

Installation and operating instructions Froling Layered tank - systems



Translation of original German version of installation and operating instructions for technicians and operators.

Read and follow all instructions and safety instructions.
All errors and omissions excepted.



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2 Safety

2.1 Hazard levels of warnings

This documentation uses warnings with the following hazard levels to indicate direct hazards and important safety instructions:

DANGER

The dangerous situation is imminent and if measures are not observed it will lead to serious injury or death. You must follow the instructions!

WARNING

The dangerous situation may occur and if measures are not observed it will lead to serious injury or death. Work with extreme care.

CAUTION

The dangerous situation may occur and if measures are not observed it will lead to minor injuries.

NOTICE

The dangerous situation may occur and if measures are not observed it will lead to damage to property or pollution.

2.2 Permitted uses

Froling layered tanks are designed exclusively to store and distribute domestic hot water in closed water central heating systems at operating temperatures of up to max. 95°C and operating pressures of up to max. 3 bar. They can be used in combination with biomass, oil or gas-fired boilers, thermal heat pumps and electrical heat generators. Models which include solar elements (solar layered tanks, H3 hygienic solar layered tanks, FW solar modular layered tanks) can be fitted with additional suitable solar elements to boost your heating system.

The Froling H2 hygienic layered tank and H3 hygienic solar layered tank also generate warm drinking water which complies with national and regional drinking water specifications (including DVGW type-test certificate) using the flow principle for both household and industry.

The Froling FW modular layered tank and FW solar modular layered tank also generate warm drinking water if equipped with an optional fresh water module (available separately) and can be connected directly to two hot water heating circuits with up to two optional heating circuit modules (available separately).

The unit should only be operated when it is in full working order. It should be operated in accordance with the instructions, observing safety precautions, and you should ensure you are aware of the potential hazards. The inspection and cleaning intervals in the operating instructions should be observed. Ensure that any faults which might impair safety are rectified immediately.

The manufacturer or supplier is not liable for any damage resulting from non-permitted uses.

2.3 Qualification of staff

2.3.1 Qualification of assembly staff

CAUTION



Assembly and installation by unqualified persons:

Risk of personal injury and damage to property

During assembly and installation:

- Observe the instructions and information in the manuals
- Only allow appropriately qualified personnel to work on the system

Assembly, installation, initial startup and servicing must only be carried out by qualified personnel:

- Heating technicians/building technicians
- Electrical installation technicians
- Froling customer services

The assembly staff must have read and understood the instructions in the documentation.

2.3.2 Personal protective equipment for assembly staff

You must ensure that staff have the protective equipment specified by accident prevention regulations!



- During transport, erection and installation:
 - wear suitable work wear
 - wear protective gloves
 - wear safety shoes (min. protection class S1P)

2.3.3 Qualification of operating staff

CAUTION



If unauthorised persons enter the Installation room / boiler room:

Risk of personal injury and damage to property

- The operator is responsible for keeping unauthorised persons, in particular children, away from the system.

Only trained operators are permitted to operate the unit. The operator must also have read and understood the instructions in the documentation.

2.4 Safety devices



- Ensure that the required on-site safety devices are available for the heating system
 - ↳ Refer to the instructions for the heating system to which the tank system will be connected (including the valid guidelines and standards for heating systems)
- Ensure that the heating system is fitted with a safety valve in such a way that it cannot be shut off from the safety equipment
- If a tank system is added to an existing system, the entire heating system must undergo a risk reassessment (e.g. correct size of expansion tank, adequate venting facility etc.)

2.5 Residual risks

DANGER



If the device is used incorrectly:

Incorrect use of the system can cause severe injury and damage.

When operating the system:

- Observe the instructions and information in the manuals
- Observe the details on procedures for operation, maintenance and cleaning, as well as troubleshooting in the respective manuals.
- Any work above and beyond this (e.g. servicing) must be carried out by a heating engineer approved by Fröling Heizkessel- und Behälterbau GesmbH or by Fröling customer services

DANGER



Operating the system without the safety equipment provided by the customer:

Risk of serious injury from unprotected system components!

For safe operation of the system:

- Only operate the system once the required safety equipment has been installed
 -  Observe the instructions and information about safety equipment to be provided by the customer in the manuals
 -  Compliance with open provisions in the declaration of installation as per Machinery Directive 2006/42/EC must be verified.

WARNING



Operating the system without a mixer valve for drinking water:

Risk of scalding from hot water if there is no mixer valve for drinking water fitted or it is defective!

Therefore:

- Ensure that the heating system has a mixer valve for drinking water fitted and that it is in perfect working order

3 Design information

Carrying out modifications to the system and changing or disabling safety equipment is prohibited.

Always comply with all fire, building and electrical regulations when installing or operating the system, in addition to following the operating instructions and mandatory regulations that apply in the country in which the tank is operated.

NOTICE! All design information such as installation and approval of the system, chimney connection/chimney system etc., see installation instructions for the boiler.

3.1 Domestic hot water

Unless contrary to other national regulations, the latest versions of the following standards and guidelines apply:

Austria:	ÖNORM H 5195	Switzerland:	SWKI BT 102-01
Germany:	VDI 2035	Italy:	UNI 8065

Observe the standards and also follow the recommendations below:

- Aim for a pH value of between 8.2 and 10.0. If the central heating water comes into contact with aluminium, the pH value must be between 8.2 and 9.0
- Use prepared water which complies with the standards cited above for filling and make-up water
- Avoid leaks and use a closed heating system to maintain water quality during operation
- When filling with make-up water, always bleed the filling hose before connecting, in order to prevent air from entering the system
- The heating water must be clear and free from substances that lead to sediments.
- With regard to corrosion protection, the use of fully demineralised filling and make-up water with an electrical conductivity of up to 100 µS/cm is recommended in accordance with EN 14868

Advantages of low-salt or fully demineralised water:

- Complies with the applicable standards
- Less of a drop in output due to reduced limescale build-up
- Less corrosion due to fewer aggressive substances
- Long-term cost savings thanks to improved energy efficiency

Filling and make-up water as well as heating water in accordance with VDI 2035:

Total heat output in kW	Total earth alkalis in mol/m ³ (total hardness in °dH)		
	Specific system volume in l/kW heat output ¹⁾		
	≤ 20	20 to ≤40	> 40
≤ 50 specific water content heat generator ≥ 0.3 l/kW ²⁾	none	≤ 3.0 (16.8)	< 0.05 (0.3)
≤ 50 specific water content heat generator < 0.3 l/kW ²⁾ (e.g. circulation water heater) and systems with electric heating elements	≤ 3.0 (16.8)	≤ 1.5 (8.4)	
> 50 to ≤ 200	≤ 2.0 (11.2)	≤ 1.0 (5.6)	
> 200 to ≤ 600	≤ 1.5 (8.4)	< 0.05 (0.3)	
> 600	< 0.05 (0.3)		

1. For calculating the specific system volume, the smallest individual heating capacity is to be used for systems with several heat generators.
2. In systems with several heat generators with different specific water contents, the smallest specific water content is decisive in each case.

Additional requirements for Switzerland

The filling and make-up water must be demineralised (fully purified)

- The water must not contain any ingredients that could settle and accumulate in the system
- This makes the water non-electroconductive, which prevents corrosion
- It also removes all the neutral salts such as chloride, sulphate and nitrate which can weaken corrosive materials in certain conditions

If some of the system water is lost, e.g. during repairs, the make-up water must also be demineralised. It is not enough to soften the water. The heating system must be professionally cleaned and rinsed before filling the units.

Inspection:

- After eight weeks, the pH value of the water must be between 8.2 and 10.0. If the central heating water comes into contact with aluminium, the pH value must be between 8.0 and 8.5
- Yearly. Values must be recorded by the owner

3.2 Requirements for drinking water

- Recommendations:*
- If the general water hardness exceeds 2.67 mmol/L or 267 mg/L (equivalent to 15°dH) use suitable water softening systems
 - ↳ Minimizes build-up of scale in the corrugated pipe element and fresh water module
 - If the carbonate hardness exceeds 1.25 mmol/L or 125 mg/L (equivalent to 7°dH) take appropriate action to reduce the carbonate hardness
 - Maximum chloride content of drinking water: 70 mg/l
 - Install an electrical separation between the tank and the drinking water system

Unless contrary to other national regulations, the latest versions of the following standards and guidelines apply:

Note on standards

DIN 1988	Codes of practice for drinking water installations
ÖNORM EN 806	Codes of practice for drinking water installations
ÖNORM EN 1717	Protection against pollution of potable water installations and general requirements of devices to prevent pollution by backflow

3.3 General standards for heating systems

Unless contrary to other national regulations, the latest versions of the following standards and guidelines apply:

EN 303-5	Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 300 kW
EN 12828	Heating systems in buildings - Design for water-based heating systems
ÖNORM M 7510	Checking of heating systems
ÖNORM H 5151	Planning of central hot water heating systems with or without hot water preparation

3.4 Requirements at the installation room

The installation room must comply with the following requirements in order for the storage system to function safely and to prevent damage to the tank:

- the floor must be even, clean and dry
- the floor must be able to take the weight of the system (for weights, see "Technical data")

NOTICE! CAUTION: When using the optional height-adjustable feet (Ø 6 cm), the surface load increases accordingly. Check that the floor can cope with the heavier load!

4 Technology

Important! The following applies to this chapter: Technical specifications regarding the energy efficiency class, standing loss S and storage volume as per Commission Regulation (EU) 812/2013 or 814/2013. Technical specifications regarding the standing loss Q_{ST} as per EN 12897.

4.1 Layered tank



Tank material:	S235JR+AR steel plate, with external rustproof primer, interior unpainted
Design:	<ul style="list-style-type: none"> ▪ upright; with feet (3x with tanks 300 – 1250, 4x with tanks 1500 – 2200) – height adjustment optional with adjustable feet ▪ with special layer separator for precise temperature layering
Heating tank:	from solid fuel boiler or other heat generators

4.1.1 Technical specifications - layered tanks

Description			Layered tank				
			300 ¹⁾	500 ¹⁾	700	850	1000
Permissible operating pressure	hot water side	bar	3	3	3	3	3
Permissible operating temperature	hot water side	°C	95	95	95	95	95
Empty weight		kg	50	73	87	99	109
Empty weight of combination tank, left		kg	-	-	90	103	113
Empty weight of combination tank, centre		kg	-	-	93	106	117
Energy efficiency class			B	B	-	-	-
Standing loss S		W	66.3	68.3	79.6	109.2	132.5
Storage volume		litres	295.8	473.8	674.8	825.8	930.8
Storage volume of combination tank, left		litres	-	-	675.3	826.3	931.4
Storage volume of combination tank, centre		litres	-	-	675.7	826.7	931.9
Standing loss Q _{ST}		kWh/24h	1.59	1.64	1.91	2.62	3.18

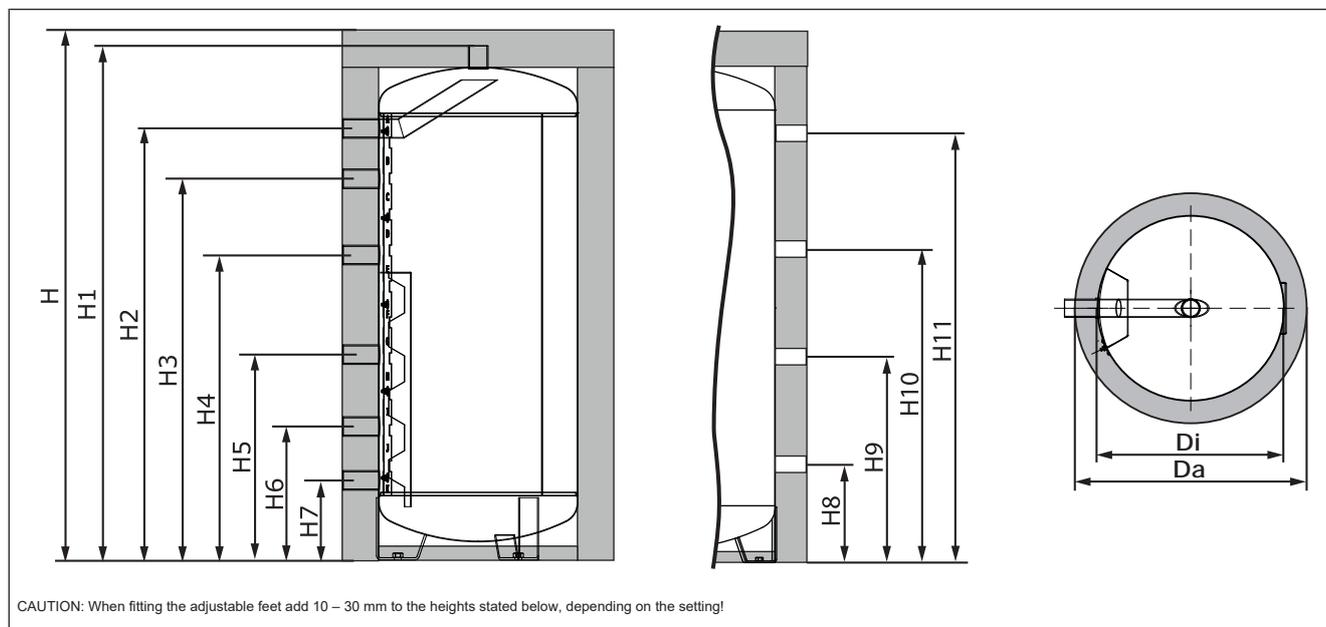
1. Layered tanks 300, 500 and 2000 not available as combination tanks

