Dear customer

Thank you very much for your order placed with us.

In order to provide the correct general regulations for the installation of your new machinery and to ensure a smooth process, we would like to supply you with various advice and instructions. Please adhere to the following installation instructions and forward them to your persons responsible for building services, if necessary.

With best regards

Herbert Kannegiesser GmbH

Installation instructions

Table of Content

1. General regulations for a successful installation and commissioning

- Sufficiently paved roads, free access and exit to/from factory premises as well as storage space for machines, lorries, cranes, fork-lifters, scrap bins and cars must be ensured on site.
- Upon delivery of machines, waste containers have to be provided at site for the disposal of packaging material and transport means such as transport securing devices, screw connections, beams, pallets etc.
- Accessibility of assembly personnel and equipment to installation site must be ensured.
- The building must be completely closed.
- During idle period, the building must be secured against access by third parties (lockage windows, doors, gates, etc.). If the building is not secured, the appropriate security must be ensured against for example vandalism, theft, etc.
- The load-bearing capacity of the ground for machine locations and machine entries must be guaranteed for installation.
- The possibility of fixing machines and systems to the construction on site must be ensured in advance.
- All constructional measures specified by Kannegiesser, such as pits, floor inlets, platforms, etc. must be finished before installation starts.
- Particularly in winter, heating of the building must be provided.
- The building is sufficiently illuminated and ventilated.
- Sufficient sanitary facilities for the assembly personnel shall be provided.
- For assemblies lasting several days, a lockable room to store tools as well as a dressing room for technicians have to be provided. If necessary, a suitable container is to be rented.
- Prior to installation, the technicians must be given a safety briefing (e.g. escape routes, position of fire extinguishers, emergency phone numbers, coordination with other constructions).
- Power consumption must be available on site at the beginning of the installation.
- Power connection with approx. 63 A, 3x400V 50 Hz, PE must be available at the beginning of the press assembly, at least temporarily, when starting the water extraction press up.
- Those involved in the project must be invited to periodical site meetings.

- It must be ensured that the fitting companies responsible for electrics, steam, condensate, gas, compressed air, supply/exhaust air, data processing, washing chemicals, etc. respect the previously agreed assembly schedule.
- All legally required permissions for constructional or assembly measures must be obtained from the customer.
- At the beginning of the commissioning, the test- and customer laundry requested by Kannegiesser must be available, as well as the required operating personnel.
- During project implementation, adequate operational technicians are mandatory for training and instruction.
- The detergent technician must be invited and made available at the start of the commissioning.
- Cleaning and maintenance of the machines after commissioning must be provided.
- The completion of the media supply must be ensured according to the schedule to be issued together with Kannegiesser.
- Lifting devices and work equipment as below must be provided for assembly; detailed information shall be coordinated with the Kannegiesser project team :
    - crane
    - fork-lifter
    - electric lift trucks
    - scissor platforms
    - heavy-duty telescopic lift for platform installation
    - Floor covering plates inside and outside (placed above channels, pits or areas with insufficient load capacity)
    - Equipment for load-bearing or load distribution with insufficient load-bearing capacity
    - Carriages, covering plates, construction columns, etc.

- Supports must be additionally used at site for access paths in the basement when installing or removing machines, e.g. for replacement purposes of an extraction press.
- In the case of scrapping machines or machine lines on site, scrap bins and storage areas must be ordered and made available. If necessary, it must be ensured that the assembly schedule is forwarded to the scrap dealer.
- After machine installation, the goods must be protected from moisture, dust and other soiling.

2. Safety fences

2.1 Safety fence for ironer lines

Under current regulations and to secure a safe operation of the ironer line, it is mandatory that there is a fencing on site between feeding unit and ironer or between ironer and folding machine, respecting the local standards valid at that time. This fencing can be quoted by Kannegiesser as an option.

2.2 Safety fence for lift conveyors, shuttles and lift-shuttle conveyors

Under current regulations and to secure a safe operation of the lift conveyor, the shuttles and the lift-shuttle conveyor, it is mandatory that there is a fencing to be installed on site. The corresponding door key system will be supplied by Kannegiesser. This fencing can be quoted by Kannegiesser as an option.

3. Tunnel washers

3.1. Setting up the machine

Place the machine on a sufficiently load bearing and level concrete floor. It is also possible to set up the machine on a base having a sufficient load bearing capacity - e.g. on a steel structure.

Adhere to the following:

- Information in section "Technical data"
- Information in chapter "Transport and stability"
- Installation drawing
- The space requirement for service work and operation. Provide a safety perimeter of minimum 0.5 meters around all accessible machine parts, on the operating side 1 meter, to the top 1.3 meters.
- The space requirement at the guards in the infeed and outfeed area
- The position in relation to the supply and return connections (three-phase current, water/process water, air, steam).
- For unloading the machine, use a crane with a transport traverse bar. Ensure that the machine is suspended horizontally in the crane during unloading.

Only remove the transport safety devices when the machine is positioned on the intended installation site.

3.2 Spatial reflection

Walls, ceilings and floors reflect the sound directly emitted by the machine. The reflection is added to the directly emitted sound. To reduce the spatial reflection and the sound level at the workplace:

- Install the machine in a room with high ceiling.
- If the walls or ceilings are made of sound-reflecting materials: Attach materials to ceilings or walls that absorb the sound.
- Install noise protection walls
- Sound emission by air flow
- Install compressed air mufflers

3.3 Required utilities connections

The installation, routing and connection of all lines to the machine (including the required locking valves) as well as the power supply lines to the switch cabinets are the responsibility of the customer and are not part of the delivery scope!

For positioning the respective utilities connections (cold water, exhaust water, steam, compressed air and exhaust air), please refer to For the position of the respective medium connection (cold water, exhaust water, steam, compressed air and exhaust air), please refer to your installation plan!your installation plan!

3.3.1 Electrical connection

How to carry out the electrical installation:

- Have the electrical connections at the switch cabinet carried out in line with the regulations by an electrician (200 - 600 VAC, see wiring diagram).
- Establish the connection to the controls of the adjacent machines (see wiring diagram).
- Check the function of all protection devices/guards (Emergency Stop switches, light barriers, protection relays, earth resistor etc.) and adjust the protection devices/guards, if necessary.
- Test all control and measuring systems

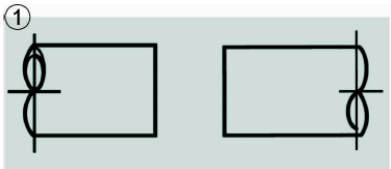
3.3.2 Water

Connect the machine to the water supply (cold soft water) and take note of the following instructions:

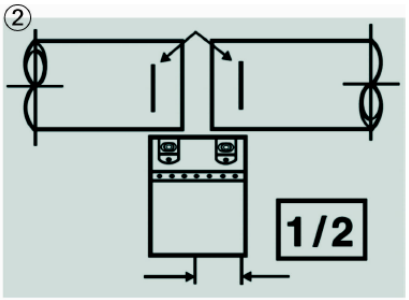
- A customer-supplied manual locking valve and a dirt trap must be installed directly upstream of the machine.
- Water pressure 0,2 - 0,4 Mpa flow pressure!

Assembly instructions for NORMA CONNECT clamp fittings
Adhere to the following information if NORMA CONNECT clamp fittings are used for assembly:

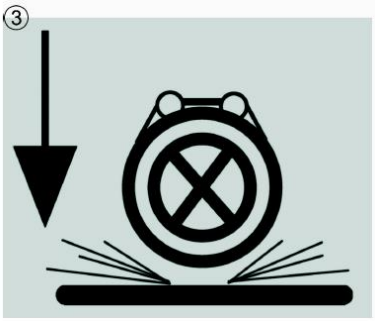
- Check pipe ends. Remedy damage in the area of the sealing lips, such as burrs, longitudinal grooves, cracks etc. and remove coatings, such as paint, rust etc.



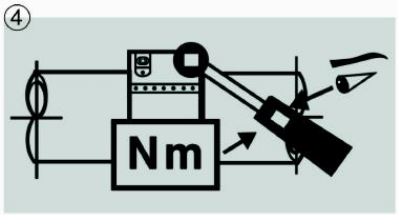
- Mark half of the coupling width on both pipe ends (2).



- If applicable, remove transport securing elements and remove possible dirt particles from the sealing surface. Do not dismantle the coupling! Do not drop the coupling!



- Then slide on the coupling and align with the marks on the pipe ends. Slightly tighten the screws alternately using a ratchet or screwdriver. Stop turning the coupling once the coupling teeth are in engagement with the pipe. Use a dynamometric key to alternately tighten the screws.



Attention:
Never exceed the tightening torque specified for the plug screws. In the event of leaks encountered after assembly, dismantle the coupling and focus again on points 1 to 4 (note: cleanliness of the sealing areas and pipe surfaces.)

Torque	
Size	Torque (Nm)
EP 26,9	10
EP 33,7	10
EP 38,0	15
EP 48,3	15
EP 60,3	20
EP 76,1	30

3.3.3 Waste water

Connect the machine to the water supply and take note of the following instructions:

- Ensure that the specified nominal width of the pipework is not reduced at any point.

3.3.4 Steam

Connect the machine to the steam supply and take note of the following instructions:

- A customer-supplied manual locking valve must be installed directly upstream of the machine!

High-pressure steam connection:	See installation drawing!	
Steam pressure (high-pressure):	All types:	0,25 0,8 Mpa (2,5 - 8bar)
Low-pressure steam connection:	All types:	upon request
Steam pressure (low pressure):	All types:	0,1 - 0,24 Mpa (1 - 2,4 bar)
Other heating media:	upon request	

3.3.5 Compressed air

Connect the machine to the compressed air supply and take note of the following instructions:

- Connect the compressed air line directly to the air servicing unit of the machine (stop cock required on site!). Ensure a sufficient line cross section (at least R 1/2"), particularly for greater distances to the compressor.

Connection line:	See installation drawing!	
Air pressure:	All types:	0,60 MPa (6,0 bar)
The compressed air may be unoiled.		

3.3.6 Exhaust air

The machine can be optionally equipped with an exhaust air connection. The exhaust air ventilator is equipped with a throttle valve. If required, this throttle valve can be used to set the exhaust air quantity.
Connect an exhaust air line to the machine.

Please take note of the following instructions:

- Provide a sufficient pipework cross section (minimum diameter 200 mm = size of connector socket).
- Never reduce the cross section of the exhaust air line.
- Enlarge the pipe cross-section if the pipe is more than 5m or when using more than 2 pipe-angles! Ensure that accumulation lines have a larger cross section than the sum of all connection piece cross sections.

Bends:

- Provide a sufficient pipework cross section (minimum diameter 200 mm = size of connector socket).
- Ensure that the exhaust air line is routed as short and straight as possible to the open! Every change of direction will increase the resistance! Sharp knees or angles will particularly increase the aerodynamic resistance.
- Ensure a minimum radius for bends of 0.5 x D (pipe diameter).

Ends:

- If the exhaust air line is guided upwards to the open, a cover must be fitted on top of the exhaust air pipe. A Meidinger disk, the diameter of which is twice the pipe diameter, has proven as a cover and must be fitted at a distance of 0.5 x D above the exhaust air line end. This will prevent an increase in aerodynamic resistance by turbulence.
- Ensure that the exhaust air line is routed as short and straight as possible to the open! Every change of direction will increase the resistance! Sharp knees or angles will particularly increase the aerodynamic resistance.
- Do not install strainers or louvres as an end of the exhaust air line!

