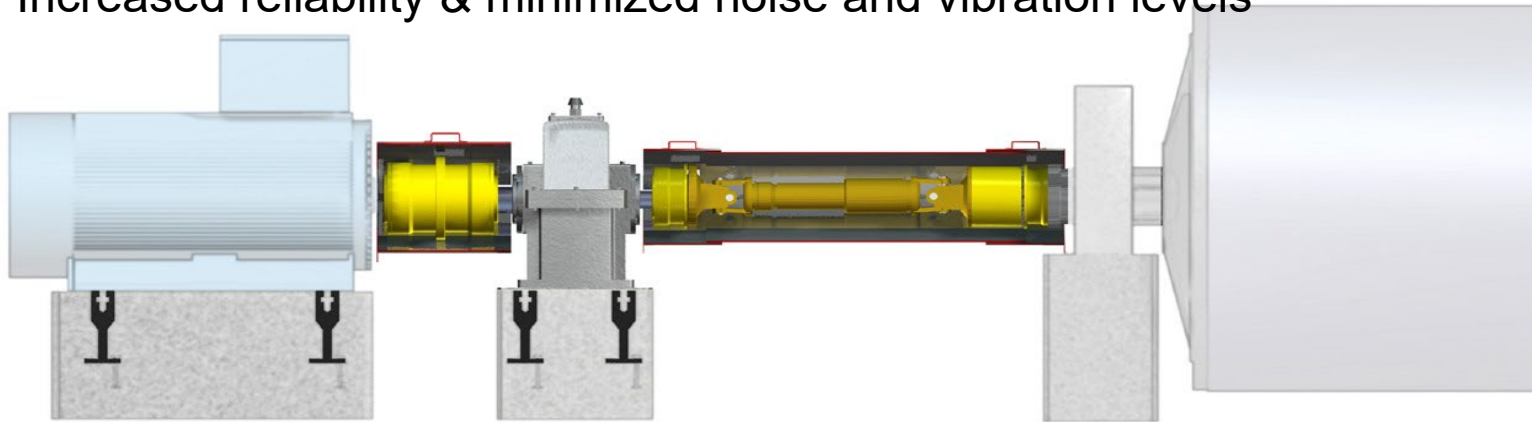


Santasalo paper machine drive products

moventas

Complete Mechanical Drive Package

- Scope of delivery includes gear units, couplings, guards and foundation accessories
- Layout engineering of the complete drive train, optimized components
- Dynamic review of the mechanical drive components
 - torsional and bending vibrations
 - power transmission capacity
- Increased reliability & minimized noise and vibration levels



Example: Complete drive package of a forming fabric turning roll

Required input information for quotation

- Power calculation: NRL, RDC, start power for each drive position
- Web speed for each machine section
- Roll diameters and the PM layout drawing
- Required electric motor speed
- Method of lubrication and cooling
- Foundation information (in case foundation accessories are in scope)
- Internal reduction ratios for each in-build/integrated reducers
- Customer requirement of service factors
- Movable/ stationary rolls

Layout design of PM drive

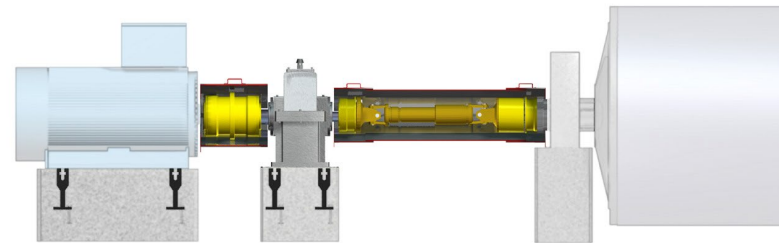
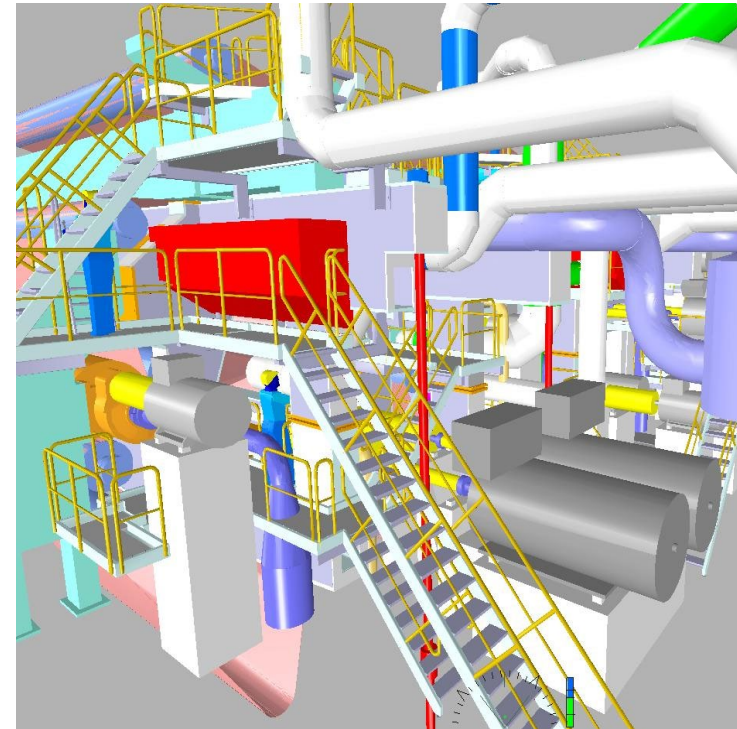
Project management: new machines and rebuilds

1. Location, installation and foundation drawings
2. Selection of transmission ratios of gear units
3. Dynamic reviews, e.g. strength and torsional vibration calculations
4. Customer specific documentation

Dimensioning and selection of components

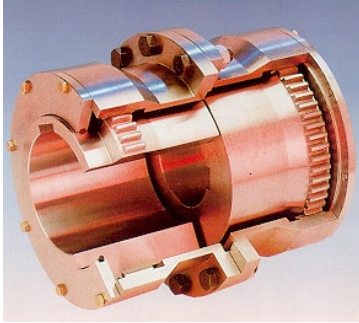
1. Gear units according to requirements of each drive point
2. Universal shafts
3. Couplings, e.g. gear and/or steel disc couplings
4. Jack shafts
5. Foundations, e.g. anchor studs, steel foundations and foundation bolts
6. Safety guards for couplings and shafts

3D modelling as per customer's needs

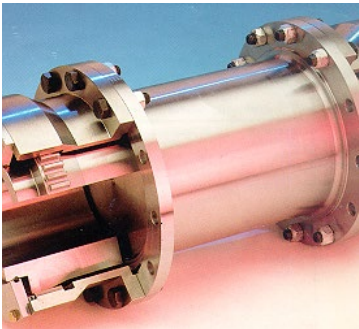


Paper Machinery Mechanical Drive

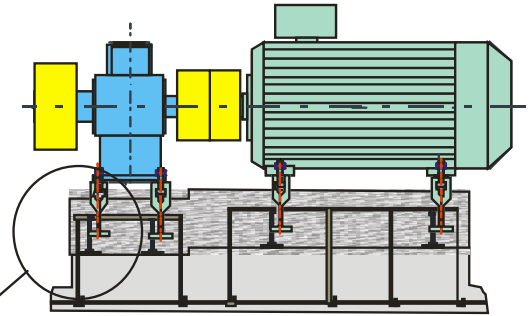
Other components



Gear coupling and guard



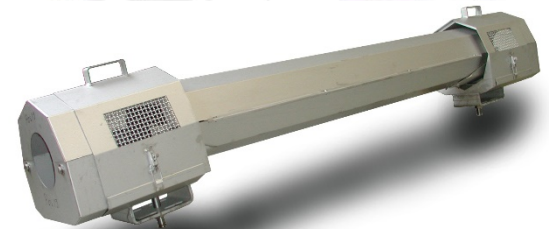
Extended gear coupling with spacer and safety guard



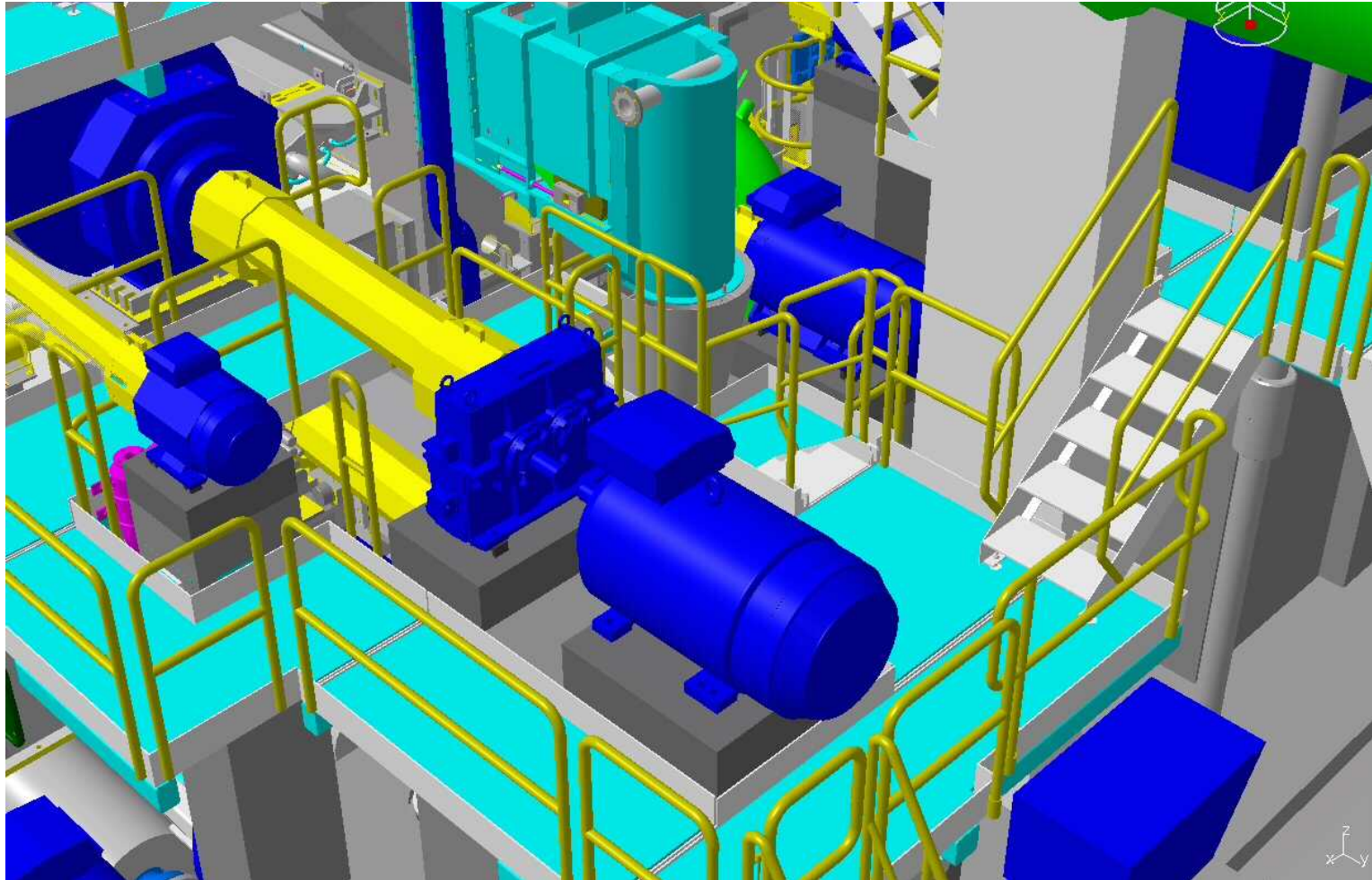
Foundation and installation with anchor studs