Description			Layered tank				
			1250	1500	1700	2000 ¹⁾	2200
Permissible operating pressure	hot water side	bar	3	3	3	3	3
Permissible operating temperature	hot water side	°C	95	95	95	95	95
Empty weight		kg	158	178	217	243	258
Empty weight of combination tank, left		kg	162	182	221	-	262
Empty weight of combination tank, centre		kg	-	-	-	-	-
Standing loss S		W	137.9	154.6	176.3	178.3	-
Storage volume		litres	1240.8	1402.8	1696.8	1993	2167.8

Description		Layered tank				
		1250	1500	1700	2000 ¹⁾	2200
Storage volume of combination tank, left	litres	1241.4	1403.4	1697.4	-	2168.4
Standing loss Q_{ST}	kWh/24h	3.31	3.71	4.23	4.28	-

1. Layered tanks 300, 500 and 2000 not available as combination tanks

4.1.2 Dimensions of layered tanks



Dimension	Description		300 ¹⁾	500 ¹⁾	700	850	1000
Da	Diameter incl. insulation	mm	750	850	990	990	990
Di	Diameter excl. insulation		550	650	790	790	790
H	Height incl. insulation		1470	1690	1640	1950	2163
H1	Height excl. insulation		1430	1650	1600	1910	2123
H2	Height of flow connection		1200	1398	1336	1648	1862
H3	Height of flow connection		1060	1248	1186	1398	1612
H4	Height of flow connection		848	1000	929	1122	1332
H5	Height of return connection		571	643	611	712	801
H6	Height of return connection		371	393	405	452	452
H7	Height of return connection		221	243	255	252	252
H8	Connections: combination tanks		-	-	312	312	312
H9	Connections: combination tanks		-	-	796	950	809
H10	Connections: combination tanks		-	-	1279	1588	1305
H11	Connections: combination tanks		-	-	-	-	1802
	Minimum width required		560	660	800	800	800
	Tilting height		1450	1670	1620	1930	2140
	Minimum store-room height	1590	1810	1760	2070	2280	

1. Layered tanks 300, 500 and 2000 not available as combination tanks!

Dimension	Description		1250	1500	1700	2000 ¹⁾	2200
Da	Diameter incl. insulation	mm	1150	1150	1300	1300	1300
Di	Diameter excl. insulation		950	950	1100	1100	1100
H	Height incl. insulation		2000	2257	2120	2435	2609
H1	Height excl. insulation		1960	2217	2080	2400	2569
H2	Height of flow connection		1639	1897	1743	2059	2228
H3	Height of flow connection		1439	1697	1543	1813	1978
H4	Height of flow connection		1142	1347	1293	1513	1586
H5	Height of return connection		767	810	834	934	934
H6	Height of return connection		510	510	534	584	534
H7	Height of return connection		310	310	334	339	334
H8	Connections: combination tanks		367	367	391	-	391
H9	Connections: combination tanks		774	858	823	-	988
H10	Connections: combination tanks		1180	1349	1254	-	1584
H11	Connections: combination tanks		1587	1840	1686	-	2181
	Minimum width required		960	960	1110	1110	1110
	Tilting height		2014	2265	2130	2440	2620
	Minimum store-room height		2120	2370	2240	2555	2730

1. Layered tanks 300, 500 and 2000 not available as combination tanks!

4.1.3 Layered tank / combination tank connections

	Item	Description	Dimension
	S1 – S7	Domestic hot water connections	1 ½" IT
	E1 – E3	Facility for connecting an electric heating element NOTICE! When an electric heating element is connected to connection E1, break through the pre-punched plate in the guide structure	1 ½" IT
	F	Sensor terminal strip item A – K ➔ "Positioning the sensor" [▶ 40]	
	SV	Connections: combination tanks (only for combination layered tanks: 3 x SV for 700 and 850 combination tanks 4 x SV for 1000 - 2200 combination tanks)	Ø 76.1 mm
	K	2 x Victaulic flexible connection couplings (only for combination layered tanks)	Type 75

4.2 Solar layered tank

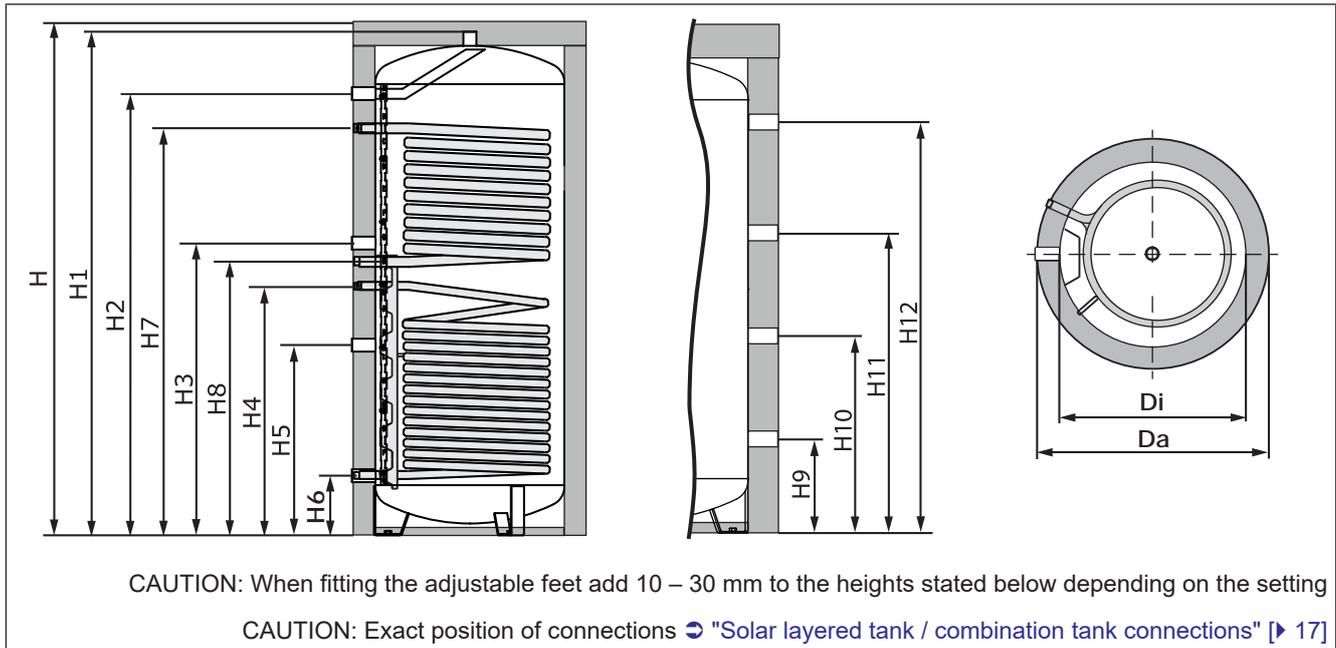


Tank material:	S235JR+AR steel plate, with external rustproof primer, interior unpainted
Element material:	P235GH steel pipe
Design:	<ul style="list-style-type: none"> ▪ upright; with feet (3x for 700 – 1250 tanks, 4x for 1500 tanks) – height adjustment optional with adjustable feet ▪ with special layer separator for precise temperature layering ▪ permanently welded plain pipe coil for loading tank with e.g. solar energy
Heating tank:	from solid fuel boiler, solar panel systems or other heat generators

4.2.1 Technical specifications - solar layered tanks

Description			Solar layered tank				
			700	850	1000 ¹⁾	1250	1500
Permissible operating pressure	hot water side	bar	3	3	3	3	3
	Solar coil	bar	16	16	16	16	16
Permissible operating temperature	hot water side	°C	95	95	95	95	95
	Solar coil	°C	110	110	110	110	110
Heating surface	Bottom solar coil	m ²	2.0	2.5	2.5	3	4
	Top solar coil	m ²	-	-	1.8	-	-
Solar collector area	optimum / maximum	m ²	6 / 8	8 / 12	8 / 12	8 / 12	12 / 16
Empty weight	with 1 solar coil	kg	114	138	148	205	240
	with 2 solar coils	kg	-	-	177	-	-
Empty weight combination tank	with 1 solar coil	kg	116	141	152	-	-
	with 2 solar coils	kg	-	-	181	-	-
Water capacity	Bottom solar coil	litres	13	16	16	18	24
	Top solar coil	litres	-	-	12	-	-
Standing loss S		W	83.8	113.3	136.7	142.1	158.8
Storage volume		litres	674.8	825.8	930.8	1240.8	1402.8
Storage volume of combination tank		litres	675.3	826.3	931.4	-	-
Standing loss Q _{ST}		kWh/24h	2.01	2.72	3.28	3.41	3.81
1. The 1000 solar layered tank is available alternatively with 2 solar coils							

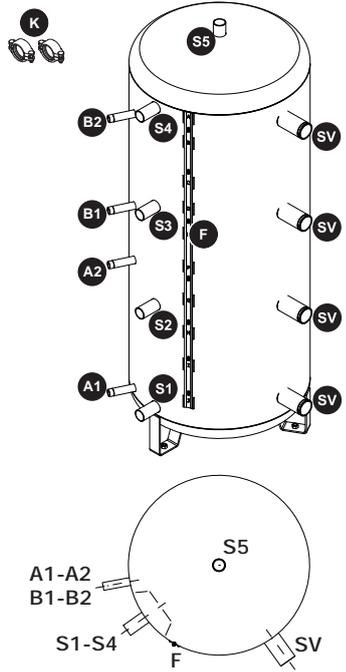
4.2.2 Dimensions of solar layered tanks



Dimension	Description		700	850	1000 ¹⁾	1250	1500
Da	Diameter incl. insulation	mm	990	990	990	1150	1150
Di	Diameter excl. insulation		790	790	790	950	950
H	Height incl. insulation		1640	1950	2163	2000	2257
H1	Height excl. insulation		1600	1910	2123	1960	2217
H2	Height of flow connection		1336	1648	1862	1639	1897
H3	Height of flow connection		930	1122	1332	1142	1347
H4	Height of solar flow connection		795	940	940	998	1228
H5	Height of return connection		612	712	802	767	810
H6	Height of return connection / solar return connection		255	252	252	310	310
H7	Height of solar flow connection 2nd coil (alternative)		-	-	1727	-	-
H8	Height of solar return connection 2nd coil (alternative)		-	-	1232	-	-
H9	Connections: combination tanks		312	312	312	-	-
H10	Connections: combination tanks		796	950	809	-	-
H11	Connections: combination tanks		1279	1588	1305	-	-
H12	Connections: combination tanks		-	-	1802	-	-
	Minimum width required		800	800	800	960	960
	Tilting height		1620	1930	2140	2014	2265
	Minimum store-room height	1760	2070	2280	2120	2370	

1. The 1000 solar layered tank is available alternatively with 2 solar coils.

4.2.3 Solar layered tank / combination tank connections

	Item	Description	Dimension
	S1 – S5	Domestic hot water connections	1 ½" IT
	A1 – A2	Connections: solar panel system, 1st coil	1" ET
	B1 – B2	Connections: solar panel system, 2nd coil alternative for 1000 solar layered tank	1" ET
	F	Sensor terminal strip item A – K ➔ "Positioning the sensor" [▶ 40]	
	SV	Combination tank connections (only for combination solar layered tanks: 3x SV for 700, 850 combination tanks 4x SV for 1000 combination tanks)	Ø 76.1 mm
	K	2 x Victaulic flexible connection couplings (only for combination solar layered tanks)	Type 75

4.3 H2 hygienic layered tank



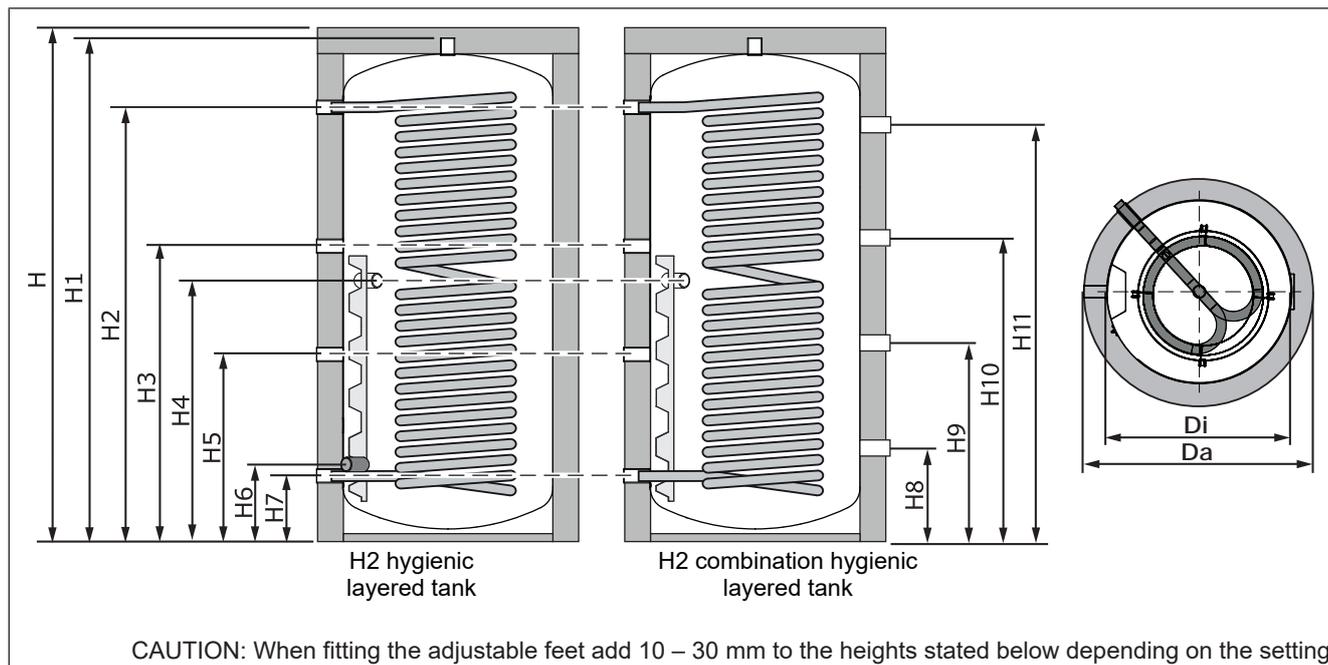
Tank material:	S235JR+AR steel plate, with external rustproof primer, interior unpainted
Element material:	austenitic CrNiMo steel 1.4404 (Niro)
Design:	<ul style="list-style-type: none"> ▪ upright; with feet (3x with tanks 500 – 1250, 4x with tanks 1500 – 1700) – height adjustment optional with adjustable feet ▪ with special layer separator for precise temperature layering ▪ integrated corrugated pipe element for hygienic heating of drinking water
Heating tank:	from solid fuel boiler, electric heating element or other heat generators
Heating drinking water:	<p>flow principle:</p> <p>The small volume of warm drinking water in the corrugated pipe element means that it is always heated to the maximum temperature and very frequently renewed, thus reducing the risk of Legionella forming.</p> <p>The thermal expansion of the corrugated pipe element prevents excessive limescale deposits. The limescale deposits that build up are broken off by the movement of the element pipe and are washed away with the flow of water.</p>

