	P_2 [kW]	I [A]	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BT S 25	1,75	1,30	7,80	-	-	16,5	●/○

3~ 400/230 V

TD 60 Hz	P_1 [kW]	P_2 [kW]	I [A] 3~ Y/Δ 400/230 V	Lpa (1m) [dB(A)]	Lwa [dB(A)]	m [kg]	WSK/PTC
Pumpe BT S 25	1,70	1,30	3,20/5,54	-	-	15,0	○/○

TD 60 Hz	$H_{max.}$ [m]	SP	Hs [m]	Hz [m]	IP	W-Kl	n [min^{-1}]	T [°C]	P-GHl [bar max.]
Pumpe BT S 25	16,8	●	3	3	55	F	3400	40(60)	2,5

Glossary	
TD	Technical data
Sa	Inlet connection
Da	Outlet connection
d-Saug	Recommended diameter for the suction line from 5 m
d-Druck	Recommended diameter for the pressure line from 5 m
max. L	Maximum length of the pump
D	Density
P_1	Power input
P_2	Power output
I	Rated current
Lpa (1 m)	Sound pressure level at 1 m measured in accordance with DIN 45635
Lwa	Acoustic capacity
m	Weight
WSK	Built-in or external overload switch
PTC	PTC resistor
$H_{max.}$	Total dynamic head
SP	Self-priming
Hs; Hz	Geodetic head between water level and pump
Hs	Total suction head
Hz	Total dynamic head with flooded suction
IP	Type of motor enclosure
W-Kl	Class of insulation
n	Motor speed
P-GHI	2.5 bar max. casing pressure/system pressure
T	Water temperature
●	Yes
○	No
T/°C	Clarification of the max. water temperature 40 °C (60 °C): 40 °C = the max. water temperature allowed according to the GS approval. (60 °C) = the pump is designed to withstand a max. water temperature of 60 °C.
1~/3~	Suitable for continuous operation at 1~ 220 - 240 V ± 5% 3~ Y/Δ 380 - 420 V/220 - 240 V ± 5% 3~ Y/Δ 660 - 725 V/380 - 420 V ± 5% For standard voltage in accordance with DIN IEC 60038; DIN EN 60034

For special voltages and/or the 60 Hz version, the performance data can be taken from the pump name plate. With some special types or motors there is no GS approval – GS approval on pump name plate where applicable.