

At ITW PP & F Korea Limited we are fully committed to a proactive approach to safety,

health, environment and product

in-house Training Facilities

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Korea 06108

Gangnam-gu, Seoul,

PAX Tower, 609 Eonju-ro,

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reflected in:

improvement. Our commitment is well

Our continuous Research and Developments

Our comprehensive range of Quality Products

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S&FLUIDS

• Our on-going in-house Training and our

Our many long-term Repeat Customers

### **About ITW**

ITW (NYSE:ITW) is a Fortune 200 global multi-industrial manufacturing leader. The company's seven industry-leading segments leverage the unique ITW Business Model to drive solid growth with best-in-class margins and returns in markets where highly innovative, customer-focused solutions are required. ITW has nearly 50,000 dedicated colleagues in operations around the world who thrive in the company's unique decentralized and entrepreneurial culture. To learn more about the company and the ITW Business Model, visit www.itw.com.

To offer the best service to each market segment, ITW PP & F Korea Limited operates the following divisions that are branded uniquely for the most prominent recognition by users and customers:



**OMEGA Ultimate Lubricants** Specializing in lubrication solutions - greases, oils and additives

### MAGNA Welding Alloys Specializing in gas and arc welding consumables for maintenance



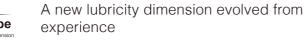
**CORIUM Industrial Chemicals** 



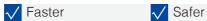
Specializing in industrial & commercial chemicals and adhesives



### ZETALUBE Lubricants



### We supply superior products that make maintenance:

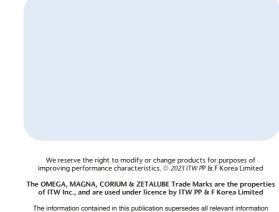


✓ More reliable

### Our products are engineered to:



✓ Reduce downtime ✓ Cut wastage



The information contained in this publication supersedes all relevant information previously released and is to the best of our knowledge and accurate at the time of issue on November, 2023.

ITW PP & F Korea Limited is a business unit of Illinois Tool Works Inc. (ITW), U.S.A.

# **EMPOWERING** the Power Generating Industries











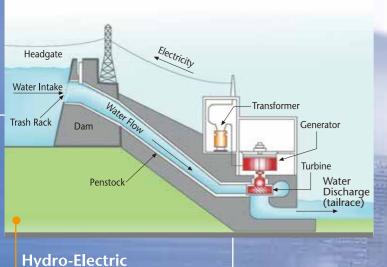




### www.magnagroup.com



Whether you are an engineer, a maintenance professional or a manager of an electric power generating plant, you are among the most critical human assets backing up modern civilizations. Towns, cities and their firms and industries rely on uninterrupted power supply to operate. Your service to your power generating plants affects the lives of thousands, if not millions. You understand that the quality of your service largely depends on a comprehensive maintenance program that needs to put its top priority on "Zero Unplanned Downtime". Yet there are a few blind spots in power generation maintenance that have long been posing potential threats to you and your plants, and one of them is certainly – lubrication.



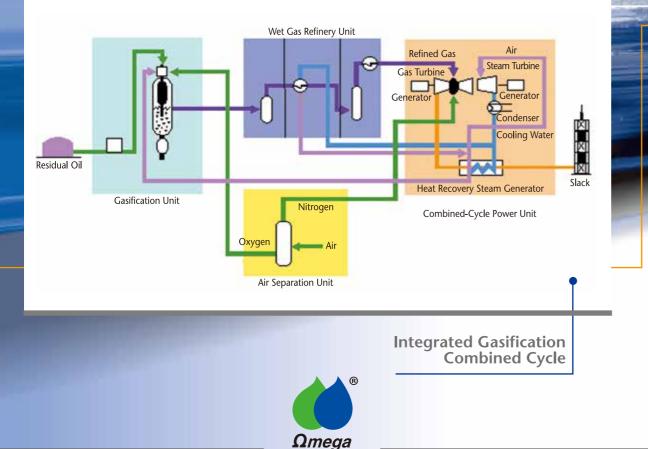
While yours may be fossil fuel fired power, hydro power, geothermal power, or nuclear power, when it comes to lubrication and maintenance, you face similar challenges like heavy loads, high temperatures and water contamination in critical components like chains, compressors, couplings, engines, steam cylinders and turbines, etc.

