

# Electrical Machines for Industry

Cement industry  
Chemical-, oil- and gas industry  
Steel- and rolling mills  
Pump industry



VEM Sachsenwerk GmbH  
Pirnaer Landstrasse 176  
01257 Dresden  
Germany

Contact: Dr. Stefan Eberl  
Phone: +49-(0)351-208-1439  
Telefax: +49-(0)351-208-3505  
E-Mail: eberl@vem-group.com  
Homepage: www.vem-group.com



A world full of motion



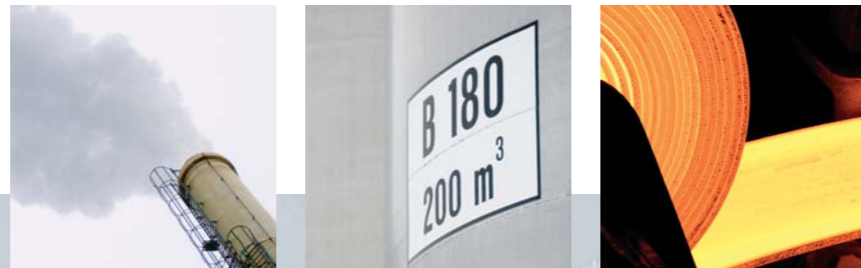


*Competence for highest requirements – medium and large scale machines by VEM*

Drive solutions made to measure at highest technical standard are a hallmark of VEM Sachsenwerk. Our engineering know-how, innovative product developments and a 125 years old tradition in the field of electrical engineering industry offer a perfect base for this purpose.

As an experienced specialist for the construction of medium and high voltage machines at VEM Sachsenwerk is focussed on selected market segments. Worldwide we supply above all industry sectors, in which highly complex requirements are made to drive technology. We plan, develop and produce asynchronous and synchronous machines for individual applications acc. to the customer requirements. Each large scale machine is exactly made to measure for the specific application and realised in top quality.

Our production is equipped perfectly due to a crane capacity of 200 tons, a VPI impregnation unit up to a diameter of 4.60 meters, a balancing machine for the rotors and the large scale test benches up to 5 MW. The technical top class conditions, a high production depth and qualified specialised personnel permit us to react in a flexible way to customer requests and to realise a short project planning and delivery times.



	Three-phase high-voltage asynchronous motors with squirrel-cage rotor 200 – 22,500 kW 2p= 2-30	+ Converter	Three-phase high-voltage asynchronous motors with slipring rotor 200 – 9,000 kW 2p= 4-16	Three-phase high-voltage synchronous motors 2,000 – 37,000 kW 2p= 4-36	+ Converter
<b>Steel- and rolling mill industry</b>	Compressors	Roller-, main-, auxiliary drives	Shredders	Roller-, main-, auxiliary drives	
<b>Cement industry</b>	Fans, Mills	Fans, Sifters Kiln drives	Fans, Mills, Crushers	Fans, Mills	Rotary kilns
<b>Chemical, oil, gas industry</b>	Pumps Extruders Compressors Fans	Pumps, Fans Compressors Extruders	Compressors	Compressors Extruders Fans	Compressors
<b>Secondary industry</b>	Pumps Mixers Screw conveyors	Pumps Extruders	Screw conveyors	Pulp grinders	
<b>Power plant technology</b>	Compressors Pumps	Pumps		Pumps	
<b>Electrical engineering</b>	Pumps, Fans Mills	Pumps, Fans Mills		Fans	

...program



*Rugged and resilient design – slipring motors for cement industry*

Dust, heat, and high mechanical stress are typical for the operating conditions of motors in cement industry. Such an environment makes high requirements to the drives, which are used here for mills, crushers, kilns or conveying belts. Asynchronous motors with slip ring rotors are particularly suitable to resist to these extreme requirements.

VEM Sachsenwerk offers rugged design slip ring motors for medium-voltage applications, that work reliably even in the dusty heat in cement plants. Due to their special starters the motors are also suitable for difficult start-up conditions. Cooling is effected by air generally. In order to avoid that cement dust penetrates the inside of the motors, each drive is equipped with an own closed cooling system in the form of an air/air heat exchanger. These heat exchangers are also designed and constructed by VEM Sachsenwerk.

Our company has a long tradition and a large experience in development and production of slip ring rotors.

