

Coupe Capers

Monthly magazine of the Ercoupe Owners Club October 1992



Cover Photo



Marlene Radebaugh flies the family Forney Coupe while his wife, Cathy, takes pictures from a camera plane.

Volume 21, Number 10, October 1992

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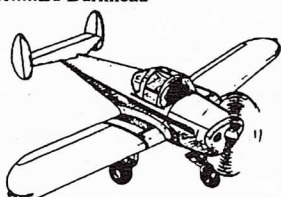
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Articles, Photographs, Members' advertisements and Letter submissions are strongly encouraged. Materials should be sent to: Editor, Coupe Capers, 511 W. Gift Ave., Peoria, IL 61604-2855, 309-685-8673. Those with computers may submit long stories on disk. We can use either 5¼ or 3½ inch disks. Wordstar or ASCII formatted files are preferred. Story deadline: 15th of month preceding. Member ad deadline: 19th of month preceding.

The fax machine will answer the phone 24 hours a day. If you can, set your machine to allow 60-90 seconds to make the connection (the normal 35 seconds may not be enough). Alternatively, dial manually and AS SOON AS THE PHONE IS ANSWERED, DIAL "#1". The fax switch should then transfer the call.

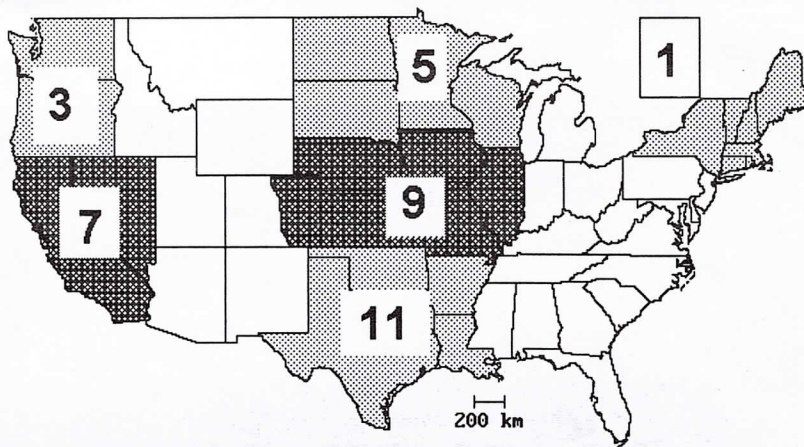
Messages and articles may also be submitted through CompuServe mail to Ed Burkhead 70410,3231.

Editor.....Ed Burkhead



Overhead

☆☆ Elections ☆☆



As is necessary each fall, we are now soliciting nominations for the club board of directors. As is required by the by-laws, half of the directors are elected each year. This year the odd-numbered regions are open for elections.

A nomination letter should be sent to club Executive Director Skip Carden for any candidate. Please hurry. The deadline for nominations is November 15th, 1992. The ballot will be printed in the December issue of Coupe Capers.

Current directors in regions having elections:

Region 1, CT, MA, ME, NH, NY, RI, VT, Dick Murphy-'93, 114 Academy St., Malone NY 12953, 518-483-2486.

Region 3, OR, WA, AK, Bob Rakozy-'93, #4 Bartok Place, Lake Oswego, OR 97013, 503-236-4218.

Region 5, MN, ND, SD, WI, Russ Jensen-'93, 325 Cedar Street, Suite 450, St. Paul, MN 55101, 612-291-8044.

Region 7, CA, NV, Zig Dawid-'93, 9237 Central Ave. Orangevale, CA 95662, 916-988-3129
Region 9, CO (Eastern side of Rockies), IA, IL, KS, MO, NE, Shirley Brittan-'93, 623 Rolling Hills Dr., Newton, KS 67114, 316-284-0145

Region 11, AR, LA, OK, TX, Leonard Page-'93, Rt. 1, Belleville, AR 72824, 501-495-2647.

The how-to-buy a Coupe issue

By Ed Burkhead

It's not anywhere near perfect. It may have flaws. But here it is. It has taken a lot of cooperation from several people to gather this information together. Particular thanks go to John Wright, Sr., who got us started on the road with suggested things to check on a pre-purchase inspection. I sent a revised list to a dozen Coupes and got long responses from John, Daryle Lessard, Burt Ellegaard and shorter responses from others.

Ron Kerlin sent us two Currency Corner articles — one aimed at the purchasing pilot and the other at that pilot's certified flight instructor.

We hope this will make your purchase and annual inspections easier.

Coupe Currency Corner

By Ron Kerlin
CFI, ATP

So you are really, seriously interested in finally acquiring and learning to fly that cute little twin-tailed airplane that first caught your eye years ago!

You may have heard comments from well-meaning, but usually uninformed, hanger flyers and FBOs: "It can't stall or spin, so it can't be a real airplane."

Despite all of this, you are still enthused enough about this 50-year ahead-of-its-time airplane to request additional information from the Er-coupe Owners Club. Therefore, to all of you folks of inexplicable good taste, this article is for you!

Although the Coupe design is now over a half-century old, the foresight, engineering genius and very hard work of its designer, Mr. Fred Weick, has given us a great plane. It is still contemporary in its handling, performance, and safety of operation. However, make no mistake, this is still a flying machine, not a toy. It deserves the same respect and consideration by the pilot as does a 747.

For those of you contemplating the purchase of a Coupe, I offer the following comments:

Do not evaluate the airworthiness of your prospective purchase by the shine on the skin or the description in Trade-A-Plane ("flown only on weekends by a little old ..."). Enlist the expertise of a Coupe-knowledgeable A&P technician. (The EOC can provide some references.)

The paper trail of logbook and related documents is a VERY important consideration in the purchase of any aircraft. Every modification or repair that has ever been accomplished must be reflected on the appropriate FAA form 337 and be noted, if required, in the airframe or engine logs. Missing or incomplete logs and equipment lists render the aircraft unairworthy.

For each modification that was not standard, ask to see the 337 and/or supplemental type certificate. If these cannot be produced, pass up the airplane. If you are ramp checked by the FAA, and your airplane is sporting an unauthorized or undocumented modification, it will be grounded and you, the pilot, will receive a "violation." Worse yet, if you are involved in an accident or incident in an aircraft deemed unairworthy, your insurance will be void!

It is much easier to repair a wing or engine, even from a basket case, than to try to document modifications of an unknown origin.

Which model is best? Each has its enthusiasts as well as its idiosyncrasies. The "D" model has more idiosyncrasies than the others. Familiarize yourself with the specs of each. The book "Touch of Class" is a wealth of useful information. Buy or borrow a copy before you decide.

Rudder pedals or not? It doesn't really matter — they both fly well and neither has been spun. If properly trained, both have about the same crosswind ability. (No, the gear doesn't caster!) If you have big feet or long legs, the 2-control Coupe has more footroom. If rigged properly, the no-pedal Coupe is delightfully well-coordinated.

Engine Horsepower? Again, not an item of major importance. All Coupes are about 100 mph planes that climb about 500 fpm. Just look for a well-maintained engine and let your A&P call the shots. You will find engines of 65 hp (rare), 75, 85, 90, and 100 (with the O-200 engine by an STC).

Cleveland brakes: Great mod — you'll be glad you've got them.

Avionics: At least one 720 channel navcom and a transponder with mode-C will save you about \$4,000 if you have to buy them later. Even if you don't plan to fly into high-density airports, resale value will be greatly enhanced.

Wheel pants: They look nice, but don't really make the airplane noticeably faster. There is also a weight penalty.

Metal or fabric wings: Fabric is lighter and easier to repair. With fabric wings, every twenty years or so, the fabric is removed and the underlying structure is checked and repaired.

Now that you have found your dream-ship, here are some comments regarding the flight characteristics of the Coupe.

First, try to find a CFI who is experienced in the Coupe. You will be glad that you took the trouble. It is not a difficult airplane to fly, but it is different!

Learn how the fuel system works. Basically, the fuel pump transfers fuel from the interconnected wings to the nose tank. The fuel then feeds by gravity to the gascolator. The excess fuel provided by the pump runs back to the wings through an overflow line. Treat the nose tank as a reserve and your wing tanks as your flying fuel.

Despite the ability to fly slowly very well, the Coupe can develop rather high power-off descent rates. The glide ratio is quite a bit less than most other training aircraft, so avoid the tendency to "get behind the power curve."

Landings should be made on the mains at the speed and attitude that you observed on rotation, approximately 65 mph and nose slightly above the horizon.

Perhaps the greatest disadvantage of the Coupe is the high noise level. Invest in a good intercom and headset. Your hearing deserves protection and the fatigue factor will be greatly reduced.

Although these tips are hopefully accurate and reasonably unbiased, please keep in mind that opinions are like arms and legs: everybody has them. You will find that EOC members will try their best to steer you in the right direction with factual information.

Fly Safe!

