

The COPA Guide to Certified Aircraft

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Contents

[Introduction](#)
[Scope Of This Guide](#)
[Selecting A Plane](#)
[Categories of Certified Aircraft](#)
[Aeroplanes](#)
[Gliders](#)
[Powered Gliders](#)
[Helicopters](#)
[Gyroplanes](#)
[Balloons & Airships](#)
[Airships](#)
[Pressurized Turbine?](#)
[Can Certified Aircraft Become Non-Certified Aircraft?](#)
[Documentation](#)
[Journey Logbook](#)
[Technical Record](#)
[Certificate of Registration](#)
[Registration & Markings](#)
[Certificate of Airworthiness](#)
[Weight And Balance](#)
[Flight Manual or Pilots Operating Handbook \(POH\)](#)
[Airworthiness Directives \(ADs\)](#)
[Insurance](#)
[Taxes \(At Registration And Importation\)](#)
[IFR for Certified Aircraft](#)
[Aerobatics for Certified Aircraft](#)
[Maintaining Your Certified Aircraft](#)
[Working with an AME](#)
[Elementary Work](#)
[Maintenance Schedules](#)
[“Out of Phase” Maintenance Items](#)
[Modifying your aircraft](#)
[STCs](#)
[LSTCs](#)
[Installing Parts](#)
[Who Can Sign for Engine Overhauls?](#)
[Replacing Cabin Upholstery](#)
[Handheld Fire Extinguishers](#)
[Maintenance References For Owners](#)
[Licences to Fly Certified Aircraft](#)
[Type Ratings](#)
[Join a Club](#)

[Aircraft Type Clubs](#)
[Canadian Certified Aircraft In the USA](#)
[Some Factors Currently Affecting Aircraft Values](#)
[Buying a Used Certified Aircraft](#)
[Importing a Certified Aircraft](#)
[The Future of Certified Aircraft](#)

The COPA Guide to Certified Aircraft



Introduction

Welcome to the world of traditional factory built aircraft that are certified to government standards.

The early days of aviation were dominated at first by amateur-built aircraft built by people like the Wright brothers and Samuel Langley in the USA and the Aerial Experiment Association under Alexander Graham Bell in Canada. With the start of World War I military aircraft suddenly came to prominence in aviation. Civil aviation really got going after the First World War when airline, bush and personal aviation became established.

In those days between the wars it became quickly apparent that it wasn't a good idea to let just anyone design, build and sell an aircraft to the general public, or to the airlines to carry members of the general public. There were lots of accidents due to faults in aircraft design and the public started to demand that the government set standards for production aircraft.

The US government set the early standards that most influenced aircraft flown in Canada with the introduction of the CAR 3 (US Civil Aviation Regulation) standards for

small aircraft, in the 1930s. Many aircraft that were certified to that early standard are still flying today, like the venerable Piper J-3 Cub.

CAR 3 essentially effect became the world's standard for light aircraft, until it was replaced in the 1960s by the [US FAR Part 23](#) certification standard. Later standards were added, like the European JAR-VLA standard for “Very Light Aircraft” and the current Canadian [CAR 523](#) standards for small aircraft. All those standards were based on CAR 3 and FAR 23 and they are all very similar to FAR 23 today. This has the advantage that any aircraft designed to FAR 23 can quickly be certified in other countries, such as Canada, since our standards are close to FAR 23.

Overall, the concept of “certified aircraft” has historically been a success, as it has produced safe, aerodynamically stable and predictable aircraft. The production of almost all certified light aircraft came to a halt in the mid-1980s aviation economic bust. At that time non-certified aircraft filled in the gap and have become the dominant force in new aircraft since that time. Non-certified aircraft in Canada include amateur-built, basic and advanced ultralights, owner-maintenance and limited class aircraft.

By 2000 most factory built certified aircraft were back in production and some new designs, such as the Cirrus SR22, Lancair 300 Columbia and Diamond DA40 Star were introduced, bringing some of the engineering innovations of the homebuilt aircraft and sailplane designers to certified, factory-built airplanes.

Today, in the USA, new certified aircraft are on the rebound from their disappearance in the 1980s and are selling quite well. In Canada, non-certified aircraft still account for almost all of the new aircraft registered in the country each year. This is mostly due to the cost – there is no doubt that certification is expensive and the result is that a completed, new, certified aircraft is about three times the cost of a similar performing amateur-built aircraft. On the plus side, there continues to be a booming market in used certified aircraft in Canada, as their prices are often very close to similar, if newer, non-certified types, such as amateur-builts.

The advantages of certified aircraft over non-certified aircraft include:

- All certified aircraft have predictable and stable handling and flight characteristics.
- Most certified aircraft have a readily available supply of parts, even if the original manufacturer is out of business.
- There is a lot of help available for the maintenance of most certified types – most AMEs can work on most types of certified aircraft.
- The aircraft are generally “ready to fly” (unless you buy one that needs rebuilding) and therefore you don't have to spend years of building before you get to fly the plane.

- There are no problems flying to other countries as certified aircraft meet ICAO standards and can be flown anywhere without special permission.
- Certified aircraft can be bought and sold across international borders without much trouble – they are accepted in all countries.
- Certified aircraft are generally easy to sell and don't attract much risk of liability for the seller compared to amateur-built aircraft.

Despite the recent popularity of non-certified aircraft in recent years, certified light aircraft still greatly outnumber non-certified aircraft in Canada. In January 2009 there were 25,890 private aircraft registered in Canada, of which 15,369 (59.3%) were certified aircraft.

These privately registered, certified aircraft included:

- 13,721 airplanes
- 569 gliders
- 616 helicopters
- 463 balloons

It can quickly be seen that certified aircraft are the dominant force in aviation in Canada and will be for some time yet, even as non-certified types slowly increase in numbers. As a flying and ownership experience certified aircraft have a lot to offer – a tried and true product.

Scope Of This Guide

This COPA Guide is designed to give you the background information that you will need to get involved in owning, maintaining and flying certified aircraft, whether you are buying a new or used aircraft. This COPA Guide will cover some of the pitfalls, regulations and choices available. It is designed to get you started!

This COPA Guide is **not** designed to tell you everything you need to know to own, maintain and fly an aircraft. That would be a huge subject and it is best covered in various specialized (and much thicker) books than this!

Suggestions for improvements to this COPA Guide are welcome! COPA updates and rewrites its COPA Guides on a regular basis to keep them up to date and relevant. Send your suggestions for improvements to benefits@copanational.org.

NOTE

While this guide does discuss the rules for owning and flying a certified aircraft, it is not legislative. Ensure that you read and understand the current CARs and know your complete obligations as an aircraft owner and pilot.

Note on Links: [Blue links](#) in this COPA Guide will lead you to external webpages and places within the Guide itself. [Green links](#) will take you to pages in the “Members Only” section of the COPA website. Your membership number and last name “all in capital letters” are required for access to these pages.

Selecting A Plane

Finding the right aircraft type is probably the most fun part of the process of buying a new or used certified aircraft!

It can be argued that there are two ways to choose a design that will suit you – the *Scientific Method* and the *Emotional Method*. Both work equally well, depending on the person involved.

The “*Scientific Method*” usually involves starting with a list of “aircraft criteria”. This is a possible list of what you might consider:

- Number of Seats
- Useful load
- Full fuel payload
- Cruise Speed
- Runway requirements
- Rate of Climb
- Range
- Endurance
- STOL capabilities
- Aerobatic Capabilities
- IFR suitability

This method could also consider some other “non aircraft performance” criteria as well:

- Total cost of the aircraft, including:
 - Purchase price

- Upgrades needed to customize the aircraft to your needs:
 - Paint and fabric
 - Instruments
 - Avionics

- Forecast annual operating cost - you can calculate this using the [COPA Guide to Estimating Aircraft Operating Costs](#)
- Insurance availability for this type of aircraft
- An airport to base the aircraft
- Hangarage required for the aircraft

Based on all these criteria and perhaps some other ones, too, the available aircraft types can be assessed to see which ones fit and which ones don't. With a "short list" made up, each remaining type can then be assessed more carefully to find the optimal solution. Given perfect information, the best choice can be made this way. The problem is that information is rarely perfect!

The "*Emotional Method*" is much simpler. This is the method most often used when buying planes and cars, too. This method simply says, "Buy the plane that you find appealing"! If this didn't work then GM would never sell Corvettes, as they don't stand up to the "*Scientific Method*"!!

Most people don't give a lot of credence to the "*Emotional Method*", but there is one strong factor in its favour – very few pilots appreciate owning and flying the scientifically best aircraft for them if they don't like the aircraft in the first place. It may be the right aircraft for them, but it just doesn't grab their imagination! We don't usually choose spouses using a *scientific method*!

In reality, most potential aircraft buyers do a combination of the two methods – they analyze the basics, create a short list of aircraft that will fit the bill for their needs and then pick the one that most appeals to them. The ultimate test is whether you are happy with the choice when it is done – how you get to that point is ultimately immaterial!

The hardest part of buying an aircraft is probably learning all the details that can be factors in the buying process. Fortunately COPA has a complete book entitled [The COPA Guide to Buying an Aircraft](#) that can help you through the whole process. It is available on the [COPA website](#) at no charge to COPA Members. A paper version is also available for a fee to cover printing and postage.

Categories of Certified Aircraft

Next let's have a look at the different categories of aircraft that are available in Canada to own and fly as certified aircraft. These basically fall into four groups:

- Aeroplanes
- Gliders and Powered Gliders
- Helicopters
- Balloons and Airships

There are currently no certified gyroplanes in Canada.

Aeroplanes

Aeroplanes, or “airplanes” as most people outside TC call them, are obviously the most popular type of aircraft to own and fly. In October 2006, airplanes accounted for 90% of the private, certified aircraft flying in Canada.

Airplanes may be powered by one, two or more engines. These can be any type of certified engine - gasoline, diesel, turboprop, turbojet or turbofan engine.

They can have wheels, floats, skis or amphibious landing gear. Certified aircraft range from single seaters to large airliners with hundreds of seats, but certified “small” aircraft are limited to 12,500 lbs and below.

The complete Canadian certification standards for these aircraft are found in [CAR STD 523](#). The equivalent US standards to which most Canadian registered light airplanes were certified is [FAR 23](#).

Gliders & Powered Gliders

Certified gliders, or sailplanes as most people refer to them, have enjoyed steady popularity over the years and currently account for 3.7% of Canadian private, certified aircraft.

Canadian glider certification standards are found in [CAR STD 522](#). This standard also covers “powered gliders” or motor gliders, as well.

Sailplanes have been flown on many long soaring flights in Canada, when the conditions are right. While most unpowered gliders or “pure sailplanes” are flown strictly for recreational purposes, motorgliders can be flown like airplanes on cross country flights, even when the weather doesn't allow soaring flights.

Helicopters

Helicopters account for 4% of the private, certified aircraft in Canada. Their flexibility makes them useful as they can take an owner away to secret fishing spots or the family cabin – even when there is no airport nearby.

There is no doubt that the higher costs of owning and operating a helicopter has limited their popularity. Helicopters are usually found on wheels or skids and many can be fitted with skis or floats for seasonal operations.

Helicopter certification standards for Canada are found in [CAR STD 527](#) while the US equivalent is [FAR 27](#).

It is worth noting that liability insurance for helicopter student pilots is generally not available in Canada, except through helicopter schools. This means that buying your own helicopter and then learning to fly on it may not be an option – you must attend a certified school to complete your *Private Pilot – Helicopter* licence with the high costs that go with that. The high training costs are one factor in the low numbers of private helicopters in Canada.

