

Compact Drive Technology for Belt Conveyors. The TurboBelt 780 TPXL.





Compact. Efficient. Reliable.

Efficient drive systems

The increasing need for raw materials worldwide places continuously growing demands on conveying capacity in mining. Higher outputs require more powerful drives with more than 800 kW. For this power range, it is quite common to use six- or eight-pole induction motors.

The TurboBelt 780 TPXL was specifically designed to meet the drive needs for these high capacity conveyors. With double the power transmission in the same installation space, it meets this challenge in a sustainable and energy-efficient manner. The fluid coupling attains an efficiency of up to 98.5%. Medium and high voltage motors can be used, allowing further efficiency increases. The cost-effectiveness of your system improves.

Rated power:

- 1,100 kW at a speed of 900 rpm
- 1,500 kW at a speed of 1000 rpm
- 1,900 kW at a speed of 1200 rpm

The hydrodynamic principle protects the belt and driveline. The wear-free power transmission and robust design results in reduced maintenance cost and high system availability.

- 1 Overburden conveyance in German brown coal surface mining, source: Contitech CBG
- 2 TurboBelt 780 TPXL for iron ore mining in Brazilian ship loading

Optimized for surface mining.

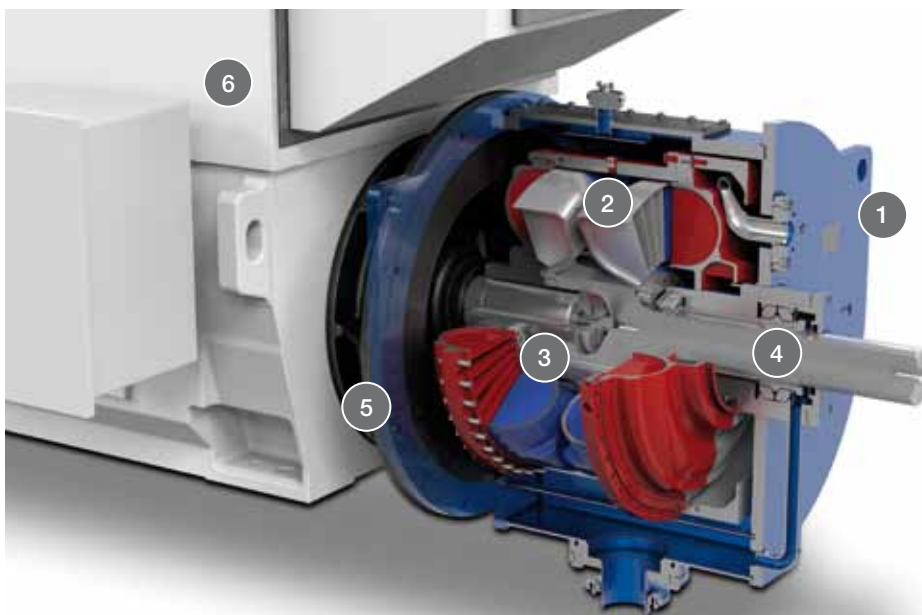
Quick assembly and easy handling

The TurboBelt 780 TPXL is bolted directly onto the motor flange. What results is a drive transmission that is up to 20% shorter and lighter than previous drive unit designs. The drive can be completely assembled at the factory or site workshop minimizing installation and alignment work. This makes the system less failure-prone, which increases reliability during production.

Reliable in any setting

The fluid coupling works reliably, even in the harsh operating conditions of surface mining. It is insensitive to heat, cold, elevation and moisture. Thanks to the external cooler, it can start up repeatedly without difficulty. The rugged design of the fluid coupling ensures use over the entire duration of production in the mine, while maintaining consistent efficiency. An overhaul is typically not necessary before 15 years of operation. The fluid coupling is then as good as new again.

