Technology...Experience...Innovation

GE Power Systems

GAS TURBINE AND COMBINED CYCLE PRODUCTS

The Power of Technology, Experience and Innovation...

The world demands a reliable supply of clean, dependable power. Always on the cutting edge of gas turbine technology, GE offers a wide array of technological options to meet the most challenging energy requirements. Using an integrated approach that includes parts, service, repair and project management, we deliver results that contribute to our customers' success. And our reputation for excellence can be seen in everything we do.

Photos, opposite page, top to bottom: RDC27902-07-03, PSP30057-10-11, PSP30251-38_pack, RDC26454-12-10, RDC26977-107, RDC26213-19, GT12062), RDC27190-01-03, PSP30216-01, PSP30223-15, RDC26652-05

GE Power Systems Gas Turbine and Combined Cycle Products

Heavy Duty		Output		Heat Rate Btu/kWh	Heat Rate kJ/kWh	Page
MS9001H	CC	480 MW	50 Hz	5,690	6,000	TWO
MS7001H	CC	400 MW	60 Hz	5,690	6,000	TWO
MS9001FB*	CC	412.9 MW	50 Hz	5,880	6,205	EIGHT
MS7001FB	CC	280.3 MW	60 Hz	5,950	6,280	EIGHT
MS9001FA	CC SC	390.8 MW 255.6 MW	50 Hz 50 Hz	6,020 9,250	6,350 9,757	FIVE
MS7001FA	CC SC	262.6 MW 171.7 MW	60 Hz 60 Hz	6,090 9,420	6,425 9,936	SIX
MS9001E	CC SC	193.2 MW 126.1 MW	50 Hz 50 Hz	6,570 10,100	6,930 10,653	TEN
MS7001EA	CC SC	130.2 MW 85.4 MW	60 Hz 60 Hz	6,800 10,420	7,175 10,991	ELEVEN
MS6001FA	CC CC SC SC	117.7 MW 118.1 MW 75.9 MW 75.9 MW	50 Hz 60 Hz 50 Hz 60 Hz	6,240 6,250 9,760 9,795	6,580 6,590 10,300 10,330	SEVEN
MS6001B	CC SC	64.3 MW 42.1 MW	50/60 Hz 50/60 Hz	6,960 10,642	7,340 11,227	TWELVE
MS6001C	CC CC SC SC	62.8 MW 62.8 MW 42.3 MW 42.3 MW	50 Hz 60 Hz 50 Hz 60 Hz	6,319 6,319 9,410 9,410	6,667 6,667 9,930 9,930	THIRTEEN
Small Heavy-Duty and Aero Turbine Products Overview						FOURTEEN
IGCC (Integrated Gasification Combined Cycle) Overview						SIXTEEN

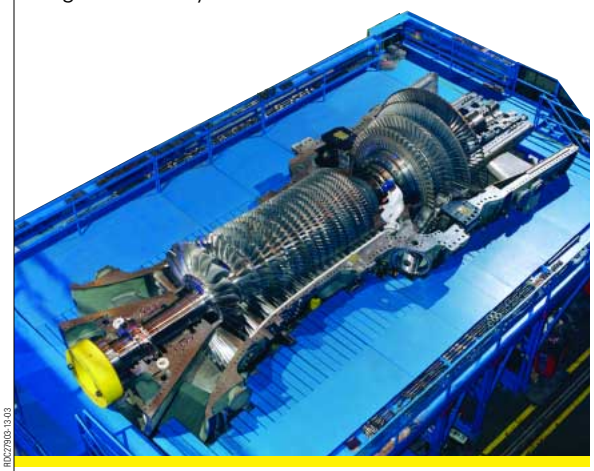
NOTE: *All ratings are net plant based on ISO conditions and natural gas fuel.*

*109FB configuration includes GE HEAT™ steam turbine.

H System™

World's Most Advanced Combined Cycle Gas Turbine Technology

GE's ***H System***™—the world's most advanced combined cycle system and the first capable of breaking the 60% efficiency barrier—integrates the gas turbine, steam turbine and heat recovery steam generator into a seamless system, optimizing each component's performance. Undoubtedly the leading technology for both 50 and 60 Hz applications, the H uses higher efficiency and output to reduce the cost of electricity of this gas-fired power generation system.



RDC2909-13-03

An MS9001H is seen during assembly in the factory.

Closed-Loop Steam Cooling

Open loop air-cooled gas turbines have a significant temperature drop across the first stage nozzles, which reduces firing temperature. The closed-loop steam cooling system allows the turbine to fire at a higher temperature for increased performance, yet without increased combustion temperatures or their resulting increased emissions levels. It is this closed-loop steam cooling that enables the ***H System***™ to achieve 60% fuel efficiency capability while maintaining adherence to the strictest low NO_x standards and reducing CO_2 emissions. Additionally, closed-loop cooling also minimizes parasitic extraction of compressor discharge air, thereby allowing more air to flow to the head-end of the combustor for fuel premixing.

IPSR0271-4-8

Baglan Bay power station is the launch site for GE's ***H System***™.

Single Crystal Materials

The use of these advanced materials, which are utilized on the first stage nozzles and buckets, and Thermal Barrier Coatings, on the first and second stage nozzles and buckets, ensures that the components will stand up to high firing temperatures while meeting maintenance intervals.

Dry Low NO_x Combustors

Building on GE's design experience, the ***H System***™ employs a can-annular lean pre-mix DLN-2.5 Dry Low NO_x (DLN) Combustor System. Fourteen combustion chambers are used on the 9H, and 12 combustion chambers are used on the 7H. GE DLN combustion systems have demonstrated the ability to achieve low NO_x levels in field service and are capable of meeting the firing temperature requirements of the H.

RCC2791K(08.09)

A 9H gas turbine is readied for testing.

RSF3124B-10

World's first H turbine is transported through Wales to Baglan Bay Power Station.

