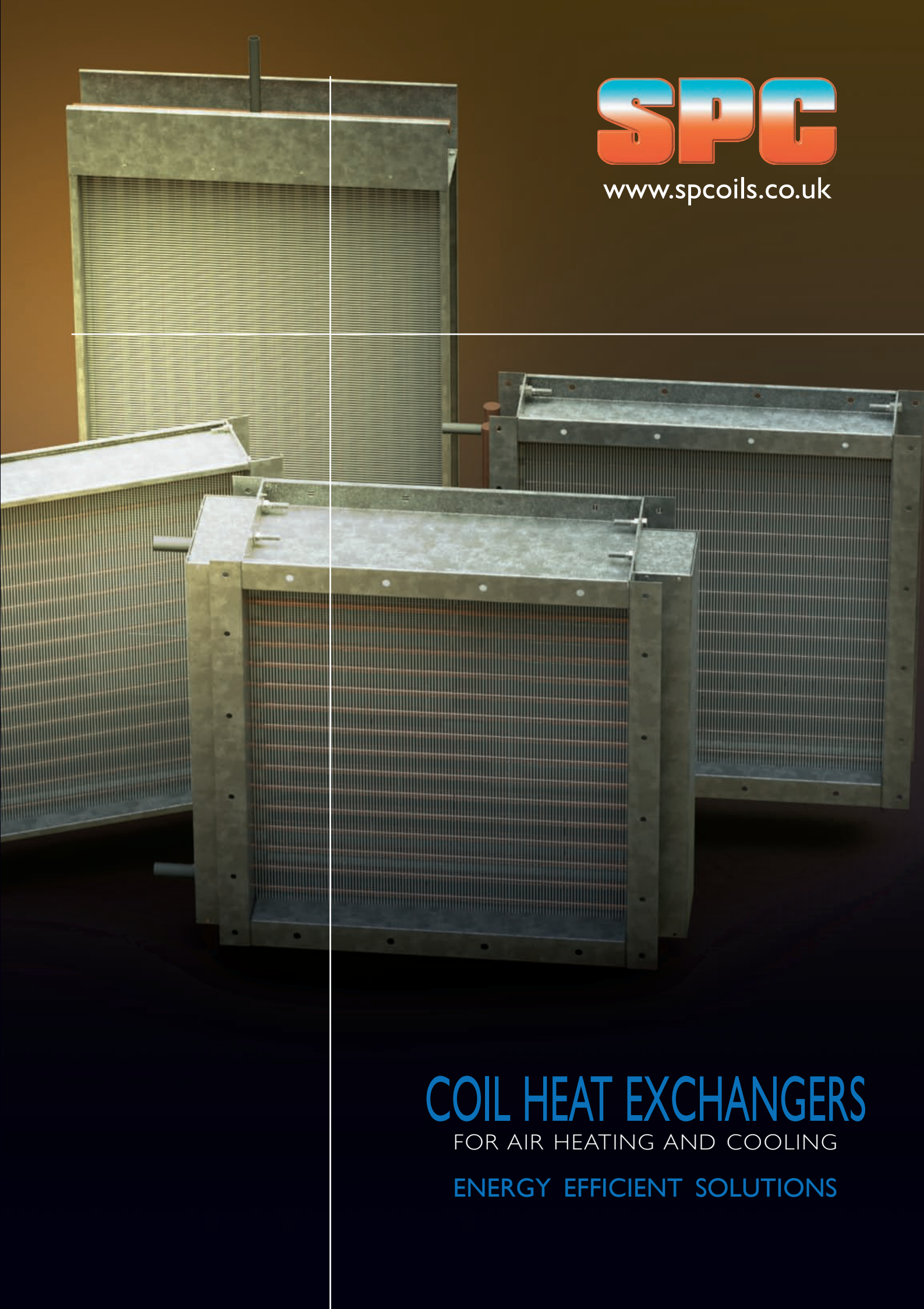


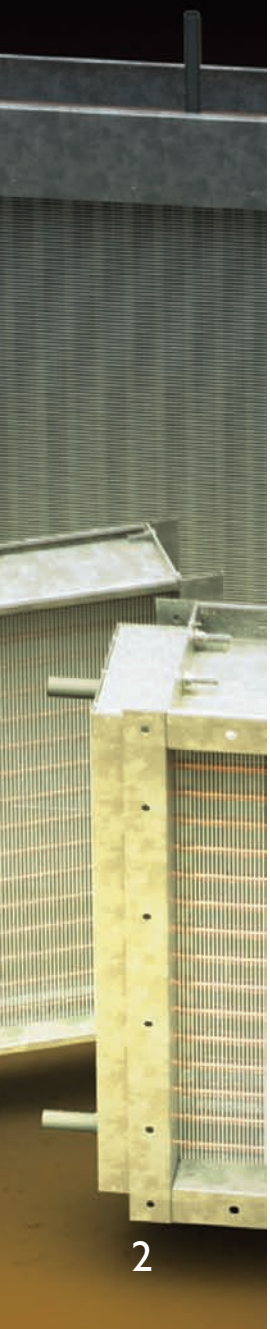
SPC

www.spcoils.co.uk

COIL HEAT EXCHANGERS

FOR AIR HEATING AND COOLING

ENERGY EFFICIENT SOLUTIONS



About SPC

The Company

S & P Coil Products Limited is a UK based specialist manufacturer and supplier of heating and cooling equipment to the public and private sector in the UK.

We have an extensive range of products to meet the needs of our customers including; **Heat Pumps, Radiant Panels, Fan Convectors, Trench Heating, Heating/Cooling Coils, Heat Pipes and Air Curtains.**

Our task is straightforward; we improve the comfort of indoor environments of those who live and work in them, whilst ensuring that our expert team is on hand to guide you through the process of specifying and acquiring your bespoke solution. The result is a range of products that are economical to run, robust and aesthetic – with all the sales and technical support that you need.

It's a winning combination, and after more than 30 years in business, we've built a worldwide network of satisfied customers.

