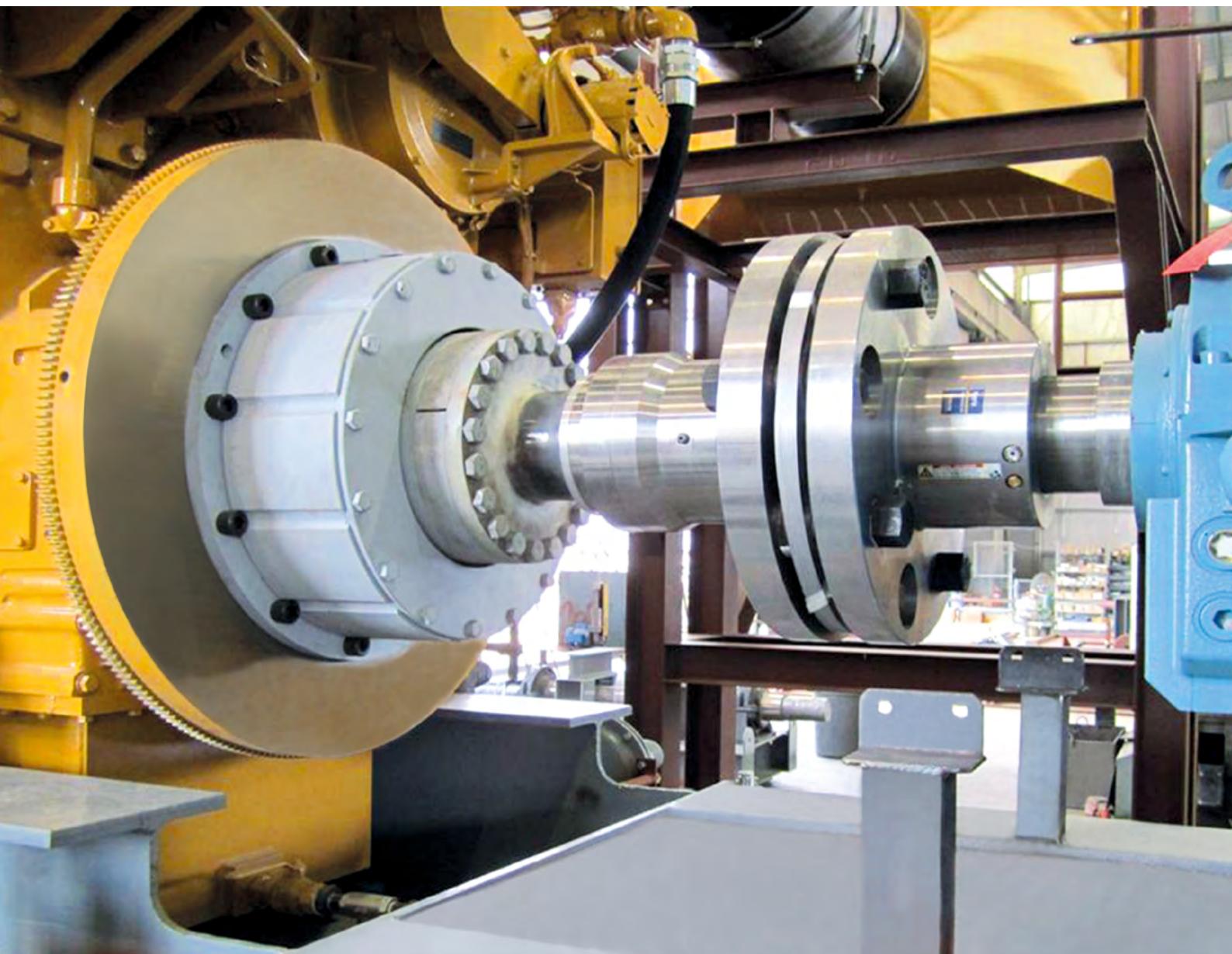


Control torsional vibrations Highly flexible couplings





Your reliable connection

Providing dependable, highly reliable solutions with a low Total Cost of Ownership (TCO), is what we do best! Manufacturers and operators have high expectations and we assist them in meeting these, ensuring their vehicles and systems are operating optimally.

Extending the lifetime and availability of all connected drive components helps ensure continued and profitable operation, regardless of the application.

Our expertise is based on accumulated knowledge and research spanning over more than 40 years, this peace of mind can't be bought.

