EUREKA®

since 1967

PTS

Permanent-Transfer System®

The Eureka-Permanent Transfer System®

Cooling Industry Award 2005

A Highly Profitable Way to Harness Refrigeration Waste Heat Using An Opimised System.

Universal Application

The Eureka heat recoverer with Permanent Transfer System is designed for a wide range of applications including supermarkets, butcher's shops, bakeries, hotels, restaurants, food processors and wherever refrigeration plant from 1 kW to 400kW is operated.

Hot Water At 50 - 60°C

The Eureka Permanent Transfer System heat recoverer harnesses waste heat from refrigeration to generate hot water at typically 50 – 60°C which is approximately 7°C above the refrigerant condensing temperature. Hot water is available within minutes of the refrigerant plant running. Virtually 100 % of the available condenser waste heat can be recovered.

Insulated Storage Cylinder

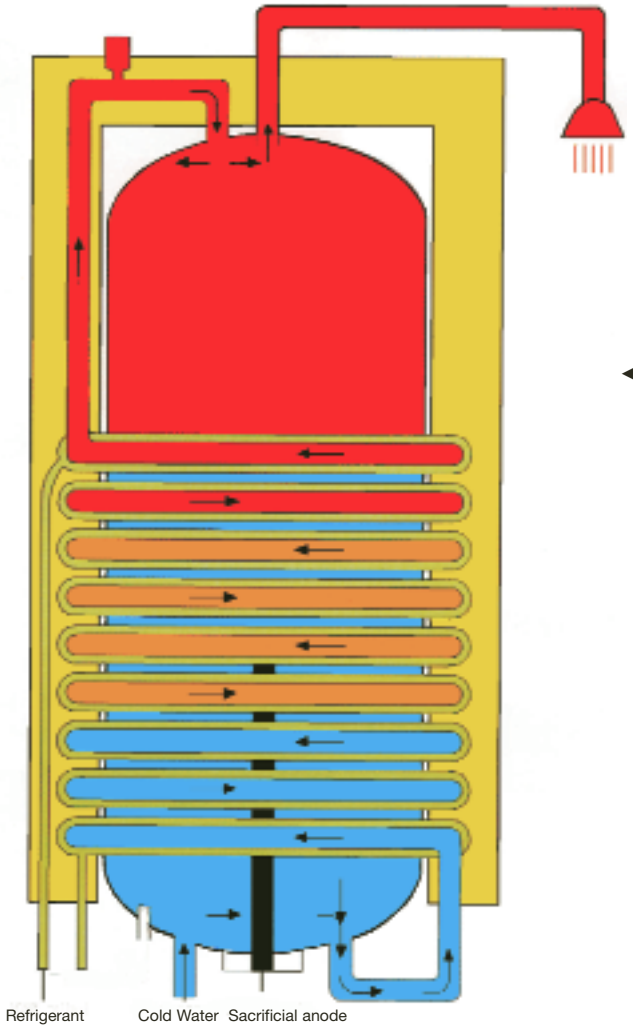
The hot water produced is stored in a cylinder insulated against heat loss with a CFC-free polyurethane or foam filled jacket. Thus hot water can be stored over a prolonged period without significant temperature loss. The cylinder is internally lined with two coats of vitreous enamel and incorporates a sacrificial magnesium anode for corrosion protection. The cylinder is also equipped with a TÜV-approved, push-button control unit for monitoring the effectiveness of the corrosion protection system both during and after the guarantee period. This enables the user to exploit the life-expectancy of the cylinder to the full.

Special Eureka Design

The design of the Eureka Permanent Transfer System heat recoverer is borne out of considerable practical experience. It operates automatically and without pumps. Because of Eureka's special design, each water molecule flows through the exchanger only once and within the space of one minute. This contact time is too short for any significant lime scale formation. Should in extreme cases de-scaling become necessary, the exchanger can be cleaned quickly and economically using the special connection points provided. It is not necessary to disconnect the water or refrigerant circuits.