**Power Generation** 



OMEGA, a preferred name in lubrication since 1965, offers complete and specialized lubrication solutions to your power plant. As a winning division of ITW PP & F Korea Limited, a business unit of ITW, Inc., USA - the world's leading industrial services innovator, OMEGA has successfully leveraged its tribology expertise and developed the industry-best lubricants to satisfy and exceed the most stringent requirements in the power generating industry.

Teaming up a global distributor and lubrication consultancy network, OMEGA has been joining hands with professionals like you in the power industry to arrive at solutions for the lubrication related needs at your plants. We help you identify areas for improvement in your plant and work to elevate the productivity and lifespan of your equipment. You will be assisted in selecting the most optimum lubricant for a particular application. We know every kilowatthour counts. Availability, performance, costsaving and safety are 4 pillars of maintenance at the top of your mind and we are confident to help you deliver all the benefits to your plant plus your ultimate electricity consumers.



In Iubrication, we understand your requirements better than any one else. Talk to your **OMEGA** expert today!









®

# Your Partner for MRO **Solutions**





## **Power Plant** Maintenance



Power plant maintenance can be divided into two general categories: RoutinemaintenanceandPreventivemaintenance.

Routine Maintenance includes the hourly, daily, and weekly maintenance requirements recommended in the manufacturer's literature. Some routine maintenance and checks include the following:

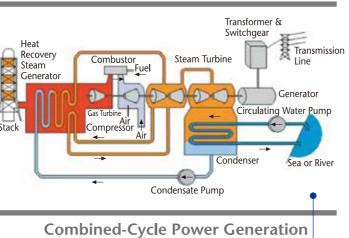
- 1. Top up lubrication oil levels to the maximum levels
- 2. Re-grease and identify any contingency needs
- Free movement of ventilation louvers 3.
- 4. Drain water and sediment from strainers and filters
- 5. Maintainlevel of coolant
- 6. Check radiator and coolant hoses for leaks
- 7. Check battery electrolyte level
- 8. Check all switches for proper operation
- 9. Drain water from fuel tank
- 10 Fill fuel tank as required with appropriate diesel fuel
- 11 Check fuel tank for leaks
- 12. Log all operator maintenance in the operation log book when it is completed

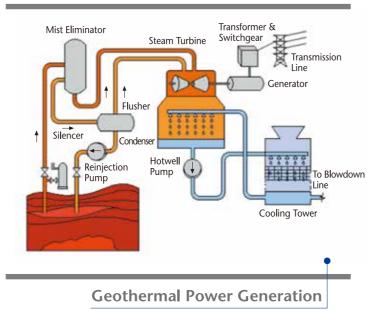
Preventive Maintenance requires the monthly, quarterly, semi-annual, and annual maintenance checks recommended in the manufacturer's literature. The maintenance supervisor is responsible for establishing a maintenance schedule to ensure the preventive maintenance is performed. A maintenance log book should be established for each generator plant and all maintenance checks recorded. The operation log book should be reviewed regularly to ensure that all preventive maintenance recommended by engine operating hours is scheduled; for example, the schedule of engine lube oil and filter replacement is normally based on hours of operation.