KEY FACTS ABOUT SPC:

- Registered provider of approved RIBA accredited CPD's
- Major supplier to local government and commercial sectors
- Free self-selection software packages
- Regional Sales and Technical Support team
- Free site check / survey
- ISO 9001 and Investors in people

COIL HEAT EXCHANGERS for Air Heating and Cooling

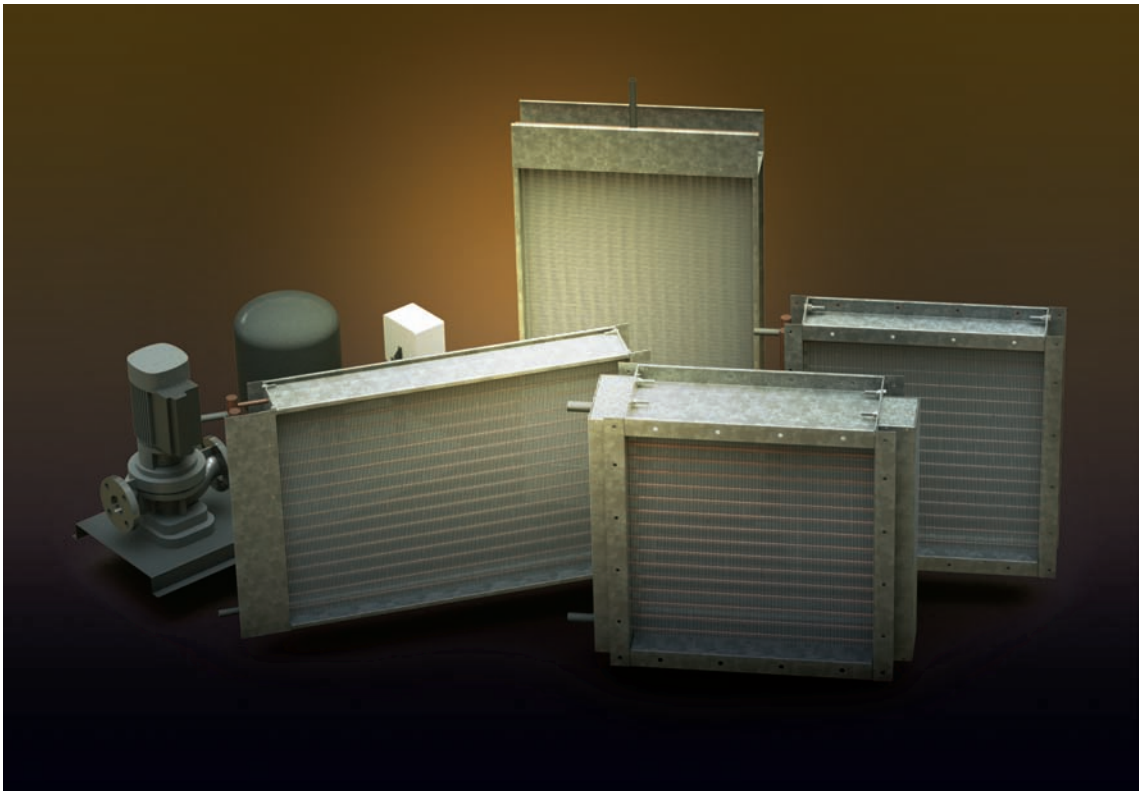
Introduction

S & P Coil Products Limited are a well established manufacturer and supplier of heating and cooling coils to suit water, refrigerant/steam fed systems, and electric heater batteries.

SPC also offer solutions for heat recovery systems with our run around coils and associated pumps packs. As an alternative, heat pipe heat recovery devices can be designed around your application.

As world leaders in heat exchange and heat recovery technology, we are able to offer our customers a complete bespoke solution, in the sound knowledge that quality is at the forefront of our manufacturing processes.

SPC regularly invest in new machinery and are well equipped with the latest technology available in the field of coil manufacture. Fin presses, expanding machinery, manifold manufacturing equipment and tube and hairpin bending kit are all a feature of the flow of manufacture through the factory. This equipment and the manufacturing techniques are subject to a process of continuous improvement aimed at providing quality, flexibility and ultimately customer satisfaction.



Design and technical expertise

SPC have noteworthy technical expertise in heat exchange and heat recovery, enabling us to be at the forefront of the industry. We have over 30 years experience in coil manufacture and as leading experts, we ensure that every stage from design through to manufacture is of the highest quality along with the right technical support for our customers.

COIL HEAT EXCHANGERS for Air Heating and Cooling

Applications

Coils find employment whenever there is a requirement to heat, cool or dehumidify air. Coils are also used in refrigeration and heat pump systems where the air is used as a source of heat or a sink into which transferred heat can be released.

Examples of coil applications are given below though the list is not exhaustive:

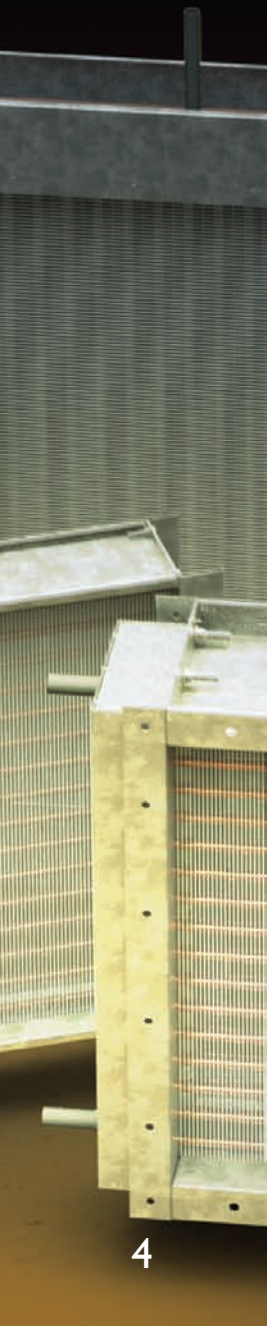
Comfort air conditioning -
No primary AHU is complete without heating and cooling coils to condition the temperature and humidity of outside and return air. In addition to central plant, coils are found in almost all branch ducts to trim the temperature of the air supplied to individual zones in both constant and variable air volume systems.

Critical zone conditioning -
Wherever the space conditions need to be controlled to meet stringent health requirements then coils will be employed along with the benefits that they bring in terms of controllability. Hospital theatres often operate against 100% outside air which must be preconditioned by coils. Cleanrooms, in addition to critical filtration requirements, need coils for temperature control and to control the flow of air.

Close control conditioning -
Environments housing sensitive equipment require close temperature and humidity control in order that the equipment operates safely and at its maximum efficiency. The growth of data centres have dramatically increased the cooling requirement and the use of chilled water and refrigerant coils within bespoke air handling equipment. Coils also play a part in energy recovery systems employed within data centres and help to reduce their environmental impact.

Unitary air conditioning equipment -
A wide variety of heating/cooling emitters and terminal units incorporate coils: fan convector units, air curtains, perimeter and trench units for heating systems, fan coil units and terminal boxes for air conditioning systems.

OEM applications -
Heating, cooling, heat recovery coils and heat pipes are regularly incorporated in original equipment intended for process or comfort air conditioning. SPC liaise at all stages with customers to design and manufacture all manner of bespoke coils and heat transfer equipment.



