ENGINEERING
TOMORROW

Data sheet

ThermoClean®

Domestic water heating system with legionella growth prevention through thermal disinfection

Description / Application

The ThermoClean® system is compact and effective solution for legionella-free domestic water heating. The system uses the thermal disinfection methods, whereby the reaction temperature inside the installation is kept at a constant temperature of 70 °C.
The ThermoClean® system is dimensioned in such a way that the water is warranted to remain in the reaction area of the device for at least 5 minutes. During tap operation, the reaction temperature of 70 °C is cooled down to the required hot water temperature within the system. This is not achieved by the addition of cold water, but through an additional re-cooling heat exchanger which cools the disinfected water, while preheating cold water, that simultaneous preheat the cold water.
The hot water temperature can be set at any temperature between 50 °C and 60 °C.[1]
It means that the installation of a scaling protection device on the taps is redundant if the temperature is adjusted accordingly.
Due to the connection of the circulation into the system a continual thermal disinfection of the hot water is ensured.
The high quality stainless steel design of reaction and buffer storage tank, heat exchanger and piping is hygienically perfect, offers a maximum in operational safety and can be universally used in combination with the wide range of materials used in the connected domestic water supply network.

[1] The recommended temperature is 60 °C.

Main system data:

	Primary	Secondary
Type	DL / Combi	
Max. operating temp. (°C)	100 (150) [2]	90
Max. operating pressure (bar)	16 (25) [2]	10
Working medium	Circulation water	DHW

[2] On request

Approvals and Standards:
- DVGW3 – Working paper W 553 – Calculation for circulation systems in DHW installations,
- DVGW3 – Working paper W 551 – Technical method for prevention of legionella growth,
- DIN 1988 – Code of practice for drinking water installations (TRWI) (when related),
- DIN EN 806 – Specifications for installations inside buildings conveying water for human consumstions,
- DIN EN 1717 – Protection against pollution of potable water installations and general requirements of devices to prevent pollution by backflow.

[3] German Technical and Scientific Association for Gas and Water

ThermoClean®-DL
Domestic water heating system with electronic controls, a stainless steel reaction storage tank, charging and re-cooling brazed plate heat exchangers as well as charging pump, shut-off valves and complete stainless steel piping.

Ordering

Explanation, ThermoClean® types

ThermoClean®-DL 200 ECL XB
- XB — Type heatexchanger
- ECL — Electronic controller type
- 200 — Reaction tank volume (liter)
- DL — Type
  DL – with reaction storage tank and brazed plate heat exchangers
- ThermoClean®-DL — Domestic water heating system with charging and re-cooling system unit

ThermoClean®

Type	**Code-No.**
	-DL
200	**004X1618**
350	**004X1619**
500	**004X1620**
750	**004X1621**
1000	**004X1622**
1300	**004X1623**

incl. electronic controller ECL310

Accessories [4]

ThermoClean®-DL
Domestic hot water storage tank
The ThermoClean® system must be combined with additional domestic hot water storage tanks to provide the required capacity for peak consumption. The required storage tank capacity is based on the calculated peak flow and the length of the consumption period.
The recommendations provided overleaf for the total storage tank capacity are based on peak consumptions lasting 1 hour or according to customer demands. If the consumption periods are shorter, the storage tank capacity can be reduced accordingly.
We recommend the utilization of the following storage tanks:
- Stainless steel domestic hot water storage tank series SE,
- Tank sizes: 150 ... 8000 liters,
- Optimum adaptation to requirements due to optional combination of multiple storage tanks.