*Technical data*

Series: Three-phase asynchronous motor, predominantly with slipring rotor

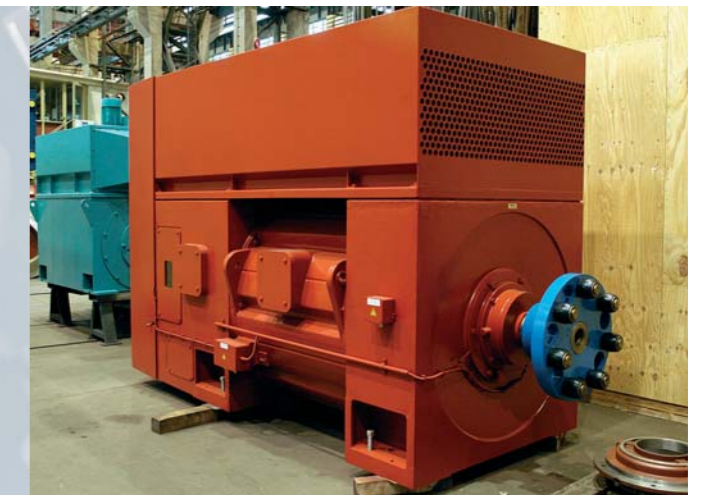
Frame sizes: 355 - 1,000

Power range: 200 - 9,000 kW

Degrees of protection: IP55 acc. to DIN EN 60035-5, higher degrees of protection optionally

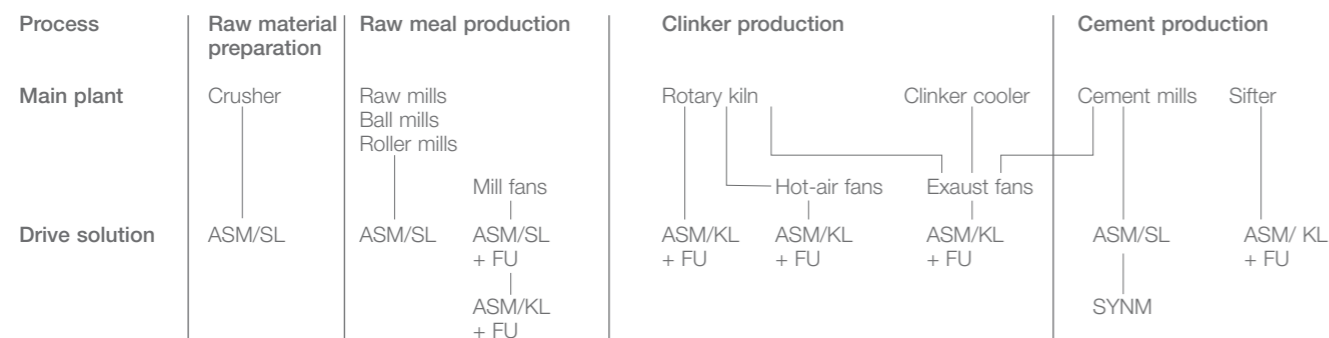
Cooling types: Air-, water cooling

Types: IM B3 and derived types acc. to DIN EN 60034-7



*Mill drive*  
Three-phase asynchronous motor with slipring rotor  
4,000 kW / 11,000 V / 994 rpm

*Crusher drive*  
Three-phase asynchronous motor with slipring rotor  
2,700 kW / 6,600 V / 992 rpm



ASM/KL: Three-phase high-voltage asynchronous motors with squirrel-cage rotor  
 ASM/SL: Three-phase high-voltage asynchronous motors with slipring rotor  
 SYNM: Three-phase high-voltage synchronous motors  
 ASM/KL + FU: Three-phase high-voltage asynchronous motors with squirrel-cage rotor and converter  
 ASM/SL + FU: Three-phase high-voltage asynchronous motors with slipring rotor and converter



cement...



Origin of photo material: BASF Schwarzheide

### Safe at explosion hazard – drives for chemical, oil and gas industry

In chemical and petrochemical industry explosion protection is indispensable for a safe operation of the machines. For operating rooms in which explosive gas/air or vapour/air mixtures or combustible dusts develop, special electrical drives are required.

