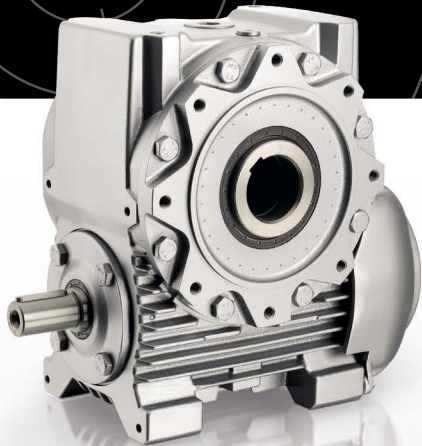


Worm gears Worm wheel sets

Unique levels of efficiency,
torque and lifetime

CAVEX[®]

German Drive Technology



www.CAVEX-GmbH.com

7 Winning Arguments:

Technology - Made in Germany

CAVEX

1 Our superior CAVEX® gearing

Our worm gearboxes are quite unlike any other. We have been proving this with our patented CAVEX® gearing system in almost all industrial sectors across the world for more than 60 years. Our unique gearing geometry is far superior to standard worm gear design.

The name CAVEX® says it all, composed from the Latin word concavus, the profile on the worm, and convexus, the profile on the worm wheel. Thanks to worm teeth with a concave flank profile (concave worm) paired with convex worm wheels, CAVEX® worm gearboxes are far superior to comparable worm gearboxes of equal size. This combination of the teeth ensures better osculation of the flanks and thus leads to a lower flank pressure (Hertzian stress) and a better build-up of the lubrication film. The result: A higher torque transmission and an increase in service life by 30% due to lower wear and tear compared to other worm gearing systems.

2 The right size for (almost) any application

CAVEX® gearboxes - industrial gearboxes based on a modular design:

- Single-stage basic gear for 18 different construction sizes with a centre distance of $a=63\text{mm}$ to $a=630\text{mm}$, in certain applications even up to $a=1400\text{mm}$
- Simple expansion of the basic gear with a helical pre-stage with transmissions from 2 to 5 or with a worm gear pre-stage with transmissions from 5 to 75 for a total transmission of up to approximately 5000. Adapting to the desired output torque is usually possible without a frequency converter

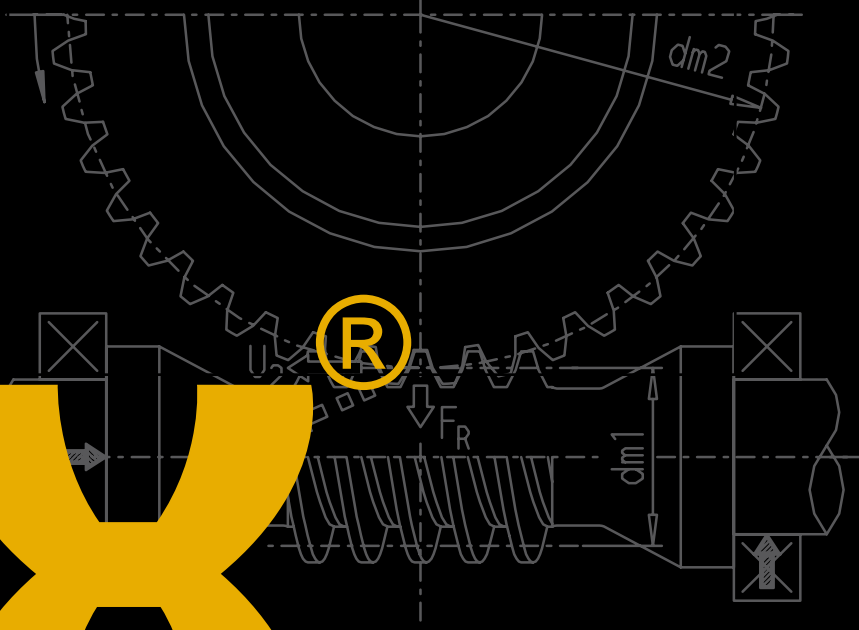
3 Highest range of transmissions

- Single-stage CAVEX® gear for standard transmissions from 5 to 75
- In addition, single-stage CAVEX® gearboxes with ratios over 100 are available on request
- Transmissions of up to 350 can be achieved with the addition of a helical or planetary pre-stage
- With two worm gear stages, a higher standard transmission of up to 5000, in certain customer applications of over 10,000, can be achieved

German Drive



CAVEX



e Technology

4 Gear efficiency of up to 97%

Energy efficiency plays an increasingly important part when deciding which gearbox to buy. Our CAVEX[®]-worm gearbox boasts efficiency rates of up to 97%. It can easily compete with any type of gearbox (e.g. bevel helical gears or planetary gears etc.). This defeats the argument that worm gearboxes have a low efficiency rate.