In-flight hull insurance for helicopters is also hard to get, especially for low time helicopter pilots and this should be considered before buying one of these aircraft. You may have to be comfortable flying without that coverage.

Balloons & Airships

Balloons are quite popular in Canada and are common year-round sights in the skies near many of Canada's larger cities.

Balloons currently account for 3% of the private, certified aircraft in Canada.

This category also includes airships, which are “powered balloons”. There are currently no certified airships registered in Canada.

Canadian certification standards for balloons are found in [CAR STD 531](#) while the US equivalent is [FAR 31](#).

Pressurized Turbine?

So you have your heart set on a really hot airplane – something turbine powered and pressurized? There are some extra considerations there beyond the obvious requirement for a [specific type rating](#) (since it is probably “high performance”).

The most important factor to consider is that all Canadian pressurized and turbine aircraft, not in commercial or flight training use, that are used to carry passengers are

required to operate under [CAR 604](#) Private Operator Passenger Transportation. This means that you will need a Private Operating Certificate (POC) and everything that goes with it. This program has been administered by the Canadian Business Aviation Association since January 01, 2003 ([CBAA](#)) on behalf of Transport Canada. This program requires you to write and follow a Safety Management System for the operation of the aircraft, belong to CBAA ([\\$1600 per year minimum membership fee](#)), have a custom-designed maintenance program that complies with [CAR 625 Appendix D](#) (you cannot just adopt CAR 625 Appendix B & C as you can with other private aircraft) and meet minimum training and insurance benchmarks plus several other requirements.

This is not to say don't buy a turbine pressurized aircraft, just be aware that there are some extra requirements and costs involved.

Please note that to fall under the requirements of CAR 604 the aircraft must be both turbine powered (jet or turboprop) and pressurized. Aircraft that are pressurized and piston powered (stock Cessna P-210 for instance) are not captured by this rule, nor are turbine, non-pressurized aircraft (Bell 206B Jet Ranger helicopter, Cessna 208 Caravan).

It is also worth noting that you can modify an aircraft into requiring an operating certificate under CAR 604 by converting the engine to turbine power. For example if you own a piston powered Cessna P-210 and you convert it to an Allison 250-engined turboprop, then you suddenly will need a POC under CAR 604 before you carry any passengers in the aircraft.

COPA was extensively involved in the negotiations with TC and CBAA over the last few years on this issue and sought to have turbine and pressurized aircraft flown for personal, non-corporate use exempted from the CAR 604 requirements. In turning down COPA's request on this issue, TC stated that they felt that a greater level of control and oversight was justified on all turbine and pressurized aircraft and that the CBAA POC program was the appropriate place for that oversight and control. It is not anticipated that there will be any changes to the types of aircraft included under this POC requirement in the future.

If you are planning on owning any type of turbine and pressurized aircraft then plan to be part of the CBAA POC program.

Can Certified Aircraft Become Non-Certified Aircraft?

This question is often asked when an aircraft owner has a certified aircraft that they want to rebuild, restore or modify and this can't be done within the certified category using STCs and LSTCs for the design.

The short answer is "yes - but". There are two possible ways to do this:

- If the aircraft is eligible for the Owner Maintenance category (some certified aircraft are and some are not)

- If the aircraft can be rebuilt as an amateur-built aircraft.

For complete information on the Owner Maintenance category in Canada, including which aircraft are eligible, please refer to the [COPA Guide to the Owner Maintenance Category](#). It is available for free to COPA members on the [COPA website](#).

There are amateur-built aircraft flying in Canada that have been constructed from certified parts in whole or in part. The builder will have to construct or supervise the construction of the major portion of the aircraft (51% minimum) for the aircraft to qualify as an amateur-built.

For more information on how this might apply to a specific aircraft project and situation have a look at the [COPA Guide to Amateur-Built](#)s or contact the agency responsible for inspecting amateur-built in Canada, [MD-RA](#) for more information.

Documentation

Like everything in aviation there is a requirement for paperwork for certified aircraft. In fact certified aircraft require more paperwork and documentation than any other category of aircraft – to maintain their certified status.

In buying and registering a certified aircraft here is a list of some of the paperwork to expect to account for:

- Journey logbook
- Technical record
- Certificate of Registration
- Certificate of Airworthiness
- Weight and Balance Report
- Flight Manual or Pilots Operating Handbook (POH)

Journey Logbook Requirements

The requirements to be entered in the Journey Logbook are spelled out in [CAR 605.94](#).

One of the most often missed items is the requirement for private aircraft owners to “enter the date, air time, operating cycle or landing at which the next scheduled maintenance action is required” in their Journey Logbook. This rule is spelled out in [Schedule I](#) paragraph 5b to CAR 605.94(1). The main intention is to alert the owner and AMEs that the items noted need attention in the future.

Having a separate maintenance schedule is a great idea, but you still need to comply with the CAR requirements and enter your “next due” dates in your Journey

Logbook. Later on we will have a more detailed look at [maintenance schedule](#) requirements and recommendations.

Here is the complete table of Journey Logbook requirements from Schedule 1 to CAR 605.94:

	COLUMN I	COLUMN II	COLUMN III
Item	Particulars to be entered	Time of entry	Person responsible for entry
1.	Aircraft nationality and registration marks Aircraft manufacturer, type, model and serial number	On starting to keep a journey log and on bringing a new volume of an existing log into use	The owner of the aircraft
2.	Except where an approved fleet empty weight and balance control program is in place, aircraft empty weight and empty centre of gravity and any change in the aircraft empty weight and empty centre of gravity	On starting to keep a journey log and on bringing a new volume of an existing log into use and, when a change is made, as soon as practicable after the change but, at the latest, before the next flight	The owner of the aircraft and, for any change, the person who made the change
3.	Where an additional flight authority has been issued in respect of an aircraft under section 507.08, any change in the flight authority in effect	On changing the flight authority in effect	The person who made the change
4.	Air time of each flight or series of flights and cumulative total air time and, where applicable, number of operating cycles or landings since date of manufacture	Daily, on completing each flight or series of flights	The pilot-in-command of the aircraft or a person designated by an air operator, a private operator or a flight training unit
5.	Except where an equivalent technical dispatch procedure is in place in accordance with section 706.06, (a) a description of the applicable maintenance schedule; and	On bringing the maintenance schedule into use and on completing each scheduled maintenance action referred to in column I of this item	The owner of the aircraft

	(b) the date, air time, operating cycle or landing at which the next scheduled maintenance action is required		
6.	Particulars of any abnormal occurrence to which the aircraft has been subjected	As soon as practicable after the abnormal occurrence but, at the latest, before the next flight	The pilot-in-command of the aircraft or, where the abnormal occurrence took place during maintenance, the operator of the aircraft at the time of the occurrence
7.	Particulars relating to a conditional maintenance release signed in accordance with section 571.10	As soon as practicable after the aircraft has received a conditional maintenance release for a test flight but, at the latest, prior to that test flight	The person who signed the conditional maintenance release
8.	Particulars relating to the results of a test flight entered pursuant to subsection 605.85(3)	On completing the test flight but, at the latest, before the next flight	The pilot-in-command of the aircraft who conducted the test flight
9.	Particulars of any defect in any part of the aircraft or its equipment that becomes apparent during flight operations	As soon as practicable after the defect is discovered but, at the latest, before the next flight	The pilot-in-command of the aircraft
10.	Except where an equivalent technical dispatch procedure is in place in accordance with section 706.06, the particulars of any defect in any part of the aircraft or its equipment that is not rectified before the next flight	Before the next flight	The person who discovered the defect
11.	Particulars of any maintenance action or elementary work performed in respect of items 2, 6, 9, and 10	As soon as practicable after the maintenance action or elementary work is performed but, at the latest, before the next flight	The person who performed the maintenance action or elementary work and, where applicable, the person signing the

			maintenance release
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Technical Record

This used to be called the “Technical Logbook”, but the name was changed with the introduction of the CARs in 1996. The main reason for that was that many commercial operators wanted the flexibility to keep records electronically.

Many private owners still use the traditional “government-issue green binder” which is still acceptable, but your technical records can be in any form, as long as they are complete and include the history of the work done, hours flown and the parts installed and removed. These days, many owners are at least tracking maintenance requirements in some electronic form. Parts records often end up in a separate binder or file folder, along with the required airframe, engine and prop records.

The complete rules on the technical records can be found in [CARs 605.92 to 602.97](#)

Certificate of Registration

When you purchase a used certified aircraft, the previous owner sends in the attached card to cancel of the old C of R and the new owner then applies to register the aircraft. This is an easy procedure – just fill in the application on the back of the C of R and send it to TC along with a cheque for \$110. TC has additional information on the registration process in a pamphlet entitled [“How do I “Re-Register” an Aircraft in My Name?”](#)

The temporary C of R that comes with the documentation is valid for 90 days, allowing you to keep flying the aircraft within Canada for that period. You should note that US Customs regulations prohibit aircraft from other countries flying on temporary registration documents from entering the US. US Customs have been checking for this at the border, so if you have to ferry your new plane home, count on flying through Canadian airspace only.



Nationality and Registration Markings

Both new and used certified aircraft are normally already marked with their nationality and registration markings. If you are importing an aircraft, you will have to apply for marks when you register it. If the aircraft you purchased has been stripped of paint as part of a rebuild, then you will need to know more about markings to reapply the registration to the aircraft.

If you have to apply for marks then, for an additional \$140, you can have your choice of marks from those that are available. To check the availability of marks use the [Canadian Civil Aircraft Register](#) search function and look for your ideal registration call letters. If they are free then you can reserve them.

The actual aircraft specifications for nationality and registration markings are contained in [CAR 202](#) and [CAR Standard 222](#). The standards are very complex and bear reading carefully through before you paint the markings on, or order them from the sign-shop in vinyl. Just some of the highlights of the registration rules include:

- Marks are now optional under the wings or under the cabin on rotorcraft.
- Certified aircraft are required to have markings on the fuselage or tail that are 11.8” high if possible, unless marks are carried under the wings, then the markings on the tail or fuselage need only be 5.9” high.
- If you do put marks under the wings then they have to be at least 19.68” high.
- Lettering has to be of equal height, Roman style capital letters, a contrasting colour and without ornamentation (no serifs).

- Letters can be angled back or forward up to 35⁰
- Letters cannot be arranged vertically down a tail or other surface (they have to run parallel to the longitudinal axis)
- ...And many, many more rules!

The rules for markings are very complex, so read them carefully before you apply your markings!

Certificate of Airworthiness

New and used certified aircraft will come with an existing C of A. The C of A does not specify an owner, so it is valid even after the aircraft changes hands – just keep it in the aircraft, it remains valid!

If you are importing a certified aircraft there is a requirement for an import inspection. Complete information on this process is available in [*The COPA Guide to Buying an Aircraft*](#).

Weight And Balance

New and used certified aircraft will come with an existing weight and balance report, done when the aircraft was manufactured. If the aircraft has had changes to the equipment installed then it will have amendments to the original weight and balance report.

A copy of the original weight and balance along with amendments must be carried in the aircraft.

If aircraft owners want to learn more about weight and balance procedures, there is a great reference book that walks you through the whole process in great detail, with lots of diagrams and examples. The FAA publication *AC 43.13-1B Acceptable Methods, Techniques and Practices, Aircraft Inspection and Repair* has an entire chapter on the weight and balance (Chapter 10), is the standard reference on the subject and is accepted by TC in Canada. The good news is that you can download the entire book for free as Adobe Acrobat files from the [FAA website](#).

Flight Manual or Pilots Operating Handbook (POH)

This subject is simple! Every certified aircraft is required to have a *Flight Manual* or *Pilots Operating Handbook* (POH) and be operated in accordance with it. As you might have guessed, it is a part of the certification process.

