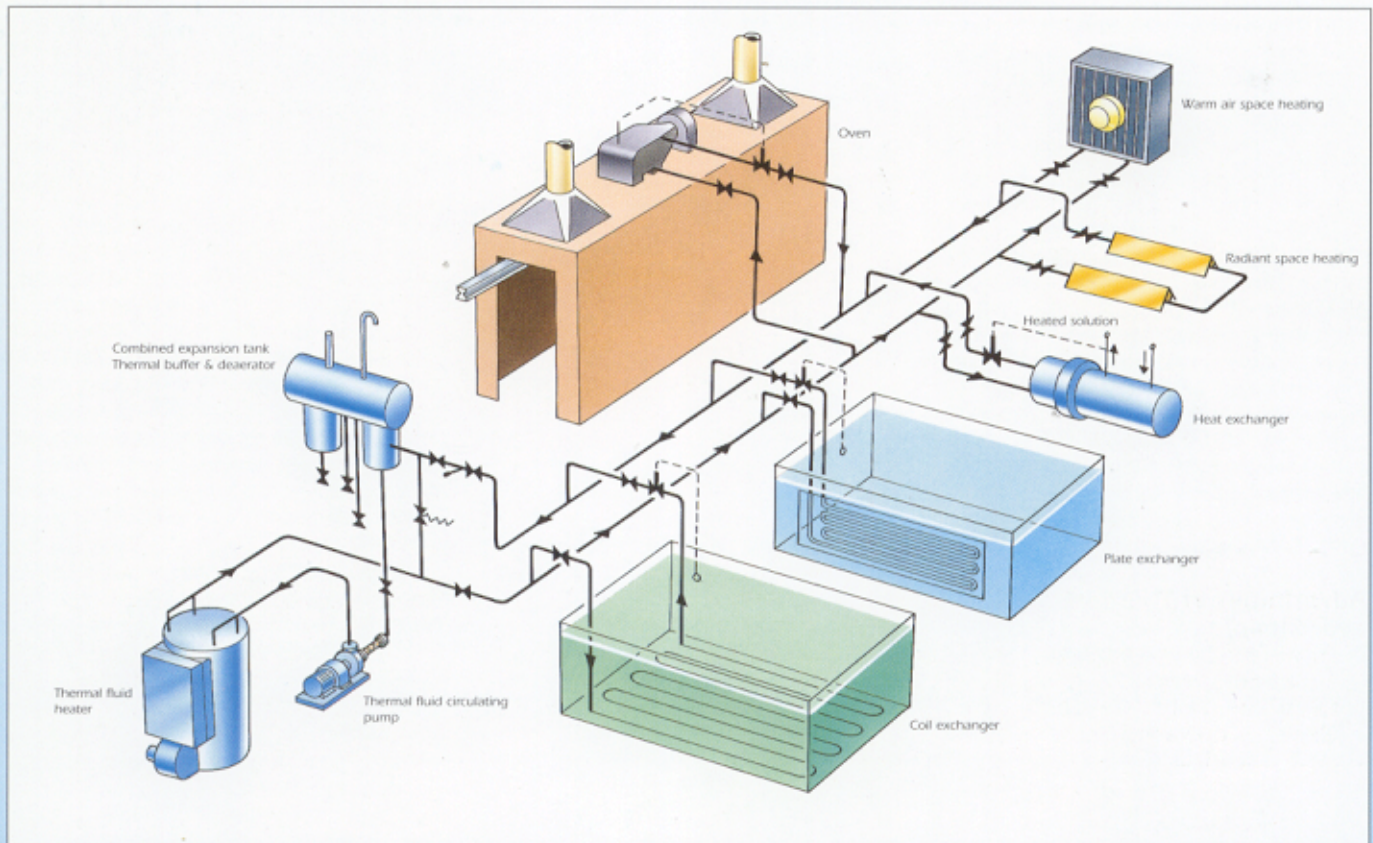


Wanson **SOLUTIONS**

PROCESS AND SPACE HEATING

THERMAL FLUID HEATING FOR CLEANING, PRE-TREATMENT AND FINISHING



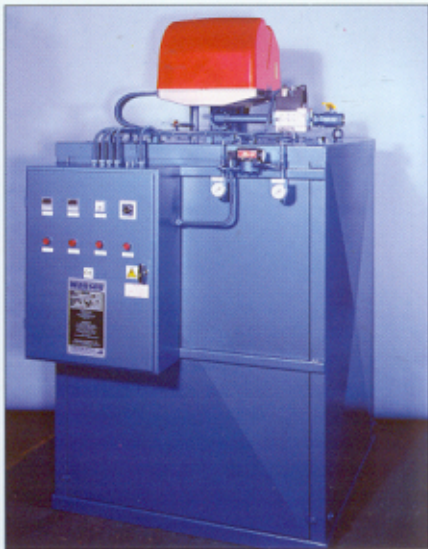
The Advantages of THERMAL FLUID HEATING SYSTEMS

Thermal fluid systems are similar in design to pressurised hot water systems with a heater and seamless mild-steel pipework serving one or more users. Thermal fluids are passive by nature and offer a number of advantages over water or steam.

With thermal fluid as the heat transfer medium, users are not confronted with problems of pressure, scale formation, corrosion and frost. This is because thermal fluids typically operate up to 320°C at only just above atmospheric pressure and remain pumpable down to -20°C and below.

Water based heating systems operating over 100°C require pressurisation and consequently are subject to mandatory annual inspection. Maintenance and high system heat losses are a problem requiring regular attention to keep some degree of control over operating costs.

The cost of a thermal fluid system does not increase significantly with higher operating temperature. In fact, components such as heat exchangers, which are constructed from expensive materials, can be kept at an economical size. Maintenance, heat loss and, therefore, operating costs are extremely low.



Wanson Thermopac Thermal Fluid Systems

Wanson specialises in supplying cost-effective solutions to industrial process and space heating problems. Wanson Thermopac thermal fluid systems are available with oil, gas or dual burner firing and can also be electrically heated. The heater is packaged, requires no special site work and can be placed close to the plant it heats. As evidence of the increasing popularity of thermal fluid, hundreds of Thermopac installations have been successfully completed by Wanson for the finishing and related industries. From the experiences of Wanson customers, the following comparisons between thermal fluid heating and alternative heating methods are provided as a guide to making the correct choice.