3.3.7 Chemicals

Recommended chemical connections

Detergents / Auxiliary washing agents	Media box LH-steam side	Media box RH	Outer drum -"10 o'clock"-positions
Detergents / Auxiliary washing agents	X	X	XX
Alkali intensiyer	X	X	XX
Tenside mix	X	X	XX
Softener	X	X	XX
Acid	X	X	XX
Peracid	-	X	XX
Active chlorine	-	XX	-
Starch	X	X	XX

XX	Preferred chemical connection
X	Dosage admissible
-	Dosage prohibited

3.4 Required utilities quality

The water, steam and compressed air quality provided by the customer must comply with the generally accepted state of the art. The following limit and reference values apply:

3.4.1 Fresh water

At the entrance of the machine, the following fresh water quality is demanded:

- Iron content max. 0.1 mg/l
- Copper content max. 0.05 mg/l
- Manganese content max. 0.03 mg/l
- Chloride content max. 200 ppm (water should not react corrosive)
- Total Ca/Mg hardness max. 0.1 mmol/l Ca/Mg alkaline earth ions (0.56 °dH / 1 °f / 0,7 °E)
- Carbonate hardness to be considered in the wash process (> 15 °dH can cause problems)
- Check the conductivity of fresh water regularly (if necessary, adjust processes and chemical dosing accordingly)
- Hygiene max. 100 cfu/ml, no pathogenic germs, no spores

3.4.2 Steam

At the entrance of the machine, the following steam quality is demanded:

- Conditioned soft water and boiler water according to DIN EN 12953-10:
    - o Conductivity of boiler water : Advised = 3.500 µS/cm, limit = 6.000 µS/cm
    - o Conductivity of condensate : < 10 µS/cm
- Iron content max. 0.1 mg/l
- Flow rate max. 25 m/s
- For the use of district heat, the same requirements are valid as for fresh water.

3.4.3 Washing liquor

The following washing liquor quality is demanded inside the machine:

- Active chlorine content max. 250 ppm
- Active oxygen content max. 500 ppm
- Wash temperature 40-95 °C
- pH value in the washing area > 7, in the neutralization chamber > 5.5
- Check the conductivity difference between the fresh water and the extraction liquor regularly (delta > 1000 µS/cm can lead to problems)

3.4.4 Compressed air

Adhere to the following compressed air quality according to ISO 8573-1:2010, class 7.4.4:

Class	Solid particles Mass concentration [mg/m3]	Water Pressure condensation point steam [°C]	Oil Total oil ratio (liquid, aerosol and fog) [mg/m3]
1			
2			
3			
4		⩽ +3	5
5			
6			
7	5-10		

3.5 Advice for gas-heated batch washing lines

During commissioning of gas-heated batch washing lines, control measurements concerning gas emissions are required on site to be able to provide inspection reports and certificates for the gas burners by respecting special rules and regulations, in particular local and regional directives, ordinance on firing installations as well as instruction of legal gas suppliers.

KANNEGIESSER does not have to render these services which are therefore not included in the quoted price.

It is recommended to get in contact, duly in time of planning, with the relevant gas supplier or specialist as well as with the local authorities. An adjustment of the burner can be carried out by Kannegiesser, but has to be quoted separately.

In case of conduct by the customer of a gas-heated batch washing line contrary to the above and damages might occur hereby, the customer holds KANNEGIESSER and members of the KANNEGIESSER Group free and harmless of any claims from a third party, in particular claims for compensation, regardless legal grounds and laws.

4. Dryers

4.1 Setting up the machine

When selecting and equipping the installation site, please adhere to the following:

- Guide the dryer exhaust air to the outside, otherwise the likelihood of the following hazards may increase: The concentration of unhealthy gases, the generation of inflammable dust, the danger of poisoning and explosion.
- Never store flammable material near the dryer, e.g. aerosols.
- Never spray aerosols near the dryer.
- Never operate gas-heated dryers in the same room as chemical cleaning machines.

The dryer can be mounted in the following two ways:

- Screwed with steel beam (platform installation)
- Fastened in concrete with adhesive anchor (pedestal installation)

The supplied adhesive anchor cartridges are approved for undrawn concrete with a compressive strength class higher than C20/25. If type of concrete does not comply with these requirements, provide a suitable fastener on site, such as dowels

4.2 Gas-heated dryers

4.2.1 General

Never operate gas-heated dryers in the same room as chemical cleaning machines. Chlorinated hydrocarbons, even excessively diluted, lead to the formation of hydrochloride acid in gas heaters.

Corrosion damage will occur within a brief period (even on "rust-proof steel") and laundry items will be damaged. Only allow an authorized expert to carry out connection work taking the relevant regulations at the installation site into account. The customer-supplied gas supply line must be equipped with an equipotential bonding device. Do not operate the dryer outdoors. The dryer is only suitable for operation in closed and sufficiently vented rooms. For installation observe and adhere to the specifications in the dimension and data sheets as well as the assembly and installation instructions. Prior to first start-up and after modifications on the exhaust gas (exhaust air) system, have the machine line inspected according to DVGW G631 by the appropriate authorities. Outside Germany, observe and adhere to the technical regulations valid for the country of destination. Ensure that the burner is only operated with the types of gas specified on the machine type plate. Ensure that the gas connection pressure does not exceed the admissible connection pressure.

4.2.2 Exhaust air ducting

The gas-heated PowerDry is seen as industrial process system according to EN 746-2 and does not require DVGW certification (German association for gas and water). All series comply with the relevant regulations/directives.

Due to the respective burner capacities, a certain proportion of exhaust gas per hour is generated by stoichiometric combustion of gas. This proportion is included in the process air of the dryer. The air and exhaust gas mixture is extracted via the ventilator and transported to the outside by means of the exhaust air line to be installed on site.

The air and exhaust gas mixture, which is defined in the DVGW sheet G 631 A, is to be classified as exhaust gas, and not as exhaust air. The exhaust gas must be properly discharged via exhaust gas line/exhaust gas system.

The relevant standards, such as DIN EN 1443, DIN EN 15287 - 1 are to be considered. We recommend to instruct an expert company for technical execution.

A certified district chimney sweep must be contacted.

Pipe system made of metal tubes to discharge exhaust gas must be state of the art. Only use certified chimney pipes. We recommend the use of corrosion-resistant stainless steel when selecting the material of the exhaust gas pipes. For D series, exhaust air temperature is max. 140°C. When selecting components, consider the corresponding directives according to the respective state building regulations.

An insulated pipe construction is advantageous to avoid that condensate is formed in the exhaust air pipe as far as possible. Exhaust gas emerging into the room is not admissible.

The exhaust path control is required. Prior to the installation of the exhaust gas system, the suitable check and control openings must be adjusted by a certified district chimney sweep. Have the exhaust path control checked once per year according to the pertinent regulations.

Dryers are not subject to the 1st federal immission control act Germany (cf. §1, Para 2 No. 2 1. BlmSchV) and therefore no exhaust gas loss or immission measurement (CO) is prescribed (German chimneys sweeper and control act KÜO of 16 June 2009).

Further technical information on exhaust air and exhaust gas hygiene is available from the factory on request. Please contact your local Kannegiesser representative if required.

4.2.3 Exhaust air line

Along with the escape air, flue gases are exhausted through the exhaust air line. For this reason, we recommend that the exhaust air line is designed as follows:

- For technical execution, we recommend an exhaust air system supplier (e.g. Westaflex Gütersloh/Germany) and/or a local specialized crafts enterprise. The inside pipes should be made from stainless steel quality Cr Ni 18 8, in particular material no. 1.4571. Low alloy steel and/or galvanized finishes are less suitable due to the corrosion susceptibility and the expected lower service life. Final selection of the components is at owner's discretion. Consider especially the corresponding directives according to the respective state building regulations.
- Seal all cutting points or seams. Use temperature-resistant sealing material, e.g. silicone glue or sleeves.
- Provide control openings for exhaust path controls. (Position and size according to responsible sweep association/guild).
- Do not cover blow-out opening on roof with sieves or screens or similar.

Technical data

For the technical data regarding the exhaust air connection, please refer to the machine data sheet.

General design regulations

Multiple versions are possible depending on the local conditions.

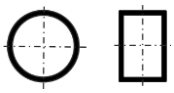
Admissible length of the escaping air pipework

Route the escaping air pipework in a straight line and on the shortest way to the outside. Please refer to the machine data sheet for the maximum back pressure.

Several machines

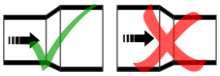
Never connect several machines to one escaping air pipework. Always install one escaping air pipework for each machine.

Cross section



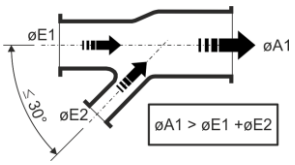
The cross section of the piping may be rectangular or round. We recommend using pipes with a round cross section.

Diameter



The diameter of the escaping air pipework must not decrease in the flow direction.

Junctions

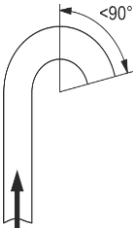


Junctions must not be fitted at an angle larger than 30° in the flow direction. Try to avoid Y-tubes. The starting diameter must be larger than the sum of the inlet diameters.

Gradient in flow direction
The gradient in the flow direction may be between 1:100 until 1:200.

Directional changes
Only change directions in small increments. Use pipe bends with a large radius.

End of the escaping air pipework



Do not end the escaping air pipework with sieves or screens and install a drainage assembly. If the ends point upwards, install a Meidinger disc or end with a pipe bend <90°.

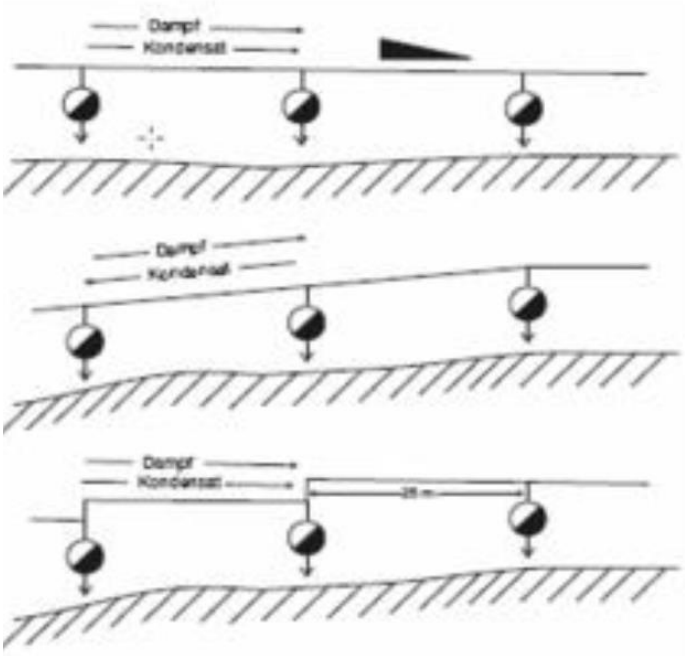
4.3 Steam-heated dryers

4.3.1 General

To prevent scalding by steam, only allow steam technology experts to carry out the steam installation at the customer's premises. All seals must be suitable for steam and pressure of up to 16 bar.
The machine owner/user is responsible for the connection line installation. The machine is delivered ready to be connected including flange and counter flange.

4.3.2. Route the steam pipework with a descending gradient

Route the steam line in the flow direction with the gradient 7, between 1:100 and 1:200.
Provide additional condensate lines for pipe sections longer than 25m.



"correct"
standard installation

"wrong"

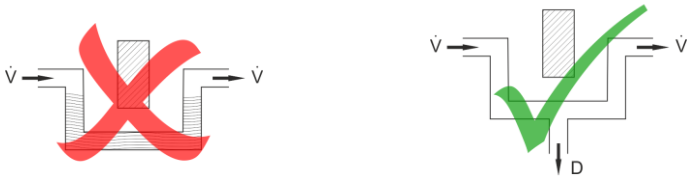
"correct"
installation with gradient in flow direction or for larger height difference

Source: Spirax Sarco GmbH

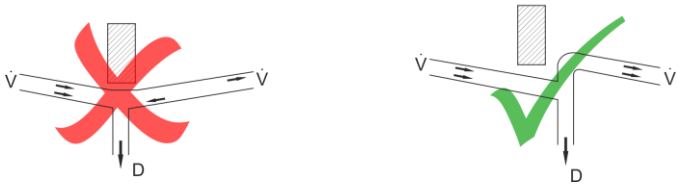
4.3.3 Routing of steam line

Observe the general rules for the routing of steam pipework:

- Ensure that water extraction points are always at all lowest points in the line:



- Route the steam line in the flow direction with a descending gradient. The descending gradient should be between 1:100 to 1:200.



