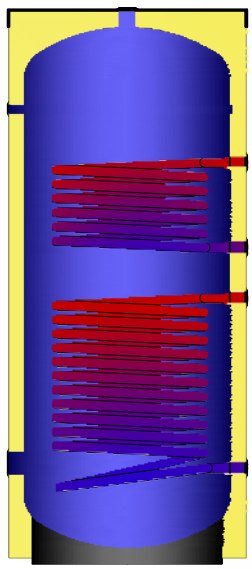
BST Series

Dual coil Hot Water cylinders for solar applications

Elbi **High efficiency dual coil calorifies** are suitable for use with renewable energy (e.g. solar, geothermal) in Domestic Hot Water ("DHW") applications. By capitalizing on the daytime solar radiation **Elbi BST calorifiers** enable remarkable storage and fast production of DHW during the peak hours. The dual coil design resolves the excess in demand of DHW because the heated water from the boiler will integrate, if necessary, the renewable energy from the solar panels or the geothermal pipes.

Circulation Control Group for Solar Systems



Circulation control group for solar systems (optional)

The circulation control group to is designed for solar water heating systems.

The main features are:
- to aid the circulation of the fluid in the primary circuit;
- to set the temperature and to avoid overpressure.

The circulation control group is supplied installed and connected to our solar hot water cylinder for reliable and quick final installation.

The water in the calorifiers is heated by the dual coiled pipe **heat exchangers** which have the heated water from the solar panel, the geothermal pipes or the boiler passing through them. The heated water pressure and temperature limits are described herewith in the technical specifications paragraph.

Elbi BST calorifiers are **Vitreous Enamel coated** for use with DHW. The internal coating provides enhanced protection from the corrosion that takes place in the cylinder during operations. These cylinders are supplied with removable sacrificial **magnesium anode and tester** to facilitate the maintenance operations.

ELBI' s BST cylinders come with rigid polyurethane insulation CFC and HCFC free, grey RAL 9006. The outer case is available in soft open cells white polyurethane (BSV800 and BSV1000 with inspection flange).

Warranty: 5 years

Technical Specifications

Cylinder

- Models: **BST 200 / BST 300 / BST 400 / BST 500 / BST 800 / BST 1000**;
- Max. Allowable Working Pressure: **10** bar;
- Max Allowable Temp: **95°**C;
- Fluid: Domestic Hot Water

Heat Exchangers

- Lower Heat Exchanger (solar): **0,70–1.20–1.40– 1.80–2.00–2.40** Sq. Mt.;
- Upper Heat Exchanger (supplementary): **0.50 – 0.75 – 0.90 – 1.20** Sq. Mt.;
- Max Allowable Pressure: **12** bar;
- Max Allowable Temp.: **110°**C;
- Fluid: Heated Water (e.g. Solar Panels, boiler).

Insulation

- **Material:**
- **BST200÷BST1000**
- Injected Polyurethane c/w 95% closed cells;
- Thickness: **40** mm.
- Minimum Density 40 kg/m3
- Thermal Conductivity: 23,5 mW/m °K
- DIN 4102 Combustion Category: **B3**;
- Cover (External finish): RAL 9006 grey Polystyrene.
- **BST800 Fløø310 ÷ BST1000 Fløø310**
- Soft Polyurethane
- Thickness: **50** mm.
- Thermal Conductivity: 39 m mW/m °K
- DIN 4102 Combustion Category: **B3**;
- Cover (External finish): RAL 9016 white

