

Introduction

CA-HVAC offer a range of both steam and water primary heat exchangers. The steam/water type is covered by the Atlantic range of calorifiers and the water/water type is covered by the Pacific range.

The 'Atlantic' Range

The Atlantic range comprises steam to water calorifiers, calorifier/flash condensers and fully packaged calorifiers/flash condensers/condensate pump-sets. These are mostly used in heating systems to transfer the heat from steam to hot water. The majority of applications are for heating LTHW (82/71°C) although the calorifiers can be used for MTHW and HTHW generation if required. Other applications may also arise with different water temperatures and materials of construction.

The 'Pacific Range

The Pacific PA range of water to water calorifiers are mostly used in heating / cooling systems to transfer heat from one independent circuit to another. The majority of applications are for generating LTHW (82/71 °C) from MTHW and HTHW although the calorifiers can be used for oils and other liquids if required. Other applications may also arise with different water temperatures and materials of construction.

Material Options Available

Shells

Carbon steel
Solid Copper
Stainless Steel

Tubeplates

Carbon steel
Brass
Stainless Steel

Primary Headers

Carbon Steel

Heat Exchanger Tubes

Solid drawn "low-fin" Integron copper
Solid drawn plain copper
Stainless Steel
Carbon Steel

Tube supports and baffles

Mild steel
Brass
Copper

Other materials are available on request.

Thermal Insulation Options

- ✓ **Type MA** Consists of 50mm mineral wool with dimpled aluminium cladding. This gives good thermal insulation and a quality finish. For some installations there will be a high risk of damage to the factory fitted insulation. In these instances it is preferable to insulate on site.

Special packages

The technical team at CA-HVAC Building Supplies have considerable experience of designing complete calorifier packages including pumps, controls, integral valves and pipework. The resulting package comes designed and built for the job, ready simply to be connected up and commissioned. This can save a lot of design time and be very cost-effective. If you have such a project in mind please contact us.



Design Standards

- ✓ **CA-HVAC Commercial Standard A** Commercial Standard calorifier is designed for minimum cost without loss of performance or reliability, based on many years' experience of calorifier design and construction.
- ✓ **BS853** For customers who require a calorifier constructed to an internationally recognised standard. CA-HVAC Building Supplies will produce calorifiers to BS853 if required. There is scope within BS853 for 3rd party verification of design and construction. This adds to cost and delivery time, but can be arranged if required.
- ✓ **BS5500** For very high working pressures CA-HVAC Building Supplies can design and build calorifiers to BS5500. However BS853 now includes higher pressures so it is not often necessary to resort to BS5500.
- ✓ **Other Standards** CA-HVAC Building Supplies will consider production of calorifiers to other standards. Please contact us with details.

ATLANTIC 'AT' NON-STORAGE CALORIFIERS

The Atlantic AT range. These are single calorifiers. Saturated steam heats the water by condensing in the calorifier and transferring latent heat through the walls of the tubes. For most systems the AT calorifier is the most economical solution.

Atlantic AT selection (LTHW secondary)

You need to know :-

- 1 Steam pressure at calorifier header (i.e. downstream of any control valve) (BarG)
- 2 Heat output required (kW)

Using the appropriate chart from the "AT outputs" sheet draw a horizontal line across from the desired output (kW) and a vertical line from the available header steam pressure (BarG).

Select the calorifier above the point where the two lines meet.

To calculate pressure drop you first need to know the Secondary water flowrate (L/s).

$$\text{Secondary water flowrate (l/s)} = \frac{\text{Heat Output (kW)}}{4.18 \times \text{Temperature Rise (}^{\circ}\text{C)}}$$

Using the "AT pressure drops chart" draw a vertical line up from the Flowrate axis until it meets the curve for the unit in question (please note that the flowrate scale is logarithmic). Draw a horizontal line from that point to find the pressure drop.

Example of selection of AT unit

Secondary Water = LTHW (71°C to 82°C)

Heat output required = 300 kW

Dry Saturated Steam Pressure at Header = 4 BarG

Selection of AT unit:

Use the "Atlantic AT Outputs" sheet. Use the top graph. Draw a line rightwards from 300 kW. Draw a line upwards from 4 BarG. They cross just beneath the line for the AT150B unit.

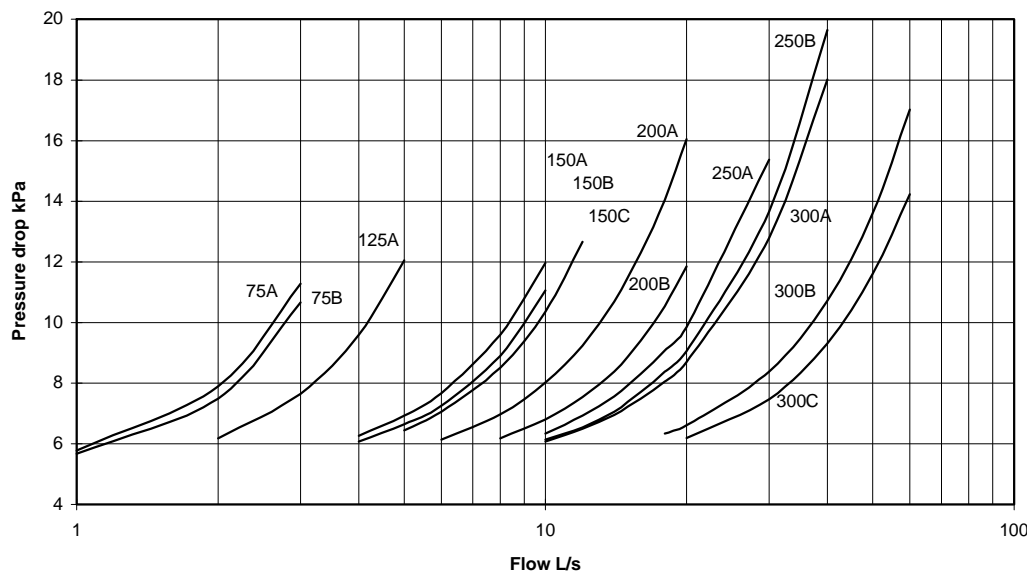
Correct selection = AT150B

To calculate the secondary water pressure drop you first need to calculate the secondary water flowrate