- If the ground rises in the flow direction, install short vertical pipes. In this manner, a saw-tooth cable guide is created when a longer supply line is fitted. Drain the steam line every 25 to 50 meters (27 to 55 yd.).

4.4 Required utilities connections

4.4.1 Compressed air

Compressor performance
The capacity of the compressor should be 20% to 30% higher than the compressed air consumption of the machine to ensure malfunction-free operation.

Supply line material
Install a supply line made of galvanized steel pipe or copper pipe to prevent rust from entering the compressed air system of the machine during operation.

Supply line diameter

Length of supply line	Diameter
<= 10 metres	1/2"
> 10 metres	3/4"

Prior to connecting the machine, fit an air shut-off valve. Use a compressed air hose to connect the machine with the supply line to prevent the transmission of vibrations. The hose should have a length of approx. 400 mm (15.75 in.) and the same cross-section as the supply line.

4.4.2 Escape air and exhaust air

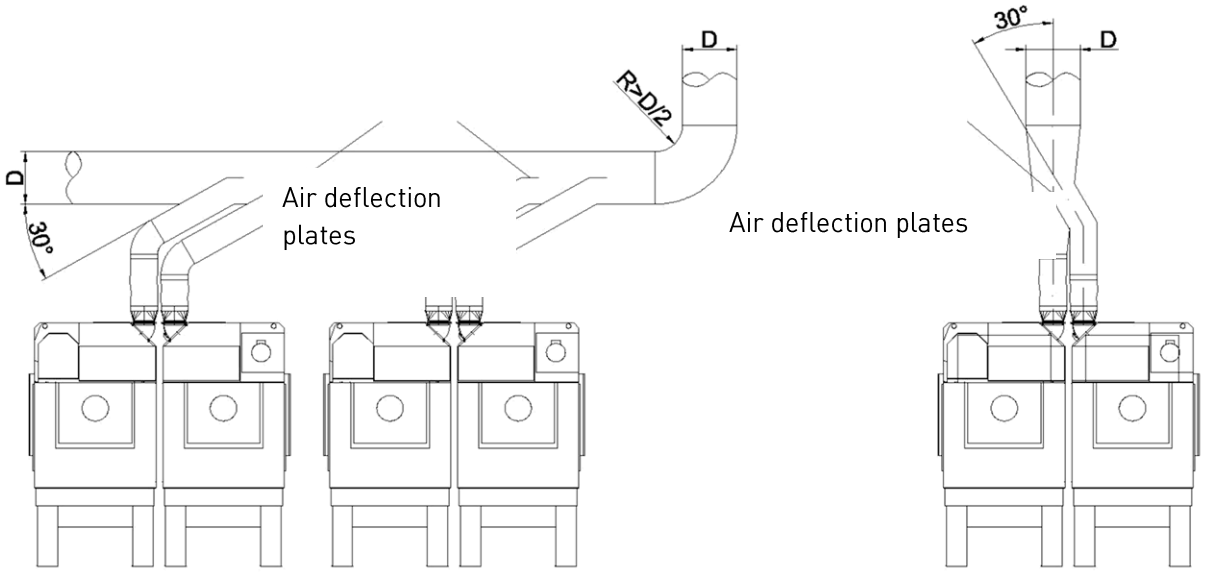
4.4.2.1 Exhaust air line

Please observe the following installation regulations:

- The best drying result is achieved with a separate exhaust air line as short as possible without any pipe bends.
- The pipe diameter of the exhaust air line is defined by the cross section of the exhaust air socket on the device and may not be selected smaller.
- For pipe lengths of more than 5m or more than two pipe bends in the exhaust air line, use the next larger pipe diameter.
- When selecting a pipe bend, the inner radius R must be at least half the pipe diameter D.

- If several dryers are connected to one exhaust air line, the cross section of the accumulation line must be at least the same size as the sum of all connecting cross sections, or refer to the diameter of the accumulation line as per table.
- Single lines should hit accumulation line at an angle of max. 30°, to prevent the dryers from being influenced by each other. The air flow should be protected by an air guide plate.
- If the exhaust air line has to be discharged upwards and below the ceiling, the lowest point directly at the dryer shall be provided with a condensate drain.
  The condensate is collected in a container or discharged through a hose line.
- If the exhaust air above the roof or outside on the wall is to be terminated, the so-called Meidinger disc is a simple solution with minimal resistance. Never cover blow-out opening with sieves or screens.

Number of dryers		**1**	**2**	**3**	**4**	**5**	**6**
Min. diameter D of accumulation line	**DII40-120**	400	560	710	800	900	1000
	DII175/220	500	710	900	1000	-	-

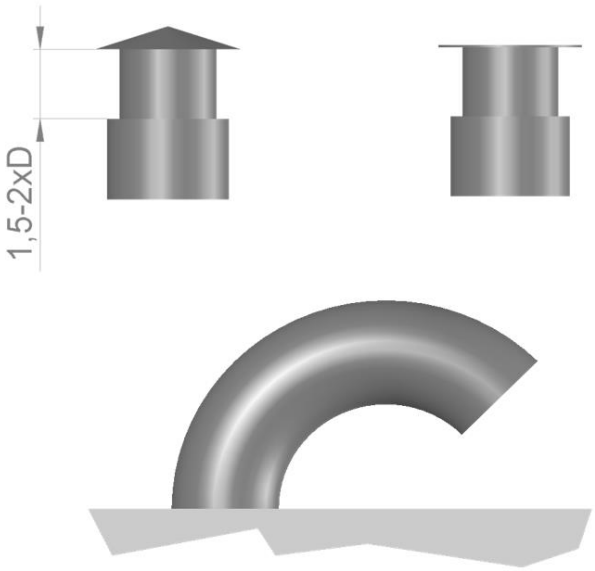


4.4.2.2 Guide of exhaust air line

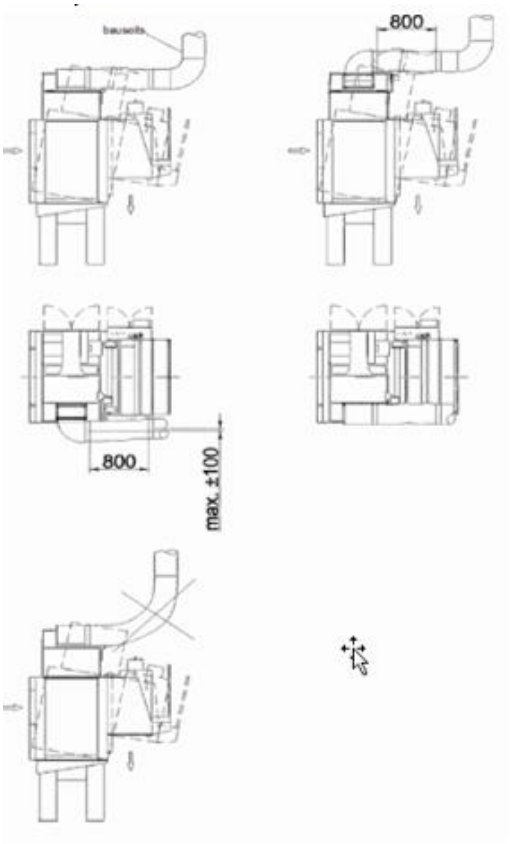
- Hoses are not suitable for replacing missing exhaust pipe bends.
- Hoses must be shortened to suitable length. Too long hoses form air pockets and reduce the air flow.
- During dryer operation, the behaviour of the exhaust air hose must be viewed and evaluated after installation. Ensure that the hose can not bend in the home position of the machine and that the complete exhaust air cross section is kept.

Above all, the air outlet via the roof is important. It is UNFAVOURABLE, IF

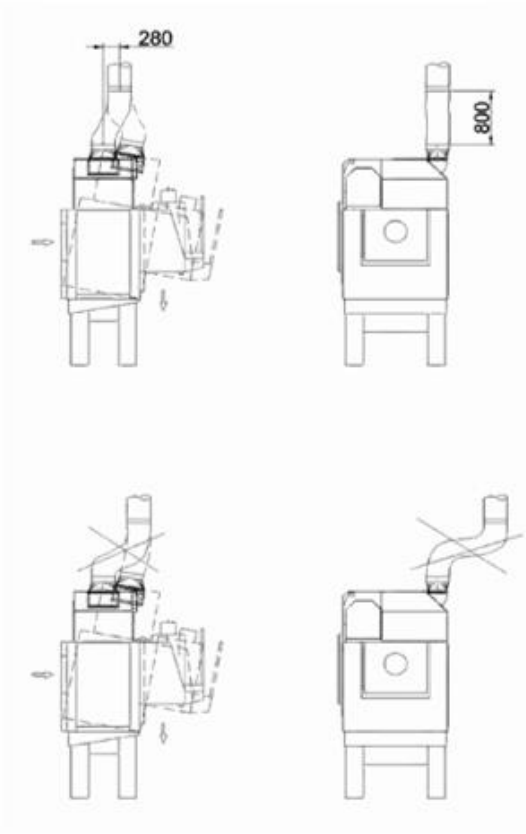
- a rain shield or a china hat is mounted just above the outlet opening. The following applies here: DISTANCE must be at least 1,5x diameter of the pipe, better MORE!
- grilles, to prevent birds from nesting, are installed in the exhaust pipe. After a short time, they will be completely impermeable for air, as they collect lint. Reflective, loosely mounted reflectors would be better to drive birds off.



Exhaust air connection to the rear (preferred solution):



Exhaust air connection upwards



4.5 Required utilities quality

The water, steam and compressed air quality provided by the customer must comply with the generally accepted state of the art. The following limit and reference values apply:

4.5.1 Steam

At the entrance of the machine, the following utilities quality is required:

- Conditioned soft water and boiler water according to DIN EN 12953-10 :
    - Conductivity of boiler water : Advised = 3.500 µS/cm, limit = 6.000 µS/cm
    - Conductivity of condensate : < 10 µS/cm
- Iron content max. 0.1 mg/l
- Flow rate max. 25 m/s
- For the use of district heat, the same requirements are valid as for fresh water.

4.5.2 Compressed air

Adhere to the following compressed air quality according to ISO 8573-1:2010, class 7.4.4:

Class	Solid particles Mass concentration [mg/m3]	Water Pressure condensation point steam [°C]	Oil Total oil ratio (liquid, aerosol and fog) [mg/m3]
1			
2			
3			
4		⩽ +3	5
5			
6			
7	5-10		

5. Washer Extractors

5.1 Setting up the machine

Place the machine on a sufficiently load bearing and level floor.
Adhere to the following:

- Installation drawing
- Space requirement for service work and operation
- Position in relation to the supply and return connections (three-phase current, water/process water, air, steam)

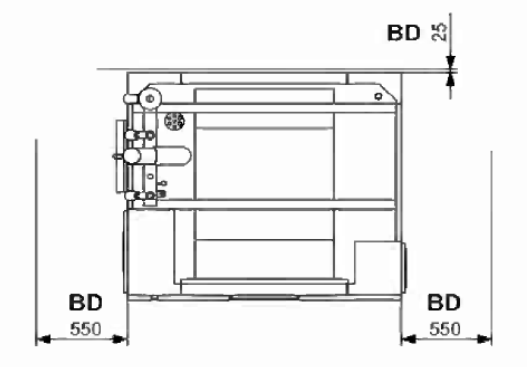
Ensure that the machine is installed horizontally and stable. To anchor the machine, drill holes in the size of the supplied adhesive anchors. The holes can be drilled when the machine is located at its operating position. Adhere to the installation instructions given for adhesive anchors. Tighten the adhesive anchor rods applying a torque of 210 Nm.

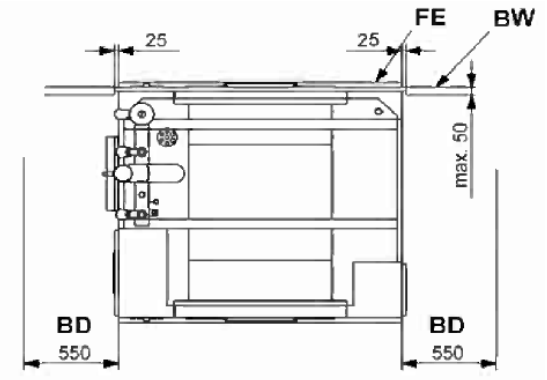
Please refer to the foundation plan for the precise position of the process water connection in conjunction with the holes to be drilled.