A power generation plant is a facility designed to produce electric energy from another form of energy, such as:

• Heat (thermal) energy generated from:

- •fossil fuels :
  - coal
  - petroleum
  - natural gas
- geothermal energy
- nuclear reaction
- •Potential energy from flowing water in a hydroelectric facility
- •Wind energy (windmills)
- •Solar energy using solar (photovoltaic) cells





CRITICAL COMPONENTS OF POWER GENERATION EQUIPMENT	LUBRICATION CHALLENGES	OMEGA SOLU
Chain	High temperatures & evaporation of ordinary lubricants	OMEGA 646 Superior Chair
		OMEGA 648



Axial Flow Compressor

Contamination, carbon deposits & oxidation

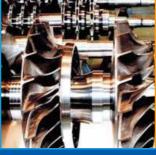
OMEGA 613 Superior Air Compressor (



Centrifugal Compressor

Water and moisture contamination, high loading and friction







	OMEGA ADVANTAGES
OMEGA SOLUTIONS	
OMECA 646 Superior Chain Lubricant	Ideal for lubricating conveyor chains at temperatures up to 200°C. Superior "Megalite" additive prevents metal welding and shearing. High stability provides lubrication for chains where other ordinary oils fling off, drip off or melt off.
<b>OMEGA 648</b> "Smokeless" Hi-Temp Chain Lubricant	Ideal for use in high-cleanliness and high-temperature applications, e.g. hot conveyor chains in drying ovens and similar severe applications. Advanced blend of extremely stable low-evaporation synthetic fluids. Non-carbonizing even when used at elevated temperatures for extended periods.
OMEGA 613 Superior Air Compressor Oil	All purpose oil suitable for an all-loss systems, or where contamination and leakage are unavoidable. Controls oxidation at elevated temperatures. Seals packing and pistons to prevent air leakage, stops the formation of carbon deposits and acts as a heat transfer medium.
<b>OMEGA 615</b> Synthetic Air & Refrigeration Compressor Oil	Supreme performance compressor oil formulated from synthesized, wax-free hydrocarbon base fluids combined with an advanced engineered super-stabilized additive package.
<b>OMEGA 670</b> Straight Mineral Gear Oil	Heavy-duty circulating oil designed for continuous reuse in circulation lubrication systems for gears and bearings. Fortified against foam and oxidation permitting high heat and improved wear performance.
OMEGA 690 Super EP Gear Oil	Excellent performance gear and bearing oil specially formulated to provide outstanding service in terms of equipment protection, extended oil life and hassle-free operation.
<b>OMEGA 699</b> Super Automatic Transmission Fluid	Provides protection from heat and oxidation – the two greatest enemies of automatic transmissions. Withstands severe operating conditions, no damage to oil seals and impervious to temperature changes.
OMEGA 613 Superior Air Compressor Oil	Designed for applications including steam and hydro turbine sets and other systems where long lubricant service life is required.
OMEGA 615 Synthetic Air & Refrigeration Compressor Oil	Provides up to ten times operating life of ordinary compressor oils used in rotary vane and rotary screw compressors. Suitable for use down to -40°C. Eliminates oil foaming and varnish formation.
<b>OMEGA 670</b> Straight Mineral Gear Oil	High resistance to foaming. Withstands sustained gear action without aerating. Completely resistant to water and moisture.
OMECA 690 Super EP Gear Oil	Lubricates transmissions, differentials and gearboxes to run efficiently for long periods. High water resistance, reduces acid and frictional wear. For multi-purpose, hypoid and extreme pressure applications as well as worm gear and limited slip differential applications.
<b>OMEGA 699</b> Super Automatic Transmission Fluid	Multipurpose high performance automatic transmission fluid designed to meet the service fill requirements for most vehicles and compressor applications.



Machinery Grease

Electric Motor OMEGA 77 Requiring heavy-duty and EP Bearing & Chassis long lasting lubricants Grease **OMEGA 85** All-Purpose Grease Diesel Engine OMEGA 757 Severe operating conditions - necessitates Long-Drain All-Fleet superior lubricant that Engine Oil gives extra long lifespan **OMEGA 903** Super Diesel Additive Gas Engin High speeds, vaporization, deposits and excessive contamination Open Gear Harsh conditions includes rust, corrosion and extreme temperatures. Only the most heavy-duty grease would qualify and perform satisfactorily OMEGA 690 Parallel Gear High loads, wide range of temperature

LUBRICATION

CHALLENGES



**CRITICAL COMPONENTS OF** 

POWER GENERATION EQUIPMENT



Engine Oil

**OMEGA 631** Superior Quality

OMEGA 73 Water Proof Open

Gear Lubricant

OMEGA 64 Pin, Bushing & Track Roller Grease

Super EP Gear Oil **OMEGA 612** 

Universal Lubrication & Hvdraulic Oil OMEGA 670

Super EP Gear Oil

periods of time because it ensures total surface coverage, even under extreme conditions.