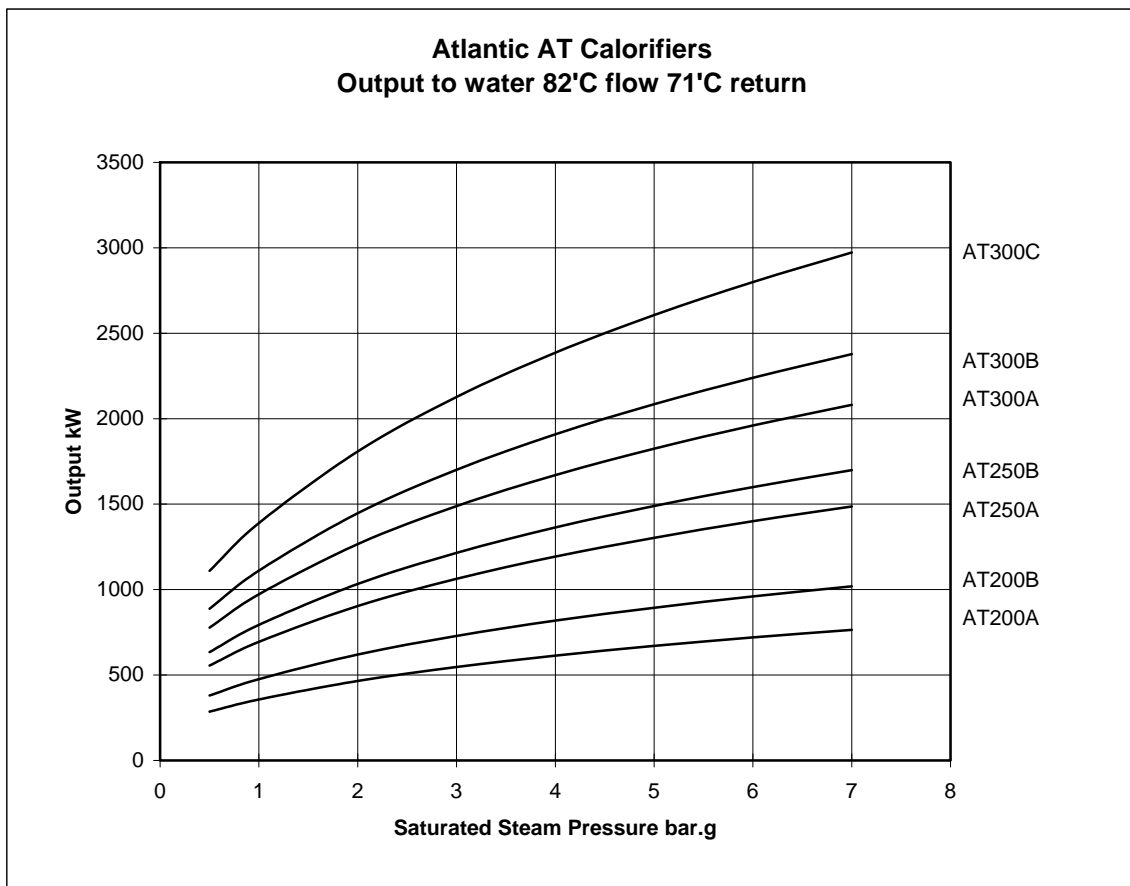
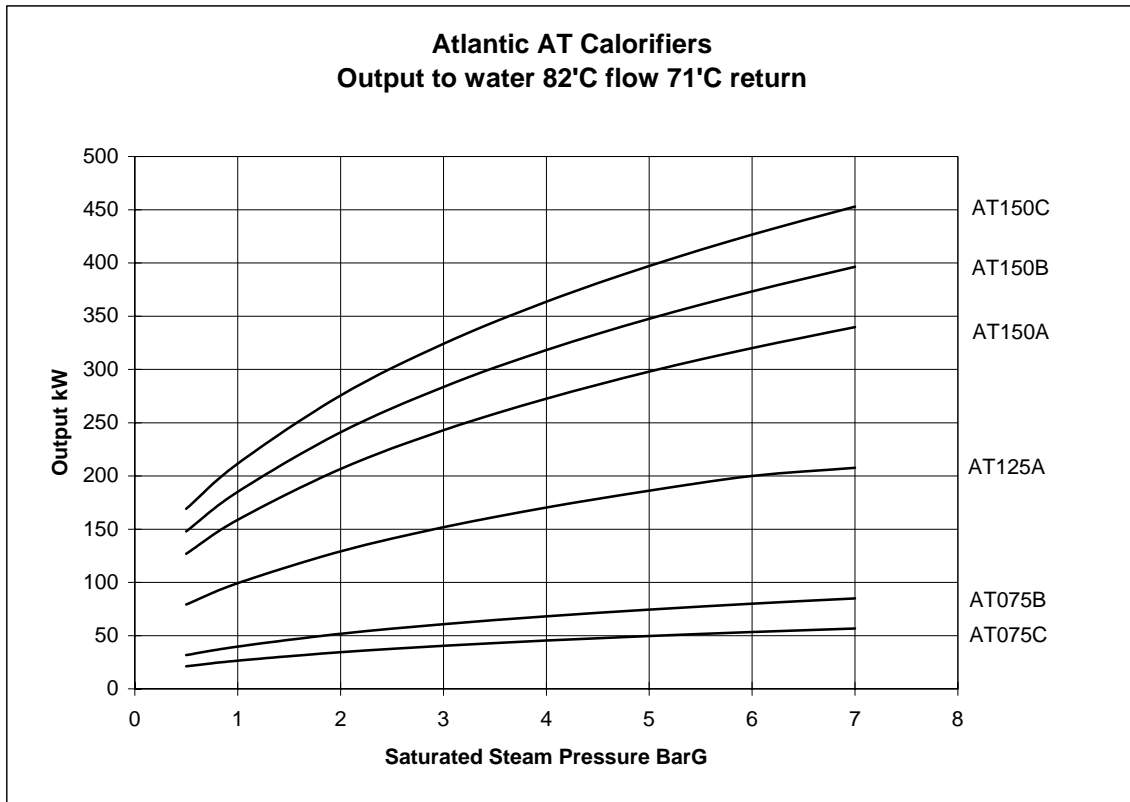
$$\text{Secondary water flowrate} = \frac{300}{(4.18 \times (82-71))} = 6.5 \text{ L/s}$$

Next, use the "Atlantic AT Pressure Drops" sheet. Please note that the flowrate scale is logarithmic. Draw a line vertically up from 6.5L/s. From the point where the line crosses the AT150B curve, draw another line horizontally left to find the pressure drop:- 7kPa.