Our portfolio includes:

- Torsional vibration simulation of the driveline.
 - Customized highly flexible couplings.
 - Load measurement of the driveline that is subject to torsional vibration.
 - 24/7 assistance and service.
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Power from serenity

In systems where a diesel engine acts as a prime mover, the highly flexible coupling has two primary functions: Shifting the natural frequency and damping any occurring vibration peaks. This prevents damage to the driveline and substantially reduces unplanned downtimes.

The individual components of a driveline are made of elastic materials (e.g. steel) and have a mass. Accordingly, they represent a system susceptible to torsional vibration. If this system is excited, for example, by a running internal combustion engine, then vibrations result. If these vibrations are not damped, the driveline is subjected to permanent stress. The result is usually fracturing of the drive shaft and, in the worst cases, damage to the engine and transmission. This leads to repair costs and downtimes.

Highly flexible couplings dampen the critical torsional vibration amplitudes and shock loads that are created in a diesel engine driveline. At the same time, they shift the resonance frequencies below idle speed. As a result, the availability and lifetime of all connected drive components is increased. Improvements in operational strength and the unit's lifetime is often achieved, only after a highly flexible coupling has been installed in the driveline.

Customer benefits

- + Increased availability of all driveline components due to damping of torsional vibrations and shock loads in the driveline.
- + Decreased life cycle costs due to increased lifetime of all driveline components.
- + Increased comfort due to less vibration and noise.

Versatile and reliable

Regardless of the size and the special requirements, we deliver the right solution.

Typical applications:

- Rail vehicles: Railcars, locomotives and special purpose vehicles.
 - Construction vehicles: Wheel loaders, dump trucks and mobile cranes.
 - Test rigs: Research and development test rigs and end-of-line test rigs.
 - Heavy industry: Shredders, rolling mills and roller conveyors.
 - Power generation: Generators, fans and pumps.
 - Oil & gas industry: Pumps and compressors.
 - Other drives subject to torsional vibrations.
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The picture shows a K coupling with a diameter of 1.5 m and a weight of 3.5 metric tons. It has been installed in a shredder system in Russia and is designed for a maximum torque of 400 kNm.



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- 1 Compressor systems in the USA
 - 2 Roller conveyor drive in a steel plant
 - 3 Diesel-hydraulic inspection vehicle for overhead contact lines in China
 - 4 Wheel loader for global use
 - 5 Russian shredder system
 - 6 Generator system

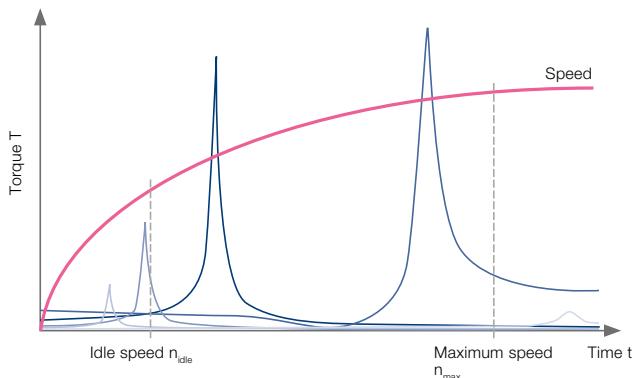


Research and development

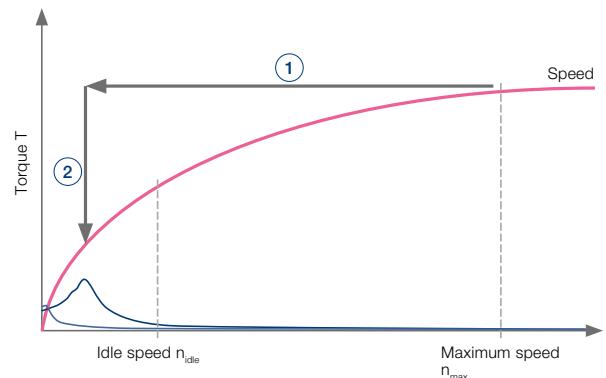
Providing you with ideas, not just products. Benefit from our long-established expertise in managing driveline projects and eliminate high life-cycle costs (LCC) in your vehicle or plant, with a highly flexible coupling.

Our torsional vibration analysis permits the loads occurring in a driveline caused from torsional vibration and resonances to be assessed. Alternating torques, power losses, angular accelerations etc. are taken into account and their influence on the lifetime of the drive components is assessed.