5 CAVEX[®] gear design for ultimate reliability

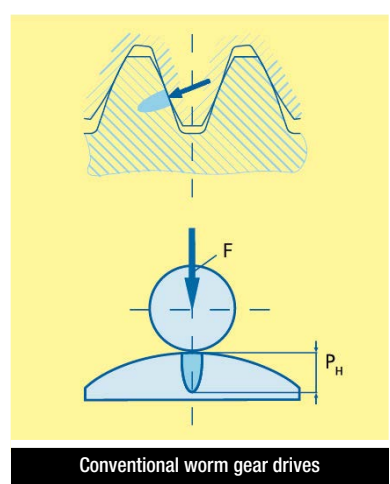
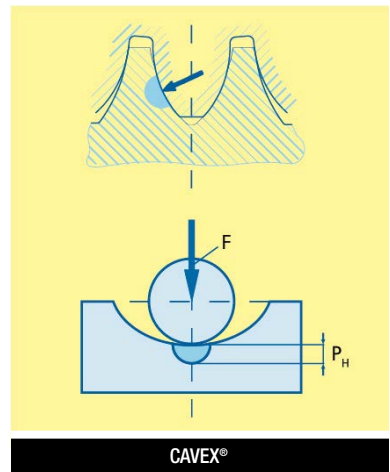
Over 65 years of experience in the development of worm gearboxes speak for itself. It is not unusual to find gearboxes that still work reliably after more than 30 years' service. Quality-made German products as good as ever!

6 Noisy gearboxes? No way!

- Our gearboxes are exceptionally quiet because of the CAVEX[®] gearing system with its optimised lubrication film build-up
- This is enhanced by the use of anti-vibration casing material such as grey cast iron
- Due to the high transmission rates in the various stages, fewer parts are needed. This leads to a reduction in the gear mesh which also reduces noise

7 Individual & industry-specific solutions

- Optional adaption of our standard gearboxes to the customer's exact specifications
- Industry-specific adaptation of our standard gearboxes
- Developing tailor-made gearboxes for individual applications