If you buy a certified aircraft and it doesn't come with a *Flight Manual* or *Pilots Operating Handbook* then you will need to get one to be legal to fly. Obviously the original aircraft manufacturer is the best source for one of these. Other possible sources include:

- Parts suppliers for the aircraft type if the original manufacturer is out of business.
- General parts suppliers such as [Aircraft Spruce and Specialty](#)
- [Aircraft type clubs](#)
- Other owners of the same type of aircraft.

You can note that you don't have to carry an original of the *Flight Manual* or *Pilots Operating Handbook* – it can be a copy, but it does have to be on board.

Airworthiness Directives (ADs)

Airworthiness Directives are mandatory compliance documents for certified aircraft. These are issued by the certification authority for the aircraft in question. Because the majority of certified aircraft in Canada are from the USA, the FAA is the responsible authority for most ADs on aircraft in Canada.

It helps to understand where ADs come from. The certification authority that certified the aircraft issues ADs, not the manufacturer. Often the manufacturer will issue a *Service Bulletin* to owners in response to an identified problem, but these are not mandatory to comply with. The certification authority may then take the Service Bulletin and issue it as an AD, but not always. In some cases the manufacturer will oppose the issue of an AD, but the certification authority will issue it anyway. Even if the manufacturer is out of business and no longer exists the certification authority may issue an AD on the aircraft if they deem it necessary.

Almost all certified aircraft have been the subject of some ADs during their lifetime, but some aircraft certainly have more ADs than other designs. They can be an annoyance if the owner thinks that they are unwarranted, but they are a mandatory part of owning a certified aircraft – they are a key part of the continuing airworthiness aspect of the certification process.

ADs come in two varieties – recurring and non-recurring. Recurring ones will require some action, such as an inspection or part replacement, at set intervals. These may be by calendar time (for instance “annually”) or by airframe time (for instance “every 100 hrs”) or sometimes both (“whichever comes first”).

Many ADs will specify a time by which the procedure must be done (“within the next 25 hrs of air time”), while others may say “before next flight”, if the matter is deemed potentially more serious.

Non-recurring ADs are “once-only” actions that have to be carried out.

It is required to record the action taken on ADs in the Technical Record. Even if a particular AD is applicable to your aircraft type, but not applicable to your particular serial number it is a good practice to record that in the Technical Record. It may make future questions about the AD easier to answer, particularly if you sell the aircraft.

As described in [CAR 605.84](#) the owner of the aircraft is responsible for ensuring that the ADs are all complied with before the aircraft is flown, not the AME who works on the aircraft. In most cases it is an AME who carries out the AD and signs it off in the Tech Record, but the owner must ensure that the applicable ADs are done.

In the past, getting lists of ADs that apply to your aircraft was a difficult task, but today, thanks to the Internet, it is a relatively easy job. TC has an interactive [database of ADs located on the TC CAWIS website](#). All an aircraft owner need do is enter the aircraft's registration and the list of possible ADs will be produced. The one limitation with this TC AD search system is that it will return all ADs that are applicable for that aircraft type – it does not differentiate between those that are applicable to your aircraft's serial number and those which are not. You still have to read each one for applicability to your individual aircraft, but as long as you know your aircraft's serial number that is a simple task.

The TC CAWIS system will only search for ADs that are applicable to your airframe, engine and propeller – it does not search for ADs that may be applicable to anything else, such as carburetors, seat belts or any after-market STC installed equipment, such as auto-pilots, doors or fairings. Those items are contained in a separate Miscellaneous Equipment AD List. Because TC has no way of knowing which accessories are installed on your aircraft you have to check this list to see which ones are applicable. There are over 500 ADs on that list! Many are items like escape slides for Boeing 777s, but some are definitely equipment that could be found on small aircraft.

A good example is [AD 96-12-22](#). This is a repetitive AD on Cessna Engine Oil Filter Adapters Assemblies. These are commonly installed on any brand of aircraft (not just Cessnas) equipped with a Teledyne Continental Motors aircraft engine, including O-200, O-470, IO-470, TSIO-470, O-520, IO-520, TSIO-520, GTSIO-520, IO-550, TSIO-550 powerplants. It requires an inspection with the first 100 hrs time-in-service and then every time the engine oil filter is removed. You won't find this AD without checking the accessory list.

There is no easy solution to this list – owners just need to check the Miscellaneous Equipment AD List to make sure no ADs are missed. The Miscellaneous Equipment AD List on the TC CAWIS system can only be found by clicking on “Advanced Search” and then “List Miscellaneous Equipment ADs” - “All ADs”.

In some cases non-AMEs, such as the owner, can carry out a required AD. The rules in [CAR 625 Appendix A](#) governing “Elementary Work” say that non-AMEs can carry out:

(29) Repetitive visual inspections or operational checks (including inspections and tests required by airworthiness directives) not involving disassembly or the use of visual aids, performed out of phase with the aircraft's scheduled check cycle at intervals of less than 100 hours air time, provided the tasks are also included in the most frequent scheduled maintenance check.

Insurance

Aircraft liability insurance is mandatory for all aircraft flying in Canada!

Not only is liability insurance required to comply with the law; it is also very smart to have. Liability insurance protects you in the event that you damage someone else's property or injure someone. This could include colliding with a parked aircraft, damaging a hangar or hitting a person.

The minimum liability insurance required is:

- \$100,000, where the maximum permissible take-off weight of the aircraft is 1043 kg (2,300 pounds) or less
- \$500,000, where the maximum permissible take-off weight of the aircraft is greater than 1043 kg (2,300 pounds) but not greater than 2268 kg (5,000 pounds)
- \$1,000,000, where the maximum permissible take-off weight of the aircraft is greater than 2268 kg (5,000 pounds) but not greater than 5670 kg (12,500 pounds)
- Aircraft over 2268 kg (5,000 pounds) also require \$300,000 liability insurance per passenger seat.

Hull coverage is not mandatory in Canada. Complete rules for insurance can be found in [CAR 606.02](#), although be warned - this CAR is very difficult to read and understand.

The good news is that insurance is generally available for certified aircraft, with some restrictions. With COPA's VIP Aviation Insurance Program, administered by The Magnes Group Inc, the minimum coverage required is available at very low rates. For example, the minimum \$100,000 liability insurance for aircraft 2300 lbs and below costs as low as \$115 per year. It is well worth the cost to cover yourself against potential suits as well as to remain within the law¹.

¹ COPA is not an Insurance Advisor and are only stating a fact. We are not recommending that you purchase the minimum liability limit available as it may be inadequate. Please consult Magnes or your own Insurance Broker for proper advice on what liability limit you should carry.

The COPA VIP Bronze Plan insurance provides Public Liability and Property Damage Coverage (Third Party Liability), Passenger Liability Insurance and Non Owned In-Motion Hull coverage for pilots who borrow or rent aircraft. Any COPA member who is qualified to fly the aircraft can purchase coverage under this group plan. Coverage can be purchased immediately online at [VIP Bronze](#). For more information, have a look at the [COPA VIP Aviation Insurance](#) or call 1-855-VIP-COPA.

The COPA VIP Silver Plan provides Public Liability and Property Damage Coverage (Third Party Liability), Passenger Liability Insurance and Not-In-Motion Hull coverage for certified aircraft. Any COPA member who owns an aircraft can purchase coverage under this group plan. Any COPA member who owns an aircraft can purchase coverage under this group plan. Up to 4 pilots may be added to your VIP Silver Policy at no additional charge as long as they are COPA Members. Coverage can be purchased immediately online at [VIP Silver](#). For more information, have a look at the [COPA VIP Aviation Insurance](#) or call 1-855-VIP-COPA.

For owners who want to apply for complete coverage, including in-motion hull coverage, COPA has the VIP Gold Plan. Coverage is not automatic, as the underwriter will assess such items as pilot experience, time on type, age, accident record, currency, aircraft performance and several more factors in determining whether they can provide coverage and at what price. Consult the [COPA VIP Gold Insurance Plan](#) form for a *Request for Quote* or call 1-855-VIP-COPA.

Helicopters are currently working with some severe insurance restrictions in Canada. Very few underwriters are willing to provide any insurance for student helicopter pilots to fly solo, except under the auspices of a certified helicopter school. Insurance is available for helicopter schools to teach helicopter students, but you will have challenges earning your licence on your own helicopter. This will greatly increase the cost of obtaining the *Private Pilot Licence – Helicopter* required to fly your own helicopter. Make sure that you investigate the costs before you commit to buying a helicopter.

Taxes (At Registration And Importation)

Taxes are a reality in Canada and are mostly unavoidable. The best you can usually do is to avoid having to pay the same tax twice.

If you import an aircraft or aircraft parts you will have to pay PST (if applicable in your province of residence) and GST or HST (if you live in NB, NS or NL) at the border. It is important to keep receipts for those taxes paid! There are no duties or other tariffs to pay, just tax.

If you buy your aircraft or aircraft parts in Canada you will pay the GST/HST and PST (where applicable) on the aircraft components as you buy them.

When you register the aircraft with Transport Canada most provinces (except Alberta and Quebec) will send you a letter demanding the PST on the aircraft. If you have already paid the PST on the aircraft or individual parts as you imported them, or purchased them in Canada, then you will be able to show that the PST was already paid on the aircraft. If you can't show receipts to prove that, then you will have to pay PST all over again on the aircraft – so keep those receipts! If you haven't paid the PST on the parts then you will have to pay it when you get the province's letter.

Taxes are unavoidable, so plan to have the money available when you are presented with the bill.

IFR for Certified Aircraft

Certified aircraft can be flown IFR if they are equipped for IFR flight. The requirement is simple – they have to be equipped as described in [CAR 605.18](#). This CAR specifies the equipment required for any aircraft to be operated IFR. It says:

Power-driven Aircraft - IFR

605.18 No person shall conduct a take-off in a power-driven aircraft for the purpose of IFR flight unless it is equipped with

- a) when it is operated by day, the equipment required pursuant to [paragraphs 605.16\(1\)\(a\)](#) to (h);
- (b) when it is operated by night, the equipment required pursuant to [paragraphs 605.16\(1\)\(a\)](#) to (k);
- (c) an attitude indicator;
- (d) a vertical speed indicator;
- (e) an outside air temperature gauge;
- (f) a means of preventing malfunction caused by icing for each airspeed indicating system;
- (g) a power failure warning device or vacuum indicator that shows the power available to gyroscopic instruments from each power source;
- (h) an alternative source of static pressure for the altimeter, airspeed indicator and vertical speed indicator;
- (i) sufficient radiocommunication equipment to permit the pilot to conduct two-way communications on the appropriate frequency; and

(j) sufficient radio navigation equipment to permit the pilot, in the event of the failure at any stage of the flight of any item of that equipment, including any associated flight instrument display,

(i) to proceed to the destination aerodrome or proceed to another aerodrome that is suitable for landing, and

(ii) where the aircraft is operated in IMC, to complete an instrument approach and, if necessary, conduct a missed approach procedure.

Aerobatics for Certified Aircraft

Certified aircraft can perform aerobatic maneuvers if they are certified for the maneuvers you want to fly. Almost all certified aircraft are certified for some maneuvers in the normal category and others in the utility category. Usually the two categories are delineated by weights and C of G locations, or restrictions such as “no rear seat passengers”.

If you want to do certain maneuvers then ensure that you check the *Pilot Operating Handbook* before you buy to ensure that the aircraft can do those maneuvers – it is that easy!

Maintaining Your Certified Aircraft

Maintaining a certified aircraft seems to be the area that causes most owners to panic, but it need not be that difficult. Most pilots don’t know a lot about aircraft construction and maintenance, but it is not hard to learn. There are excellent texts and also AMEs who know everything you need to know.

