

POWER GENERATION

PRODUCT HANDBOOK



solarturbines.com

Solar[®] Turbines
A Caterpillar Company

GENERATOR TURBINE RATINGS

PRODUCT LINE AND SPECIFICATIONS

SOLAR TURBINES OFFERS A COMPLETE SOLUTION FOR YOUR POWER NEEDS

Proven designs, combined with high-quality manufacturing and rigorous testing, ensure maximum power, efficiency and return on investment.

GAS ONLY		Centaur® 40	Centaur® 50	Mercury™ 50	Taurus™ 60	Taurus™ 70	Mars® 100	Titan™ 130	Titan™ 250	Titan™ 350	Titan™ 350
ISO ¹ Output Power	MW	3.5	4.6	4.6	5.7	8.2	11.3	16.5	23.1	34.0	38.0
ISO ¹ Heat Rate	kJ/kWe-hr	12,900	12,270	9,350	11,430	10,470	10,940	10,160	9,130	9,130	8,965
	Btu/kWe-hr	12,230	11,630	8,865	10,830	9,920	10,370	9,630	8,650	8,655	8,495
Fuel Input	MJ/s	12.6	15.7	12.0	18.0	23.8	34.5	46.7	58.6	86.2	96.5
	MMBtu/hr	43.0	53.6	40.9	61.4	81.1	117.7	159.2	200.0	294.3	329.3
Electrical Efficiency	%	27.9	29.3	38.5	31.5	34.4	32.9	35.4	39.4	39.3	40.3
Exhaust Gas Flow	kg/s	19.0	19.1	17.8	21.8	26.9	42.6	56.3	70.4	107.3	107.6
	lb/s	41.9	42.1	39.3	48.0	59.2	93.8	124.0	155.2	236.5	237.2
Exhaust Gas Temp	deg C	443	509	365	510	519	484	489	462	450	487
	deg F	829	949	689	951	967	904	912	864	840	909
SoLoNOx™ Technology	Dry NOx	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NOx Emissions ²	PPM	25	15	5	9	9	15	9	9	9	9
CO Emissions ²	PPM	50	25	10	15	15	25	15	15	15	15
HEAT RECOVERY PERFORMANCE DATA											
Steam Production ³ @ 10.3 barg Gauge Saturated (150 psig)	t/hr	8.8	11.5	5.6	13.1	16.7	23.4	31.4	35.6	51.3	60.0
	lb/hr	19,460	25,270	12,300	28,950	36,850	51,600	69,300	78,500	113,000	132,300
Steam Production ³ 10 barg Gauge Saturated (150 psig) fired to 871 °C (1600 °F)	t/hr	24.0	24.5	21.9	28.0	34.6	54.4	72.0	89.5	136.0	138.0
	lb/hr	50,800	54,000	42,200	61,650	76,300	119,800	158,600	197,400	299,700	304,000
Additional fuel input to burner to reach 871 °C (1600 °F)	MW	10.0	8.6	11.0	9.7	11.7	20.4	26.7	35.6	56.1	51.3
	MMBtu/hr	34.0	29.2	37.6	33.2	40.1	69.5	91.0	122.0	191.0	175.0
Steam Production ³ @ 10.3 barg Gauge Saturated (150 psig) fired to 1204 °C (2200 °F)	t/hr	37.1	37.8	29.9	43.1	53.4	84.0	111.0	138.0	210.0	213.0
	lb/hr	76,100	83,300	65,800	95,100	117,700	184,100	244,900	305,200	463,800	469,400
Additional fuel input to reach 1204 °C (2200 °F)	MW	18.9	17.6	16.6	20.0	24.5	40.5	53.3	69.0	107.0	102.0
	MMBtu/hr	64.6	60.0	56.5	68.3	83.5	138.0	182.0	235.0	365.0	349.0
Chilling Capacity ⁴ @ 10.3 barg Gauge Saturated (150 psig)	kW	7,490	9,720	4,740	11,140	14,180	19,850	26,700	30,200	43,500	50,900
	RT	2,130	2,760	1,350	3,170	4,030	5,640	7,580	8,590	12,360	14,500

1. ISO conditions: Sea level, 15°C (59°F), no gas path losses, relative humidity 60%, natural gas fuel with LHV = 35 MJ/Nm³ (940 Btu/scf).

