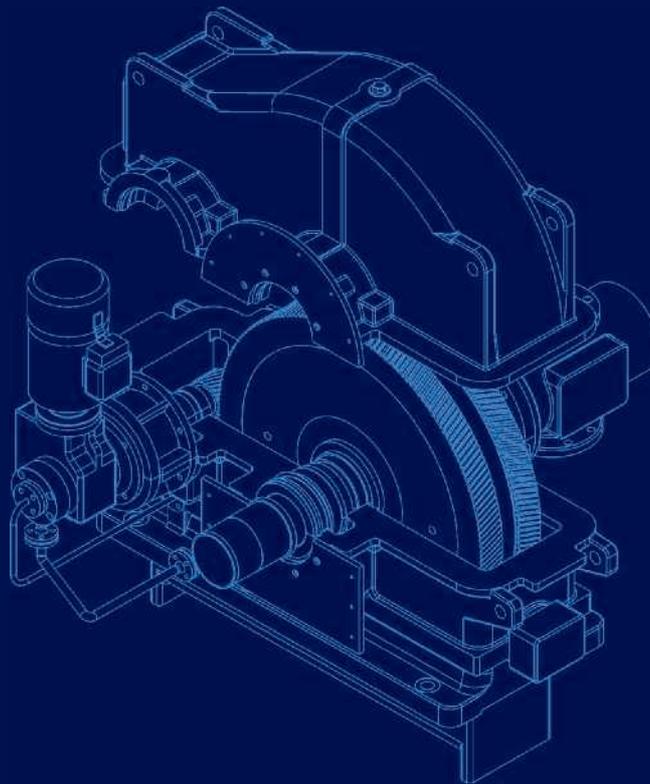




Innovative Power Transmission



HIGH SPEED GEARBOXES

Innovative Gear in Power Plants Systems

First-Class Gearboxes

1 General

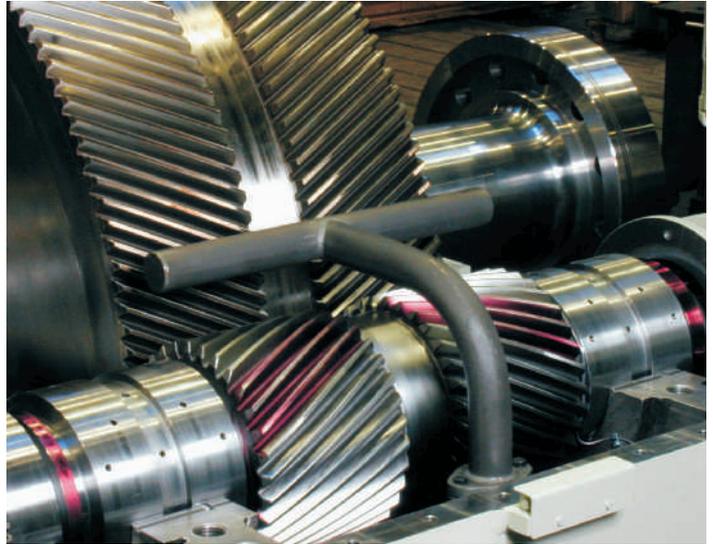
For many decades, RENK has been a leading manufacturer of highspeed gearboxes and enjoys an excellent reputation with their series TS, TB, TL, TNA and TNB. Supported by up-to-date CAD-systems and computer-controlled production, products of superior quality are built and delivered worldwide.

2 Gearboxes

Depending on the specification, the gearboxes are built according to DIN 3990, AGMA 421.06 or API 613 standard. In order to achieve optimum efficiency and excellent running characteristics regarding vibration and noise, the gear teeth, bearings, natural frequencies and rotor dynamics are calculated according to the latest state of the art.