Advantages of Thermal Fluid over Steam

- Lower installation cost: no special foundations, blow-down pit, boiler-house or water treatment plant.
- Higher operating temperatures

mean smaller heater batteries, radiant panels and tank heating coils; but - no high pressure components.

- Lower operating costs: rapid heat-up for greater fuel economy and automatic, unattended operation.
- No blowdown.
- No condensate losses.
- Higher operating temperature allows tank heating to be easily combined with oven heating at up to 260°C - 280°C.

Advantages of Thermal Fluid over Direct Gas or Oil Heating

- Significantly lower emissions, reduced fire hazard with thermal fluid.
- Lower capital cost with direct firing, but direct firing systems require more space for ducting, burners and local control systems.

Advantages of Thermal Fluid over Tank Heating via bar burners under tank

- Higher efficiency, thermal fluid heater can burn oil instead of gaseous fuels.
- Easier to control.
- Does not reduce tank life.
- Avoids condensation which may cause problems in metal plating.

Advantages of Thermal Fluid over Tank heating via immersed fire tubes

- Higher efficiency: does not require large tanks, low phosphate sediment build-up on fire tubes.
- Easy operation: no tube clean-outs, no multi-burner arrangements.
- Ideal for heating solutions in acid resistant tanks.

Advantages of Thermal Fluid over Gas and Oil Indirect Oven Heating

- Comparable capital costs.
- Higher efficiency.
- Avoids heat exchanger burn-outs.
- Lower maintenance: no multi-burner arrangements.

- Fully modulating control, even with simple on/off heater operation, by modulating temperature control valves.

- Smaller heat exchangers and supporting structures.