Atlantic AT Pressure Drop Chart



ATLANTIC 'AT' NON-STORAGE CALORIFIERS



ATLANTIC 'AT' NON-STORAGE CALORIFIERS

Standard Material Schedule

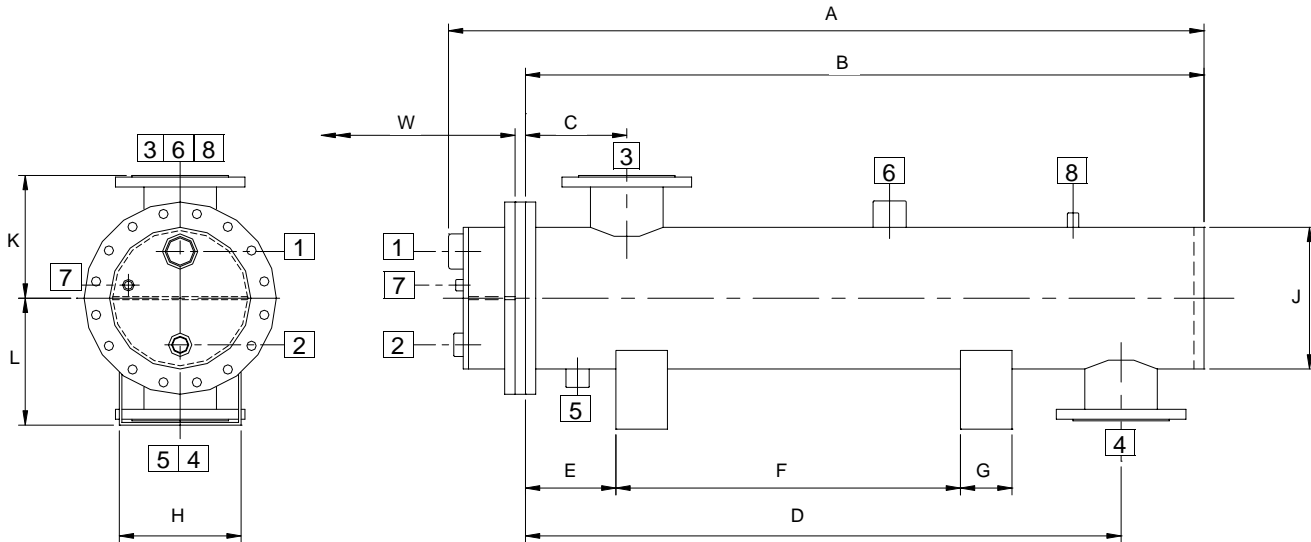
Shell	Carbon Steel
Header	Carbon Steel
Heater Tubes	Copper 'low-fin' Integron
Tubeplate	Carbon Steel
(Other materials on request)	

Connections

Ref	Description	Size	Ref	Description	Size
1	Primary Steam Inlet	Varies	5	Drain	¾" BSP
2	Primary Condensate Outlet	Varies	6	Safety Valve	Varies
3	Secondary Flow	Varies	7	Primary Pressure Gauge	¾" BSP
4	Secondary Return	Varies	8	Secondary Pressure Gauge	¾" BSP

Design Data	Shell Side	Tube Side
Maximum Working Pressure	7.0 BarG	10.0 BarG
Hydraulic Test Pressure	11.55 BarG	15.0 BarG
Design Code	BS853 1996 Part 1 Grade A & PED 1999 (SI 1999/2001)	
Higher pressures on request		

Unit shown below is horizontal type.
The Atlantic 'AT' calorifier can also be supplied for vertical installations.



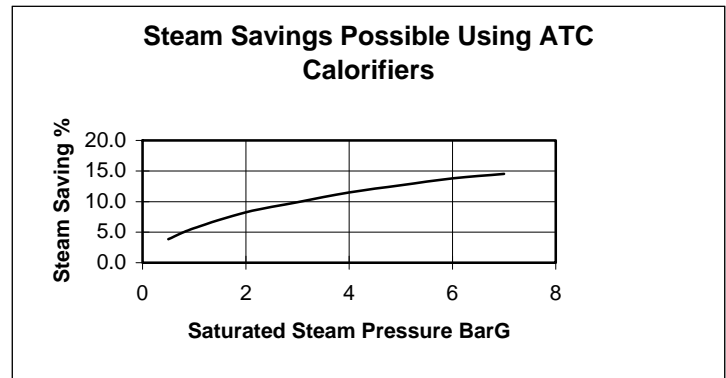
Unit	Dimensions in mm												Connections					Weight (dry) kg	Water Content Litres
	A	B	C	D	E	F	G	H	J	K	L	W	1	2	3	4	6		
AT075A	770	620	95	535	175	215	50	80	89	70	80	520	¾"	½"	1½"	1½"	¾"	20	1.7
AT075B	935	785	95	685	175	360	50	80	89	70	80	720	¾"	½"	1½"	1½"	¾"	23	2.2
AT125A	1220	1045	110	940	175	605	65	120	139	95	105	980	1"	½"	2"	2"	1"	50	10
AT150A	1230	1045	170	930	175	535	65	145	168	185	195	985	2"	¾"	DN80	DN80	1"	71	15
AT150B	1370	1185	170	1070	175	675	65	145	168	185	195	1135	2"	¾"	DN80	DN80	1"	75	17.5
AT150C	1540	1360	170	1250	175	850	65	145	168	185	195	1285	2"	¾"	DN80	DN80	1½"	81	20
AT200A	1355	1145	175	989	175	540	100	195	219	210	220	1010	2½"	1"	DN100	DN100	1½"	110	32
AT200B	1735	1525	175	1369	175	920	100	195	219	210	220	1320	2½"	1"	DN100	DN100	1½"	130	43
AT250A	1630	1310	210	1150	175	665	100	235	273	235	245	1190	DN80	1½"	DN150	DN150	1½"	192	59
AT250B	1860	1540	210	1375	175	895	100	235	273	235	245	1420	DN80	1½"	DN150	DN150	2"	209	69
AT300A	1755	1385	240	1190	175	685	100	275	324	265	275	1215	DN100	1½"	DN200	DN200	2"	265	91
AT300B	1985	1610	240	1400	175	895	100	275	324	265	275	1445	DN100	1½"	DN200	DN200	2"	288	106
AT300C	2210	1840	240	1620	175	1115	100	275	324	265	275	1675	DN100	1½"	DN200	DN200	2"	310	121