3 Type Designation

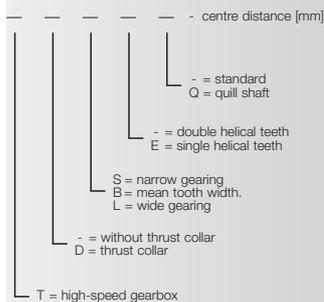
Construction series and centre distances are identified by the gearbox designation. The overview shown below explains the meaning of the alphanumeric designation. The numerical part refers to the centre distance. TNA and TL types are gear units with wide gear teeth which allow to realize low transmission ratios. TNB and TS have narrow gear teeth for high transmission ratios. For centre distances up to 400 mm, the gear casings are manufactured with high-quality cast iron; Casings with welded steel construction are used for centre distances up to 450 mm.



| Gearbox | Transmission ratio i | | |
|---------|------------------------|----|----------|
| | i low | | i high |
| Series | TNA | | TNB |
| Series | TL | TB | TS |

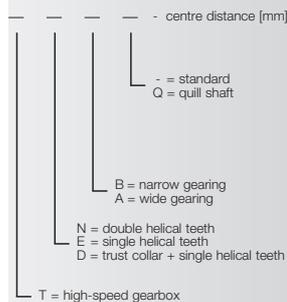
The following type code indicates the designations of the standard gearbox series:

Type Code
TS, TB, TL gearboxes



| | written: |
|-----------------|-----------|
| T D S E Q - 560 | TDSEQ-560 |
| T B - 900 | TB-900 |
| T S E - 630 | TSE-630 |

Type Code
TNA, TNB gearboxes



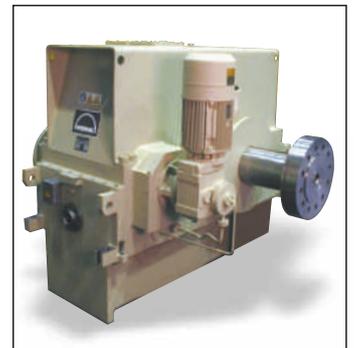
| | written: |
|-------------|----------|
| T D A - 355 | TDA-355 |
| T N A - 315 | TNA-315 |
| T E B - 400 | TEB-400 |



TNA-355 - Casing made from high-quality grey cast iron

Example 1:
(T) High-speed gearbox,
(L) low transmission ratio,
(E) single helical teeth with
(Q) quill shaft, centre distance
850 mm => designation:
TLEQ-850

Example 2:
(T) High-speed gearbox,
(S) high transmission ratio,
centre distance 710 mm
=> designation: TS-710



TB-900 - Steel casing - welded

Example 3:
(T) High-speed gearbox,
(D) thrust collar,
(B) mean transmission ratio,
(E) single helical teeth,
centre distance 800 mm
=> designation: TDBE-800

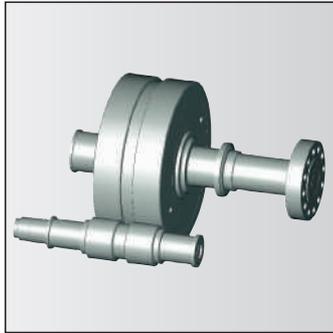
Gearbox Elements

4.1 Gear Set

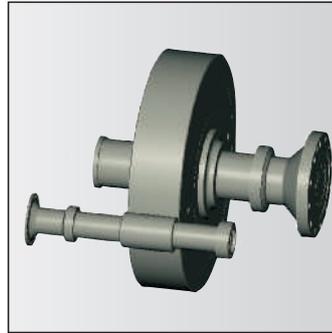
Different gear sets characterize the gearbox series.

Following design options are possible:

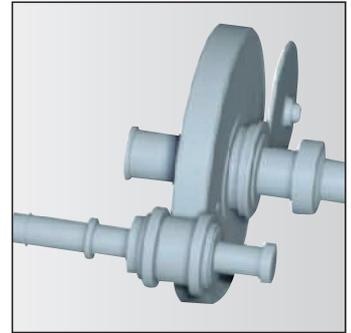
- single helical teeth
- single helical teeth with thrust collar
- double helical teeth



Double helical teeth

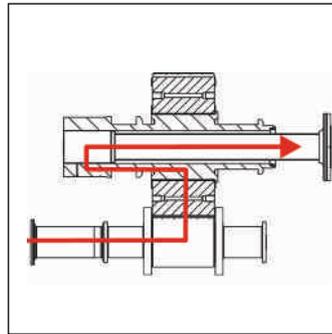
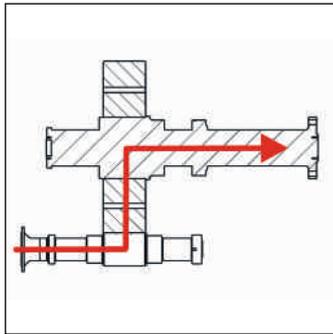
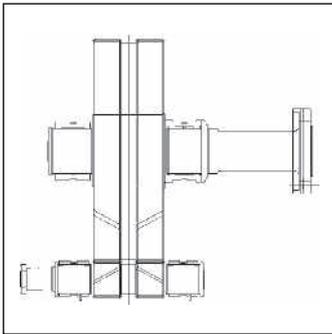


