



RUSCHMEYER R90 230 RG

Where composite becomes conventional

BY THOMAS A. HORNE

Until now, Germany's offerings to the general aviation market have been limited to the exotic (Extra 300, Speed Canard, dozens of high-performance sailplanes and motorgliders) and the training field (Grob G115, Hoffmann Dimona, Euro-trainer, Fantrainer). For those of you who wondered when—if ever—the Germans would apply their energies to a more conventional, four-seat single-engine design, the wait is over. ■ The Ruschmeyer R90 230 RG has landed in America. It's built by a small, family-owned company, Horst Ruschmeyer Aircraft Production KG of Melle, Germany, a suburb of Hannover. Though only 105 employees strong, the company has ambitious goals. The plan is to slowly introduce a complete line of fixed- and retractable-gear single-engine aircraft ranging from 180 to 300 horsepower. There's even a 470-shp, Allison 250B20-powered turbine model in the works. But first comes the R90 230 RG. ■ Like virtually all other German general aviation

PHOTOGRAPHY BY MIKE FIZER

aircraft, the Ruschmeyer R90 230 RG has an all-composite, fiberglass airframe and the sleek good looks that mark nearly all German light aircraft. Pilots averse to composites should know that the Ruschmeyer isn't just another wonky European experiment in composites for composites' sake. The airframe has withstood Germany's very strict certification tests, enduring the equivalent of 54,000 flight hours. The result is a structure with a certified life limit of 18,000 hours. That's when the *first* inspection of all vital airframe components is required.

German authorities first certified the R90 in 1990, and some 29 airplanes have been flying under European registry since then. In the intervening four years, other structural upgrades were added: a redundant elevator trim system, seats that meet the latest crashworthiness standards, and lightning protection. When Ruschmeyer was granted U.S. certification under FAR/JAR Part 23 last June, it was to Amendment 35—the latest iteration of those rules at the time.

While all these features are good, they are more or less invisible. More obvious is the stubby, four-bladed propeller. It's composite, too, and has protective aluminum leading edge inserts.

The small-diameter propeller is key to another forward-thinking aspect of the R90's design. European regulatory bodies are the most noise-sensitive in the world, with the Netherlands, Germany, and Switzerland leading the pack. Other nations, municipalities, and individual airports around the world—the United States among them—show every promise of adopting their own stringent noise rules.

Higher propeller tip speeds on large-diameter props make more noise. Four blades can help improve a propeller's efficiency in producing thrust but won't do all that much by themselves to cut the racket. When tip speeds near the supersonic range (yes, it can happen), two things occur: The noise becomes deafening, and propeller efficiency goes down the drain.

Besides lowering tip speeds, small props have other advantages. Good ground clearance is one, and this is especially important for airplanes with composite propellers. Composite propellers don't take kindly to damage from stones and other debris. What might

cause a small nick in an all-aluminum propeller could shatter a composite model. The Ruschmeyer's leading edge inserts provide good protection against this kind of catastrophic failure, but when it comes to foreign object damage, the more the distance between propeller and ground, the better.

Ruschmeyer approached the noise issue by preserving the small propeller disc and derating the R90's 260-hp Lycoming IO-540 engine. By holding propeller speed to a maximum of 2,400 quiet rpms (the engine is rated up to 2,600 rpm), Ruschmeyer cut the engine's power output to 230 hp, yielding one more noise-reducing measure, then added a specially-designed, stainless steel muffler.

Consequently, the R90 is one of the quietest piston singles in the world. The International Civil Aviation Organization's latest noise rules limit piston singles to a 1,000-foot-agl, full-power, gross weight flyover noise level of 74.0 dB. The R90's 200-rpm, 30-hp derating gives it a flyover noise score of 65.9 dB—8.1 dB quieter than it needs to be.

All this attention to engineering carries an immediate subliminal payoff when you first spot an R90 on the ramp. The prop and cowling make a combination that's easy on the eyes: aggressive, yet graceful. The laminar-flow wing, gull-wing doors, and what appears to be an area-ruled fuselage cross section also contribute to the Ruschmeyer's modern lines. The only aberration is the tail section, which has an angularity that's somehow out of step with the rest of the airframe's swoopy lines.

