MAAG Gear Units for the Mining Industry
KA and KB Transmission Gears
MAAG Gear has almost 100 years of experience in manufacturing gear units. The company was founded in 1913 and quickly expanded into an international group. MAAG Gear introduced the technology of mill gear boxes for the mineral and cement industry with great success in 1964. In 1974 the first KA gear type was installed. MAAG Gear has sold over 2600 mineral gear units, over 650 cement gear units and over 1800 Symetro/Atox gears.

At the MAAG Gear headquarters in Winterthur, Switzerland, over 100 employees work in development, design, finance, project management, sales and marketing. Production, heat treatment, engineering, purchasing, quality and service takes place in a modern plant equipped with new high-performance machines in Elblag, Poland, where over 160 employees manufacture gear units that satisfy the most demanding quality standards. The company belongs to the successful FLSmidth Group, a listed Danish firm.

The combination of unique precision, accuracy and modularized solutions with compact design leads to high efficiency and low maintenance costs. Experience, new technical findings and the latest manufacturing techniques are incorporated in the production process. Intensive training and development of our engineers provides an optimal understanding of how to manage and lengthen the lifecycle of a gear. A constant willingness to innovate, and close collaboration with our customers and suppliers, help to ensure that MAAG Gear units operate reliably throughout the world under the toughest conditions.

Today, the product range includes gear solutions for bucket wheel excavators and belt conveyors, various gear units for mills, and maintenance systems for all types of plant.

MAAG Gear offers the following units and more for the cement industry:
- WPV: three-stage gear unit for vertical roller mills
- WPU: two-stage gear unit for vertical roller mills
- LGD: lateral gear drive for ball mills / SAG mills / FT
- CPU and CPV: central planetary gear units for ball mills
- Atox: bevel/helical gear unit for Atox raw mills
- Symetro: central drive gear units for ball mills
- PPU: planetary gear unit for roller presses
- Replacements: replacement gear units for all types of installation
- Rotating parts for Symetro/Atox gear units

All MAAG Gear units can be specially customized.
**Introduction**

Bevel-cylindrical reduction gear units type KA or KB are designed for torque transmission from electric drive motor to conveyor shaft (usually of belt type). They found their application in brown and hard coal mines, copper and sulphur mines, and in other general purposes. Design and manufacturing of these gear units have been based on our long experience in developing industrial gears. Design process is supported by the newest calculation methods with usage of computer techniques (engineering programs, CAD, CAE etc.)

Advanced manufacturing process uses the latest achievements in heat-treatment and teeth machining. Precise machines in connection with control process ensure that rotors and casings are always on the highest level of quality. This is our guarantee that technical assumptions are met every time, providing optimal quality, silent running and efficiency of our gearboxes.

**Technical description**

**Gear wheels**

All gear wheels are made of an alloy, casehardened steel, which ensures high strength and wear resistance of the teeth and provides light and compact construction of the gearbox. Toothing of the bevel stage is of the Cyclo-Palliod type. Toothing of helical stages is with all necessary modifications. Heat treatment and precise teeth machining result in optimal tooth contact under load conditions.

**Bearings**

KA and KB gear units are working on roller bearings. The type of bearings depends on load type transmitted. Standard bearing durability calculation assumes 30,000 working hours.

**Gear casing**

Sturdy, ribbed casings are made of ductile cast iron in standard version. To simplify the maintenance, their role is to be also an oil tank. Solutions applied in their construction ensure high quality of the acoustic and the dynamic state. Sealing of the shafts prevent internal parts from any contamination present in usual operation environment of the gearbox.

**Lubrication system**

Gearboxes work with a splash-gravity lubrication system. To ensure the best quality of gears and bearings lubrication, gearboxes are equipped with oil heaters. For special purposes or requirements of the customer a pressure lubrication system is also available.

**Monitoring system**

Standard version of the gearboxes is equipped with resistance thermometers. They monitor and signalize too high oil temperature, switching off the main motor drive in case of reaching critical conditions. For a pressure lubrication system, the monitoring system is more complex. It contains pressure transmitters, resistance temperature transmitters, thermometers and pressure gauges.

**Technical Terms of Delivery**

**The Quality**

The Quality of the gear unit is guaranteed by the Company Quality Assurance System complying with ISO 9001 (certificate SGS).

**Painting and Preservation**

All internal surfaces are covered with preservative medium, which doesn’t require to be removed before the start up of the gear unit. All external parts are painted with appropriate paint without lute fillings. Preservation of the gearbox is normally foreseen for 6 months of storage in a closed room. Painting and preservation can be easily adjusted every time to requirements of the customer.

**Warranties**

Standard warranty period is 12 months from commissioning, however not longer than 18 months from the delivery. Warranty conditions can be negotiated if required by the customer - warranty period may increase if installation and commissioning will be inspected by the Service of the gear unit manufacturer.

**Reference**

Design and manufacturing process of the bevel-cylindrical gear units is based on the over 40 years of MAAG Gear Zamech experience (formerly ABB Zamech Ltd and ZAMECH - Elblag).
### Diagram No. 1

<table>
<thead>
<tr>
<th>Gear Unit Size (distance A in cm)</th>
<th>Assembly code</th>
<th>K</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>one helical stage</td>
<td>K</td>
<td>K</td>
<td>K</td>
</tr>
<tr>
<td>two helical stages</td>
<td>K</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>

#### Gear Unit Size (distance A in cm)

<table>
<thead>
<tr>
<th>Gear Unit Size</th>
<th>KA 170</th>
<th>KA 150</th>
<th>KA 145</th>
<th>KA 125</th>
<th>KA 116</th>
<th>KA 102</th>
<th>KA 00</th>
<th>KA 03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Power P (kW)</td>
<td>1150</td>
<td>570</td>
<td>470</td>
<td>360</td>
<td>290</td>
<td>225</td>
<td>170</td>
<td>140</td>
</tr>
<tr>
<td>at n1 (1000 rpm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rpm of the input shaft (n1)</td>
<td>1 1000</td>
<td>2 1500</td>
<td>3 750</td>
<td>4 1800</td>
<td>5 1200</td>
<td>6 900</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rpm of the output shaft (n2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Diagram No. 2

<table>
<thead>
<tr>
<th>Gear Unit Size (distance A in cm)</th>
<th>Assembly code</th>
<th>K</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>one helical stage</td>
<td>K</td>
<td>K</td>
<td>K</td>
</tr>
<tr>
<td>two helical stages</td>
<td>K</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>

#### Gear Unit Size (distance A in cm)

<table>
<thead>
<tr>
<th>Gear Unit Size</th>
<th>KB 200</th>
<th>KB 176</th>
<th>KB 141</th>
<th>KB 127</th>
<th>KB 111</th>
<th>KB 103</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Power P (kW)</td>
<td>590</td>
<td>465</td>
<td>370</td>
<td>295</td>
<td>235</td>
<td>185</td>
</tr>
<tr>
<td>at n1 (1000 rpm)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>rpm of the output shaft (n2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Diagram No. 1

- **K**: bevel stage
- **A**: one helical stage

#### Diagram No. 2

- **K**: bevel stage
- **B**: two helical stages

**Notes**
- Diagram No. 1 illustrates the relationship between input and output shaft rpm for different gear unit sizes.
- Diagram No. 2 shows the transmission ratio for various input and output shaft speeds.

Other designs would be available on request.
MAAG GEAR QUALITY POLICY

MAAG Gear’s Quality Policy is that we, at all time, meet the requirements of our stakeholders with regard to our projects, products and services in the industry we serve.

With our process management (QM System) we increase and improve customer’s trust and satisfaction. By commitment, competence and personal responsibility of all our employees we achieve our targets based on the following principles of our policy.

The business management is committed and dedicated to ensure continuous implementation and evaluation of the following principles of our quality policy. Each employee is aware about the vision and strategy of MAAG Gear and through the implemented guidelines fulfils the required quality in his own field of activity. All employees are individually responsible for their own tasks.

Continuous improvement in organizational, operational, technical or personal affairs will increase our quality on products, projects and services. At the same time this enables us to lower our costs but also to ensure and improve our market position. Our process management considers all our processes and supports economic behaviour at all levels.

We work in partnership with our suppliers and external partners based on open communication and performance-oriented results.

CONTACT

Representatives

MAAG Gear can be contacted within a very short time through our worldwide network of agents.

Our skilled service specialists are ready to provide rapid and expert assistance at any time.

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