The concrete floor should be at least 150 mm thick and meet the quality standard BN 250. Place the supplied stainless steel plates beneath the machine feet at the machine corners onto the floor.

Cover open waste water channels running underneath the machine to prevent corrosion to the machine.

The lateral distance from the wall on the non-drive side and the opposite side should not be less than that indicated in the dimensions below to ensure that the doors can be opened for maintenance purposes (figure LH: Commercial version; figure RH: Pass through version; BD: min. wall spacing; FE: collision protection; BW: barrier wall).





5.2 Machine in barrier wall execution

Barrier wall opening (optional for machine in barrier wall execution (BW))

When integrating the machine into a separating wall according to the national directives (for Germany according to BGR 500 «Operating equipment») between clean and soiled side, strictly adhere to the following opening dimensions:

	Width in mm	Height in mm
FAV 300	1450	1877
FAV 400	1650	1877
FAV 600	1700	2027
FAV 800	1950	2027
FAV 1000	2210	2027
FAV 1150	1950	2127
FAV 1450	2200	2127
FAV 1900	2640	2127
FAV 2250	2220	2409
FAV 2700	2450	2409

5.3 Required utilities connections

5.3.1 Electrical connection

Always have the connection made by an approved electrician. Ensure that the electrical connection meets the (German) VDE regulations and the additional directives of your competent power supply company.

Connect the machine via an all-pole main switch. Ensure that the type of current and the voltage of the machine (see machine plate) coincide with the main voltage at the installation site. The supply cable is not part of our delivery.

Check whether or not a RCD fault current protection switch is to be installed into the supply line.

5.3.2 Water

The machine is supplied with two water connections as a standard (additional options are possible). The supply lines are connected rigidly or flexibly and must be connected without leaks to the intake valves on site.

Please refer to the technical data for the respective dimensions.

Ensure that the water pressure in the supply lines is at least 2 bar (2 - 4 bar are recommended) and does not exceed a pressure of 6 bar. Take respective measures if the pressure exceeds the specified values, e.g.install a pressure reducer in the supply line. The machine is not equipped with its own DVGW separation. If this cannot be installed on site, operate the FAVORIT Plus with a supply tank.

5.3.3 Waste water

The delivery scope includes a rubber bellows to be connected to the lye outlet pipe on the machine with a circlip. The temperature resistant pipework on site is connected to the other end of the spiral coiled tube.

5.3.4 Exhaust air

Connect the exhaust air to an open venting pipe. ATTENTION, NEVER TO A VACUUM SYSTEM. This will lead to incorrect level measuring results in the machine.

The accessories include a flexible hose for the connection between the exhaust air pipe on the machine and the exhaust air pipe on site. Install this hose such that the machine movements are compensated.

5.3.5 Steam

Install the steam connection to the machine steam valve with a gradient in the flow direction. Fit a filter and a valve or stop cock to shut off the steam into the supply line.

We recommend installing a condensate drain directly in front of the machine to prevent time losses and the entry of foreign objects (e.g. rust).

Ensure that the maximum pressure (bar) does not exceed the limit values specified in the data sheet. Check the steam connection for leaks at regular intervals. The steam valve is a Y-valve with flange connection.

Please refer to the technical data for the respective dimensions.

The throughflow direction of the valve is marked by an arrow.

5.3.6 Compressed air

Compressed air is required by the machine to control the respective pilot valves, the brake and the door locking (and the pneumatic detergent box, if installed). The supply line is equipped with a manual valve used to shut off the compressed air. Maintain the set air pressure of 6 bar at the installed compressed air assembly. The setting of the pneumatic springs depends on the type of machine.

Please refer to the technical data for the maximum operating and control pressures.

5.4 Required utilities quality

The water, steam and compressed air quality provided by the customer must comply with the generally accepted state of the art. The following limit and reference values apply:

5.4.1 Fresh water

At the entrance of the machine, the following fresh water quality is demanded:

- Iron content max. 0.1 mg/l
- Copper content max. 0.05 mg/l
- Manganese content max. 0.03 mg/l
- Chloride content max. 200 ppm (water should not react corrosive)
- Total Ca/Mg hardness max. 0.1 mmol/l Ca/Mg alkaline earth ions (0.56 °dH / 1 °f / 0,7 °E)
- Carbonate hardness to be considered in the wash process (> 15 °dH can cause problems)
- Check the conductivity of fresh water regularly (if necessary, adjust processes and chemical dosing accordingly)
- Hygiene max. 100 cfu/ml, no pathogenic germs, no spores

5.4.2 Steam

At the entrance of the machine, the following steam quality is demanded:

- Conditioned soft water and boiler water according to DIN EN 12953-10 :
    - o Conductivity of boiler water : Advised = 3.500 µS/cm, limit = 6.000 µS/cm
    - o Conductivity of condensate : < 10 µS/cm
- Iron content max. 0.1 mg/l
- Flow rate max. 25 m/s
- For the use of district heat, the same requirements are valid as for fresh water

5.4.3. Washing liquor

The following washing liquor quality is demanded inside the machine:

- Active chlorine content max. 250 ppm
- Active oxygen content max. 500 ppm
- Wash temperature 40-95 °C
- pH value in the washing zone > 7, in the neutralization chamber > 5.5
- Check the conductivity difference between the fresh water and the extraction liquor regularly (delta > 1000 µS/cm can lead to problems)

5.4.4 Compressed air

Adhere to the following compressed air quality according to ISO 8573-1:2010, class 7.4.4:

Class	Solid particles Mass concentration [mg/m3]	Water Pressure condensation point steam [°C]	Oil Total oil ratio (liquid, aerosol and fog) [mg/m3]
1			
2			
3			
4		≤ +3	5
5			
6			
7	5-10		

6. Ironers

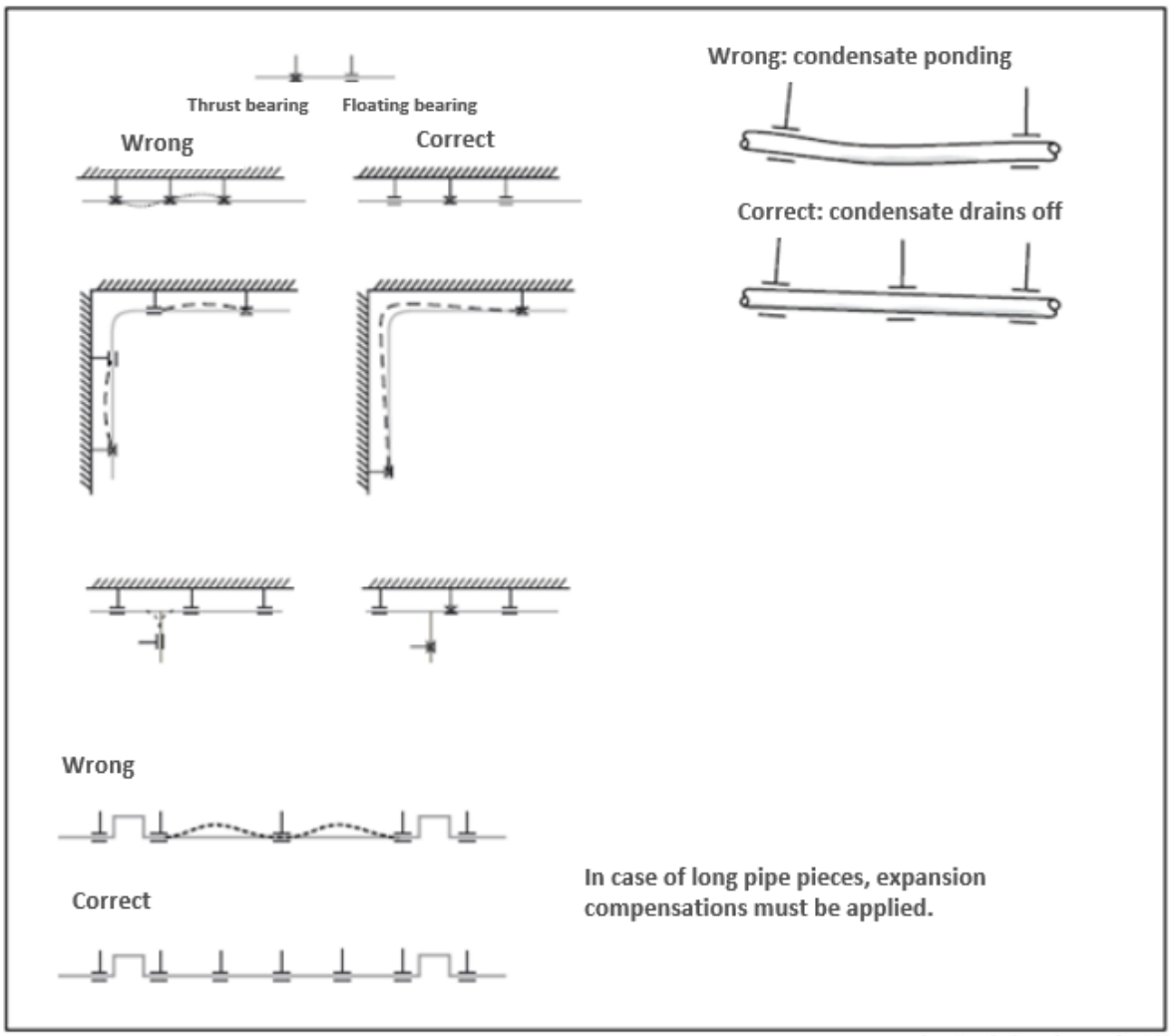
The water, steam and compressed air quality provided by the customer must comply with the generally accepted state of the art. The following standard and respectively limit values apply.

6.1 Installation of steam- and condensate lines

The installation of the steam and condensate lines is in the sole responsibility of the customer. The steam and condensate lines must be installed properly and professionally - in accordance with industry-standard guidelines.
The installation instructions shown are intended to provide basic information to prevent particularly critical installation errors and do not replace a competent installation.
During installation of the steam pipe system, particularly observe the expansion and the discharge of condensate in the pipework.

6.1.1 Expansion of supply lines

Ensure that the longitudinal extension of the supply lines is allowed.



Source: Spirax Sarco GmbH

6.1.2 Discharge of condensate

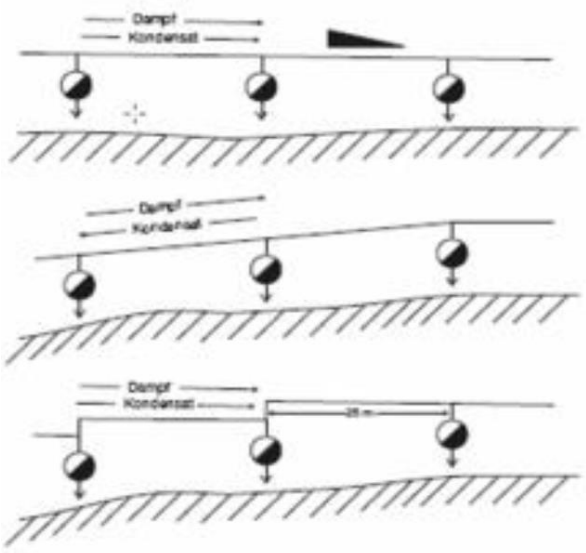
If condensate is formed in the steam line, the following problems may occur

- Increased risk of erosion
- Increased loss in pipe friction
- Obstruction of steam flow
- Difficulties in starting the pipe network
- Causing hydraulic pounding in the supply line which could destruct or endanger components and ironer

It is essential to drain the steam line.

6.1.3 Routing of the steam pipework with a descending gradient

Route the steam line in the flow direction with the descending gradient 7, between 1:100 and 1:200. Provide additional condensate lines for pipe sections longer than 25m.