Inside, the cabin is topnotch. The instrument panel's sense of order and cleanliness is enough to make any Saxon stand up and cheer. And what's this? A control stick! And it's chockablock with pitch trim, transponder ident, autopilot disconnect, and control-wheel steering switches. It's big, looks helicopter-style important, and certainly feels better to fly than a yoke.

The seats aren't bad, either. The demonstrator we flew, N230RG, was fitted out with leather all around (a \$3,539 option) and a boatload of avionics. The only things missing appeared to be a Stormscope or Strikefinder, a flight director, and a radar altimeter.

Thanks to a strategically-placed widening of the fuselage and doors, the front seaters have gobs of shoulder



Smooth lines, a muscular-looking propeller, and a first-rate cockpit distinguish the R90 230 RG. The trailing link landing gear makes for smooth arrivals.







Luxurious leather seats—and the optional crash axe—are crowning touches in this Ruschmeyer's cabin. The fiberglass construction includes a laminar flow airfoil and gull-wing doors.



■
*On the takeoff run,
get ready to stomp
on the right rudder.
There's lots of torque
and no rudder trim.*





room. The shape of the side windows helps give great visibility, particularly when looking above. And while the back seats may look close and cramped, this has proven to be deceptive. The cabin's still relatively large back there, and a 6-foot 1-inch, 215-pound staffer reported good leg- and headroom. "The curved sidewalls cramped my shoulders," he said, but quickly admitted that this may be more of a diet problem than anything else.

Flying the R90 is a real treat. It's the stick that gives you a hint of things to come. One look at the stick, another at the prop, another at the low-drag lines, and the first question out of your mouth is apt to be, "Is this airplane certified for aerobatics?" The answer is no, for the time being. Right now, the R90 230 RG is in the Normal category, and aerobatic maneuvers, including spins, are prohibited. According to the company, Utility-category certification tests are under way. If successful, the R90 will be approved for limited aerobatics.

The first unique sensation comes during the start. Turn the key, and the light, stubby propeller spins up quickly. Strapped in and taxiing, you get the impression that the Ruschmeyer is smaller outside than in—another reinforcement of the R90's sporty ambience.

On the takeoff run, get ready to stomp on the right rudder. That little propeller produces a lot of torque and thrust, and astonishingly, there's no rudder trim. The best technique is to feed in power gradually, applying more and more rudder force as power and airspeed build.

It bears repeating: The Mühlbauer propeller is very efficient, so get ready with *plenty* of right rudder if you want to stay on the runway centerline. Compounding the urgency of this procedure is the rudder-nosewheel interconnect. Make your liftoff a firm one, because if you settle back to the runway, the nosewheel will be canted way to the right due to all the right rudder you've been applying. 'Nuff said.

True to the claims, the Ruschmeyer is relatively quiet, both in the cabin and outside. Indeed, several people standing a quarter-mile from the takeoff point said they couldn't hear the Ruschmeyer at all.

Holding 100 KIAS and a heavy right foot, the R90 settled into a 1,000-fpm initial rate of climb. Ruschmeyer offi-

cial says that rudder trim is on the way, and it can't come too soon. The system will likely be a simple, bungee-style rudder bias device of the kind used in Piper Cherokees, Sixes, and Saratogas. Ruschmeyer wants to avoid the use of trim tabs. Under the latest certification rules, any trim tab must have a backup, which would add expensive design and testing time. The stone-simple bungee moves the entire rudder, obviating the need for tabs.

In level flight the rudder trim problem goes away, leaving you with very, very pleasing and responsive control forces. Ruschmeyer uses control rods instead of cables, so when you move the stick, the control reaction is almost instantaneous. There's a tight, solid feel to the airplane, and it begs for steep turns and other abrupt maneuvers. This is the kind of airplane you wear.

At 7,000 feet msl and standard conditions, Ruschmeyer claims a 75-percent-power cruise speed of 165 KTAS. That's with a 2,200-rpm power setting and a fuel burn of about 14.5 gph. IFR range and endurance under these conditions work out to about 600 nautical miles and 3 hours 45 minutes. An 85-percent power setting is authorized.

Wide open, Ruschmeyer claims a 175-KTAS cruise speed. Trouble is, that's at sea level, and no one flies that low.