ATLANTIC 'ATC' NON-STORAGE CALORIFIERS

The Atlantic ATC range of calorifier/flash condensers. An ATC unit effectively comprises two calorifiers and an intermediate trap-set and pipework. Saturated steam heats the water by condensing in the first calorifier and transferring latent heat through the walls of the tubes. The resultant condensate is effectively at the same temperature & pressure as the steam. Therefore when this condensate is discharged through the trap its pressure falls and flash steam is given off. The second calorifier condenses the flash steam and cools the condensate - transferring the heat (which would otherwise be wasted) to the secondary water. The final temperature of the condensate depends on the secondary water return temperature. In the case of LTHW (82°C flow 71°C return) the condensate will be cooled to 90°C approx.

For a given duty the capital cost is higher than for an AT unit but there are several important benefits:-

- ✓ Reduced steam consumption (e.g. by 14% for 6 BarG steam - see graph).
- ✓ Eliminates steam hammer in condensate main.
- ✓ Reduces boiler hot-well temperature (reducing evaporation losses and feed pump cavitation).
- ✓ May allow higher steam pressures at the calorifier.
- ✓ May allow use of a smaller calorifier.
- ✓ May remove need for steam pressure reducing valve.
- ✓ May allow smaller controls, steam mains and, particularly, condensate mains to be used.
- ✓ Reduces energy losses from condensate main.



ATC Configurations available:- Horizontal only

ATC Construction: Same as the AT units with the addition of float type steam trap, sight glass and strainer and intermediate pipework.

ATC standard materials:

As the AT units with the addition of:-

- 1 Pipe-work: Heavy wall screwed steel pipe and malleable iron fittings
- 2 Steam trap and strainer: Cast iron
- 3 Sight glass: Pressed brass

Atlantic ATC selection (LTHW secondary)

Follow the same procedure as for the Atlantic AT but use the "ATC outputs" sheet.

To calculate pressure drop of the selected ATC unit, you multiply the equivalent AT unit pressure drop by 2.

Example of selection of ATC unit

(Selection based on the same duty as the above example)

Use the same procedure as above but use the "Atlantic ATC Outputs" sheet. From this the correct selection is the Atlantic ATC150A calorifier.

Pressure drop is calculated as follows:-

Flowrate = 6.5 L/s (unchanged from first example)

As before, use the "Atlantic AT Pressure Drops" sheet. Draw a line vertically up from 6.5L/s. From the point where the line crosses the AT150A curve, draw another line horizontally left to find the AT pressure drop:- 8kPa.

Therefore the pressure drop for the ATC150A = 2 x 8 =16 kPa.

