PurePower Engine Family Specs Chart

Engine Program	PW1200G	PW1500G	PW1100-JM	PW1400G
Engine Type	Geared TurbofanTM (GTF) Engine with scaled engine core; current models from 10,000 to 40,000 pounds of thrust	Geared TurbofanTM (GTF) Engine with scaled engine core; current models from 10,000 to 40,000 pounds of thrust	Geared TurbofanTM (GTF) Engine with scaled engine core; current models from 10,000 to 40,000 pounds of thrust	Geared TurbofanTM (GTF) Engine with scaled engine core; current models from 10,000 to 40,000 pounds of thrust
Aircraft Family	Mitsubishi Regional Jet	Bombardier CSeries	Airbus A320neo	Irkut MC-21
Aircraft Models	MRJ70 MRJ90	CS100 CS300	A319neo A320neo A321neo	MC-21-200 MC-21-300 MC-21-400
Passenger Capacity	70–96	100–145	124–220	130–230
Engine Models (thrust in pounds-force)	PW1215G 15,000lbs PW1217G 17,000lbs	PW1521G 21,000lbs PW1524G 23,300lbs	PW1124G 24,000lbs PW1127G 27,000lbs PW1133G 33,000lbs	24,000–33,000lbs
Architecture	1-G-2-8-2-3	1-G-3-8-2-3	1-G-3-8-2-3	1-G-3-8-2-3
Bypass Ratio (BPR)	9:1	12:1	12:1	12:1
Fan Diameter	56 inches	73 inches	81 inches	81 inches
Entry into Service (EIS)	2014	2013	October 2015	2016

Updated September 2012

PurePower Engines are Pratt & Whitney's next generation of engines, which offer double-digit improvements in fuel consumption, noise, environmental emissions, and operating costs. To date, PurePower Engines comprise two engine families: the PW800 engine family by Pratt & Whitney Canada, which will power the next generation of large business jets, and the PW1000G—or geared turbofan (GTF)—engine family. Common between the PW800 and PW1000G engine families is the PurePower engine core: a high performance core built for the demands of high-cycle, short-haul operation.

How can one core meet the demands of so many aircraft? The answer is two-fold. First, Pratt & Whitney and partner MTU Aero Engines collaborated to design a state-of-the-art core that would be fully capable from 10,000 to 40,000 pounds of thrust. Second, scaling an engine core over this range was further enabled by the unique advantages of GTF engine architecture. Because GTF engines can slow the fan while greatly increasing the speed of the low-pressure modules, the low pressure compressor (LPC) is able to "supercharge" the air before it enters the high-pressure compressor (HPC). In turn, that means fewer HPC stages are required to accomplish the same work at an engine level. The end result for operators? A lighter-weight core with fewer parts, which is easier to maintain, with hundreds fewer airfoils and two fewer life-limited parts (LLPs). All this, with the same core across two families of engines, meaning operators will also benefit from the higher maturity that comes with so many more hours of experience.

The numbering scheme for each PW1000G engine model follows the same historical Pratt & Whitney pattern: the first number represents the generation—in this case, 1 or 1,000. The second number denotes the customer: 1 for Airbus, 2 for Mitsubishi, 4 for Irkut, and 5 for Bombardier. The last two numbers indicate the thrust class: 24 for 24,000 pounds of thrust, and so forth. And finally, the "G" stands for a geared turbofan engine. Above, the full PW1000G engine product table is listed in order of thrust.

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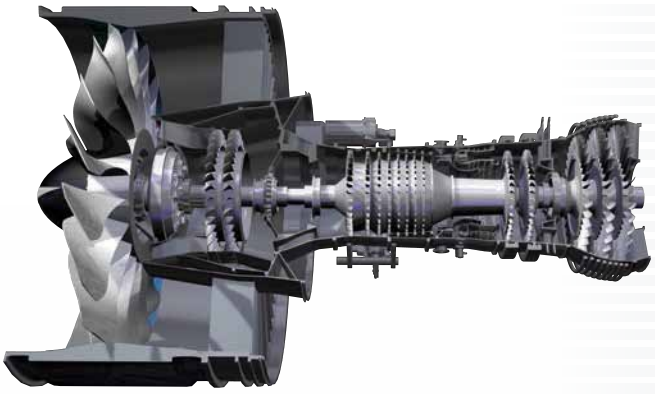
PurePower® PW1200G Engine

Powering the Mitsubishi Regional Jet

- **Double-digit fuel burn reduction**
- **50% reduction in noise**
- **Low emissions**



Mitsubishi Aircraft has selected the award-winning Pratt & Whitney geared turbofan™ engine to power the Mitsubishi Regional Jet (MRJ).

The Mitsubishi Regional Jet is the next-generation regional jet that will offer both top-class operational economy and outstanding cabin comfort. By featuring a game-changing engine, state-of-the-art aerodynamic design and noise-reduction technology, the MRJ will significantly cut fuel consumption, noise and emissions.

The PurePower PW1200G engine is the exclusive power plant for the MRJ aircraft and is scheduled to enter into service in 2015.

