arbe
Integrated Engineering

Product Guide

HEATING SOLUTIONS
AF THERMAL STORES

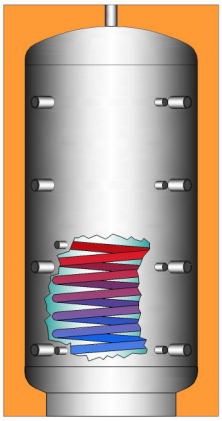
Inventive Engineering

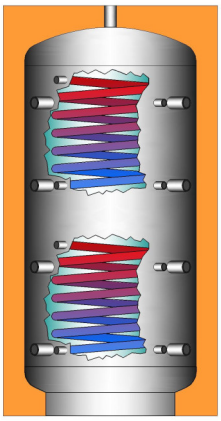
Thermal Stores

Arbe Integrated Engineering offer various type of thermal stores to suit multiple applications. These are split into 3 types:

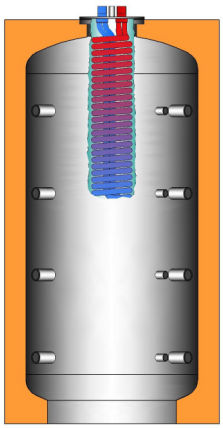
AF - Traditional thermal stores with multiple connections to suit various system designs. The AF range of vessels are bespoke to each application

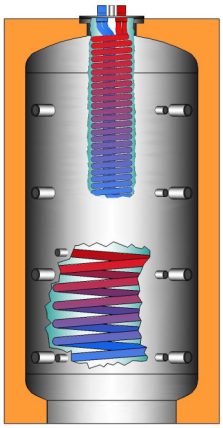
AF-PV - Thermal stores for systems with various heat input circuits, available as a standard design

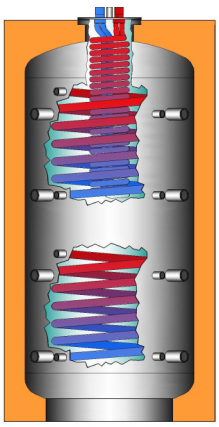




AF-RM - Multi-functional vessel with various heat inputs and DHW production for small systems







AF Thermal Stores

The Arbe AF series of thermal stores are utilised to store heating water produced by an external heat source such as a CHP, heat pump or a biomass boiler, in closed circuits. The vessels are supplied plain as standard with material options available as below. Vessels can also be supplied with baffle plates, dividers and sparge pipes where required

Each vessel is supplied with 4 off system connections and other connections as listed. The vessels can also be supplied with 3 off sensor connections for use with equipment such as CHP units or biomass boilers

AFT – Carbon steel shell
AFZ – Galvanised steel shell
AFS – Carbon steel shell, with perforated central divider plate
AFP – Carbon steel shell, with multiple flow divider plates
AFX – Stainless steel shell

Connections		**Insulation**
Ax2	Primary System	100 to 500 litre: 50mm PU hard polyurethane
Bx2	Secondary System	800 to 2,000 litre: 100mm PLFH soft polyurethane
T	Thermometer	2,500 to 10,000 litre: 100mm PLF soft polyurethane
S	Sensors	Optional: 100 to 10,000 litre: 50mm to 200mm mineral wool
V	Vent	or phenolic foam
R	Safety Valve	**Casing**
L	Drain	Standard: PVC cladding with zipper fastening
		Optional: Stucco Aluminium or Aluzinc casing

AF Thermal Stores

The Arbe AF series of thermal stores can be designed to suit each application, ensuring maximum efficiency of the system.

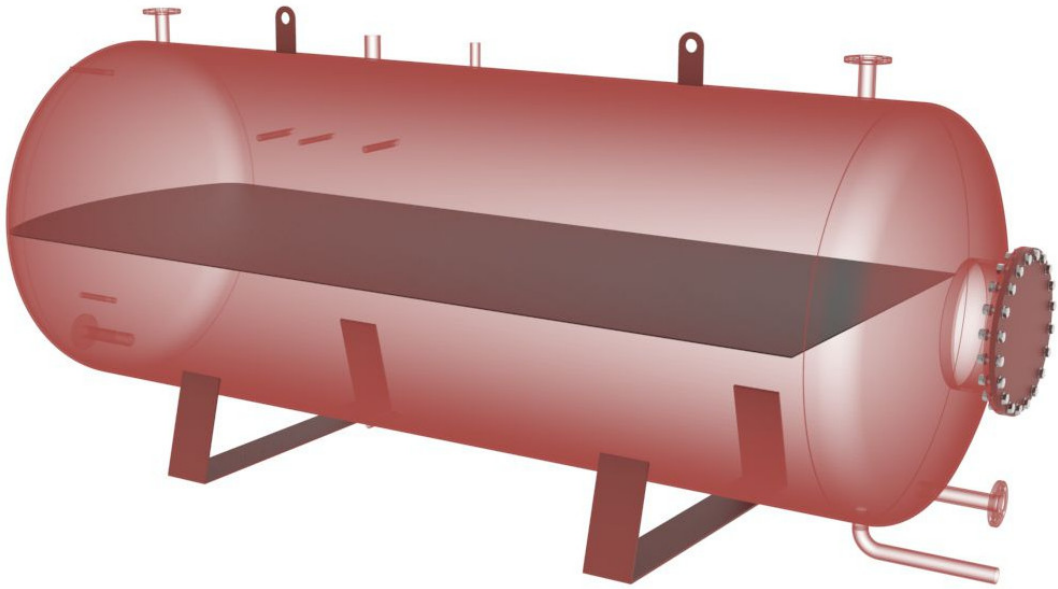
Thermal Store Design

Baffle Plates
Used to separate the hotter and colder areas within the vessel, increasing stratification within the vessel. This ensures optimal operation of the heat input equipment

Sparge Pipes:
Used to evenly distribute inlet water and direct the flow to the best area within the vessel, maximising storage capacity within the tank and increasing stratification

Horizontal Thermal Stores

Where it is not possible to install a vertical thermal store, Arbe can design a vessel with a horizontal orientation. The units are supplied with baffle plates to separate the hot and cold zones, ensuring optimum operation.



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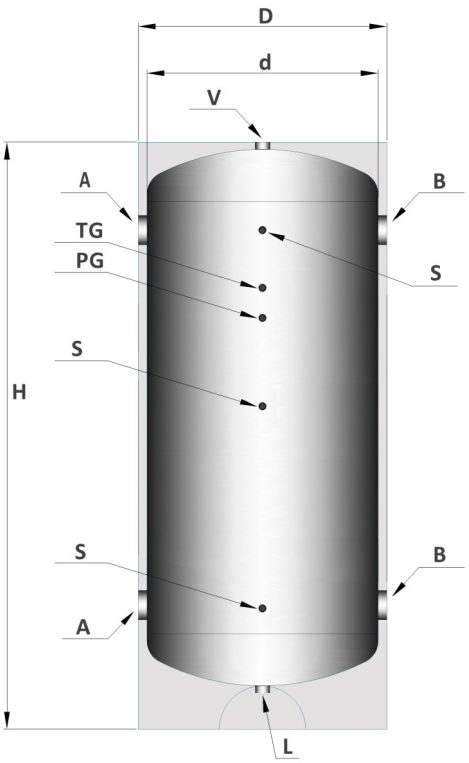
AF Thermal Stores

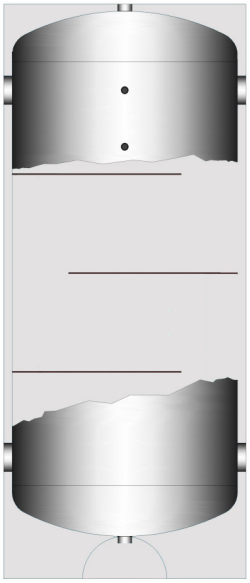
AF Capacity (Litres)	Dimensions & Connection Sizes											
	D	d	H	L	H1	A	B	S	TG	PG	L	V
100	510	400	1000	855	580	1"	1"	½"	½"	½"	1¼"	½"
200	560	450	1400	1240	630	2"	2"	½"	½"	½"	1¼"	½"
300	660	550	1420	1260	730	2"	2"	½"	½"	½"	1¼"	½"
500	760	650	1660	1520	830	DN65	DN65	½"	½"	½"	1¼"	½"
800	910	800	1820	1645	980	DN80	DN80	½"	½"	½"	1¼"	½"
1000	1000	800	2070	1895	980	DN100	DN100	½"	½"	½"	1¼"	½"
1500	1150	950	2450	2295	1180	DN100	DN100	½"	½"	½"	1¼"	½"
2000	1300	1100	2570	2325	1330	DN100	DN100	½"	½"	½"	1¼"	½"
2500	1450	1250	2600	2435	1480	DN100	DN100	½"	½"	½"	1¼"	½"
3000	1450	1250	2800	2635	1480	DN100	DN100	½"	½"	½"	1¼"	½"
3500	1600	1400	2550	2375	1630	DN150	DN150	½"	½"	½"	1¼"	½"
4000	1600	1400	2880	2705	1630	DN150	DN150	½"	½"	½"	1¼"	½"
4500	1800	1600	2650	2475	1830	DN150	DN150	½"	½"	½"	1¼"	½"
5000	1800	1600	2960	2785	1830	DN150	DN150	½"	½"	½"	1¼"	½"
6000	2000	1800	2850	2675	2030	DN150	DN150	½"	½"	½"	1¼"	½"
7000	2000	1800	3250	3075	2030	DN150	DN150	½"	½"	½"	1¼"	½"
8000	2200	2000	3160	2985	2230	DN150	DN150	½"	½"	½"	1¼"	½"
9000	2200	2000	3380	3205	2230	DN150	DN150	½"	½"	½"	1¼"	½"
10000	2400	2200	3180	3005	2430	DN150	DN150	½"	½"	½"	1¼"	½"

Energy Efficiency Class	AF Capacity (Litres)							
	100	200	300	500	800	1000	1500	2000
Rating	B	B	B	C	C	C	C	C
W	50	55	68	93	115	128	153	176

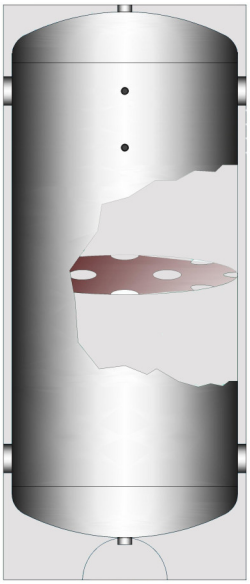
Model	Maximum Pressure	Maximum Temperature
AF	6 BarG	-10/90 DegC



AFT Thermal Store with Plain Interior



AFS Thermal Store with Baffle Plates



AFP Thermal Store with Perforated Plate

AF-PV Thermal Stores

The Arbe AF-PV series of thermal stores are utilised to store heating water produced by an external heat source such as a CHP, heat pump or a biomass boiler, in closed circuits. The vessels are supplied plain as standard but can also be supplied with coils for multifunctional use, such as multiple heat sources with varying temperatures.

The vessels can be supplied up to 10,000 litre in capacity as standard, and are supplied with a 6 Bar maximum working pressure as standard, with working pressures up to 10 Bar available.

Each vessel is supplied with 8 off system connections and other connections as listed. The vessels can also be supplied with 4 off sensor connections for use with equipment such as CHP units or biomass boilers

AF-PV – Carbon steel shell
AF-PV-1S – Carbon steel shell with single coil
AF-PV-2S – Carbon steel shell with twin coils

Connections

A	Coil Connections
C	Primary System
E	Secondary System
M	Sensors
V	Vent
L	Drain

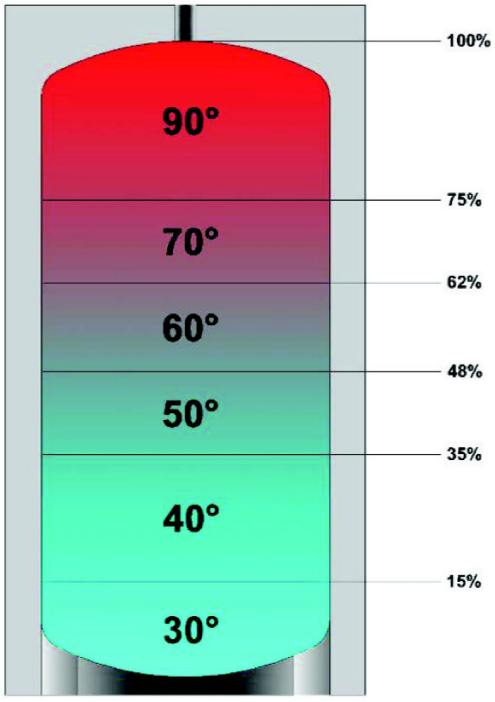
Insulation

100 to 500 litre: 50mm PU hard polyurethane
800 to 2,000 litre: 100mm PLFH soft polyurethane
2,500 to 10,000 litre: 100mm PLF soft polyurethane

Casing

Standard: PVC cladding with zipper fastening
Optional: Stucco Aluminium or Aluzinc casing

Model	Maximum Pressure	Maximum Temperature
AF-PV	10 BarG	-10/110 DegC



Operating Principle

The Arbe range of AF-PV range of thermal stores are designed to be installed in heating systems. Combined with renewable energy sources can result in significant economic savings. They are simple to use thanks to the stratified temperature achieved inside the tank.

The main functions of the vessel are as follows:

Stratification - Thanks to the inlet & outlet hydraulic connections located at various vessel heights, it is possible to stratify the temperature of the water using the various temperatures available.

Partitioning - In addition to separating the hydraulic circuits between primary and secondary, it is possible to expand both the primary - by connecting additional energy sources - increasing the use of thermal energy for other installations. This is achieved by using the coils available in the vessel for circuit separation.

Our AF-PV range offer a perfect solution for boiler & CHP installations.

AF-PV Thermal Stores

Heating Coil(s) Output Table

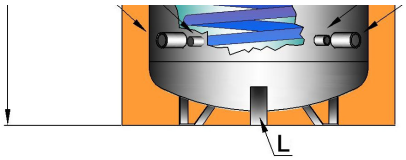
Lower Coil - AF-PV-1S & AF-PV-2S						
Vessel Capacity (Litres)	Coil Surface Area (m^2)	Power (kW)	Primary Flowrate (L/Second 80/60°C)	Secondary Flowrate (L/Second 50/70°C)	Primary Pressure Drop (kPa)	Primary Coil Capacity (Litres)
300	1.5	14	0.17	0.17	2	7.5
500	2.3	21	0.26	0.26	4	11.5
800	2.8	26	0.31	0.31	5	14.0
1000	3.0	28	0.34	0.34	6	15.0
1500	4.0	37	0.45	0.45	8	20.0
2000	4.5	42	0.51	0.51	10	22.5
2500	4.5	42	0.51	0.51	10	22.5
3000	6.0	56	0.67	0.67	16	30.0

Upper Coil - AF-PV-2S						
Vessel Capacity (Litres)	Coil Surface Area (m^2)	Power (kW)	Primary Flowrate (L/Second 80/60°C)	Secondary Flowrate (L/Second 50/70°C)	Primary Pressure Drop (kPa)	Primary Coil Capacity (Litres)
300	1	9	0.11	0.11	1	5
500	2	19	0.23	0.23	3	10
800	2	19	0.23	0.23	3	10
1000	3	28	0.34	0.34	6	15
1500	4	37	0.45	0.45	8	20
2000	4.5	42	0.51	0.51	10	22.5
2500	4.5	42	0.51	0.51	10	22.5
3000	4.5	42	0.51	0.51	10	22.5

Fixed Annular Heating Coils
Our heating coils are manufactured from high strength steel and provide a robust means of transferring heat in our models of thermal stores as shown

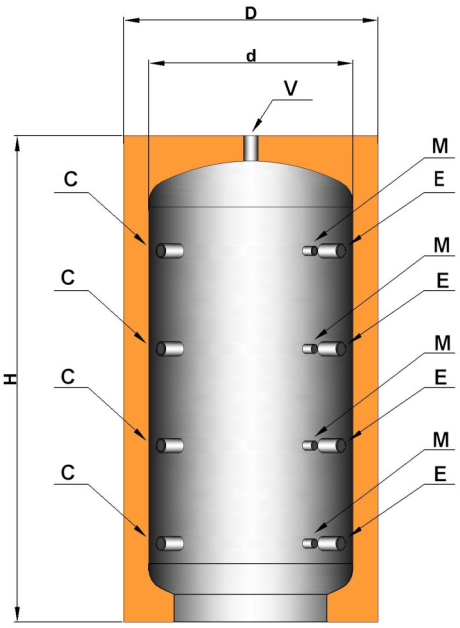
AF-PV Thermal Stores

AF-PV Capacity (Litres)	Coil Size - AF-PV-1S & AF-PV-2S		Dimensions & Connection Sizes										
	Lower m²	Upper m²	D	d	H	A	C	E	M	TG	PG	L	V
300	1.5	1.0	650	550	1490	1"	1½"	1½"	½"	½"	½"	-	½"
500	2.3	2.0	760	650	1630	1"	1½"	1½"	½"	½"	½"	-	½"
800	2.8	2.0	990	790	1760	1"	1½"	1½"	½"	½"	½"	-	½"
1000	3.0	3.0	990	790	2060	1"	1½"	1½"	½"	½"	½"	-	½"
1500	4.0	4.0	1150	950	2420	1"	1½"	1½"	½"	½"	½"	-	½"
2000	4.5	4.5	1300	1100	2460	1"	1½"	1½"	½"	½"	½"	-	½"
2500	4.5	4.5	1400	1200	2640	1"	2"	2"	½"	½"	½"	1¼"	½"
3000	6.0	4.5	1450	1250	2840	1"	2"	2"	½"	½"	½"	1¼"	½"
4000	-	-	1600	1400	2920	-	2"	2"	½"	½"	½"	1¼"	½"
5000	-	-	1800	1600	3040	-	2"	2"	½"	½"	½"	2"	½"
6000	-	-	1800	1600	3540	-	3"	3"	½"	½"	½"	2"	½"
7000	-	-	1800	1600	4040	-	3"	3"	½"	½"	½"	2"	½"
8000	-	-	1800	1600	4540	-	3"	3"	½"	½"	½"	2"	½"
9000	-	-	1800	1600	5040	-	4"	4"	½"	½"	½"	2"	½"
10000	-	-	1900	1700	5020	-	4"	4"	½"	½"	½"	2"	½"

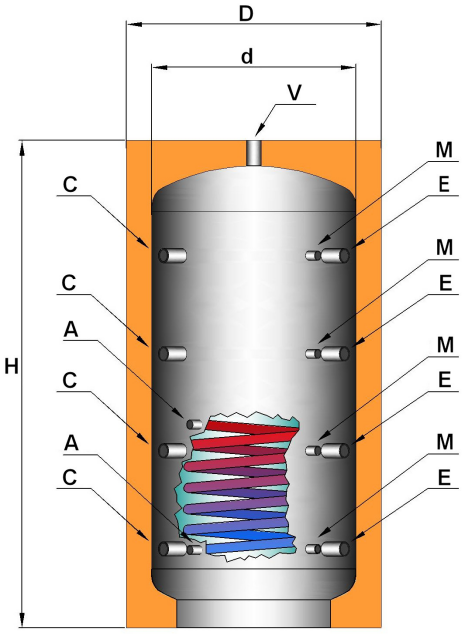


AF-PV Vessel with Legs
Capacities Above 2000 Litre

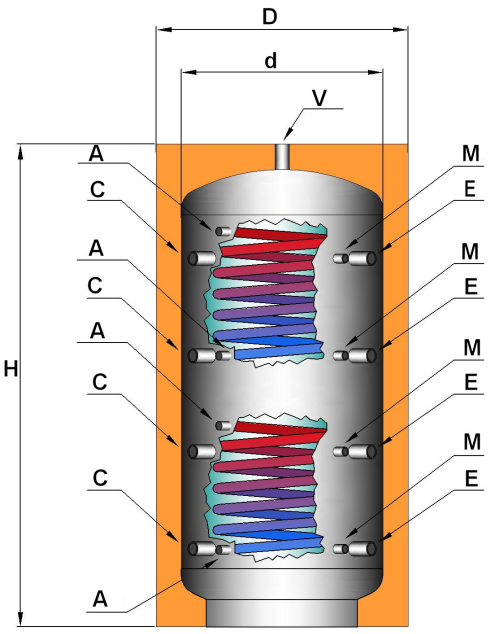
Energy Efficiency Class	Capacity					
	300	500	800	1000	1500	2000
AF-PV Rating	C	C	C	C	C	C
AF-PV W	82	104	111	123	163	174
AF-PV-1S Rating	C	C	C	C	C	C
AF-PV-1S W	83	105	112	124	164	175
AF-PV-2S Rating	C	C	C	C	C	C
AF-PV-2S W	85	106	114	125	138	165



AF-PV Vessel with No
Coils - 300 to 2000 Litre



AF-PV-1S Vessel
with Single Coil



AF-PV-2S Vessel
with Twin Coils

Approximate Dry Weight (kg)	Capacity														
	300	500	800	1000	1500	2000	2500	3000	4000	5000	6000	7000	8000	9000	10000
AF-PV	74	94	138	158	240	300	330	390	475	640	740	825	910	1000	1120
AF-PV-1S	96	122	175	204	290	360	385	465	-	-	-	-	-	-	-
AF-PV-2S	110	138	197	226	340	415	445	525	-	-	-	-	-	-	-

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AF-RM Thermal Stores

The Arbe AF-RM series of thermal stores are utilised to store heating water produced by an external heat source such as a CHP, heat pump or a biomass boiler, in closed circuits. The vessels are supplied plain as standard but can also be supplied with coils for multifunctional use, such as multiple heat sources with varying temperatures. The units also have separate coils for the generation of potable hot water, for small systems

The vessels can be supplied up to 2,000 litre in capacity as standard, and are supplied with a 6 Bar maximum working pressure as standard, with working pressures up to 10 Bar available.

Each vessel is supplied with 8 off system connections and other connections as listed. The vessels can also be supplied with 4 off sensor connections for use with equipment such as CHP units or biomass boilers

AF-RM – Carbon steel shell & single DHW coil
AF-RM-1S – Carbon steel shell with single coil & single DHW coil
AF-RM-2S – Carbon steel shell with twin coils & single DHW coil

Connections

A	Coil Connections
B	DHW Coil Connections
C	Primary System
E	Secondary System
M	Sensors
V	Vent
L	Drain

Insulation

100 to 500 litre: 50mm PU hard polyurethane
800 to 2,000 litre: 100mm PLFH soft polyurethane

Casing

Standard: PVC cladding with zipper fastening
Optional: Stucco Aluminium or Aluzinc casing

Model	Maximum Pressure	Maximum Temperature
AF-RM	6 BarG	-10/110 DegC

Heating Coil(s) Output Table

Lower Coil						
Vessel Capacity (Litres)	Coil Surface Area (m²)	Power (kW)	Primary Flowrate (L/Second 80/60°C)	Secondary Flowrate (L/Second 50/70°C)	Primary Pressure Drop (kPa)	Primary Coil Capacity (Litres)
300	1.5	14	0.17	0.17	2	7.5
500	2.3	21	0.26	0.26	4	11.5
800	2.8	26	0.31	0.31	5	14.0
1000	3.0	28	0.34	0.34	6	15.0
1500	4.0	37	0.45	0.45	8	20.0
2000	4.5	42	0.51	0.51	10	22.5

Upper Coil						
Vessel Capacity (Litres)	Coil Surface Area (m²)	Power (kW)	Primary Flowrate (L/Second 80/60°C)	Secondary Flowrate (L/Second 50/70°C)	Primary Pressure Drop (kPa)	Primary Coil Capacity (Litres)
300	1	9	0.11	0.11	1	5
500	2	19	0.23	0.23	3	10
800	2	19	0.23	0.23	3	10
1000	3	28	0.34	0.34	6	15
1500	4	37	0.45	0.45	8	20
2000	4.5	42	0.51	0.51	10	22.5

AF-RM Thermal Stores

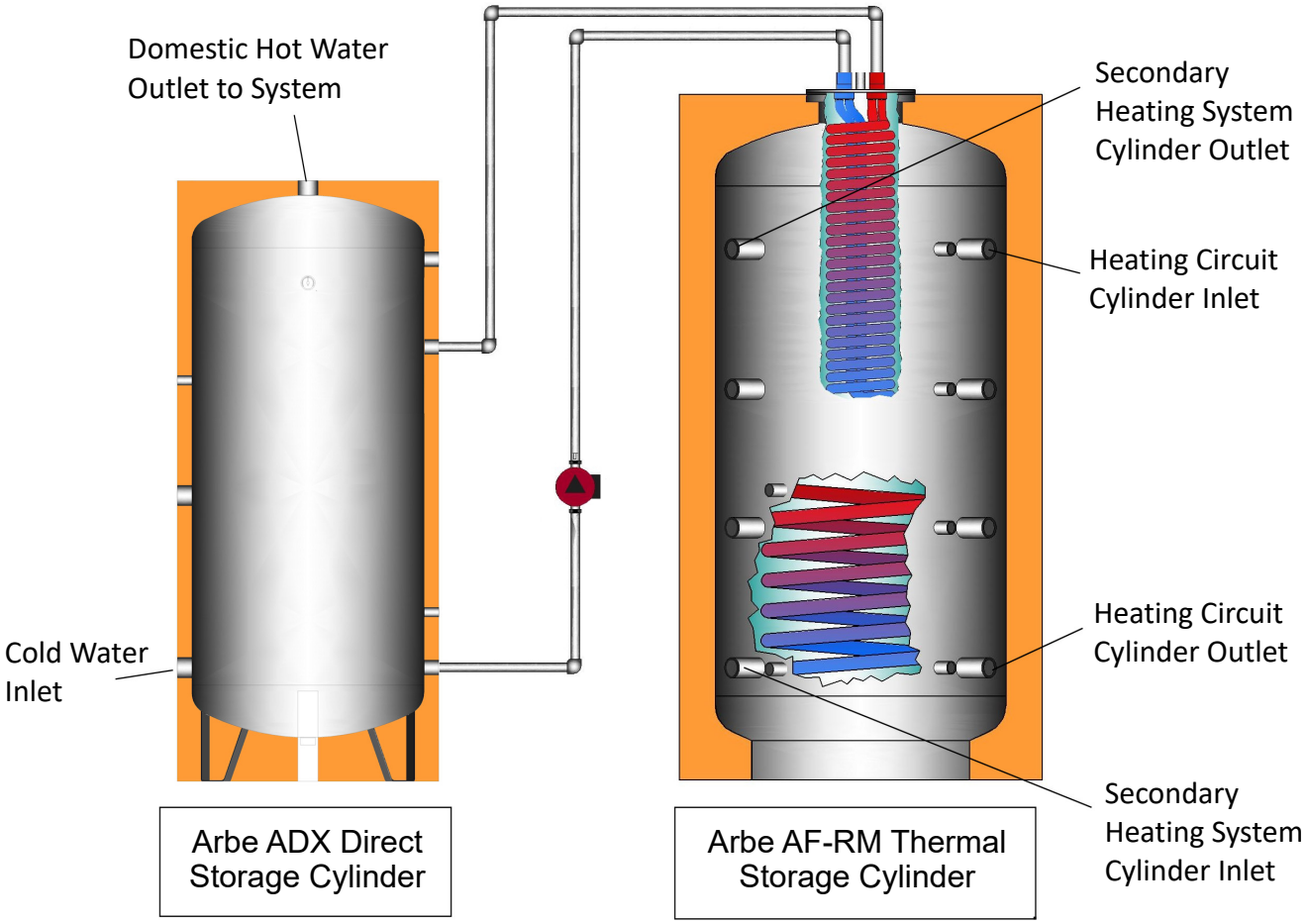
Domestic Hot Water Coil Output Table

Duties with 70/50°C Storage Temperature in Buffer Vessel

Vessel Capacity (Litres)	Coil Surface Area (m^2)	Power (kW)	Primary Flowrate (L/Sec)	Secondary Output (L/Hour 10/45°C)	Secondary Output (L/Hour 10/60°C)
300	3.6	47	0.57	1445	809
500	4.54	59	0.71	1794	1015
800	5.26	66	0.79	1999	1135
1000	6.34	79	0.95	2360	1359
1500	6.34	79	0.95	2360	1359
2000	6.34	79	0.95	2360	1359

Duties with 80/60°C Storage Temperature in Buffer Vessel

Vessel Capacity (Litres)	Coil Surface Area (m^2)	Power (kW)	Primary Flowrate (L/Sec)	Secondary Output (L/Hour 10/45°C)	Secondary Output (L/Hour 10/60°C)
300	3.6	59	0.71	1445	1015
500	4.54	73	0.87	1794	1256
800	5.26	81	0.97	1999	1393
1000	6.34	96	1.15	2360	1651
1500	6.34	96	1.15	2360	1651
2000	6.34	96	1.15	2360	1651



Typical Installation of AF-RM Cylinder with ADX Direct Storage Cylinder for Domestic Hot Water

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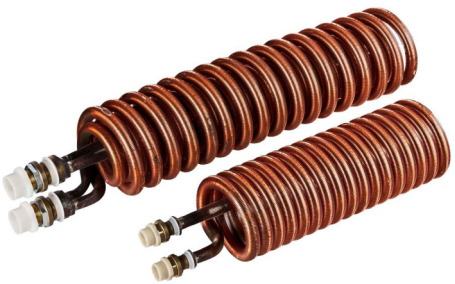
AF-PV Thermal Stores

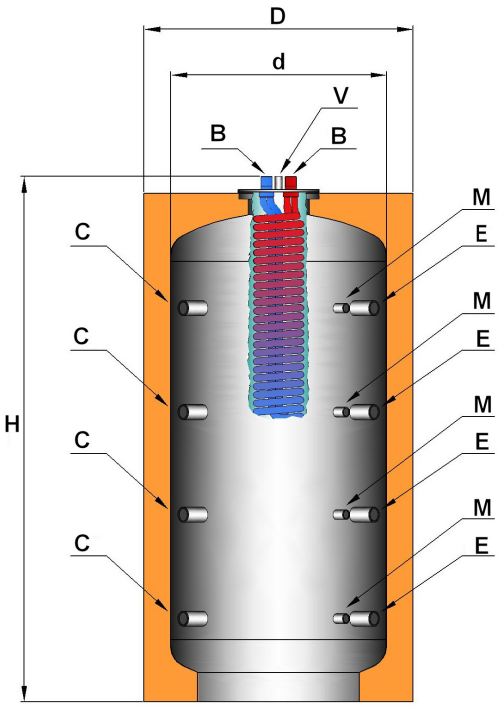
AF-RM Capacity (Litres)	Coil Size - AF-RM, AF-RM-1S & AF-PV-2S			Dimensions & Connection Sizes										
	Lower m²	Upper m²	DHW m²	D	d	H	A	C	E	M	TG	PG	L	V
300	1.5	1.0	3.60	650	550	1490	1"	1½"	1½"	½"	½"	½"	-	½"
500	2.3	2.0	4.54	760	650	1630	1"	1½"	1½"	½"	½"	½"	-	½"
800	2.8	2.0	5.26	990	790	1760	1"	1½"	1½"	½"	½"	½"	-	½"
1000	3.0	3.0	6.34	990	790	2060	1"	1½"	1½"	½"	½"	½"	-	½"
1500	4.0	4.0	6.34	1150	950	2420	1"	1½"	1½"	½"	½"	½"	-	½"
2000	4.5	4.5	6.34	1300	1100	2460	1"	1½"	1½"	½"	½"	½"	-	½"

Energy Efficiency Class	Capacity					
	300	500	800	1000	1500	2000
AF-RM Rating	C	C	C	C	C	C
AF-RM W	84	102	132	139	183	194
AF-RM-1S Rating	C	C	C	C	C	C
AF-RM-1S W	84	102	132	139	183	194
AF-RM-2S Rating	C	C	C	C	C	C
AF-RM-2S W	84	102	133	139	183	194

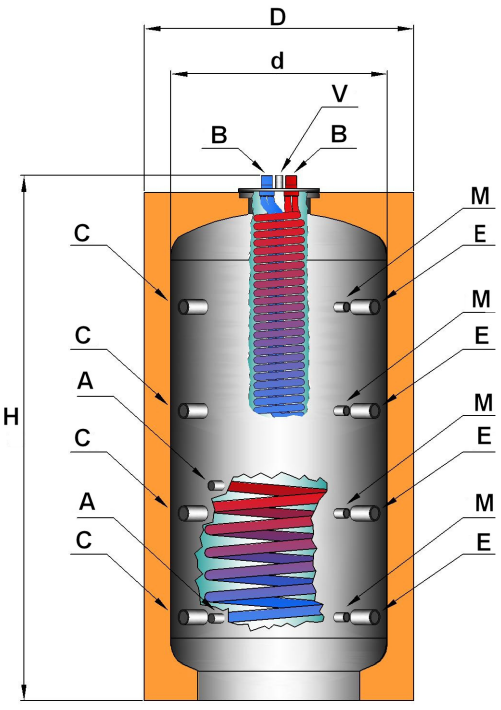
Approximate Dry Weight (kg)	Capacity					
	300	500	800	1000	1500	2000
AF-RM	90	120	145	160	245	310
AF-RM-1S	100	135	175	190	295	370
AF-RM-2S	110	155	195	220	345	425



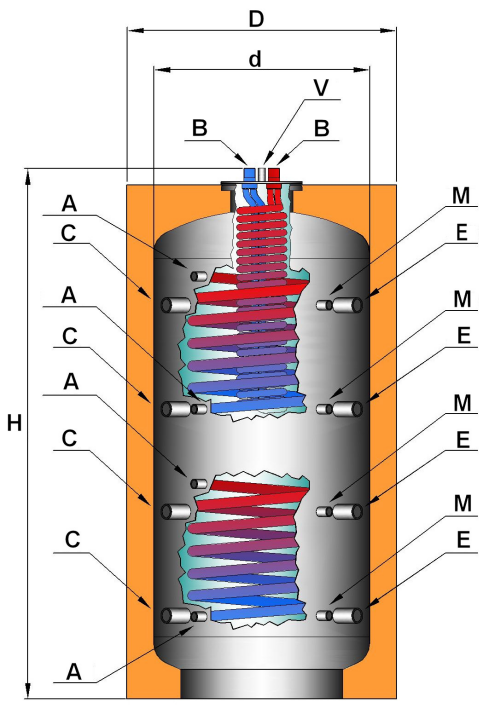
Copper Coils for Domestic Hot Water



AF-RM Vessel with No Coils - 300 to 2000 Litre



AF-RM-1S Vessel with Single Coil



AF-RM-2S Vessel with Twin Coils

Insulation

The range of thermal stores supplied by Arbe are insulated with 2 different types of insulation, depending on the capacity of the vessel. Vessels are finished in a PVC casing as standard, suitable for internal applications only or with Stucco aluminium cladding as an option, for applications where the vessel is to be installed externally or a stronger jacket is specified or required.