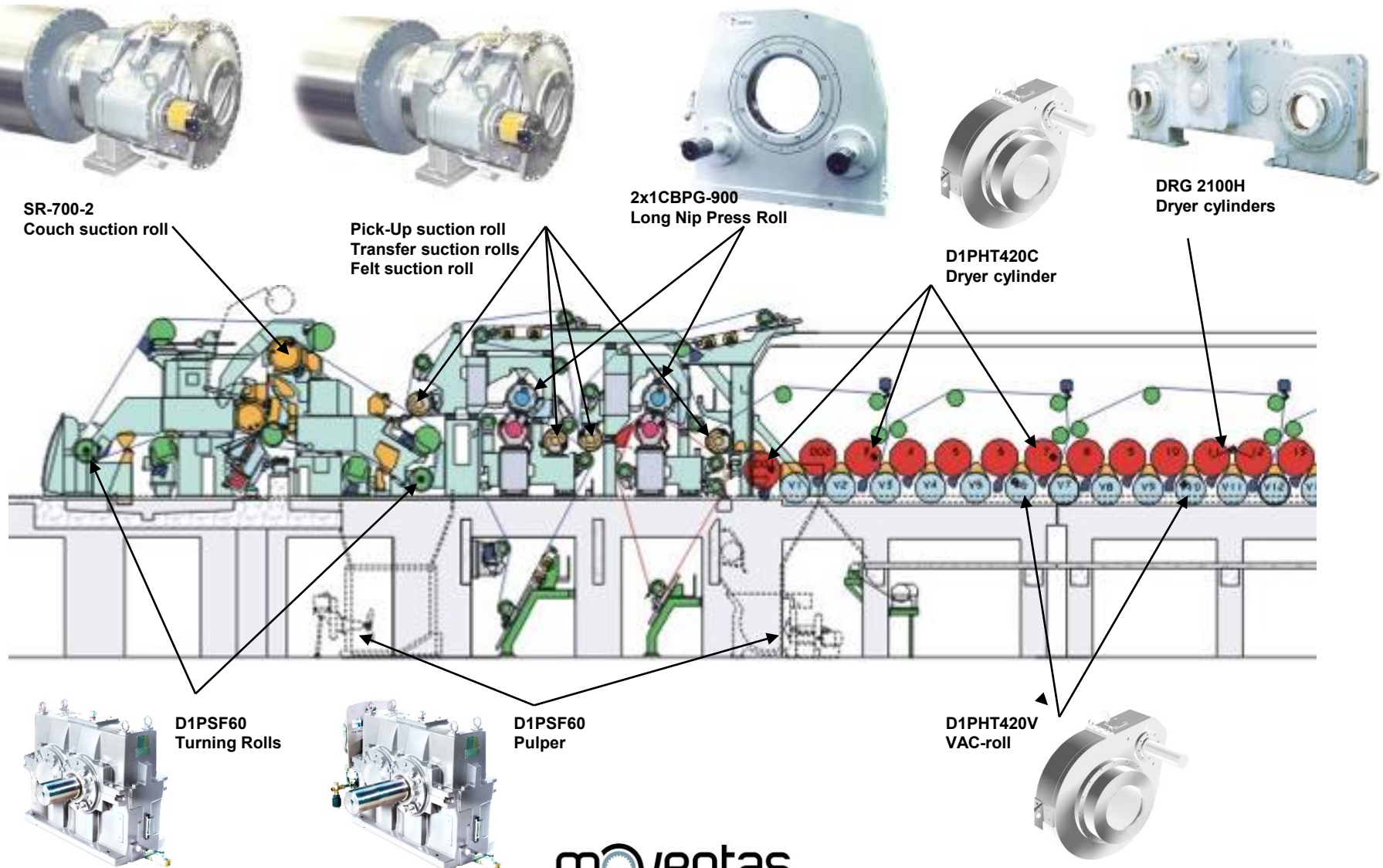
Universal shaft and guard



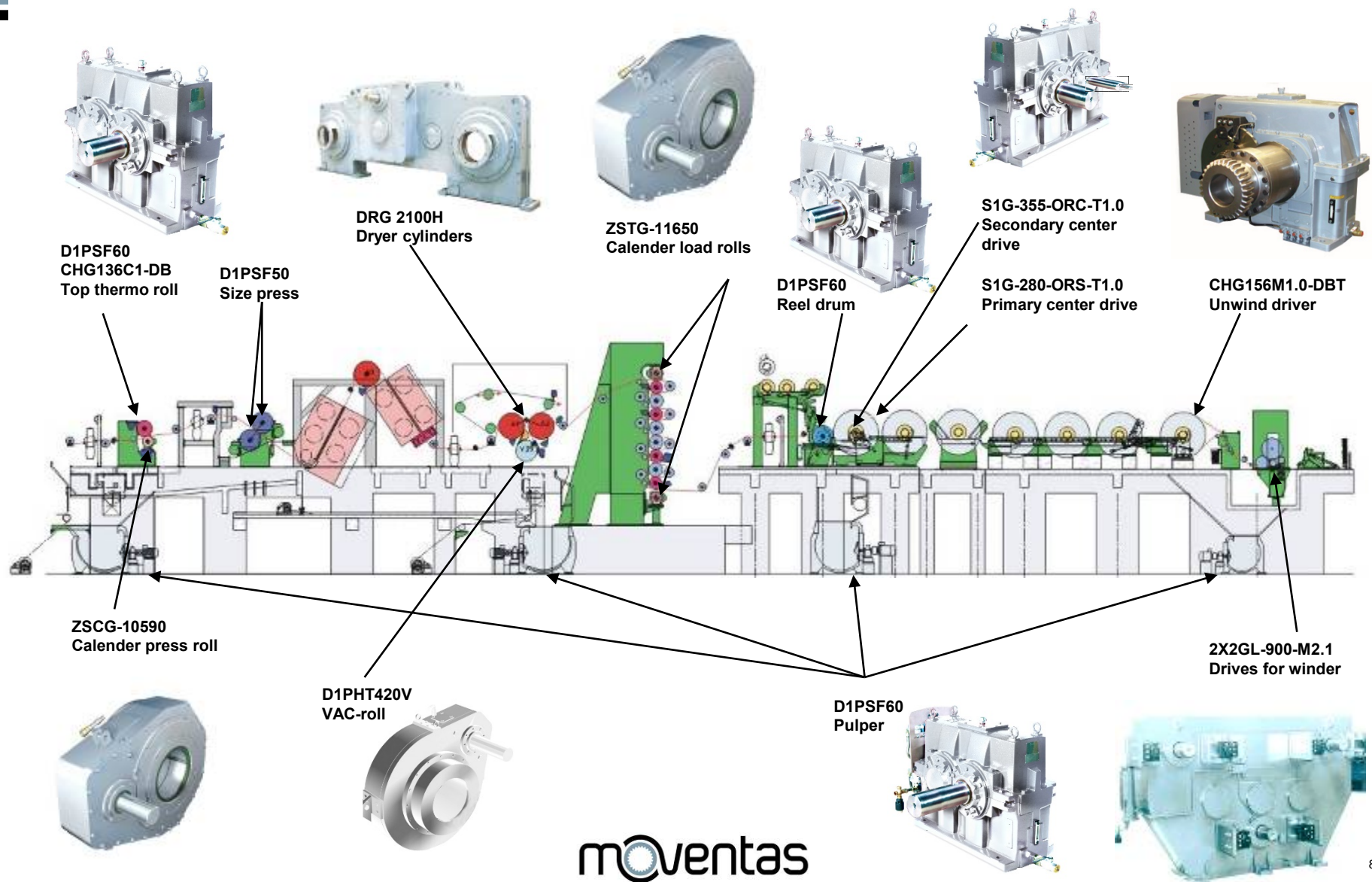
Paper Machinery Mechanical Drive and 3D modelling



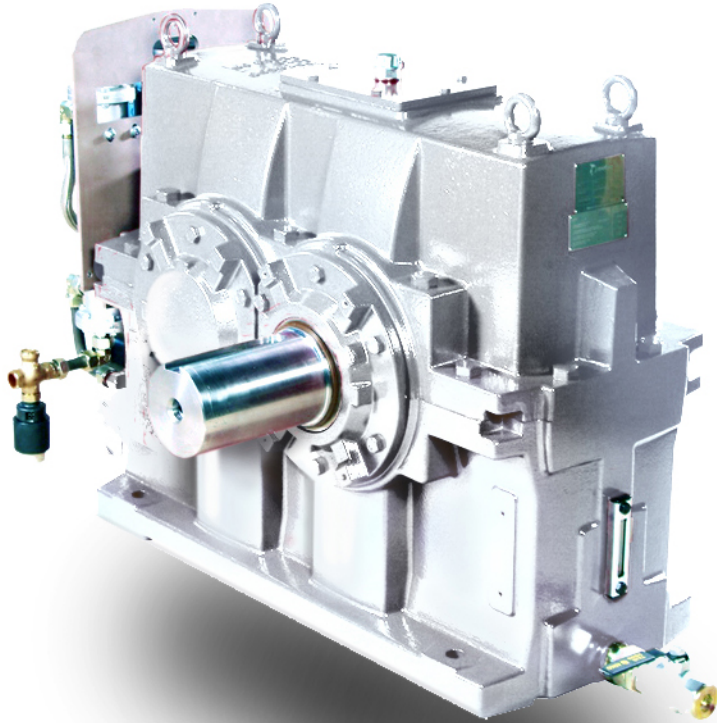
30 - 150 drive points in a paper machine...