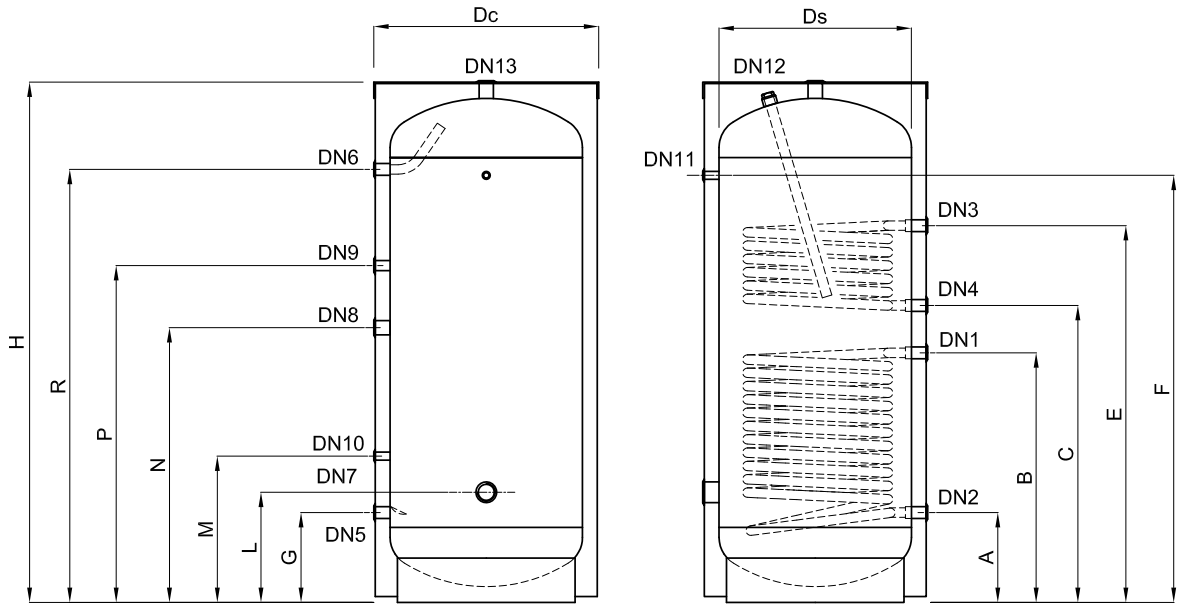
Elbi BST calorifiers are in compliance with the European Directive No. PED 97/23/EC

Dimensional Data

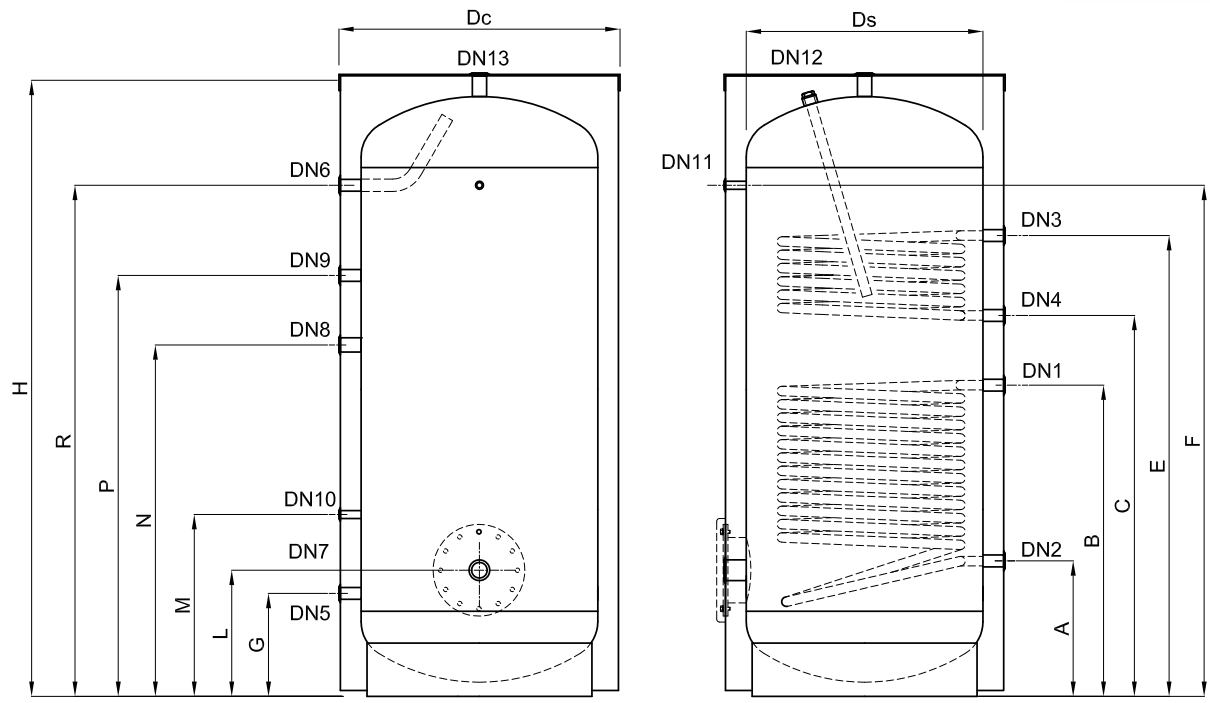
MOD.	Litre	SINF m²	SSUP m²	SINF litre	SSUP litre	Ds mm	Dc mm	H mm	A mm	B mm	C mm	E mm	F mm	G mm	L mm	M mm	N mm	P mm	R mm
BST	**200**	0,70	0,50	5	4	500	580	1260	235	585	735	985	1035	235	250	350	660	860	1045
	300	1,20	0,75	8	5	550	630	1400	255	710	815	1085	1155	255	270	405	760	950	1165
	400	1,40	0,90	9	6	650	730	1445	280	685	805	1075	1170	280	295	470	745	940	1190
	500	1,80	0,90	12	6	650	730	1695	280	820	980	1250	1420	280	295	495	905	1115	1430
	800	2,00	1,20	13	8	800	880	1785	450	910	1060	1330	1470	340	365	605	985	1195	1470
	1000	2,40	1,20	15	8	800	880	2035	450	1045	1280	1550	1720	340	365	607	1180	1415	1720
	800+FI	2,00	1,20	13	8	800	900	1785	450	910	1060	1330	1470	340	435	605	985	1195	1470
	1000+FI	2,40	1,20	15	8	800	900	2035	450	1045	1280	1550	1720	340	435	607	1180	1415	1720