Coupe Currency Corner

By Ron Kerlin
CFI, ATP

You say that you've just been called to give some primary dual to a new student in something called an Ercoupe? Or was it an Aircoupe?

If you are mentally sifting through the planes that you are familiar with and come up blank (as the saying goes) this one's for you!

The Ercoupe/Aircoupe can present a challenge to the CFI who is not familiar with its characteristics — a large percentage of the Coupe fleet are lacking rudder pedals, thus, all control is accomplished by the yoke.

To provide a basic familiarization, I will briefly describe some of the more noteworthy characteristics of the Coupe. I should also point out that, years ago, a flight check taken in a 2-control Coupe resulted in a restricted certificate. This is no longer the case! In fact, Coupe-trained pilots seem to adapt more readily to 3-control airplanes than do conventional pilots transitioning to Coupes.

First, some generalities:

All models are unspinable and all but the Alons and Forneys are unstallable due to restricted elevator travel. All Coupes can, however, develop high sink rates if glide speed gets too low.

The C, D, CD, G and H models are quite similar in their characteristics with the D model having the most restricted up-elevator travel.

Regardless of model or horsepower, performance is reasonably similar with 500 fpm climbs and a cruise speed of about 100 mph being the norm. Fuel burn varies from about 4.5 to 5.7, but using a 6 gph average results in a simple rule of thumb: the 18 gallons in the wings last for three hours and the six gallon nose tank is a nice one-hour reserve.

The fuel system is somewhat unconventional (and better) in that the two nine gallon wing tanks are inter-

connected and fuel is pumped by the engine-driven fuel pump to the six gallon nose tank. From the nose tank, it is gravity fed to the carb. Since the pump transfers fuel faster than it is burned, the overflow is returned to the wings. In effect, fuel continuously flows in a circle. As you may imagine, if the nose tank float begins to drop before the wings empty, you should expect a fuel pump failure. **Keep your eye on the nose tank float-gauge!**

After prolonged nose-high attitudes, you may see the nose tank level lower than normal since more fuel runs back to the wings than during level flight. Most Coupe fuel shut-offs are under the panel and are only used for maintenance purposes and emergency shutoff.

Coupes are somewhat more susceptible to vapor-locking than are most other types, so avoid prolonged ground operations during hot weather.

Ground handling is nimble, once you get used to taxiing without using your feet — you already know how, you've been steering with a wheel as long as you've driven ground vehicles. About 90 degrees of yoke travel should give about the shortest turn radius. Funny how your feet seem to have a mind of their own and want to push on something. Just glue two bath sponges on the floor and your feet will feel right at home with something to push on!!

Takeoffs and landings, especially during crosswinds, will present the greatest challenge to learning to fly the Coupe. All Coupes feel about right using about 70 mph for climb and on final. **The first time you fly a particular old Coupe, determine the minimum flying speed with full up-elevator and no power on that plane with those old instruments, then compute the normal 1.3 times minimum speed for the approach.**

For takeoff, simply drive down the centerline until about 65, then rotate until the nose just covers the horizon. The aircraft rigging corrects for P fac-

tor and the twin tails eliminate prop slipstream effects on the rudder. Do not hold excessive forward yoke, even during crosswinds. Slightly forward of neutral is adequate. **In a strong crosswind, the up-wind wing might rise. Don't panic, just keep driving down the center line and keep only a slight forward push on the yoke to keep the nose wheel on the ground. When you reach flying speed, take off.**

During flight, you will be surprised how coordinated turns are and how the ailerons remain effective even during the slowest of slow flight. The downward cant of the engine makes power-on and power-off characteristics similar. The cant of the engine to the right also reduces the effect of engine torque and P-factor.

You will soon notice that all Coupes are noisy, so a good intercom and headset are necessities. I also wear **ear plugs** under my headset and find that they improve intelligibility of communications even more. Surprisingly, Coupes are not much noisier with the windows open. Open windows do cause more drag and will lengthen takeoff rolls somewhat and will steepen the approach a small amount.

Despite the low wing-loading and slow-speed airfoil, Coupes have a rather poor power-off glide ratio. If it looks like you are too high, you are probably about right. Most patterns work well by reducing RPM to about **1250-1500** during the base turn and **holding the same setting** during the remainder of the pattern. Ensure that touchdowns are on the mains, at minimum speed. The visual references during touchdown should be similar to what you see during rotation for take-off. Check that the yoke is full back as some models (with "split" elevators) have a built-in resistance to warn the pilot of excessively slow speeds. More landing problems are a result of being too fast than being too slow!

Without flaps or the ability to slip, 2-control Coupes are limited to "S"

turns to lose excessive altitude. You will find that the low glide ratio is really an advantage. Even in a 3-control Coupe, the size of the rudder will not produce a very dramatic slip.

Your first experience with cross-wind landings are where your feet will really tap a rhythm on the floor. Simply hold enough crab to eliminate drift and flair as usual. **Let it touch down wings-level, in the crab!**

At the moment of touchdown, release the yoke. Yes, you heard me right! This will prevent you from applying aileron to lower the upwind wing if the wind picks it up. Since the nose wheel is also coupled to the yoke, if you attempt to use aileron, you will also make a bee-line swerve to the upwind infield! But, when you release the yoke at touchdown, the airplane will straighten itself with no help from you.

If the wind does pick up a wing, a touch of brake should put it down. As soon as the airplane straightens itself, **simply take hold of the yoke and steer down the centerline**, keeping the yoke slightly forward of neutral.

After you become comfortable doing the opposite of what you have been previously teaching, you will find that Coupes are more cross-wind capable than most any other light aircraft.

No, the gear does not castor. It is simply a strong, trailing-link gear, much like those found on the Falcon 20 business jet. Landings are usually quite soft due to the 12" strut extension on all three gears!

I hope that these tips prove beneficial, and that you will also become enchanted with this fine little aircraft that was 50 years ahead of its time. Have fun and fly safe!

Coupe Currency Corner is written by E.O.C. member Ron Kerlin. Ron is an ATP rated Gold Seal flight instructor. He welcomes your comments and requests for topics and also welcomes your questions regarding anything of a training or regulatory nature. He can be contacted at:

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Members' Ads

buy, sell, trade



Ads are free to all members of the Ercoupe Owners Club. Please send in a new ad each time that you want it to be listed. NO PHONE ADS!! (Phone calls to kill ads are OK.) The editor must receive ads by the 19th of the month before you'd like it to be listed.

WANTED: Donate or sell a non-flying Ercoupe for a static museum display at the Sun-N-Fun EAA museum at Lakeland, Florida. By the current plan, this plane will be a touch-display. Children will be allowed to touch, climb into, and sit in this plane. It will be regularly maintained by the Florida Wing of the Ercoupe Owners Club and/or EAA chapter #99. This could be a great use for some poor Coupe with a corroded spar center section or other hidden damage. Contact Gene R. Gagliardi, 8525 Waco Way, Vero Beach, Florida 32968. 407-567-4239.

FOR SALE: Ercoupe parts left from rebuild project. 415-C fuselage forward of frame F, \$750. Tail group, complete, \$850. SASE for list. Indoor, dry storage. Scott Reaser, 1121 Villa View Drive, Pacific Palisades, CA 90272, 310-454-8277, 6-8 p.m. local time.

WANTED: For 415-C, serial number 207, multiple items: information on how to hook up trim from instrument panel to control column; C-75 engine, prefer complete with accessories; Nose Bowl; Aileron push rods. Please send postcard with phone number and pieces to: Greg Jannakos, P.O. Box 280162, Columbia, S.C. 29228-0162, weekday phone: 803-739-7679.

FOR SALE: 1947 415-D, 85 hp. 1973 TTAE, 94 SMOH, Complete rebuild 1989. Stits wings, polished fuselage, custom interior, cleveland wheels and brakes, see Sport Aviation, Feb., 92, won Best Ercoupe at Watsonville, 1990. \$13,500. Art Pauly, 916-784-0590.

FOR SALE: SPACERS for landing gear — \$17; FRONT WHEEL TOOL (double fork) for removing or installing WHEEL BEARING TUBE easily, \$38. Send request to Dr. Kris Christofferson, 1740 Alta Vista Ave., Escondido, CA 92027. Sample 337 and instructions for spacers. Spacers made of cold-rolled machine steel, polished. Dr. Kris has 785 landings on his installed set.

FOR SALE: Used Alon canopy glass, green tint, a little cloudy, no crazing, serviceable \$100.00. Alon right and left windshield, clear, very good condition \$50.00 each. 706-342-7210.

FOR SALE: AVIONICS — EdoAire RT-553, 360 channel NavCom \$350. Genave Alpha 200B, 90 channel NavCom \$150. EBC-302V voice and signal transmitting ELT \$75.00. Narco VOA-50M ILS head with Narco UGR-2 glidescope receiver \$175. Cessna electric turn coordinator \$75. Sigtronics SPA400TSO intercom \$75. 706-342-7210.