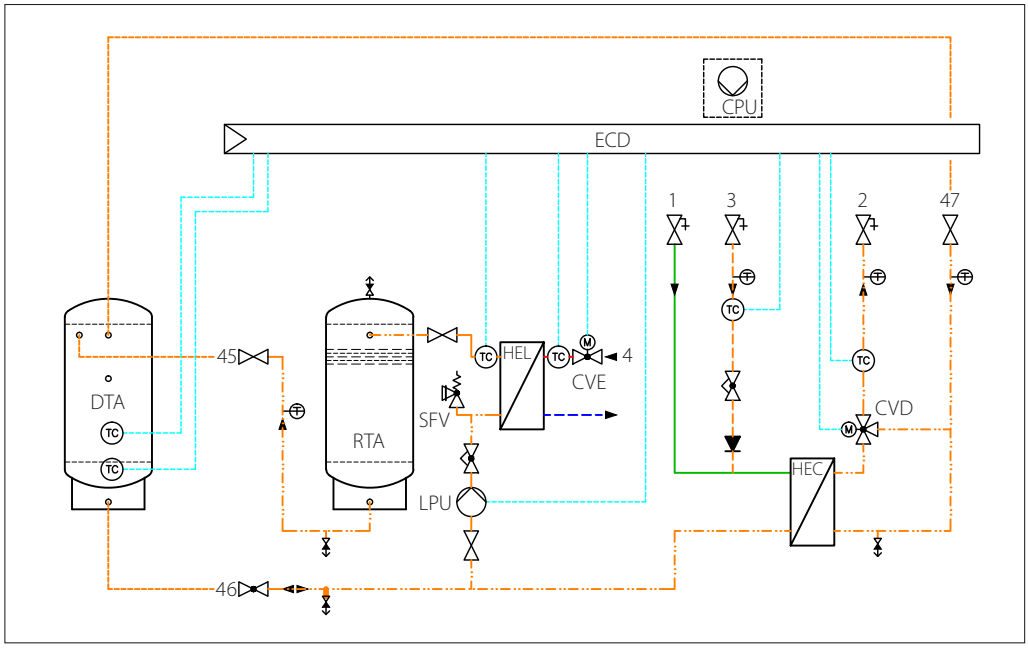
[4] accessories for separately order

Technical data

Type		Performance index	Connected load	Max. power for peak consumption	Heating (Hot) water flow	Domestic hot water capacities			Charge flow total	Circ. flow (max.)	Resistance		
					at ϑ_{VL} = 75 °C	Permanent capacity	Peak capacity				Heating water	DHW (max.)	Circ. (max.)
		NL[5]	kW	kW	l/h	l/h	l/h	l/s	l/h	l/h	kPa	kPa	kPa
-DL	200	-[6]	84 .. 46	140	2480	1330 .. 600	5000	1,389	2400	1070 .. 1800	24	54	19
	350	-[6]	147 .. 80	245	4440	2330 .. 1050	7500	2,083	4200	1870 .. 3150	20	64	20
	500	-[6]	210 .. 114	350	6480	3330 .. 1500	9000	2,500	6000	2670 .. 4500	22	58	20
	750	-[6]	315 .. 171	525	9650	5000 .. 2250	12000	3,333	9000	4000 .. 6750	23	59	23
	1000	-[6]	420 .. 228	700	12960	6670 .. 3000	15000	4,167	12000	5330 .. 9000	29	65	27
	1300	-[6]	546 .. 296	910	16980	8670 .. 3900	20000	5,556	15600	6930 .. 11700	35	86	30

[5] Performance index NL acc. to DIN 4708
[6] Dependent on the additional storage tank(s)

Design and function



RTA reaction tank/vessel
HEL HEX charging/load
HEC HEX cooling
LPU charging pump/load
CPU circulation pump (on site/by customer)
SFV safety valve
CVE control valve electrical
ECD electronic controller DHW
CVD control valve electrical domestic
DTA domestic buffer tank (accessory)

shut off device

balancing valve

sensor (direct, cable/universal, surface)

1) domestic water cold
2) domestic water hot
3) circulation
4) heating supply
5) heating return
45) to domestic buffer tank (stainless steel) top
46) from domestic buffer tank (stainless steel) below
47) from domestic buffer tank

thermometer

drain / air vent (on site / by customer)

check valve

sampling valve

The heat exchanger brings the system volume to the disinfection temperature of 70 °C.
A temperature sensor at the exit of the heat exchanger monitors this temperature and regulates the application of heat energy accordingly. The system is dimensioned to ensure that the domestic hot water remains in the reaction area for at least 4 minutes to warrant the extermination of the legionella bacteria.
The entire system volume is maintained at the defined disinfection temperature. Only when the water is tapped, the required quantity of water is cooled down to the demanded network temperature (50 ... 60 °C) while the new cold water that is being added is preheated.