"correct"
standard installation

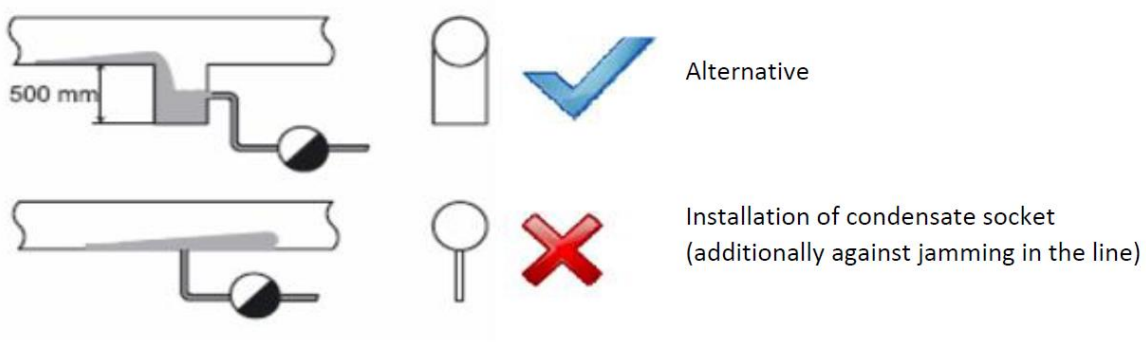
"wrong"

"correct"
installation with gradient in flow direction or for larger height difference

Source: Spirax Sarco GmbH

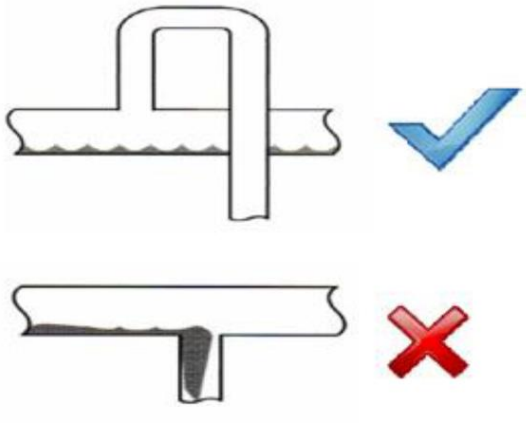
6.1.4 Drainage of supply lines

The low points and ends of the supply pipe must be drained.
Rated width of steam line = rated width of condensate separator



Alternative

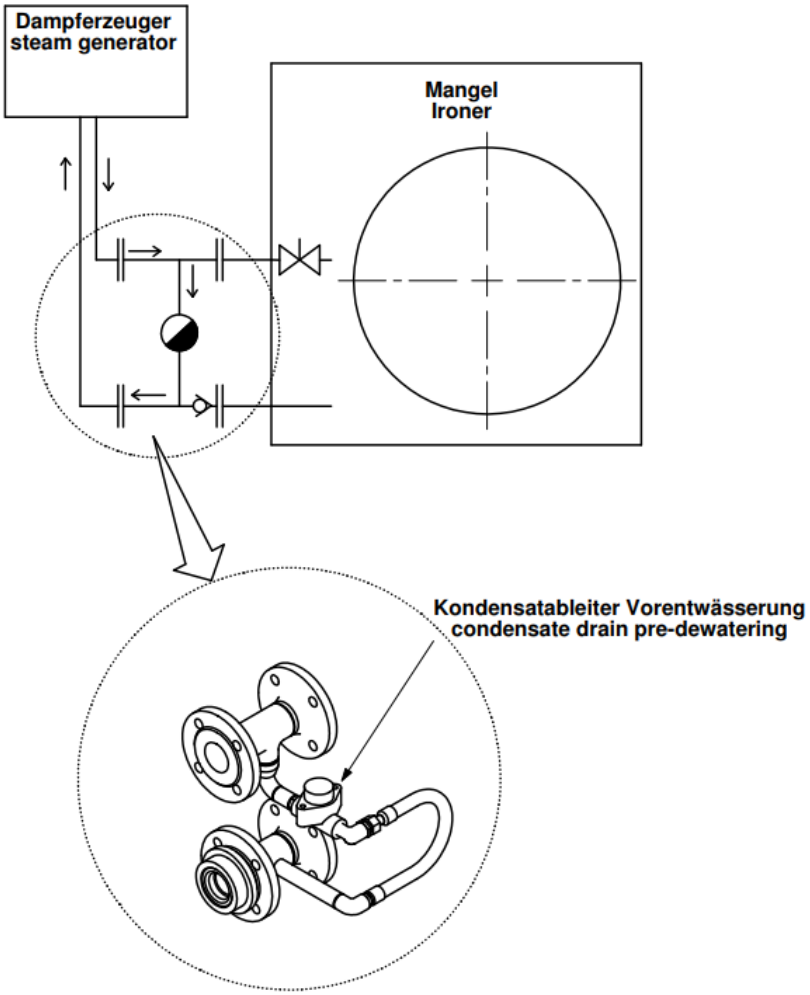
Installation of condensate socket
(additionally against jamming in the line)



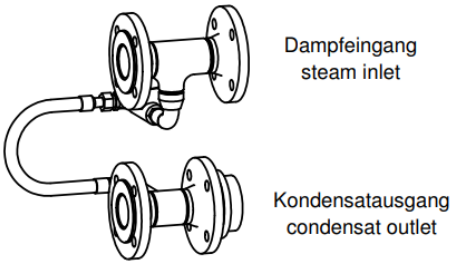
Connection of steam branch

Drainage directly prior to ironing

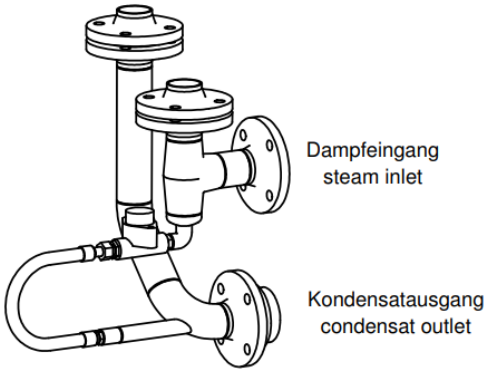
It is necessary to drain the steam line prior to the entrance of the ironer. The drawing shows an example designed by Kannegiesser. This type of drainage is supplied by Kannegiesser.



Horizontal execution
Horizontale Ausführung



Vertical execution
vertikale Ausführung



IMPORTANT !

Non-return valves are to be provided at ironer outlet. The condensate line may ascend quite high behind the ironer.
If the steam pressure collapses after closing the cut-off valves, the water column pushes the condensate back into the ironer via the condensate traps.
Condensate impacts might occur during start-up.
Note: This valve is included in the drainage assembly group with a non-return valve.

6.2 Required utilities connections

6.2.1 Compressed air

Compressor performance
The capacity of the compressor should be 20% to 30% higher than the compressed air consumption of the machine to ensure malfunction-free operation.

Supply line material
Install a supply line made of galvanized steel pipe or copper pipe to prevent rust from entering the compressed air system of the machine during operation.

Supply line diameter

Length of supply line	Diameter
<= 10 metres	1/2"
> 10 metres	3/4"

Prior to connecting the machine, fit an air shut-off valve. Use a compressed air hose to connect the machine with the supply line to prevent the transmission of vibrations. The hose should have a length of approx. 400 mm (15.75 in.) and the same cross-section as the supply line.

6.2.2 Escape air and exhaust air

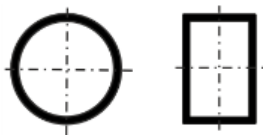
Technical data
For the technical data regarding the exhaust air connection, please refer to the machine data sheet.

General design regulations
Multiple versions are possible depending on the local conditions.

Admissible length of the escaping air pipework
Route the escaping air pipework in a straight line and on the shortest way to the outside. Please refer to the machine data sheet for the maximum back pressure.

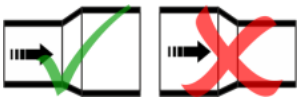
Several machines
Never connect several machines to one escaping air pipework. Always install one escaping air pipework for each machine.

Cross section



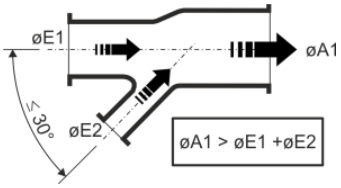
The cross section of the piping may be rectangular or round. We recommend using pipes with a round cross section.

Diameter



The diameter of the escaping air pipework must not decrease in the flow direction.

Junctions

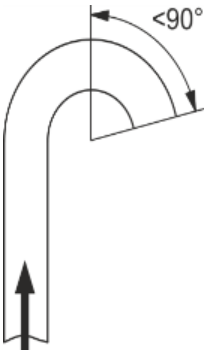


Junctions must not be fitted at an angle larger than 30° in the flow direction. Try to avoid Y-tubes. The starting diameter must be larger than the sum of the inlet diameters.

Gradient in flow direction
The gradient in the flow direction may be between 1:100 until 1:200.

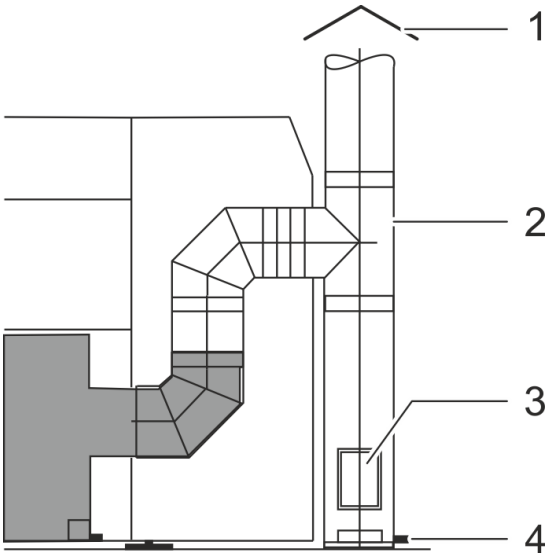
Directional changes
Only change directions in small increments. Use pipe bends with a large radius.

End of the escaping air pipework



Do not end the escaping air pipework with sieves or screens and install a drainage assembly. If the ends point upwards, install a Meidinger disc or end with a pipe bend <90°.

6.2.3 Exhaust gas



The bright section of the exhaust gas guide is to be installed by the ironer owner/user. Guidance must comply with the local, valid regulations. Contact the local, responsible authorities.

- 1 Protective hood
- 2 Insulation: at least 30 mm (1.18 in.)
- 3. Inspection opening
- 4. Condensate drain

6.3 Required utilities quality

The water, steam and compressed air quality provided by the customer must be state of the art. The following standard and respectively limit values apply.

6.3.1 Steam

At the entrance of the machine

- Conditioned soft water and boiler water according to DIN EN 12953-10.
- Flow rate max. 25 m/s
- For the use of district heat, the same requirements are valid as for fresh water.

6.3.2 Compressed air

Adhere to the following compressed air quality according to ISO 8573-1:2010, class 7.4.4 :

Class	Solid particles Mass concentration [mg/m3]	Water Pressure condensation point steam [°C]	Oil Total oil ratio (liquid, aerosol and fog) [mg/m3]
1			
2			
3			
4		≤ +3	5
5			
6			
7	5-10		

6.4 Advice for gas-heated ironers

During commissioning of gas-heated ironers, control measurements concerning gas emissions are required on site to be able to provide inspection reports and certificates for the gas burners by respecting special rules and regulations, in particular local and regional directives, ordinance on firing installations as well as instruction of legal gas suppliers.