4.3.1 Technical specifications - H2 hygienic layered tank

Description			H2 hygienic layered tank							
			500	700 ¹⁾	850 ¹⁾	1000 ¹⁾	1250	1500	1700	2000
Permissible operating pressure	hot water side	bar	3	3	3	3	3	3	3	3
	drinking water side	bar	6	6	6	6	6	6	6	6
Permissible operating temperature	hot water side	°C	95	95	95	95	95	95	95	95
	drinking water side	°C	95	95	95	95	95	95	95	95
Heating surface	Drinking water coil	m ²	5.6	5.6	6.0	6.6	6.6	6.6	6.6	6.6
Performance indicator	Drinking water coil	NL	1.2	1.4	1.9	2.5	3.1	3.8	3.8	3.8
Output of coil ²⁾	Drinking water coil	kW	55	55	60	75	75	75	75	75
Heating water flow dT = 20K	Drinking water coil	m ³ /h	3.5	3.5	4.0	5.95	6.35	6.64	6.85	6.85
Flow capacity ³⁾	Drinking water coil	l/h	850	1180	1290	1520	1615	1615	1615	1615
Empty weight		kg	109	122	138	157	201	224	263	292
Empty weight of combination tank		kg	-	125	142	161	-	-	-	-
Water capacity	drinking water side	litres	35	35	40	43	43	43	43	43
Energy efficiency class			B	-	-	-	-	-	-	-
Standing loss S		W	70.4	83.8	113.3	136.7	142.1	158.8	178.3	178.3
Storage volume		litres	473.7	674.7	825.7	930.7	1240.7	1402.7	1696.7	1993
Storage volume of combination tank		litres	-	675.1	826.1	931.3	-	-	-	-
Standing loss Q _{ST}		kWh/24h	1.69	2.01	2.72	3.28	3.41	3.81	4.28	4.28

1. H2 700, 850 and 1000 hygienic layered tanks are available as combination tanks.
2. Continuous output (tv = 70° C)
3. 70° C (fully loaded tank); 25 l/min at 45° C

4.3.2 Dimensions of the H2 hygienic layered tank / combination stank



Dimension	Description		500	700	850	1000	1250	1500	1700	2000
Da	Diameter incl. insulation	mm	850	990	990	990	1150	1150	1300	1300
Di	Diameter excl. insulation		650	790	790	790	950	950	1100	1100
H	Height incl. insulation		1690	1640	1950	2163	2000	2257	2120	2435
H1	Height excl. insulation		1650	1600	1910	2123	1960	2217	2080	2400
H2	Height, flow / warm drinking water connection		1398	1336	1648	1862	1639	1897	1743	2055 / 2063
H3	Height of flow connection		1000	862	1122	1332	1142	1347	1293	1513
H4	Height, top electric heating element connection		921	862	999	1164	1067	1311	1156	1405
H5	Height of return connection		643	611	712	802	767	810	834	934
H6 ¹⁾	Height, bottom electric heating element connection		-	285	282	282	340	340	364	369
H7	Height, cold drinking water / return connection		243	255	252	252	310	310	334	339
H8	Connections: combination tanks		-	312	312	312	-	-	-	-
H9	Connections: combination tanks		-	796	950	809	-	-	-	-
H10	Connections: combination tanks		-	1279	1588	1305	-	-	-	-
H11	Connections: combination tanks		-	-	-	1802	-	-	-	-
	Minimum width required		660	800	800	800	960	960	1110	1110
	Tilting height		1670	1620	1930	2140	2014	2265	2130	2620
	Minimum store-room height		1810	1760	2070	2280	2120	2370	2240	2555

1. Bottom electric heating element connection present only on the H2 hygienic layered tank

4.3.3 H2 hygienic layered tank connections

	Item	Description	Dimension
	S1 – S5	Domestic hot water connections	1 ½" IT
	T1	Cold drinking water connection	1 ¼" ET
	T2	Warm drinking water connection	1 ¼" ET
	E1, E2	Electric heating element connection Max. installed length: <ul style="list-style-type: none"> ▪ H2 700-1000: max. 660 mm ▪ H2 1250-1500: max. 760 mm ▪ H2 1700-2000: max. 830 mm 	1 ½" IT
	F	Sensor terminal strip item A – K ➔ "Positioning the sensor" [▶ 40]	

4.3.4 H2 combination hygienic layered tank connections

	Item	Description	Dimension
	S1 – S5	Domestic hot water connections	1 ½" IT
	T1	Cold drinking water connection	1 ¼" ET
	T2	Warm drinking water connection	1 ¼" ET
	E1	Electric heating element connection Max. installed length: <ul style="list-style-type: none"> ▪ H2 700-1000: max. 660 mm ▪ H2 1250-1500: max. 760 mm ▪ H2 1700-2000: max. 830 mm 	1 ½" IT
	F	Sensor terminal strip item A – K ➔ "Positioning the sensor" [▶ 40]	
	SV	Connections: combination tanks 3 x SV for 700 and 850 combination tanks 4 x SV for 1000 combination tanks	Ø 76.1 mm
	K	2x Victaulic flexible connection couplings	Type 75

4.4 H3 hygienic solar layered tank

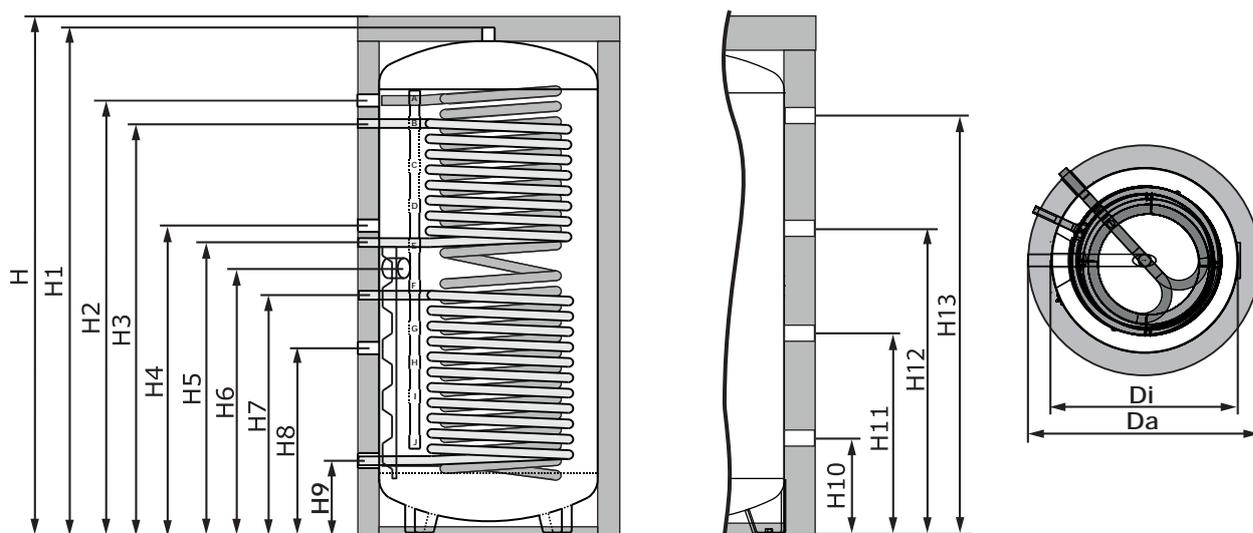


Tank material:	S235JR+AR steel plate, with external rustproof primer, interior unpainted
Element material:	<ul style="list-style-type: none"> ▪ corrugated pipe element: austenitic CrNiMo steel 1.4404 (Niro) ▪ Plain pipe element: P235GH steel pipe
Design:	<ul style="list-style-type: none"> ▪ upright; with feet (3x with tanks 700 – 1250, 4x with tank 1500) – height adjustment optional with adjustable feet ▪ with special layer separator for precise temperature layering ▪ 2 permanently welded plain pipe elements for loading tank with e.g. solar energy. ▪ integrated corrugated pipe element for hygienic heating of drinking water
Heating tank:	from solid fuel boiler, solar panel system, electric heating element or other heat generators
Heating drinking water:	<p>flow principle:</p> <p>The small volume of warm drinking water in the corrugated pipe element means that it is heated to the maximum temperature and very frequently renewed, thus reducing the risk of Legionella forming.</p> <p>The thermal expansion of the corrugated pipe element prevents excessive limescale deposits. The limescale deposits that build up are broken off by the movement of the element pipe and are washed away with the flow of water.</p>

4.4.1 Technical specifications - H3 hygienic solar layered tank

Description			700	850	1000	1250	1500	2000
Permissible operating pressure	hot water side	bar	3	3	3	3	3	3
	drinking water side	bar	6	6	6	6	6	6
	Solar coil	bar	16	16	16	16	16	16
Permissible operating temperature	hot water side	°C	95	95	95	95	95	95
	drinking water side	°C	95	95	95	95	95	95
	Solar coil	°C	110	110	110	110	110	110
Heating surface	Drinking water coil	m ²	5.6	6.0	6.6	6.6	6.6	6.6
	Top solar coil	m ²	1.6	2.2	2.2	2.4	2.4	2.4
	Bottom solar coil	m ²	2.4	3.0	3.0	3.0	4.0	4.0
Performance indicator	Drinking water coil	NL	1.4	1.9	2.5	3.1	3.8	3.9
Output of coil ¹⁾	Drinking water coil	kW	55	60	75	75	75	75
Heating water flow dT = 20K	Drinking water coil	m ³ /h	3.5	4.0	5.95	6.35	6.64	6.64
Flow capacity ²⁾	Drinking water coil	l/h	1180	1290	1520	1615	1615	1615
Solar collector area	optimum / maximum	m ²	6 / 8	8 / 12	8 / 12	8 / 12	12 / 16	12 / 16
Empty weight		kg	178	223	238	278	325	394
Empty weight of combination tank		kg	181	226	242	-	329	-
Water capacity	drinking water side	litres	35	40	43	43	43	43
	Top solar coil	litres	11	15	15	16	16	16
	Bottom solar coil	litres	16	18	18	18	24	24
Standing loss S		W	90.0	119.6	142.9	148.3	165.0	178.3
Storage volume		litres	674.7	825.7	930.7	1240.7	1402.7	1993
Storage volume of combination tank		litres	675.1	826.1	931.3	-	1403.3	-
Standing loss Q _{ST}		kWh/24h	2.16	2.87	3.43	3.56	3.96	4.28
1. Continuous output (tv = 70° C) 2. 70° C (fully loaded tank); 25 l/min at 45° C								

4.4.2 Dimensions of the H3 hygienic solar layered tank

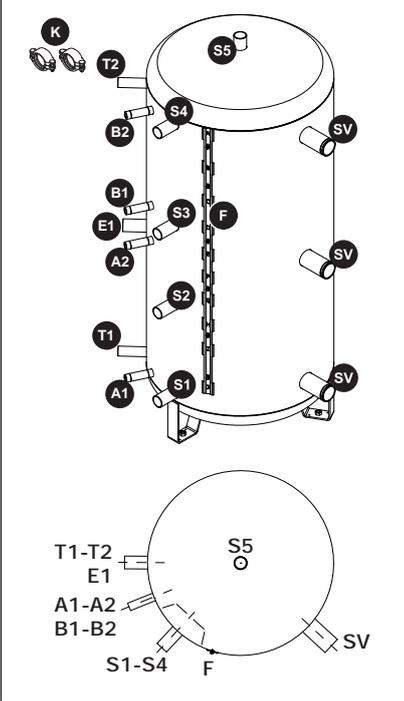


CAUTION: When fitting the adjustable feet add 10 – 30 mm to the heights stated below, depending on the setting!