Design of the TurboBelt 780 TPXL



1. Robust steel fabricated housing
2. Highly efficient XL blade wheel profile for wear-free power transmission
3. Dual working circuits for power doubling
4. Labyrinth seal and high-quality bearings with a lifetime L_{10} of 80,000 h
5. Integrated direct attachment to motor flange
6. Six- or eight-pole foot & flange mounted induction motor of any voltage

Innovative and powerful.

Hydrodynamics - State of the Art

The TurboBelt 780 TPXL utilizes a new XL blade wheel profile. During its development, decades-long experience in mining was combined with modern CFD flow simulation.

The fluid coupling transmits now twice the power of previous designs without any increase in the installation space. Two parallel working circuits double the power transmission yet again.

Easy to control

The quality of control during the starting process is a key factor for belt-protecting operation. The TurboBelt 780 TPXL provides a convincing solution with precise, easy-to-control torque transmission.

Further benefits of hydrodynamics

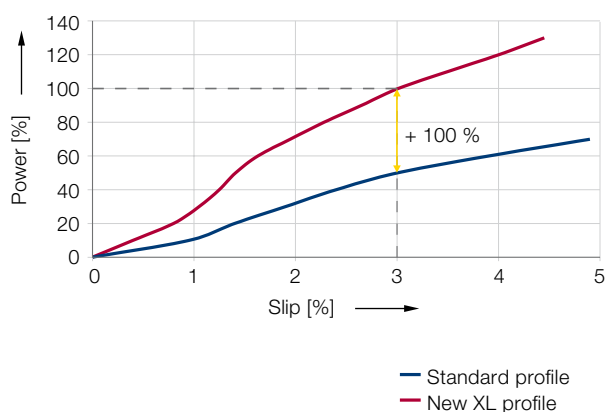
In addition to the design benefits, system operators also tap into the systemic benefits of hydrodynamics. It:

- transfers power in a wear-free manner,
- dampens torque peaks,
- decouples motor and driven machine,
- adjusts torque steplessly,
- establishes natural load balancing in the case of multiple drives.

The TurboBelt 780 TPXL drives conveyor systems in a belt-protecting manner. Because of this, the systems work dependably, efficiently and with a high degree of reliability.

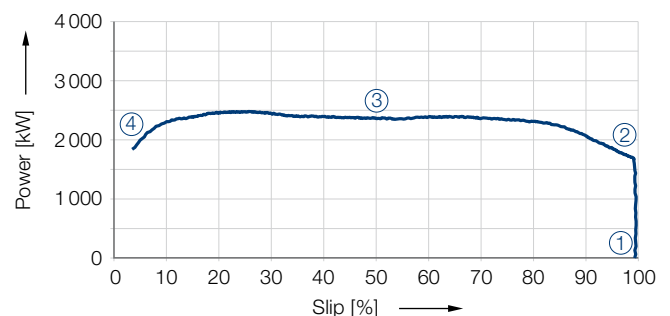
XL profile of the blade wheel

Double the power transmission



Measurement report: TurboBelt 780 TPXL

Behavior during overloaded startup



- 1 No-load motor startup with emptied coupling
- 2 Belt starting
- 3 Acceleration of the belt
- 4 Nominal operation

Function and operating conditions.

Hydrodynamic couplings transmit the initiated mechanical power via a flow of fluid. This occurs by means of two bladed wheels positioned face to face. The primary wheel is connected to the motor and acts as a pump. The secondary wheel is connected to the transmission and works as a turbine. Torque transmission is proportional to the steplessly controlled coupling filling. Just two solenoid valves control this reliably. Fluid flows continuously in a self-contained circuit through an external cooler resulting in optimized cooling control capable of providing multiple loaded starts.

1. Motor startup

With an empty coupling, the motor starts under no load. Multiple motor systems are switched on in a staggered sequence. In addition to the motor, this also protects the power grid.

2. Breakaway

Torque is increased smoothly by filling the coupling. Tension is applied to the belt gradually, allowing the breakaway torque to be achieved safely even in an overloaded condition.

