

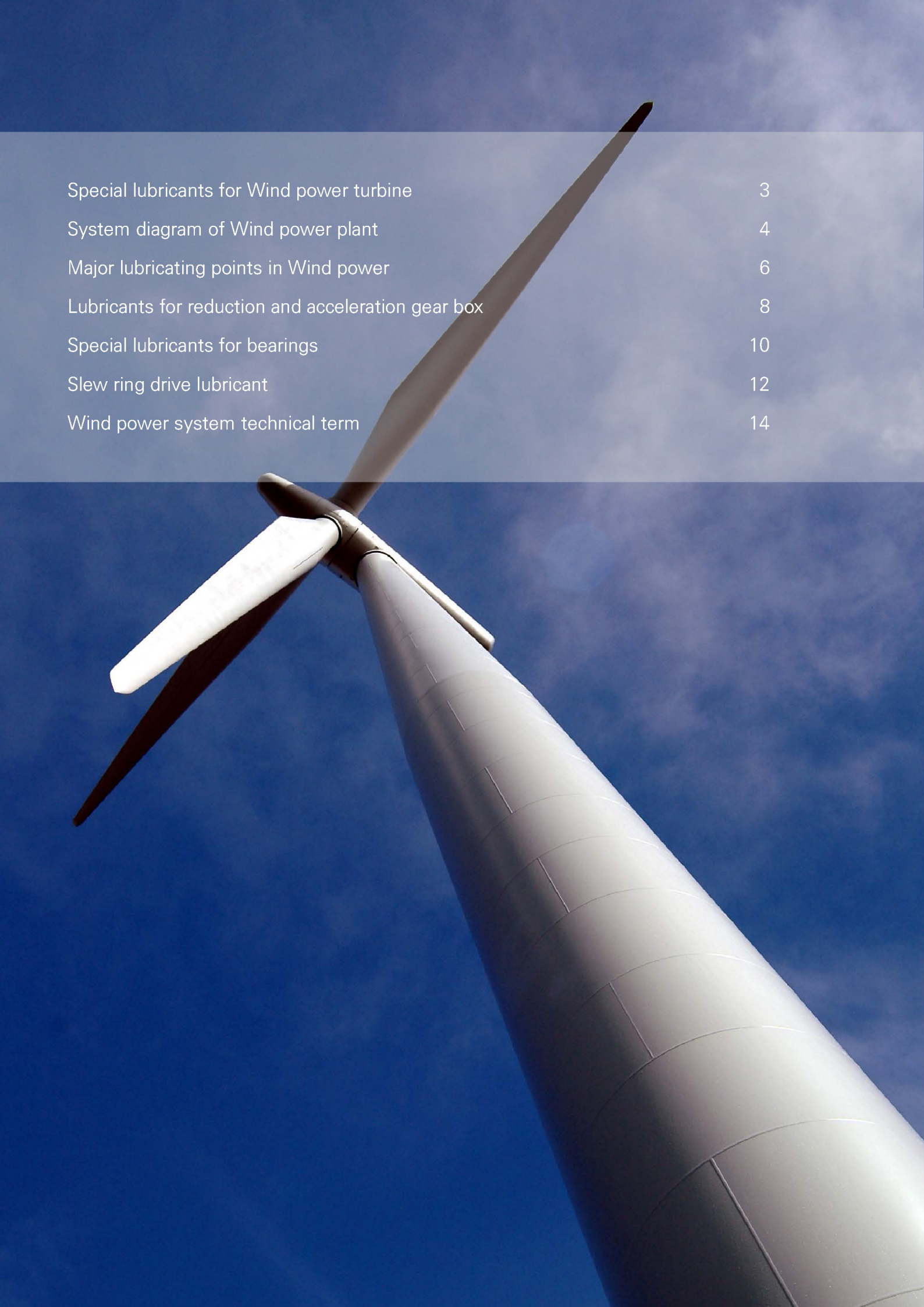


Your global lubrication partner

LUBCHEM
LUBRICATION

Special lubricants for wind power plants





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Special lubricants for wind power turbine

With increasing energy demand response to the global demand for clean energy, the correct answer to solve lubricating problem in wind power is to apply a special Lubchem lubricants.

For reliable operation and efficiency of wind turbines, specially designed lubricants for use in various parts of environmental condition are required.

While satisfaction at wide temperature range, high-load conditions and prevention to contamination of the water, choosing the LUBCHEM synthetic special lubricant will be the easiest solution to solve the mechanical problems that would be expected in wind power plant.

