

Micro-hybrid and Mini-hybrid Rocketry



What are micro and mini-hybrid rocket motors?

The original micro-hybrid was developed in 1995-96 by Rene Caldera. These ingenious little rocket motors are in the D (micro) and E (mini) power classes. Each reloadable motor is precision machined from aluminum, brass, stainless steel and graphite. They are propelled by readily-available whipped cream dispenser cartridges and homemade fuel rolled from paper grocery bags. No special launch controller is required, just a standard 12 Volt hobby rocketry launch system. These experimental motors can fly almost any larger Estes, Quest or similar rocket kit with some simple modifications. Best of all, they are very inexpensive to fly!

What is needed to fly micro and mini-hybrid powered rockets?

- Reusable micro or mini-hybrid motor hardware.
- Whipped cream dispenser cartridges containing either 8 (micro) or 16 (mini) grams of nitrous oxide.
- Homemade fuel as simple as rolled-up paper bag material.
- A few small replaceable parts like O-rings, a plastic burst disk and a pre-heater grain.
- A typical C, D, or E class rocket kit at least 24 mm in diameter modified to take the motor and a deployment device.
- A lightweight parachute and electronic deployment system, either an altimeter, magnetic apogee detector or timer.
- A standard hobby rocketry 12 Volt launch system with 1/8", 3/16" or 1/4" launch rods as needed.

Who would enjoy flying micro and mini-hybrid powered rockets?

Any experienced rocketeer who can build small, lightweight but strong rockets, is comfortable with electronic deployment, and enjoys experimenting with unique propulsion methods. These motors are neither for beginners nor for children without adult supervision.

Why fly micro and mini-hybrids?

- Low cost flights; typically \$1.00 to \$2.00 per flight. This is about 1/4 to 1/3 the list price of flying an Estes D single-use or Aerotech D reloadable motor. Mini-hybrids cost just a bit more, about \$2.00 to \$2.50 per flight due to the increased cost of the 16 gram N₂O cartridges.
- Relatively inert propellant components.
- Fairly clean burning and a bit easier clean-up than most solid reloadables.
- Allows for some experimentation with propellants (at least the fuel).
- Easy to use. Unlike many larger hybrids, no complicated and expensive ground support equipment is needed.
- Arguably the most elegant hobby rocket motor of its size ever designed!

Learn all the details of these fascinating motors and of the rockets to fly with them:

- *Micro and Mini-hybrid User's Guide* (163 pages available as a pdf) Free
- *Micro and Mini-hybrid Rocket Construction Techniques and Examples* (156 pages available as a pdf) Free
- *Test Stand Manual* (31 pages available as a pdf) Free
- For more information or to order the manuals contact me by e-mail at the address below:

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