3. Acceleration

Through filling control, the belt accelerates in the course of several minutes. This occurs independently of load state. Longitudinal vibrations are avoided effectively.

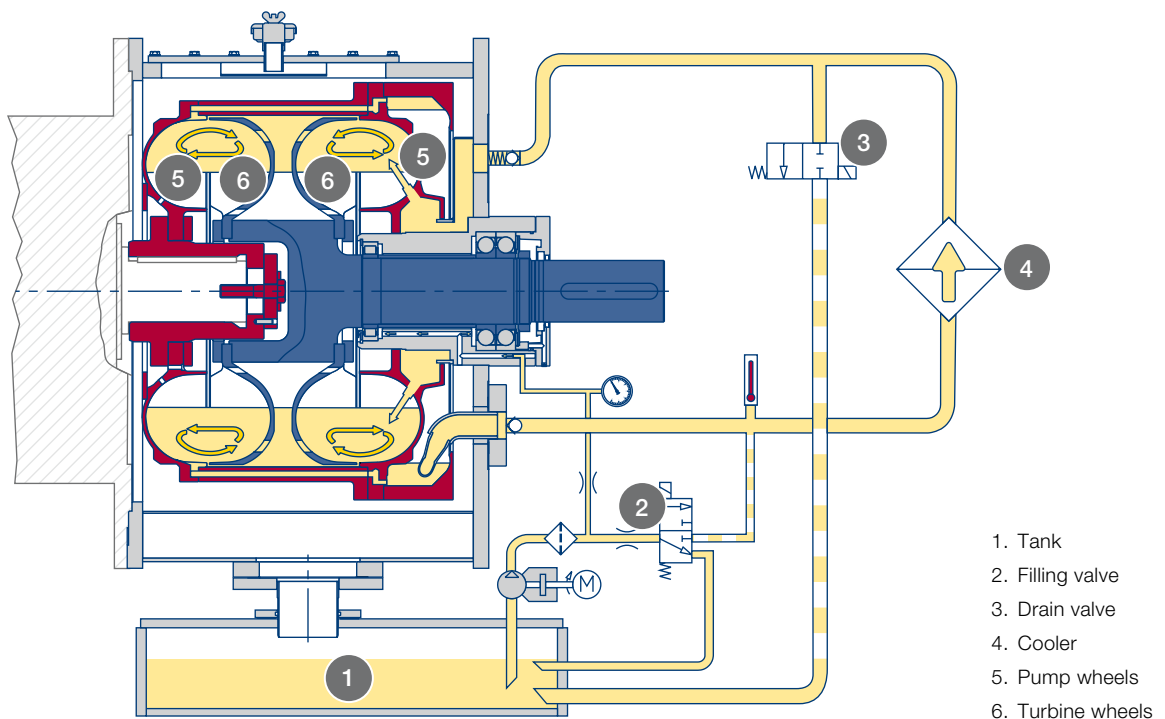
4. Nominal operation

The coupling is filled. In this way, it works with an optimal efficiency of up to 98.5%. Adjustments for active load balancing with multi motor drives are achieved through valve timing. The hydrodynamic principle automatically compensates for smaller variations.

5. Inspection speed

The controls adapt coupling filling for inspection speed. The empty conveyor belt then moves at some 10% to 20% of its nominal speed.

Sectional drawing of the TurboBelt 780 TPXL



Solutions for drive units.

System integration

We have decades of experience in drive technology for mining. This experience enables us to offer not only couplings, but also drive solutions. This begins with a joint analysis of your needs. Based on this analysis, the optimal configuration is selected.