PurePower® PW1200G Engine for the Mitsubishi Regional Jet

The PurePower PW1200G engine's fan-drive gear system is just one component of this next-generation engine. The engine also incorporates advances in 3D aerodynamics, lightweight materials such as a composite fan case and other major technology improvements in the compressor, combustor, turbine, controls, engine health monitoring and more.

More than 20 years in the making, the PurePower PW1200G engine has entered the validation and certification phase of the program. PW1200G test engines and several system validation rigs will validate performance, durability and reliability to support entry into service in 2015. That's delivering a next-generation dependable engine.

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Product Facts

Program Milestones

Q2 2011	PW1200G First Engine to Test
Q2 2012	PW1200G First Flight
Q4 2013	MRJ First Flight
Q3 2015	MRJ Entry into Service powered by PW1200G

Characteristics	PW1215G	PW1217G
Diameter, fan tip, in.	56	56
Stages	1-G-2-8-2-3	1-G-2-8-2-3

Nominal Performance—Sea level, static

Takeoff rating, lbs.	15,000	17,000
Bypass ratio	9:1	9:1
Flat-rated temp.,°C	ISA+15	ISA+15

Aircraft Installation		
	MRJ70STD	MRJ90STD
	MRJ70ER	MRJ90ER
	MRJ70LR	MRJ90LR

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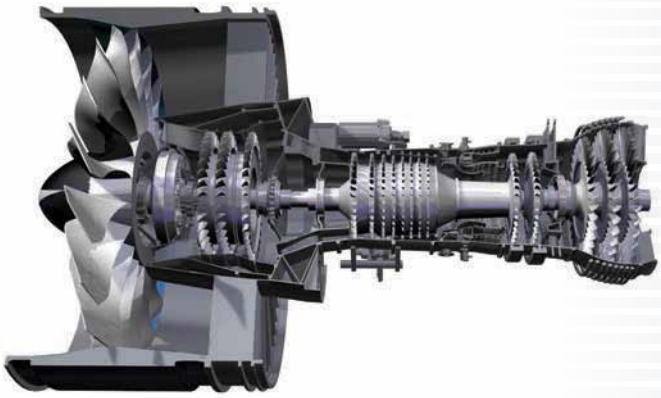
Commercial Engines

PurePower®

PW1500G Engine

Exclusive Power for the Bombardier® CSeries®

- **Double-digit fuel burn reduction**
- **50% reduction in noise**
- **Low emissions**



The PurePower PW1500G engine has been selected as the exclusive power plant for the Bombardier CSeries, with entry into service scheduled for 2013. The PurePower PW1500G engine contributes to the exceptional economic benefits of the CSeries, which delivers 20% fuel burn advantage over in-production aircraft. Our geared engine architecture reduces the number of stages and parts while simultaneously improving efficiency. The PW1500G engine's environmental benefits are equally impressive: 20 dB margin to Chapter IV noise with high-efficiency components and advanced combustor technologies that slash CO_2 and NO_X emissions.

PurePower® PW1500G Engine for the Bombardier CSeries

The PurePower PW1500G engine is the exclusive power plant for the Bombardier CSeries. The geared architecture combined with the all-new, advanced PurePower engine core enables the PW1500G to deliver significant economic and environmental benefits, without compromise.

With PW1500G engines running in the test stand today, the program has successfully moved into the validation and certification phase, supporting entry into service in 2013.

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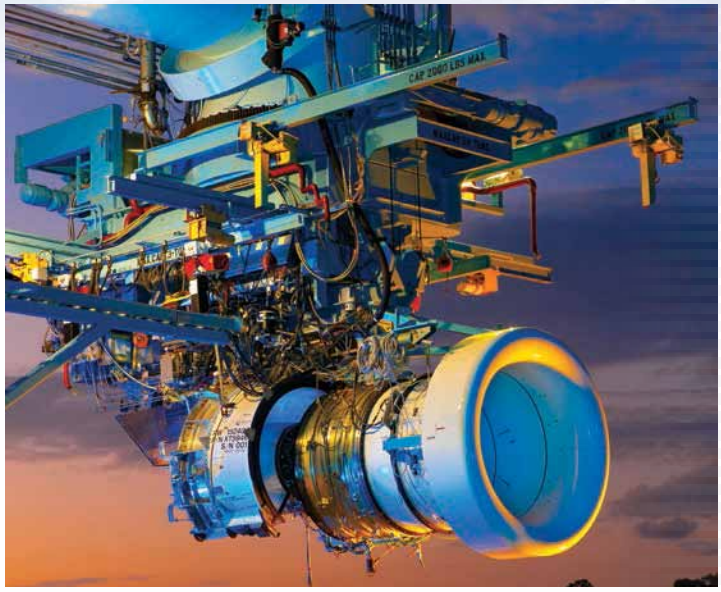

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Product Facts

Program Milestones

Q3 2010	PW1500G First Engine to Test
Q2 2011	PW1500G First Flight
Q4 2012	PW1500G Engine Certification
Q4 2013	CSeries Entry into Service powered by PW1500G

