CompAir
by Gardner Denver

CASE STUDY
TurboScrew C210TS-21

SBS is drilling down to 100 m in Lausitz granite

Geothermal experts rely on the power of CompAir

Sächsischer Brunnen- und Spezialtiefbau GmbH, or SBS for short, is regarded as a specialist company in the field of drilling technology for installation of depth probes. The company, which is based south-east of Leipzig, Germany and operates nationwide, uses a drilling unit from Nordmeyer and a type C210TS-21 TurboScrew compressor from CompAir, supplied by HKL Leipzig.

Overview

Client
Sächsischer Brunnen- und Spezialtiefbau GmbH

Location
Bischofswerda, near Dresden

Application
Sinking a geothermal hole down to a depth of 100 m in hard Lausitz granite

Product
TurboScrew C210TS-21

Customer Benefits
Compressor supplies 21 bar positive operating pressure with a volume flow of 21 m³/min. Patented pre-compression with turbocharger ensures low fuel consumption and operating costs. An operating weight of less than 3,500 kg enables economical relocation by means of transporter or SUV with just an overrun brake.

Application details

The use of geothermal energy for heating is very important. This is because, unlike heating systems based on burning fossil fuels, unlike solar and wind power and also in contrast to nuclear power, the extraction of geothermal energy does not involve any pollutants at all. It does not depend on the weather or time of year. Geothermal probes are normally

SBS needs a compressor output of 21 bar to install geothermal probes at a depth of 100 metres.

installed by SBS at a depth of 50-100 m. Down to a depth of 400 meters is referred to as near-surface geothermal energy.

"We recently handled a typical order in Bischofswerda, east of Dresden", reports Dr.-Dipl.-Ing. Heiko Schwarze, Managing Director at SBS. A geothermal probe was installed there at a depth of 100 m in order to heat a detached home. There is solid Lausitz granite close to the surface there, which is common throughout the entire region. "To actually reach a drilling depth of 100 m, we need compressed air with up to 21 bar of positive operating pressure with a volume flow of 21 m³/min. Only a small portion of the compressed air is used to operate the hammer drill. The vast majority of the compressed air is used to blow out the bore hole and convey the drilling cuttings to the surface. Here it is granite granulate", explains Dr. Schwarze. After sinking the hole and installing the geothermal probe, the range of geothermal services provided by SBS includes all work, from borehole grouting with a special compound, filling the probe with the heat exchanger medium through to handover of the connections in the technical or utility room.

The compressor used by SBS supplies 21 bar positive operating pressure with a volume flow of 21 m³/min.

The positive operating pressure, volume flow and costeffectiveness of the CompAir TurboScrew compressor series make for an unbeatable combination. The compressor used by SBS supplies 21 bar positive operating pressure with a volume flow of 21 m³/min, whereby values greater than 14 bar of overpressure can be set. One of the bi-turbo machine's exhaust gas turbochargers provides the air end with pre-compressed intake air. Together with an effective machine controller, this results in a market-leading level of efficiency for the compressor system. No machine with a comparable performance level generates more compressed air per litre of diesel. After all, environmental protection also means careful use of resources. The new TurboScrew compressors are equipped with a recognised SCRT® system (Selective Catalytic Reduction Technology), which removes almost all soot particles and nitrogen oxide from the diesel exhaust gases.
No portable equipment in this series weighs more than 3,500 kg. Together with a suitable towing vehicle, there is less weight to be moved for transport on the road, which also paves the way for fuel savings.

SBS has been operating in this market for over 25 years and the company's roots go back to 1875. The company's range of services covers earth exploration, well building, special processes, environmental technology and, needless to say, geothermal energy. They boast nationwide references, including Lake Ammer in Bavaria, while the majority of their customers are in Saxony, Saxony-Anhalt and Thuringia. Several thousand holes have already been drilled and well over 100,000 probe meters have been installed.

Near-surface geothermal energy — heating buildings using geothermal heat

Near-surface geothermal energy is the use of geothermal heat from a depth of down to 400 m. From a geological perspective, all residential and commercial properties are suitable for geothermal heating. Of course, economical, technical, legal and, last but not least, geological aspects must be taken into account.

The key factor is the ambient heat extraction capacity through the ground probe. Dense and solid granite has excellent properties for such use thanks to its high specific weight and thermal conductivity. In contrast, looser and dryer gravel and sand formations noticeably reduce the flow of heat to the probe.

The number of probes per construction project depends on the heat required for the building and the geological condition of the solid ground. The building should have good insulation and low-temperature radiant panel heating should be employed to provide an optimum environment.

Geothermal drilling in Bischofswerda, Saxony in solid Lausitz granite bedrock.

A double-U probe provides excellent energy extraction capacity for heat pump heating.

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GERMAN ENGINEERING & DESIGN

Your benefits at a glance

- **Reliable Cummins engine with an exhaust gas treatment system (SCRT®)**
  meets all of the statutory threshold values of Stage 4 of 97/68/EC
- **Patented pre-compression with additional turbo charger**
  for high fuel savings (up to 30% in comparison to conventional compressors)
- **Wide Regulation Range**
  between 1000 and 2400 rpm adapts precisely to the varying air demand
- **Operating weight below 3,500 kg**
  Can be moved with transporter or SUV. Only overrun brake required

LOW EMISSION ZONE

Technical specifications

Type			DLT 2702		
Model			**C 200 TS-24**	**C 210 TS-21**	**C 230 TS-17**
Operating data	Volume flow [1]	m³/min	20	21	23
		cfm	706	741.6	812
	Operating overpressure	bar	24	21	17
		psi	348	304.5	246.5
	Pressure range	bar	13–24	13–21	13–17
Engine	Drive engine/engine type			Cummins QSB6,7	
	Cylinders			6	
	EG Stage			IV	
	Cooling system			Water cooled	
	Installed engine power	kW		224	
	Speed range	min⁻¹		1.000 – 2.400	

[1] in accordance with ISO 1217 Ed. 3 1996 Annexe D
[2] without options
[3] Statutory threshold values of EC Directive
[4] PN8NTC2.2