COIL HEAT EXCHANGERS for Air Heating and Cooling

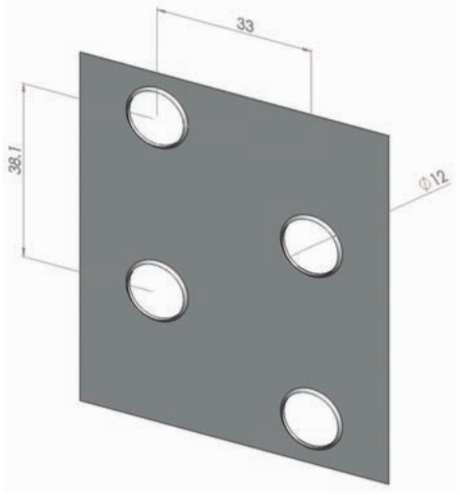
Water Coils

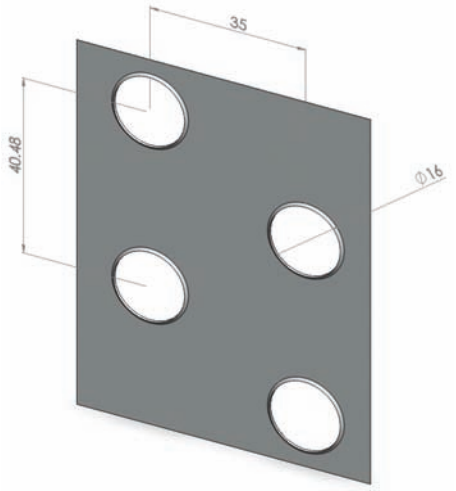
S & P Coil Products Limited manufacture coils to suit low, medium and high temperature water as well as chilled water and glycol systems.

All coils are designed to suit the application, so can be tailored to suit the physical constraints, pressure drop requirements or environmental / economic considerations.

All water coils are tested to a minimum of 22 bar g air under water. Coils can be manufactured from a wide range of materials and casing styles and will terminate in plain copper tails, threaded or flanged pipe connections. Connections can be fitted with vent and drain points and / or test points if required.

Coils are manufactured from either 12 or 16mm tubes on pitches as below, fin sizes are therefore a multiple of these pitch dimensions. In a single section, a coil can be manufactured to a maximum of 2m in height but multiple sections can be provided if required. The width can be up to 4.5m.

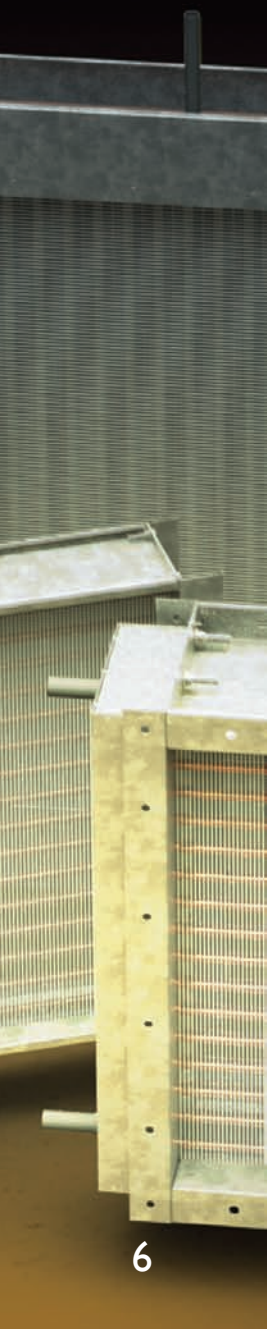




12mm tube coils offer the most economical solution in most cases; however 16mm tube will offer benefits on larger coils where fluid pressure drops need to be minimised.

Heating coils are increasingly expected to operate against hot water temperatures considerably lower than those that would previously have been expected from 'conventional' boilers. The increase in popularity of heat pumps has lowered hot water temperatures as the heat pumps run at their most efficient when their delivery temperatures are minimised. Similarly, modern efficient boilers require return temperatures less than 50°C in order that they operate in an efficient, condensing mode.

As heat pump suppliers, SPC has a wealth of experience in matching water coils to heat pumps and other low grade hot water systems and will design the optimum coil for your requirements in terms of both the water temperatures and the flowrate associated with them.

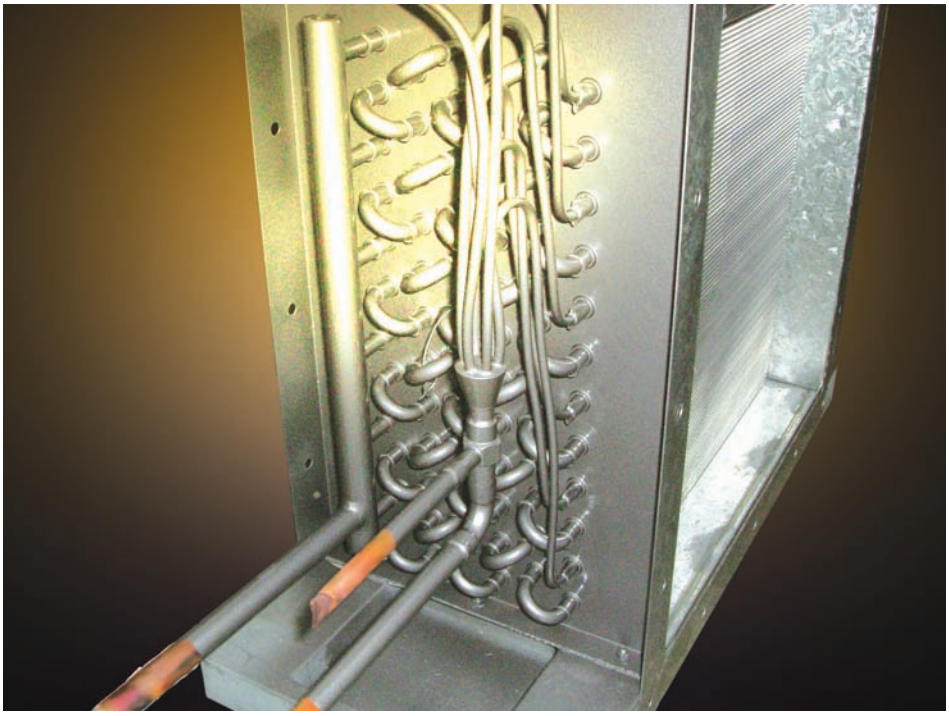


COIL HEAT EXCHANGERS for Air Heating and Cooling

Refrigerant Coils

S & P Coil Products Limited design and manufacture condenser and DX (evaporator) coils to suit commonly used refrigerants: R4109a, R134a, R407c and R404a.

Coils can be designed with a number of refrigerant circuits, interlaced or split in face. Hot gas inlets can be added to provide additional control or defrost facility.



DX coil complete with hot gas inlet

All coils are pressure tested air under water, dried, vacuum tested, nitrogen charged and sealed.

Refrigerant coils terminate in plain copper tails sized to suit the capacity and number of circuits.

SPC also manufacture coils for heat pump systems allowing operation in both evaporating and condensing (reverse cycle) modes. All heat pump coils are manufactured with thick walled tubes and high sliver content braze to suit the high working pressure.