Characteristics	PW1519G	PW1521G	PW1524G
Diameter, fan tip, in.	73	73	73
Stages	1-G-3-8-2-3	1-G-3-8-2-3	1-G-3-8-2-3
Nominal Performance—Sea level, static			
Takeoff thrust, lbs.	19,000	21,000	23,300
Bypass ratio	12:1	12:1	12:1
Flat-rated temp.,°C	ISA+15	ISA+15	ISA+15
Aircraft Installation	**CS100**	**CS100 CS300**	**CS100 CS300**

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PurePower®

PW1100G-JM Engine

Greenest Engine on the Airbus A320neo

- **Double-digit fuel burn reduction**
- **50% reduction in noise**
- **Low emissions**

Airbus selected the award-winning Pratt & Whitney geared turbofan™ engine as the launch engine on the A320neo (new engine option) aircraft family. The ultra-efficient PurePower PW1100G-JM engine delivers double-digit improvements in fuel efficiency, reduces noise by 50% and slashes CO_2 and NO_X emissions.

The PW1100G-JM engine's exceptional environmental performance goes hand in hand with a reduction in engine cash operating cost, as it has been designed for maintenance, with fewer stages and lower parts count. The geared architecture combined with the advanced PurePower engine core enables our game-changing engine to deliver on all fronts, without compromise.

PurePower® PW1100G-JM for the A320neo

The PurePower PW1100G-JM engine offers the greenest engine option on the A320neo. With 15% fuel burn and CO_2 emissions reduction, the PW1100G engine sets the standard.

With 50% margin to CAEP/6 and 35% margin to CAEP/8, the PW1100G-JM engine meets today's and future requirements for NO_X emissions. A 15 dB margin to Stage IV noise requirements sharply reduces noise impact on communities and enhances cabin comfort.

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Product Facts

Program Milestones

Q4 2012	PW1100G First Engine to Test
Q4 2014	PW1100G Engine Certification
Q4 2015	A320neo Entry into Service powered by PW1100G

Characteristics	**PW1124G**	**PW1127G**	**PW1133G**
Diameter, fan tip, in.	81	81	81
Stages	1-G-3-8-2-3	1-G-3-8-2-3	1-G-3-8-2-3
Nominal Performance—Sea level, static			
Takeoff thrust, lbs.	23,500	26,250	32,100
Bypass ratio	12:1	12:1	12:1
Flat-rated temp.,°C	ISA+15	ISA+15	ISA+15

Aircraft Installation	**A319neo**	**A320neo**	**A321neo**

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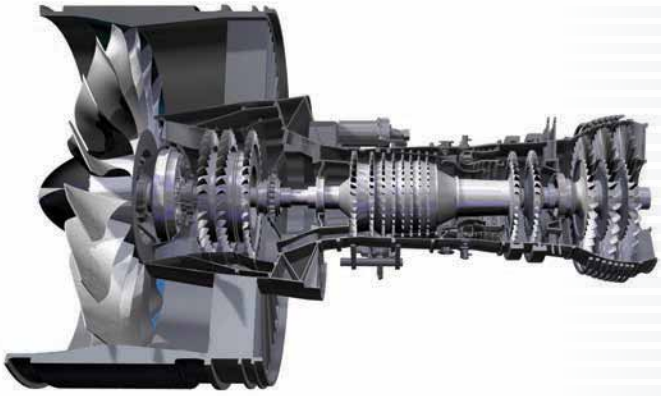
PurePower® PW1400G Engine

Power for the Irkut MC-21

- **Double-digit fuel burn reduction**
- **50% reduction in noise**
- **Low emissions**



The PurePower PW1400G engine has been selected to power the Irkut MC-21 aircraft family, with entry into service scheduled for 2017. The PurePower PW1400G engine delivers double-digit improvements in fuel efficiency, reduces noise by 50%, and slashes CO_2 and NO_x emissions.

The MC-21, or "Airliner of the 21st Century," is a family of aircraft designed by Irkut, part of Russia's United Aircraft Corporation (UAC), and supported by suppliers and partners around the globe. The MC-21 family will offer significant fuel burn, environmental and economic advantages over both its domestic and international rivals.

PurePower® PW1400G Engine for the Irkut MC-21

The PW1400G engine's exceptional environmental performance goes hand in hand with a reduction in engine operating costs, as the PW1400G has been designed for maintenance, with fewer stages and lower parts count. The geared architecture combined with the all-new, advanced PurePower engine core enables the PW1400G engine to deliver on all fronts, without compromise.

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Product Facts

Characteristics	**PW1428G**	**PW1431G**
Diameter, fan tip, in.	81	81
Stages	1-G-3-8-2-3	1-G-3-8-2-3
Nominal Performance—Sea level, static		
Takeoff thrust, lbs.	28,000	31,000
Bypass ratio	12:1	12:1
Flat-rated temp., °C	ISA+15	ISA+15

Aircraft Installation	**MC-21-200**	**MC-21-300**

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