'ATC-MP' NON-STORAGE CALORIFIERS

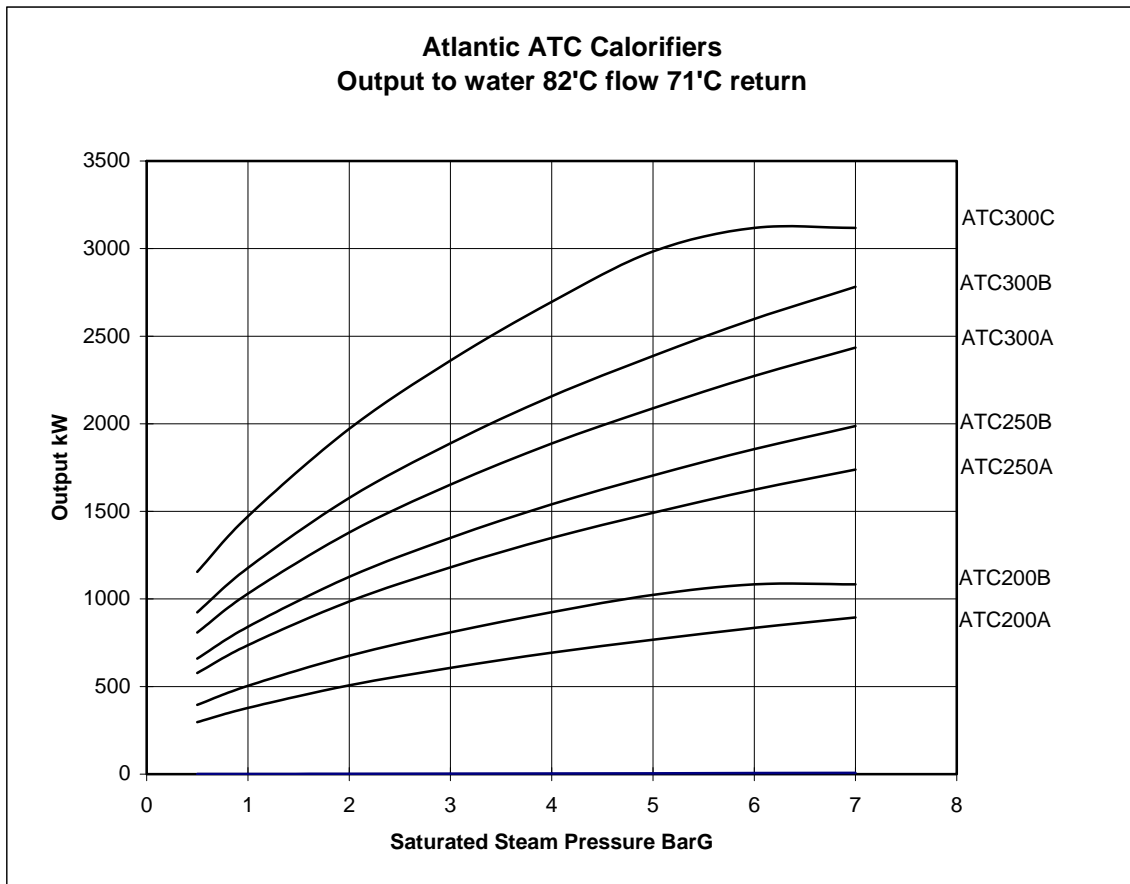
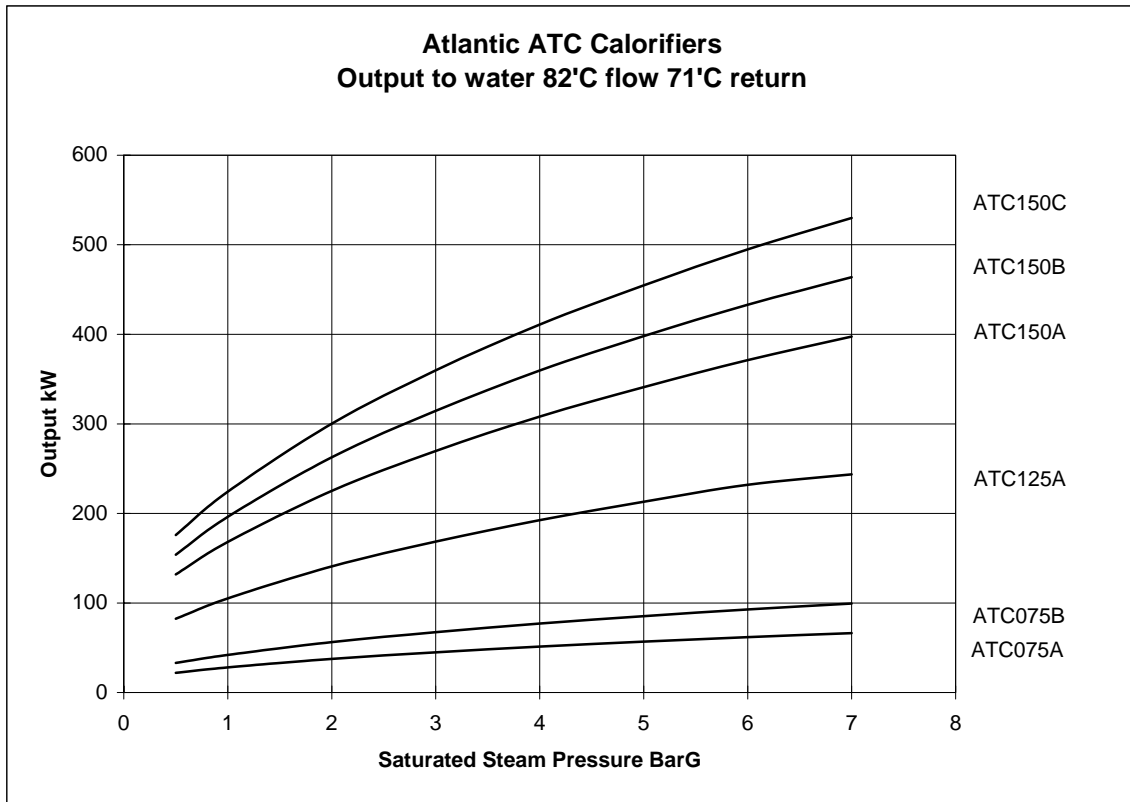
CA-HVAC also offer The Atlantic ATCMP range of packaged calorifiers/flash condensers/condensate pump-sets. These not only heat water but collect and pump away the condensate as well! Performing all the functions of the Atlantic ATC units but with a condensate receiver and automatic condensate pump (steam or compressed air driven), these units solve frequently encountered difficulties of condensate removal. The condensate receiver and pump can also be used to remove condensate from other items of plant nearby, provided this is taken into account at the design stage. **Please note that a separate steam or compressed air supply is required to power the pump.**

CA-HVAC Building Supplies also produce a range of **electrically powered condensate pump sets**. These can be combined with ATC calorifiers if required. Details available from our sales office.

Atlantic ATCMP selection (LTHW secondary)

For overall dimensions, weights and pressure drop calculation, follow the same procedure as for the Atlantic ATC, using the "ATC outputs" sheet. If, for example, you determine from this that the ATC300A will meet the output requirements, then the ATCMP-300A is the required ATCMP unit. Please contact our sales office for further details and diagrams

ATLANTIC 'ATC' NON-STORAGE CALORIFIERS



ATLANTIC 'ATC' NON-STORAGE CALORIFIERS

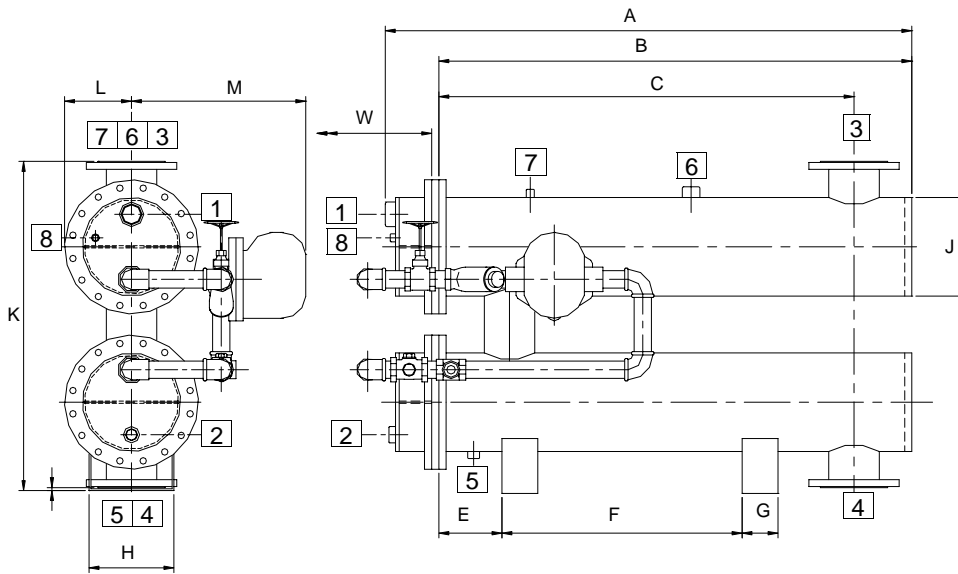
Standard Material Schedule

Shell	Carbon Steel
Header	Carbon Steel
Heater Tubes	Copper 'low-fin' Integron
Tubeplate	Carbon Steel
(Other materials on request)	