Delivers outstanding extreme pressure characteristics and loading carrying properties, for use in all types of enclosed gear drives with circulation or splash lubrication systems. Premium quality automotive lubricant formulated from select base oil and an advanced additive system specifically for limited-slip differentials.

CRITICAL COMPONENTS OF POWER GENERATION EQUIPMENT	LUBRICATION CHALLENGES	OMEGA SOLUTIONS	OMEGA ADVANTAGES
Parallel Gear	High loads, wide range of temperature	OMEGA 22 "Glide Sensation+" All Purpose Grease	Supreme grease designed for a wide variety of application extremes of temperature.
Worm Gear	Heavy loads, slow speed, high energy consumption, foam and oxidation	<b>OMEGA 680</b> High-Performance Worm Gear Oil	High performance high viscosity oil designed for use in enc worm gears operating at moderate to high speeds temperatures, and where heavy loads and slow speeds pr Improves operating efficiency, saves energy, lowers oper temperatures and provides superior operating life for w gear sets.
		<b>OMEGA 690</b> Super EP Gear Oil	Specially designed for gear and bearing that provides outstan equipment protection and extended oil lifetime.
		<b>OMEGA 670</b> Straight Mineral Gear Oil	Heavily fortified against foam and oxidation. Enduring heat and not compromising wear performance.
General Purpose Applications - Grease	Applications - Grease Unpredictable and harsh conditions   Image: Conditions Image:	OMEGA 22 "Glide Sensation+" All Purpose Grease	High performance lithium complex grease with PTFE for a variety of applications and severe operating conditions.
		<b>OMEGA 33</b> Extreme Heat Resistant Grease	Supreme performance antiwear grease designed for temperature applications. Remains stable up to 37 Unparalleled heat tolerating capacity.
		OMEGA 57 Super Bearing Grease	Exceptional resistance to water contamination conditions to of power plants and similarly harsh environments.
		<b>OMEGA 73</b> Waterproof Open Gear Lubricant	Non-solvent containing grease for the lubrication of open and bearings. Super affinity to metal to resist fling-of wipe-off. Outstanding water resistance to minimize wa in wet conditions. High EP properties to prevent gear sur scoring, galling and scuffing.
		OMEGA 77 EP Bearing & Chassis Grease	Formulated especially to resist oil separation in high s rotating equipment, to protect against wear, rust and corre
		<b>OMEGA 85</b> "Shear Sensation Plus" All-Purpose Grease	High performance heavy-duty, polyurea-thickened multipu EP grease, for electric motor bearings. Shear-stable excellent extreme pressure and load-carrying characteris
Hydraulic Applications	High pressure, foam formation, oil migration	<b>OMEGA 615</b> Synthetic Air &	High performance lubricants to satisfy a wide range of r use equipment requirements.