...designed for the special needs



Floor mounted gear units



- Modular design and accessories
- Sizes 20 - 130 corresponding shaft distances 125 – 600mm
- Cast iron housing in sizes 20 - 100
- Reduction ratios 1.25 - 7.1
- Low noise & vibration levels
- Versatile lubrication and cooling arrangements
- Horizontal split plane for easier assembly and replacement of spare parts

Suction roll gear units

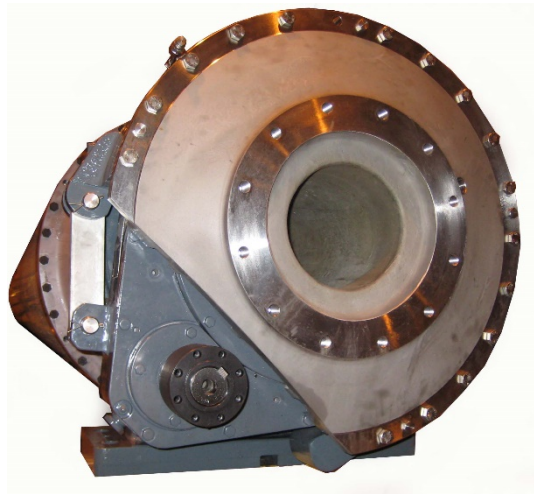
- Selected & designed acc.to roll dimensions



SR1G-650N



SR-650-1



TLA-66HS

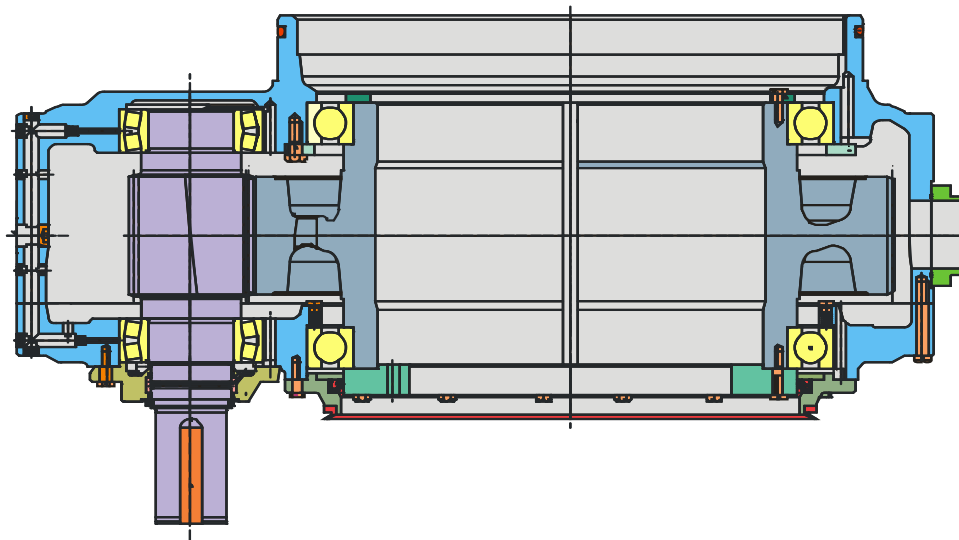
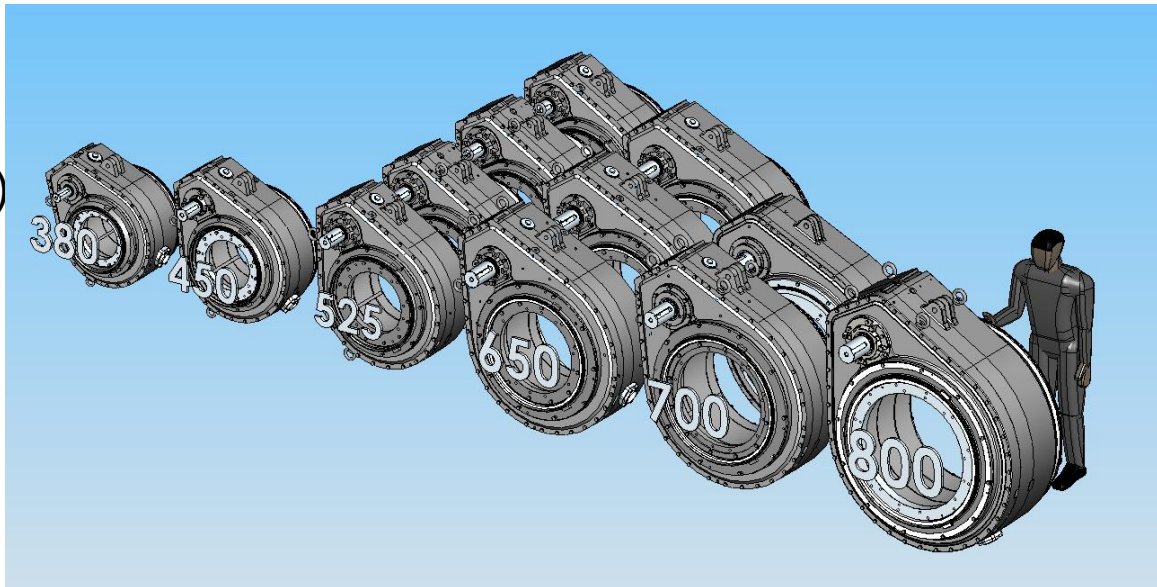


MSR1G-530

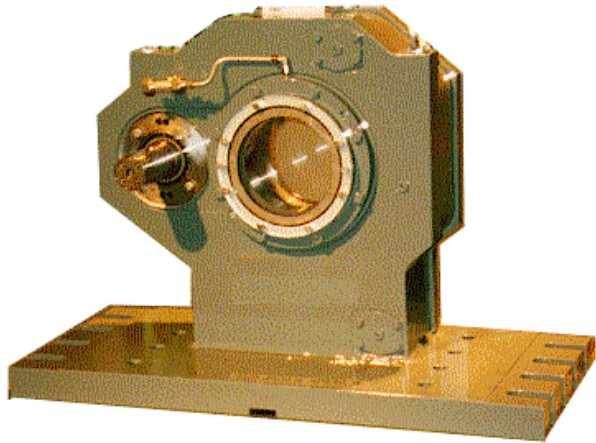
New SR-xxx Suction roll drive Series

Comprehensive range of unit
Sizes (for all roll bearing sizes)

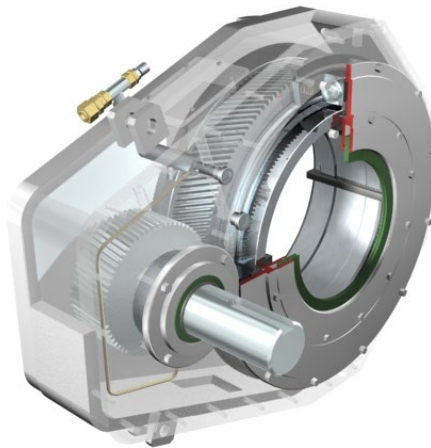
- SR-380
- SR-450
- SR-525-1
- SR-525-2
- SR-525-3
- SR-525-4
- SR-650-1
- SR-650-2
- SR-650-3
- SR-700-1
- SR-700-2
- SR-800-1



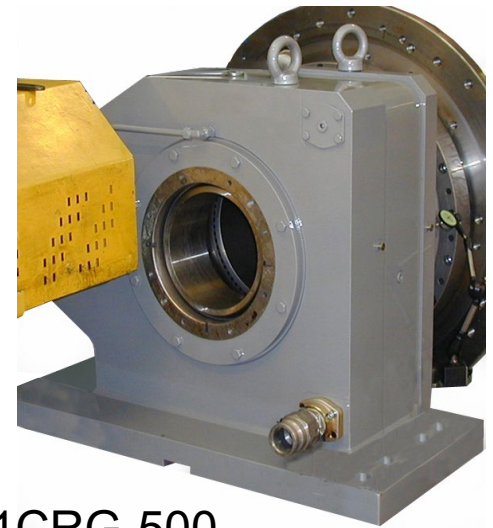
Gear units for deflection compensated rolls