Connections

Ref	Description	Size	Ref	Description	Size
1	Primary Steam Inlet	Varies	5	Drain	¾" BSP
2	Primary Condensate Outlet	Varies	6	Safety Valve	Varies
3	Secondary Flow	Varies	7	Primary Pressure Gauge	¾" BSP
4	Secondary Return	Varies	8	Secondary Pressure Gauge	¾" BSP

Design Data	Shell Side	Tube Side
Maximum Working Pressure	7.0 BarG	10.0 BarG
Hydraulic Test Pressure	11.55 BarG	15.0 BarG
Design Code	BS853 1996 Part 1 Grade A & PED 1999 (SI 1999/2001)	
Higher pressures on request		



Unit	Dimensions in mm											Connections					Weight (dry) kg	Water Content Litres	
	A	B	C	E	F	G	H	J	K	L	M	W	1	2	3	4			6
ATC075A	850	620	535	175	215	50	80	89	390	100	283	520	¾"	½"	1½"	1½"	¾"	60	4
ATC075B	995	785	685	175	360	50	80	89	390	100	283	720	¾"	½"	1½"	1½"	¾"	65	5
ATC125A	1300	1045	940	175	605	65	120	139	525	125	310	980	1"	½"	2"	2"	1"	120	20
ATC150A	1310	1045	930	175	535	65	145	168	700	142	367	985	2"	¾"	DN80	DN80	1"	170	30
ATC150B	1450	1185	1070	175	675	65	145	168	700	142	367	1135	2"	¾"	DN80	DN80	1"	180	35
ATC150C	1620	1360	1250	175	850	65	145	168	700	142	367	1285	2"	¾"	DN80	DN80	1½"	190	40
ATC200A	1455	1145	989	175	540	100	195	219	800	170	446	1010	2½"	1"	DN100	DN100	1¼"	270	64
ATC200B	1835	1525	1369	175	920	100	195	219	800	170	446	1320	2½"	1"	DN100	DN100	1½"	305	86
ATC250A	1730	1310	1150	175	665	100	235	273	900	202	475	1190	DN80	1½"	DN150	DN150	1½"	440	118
ATC250B	1960	1540	1375	175	895	100	235	273	900	202	475	1420	DN80	1½"	DN150	DN150	2"	465	138
ATC300A	1855	1385	1190	175	685	100	275	324	1020	230	519	1215	DN100	1½"	DN200	DN200	2"	590	182
ATC300B	2085	1610	1400	175	895	100	275	324	1020	230	519	1445	DN100	1½"	DN200	DN200	2"	635	212
ATC300C	2310	1840	1620	175	1115	100	275	324	1020	230	519	1675	DN100	1½"	DN200	DN200	2"	680	242