Where applicable condenser coils and reverse cycle coils are tested to 44 bar g under water using nitrogen.

Increasingly, there is a requirement to match DX cooling coils and reverse cycle coils to condensing units and heat pump units supplied by other manufacturers. SPC engineers are well schooled in designing refrigerant coils to match the requirements of a vast range of equipment. Total flexibility in design means that you will receive exactly the right coil for your application without compromise.

SPC are considered the manufacturer of choice for refrigerant coils, not only from a design standpoint but also due to the advanced manufacturing techniques employed in supplying these critical pieces of equipment.

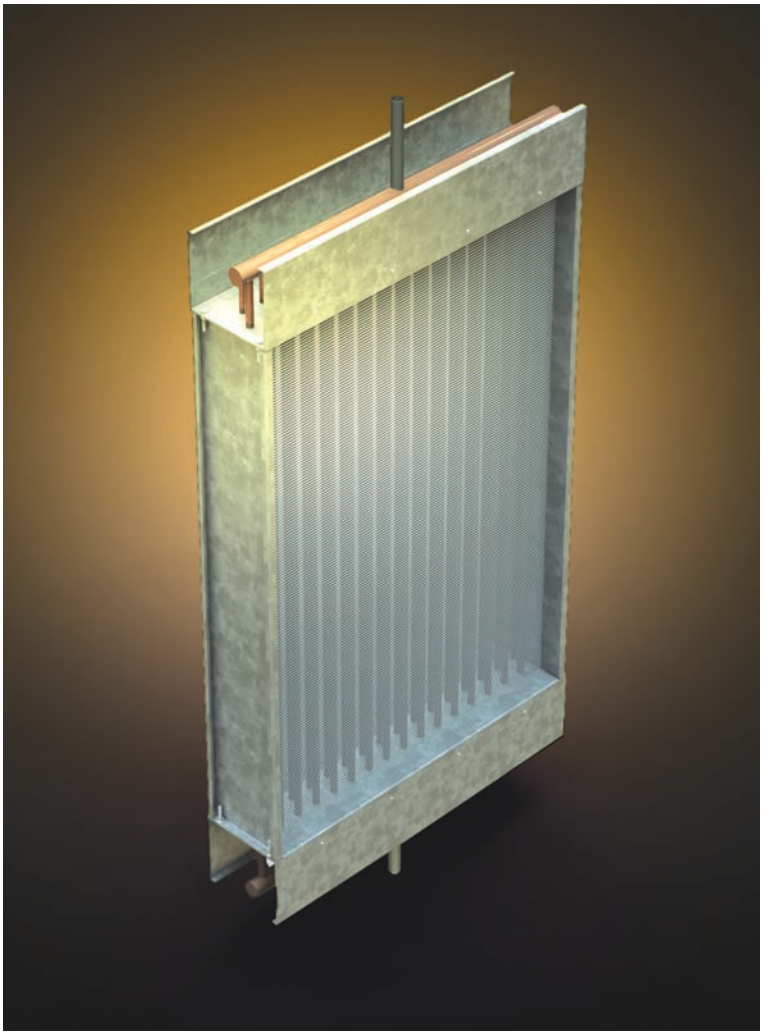
COIL HEAT EXCHANGERS for Air Heating and Cooling

Steam Coils

S & P Coil Products Limited manufacture steam coils for use against working pressures of up to 8 bar g (175 deg C).

All steam coils are manufactured from thick walled copper tubes (16mm diameter) and heavy gauge copper headers with flow drilled holes for a strengthened joint.

In order to prevent condense laying in the tubes, which is likely to cause premature coil failure, SPC recommend a 'straight through vertical' design with steam and condense headers on opposite sides of the coil.



Connections can be arranged top and bottom or from the ends of the headers on the same side.

Alternatively a horizontal arrangement with sloping tubes and connections on opposite sides can be offered. Steam coils are available to suit either horizontal or verticle airflow.

Where necessary SPC will provide coils split into a number of sections. Each section will have a separate steam / condense connection and will need to be trapped independently.

COIL HEAT EXCHANGERS for Air Heating and Cooling

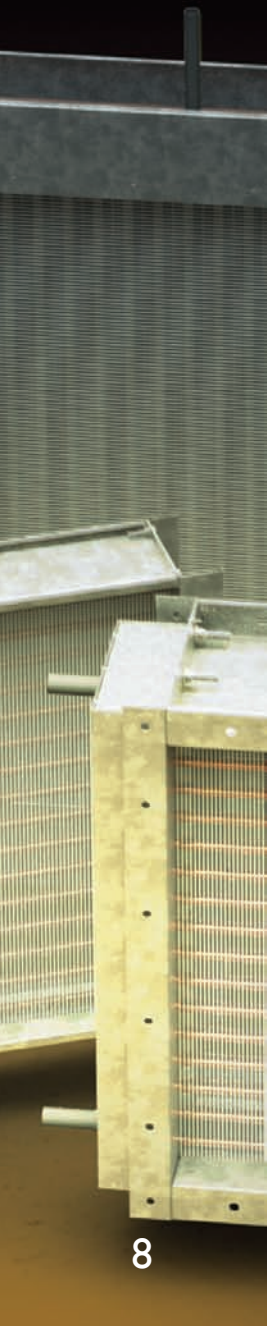
Heat Recovery

Heating and air conditioning systems consume vast amounts of energy in order to ensure that the built environment is comfortable or suitably conditioned for the equipment it houses. Building regulations stipulate a rate at which 'clean' outside air must be introduced and this outside air needs to be conditioned to a comfortable or appropriate temperature.

Ventilation heat losses can be mitigated through the use of air to air heat recovery devices. These devices are capable of reducing the ventilation load by up to 70% and they achieve this by capturing the heat within the 'dirty' extract air and transferring a large portion of it into the 'fresh' outside air being introduced into the building. Heat recovery should always be considered whenever mechanical ventilation is used; the choice should only be the type of device to employ. Accordingly, a number of regulations and incentives are now in place to encourage the use of this equipment.

It is important to make a thorough assessment of the energy savings which can be achieved through employing air to air energy recovery devices. The analysis, in addition to the headline energy savings at design conditions, must consider the savings throughout the year at the actual conditions pertaining and the number of hours of operation. SPC engineers are available to assist with the generation of saving analyses for particular applications.

As a useful rule of thumb, the energy saving that could be realised in a UK application would be in the region of 20,000 to 30,000kWh p.a. for every kg/s of ventilation air introduced.



