RD-180

Pratt & Whitney Rocketdyne

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RD-180
Propulsion System

Pratt & Whitney Rocketdyne (PWR), through RD AMROSS, is proud to include in its propulsion lineup the RD-180, one of the world's most robust, mission-proven, reliable and powerful kerosene-fueled liquid booster engines in production. By combusting liquid oxygen and kerosene propellants, the RD-180 provides clean operation and is one of the most environmentally friendly booster engines in use today.

RD AMROSS, LLC is a partnership of Pratt & Whitney Rocketdyne and NPO Energomash.

RD-180-Powered Launches

Atlas III Launches

AC-201	May 24, 2000
AC-204	February 21, 2002
AC-205	April 12, 2003
AC-203	December 18, 2003
AC-202	March 13, 2004
AC-206	February 3, 2005

Atlas V Launches

AV-001	August 21, 2002
AV-002	May 13, 2003
AV-003	July 17, 2003
AV-005	December 17, 2004
AV-004	March 11, 2005
AV-007	August 12, 2005
AV-010	January 19, 2006
AV-008	April 20, 2006
AV-013	March 9, 2007
AV-009	June 15, 2007
AV-011	October 11, 2007
AV-015	December 10, 2007
AV-006	March 13, 2007
AV-014	April 14, 2008

The RD-180 is an evolution of the Russian-developed and flight-proven RD-170 engine, which successfully powered numerous Russian missions. So safe and dependable was the RD-170's performance (RD-170 is currently out of production) that it was certified (in Russia) for human flight.

The dual-combustion chambered (fed by a single turbopump) RD-180 utilizes an extremely efficient, high-pressure staged combustion cycle and liquid oxygen-rich preburner, which contributes to the engine's unparalleled performance.

A totally integrated propulsion package, the RD-180 includes hydraulics for control valve actuation and thrust vector gimbaling, pneumatics for valve actuation and system purging, and a thrust frame to distribute loads.

With its initial launch in 2000, the RD-180 became the first Russian rocket engine to power a U.S. expendable launch vehicle. Since then, it has reliably powered many missions for both the Atlas III and V launch vehicles, and currently powers the Atlas V.

Produced in Russia, the RD-180 is provided to the launch industry by RD AMROSS, a partnership between the world's two premier propulsion companies – Pratt & Whitney Rocketdyne of the United States and NPO Energomash of Russia.

RD-180 Characteristics (100% power)

Nominal Thrust:	(sea level) (vacuum)	860,200 lb 933,400 lb
Specific impulse: (sea level)	311.3 sec	
Vacuum specific impulse:	337.8 sec	
Chamber Pressure:	3,722 psia	
Nozzle area ratio:	36.4:1	
Mixture ratio:	2.72	
Length:	140 in.	
Diameter:	124 in.	
Throttle Range:	47% – 100%	
Dry weight:	12,081 lb (5,480 kg)	

Description

- Staged-combustion cycle engine
- Liquid oxygen/kerosene propellants
- Dual thrust chambers (gimbal +/-8 degrees)
- Single oxygen-rich preburner
- High-pressure turbopump assembly
  - two-stage fuel pump • single-stage oxygen pump • single turbine
- Hypergolic ignition
- Self-contained hydraulic system powered with kerosene from fuel pump
- Minimal interfaces with launch pad and vehicle
- 70% RD-170 parts

PRATT & WHITNEY ROCKETDYNE, a United Technologies company with sites throughout the U.S., is dedicated to providing advanced, reliable, and cost-effective propulsion systems for spacecraft and missile propulsion systems and service.

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