ATLANTIC 'ATCMP' NON-STORAGE CALORIFIERS

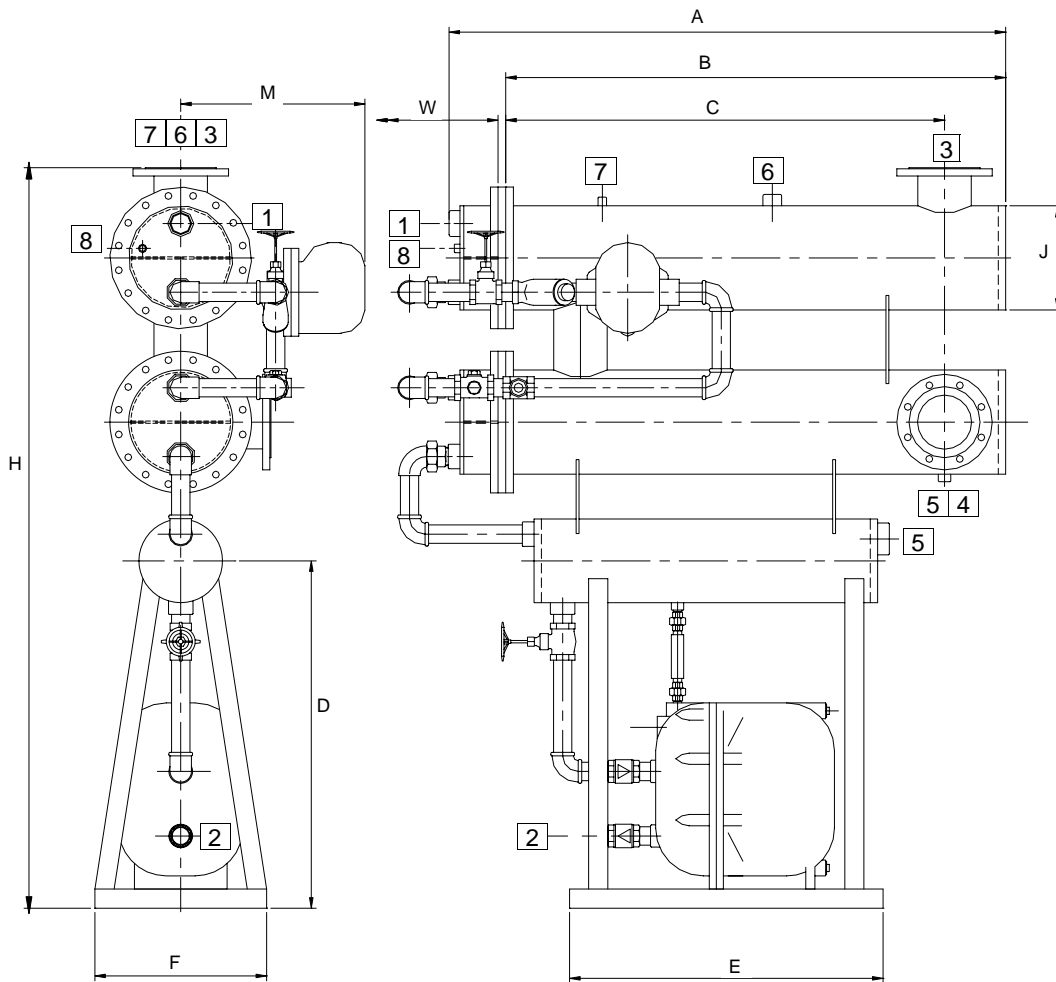
Standard Material Schedule

Shell	Carbon Steel
Header	Carbon Steel
Heater Tubes	Copper 'low-fin' Integron
Tubeplate	Carbon Steel
(Other materials on request)	

Connections

Ref	Description	Size	Ref	Description	Size
1	Primary Steam Inlet	Varies	5	Drain	¾" BSP
2	Primary Condensate Outlet	Varies	6	Safety Valve	Varies
3	Secondary Flow	Varies	7	Primary Pressure Gauge	¾" BSP
4	Secondary Return	Varies	8	Vent/Overflow	Varies

Design Data: As the AT & ATC Range



Unit	Dimensions in mm										Connections						Weight (dry) kg	Water Content Litres
	A	B	C	D	E	F	H	J	M	W	1	2	3	4	6	8		
ATC-MP075A	850	620	535	750	100	450	1195	89	283	415	¾"	½"	1½"	1½"	¾"	2½"	142	4
ATC-MP075B	995	785	685	750	245	450	1195	89	283	720	¾"	½"	1½"	1½"	¾"	2½"	147	5
ATC-MP125A	1300	1045	940	750	300	450	1330	139	310	980	1"	½"	2"	2"	1"	2½"	202	20
ATC-MP150A	1310	1045	930	750	300	450	1505	168	367	985	2"	¾"	DN80	DN80	1"	2½"	234	30
ATC-MP150B	1450	1185	1070	750	375	450	1505	168	367	1135	2"	¾"	DN80	DN80	1"	2½"	262	35
ATC-MP150C	1620	1360	1250	750	450	450	1505	168	367	1285	2"	¾"	DN80	DN80	1¼"	2½"	272	40
ATC-MP200A	1455	1145	989	750	375	450	1715	219	446	1010	2½"	1"	DN100	DN100	1¼"	3"	357	64
ATC-MP200B	1835	1525	1369	800	400	450	1715	219	446	1320	2½"	1"	DN100	DN100	1½"	3"	418	86
ATC-MP250A	1730	1310	1150	800	300	450	1935	273	475	1190	DN80	1½"	DN150	DN150	1½"	3"	566	118
ATC-MP250B	1960	1540	1375	800	245	450	1935	273	475	1420	DN80	1½"	DN150	DN150	2"	3"	610	138
ATC-MP300A	1855	1385	1190	850	400	450	2290	324	519	1215	DN100	1½"	DN200	DN200	2"	4"	742	182
ATC-MP300B	2085	1610	1400	850	300	450	2290	324	519	1445	DN100	1½"	DN200	DN200	2"	4"	806	212
ATC-MP300C	2310	1840	1620	850	450	450	2290	324	519	1675	DN100	1½"	DN200	DN200	2"	4"	851	242

PACIFIC 'PA' NON-STORAGE CALORIFIERS

Introduction

The **Pacific PA** range of water to water calorifiers are mostly used in heating / cooling systems to transfer heat from one independent circuit to another. The majority of applications are for generating LTHW (82/71 °C) from MTHW and HTHW although the calorifiers can be used for oils and other liquids if required. Other applications may also arise with different water temperatures and materials of construction. The technical team at CA-HVAC Building Supplies have many years' of experience of calorifier and heat exchanger design - we can offer special units, designed for the job, if required.

PA Configurations available:- Horizontal and Vertical. Multiple units in series may be offered for certain temperature conditions.

PA Construction: All units are of robust construction. Tube bundles have substantial supports and baffles and are withdrawable for inspection. Design and construction are to BS853 part 1 :1996

PA standard materials:

- √ Shells: Carbon steel.
- √ Headers: Carbon Steel.
- √ U-Tubes: Solid drawn "low-fin" copper U-tubes/ plain tubes/stainless steel.
- √ Tube supports and baffles: Mild steel.

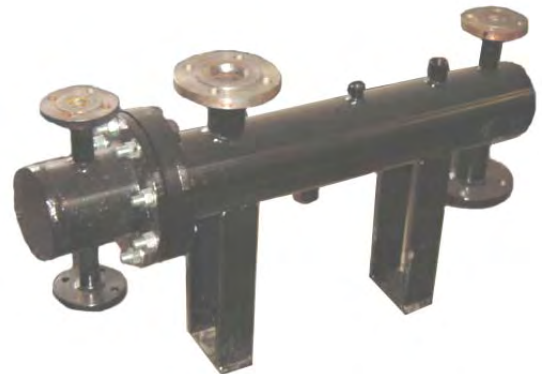
Other materials are available on request.

Pacific PA selection

Pacific units are selected by computer for the specific duty required.

You need to supply our sales team with the following :-

- √ Primary fluid inlet temperature
- √ Primary fluid outlet temperature
- √ Secondary fluid inlet temperature
- √ Secondary fluid outlet temperature
- √ Heat output required (kW)
- √ Maximum working pressure and temperature



Selection - general points

Prices for standard Pacific PA units are readily available from our Sales Office, who will be pleased to assist with any selection and can advise on special units and unusual operating conditions, in particular:-

Non-standard materials:

We are able to offer special units in materials such as copper and stainless steel at very competitive prices.

Units with plain tubes:

The standard units have finned heat transfer tubes. Sometimes plain tubes are required by customers. Plain tube units tend to be larger for a given duty; our sales office can supply details.