Conventional worm gear drives

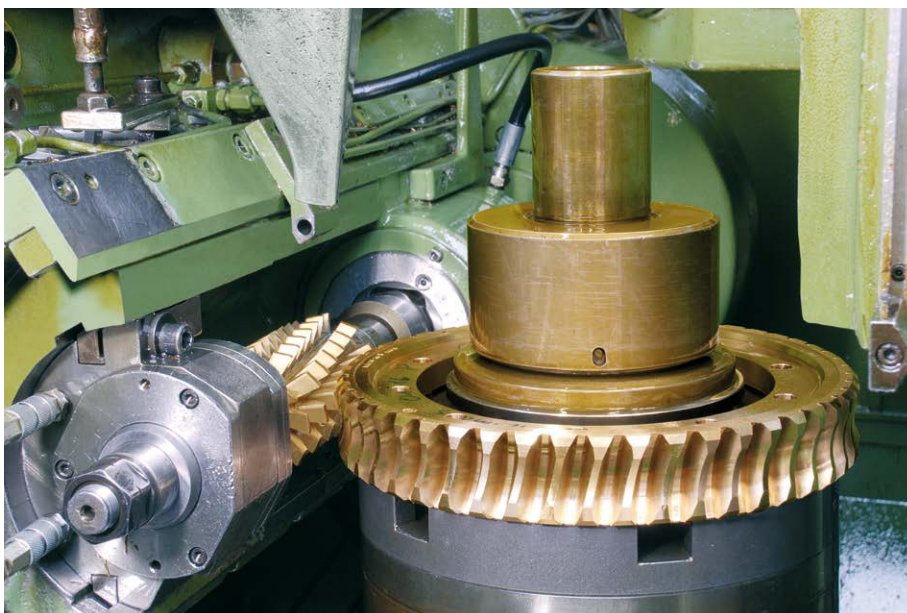
Worm gear production

Standard wheel sets or customer specific solutions

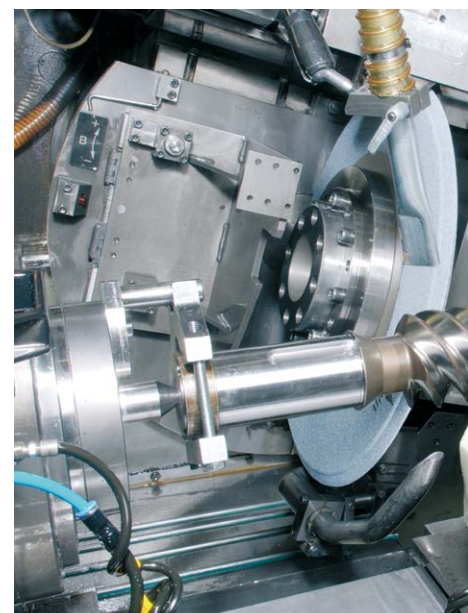
We produce worm wheel sets in versatile designs according to customer drawings. The CAVEX®- wheel set range has proven itself over decades. Due to their power density and the long lifetime CAVEX®- wheel sets are always number 1 among experienced constructors of sophisticated machines and units like

- Packaging machines
- Food machines
- Rolling mills (scissors, coilers, roller tables)
- Mixing units and agitators
- Ship construction

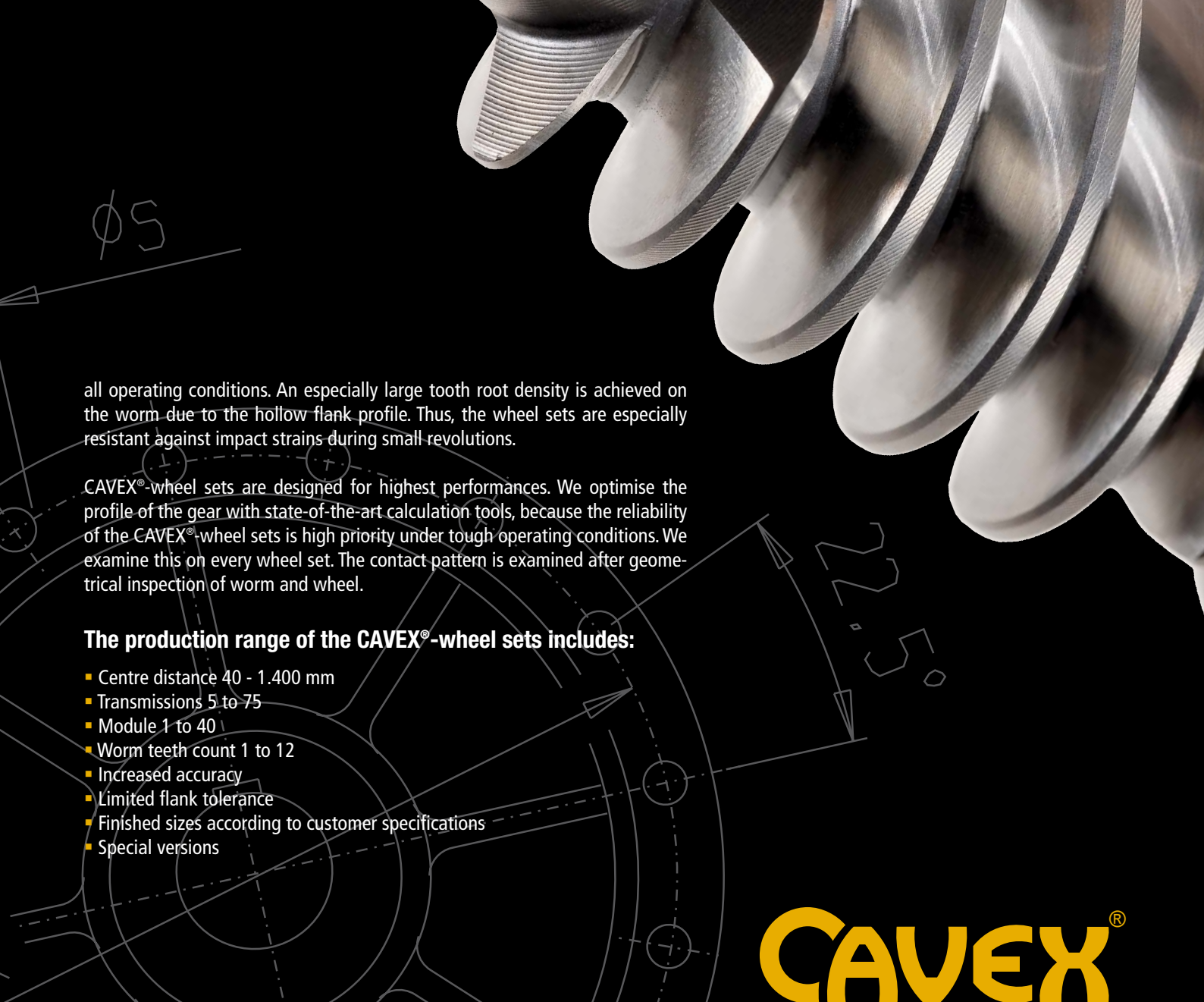
In case of machine tool with increased demands towards accuracy and rigidity the DUPLEX wheel set is usually the set of choice for many applications. In this wheel set the worm is designed with an adjustable incline, thus allowing an exact setting of the wheel set. This provides the ground for high precision production. The geometric profile of the CAVEX®-wheel set is decisive for the long standing time and the high load capacity of the wheel sets. Due to the hollow flank profile, the material characteristics of the high quality bronze of the wheel and the case hardened worm can be fully exploited because flank pressures are significantly reduced and the lubrication of the teeth is clearly improved under