DN1-DN2: 1” (Inlet / Outlet solar heat exchanger); **DN3-DN4: 1”** (Inlet / Outlet boiler heat exchanger); **DN5: 1”** (Mains Supply models 200÷500) **1 1/4”** (Mains Supply models 800/1000); **DN6: 1”** (Hot Water Draw-off model 200÷500); **1 1/4”** (Hot Water Draw-off model 800/1000); **DN7: 2”** (Immersion/ Inspection bore); **DN8: 1 1/2”** (Immersion); **DN9: 3/4”** (Circulation model 200÷500); **1”** (Circulation model 800/1000); **DN10: 1/2”** (Thermostat); **DN11: 1 1/4”** (Thermometer); **DN12: 1 1/4”** (Magnesium anode); **DN13: 1 1/4”** (Hot water Draw-off model 200÷500) **1 1/2”** (Hot water Draw-off model 800/1000)
Complementary I.D. 210 mm. flanged bore on Model 800/ 1000 or DN7 coupling

BST 200 – 300 – 400 – 500



BST 800 – 1000

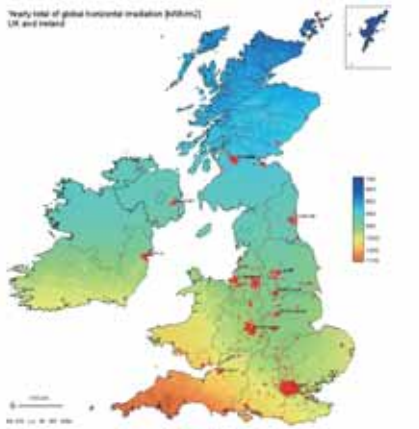


Technical Information

Elbi **BST calorifiers** are selected in relation to multiple factors. These are:

- Domestic Hot Water requirements (see on page 5);
- Solar radiation;
- Number of users;
- Solar panels surface

Solar Radiation: Annual solar radiation (kWh/m 2)



Number of users:

Model	Number of users
BST 200	1 - 2
BST 300	2 - 4
BST 400	3 - 5
BST 500	5 - 7
BST 800	up to 10
BST 1000	up to 18

Solar Panels surface:

Model	Solar Panel Surface (Sq. Mt.)
BST 200	2.5
BST 300	2.5 - 5
BST 400	7.5
BST 500	10
BST 800	12.5
BST 1000	15

Safety devices:

In order to avoid overpressure to occur in the cylinder the following controls and safety devices shall be installed in both the heating and the domestic circuit:

- DHW circuit:
  - safety valve;
  - Elbi D-DV series expansion vessel for use with domestic hot water. The attached sizing chart is applicable under the following working conditions. T&P valve settings 85°C / 6 Bar Mains Water @ 15°C / Vessels Precharge pressure 3 bar.