Five Year Guarantee

The design and construction of the heat recoverer is such that virtually all known forms of corrosion have been eliminated. Based on the proven longevity of the unit, Eureka guarantee the cylinder for five years whilst all other parts carry a two-years guarantee.



◀ **Flow Schematic**

Permanent Transfer System® (PTS) Operating Principle

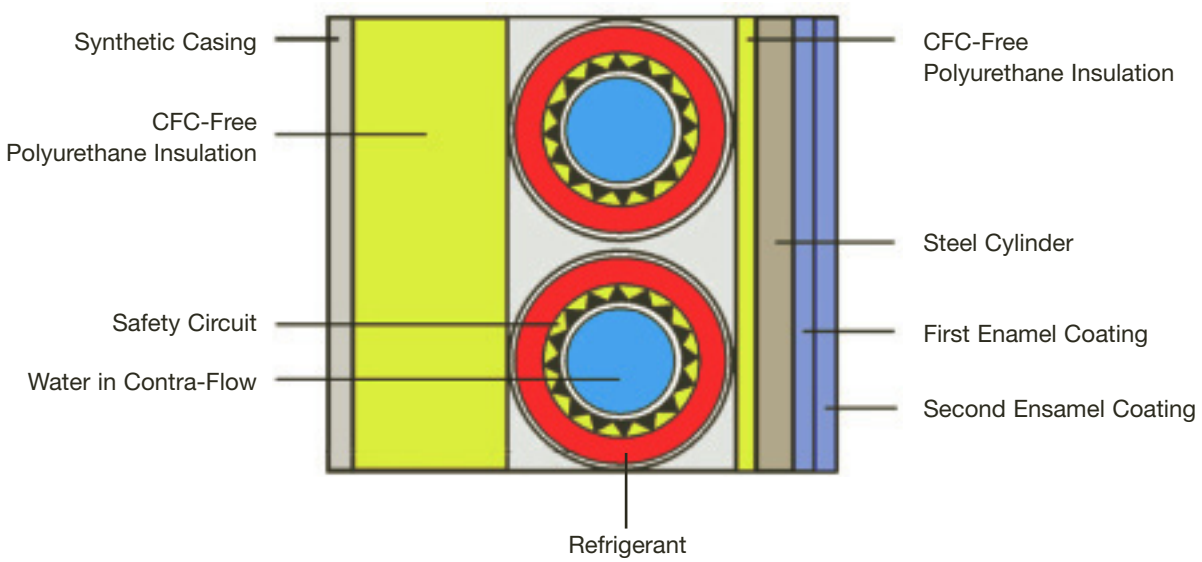
The Eureka Permanent Transfer System heat recoverer is vastly different - both in design and operation - to all other known heat recoverers.

The water storage cylinder is connected to the cold water supply at its base. As soon as the refrigeration plant starts to operate, cold water flows out of the cylinder base and into the inner tube of the double pipe heat exchanger where it passes in contra-flow with refrigerant flowing through the outer tube and is heated. The refrigerant is fully condensed. Water flows - by natural thermo-dynamic action - through the so-called superheat region of the refrigerant which causes it to be heated 5°C to 7°C above condensing temperature before entering the top of the insulated cylinder where it is stored until required. This hot water does not mix with the cold water in the cylinder. Thus the user is provided with a supply of sufficiently hot water - eg at 55°C based on a condensing-temperature of 48°C - within a few minutes of the plant operating.

Boost heating using costly primary energy is necessary only in exceptional cases. The Permanent Transfer System even sub-cools the refrigerant, resulting in a further energy gain. If desired, this energy gain can be utilized to increase the condensing pressure and hence hot water temperature to provide an instantaneous supply of “pasteurised” water.