Small Footprint/High Power Density

The ***H System***™ offers a greater than 40% reduction in land area per installed megawatt compared to other combined cycle systems, once again helping to reduce the overall cost of producing electricity.

Thoroughly Tested

The design, development and validation of the ***H System***™ has been conducted under a regimen of extensive component, sub-system and full unit testing. Broad commercial introduction has been controlled to follow launch units demonstration. This thorough testing approach provides the introduction of cutting edge technology with high customer confidence.

MS9001H/MS7001H Combined Cycle Performance

		Net Plant Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Net Plant Efficiency	GT Number & Type
50 Hz	S109H	480	5,690	6,000	60.0%	1 x MS9001H
60 Hz	S107H	400	5,690	6,000	60.0%	1 x MS7001H

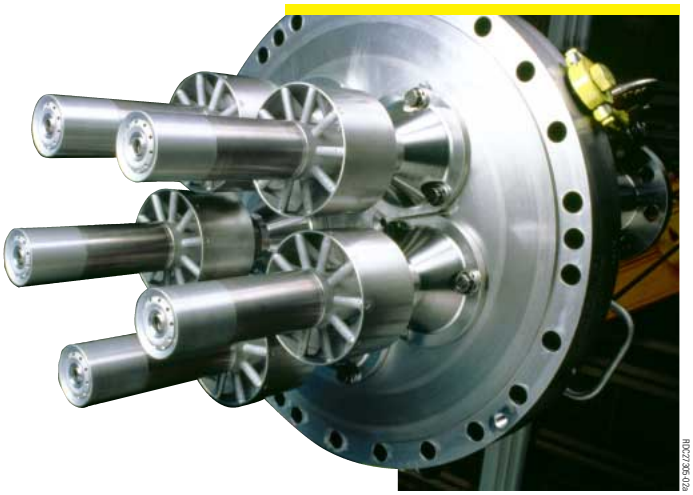
F Class

World's Most Experienced Advanced Technology Gas Turbines

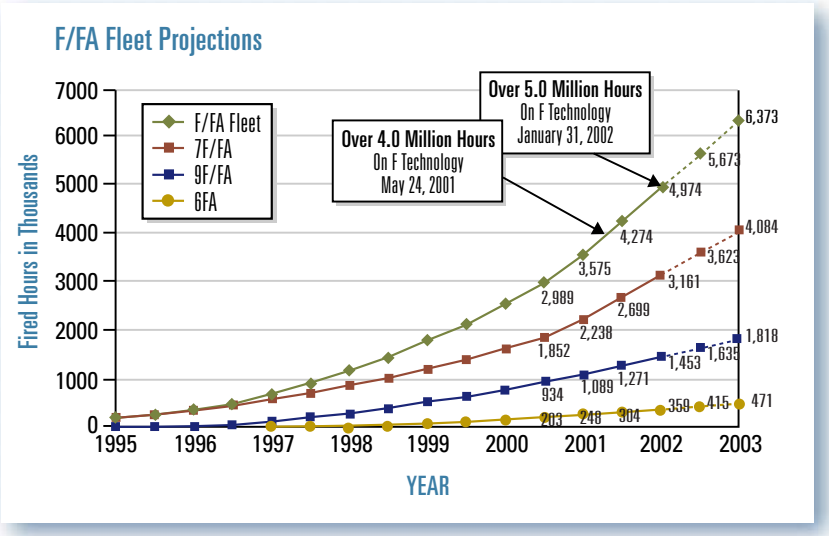
With millions of hours of operation, our F class turbines have established GE as the clear industry leader for successful fired hours in advanced technology gas turbines. Representing the world's largest, most experienced fleet of highly efficient gas turbines, designed for maximum reliability and efficiency with low life cycle costs, our F class turbines are favored by both power generators and industrial cogenerators requiring large blocks of reliable power.

Introduced in 1987, GE's F class gas turbines resulted from a multi-year development program using technology advanced by GE Aircraft Engines and GE's Global Research Center. GE continually advances this technology by incrementally improving the F class product to attain ever higher combined cycle efficiencies.

Our F class gas turbines, including the 7F (60 Hz), the 9F (50 Hz) and the 6F (either 50 or 60 Hz), offer flexibility in cycle configuration, fuel selection and site adaptation. All F class gas turbines include an 18-stage axial compressor and a three-stage turbine, and they feature a cold-end drive and axial exhaust, which is beneficial for combined cycle arrangements where net efficiencies over 58% can be achieved.



Dry Low NO_x combustor systems allow GE F Class turbines to meet today's strict environmental emissions requirements.



MS9001FA 9FA

Proven Excellence in Reliable 50 Hz Combined Cycle Performance

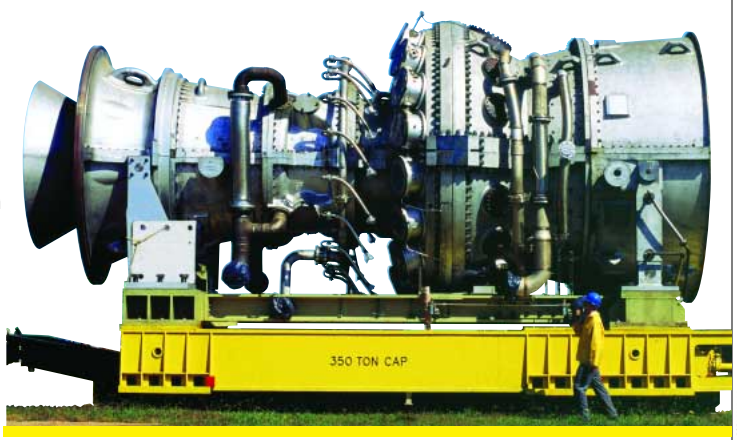
From Argentina to Singapore, world power producers require reliable power generation. The 9FA is the 50 Hz gas turbine choice for large combined cycle applications. Since the 9FA is an aerodynamic scale of the highly successful 7FA gas turbine, it too has experienced industry-leading reliability. Key advantages of the 9FA gas turbine include its fuel-flexible combustion system and higher output performance.