CAUTION: Exact position of connections → "H3 hygienic solar layered tank / combination tank connections" ▶ 24]

Dimension	Description		700	850	1000	1250	1500	2000
Da	Diameter incl. insulation	mm	990	990	990	1150	1150	1300
Di	Diameter excl. insulation		790	790	790	950	950	1100
H	Height incl. insulation		1640	1950	2163	2000	2257	2435
H1	Height excl. insulation		1600	1910	2123	1960	2217	2400
H2	Height, flow / warm drinking water connection		1336	1648	1862	1639	1897	2055 / 2063
H3	Height, solar flow connection, top coil		1291	1616	1727	1639	1897	2063
H4	Height of flow connection		930	1122	1332	1142	1357	1513
H5	Height, solar return connection, top coil		930	1122	1232	1104	1347	1523
H6	Height, electric heating element connection		862	1002	1164	1067	1311	1405
H7	Height, solar flow connection, bottom coil		795	940	940	998	1228	1252
H8	Height of return connection		612	712	802	767	810	934
H9	Height, return / solar return connection, bottom coil / cold drinking water		255	252	252	310	310	339
H10	Connections: combination tanks		312	312	312	-	367	-
H11	Connections: combination tanks	796	950	809	-	858	-	
H12	Connections: combination tanks	1279	1588	1305	-	1349	-	
H13	Connections: combination tanks	-	-	1802	-	1840	-	
	Minimum width required	800	800	800	960	960	1110	
	Tilting height	1620	1930	2140	2014	2265	2620	
	Minimum store-room height	1760	2070	2280	2120	2370	2555	

4.4.3 H3 hygienic solar layered tank / combination tank connections

	Item	Description	Dimension
	S1 – S5	Domestic hot water connections	1 ½" IT
	A1 – A2	Lower solar coil connection	1" ET
	B1 – B2	Upper solar coil connection	1" ET
	T1	Cold drinking water connection	1 ¼" ET
	T2	Warm drinking water connection	1 ¼" ET
	E1	Electric heating element connection Max. installed length: <ul style="list-style-type: none"> ▪ H3 700-1000: max. 660 mm ▪ H3 1250-1500: max. 760 mm ▪ H3 1700-2000: max. 830 mm 	1 ½" IT
	F	Sensor terminal strip item A – K "Positioning the sensor" [▶ 40]	
	SV	Connections: combination tanks (only for combination hygienic solar layered tanks: 3 x SV for 700 and 850 combination tanks 4 x SV for 1000 and 1500 combination tanks)	Ø 76.1 mm
	K	2 x Victaulic flexible connection couplings (only H3 combination hygienic solar layered tank)	Type 75

4.5 FW modular layered tank



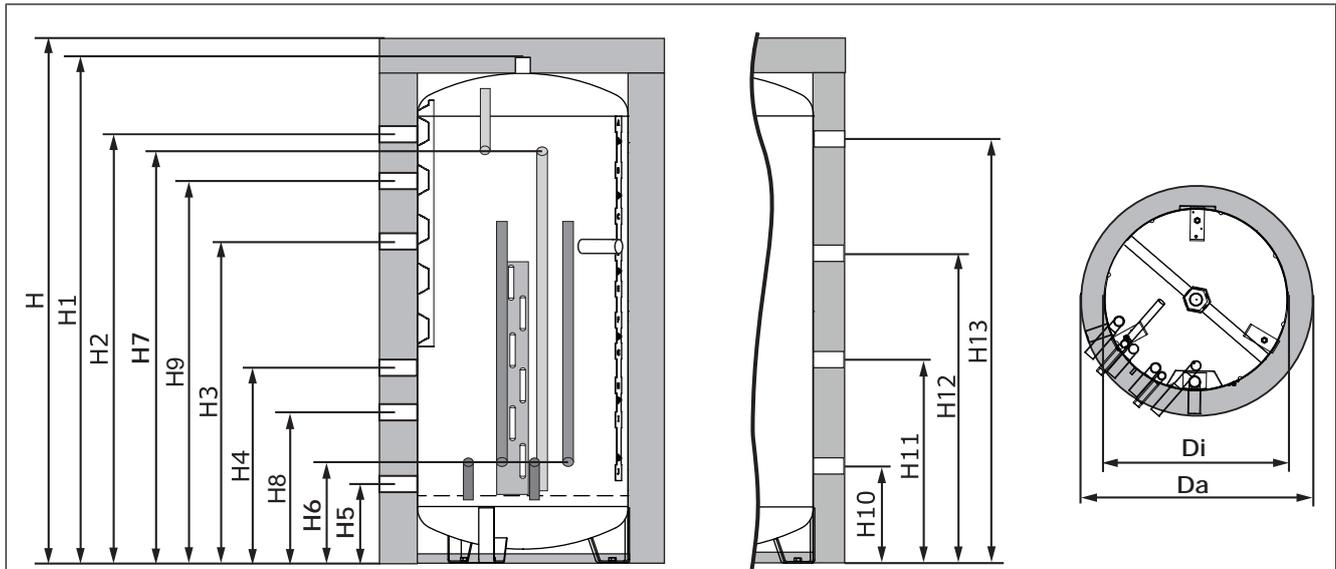
Tank material:	S235JR+AR steel plate, with external rustproof primer, interior unpainted
Design:	<ul style="list-style-type: none"> ▪ upright; with feet (3x for 850 – 1000 tanks, 4x for 1500 tanks) – height adjustment optional with adjustable feet ▪ with integrated temperature control system TCS ▪ connections available for fresh water module, 2 heating circuit modules and other heat generators
Heating tank:	from solid fuel boiler, electric heating element or other heat generators
Heating drinking water:	<p>on the flow principle:</p> <p>The small volume of warm drinking water in the fresh water module means that it is always heated to the maximum temperature and very frequently renewed. which reduces the risk of Legionella forming.</p> <p>The pre-set hot water temperature in the fresh water module keeps limescale deposits to a minimum.</p>

4.5.1 Technical specifications - FW modular layered tank

Description			850	1000	1500
Permissible operating pressure	hot water side	bar	3	3	3
Permissible operating temperature	hot water side	°C	95	95	95
Empty weight		kg	122	132	206
Empty weight of combination tank		kg	125	136	210
Standing loss S		W	113.3	136.7	158.8
Storage volume		litres	826.3	931.3	1403.3
Storage volume of combination tank		litres	826.7	931.9	1403.9
Standing loss Q_{ST}		kWh/24h	2.72	3.28	3.81

Fresh water module [↪ "Technical specifications - fresh water module" \[▶ 31\]](#)

4.5.2 Dimensions of the FW modular layered tank



CAUTION: When fitting the adjustable feet add 10 – 30 mm to the heights stated below, depending on the setting!

CAUTION: Exact position of connections → "FW modular layered tank / combination tank connections" [▶ 27]

Dimension	Description		850	1000	1500
Da	Diameter incl. insulation	mm	990	990	1150
Di	Diameter excl. insulation		790	790	950
H	Height incl. insulation		1950	2163	2257
H1	Height excl. insulation		1910	2123	2217
H2	Height of flow connection		1648	1862	1897
H3	Height of flow connection		1122	1332	1347
H4	Height of return connection		712	802	810
H5	Height of return connection		252	252	310
H6	Height, flow and return connections		312	312	367
H7	Height, fresh water module connection		1462	1562	1540
H8	Height of return connection		452	452	510
H9	Height of flow connection		1398	1612	1697
H10	Connections: combination tanks		312	312	367
H11	Connections: combination tanks		950	809	858
H12	Connections: combination tanks		1588	1305	1349
H13	Connections: combination tanks		-	1802	1840
	Minimum width required		800	800	960
	Tilting height		1930	2140	2265
	Minimum store-room height		2070	2280	2370

4.5.3 FW modular layered tank / combination tank connections

	Item	Description	Dimension
<p>The diagram illustrates the connection layout for a modular layered tank. It shows two views: a side view of the tank with various ports labeled S1 through S7, E1, T1, T2, A1, A2, B1, B2, F, D, and SV, and a top-down view of the tank base showing the arrangement of these ports. Item K is shown as two flexible connection couplings.</p>	S1 – S7	Heating connections	1 ½" IT
	E1	Electric heating element connection	1 ½" IT
	T1 – T2	Fresh water module connections	1" ET
	A1 – A2	Heating circuit module 1 connections	1 ¼" IT
	B1 – B2	Heating circuit module 2 connections	1 ¼" IT
	F	Sensor terminal strip	
	D	Fresh water module attachment	M10
	SV	Combination tank connections (only for combination modular layered tanks: 3x SV for 850 combination tanks 4x SV for 1000 – 1500 combination tanks)	Ø 76.1 mm
	K	2 x Victaulic flexible connection couplings (only for combination modular layered tanks)	Type 75

4.6 FW modular solar layered tank

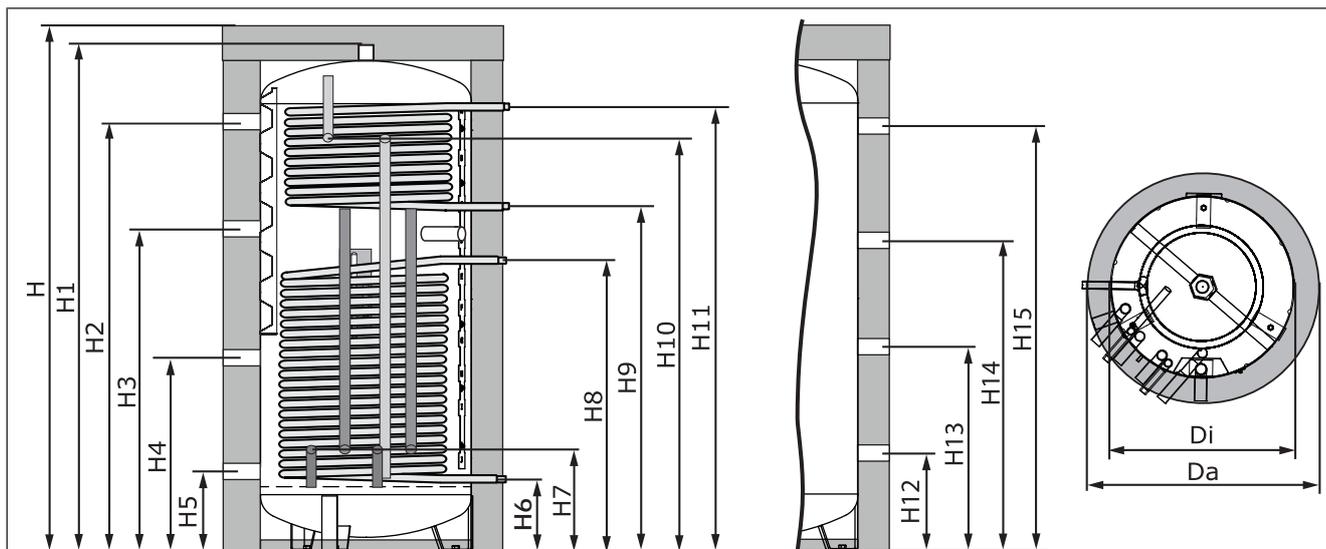


Tank material:	S235JR+AR steel plate, with external rustproof primer, interior unpainted
Element material:	P235GH steel pipe
Design:	<ul style="list-style-type: none"> ▪ upright; with feet (3x for 850 – 1000 tanks) – with optional height adjustment feet ▪ with integrated temperature control system TCS ▪ connections available for fresh water module, 2 heating circuit modules, solar module and other heat generators ▪ 2 permanently welded plain pipe coils for loading tank with e.g. solar energy
Heating tank:	from solid fuel boiler, solar panel system, electric heating element or other heat generators
Heating drinking water:	<p>on the flow principle:</p> <p>The small volume of warm drinking water in the fresh water module means that it is always heated to the maximum temperature and very frequently renewed. which reduces the risk of Legionella forming.</p> <p>The pre-set hot water temperature in the fresh water module keeps limescale deposits to a minimum.</p>

4.6.1 Technical specifications - FW modular solar layered tank

Description			850	1000
Permissible operating pressure	hot water side	bar	3	3
	Solar coil	bar	16	16
Permissible operating temperature	hot water side	°C	95	95
	Solar coil	°C	110	110
Heating surface	Solar coil top / bottom	m ²	1.8 / 2.5	2.2 / 2.5
Solar collector area	optimum / maximum		8 / 12	8 / 12
Empty weight		kg	166	200
Empty weight of combination tank		kg	169	204
Water capacity	Solar coil top / bottom	litres	12 / 16	15 / 16
Standing loss S		W	119.6	142.9
Storage volume		litres	826.3	931.3
Storage volume of combination tank		litres	826.7	931.9
Standing loss Q _{ST}		kWh/24h	2.87	3.43

4.6.2 Dimensions of the FW modular solar layered tank



CAUTION: When fitting the adjustable feet add 10 – 30 mm to the heights stated below, depending on the setting!