2. Minimum engine capability for NOx and CO emissions on natural gas (values corrected to 15% O₂)

3. Site conditions for steam production: Sea level, 15°C (59°F), 100 mm (4") H₂O inlet pressure loss, 254 mm (10") H₂O exhaust pressure loss. Natural gas fuel; full load; feed water temperature 105°C (221°F), 100% condensate return, no deaerator, no blowdown.

4. Chilling capacity is calculated based on two stages: steam or exhaust absorption chiller, water temperature in/out 12/7°C (54/45°F).



COMBINED HEAT AND POWER

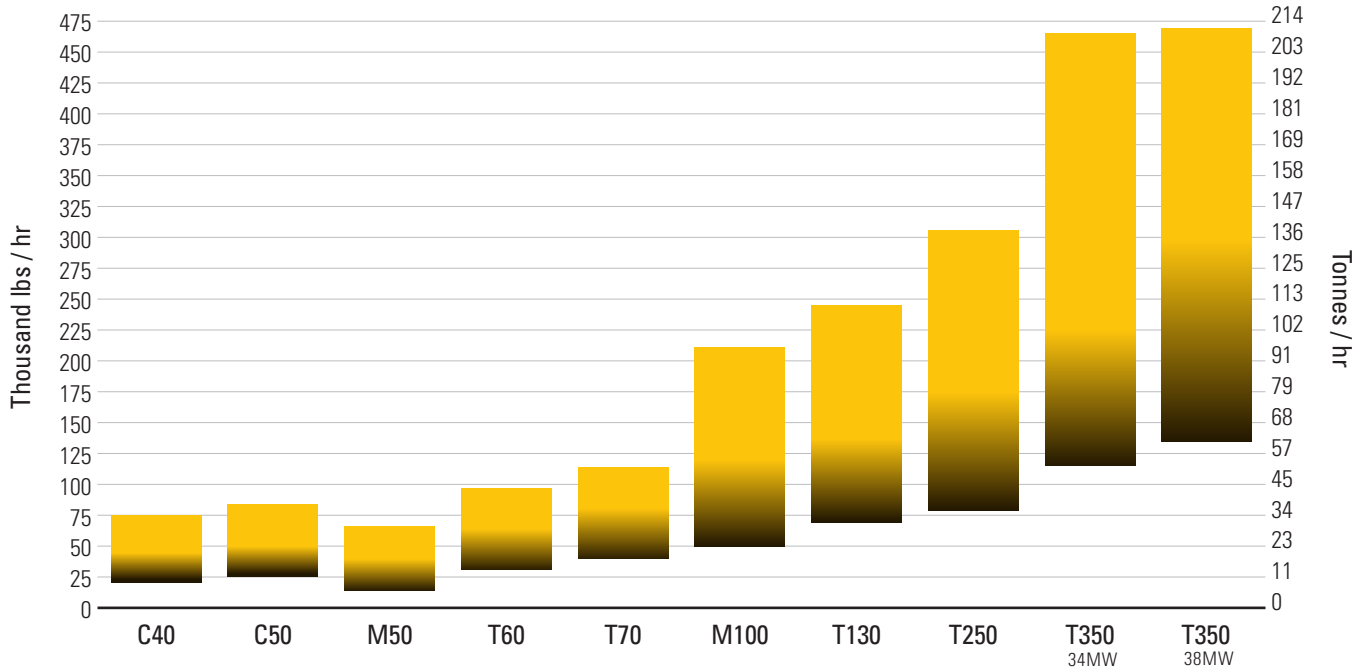
- Improved Fuel Efficiency
- Reduce Costs
- Increase Reliability
- Lower Emissions
- Sell Surplus Power
- Steam for Production