Temperature fluctuations are balanced out by the mixing valve, so that the precise degree of water temperature indicated is definitely being maintained. Proven control technology ensures that the domestic hot water network is not heated up during breaks in tapping.
If the consumption volume during peak times exceeds the charge flow of the system, the available storage tank volume is tapped. The optionally available over-tapping protection ensures that during unexpected functions (e.g. peak tapping continues for a period exceeding the determined consumption period) the cold water supply is suspended until sufficient thermally disinfected domestic water is once again available through the charging process via the reaction tank.
The circulation water from the network enters the system, is once again heated up to 70 °C by the charge heat exchanger and consequently incorporated into the thermal disinfection process continually.

Sizing

For dimensioning and selection of ThermoClean® system please contact with Danfoss local sales representative.

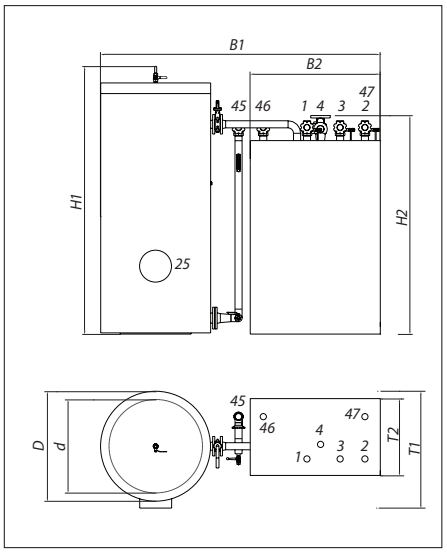
Mounting

ThermoClean®-DL
After setting up, connect reaction and DHW storage tank, charge/re-cooling system unit via the pre-installed connections. Next the heating and domestic water connections, mains connections. Commissioning as described in the installation and operating instructions.

ThermoClean®-Combi
After setting up, connect combination and DHW storage tank, charge/re-cooling system via the pre-installed connections. Next the heating and domestic hot water connections, mains connections. Commissioning as described in the installation and operating instructions.

Dimensions

ThermoClean®-DL



Type		H1	d	D	H2 approx.	B1 approx.	B2 approx.	T1 approx.	T2 approx.[10]	Connections				Weight		
										1, 2	3	4, 5	45-47	Storage tank[11]	Re-cooling unit[7]	Charging unit[8]
		mm	mm	mm	mm	mm	mm	mm	mm	G/Rp	G/Rp	DN	G/Rp	kg	kg	kg
-DL	200	1600	500	700	1730	1950	1000	725	600[9]	G 1½"	G 1¼"	25/20	G 1½"	70	140	-
	350	2045			1795	1950				G 1¾"	G 1½"	40	G 1¾"	90	160	-
	500	2090	600	800	1845	2060		825	650[9]	G 2⅜"	G 1¾"	50/40	G 2⅜"	90	170	-
	750	2240	750[9]	950	1970	2365	1100	990			G 2⅜"			155	230	-
	1000	2525	800[9]	1000	2220	2570	1200	965	920	Rp 2½"	Rp 2"		Rp 2½"	210	250	-
	1300	2610	900[9]	1100	2245	2720	1250	995			Rp 2½"	65/50		235	300	-

[7] For ThermoClean® type -DL incl. charging unit
[9] min. door width; when needed components has to demounted
[10] max. width of frame
[11] raw weight (without insulation/package)
All connection axis measures are approximate and have a tolerance of +/- 15 mm.

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