COIL HEAT EXCHANGERS for Air Heating and Cooling

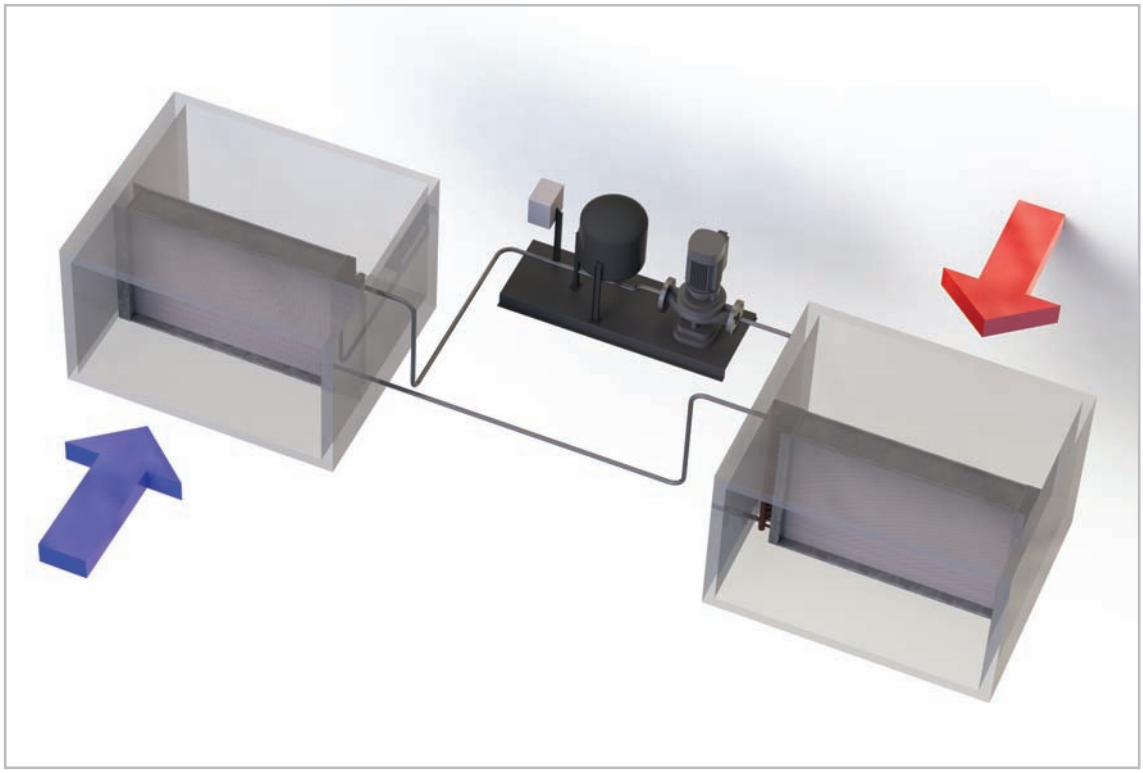
Run Around Coils

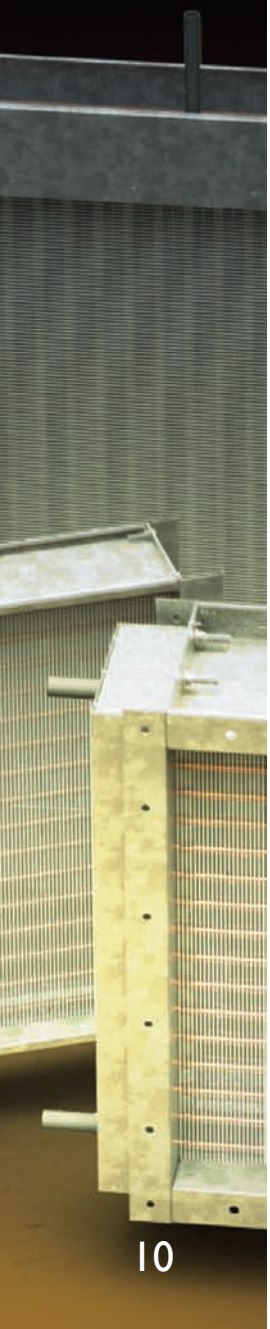
S & P Coil Products Limited offer matched run around coils to recover waste heat from extract ducts / units and add this heat into cold supply air.

Significant energy savings can be made, especially with larger air volumes and a large temperature difference between the two air streams. Our team of highly trained engineers are always happy to help design and implement a fully bespoke solution.

Effectiveness values of 60% can typically be achieved using a carefully designed run around system. Unlike competing air to air heat recovery devices, run around coils can be used where the two airstreams are significant distances apart.

The supply and extract coils are linked via interconnecting pipework and a pump pack to circulate the glycol solution. Glycol should be used wherever there is potential for freezing of the water. Concentrations of up to 25% are recommended; this has a freezing point of -11 deg C.





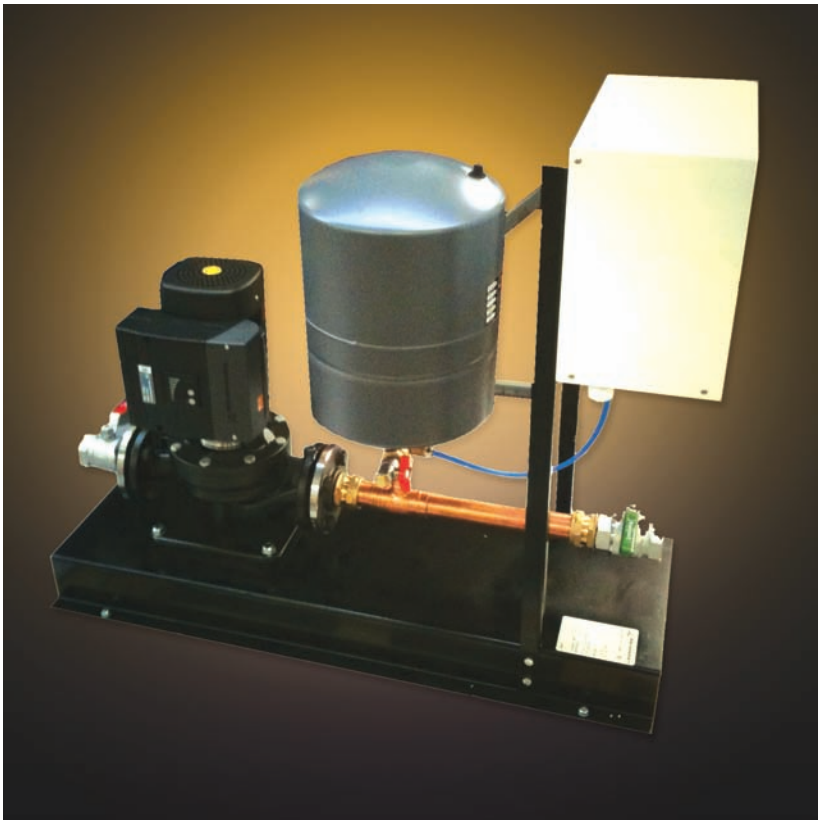
COIL HEAT EXCHANGERS for Air Heating and Cooling

Run Around Coils

SPC offer a range of pump packs to suit most run around coil systems.