MS9001FA Simple Cycle Performance		50 Hz Power Generation
Output	(MW)	255.6
Heat Rate	(Btu/kWh) (kJ/kWh)	9,250 9,757
Pressure Ratio		15.4:1
Mass Flow	(lb/sec) (kg/sec)	1,375 624
Turbine Speed	(rpm)	3,000
Exhaust Temperature	(°F) (°C)	1,129 609
Model Designation		PG9351FA

The 9FA gas turbine is configured with the robust Dry Low NO_x (DLN) 2.0+ combustor, which is ideally suited for the diverse fuels typical of the worldwide 50 Hz power generation market. The DLN 2.0+ combustor is the industry leader in pollution prevention for 50 Hz combined cycle applications with greater than 56% efficiency achieving less than 25 ppm NO_x.

For large combined cycle or cogeneration power plants where flexible operation and maximum performance is the prime consideration, the 9FA can be arranged in a multi-shaft configuration where one or two gas turbines are combined with a single steam turbine to produce power blocks of 390 or 780 MW.

The 9FA gas turbine is a building block that can be configured to meet site and power requirements. For re-powering applications, where space limitation is a key consideration, the 9FA gas turbine can be configured in a single-shaft combined cycle arrangement with the generator and steam turbine.



An MS9001FA gas turbine ships from the plant.

PSP20027-06

MS9001FA Combined Cycle Performance

		Net Plant Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Net Plant Efficiency	GT Number & Type
50 Hz	S109FA	390.8	6,020	6,350	56.7%	1 x MS9001FA
	S209FA	786.9	5,980	6,305	57.1%	2 x MS9001FA

MS7001FA 7FA

Industry Standard for 60 Hz Power in All Duty Cycles

The wide range of power generation applications for the 7FA gas turbine include combined cycle, cogeneration, simple cycle peaking and Integrated Gasification Combined Cycle (IGCC) in both cyclic and base load operation with a wide range of fuels.

Reliability

The reliability of the 7FA gas turbine has been consistently 98% or better. This high reliability provides customers more days of operation per year while minimizing the overall life cycle cost of the gas turbine.

Emissions

The 7FA gas turbine is the industry leader in reduction of NO_x and CO emissions. GE's DLN 2.6 (Dry Low NO_x) combustor produces less than 9 ppm NO_x and CO, thereby minimizing the need for exhaust cleanup systems and saving millions for our customers. GE's DLN 2.6 is a proven product with hundreds of thousands of operating hours.

KEPCO's Seoinchon Plant, one of the world's largest combined cycle plants, has operated for more than 40,000 hours in daily start/stop cyclic duty.

Upgrades

With hundreds of units in operation, GE has continued to make incremental design enhancements that improve output, efficiency, reliability and availability. But including these improvements on new units is only the beginning; GE continually provides customer upgrade packages for operating units.

Power augmentation equipment to provide additional gas turbine performance during summer peak demand periods is a feature developed by GE that adds customer value. These power augmentation techniques include inlet cooling, steam injection and peak firing.

MS7001FA Simple Cycle Performance		60 Hz Power Generation
Output	(MW)	171.7
Heat Rate	(Btu/kWh) (kJ/kWh)	9,420 9,936
Pressure Ratio		15.5:1
Mass Flow	(lb/sec) (kg/sec)	952 432
Turbine Speed	(rpm)	3,600
Exhaust Temperature	(°F) (°C)	1,116 602
Model Designation		PG7241FA

MS7001FA Combined Cycle Performance

		Net Plant Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Net Plant Efficiency	GT Number & Type
60 Hz	S107FA	262.6	6,090	6,425	56.0%	1 x MS7001FA
	S207FA	529.9	6,040	6,375	56.5%	2 x MS7001FA

MS6001FA 6FA

Proven Performance in a Mid-Size Package

In a performance class all its own, the highly efficient 6FA gas turbine is a mid-size version of the well-proven 7FA and 9FA. Designed for either 50 or 60 Hz applications, the gear-driven 6FA answers the need for mid-size power blocks with high performance in combined heat and power applications. Its output range, high exhaust energy, full packaging and robust design make the 6FA ideally suited for a wide variety of applications, ranging from cogeneration and district heating to pure power generation in combined cycle and Integrated Gasification Combined Cycle (IGCC)

This high-speed gas turbine produces 75.9 MW of simple cycle power at 35% efficiency and 117.7 MW of combined cycle power at 54.7% net efficiency. The 6FA provides major fuel savings in base-load combined cycle operation over earlier mid-range machines and is adaptable to either single-shaft or multi-shaft configurations. In IGCC operation, gross plant efficiencies can reach up to 46%.

Half of all 6FA installations are located in Europe. This CHP plant is owned by Porvoo, Finland.

With more than 58 units in operation or on order worldwide, the 6FA has accumulated over 450,000 reliable operating hours. A two-thirds scale of the 7FA, the 6FA is a classic example of the GE philosophy of evolutionary design improvement. The compressor, for example, is an 18-stage axial design, aerodynamically scaled from the 7FA. Although its can-annular combustors are the same size and configuration as the 7FA's, the number of combustion chambers is decreased from 14 to 6. Cold-end drive allows exhaust gases to be directed axially into the HRSG.

Like other F technology units, the 6FA provides the ability to burn a wide spectrum of fossil fuels, including gasified coal. Fuels can be switched after start-up without sacrificing performance. The Dry Low NO_x combustion system is available, which can achieve NO_x emissions of 15 ppm when burning natural gas.