COMBINED HEAT & POWER
PLANT EFFICIENCY

Up to 90% +

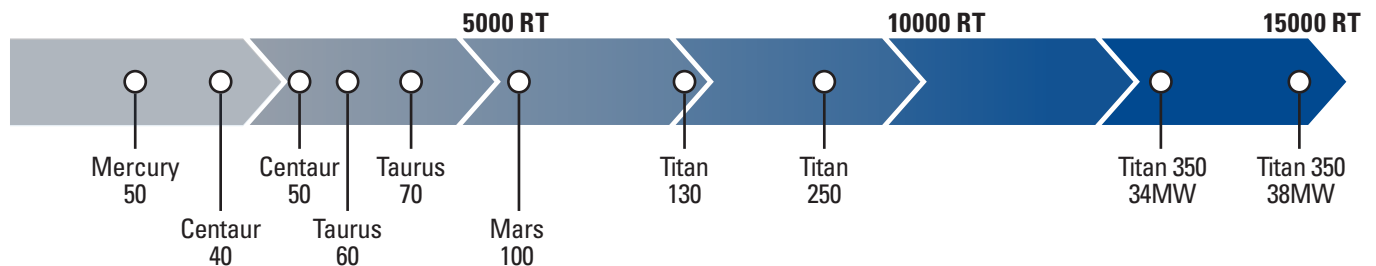
STEAM PRODUCTION RANGES

From an unfired basis to a max-fired rate



CHILLED WATER PRODUCTION

Double-Effect Absorption Chiller* (Steam, Unfired)



Conversion factor: 1000 RT = 3.5 MW(th)

* Alternative chiller configurations are also available including single effect, hot water and indirect-fired absorption.

POWER GENERATION

PACKAGE OPTIONS



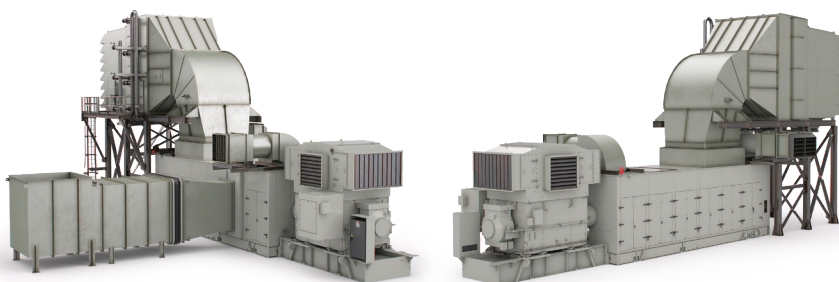
POWER GENERATION PACKAGE

With thousands of units sold worldwide, our robust configurations are fully customizable to meet various site-specific needs.

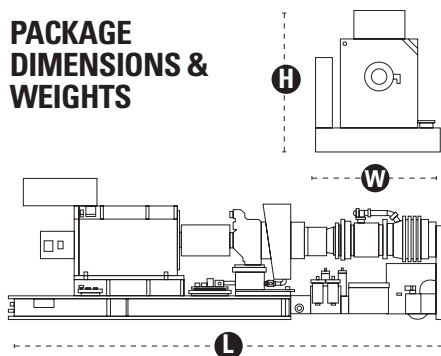
3+ Billion Fleet Operating Hours

8,000+ PG Systems Installed

100+ Countries



PACKAGE DIMENSIONS & WEIGHTS



	LENGTH		WIDTH		HEIGHT		WEIGHT	
	m	ft, in	m	ft, in	m	ft, in	kg	lb
TITAN 350	22.1	72' 6"	4.0	13' 1"	4.7	15' 6"	184,160	406,000
TITAN 250	18.2	59' 6"	3.4	11' 2"	3.9	12' 9"	141,150	311,100
TITAN 130	14.2	46' 6"	3.0	9' 9"	3.7	12' 1"	87,510	192,925
MARS 100	14.2	46' 6"	2.8	9' 2"	3.7	12' 1"	82,145	181,000
TAURUS 70	11.1	36' 3"	2.8	9' 2"	3.5	11' 6"	61,775	136,215
MERCURY 50	11.1	36' 3"	3.2	10' 5"	3.5	11' 6"	45,700	100,700
TAURUS 60	9.8	32' 2"	2.6	8' 6"	3.2	10' 5"	37,920	83,600
CENTAUR 50	9.8	32' 2"	2.6	8' 6"	3.2	10' 5"	37,785	83,300
CENTAUR 40	9.8	32' 2"	2.6	8' 6"	3.2	10' 5"	33,480	73,280

Dry weight, unenclosed height and weight. Actual values will vary depending on customer options, such as generator type. All specifications are for reference only.

