

## CASE STUDY

### TurboScrew C200TS-24



Parhammer near-surface geothermal energy

## Geothermal energy for heating – probe drilling down to 100 m below ground

The use of geothermal energy for heating purposes is vitally important to the safeguarding of our environment. Unlike heating systems based on the combustion of energy sources and unlike solar, wind or nuclear energy, the exploitation of geothermal energy is absolutely free of pollutants. It is also not bound by weather or seasons. Parhammer Brunnen und Erdwärme GmbH install geothermal probes at depths of between 50 and 100 metres. Probes installed to depths of up to 400 metres develop what is known as “shallow geothermal energy”.

### Project overview

- ▶ **User**  
Parhammer Brunnen und Erdwärme GmbH
- ▶ **Usage site**  
Mondsee, Austria
- ▶ **Application**  
Driving a geothermal drill down to a depth of 100m
- ▶ **Machine used**  
TurboScrew C200TS-24 series
- ▶ **Added value**
  - Sufficient compressed air to operate the hammer drill and blow out the borehole: 20m<sup>3</sup>/min volume flow at up to 21 bar positive operating pressure
  - Patented pre-compression by way of two turbochargers resulting in minimal fuel requirements and therefore low operating costs

## The applications in detail

Parhammer Brunnen und Erdwärme GmbH, based at Mondsee, is a professional specialists in drilling technology. The company's business activities are wide-ranging and include well drilling,

probe drilling for geothermal energy, drainage wells and well deepening, in addition to redevelopment and regeneration. The company, which operates across Austria, uses MC 900

P drilling equipment from Comacchio and a TurboScrew compressor type C 200TS-24 by CompAir, a machine with a maximum of 24 bar positive operating pressure.

“We recently completed a typical project in Mondsee”, reports owner Matthias Parhammer. A geothermal probe was installed down to 100m depth to heat a new-build 12-unit housing complex. Common for the region, the soil close to the surface is clayey, followed by sandstone lower down. “In order for us to reach a drilling depth of 100 metres, we require compressed air with up to 24 bar positive operating pressure, with a volume flow of 20m<sup>3</sup>/min. “Only a small amount of compressed air is used to operate the hammer drill. The rest blows out the borehole and sends the drillings to the earth’s surface,” explains Matthias Parhammer.

The scope of work for geothermal energy includes drilling the hole, the installation of the geothermal probe, deep injection of the borehole with a special compound, filling the probe with the heat exchange medium and connection to the utility room.

The CompAir TurboScrew compressor series represents an unbeatable combination of positive operating pressure, volume flow and economical operation. The compressor used by Parhammer delivers 24 bar at a 20m<sup>3</sup>/min volume flow, whereby values can be set from 14 bar positive pressure. The unique and patented bi-turbo technology pre-compresses the suction inlet air before it enters the compression chamber, which when combined with effective machine control, delivers market-leading levels of effectiveness for compressor systems. No machine with a comparable performance produces more compressed air from one litre of diesel. After all, safeguarding the environment also involves the careful use of resources. The new TurboScrew compressors are equipped with a recognised SCRT® system (Selective Catalytic Reduction Technology) that removes virtually all particulates and nitric oxides from the diesel exhaust fumes, therefore fulfilling the tightened stipulations of TIER IV Final (USA) and EU97/68 Stage 3b (EU norm) for off-highway engines.

The lightweight TurboScrew compressors can be towed by a vehicle with a maximum towing weight of 3,500kg and are therefore great for getting to hard-to-access sites – less mass is moved, which also offers potential for fuel savings. Large and wide-opening doors provide good access to all service points.

## Near-surface geothermal energy – building heating using geothermal energy

Near-surface geothermal energy is defined as the use of geothermal energy up to approx. 400m depth. From a geological perspective, every domestic and industrial plot is able to use geothermal energy. It goes without saying that economic, technical, legal and of course, geological aspects need to be considered. The geothermal probe’s ambient heat extraction capacity is important. The number of probes per construction project is based on the heat requirement of the building and the geological conditions of the local ground.

The building should be well-insulated and have a low-temperature heating system installed providing the optimal environment. The construction project in Mondsee will create 12 housing units in a central location, with a modern finish and constructed in an environmentally friendly manner. The project wins over with its combination of modern architecture and environmentally friendly timber construction – it provides generous rooms that are flooded with light, an unrivalled indoor climate and the best energy efficiency. And all that in the middle of one of the most beautiful locations in Austria: the picturesque Mondsee.



Even in wintry conditions, as encountered in Mondsee at the end of March 2018, drilling operations are being carried out, which speaks volumes for the reliability of the compressor being used.

# CASE STUDY

## TurboScrew C200TS-24

GERMAN  
ENGINEERING  
& DESIGN

### Your benefits at a glance

- ▶ **Reliable Cummins motor with exhaust gas treatment (SCRT®)**  
fulfils thresholds for level 4 in accordance with 97/68/EC and is permitted for use in low-emissions zones
- ▶ **Patented pre-compression using an additional turbo charger**  
for high fuel savings (up to 30% compared to conventional compressors)
- ▶ **Further control range**  
from 1,000 to 2,400U/min – to adjust to fluctuating compressed air requirements
- ▶ **Unsurpassed efficiency weight below 3,500kg**  
Can be moved with transporter or SUV.  
Only overrun brake required

**LOW  
EMISSION  
ZONE**

**LOW  
EMISSION  
ZONE**

**UP TO  
24  
BAR**



### Technical data

Type		DLT 2702			
Model		C 200 TS-24	C 210 TS-21	C 230 TS-17	
Operating data	Volume flow <sup>1)</sup>	m <sup>3</sup> /min	20	21	23
	Positive operating pressure	bar	24	21	17
	Pressure range	bar	13–24	13–21	13–17
Engine	Propulsion engine	Cummins QSB6,7			
	Cylinders	6			
	EU emissions stage	IV			
	Engine cooling	Water cooling			
	Engine power	kW	224		
	Speed range	min <sup>-1</sup>	1.000–2.400		

<sup>1)</sup> according to ISO 1217 Ed. 3 1996 Appendix D