MS6001FA Combined Cycle Performance

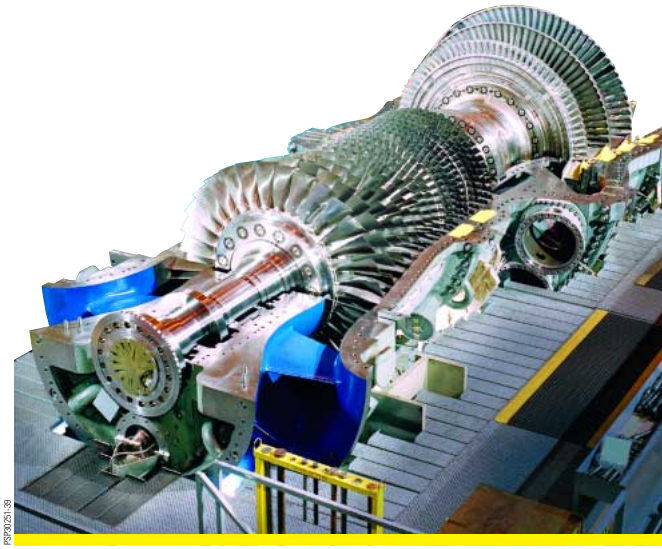
		Net Plant Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Net Plant Efficiency	GT Number & Type
50 Hz	S106FA	117.7	6,240	6,580	54.7%	1 x MS6001FA
	S206FA	237.9	6,170	6,510	55.3%	2 x MS6001FA
60 Hz	S106FA	118.1	6,250	6,590	54.6%	1 x MS6001FA
	S206FA	237.5	6,210	6,550	54.9%	2 x MS6001FA

MS6001FA Simple Cycle Performance

		Power Generation 50 Hz	60 Hz
Output	(MW)	75.9	75.9
Heat Rate	(Btu/kWh) (kJ/kWh)	9,760 10,300	9,795 10,330
Pressure Ratio		15.6:1	15.7:1
Mass Flow	(lb/sec) (kg/sec)	447 203	449 204
Turbine Speed	(rpm)	5,231	5,254
Exhaust Temperature	(°F) (°C)	1,120 605	1,118 604
Model Designation		PG6111FA	

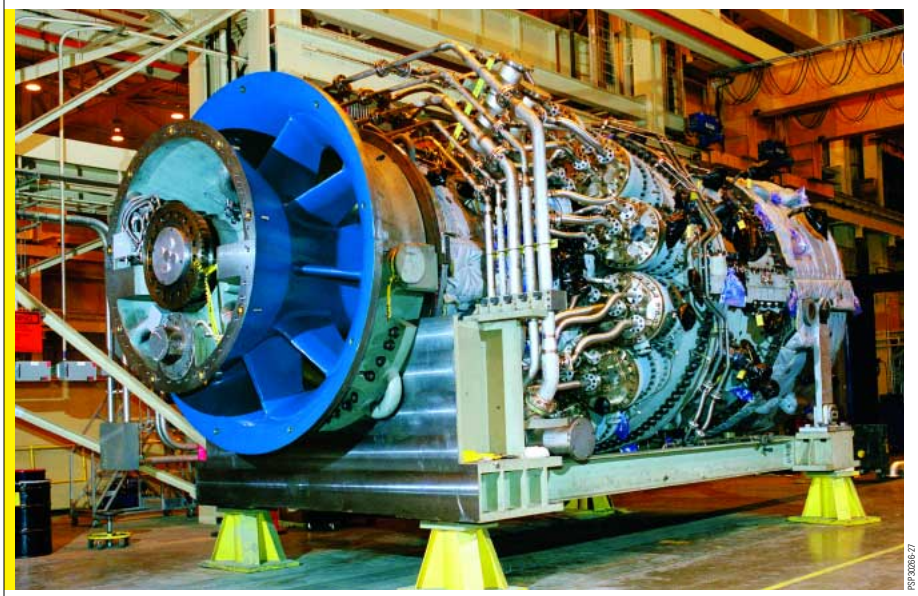
MS7001FB
MS9001FB FB

World's Most Advanced Air-Cooled Gas Turbine



This MS7001FB is seen on half shell during assembly.

The FB is the latest evolutionary step in GE's proven F series. Taking F technology to a new level of output and efficiency, we've utilized both our cutting-edge technology, including the materials developed for the ***H System™***, and our leadership position with millions of fired hours in advanced gas turbine experience. The result is a large combined cycle system designed to provide high performance and low electrical cost.

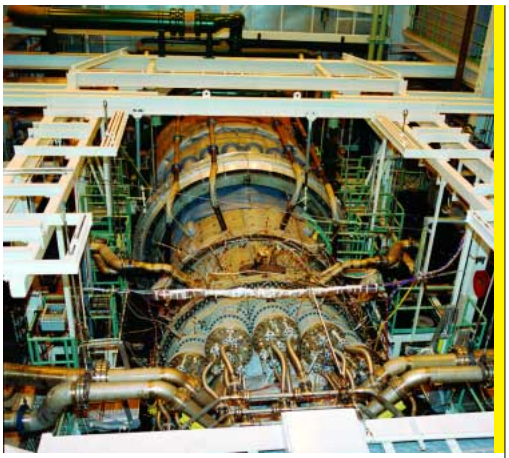


This MS7001FB is shown in the factory.

Improved output and efficiency means better fuel economy and reduced cost of producing electricity. With today's competitive markets and unpredictable fuel prices, this—now more than ever—is the key to success.

In developing the FB, we followed a specific course that significantly improved the key driver of efficiency—firing temperature. The FB firing temperature was increased more than 100 degrees Fahrenheit over GE's FA technology, resulting in combined cycle efficiency rating improvements of better than 1%. Output improvements of more than 5% were also achieved. These improvements equate to more MW per MBtu of natural gas burned.