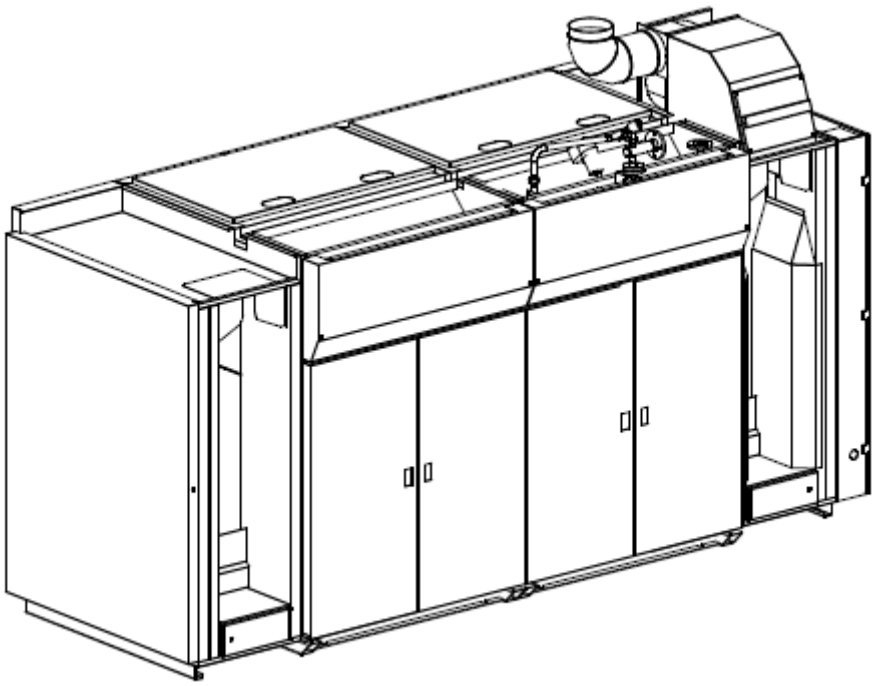
KANNEGIESSER does not have to render these services which are therefore not included in the quoted price.

It is recommended to get in contact, duly in time of planning, with the relevant gas supplier or specialist as well as with the local authorities. An adjustment of the burner can be carried out by Kannegiesser, but has to be quoted separately.

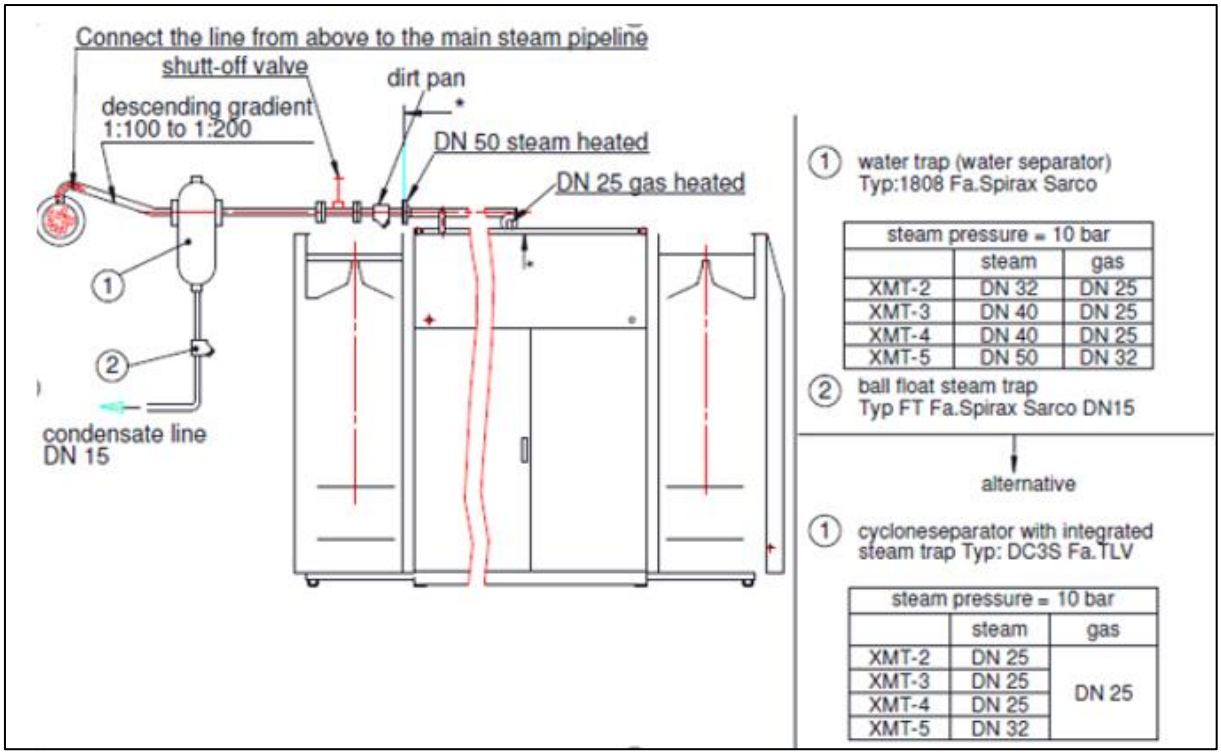
In case of conduct by the customer of gas-heated ironers contrary to the above and damages might occur hereby, the customer holds KANNEGIESSER and members of the KANNEGIESSER Group free and harmless of any claims from a third party, in particular claims for compensation, regardless legal grounds and laws.

7. Tunnel finisher

7.1 Steam-heated tunnel finisher



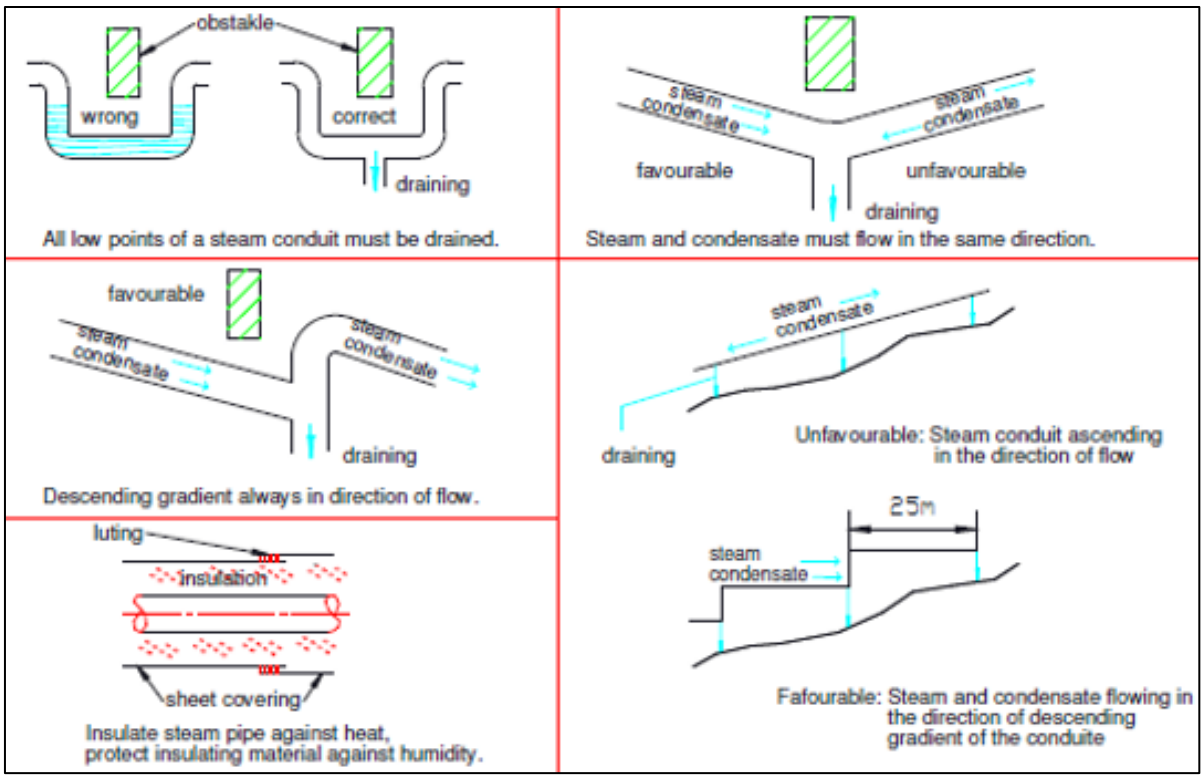
7.1.1 Steam line



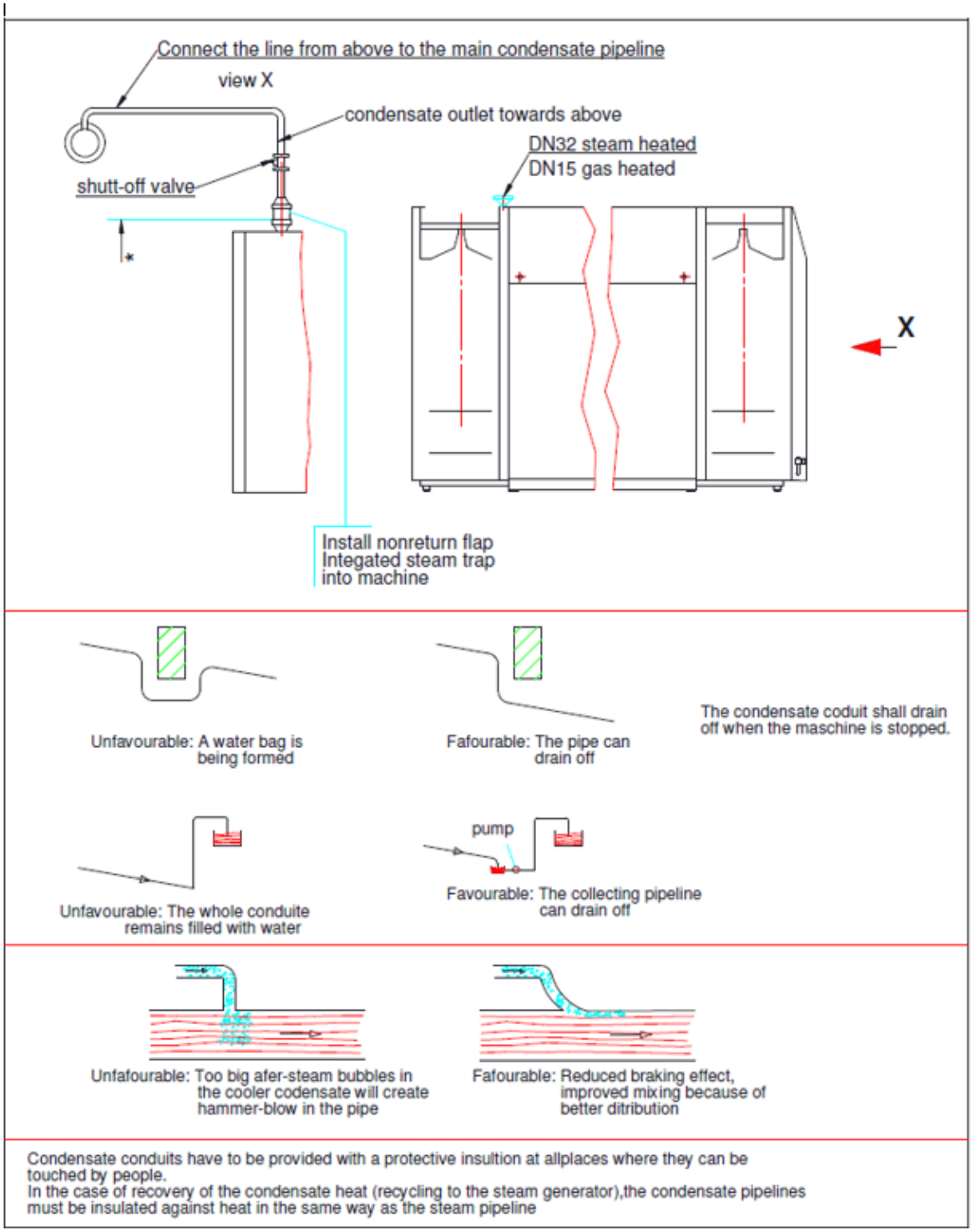
steam pressure = 10 bar		
	steam	gas
XMT-2	DN 32	DN 25
XMT-3	DN 40	DN 25
XMT-4	DN 40	DN 25
XMT-5	DN 50	DN 32

steam pressure = 10 bar		
	steam	gas
XMT-2	DN 25	DN 25
XMT-3	DN 25	
XMT-4	DN 25	
XMT-5	DN 32	