FOR SALE: 1946 Ercoupe 415-D — airframe only. 2150 TT. Complete airframe complete with bubble windscreen, split elevator, rudder conversion and large rear windows. No known corrosion or damage history. Complete with log book. Paint is 6+7/10, interior is fair with Edo-Aire nav/com. Price is \$4,500 Canadian, (FIRM). Mr. James Hudson, 48 Middleton Way, Bramalea, Ontario, Canada, L6S-4B1, 416-792-0670.

FOR SALE: Wing fold installation for Ercoupes: plans only — \$100. Kit of plans and hardware — \$477.

Flat hat shelf and extended baggage compartment — plans \$35.

Pop rivet fabric attachment and fabric tricks — instructions, hints and approval reference — \$10.

Shoulder harness brackets and installation — hardware, instructions, & approval reference \$55.

Alternator and upgraded electrical system. For Ercoupes — Canadian DOT approved for E model. Plans, data, etc. \$35.

Cockpit upholstery panels — plans \$5.

ERCOUPE BROCHURE with photos, sample plans, details and data — airmailed — \$8.00

For Canadian DOT approval with DCN (drawing change notice) for modification on your aircraft send registration letters, model & serial numbers \$25. (Ad continued on page 9)

Member Ads (continued on page 9)

Why buy a Coupe?

And which one should you buy?

By Ed Burkhead

This article was originally prepared in response to two letters from prospective Coupe buyers who wanted to know the safety history, problems to look for, model information and everything else in which a prospective buyer would be interested. It does not try to be a complete source, though.

See Stanley Thomas' excellent book The Ercoupe, from Tab books (your local book store can order it) and The Ercoupe — A Touch of Class by Frank Saletri, which is advertised on the back page of Coupe Capers, for more thorough information. In addition, the Univair book Specification, A.D. notes, S.T.C.s (Univair product number ESS, \$9.00) is a critical reference book that every Coupe owner or would-be owner should have.

Quick history

This plane is a member of the family of planes known as Ercoupe or Aircoupe. The Ercoupe was designed between 1936 and 1940, with the first flight of the prototype in 1937. Before WW2, 112 were built and approximately 5,000 were made immediately after the war. About 400 more were built between 1958 and 1969. The original name was derived from the name of the company, ERCO, which stood for Engineering and Research Corporation. When later companies manufactured the plane, it was called the Aircoupe.

Designed by Fred Weick and a small team, the Ercoupe was the first plane to incorporate much of the original research that Weick performed as the assistant chief of the NACA aerodynamics division. These new features include the inability to be held in a spin, the tricycle landing gear to improve landing and take-off safety, the fully cowled engine, and a control system in which the rudders are linked to the ailerons to simplify controlling the airplane. All these features were invented by Fred Weick and his team.

Basic flying characteristics are the same as modern aircraft with one exception. In the Ercoupes with linked rudders/ailerons, in a cross-wind, the airplane is landed in a wing-level crab. Though the main landing gear is sturdy, it is not abnormally strong and certainly doesn't "swivel." Yet, due to the natural geometry of a tricycle with a swiveling nose wheel, the airplane immediately lines up with the direction of travel after touchdown. Two-control Ercoupes fly with a demonstrated cross-wind component of 25 mph. Some Coupers regularly fly with even stronger cross-winds.

Engine comparison

The planes with 75 hp engines have pretty good performance. They will generally fly between 98 and 106 miles an

hour, depending on the pitch of the propeller. This is a good benefit of the airplane's designer being the time-period's leading authority on propellers.

When comparing the following figures with your own plane (or the one you are about to buy) consider these factors: The propeller pitch will greatly affect the cruise speed and climb performance. For every inch of steeper pitch, there will be about two miles per hour gain in speed until you reach the point (very quickly) when the engine doesn't have the horsepower to spin the prop up to speed. As speed increases, horsepower required increases almost linearly until a certain speed is reached where much more power is required to effect each new increment in speed. The speed at which this occurs depends on the shape of the object being pushed through the fluid, in this case, the air-frame through air.

At some point, a steeper pitched prop will result in less thrust than would be obtained with a flatter pitched propeller. Probably before this point is reached, the climb performance will be nonexistent — climbing is done at slower speeds where the steeper pitched prop is even more inefficient!

Ercoupes with the 85 hp engine get better take-off and climb performance, and will cruise a bit faster, and will use a little bit more fuel than 75 hp planes. But there's not a lot of difference. Cruising speeds with the 85 hp engine range from 104-112 mph.

Most of the 85 hp engines in service in C and D models have been converted from 75 hp engines. This was done (as allowed in type certificate A-787 note 4) per Continental Service Bulletin M47-16 dated June 7, 1948. Mostly, this requires changing the carburetor fuel jet to allow more fuel flow, remarking the oil dip-stick to show 4.5 quarts as full, adding a couple of engine baffles to take care of increased heat production, and changing the propeller so it conforms to the requirements of the new engine. The details are in the Ercoupe's Aircraft Specification A-787 and the other documents mentioned.

There is some performance gain — about 2-3 mph according to Paul Prentice's book Fly-About Adventures and the Ercoupe.

The Forney Aircoupes have the C-90 engine with a well matched propeller. They always out climb my C-85 which has a climb propeller and they have to throttle back quite a bit for me to stay with them in cruise. Cruising speeds probably run from about 106-114 mph (again according to Paul). The Alon Aircoupes, with their sleek bubble windshield and 90 hp engine often claim cruising speeds up to 124

mph.

With the O-200 engine, climb improves again, but cruising speeds drop down because of the propeller that was STCed with the engine conversion. In the absence of definitive data, estimate cruising speeds to be about 108 mph. Someone who'd like to research alternate propeller lengths and pitches (and fight with the FAA for approval) may be able to trade some of that climb for somewhat better cruising performance.

Remember that, for each airframe, there is a natural "maximum" speed determined by the shape and drag. To get to that speed, it doesn't take much increase in power. To go faster than that speed, it takes a lot more power. So, putting a much bigger engine on a plane will make it climb much better and yet it may not fly much faster.

Different models

Which models are dogs, which are the best? I'd say that none of the models are dogs. The later models are most popular among aficionados. The pretty bubble canopy on the Alons may increase the top speed, but they have a window-open max speed of 100 mph. The slide-down canopy on the older model allows windows-down open-cockpit flying at any speed. (I personally prefer this feature.)

A difference that may be important to you is gross weight and airplane weight. The "C" model only allows a gross weight of 1,260 lbs. In the early planes of the model, the weight of the airplane was low, the useful load was around 450 lbs, the fuel tanks about three gallons (total) smaller than in later models and the weight left over for pilot, passenger and luggage was reasonable. The planes had minimal instrumentation and equipment.

As the months and years went by, the planes got heavier — starters, batteries, gyro instruments, radios and more were installed. Useful load shrank with full fuel to where many planes could only carry one person, legally.

Beginning with the D model in early 1947, serial number 4424 through 4499, 1,400 lbs gross weight was allowed — a big improvement. This entailed limiting the elevator to 9° instead of the previous 13° due to inadequate stability in the condition of full power, full gross weight, and full up elevator at 13°.

The 9° limitation on the D model's elevator did not allow as slow a landing speed and this was thought to be less desirable. Therefore, beginning with serial number 4500, in about April of 1947, the plane was manufactured as the CD model with all the D's improvements but with the elevator restricter bolt in the 13° hole and allowing only 1,260 lbs gross weight. According to the type certificate A-787, the plane could be converted to be a D model, allowing it the 1,400 lb gross weight, if the owner desired.

The E and G models had the split elevator, 85 hp engines and were allowed 1,400 lbs gross weight. The split elevator allowed the slipstream to flow through the split without much affecting the elevator. This allowed slow flight similar to the C model but with little change in trim between zero and maximum engine power. The F model, a fuel

injected variant, was not marketed. The E model was introduced in 1948 and the G "Club-Air" and H models were introduced in 1949.

The H model was stripped down with only a 75 hp engine, no starter, radio, lights, battery or generator. Only seven were produced and these may have been converted to add those features back in.

Beginning with Forney F-1A, serial number 5715, the gross weight was increased to 1,450 lbs. (Note: Forney F-1s, serial number 5611-5714 can be upgraded to be F-1As according to Aircraft Specification A-787, note 5.)

A popular "folk wisdom" is that the Coupe will fly with anything that you can fit into it. This is belied by the occasional event such as when our club president, Jack Harkness, and Jimmy Funk died when they tried a high, hot take-off at high gross weight. I have personal maximums for the gross weight with which I'll fly. Remember, if you fly above legal gross weight, you probably have no insurance and you are a test pilot in an unproven airplane.

For perspective, most Coupes weigh around 850-950 lbs. Mine hasn't been weighed recently but is supposed to weigh 890 lbs.