TVC without highly flexible coupling



TVC with highly flexible coupling



Above: The critical resonance frequencies are in the operating speed range. When components are subjected to these loads on a continuous basis, damage is inevitable.

1 Shift the natural frequency of the vibrating driveline into an uncritical range.

2 Sufficiently damp any occurring vibration amplitudes.

By using the highly flexible coupling, the vibrations are reduced significantly. This long term solution eliminates high stress loads from the driveline.



Providing a professional assessment based on vibrational test results, your highly flexible coupling is tailor-made for your application.

Torsional vibration measurement (TVM)

Torsional vibration measurement records the loads occurring in a drive system, which in turn enables us to forecast the longevity of the drive components and provide valuable recommendation and solutions.

Fatigue analysis (FA)

In many sectors, fatigue analysis has become an established part within the development process. Lifecycle costs (LCC) are optimized and preventative maintenance measures can be planned for in advance.

During the prototype phase, the torsional vibration data obtained provides the foundation for fatigue analysis. This enables us to provide an expected lifetime for the wearing and fatigue parts, including elastomers.

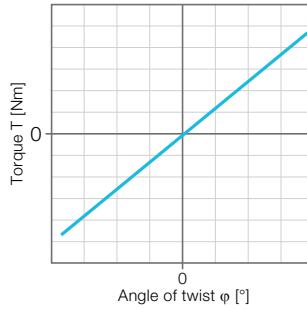
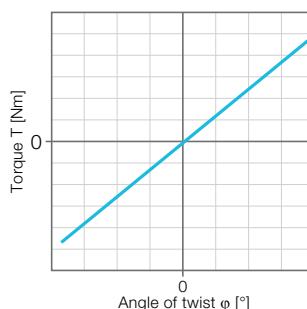
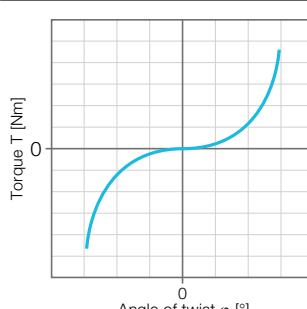
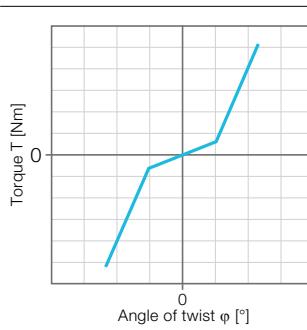
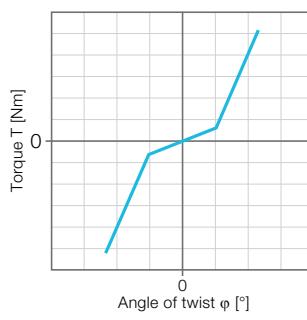
Certification

At Voith, our top priority is to ensure the affordability, reliability, environmental compatibility and safety of our products and services. In order to maintain these principles in the future just as we do today, Voith Turbo has a firmly established integrated management system for quality, the environment, and occupational health and safety.

For our customers, this means that they are purchasing high-quality capital goods that are manufactured and can be used in safe surroundings and with minimal environmental impact.

