# Ultra-high temperature heat pump

# OCHSNER Energie Technik



**Figure 1: Ultra-high temperature heat pump IWWDS 430 R4b on the 130 °C test bench.**

## Summary of technology

Ultra-high temperature heat pumps can provide process heating at high temperature for industrial applications. The most relevant applications are: paper industry, food industry, chemical industry, waste heat utilization from process cooling and power plants, industrial processes, and district heating. The ultra-high temperature heat pump technology by Ochsner Energie Technik has been commercialized and is currently available in the market.

The heat pump is based on an electricity-driven hermetic single-stage refrigerant circuit. It equips a semi-hermetic rotary screw compressor. The lubrication system includes an internal oil circuit and an external oil circuit for additional cooling.

The evaporator and condenser heat exchanger have a shell & tube design and suitable transport media on the sink and source side are water or brine.

The design is application-specific. A buffer tank is required on the sink and on the source side to ensure minimum running time.

Ochsner technology solutions use heat extremely efficiently and with very low environmental impact. The COPs measured in the laboratory at different temperatures are shown in Table 1.



**Figure 2: Ultra–high temperature heat pump**

**Table 1: Performance.**

| $T_{source,in}$ | $T_{source,out}$ | $T_{sink,in}$ | $T_{sink,out}$ | $COP_{heating}$ |
|---|---|---|---|---|
| [°C] | [°C] | [°C] | [°C] | [-] |
| 40 | 45 | 130 | 125 | 1.6 |
| 55 | 60 | 125 | 130 | 2.3 |
| 50 | 55 | 100 | 110 | 3.2 |

Figure 3 shows the temperature limits of the condenser outlet and evaporator inlet.

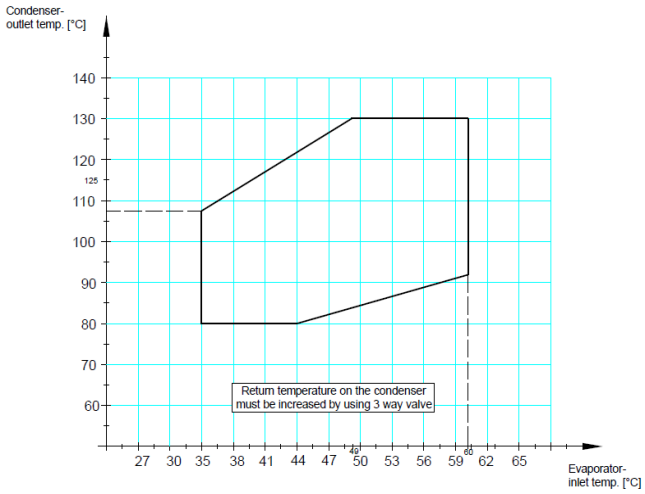


**Figure 3: Limits of use**

## FACTS ABOUT THE TECHNOLOGY

**Heat supply capacity:** 500 kW

**Temperature range:** condenser +80/+130 °C, evaporator +35/+60 °C

**Working fluid:** R1233zd

**Compressor technology:** semi-hermetic screw

**Specific investment cost for installed system without integration:** 350 - 700 €/kW

**TRL level:** TRL9

**Expected lifetime:** 20 years.

**Size:** Weight 4000 kg, footprint 4 $m^2$

## Contact information

Bernd Lieber, Ochsner Energie Technik
bernd.lieber@ochsner-energietechnik.com
+43 676 881234 300

Thomas Ciepiela, Ochsner Energie Technik
thomas.ciepiela@ochsner-energietechnik.com
+43 676 881234 505

All information were provided by the supplier without third-party validation. The infomation was provided as an indicative basis and may be different in final installations depending on application specific parameters.