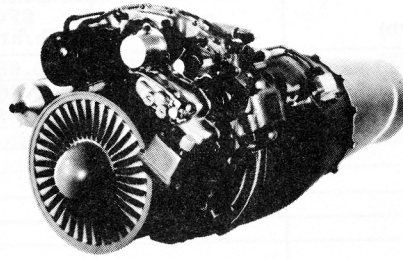


*Williams Research Corporation  
F107-WR-400*

# Propulsion Characteristics Summary

**TURBOFAN** . . . . . F107-WR-400



Williams Research Corporation  
Walled Lake, Michigan  
Spec. 24235WR9501C  
Contractually Approved  
21 April 1983

(U)  
JOINT CRUISE MISSILE PROGRAM OFFICE (JCMPO)

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## FEATURES

The engine is a low bypass ratio turbofan with mixed exhaust. The low-pressure spool consists of a two-stage axial fan, followed by two additional axial compressor stages in the gas generator flow path, all driven by two axial turbines. The high-pressure spool consists of a single-stage centrifugal compressor driven by an axial turbine. The engine utilizes an annular burner with rotary fuel injection, and is started by impingement of solid propellant gases on the turbine blades. The lubrication system is self-contained.

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## AVAILABILITY

Program Initiated (As F107-WR-100) . . .	Feb 72
First BGM-109 Flight . . . . .	Jun 76
Begin Full Scale Development . . . . .	Feb 77
Complete Qualification Testing . . . . .	Mar 80
First Production Delivery . . . . .	Mar 81

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## CONTRACTUAL

USN Contract N00019-78-C-0206 . . . . .	Full Scale Development
USN Contract N00019-80-C-3003 . . . . .	FY80
USN Contract N00019-81-C-3116 . . . . .	FY81
USN Contract N00019-82-C-3208 . . . . .	FY82
USN Contract N00019-83-C-3332 . . . . .	FY83

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## STATUS

In production. Engines also manufactured by Teledyne CAE, Toledo, Ohio, under license.

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## GENERAL

Compressor . . . . .	Two-spool, counter-rotating	Turbine Cooling . . . . .	None
LP Rotor . . . . .	Axial, 2 fan and 2 intermediate stages	Max Rated Turb Inlet Temp/SLS . . . . .	1850°F
HP Rotor . . . . .	Centrifugal, 1-stage	Exhaust Nozzle . . . . .	Fixed, mixed flow, convergent
Max Design Pressure Ratio/SLS:		Regeneration . . . . .	None
Fan . . . . .	2.1:1	Max Rated Exhaust Temp/SLS . . . . .	1104°F/595°C
LP Rotor . . . . .	3.6:1	Electrical System . . . . .	Saturable Core, AC ignition generator
HP Rotor . . . . .	3.9:1	Ignition . . . . .	Surface gap igniters
Overall . . . . .	13.8:1	Power Control . . . . .	Hydromechanical
Bypass Airflow Ratio . . . . .	1:1	Fuel . . . . .	RJ-4
Max Allowable Air Bleed (HP) . . . . .	3.0%	Oil . . . . .	Synthetic, MIL-L-7808
Max Rated Airflow/SLS . . . . .	13.6 lb/sec	MCP Oil Consumption . . . . .	0.014 gal/hr
Combustion Chamber . . . . .	Single, annular, with slinger type injection	Accessory Drive Provisions . . . . .	One pad
Turbine . . . . .	Two-spool, counter-rotating	Thrust to Weight Ratio . . . . .	4.6:1
LP Rotor . . . . .	Axial, 2-stage		
HP Rotor . . . . .	Axial, 2-stage		

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## SIZE & WEIGHT

Length, Overall . . . . .	36.9 in.
Diameter, Nominal . . . . .	12.00 in.
Max. Radial Projection . . . . .	10.73 in.
Weight, Dry . . . . .	139 lb
Weight, Wet . . . . .	142 lb

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## UTILIZATION

This engine is used in the BGM-109 (General Dynamics) Sea Launched Cruise Missile (SLCM) (USN) and the Ground Launched Cruise Missile (GLCM) (USAF).