The Reclaim Plus Pump Packs are available in two models, the 2L and 6L. The pump packs have been optimised for use with run-around coupled coil heat exchangers. The features and operational benefits include:

- In-line single stage, centrifugal circulating pump
- Inverter technology for pump speed control to optimise efficiency
- Off-line pressurisation set with piston pump, break tank, fill valve, pressure control switch, pressure gauge and overflow connector
- 24 litre expansion vessel to accommodate system volume change
- Full bore shut off valves on pump set suction and discharge ports
- Powder coated steel base
- Remote control device supplied as standard to access all features of circulating pump
- Pump set suitable for use with glycol solutions for protection against freezing



The size 2L unit will circulate a nominal 2 litres per second through the system against a head of 150 kPa. The size 6L will circulate a nominal 6 litres per second against 250 kPa. The speed of the pump can be easily adjusted to match the system requirements exactly.

Where the airstreams are adjacent, heat pipes may be used as a more efficient alternative.

COIL HEAT EXCHANGERS for Air Heating and Cooling

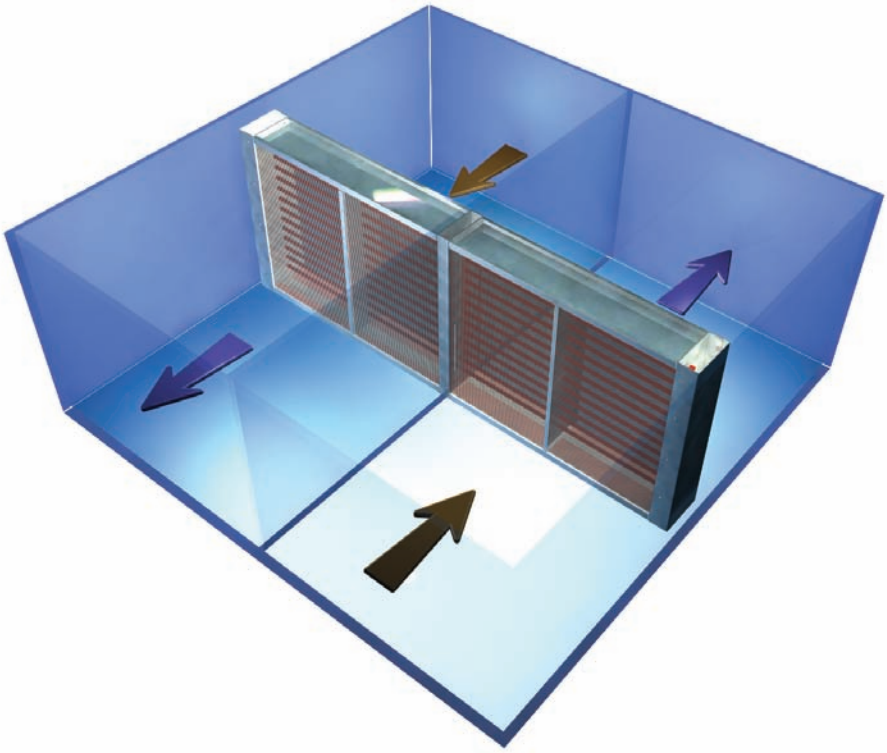
Heat Pipes for Heat Recovery

With adjacent air streams a heat recovery heat pipe can be utilized for "free" heat recovery. The principle is simple – the heat pipe uses the hot dirty air from the extract air stream to condition the incoming cold fresh air supply, and preheat it prior to it being further treated.

The effectiveness of this process can be high as 70% and the running costs are virtually nil due to the passive nature of the heat pipes and their low airside pressure drops. Additional capital expenditure is extremely low, particularly when compared to other products such as thermal wheels and plate heat exchangers.

Unlike any other type of heat recovery device a heat pipe can recover and recycle heat without the fear of contamination from the dirty extract. Combine this with the ability to treat the heat pipe to withstand corrosive environments and the range of applications is virtually limitless.

Typical applications for energy recovery heat pipes include swimming pools, laundries, kitchens and hospitals where zero cross-contamination is vital.



COIL HEAT EXCHANGERS for Air Heating and Cooling

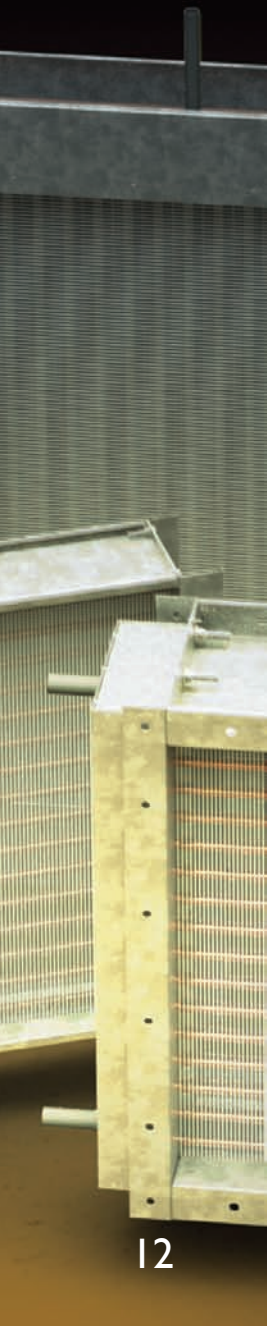
Heat pipes for heat recovery

Many types of heat exchangers are available for recovery applications. However each type of heat exchanger has certain advantages and drawbacks:

Plate heat exchangers are quite effective, but are bulky, expensive and very difficult to clean. They can trap condensate resulting in the growth of moulds.

Heat recovery wheels are maintenance intensive and prone to cross contamination and do not effectively drain condensation.

Only HEAT PIPES offer all the benefits combined; no moving parts, high effectiveness, low air-pressure drop, easy drainage of condensation, no direct energy requirement and zero cross- contamination. They are also proven to be long lasting and virtually maintenance-free, commonly outlasting the air handling units into which they have been installed.



COIL HEAT EXCHANGERS for Air Heating and Cooling

Materials

Tubes:

All S & P Coil Products Limited Coils are manufactured from seamless copper tubes either 12mm or 16mm o/d. The standard wall thickness is 0.4mm. Increased thickness of 0.7mm for our 12mm tube and 0.9mm for 16mm are available, typically for steam, HTHW and condenser/heat pump applications.

Fins:

SPC offer a variety of fin materials and coatings:

Material	Finish Available	Thickness
Aluminium	Plain untreated	0.15mm & 0.25mm
	Vinyl coated	0.15mm only
Copper	Plain untreated	0.15mm only
	Electro-tinned after manufacture	

Blygold®

For unsurpassed corrosion protection SPC recommend Blygold fin coating which offers a guarantee against corrosion. Due to the nature of the Blygold protection we are able to offer a 5 year warranty against corrosion and its effects on coil performance. The Blygold process is a post coating process which is undertaken after manufacture of the coil block and ensures that no edges are left unprotected.