Worm gear milling machines



Worm gear grinders



all operating conditions. An especially large tooth root density is achieved on the worm due to the hollow flank profile. Thus, the wheel sets are especially resistant against impact strains during small revolutions.

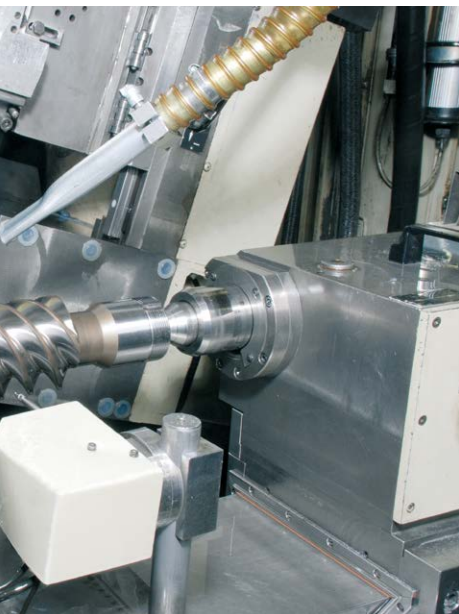
CAVEX®-wheel sets are designed for highest performances. We optimise the profile of the gear with state-of-the-art calculation tools, because the reliability of the CAVEX®-wheel sets is high priority under tough operating conditions. We examine this on every wheel set. The contact pattern is examined after geometrical inspection of worm and wheel.

The production range of the CAVEX®-wheel sets includes:

- Centre distance 40 - 1.400 mm
- Transmissions 5 to 75
- Module 1 to 40
- Worm teeth count 1 to 12
- Increased accuracy
- Limited flank tolerance
- Finished sizes according to customer specifications
- Special versions

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Worm gear inspection

CAVEX[®]industry

It is your choice: Individual or standard

Typical versions:

- Solid and hollow shaft on the output
- Drive or output shaft on both sides
- Output with reinforced bearing
- Hollow shaft with keyway or shrink disc
- Labyrinth-shaft sealing
- Casing in grey cast iron (GG-20) or spheroidal graphite iron (GGG-40)
- Worm wheel sets with increased accuracy (e.g. DUPLEX-teething)

Always the right solution

CAVEX[®]-worm gear units have been continually developed for more than 50 years. And one thing has been consistent over this time: your requirements. In addition to the standard CAVEX[®] range, which is always up-to-date and in close cooperation with customers and partners, a whole range of individual solutions has been created both for customer-specific applications as well as for individual sectors.

Full range

CAVEX[®] offers you the full range of CAVEX[®]-worm gear units in 18 sizes from 100 to 360.000 Nm. From single to multi level. In different standard variants, as branch specific solution or individually attuned to your needs.