The more you learn about how your aircraft is built, how it works and what it needs to keep it flying well the more comfortable you will be with the plane and the more money you will save on maintenance!

One of the key concepts in the CARs for all aircraft is that the owner is responsible for the maintenance of the aircraft. This is carefully spelled out in [CARs 605.84 to 605.86](#) for all aircraft other than ultralights and hang gliders.

the owner’s responsibilities are laid out in these regulations and are pretty straight forward. The owner is not permitted to let anyone fly the aircraft unless:

- The aircraft is maintained in accordance with any airworthiness limitations applicable to the aircraft type design

- The aircraft meets the requirements of any airworthiness directives issued
- When the aircraft has undergone maintenance, that the work has been certified by the signing of a maintenance release as required in [CAR 571.10](#)
- The aircraft is maintained in accordance with a maintenance schedule that conforms to the [Aircraft Equipment and Maintenance Standards](#).

That doesn't mean the owner can do the maintenance work themselves or even that they are permitted to sign for it – just that if the aircraft is flown when its annual, ADs or other required maintenance are expired then it is the owner's responsibility, not the AME's. AMEs and maintenance shops (AMOs) are responsible for the work that they are asked to perform by the aircraft owner. They are not responsible for scheduling the aircraft for maintenance. The responsibility for signing maintenance releases is spelled out in [CAR 571.10](#).

This means that AMEs and AMOs have to sign for the work that they have completed and certify that it meets the applicable standards of airworthiness spelled out in the CARs Part V. If they complete work that the owner requested and it is not done in accordance with the airworthiness standards then they are responsible for that work and liable for the consequences.

When an AME signs for maintenance that they have done or supervised they must use the statement specified in [CAR 571.10](#): “The described maintenance has been performed in accordance with the applicable airworthiness requirements” or a similarly worded statement – look for it in your logbooks.

Working with an AME

Some AMEs have poor opinions of pilots and refuse to work with aircraft owners - these are the ones to avoid. These days most AMEs are aware that aircraft owners want to know more about their aircraft and also want to use that knowledge to save themselves some money on aircraft maintenance.

The CARs are pretty clear that only an AME can sign for most of the work that is done on a certified aircraft, but that doesn't mean that they have to physically do all the work themselves. At most Approved Maintenance Organizations (AMOs) a lot of the work is usually accomplished by apprentices, under supervision of an AME. Most AMEs will also allow the aircraft owner to “work under supervision” and then they will inspect and sign for the work done. This is common and legal to do.

The key to a happy certified ownership experience often hinges on finding an AME with whom you can comfortably work. Often these will be “freelance” AMEs who are not part of an AMO, although many AMOs are great to work with as well.

How do owners find a local AME who will be easy to work with? Usually they are found by talking to other aircraft owners in your area. [COPA Flights](#) are often the best place to connect with other owners and even AMEs, too. Many AMEs are also pilots and can be found through your local COPA Flight or Flying Club.

Elementary Work

Not all work on a certified aircraft requires an AME's signature. There are actually some maintenance items that TC will let owners carry out and then sign for. These are referred to as "Elementary Work" tasks and are detailed in [CAR 625 Appendix A](#).

That CAR says, "The following list is exhaustive; if a task is not listed, it is not elementary work". That pretty much covers it – anything not on the list, other than normal servicing items (refueling, washing windows, etc) requires an AME's signature.

CAR 625 Appendix A allows anyone who is not an AME to do the following work:

Elementary Work Task Listings

- 1) fabric patches measuring not more than 15 cm (6 in) in any direction and not requiring rib stitching or the removal of control surfaces or structural parts, on small privately operated aircraft;
- (2) removal and replacement of tires, wheels, landing skids or skid shoes, not requiring separation of any hydraulic lines, on small privately operated aircraft;
- (3) removal and replacement of skis on fixed landing gear, not requiring separation of any hydraulic lines, on small privately operated aircraft;
- (4) repair of non-structural fairings, cover plates and cowlings, on small privately operated aircraft;
- (5) cleaning and replacement of spark plugs, on small privately operated aircraft;
- (6) checking of cylinder compression, on small privately operated aircraft;
- (7) cleaning or changing of fuel, oil, and air filters, on small privately operated aircraft;
- (8) draining and replenishing engine oil, on small privately operated aircraft;
- (9) checking the electrolyte level and specific gravity of lead acid batteries, on small privately operated aircraft;

- (10) adjustment of generator or alternator drive belt tension, on small privately operated aircraft;
- (11) cleaning of balloon burner nozzles;
- (12) removal and replacement of balloon baskets, burners and gas tanks that are designed for rapid change in service;
- (13) removal and replacement of glider wings and tail surfaces that are designed for quick assembly;
- (14) repair of upholstery, trim and cabin furnishings;
- (15) removal and replacement of role equipment designed for rapid removal and replacement;
- (16) removal and replacement of passenger seat belts and harnesses;
- (17) removal and replacement of fuses, light bulbs and reflectors;
- (18) removal and replacement of avionics components that are rack mounted or otherwise designed for rapid removal and replacement, where the work does not require testing other than an operational check;
- (19) removal and replacement of aircraft batteries;
- (20) removal and replacement of co-pilot control levers, wheels, pedals and pedal guard plates that are designed for rapid removal and replacement, on other than transport category aircraft;
- (21) opening and closing of non-structural access panels;
- (22) removal and replacement of cabin doors on unpressurized aircraft, where the door is designed for rapid removal and replacement;
- (23) removal, replacement and repositioning of non structural partitions in the passenger cabin;
- (24) inspection and continuity checking of self-sealing chip detectors;
- (25) removal and replacement of induction system anti-icing baffles, scoops and deflectors that are designed for rapid removal and replacement;
- (26) removal, cleaning, replacement and adjustment of external components of chemical dispersal systems that are designed for rapid removal and replacement;

(27) deactivating or securing inoperative systems in accordance with sections [605.09](#) or [605.10](#) of the CARs, including the installation of devices specifically intended for system deactivation, where the work does not involve disassembly, the installation of parts, or testing other than operational checks;

(28) checking and adjusting air pressure in helicopter floats, and aircraft tires having an operating pressure below 100 psi, except on aircraft operated under [CAR 704](#) and [CAR 705](#).

(29) repetitive visual inspections or operational checks (including inspections and tests required by airworthiness directives) not involving disassembly or the use of visual aids, performed out of phase with the aircraft's scheduled check cycle at intervals of less than 100 hours air time, provided the tasks are also included in the most frequent scheduled maintenance check.

Information Notes:

(i) An operational check referred to in (27) above constitutes a check to determine if the unit is working. Operational checks do not involve measuring the unit's performance against a predetermined standard. Where the testing procedures require such measurement, replacement of the unit shall not constitute Elementary Work. (amended 2004/03/01; previous version)

(ii) Tasks referred to in (29) above are elementary work when performed out of phase, but require a maintenance release when done as part of a scheduled maintenance check.

Elementary work still has to be recorded, as the CAR notes, "The performance of all tasks designated as elementary work shall be entered in the technical record for the aeronautical product, as required by section [571.03](#) of the CARs and in accordance with Subpart 605, [Division IV](#) – Technical Records."

Maintenance Schedules

A maintenance schedule is the way you keep track of the work that needs to be done next on your aircraft. In fact, unless you own a basic ultralight, advanced ultralight, paraglider or a hang glider then the law requires you to have a maintenance schedule. Most ultralight and hang glider owners have maintenance schedules, too, because it makes sense to take good care of your aircraft, no matter what type it is.

When the CARs were introduced on October 10th, 1996 they included a new requirement for all aircraft, except hang gliders and ultralights, to have a maintenance schedule. [CAR 605.86](#) spells it out clearly – a maintenance schedule is required for all certified and amateur-built aircraft, including airplanes, balloons, helicopters, gliders, airships and gyrocopters.

The CAR Standard 625 that goes with that rule tells you how to accomplish that. That standard even contains a Transport Canada pre-approved maintenance schedule that private aircraft owners can use.

It is all contained in CAR 625: “Owners of non-commercially operated small aircraft and balloons who choose to comply with Parts I or II of Appendix B as applicable, and Appendix C, need not submit any documents to the Minister for formal approval. The schedule is considered to be approved for their use by the Minister. Owners need only to make an entry in the aircraft technical records that the aircraft is maintained pursuant to the maintenance schedule.”

Well, reading that, it looks like all you have to do is make a logbook entry specifying that you will use CAR 625 Appendix B & C and you can forget about maintenance schedules for as long as you own the airplane, right?

Some AMEs have recently pointed out that while making that logbook entry makes the airplane completely legal, it doesn't go very far in helping you or your AME maintain your airplane properly. Just making that required logbook entry wouldn't tell your AME when that fire extinguisher in the plane needs replacing or whether there are any outstanding ADs applicable. What you and your AME need to see is a real schedule that shows when everything that has a time limit on it is due for inspection or maintenance.

[CAR 625 Appendix B](#) & [Appendix C](#) are a great place to start in making up a usable schedule, as they list all the items that need to be covered in the annual inspection (Appendix B) and those items which are “out of phase” with the annual inspection (Appendix C).

A great aid in making up a real maintenance schedule is a spreadsheet program, such as “Excel” or “Lotus” that allows you to create a table of numbers. Database programs, such as “Access” work well, too. Of course you can easily do it on paper just as well. Many small commercial operators use a wallboard in the hangar work area.

There are lots of ways to draw up a maintenance schedule. The approach many owners take is to have columns for the item to be completed, the date or airframe hours last done, the “periodicity” or time between inspection or replacement and the date or hours next due. Some items will specify a date when they are due and others will be an airframe or engine time. Some specify both a calendar date and airframe hours, so your system will need some flexibility. Many owners convert engine or component times to airframe times so all the numbers are easier to compare to your current airframe time, without having to remember when that component was installed.

One of the items that should definitely be on your maintenance schedule is the date of your annual inspection. This is specified in CAR 625 as being not more than 12 months following the date of the last annual inspection. That means if the last one was May 1st, 2006 your next one will have to be signed off no later than May 1st 2007 if you

want to fly on May 2nd. There probably isn't any need to specify things that are part of the annual on the schedule as they should be in the annual inspection checklist that the aircraft manufacturer provides.

Small privately-owned aircraft are only required to have annual inspections, plus any inspections called up in ADs. Any manufacturer-specified 50 or 100 hour inspections are not mandatory as far as TC is concerned, although completing them may be a good idea.

Oil changes at 25 or 50 hour intervals, as applicable, are good to include, as are any recurring ADs that have either calendar times or airframe hours, or both, when they have to be completed. A good example is the well-known Canadian AD [CF 90-03R2](#) that requires an inspection of the aircraft heat exchanger on all Canadian aircraft that have heaters that use a heat exchanger to operate. This AD requires an inspection every 150 hrs or annually, whichever comes first. You will need to use a system to track both the calendar and airframe hour limits on those types of inspections. One way to do that is to use two lines on your table.

Any recurring manufacturer Service Bulletins that you are concerned about should be entered as well, just like recurring ADs.

Another area to think about is STCs. Do any of the STCed modifications on your aircraft have special inspections or maintenance action required? These STC "Instructions for Continued Airworthiness" (ICAs) are important to keep your plane airworthy and will soon be required to be entered in your *Technical Record*, through an upcoming CAR amendment.

The rest of the items will come from a quick read through CAR 625 Appendix C – the "out of phase items" list. Do you have a fixed pitch propeller? They need to be removed and inspected every five years. Variable pitch props are generally required to be sent for overhaul every ten years.