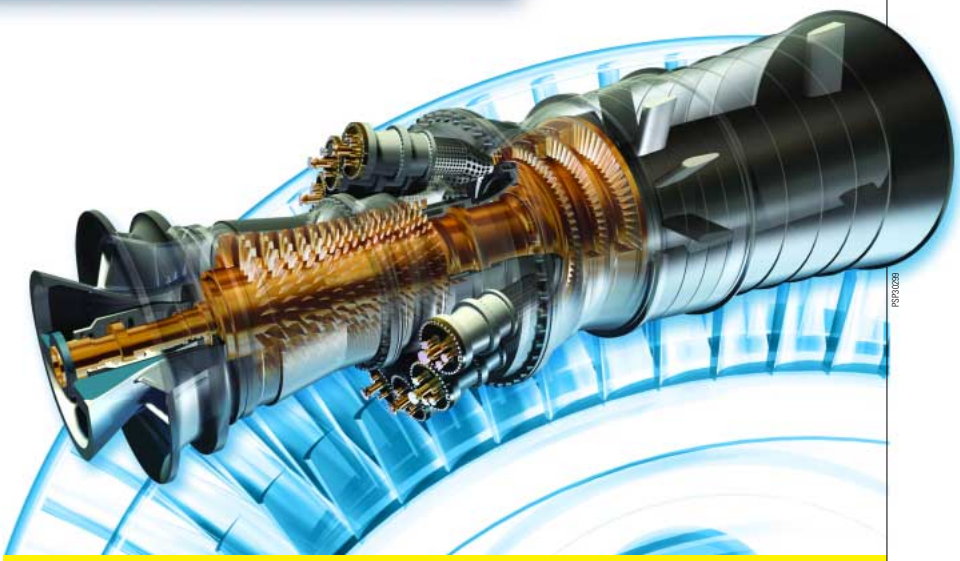
The use of advanced turbine materials, such as Single Crystal First-Stage Buckets, ensures that components can stand up to the higher firing temperatures of the FB without an increase in maintenance intervals. Providing the basis of process rigor, Six Sigma methodologies were used to assure a highly reliable robust design optimized for lowest cost of electricity. Indeed, in developing the FB, we were able to maintain many of the proven features of the world's most successful advanced technology turbine, the F/FA.



An MS7001FB is seen in test cell.

MS7001FB/MS9001FB Combined Cycle Performance

		Net Plant Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Net Plant Efficiency	GT Number & Type
50 Hz	S109FB*	412.9	5,880	6,205	58.0%	1 x MS9001FB
	S209FB	825.4	5,884	6,208	58.0%	2 x MS9001FB
60 Hz	S107FB	280.3	5,950	6,280	57.3%	1 x MS7001FB
	S207FB	562.5	5,940	6,260	57.5%	2 x MS7001FB



*109FB configuration includes GE HEAT™ steam turbine.

MS9001E 9E

Fuel-Flexible 50 Hz Performer

MS9001E Simple Cycle Performance		50 Hz Power Generation
Output	(MW)	126.1
Heat Rate	(Btu/kWh) (kJ/kWh)	10,100 10,653
Pressure Ratio		12.6:1
Mass Flow	(lb/sec) (kg/sec)	921 418
Turbine Speed	(rpm)	3,000
Exhaust Temperature	(°F) (°C)	1,009 543
Model Designation		PG9171E

The MS9001E gas turbine is GE's 50 Hz workhorse. With more than 350 units, it has accumulated over eight million hours of utility and industrial service, many in arduous climates ranging from desert heat and tropical humidity to arctic cold. Originally introduced in 1978 at 105 MW, the 9E has incorporated numerous component improvements. The latest model boasts an output of 126 MW and is capable of achieving more than 52% efficiency in combined cycle.

Whether for simple cycle or combined cycle application, base load or peaking duty, 9E packages are comprehensively engineered with integrated systems that include controls, auxiliaries, ducts and silencing. They are designed for reliable operation and minimal maintenance at a competitively low installed cost.

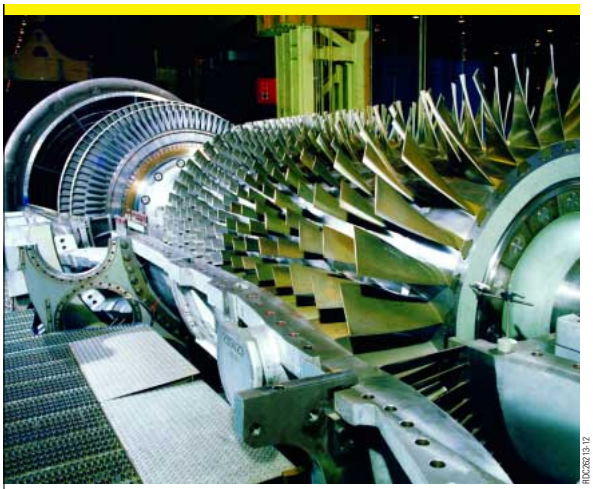
Like other GE E-class technology units, the Dry Low NO_x combustion system is available on 9E, which can achieve NO_x emissions under 15 ppm when burning natural gas.

With its state-of-the-art fuel handling capabilities, the 9E accommodates a wide range of fuels, including natural gas, light and heavy distillate oil, naphtha, crude oil and residual oil. Designed for dual-fuel operation, it is able to switch from one fuel to another while running under load. It is also able to burn a variety of syngases produced from oil or coal without turbine modification. This flexibility, along with its extensive experience and reliability record, makes the 9E well suited for IGCC projects.

In simple cycle, the MS9001E is a reliable, low first-cost machine for peaking service, while its high combined cycle efficiency gives excellent fuel savings in base load operations. Its compact design provides flexibility in plant layout as well as the easy addition of increments of power when a phased capacity expansion is required.

MS9001E Combined Cycle Performance

		Net Plant Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Net Plant Efficiency	GT Number & Type
50 Hz	S109E	193.2	6,570	6,930	52.0%	1 x MS9001E
	S209E	391.4	6,480	6,840	52.7%	2 x MS9001E



The MS9001E gas turbine is designed to attain high availability levels and low maintenance costs, resulting in extremely low total cost of ownership.