Lubricant should be regarded as design element in machine manufacturing thus, selecting the proper lubricants in machine operation minimize production loss, repair cost and unexpected equipment downtime caused by unnecessary maintenance.

Special lubricants produced by the lubricating experts

Our high level of lubrication recipe and find the best product from the ground up in close cooperation through any issues that require lubrication to customer needs by focusing on research and development and production of customized and OEM. Our well-trained field engineering services team offers the best customer service related to the operation and maintenance of the industrial equipment and lubrication systems. These services will assist you in solving the problems associated with mechanical drive failures without lubrication from a long-term perspective of the customer's wind power equipment In addition to the LUBCHEM synthetic lubricants.

Proven LUBCHEM lubricant applied in the OEM

LUBCHEM have been officially certified by the world's leading electronics companies, automobile makers and various machine manufactures through supplying OEM lubricants in high technology.

We are committed to develop products that meet the strict testing standards required by our customers through a variety of physical properties, mechanical tests and actual field test with the benchmark of the test chamber.

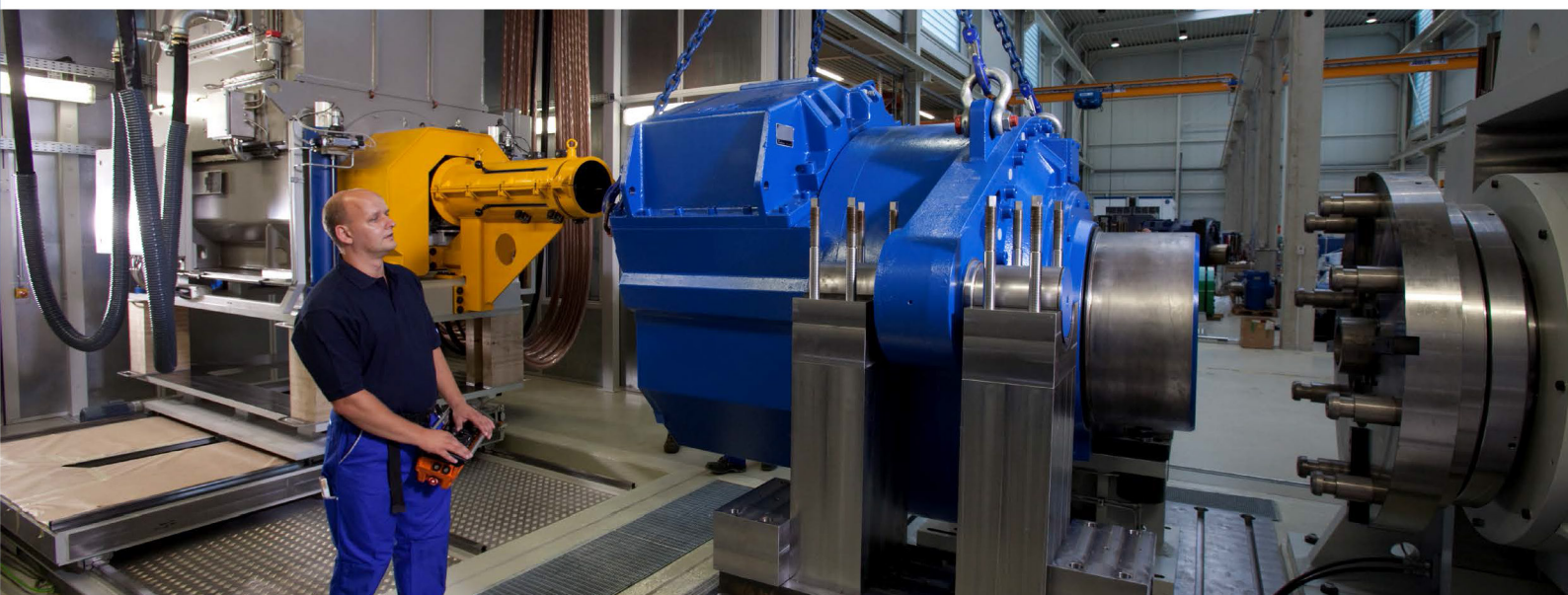
Our synthetic gear oils are applied to various industrial facilities that operate in harsh conditions and also, were proven the superiority of its quality from customers. Furthermore, bearing grease properly formulated with synthetic oils and special thickeners plus additives have been supplied to the world's leading bearing manufacturers for long-term and lifetime lubricants.