One of the most important features of the Permanent Transfer System is the location of the heat exchangers. These are arranged beneath the insulation jacket and are wound spirally around the cylinder but have no contact with the cylinderwall. The exchangers are continuously supplied with “mains cold” water from the cylinder base even when no hot water is being drawn off. All of the waste heat is transferred until the cylinder is filled - from top to bottom - with hot water. This is attributable to a further, unique Permanent Transfer System design feature whereby the hot and cold water layers are maintained separate throughout the heat recovery process. The hot water produced is deposited gently at the top of the cylinder and spreads horizontally to form a clearly defined layer above the cold water block. The volume occupied by this hot water is the same as that flowing from the cylinder base through the exchanger. When the hot layer reaches the cylinder base the refrigerant is diverted directly to the normal condenser using a by-pass circuit recommended by Eureka. This prevents both scaling of the exchanger and unnecessary operation of the refrigeration plant at an elevated condensing pressure.

Safety Circuit Incorporated Within The Insulation Jacket



Permanent Transfer Exchanger With Safety Circuit

All heat exchangers incorporate a safety circuit using a pyramidal tube with leak detector. By means of this specially-developed Eureka system all of the waste heat energy can be transferred into water. All exchangers are TÜV-approved and are registered with and monitored by the DVGW (German Association of Gas and Water Engineers).

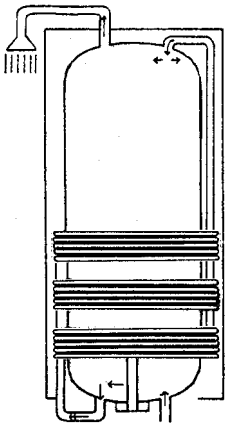
Test Mark: DIN-DVGW NW 9401 AR 3328

All exchangers are manufactured as standard in high-grade copper and are suitable for refrigerants R 134a, R 404A, R 407C, R 410A, R 507, R 22. Internal nickel plating is an available option for special applications.

Multiple Exchangers Per PTS Unit

Each PTS unit can be fitted with several heat exchangers. The individual exchanger heights (see Heat Exchanger data table 3) are added together up to the maximum permissible installed exchanger height as stated in the Permanent Transfer System Model data table 1.

PTS 300
PTS 450
PTS 500
with multiple
Exchangers



PTE with large
Capacity exchangers
parallel connected
to water storage
cylinder

Water Storage Cylinders

Permanent Transfer System heat recoverers models PTS 300, PTS 450 and PTS 500 incorporate water storage cylinders of 300, 450 and 500 litres volume, respectively. The storage capacity can be increased by parallel-connecting water storage cylinders of the same size. For very large capacities a variant model is used - the Permanent Transfer unit (PTE) - which contains only heat exchangers. The PTE unit is parallel-connected on site with a water storage cylinder selected to match the exchanger capacity and/or the required water storage capacity. All water storage cylinders are manufactured in steel. Cylinders up to and including 2000 litres are lined with two coats of vitreous enamel. Cylinders 3000 litres and larger are internally synthetically lined with Rexit. All cylinders are suitable for providing potable water and feature a TÜV-approved corrosion protection device.

Numerous First And Several Unique Awards Are Clear Indicators Of The Permanent Transfer System® Special Qualities.

In 1980 the Permanent Transfer System was the first heat recoverer to be approved by the German Agricultural Association (DLG). A further approval was given by the Department of Energy in the canton of Bern, Switzerland, who measured the standing heat loss to be so small that it exceeded even their most stringent test requirements. The German Institute of Refrigeration Engineers (VDKF) also awarded a Permanent Transfer System installation with the Josef Biber Prize for advanced energy-saving technology. In September 1993, in Great Britain, Eastern Electricity voted the Permanent Transfer System winner in their PEP (Power For Efficiency and Productivity) Award Competition. In September 2005, in London, the RAC „Cooling Industries Award“ was given to an Eureka heat recovery system containing a Permanent Transfer System in the category „Green End User Of The Year“.

Additional Merits And Award-Winning Features Are Displayed On the Permanent Transfer System Insulation Casing.

International Technology Trophy.
A Eureka First!

TÜV-Approved Corrosion Protection System.
A Eureka First!

TÜV-Approved Heat Exchanger Safety Circuit.
A Eureka First!

DVGW (German Institute of Gas and Water Engineers) Seal of Approval for the Above Mentioned Tests. A Eureka First!