CAVEX® - Worm gear units in detail:

Typical application examples	<ul style="list-style-type: none"> ▪ Steel industry ▪ Elevator drives ▪ Solar technology ▪ Mixers ▪ Escalators ▪ Paper industry
Versions of multi-level gears	Gear combination CAVEX® helical prestage module Gear combination CAVEX® as double worm gear unit
Torque	Up to 360.000 Nm
Number of gear sizes	Can be combined with prestages
Gear transmission single level	5 - 75
Gear transmission multi-level	20 - 5250

Solutions for:

- Packaging machines
- Food machines
- Steel mills (slitters, coilers, roller tables, presses & continuous casting)
- Mixing units and agitators
- Ship construction
- and many more

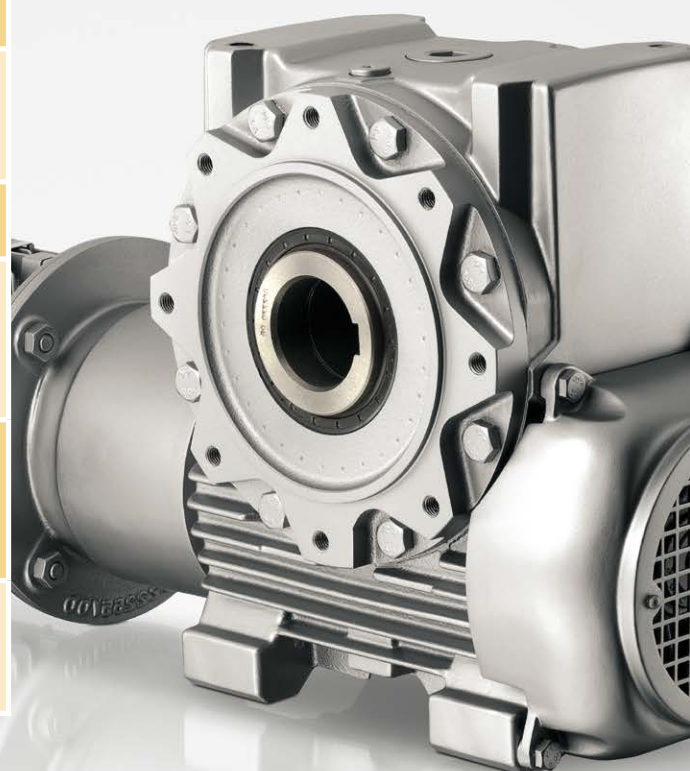
Further branches and solutions are listed in the table below.

CAVEX®

German Drive Technology

Tried and tested in many branches:

Branches	Examples	Advantages
People transport	<ul style="list-style-type: none"> ▪ Escalator drives ▪ Elevator drives 	<ul style="list-style-type: none"> ▪ High system attenuation ▪ Low noise generation ▪ High power density ▪ Special robust design
Mixers	<ul style="list-style-type: none"> ▪ Cement mixers ▪ Bitumen mixers 	<ul style="list-style-type: none"> ▪ Structure optimised for construction space ▪ Robust design ▪ High overload capacity
Conveying technology	<ul style="list-style-type: none"> ▪ Belt drives 	<ul style="list-style-type: none"> ▪ High transmissions ▪ High overload capacity
Rotation gears	<ul style="list-style-type: none"> ▪ Wastewater processing ▪ Ventilation gears ▪ Coffee roasters ▪ Drum filters ▪ Paper processing 	<ul style="list-style-type: none"> ▪ High reliability ▪ Overload capacity ▪ High transmissions
Steel industry	<ul style="list-style-type: none"> ▪ Actuators and part turn actuators ▪ Roller gear drives ▪ Slab drives ▪ Crank drives 	<ul style="list-style-type: none"> ▪ Special design for heavy-duty environment ▪ Maximum overload capacity ▪ High reliability
Solar technology	<ul style="list-style-type: none"> ▪ Rotary actuators 	<ul style="list-style-type: none"> ▪ High transmissions ▪ Overload capacity ▪ Positioning accuracy ▪ Automatic interlock



CAVEX[®]hygienic

Hygienic Design Gearbox

Industry solutions:

- Medical Engineering
- Chemical und Pharmaceutical
- Food industry

CAVEX[®]hygienic

A stainless steel gear range by CAVEX[®]

Deliberately sophisticated

A worm gear is not just a worm gear. CAVEX[®] has proven this again and again for more than 50 years.