Used oil analysis and development of alternatives

Customers are constantly required a high performance lubricant. Accordingly, we try to do our best to develop excellent substitute than conventional lubricants from taking advantage of state-of-the-art manufacturing know-how and lubrication analysis equipment.

By economical and reliable Lubchem special lubricants, please achieve cost-effective facility management.

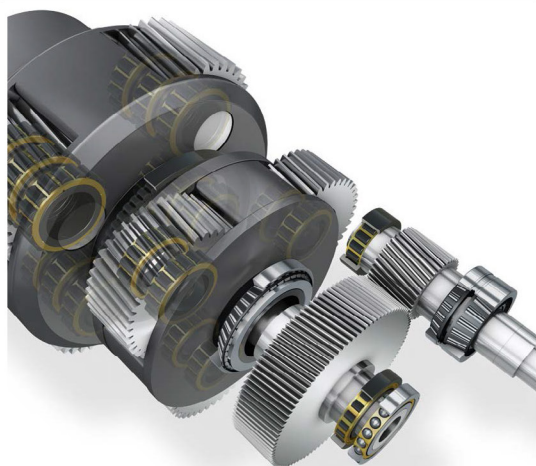
Our lubrication engineers will help you at any time.



Lubricants for reducing and acceleration gear box

Components

Requirements of Lubricant



Main Gearbox





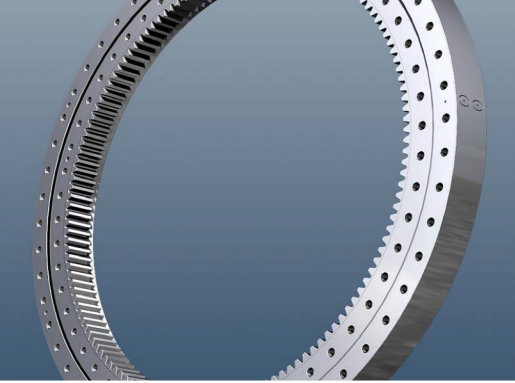

Gear Motors

- required of high resistance to scuffing and micro-fitting
- compatibility with paints and elastomers
- Lubricants should offer operating reliability in gears and bearings



Products	Special features	Advantage
LUBCHEM GM 320 S (PAO, ISO VG 320)	<ul style="list-style-type: none"> <input type="checkbox"/> synthetic high performance oil, especially suitable for low speed and high load at elevating temperature <input type="checkbox"/> 3 times longer oil change interval compared to mineral oil <input type="checkbox"/> fully synthetic gear oil based on synthetic hydrocarbon 	
LUBCHEM GH 320 (PAG, ISO VG 320)	<ul style="list-style-type: none"> <input type="checkbox"/> synthetic high performance oil, especially suitable for low speed and high load at elevating temperature <input type="checkbox"/> 5 times longer oil change interval compared to mineral oil <input type="checkbox"/> fully synthetic gear oil based on PAG 	<ul style="list-style-type: none"> <input type="checkbox"/> high FZG scuffing resistance > 12 <input type="checkbox"/> preventing premature failure of bearings due to high stable operating at high temperature <input type="checkbox"/> good anti-wear property
LUBCHEM GM 320 S (PAO, ISO VG 320)	<ul style="list-style-type: none"> <input type="checkbox"/> synthetic high performance oil, especially suitable for low speed and high load at elevating temperature <input type="checkbox"/> 3 times longer oil change interval compared to mineral oil <input type="checkbox"/> fully synthetic gear oil based on synthetic hydrocarbon 	<ul style="list-style-type: none"> <input type="checkbox"/> oil leakage prevention due to compatibility with NBR and FKM seal materials <input type="checkbox"/> no blocking in oil filter <input type="checkbox"/> clean gear operating possible due to low residue building <input type="checkbox"/> higher efficiency with optimized operating
LUBCHEM GH 320 (PAG, ISO VG 320)	<ul style="list-style-type: none"> <input type="checkbox"/> synthetic high performance oil, especially suitable for low speed and high load at elevating temperature <input type="checkbox"/> 5 times longer oil change interval compared to mineral oil <input type="checkbox"/> fully synthetic gear oil based on PAG 	