Single helical teeth



Single helical teeth with thrust collar

The gear shaft is built in two different ways:

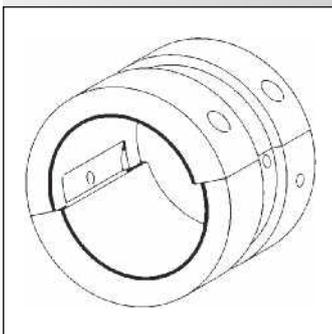


The quill shaft design takes advantage of the higher resilience of a long shaft, whereby the power flow is directed into the output shaft that is located opposite to the driven machine.

4.2 Bearings

Split journal bearings are used for the standard design, and one bearing of the gear shaft is equipped with axial stop collars. If higher speeds are involved, radial tilting pad bearings are mounted. The use of separate axial thrust bearings according to API 613 is also possible.

Journal bearing with offset profile



4.3 Seals

The gearboxes require pressure oil lubrication. The oil may optionally be supplied by a separate or a flange-mounted oil pump. The gearbox can also be connected to a central lubrication system. The shaft ends of the gearboxes are sealed by means of a split, noncontact labyrinth seal made from aluminium. Upon request, special seals are also available.

5 Power loss and efficiency

With view to power loss and efficiency, RENK gearboxes are designed to the optimum possible. Decisive factors to achieve a high efficiency are the selection of the bearings and their dimensioning as well as the oil flow and type of teeth.

6 Noise and vibrations

Each gearbox is noise-optimized for nominal load. The dimensioning of the teeth, lubrication and casing is focused on low noise and quiet operation.

7 Instrumentation

The gearboxes can be supplied with a number of monitoring instruments, such as built-in resistance thermometers, thermocouples, vibration detectors, speed sensors, accelerometers, position detectors and oil pressure transmitters. These devices are also available in exproof or ATEX-design.

Quality Assurance



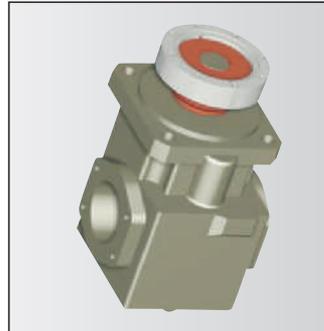
8 Accessories

The following accessories can be supplied:

- rotor turning devices
- gear oil pump
- screw-spindle pump



Rotor turning device



Gear oil pump



Screw spindle pump

9 Production and Assembly

The gearboxes obtain highest demands as the individual components are manufactured on Hi-Tech-equipment, and the gearbox assembly is carried out by highly qualified specialists. As far as quality assurance is concerned, our plant is certified according to DIN / ISO 9001 / EN 29001.



Assembly of a TB-950 gearbox

10 Trial run

Every gearbox is subjected to extensive inspections and tests during which efficiency, noise emission, vibration characteristics and proper function of the lubrication system are thoroughly checked. The results are recorded and documented.



TB-630 Test run

Service around the Product



Our service team can and will arrange and/or co-ordinate all necessary measures and ensures competent assistance with remedies without any loss of time. Our highly qualified team of experts will be supporting you

once the ordered gearbox or coupling has left our factory. The Service Team can be contacted at any time to assist you with any questions or problems you have.

In addition, our after-sales service department is flanked by a group of experienced field engineers. We provide constant support to these team members to ensure that complex queries are solved fast and accurately.



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We maintain the most advanced test and inspection facilities:

- 3D gear teeth measurement
- 3D coordinate measurement machine
- crack testing, surface testing and ultrasonic testing
- endoscope for inspecting the inside

Upon completion of the analysis, you will receive an examination report including suggestions and recommendations as how to proceed.



3D measurement machine



Gearing measurement



Inspection of a high-speed gearbox

Further products of our range of couplings



1 Curved tooth coupling with hardened and ground external and internal teeth and tooth-by-tooth injection lubrication

2 High-speed diaphragm coupling
Type MCN

3 Raflex® steel disk coupling
Type MTP according to API 610



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