The special machines by VEM Sachsenwerk for chemical industry are adjusted to these specific requirements and custom-designed. We supply drives for compressors, blowers, pumps and extruders which are provided with the respectively prescribed explosion protection. Depending on the conditions at the operation site we offer motors with the types of protection increased safety „e“, overpressure design „p“ and non-sparking „n“. Speed controlled drives with explosion protection are part of our product range as well.

Asynchronous and synchronous motors by VEM are used for chemical plants worldwide. Their safety and reliability has been proved for many operating hours and numerous applications.



Compressor drive  
High-voltage synchronous motor Ex p II BT3  
7,600 kW / 10,000 V / 360 rpm

### Technical data

Series:	Three-phase synchronous motors, brushless Three-phase synchronous motors
Frame sizes:	from 355 onwards
Power range:	280 - 37,000 kW
Type of protection:	Ex n, e and p
Degrees of protection:	IP55 acc. to DIN EN 60035-5, higher degrees of protection optionally
Types:	IM B3 and derived types acc. to DIN EN 60034-7



Extruder drive  
High-voltage asynchronous motor with squirrel-cage rotor  
4,000 kW / 11,000 V / 1,186 rpm



chemical-, oil- and gas...



Origin of photo material: ArcelorMittal

*For highest requirements – large-scale machines for steel and rolling mills*

Drives for steel and rolling mills are exposed to extremely high requirements. Glowing steel, changing operating modes and arising overloads mean a high electrical and mechanical stress which requires a highly rugged design.

As a traditional subsupplier for heavy industry, over the decades VEM Sachsenwerk has become a specialist for rolling mill drives. At new construction of rolling mills as well as at modernisation and retrofitting of existing machines, we are a competent partner for steel industry. Our delivery program includes drives of type twin drives, such for mill stands, shears and coilers, which are suitable for highest requirements. Moreover our specialised personnel is experienced in changing over the production lines of DC machines towards three-phase technology at simultaneous capacity increase.

The drives by VEM Sachsenwerk comply with the SEB guidelines for rolling mill motors of the German Iron and Steel Institute (Verein Deutscher Eisenhüttenleute VDEh).



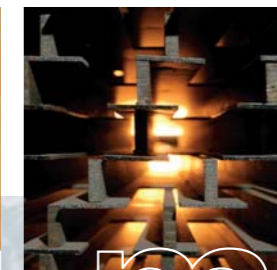
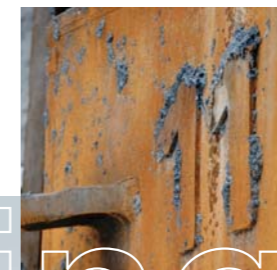
*Coiler drive*  
High-voltage asynchronous motor with squirrel-cage rotor  
1,500 kW / 660 V / 300 rpm



*Rolling mill drive*  
High-voltage synchronous motor  
5,000 kW / 2,000 V / 0-160 / 400 rpm

*Technical data*

Series:	Three-phase asynchronous motors Tree-phase synchronous motors
Frame sizes:	from 400 onwards
Power range:	500 - 18,000 kW
Frequency:	for converter operation or 50 Hz, 60 Hz
Speed range:	30 - 1,800 rpm
Cooling types:	Water cooling
Types:	B3, V1, V2, IM 7311, IM 7315



steel- and rolling mills...



Origin of photo material: Zellstoff Stendal

*High capacity and reliability– drives for pumps and compressors*

No matter if they are used in power plants, in oil and gas industry or in plastic processing industry – high capacity pumps and compressors are used in many industry sectors for different systems. Since they often are the heart of the production line, the drives must be very reliable, long-lived and energy efficient.

VEM Sachsenwerk produces high-voltage asynchronous and synchronous motors for pumps and compressors which comply with these high requirements. We offer individual drive solutions specific to the application with a large range of modifications. These are among others water cooled motors with a minimum noise emission or converter fed drives. Our technical know how assures that the operator can use the plants in an energy efficient way.

VEM Sachsenwerk supplies chemical, oil and gas industry as well as electrical and environmental engineering companies and processing industry with pump and compressor drives.