CAUTION: Exact position of connections → "FW modular solar layered tank / combination tank connections" [▶ 30]

Dimension	Description		850	1000
Da	Diameter incl. insulation	mm	990	990
Di	Diameter excl. insulation		790	790
H	Height incl. insulation		1950	2163
H1	Height excl. insulation		1910	2123
H2	Height of flow connection		1648	1862
H3	Height of flow connection		1122	1332
H4	Height of return connection		712	802
H5	Height of return connection		252	252
H6	Height, solar return, bottom coil		252	251
H7	Height, flow and return connections		312	312
H8	Height, solar flow bottom coil		940	940
H9	Height, solar return, top coil		1122	1232
H10	Height, fresh water module connection		1462	1562
H11	Height, solar flow top coil		1617	1726
H12	Connections: combination tanks		312	312
H13	Connections: combination tanks		950	809
H14	Connections: combination tanks		1588	1305
H15	Connections: combination tanks		-	1802
	Minimum width required			800
	Tilting height		1930	2140
	Minimum store-room height		2070	2280

4.6.3 FW modular solar layered tank / combination tank connections

	Item	Description	Dimension
	S1 – S5	Domestic hot water connections	1 ½" IT
	E1	Electric heating element connection	1 ½" IT
	T1 – T2	Fresh water module connections	1" ET
	A1 – A2	Lower solar coil connection	1" ET
	B1 – B2	Upper solar coil connection	1" ET
	X1 – X2	Heating circuit module 1 connections	1 ¼" IT
	Y1 – Y2	Heating circuit module 2 connections	1 ¼" IT
	F	Sensor terminal strip	
	D	Fresh water module attachment	M10
	SV	Connections: combination tanks (only for combination modular solar layered tanks: 3 x SV for 850 combination tanks 4x SV for 1000 combination tanks)	Ø 76.1 mm
	K	2 x Victaulic flexible connection couplings (only for combination modular solar layered tanks)	Type 75

4.6.4 Technical specifications - fresh water module



Data measured at a cold water inlet temperature of 10° C and hot water outlet temperature of 45° C;
storage tank temperature 80° C

Description		for modular (solar) layered tanks		
		850	1000	1500
Permissible operating pressure	bar	10	10	10
Permissible operating temperature	°C	95	95	95
Overall flow rate	litres	1320	1725	2160
Performance indicator	NL	4.8	5.3	5.9
Max. output capacity	l/min.	30	30	30
Charging pump		230 V / 50 Hz, power consumption 3-45 W, nominal current 0.03-0.44 A		
Circulation unit		230 V / 50 Hz, power consumption 8 W, nominal current <0.1 A		
Dimensions (W x H x D)	mm	400 x 800 x 330	400 x 800 x 330	400 x 800 x 330
Weight	kg	20	20	20

4.7 Layered tank with flange



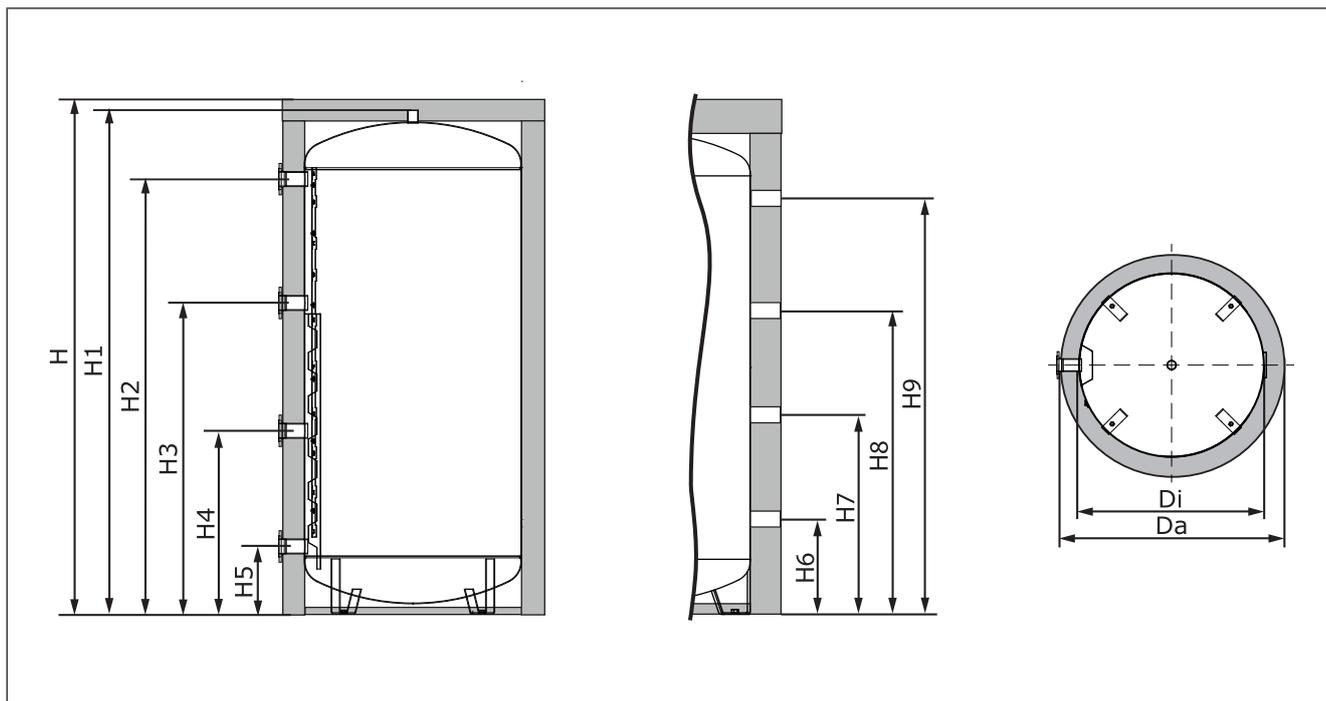
Tank material:	S235JR+AR steel plate, with external rustproof primer, interior unpainted
Design:	<ul style="list-style-type: none"> ▪ upright; with feet (4x for 1500 - 2200 tanks) – with optional height adjustment feet ▪ with special layer separator for precise temperature layering
Heating tank:	via a solid fuel boiler or other heat generators

4.7.1 Technical specifications – layered tanks with flange

Description			1000 ¹⁾	1500	1700	2200
Permissible operating pressure	hot water side	bar	3	3	3	3
Permissible operating temperature	hot water side	°C	95	95	95	95
Empty weight		kg	166	200	266	303
Empty weight of combination tank		kg	169	204	270	307
Standing loss S		W	132.5	154.6	176.3	-
Storage volume		litres	931.9	1402.7	1696.7	2167.7
Storage volume of combination tank		litres	931.2	1403.2	1697.2	2168.2
Standing loss Q _{ST}		kWh/24h	3.18	3.71	4.23	-

1. 1000 layered tanks with flange available only as combination tanks.

4.7.2 Dimensions of layered tank with flange



Dimension	Description		1000 ¹⁾	1500	1700	2200
Da	Diameter incl. insulation	mm	990	1150	1300	1300
Di	Diameter excl. insulation		790	950	1100	1100
H	Height incl. insulation		2163	2257	2120	2609
H1	Height excl. insulation		2123	2217	2080	2569
H2	Height of flow connection		1852	1887	1733	2218
H3	Height of flow connection		1332	1347	1293	1586
H4	Height of return connection		802	810	834	934
H5	Height of return connection		252	320	344	344
H6	Connections: combination tanks		312	367	391	391
H7	Connections: combination tanks		809	858	823	988
H8	Connections: combination tanks		1305	1349	1254	1584
H9	Connections: combination tanks		1802	1840	1686	2181
	Minimum width required		800	960	1110	1110
	Tilting height		2140	2265	2130	2620
	Minimum store-room height	2280	2370	2240	2730	

1. 1000 layered tanks with flange available only as combination tanks.

4.7.3 Layered tank with flange / combination tank connections

	Item	Description	Dimension
	S1 – S4	Side connections for domestic hot water	DN 65
	S5	Top connection for domestic hot water	1 ½" IT
	F	Sensor terminal strip	
	SV	Connections: combination tanks (only for combination layered tanks)	Ø 76.1 mm
	K	2 x Victaulic flexible connection couplings (only for combination layered tanks)	Type 75

4.8 Insulation

4.8.1 Technical specifications - insulation

Name		acc. to standard
Material	Neopor + fleece	
Surface	Polypropylene	
Closing	Zip	
Total jacket insulation thickness	100 mm	
Neopor / fleece	80 / 20 mm	
Total cover insulation thickness	100 mm	
Neopor / fleece	50 / 50 mm	
Total floor insulation thickness (fleece only)	50 mm	
Lambda value Neopor / fleece	0.032 / 0.039 W/mK	DIN EN 12667
Fire class	B2	DIN 4102
Temperature resistance	95 °C	

5 Installation

CAUTION



Assembly and installation by unqualified persons:

Risk of personal injury and damage to property

During assembly and installation:

- Observe the instructions and information in the manuals
- Only allow appropriately qualified personnel to work on the system

5.1 Materials supplied

The tank is delivered on a pallet. The insulation is packed separately, self-adhesive collars and insulating material are enclosed wrapped in film.



A Insulation

D Optional: couplings for combination tanks

B Tank

E Label: Energy Efficiency Category as per Commission Delegated Regulation (EU) 812/2013²⁾

C Document pack incl. identification plate¹⁾

1. Identification plate provided must be affixed to the fully insulated tank where it can be clearly seen and easily accessed.

2. Only for tanks 300 / 500 (sample illustration)

NOTICE

Keep insulation out of direct sunlight.

5.2 Positioning

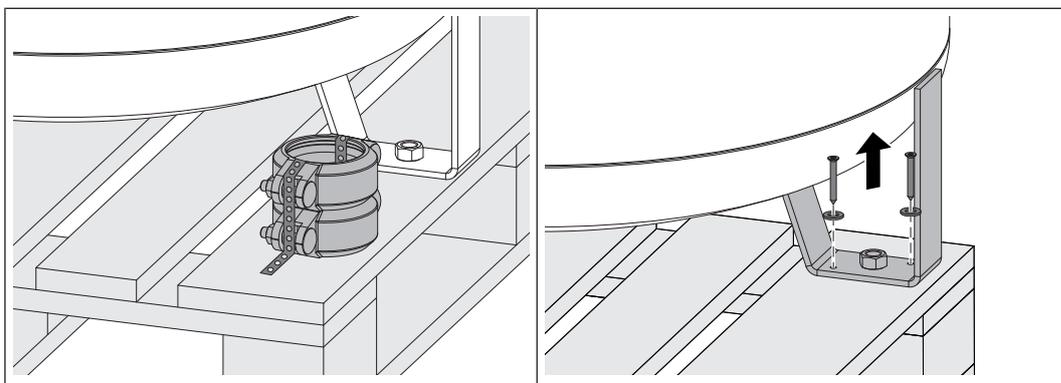
NOTICE



Possibility of damage to components if handled incorrectly

- Follow the transport instructions on the packaging
- Transport components with care to avoid damage
- Protect components against damp
- Unloading, positioning and installation should only be performed by appropriately trained professionals. Staff must be trained in techniques for moving heavy loads (correct tools and lifting equipment, hooking and slinging points, etc.)

5.2.1 Removing the tank from the pallet



- Optional for combination tanks: Remove the couplings from the pallet
- Remove the screws from the base of the tank
- Lift the tank off the pallet

- Position a fork-lift or similar lifting device in the recesses on the underside of the tank and move the tank into position

Applies only to layered tanks, solar layered tanks, FW modular layered tanks, FW modular solar layered tanks and layered tanks with flanges:

NOTICE! If the tank cannot be brought in vertically, it can also be transported to the boiler room horizontally

- Make allowance for the tilting height!
- Take care not to damage the connections

5.2.2 Temporary storage

If the system is to be assembled at a later stage:

- store components in a protected location which is dry and free from dust
 - ↳ Damp and frost can damage components and reduce the efficiency of the insulation

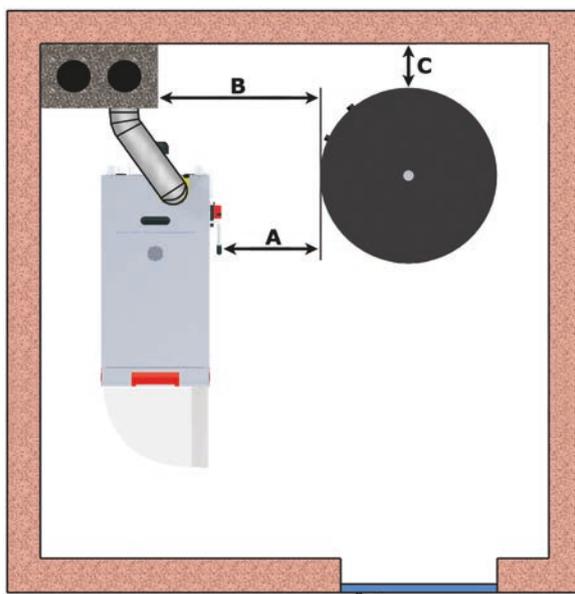
NOTICE

Keep insulation out of direct sunlight.

5.3 Installing the tank in the boiler room

5.3.1 Recommended clearances in the boiler room

- The system should generally be set up so that it is accessible from all sides to allow quick and easy maintenance!
- Regional regulations regarding necessary maintenance areas for inspecting the chimney should be observed in addition to the specified distances!
- Observe the applicable standards and regulations when setting up the system!
- Comply with additional standards for noise protection!
(ÖNORM H 5190 - Noise protection measures)
- Observe local country regulations regarding thermal insulation!



The following clearances are applicable for all tank systems in these instructions:

Dimension	Description	
A	Distance between tank (incl. insulation) and boiler	300 mm
B	Distance between tank (incl. insulation) and flue pipe	500 mm
C	Distance between tank (incl. insulation) and wall	100 mm

5.3.2 Requirements at the installation room

The installation room must comply with the following requirements in order for the storage system to function safely and to prevent damage to the tank:

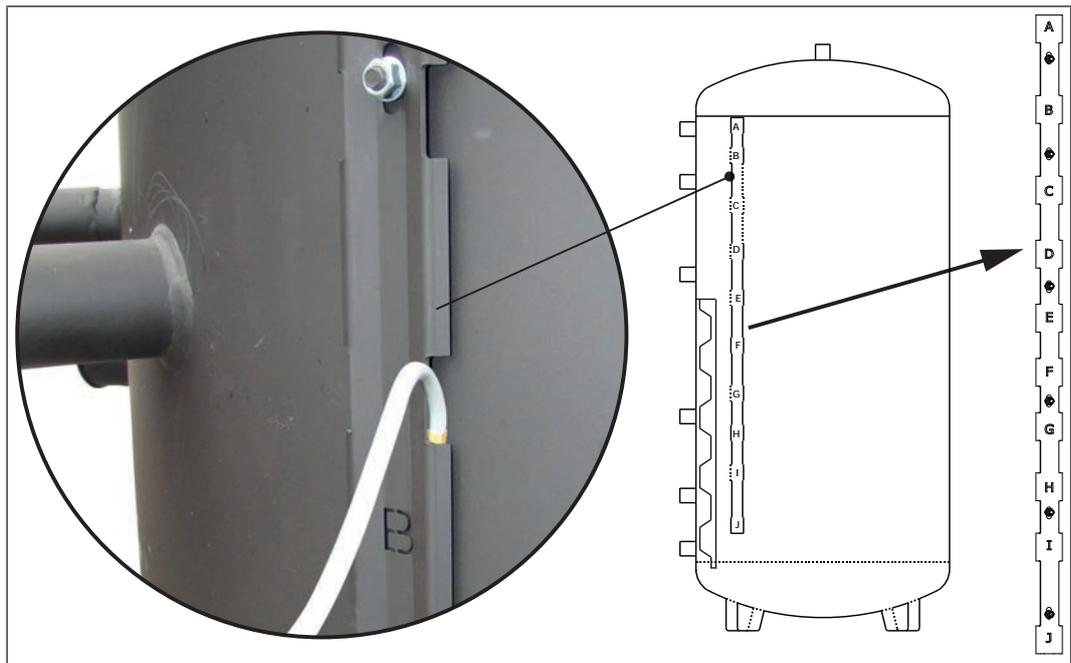
- the floor must be even, clean and dry
- the floor must be able to take the weight of the system (for weights, see “Technical data”)

NOTICE! CAUTION: When using the optional height-adjustable feet (Ø 6 cm), the surface load increases accordingly. Check that the floor can cope with the heavier load!