CAVEX[®] HD unit implements all the requirements of a “hygienic design” and combines them with the **CAVEX[®] product properties** that provide a **high load capacity**, the possibility of **high ratios in space saving surroundings** and **low noise emission**. Worldwide CAVEX[®] now offers the first worm gearbox which has been exclusively developed **for the above mentioned industries**.

An optimal cleaning is ensured through the use of stainless steel and a gearbox casing design that is characterized by ‘rounded’ outer surfaces. Through its compact design, the integration of the gearbox in applications provides flexibility and space saving.

The applications are multiple: on one hand, CAVEX[®]HD replaces conventional gears that, up to now had to be sealed off from critical zones behind complex stainless steel covers, and on the other hand, surface coated gears will be replaceable, which in the past has always been a compromise. Furthermore, customers benefit from a worldwide availability and the comprehensive service network of CAVEX[®].



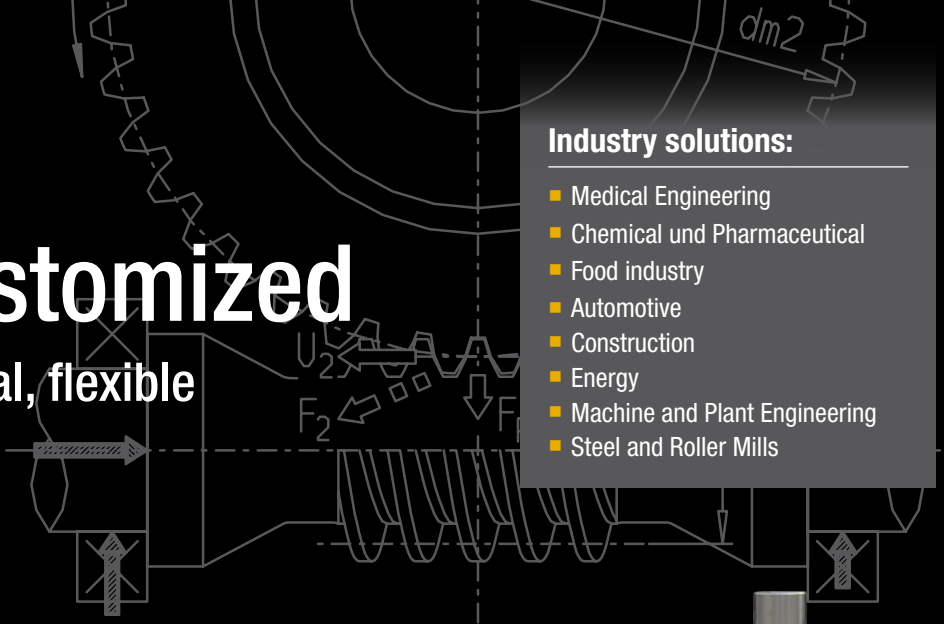
- **Developed for the food industry and chemical/ pharmaceutical applications**
- **Full stainless steel casing**
- **CAVEX[®] original gearing system**

CAVEX® customized

Optimized, individual, flexible

Industry solutions:

- Medical Engineering
- Chemical und Pharmaceutical
- Food industry
- Automotive
- Construction
- Energy
- Machine and Plant Engineering
- Steel and Roller Mills



CAVEX® customized

Individual and industry-specific solutions

Our product range with its variety of solutions for various industries covers most applications ideally. In addition we offer customer-specific special solutions, either by adapting existing gearboxes or by developing completely new models. Our experience and our state-of-the art R&D department enable us to complete every project in a very short cycle time.

Do get in touch with us!

Checklist individual gearbox:

Requirements		Example	Unit
Application	Food, pharmaceutical, ...		
Type of Gearbox	Worm, coaxial, helical		
Nominal power (installed electrical power)		[W]	
Nominal output torque		[Nm]	

- Cooperative realization
- Cost efficient development
- Original CAVEX® gearing with its well known high efficiency

We gladly accept your challenge!