Once you have thought about the annual inspection date, recurring ADs and Service Bulletins, STC ICAs and CAR 625 Appendix C "out of phase items" you will probably have a complete maintenance schedule. Of course you can add any other personal items that you would like to note there, too, to make it complete. Some people keep track of things like "time since engine overhaul", not because private owners are required to overhaul at the recommended number of hours, but just to see how close the engine is getting to that figure. It is a useful information note.

The sample maintenance schedule produced here will give you a good idea how these can be customized to the individual owner's tastes. As you can see all you have to do is compare the current airframe hours at the top and today's date with the column below it to see if anything is now due. The last column gives the hours left until the inspection or work is due.

C-FABC's Maintenance Schedule - Cessna 182

Current Flying hours As of 8-Mar-02 3136.0

Item	Last done at	Periodicy	Due at	Hours until inspection
50 hour insp/oil change	3135.2	50.0	3185.2	49.2
500 hour inspection	2990.7	500.0	3490.7	354.7
Annual Inspection	4-Mar-02	365 days	4-Mar-03	
Engines Hours SMOH	2185.8	1500	3685.8	549.8
Prop inspection - date	18-Feb-97	10 years	18-Feb-07	
Prop inspection - hrs	2153.1	1500	3653.1	517.1
Tachometer calibration	4-Mar-02	365 days	4-Mar-03	
ELT certification	26-Feb-02	365 days	26-Feb-03	
ELT battery	26-Feb-01	2 yrs	31-Jan-03	
Altimeter - IFR use	28-Feb-01	2 yrs	28-Feb-03	
Transponder	26-Feb-01	2 yrs	26-Feb-03	
Rails CF 87-15R2 - date	4-Mar-02	365 days	4-Mar-03	
Rails CF 87-15R2 - hrs	3135.2	100.0	3235.2	99.2
Muffler CF-90-03R2 date	04-Mar-02	365 days	04-Mar-03	
Muffler CF-90-03R2 hrs	3135.2	150.0	3285.2	149.2
Vacuum pump SEB02-3	3135.2	500.0	3635.2	499.2
Vacuum coupling SEB02-3	04-Mar-02	6 yrs	04-Mar-08	
Fire Extinguisher	2001	12 yrs	31-Dec-13	

[CAR 625 Appendix B](#) contains a complete checklist of things to consider for your annual inspection, so let's take a quick run though of what it says:

Appendix B - Maintenance Schedules

General Procedures

(1) The Maintenance Schedule includes:

- (i) Part I - Scheduled Inspections for Aircraft other than Balloons;
- (ii) Part II - Scheduled Inspections for Balloons.

It must be supplemented by the applicable requirements of [Appendix C](#), for out of phase tasks and equipment maintenance requirements.

(2) Each person performing inspections required by the maintenance schedule shall record the inspections in the aircraft technical record, using a check list that includes all items in Parts I or II that are applicable to the aircraft concerned. Additionally, all tasks required by [Appendix C](#) shall be recorded in the aircraft technical record.

Information Note:

Aircraft manufacturers' check lists can be used, provided that they include all the applicable items listed herein.

(3) The tasks listed in the maintenance schedule are described in general terms only, as the specific items applicable to particular aircraft will vary according to aircraft type.

(4) The method of inspection for each item on the maintenance schedule shall be in accordance with the manufacturer's recommendations or standard industry practice.

Information Note:

The following is provided as a quick reference chart. The specific details are contained in : [Section 625.86](#); the relevant paragraphs of this Appendix B; [Appendix C](#); and [Appendix D](#) of these standards.

Maintenance Schedules - Quick Reference Chart

(5) The depth of inspection of each item on the schedule shall be determined by the person performing the inspection, and shall be consistent with the general condition and operating role of the aircraft.

(6) Pursuant to [CAR 605.86\(2\)](#), the schedule is considered to be approved for use by owners of small non-commercial operation aircraft and all balloons. Owners need only to make an entry in the aircraft technical records that the aircraft is maintained pursuant to the maintenance schedule.

(7) Pursuant to [CAR 605.86\(2\)](#), the maintenance schedule can be used as the basis for a commercial air operator's maintenance schedule. With the exception of a balloon inspection schedule, commercial air operator's maintenance schedules based on this document are subject to approval by the Minister in accordance with [Appendix D](#). Schedules for aircraft operated in commercial air service (including balloons pursuant to CAR) shall include an inspection of the items listed in Part I or II of this appendix, as applicable, and the accomplishment of out of phase tasks and equipment maintenance requirements specified in [Appendix C](#).

(8) Pursuant to [CAR 605.86\(2\)](#), where the aircraft utilization is sufficient to ensure that all items listed in Parts I or II of this appendix are performed within a 12 month period, an owner can request that inspections under this maintenance schedule be performed progressively. In this case, a revised maintenance schedule shall be submitted for the Minister's approval in accordance with the procedures outlined in [subsection 625.86\(2\)](#) of these standards.

(9) Pursuant to [CAR 605.86\(2\)](#), where a flight training unit operating aeroplanes and helicopters pursuant to [CAR 406](#) chooses to use Part I of this appendix as a basis for inspections to be carried out at 100 hour intervals, it must be approved in accordance with the procedures outlined in [Appendix D](#) of these standards.

(10) This maintenance schedule is not an inspection checklist. Prior to performing the inspections tabled herein, an appropriate checklist containing these requirements must be developed.

Information Notes:

(i) Many aircraft manufacturers produce detailed inspection checklists. In many cases the location of system components is clearly identified on those documents. In the interest of efficiency an owner may wish to use a manufacturer's checklist in order to accomplish this inspection. Manufacturer's checklists may be used, provided they include at least the items listed in Part I or Part II of this appendix, as applicable. Where an owner has chosen to use a manufacturer's checklist, it should be clearly marked to indicate that the check is following the general maintenance schedule. In addition, any references in those checklists concerning compliance with Airworthiness Directives must be stricken out as not applicable, as it is the owner's responsibility to advise the AME of any outstanding Airworthiness Directives or airworthiness limitations.

(ii) Large aircraft comply with a detailed maintenance schedule as per [Appendices C and D](#) of these standards.

Part I - Scheduled Inspections for Small Aircraft other than Balloons

At intervals prescribed in the General Procedures to this appendix, inspect the aircraft as follows:

(1) Aircraft Generally

(a) Remove or open all necessary inspection plates, access doors, fairings and cowlings. Thoroughly clean the aircraft and engine.

(b) Inspect panel, door and cowling closing and locking mechanisms for improper installation and function.

(c) Lubricate in accordance with the manufacturer's recommendations.

(2) Fuselage and Hull Group

(a) Structure - inspect for deterioration, distortion, evidence of failure and defective or insecure attachment of fittings.

(b) Systems and components - inspect for improper installation, apparent defects and unsatisfactory operation.

(3) Cabin and Cockpit Group

(a) Generally - inspect for dirt and loose equipment that might foul the controls;

(b) Seats and safety belts - inspect for poor condition, fraying, and any other apparent defects;

(c) Windows and windshields - inspect for deterioration and breakage;

(d) Instruments - inspect for poor condition, mounting, marking and, where practicable, for improper operation;

(e) Flight and engine controls - inspect for improper installation and improper operation;

(f) Batteries - inspect for improper installation and improper charge;

(g) All systems - inspect for improper installation, poor general condition, apparent and obvious defects and insecurity of attachment.

(h) Placards - inspect for missing and illegible mandatory placards.
(amended 2002/06/01; no previous version)

(4) Engine and Nacelle Group

(a) Leaks - inspect for oil, fuel or hydraulic leaks;

(b) Studs and nuts - inspect for defects, evidence of improper torque and safety locking;

(c) Cylinder compression - check; if compression test indicates problems, check internal condition and tolerances;

(d) Screens and sump drain plugs - check for metal particles or foreign matter;

(e) Engine mounts - inspect for cracks, looseness of mounting and looseness of engine to mount;

(f) Flexible vibration dampeners - inspect for poor condition and deterioration;

(g) Engine controls - inspect for defects, improper travel and improper safety locking;

(h) Lines, hoses and clamps - inspect for leaks, improper condition and looseness;

(i) Exhaust stacks - inspect for cracks, defects and improper attachment;

(j) Accessories - inspect for apparent defects in security of mounting;

(k) All systems - inspect for improper installation, poor general condition, defects and insecure attachment;

(l) Cowlings - inspect for cracks and other defects.

(m) Internal corrosion - inspect engines which have not been inhibited and have been out of service in excess of 12 months.

(n) Engine performance - during the ground run, run the engine in accordance with the manufacturer's recommendation to determine satisfactory performance of the following:

(i) idle and maximum RPM;

(ii) magneto RPM drop;

(iii) fuel and oil pressures;

(iv) cylinder and oil temperatures.

(o) Engines maintained to an On-condition program - check reference RPM.

(5) Landing Gear Group

(a) All units - inspect for condition and security of attachment;

(b) Shock absorbing devices - check oleo fluid level;

(c) Linkage, trusses and members - inspect for undue or excessive wear, fatigue and distortion;

(d) Retracting and locking mechanism - inspect for improper operation;

- (e) Hydraulic lines - inspect for leakage;
- (f) Electrical system - inspect for chafing and improper operation of switches;
- (g) Wheels - inspect for cracks, defects and condition of bearings;
- (h) Tires - inspect for wear, cuts and incorrect inflation; inspect for improper installation and improper operation.
- (i) Brakes - inspect for improper adjustment;
- (j) Floats and skis - inspect for insecure attachment and apparent defects;

(6) Wing and Centre Section Assembly

Inspect structure for general condition, deterioration, distortion, evidence of failure and insecurity of attachment.

(7) Empennage Assembly

Inspect structure for general condition, deterioration, distortion, evidence of failure, insecure attachment, improper component installation and improper component operation.

(8) Propeller Group

- (a) Propeller hub assembly - inspect for cracks, nicks, binding and oil leakage;
(amended 2000/12/01; [previous version](#))
- (b) Bolts and nuts - inspect for improper torque and safety locking;
(amended 2000/12/01; [previous version](#))
- (c) Anti-icing devices - inspect for improper operation and defects, paying particular attention to:
(amended 2000/12/01; [previous version](#))
 - (i) deicer boots for cuts, gouges and adherence;
 - (ii) slip ring for excessive wear and gouges; and
 - (iii) connections and harness for tightness.
- (d) Control mechanisms - inspect for improper operation, insecure mounting and improper range of travel;

(e) Blades - inspect for
(amended 2000/12/01; no previous version)

(i) cracks, nicks, external corrosion,
(amended 2000/12/01; no previous version)

(ii) evidence of lightening or object strike, and
(amended 2000/12/01; no previous version)

(iii) correct track, excessive rotational and end play;
(amended 2000/12/01; no previous version)

(f) Spinner assembly - inspect for cracks and wear;
(amended 2000/12/01; no previous version)

(9) Radio Group

(a) Radio and electronic equipment - inspect for improper installation and insecure mounting.

(b) Emergency Locator Transmitters - test performance in accordance with the procedure specified in [Appendix G](#) of Chapter 571 of the *Airworthiness Manual*.

(c) Wiring and conduits - inspect for improper routing, insecure mounting and apparent defects.

(d) Bonding and shielding - inspect for improper installation and poor condition.

(e) Antennas, including trailing antennas - inspect for poor condition, insecure mounting and improper operation.

(10) Miscellaneous Items Not Otherwise Covered by this Listing:

(11) Aircraft Generally, Including Technical Records

(a) Enter details of all deficiencies found during the inspection in the aircraft technical records.

(b) Upon completion of the inspection, replace or close all inspection plates, access doors, spinners, fairings and cowlings.