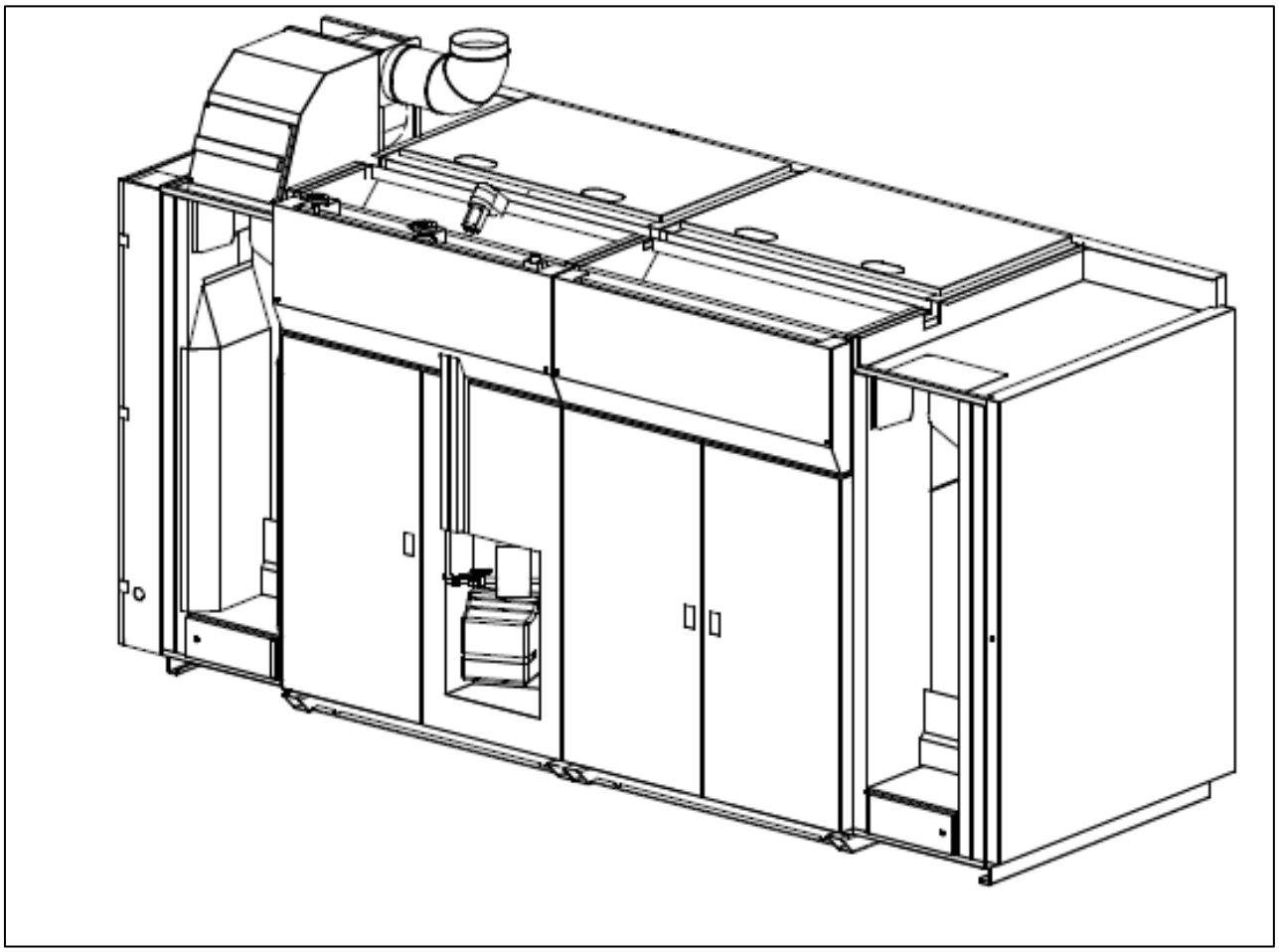
Installation instructions



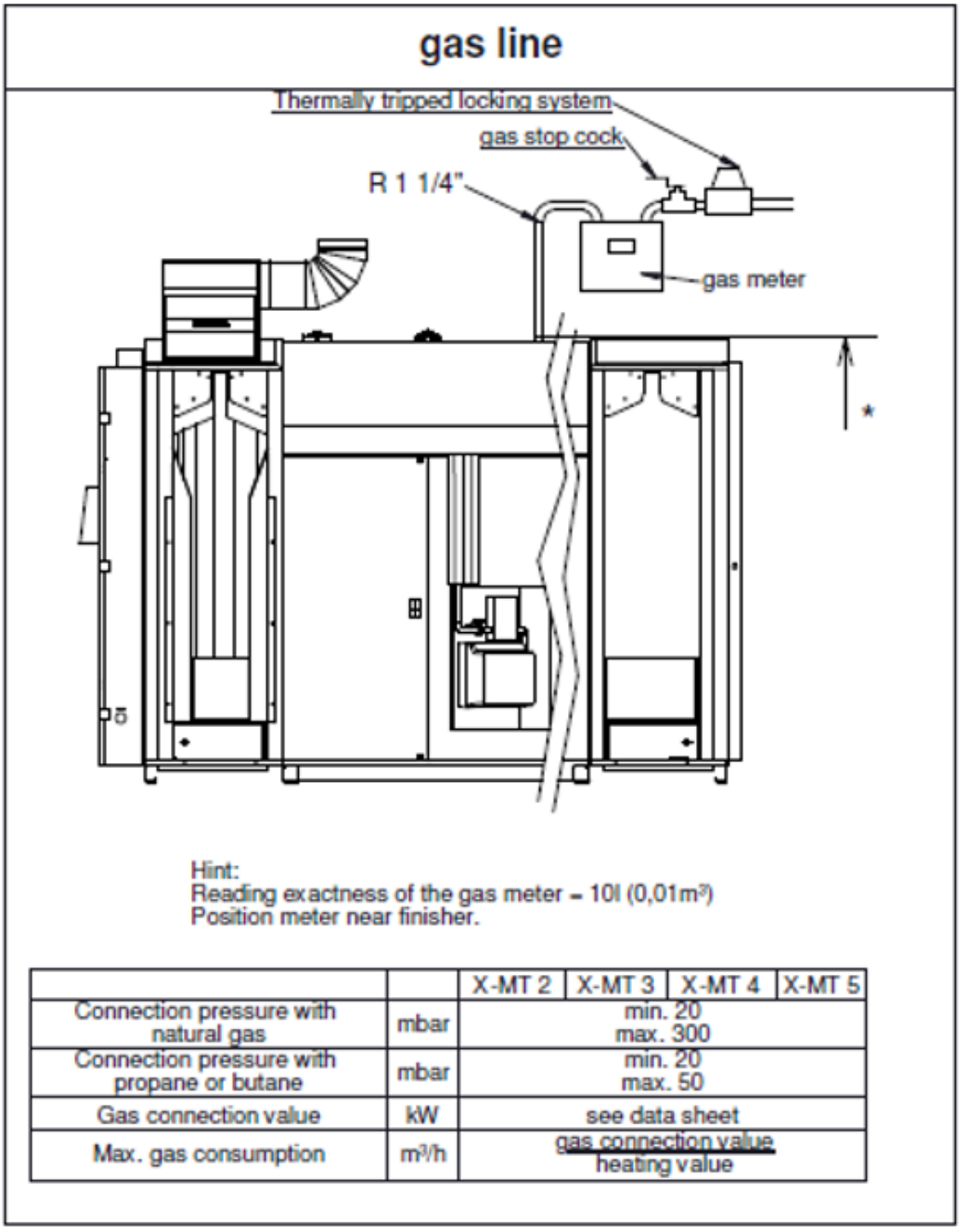
7.1.2 Condensate line



7.2 Gas-heated tunnel finisher



7.2.1 Gas line



		X-MT 2	X-MT 3	X-MT 4	X-MT 5
Connection pressure with natural gas	mbar	min. 20 max. 300			
Connection pressure with propane or butane	mbar	min. 20 max. 50			
Gas connection value	kW	see data sheet			
Max. gas consumption	m³/h	gas connection value / heating value			

Important: Installation of the gas line only permitted by a specialized company with DVGW approval!

7.2.2 Outlet air line

Along with the outlet air, flue gases are exhausted through the outlet air line.
Special requirements are valid for the outlet air line:

1. Pipe material: Aluminium or stainless steel
2. Seal all cutting points or seams. Use temperature-resistant sealing material, e.g. silicone glue or sleeves.
3. Provide control openings for exhaust path controls. (Position and size according to responsible sweep association/guild)
4. Do not cover blow-out opening on roof with sieves or screens or similar.

7.2.3 Outlet air ducting

The gas-heated tunnel finisher XMT and SMT are seen as industrial process systems according to EN 746-2 and do not require DVGW certification (German association for gas and water). All series comply with the relevant regulations/directives.

Due to the respective burner capacities, a certain proportion of exhaust gas per hour is generated by stoichiometric combustion of gas. This proportion is included in the process air of the finisher. The air and exhaust gas mixture is extracted via the ventilator and transported to the outside by means of the exhaust air line to be installed on site.

The air and exhaust gas mixture, which is defined in the DVGW sheet G 631 A, is to be classified as exhaust gas, and not as exhaust air. The exhaust gas must be properly discharged via exhaust gas line/exhaust gas system.

The relevant standards, such as DIN EN 1443, DIN EN 15287 - 1 are to be considered. We recommend to instruct an expert company for technical execution.

A certified district chimney sweep must be contacted.

Pipe system made of metal tubes to discharge exhaust gas must be state of the art. Only use certified chimney pipes. We recommend the use of corrosion-resistant stainless steel when selecting the material of the exhaust gas pipes. For XMT series, exhaust air temperature is max. 100°C resp. 120°C for SMT series. When selecting components, consider the corresponding directives according to the respective state building regulations.
An insulated pipe construction is advantageous to avoid that condensate is formed in the outlet air line as far as possible. Exhaust gas emerging into the room is not admissible.

The exhaust path control is required. Prior to the installation of the exhaust gas system, the suitable check and control openings must be adjusted by a certified district chimney sweep. Have the exhaust path control checked once per year according to the pertinent regulations.

Tunnel finishers are not subject to the 1st federal immission control act Germany (cf. §1, Para 2 No. 2 1. BlmSchV) and therefore no exhaust gas loss or immission measurement (CO) is prescribed (German chimneys sweeper and control act KÜO of 16 June 2009)

Further technical information on outlet air and exhaust gas hygiene is available from the factory on request. Please contact your local Kannegiesser representative if required.

7.2.4 Advice for gas-heated tunnel finisher

During commissioning of the gas-heated tunnel finisher, control measurements concerning gas emissions are required on site to be able to provide inspection reports and certificates for the gas burners by respecting special rules and regulations, in particular local and regional directives, ordinance on firing installations as well as instruction of legal gas suppliers.

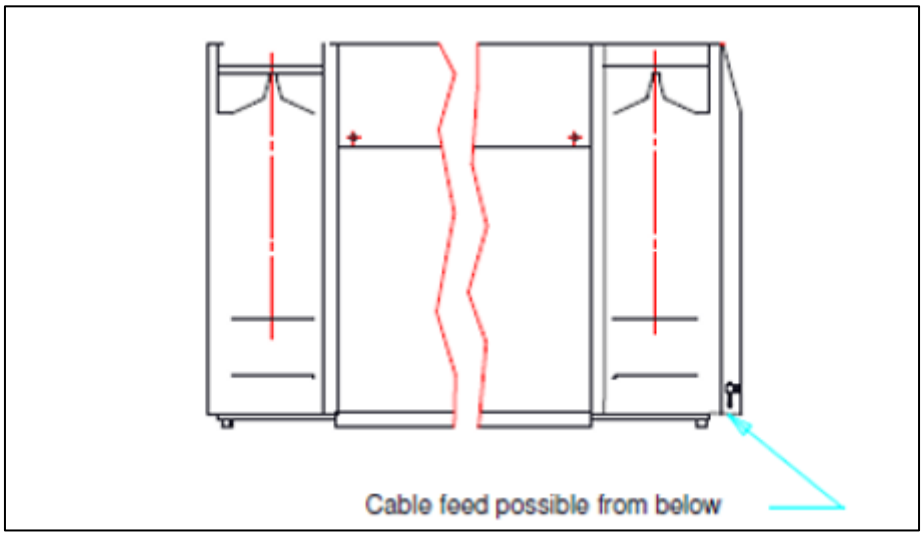
KANNEGIESSER does not have to render these services which are therefore not included in the quoted price.