MS7001EA 7EA

Time-Tested Performer for 60 Hz Applications

With more than 750 units in service, the 7E/EA fleet has accumulated tens of millions of accumulated hours of service and is well recognized for high reliability and availability.

With strong efficiency performance in simple and combined cycle applications, this 85 MW machine is used in a wide variety of power generation, industrial and cogeneration applications. It is uncomplicated and versatile; its medium-size design lends itself to flexibility in plant layout and fast, low-cost additions of incremental power.

With state-of-the-art fuel handling equipment, advanced bucket cooling, thermal barrier coatings and a multiple-fuel combustion system, the 7EA can accommodate a full range of fuels. It is designed for dual-fuel operation, able to switch from one fuel to another while the turbine is running under load or during shutdown. 7E/EA units have accumulated millions of hours of operation using crude and residual oils.

In addition to power generation, the 7EA is also well suited for mechanical drive applications.

MS7001EA Simple Cycle Performance	60 Hz Power Generation		Mechanical Drive	
Output	(MW)	85.4	(hp)	115,630
Heat Rate	(Btu/kWh) (kJ/kWh)	10,420 10,991	(Btu/shp-hr)	7,720
Pressure Ratio		12.6:1		11.9:1
Mass Flow	(lb/sec) (kg/sec)	643 292	(lb/sec) (kg/sec)	659 299
Turbine Speed	(rpm)	3,600	(rpm)	3,600
Exhaust Temperature	(°F) (°C)	998 537	(°F) (°C)	998 537
Model Designation		PG7121EA		M7121EA

GT23021

An MS7001EA is shown on half shell during assembly.

MS7001EA Combined Cycle Performance

		Net Plant Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Net Plant Efficiency	GT Number & Type
60 Hz	S107EA	130.2	6,800	7,175	50.2%	1 x MS7001EA
	S207EA	263.6	6,700	7,070	50.9%	2 x MS7001EA

MS6001B 6B

Reliable and Rugged 50/60 Hz Power

The MS6001B is a performance proven 40 MW class gas turbine, designed for reliable 50/60 Hz power generation and 50,000 hp class mechanical drive service. With availability well documented at 96.2% and reliability at 99.2%, it is the popular choice for efficient, low installed cost power generation or prime movers in mid-range service.

The 6B is one of the most versatile and widely used gas turbines ever manufactured. With over 900 units in service, it has accumulated more than 40 million operating hours, representing the widest range of applications: simple cycle, heat recovery application, combined cycle and mechanical drive. It can be installed fast for quick near-term capacity.

The 6B is recognized as rugged and reliable to handle the multiple start-ups required for peak load service. It can accommodate a variety of fuels and is well suited to IGCC.

In combined cycle operation the 6B is a solid performer at nearly 50% efficiency. It is also a flexible choice for cogeneration applications capable of producing a thermal output ranging from 20 to 400 million Btu/hr.

Like all GE heavy-duty gas turbines, the 6B has earned a solid reputation for high reliability and environmental compatibility. With a Dry Low NO_X combustion system, the 6B is capable of achieving less than 15 ppm NO_x on natural gas.

With its excellent fuel efficiency, low cost per horsepower and high horsepower per square foot, the MS6001B is an excellent fit for selective mechanical applications.

An MS6001B rotor is seen on half shell.

RDC24656-03

MS6001B Simple Cycle Performance	50/60 Hz Power Generation		Mechanical Drive	
Output	(MW)	42.1	(hp)	58,380
Heat Rate	(Btu/kWh) (kJ/kWh)	10,642 11,227	(Btu/shp-hr)	7,650
Pressure Ratio		12.2:1		12.0:1
Mass Flow	(lb/sec) (kg/sec)	311 141.1	(lb/sec) (kg/sec)	309 140
Turbine Speed	(rpm)	5,163	(rpm)	5,111
Exhaust Temperature	(°F) (°C)	1,019 548	(°F) (°C)	1,012 544
Model Designation		PG6581B		M6581B

MS6001B Combined Cycle Performance

		Net Plant Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Net Plant Efficiency	GT Number & Type
50 Hz	S106B	64.3	6,960	7,340	49.0%	1 x MS6001B
	S206B	130.7	6,850	7,230	49.8%	2 x MS6001B
	S406B	261.3	6,850	7,230	49.8%	4 x MS6001B
60 Hz	S106B	64.3	6,960	7,340	49.0%	1 x MS6001B
	S206B	130.7	6,850	7,230	49.8%	2 x MS6001B
	S406B	261.3	6,850	7,230	49.8%	4 x MS6001B

MS6001C 6C

High Efficiency and Performance in a 40 MW Class

The 6C is designed for low cost electricity heat recovery applications for both 50 and 60 Hz. Key industry segments for the machine include industrial cogeneration, process industries, municipalities (district heating), combined heat and power, and mid-sized combined cycle projects.

Consistent with GE's evolutionary design philosophy, the 6C incorporates technologies that have been validated in service worldwide. This evolutionary approach ensures users of the 6C that they are receiving advanced but well-proven technology.