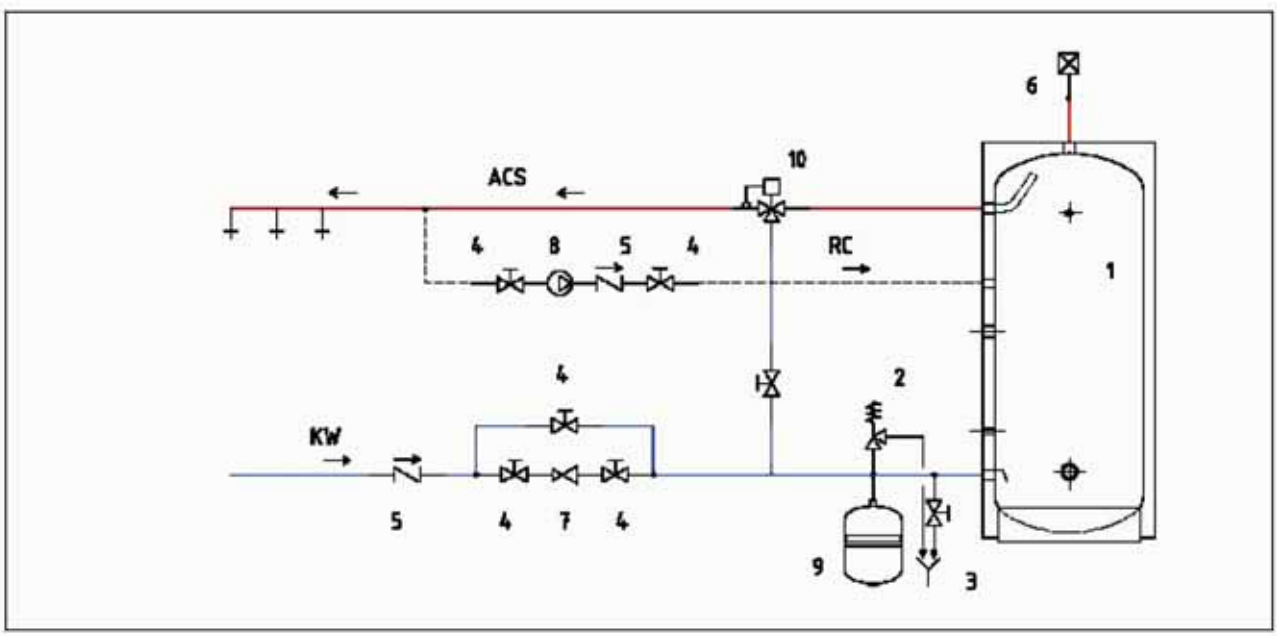
Model	ELBI D-DV series expansion vessel	ELBI DS-DSV series expansion vessel
BST-200	**D - 18**	**DS-18**
BST-300	**D - 24**	**DS-18**
BST-400	**D - 35**	**DS-24**
BST-500	**D - 35**	**DS-35**
BST-800	**DV - 80**	**DS-35**
BST-1000	**DV - 80**	**DSV-50**

- Solar circuit:
  - Safety valve;
  - ELBI DS-DSV series of solar expansion vessel. These sizing charts shall have to be revised to reflect the actual working conditions.

Magnesium Anode:

Model	Dimension anode
BST 200	1.1/4” x 350
BST 300	1.1/4” x 550
BST 400	1.1/4” x 550
BST 500	1.1/4” x 700
BST 800	1.1/4” x 700
BST 1000	1.1/4” x 700

Installation Example Heating Circuit :