*Technical data*

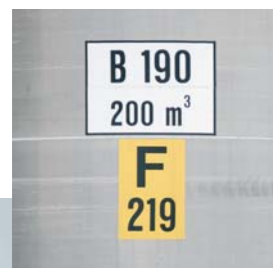
- Series: Three-phase asynchronous motors  
Three-phase synchronous motors
- Power range: 500 - 37,000 kW
- Voltage range: 690 - 13,800 V
- Frequency: 50 Hz, 60 Hz or for converter operation
- Speed range: 200 - 1,800 rpm
- Number of poles: 4- to 36-pole
- Cooling types: Air-, water cooling



*Pump drive*  
High-voltage asynchronous motor with squirrel-cage rotor  
2,550 kW / 6,000 V / 331 rpm



*Pump drive*  
High-voltage asynchronous motor with squirrel-cage rotor  
800 kW / 11,000 V / 994 rpm

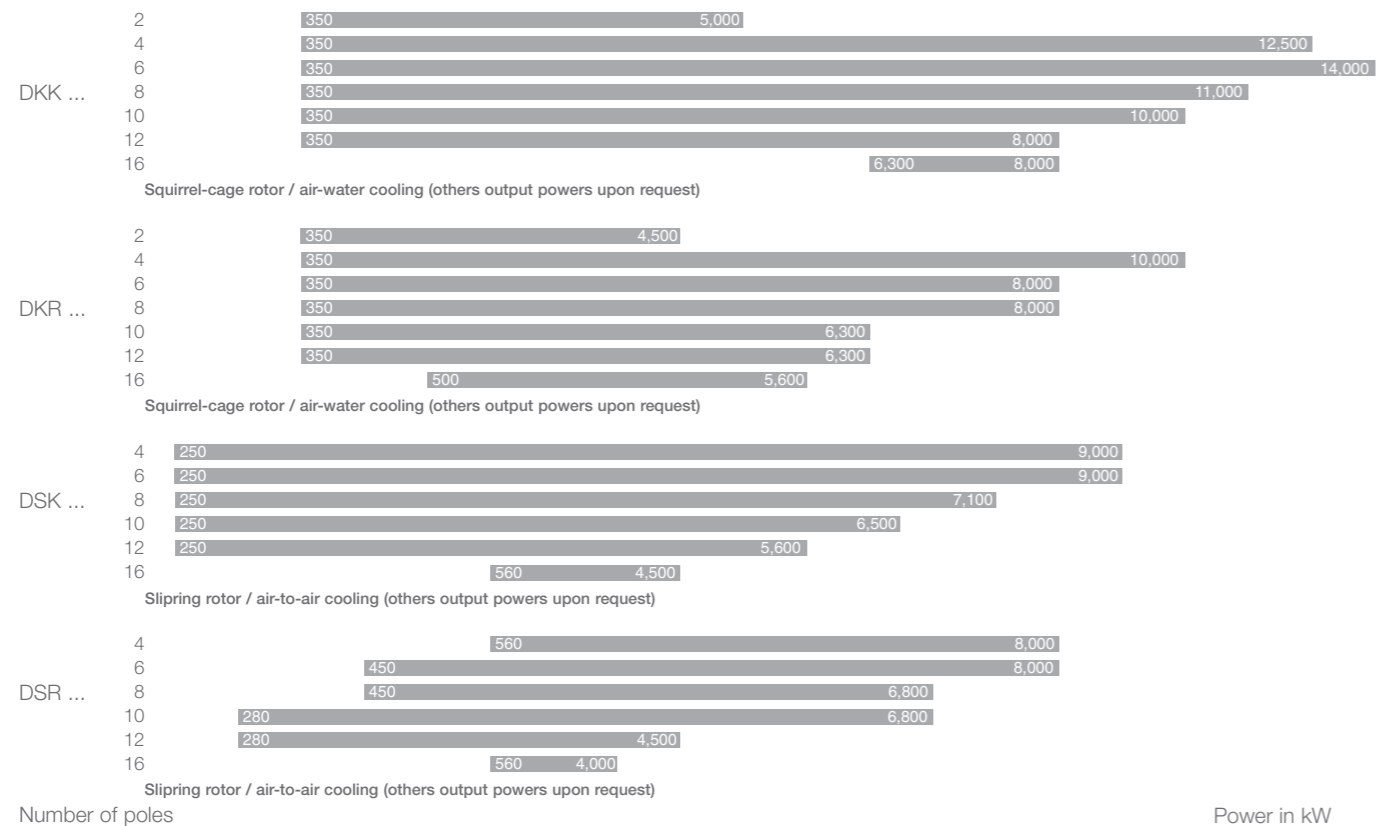


pump industry...