Bearing lubricants

Components	Lubricating condition
 <p data-bbox="619 622 774 651">Main Bearings</p>	<ul style="list-style-type: none"> <input type="checkbox"/> low speed <input type="checkbox"/> operating under ocillation <input type="checkbox"/> high load <input type="checkbox"/> vibration
 <p data-bbox="619 987 831 1016">Generator Bearings</p>	<ul style="list-style-type: none"> <input type="checkbox"/> low and high speed <input type="checkbox"/> operating under ocillation <input type="checkbox"/> high temperature <input type="checkbox"/> high load <input type="checkbox"/> vibration
 <p data-bbox="619 1420 842 1449">Blade Pitch Bearings</p>	<ul style="list-style-type: none"> <input type="checkbox"/> operating under ocillation <input type="checkbox"/> high load <input type="checkbox"/> vibration <input type="checkbox"/> low temperature
 <p data-bbox="619 1807 767 1836">Yaw Bearings</p>	<ul style="list-style-type: none"> <input type="checkbox"/> operating under ocillation <input type="checkbox"/> high load <input type="checkbox"/> vibration



Products	Special features	Advantage
<p>LUBCHEM SB 6041 S (Mineral + Li-soap, NLGI 1)</p>	<p>The wide service temperature range, good pumpability and metering in centralised lubricating systems plus the good grease distribution and oil release ensure trouble-free operation of wind turbine bearings. The good wear protection properties, even under vibration conditions, lead to extended bearing life.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> due to extended maintenance interval, high production efficiency <input type="checkbox"/> repair and spare parts cost saving <input type="checkbox"/> due to extended maintenance interval, high production efficiency <input type="checkbox"/> repair and spare parts cost saving
<p>LUBCHEM SB 6041 S (Mineral + Li-soap, NLGI 1)</p>		
<p>LUBCHEM SB 6041 S (Mineral + Li-soap, NLGI 1)</p>		
<p>LUBCHEM SB 6041 S (Mineral + Li-soap, NLGI 1)</p>		

Slew ring drive lubricants

Components

Lubricating condition



Slew ring drives
(yaw and pitch
control)

- low speed
- high load
- vertical positioning tooth face
- easy to corrosion



Products

LUBCHEM BE 2101 / 2102
(Mineral + Al-complex soap,
NLGI 1 / 2)

Advantage

- no grease dropping from vertical tooth flank and under vibration thanks to good adhesivness
- prevention of lubricant contamination due to bright grease color in nacelle and turbine tower
- saving cleaning costs
- useful in central lubricating system and good pumpability, trouble-free operation
- high resistance to salty water and humid air and providing good anti-corrosion in offshore application even during non-operation
- can be used for large and samll open gears

윈드파워 시스템 기술 용어

로터(Rotor)

주로 윈드 터빈은 동력 출력의 최적화와 조절을 위한 규칙적인 간격의 3개의 블레이드가 부착된 로터를 가지고 있음. 로터 속도는 가변적이는데 이는 공기역학적인 효율성을 극대화하고 동력제어 동안에 속도에 적응하기 위한 트랜스미션 시스템에서 동적인 하중을 최소화하는데 있다.

날개(Blades)

주로 유리섬유 강화 에폭시 소재로 제조됨. 제조사별로 차별성 있는 제조 공정을 가지게 됨. 접착제를 사용하여 제작하는 방법과 하나의 부품으로 주조하는 방식으로도 제조가 가능하다. 공기역학적으로 설계됨과 동시에 특별히 안정성에 유의하여 제작된다.

로터 허브(Rotor hub)

로터허브는 이이언 주조 공법으로 제작되면 플랜지 접속이 있는 주사프트에 부착된다. 허브는 피치 베어링과 볼트 접속의 수리 과정에서 최소 두명의 수리 작업자가 들어 갈 수 있을 정도로 제작됨.

메인 샤프트와 베어링(Main shaft and bearing)

메인 샤프트는 합금강으로 단조하여 제작되며 블레이드 피치 시스템에서 동력과 신호를 전달하기 위해서 내부는 속이 빈 상태로 제작된다. 자동조심이중스페리컬 롤러 베어링이 사용되며 주로 자동 급지 시스템으로 운영된다. 베어링실은 보수가 필요 없는 labyrinth seals을 사용한다.

기어박스(Gearbox)

기어박스는 고객 맞춤형으로 제작되는데 3단 헬리컬 유성기어 타입이 주로 적용됨. 첫번째 두 개의 헬리컬 유성 기어인, 높은 토크 단계는 컴팩트한 높은 성능을 제공한다. 고속 단계는 일반 헬리컬 기어가 적용되며 동력의 흐름과 피치시스템에서 메인 샤프트를 통해서 신호를 조절의 흐름을 허용하기 위한 오프셋으로 연결되어 진다. 기어박스에는 대형 냉각 시스템과 필터 시스템을 갖추고 있어서 작동의 최적화를 달성한다.