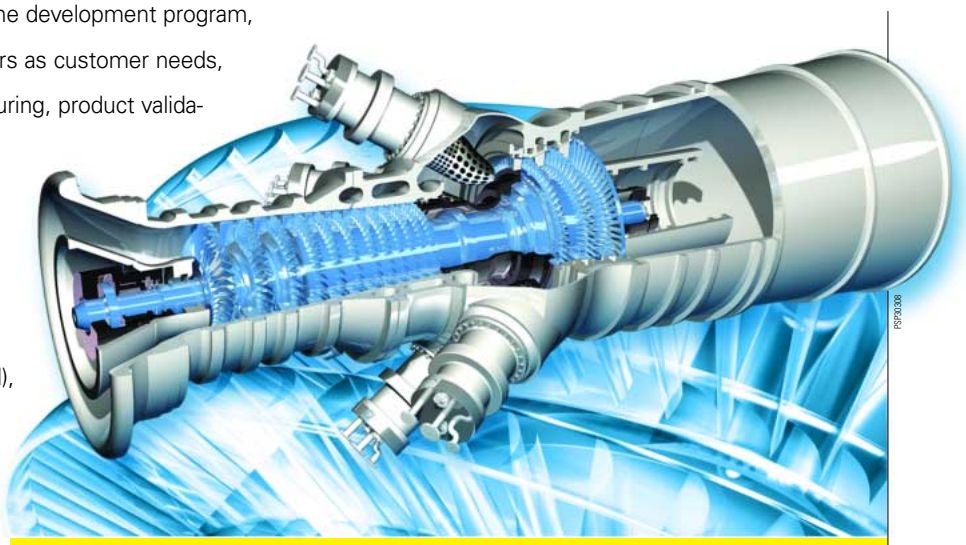
The 6C incorporates the flowback of GE's world leading F technology, and builds on the experience and performance of the successful Frame 6B technology.

The Frame 6C development has been fully supported by GE's Six Sigma quality initiative. Rigorous Six Sigma methodology has been employed at all steps of the development program, addressing such key factors as customer needs, product design, manufacturing, product validation and testing. The 6C features 6 can-annular combustion chambers with dual-fuel capability, DLN2 combustor (for 15 ppm NO_x with gas fuel), as well as state-of-the-art Mark VI Control Systems.

MS6001C Simple Cycle Performance		50/60 Hz Power Generation
Output	(MW)	42.3
Heat Rate	(Btu/kWh) (kJ/kWh)	9,410 9,930
Pressure Ratio		19.0:1
Mass Flow	(lb/sec) (kg/sec)	258 117
Turbine Speed	(rpm)	7,100
Exhaust Temperature	(°F) (°C)	1,065 574
Model Designation		PG6591C

MS6001C Combined Cycle Performance

		Net Plant Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Net Plant Efficiency	GT Number & Type
50 Hz	S106C	62.8	6,319	6,667	54.0%	1 x MS6001C
	S206C	126.7	6,273	6,618	54.4%	2 x MS6001C
60 Hz	S106C	62.8	6,319	6,667	54.0%	1 x MS6001C
	S206C	126.7	6,273	6,618	54.4%	2 x MS6001C



Small Heavy-Duty & Aero

A Broad Portfolio of Packaged Power Plants

GE provides a broad range of power packages from 5 MW to nearly 50 MW for simple cycle, combined cycle or cogeneration applications in the utility, private and mobile power industries. Marine applications for these machines range from commercial fast ferries and cruise ships to military patrol boats, frigates, destroyers and aircraft carriers.

The powerful LM6000 is one of the most fuel-efficient simple cycle gas turbines in the world.

Oil and Gas

GE is a world leader in high-technology turbine products and services for the oil and gas industry. We offer full turnkey systems and aftermarket solutions for production, LNG, transportation, storage, refineries, petrochemical and distribution systems.

GE Oil and Gas products are installed in major upstream, midstream, downstream and distribution applications around the world.

Aeroderivative Gas Turbines

		Output (kW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Pressure Ratio	Turbine Speed (rpm)	Exhaust Flow (lb/sec)	Exhaust Flow (kg/sec)	Exhaust Temp. (°F)	Exhaust Temp. (°C)
50 Hz Power Gen	LM6000PC Sprint*	49,500	8,471	8,935	30.0:1	3,627	297	135	821	438
	LM6000PC	43,000	8,538	9,006	30.0:1	3,627	285	129	787	419
	LM6000PD Sprint	46,900	8,262	8,715	30.0:1	3,627	292	132	834	446
	LM6000PD	41,700	8,366	8,824	30.0:1	3,627	279	127	838	448
	LM6000PD (liquid fuel)	40,417	8,443	8,721	28.5:1	3,627	272	123	853	456
	LM2500PK	29,300	9,625	10,152	22.8:1	3,000	197	89	911	488
	LM2500PV	33,500	8,920	9,409	23.0:1	6,100	197	89	907	486
	LM2500PH	26,500	8,673	9,148	18.2:1	3,000	167	76	927	497
	LM2500PE	22,800	10,008	10,556	18.9:1	3,000	158	72	956	513
	LM2000	17,600	9,600	10,129	15.6:1	3,000	139	63	885	474
	LM1600PA	13,700	9,760	10,295	20.1:1	7,900	110	50	894	478
60 Hz Power Gen	LM6000PC Sprint*	49,500	8,451	8,914	30.0:1	3,627	300	136	826	441
	LM6000PC	43,500	8,485	8,950	30.0:1	3,627	284	129	792	422
	LM6000PD Sprint	46,800	8,235	8,686	30.0:1	3,627	290	132	837	447
	LM6000PD	42,300	8,308	8,763	30.0:1	3,627	278	126	846	452
	LM6000PD (liquid fuel)	40,212	8,415	8,878	28.1:1	3,627	268	122	857	458
	LM2500PK	30,900	9,288	9,797	22.9:1	3,600	197	89	906	486
	LM2500PH	27,700	8,402	8,862	17.8:1	3,600	167	76	922	494
	LM2500PE	24,000	9,716	10,248	19.0:1	3,600	157	71	955	513
	LM2000	17,600	9,715	10,247	15.4:1	3,600	136	62	917	492
	LM1600PA	13,700	9,760	10,295	20.1:1	7,900	110	50	894	478
Mechanical Drive		Output (hp)	Heat Rate (Btu/shp-h)		Pressure Ratio	Turbine Speed (rpm)	Exhaust Flow (lb/sec)	Exhaust Flow (kg/sec)	Exhaust Temp. (°F)	Exhaust Temp. (°C)
	LM6000PC	60,000	5,938	—	29.1:1	3,600	281.9	127.8	825	440
	LM2500PK	40,044	6,702	—	22.6:1	3,000	193.5	87.7	967	519
	LM2500PE	30,400	7,017	—	18.1:1	3,000	153.3	69.5	994	534
	LM2000PA	24,300	7,117	—	16.0:1	3,600	141.9	64.4	894	479
	LM1600PA	19,100	7,016	—	20.2:1	7,900	104.3	47.3	915	491

*Sprint 2002 deck is used with water injection to 25 ppmvd for power enhancement.
NOTE: Performance based on 59° F amb. Temp., 60% RH, sea level, no inlet/exhaust losses on gas fuel with no NOx media, unless otherwise specified.