5.4 Positioning the sensor

Froling layered tanks have a terminal strip for optimal positioning of the sensors. This allows multiple sensors to be positioned at any height and moved without having to empty the tank.

NOTICE! Correct positioning of the sensors on the terminal strip is crucial for optimal operation of the system!



- Undo the screws on the terminal strip
- Fix the sensors to items A - J as shown in the Froling connection diagrams with heat conducting paste
- Tighten the screws on the terminal strips
- Label each sensor at the end of the cable
 - ↳ Sensors will be easy to identify when it comes to connecting them up later

NOTICE! Recommendation: Position sensors before fitting installation!

5.5 Insulation

⚠ CAUTION

Danger of burns due to open flames



The insulation must not come into contact with an open flame as it can be set alight.



Therefore:

- carry out soldering and welding tasks with precaution
- open flames are forbidden in the installation room
- no smoking

NOTICE

Keep insulation out of direct sunlight.

The insulation consists of the following parts:



1 Multi-part insulation jacket with zip

2 Top round insulation

3 Thermoformed lid

4 Top round insulation

5 Self-adhesive collars for connections

6 Insulating material for connections

5.5.1 Installing the insulation

- Remove protective covers from all connections on tank
- Plug and seal any unused connections on the tank
- Align the tank in the installation room
 - ↳ Optional: Fit the adjustable feet (M16) and adjust them as required
- Make sure you have noted down the manufacturer's number of the boiler Making a note of the facility name and serial number

NOTICE! This number is required when processing queries, repeat orders and complaints.

NOTICE

Install the insulation before connecting the tank.

NOTICE! The flexibility of the insulation may be affected by room temperature

- Ideal installing temperature: 20°C
 - If the temperature is below this, pre-warm the insulation in a heated room

- Place the round insulation under the tank



- Remove insulating material where required depending on tank type
 - ↳ Firmly press hand against the cut-out in the insulating material
 - ↳ For all connections on the tank

NOTICE

Position the insulation on the tank in such a way that the zip closes from top to bottom.



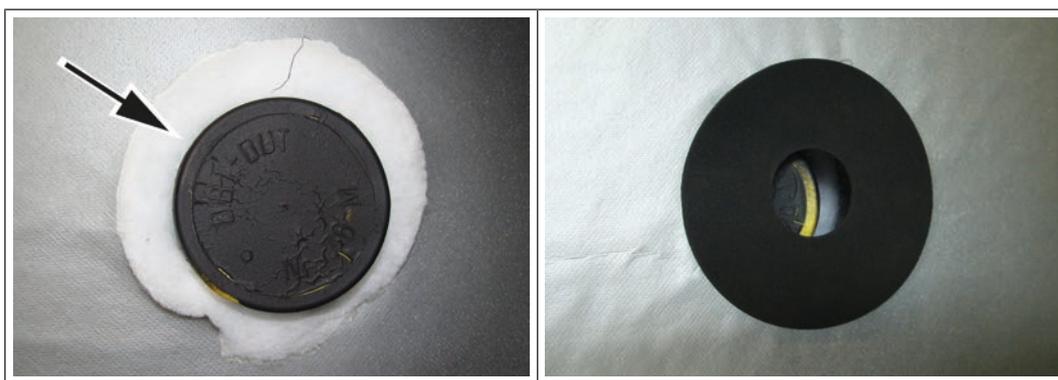
- Place the round insulating part (1) on the top
- Place the insulation jacket (2) around the tank and close it using the zip
 - ↪ Use an open hand, tap the insulation jacket into place so it fits snugly around the tank

NOTICE! Note the hole pattern for the connections – heating connections always to the left of the zip! This zip must be above the terminal strip.

- Lead the sensor cables out from the top of the insulation



- Place the thermoformed cover (1) on the top



- Seal all connections using the insulating material provided
- Attach the self-adhesive collars on the outside of the insulation

Optional for tanks 300 and 500

- Affix the Energy Efficiency Category label provided in a conspicuous place on the insulation

5.6 Connecting the tank



- Ensure that the required on-site safety devices are available for the heating system
 - ↳ Refer to the instructions for the heating system to which the tank system will be connected (including the valid guidelines and standards for heating systems)
- Ensure that the heating system is fitted with a safety valve in such a way that it cannot be shut off from the safety equipment
- If a tank system is added to an existing system, the entire heating system must undergo a risk reassessment (e.g. correct size of expansion tank, adequate venting facility etc.)

If the tank is to be installed in an existing heating system:

- Switch off the heating system/boiler
- Switch off the power supply

DANGER

When working on the unit with a live power supply:

Risk of serious injury from system components or unauthorised switching on!

When working on the unit or in the store, observe the following points:

- Switch off the boiler correctly and let it cool completely
- Shut off the power supply to the heating system
- Secure the system so that it cannot be switched on again

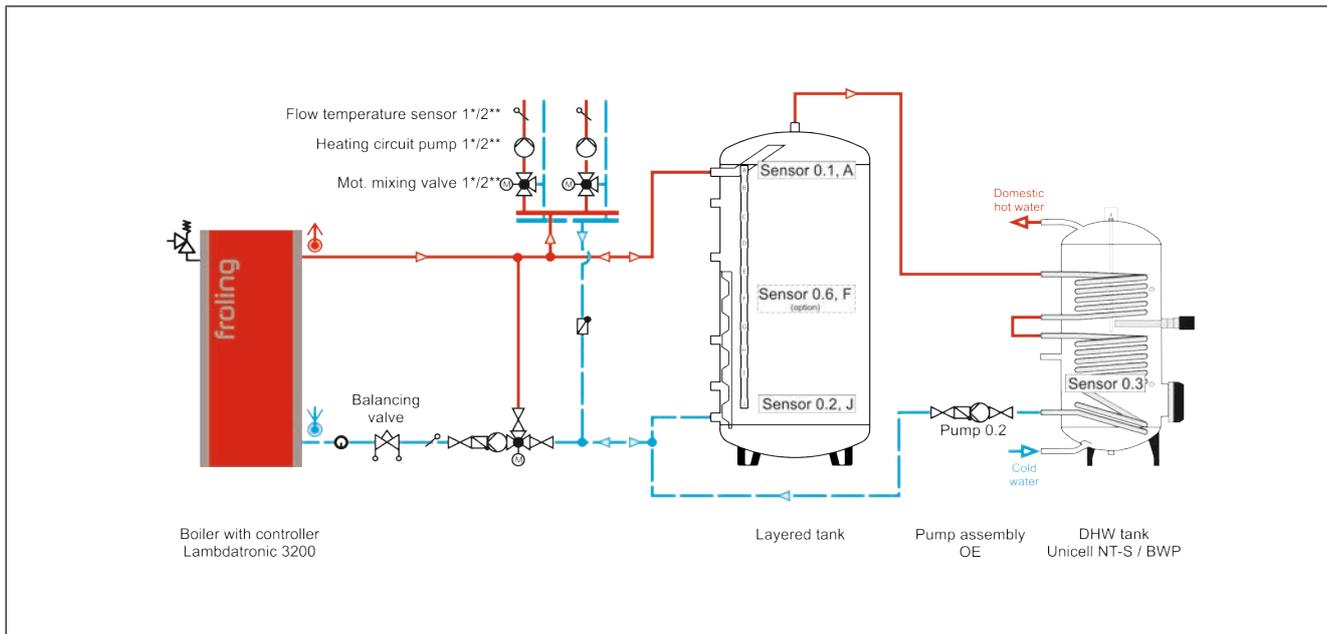
- Affix identification plate provided to the fully insulated tank where it can be clearly seen and easily accessed
- Be sure to take a note of the manufacturer's number of the tank Making a note of the facility name and serial number

NOTICE! This number is required when processing queries, repeat orders and complaints.

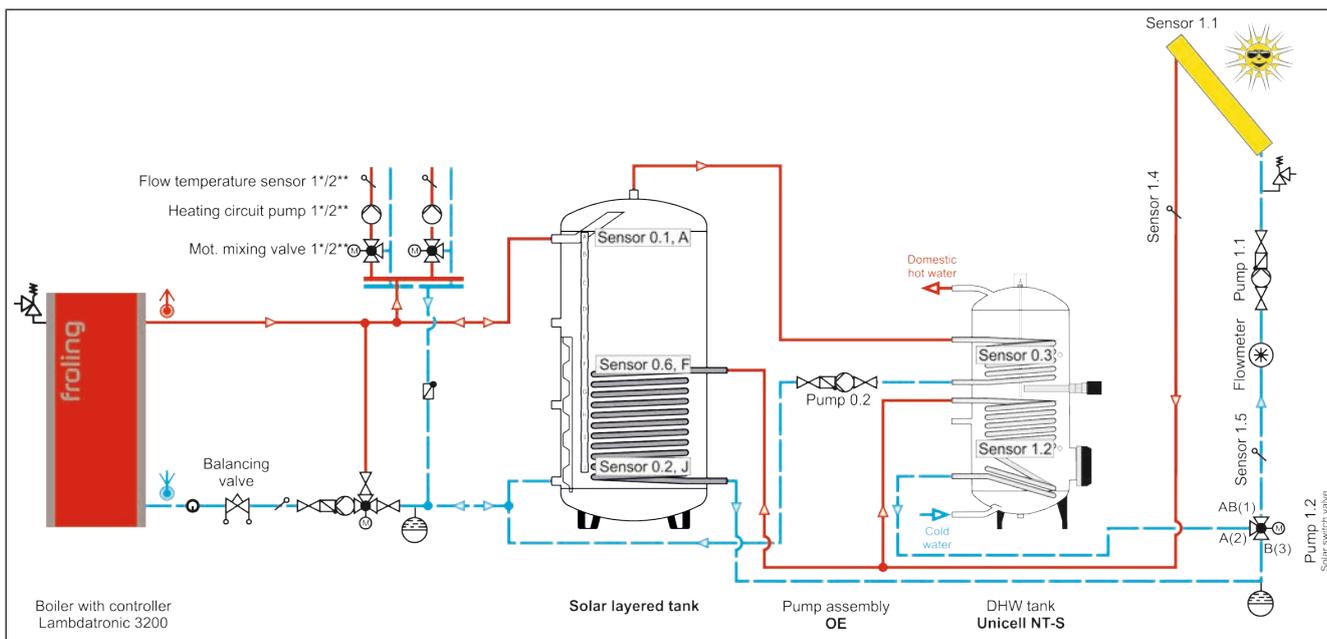
- Connect the tank to the heating system using the correct connections
- Plug and seal any unused connections on the tank
- Refer to the sensor positions and names detailed in Fröling connection guides
 - ↳ Installing the sensors Positioning the sensor

NOTICE! The following connection examples are only schematic

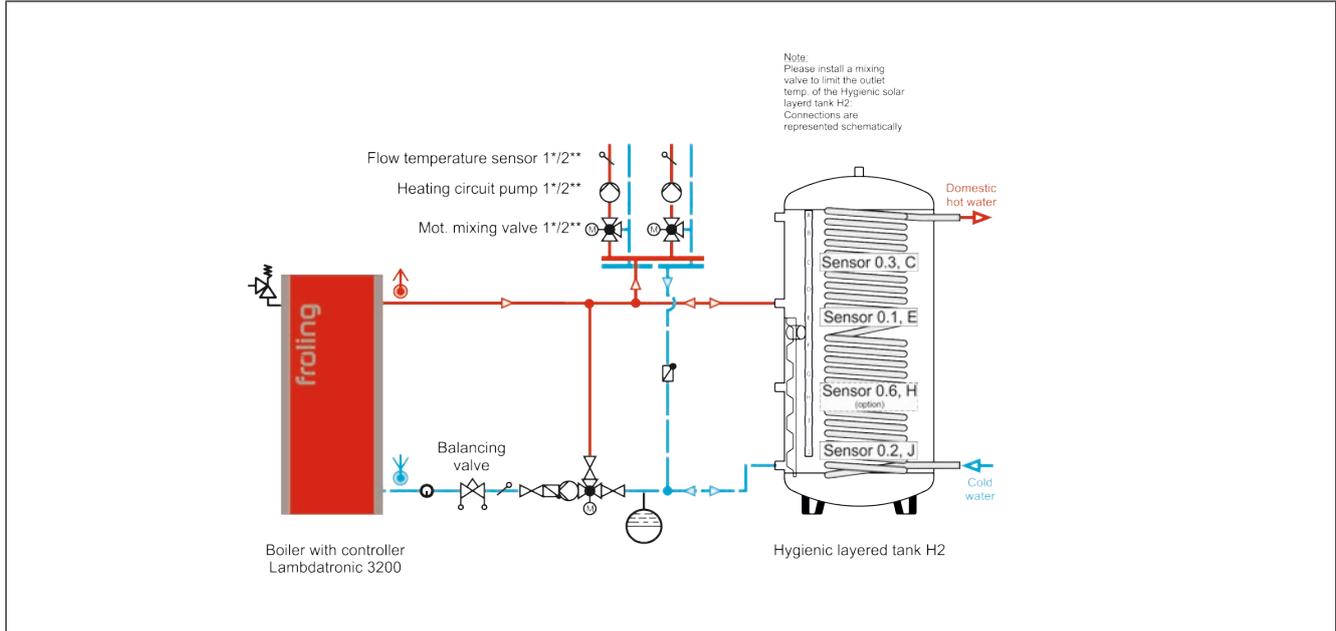
5.6.1 Layered tank connections (example)