Advantages of Thermal Fluid over Electric Heating

- Considerably lower running costs.
- Better controllability in some applications.
- Although electric heating may have a lower installation cost, the difference in installation costs between thermal fluid and electric heating can be recovered within 12 to 18 months through savings in running cost.

Advantages of Thermal Fluid over HPHW (High pressure hot water)

- No corrosion.
- No high pressures or pressurising system.
- Lower heating system maintenance.

Applications in the Finishing Industry

The versatility of thermal fluid heating makes it suitable for a wide range of applications - from simple single-tank low temperature heating to the complete factory project, comprising more than 100 users and several types of space heating, and demanding positive control at widely differing temperatures. It can also be easily applied to existing plant.

Many types of finishing plant, from curtain coaters and degreasing plant to spray booths and stoving ovens have been designed to operate with thermal fluid heating.

Thermal fluid heating is simple, efficient and as controllable as the process demands. The following applications show how some of our customers have benefited from Wanson's thermal fluid heating solutions.

TUBE TREATMENT

Universal Steel Tube utilises a natural gas-fired Wanson Thermopac 1500 thermal fluid heater at its Birmingham plant to heat the pickling and phosphating tanks in the finishing of high precision, low eccentricity cold drawn seamless steel tubing.

Tubes up to 25 metres in length, outer diameter 127mm and 22mm wall thickness can be treated at the plant and supplied as bright, drawn soft bright, tempered, annealed or normalised finishes.

Zirconium coils containing thermal fluid from the Thermopac heater are used to transfer heat to the sulphuric acid in the main pickling tank, which can treat up to 6 tonnes of tubing per hour. Stainless steel coils are employed in the phosphating tanks.

With the high productivity and

sheer size of much of the tubing made at the plant, the company takes careful precautions to avoid any risk of leakage of thermal fluid into the treatment solutions. In the event of the heating coils being damaged

accidentally whilst tubing is lowered into or removed from a tank, a vertical expansion vessel close to the Thermopac incorporates an electronic sensor, which detects any significant drop in thermal fluid pressure and automatically isolates the system thereby before serious contamination of solution can occur.



WANSON MAKES MONEY



An overview of the new nickel-plating shop at the Birmingham Mint, showing the degreasing tanks, nickel tanks and storage tanks that are supplied with heat by the Wanson Thermopac 600B thermal fluid heater.

A computer-controlled Wanson Thermopac 600B thermal fluid heater supplies heat to the three degreasing tanks, eight nickel tanks and three off-line storage tanks at the heart of the latest type of coin production process at the Birmingham Mint.

Commissioned in September 1991, the plant is one of the largest nickel-plating plants in Europe with the capacity to turn out 2000 tonnes of coin blanks per annum.

The Thermopac serves the plant via 300 feet of flow and return pipes plus an expansion loop. At each of the fourteen tanks the thermal fluid passes through an isolating valve up into the heating coil at the top, out of the heating coil through the control valve, down through another isolating valve and back to the heater. The heater itself is fired by natural gas, with a high-low burner.

Blanks are initially pre-cleaned in a Hot Soak Clean tank containing a proprietary solution maintained at temperature by the Thermopac to remove dirt and grease before they are transferred to a Hot Electro Clean tank and further cleaned using an electro-cleaning process.

The next stage is the nickel-plating. Eight plating tanks each containing 6,500 litres of nickel solution are heated to a constant temperature of 60-65°C. Occasionally, the nickel solution is pumped into three out-of-line storage tanks so that fresh solution can be made up or the tanks cleaned. The nickel solution is maintained at temperature in the out-of-line tanks by a separate heating system also controlled by the Thermopac.

The blanks are dried before leaving

the plating shop to be annealed in an inert gas furnace. A final clean, and the coins are minted in a single blow which impresses both faces and the edge simultaneously.

Control with a difference

For convenient control of the heating system, Wanson and the manufacturer of the plant jointly designed a control system employing air-operated ball valves instead of the direct acting temperature type control valves commonly used in such installations.