Serial numbers 113-812 were mostly constructed the same as the pre-war planes except that a 75 hp engine was used and a starter, generator and battery were added.

Pre-WW2 Ercoupes used a cast aluminum alloy main landing gear and Hayes wheels. Post war planes, serial numbers 113-812, used a welded steel landing gear. Numbers 813 and up used forged aluminum parts and Goodyear wheels and brakes with 6.00 x 6 tires. Alon introduced a spring-steel main gear that was simpler and almost maintenance-free. However, it was stiffer when taxiing on rough ground (the old-style main gear was still offered as an option).

Early Coupes used an elevator trim system that included a crank on the instrument panel to change bungee tension on the control column. Later models used an aerodynamic trim tab on the elevator which worked better and provided a backup aerodynamic control of the elevator in case of control cable breakage. Still later models increased the area of the trim tab. The aerodynamic tab is desirable and is available as a kit from Skyport.

The throttle and trim were on a quadrant at the bottom center of the instrument panel. Later manufacturers dropped this feature.

Forney built the plane from 1956-1960. The biggest change in the Forney Aircoupe was the introduction of the Continental C-90 engine and a well matched propeller, giving improved performance. They also, according to Stanley G. Thomas, in his book *The Ercoupe*, replaced the fabric covering of the outer wing panels with metal, installed the bubble windshield and larger rear windows of a rectangular shape, installed bucket seats, modernized the instrument panel and replaced the rubber doughnut cushions in the main landing gear with Belleville springs.

Keeping the split-elevator, Forney improved it by adding a pre-loaded spring to the elevator control system that

would give the feeling of a stop at 60 mph (about 13°) yet allow the pilot to pull through the spring to get the low speed landing with 20° of up-travel.

Forney also initiated the double-fork nose gear which has been retrofitted to many earlier Coupes. The earlier, single-fork nose gear was more susceptible to shimmy than the double-fork. However, if your plane has no shimmy problem, just keep it in good repair, there's no need to change. Forney also added large rear windows.

The F-1A Forney Trainer allowed an increase in gross weight to 1,450 lbs (up from 1,400 lbs).

Air Products Co., then manufactured F-1A Forney Trainers at Carlsbad, New Mexico between 1960 and 1962.

The Alon Aircoupe, built from about 1964-1968, incorporated a sliding-back bubble canopy and a greatly improved instrument panel with the ability to easily add radios. The Alon Aircoupe had three-controls standard (configured like standard aircraft with rudder pedals controlling the nose wheel). The two-control arrangement was offered as an option. Alon also lowered the window sills to allow easier entry.

Mooney bought the rights to the design and redesigned the tail to be the single Mooney-style. The new Mooney M-10 Cadet was designed to be spinable. It kept the Ercoupe fuselage and wing, the C-90 engine and a variant on the Alon canopy.

The type certificate and parts manufacturing authority for the Coupes are now owned by Univair of Boulder, Colorado. (See the advertisement on the back page.)

Popular upgrades

Modifications that are popular are upgrades from the "C" to the "D" model, the large baggage compartment, Cleveland brakes (I personally consider this a high priority), instruments, radios, lorans, paint, wheel pants, and the "split" elevator (for improved handling, this is part of conversion to the "E" model).

According to an FAA specialist I talked to at Oshkosh, an airframe may be converted to be a different model only if it is explicitly allowed in the type certificate.

The conversion of Ercoupes serial number 113-4423 and 4500-4868 is explicitly allowed by Aircraft Specification A-787. (Numbers 4424-4499 are already D models.)

The FAA specialist also said that an aircraft may be converted to be "like model x," meaning that all things necessary have been done to make that plane a model x even though it can't really be a model x. In other words, while you can convert your C, CD or D to be "like model E," it isn't really a model E. But for all practical purposes, you still get the increased safety of the split-elevator. Talk to your Flight Services District Office representatives (after first talking to local mechanics to find out which specialists normally approve changes and which ones normally reject changes).

Both C and D models are eligible for conversion to 85 hp engines. For model C, see A-718, section Engines and Engine Accessories, paragraph 110. For model D, see A-787, note 4. Conversion of model D Ercoupes can be done

to a Continental O-200, 100 hp engine by paying for use of Skyport's STC (supplemental type certificate) and, of course, doing the FAA paperwork. Conversion to the O-200 for other models and other engine conversions would require that you persuade the local FAA representative to sign off on a one-time-STC.

Response to question about airworthiness of Coupes

I've not heard of any problems with airplane crashes from age, corrosion, or fatigue.

There was at least one airframe failure due to hidden damage to the wing (near the joint between the main spar and the tapering tip spar). This was addressed in Univair Service Bulletin #27 requiring installation of four inspection ports in the wing so this could be checked.

There have been a number of airframes grounded because of corrosion near the wing attachment points and on the main spar center section. These problems are repairable though, in the case of the spar center section, repair can be expensive (i.e. complete replacement of the spar center section if the corrosion is bad enough).

The wing spar attachment points (both on the wing side and the center section side) have the problem of dissimilar metals being joined — this acts as a battery causing electrical current flow which encourages corrosion. There may be an interaction with sitting outside and having either rain moisture or mouse urine present. Most of our planes are NOT showing the problem — and it can be readily inspected.

Acidic mouse urine may eventually ground a bunch of planes for major repairs. Paying hangar fees can be the economical route to avoid costly repairs.

Any plane you buy should be carefully inspected for main and rear spar corrosion near those attachment points, in the center section (take out the floor boards and baggage compartments), and (perhaps) the horizontal stabilizer spar. This is especially true of Ercoupes with metalized wings! The worst corrosion problems have been found on metalized wings.

The aileron push rods should be tested with an ice-pick near the ends (if the ice-pick pushes through, replace them — it's not too expensive and might be safety critical. And, the control system behind the instrument panel should be carefully inspected. Again, this is economically repairable and is critical for safety.

Most other problems are common to all planes of the era. There are some things that have been discovered over the last 45+ years and have been addressed by service bulletin or airworthiness directive. If your plane has these items correctly complied with, it should be a quite safe airplane. Overall, we have a very safe airplane.

Few Coupes seem to have accumulated a very high number of flight hours — not many were owned for extended periods by training or rental operations. I've yet to knowingly see a Coupe with more than 3,600 hours. If your prospective Coupe has over this number of hours, please watch for (and keep the club posted on) any fatigue related problems.

Cross country travel

Are Coupes suitable for travel? I've been to the Atlantic Ocean, the Pacific, the Canadian border, Florida, and a lot of places in between. It's as good for cross country as any 100-108 mph plane.

It is better than most if you have a Coupe with no rudder pedals because you have much more leg room. It is also better than most because, with any Coupe, you can accept about 10 mph more crosswind component than with (for example) a Cessna 150 or 172 — that's really useful on cross country trips. It is far better than most planes for cross countries because, wherever you land, people are interested in the Coupes!

Prices

When you buy your Coupe, expect to pay \$10,000-\$15,000 for a plane in excellent condition. \$7,000-11,000 may get you a perfect plane, if you get lucky, but most will have a value reducer like a mid-time engine or bad paint. Six to eight thousand dollars may get you a fix-it-up before flying airplane.

It would be ideal to buy a plane that has been restored by one of the A&P or AIs who restores Coupes as a hobby or professionally. If you buy one that hasn't been recently restored, (or even if it has) have it inspected carefully.

How far will your Coupe take you in an aviation career?

Pretty far, with one caveat. A Coupe is an airplane. It has a couple advantages — it can't spin or ground-loop, it's well behaved and it handles cross winds better than most planes.

If you are going to go professional, I'd suggest getting

a Coupe with rudder pedals. The one problem you might encounter (this is the caveat), is that you might apply for a job with someone who doesn't really know anything about Coupes but who heard misinformation in the hangar, decades ago. That person might not respect your 1,000 hours of Coupe time as much as he would Cessna 150 time. (Brain damaged, I know, but it is possible.) On the other hand, you might run into one of many former (or current) Coupe owners or fliers and get the job automatically because of your demonstrated superior judgement in being a Coupe owner.

An aside: Fred Weick told me that he expected to sell a lot of the Coupes with rudder pedals. They are an OK part of the design. If you find the ideal plane, and it has no pedals, you should be able to buy a kit for less than \$500. They are available, I think, from Univair and Skyport and from people who might want to remove them from their planes so they can have simpler controls and more leg-room. Put out an add offering to pay the expense of removing them from the seller's plane and you may get several responses.

The Coupe can make a good instrument platform, I'm told by very experienced instrument pilots. It would be a good plane for building time in your logbook.

How long will you want to keep your Coupe?

That one is easy — forever. Sure, as you get rich you'll want to get a Cherokee-6 or a Cessna P-210 or an Aero Commander or Citation — but you'll still want to keep your Coupe for the sheer fun-of-flying. That's just the way it is.

Good luck in finding a Coupe — we'll look forward to seeing you often.