Contact the SPC office with details of the environment in which the coil is to operate so as to ensure that Blygold will provide the necessary protection and that the warranty is applicable.

Blygold is an aluminium pigmented polyurethane which forms a chemical bond with the substrate and offers exceptional corrosion resistance and cannot peel away. The pigmentation allows the thin layer of Blygold to maintain excellent thermal performance.

COIL HEAT EXCHANGERS for Air Heating and Cooling

Materials

Fins for 12mm tubes are also available in a choice of two profiles:

Louvred Offers excellent heat transfer properties giving the most compact and economical solution.

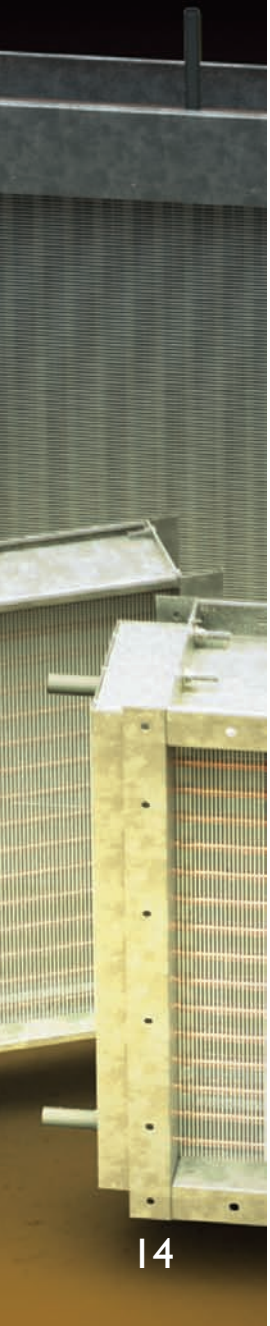
Rippled Offers a low resistance to airflow; important where minimal air pressure drops are required.

Fins for 16mm tubed coils are available with ripple profile only.

Casing Material:

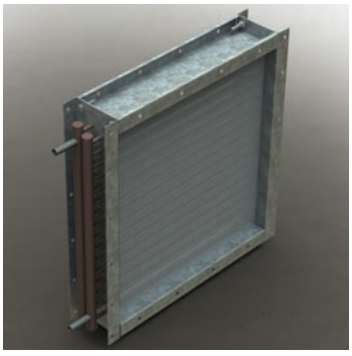
Available in a wide range of materials including:

Materials	Thickness
Galvanised steel	Supplied in 16g thickness as standard. Other thickness available on request
Stainless steel – 304 & 316	
Aluminum	
Brass	
Copper	



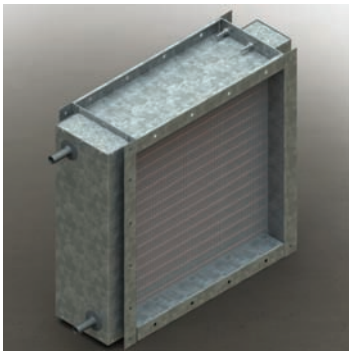
COIL HEAT EXCHANGERS for Air Heating and Cooling

Casings



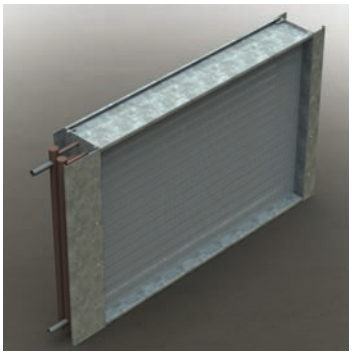
Economy / Standard

- Flanged casings (25mm economy & 45mm standard) to suit general ductwork applications.
- Flanges supplied pre-drilled to aid installations
- 'Economy' casings offer a compact and economical solution for smaller duct mounted heating coils
- For 'standard' cased cooling coils, the drain pan covers the fin block only



Enclosed

- Flanged casing (50mm) to suit ductwork applications.
- Complete with cover boxes over headers and return bends to minimise air leakage.
- Welded and sealed cover boxes can be provided to further reduce air leakage. Drain pans on cooling coils extends under the headers and bends.



Unitary

- Casing to suit insertion into AHU or similar
- Complete with baffle plates as required to prevent air bypass (one or both faces).
- Overall size can be tailored to suit requirements.
- For cooling coils, drain pan extends under headers and bends. Alternatively a perforated base is provided to allow drainage into a pan in the base of the AHU.

Other configurations are available to suit your specific requirements, including coils for inclusion in fan coils, air curtains and other original manufacturer equipment. Various end plate arrangements and replacement elements provide flexibility of choice for custom applications.

Cooling coils can be supplied with drain pans to suit application (flat, sloping, removable, intermediate, perforated).

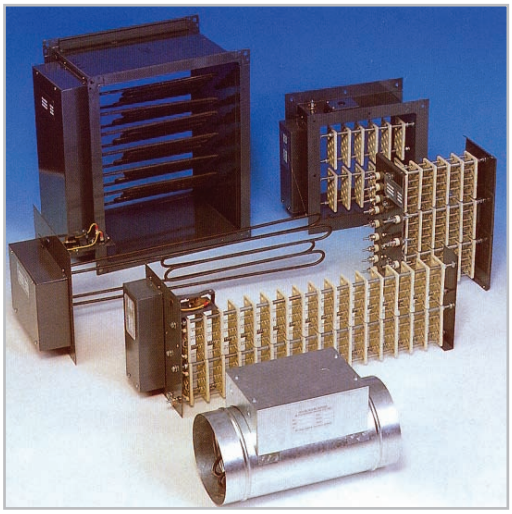
General arrangement drawings available on request.

COIL HEAT EXCHANGERS for Air Heating and Cooling

Electric Heaters

S & P Coil Products Limited offer a full range of electric heater batteries.

The most popular designs are rectangular and circular duct mounted heaters. Rectangular heater casings are manufactured from grey stove enameled 18g mild steel, circular heaters from 18g galvanised steel with dimensions to suit duckwork.



