We Fly: Diamond DA40 NG

This diesel-powered gem could be just what the general aviation market is clamoring for. FLYING MAGAZINE

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If you haven't looked at the Diamond DA40 lately, you're in for some surprises. For starters, the gasoline version isn't even in production. That's right, if you want to buy a new DA40 today, it's diesel or nothing — at least until next year, when the Lycoming IO-360-powered DA40 XLT returns. And although the diesel version, known as the DA40 NG, for "next generation," first appeared way back in 2002, the current iteration has undergone so many design enhancements and improvements that it doesn't seem fair to call it the same airplane. Diamond DA40 NG 2.0 seems like a more apt name for this economical four-seater that finally appears ready to be taken seriously in the U.S. market — and might even help resurrect it.

Powered by a water-cooled 168 hp Austro four-cylinder turbodiesel, the DA40 NG is a sister product of the gasoline-powered DA40 XLT that has been popular with new airplane buyers for many years — that is, until a production hiatus when the company came under control of new Chinese ownership last year after its sale by the Dries family of Austria. Production of the Diamond aircraft line is being transferred from Europe to North America

at Diamond's factory in London, Ontario. Because there was only so much capacity within the company to handle such a herculean undertaking while simultaneously transitioning airplanes to the new Garmin G1000 NXi avionics system (which requires additional certification work), Diamond's new owners decided to get the London production lines for the DA40 NG, DA42 and DA62 up and running first before circling back to the gasoline DA40. That's OK, because the DA40 NG is probably the airplane you'll want to own if you're in the market for a single-engine Diamond. Boasting decent performance, exceptional operating economics and mild-mannered handling characteristics, the NG is a perfect first airplane that outclasses many other factory-built piston singles in its price range. It wasn't always that way. Diamond first brought the DA40 NG to the U.S. market in 2009, but the combination of a low useful load, suspicions of diesel power, poor euro exchange rate and struggling economy conspired to dampen the market for what was a good airplane, but perhaps not a great airplane. So, where did Diamond go right?

For improved air intake, the DA40 NG's cowling underwent numerous changes. The company went back to the drawing board to reimagine the DA40 NG as an airplane that the designers believed could appeal to U.S. buyers, who have yet to embrace diesel power with the same fervor as customers in other parts of the world — and who still remember the mess that was caused in early Diamond diesel DA42s with the insolvency of engine supplier Thielert. A lot of air has passed over the empennages of Diamond airplanes since the Thielert debacle, though, and the result of the push to build new DA40 NGs in Canada is an airplane that now firmly belongs in the "great" category.

Flight schools in China are lining up to add fuel-efficient DA40 NGs to their burgeoning fleets, but should pilots in the United States consider buying one? The short answer is yes, and the reason is simple: the DA40 NG's engine is spectacular. Hundreds of DA40 NGs are expected to be delivered to the Chinese flight-training market in the coming years, meaning U.S. buyers can expect to benefit from the efficiencies brought by a steady flow of airplanes rolling along busy factory floors.

The DA40 XLT and DA40 NG are so different that they're produced under separate type certificates, and there's much to differentiate the two for discerning potential purchasers. Apart from the engines, the major distinctions between the models are the NG version's wider landing-gear stance and bigger tires, taller tail, all-new wheel pants, reshaped cowling and the addition of large winglets, which allowed engineers to shorten the NG's wingspan by a foot, from 39 feet 2 inches to 38 feet 2 inches. If you're looking to fit your new Diamond in a 40-foot hangar, there's no question which airplane you'll want. The DA40 NG fits, and the XLT, well, really doesn't. Like its gasoline-powered cousin, entry into the DA40 NG is decidedly civilized.

The Diesel Difference

The airplanes fly differently too, as I found out during a demonstration with John Armstrong, a Diamond distributor and the founder of LifeStyle Aviation, a company that offers buyers an attractive pathway to airplane

ownership through a program called DiamondShare. For my demo flight, Armstrong and I met up at Plant City Airport in central Florida to spend an afternoon smashing bugs just beyond the eastern edge of Tampa's Class B airspace. I have a fair amount of time in DA40s, and although the family resemblance is obvious, it's clear that the NG and XLT are very different machines. Having now flown both, there's no question in my mind that the NG is the superior airplane.