At altitude, the R90 will make 85-percent power up to about 5,500 feet, at which point you'll toot along at approximately 168 KTAS and burn over a gallon an hour more than you would at the 75-percent setting. That's a pretty stiff penalty for a mere 3 knots.

We tried the 85-percent setting at 4,500 feet, with an OAT of 70 degrees Fahrenheit. Our true airspeed worked out to 163 KTAS—4 knots below book.

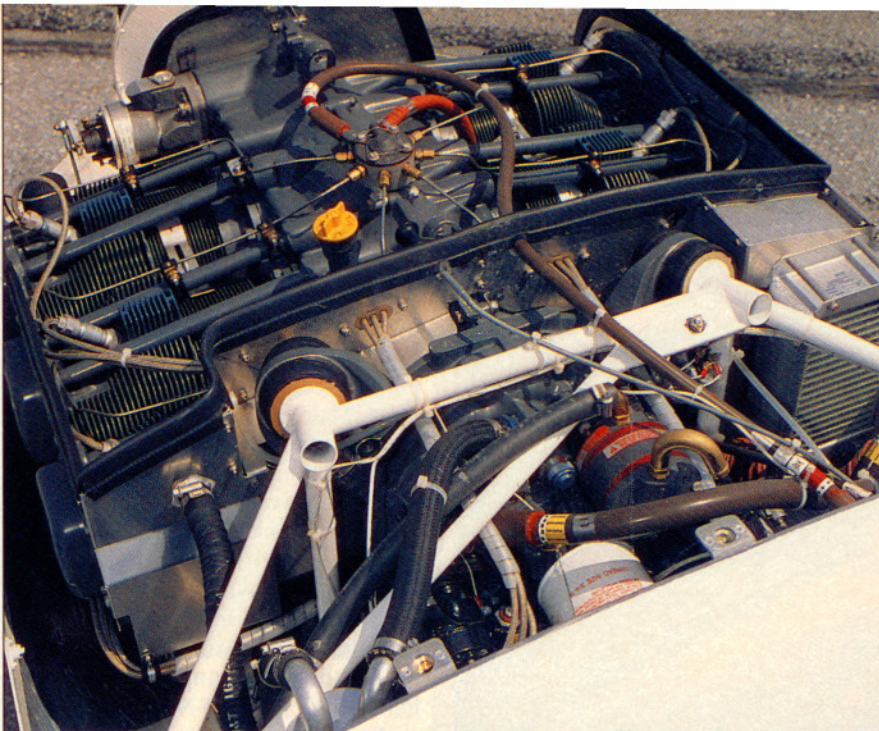
Slow flight was nothing out of the ordinary, but the R90 sure likes to drop a wing in a stall. The wing drop can be quite abrupt—maybe alarmingly so to someone accustomed to a more run-of-the-mill airfoil. In any event, standard recovery procedures work well, and anyone who spends a little time practicing will quickly come to terms with the R90's behavior on the hairy edge of the envelope.

If the Ruschmeyer isn't happy flying slow, it doesn't like decelerating, either. Once it's up and rolling, it takes

some strategy to slow down in preparation for landing. The hot tip here is to reduce power well away from the pattern, let the airplane slow to its V_{LO} of 140 KIAS, then extend the gear. After that, it's time to wait for more airspeed to bleed off—lots more. The manual says the first notch of flaps—15 degrees' worth—can go down at 102 KIAS; a Ruschmeyer spokesman reports that this speed will be raised to a handier 125 KIAS.

Downwind is best flown at 100 KIAS, and the full 30 degrees of flaps can be extended once you've got the field made. Fly short final at 85 to 90 KIAS for the first few times around the patch (80 KIAS can be used for short-field landings), flare when it feels right, and be sure to hold the nose-wheel off after touching down. This is especially true in crosswind conditions, when you'll be holding rudder to align the airplane with the centerline. You surely don't want a cocked nosewheel to hit the pavement while you're still tooling along at 60 KIAS. At least, not if you're unprepared for it.

The base price of the R90 230 RG is \$210,000. But that would be a strictly



A slower-turning propeller, a derated Lycoming IO-540, and a customized stainless steel muffler all team up to make the Ruschmeyer one of the world's quietest singles.