PACIFIC 'PA' NON-STORAGE CALORIFIERS

Standard Material Schedule

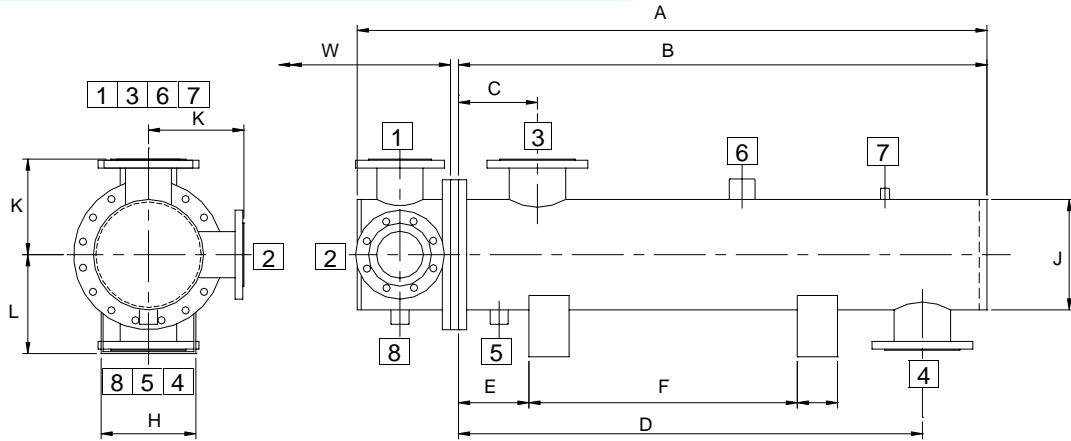
Shell	Carbon Steel
Header	Carbon Steel
Heater Tubes	Copper 'low-fin' Integron
Tubeplate	Carbon Steel
(Other materials on request)	

Connections

Ref	Description	Size	Ref	Description	Size
1	Primary Inlet	Varies	5	Secondary Drain	¾" BSP
2	Primary Outlet	Varies	6	Safety Valve	Varies
3	Secondary Flow	Varies	7	Pressure Gauge	¾" BSP
4	Secondary Return	Varies	8	Primary Drain	¾" BSP

Design Data

	Shell Side	Tube Side
Maximum Working Pressure	7.0 BarG	10.0 BarG
Hydraulic Test Pressure	11.55 BarG	15.0 BarG
Design Code	BS853 1996 Part 1 Grade A & PED 1999 (SI 1999/2001)	
Higher pressures on request		



Unit	Dimensions in mm												Connections					Weight (dry) kg	Water Content Litres	
	A	B	C	D	E	F	G	H	J	K	L	W	1	2	3	4	5		Pri	Sec
PA125A2	900	710	127	635	175	310	65	120	142	127	140	650	1"	1"	2"	2"	¾"	46	1.5	10
PA125A4	900	710	127	635	175	310	65	120	142	127	140	650	1"	1"	2"	2"	¾"	46	1.5	10
PA125B2	1500	1320	127	1245	175	920	65	120	142	127	140	1265	1"	1"	2"	2"	¾"	66	2.5	18
PA125B4	1500	1320	127	1245	175	920	65	120	142	127	140	1265	1"	1"	2"	2"	¾"	66	2.5	18
PA150A2	1955	1715	165	1555	160	1180	65	145	168	185	200	1570	DN50	DN50	DN80	DN80	¾"	98	5	35
PA150A4	1955	1715	165	1555	160	1180	65	145	168	185	200	1570	DN40	DN40	DN80	DN80	¾"	98	5	35
PA150B2	2565	2325	165	2165	160	1790	65	145	168	185	200	2185	DN50	DN50	DN80	DN80	1"	122	6.1	47
PA150B4	2565	2325	165	2165	160	1790	65	145	168	185	200	2185	DN40	DN40	DN80	DN80	1"	122	6.1	47
PA200A2	1725	1450	175	1280	150	865	100	195	219	210	225	1300	DN80	DN80	DN100	DN100	1"	160	12	50
PA200A4	1725	1450	175	1280	150	865	100	195	219	210	225	1300	DN50	DN50	DN100	DN100	1"	160	12	50
PA200B2	2185	1905	175	1740	150	1325	100	195	219	210	225	1755	DN80	DN80	DN100	DN100	1½"	186	14	63
PA200B4	2185	1905	175	1740	150	1325	100	195	219	210	225	1755	DN50	DN50	DN100	DN100	1½"	186	14	63
PA200C2	2640	2365	175	2195	150	1780	100	195	219	210	225	2220	DN80	DN80	DN100	DN100	1½"	215	16	80
PA200C4	2640	2365	175	2195	150	1780	100	195	219	210	225	2220	DN50	DN50	DN100	DN100	1½"	215	16	80
PA250A2	2080	1785	210	1590	135	1155	100	235	273	235	250	1620	DN100	DN100	DN150	DN150	1½"	260	23	90
PA250A4	2080	1785	210	1590	135	1155	100	235	273	235	250	1620	DN80	DN80	DN150	DN150	1½"	260	23	90
PA250B2	2690	2395	210	2200	135	1765	100	235	273	235	250	2230	DN100	DN100	DN150	DN150	2"	320	28	120
PA250B4	2690	2395	210	2200	135	1765	100	235	273	235	250	2230	DN80	DN80	DN150	DN150	2"	320	28	120
PA300A2	2190	1825	235	1615	160	1130	100	275	324	265	280	1640	DN150	DN150	DN200	DN200	2"	370	42	130
PA300A4	2190	1825	235	1615	160	1130	100	275	324	265	280	1640	DN100	DN100	DN200	DN200	2"	370	42	130
PA300B2	2800	2435	235	2225	160	1740	100	275	324	265	280	2250	DN150	DN150	DN200	DN200	2½"	450	48	170
PA300B4	2800	2435	235	2225	160	1740	100	275	324	265	280	2250	DN100	DN100	DN200	DN200	2½"	450	48	170
PA350A2	2535	2170	255	1940	180	1400	100	300	356	280	295	1960	DN150	DN150	DN250	DN250	2½"	540	50	185
PA350A4	2535	2170	255	1940	180	1400	100	300	356	280	295	1960	DN100	DN100	DN250	DN250	2½"	540	50	185