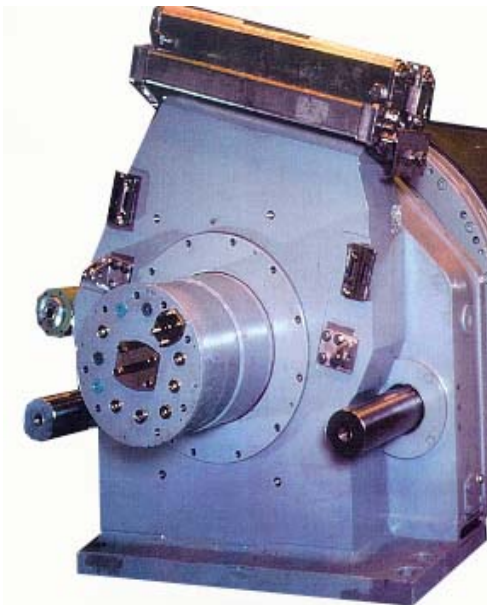
1RG-50



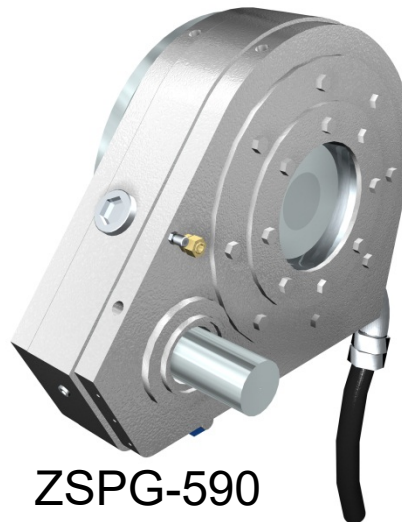
ZSCG-10590



1CRG-500



2x1BPG-800



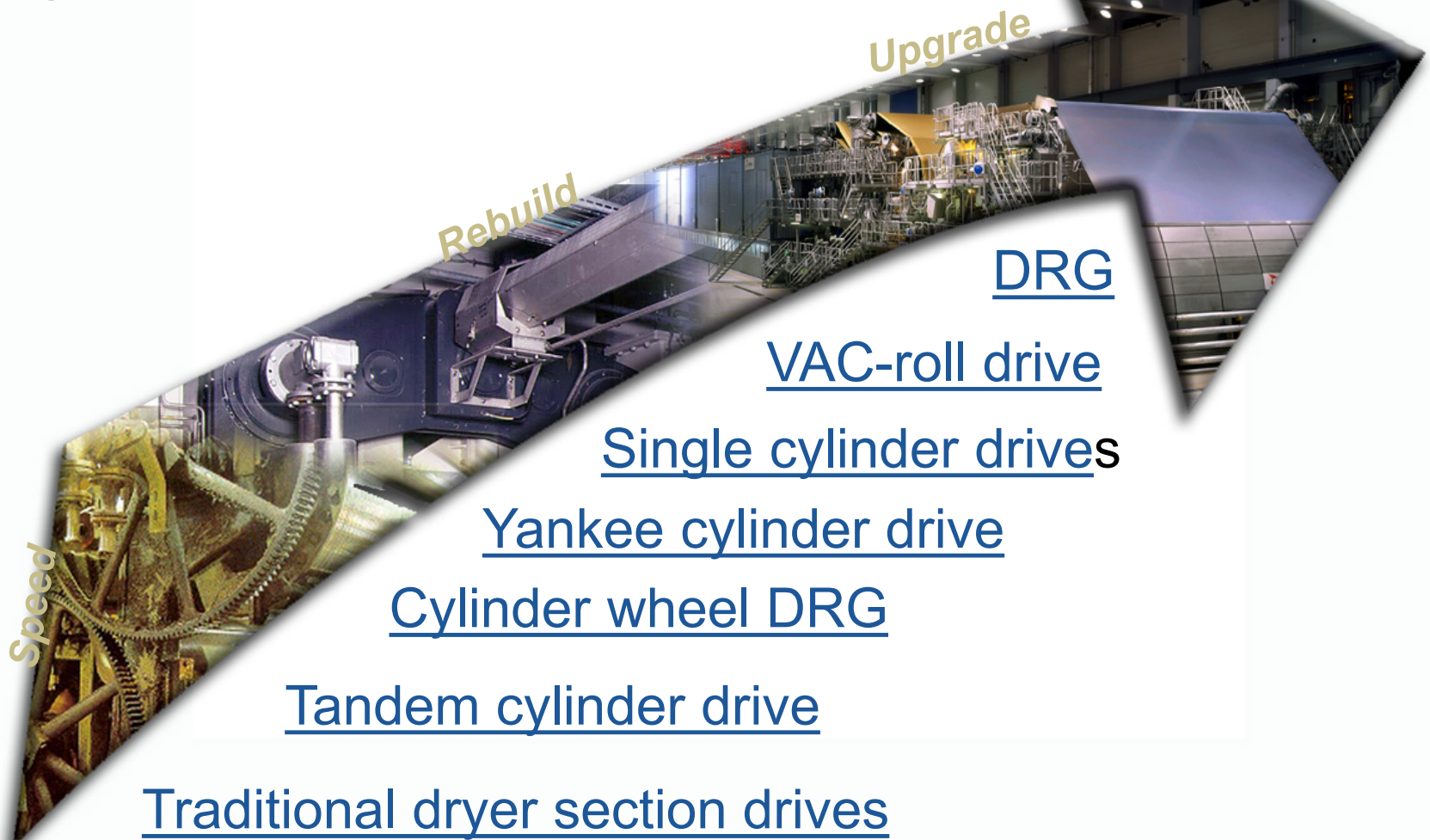
ZSPG-590

moventas

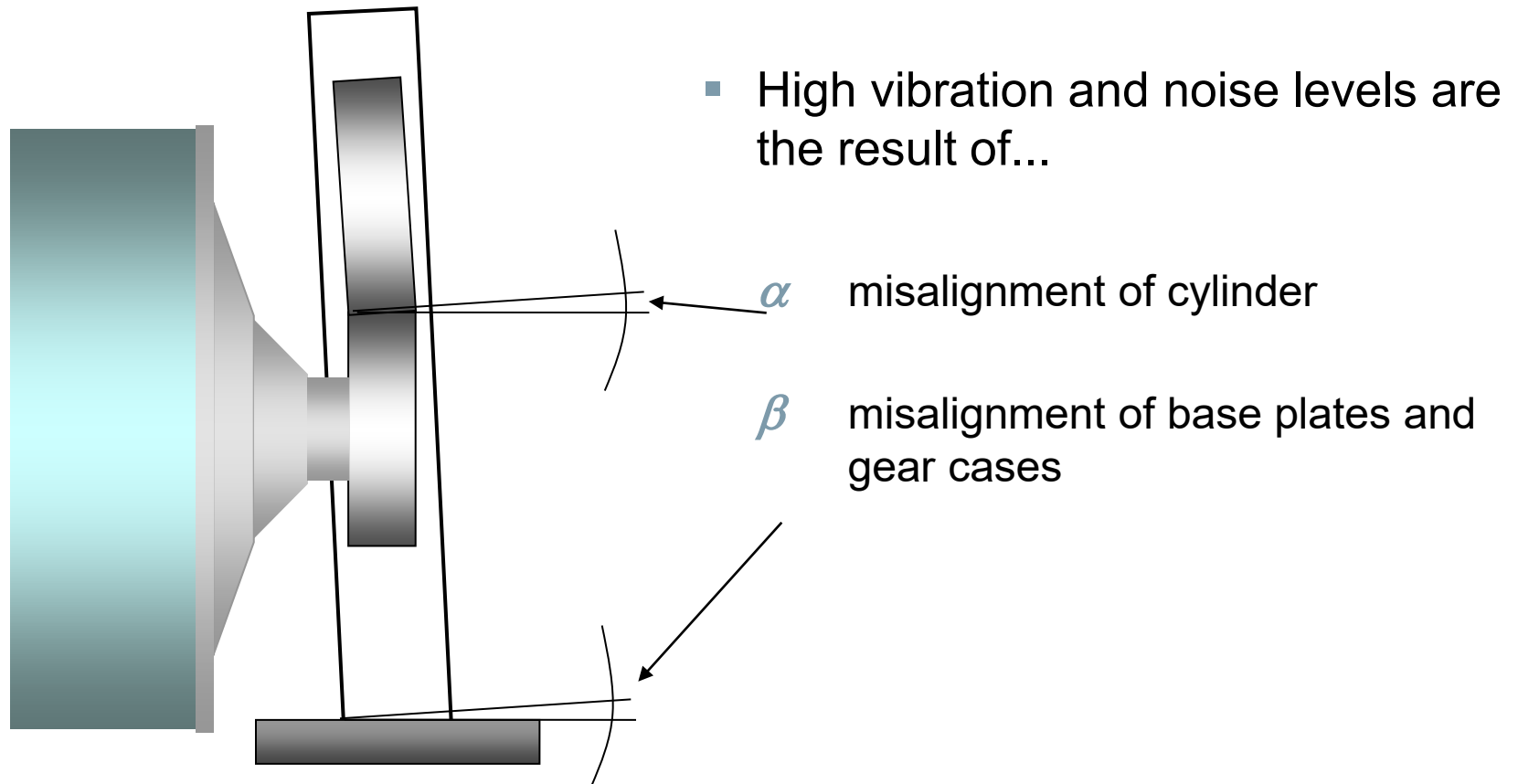


2x1CBPG-900

Dryer section drive solutions by Moventas



Problems with conventional gear cases

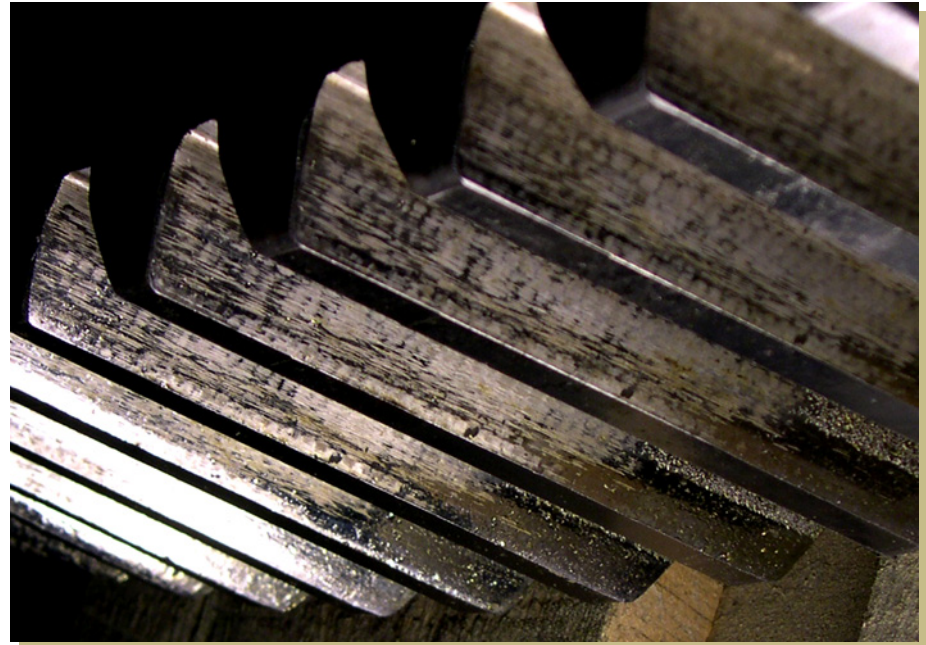


Typical problems in the traditional design dryer section drives

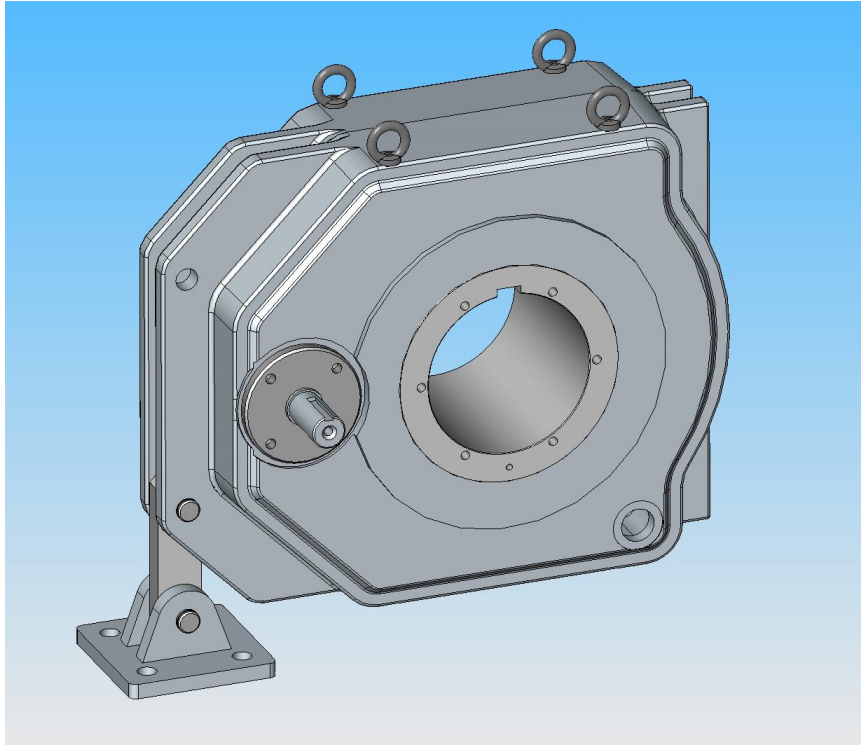
- Misalignment between gear frame and drying cylinder
- Misalignment is caused by sinking foundation, mounting inaccuracies and thermal expansions