Requirements for individual gearboxes		
Inquiry:	Author:	Date:
Customer:	Contact person:	Place:

Inquiry:	Author:	Date:
Customer:	Contact person:	Place:

Requirements	Example	Unit
Application	Food, pharmaceutical, ...	
Type of Gearbox	Worm, coaxial, helical	
Nominal power (installed electrical power)		[W]
Nominal output torque		[Nm]



CAVEX[®] replica

Replicas of older FLENDER
worm gearbox ranges

Industry solutions:

- Automotive
- Construction
- Energy
- Machine and Plant Engineering
- Steel and Roller Mills

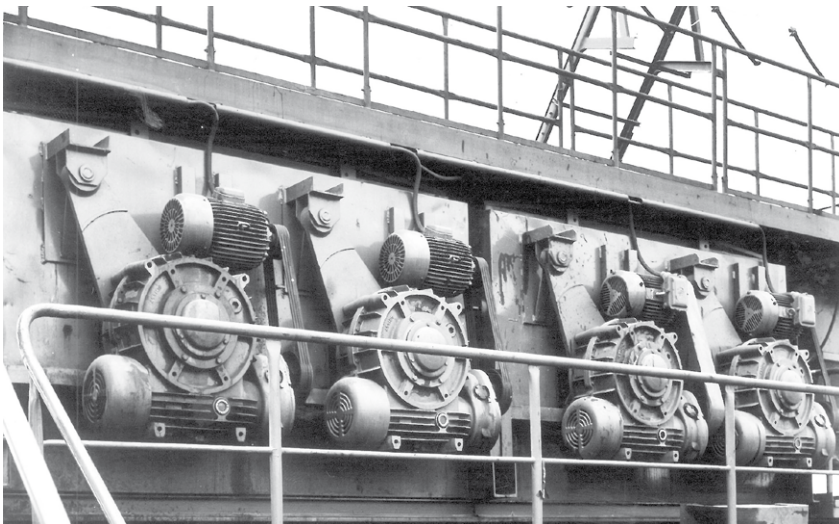
CAVEX[®] replica

Avoids redesign of existing machine configurations

CAVEX[®] worm gearboxes are renowned for their robustness and their durability in excess of 30 to 40 years.

We can offer you replicas of the old CAVEX[®] series produced by FLENDER or Siemens. This will save you engineering/design time for your current installation.

We look forward to hearing from you!



- **No change of machine design**
- **time efficient realization**
- **Original CAVEX[®] gearing with its well known high efficiency**