POWER GENERATION MODULE – PGM

Solar's modular concepts have been optimized for transportation and minimized for civil works, resulting in shorter installation and commissioning times, thereby reducing overall costs for our customers.



Benefits

- Proven Design for PG Markets
- Quick Installation & Commissioning
- Integrated Control Room and MCC
- SoLoNOx Options 9, 15, 25 ppm
- Compact Footprint
- Digital Capabilities

Scope

- Package Ventilation Filters
- Turbine Air Inlet Filters
- Package Exhaust
- Enclosure Structure
- Ladders and Platforms
- EEC and On-Skid Control Box

	LENGTH		WIDTH		HEIGHT		WEIGHT	
	m	ft, in	m	ft, in	m	ft, in	kg	lb
PGM130	17.6	57' 9"	3.1	10' 2"	10.5	34' 5"	125,400	276,210
PGM70	14.7	48' 3"	2.9	9' 6"	7.7	25' 2"	80,350	176,980

Weights and dimensions for compact filter configuration, dry weight.



FUEL FLEXIBILITY

FUEL EXPERIENCE

SINGLE FUEL

DUAL FUEL

Gases

- Natural Gas
- Associate Gas
- Raw Natural Gas
- Refinery off Gas
- Landfill Gas
- Digester Gas
- Coke Oven Gas
- Gasified Biomass

Liquids

- Gasoline
- Diesel
- Kerosene
- Naphtha
- Liquefied Natural Gas (LNG)
- Liquefied Petroleum Gas (LPG)
- Hydrotreated Vegetable Oil (HVO)