Consequences:

- Incorrect tooth contact
- Tooth wearing problems
- High noise and vibration levels
- Bearing damages



Shaft mounted reducer D1PHT280



- Journal diameter 150...240mm
- Gear ratio $i=4,5:1 \dots 11,5:1$
- Mounting positions "8AM – 4PM" o'clock
- Pre-loaded main bearings
- To be connected to c-lube system
- Simple & reliable construction
- Recommended for small & medium size PM
- Easy installation for rebuilds

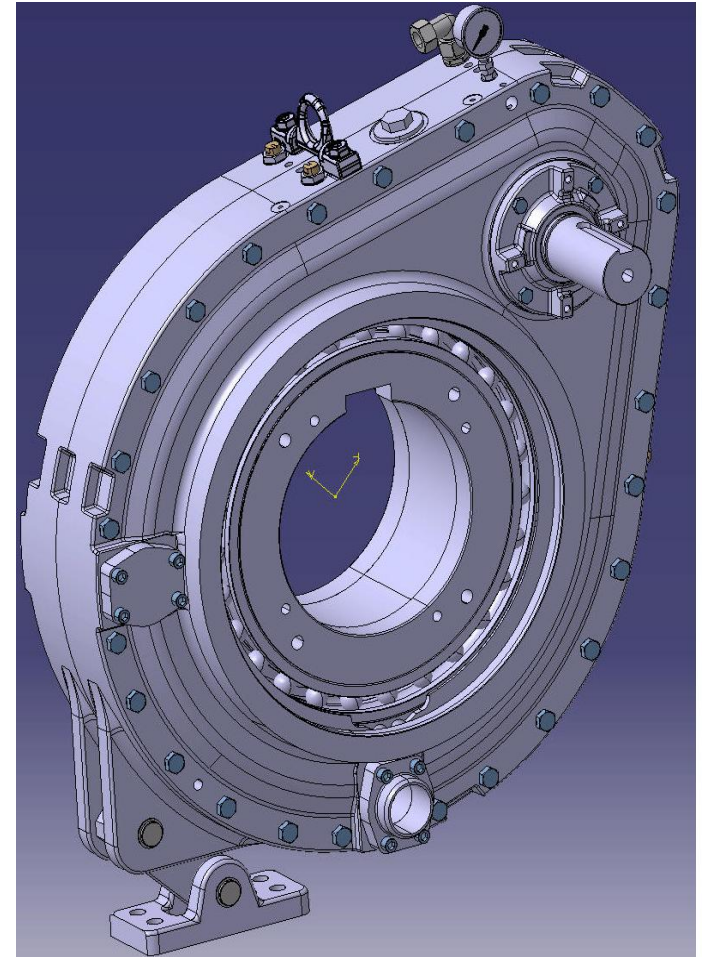
VAC-roll drive gear unit D1PHT420V

- Shaft-mounted gear unit which is installed to VAC-roll journal
- Axially loaded LSS bearings
- Suction pipe of the VAC-roll is attached to the gear unit
- Standardized gear unit with standardized drive positions
- Gear unit is connected to central lubrication system of paper machine



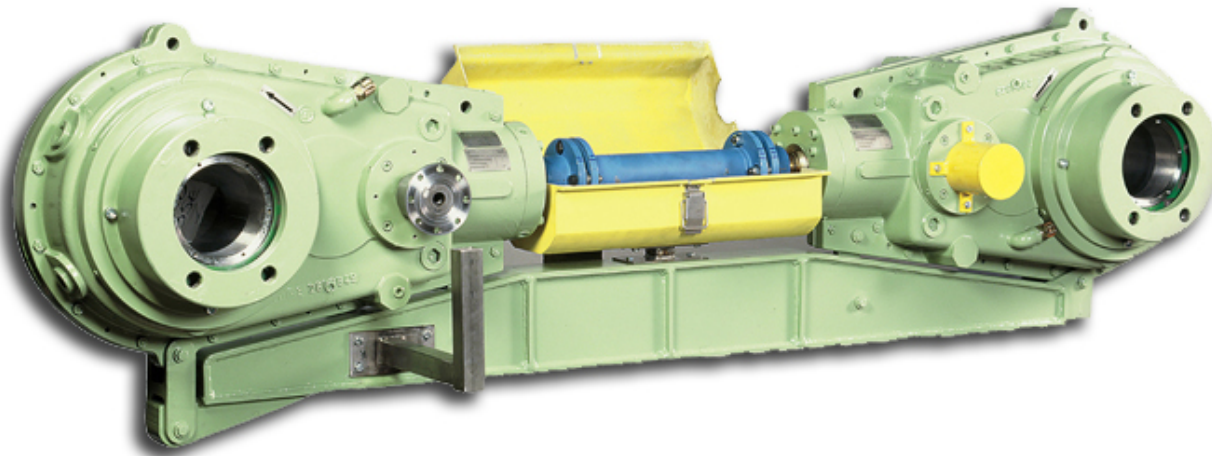
Dryer cylinder drive gear unit D1PHT420C

- Shaft-mounted gear unit which is installed to dryer cylinder journal
- Axially loaded LSS bearings
- Part of return oil flow from cylinder bearings goes through gear unit
- Standardized gear unit with standardized drive positions
- Gear unit is connected to central lubrication system of paper machine

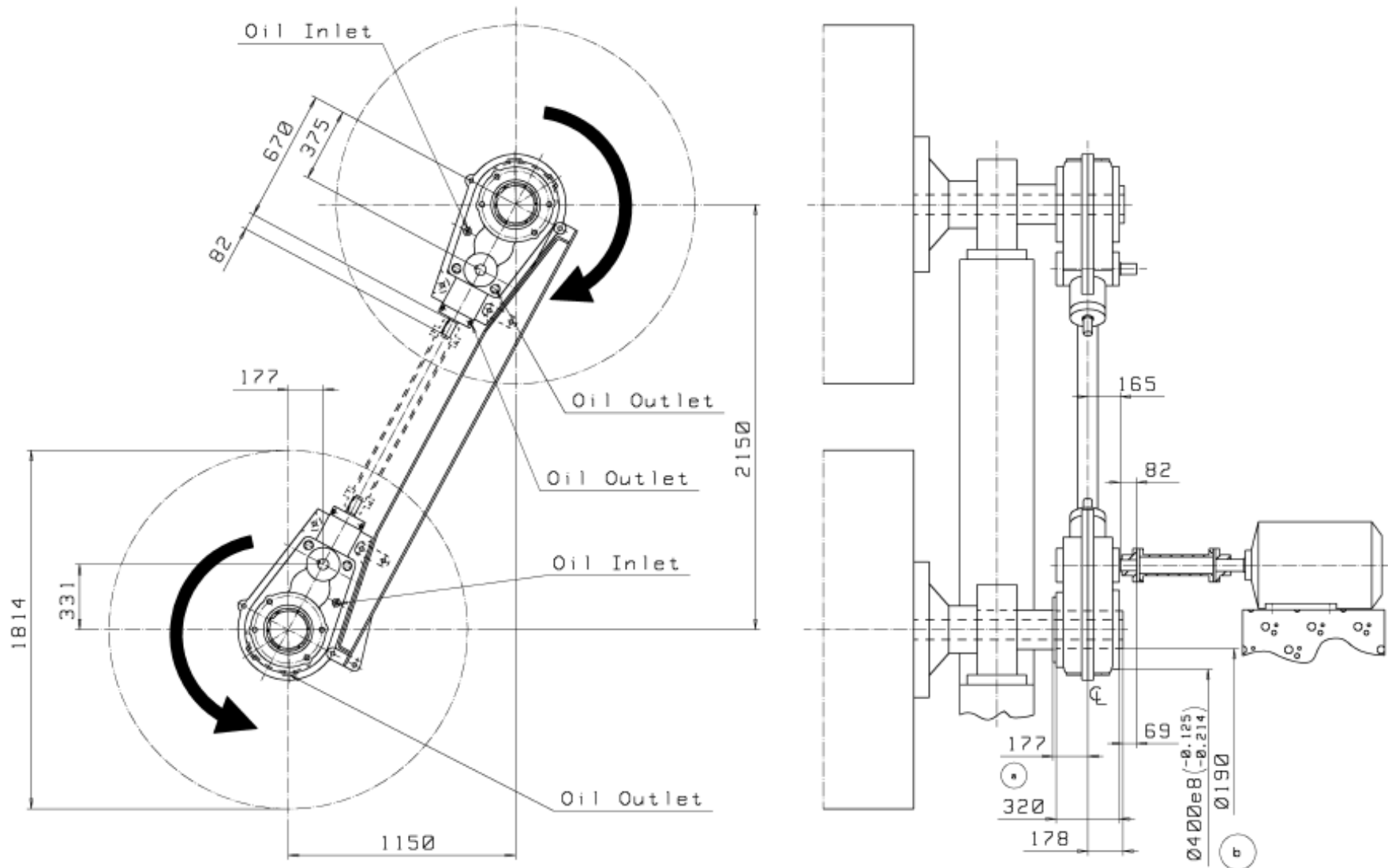


Tandem Cylinder Drive 3TKC235

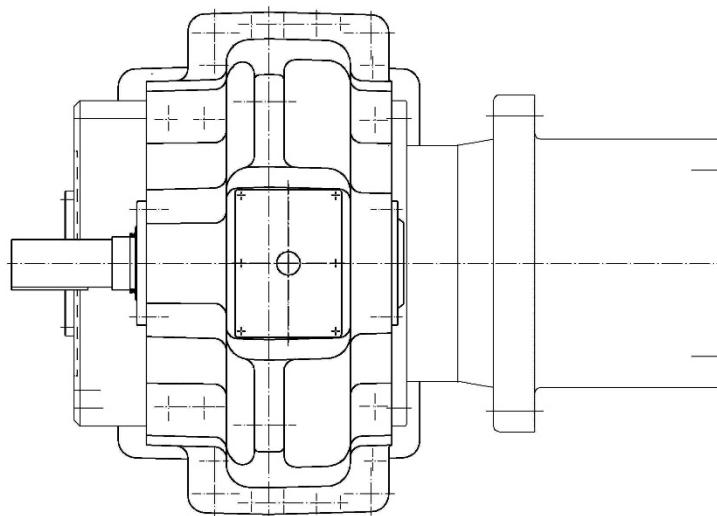
- Journal diameter 120...210mm (size 235)
- Gear ratio $i=7:1$... $25:1$
- Horizontal, vertical or diagonal mounting positions
- To be connected to c-lube system
- Recommended for small & medium size PM
- Easy installation for rebuilds



