

Raptor 2

AN-001
HOW IT WORKS
FULL-FLOW STAGED COMBUSTION

How does a rocket engine work?

Two very cold liquids, liquid oxygen and methane, are pumped up to 300 bar. A little of each burns in two small preburners whose hot gas spins the pumps. Then both hot gases meet in the main chamber, and the bell nozzle turns that pressure into 230 tonnes of thrust.

230 _{tf}

THRUST AT SEA LEVEL

300 _{bar}

MAIN CHAMBER PRESSURE

3.6 : 1

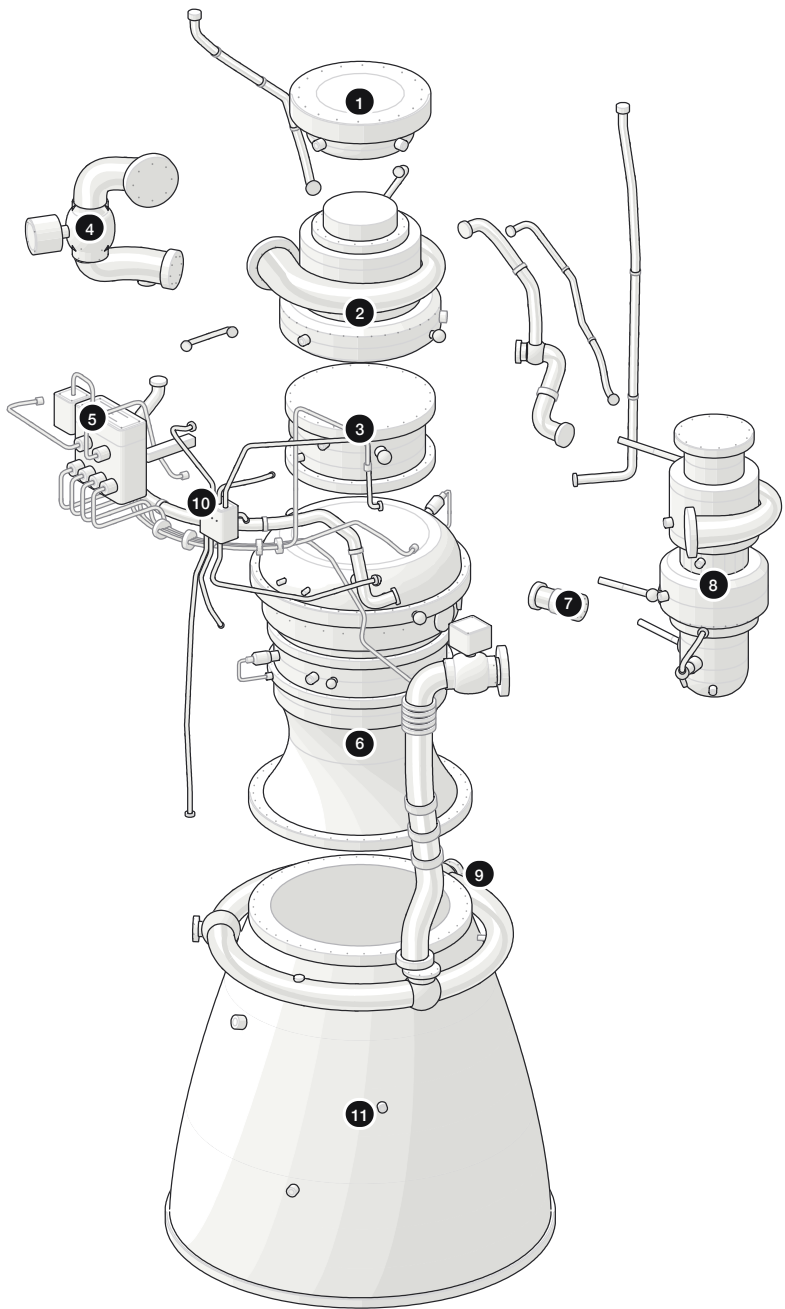
OXYGEN TO METHANE, BY MASS

1,630 _{kg}

DRY MASS

1.3 _m

NOZZLE EXIT



01 Gimbal and thrust puck

Carries 230 tf into the stand and lets the engine steer.

02 Oxygen turbopump

Spun by oxygen-rich gas; raises the oxygen to chamber pressure.

03 Oxygen-rich preburner

All the oxygen, a little methane: hot gas for the oxygen turbine.

04 Oxygen duct and main valve

Carries liquid oxygen from the pump to the preburner.

05 Engine controller and harness

Opens the valves, reads the sensors, runs the start.

06 Injector and main chamber

Both hot gases meet and burn at 300 bar. No igniter of its own.

07 Hot-gas manifold

Brings the fuel-rich gas round to the injector.

08 Methane turbopump and fuel-rich preburner

All the methane, a little oxygen: hot gas for the methane turbine.

09 Downcomer and main fuel valve

Sends methane down to the nozzle's cooling jacket.

10 Plumbing

Sense lines into a block, plus feed, purge and igniter lines.

11 Nozzle

A 1.3 m bell, cooled by the methane running through its wall.