Small Heavy-Duty Gas Turbines

		Output (kW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Pressure Ratio	Turbine Speed (rpm)	Exhaust Flow (lb/sec)	Exhaust Flow (kg/sec)	Exhaust Temp. (°F)	Exhaust Temp. (°C)
Generator Drive*	GE5	5,500	8,297	11,720	14.6:1	16,630	19.6	43.2	1,065	574
	GE10	11,250	8,114	11,481	15.5:1	11,000	47.5	104.7	890	477
	MS5001	26,830	8,967	12,687	10.5:1	5,094	125.2	276.1	901	483
Mechanical Drive**		Output (shp)	Heat Rate (Btu/shp-h)		Pressure Ratio	Turbine Speed (rpm)	Exhaust Flow (lb/sec)	Exhaust Flow (kg/sec)	Exhaust Temp. (°F)	Exhaust Temp. (°C)
	GE5	7,509	8,080	—	14.6:1	12,500	44.7	20.3	1033	556
	GE10	15,675	7,820	—	15.2:1	7,900	103.0	46.7	909	487
	MS5002C	38,005	8,814	—	8.8:1	4,670	274.1	123.4	963	517
	MS5002D	43,690	8,650	—	10.8:1	4,670	311.7	141.4	948	509

ISO conditions - natural gas - electrical generator terminals
**ISO conditions - natural gas - shaft output*

IGCC

The Next Generation Power Plant

Making Environmental Compliance Affordable

Integrated Gasification Combined Cycle (IGCC) technology is increasingly important in the world energy market, where low cost opportunity feedstocks such as coal, heavy oils and pet coke are the fuels of choice. And IGCC technology produces low cost electricity while meeting strict environmental regulations.

The IGCC gasification process "cleans" heavy fuels and converts them into high value fuel for gas turbines. Pioneered by GE almost 30 years ago, IGCC technology can satisfy output requirements from 10 MW to more than 1.5 GW, and can be applied in almost any new or re-powering project where solid and heavy fuels are available.

PSP30120

This 550 MW IGCC is located at the Saras oil refinery in Sardinia. The three GE 109E single-shaft combined cycle units have accumulated over 12,000 hours of syngas operation.

Optimal Performance

For each gasifier type and fuel, there are a vast number of technical possibilities. Integrated Gasification Combined Cycle (IGCC) systems can be optimized for each type of fuel as well as site and environmental requirements. Using knowledge gained from successfully operating many IGCC units, GE has optimized system configurations for all major gasifier types and all GE gas turbine models.

Experience

GE engages experts from throughout the gasification industry at both operating and research levels to develop the most economical and reliable approaches to IGCC technology. Using the same combined cycle technology for IGCC that we use for conventional systems, GE offers extensive experience and unmatched levels of reliability.

GE offers a complete range of gas turbines that can be integrated efficiently with IGCC plants.

Gas Turbines		IGCC	
Model	Syngas Power Rating	Model	Net Plant Output Power
GE10	10 MW (50/60 Hz)	GE10	14 MW (50/60 Hz)
6B	40 MW (50/60 Hz)	106B	60 MW (50/60 Hz)
7EA	90 MW (60 Hz)	170EA	130 MW (60 Hz)
9E	150 MW (50 Hz)	109E	210 MW (50 Hz)
6FA	90 MW (50/60 Hz)	106FA	130 MW (50/60 Hz)
7FA	197 MW (60 Hz)	107FA	280 MW (60 Hz)
9FA	286 MW (50 Hz)	109FA	420 MW (50 Hz)

GE Value

GE is a leading global supplier of power generation technology, energy services and management systems, with an installed base of power generation equipment in more than 120 countries. GE Power Systems provides innovative, technology-based products and service solutions across the full spectrum of the energy industry.

Industries Served:

- **Commercial and industrial power generation**
- **Distributed power**
- **Energy management**
- **Oil and gas, pipelines and refineries**
- **Petrochemical**
- **Gas compression**
- **Commercial marine power**
- **Energy rentals**
- **Industrial water treatment**

Our products, services and people deliver enhanced performance, competitive life-cycle costs and continuous technological innovation with unmatched experience. Our Customer-Centric approach, combined with Six Sigma quality methodology, assures that customer needs are defined up front and that performance against customer expectations is measured and managed every step of the way.

In a world where power is a major driving force behind future economic growth, GE Power Systems stands ready with a full array of quality products and services designed to meet our customers' most challenging requirements. From onsite power to large, turnkey power plants and customized contractual services, we are uniquely prepared to fulfill world demand for reliable, clean and efficient energy.

gepower.com

GAS TURBINE AND COMBINED CYCLE PRODUCTS

Driving the energy industry into the future, GE Power Systems provides a full array of quality products and services to meet your most challenging requirements. With more than a century of experience and an installed base of power generation equipment in over 120 countries, we're ready to deliver. From on-site power and wind generation, to combined cycle systems and optimization and management services, we'll help you fulfill the demand for reliable, clean, and efficient energy.

Let us put the power of technology, experience, and innovation to work for you.

Visit us on on the web at gepower.com

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