

One Source

MAAG™ WPU two-stage gear unit up to 1500 kW



FLSMIDTH
MAAG GEAR

Our quality policy



FLSmidth MAAG Gear is committed to creating strong relationships with customers, suppliers and employees that establish us as a trustworthy, reliable and professional partner. This commitment includes providing high-quality and high-value solutions, products and services that create satisfied and loyal customers.

We are certified to the ISO 9001:2008 standards. With our process management we endeavor to meet and exceed international quality standards and provide adequate resources to support the quality system. Our quality policies are centered on the importance of meeting our customers' requirements.

The quality objectives are continually established and reviewed by our management. Our employees are committed to the company's management system and to the continual improvement of the system and the

entire organization. Each employee is aware of the vision and strategy of FLSmidth MAAG Gear, and works in a culture of opportunity.

With our suppliers and external partners we cultivate an open communication and work on performance-oriented results.

A pioneer of modern gear technology

FLSmidth 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. FLSmidth MAAG Gear introduced the technology of mill gear units for the cement industry with great success in 1966. Since then over 700 MAAG™ gear units were sold in this sector.

The company

At the FLSmidth MAAG Gear headquarters in Winterthur, Switzerland, more than 100 employees work in development, design, finance, project management, sales, customer service and marketing. Production and assembly takes place in three modern plants equipped with high-performance machines. In Elblag/Poland, Milano/Italy and Bawal/India more than 200 employees manufacture gear units, drive systems and components which satisfy the most demanding quality standards. The company belongs to the successful FLSmidth Group, a listed Danish firm.

Our strength

The combination of unique precision, accuracy and modularized solutions with compact design are leading to high efficiency products and therefore low maintenance cost for the customer. Experience, new technical solutions and the latest manufacturing techniques are regularly incorporated into the production process.

Intensive development and training of our engineers assure best understanding of how to operate a gear unit and lengthen its life cycle.

A constant willingness to innovate, and close collaboration with our customers have helped to ensure that MAAG gear units continue to operate reliably throughout the world under the toughest conditions.

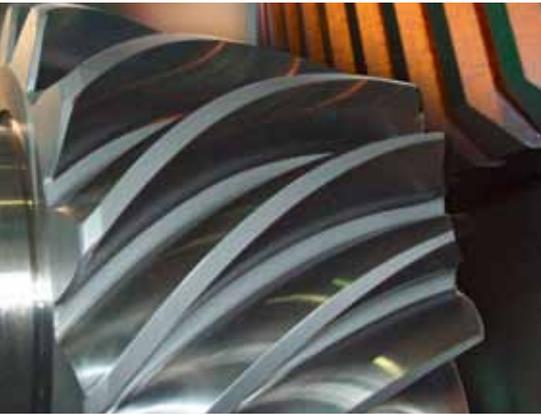
Product range

Today, the product range includes various gear units for mills, complete drive systems, gear solutions for bucket wheel excavators and belt conveyors, as well as maintenance systems for all types of plant. In addition FLSmidth MAAG Gear manufactures components such as bevel sets, girth gears and various replacement parts.

All MAAG gear units are available as standard solutions or are customized to the required needs.



Innovative technology



Introduction

The compact two-stage MAAG™ gear bevel and planetary gear unit transmits the power from the electric motor to the grinding table. It reduces the speed of the electric motor to the desired speed of the grinding table and changes the horizontal input axis to a vertical output axis. The gear unit also supports the grinding table, mounted on the output disc. An external oil supply unit lubricates and cools the gear unit.

FLSmidth MAAG Gear distributes two MAAG WPU series based on the same design concept. The smaller MAAG WPU series from type 04 to 48 described here is focused on coal mills in the cement and thermal power plant industry. For more information about the MAAG WPU series for vertical cement mills – from type 54 to 420 – please refer to our separate brochure.

Assemblies

The design of the WPU gear unit provides easy maintenance of the gears combined with highest reliability. The arrangement of the bevel pinion secures the best possible meshing condition of the cyclopalloid bevel stage. In addition, precise transmission is ensured by the application of roller bearings on each pinion and gear wheel.