Obviously, the biggest difference is what's under the cowling. Austro Engine is a subsidiary of Diamond Aircraft Industries that was sold, lock, stock and barrel, last year to Wanfeng Aviation Industry, one of 60 subsidiaries of the Wanfeng Auto Holding Group, a massive Chinese conglomerate that's just easing into the general aviation market. (Originally, Wanfeng had purchased a 60 percent interest in Diamond's Canadian operation in 2016 before buying the entire company.) The four-cylinder Austro AE300 turbodiesel that powers the DA40 NG is actually a stock Mercedes OM640 diesel engine, of which the German luxury carmaker has produced more than a million units for its small A- and B-class cars. So you know the reliability is at least as good as products from established airplane engine manufacturers, and probably even better, if we're being totally honest.

The big advantage of the two-liter AE300 over the Lycoming IO-360 is the diesel's fuel efficiency, and that's saying something, considering the Lycoming four-cylinder IO-360 gasoline engine is one of the most fuel-efficient engines ever produced for the general aviation market. On our demo flight, max continuous power at 9,500 feet yielded a fuel burn of 8.2 gph and a cruise speed of 150 ktas. Pulling the power lever back to economy cruise setting produced a miserly 5.1 gph fuel burn at 126 ktas. Max endurance of the DA40 NG stretches to more than seven hours, an incredible figure, considering the fuel tanks hold only 41 gallons, 39 of them usable.

What struck me about the AE300 engine is how smooth and quiet it is, both on the ground and in flight. To demonstrate the joys of operating the well-mannered diesel, Armstrong suggested we keep the canopy open during engine start. All that's required to get the three-blade MT propeller spinning is to set the power to idle, switch the electrical master on, ensure the glow plug light is off and turn the ignition key to start. The engine fires instantly,

just like a car engine. The AE300's computer brains, known as the electronic engine control units, manage fuel flow and in general act just like a fadec on a jet engine. There are two EECUs per engine, each with battery backup.

After I twisted the key to start the engine, I was surprised by the agreeable thrum emanating from ahead of the firewall. If you remember diesel car engines from the 1970s that idled like someone under the hood was shaking a coffee can full of marbles, you'll be stunned by how quiet the Austro engine is, even compared with the Lycoming engine in the DA40 XLT. The AE300 purrs like a friendly kitten.

After performing the run-up, which requires flipping a switch between the A and B channels of the EECU rather than performing a mag check (as the engine's rpm magically advances and retards without the pilot ever needing to touch the power lever), we prepared to depart straight out from KPCM's Runway 10. I was struck that the DA40 NG required quite a bit more right rudder on the takeoff roll than the gasoline version and that rotation speed is about 10 knots faster, about 69 kias versus 59. Climb rates certainly weren't jaw-dropping but we saw 600 to 750 fpm consistently all the way to 9,500 feet. Maneuvering the DA40 NG through a series of aggressive 50-degree steep turns, I noted that the lateral control feel is heavier than in the DA40 XLT, owing to those big winglets.

Otherwise, the DA40 NG flew pretty much like every other Diamond I've piloted. The stick between the pilot's legs feels just right, and the avionics, which were good before, are even better now thanks to the upgrade to Garmin G1000 NXi, featuring faster processors and crisper displays to go along with added capabilities. I was appreciative on this hot spring day for air conditioning in this airplane, an option that really should be one of the first boxes a buyer ticks before they hand over the deposit check. The DA40's large canopy, with the wing positioned slightly aft of the pilot, provides excellent visibility, but the downside is that the large greenhouse makes for a hot cabin environment on warm days. Electric air conditioning keeps things cool and comfortable for taxi, and lets the pilot select the perfect temperature in cruise. The major differences between the gasoline and diesel DA40s are the NG's improved fuel economy and slightly faster speed.