SVGW (Swiss Institute of Gas and Water Engineers) Approval

RAC Cooling Industries Award (Green End User Of The Year)
A Eureka First!

The Disadvantage Of The Permanent Transfer System®

The unique Permanent Transfer System operating principle is seldom understood on first acquaintance. The Eureka Permanent Transfer System heats water using a method which differs from all other known heat recoverers or indeed conventional water heaters. A direct comparison is impossible! Unfortunately, it can take a while for the "penny to drop"! This is the Eureka disadvantage .... but it is certainly worth making the effort to familiarise yourself with the unique features of the system because ...

The Permanent Transfer System® Can Save Valuable Energy.
And It Does So Safely, Dependably And At Maximum Efficiency.

Eureka have been preparing profitability calculations since 1975. Many thousands of systems are in operation throughout Europe yielding a wealth of practical experience which gives credibility to the Eureka claim:

“We Know Of No Other Heat Recoverer Which Can Save More
Energy Than The Eureka Permanent Transfer System®.”

Delivery Content

The Permanent Transfer System Heat Recoverer is supplied complete with insulation, thermometer and the specified safety-circuit heat exchanger(s) including the Integrated Control Unit which monitors both the safety-circuit and the corrosion protection system. The unit is supplied packed suitable for transportation and ready for installation. The heat recoverer complies with the German Food and Beverage Protection Law §31 LMBG, DIN 4753 and DIN 1988 for potable water heating appliances.

TABLE 1 Technical Data For Permanent Transfer System Models (Select Heat Exchangers From Table 3)

Permanent Transfer System Model	Water Storage Volume in litres	Height in mm Dimension H in drg.	Diameter Including Insulation in mm	Diameter Excluding Insulation in mm	Weight in kg	**Maximum Height for Installing Heat Exchangers in mm**	Cold Water Connection Male Spigot inch BSP Pos 1 or 3* in drg.	Hot Water Connection Male Spigot inch BSP Pos 2 or 4* in drg.	Thermometers 0 – 120°C Male Spigot inch BSP Pos 6 in drg.	Air Vent Connection Male Spigot inch BSP Pos 4 in drg.	Secondary Circulation Connection Male Spigot inch BSP Pos 5a or 5b in drg.	Anode Length/Diameter in mm Pos 7a, 7b, 7c in drg.	Handhole Diameter mm Pos 10 in drg.	Manhole Diameter mm Pos 11 in drg.	Thermostat Pocket 10 mm Diameter Male Spigot inch BSP Pos 9 in drg.	Auxilliary Heater** Connection Male Spigot inch BSP Pos 8 in drg.	Position Of Auxilliary Heater Centre Line Thermometer to Center Line Heater Spigot in mm Pos 8a in drg.	Volume Heated By Electric Immersion Heater in Litres, Maximum Temperatur 90°C**	Maximum Operating Pressure in bar	Maximum Operating Temperature in °C
PTS 300	300	1350	810	720	115	520	1¼ (1)	1¼ (2)	¾	½	¾ (5a)	450/33 (7c)	280	–	¾	2	160	90	10	95
PTS 450	450	1800	810	720	160	880	1¼ (1)	1¼ (2)	¾	½	¾ (5a)	700/33 (7c)	280	–	¾	2	270	120	10	95
PTS 500	500	1980	810	720	170	880	1¼ (1)	1¼ (2)	¾	½	¾ (5a)	700/33 (7c)	280	–	¾	2	270	120	10	95
PTE	0	1980	810	720	25	1560	2 (3*)	2 (4*)	–	½	–			–	–	–	–	–	–	95

TABLE 2 WATER STORAGE CYLINDERS (To Increase The Water Storage Volume)