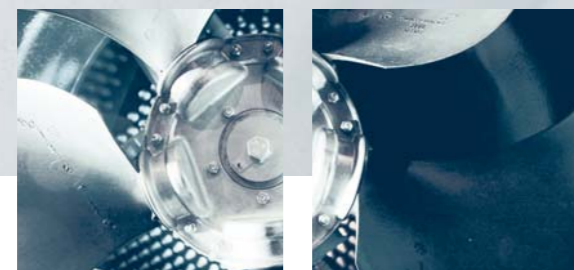
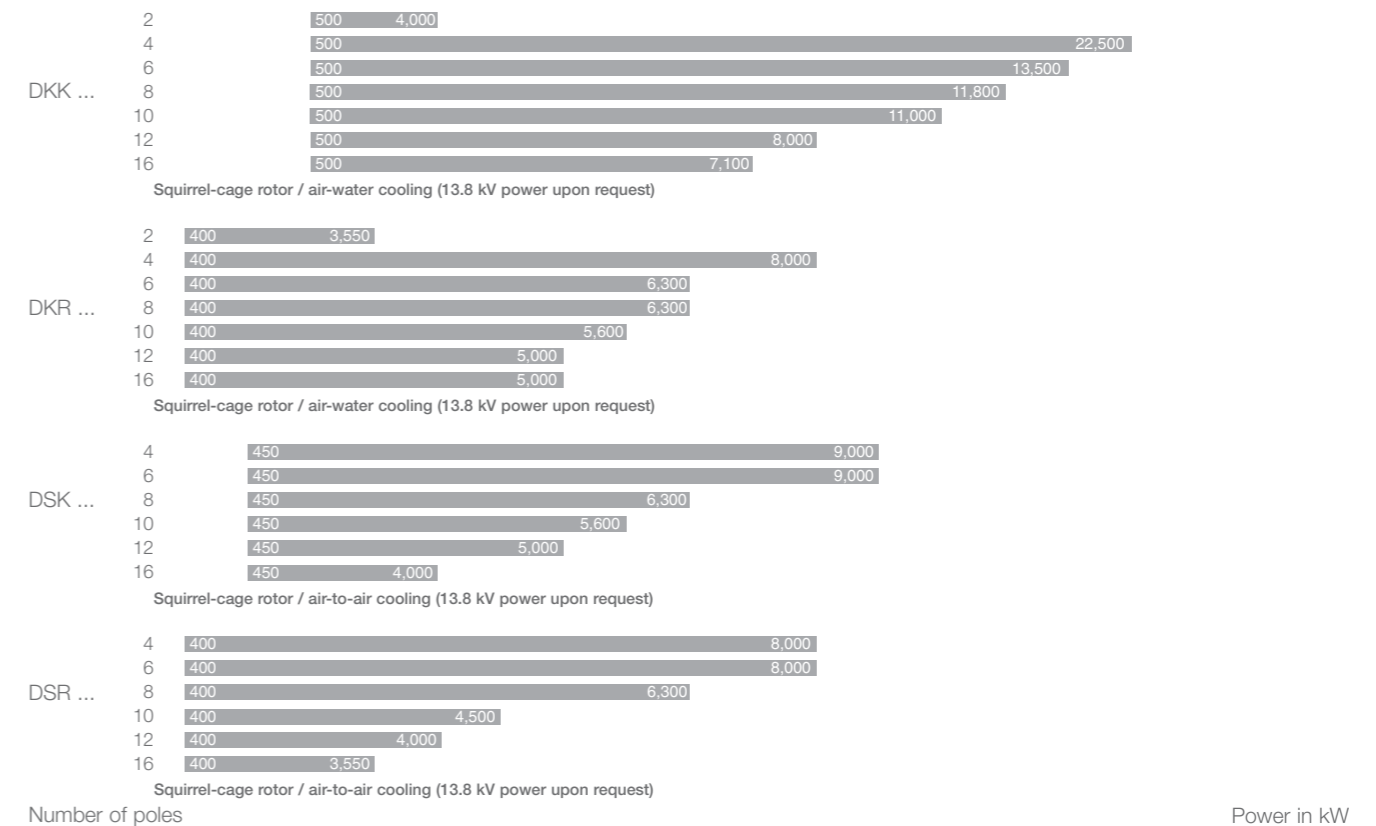