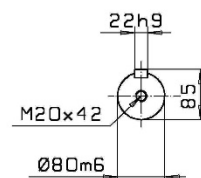
Dryer section structure with 3TKC235E



Bearing 23152CCK/W33

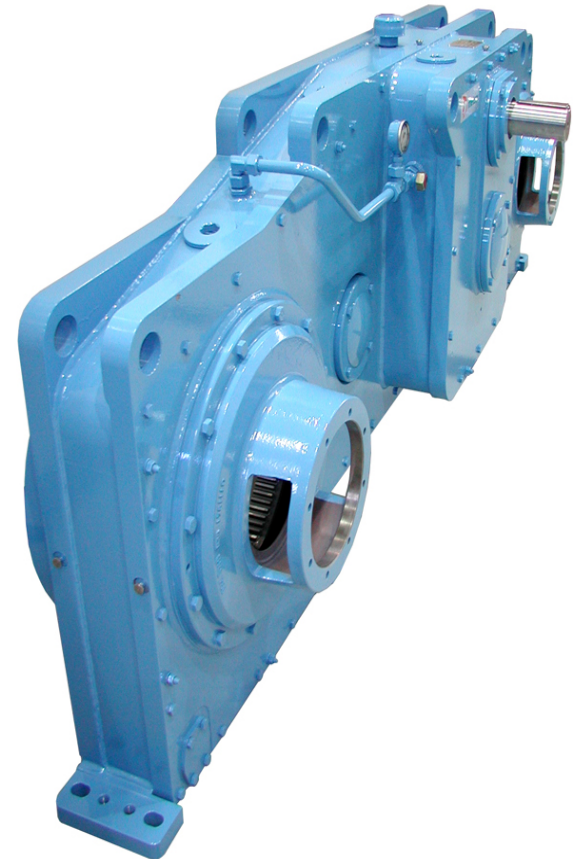


Oil inlet R3/4

[illegible]

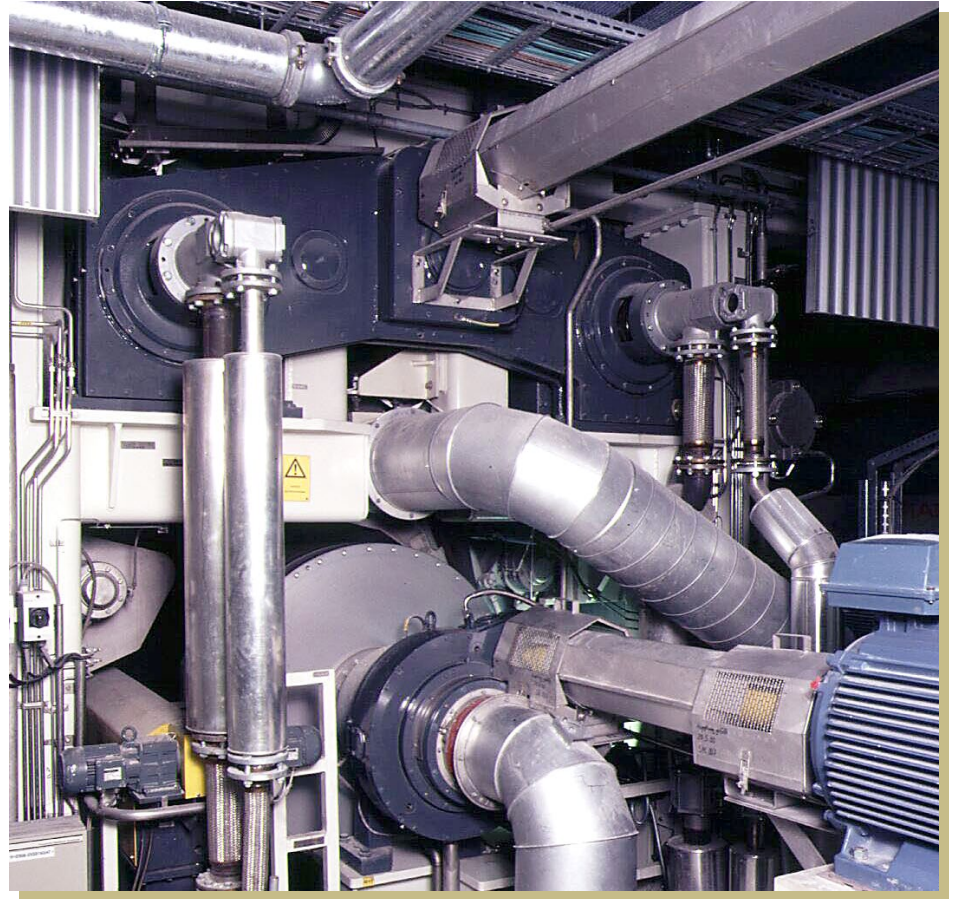
Dryer group drive unit DRG-2100H

- Drive unit for two dryer cylinders
- Attached to the frame of the paper machine
- Transmission ratio is easy to change in rebuilds
- Thanks to the patented coupling design the misalignments of the cylinders don't have influence on the gear unit
- The steam couplings of the cylinders are attached to the gear unit
- Return oil flow from cylinder bearings goes through gear unit
- Gear unit is connected to central lubrication system of paper machine



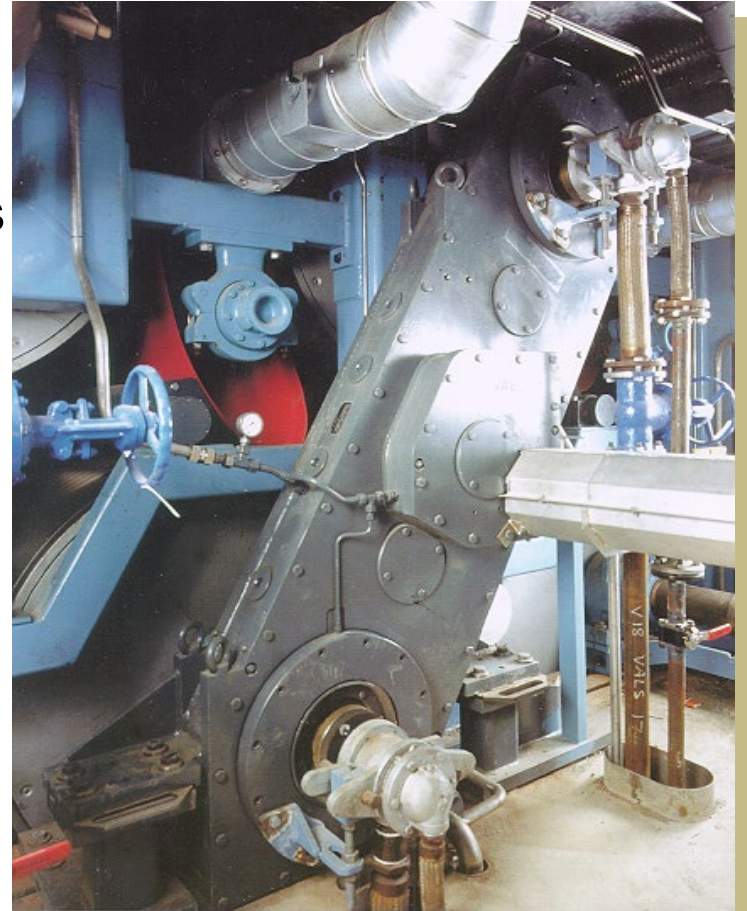
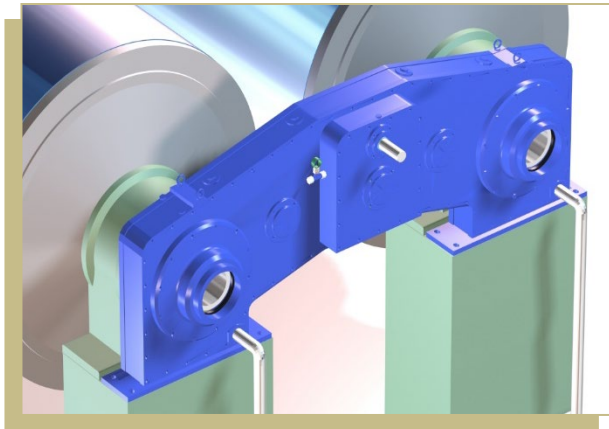
DRG References

- More than 500 DRG references since 1994
- Latest start-up: ProPapier Pm2
- Next start-up: Huatai PM8 China

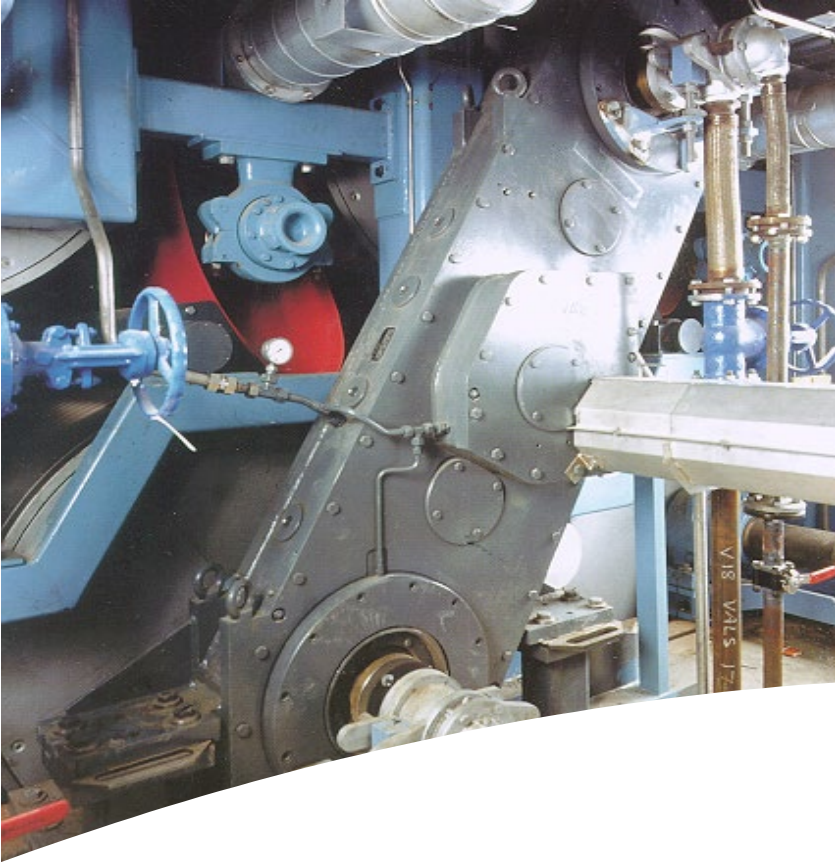


DRG

- Suitable for Open and Enclosed Gear Dryer Sections
- Complete Packages for New Machines and Machine Rebuilds