(amended 2000/12/01; [previous version](#))

Part II - Scheduled Inspections for Balloons

(1) At intervals prescribed in the General Procedures, inspect the:

- (a) envelope;
- (b) basket (gondola) and its attachments;
- (c) load tapes and support lines;
- (d) instruments;
- (e) controls;
- (f) burners;
- (g) fuel tanks, hoses and clamps; and
- (h) radios and other installed equipment.

(2) Where the check list used differs from the manufacturer's recommended check list, the list shall be approved by the Minister.

(3) Where the balloon is a foreign registered balloon operating in accordance with an authorization issued by the Minister pursuant to [CAR 603](#), it shall be inspected and maintained in accordance with a program which complies with the requirements of this appendix.

“Out of Phase” Maintenance Items

As mentioned the Maintenance Schedule information in [CAR 625 Appendix B](#) is supplemented by the information in [CAR 625 Appendix C](#). Appendix C contains all the items that are “out of phase” with the annual inspection. In other words they may need taking care of at other times of the year. The two appendices together make a complete checklist for most things you need to remember in maintaining your aircraft.

As mentioned, Appendix C contains the “out of phase items” and bears a more detailed description here. Here are some of the important highlights that affect small certified aircraft:

- Rotorcraft Dynamic Components - At the intervals recommended by the aircraft manufacturer, inspect, overhaul or test:
 - ✓ the drive shafts or similar systems
 - ✓ the main rotor transmission gearboxes

- ✓ the main rotors and hubs
 - ✓ the tail rotor.
- Variable Pitch Propellers - Where the manufacturer has made recommendations regarding the air time between overhauls, overhaul at the interval recommended or every ten years, whichever comes first;
- ✓ Where the manufacturer has not made any recommendations regarding TBO, the propeller(s) shall be overhauled at the following intervals:
 - ✓ in the case of propellers installed on turbine engines: 2,000 hours air time or ten years, whichever comes first
 - ✓ in the case of double acting propellers installed on piston engines: 2,000 hours air time or ten years, whichever comes first, or
 - ✓ in the case of single acting propellers installed on piston engines: 1,500 hours air time or ten years, whichever comes first.
- Fixed Pitch and Ground Adjustable Propellers - At intervals of not more than 5 years, the propeller shall be removed from the aircraft and inspected for corrosion or other defects over its entire surface, including the hub faces and the mounting hole bores. While the propeller is removed, it shall also be checked for correct dimensions. However, if defects which require repairs beyond those recommended as field repairs by the propeller manufacturer are found, the propeller shall be repaired by an organization approved for the overhaul of propellers.
- ✓ *Information Note:*
The dimensional check requirement does not include a check on blade twist. The dimensional check refers to changes in blade dimension resulting from repairs, particularly cropping of the tips. It is intended to ensure that the blade diameter remains within service limits.
- Engines
- ✓ *Information Note:*
No hard time, including calendar time, between overhauls need be observed in the case of small aircraft reciprocating engines in non-commercial private operation.
- Tachometers - The accuracy of mechanical drag cup type tachometers, for fixed wing propeller driven aircraft, shall be checked on site annually, and be accurate to within the tolerances established by the aircraft manufacturer or, where no tolerance has been specified by the aircraft manufacturer, to within $\pm 4\%$ of

engine RPM at mid-point of the cruise range.

- Non-stabilized Magnetic Direction Indicators (MDIs) - Non-stabilized magnetic direction indicators (wet compasses) shall be calibrated, and a dated correction card installed for each indicator, at intervals not exceeding 12 months;
- Survival and Emergency Equipment - Survival and emergency equipment shall be overhauled at the intervals recommended by the manufacturer.
- Emergency Locator Transmitters (ELTs) - Except where powered by water activated batteries, the ELT shall be checked at intervals not exceeding 12 months, in accordance with [Appendix G](#) of Chapter 571 of the *Airworthiness Manual*.
 - ✓ ELTs powered by water-activated batteries shall be performance-tested at intervals not exceeding 5 years.
 - ✓ ELT batteries shall be replaced at the interval recommended by the ELT manufacturer.
- Altimetry Devices - Altimeters and other Altimetry devices installed in aircraft operating under Instrument Flight Rules, or under visual flight rules in Class B Airspace shall be calibrated at intervals not exceeding 24 months, to the standard outlined in [Appendix B](#) of Chapter 571 of the *Airworthiness Manual*.
 - ✓ *Information Note:*
For the purpose of this section, the term "other altimetry devices" includes any air data computer, or other barometric device, providing a flight crew station, or an auto pilot, or automatic pressure altitude reporting system with altitude data derived from static pressure.
- Air Traffic Control (ATC) Transponders - ATC Transponders, including any associated altitude sensing reporting mechanisms, where installed, shall be tested every 24 months, in accordance with [Appendix F](#) of Chapter 571 of the *Airworthiness Manual*.

CAR 625 Appendix C has lots of useful information in it that will help keep your certified aircraft legal and hopefully safer, too.

Modifying your aircraft

Certified aircraft can be modified, it just takes more paperwork than some other categories of aircraft!

One of the key things to remember is that, other than “standard parts” (like AN bolts that are made to Mil Specs), pretty much everything that you permanently attach to an aircraft has to be a certified part. Not only the part itself has to be approved, but the

way it is installed requires approval, too. This keeps the aircraft's certified status intact and ensures that any modifications have been well engineered and flight-tested to ensure that they don't reduce the safety of the aircraft or imperil its occupants.

In Canada there are basically two legal ways to modify a certified aircraft:

- Supplementary Type Certificates (STCs)
- Limited Supplementary Type Certificates (LSTCs)

The USA has a third method called a “field approval” or FAA 337 procedure that allows “one-off” approvals to be made in the field by an inspector, but these do not exist in Canada, nor do we have an equivalent.

If you really have your heart set on modifying an aircraft greatly and the STCs do not exist to do the modifications that you want to do, then it is going to be difficult to get approvals for the work. Consider that a certified aircraft may not be the right aircraft for you – perhaps putting the aircraft in the [Owner Maintenance](#) category or buying an amateur-built or basic ultralight aircraft would be a better choice, as modifications by the owner are permitted in those categories. The COPA Guides to [Amateur Builts](#) and [Ultralights](#) provide more information on those categories of aircraft.

STCs

A Supplementary Type Certificate (STC) is the paperwork that is issued to indicate that a modification is approved for an aircraft. It can be approved for a range of serial numbers or all aircraft of one type.

When you buy a modification kit for your aircraft (it could be a door latch, camera window, float installation, almost anything) it will come with:

- STC paperwork that shows that the modifications is approved for your aircraft (usually with a range of serial numbers)
- Installation instructions for the modification
- *Flight Manual* or *POH* supplements that show how the aircraft performance changes (if at all)
- *Instructions for Continuing Airworthiness* (ICAs) to show you how to maintain the aircraft with this modification installed.

After the kit is installed and your AME has signed off the entry in the *Technical Record* showing that the modification is complete, ensure that you put the complete paperwork into the *Technical Record* (can be a file folder) so that there is a permanent record of the mod. Add any STC supplements to the POH, if required. Next ensure that

you make whatever changes are required to your [Maintenance Schedule](#) to reflect the extra requirement of the STC installation – if any!

One complaint aircraft owners often make about STCs are that they can be expensive. The most obvious cases of this effect are “auto fuel” STCs where the mod kit only provides placards, stickers and STC paperwork – no actual parts at all! Typically these still cost several hundred dollars – quite a lot of money for a few stickers! The answer is that you are paying for the benefits of an extensive engineering assessment and flight test program that proved that the mod worked and is safe. The aircraft’s certification is intact even after the mod is incorporated and you pay for that when you order the mod kit!

You can get a complete list of available STCs for your aircraft if it was certified in the USA on the [FAA website](#).

LSTCs

Limited Supplementary Type Certificates (LSTCs) work much like plain old STCs except that they are generally approvals for just one single aircraft. In Canada these are used when you wish to install a piece of equipment, such as an IFR GPS set, that requires integration with other equipment (such as an autopilot) and there is no STC for the installation.

Most people avoid having to go the LSTC route if they have a choice as it tends to be time consuming, cumbersome and expensive. The installer has to engineer the installation, write all the documentation on the installation, including the *Instructions for Continuing Airworthiness* (ICAs) and *Flight Manual Supplements*. They then have to submit all the paperwork to TC so that the TC engineering staff can confirm it is all correct. Then a TC test pilot will fly the aircraft to ensure it all works. In some cases the test flying can be delegated to a Delegated Airworthiness Representative (DAR). You have to pay for your own installer to do their work and also for the TC or DAR test flight as well.

While it can be done, it is much easier if the manufacturer of the equipment to be installed has done the work for you in advance and issued an STC.

Canada’s LSTC process is not as easy as the US 337 process, but it does ensure that the certification basis of the aircraft is protected and that the aircraft continues to be airworthy.

Installing Parts

Installing parts on your certified plane is a subject that confuses a lot of people. What parts are you allowed to install and what paperwork is required for which parts?

The rules are contained in [CAR 571.07](#) for new parts and [CAR 571.08](#) for used parts.

Let's look at each class of parts in turn.

1. A new part manufactured in Canada by the holder of the type certificate (TC) or a Supplemental Type Certificate (STC) can be installed, but requires a certification tag under [Airworthiness Manual Chapter 561](#).

2. A new part manufactured by the holder of the TC or an STC in a country with which Canada has a bilateral agreement to accept their export certification can be installed without a certification tag as long as you have the export paperwork. Transport Canada no longer requires specific "export documents" for anything other than complete aircraft and this CAR is likely to be amended soon. In the meanwhile, [CAR 571.07\(2\)\(b\)](#) will also apply to these parts. That section reads: "...a foreign-manufactured part that is obtained from a manufacturer holding a type design recognized in Canada and the part is certified in accordance with the laws of the state of manufacture".

In the case of parts originating in the United States, Transport Canada has said that they interpret 571.07(2)(b) to include new parts received with any documentation (not necessarily a formal release) issued by the appropriate manufacturer, indicating that the part came from them. That could include invoices, packing slips, etc. This puts our access to US parts on the same footing as US users, and ensures Canadians do not suffer financial disadvantage by requiring additional paperwork.

3. A standard part can be installed without a certification tag as long as it is specified in the type design. A standard part is one that is produced to an aviation industry accepted standard, such as AN bolts, Mil-Spec wiring etc.

4. A commercial part can be installed without a certification tag as long as it is specified in the type design. Commercial parts are non-aeronautical parts that an aircraft TC or STC holder specifies as being part of the aircraft type design, such as a commercial automobile-type door seal, for instance.

5. An FAA approved "Parts Manufacturing Authority" new part (PMA) can be installed without a certification tag provided it is specified in the aircraft type design. For more information on acceptance of PMA parts see [CAR Standard 571.07](#)

6. A part that is made under [CAR 571.06\(4\)](#) must be installed without a certification tag, as long as it complies with the specification of the original type certification documents. [Airworthiness Manual 571.06](#) provides additional information on these parts.

7. Used parts can be installed provided that it is an airworthy part that has been removed from an aircraft for immediate installation on another aircraft, or it is an airworthy part that has undergone maintenance for which a maintenance release has been signed as required by [CAR 571.11\(2\)\(c\)](#), or the part has been inspected and tested to ensure that the part conforms to its type design, is in a safe condition and a maintenance release has been signed to that effect.

Making sure that the parts you install on your plane are “legal parts” and are properly documented can be confusing. If in doubt check the CARs.

Who Can Sign for Engine Overhauls?