Member Ads (continued from page 5)

For U.S. — FAA field approval on form 337 will be required. Mods are done to STC standards but STCs have not yet been procured. A Canada-U.S. bilateral agreement exists for approvals.

Falconar Aviation Ltd., 19 Airport Rd., Edmonton, Alberta, Canada, T5G-0W7, 403-454-7272, FAX: 403-455-8810.

FOR SALE: Complete set of the VCR tapes and study book for the King Private Pilot written exam course. \$75. It worked for me. Louis Toth, 506 Douglas Ln, Marion, MI 49665, 616-743-2420.

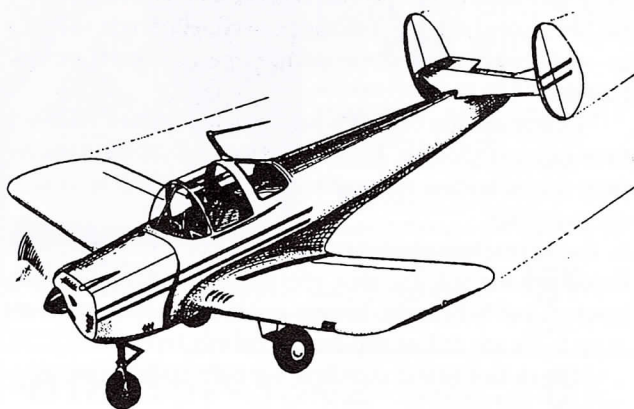
FOR SALE: 1947 415-D, 85 hp, 100 SMOH, 1800 TT, Feb, 1993 annual. Rebuilt magnetos, new muffler and carb heat muff. All polished metal, corrosion proofed with ACF. 10 inspection plates bottom of wing! Full IFR pannel (just certify the altimeter, and you are ready to go). Beech Roby controllable pitch prop (take off short then cruise at 115-120 mph). Mode C transponder (still in warranty). Nice interior with large baggage compartment. New doughnuts in the main gear. Pretty to look at and flies like an angel. Flown regularly. Will sell without the transponder and with a McCaulley fixed pitch prop for \$11,000. With the controllable pitch Beech Roby and the Narco transponder, the price is \$13,500 (a real bargain, with that prop it is a Super-Coupe). Call Jim Isbell at 512-280-4457 after 7 p.m. Central time. Might trade up on an inexpensive Maul, Cessna 190-5, D-18 Beech or other interesting flying machine. (I like radial engines.)

WANTED: Anyone interested in scale R/C modeling of the Ercoupe including the M-10 Cadet to exchange information, fun flies, etc. May form an Ercoupe R/C Scale Squadron. Glen Mills, P.O. Box 3393, Mission Viejo, CA 92690, 714-768-0585.

FOR SALE: 415-C parts. All prices FOB Virginia. All parts FOB Virginia. All parts in fair condition: Seat cushion (white) \$25, Right rag wing \$200, Tach (no hour meter) \$25, Turn & bank indicator \$25, Battery box \$25, hub caps \$5, flat front windshield \$10, nose cowl assembly with cold air intake \$75, left and right exhaust manifolds \$50 ?? Call Dave Fretwell, 703-444-3117 (home) 11004 Beech Nut Rd., Great Falls, VA 22066.

WANTED: Left wing, left fuel tank with gauge (wing tank) will consider a pair of fabric wings. Sam Henderson, 101 Wilson Ave., Hightstown, NJ 08520-3505, 609-443-8162.

FOR SALE: 1946 Ercoupe 415-C. 280 SMOH on C-75, 1750 TTAF. As close to original looks and equipment as you can find. Painted silver with red trim, metal wings. \$11,500. Southern California, D. Leary, 14943 Tacony Rd., Apple Valley, CA 92307, 619-242-2410.



The pre-purchase inspection

By Ed Burkhead

based on contributions from: John Wright, Sr., Daryle Lessard, Burt Ellegaard and others

Tools needed: Differential compression tester and air compressor, flashlight, safety wire and pliers, magneto timing tester, mirror, large crescent wrench, magnet, spark plug socket and ratchet, screwdrivers and metal awl.

AIRFRAME

1. Check the whole structure for corrosion. If the aircraft is painted, corrosion will cause paint to bubble. If the aircraft is polished, corrosion will be evident by small black spots.

The wing should have inspection panels on bottom side — if it doesn't have them, beware, the wing could be full of corrosion without anyone knowing it. Don't buy the plane until inspection panels are installed and the wing inspected. Also, according to John Wright, Sr., there could be damage from a previous improper repair that may not even be recorded in the logbook. The accident that prompted service bulletin #27, says John, had two previous repairs made to the left wing. This aircraft had also been severely punished by the owner.

Pull up on wing tips, then down with about 100 pounds pressure. Look for looseness at front spar to spar-tip joint — 3-4 feet from wing tip. (The spar has two parts, the main section and a pointed tip-section — it is the joint between these that should be checked.) Loose flathead rivets will creak at this joint. Also check wing attach bolts to center section using this pressure method. While assistant is raising and lowering wingtip, put two fingers between spar and bolt at wing attachment point. If loose, the wing will wear the bolts rapidly. Check for open drain holes at the bottom/rear of fabric wings.

2. Corrosion on front wing spar behind wing tanks. They can be inspected by removing the gap covers (between the wing and center section) and inspecting with a mirror and flashlight.

Slight surface corrosion can be treated with ACF 50. Deep corrosion (white powder) is cancer. Find out if aircraft has been hangared or left outside and climate it was exposed to — be extra cautious about aircraft based in coastal areas or Florida.

Center section behind wing tanks has limited visibility from gap seal opening. Floor board has to come up to see the front side of bottom spar cap and the entire center section of the front spar.

3. Entire fuselage should be inspected for inside corrosion. Especially the tailcone area, elevator and rudder, attaching brackets and bellcranks, bottom and belly when insufficient drain holes are drilled and around battery box.

Check horizontal stabilizer for tight attachment, espe-

cially at front bolts. Be sure that the bolts are long enough to go through the nuts — at least far enough that the fiber-lock or other safetying system is functional. Check for smooth trim handle movement. Trim control wire will corrode and freeze up. Be sure that the trim wire is firmly attached to the trim tab.

4. Inspect control surfaces for corrosion and mis-rigging.

Lower inboard ends of ailerons can collect water (dihe-dral) Look through this end of aileron with aileron lifted. The bottom of elevator and horizontal stabilizer sometimes corrodes. Look through holes at the rear of the horizontal stabilizer to see rear spar (elevator lifted).

Rudders: Rudders seldom show much corrosion but check bottoms and steel attach fittings to horizontal stabilizer for rust. Push outward on rudders listening for cracking/snapping noise in rudder spars (see AD 59-05-04).

Check elevator up travel to specs using drilled hole in rudders. 415C, CD, D, E are different as is Forney, Alon, Mooney. On rudder, lay out line at right angles to leading edge of rudder from point midway between attaching bolts of center hinge, and running to rudder trailing edge. From intersection of this line and rudder trailing edge, measure up or downward to find travel of elevator. See if it looks close for pre-purchase inspection, then get rigging re-done when you can. It'll take about eight hours or so for someone who know what he's doing to re-rig the plane, assuming you don't have to replace parts. Elevator:

415-C: up 13° down 12° (3.25" up \pm .25", 2.88" down \pm .5")

415-D: up 9° down 12° (2.2" up \pm .25", 2.88" down \pm .5")

415-E,G Forney F-, F-1A,

Alon A-2, A2-A: up 20° down 10° (4.9" up, 2.5" down)
M-10: up 25°-24° down 32°-36°

Trim:

415-C: up ? down ?

415-D: up 0° down 60°

415-E,G Forney F-1, F-1A,

Alon A-2, A2-A:

up 10° down 36°

M-10 up 7°-10° down 32°-36°

5. Inspect aileron control rods for corrosion. Use a sharply pointed tool (like an ice pick) to poke at the surface of the rod, especially in the last few inches near the ends. If the tool pokes through, the rod has probably rusted through from the inside out. One inside rod can probably be replaced for less than \$100 but you will have to remove the wings. The short rods, between the center section and the wings, only cost about \$45 and are pretty easy to replace. If you replace a rod, make the new rod the same length as the old one before installation, then check the rigging after installation.

Especially check under battery box where right/hand aileron control rod passes through.

6. Check control rods for excessive play. Have someone hold the aileron firmly next to the center section on one side of the airplane while you lift and lower the aileron on the other side. Play should not exceed 5/16" at wing root (7/16" if the original aileron counterweights are still installed).

If play is excessive, it could be many things causing it: worn rod ends, control column bearings, upper quadrant bolt loose or worn, mixer box bearings or shaft worn, bicycle chain on control column loose or the bearings in wing root bellcrank. These are some of the common problems in some aircraft — if all are bad, it could be many dollars to fix.

Check for dry heim joints (rod end bearings) for lack of lubrication.