11 21



LUTIONS	OMEGA ADVANTAGES
<b>2</b> brication & il	Designed for industrial and mobile service where antiwear lubricants are required.
<b>6</b> Iydraulic Oil	For use in high-speed, high-pressure piston, vane and gear pumps.
<b>5</b> r & Դ Oil	Supreme performance hydraulic oil formulated from synthesized, wax-free hydrocarbon base fluids combined with a carefully engineered super-stabilized additive package.
<b>5</b> Line	Highly suitable for the oil-fog or mist-lubrication of machine components such as slideways, bearings, gears, chains, etc. OMEGA 605 bonds tenaciously to working surfaces for long- lasting protection, contains foam inhibitors to reduce pressure on seals and boost overall performance.
tion+" Grease ng Grease ase ation Plus" Grease	Superior EP greases, exceptional resistance to the water contamination conditions typical of surface mining, and off- highway conditions.
<b>2</b> brication & il	Anti-wear hydraulic oils specially formulated to withstand wide temperature range applications.
<b>6</b> 1	High shear stable and high viscosity index ensures all-temperature performance. Built-in air and water-release agents to eliminate foaming and water emulsions. Contains excellent oxidation while fighting sludge, varnish and gum build-up.
<b>5</b> r & າ Oil	Provides up to ten times operating life of ordinary compressor oils used in rotary vane and rotary screw compressors. Suitable for use down to -40°C. Virtually eliminates oil foaming and varnish formation.
<b>1</b> eration Oil <b>5</b> r & n Oil	High performance naphthenic mineral oils engineered for use in refrigeration compressors. OMEGA 611 offers constant lubrication to rotors, pistons and bearings in all types of refrigeration compressor systems. Contains special foam suppressors to minimize foaming in compressors. OMEGA 615 is formulated with the blending of advanced synthetic POA (polyalphaolefin) for the most thorough lubrication. Leaves no harmful varnish or carbon deposits – eliminates maintenance cleaning of compressors.



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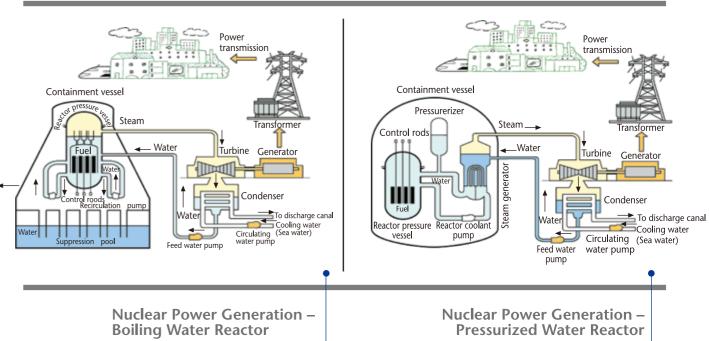
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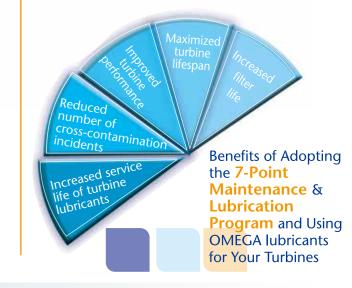
## OMEGA "7 – Point" Maintenance & **Lubrication Program** for Turbines

Comprehensive Inspection Prior to Filling	A comprehensive site inspective specification and volume of and potential HSE spill contained by the spill contain
Commission Fill & Recirculation	Commission fill & recirculation and the removal of solids cont The oil should be filtered acc
Oil Change	The regular process includes the turbine and filtering the
Recirculation Filtration & Purification	This involves the removal of oil. They are essential in m service, the oil should be test as well as the expert recomm
Failure Flushing	It is intended to isolate the and instituting a flushing reg
Filtration of Bulk Storage & Ancillary Systems	While ancillary and bulk stora water and other particulates be planned to remove these and ready when needed.
Survey and Study on Oil & Filtration	Filter service life can be opti by conducting this survey a cleanliness targets are achiev