Can an AME can sign for an overhaul on a certified aircraft engine that will be installed on a private aircraft, or does it need to be an AMO (Approved Maintenance Organization)?

This is a good question and, as usual, the answer is skillfully hidden in the CARs. The answer really hinges on whether the work in question is considered by TC to be “Specialized Maintenance” or not. If it is then an AMO needs to sign for it and if not then an AME can sign.

[CAR 571.04](#) explains the requirements for Specialized Maintenance:

571.04 No person shall perform the specialized maintenance set out in Schedule II to this Subpart on an aeronautical product other than an aircraft operated under a special certificate of airworthiness in the owner-maintenance or amateur-built classification, except in accordance with

(a) a maintenance policy manual (MPM) established by the holder of an approved maintenance organization (AMO) certificate issued pursuant to Section 573.02 with a rating of a category appropriate to the work to be performed; or

(b) a foreign document equivalent to an MPM established by a maintenance organization approved under the laws of a state that is party to an agreement with Canada, and the agreement provides for recognition of the work to be performed.

That means of course that you have to go and look in [Schedule II](#) to find the list of what is Specialized Maintenance. Anything not on that list isn't.

CAR 571 Schedule II - Specialized Maintenance, on the subject of engine maintenance says:

The following tasks constitute the specialized maintenance referred to in section 571.04 of these Regulations...

...Engine

2. Any of the following types of tasks is engine specialized maintenance:
- (a) the reassembly of a multi-part engine crankshaft or a crankshaft equipped with a dynamic counterweight system;
 - (b) the reassembly of the crankcase of a reciprocating engine that is equipped with an integral supercharger or a propeller reduction gear;
 - (c) the overhaul of a reciprocating engine that is equipped with an integral or turbo supercharger; and
 - (d) the overhaul of a turbine engine or turbine engine module.

So as long as the engine you want to have overhauled isn't described on that list then it isn't Specialized Maintenance and therefore can be signed out by an AME and doesn't require an AMO sign-out.

Does this mean that any freelance AME can or should conduct an overhaul on an aircraft engine? No - some freelance AMEs have the expertise, publications, parts and the tools to do the job but many don't. Some owners believe that an AME overhaul may be cheaper than one at an AMO, but that often isn't the case as AMO overhaulers are usually set up for production line overhauling and can do the job in fewer man-hours, which should save you money. As always in aviation, before deciding who to take your engine to for an overhaul, shop around and find out what you will get and how much it will cost.

Replacing Cabin Upholstery

The question is often asked about the requirements for replacing cabin upholstery. This is a very good question because it varies depending on the category of aircraft and the basis of certification.

The requirements are specific only to certified aircraft as no other category specifies fabric and upholstery standards. With amateur-built, owner maintenance and ultralights you are on your own for fabric standards, although you can use the certified aircraft standards if you wish to.

In the case of a certified aircraft the requirement is that you have to comply with the original certification document that the aircraft was certified under. For newer light aircraft this will be CAR standard 523, but only for aircraft certified in Canada after 1986. Aircraft before 1986 were accepted in Canada on the basis of their US certification under FAR Part 23 or for even older aircraft, US CAR-3.

So in order to determine the fabric requirements you first have to determine the certification basis of the aircraft!

For older aircraft certified under CAR-3 the only requirement is that the fabric meets an ASTM or other national standard for flame resistance. A manufacturer's statement is sufficient for this.

For aircraft certified under FAR 23 the relevant section is [FAR 23.853](#) which says:

“(f) Airplane materials located on the cabin side of the firewall must be self-extinguishing or be located at such a distance from the firewall, or otherwise protected, so that ignition will not occur if the firewall is subjected to a flame temperature of not less than 2,000 degrees F for 15 minutes. For self-extinguishing materials (except electrical wire and cable insulation and small parts that the Administrator finds would not contribute significantly to the propagation of a fire), a vertical self-extinguishing test must be conducted in accordance with [appendix F](#) of this part or an equivalent method approved by the Administrator. The average burn length of the material may not exceed 6 inches and the average flame time after removal of the flame source may not exceed 15 seconds. Drippings from the material test specimen may not continue to flame for more than an average of 3 seconds after falling.”

In most cases you can show that the materials are "located at such a distance from the firewall, or otherwise protected, so that ignition will not occur if the firewall is subjected to a flame temperature of not less than 2,000 degrees F for 15 minutes" and therefore don't need to do the specified (and rather involved) [Appendix F](#) testing.

If you are just replacing seat covers then it is pretty easy to show that they meet that criteria - they will be several feet away from the firewall. If the fabric is closer to, or in contact with, the firewall, that would raise a requirement for the testing.

If you can't state that, then you just need to comply with the “vertical test” specified.

An alternative to all this is to use the same type of material that manufacturer originally installed (if you have the spec on that - it is often in the aircraft parts manual) or use leather - it complies as it is!

FAR 23 [Appendix F](#) specifies the way to do the tests including the conditions and the “vertical test” and says:

“Acceptable test procedure for self-extinguishing materials for showing compliance with §§23.853, 23.855 and 23.1359.

(a) *Conditioning*. Specimens must be conditioned to 70 degrees F, plus or minus 5 degrees, and at 50 percent plus or minus 5 percent relative humidity until moisture equilibrium is reached or for 24 hours. Only one specimen at a time may be removed from the conditioning environment immediately before subjecting it to the flame.

(b) *Specimen configuration*. Except as provided for materials used in electrical wire and cable insulation and in small parts, materials must be tested either as a section cut from a fabricated part as installed in the airplane or as a specimen simulating a cut section, such as: a specimen cut from a flat sheet of the material or a model of the fabricated part. The

specimen may be cut from any location in a fabricated part; however, fabricated units, such as sandwich panels, may not be separated for a test. The specimen thickness must be no thicker than the minimum thickness to be qualified for use in the airplane, except that: (1) Thick foam parts, such as seat cushions, must be tested in 1/2 inch thickness; (2) when showing compliance with §23.853(d)(3)(v) for materials used in small parts that must be tested, the materials must be tested in no more than 1/8 inch thickness; (3) when showing compliance with §23.1359(c) for materials used in electrical wire and cable insulation, the wire and cable specimens must be the same size as used in the airplane. In the case of fabrics, both the warp and fill direction of the weave must be tested to determine the most critical flammability conditions. When performing the tests prescribed in paragraphs (d) and (e) of this appendix, the specimen must be mounted in a metal frame so that (1) in the vertical tests of paragraph (d) of this appendix, the two long edges and the upper edge are held securely; (2) in the horizontal test of paragraph (e) of this appendix, the two long edges and the edge away from the flame are held securely; (3) the exposed area of the specimen is at least 2 inches wide and 12 inches long, unless the actual size used in the airplane is smaller; and (4) the edge to which the burner flame is applied must not consist of the finished or protected edge of the specimen but must be representative of the actual cross section of the material or part installed in the airplane. When performing the test prescribed in paragraph (f) of this appendix, the specimen must be mounted in metal frame so that all four edges are held securely and the exposed area of the specimen is at least 8 inches by 8 inches.

(c) *Apparatus.* Except as provided in paragraph (g) of this appendix, tests must be conducted in a draft-free cabinet in accordance with Federal Test Method Standard 191 Method 5903 (revised Method 5902) which is available from the General Services Administration, Business Service Center, Region 3, Seventh and D Streets SW., Washington, D.C. 20407, or with some other approved equivalent method. Specimens which are too large for the cabinet must be tested in similar draft-free conditions.

(d) *Vertical test.* A minimum of three specimens must be tested and the results averaged. For fabrics, the direction of weave corresponding to the most critical flammability conditions must be parallel to the longest dimension. Each specimen must be supported vertically. The specimen must be exposed to a Bunsen or Tirrill burner with a nominal 3/8-inch I.D. tube adjusted to give a flame of 1 1/2 inches in height. The minimum flame temperature measured by a calibrated thermocouple pyrometer in the center of the flame must be 1550 °F. The lower edge of the specimen must be three-fourths inch above the top edge of the burner. The flame must be applied to the center line of the lower edge of the specimen. For materials covered by §§23.853(d)(3)(i) and 23.853(f), the flame must be applied for 60 seconds and then removed. For materials covered by §23.853(d)(3)(ii), the flame must be applied for 12 seconds and then removed. Flame time, burn length, and flaming time of drippings, if any, must be recorded. The burn length determined in accordance with paragraph (h) of this appendix must be measured to the nearest one-tenth inch.”

Aircraft certified in Canada under CAR 523 have an identical requirement to FAR 23 as stated above.

Handheld Fire Extinguishers

Most pilots know that all powered aircraft, except ultralights, need fire extinguishers. That requirement is outlined in [CAR 602.60](#) but that CAR is pretty general in nature. It just requires “a hand-held fire extinguisher in the cockpit that is

- ✓ of a type suitable for extinguishing the fires that are likely to occur,
- ✓ designed to minimize the hazard of toxic gas concentrations, and
- ✓ readily available in flight to each flight crew member”

That CAR doesn’t tell you what standard the fire extinguisher has to meet, if any and doesn’t refer to anywhere else in the CARS to look for a standard for fire extinguishers.

As is common in the CARS there is a standard, but it is well hidden and not cross-referenced from the regulation.

The standard for fire extinguishers is hidden away in [CAR 551.400](#). This CAR indicates that it is the standard for “Hand-Held Fire Extinguishers required by CAR 602.60, 604.41, 704.83 and 705.93.” and includes this information note:

“As required by CAR Part VI and VII requirements, hand-held fire extinguishers shall contain a type and quantity of extinguishing agent suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used. For crew and passenger compartments, hand-held fire extinguishers shall be designed to minimize the hazard of toxic gas concentrations.”

It then lists the acceptable standards that hand held fire extinguishers must comply with. These are any of:

- ✓ [TSO C19b](#),
- ✓ approved by Underwriters Laboratories of Canada, bearing ULC approval label; approved by the British Civil Aviation Authority (BCAA) for aircraft use;
- ✓ approved by the Federal Aviation Administration (FAA) for aircraft use, including extinguishers approved to [TSO-C19b "Portable water-solution type fire-extinguishers"](#);
- ✓ approved by Underwriters Laboratories Inc. (U.L.), Factory Mutual Research Corporation to specification U.L. 1093 (construction and operation), and to specification U.L. 711 (rating and testing);

- ✓ approved by U.S. Coastguard under title 46 of the U.S. Code of Federal Regulations, for use in aircraft;
- ✓ approved for aircraft use by the airworthiness authority of any country, whose standards are accepted by the Minister.

The CAR then gives information on the installation: “The installation of hand-held fire extinguishers shall be such that when properly secured in its mounting:
 (1) the extinguisher will remain secure when subjected to the ultimate inertia loads established by the aircraft basis of certification, but not less than the following ultimate load factors:

Load Factors	Aeroplanes	Rotorcraft
Forward	9.0	4.0
Sideward	1.5	2.0
Upward	2.0	1.5
Downward	4.5	4.0

(2) the extinguisher will have a "quick release" function to enable easy removal from its mount.

The standard then finished with requirements for Identification and Markings:

- (1) The hand-held fire extinguisher shall be identified and marked with the applicable specifications as determined by the approving authority per paragraph (b).
- (2) A stowage compartment or stowage container that contains a hand-held fire extinguisher shall be clearly marked as to its contents.”

So as long as your installed handheld fire extinguisher meets one of those stated standards and is mounted as described then it will meet the CAR requirements.

Maintenance References For Owners

There are literally hundreds of excellent publications, videos and references for owning your own aircraft. This is a very short list of just a few of the more useful publications and websites.