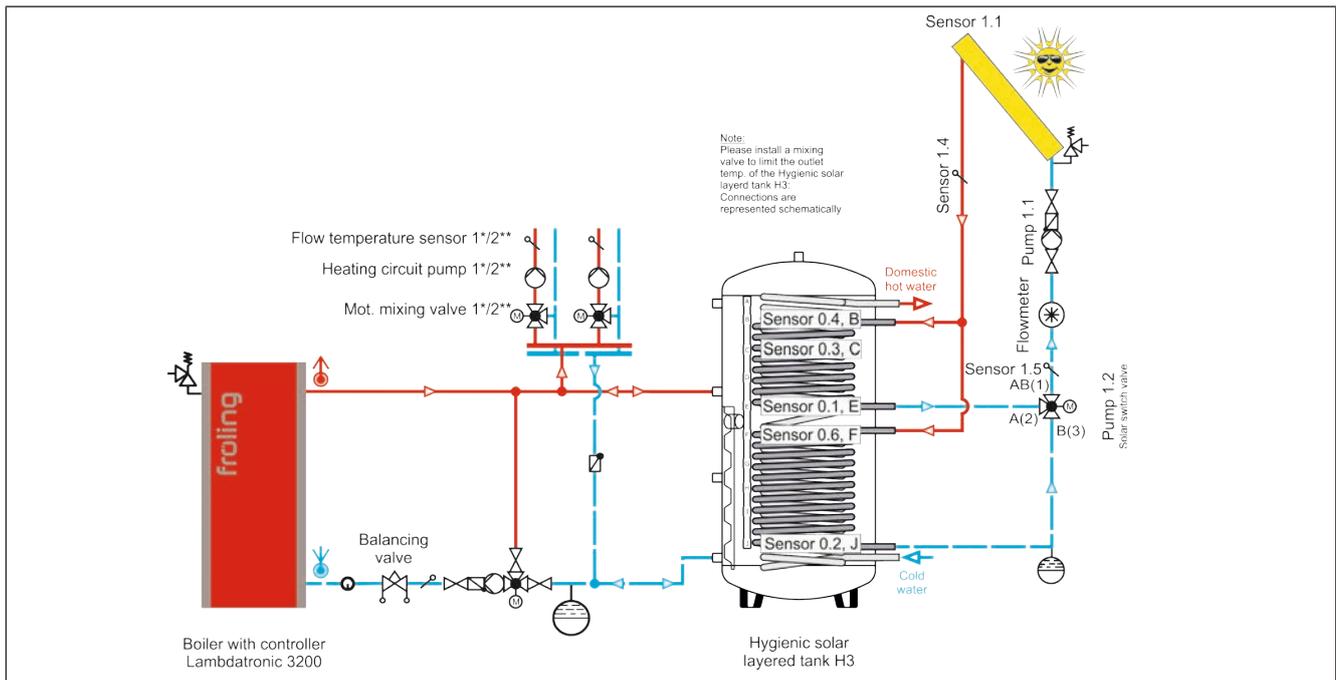
5.6.2 Solar layered tank connections (example)



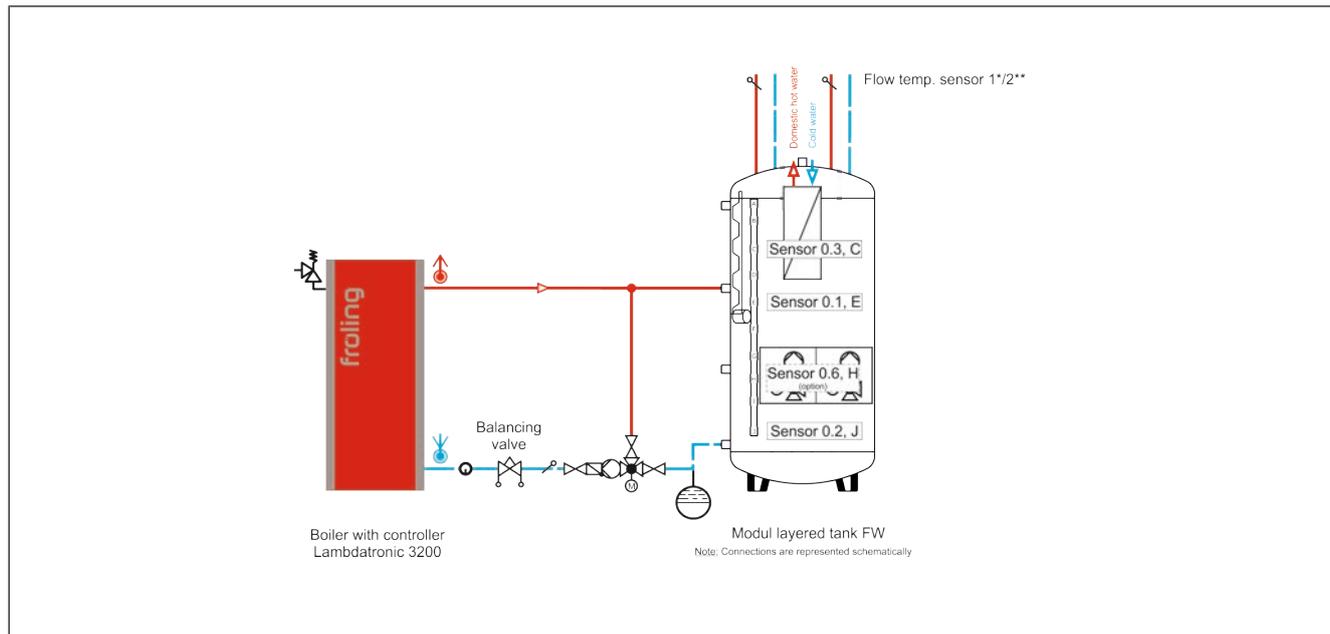
5.6.3 H2 hygienic layered tank connections (example)



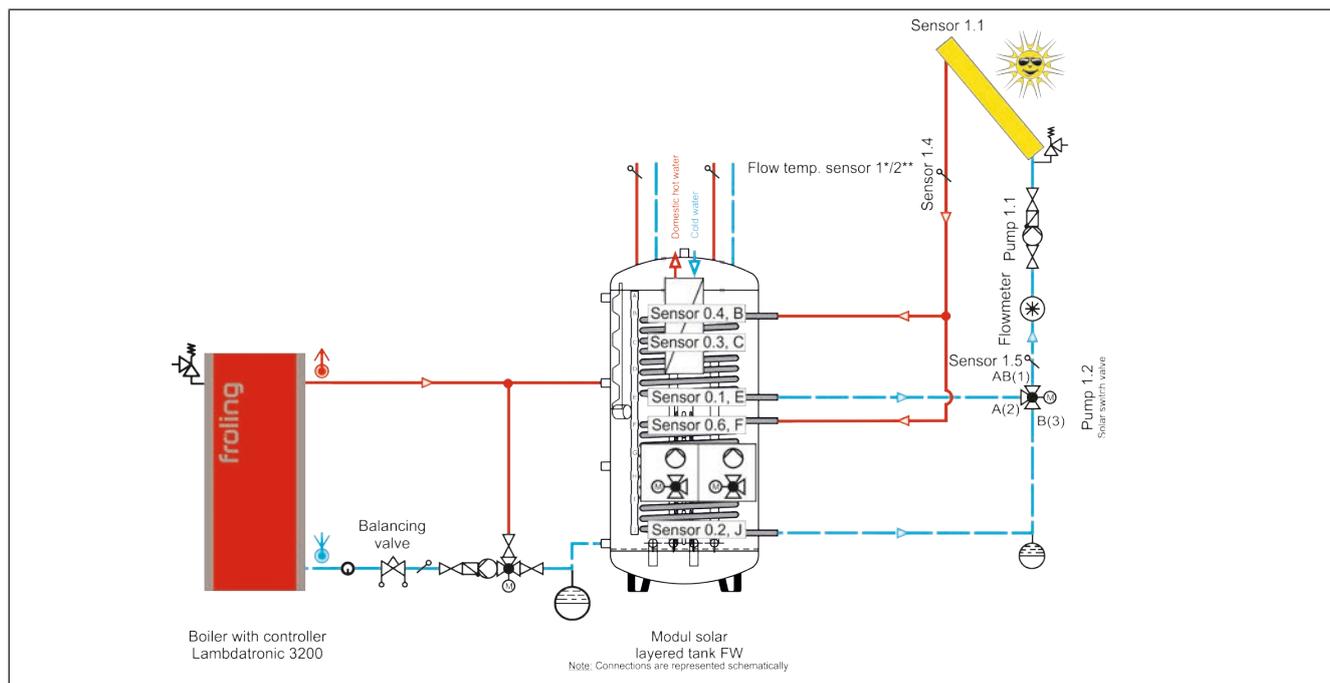
5.6.4 H3 hygienic solar layered tank connections (example)



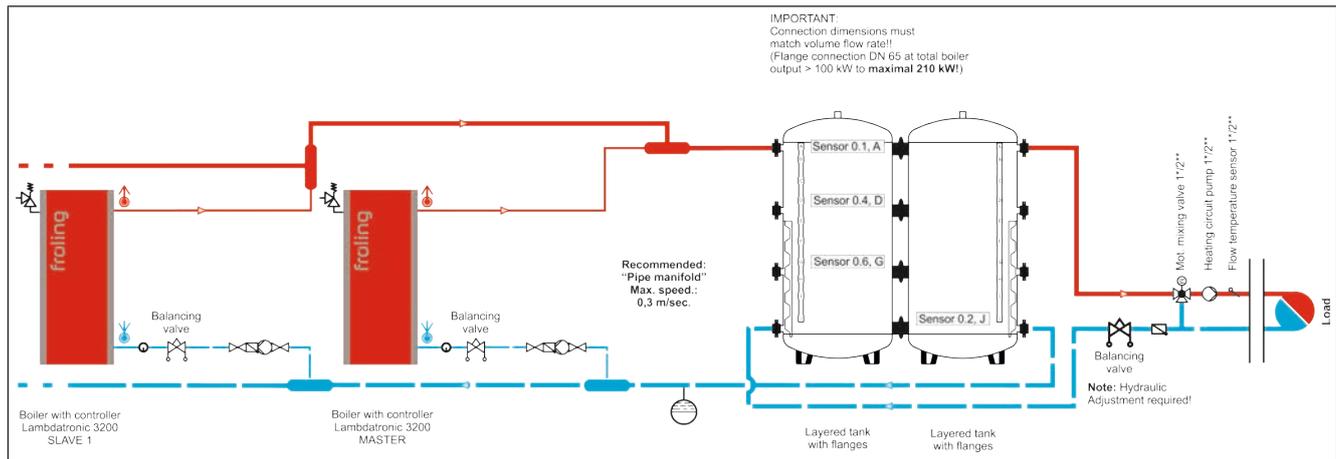
5.6.5 FW modular layered tank connections (example)



5.6.6 FW modular solar layered tank connections (example)



5.6.7 Connection example: special layered tank with flange



5.6.8 Connecting the drinking water

⚠ WARNING



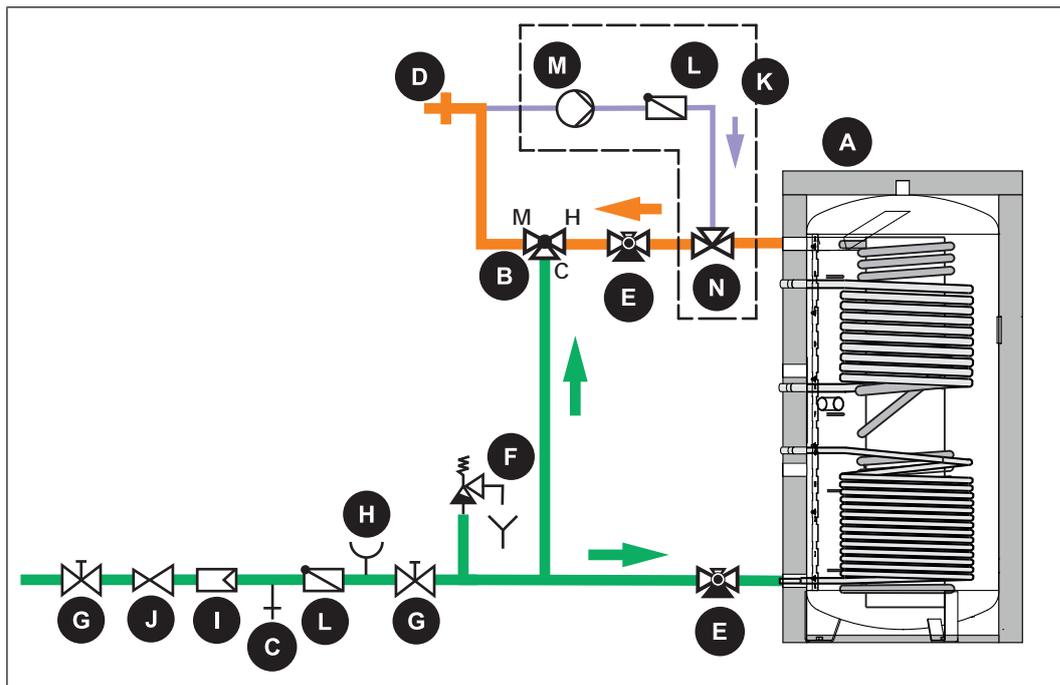
Operating the system without a mixer valve for drinking water:

Risk of scalding from hot water if there is no mixer valve for drinking water fitted or it is defective!