The right solution for every application

Coupling types	Features	Advantages and benefits
K Coupling	<ul style="list-style-type: none"> Modular design Shifts resonance speeds into non-critical speed ranges Damping of torsional vibration peaks High torque capacity 	<ul style="list-style-type: none"> Flexible and simple integration into the driveline → Customized and cost-effective solution Damping vibrations and noises → Smooth running with increased comfort The operational stability is increased → Productivity and availability improvement The load on the drive and the entire driveline is reduced → System or vehicle lifetime is increased and life cycle costing (LCC) is reduced High torque capacity → High torques are transmitted safely and reliably, even when installation is limited
D Coupling	<ul style="list-style-type: none"> Specially developed for 1–3 cylinder engines High torsional flexibility Misalignment capacity between the engine and the driven machine using a spherical joint Modular design 	<ul style="list-style-type: none"> Reproduce test cycles more precisely and achieve precise test results High-speed engines can usually be tested at their maximum speed Flexible and simple integration into the driveline → Customized and cost-effective solution The load on the drive and all connected components is reduced → The lifetime and availability of your test rig is increased and life cycle costing (LCC) is reduced
CT Coupling	<ul style="list-style-type: none"> Fail-safe design Very low maintenance, does not require lubricants, very easy to exchange the elastomer elements Shifts resonance speeds into non-critical speed ranges 	<ul style="list-style-type: none"> No sudden downtimes → Plant availability increases Downtimes are reduced and the associated costs avoided → Lower maintenance and repair costs optimize your life cycle costing (LCC) Damping vibrations and noises → Smooth running with improved comfort The load on the drive and the entire driveline is reduced → The lifetimes of your system or your vehicle are increased and life cycle costing (LCC) is reduced
H Coupling	<ul style="list-style-type: none"> Shifts resonance speeds into non-critical speed ranges Compression springs made of steel generate high damping values and operate virtually wear-free Optimum damping behaviour across the entire nominal speed range because the damping effect increases proportionally to the coupling's angle of twist Completely maintenance-free and resistant to all types of contamination 	<ul style="list-style-type: none"> Designed especially for “bell-house” applications → Dirt and temperature has no effect on the damping behavior of the coupling Damping of vibrations and noises → Smoother running and increased comfort The load on the drive and the entire driveline is reduced → The lifetime and availability of your vehicle are increased and the life cycle costing (LCC) are reduced Very high durability → Ensuring service and repair costs stay low
HP Coupling	<ul style="list-style-type: none"> Specially designed for internal combustion test engines where a dummy gear box is flange-mounted to the engine Fine tuning is undertaken according to the driveline's requirements A viscous-hydraulic damping and isolation function ensures optimal coupling damping behavior across the entire nominal speed range 	<ul style="list-style-type: none"> Special temperature resistant PEEK material increases the spring assemblies' wear resistance → This provides realistic engine testing, up to 8 500 rpm The internal steel springs are available in 16 different stiffness values → The coupling can be fine tuned to the application's requirements A damping ring absorbs and isolates vibrations within the defined backlash range → This minimizes test rig power loss resulting in precise test results

Areas of application	Technical data	Damping media and stiffness characteristics
<ul style="list-style-type: none"> Rail vehicles: Locomotives, electric railcars and special vehicles Construction equipment of all types, e. g., wheel loaders, dump trucks and graders Gensets Test rigs of all types such as engine development test rigs and end-of-line test rigs 	<ul style="list-style-type: none"> Nominal torque: Up to 140 000 Nm Speed: Up to 13 000 rpm 	 <p>Linear stiffness characteristic of a rubber element coupling stressed to shearing</p>
<ul style="list-style-type: none"> Test rigs: Engine test rigs with low excitation orders 	<ul style="list-style-type: none"> Nominal torque: Up to 780 Nm Speed: Up to 10 000 rpm 	 <p>Linear stiffness characteristic of a rubber element coupling stressed to shearing</p>
<ul style="list-style-type: none"> Steel industry: Roller conveyor drives Recycling: Primary drives for crushers and shredders Unit construction: High-performance generators and pump systems Oil and gas industry: Compressors Mechanical engineering: Crane drives, drill drives and paper making applications 	<ul style="list-style-type: none"> Nominal torque: Up to 200 000 Nm Speed: Up to 7 200 rpm 	 <p>Progressive stiffness characteristic of a rubber element coupling stressed with pressure</p>
<ul style="list-style-type: none"> Construction equipment of all types, e. g., wheel loaders, dump trucks and graders 	<ul style="list-style-type: none"> Nominal torque: Up to 3 700 Nm Speed: Up to 3 200 rpm 	 <p>Two-stage stiffness characteristic of a steel spring coupling stressed with pressure</p>
<ul style="list-style-type: none"> Engine test rigs where a dummy gear box is flange-mounted to a combustion engine 	<ul style="list-style-type: none"> Max. torque: Up to 1 600 Nm Max. speed: Up to 8 500 rpm Max. temperature: Up to 150°C 	 <p>Two-stage stiffness characteristic of a steel spring coupling stressed with pressure</p>