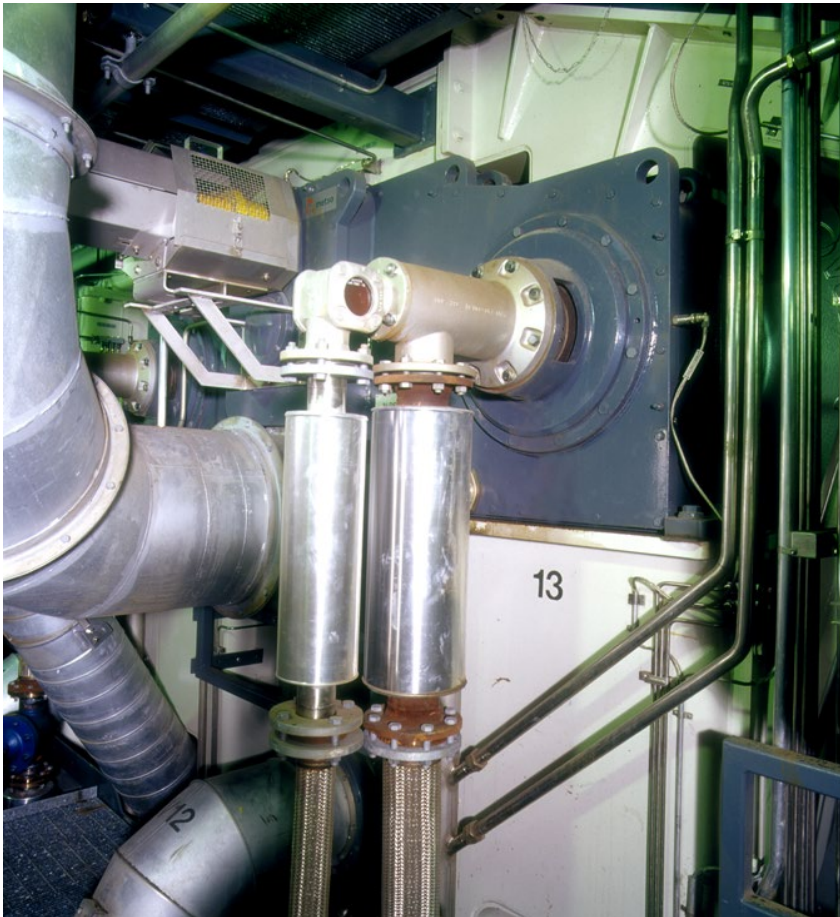


DRG-unit: Advantages



- Unique coupling design accommodates thermal expansion, mounting inaccuracies and possible base distortions.
- Low noise and vibration levels
- Simple gear ratio change
- Minimum number of electric motors and controls required
- Better air flow and faster drying, resulting in lower operating costs
- Eliminates maintenance and safety problems

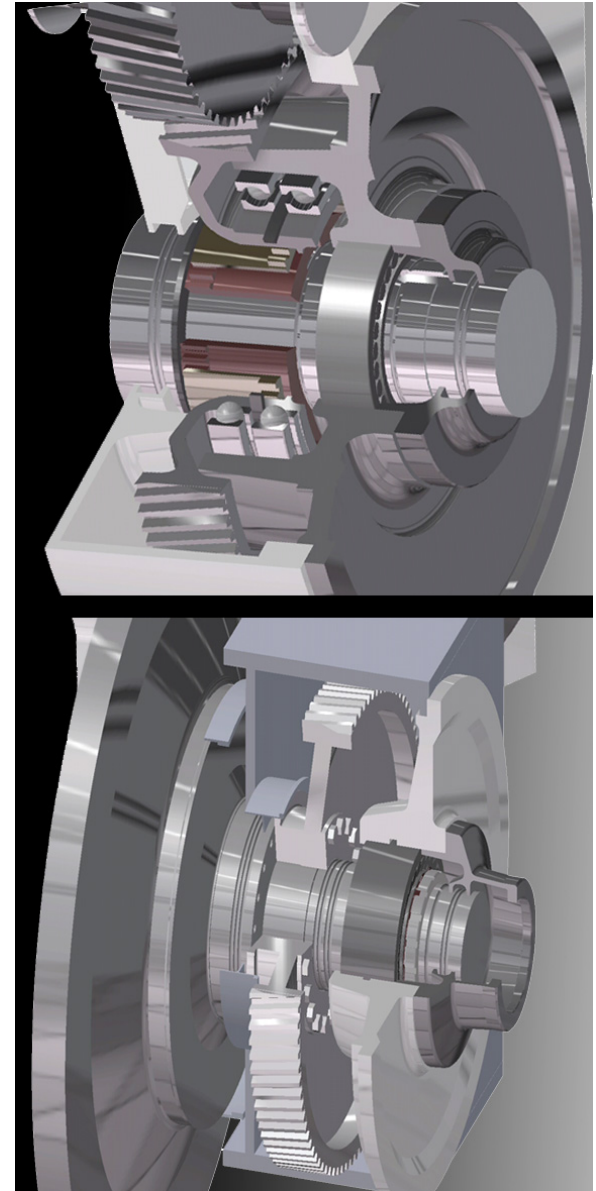
DRG Design



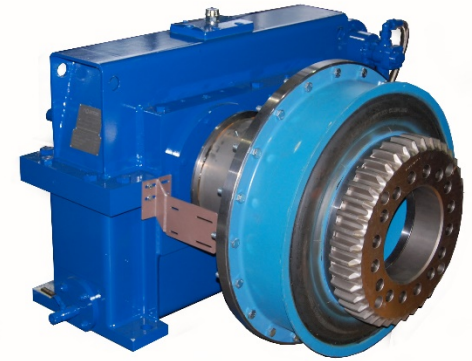
- Patented coupling arrangement connects the driving gear to the driven cylinder journal
- Power transmission capacity as high as required
- Suitable for totally felted single- and double-felt dryer sections
- Tailor-made application engineering
- Steam joint is fastened directly to gear housing
- Compact size - necessary components built in
- Connectable to paper machines condition monitoring system

Cylinder wheel DRG: Concept

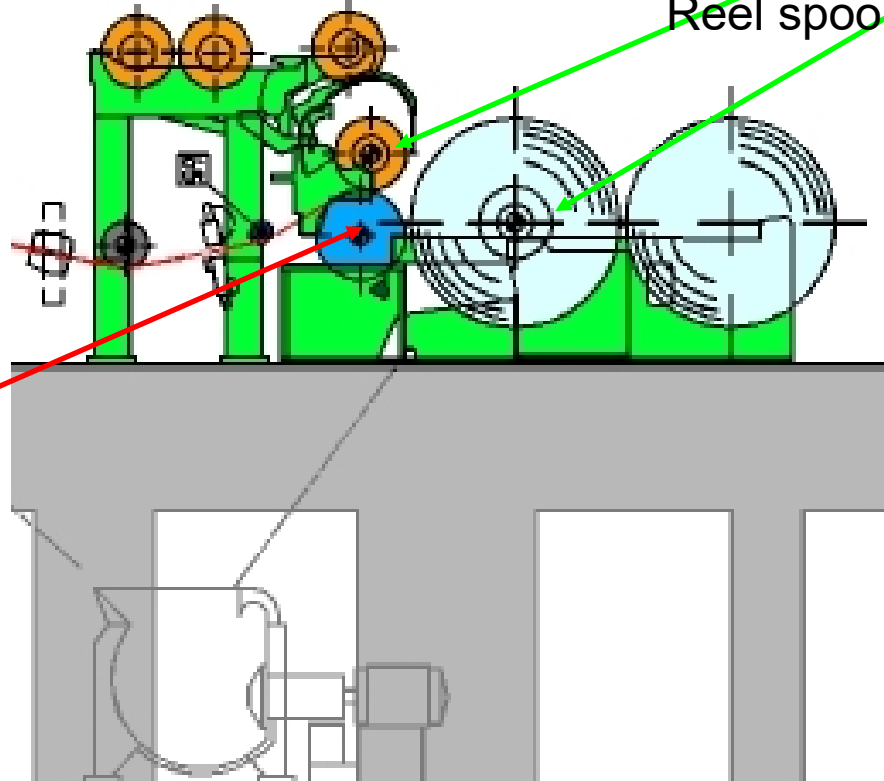
- Corrects the problems caused by misalignment
- To ensure good tooth contact the cylinder gear wheel is assembled with bearings in the frame
- Coupling arrangement connects the driving gear to the driven cylinder journal