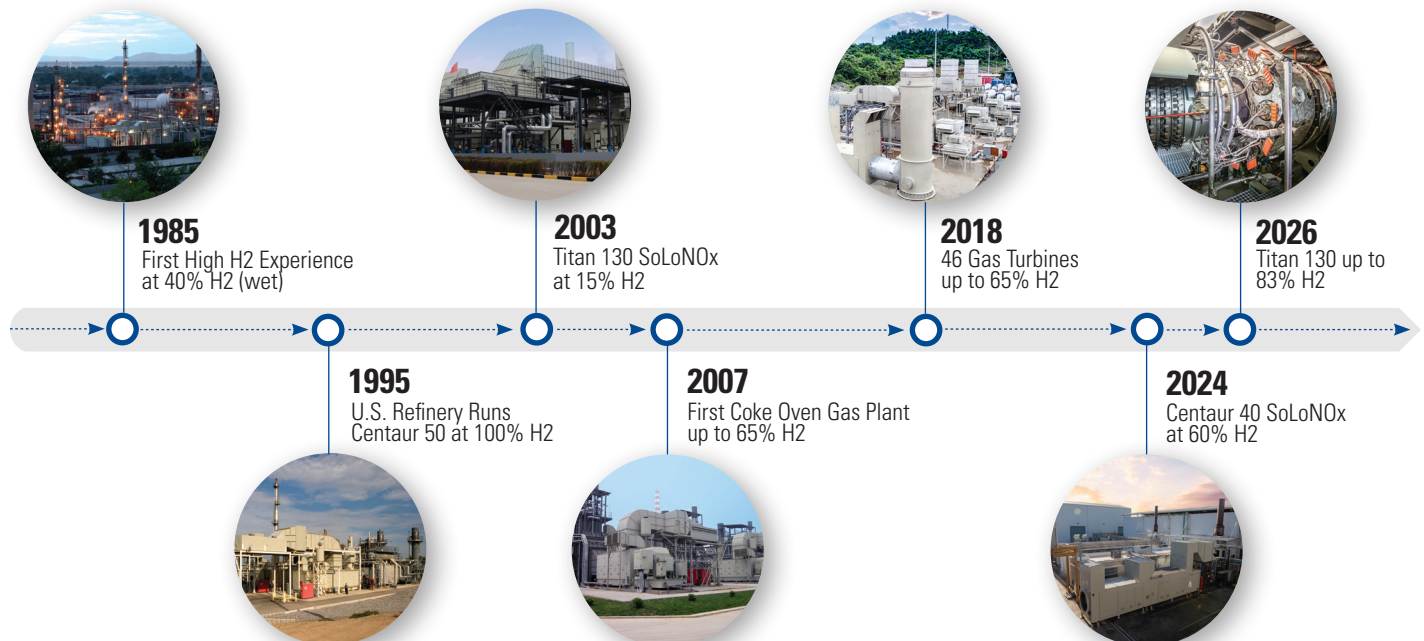
Renewables

- Hydrogen up to 100%
- Biomethane & Biogas
- Renewable Natural Gas
- Bio Propane
- B20-B100 Biodiesel mix
- Renewable Diesel
- Syngas

HYDROGEN EXPERIENCE

Utilizing hydrogen in gas turbine operations offers carbon reduction opportunities across a wide range of applications and industries.

- Solar Turbines has been providing solutions for hydrogen-rich fuels since 1985.
- All Solar gas turbines are capable of running at 100% hydrogen in conventional combustion.
- Solar proudly claims over two million hours of operation across more than 55 packages using high hydrogen fuels.
- Solar is committed to continue investing in 100% hydrogen capability with dry low emissions.



SOLAR MOBILE TURBOMACHINERY



MOBILE SOLUTIONS

Solar Turbines offers mobile power plant solutions in two sizes: 5.7 MWe and 16 MWe. Our Solar Mobile Turbomachinery (SMT) products are easy to transport, relocate and require minimal site setup. Built around our proven Taurus 60 and Titan 130 gas turbines, our SMT products are ready to provide power anytime and anywhere.

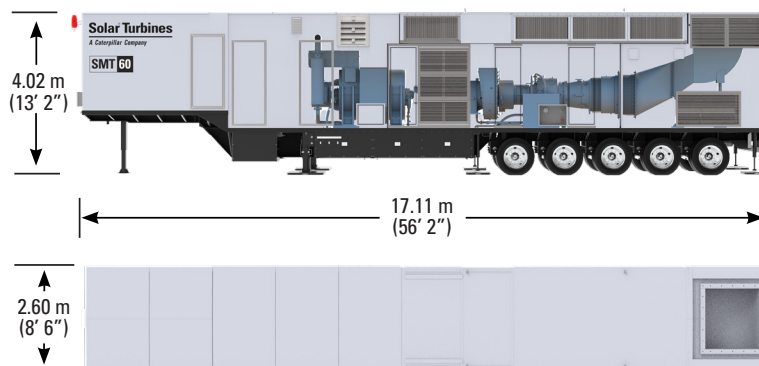
Your Advantages

- Proven design for power generation
- Power plant modularity
- Fuel flexibility
- Microgrid ready: island mode/grid parallel, variable renewables integration, demand/response
- Dual fuel capable with low emissions
- 50 and 60 Hz available
- 100% load blocks capable
- Continuous power (COP) rating

SMT 60 Taurus 60 Generator Set

5.7 MWe

- Fully-integrated, single-trailer design
- Hydraulic leveling system
- Quick setup: less than 4 hours
- Mobile for easy deployment
- No concrete foundation required
- No crane lifts required at site

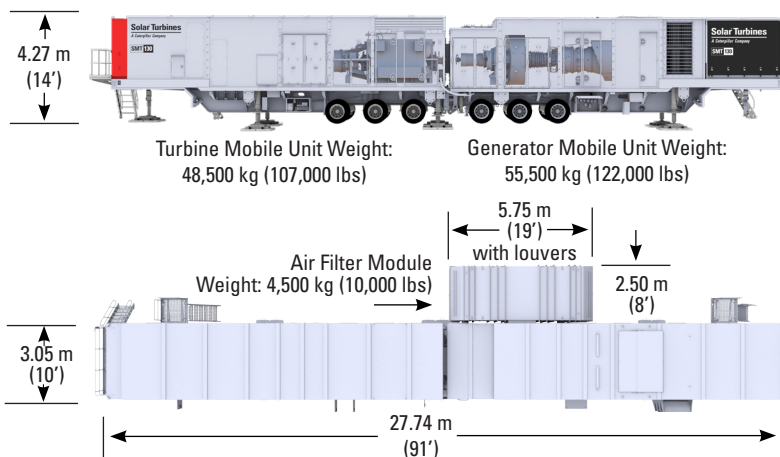


Package weight without tractor: 50,330 kg (110,960 lbs)