A pilot solenoid valve on top of each ball valve transfers actual control of the system to a central computer at the end of the plant, enabling the plant manager to go to a VDU, call up a

tank on the screen, and adjust the temperature of that tank from the console. As an additional benefit, a tank that is not required on-line can be isolated from the heating system without having to walk down the plant opening and shutting valves manually. The system is failsafe because if the air supply fails, the valve shuts automatically.

Such a control method for thermal fluid heating systems is still quite new in plating plants, but Wanson believes that it may replace the more conventional thermostatic valves in the future. The innovation will be of particular interest to managers of multi-purpose plants, for whom the convenience of bringing tanks on- and off-line from a central control point will prove an invaluable time-saver.

Another safety feature which removes any risk of conduction of stray electric currents from the plating baths through the thermal fluid pipes to the earthed heating coils in the heater is the installation of insulation bushes in the flanges. Coils in the tanks are also electrically charged to make them slightly anodic to provide further protection against damage from stray currents.

Cost saving Thermopac system

The Mint's Thermopac provides a saving of approximately two thirds when compared with an equivalent electrical system. Combustion efficiency is also high at 85 per cent and the distribution losses of the plant are less than 3 per cent, making the overall efficiency of the plant, including distribution losses, in excess of 80 per cent.



The nickel-plating plant at the Birmingham Mint, showing covered tanks and automatic transport system.

CUTTING ELECTRO-PLATING ENERGY COSTS

The installation of a natural gas-fired Wanson thermal fluid process heating system on electro-plating lines at this company in Coventry in place of original steam heating plant, is saving the company at least 30 per cent in energy costs, as well as significantly reducing costs of manpower since it runs entirely unattended, eliminating down-time from operational problems and maintenance requirements.

A single Wanson Thermopac 1000, sited within the working area, provides continuous process heating for six electro-plating lines, three hot-air driers and an ultrasonic degreasing plant at the 120,000 sq. ft. facility, said to be one of the largest of its kind in Europe. This plant was designed to specialise in the application of copper, nickel and chromium plated finishes to a wide range of familiar everyday products



Valves controlling flow of thermal fluid from Wanson Thermopac heater to individual electro-plating tanks.



General view of one of the electro-plating lines designed to specialise in the application of copper, nickel and chromium plated finishes.

such as pen clips, razors, bicycle frames and musical instruments, as well as architectural, automotive and aerospace components. As many as 250,000 components can be treated in any eight hour shift. Typically, components to be plated are manufactured from steel or brass, or die-cast zinc. The plating line will accommodate parts up to 8 feet long and can apply coatings of up to 50 microns in thickness.

Great expectations

Design and installation of the new plant was undertaken by a major contractor in the Midlands in conjunction with Wanson and British Gas, West Midlands.

The largest electrolytic tanks on the five plating lines employ 12,000 litres of electrolyte. Each line is independently fed by a flow and return heating main, so that when one needs to be shut down for any reason, the others remain in service. In addition, each tank is individually thermostatically controlled.

Working temperatures of the electrolytic solutions are maintained in the range 17°C-95°C by immersed non-conductive coils carrying thermal fluid at 200°C from the 1160kW rated Wanson Thermopac 1000. From cold it takes 6 hours to bring the plating lines up to working temperature compared to as long as 12 hours with the previous steam heating plant.

WANSON PROVIDES THE KEY FOR A QUARTER OF A CENTURY

For a quarter of a century the same two Wanson Thermopac 1000 heaters have provided the heating source for Josiah Parkes' Willenhall factory where the world-famous Unison locks and architectural ironmongery brands are made. The plant is one of the largest thermal fluid heating installations in the finishing industry.

Two model 1000 Thermopacs serve more than 100 individually controlled users in the plant including an automatic plating line and open treatment tanks. In addition a second thermal fluid circuit from the Thermopacs provides space heating via wall-mounted warm air heating units and an overhead radiant ring main.

During their 25 years' reliable service, the two Thermopacs have had just one routine coil change some ten years ago at the same time as switching the burners from oil-fired to gas-fired.



Wanson

Wanson Company Ltd

7 Elstree Way, Borehamwood, Herts WD6 1SA, U.K. Tel: 0181 953 7111 Fax: 0181 207 5177

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