VFR airplane, with little more than an altimeter, wet compass, and airspeed and rate of climb indicators. Toss in a shipment of Bendix/King avionics and a raft of other items like those in N230RG (the \$581 clock, the \$230 gust

lock, the \$23 crash axe, the \$1,121 in documentation charges) and you can rack up a big bill in a hurry. The demonstrator can be yours for \$300,000.

In its price range, assuming average equipment, the R90 230 RG finds itself in with some pretty stiff competition. The Mooney Ovation is 20 knots faster. The Mooney TLS is a 200-knot-plus hot rod. The Aerospaiale Trinidads and Commander 114s are a very close match. And that's just the current-production market. There are plenty of used high performance singles out there at the quarter-million mark that'll give the R90 230 RG a good run for its money.

For those drawn to the R90, however, these kinds of comparisons may mean little. The Ruschmeyer is roomier than any Mooney and, with the exception of rudder forces, has much more crisp, responsive handling qualities than any competitors in its price class. Moreover, the R90 offers a unique blend of modern construction, high performance, and sex appeal. It's a distinctive airplane with classic good looks, and it's strongly reminiscent of another classic composite single: the Windecker Eagle.

The Eagle had the same refined look as the Ruschmeyer, but only a handful of these—the first certified all-composite general aviation aircraft—were ever sold. Here's hoping that the R90 230 RG gets Ruschmeyer off to a much better start. □

Ruschmeyer R90 230 RG
Base price: \$210,000

Specifications

Powerplant	230-hp Lycoming IO-540-C4D5
Recommended TBO	2,000 hr
Propeller	Mühlbauer MTV-14-B/190-17, four-blade, constant speed, 74.8-in diameter
Length	26 ft 0 in
Height	8 ft 10 in
Wingspan	31 ft 2 in
Wing area	42.45 sq ft
Wing loading	70.1 lb/sq ft
Power loading	12.9 lb/hp
Seats	4
Cabin length	9 ft 5 in
Cabin width	3 ft 9 in
Cabin height	4 ft 0 in
Empty weight	1,979 lb
Gross weight	2,977 lb
Useful load	996 lb
Payload w/full fuel	622 lb
Fuel capacity, std	66 gal (62 gal usable)
Baggage capacity	396 lb (372 lb usable)
	110 lb, 2.6 cu ft

Performance

Takeoff distance, ground roll	853 ft
Takeoff distance over 50-ft obstacle	1,706 ft
Max demonstrated crosswind component	16 kt
Rate of climb, sea level	1,140 fpm
Max level speed, sea level	175 kt
Cruise speed/endurance/range w/45-min rsv, std fuel (fuel consumption)	

@ 85% power, best economy

6,000 ft	68 kt/3.4 hr/550 nm (91.9 pph/15.3 gph)
----------	---

@ 75% power, best economy

8,000 ft	165 kt/3.7 hr/605 nm (85.5 pph/14.2 gph)
----------	--

@ 65% power, best economy

9,000 ft	156 kt/4.4 hr/675 nm (71.3 pph/11.8 gph)
----------	--

@ 45% power, best economy

9,000 ft	130 kt/6.3 hr/820 nm (49.1 pph/8.2 gph)
----------	---

Service ceiling	16,000 ft
Landing distance over 50-ft obstacle	1,575 ft
Landing distance, ground roll	1,066 ft

Limiting and Recommended Airspeeds

V_X (best angle of climb)	76 KIAS
V_Y (best rate of climb)	98 KIAS
V_A (design maneuvering)	128 KIAS
V_{FE} (max flap extended)	102 KIAS
V_{LE} (max gear extended)	140 KIAS
V_{LO} (max gear operating)	140 KIAS
V_{NO} (max structural cruising)	157 KIAS
V_{NE} (never exceed)	193 KIAS
V_R (rotation)	62 KIAS
V_{S1} (stall, clean)	71 KIAS
V_{S0} (stall, in landing configuration)	60 KIAS

For more information, contact Ruschmeyer Aircraft Production, c/o KAS International, RR 3, Box 329, Galesburg, Illinois 61401; 309/342-1956; fax 309/342-5455.

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted.