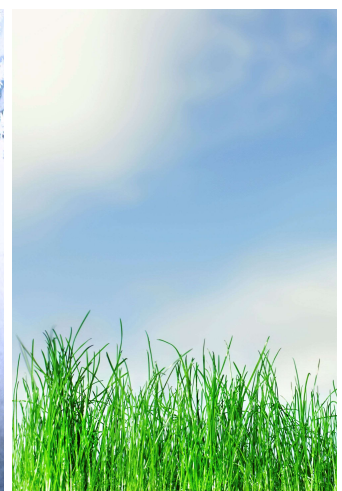


Product Guide

DOMESTIC HOT WATER SOLUTIONS STORAGE CALORIFIERS

Inventive Engineering





Storage Calorifiers

The Arbe ALXA series of storage calorifiers are used for the production of potable domestic hot water through a removable tube bundle type heat exchanger. There are 4 options for materials on the vessels and 2 options for heater battery materials, with copper and stainless steel. All vessels can be factory fitted with optional insulation. Sacrificial and electronic anodes are supplied with our galvanised steel storage calorifiers as standard, but are available for all material options. The standard range of calorifiers covers capacities from 200 to 10,000 litres, available both vertically or horizontally and are suitable for both water and steam primary mediums.

We can also design and manufacture bespoke calorifiers up to 120,000 litre capacity to suit most applications.

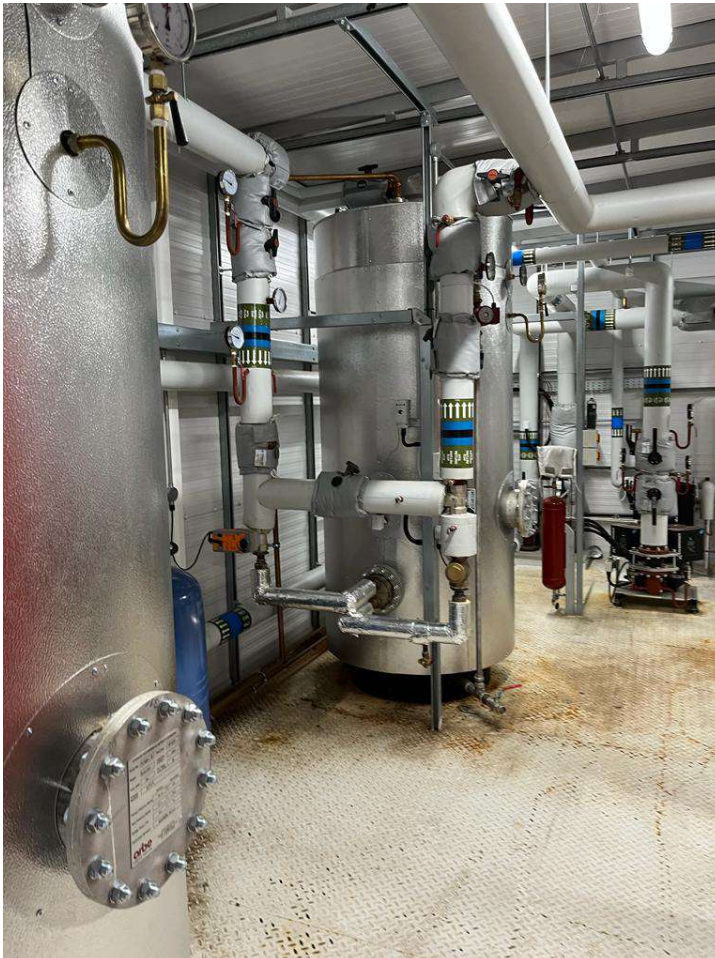
ALXA - Stainless steel AISI 316L shell, with a finned copper removable U-tube heat exchanger

ALCA - Solid Copper shell with a finned copper removable U-tube heat exchanger

ALZA - Galvanised steel shell, with a finned copper removable U-tube heat exchanger

ALCLA - Copper-lined carbon steel, with a carbon steel shell and lined internally with copper, supplied with a finned copper removable U-tube heat exchanger

Our storage calorifiers can be supplied with accessories either loose or factory fitted such as primary control packages and de-stratification pump sets.



Heater Battery Materials

Arbe storage calorifier heater batteries are removable, and are manufactured from low-fin copper integron tubes, which are roller expanded into a stainless steel 316L tubeplate as standard. The heater primary chests are supplied in either carbon steel or stainless steel, depending on the application





Storage Calorifiers

The kW requirement can be quickly calculated using the table below, which shows the range of our standard calorifiers. The kW rating shown is the required heat input to raise the cylinder temperature by the given temperature rise in 1 hour. The tabulated figures can be doubled for a 1/2 recovery or halved for a 2 hour recovery etc. You can also calculate an exact requirement for any capacity cylinder by using the formula below the table

Calorifier Capacity (Litres)	Heat Input Required (kW) for Temperature Rise °C						
	30	35	40	45	50	55	60
100	3.5	4.1	4.7	5.3	5.9	6.4	7.0
200	7.0	8.2	9.4	10.5	11.7	12.8	14.0
300	10.5	12.3	14.0	15.7	17.5	19.2	21.0
400	14.0	16.3	18.7	21.0	23.3	25.6	28.0
500	17.5	20.4	23.3	26.2	29.1	32.0	34.9
600	21.0	24.5	28.0	31.4	34.9	38.4	41.9
700	24.5	28.5	32.6	36.7	40.7	44.8	48.9
800	28.0	32.6	37.3	41.9	46.6	51.2	55.9
900	31.4	36.7	41.9	47.1	52.4	57.6	62.8
1000	34.9	40.7	46.6	52.4	58.2	64.0	69.8
1250	43.7	50.9	58.2	65.5	72.7	80.0	87.3
1500	52.4	61.1	69.8	78.5	87.3	96.0	104.7
2000	69.8	81.4	93.1	104.7	116.3	128.0	139.6
2500	87.3	101.8	116.3	130.9	145.4	159.9	174.5
3000	104.7	122.1	139.6	157.0	174.5	191.9	209.4
3500	122.1	142.5	162.8	183.2	203.5	223.9	244.2
4000	139.6	162.8	186.1	209.4	232.6	255.9	279.1
4500	157.0	183.2	209.4	235.5	261.7	287.8	314.0
5000	174.5	203.5	232.6	261.7	290.7	319.8	348.9
6000	209.4	244.2	279.1	314.0	348.9	383.8	418.7
7000	244.2	284.9	325.6	366.3	407.0	447.7	488.4
8000	279.1	325.6	372.1	418.7	465.2	511.7	558.2
9000	314.0	366.3	418.7	471.0	523.3	575.6	628.0
10000	348.9	407.0	465.2	523.3	581.4	639.6	697.7

To calculate the heat input required for a certain capacity with a required temperature size, you can use a simple calculation for this:

$$\frac{\text{Heat Factor (0.001163)} \times \text{capacity (litres)} \times \text{temperature rise required}}{\text{Hours recovery}} = \text{kW requirement}$$

Example - a 1000 litre calorifier needs to be heated from 5 to 60°C in 45 minutes

$$\text{Therefore: } \frac{0.001163 \times 1000 \times 55}{0.75} = 85.3 \text{ kW}$$



Storage Calorifiers

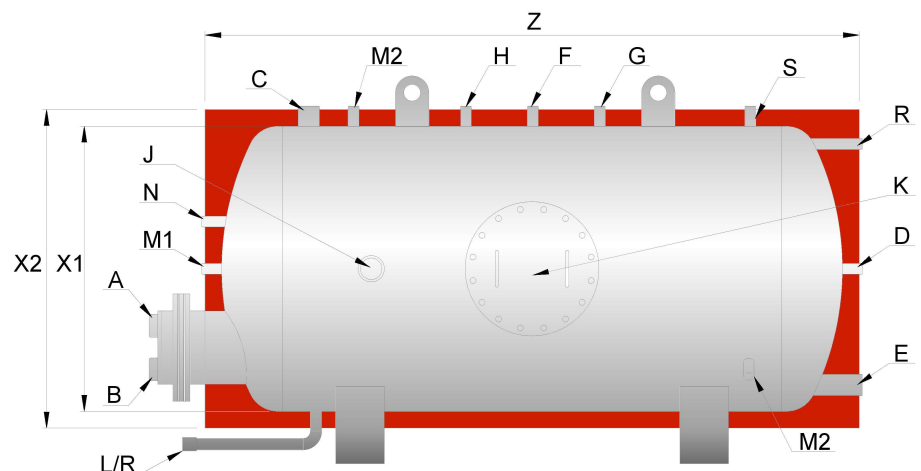
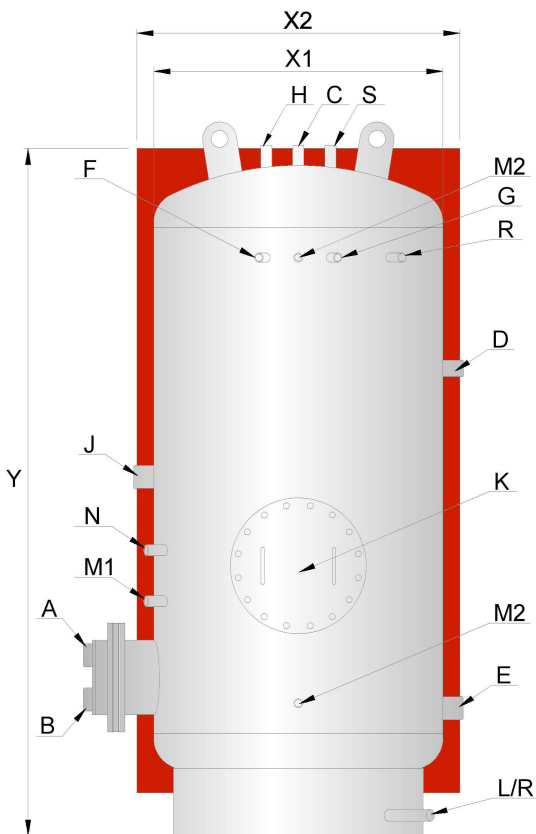
The Arbe Hevacal range of stainless steel calorifiers offer a solution for simple water heating with storage of the heated water. Supplied with a removable copper integron battery, our HevaCal ALXA range of units offers a long life product for most applications

Storage Calorifier Design Details		
Characteristics	Standard	Optional
Tank Capacity	200 - 5000 Litre	
Arrangement	Vertical	Horizontal
Tank Material	Stainless Steel 316L	Solid Copper Galvanised Steel Copper-Lined Mild Steel
Coil Material	Copper Integron	Stainless Steel 316L
Insulation	None	Mineral Wool & Stucco or Aluzinc Cladding
Accessories	Standard	Optional
	Thermometer	Unvented Kit & Safety Valve
	Pressure Gauge	Immersion Heater(s)
	Drain Valve	De-Stratification Pumpset Anode
Applicable Standard		

UKCA PE(S)R 2016: Category SEP

Connections:

- A - Primary Inlet
- B - Primary Outlet
- C - Secondary Flow
- D - Secondary Return
- E - Cold Feed
- F - Thermometer
- G - Pressure Gauge
- H - Safety Valve
- J - Immersion Heater
- K - Inspection Opening
- L - Drain
- M1 - Control Sensor
- M2 - BMS Sensor
- N - High Limit Stat
- R - De-Strat Pumpset
- S - Anti-Vacuum Valve





Storage Calorifiers

The Arbe Hevacal range of stainless steel calorifiers offer a solution for simple water heating with storage of the heated water. Supplied with a removable copper integron battery, our HevaCal ALXA range of units offers a long life product for most applications

Capacity (Litres)	Storage Calorifiers - Standard Vessel Dimensions & Connection Sizes												
	X1	Y	Z	C/E	D	F	G	H	J	K	L	M1 /M2	N
100	400	1140	1015	1½"	¾"	½"	⅜"	¼"	2"	DN200	1¼"	½"	½"
200	450	1600	1475	1½"	¾"	½"	⅜"	¼"	2"	DN200	1¼"	½"	½"
300	550	1615	1490	1½"	¾"	½"	⅜"	¼"	2"	DN200	1¼"	½"	½"
400	650	1580	1535	1½"	¾"	½"	⅜"	¼"	2"	DN200	1¼"	½"	½"
500	700	1685	1640	2"	1"	½"	⅜"	¼"	2"	DN300	1¼"	½"	½"
600	800	1590	1545	2"	1"	½"	⅜"	¼"	2"	DN300	1¼"	½"	½"
700	800	1790	1625	2"	1"	½"	⅜"	¼"	2"	DN300	1¼"	½"	½"
800	850	1815	1770	2"	1"	½"	⅜"	¼"	2"	DN300	1¼"	½"	½"
900	900	1825	1780	2"	1"	½"	⅜"	¼"	2"	DN300	1¼"	½"	½"
1000	900	1985	1940	2"	1"	½"	⅜"	¼"	2"	DN300	1¼"	½"	½"
1250	1050	1870	1825	2"	1"	½"	⅜"	¼"	2"	DN300	1¼"	½"	½"
1500	1100	2015	1970	2"	1"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
2000	1200	2220	2175	2"	1"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
2500	1300	2335	2290	DN65	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
3000	1400	2425	2380	DN65	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
3500	1500	2475	2430	DN65	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
4000	1500	2755	2710	DN80	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
4500	1600	2745	2700	DN80	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
5000	1700	2725	2680	DN100	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
6000	1800	2890	2845	DN100	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
7000	1900	3025	2980	DN100	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
8000	2000	3105	3060	DN100	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
9000	2000	3425	3380	DN100	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"
10000	2100	3445	3400	DN100	1½"	½"	⅜"	1"	2"	DN400	1¼"	½"	½"

Vessel Diameter

** Dimension X2 is the overall diameter including insulation, so can be X1 + insulation thickness, either 50mm, 100mm, 150mm or 200mm depending on project requirement.

Copper-Lined & Semi-Storage Calorifiers



Arbe design and manufacture specialist storage calorifiers, manufactured from materials such as copper lined carbon steel. A copper-lined calorifier shell consists of a steel outer shell with an internal lining of solid copper sheets. The steel outer shell gives the shell its strength against the internal pressure and the copper ensures the calorifier is suitable for potable water applications.

We can also design and manufacture semi-storage calorifiers, such as the one shown in the image below, supplied to a poultry processing factory. A semi-storage calorifier, also known as a semi-instantaneous calorifier, has an internal heater battery as a traditional calorifier but the unit also has a secondary shunt pump which pulls water from the bottom of the storage tank, through the heater battery shell where it is heated up by the primary medium in the tubes and back into the top of the tank, ready to be taken off to the system.

Our HevaCal-CSS semi-storage calorifiers can be designed with a primary medium of LTHW or steam, and can be supplied with all necessary controls where required, such as steam and condensate controls, temperature control panels and fully factory packaged systems





Sectional Storage Calorifiers

Arbe design and manufacture sectional storage calorifiers where it is not possible to move a single piece standard storage calorifier into a building or a plantroom.

The calorifiers can be manufactured in stainless steel, galvanised steel, copper-lined steel or solid copper, depending on the site specification requirements.

All units are bespoke so dimensions, connection sizes and orientations and heater battery duties are designed to suit each application, offering a solution where a like-for-like unit can be manufactured for simple calorifier swap overs.

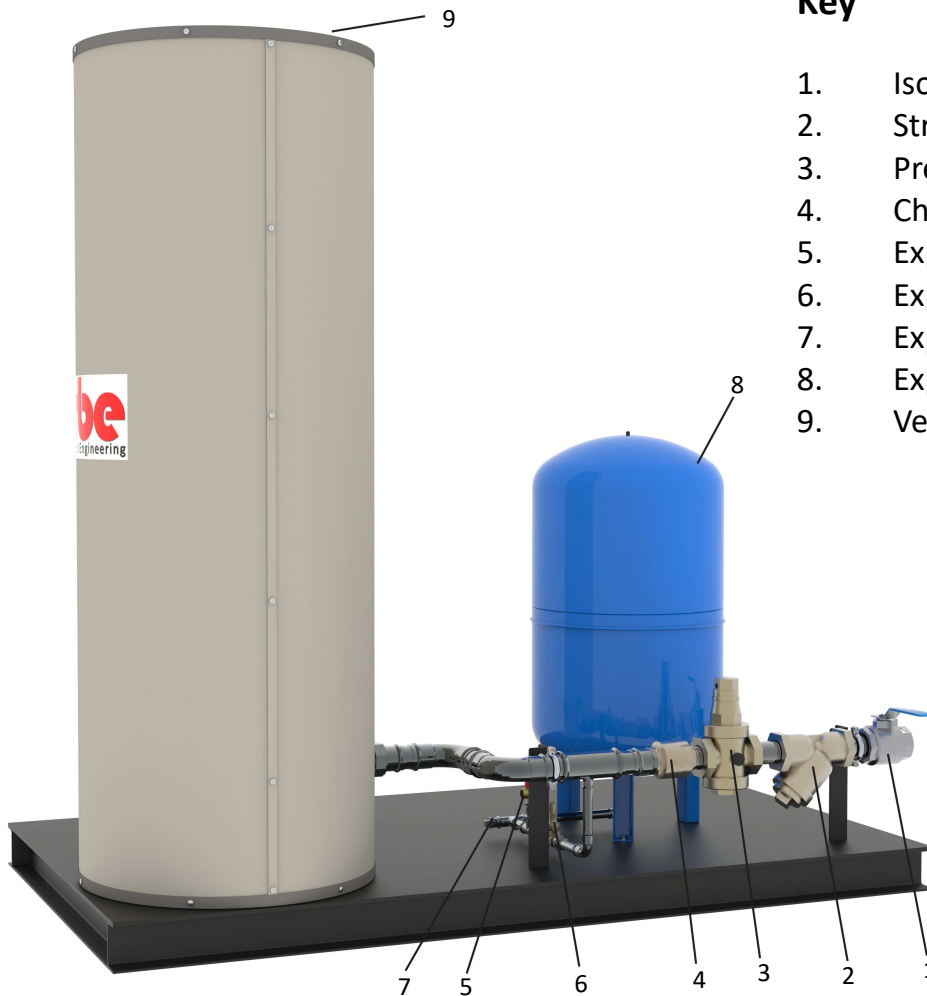
The calorifiers can be manufactured to suit any pressure requirement, please contact our sales department for further information





Unvented Systems

The layout below is the standard recommended cold feed kit available with our AL storage calorifiers for unvented systems, complying with Building Regulations. The size of each cold feed and kit expansion vessel is project specific so please contact us with any queries on sizing or the kit that is required. The unit can be supplied factory packaged with the unvented kit on a fabricated skid base, reducing site installation time, which also removes the need for a concrete plinth to be made on site



Key

1. Isolating Valve
2. Strainer
3. Pressure Reducing Valve
4. Check Valve
5. Expansion Relief Valve
6. Expansion Isolating Valve
7. Expansion Drain Valve
8. Expansion Vessel
9. Vessel P/T Safety Valve

Unvented Systems

Expansion vessels can be sized using our quick look-up table on the following page. We also have a handy sizing spreadsheet available in our downloads section



Expansion Vessel Sizing

Expansion vessel sizes can be quickly calculated using our table below. Sizing is simple:

1. Look up your system content (or nearest capacity shown which is above)
2. Look at the cold feed pressure in the blue bar (at 10°C)
3. Look up your maximum hot working pressure in the red bar (at 60°C), either with a 0.5 BarG pressure difference between hot and cold or a 1.0 BarG difference
4. This will give the recommended expansion vessel(s) size

Cold Feed Pressure (BarG) at 10°C	2.0		2.5		3.0		3.5		4.0		4.5		5.0	
Maximum Working Pressure (BarG) at 60°C	2.5	3.0	3.0	3.5	3.5	4.0	4.0	4.5	4.5	5.0	5.0	5.5	5.5	6.0
System Capacity (Litres)	Recommended Expansion Vessel Capacity Required (Either Single or Multiple Vessels)													
250	35	18	35	24	50	24	50	24	50	35	60	35	60	35
500	60	35	80	50	80	50	100	50	100	60	150	60	150	60
750	100	60	150	60	150	80	150	80	150	80	200	100	200	100
1000	150	80	150	80	200	100	200	100	200	150	300	150	300	150
1250	150	100	200	100	200	150	300	150	300	150	300	150	300	150
1500	200	150	300	150	300	150	300	150	300	200	400	200	400	200
1750	300	150	300	150	300	150	300	200	400	200	400	200	400	300
2000	300	150	300	200	400	200	400	200	400	300	750	300	750	300
2500	300	200	400	200	400	300	750	300	750	300	750	300	750	300
3000	400	300	750	300	750	300	750	300	750	400	750	400	750	400
3500	750	300	750	300	750	300	750	400	750	400	750	400	1000	750
4000	750	300	750	400	750	400	750	400	750	750	1000	750	1000	750
4500	750	400	750	400	750	400	1000	750	1000	750	1000	750	1000	750
5000	750	400	750	400	1000	750	1000	750	1000	750	1250	750	1250	750
5500	750	400	750	750	1000	750	1000	750	1250	750	1250	750	1250	750
6000	750	750	1000	750	1000	750	1250	750	1250	750	1250	750	1500	750
6500	1000	750	1000	750	1000	750	1250	750	1250	750	1500	750	1500	1000
7000	1000	750	1000	750	1250	750	1250	750	1500	750	1500	1000	1750	1000
7500	1000	750	1250	750	1250	750	1500	750	1500	1000	1750	1000	1750	1000
8000	1000	750	1250	750	1250	750	1500	750	1500	1000	1750	1000	2000	1000
8500	1250	750	1250	750	1500	750	1500	1000	1750	1000	1750	1000	2000	1250
9000	1250	750	1250	750	1500	1000	1750	1000	1750	1000	2000	1000	2000	1250
9500	1250	750	1500	750	1500	1000	1750	1000	2000	1000	2000	1250	2250	1250
10000	1250	750	1500	1000	1750	1000	1750	1000	2000	1250	2250	1250	2250	1250
10500	1250	750	1500	1000	1750	1000	2000	1000	2000	1250	2250	1250	2500	1250
11000	1500	750	1500	1000	1750	1000	2000	1250	2250	1250	2250	1250	2500	1500
11500	1500	1000	1750	1000	2000	1000	2000	1250	2250	1250	2500	1500	2750	1500
12000	1500	1000	1750	1000	2000	1250	2250	1250	2250	1250	2500	1500	2750	1500
12500	1500	1000	1750	1000	2000	1250	2250	1250	2500	1500	2750	1500	3000	1500
13000	1750	1000	2000	1000	2000	1250	2250	1250	2500	1500	2750	1500	3000	1750
13500	1750	1000	2000	1250	2250	1250	2500	1500	2750	1500	3000	1500	3000	1750
14000	1750	1000	2000	1250	2250	1250	2500	1500	2750	1500	3000	1750	3250	1750
14500	1750	1000	2000	1250	2250	1250	2500	1500	2750	1500	3000	1750	3250	1750
15000	2000	1250	2250	1250	2500	1500	2750	1500	3000	1750	3250	1750	3500	2000



Insulation

The range of calorifiers supplied by Arbe are insulated with 2 different types of insulation, depending on the capacity of the vessel. Vessels are finished in a stucco aluminium casing as standard, suitable for internal and external applications or with stainless steel or Aluzinc cladding as options. For applications where the vessel is to be installed externally the insulation is specifically designed for this.

High Density Mineral Fibre Insulation

The insulation consists of high quality mineral fibre rolls, faced with reinforced aluminium foil, with a nominal density of 45 kg/m^3 .

Fire Properties

Reaction to Fire, Euroclass: A1 - EN 13501-1

Combustability: Non-Combustible - EN ISO 1182:2002, Class O According to BS476: Part 6 1989 and Part 7 1997

Thermal Conductivity

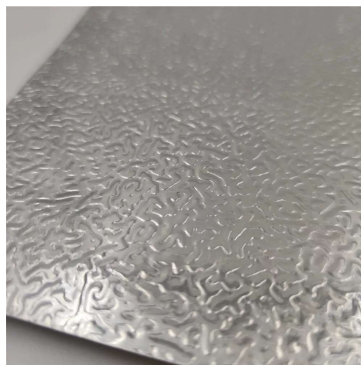
Thermal Conductivity (Declared) in 10°C λ_{10} 0.034 W/m_k







Thermal Conductivity (Declared) in 50°C λ_{10} 0.039 W/m_k

Thermal Conductivity (Declared) in 100°C λ_{10} 0.048 W/m_k

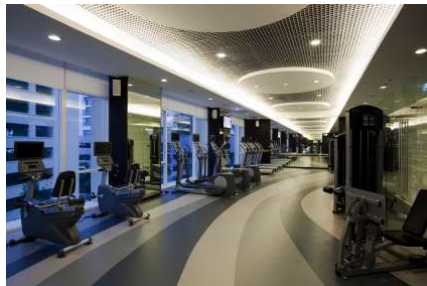
Moisture Properties

Water Absorption, Short Term WS, $W_p \leq 1 \text{ kg/m}^2$ EN 1609



 Suitable for Heating Systems
 Suitable for Potable Systems
 Suitable for Chilled Systems
 Suitable for Steam Systems
 Suitable for Renewable Systems
 Suitable for Boosted Water Systems

Key to Product Suitability

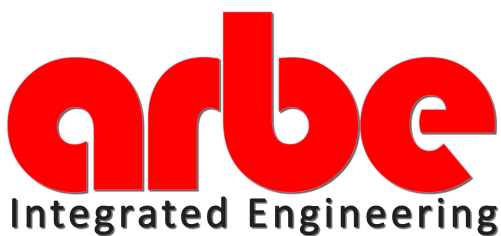


Design | Supply | Manufacture | Install | Commission

DHW & LTHW Generation
 Booster Sets & Pressurisation
 Steam Packages & Equipment
 Condensate Removal & Recovery

Heat Exchangers
 Package Plantrooms
 Gas & Biomass Boilers
 CHP & Heat Recovery

Solar Energy
 Chillers & Heat Pumps
 Buffer Vessels
 Complete HVAC Integration



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