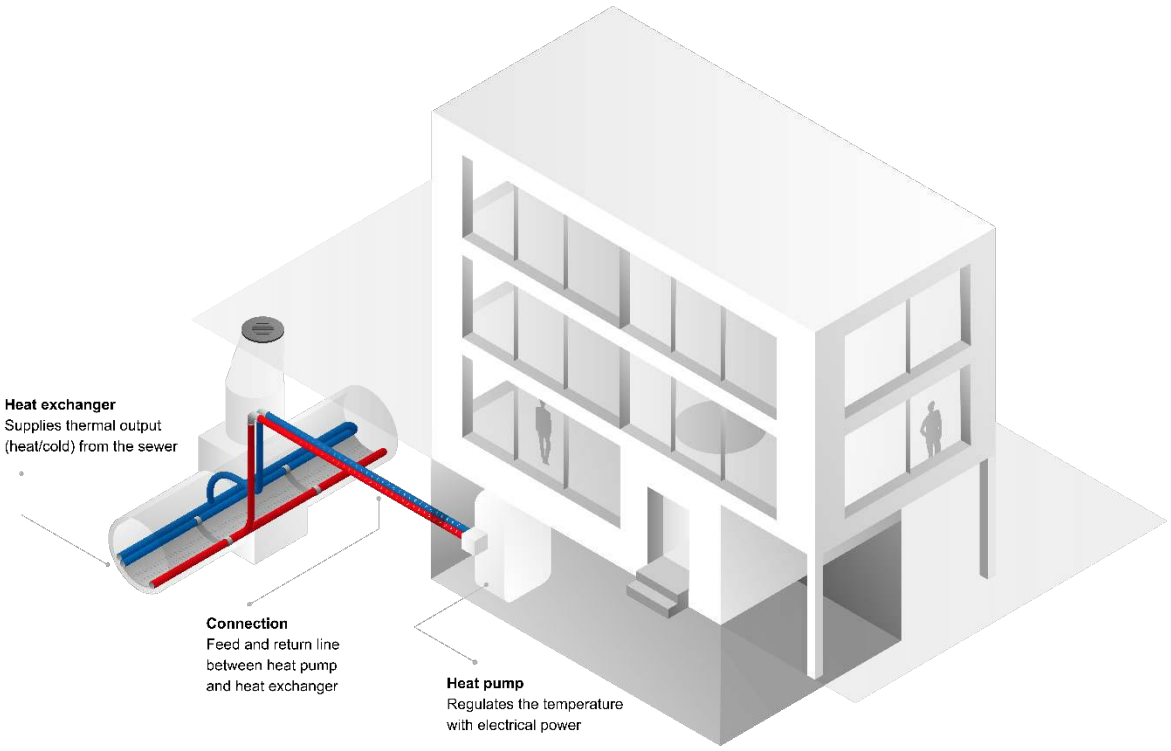
Energy from Wastewater with UHRIG Therm-Liner
Description of the Heat Exchanger System

1. Energy from wastewater - Operating principle

There is a massive energy potential in wastewater which is available in our sewers all the time and in large quantities. Wastewater has an average temperature of 10 to 12 °C in winter and between 17 and 20 °C in summer. This temperature represents heat or thermal energy that can be used to heat buildings in winter and cool them in summer. Energy from wastewater is a heat pump-based technology.



At suitable locations, energy from wastewater can achieve a net energy cost of about 7 cents per kWh. Our system covers heating and cooling requirements. The overall costs of the system will include the cost of the heat exchanger, the connection and the heat pump. Well suited locations are to be found in cities and urban areas, and smaller towns that are close to a sufficiently large sewer network. As a renewable resource, energy from wastewater reduces carbon emissions in the building sector.

2. Energy from wastewater - Project development

If a new building is being constructed or an existing building refurbished, there are three important questions to be asked:

- ► Is there a public sewer system nearby?
- ► How much water flows through the sewer?

► What is the temperature of the wastewater?

Using the answers to these questions, it is easy to calculate how much energy can be made available and at what price. The UHRIG Therm-Liner System can supply individual buildings in addition to larger complexes.

3. UHRIG Therm-Liner - Characteristics

► Developed for retrofitting in existing and new sewers

► Designed in such a way that it does not affect the actual operation of the sewer in any way

► Always a custom solution matched precisely to the relevant sewer system

► Easy to install as the Therm-Liner modules are installed using the existing manhole structure

► Capable of removal or expansion at any time

► Patented and certified

Therm-Liner Form A

Therm-Liner Form B

► We offer individual tailor-made solutions, bypasses, and pressure line solutions

4. UHRIG Therm-Liner - Production and installation

The heat exchanger elements are manufactured by UHRIG and are ready for immediate installation. They consist of austenitic stainless steel 1.4404 which, because of its excellent resistance to pitting and corrosion, is ideal for use in wastewater. The heat exchanger surface is pickled and passivated. The surface structure ensures a turbulent wastewater flow, reducing biofilm formation and enhancing heat exchange. A coupling system connects the heat exchanger elements in the sewer. The connection system guarantees secure installation and maximum flexibility. The connecting pipes are adapted to the structure of the sewer and manhole structure.

After delivery to the site, the installation is carried out by UHRIG. After being brought in, the Therm-Liner modules are installed sequentially and interconnected according to the “Tichelmann principle”. A mechanical connection in the sewer and a run-up and run-down ramp fixes the Therm-Liner System. The feed and return pipes with shut-off valves are led upwards out of the sewer via the manhole shaft or a core bore. The system is filled, ventilated, and then tested according to DIN EN 805 using the contraction method with 1.5 times operating pressure. The operating pressure for the entire system is generally set at 2.5 bar (~36 psi).

Documentation and labelling are in accordance with the SI system. The Therm-Liner equipment is designed for a working life of up to 50 years.

5. UHRIG Therm-Liner - USP

No civil engineering	The heat exchangers are installed through existing manhole structures. Additional infrastructure is not required. In some cases, the cone may have to be temporarily removed for installation.
No cleaning effort	The wastewater remains in the sewer and flows over the installed heat exchanger. No pumping and filtering of the wastewater is necessary. The wastewater does contaminate the heat exchanger surface (biofilm effect) and reduces the performance. To address the inevitable biofilm effect, we simply over-size the system. The designed system output can be achieved at any time without cleaning measures.
Low operating costs	Since cleaning and wastewater pumping measures are unnecessary, there are virtually no operating costs. The systems do not require maintenance but should be inspected at regular intervals.
Easily expandable	Due to the fact that the Therm-Liner is installed separately from the sewer and is modular in design, the system capacity can also be expanded by adding further sections, if needed. In the unlikely event of repairs, a targeted replacement of individual sections is also possible.
Real-time monitoring	Our UHRIG monitoring system makes it possible to keep an eye on system performance in real time, around the clock.

6. UHRIG Therm-Liner - Contact

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