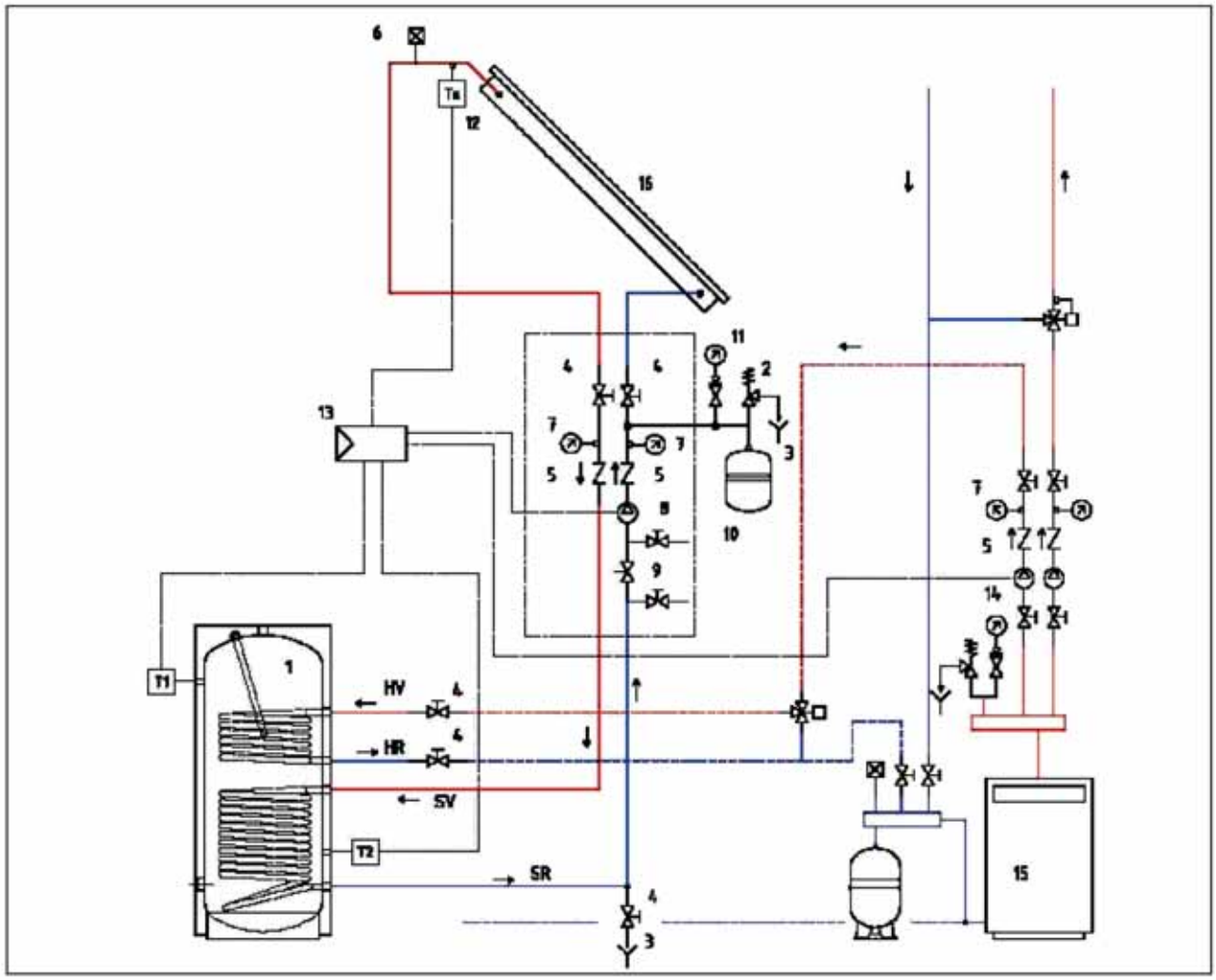


1 – BST Cylinder
2 –Safety Valve
3 – Drain
4 – Isolating Valve
5 – Check Valve
6 – Purge Valve
7 – Pressure reducing valve

8 – DHW circulation Pump
9 – Elbi D/DV series pressure tank
10 – Mixing Valve

DHW – Draw-off
KW – Mains Water supply
RC – Circulation

Installation Example domestic hot water circuit



1 – BST Cylinder
2 – Safety Valve
3 – Drain
4 – Isolating Valve
5 – Check Valve
6 – Purge Valve
7 – Thermometer
8 – Solar Circuit circulator Pump
9 – Fill-in Valve
10 – Elbi DS series expansion tank
11 – Pressure Gauge
12 – Solar Panel probe