Check rigging — when ailerons are faired at wing root (on both sides, steering wheels should be straight (use straight edge on bottoms of wheels) the nose gear should be straight and the rudders should both be straight.

7. Check control wheels for excessive play.

Control mast chains must not be loose or too tight — just parallel to horizontal travel (i.e. no sag). Universal joints on steering shafts should be tight — control wheels should not have more than 1/4" rotational play if U joints and chains are correct. Front landing gear pushrod should have no more than 1/32" play at joints and steering total play should be no more than 1/16" from control wheels to nose wheel or vibration will occur.

Cables at top of control mast break strands where they make tight turn from quadrant — AD 54-26-02 (annual). Not required with new type quadrant & cables. A member recently had one of these cables break (on the ground, fortunately).

Especially be sure that the chain is in good condition and that the master link is safety wired and firmly in place.

Worst stress on control assemblies comes when attempting to rotate them when plane is stationary. New universal couplings are \$20 each.

Failure of these components would be life-threatening.

8. Look for fuel tank leaks or evidence of fuel stains on bottom of tanks. It's easier to see stains if 80 octane has been used.

Look for auto fuel usage and wrong Randolph sloshing compound used. Look into tanks with a flashlight for white,

not brown, sloshing compound or no sloshing compound. Look for floating specks of stuff in the gascolator and drained fuel.

9. Inspect nose bowl and cowling for cracks, missing fasteners, etc.

Inspect top cowling supports that attach at top engine mount/firewall bolts to lateral top supports for cracks near weld joints.

Is stainless steel skin over fuselage tank on planes claiming to be model "D" or "E" but whose serial number is 4423 or below? (All planes serial # 4424 and up should already have stainless steel over the tank. .pa

PROPELLER AND ENGINE

1. Inspect prop for nicks. Check tracking of the propeller and look for evidence of abuse. Check propeller for straightness by sighting along leading edge.

Also check the prop and logbooks against the type certificate (available from Univair: book id: ESS, price \$9.00). It could be costly if it is illegal and some picky IA finds it. Check pitch as stamped on front of prop hub. Spinner must be removed. Static RPM is controlled by prop pitch. Is proper length prop installed? (Note: polished props are vulnerable to corrosion unless kept waxed.)

2. Check spinner for damage by applying light pressure up and down. Spinner should not be loose. Single attachment plate spinners are more likely to crack than double attachment plate spinners.

Back plate usually cracks first. Prop must be removed to properly inspect backplate.

John Wright, Sr., says, "Single plate spinners should be outlawed, in my opinion. I have seen many of the back plates cracked and there is really not a good way to check them without pulling the prop. I have seen them crack with as low as 35 hours on them."

3. Compression test of engine should be OK. Normal compression of good C-75, C-85, C-90, O-200 engines is 72/80. Less than 60/80 is reject — usually bad exhaust valve or stuck rings.

Pull oil screen — look for metal particles (flakes) that can



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be removed with a magnet — indicates camshaft or piston ring wear. Bronze particles indicate exhaust valve guide wear, dark aluminum indicates bearing (rods, mains) wear.

If a cylinder is low, listen at the exhaust. If you hear hissing, it is the exhaust valve. If hissing is heard at the carburetor air filter, it is the intake valve. If it is heard at the crankcase breather tube, it is going past the piston rings. Valves or valve guides could be worn or it could be broken piston rings. It could cost many bucks for this job.

4. Engine compartment should be inspected for excessive oil leaks, condition of exhaust system, hoses, wiring, etc.

"Oil leaks should be found," says John Wright, Sr. "Small leaks are common. C-85 Continentals are kind of like a Harley Davidson, if there is no oil leaking out of it, it probably doesn't have any in it. However, I had two engines with persistent leaks — one had a cracked cylinder barrel, the other had a cracked crankcase."

Check baffling and baffling seals, hot spots (brown) on cylinders indicate cracking. Check engine mount for bent tubes which indicate hard landing on nose gear. Check hours since major or top overhaul time on mags, generator, starter, exhaust gaskets for leaking, loose muffler or carb heat muff.

Is gascolator double bracket installed? (Must have two brackets from gascolator to engine to brace the gascolator from vibrational breakage. AD.)

Exhaust muffler outlet pipe should have stabilizing support to some point on engine (not engine mount). Connections to exhaust pipes are insufficient to retard pendulum effect of outlet pipe.

ENGINE START

1. Engine should start within 3 or 4 revolutions. Mags off — turn prop over to hear both impulse couplings snap.

2. Starter should not make any abnormal noise. Some noise is normal because the Coupe has a reduction gear starter. Check adjustment of pinion and cable. Harsh noises indicate Bendix clutch is near failure. Grinding or grating noise could

be bad starter bushings or bad teeth on the gears.

3. Oil pressure should be up within 30 seconds. 45 PSI cold engine indicates good pressure. (In cold weather, a car dipstick heater in the oil tank may warm the oil enough that the pressure can come up in 3-4 seconds. (P.S. Heaters can be obtained at Western Auto for \$10.)

4. Generator or alternator should have good initial charge rate. 1500 rpm and 20 amp generator should charge 10-14 amps for short time — turn on all accessories — charge rate must be above 0 amps when flying at cruise rpm. 12 amp generator charges 5-10 amps initially. See AD 47-20-09. The initial rate depends on battery condition and how long it took to start. Charging rate also depends on rpm. A generator doesn't come on line until 1300-1400 rpm and doesn't put out full power till 1800-2000+ rpm. An alternator will come on line at idle rpm and will put out full capacity at about 1000-1100 rpm.

ENGINE RUNUP

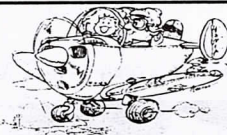
1. Mag check should be done at 1500 rpm for C-75 or C-85 and at 1800 rpm for C-90 or O-200. An rpm drop of 50 to 75 rpm is normal. Make sure each mag drops — if one does not drop, the mag switch could be inoperative and you wouldn't know it otherwise.

2. Check carburetor heat at same rpm — rpm should drop 75° to 100°. This is a go/no-go situation — if it does not drop, the carb heat is not working and the aircraft should not be flown. Very dangerous is a partially-on carb heat condition which could cause icing.

3. Static rpm should be checked as correct depending on prop and pitch.

4. Check oil pressure and oil temperature during runup. Values for oil pressure should be in green range on gauge. Oil temperature should be 75 degrees F before takeoff to ensure proper oiling (spray of pistons and camshaft, especially under full power. Oil pressure should be steady and not fluctuate.

Come Fly With Us The Ercoupe Owners Club



Join with other owners and pilots of Ercoupe, Alon, Forney and M-10 Cadet aircraft. The Ercoupe Owners Club was founded to provide a way for owners and pilots of Ercoupes to exchange ideas and make available information on parts, repairs and safe responsible flight. Members enjoy free classified ads in the newspaper, discounts on parts and accessories and special insurance rates.

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(\$20.00 per year Dues)

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE _____

N # _____ SERIAL # _____

MODEL _____ YEAR MFG. _____

SPECIAL FEATURES: _____

TAXI TEST

1. Brakes should stop plane reasonably well if Goodyears and very well if Cleveland. Brakes should hold plane against thrust up to full power — be careful if you test this that you don't suck gravel up to damage the propeller or overheat the engine. Find a spot of clean pavement or good grass.

Cleveland linings are easy to visually inspect for wear — if they are less than 1/8" thick, replace them.

Goodyear brakes require wheel and disc removal. If Goodyear brakes are installed, be sure to check disks and the buttons and clips that hold the disks in place. This has been a problem in the past in that the buttons fall out causing the disk to cock and lock the wheel.

2. Plane should taxi straight with control wheel in the center (under no wind conditions). There shouldn't be excessive play in the steering wheel. If play is excessive, refer to paragraphs 6 & 7 of airframe inspection section.

FLIGHT TEST

1. Test all radios and avionics gear to be sure they really work, that radios receive, that transmitters transmit and that navigation equipment tracks correctly. Check all instruments for normal operation.

Call radar and check transponder/encoder operation.

2. Flight controls should be smooth. The aircraft should trim up and fly hands off in smooth air. Rigging should not require a trim tab unless wings are warped (washin/washout) due to prior damage. Only Alons and Mooney Cadets were built with trim tabs. Ercoupes are trimmable by bending the trailing edge of ailerons (within certain limits).

3. All engine gauges should be in the green. Check cylinder head instrument, if installed. Readings in flight should be 400-475°F or less.

4. Oil temperature should not exceed 100° above ambient temperature. Excess temperature may indicate baffling that will need to be fixed or that there is excessive clearances on rods, mains and cam bearings. 220°F is the max allowable temp. Too high oil temp causes fretting of the engine halves. The aluminum case is malleable at 190° which is the optimum temperature and allows the case to expand properly — high oil temp can cause case cracking.

5. **Oil pressure should not drop below 30 psi when oil temperature is stabilized at the hot operating temperature.** This is a biggie — if the pressure is lower than 30 psi, it could be major overhaul time. Overhauls are expensive and crankshafts are getting scarce.

However, there may be a particle under the oil pressure relief valve causing lower pressure. This is easy to find — just remove acorn nut R/H rear on engine, remove spring & plunger. Check for particle and reinstall. Usually find piece of plastic from oil bottles that fell into tank when adding oil.

6. Cylinder head temperature should not exceed 425° or so in cruising flight, 475 degrees on climb. Even these numbers may be high. John Wright, Sr., cited several planes on which he works, that have excellent engine baffles, which show 360° in cruise and 400°-410° in climb. Most Coupes, says John, show about 350°-375°F in cruise. The book says the limit is 525°F max, but you will cook your engine long before that.

MISCELLANEOUS

1. If tail height is too low (airplane on level ground), new main landing gear doughnuts may be required, perhaps spacers will also be needed to bring the height up to normal. Normal height of the vertical stabilizers is 75 inches. If the tail height is below 68 inches, the doughnuts should be replaced. This is a 2-3 hour job. A low tail will adversely affect crosswind landing behavior.

A low tail will also cause fuel pump failure in cold climates. Water will collect at rear of main tanks and not drain out of drains at front of tanks. After water is pumped to fuel pump it freezes at the pump diaphragm from cold ram air and breaks the pump actuator link. This is tough to troubleshoot and can be costly. Is double fork nose gear installed? Even good donuts may need 7/16" spacer to get 72-75 inches on tail when you have a double fork nose gear (which is 1.5" longer than a single fork gear).

2. Inspect fuselage skin for signs of wrinkling due to a hard landing or minor accident. Remember that this skin is the load-bearing structure. Closely inspect belly skin below rear spar. It will be pushed downward and have a unique outline of the rear spar of the aircraft has been damaged on landing hard. Check rear spar for deformation if belly shows this problem. Repairing or replacing rear spar is very expensive (\$2,000 - \$3,000).

3. Have wing fabric tested with a non-destructive tester. Discuss with owner ahead of time who's responsible for repairs if the fabric tester punches through the fabric.

Use "knuckle" test on fabric if tester is unavailable. Hold hand in fist, rap middle knuckle on fabric rapid movement. Fabric will sound good, no dope cracks at point of rap, tight, drumlike sound from fabric with no depression at point of rap. Pay special attention to top of wings.

According to Burt Ellegard, there is no documented test for Ceconite.

4. Check equipment list, A.D. compliance record, weight and balance record, 337s on modifications, approved flight manual, ELT & battery, I.D. plate at rear of fuselage, dataplate on engine for proper horsepower stamping, lock books showing TTAF, SMOH, STOH, oil change entries, preventative maintenance entries, annual inspections, STCs or major repairs, yellow tags for any appliance repairs, encoder/altimeters test (required bi-annually for VFR flight).



Annual inspection checklist

ERCOUPE ANNUAL INSPECTION / WORK REPORT

Date _____

Page 1 of 4

A/C reg # _____ MAKE _____ MODEL _____ S/N _____ HOURS _____

ENGINE MAKE & MODEL _____ ENG HRS _____ (TACH) (HOBBS)

DATE PREV. ANNUAL _____ HOURS _____

OWNER _____ ADDRESS _____

INSPECTION PERFORMED BY _____

ADDRESS: _____

A & P NO: _____

Instructions: Check [] if item is ok. Add pertinent measurements or observations, including corrective actions.

[OK] ITEM

- [] A. D. NOTES
- [] EQUIPMENT LIST
- [] LOG BOOK ENTRIES
- [] FORM 337s present reflecting all changes
- [] WEIGHT & BALANCE
- [] APPROVED FLIGHT MANUAL
- [] AIRWORTHINESS CERTIFICATE (Does it match model as shown in log books?)
- [] STATE REGISTRATION AND STICKER (if required)
- [] RADIO LICENSE

I. Fuselage

- 1. Exterior
 - [] a. Skin/paint
 - [] b. Cleanliness
 - [] c. Check main spar for corrosion
 - [] d. Airspeed system tubing - rubber connectors at wing seal gap
 - [] d. Windshield condition
 - [] f. Side & rear windows
 - [] g. Battery box drain tube extension (must extend $\frac{1}{2}$ " below fuselage per AD 47-20-08 ERCO).
- 2. Behind seat
 - [] a. Check rear spar for corrosion
 - [] b. Push rods & ball joints-grease
 - [] c. Push rods test for rust (awl)
 - [] d. Aft quadrant - grease
 - [] e. Rudder & elevator cables
 - [] f. Check chafing blocks
 - [] g. Battery fluid levels
 - [] h. Battery compartment
- 3. Under instrument panel
 - [] a. Control wheel freeplay
 - [] b. Control wheel bushings
 - [] c. Control wheel U-joints
 - [] d. Control quad chain-lube
 - [] e. Control quad cables

- [] f. Fuselage tank support
- [] g. Trim lever - oil
- [] h. Trim cable - oil
- [] i. Inspect vacuum hoses for leaks
- [] j. Install new filters in gyro instruments
- 4. Under floor boards
 - [] a. Lower quad bushings
 - [] b. Lower quad ball joints-grease
 - [] c. Check brake lines
 - [] d. Check fuel lines & primer
 - [] e. Check pitot/static tubes under floor and seat
- 5. Other cockpit items
 - [] a. Fuel system gauges
 - [] b. Selector valves
 - [] c. Placards: fuel, baggage, etc.
 - [] d. Oil system pressure and temp gauges
 - [] e. Electrical system
 - [] 1. Fuses/breakers
 - [] 2. Switches
 - [] 3. Bulbs/eyebrow lights
 - [] 4. ELT battery
 - [] 5. Wires & cables for wear and chaffing
 - [] f. Instruments
 - [] 1. Range markings
 - [] 2. Placards
 - [] 3. Compass correction
 - [] 4. Inspect compass bracket for cracks
 - [] g. Engine controls & placards
 - [] h. Safety belts and harness
 - [] i. Seats and upholstery
 - [] j. Floor boards and carpet
 - [] k. Fuselage tank finger screen
 - [] l. Microphone/speaker/headset condition, operation
- x. Engine compartment
 - [] a. Brake master cylinder - reservoir replenished with MilH-5606AM fluid [] _____ oz. required
 - [] b. Heating and ventilating

II. Wing and wing center section

- [] a. Fabric or metal condition/paint
- [] b. Attachment fittings - feel for movement between wing attachment bolts and fittings when helper is lifting and lowering wing-tip. Visually check for cracks.
- [] c. Aileron hinges - lubricate - LPS-3
- [] d. Aileron pushrods - lubricate

- [] e. Bellcranks at wing gaps - lubricate
- [] f. Tie down rings
- [] g. Walkway, non-skid
- [] h. Fuel system markings
- [] i. Pitot/static tubes and connections
- [] j. Electrical system to lights

III. Empennage

- [] a. Rudder & elev hinges-lubricate
- [] b. Rudder attach fittings
- [] c. Rudder freeplay $\sim 1/8"$
- [] d. Rudder pushrods - oil - LPS-3
- [] e. Elevator freeplay $\leq 3/16"$
- [] f. Trim tab setting range
 - 415-C: up ? down ?
 - 415-D: up 0° down 60°
 - 415-E,G Forney F-1, F-1A, Alon A-2, A2-A:
 - up 10° down 36°
 - M-10 up 7° - 10° down 32° - 36°
- [] g. Trim tab cable - adjust to maximum speed position using cockpit control, at trim tab check that tab is against stop then remove connector between tab and cable. Pull tab to down position by hand and release, checking that spring can firmly push tab up against the stop (this is to prevent flutter in case the cable connector becomes loose in flight). Reattach tab to cable while tab is against stop - this should keep the same relationship between the control and the tab that existed before the check.
- [] h. Elevator travel - On rudder, lay out line at right angles to leading edge of rudder from point midway between attaching bolts of center hinge, and running to rudder trailing edge. From intersection of this line and rudder trailing edge, measure up or downward to find travel of elevator. Using reference hole, check elevator up-travel by pulling control wheel to full aft position as limited by stop on control wheel shaft. Correct any error by adjustment of elevator control cables. Tension on these control cables should be 160-190 pounds. (Reference: Aircoupe Service

Manual, Surface Controls and Rigging, Rigging of Elevator. Elevator travel reference: Aircraft Specifications A-718 and A-787.)

415-C: up 13° down 12° (3.25" up ±.25", 2.88" down ±.5")

415-D: up 9° down 12° (2.2" up ±.25", 2.88" down ±.5")

415-E,G, Forney F-1, F-1A, Alon A-2, A2-A: up 20° down 10° (4.9" up, 2.5" down)

M-10: up 25°-24° down 32°-36°

- [] i. Skin and paint
- [] j. Electrical system
- [] k. Tie down ring

IV. Landing gear

1. Main gear

- [] a. Brake lines
- [] b. Pivot bearings
- [] c. shock struts — fill to inlet annually or more often (inlet is in back center of strut)
- [] d. "springs"
 - [] 1. Doughnuts — look for bulging, check tail height (should be 75") replace doughnuts if below 68"
 - [] 2. Belleville springs if present in place of doughnuts — take apart every annual, clean and grease
- [] e. Tire condition
- [] f. Grease wheel bearings
- [] g. Brake linings Pad: LH inner _____ RH inner _____ Thickness: LH outer _____ RH outer _____
- [] Hayes brakes: "when new, each of 6 blocks is 3/32 inch thick above retaining spring slot and may wear without loss of braking until retaining spring becomes exposed to drum. When block has worn within approximately 1/36 inch of spring slot, all blocks should be replaced." *Aircoupe Service Manual*
- [] Goodyear brakes: "Linings are .460 inches long when new. When lining wears to approximately .323 inch (21/64 inch), there will be complete loss of braking; therefore, when either lining measures less than .375 inch (3/8) inch)

both should be replaced. Movable lining can be measured only by disassembly of brake unit; however, fixed lining may be measured by removal of wheel only and should provide sufficient indication of lining wear between disassembly periods. At 25-hour checks, wear on fixed block may be determined with reasonable accuracy by inserting feeler gauge without removing wheel. With brake "on," if feeler 7/64 inch thick can be inserted between brake assembly housing and disk, wheel should be removed for accurate check of fixed lining length." *Aircoupe Service Manual*

- [] h. Check brake disk clips
- [] i. Check brake hoses
- [] j. Knee joint freeplay
- [] k. Lube strut and arm attachments
- [] l. Check attachment fittings

V. Nose Gear

- [] a. Tire condition
- [] b. Grease wheel bearings
- [] c. Steering collar & ball — grease
- [] d. Nutcracker — lube
- [] e. Lower bushing fit — look for slop
- [] f. Strut oil level
- [] g. taxi spring height — at least 2.75"
- [] h. engine mount attachments
- [] i. control wheel tracking
- [] j. Steering collar and bolt between steering pushrod and nose gear — inspect for cracks (also make sure that old style socket ball fitting has been replaced with bolt (Skyport nose gear steering ball replacement kit)

VI. Propeller

- [] a. Blades, tips, leading edges, check for nicks
- [] b. Attachment bolts and safteying
- [] c. Tracking
- [] d. Hub and backplate
- [] e. Spinner attachment

VII. Engine

- [] a. Fuel pump - check screen according to AD 81-07-06 TELEDYNE CONTINENTAL MOTORS; Amendment 39-4071 and Continental Service Bulletin M81-8 dated March 9, 1981. Fuel pump surge chamber.
- [] b. Cleanliness/leaks
- [] c. Compression
1=___/80 2=___/80 3=___/80 4=___/80
comp last ann
1=___/80 2=___/80 3=___/80 4=___/80
- [] d. Spark plugs
- [] e. Cylinder walls
- [] f. Breather tube
- [] g. Oil screen
- [] h. Oil filter (if present) change
- [] i. Change oil
- [] j. Mag points, timing and impulse couplings
- [] k. Clean out mixture valve - Even if wired full rich, take apart and check occasionally. Fibers from air filter can block holes in plate giving dangerously lean mixture.
- [] l. Carburetor finger screen
- [] m. Flush Carb float chamber
- [] n. Gascolator screen & sump
- [] o. Clean air cleaner (inspect for loose fibers that may be ingested by engine and mixture control)
- [] p. Throttle control - oil
- [] q. Carb heat and mixture control - check proper operation, oil
- [] r. Check condition of fuel and air hoses
- [] s. Baffles - check condition
- [] t. Exhaust stack condition
- [] u. Heat muffler - remove for inspection
- [] v. Engine mounts - check for sag, deterioration, damage
- [] w. Cowling condition
- [] x. Cowling support structure, fasteners
- [] y. Chafing strips
- [] z. Gascolator braces - Must have two between gascolator and engine. Ercoupe Service Bulletin #24A, mandatory, applies to all ERCO and Forney Coupes. Must have old aluminum nipple replaced with brass nipple (AD-46-38-03).

VIII. Engine compartment electrical items

- [] a. Starter brushes and switch
- [] b. Generator brushes
- [] c. Wire and cable runs
- [] d. Ignition harness
- [] e. Grounding strip from engine to engine mount

IX. Avionics

- [] a. Receivers
- [] b. Transmitters
- [] c. Transponder
- [] d. Loran - memory battery replacement due? _____
- [] e. ELT - battery replacement due? _____
- [] f. Antennas and cables, condition, cables, and bonding to airframe
- [] g. Bonding of engine and control surfaces to airframe
- [] h. Shielding of ignition noise

X. Flight test

- [] a. Flight controls correct movement, throw
- [] b. Position lights, landing lights
- [] c. Mag drop
- [] d. Carb heat
- [] e. Oil pressure
- [] f. Charge rate
- [] g. Ground roll tracking
- [] h. Idle - observed rpm _____
- [] i. Static rpm _____
- [] j. Ambient temperature
- [] k. Mixture operation
- [] l. Cylinder head temperature
1.[] 2.[] 3.[] 4.[]
- [] m. Exhaust gas temp
1.[] 2.[] 3.[] 4.[]
- [] n. Fuel pressure, each pump
- [] o. Trim range
- [] p. Electrical system charging rate, with lights
- [] q. Brakes
- [] r. Communication test, each radio
- [] s. Loran operational test
- [] t. Transponder check with traffic control
- [] u. VOR test.

Wing leaders — who are they?

[This is just the beginning of this listing. All wing leaders or regional directors, please send us up-to-date names, addresses, and phone numbers for all wings. If I have any errors here, please let me know. Ed.]

Alabama:	Bob Burk	Rt. 2 Box 28, Flomaton, AL 36441	205-296-5584
California — Northern Wing:	Charles Eck	1481 S. Mary Ave., Sunnyvale, CA 94087	408-735-8474
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Colorado:	Norman Avery	19101 E. Chaffee Place, Denver, CO 80249	303-371-7978
Florida:	Harvey Readey	2121 Nela Ave., Orlando, FL 32809	407-855-7886
Georgia:	Leroy Pacheco	212 Cypress Dr., Kingsland, GA 31548	912-882-2485
Illinois:	John Wright, Sr.	#4 Flossmoor, RR 6, Springfield, IL 62707	217-546-0585
Indiana:	Ron & Carolyn Kerlin	9485E 1000N, Syracuse, IN 46567	219-856-2921
Iowa:	Tony Crandell	501 N. Walnut, Lamoni, IA 50140	515-784-7204
Kansas (east):	Frank Jenkins	9048 W. 101st Ter., Overland Park, KS 67062	913-648-7786
Kansas (west):	Ken Richards	409 S. Weaver, Hesston, KS 67062	316-327-2223
Mississippi:	vacant		
Missouri:	Ron & Marguerite Avise	4200 NW 79th Terr #3, Kans Cty, MO 64151	816-746-5120
Minnesota:	Wilber Eck	Rt. 2 Box 312, Monticello, MN	612-295-2118
Nevada:	Max Doubrava	3121 Hastings Ave., Las Vegas, NV 89107	702-870-6007
Ohio:	Terry & Diane Shankland	851 Islington, Toledo, OH 43610	419-255-2956
Puerto Rico:	Garred Giles	Punta Borinquen, Calle N 136, Ramey, PR 00604	
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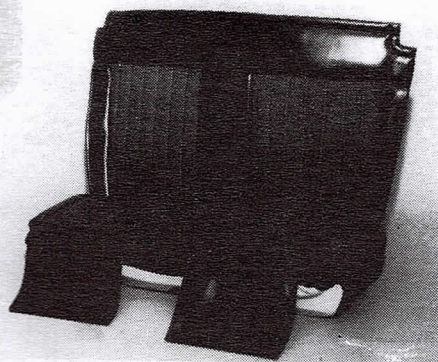
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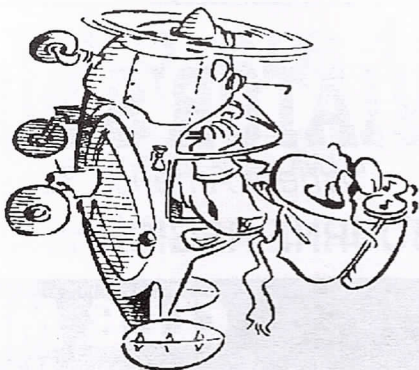


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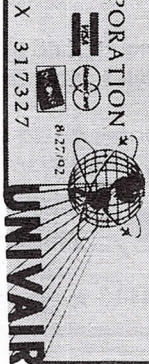
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