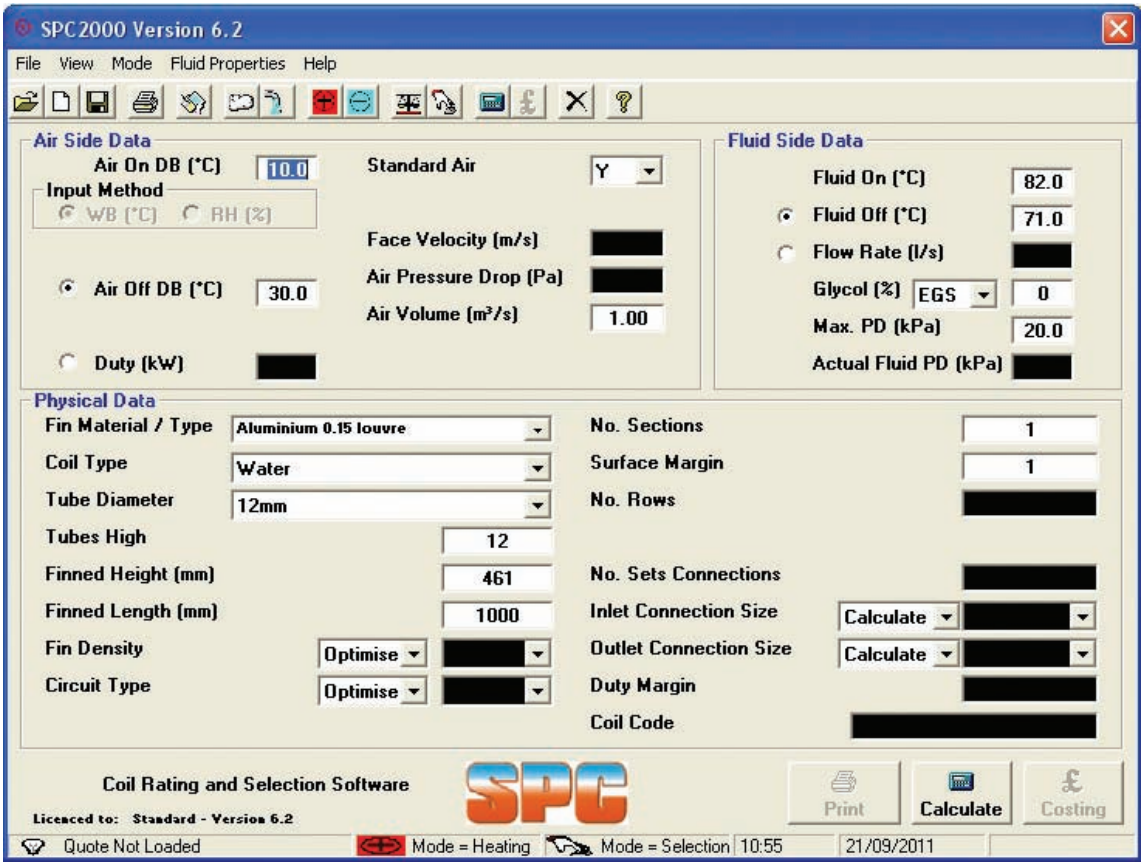
- Complete with electric elements of Incoloy 800 stainless steel sheaths which can be banked together in a number of stages if required (1ph & 3ph available).
- Duties available from 0.5 to 400kW.
- Sheathed elements are inherently 'safe' and comply with most specifications.
- All heaters supplied with high temperature thermal cut-out, available with manual or auto reset to suit. Auto reset cut-outs also available with additional contact for connection to warning light or control panel.

Stab-in type heaters for insertion into existing duckwork and heaters to suit air handling units also available on request.

COIL HEAT EXCHANGERS for Air Heating and Cooling

Software

S & P Coil Products Limited have developed a self-selection program for all types of coil (water, glycol, refrigerant and steam) which is freely available from our website www.spcoils.co.uk or on CD-rom.



Heating and Cooling Coils - Standard Specification

1 General

The coils shall be used to either heat or cool a stream of air passing through the fin block perpendicular to the tubes. The design shall be such as to suit the in tube medium and its temperature and pressure. Cooling coils shall be arranged such that the air and cooling medium are generally in counterflow with one another in order to maximize the performance. Heating coils may have a crossflow arrangement. Coils are available for low, medium and high temperature hot water, steam, refrigerant and chilled water. Casing design shall suit the installation and can be arranged for either unit or duct mounting. Alternatively special designs can be incorporated if specified.

1.1 Fins

Coil heat exchangers will be of the finned tube type with circular tubes expanded into continuous rectangular fins. Individually finned or spiral wound type coils will not be used.

The external fins shall be of aluminium with a minimum thickness of 0.15mm. Fins shall be of the continuous plate type to maximize the external surface area rather than individually finned tube pattern. The fins shall be of the rippled or louvred type to match the airside heat transfer and pressure drop requirements. Fins shall be spaced at such a distance as required by the conditions specified. Frost coils can be manufactured as bare tubes if required. Fins can be from copper if the application requires it and may also be electro-tinned. Alternatively aluminium fins may be supplied with either a vinyl precoating or Blygold postcoating.

1.2 Tubes

Tubes shall be of seamless copper C106 grade with a soft temper for heat exchanger use. Tube diameter shall be 12mm or 16mm with a smooth inner surface. The minimum tube thickness shall be 0.4mm but shall be 0.7mm for high temperature applications. The number of rows of tubes shall be selected to suit the application. Multiple row coils shall have tubes in a staggered, equilateral pattern to optimize the airside heat transfer.

1.3 Casing

Casings shall be from galvanized sheet steel with a minimum thickness of 1.5mm. The casing shall incorporate tube plates, sideplates and intermediate stiffening plates as required. If for use in a duct mounted application, coil casings will be supplied with mating flanges all-round. Should air leakage need to be minimized then an enclosed casing shall be used whereby the coil headers and return bends are enclosed in sealed coverboxes. If the coils are for mounting within air handling units then they shall be supplied with blanking plates to prevent air bypass around the manifolds and bends.

Heating and Cooling Coils - Standard Specification

Whenever cooling coils are specified and the temperature of the cooling medium is below the dewpoint of the air then condensate catchment should be arranged. Duct mounted coils shall be supplied with a drainpan below the fin block and insulation shall be provided around the headers and bends by the installer to prevent sweating. Alternatively an enclosed casing can be used whereby the drainpan extends below the ends of the coil and is sealed. Cooling coils for air handling unit mounting will be supplied with a perforated base to allow condensate to collect within the drainpan in the base of the AHU. If no drainpan is fitted in the base of the air handling unit then the cooling coil shall be supplied with an integral drainpan, extending under the manifolds and bends.

For applications where high rates of condensation are likely and cleanliness is vital then the whole casing or the drainpan shall be manufactured from 304 grade stainless steel.

1.4 Connections

Water and steam coils shall be provided with mild steel connections brazed to copper headers. The connections shall be threaded to BS21. Connections can be supplied with screw on flanges to BS4504 or welded slip-on flanges for high/pressure temperature applications.

Serpentine coils without headers shall finish in plain copper connections.

Refrigerant coils shall be c/w plain copper connections and copper sealing caps.

1.5 Testing

All coils shall be pressure tested to a minimum of 22 bar g, air under water.

Refrigerant coils, additionally, shall be dehydrated using vacuum and supplied with a holding charge of nitrogen. High pressure refrigerant coil shall be tested to 44 bar g.

1.6 Performance

Coils shall be independently type tested in line with British Standards BS 5141 pt1 & pt2 and European Standards EN 305 & 306. All software used to predict the performance of coils shall be based upon the results of these independent tests.

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