CRITICAL COMPONENTS OF POWER GENERATION EQUIPMENT	LUBRICATION CHALLENGES	OMEGA SOLUTIONS	OMEGA ADVANTAGES
Corrosion Attack	Oil separation, water washout, rust, metal corrosion & oxidation	<b>OMEGA 95</b> Super Corrosion-Control Grease	Features exceptional shear stability, oxidation resistance an high penetration. Highly resistant to water and washou Excellent protection against rust, corrosion and wear.
		<b>OMEGA 99</b> "Seize-Stop" Grease	Acts as a thread lubricant and sealant, guards against acid actio metal seizing and galling, galvanic action, heat and rust actio Stable from -130°C to 1093°C.
		<b>OMEGA 99N</b> Nuclear-Grade "Seize-Stop" Grease	Finest quality nickel-based anti-seize compound for use in nucle power plants. Protects all types of threaded assemblies, even elevated temperatures up to 1,260°C.
		<b>OMEGA 612</b> Universal Lubrication & Hydraulic Oil	Specially designed as run-in or lay-up lubricant, provides effecti rust preventive films on the internal surfaces of machinery. Turbir quality circulation oil containing anti-oxidants and defoamants
		<b>OMEGA 636</b> Jamaican-Base Universal Maintenance Oil	Made with pure Jamaican pimento oil for enduring quali Four-in-one action – lubricates, penetrates, lifts water & inhil rust formation. Unprecedented standard of protection f metal surfaces against corrosion caused by oxidation.
Steam Cylinder	High temperatures and corrosion	<b>OMEGA 670</b> Straight Mineral Gear Oil	100% straight paraffinic gear oil designed for high-pur applications. Withstands acid, heat and wear. Provid exceptional protection against metal corrosion and oxidation
Transmission, Differential and inal Drive Acids, sludge and carbon deposits	<b>OMEGA 690</b> Super EP Gear Oil	High quality commercial gear lubricants formulated from sel- based oils and an advanced additive package. Engineered meet the most demanding extended drain and OEM requiremer	
	<b>OMEGA 699</b> Super Automatic Transmission Fluid	Provides superior thermal stability – resists temperatures to 176°C. Completely sulfur-free to prevent damaging a formation – improves system cleanliness for optimu transmission performance. Free from heavy waxes found ordinary transmission fluids – prevent sludge or carbon soli	
Gas Turbine	High operating temperatures leading to premature turbine oil failure. Requires lubricants with high temperature oxidative stability (175°C), good air release, minimized foaming and no rusting	<b>OMEGA 612</b> Universal Lubrication & Hydraulic Oil	Engineered for use in gas and steam turbines and applicatio under the most severe operating conditions. Anti-magne formulation – will not attract metallic dust & particles. Supe lubrication with anti-wear and anti-rust additives for consistent a long-lasting protection. Ideal for turbine application with its hi viscosity index – viscosity remains constant throughout temperatu fluctuations and retains its texture regardless of varied condition Special supplements to promote interface tenacity and hold lubrica in position – resists migration and fling-off. Special anti-foa additive – resist foam formation even at elevated temperatures
Steam Turbine	Constant and harsh water contamination, reduces oxidation stability and promotes rust. Extreme heat causing reduced turbine oil life through elevated oxidation. Need lubricants with moderate	<b>OMEGA 612</b> Universal Lubrication & Hydraulic Oil	Premium performance turbine oil that is engineered to me the requirements of the most severe steam turbine designs a operation, with maximum oil charge life. Offers superior prope retention capabilities against premature oxidation because additive dropout and base stock oxidation. High quality ba stocks, characterized by higher percentage saturates, low percentage aromatics, and lower sulfur and nitrogen levels.
stability water-sh release minimiz	temperature oxidative stability (95°C), excellent water-shedding and air release properties, minimized foaming as well as no rusting	<b>OMEGA 606</b> Multi-Grade Hydraulic Oil	Ideal for steam and hydro turbine sets and other systems who long lubricant service life is required. High shear stable a high viscosity index ensures all-temperature performance Built-in air and water-release agents to eliminate foaming a water emulsions. Contains excellent oxidation inhibitors protects against rust and corrosion while fighting sludge, varn and gum build-up

and gum build-up.



ection is necessary to assess logistics requirements, of lubricants, filtration and purification methodologies ainment.

ion incorporates on-site filling of oil into the turbine tamination from turbine manufacture and installation. cording to equipment specification.

properly dispose waste of used turbine oil, refilling oil to equipment specification.

solid contaminants and soluble water from turbine naximizing the life of your turbine oil. After each ted according to the specifications of the equipment mendation of the lubrication provider.

nature and possible location of debris from failure gime that concentrates on the impacted area.

age facilities are only required on an as needs basis, s can often accumulate. An annual filtration should contaminants and get these systems clean and dry,

timized and associated maintenance costs reduced and study. The objective is to ensure that system ved.