13 – Control Panel
14 – Boiler circulator pump
15 – Boiler
16 – Solar Panel

HV – Primary flow from Boiler
HR – Primary return to Boiler
SV – Primary flow from Solar Panel
SR – Primary return to Solar Panel
T 1 – Probe
T 2 – Probe

Performances

<u>Lower Heat Exchanger</u> Primary Flow @ 80°C (∆T=10°C), Domestic Hot Water @ 60°C and mains water @ 15°C

Model	Coil Power (1) (2) (kW)	Pump Capacity (litre/H.)	Heating Time [3] (min.)	Production of Hot Water @ 60°C (litre/H)	First 10 min. production of water @ 45°C (litre) [4]
BST 200	16.50	1450	38	315	195
BST 300	29.00	2600	31	554	310
BST 400	34.50	3000	38	659	395
BST 500	44.00	3850	35	840	495
BST 800	50.00	4400	49	955	668
BST 1000	60.00	5300	47	1145	770

(1) primary flow @ 80°C Primary return @ 70°C;
(2) Mains Water supply @ 15°C;
(3) Heating time from 15 °C to 60 °C
(4) Domestic Hot Water available @ 45°C in the first 10 minutes of water draw-off from stored water @ 60 °C.

<u>Lower Heat Exchanger</u> Primary Flow @ 80°C (∆T=10°C), Domestic Hot Water @ 45°C and mains water @ 15°C

Model	Coil Power (1) (2) (kW)	Pump Capacity (litre/H.)	Heating Time (3) (min.)	Production of Hot Water @ 45°C (litre/H)
BST 200	20.00	1760	21	570
BST 300	35.00	3000	18	1000
BST 400	40.00	3500	22	1140
BST 500	53.00	4670	20	1500
BST 800	59.50	5200	28	1700
BST 1000	68.50	6000	28	1960

(1) primary flow @ 80°C Primary return @ 70°C;
(2) Mains Water supply @ 15°C;
(3) Heating time from 15 °C to 45 °C

<u>Upper Heat Exchanger</u> Primary Flow @ 80°C (∆T=10°C), Domestic Hot Water @ 60°C and mains water @ 15°C

Model	Coil Power (1) (2) (kW)	Pump Capacity (litre/H.)	Heating Time (3) (min.)	Production of Hot Water @ 60°C (litre/H)
BST 200	11.50	1000	24	220
BST 300	18.00	1500	22	340
BST 400	21.00	1850	28	400
BST 500	21.00	1850	32	400
BST 800	29.00	2500	35	550
BST 1000	29.00	2500	37	550

(1) primary flow @ 80°C Primary return @ 70°C;
(2) Mains Water supply @ 15°C;
(3) Heating time from 15 °C to 60 °C

<u>Upper Heat Exchanger</u> Primary Flow @ 80°C (∆T=10°C), Domestic Hot Water @ 45°C and mains water @ 15°C.

Model	Coil Power (1) (2) (kW)	Pump Capacity (litre/H.)	Heating Time (3) (min.)	Production of Hot Water @ 45°C (litre/H)
BST 200	14.00	1230	14	400
BST 300	21.50	1840	13	610
BST 400	26.00	2230	16	740
BST 500	26.00	2230	18	740
BST 800	36.00	3170	19	1020
BST 1000	36.00	3170	20	1020

(1) primary flow @ 80°C Primary return @ 70°C;

(2) Mains Water supply @ 15°C;

(3) Heating time from 15°C to 45 °C

Heat Exchanger Pressure Drop:

MODEL		Pressure Drop (mbar)
BST 200	LOW COIL	125
	HIGH COIL	65
BST 300	LOW COIL	220
	HIGH COIL	100
BST 400	LOW COIL	260
	HIGH COIL	120
BST 500	LOW COIL	300
	HIGH COIL	120
BST 800	LOW COIL	350
	HIGH COIL	200
BST 1000	LOW COIL	400
	HIGH COIL	200

Insulation allowable heat loss :

MODEL	q (kWh / 24h)
BST 200	1.38
BST 300	1.67
BST 400	2.00
BST 500	2.33
BST 800	2.23
BST1000	2.53