발전기(Generator)

발전기는 squirrel cage roto를 가진 완전히 밀폐된 asyn-chronous 기계이며 슬립 링이 별도로 요구되지는 아니함. 발전기 동력 구조와 stator 와인딩은 부분적인 하중에서 높은 효율성을 위해 특별히 구조한 제너레이터 내부에는 열 교환 시스템을 갖춘 환기 및 냉각 장치가 부착되어 있다.

기계적 브레이크(Mechanical brake)

브레이크는 터빈의 작동을 일시 정지 하기 위해서 부착된 장치임. 기어박스 고속 샤프트 부위에 장착되며 두 개의 유압 캘리퍼를 가지고 있다. 오시스렐 베어링은 내부적으로 기어가 장착된 슬루링과 분리된 오 브레이크이다. 6개의 전기적 유성 기어 모터가 이를 구동시킨다.

컨트롤러(Controller)

표준 산업형 컴퓨터를 통해서 터빈을 컨트롤 함. 컨트롤러는 자기 진단 기능을 수행하고 각종 터빈의 작동을 제어 함.

동력 전환(Power conversion)

파워 전환 시스템은 제너레이터 작동을 가변적인 속도, 주파수와 볼트로 작동하게 하지만 동력을 지속적인 주파수와 볼트를 MV Transformer에게 제공함. 동력 전환 시스템은 보수를 쉽게 하기 위해 모듈 형태로 정렬됨. 동력은 낫셀에 설치된 정류기로부터 타워 하단부에 설치된 인버터까지 DC에 의해서 변환되어 케이블 사용을 최소화 하고 트랜스포머가 장착된 낫셀의 단순화 시킴.

타워(Tower)

주로 원형 타입의 스틸 타워로 제조 됨. 타워는 윈드 터빈을 지지하고 장착하는 기본 지지대임.

작동(Operation)

윈드 터빈은 자동적으로 작동 및 기동 되는데 풍속이 초당 3~5m에 이를 경우 점 됨. 작동중 동력효율이 떨어질 경우 피치 앵글과 로터 속도가 지속적으로 조절되어 공기역학적 효율성을 극대화 시킴. 일반적으로 풍속 13~14m 초속일때가 가장 운전에 적합한 조건임. 보다 높은 풍속에서 출력이 정격적으로 유지되도록 규제됨. 속도의 급격한 변화에 따른 트랜스미션에 갑작스런 부하를 적절히 제어하여야 함. 초속 25m가 넘을 경우 터빈은 가동이 중지된다. 그 이하로 풍속이 떨어지는 경우 시스템이 자동적으로 가동 되는 운전 시스템을 갖추고 있음.

원격 조절(Remote control)

풍력 설비에는 원격으로 조절하는 시스템을 갖추고 있어서 윈드 터빈의 상태를 체크하고 상황에 맞는 운전 조건을 셋팅할 수 있다. 원격 조정 시스템을 갖춘 경우 현재 전기적 기계적 운전 상태를 시스템의 오작동 여부를 체크하고 각종 데이터 수집이 가능하다.

터빈 상태 모니터링(Turbine Condition Monitoring)

터빈의 기계적 부품 요소에 대한 문제점을 실시간으로 정밀 상태 진단이 가능함. 각종 요소를 취합하고 분석하여 사전 설비 보전에 초점을 두고 운영함.





Lubchem Korea keep a variety of standardized testing equipment and always spend our all efforts in quality assurance through the regular product inspection.

We are consistently developing the special lubricant that can be applied in all industries, through close relationship and cooperation with OEM, such as gears, bearings and chains etc.

Our lubricant development is firstly initiated from the customer's perspective and we are willing to return the development benefits to customer with highest priority. Based on our optimized processes, higher productivity, and products that meet the strict quality standards, we help customer to save cost in maintenance and repair parts. In addition, through a close partnership with our customers, we provide a high level of products and services that can be differentiated with customer's rival companies.

Our goal to development of lubricants is that achieve maximum re-lubrication interval with minimal lubricant usage at each lubricating points and these results can save natural resources and protect the environment through waste minimization.

Specialty lubricants can be used to minimize the energy savings and CO2 emissions by high efficiency. The most basic value in lubricants developed by our experts is that clean and safe product, easy to handle. To solve high level of various complicating lubricating problem in developing lubricants and applications, if you need our help, please talk to us.

Our staffs are happy to help.

You want to know more about Lubchem?
Type "LUBCHEM" on youtube!



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