Reel drives

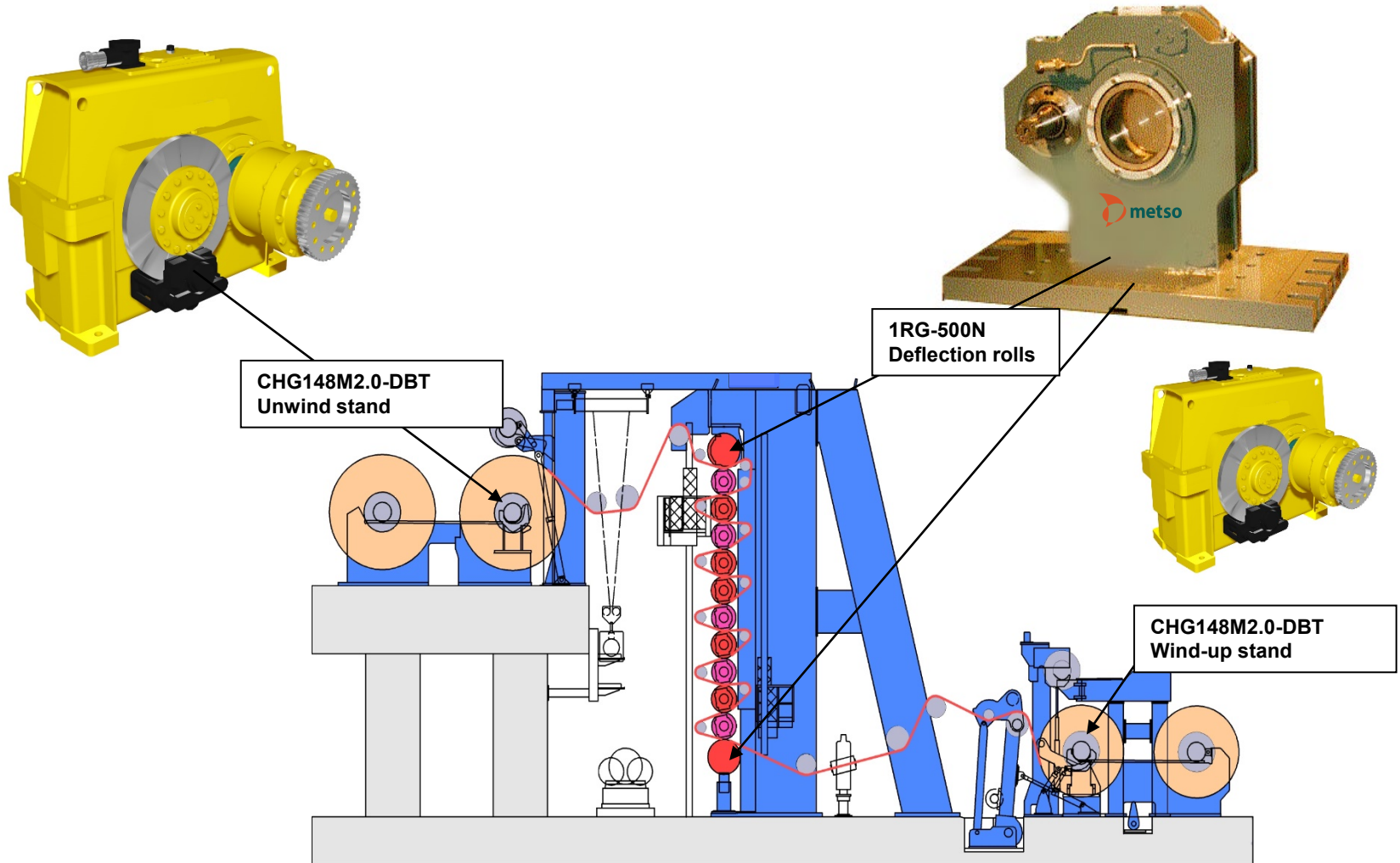


Reel spool center drive



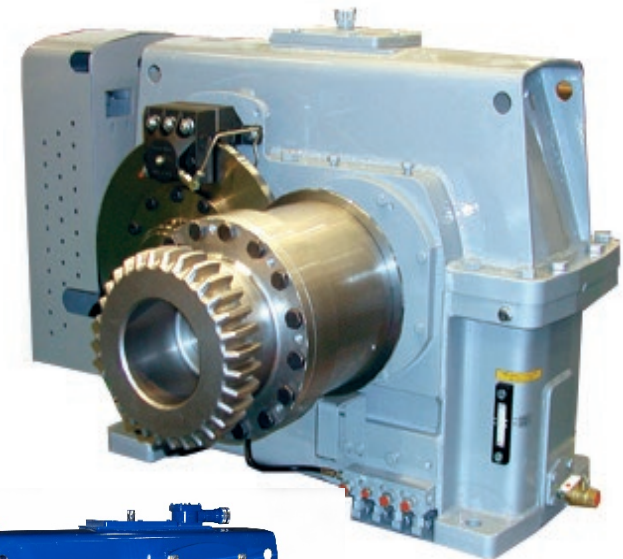
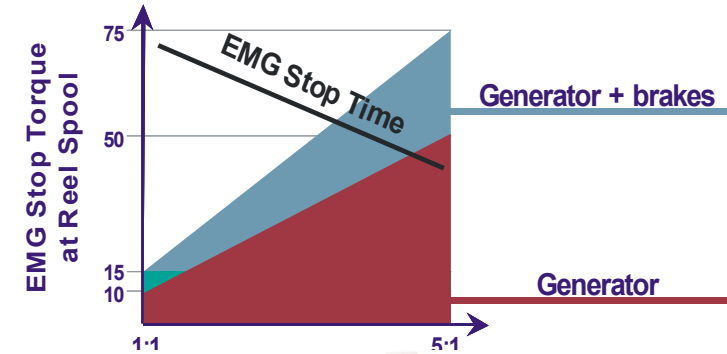
Reel drum drive

Off-line calender drives

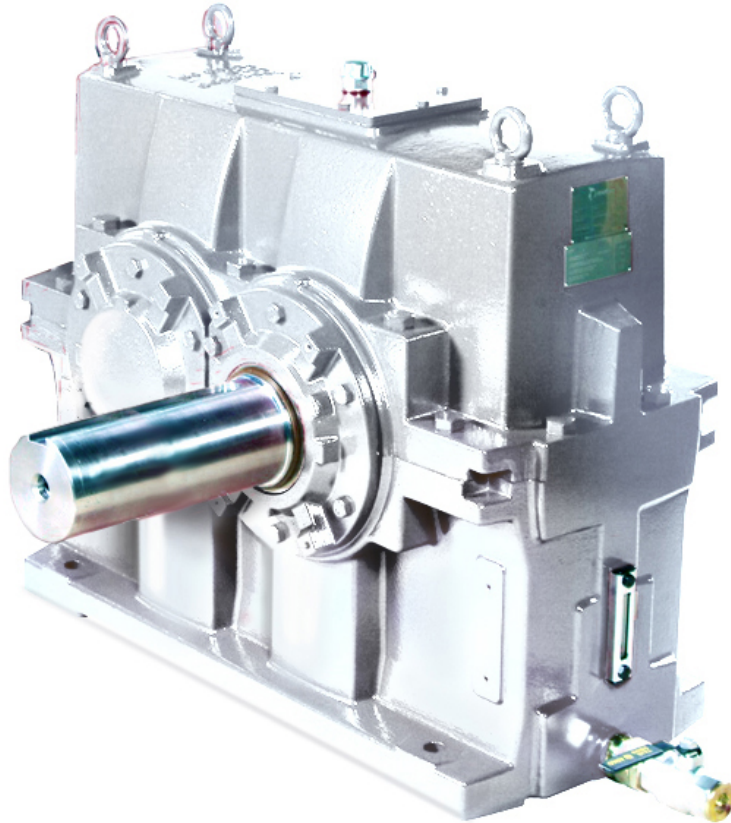


Unwind and windup drive units

- Manufactured since 1988
- Patented drive solution to unwind and windup drives of offline-calenders, winders, rereelers and coating machines
- Gear unit is delivered as a ready-to-install package including:
 - Hydraulically operated secondary coupling which follows oscillating of reel spool
 - To gear unit integrated brake unit including one or two brakes
 - Ready installed piping for the operating cylinder of reel spool coupling and brakes
 - Oil filling filter as standard equipment
 - Safety guards for primary and secondary couplings
- Gear unit can be equipped with separate pressure lubrication unit or connected to central lubrication system of winder



Pulper drives

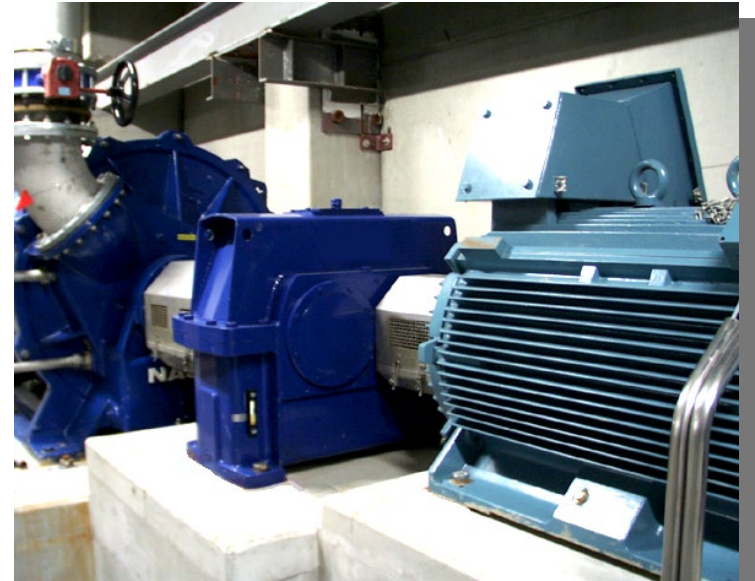
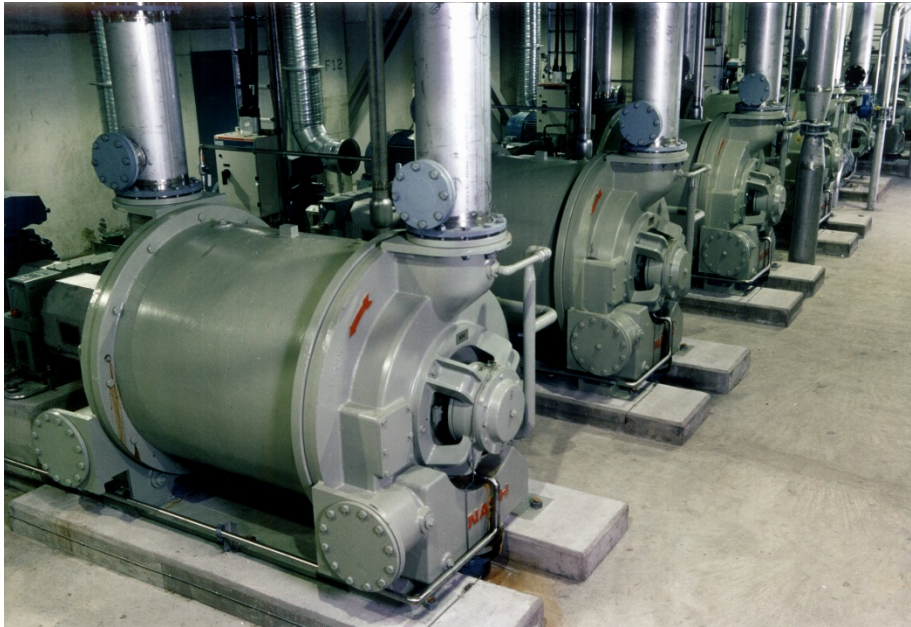


Horizontal shaft Pulper drive unit

- Special sealing arrangements
- Internal bearing systems to handle the forces of a rotor lead to increased durability
- In the rotor-integrated drive solution, the pulper drive is attached directly to the low-speed shaft
- Separate pulper drive units are also available

Pump Drives

- Vacuum pumps
- Fan pumps
 - 2-motor drive for high power levels



Vacuum pump drive