**We realize every replica
with the old serial number!**

CAVEX[®]-Service

Gearbox overhaul service with original parts and warranty

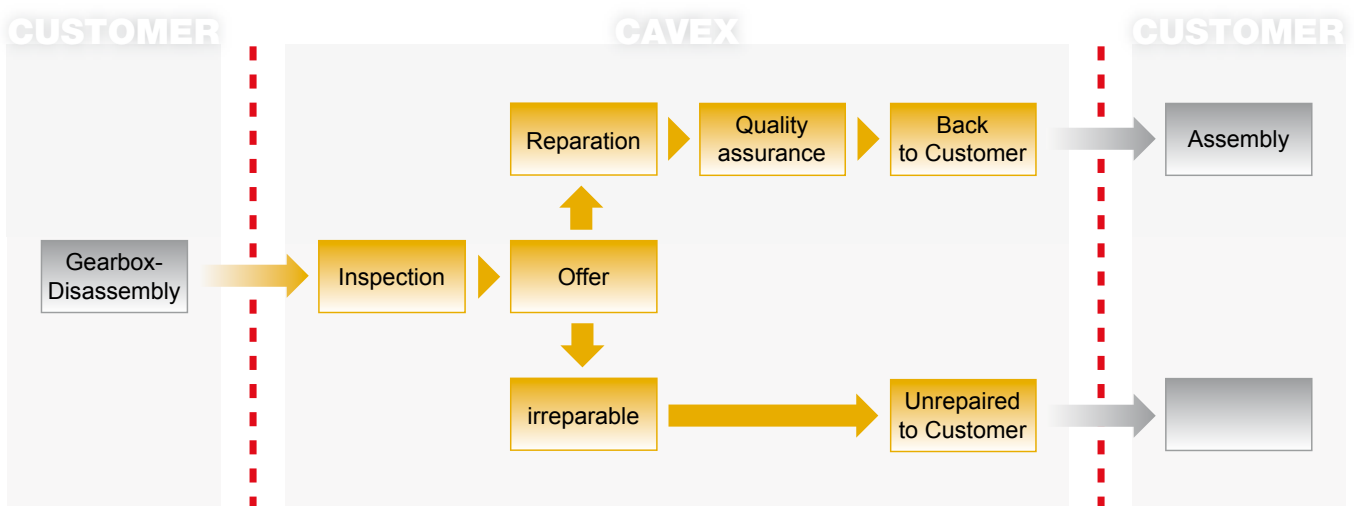


CAVEX[®] service

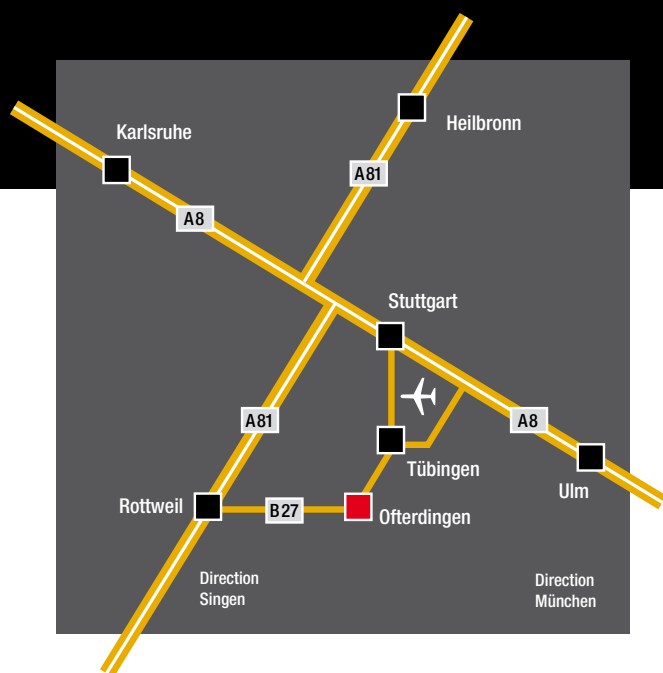
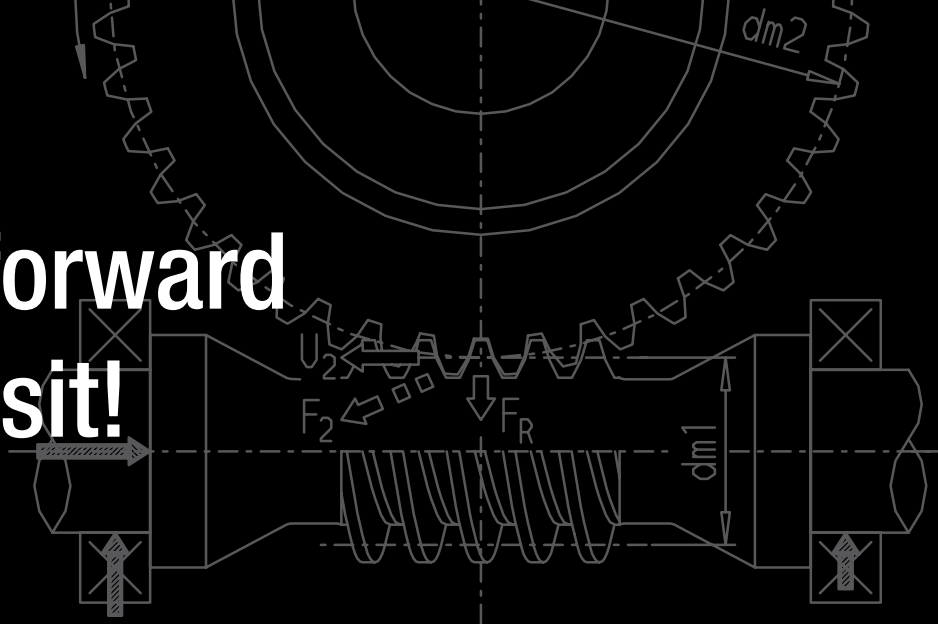
Guaranteed reliability

CAVEX[®] gearboxes perform reliably and almost maintenance-free for many years. If malfunction does occur, we are usually able to overhaul the gearbox. This saves you time and money. You can send us your gearbox stating the fault/defect. We will check it and give you a price for the repair. You then decide what to do. If you decide to go ahead, the repair work will be carried out in-house by our team of experts. After a quality check, your gearbox will be returned to you ready for reassembly. If a repair is not feasible, we will be pleased to offer you a replacement gearbox from our extensive product range.

Service process chart:



We look forward to your visit!



CAVEX®

German Drive Technology



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