CLASSIFIED BY OPNAVINST S-5513.2  
ID: 02-71.3 OF 25 JAN 79  
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## Performance

GUARANTEED RATINGS AT STATIC SEA LEVEL STANDARD CONDITIONS					
RATING	THRUST (lb)	RPM	SFC (lb/hr/lb)	MEAS. EGT (max, °F/C)	AIRFLOW (lb/sec)
Max Continuous	635	63,200/33,100	0.683	1130/610	13.60
90% Max Continuous	571	61,650/31,600	0.665	1060/571	13.00
75% Max Continuous	476	54,700/29,600	0.643	960/515	12.1
Idle	150 (Max)	48,645/20,040	104 (lb/hr)	709/376	7.07

### GUARANTEED ALTITUDE RATINGS ICAO STANDARD ATMOSPHERE ~ 100% RAM EFFICIENCY

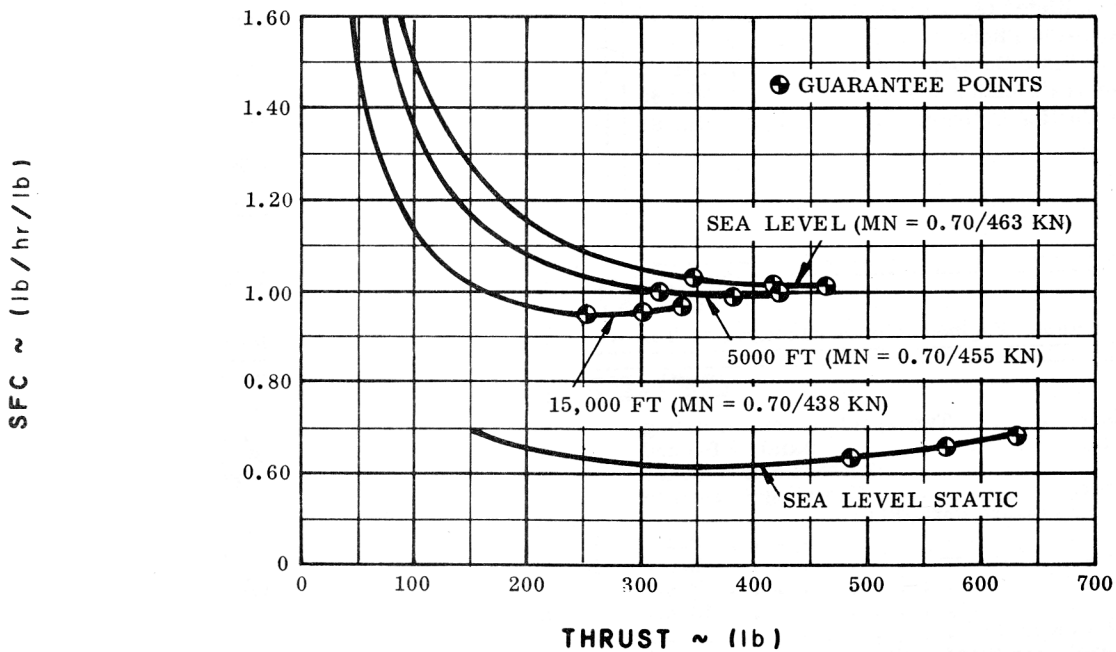
RATING	ALTITUDE (ft)	MACH/KN	THRUST (lb)	SFC (lb/hr/lb)	MEAS. EGT (max, °F/C)	AIRFLOW (lb/sec)
Max Continuous	0.0	0.70/463	464	1.014	1123/606	16.70
Max Continuous	5000	0.70/455	423	0.995	1114/601	14.51
Max Continuous	15,000	0.70/438	335	0.968	1100/592	10.60
Cruise	0.0	0.70/463	318	1.043	978/526	15.11

### GUARANTEED OPERATING LIMITS

Absolute Altitude . . . . .	30,000 ft	Max Start Alt (RJ-4) . . . . .	12,000 ft
Limiting Mach Number at Sea Level . . . . .	0.9		

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### ICAO STANDARD ATMOSPHERE ~ 100% RAM EFFICIENCY



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## NOTES