Flying the DA40 NG

I was surprised that Diamond chose not to bring the XLT's excellent interior to the NG, but quickly began to warm to the more Spartan interior in the airplane I flew, noting its many creature comforts. Lacking are the XLT's carbon fiber and burled wood interior accents and supple leather seats with "infrared control technology" to keep them cool even in direct sunlight, but the more basic NG interior is comfortable and even sleekly minimalist. What I loved about the seats was the ability to recline them through infinite adjustments, all the way to nearly flat. In a pinch, the DA40 NG would be a cozy place to spend the night on a ramp waiting out bad weather.

Cruising at 9,500 feet, I slipped my headset off to gauge the ambient sound level in the cockpit and was gratified to find that the diesel in flight is much quieter than the gasoline engine in the XLT — and a mere whisper compared to the big Continental six-cylinders I've been flying in Cirrus SR22s. In fact, the cool air whooshing through the four overhead vents in the ceiling seemed to be adding just as much noise in the cabin as the engine.

Did I mention I love the engine? Austro has done a masterful job of taking a stock automobile diesel and adapting it to general aviation use, developing a reduction gear box that decreases prop rpm to 2,400 at max continuous power versus the 4,500 engine rpm that cars are designed to run at. The turbocharger produces full power all the way up to 10,000 feet, and then the power curve drops off quickly at higher altitudes. A downside of diesel engines, of course, is their weight, which is generally more than a comparably sized gasoline engine. Thielert tried to reduce weight by using an aluminum block, but the AE300 has a cast-iron block, which is heavy, yes, but also allows the engine to be overhauled, while the Thielert engines had to be replaced. Current TBO of the AE300 is 1,800 hours, with no need for inspections or maintenance of the reduction gear box as was the case with the Thielert engines, which were of a different design.

Base price for the DA40 NG is around $430,000, versus $390,000 for the DA40 XLT when last Diamond offered it, while the well-equipped airplane I flew was slightly under $500,000. Max takeoff weight of the NG is higher than the XLT, at 2,888 pounds versus 2,646 pounds, for a useful load of a respectable 950 pounds. Takeoff and landing distance are a bit longer than in the gasoline version, though the book says the DA40 NG can get off the ground and climb to 50 feet using 1,936 feet of space, so that won't be an issue for most buyers.

After playing around for a while in the skies above central Florida, we tried some power-on and -off stalls, which are benign and easily managed in this airplane. Diamond salespeople like to point out that a fully stalled DA40 will crash land under control at a slower vertical rate of descent than a Cirrus going down under its BRS parachute. They never mention the horizontal speed component when making the comparison, but hey, it's just a joke anyway — I think.

Finally, it was time to head back to the airport, where I executed the RNAV WAAS LPV approach to Runway 10 with the autopilot coupled. Clicking the

autopilot off at 500 feet, I hand-flew the rest of the way in a gusty crosswind. The sight picture on final and during the round out to flare is slightly different in the DA40 NG than the XLT, but it will take pilots no time at all to get comfortable landing the diesel Diamond.

The DA40 NG's sleek new nosewheel contains a full-size tire; the DA40 has been upgraded all around with bright and long-lasting LEDs; the reshaped winglets, which house the nav lights, allowed for a shortened wingspan; the front seats in the DA40 NG's chic but utilitarian interior fold nearly flat.

Diamond DA40 NG	
Price as equipped	$494,765
Engine	Austro Engine AE300 (168 hp)
Propeller	MT three-blade
Seats	4
Length	26 ft. 5 in.
Height	6 ft. 6 in.
Interior width	3 ft. 8 in.
Wingspan	38 ft. 2 in.
Wing area	145 sq. ft.
Wing loading	17.4 lb./sq. ft.
Power loading	16.99 lb./hp
Max gross weight	2,888 lb.
Empty weight	1,938 lb.
Payload	677 lb.

Diamond DA40 NG	
Useful load	950 lb.
Max fuel	41 gal./275 lb.
Max operating altitude	16,400 ft.
Max rate of climb	777 fpm
Max speed	172 kias
High speed cruise	154 ktas
Max range	984 nm
Stall speed, flaps up	53 kias
Stall speed, full flaps	49 kias
Takeoff over 50 feet	1,936 ft.
Landing over 50 feet	2,133 ft.
Engine TBO	1,800 hours