- The *Standard Aircraft Handbook*, published by Tab Aero Books, edited by Larry Reithmaier ISBN 0-8306-8634-7. An excellent pocket reference that outlines how to select and use aircraft hardware, materials and techniques. It is widely available from outlets such as [Chapters](#) in Canada.

- The FAA publication *AC 43.13-1B Acceptable Methods, Techniques and Practices, Aircraft Inspection and Repair* has an entire chapter on weight and balance (Chapter 10) and is the standard reference on the subject. It also gives complete information on all accepted practices for all aircraft. An invaluable reference to have! The good news is that you can download the entire book for free in adobe Acrobat format from http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/99C827DB9BAAC81B86256B4500596C4E?OpenDocument. It is also widely available for sale in a paper version. One such source of the paper version is [Aircraft Spruce and Specialty](#).
- Your aircraft's *Parts Manual* – this should be available from the manufacturer, the current aircraft parts supplier (if the manufacturer isn't around anymore) or the [aircraft type club](#) if one exists for the aircraft type.
- Your aircraft's *Maintenance Manual* – this is the book that tells you how to take apart, fix and put back together everything about the aircraft. It may also include repair schemes for complex repair work. This is all very useful information for an owner to have. As with the *Parts Manual* this book should also be available from the manufacturer, the parts supplier (if the manufacturer isn't around anymore) or the [aircraft type club](#) if there is one for the aircraft type.
- A complete list of *Airworthiness Directives* for your aircraft – these can be obtained at no cost from TC's website at <http://www.tc.gc.ca/aviation/applications/cawis-swimn/awd-lv-cs1401.asp?lang=E&rand=>
- A complete list of STCs approved for your aircraft type can be found on the [FAA website](#) if the aircraft has a US type certificate.

Licences to Fly Certified Aircraft

All certified aircraft require a pilot licence and a valid medical certificate to fly in Canada. This means that to fly a:

- Certified airplane you need an airplane licence:
 - ✓ Private Pilot Licence – Aeroplanes
 - ✓ Commercial Pilot Licence – Aeroplanes
 - ✓ Airline Transport Pilot Licence – Aeroplanes
 - ✓ If the aircraft is single-engined, has four or fewer seats and is non-high performance then it can be flown with a *Pilot Permit – Recreational Aeroplanes*, provided that only one passenger is carried.
 - ✓ If the certified aircraft is 1200 lbs or less and has a stall speed (V_{SO}) of 39 knots or less then the minimum licence is a *Pilot Permit - Ultralight*

Aeroplanes (although this licence does not allow the carriage of passengers)

- ✓ Note – all aeroplanes that are considered “high performance” require a type rating to fly. See [“Type ratings”](#) below.

➤ Certified helicopter you will need a helicopter licence:

- ✓ *Private Pilot Licence – Helicopters*
- ✓ *Commercial Pilot Licence – Helicopters*
- ✓ *Airline Transport Pilot Licence – Helicopters*

➤ Certified glider you will need a:

- ✓ *Pilot Licence – Gliders*

➤ Certified powered glider you will need a:

- ✓ *Pilot Licence – Gliders*

➤ Certified balloon you will need a:

- ✓ *Pilot Licence – Balloons*

➤ Certified airship you will need a:

- ✓ *Pilot Licence – Balloons*, with a type endorsement for each airship type

Type Ratings

What if the aircraft you are looking at is classified as a “high performance aircraft”? This happens when a certified aircraft has:

- A V_{NE} of over 250 knots or
- A V_{SO} of more than 80 knots

As explained in [CAR 421.40](#) if your aircraft is “high performance” then it is not a showstopper, you will just need a type rating.

The requirements for the rating are fairly straightforward:

High Performance Aeroplane

(i) *Knowledge*

An applicant for an individual aircraft type rating for a high performance aeroplane shall have completed ground training on the aeroplane type.

(ii) *Experience*

An applicant shall have completed flight training and have acquired a minimum of 200 hours pilot flight time on aeroplanes.

(iii) Skill

Within the 12 months preceding the date of application for the rating, an applicant shall have successfully completed a qualifying flight under the supervision of a Transport Canada Inspector or a qualified person qualified in accordance with [CAR 425.21\(7\)\(a\)](#)

Join a Club

One of the best ways to learn about owning your own aircraft and find support and encouragement is to join a club and mix with others who are doing the same thing.

In Canada the following organizations are great sources of knowledge for certified aircraft owners:

- COPA Flights – the local chapters of COPA usually include many certified aircraft owners along with amateur-builders and ultralighters. The [COPA website lists well over 160 local COPA Flights](#) right across Canada.
- Local Flying Clubs - are also a great source of help and may get you access to airports, hangarage or tie-down space and fuel. You can usually find them at your local airport or through local flying schools. Many local flying clubs are also COPA Flights – which makes them easy to find!

Aircraft Type Clubs

Aircraft type clubs can provide a wealth of information on specific aircraft types and variants. There are literally hundreds of these clubs around the world providing services to many, if not most, aircraft types that have been produced in any significant numbers.

Type clubs vary a lot in the services they offer and how they work. Some are simply volunteer clubs run by one enthusiast, using a free web service to provide a website. These often have minimal publications or services. On the other end of the scale some of the largest types clubs have a fulltime staff and offer a full range of services.

Here are services that some type clubs offer:

- A magazine to pass type-related information, news and events
- A website, often with type-specific buyers checklists
- Technical question support from aircraft type experts
- Buyers guides
- Conventions and fly-ins
- Information on ADs that apply

- Information on STCs available
- Type specific classified ads (often on-line)
- Background and aircraft type historical information
- Maintenance tips publications
- Operating tips information
- Maintenance and aircraft systems courses
- Aircraft type conversion training programs
- Type specific insurance (often available in the USA only!)
- Formation flying training
- Scholarships
- Many other possible services

In some cases, with highly popular aircraft designs you may find that there are competing type clubs that both offer services for the same aircraft type or types. In those cases you have the choice of clubs, or you can join them all!

COPA supports aircraft type clubs – they serve a great need in the aviation world, providing type-specific technical information and support that is not provided by anyone else. Consider joining and supporting the club for the type of aircraft that you buy – most of them are well worthwhile.

COPA has listed all the aircraft type clubs that we are aware of on the [COPA Website](#). We welcome submissions of clubs that are not on the current COPA list. Send your club contact info to benefits@copanational.org.

What if you check and discover that there is no type club for your aircraft type? Well then, consider starting one. With free web services on which to post a website it can be done for no cost. If nothing else you will meet many more fans of the aircraft type you own!

Canadian Certified Aircraft In the USA

Some aircraft categories have restrictions on flying them in other countries. For instance Canadian amateur builds and ultralights need to print, sign and carry with them a blanket authority from the FAA to fly in the USA, while Canadian Owner Maintenance aircraft are banned from flying in US airspace!

With a certified aircraft it is much easier to fly in other countries. Because certified aircraft have a standard *Certificate of Airworthiness* that complies with ICAO requirements, they are allowed into all countries without special permission. That means that you just have to comply with normal arrival requirements, like clearing Customs and Immigration, but you don't need special permission to fly the aircraft in other countries. Certification to international standards does have its benefits!

Some Factors Currently Affecting Aircraft Values

Since 2002 there has been a lot of confusion about the rapid changes that have occurred in aircraft values. Commonly asked by buyers, “Why are used aircraft prices so much lower in the USA than in Canada?” Asked by sellers “Why isn’t my aircraft selling?” and from everyone “How is the high Canadian dollar affecting aircraft prices?”

The answers are relatively clear. Some people selling aircraft haven’t noticed that the Canadian dollar is at record highs for recent years against the US dollar. Because there is one unified market in aircraft in North America and it is easy to import and export aircraft that means that that all aircraft are valued in US dollars. When the Canadian dollar goes up in value, airplanes get cheaper. This is good news for people buying aircraft and bad news for those selling.

The Canadian dollar peaked out at \$1.61 in early 2002. In 2009 it is at about \$1.09. That means that airplanes are now about 33% cheaper in Canada than they were in January 2002, while Americans haven’t noticed any difference in their prices. It also means that aircraft parts and hull insurance are cheaper, since you don’t have to buy as much hull insurance.

Let’s look at some examples from the *Aircraft Blue Book*. Here are some sample values for aircraft in the fall of 2006 & 2009 with half time engines and average paint, interiors and avionics:

	2006	2009
1967 Cessna 182	Cdn\$65,500	Cdn\$45,000
1977 Cessna 150	Cdn\$23,000	Cdn\$20,000
1963 Piper PA-28-180	Cdn\$35,500	Cdn\$28,500
2001 Cirrus SR-22	Cdn\$233,000	Cdn\$164,000

A recent validation showed that the *BlueBook* values are very accurate for aircraft prices in the US. In Canada many of the current asking prices are far too high. Advertising aircraft that are overpriced naturally results in few phone calls and no sales.

Other factors may be just starting to emerge that will affect prices in the near future.

With the recent launch of the Light Sport Aircraft (LSA) and Sport Pilot Licence in the US there seems to be a growing demand for existing used aircraft that can be flown in that category. That means that two seaters that have a 1320 lb or lower gross weight and a maximum 52 mph stall will be in demand in the near future. This includes aircraft that are registered in categories other than LSA, but can be flown under LSA rules, such as amateur-builts and certified aircraft. This will probably drive up prices on those aircraft over time.

This also means that the US market demand for two seat aircraft that do not fit the LSA criteria will be reduced and prices will fall on these non-LSA compliant aircraft. This includes Cessna 150s, 152, Piper PA-38 Tomahawks, Beech 77 Skippers and other two seaters over 1320 lbs.

A similar effect is starting to emerge in the North American four seater market where there is a strong and growing demand for later model aircraft that have glass cockpits. This is starting to depress the value of later model aircraft that have older style gauge instruments, especially with aircraft like the Cirrus SR20 and SR22 and the Cessna 182.

The current situation with the Canadian dollar and aircraft values is good news for Canadians looking to buy an aircraft. It also means, as many COPA members are discovering, that if you cannot find the aircraft you are looking for at a realistic price in Canada, and then check the US market. South of the border they are unaware that the Canadian dollar has become stronger – their used aircraft asking prices, in US dollars, haven't changed much in the past few years. Lots of Canadians are buying aircraft in the US right now and importing them into Canada.

It looks like the higher dollar will be with us for awhile and that means that aircraft will remain cheaper to buy, get parts for and insure for hull value in the near future. If you are looking to buy an aircraft, this is a great time to do that – just ensure that you don't pay last year's prices for it.

If you are selling an aircraft you have to accept that it is worth a lot less than it was a year or two ago, or else decide to keep it and not sell it at the present time.

Economics being what they are, the future of used aircraft prices will depend on what happens with many factors, including the strength of the Canadian dollar.

Buying a Used Certified Aircraft

Buying a used certified aircraft is a relatively straight-forward exercise, mostly due to the existence of a COPA Guide that will take you through the whole process. For a complete rundown have a look at the best-selling [*COPA Guide to Buying an Aircraft*](#). It is available on the [COPA website](#) at no charge to COPA members.

Importing a Certified Aircraft

One of the advantages of certified aircraft is that they are universally accepted and relatively easy to import and export. If the plane of your dreams is located in another country then it is not all that difficult to import it. The [*COPA Guide to Buying an Aircraft*](#) has a complete look at what is required.

The Future of Certified Aircraft

Transport Canada statistics currently show that certified aircraft are in the middle of a dramatic increase in Canada in 2006 and still going strong in 2008, driven by imports of older cross-country capable aircraft from the USA.

With the certified fleet growing more quickly than any other category of aircraft in Canada at the present, there is no doubt that the current large fleet of certified aircraft in Canada will continue to have a large impact on flying in Canada for many years to come.