Exceeding service expectations All the time – Anywhere

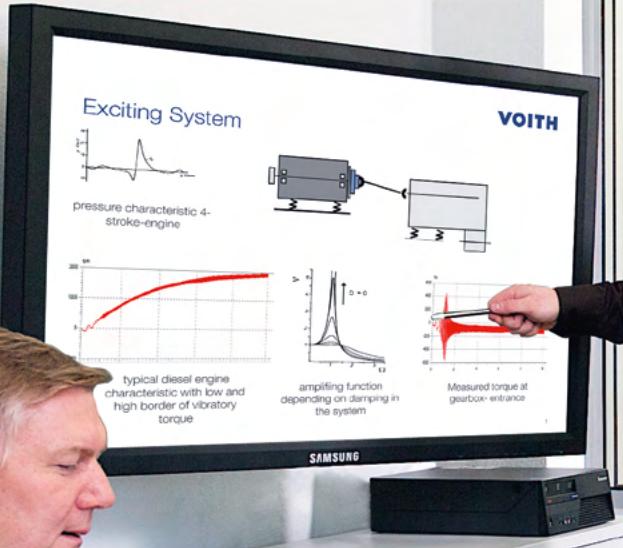
In addition to a quality product, our technical experts provide service beyond the normal scope.

What sets us apart from the competition:

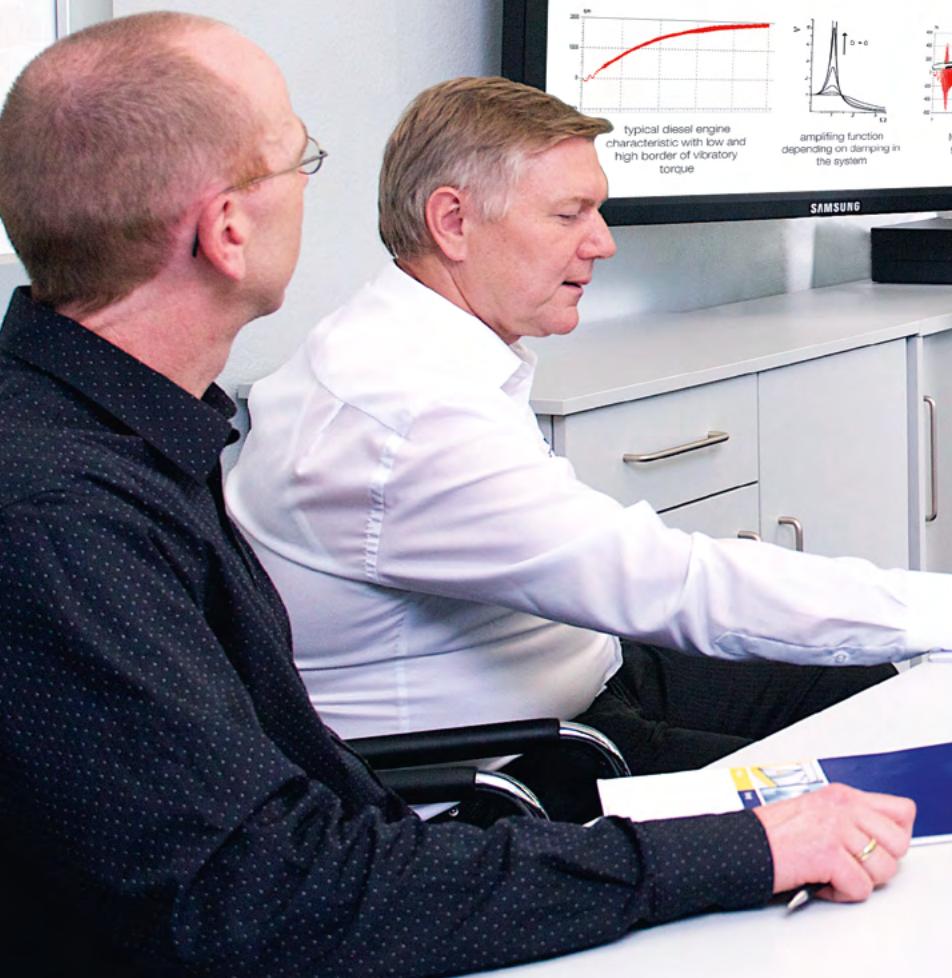
- Engineering analysis is offered in regards to torsional vibrations or failures, like root-cause analysis (RCA).
- Quick repairs are offered to customers that have a single or a few Voith units installed.
- A fast spare unit supply concept is possible for larger fleet customers.

Additionally we offer:

- Onsite installation and commissioning
- Training theoretical and practical
- Genuine Voith Spare parts



SAMSUNG



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VOITH
Inspiring Technology
for Generations