Gearing

Both bevel and planetary stage gears are made from very high-quality materials, precisely cut on top class machines and heat treated in fully controlled equipment. The toothed flanks of the sun pinions have both profile and longitudinal modifications to fully compensate for deformations of the sun pinion and planet wheels occurring under load. This method guarantees optimum tooth flank contact and very long life cycle.

Drive

The motor drives the bevel gear stage via a flexible coupling. The torque is then transmitted to the planetary gear stage via a toothed coupling. The rotating planet carrier is bolted and pinned to the output disc and drives the grinding table.

Thrust bearing

The pads of the high-quality tilting-pad thrust bearing for the grinding table are lined with babbitt metal. Their purpose is to absorb the static and dynamic grinding forces. They are of hydrodynamic type lubricated by low-pressure pumps or hydrostatic type on demand. Their temperature is continuously monitored.

Customer benefits

- High operational reliability
- Customer-specific design of gear units
- Very high efficiency
- Planetary gear stage and thrust bearing for grinding table with a very long service life
- Short installation time
- Low-cost maintenance

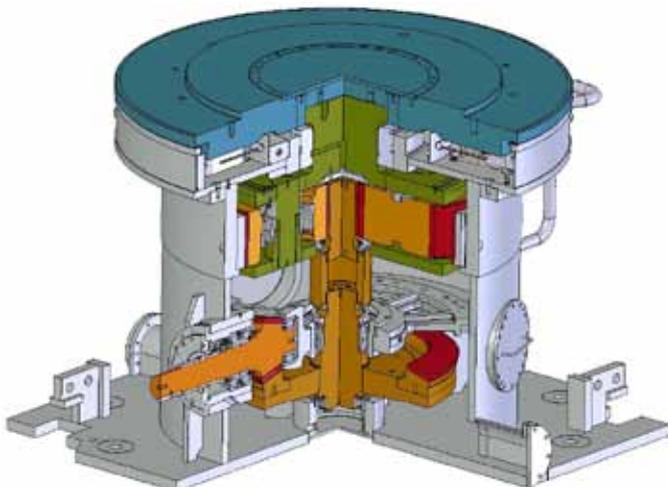
Casing with internally toothed ring gear

The gear casing consists of a robust welded steel construction or well-ribbed cast structure. The fixed ring gear is mounted to the casing so that reliable torque transmission is guaranteed. The grinding load including grinding table weight is transmitted straight to the foundation via the tilting-pad thrust bearing and the casing wall (see figure below, right).

Coupling

Our standard supply includes a flexible coupling with the following features:

- Durable and reliable
- Low operating costs
- Almost maintenance-free (no lubricants to change)
- Low vibratory loads in the drive train
- Relatively wide range for axial and radial misalignment



Planet shafts

The planet shafts are made from alloy steel. Spherical roller bearings, mounted on them, ensure best possible position of planet wheel during operation in each load condition.

Lubrication system

The gear unit is lubricated by a closed circuit oil system. The oil tank serves as a platform on which all the assemblies and components such as motor pumps (high and low pressure), switchable double oil filter, oil cooler and instrument panel are installed. The design of the lubrication system is standardized thus it is applicable for several gear types. This ensures easy handling, optimal insertion and low costs. Also the components of the lubrication system like instrumentation, filter and cooling/ heating system are consistent. The lubrication system is monitored with digital indication on site. Top priority is given

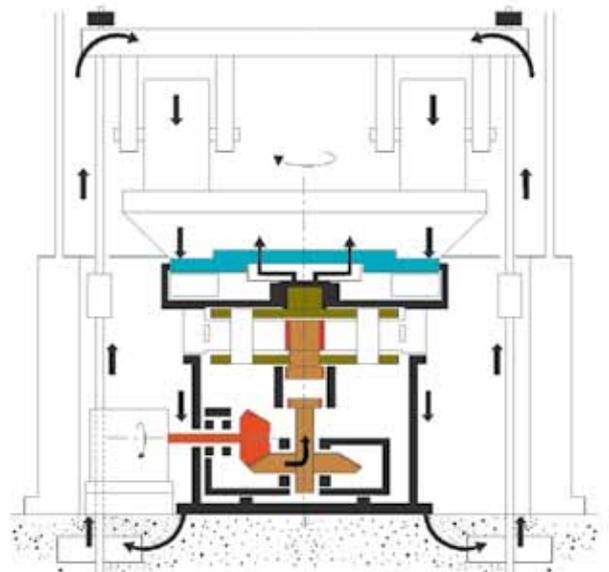
to guarantee operational reliability. A lubrication system with high pressure pump is available if required by the application.

Instrumentation

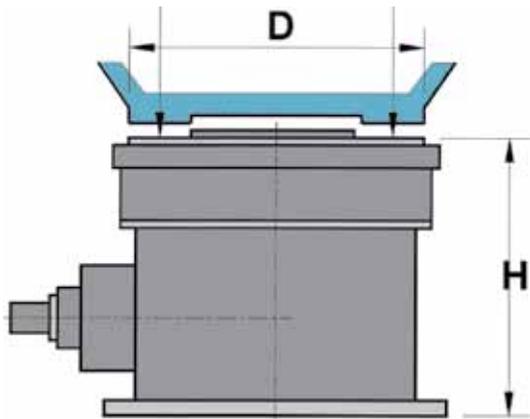
To ensure highest reliability and lowest maintenance costs, gear and lubrication unit are equipped with sensors, which monitor operation parameters like bearing temperature, oil pressure or vibration level. On demand the entire electrical equipment installed on the gear unit complies with anti-explosive requirements.

Auxiliary drive/maintenance drive

Auxiliary or maintenance drives are available to meet your demands. The maintenance drive is placed between the mill motor and the gear unit, whereas the auxiliary drive is located behind the mill motor.



MAAG™ WPU series for coal mills



Type	P/n (kW/rpm)	Fa (kN)	D (mm)	H (mm)	Weight (t)
04	3,8	558	1100	1100	4,5
06	5,0	675	1220	1100	4
08	7,0	951	1380	1215	6,5
12	10,2	1000–1500	1530–1700	1350–1430	8–10
19	15,0	1500–1900	1700–1830	1370–1455	9–11
27	23,0	1800–2300	1950–2200	1600–1700	17–20
32	27,2	1900–2500	2000–2200	1600–1700	18–22
37	34,0	2300–3300	2000–2470	1770–1980	21–29
48	43,0	3160–3350	2340–2520	1900–2090	24–32

P – Mill power [kW], n – Mill speed [rpm]

Fields of application

The smaller MAAG WPU series is widespread and well proven in coal mills used in

- Cement plants
- Power plants

On demand FLSmidth MAAG Gear will follow the latest ATEX standards mainly asked for in thermal power plant applications.

Hazardous environments

The coal grinding system must take into account the available heat sources for drying the raw coal as well as the fire and explosion hazards of coal dust. The entire grinding plant must therefore be shock-resistant and equipped with a number of explosion relief valves.



Cement plant



Power plant

Customer benefits

Condition Monitoring

To ensure highest reliability and lowest maintenance costs, the gear unit is equipped with diagnostic tools and sensors monitoring all important operation parameters.

Customer service

Customer service staff is highly trained and guarantees professional support in routine and emergency services, gear unit inspections, overhaul or assembly.

Delivery time

Thanks to continuous monitoring of our production schedule, our clients are provided with the up-to-date status of a project at any time.

Installation

The compact design simplifies shipping and reduces erection time.

Production

The latest machines and technical aids are used in manufacturing.

Quality

Production and all activities are monitored by the internal quality assurance system in strict compliance with ISO 9001.

Service Hotline

24 hrs/day – 7 days/week
+41 79 619 91 00
service@FLSmidthMaagGear.com

Spare parts

Spare parts are available throughout the life of the gear units.

Test running

Gear units are tested and logged in detail on our test bed prior to delivery.

Training

FLSmidth MAAG Gear offers training programs for local maintenance personnel to enable them to keep the gear units in shape.

Troubleshooting

FLSmidth MAAG Gear field service technicians are strategically located around the world to minimize response time and reduce costs.



FLSmidth Atox mill with MAAG™ coal mill gear unit



State of art assembly shop in Bawal/India with highest standards in terms of equipment, operation, process and safety.

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