It is recommended to get in contact, duly in time of planning, with the relevant gas supplier or specialist as well as with the local authorities. An adjustment of the burner can be carried out by Kannegiesser, but has to be quoted separately.

In case of conduct by the customer of a gas-heated tunnel finisher contrary to the above and damages might occur hereby, the customer holds KANNEGIESSER and members of the KANNEGIESSER Group free and harmless of any claims from a third party, in particular claims for compensation, regardless legal grounds and laws.

7.3 Required utilities connections

7.3.1 Electrical connection



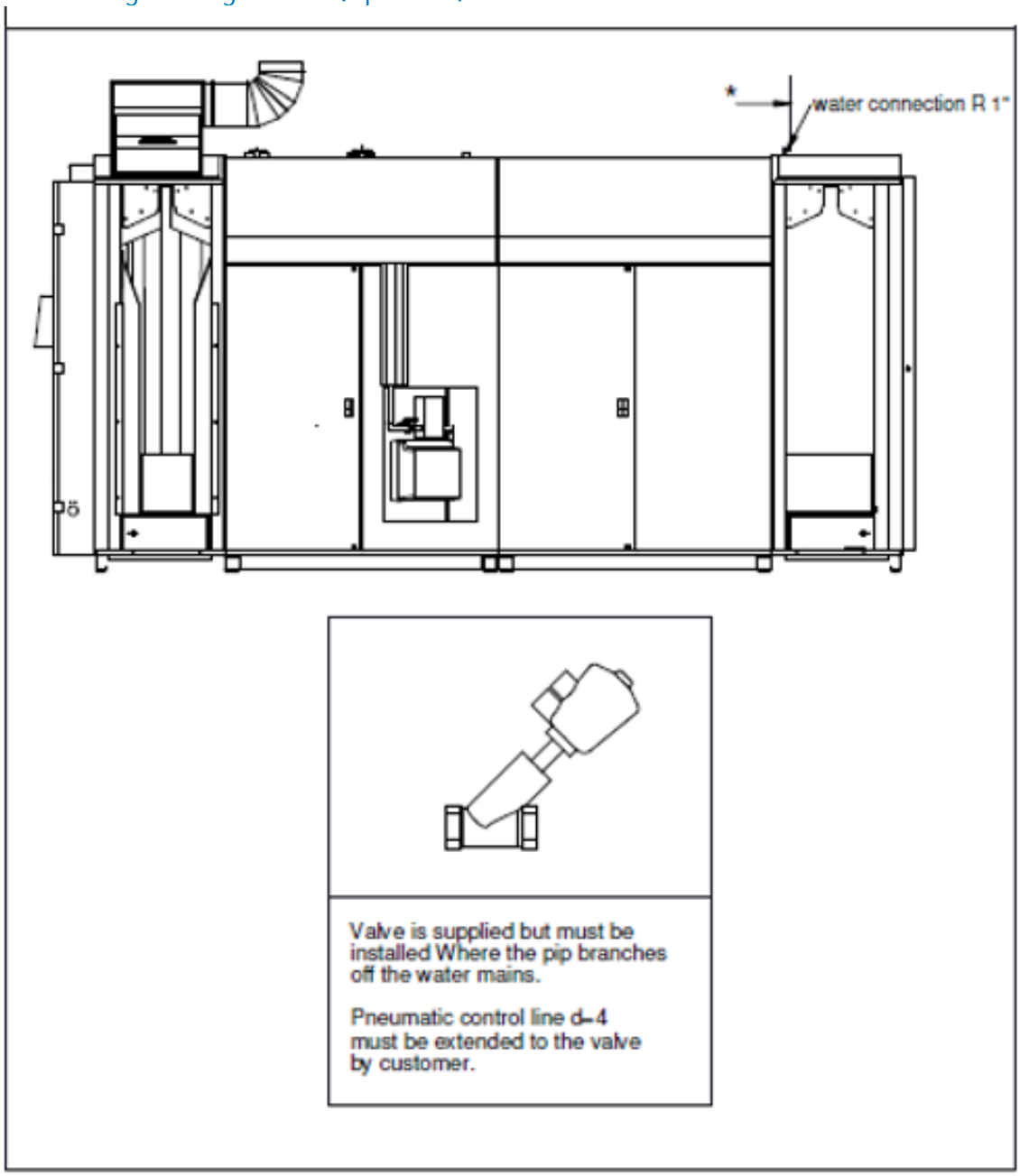
Connection of the machine to the main supply must be done only via the contact points shown and numbered on the wiring diagram annexted to this instruction manual and may only be carried out by a qualified electrian. Data about electrical connection loading is to be found on the machine data sheet.

Voltage and current must correspond to the values shown on the machine specification plate.

It is essential that the machine is correctly connected and proteted according to the regulations supplied by the responsible electricity authority (earthing, fuse and neutral line). Earthing is made through the special grounding screw in the switch box. Further information concerning the electrical circuit inside the machine is found in the wiring diagram.

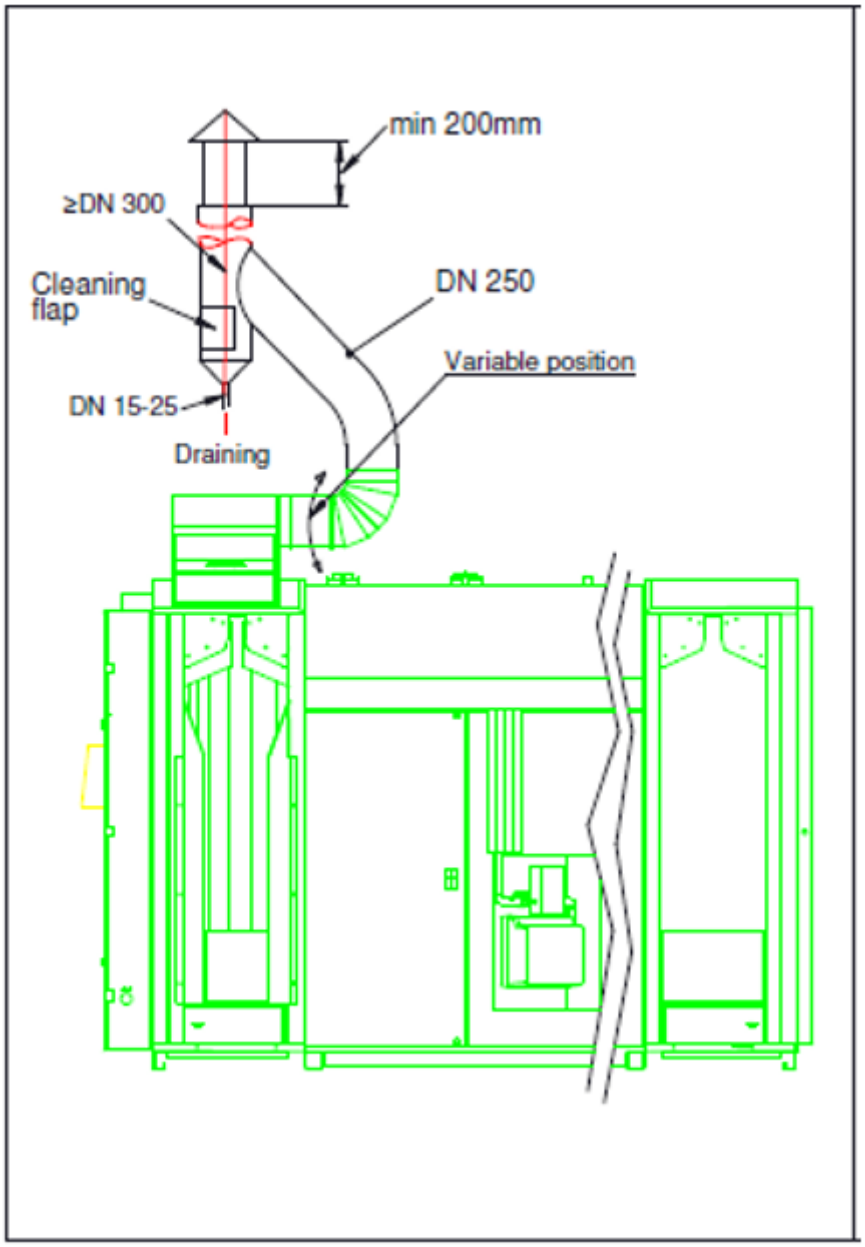
Motors: After connecting the electrical supply line, run the drive motor for a short period and check the direction of the rotation marked with arrows. In case of wrong sense of r otation, exchange phases.

7.3.2 Extinguishing device (optional)



*) Kannegiesser scope of delivery

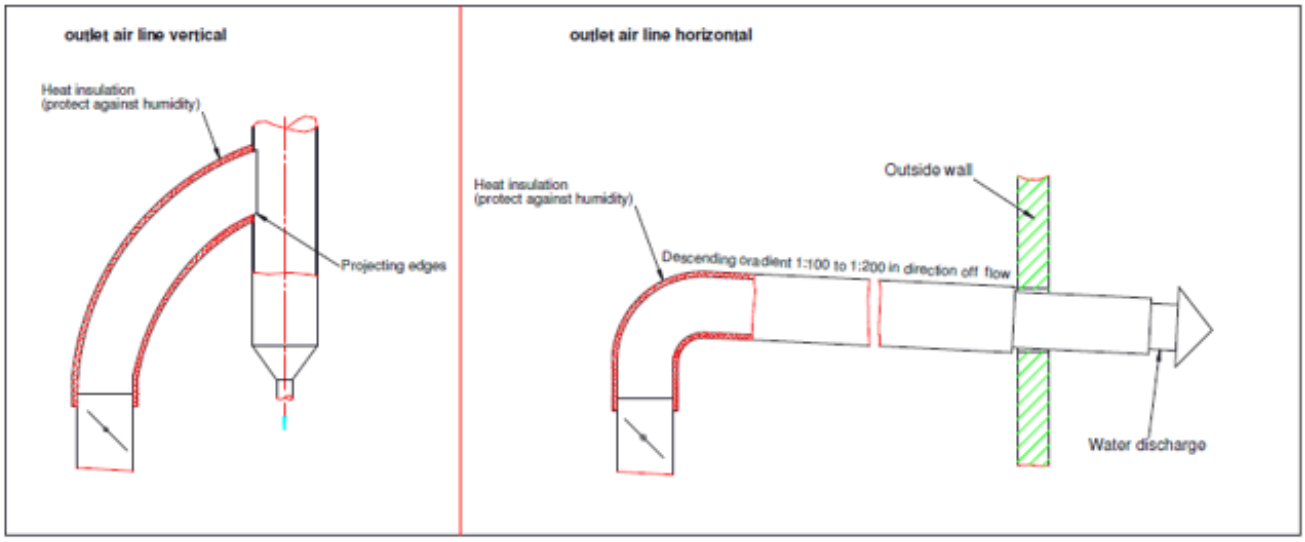
7.4 Outlet air line



7.5 Other directives and regulations

1. The machine is not subject to the gas appliances directive. No special type examination or certifying are required. Gas burner and fittings are certified.
2. A flue gas loss measurement and repeated monitoring is not required according to the 1st federal immission control act (Germany) dd. 1997 (small heating systems).
3. According to the German KÜO (chimneys sweeper and control act), a flue gas path control (check for correct function of flue gas guidance and hazard-free flue gas behaviour) is required by the responsible chimney sweep association/guild (control opening).

Details :



8. Proper storage of machines

Adhere to the following information if storage of machines will become necessary:

- The temperature in the storage area must not exceed 50°C or be less than 0°C
- Direct sunlight should be avoided
- The goods must be protected from moisture, dust and other soiling
- The storage area must be protected against access by unauthorized persons