SMT 130 Titan 130 Generator Set

16 MWe

- Dual-trailer design
- Hydraulic leveling system
- Quick setup: less than 12 hours
- Mobile for easy deployment
- No concrete foundation required
- No crane lifts required at site



Note: Displayed weights shown are estimated installed



PRIME POWER, MICROGRIDS AND GRID SUPPORT

Solar Turbines has developed products and solutions that optimize the real-time balance of electricity supply and demand, reducing costs while maintaining grid stability and reliability. Solar's microgrid and mission critical applications ensure reliable, uninterrupted power for essential services like hospitals, data centers and communication networks.

KEY FEATURES DEVELOPED

Optimized Power Quality

The developed grid support capabilities help customers with voltage control, frequency regulation and managing loads on the local grid, even when renewable energy sources are not generating power.

- Frequency Regulation
- Voltage Control
- Black Start Capability
- Reserve Capacity
- Demand Response
- Load Following
- Reactive Power Support
- Spinning Reserves
- Non-Spinning Reserves

Resiliency & Fast Start

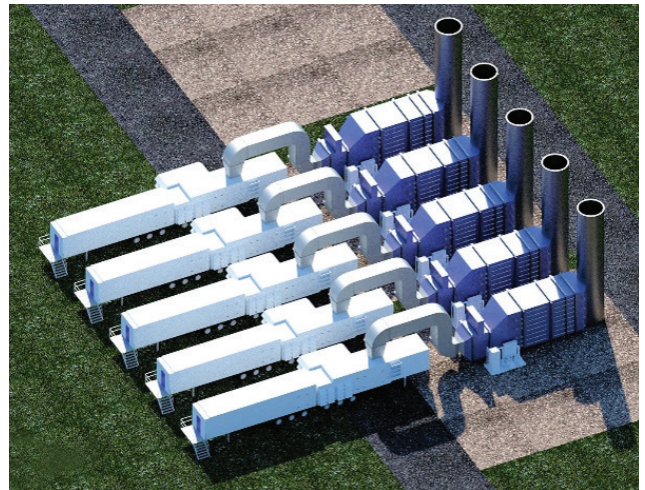
Solar's solutions ensures seamless power, even during outages, without the need for continuous consumption of resources like lube oil and water. The 3.5 MW Centaur 40 turbine can start and achieve full load in 35 seconds while the 16 MW and 38 MW Titan turbines can start and achieve full load in less than five minutes.

Fuel Flexibility & Low Emissions

Solar combined the reliable power sources of gas turbines with the capability of low carbon fuels to minimize environmental impact. Solar's gas turbines can achieve single-digit emissions of NOx and CO without the need for exhaust controls or water injection.

Scalable & Adaptable

Accommodate changing energy demands by allowing for future expansion or integration of new technologies. Gas turbines deliver substantial power output relative to their compact size, making them ideal when space is limited or expensive.



POWERING YOUR SUCCESS

Solar Turbines' global sales and service organization is dedicated to powering your success. Our culture of customer care is the foundation of our commitment to the highest quality customer experience, from your initial inquiry through the entire lifespan of your equipment. Our customer support team is the world's largest and most experienced in turbomachinery services.

CUSTOMER SUPPORT

We provide customer support from over 50 strategic locations worldwide, with over 3,000 field personnel dedicated to your success.

- Overhaul Centers
- Field Service Offices
- Parts Depots
- Training Facilities

LIFECYCLE SUPPORT

We offer a variety of services to extend the life of your product and minimize its lifetime cost.

- Gas Turbine Overhaul
- Upgrades and Uprates
- Low-Emission Conversions
- Digital Solutions
- Equipment Optimization
- Service Parts

SALES AND SERVICE LOCATIONS



CONTACT US

For more information and to locate the office nearest you:
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email **infocorp@solarturbines.com**



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