Therefore:

- Ensure that the heating system has a mixer valve for drinking water fitted and that it is in perfect working order

H2 hygienic layered tank / H3 hygienic solar layered tank



Designation	Name	Name
A	Tank	B Mixer valve
D	Tap connections	C Drainage connection
F	Safety valve	E Multifunctional tap (rinsing / descaling heat exchanger)
I	Drinking water filter	G Cut-off
J	Pressure reducer	H Pressure gauge connection
K	Circulation line (optional)	L Backflow preventer
N	Circulation lance	M Circulation pump

Circulation line (optional):

- Connect drinking water in accordance with DIN 1988 / ÖNORM EN 806
- Safeguard the tank with a certified safety valve

NOTICE! Install the safety valve at the top of the tank so the tank does not have to be emptied to replace it

Fresh water module

- Refer to the instructions regarding the fresh water module for installation, connections and start-up

5.6.9 Connecting the sensors

- Connect the sensors to the boiler controller

NOTICE! For more information, refer to the Froling connection guides

5.6.10 Connecting a combination tank

NOTICE



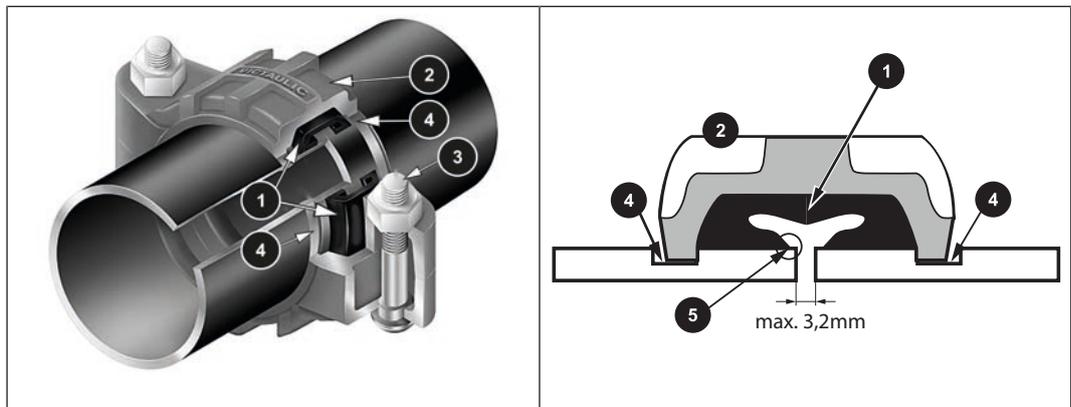
Avoid leaking rubber collars

If tanks are installed on uneven surfaces or the connections are not made correctly, the rubber collars may leak when under pressure (full tank).

To avoid this:

- only install the tank on even surfaces
- ensure the rubber collars and connections are installed correctly

NOTICE! Do not connect the combination tanks until the tank insulation has been installed!



- Slide the rubber collars (1) onto the connection pipes of the first tank
- Place the tanks alongside each other and align them exactly
 - ↳ Maximum permitted offset of connection pipes to each other: 1 mm
- Slide the rubber collars (1) onto the corresponding connection pipe on the other tank
 - ↳ The rubber lips (5) on the rubber collar (1) must fit snugly on the end of the connection pipes or the pipes must cover them
 - ↳ The rubber lips (5) must never extend beyond the pipes
 - ↳ Maximum distance between connection pipes: 3.2 mm
- Place the red couplings (2) over the collars and secure with the screws (3).
 - ↳ The couplings must be positioned in the groove (4) on the connection pipes!
- Fit insulation for connection couplings (optional accessories)

- Distance between connected tanks incl. insulation: 70 mm
 - ↳ Depends on the length of the connections

5.6.11 Connecting the electric heating element

DANGER



When working on electrical components:

Risk of electrocution!

When work is carried out on electrical components:

- Always have work carried out by a qualified electrician
- Observe the applicable standards and regulations
- ↳ Work must not be carried out on electrical components by unauthorised persons

- Assemble and connect the electric heating element according to the instructions provided

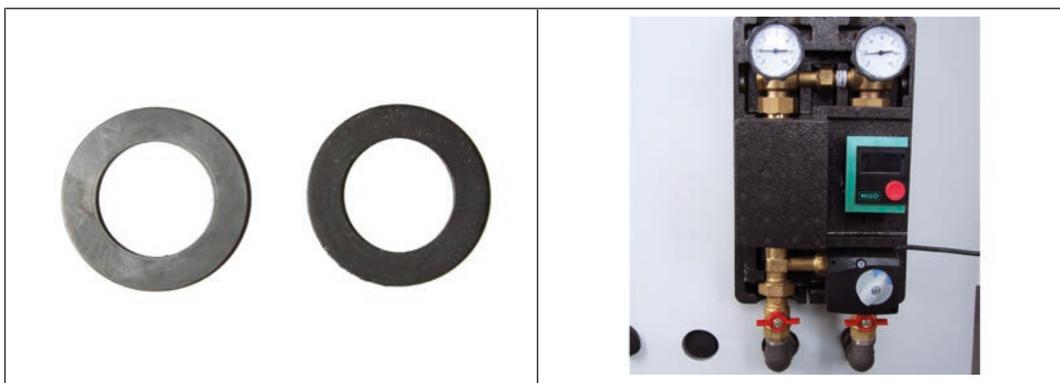
5.7 Assembling modules (FW modular layered tank; FW modular solar layered tank)

5.7.1 Installing the heating circuit module

NOTICE! Install the heating circuit module and pipes before the fresh water module!

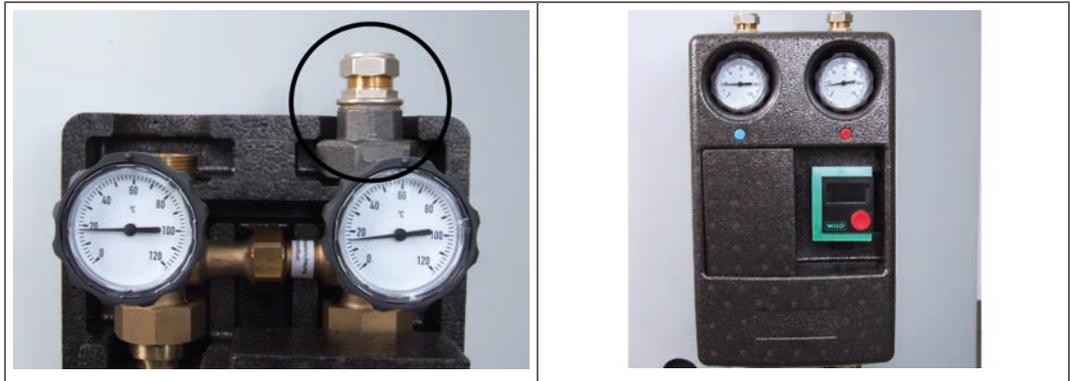


- Install ball valves on the two right-hand connections on the tank and place union nuts (1) on them
 - ↳ Align the ball valves so that they face vertically upwards
- Ensure that the seal surfaces of the valves are completely level



- Place a seal in each connection for the open ball valves

- Tighten the flow and return connection pipes to the corresponding connections in the heating circuit module (max. torque: 70 Nm)



- Install pump screw connections with cutting ring fittings on the left and right-hand side of the heating circuit module
 - ↳ seal already included
- Place the cover over the heating circuit module



- Cut the pipes to the correct length if necessary
 - ↳ only FW 850 modular layered tank / FW 850 modular solar layered tank
- Connect the pipes to the heating circuit module
- Tighten the cutting ring fittings at the end of the pipes

5.7.2 Installing the fresh water and circulation module

Refer to the instructions regarding the fresh water module

6 Commissioning

NOTICE

Efficient operation can only be guaranteed if the system is set by specialist staff and the default factory settings are observed.

Therefore:

- Initial startup should be carried out with an installer approved by Fröling Heizkessel- und Behälterbau GesmbH or with Fröling customer services

6.1 Initial start-up

NOTICE

Foreign bodies in the heating system impair its operational safety and can result in damage to property.

As a result:

- The whole system should be rinsed out before initial start-up in accordance with EN 14336.
- Recommendation: Make sure the hose diameter of the flush nozzles in the flow and return complies with ÖNORM H 5195 and is the same as the hose diameter in the heating system, however not more than DN 50.

6.1.1 Filling the system with drinking water

NOTICE

Damage to the electric heating element as a result of incorrect start-up

The electric heating element can be destroyed if installed (electrically isolated) in a system which is not completely filled before start-up

Therefore:

- Only start up the system once it is completely filled

H2 hygienic layered tank / H3 hygienic solar layered tank

NOTICE

Damage to the system caused by excess pressure

The system will suffer damage if the pressure in the cold water supply line exceeds 6 bar

Therefore:

- Install a safety valve in the supply line to the corrugated pipe element
 - ↳ we also recommend installing an additional pressure relief valve

- Ensure that all discharge taps are turned off

- Open at least one of the valves in the drinking water supply system to ensure that it is vented while it is being filled
- Fill the corrugated pipe element with cold drinking water
- Check that all connections on the drinking water side are tight
- Check the safety valve on the cold water supply line is in good working order
 - ↳ the safety valve must trip at max. 6 bar

NOTICE! A safety valve which is not operating perfectly can lead to damage from excessive pressure.

- Bleed all the drinking water supply valves connected to the heating system in order until water starts to come out
 - ↳ This ensures there is no air in the drinking water pipe system

Fresh water module

- Refer to the instructions regarding the fresh water module for installation, connections and start-up

6.1.2 Putting the system into operation

- Fill up the system with hot water
- Check that all connections are tight
 - ↳ Also applies to connections not in use.
- Completely vent the heating circuit
- Ensure the air outlet pipe on the safety valve is unobstructed
- Once all of the above has been completed, start to heat the tank
- Instruct the owner/operator on proper maintenance

6.2 Operation

NOTICE

The system installer must train the operator how to operate and maintain the system correctly, as well as the function and significance of the safety devices.

- The boiler controller is used to adjust and operate the tank
 - ↳ see operating instructions for the boiler controller

7 Servicing

NOTICE

Perform all maintenance work for drinking water systems as stipulated in ÖNORM EN 1717 and ÖNORM EN 806.

7.1 Inspection

7.1.1 Safety devices

- Ensure the air outlet pipes on the safety valves are unobstructed
- Check that the safety devices on the heating system work correctly and in accordance with the manufacturer's instructions
- Check that the hot water and drinking water (if fitted) safety valves work correctly and in accordance with the manufacturer's instructions

7.2 Cleaning

- Clean the outer parts with a wet cloth whenever necessary
 - ↳ Avoid cleaning agents which are abrasive or contain solvents

7.3 Periodic inspection and cleaning

NOTICE

The following tasks must only be carried out by a heating engineer approved by Froling or appropriately qualified specialist staff.

7.3.1 Descaling

The corrugated pipe element in the H2 hygienic layered tank and H3 hygienic solar layered tank should be descaled at least every 2 years with a citric acid-based descaling agent. It may be necessary to perform this process more frequently in hard water areas. If the heating performance drops noticeably, the system should be descaled.

Note:

In the case of stainless steel, the following can be used as a descaling agent: acetic acid, formic acid and citric acid. Hydrochloric acid must not be used as there is the risk of pitting if any acid remains in the pipes.

Advantages of citric acid: does not have an unpleasant odour and any products resulting from chemical reactions can be washed away easily by rinsing.

Temperature recommendation:	50 - 60°C (wherever possible use the heat from the tank)
Cleaning time:	30 minutes (at room temperature: 60 minutes)

Descaling the corrugated pipe element

- Remove the corrugated pipe element from the drinking water pipe system
- Form a circuit with a separate mobile pump
- Feed the descaling agent into the circuit according to the manufacturer's instructions
- End the descaling process when no more foam is formed
- Rinse the corrugated pipe element with water to remove any chemicals formed during the descaling process

NOTICE! For more information on descaling, please refer to the details given on the descaling agent packaging

8 Decommissioning

8.1 Out of service for long periods

Hot water side

- The unheated tank must be emptied completely if there is a chance of frost

Preparing drinking water

The following measures should be taken if the tank is to remain out of service for several weeks (e.g. during holidays):

- Disconnect the hot drinking water preparation circuit
 - ↳ Ensure that the temperatures at the installation location and in the connected piping system are above the freezing point

In case of prolonged stagnation in the pipes and the tank, the water quality can be affected by increased build-up of germs. As a result, the following measures should be taken when starting up the system again after a long period out of service:

- Heat drinking water to a temperature of at least 60°C
- Let the drinking water run before use for a length of time appropriate to the pipe volume (as per ÖNORM EN 806)

8.2 Disassembly

To disassemble the system, follow the steps for assembly in reverse order.

8.3 Disposal

- Ensure that they are disposed of in an environmentally friendly way in accordance with waste management regulations in the country (e.g. AWG in Austria)
- You can separate and clean recyclable materials and send them to a recycling centre.

Manufacturer's address

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