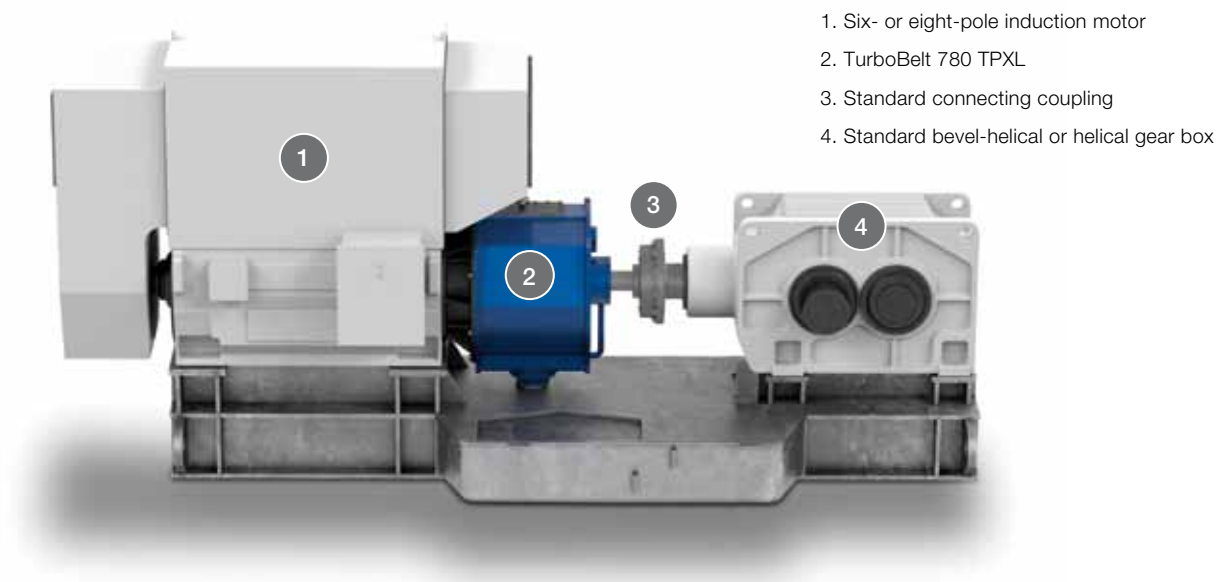
Our drive solutions offer:

- safe startup under all conditions
- short-term operation at overload, in order to safely remove overloads
- three or more consecutive starts through active cooling of the working fluid
- Consideration of all temperature and environmental influences, additional climatization measures not necessary
- Extended life for the motor and other drive components

Drive solutions

In addition to the fluid coupling, we also supply the required peripheral hardware, as well as the control and supervision electronics. Voith can offer complete drive package solutions including the drive hardware, PLC controller, and supervision of installation as well as commissioning.

Drive unit



More than just a product.

A broad portfolio for different requirements

In addition to the Turbobelt 780 TPXL, couplings in a power range up to 4 MW are available. Constant fill or fill-controlled, for four-pole or optimized for six- and eight- pole induction motors: Voith has a broad portfolio of couplings for belt conveyors at its disposal.

Beyond our broad product portfolio, you will receive competent design and application consulting from experienced engineers. In addition to this, a competent team of local Voith service personnel will stand at your side for planning, commissioning, maintenance and technical analyses. Talk with us, and we will find the correct solution for your requirements.

Voith's portfolio: hydrodynamic couplings for belt conveyors cover a wide range of power requirements.

Coupling	TV	TVV	TVVS	TPKL	TurboBelt 780 TPXL
Power range in kW	37 – 400	37 – 630	75 – 1 500	150 – 4 000	700 – 1 900
Motor speed in rpm	900 – 1 800	900 – 1 800	900 – 1 800	1 500 – 1 800	900 – 1 200
Type T/TP	constant fill			fill controlled	
Thermal capacity	surface cooling			active cooling	
Startup time	up to 25 s	up to 35 s	up to 45 s	up to several minutes	up to several minutes
Service	Design, planning, commissioning, technical analysis, maintenance, training				



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