High Density Polyester Fibre (PLF & PLFH)

The raw materials used in our standard cylinder insulation are produced with polyester fibres and thermo-binding co-ployester fibres. The insulation is considered to be environmentally friendly even though it is not of natural origin, due to the material being manufactured from recycled plastic bottles, and is fully recyclable at the end of it's working life.

Benefits

- Rot proof
- Resistant to mould, bacteria or rodents
- Hypoallergenic
- Water-repellent
- 100% recyclable
- Environmentally friendly
- Light weight
- Self-supporting
- Fireproof

Hard Foam Polyurethane (PU)

Insulation made of hard foam polyurethane with more than 93% of closed cells content, CFC-free and HCFC-free. The insulation is available in different thicknesses, that can be injected directly using a mould or composed of 2 removable shells.

Material Insulation	Thickness	Density kg/m³	Thermal Conductivity	Working Temperature	Fire-Resistance (Euroclass EN13501-1)
PLF Polyester Fibre	100mm	20	ë = 0.037 W/mK	Ambient / 110°C	B-s2,d0
PLFH Polyester Fibre	100mm	25	ë = 0.034 W/mK	Ambient / 110°C	B-s2,d0
Hard Foam Polyurethane	55-85mm	42	ë = 0.019 W/mK	Ambient / 110°C	F

Welcome to Arbe Integrated Engineering

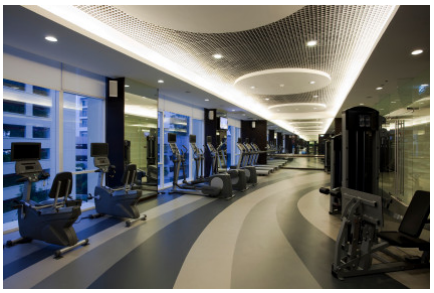
Arbe Integrated Engineering offer a range of products and services for the HVAC building services industry, ranging from bare heat exchangers and storage cylinders to fully packaged plantrooms and associated equipment. With over 20 years of design experience, our design and technical team can offer a complete solution for a wide range of project requirements.

Seamless Integration:
With our next generation range of equipment, our products offer complete integration with renewable and future energies, ensuring all available energy is utilised, reducing fossil fuel usage. In addition, our HevaSys products offers a unique next generation range of equipment with integral BMS style controls that can be adapted to any installation and can provide a standalone management system for buildings where the heating and hot water generation is relatively small, such as a leisure centre or a school.

Inventive Engineering:
In addition to our standard equipment, including heat exchangers, storage calorifiers and packaged solutions, we also design and manufacture bespoke equipment to end user or consultant specifications and we carry out extensive research and development to invent new products and enhance current designs.

Application Solutions:
With our complete range of products, we have solutions to cover most applications. With our ability to carry out complete bespoke design, we have a solution for each and every project requirement. Our end users include:

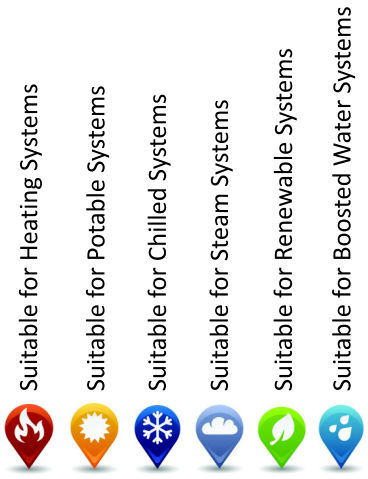
- Hotels
- Schools
- Universities
- Leisure Centres & Gyms
- Hospitals



Products Include:

Calorifiers
Indirect Cylinders
Direct Cylinders
Thermal Stores
Pressure Vessels
Plate Heat Exchangers
Brazed Heat Exchangers
Shell & Tube Exchangers
Heat Exchanger Packages

TwinHeat DHW/LTHW Systems
Gas Fired Calorifiers
Boilers & Associated Equipment
Packaged Boiler Houses
Packaged Plant Rooms
Solar Energy Packages
Heat Pumps
Booster Sets & Pressurisation
Bespoke Engineering Packages



Key to product Suitability

Integrated Engineering

Arbe Integrated Engineering Ltd
Unit 19, Halifax Industrial Estate, Marshway
Halifax, HX1 5RW
Tel 01422 646865, Fax 01422 500018
mail@arbe.co.uk www.arbe.co.uk