WLT 300	300	1350	810	600	115	–	1¼ (1)	1¼ (2)	¾	–	¾ (5a)	450/33 (7c)	280	–	¾	2	160	90	10	95
WLT 450	450	1800	810	600	160	–	1¼ (1)	1¼ (2)	¾	–	¾ (5a)	700/33 (7c)	280	–	¾	2	270	120	10	95
WLT 500	500	1980	810	600	170	–	1¼ (1)	1¼ (2)	¾	–	¾ (5a)	700/33 (7c)	280	–	¾	2	270	120	10	95
WLT 750	750	2030	1000	800	230	–	2 (1)	2 (2)	¾	–	¾ (5b)	700/33 (7a)	280	–	¾	2	265	300	6	95
WLT 1000	1000	2430	1000	800	270	–	2 (1)	2¼ (2)	¾	–	¾ (5b)	700/33 (7a+7b)	280	–	¾	2	265	300	6	95
WLT 1500	1500	2290	1200	1000	335	–	2 (1)	2 (2)	¾	–	¾ (5b)	700/33 (7a+7b)	280	–	¾	2	265	500	6	95
WLT 2000	2000	2520	1300	1100	400	–	2 (1)	2¼ (2)	¾	–	¾ (5b)	700/33 (7a+7b)	280	–	¾	2	265	600	6	95
WLT 3000	3000	2600	1500	1300	790	–	2½ (1)	2½ (2)	¾	–	¾ (5b)	–	–	450	¾	2	400	150	6	95
WLT 4000	4000	3400	1500	1300	930	–	2½ (1)	2½ (2)	¾	–	¾ (5b)	–	–	450	¾	2	400	2000	6	95
WLT 5000	5000	3300	1700	1500	1230	–	3 (1)	3 (2)	¾	–	¾ (5b)	–	–	450	¾	2	400	2500	6	95

Manufacturer

EUREKA®

seit 1967
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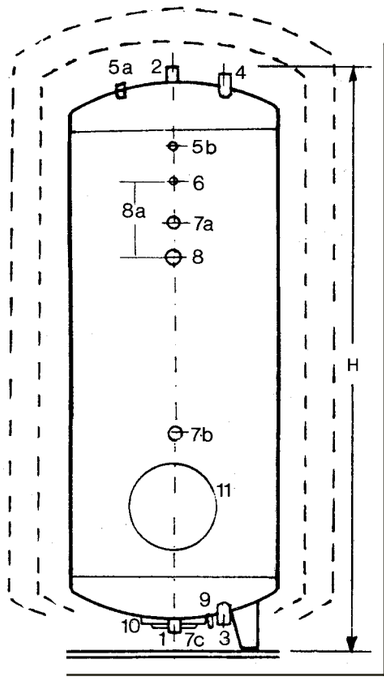
Explanatory Drawing Tables 1 and 2



* Spigots 3 and 4 are the cold and hot water connections used when parallel-connecting PTE units and water storage cylinders.

** Auxillary electric heaters can be fitted to all PTS models and Water Storage Cylinders. Capacity ratings: 2kW (220-240V) or 4.5kW, 6.0kW,9.0kW (380-415V).

TABLE 3: Heat Exchangers For PTS- and PTE-Models

Model	Continuously Rated Capacity ± 5%* in kW	**Installed Height in mm**	Weight in kg	Refrigerant Connections in mm	Water-side Maximum Permissible Operating Pressure in bar	Water-side Maximum Permissible Operating Temperature in °C	Refrigerant-side Maximum Permissible Operating Pressure in bar	Refrigerant-side Maximum Permissible Operating Temperature in °C
B	2	100	13	12 x 1	10	5 – 95	35	5 – 150
C	4	200	22	16 x 1	10	5 – 95	35	5 – 150
CX	6	240	35	18 x 1	10	5 – 95	35	5 – 150
D	9	290	44	22 x 1	10	5 – 95	35	5 – 150
DX	12	430	66	22 x 1	10	5 – 95	35	5 – 150
E ***	16	520	112	22 x 1	10	5 – 95	35	5 – 150
PAR	Capacity can be increased up to 400kW by parallel connecting exchangers. Details on request.							

* The capacities in table 3 are continuously rated capacities based on condensing temperature 48 °C, discharge gas temperature > 70°C, entering cold water temperature 10°C, hot water supply temperature 53-60°C.