Delivery program

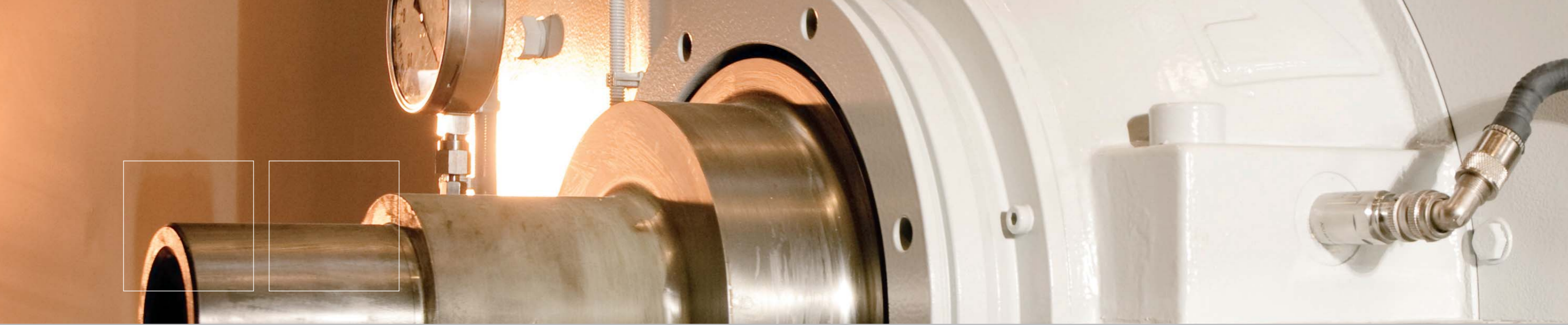
Three-phase high-voltage asynchronous motors 6 kV



Three-phase high-voltage asynchronous motors 10 kV



delivery program...



*Delivery program*

**High-voltage synchronous motors, brushless (6 kV / 50Hz /  $\cos \phi = 0.9\bar{u}$  / air-water cooler)**

4	2,000	24,000
6	2,000	24,000
8	2,000	16,000
10-12	2,000	14,000
16-20	2,000	14,000
24-28	2,000	14,000
30-36	2,000	27,000

Number of poles

Power in kW

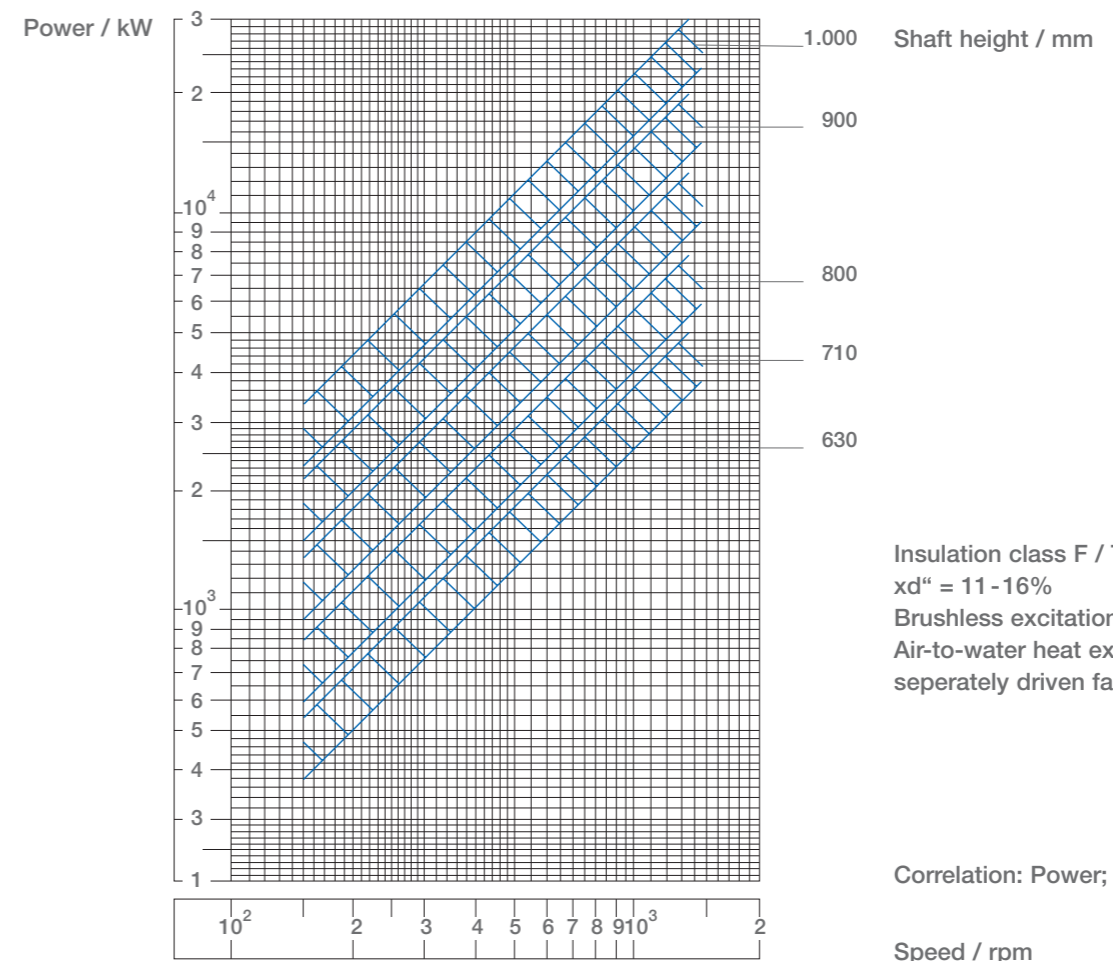
**High-voltage synchronous motors, brushless (10 kV / 50Hz /  $\cos \phi = 0.9\bar{u}$  / air-water cooler)**

4	2,000	37,000
6	2,000	37,000
8	2,000	20,000
10-12	2,000	20,000
16-20	2,000	20,000
24-28	2,000	30,000
30-36	2,000	37,000

(higher output powers upon request)  
Number of poles

Power in kW

**Converter-fed synchronous motors with damper winding**



delivery program.







*Participation in selected industrial projects*

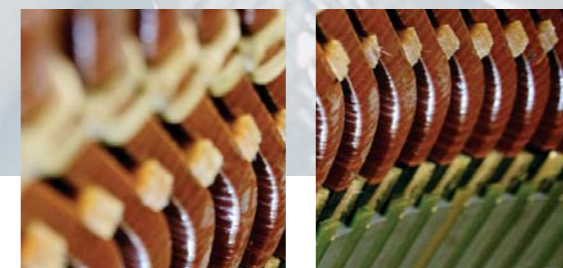
Cement industry

<b>Three-phase high-voltage asynchronous motors with squirrel-cage rotor</b>		
Kokshe / Kazakhstan	Fan drives 2,930 / 365 kW Mill drives 450 kW	2008
AUCC II Cement Plant / Lybia	Fan drives 3,150 kW Kiln drives 750 kW	2008
<b>Three-phase high-voltage asynchronous motors with slipring rotor</b>		
Sumbe / Angola	Mill drives 4,100 / 2,900 / 2,300 kW Crusher drives 1,600 / 355 kW	2010
Ha Tien / Vietnam	Fan drives 2,832 / 495 kW Mill drives 3,200 / 750 / 680 kW	2010
KRIMFA / Ukraine	Fan drives 4,085 / 895 / 485 kW Mill drives 6,800 / 3,500 kW Crusher drives 900 kW	2009-2010
Kursk / Russia	Fan drives 560 kW Mill drives 4,400 kW Crusher drives 2,000 / 315 kW	2009
Podgorensky / Russia	Fan drives 765 kW Mill drives 7,000 / 1,320 kW Crusher drives 2,000 kW	2009
Al Takamol / Sudan	Fan drives 2,900 / 420 kW Mill drives 4,720 / 2,380 kW Crusher drives 1,180 kW	2008-2009
KIREFA / Senegal	Fan drives 2,815 / 353 kW Mill drives 3,500 / 2,500 kW	2008
Orascom / Egypt	Fan drives 520 kW Mill drives 5,300 / 4,900 kW Crusher drives 850 kW	2008

Chemical, Oil- and Gas

<b>Three-phase high-voltage synchronous motors</b>		
MAPTAPUTH / Thailand	Piston compressor drives 22,500 / 7,100 kW	2009
LDPE Tasnee / Saudi Arabia	Piston compressor drives 27,500 / 7,600 kW	2007
LDPE Bandar Imam / Iran	Piston compressor drives 22,500 / 7,000 kW	2007
LDPE Marun / Iran	Piston compressor drives 22,400 / 6,500 kW	2003
LDPE BASELL / France	Piston compressor drives 23,500 / 5,600 kW	1999
<b>Three-phase high-voltage asynchronous motors with squirrel-cage rotor</b>		
Datteln-Sterling / Germany	Cool water drives 14,500 / 4,100 kW	2009-2010
Suez II / Alexfert / Egypt	Piston compressor drives 950 / 750 kW	2004, 2007
Leuna / Germany	Piston compressor drives 725 / 235 kW	2003
<b>Three-phase asynchronous high-voltage motors with slipring rotor</b>		
Jakhira / Lybia	Turbo compressor drives 7,000 kW	1999

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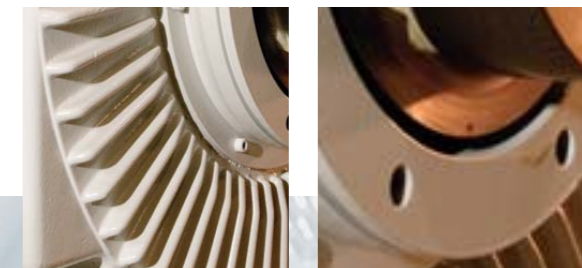
*Participation in selected industrial projects*

Rolling mill drives

<b>Three-phase high-voltage asynchronous motors with squirrel-cage rotor</b>		
LOWAKK / Germany	Hot planisher 450 kW	2010
Rasselstein / Germany	Coiler drives 2,000 / 750 kW	2009, 2003
MMK 2500 / Ukraine	Rolling mill drives 560 kW Auxiliary drives 1,500 / 560 kW Coiler drives 1,500 kW	2008
Tianjin / China	Wire rod mill drives 4,000 kW	2008
TKS Bruckhausen / Germany	Rolling mill drives 5,000 kW	2006
TMZ Marcinelle / Belgium	Rolling mill drives 1,500. 600 kW	2005
<b>Three-phase high-voltage synchronous motors</b>		
Rasselstein / Germany	Rolling mill drives 4,000 / 3,000 kW	2009, 2003
Quatrotandem EKO / Germany	Stand drives 5,900 kW	2009
IISCO Steel / India	Stand mill drives 4,000 kW Edger 1,500 kW	2009
MMK 2500 / Ukraine	Stand drives 10,000 kW Twin drives 8,000 kW Edger 1,600 kW	2009
MMK 5000 / Ukraine	Twin drives 12,000 kW Edger 1,250 kW	2008
TKS Bruckhausen / Germany	Rolling mill drives 6,000 / 5,000 kW	2006, 2003
Alu Norf / Germany	Rolling mill drives 5,000 kW	2005

Pump drives

<b>Three-phase high-voltage asynchronous motors with squirrel-cage rotor</b>		
KW Datteln / Germany	Pump drives 14,500 / 4,100 kW	2009
Maritza East / Bulgaria	Pump drives 1,300 / 1,100 kW	2009
Qinshan Power Plant / China	Pump drives 7,700 kW	2009, 2008
REA Cottam / U.K.	Pump drives 1,400 / 800 / 250 kW	2007, 2005, 2004
Al Balikh / Syria	Pump drives 1,300 kW	2007
<b>Three-phase high-voltage asynchronous motors with slipring rotor</b>		
Pumps-Syria	Pump drives 1,070 kW	2003
Asswan Pumping Station / Egypt	Pump drives 750 kW	2000
Bagdad / Irak	Pump drives 490 kW	2000
Lattakia / Syria	Pump drives 1,150 kW	1999
Aleppo / Syria	Pump drives 1,500 kW	1999
<b>Three-phase high-voltage synchronous motors</b>		
Yanbu / Saudi Arabia	Pump drives 4,200 kW	2009



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