

## **GUIDE TO COMPLETION OF FORM 24-0079**

MDRA FORM C 13 REV AUG 09

Are you having trouble filling out the forms required for the final inspection of an Amateur Built aircraft? You are not alone, these forms are the main reason for delays, they are frequently incorrect, marked up with changes or illegible and must be returned to the builder.

The Transport Canada instructions detailing how to complete form 24-0079, are difficult to understand. While filling out this form read the regulations along with the following details.

On this form each box, numbered 1 through 29, must be filled out. Some of the entries are obvious, others require a little thought. Make a few copies of the form to work on, get your calculator and have a go at it.

### 1/ Registration Marks

Answer; as shown on your C of R. Note; provide a copy of your C of R for the inspector at your final inspection, it is used to fill out the Flight Authority.

### 2/ Aircraft Type and Model

Answer; from the kit or plans, if it's an original, don't use a name that will confuse air traffic control or fellow pilots.

### 3/ Serial Number

Answer; from the kit or plans, or, for your own design, you could use your initials plus dash 1 or whatever number of airplanes you have built.

### 4/ Was the design modified by builder? If yes, attach details of modifications you have made.

Answer; No? - go to 5

Yes? Make a list of the modifications you made. Be prepared to explain how the modifications will affect your project.

### 5/ Name and address of person responsible for design.

Answer; from the kit or plans, or yourself if an original.

### 6/ A <sup>3</sup>/<sub>4</sub> side view photograph of the aircraft at least 2"x3" shall be attached to this space. Answer; This can be a bit tricky getting a photo cut to size so that the airplane fills the 2"x3" space. Staple it in place in case you need to remove it.

### 7/ Name and address of builder

Answer; the address where you want your Flight Authority (C of A) mailed.

**Note: for imported aircraft use your name as the importer, and indicate the name of the actual builder as well in this area of the form.**

### 8/ My base of operations will be.

Answer; where the airplane will be based for the first 25 hours of operation.

9/ Class of aircraft

Answer; check as appropriate.

10/ Number of seats

Answer; number of seats including pilot.

11/ Capacity of fuel tanks

Answer; the total capacity in litres or gallons.

121 Is aircraft provided with flaps? Answer; Yes or No

13/ Gross wing area

Answer; from kit or plans or by calculation. Use disk area for rotary wing.

14/ One flap area

Answer; from kit or plans or by calculation.

15/ Flap deflection

Answer; from the actual aircraft, check they are both the same and record the angle.

16/ Maximum empty mass. (Aeroplane and rotary wing), use the following formula:

$$M_{EMAX} = M_{TOMAX} - (80 + 80\sqrt{a} + 0.3P) \text{ (kg)}$$

$$((W_{EMAX}) = (W_{TOMAX}) - (175 + 175\sqrt{a} + 0.5P) \text{ (lb)})$$

where:

$M_{TOMAX}$  ( $W_{TOMAX}$ ) = maximum permissible take-off mass (weight) selected by the application in kg(lb)

a = the number of passenger seats; and

P = the rated power of all engine(s) in kw(BHP)

17/ Actual empty mass.

Answer; the empty weight from your weight and balance.

18/ Maximum permissible take-off mass.

Answer: Number from box 20 times number from box 13.

19/ Maximum mass requested

Answer; the design gross weight from the kit, plans or your own design. This should be equal to or less than box 18. (See box 21 note)

20/ Maximum permissible load

Answer;           a / Rotary wing 4.10 lb./sq. ft.  
                      b / Fixed wing without flaps 13.2 lb./sq. ft.  
                      c / Fixed wing with flaps 20.4 lb./sq. ft.

Note: The above are the legally permitted maxima. Do not exceed the designer's specifications for your particular aircraft.

21/ Maximum requested load

Answer; Box 19 ÷ Box 13

This box should be less than the maximum permissible (box 20). Note; If it is more than box 20 a placard for high performance endorsement is required, (not applicable to rotary wing).

22/ Name of manufacturer (engine)

Enter the information here

23/ Engine model Answer: Enter the

Information here

24/ Minimum rated power

Answer; for a monoplane, tandem or canard wing use the following formulae

For SAE units use:

$$P_{\min} = 0.016W + \frac{C\sqrt{W^3}}{b} \text{ (BHP)}$$

The result will be in Brake Horsepower (BHP)

Where

Pmin = Minimum power require in BHP

C (Constant) = 0.018 for monoplanes- tandem and canard

Or

C (Constant) = 0.023 for biplanes and triplanes

W = Declared Max Take Off Weight

B = Total span of all wings

For Metric units use:

$$P_{\min} = 0.0263M + \frac{C\sqrt{M^3}}{b} \text{ (kW)}$$

The result will be in kW

Where

Pmin = Minimum power required - in kW

C (Constant) = 0.01339 for monoplanes- tandem and canard

Or

C (Constant) = 0.01711 for biplanes and triplanes

W = Declared Max Take-Off Weight

B = wing span in metres

Note: For jet propelled aircraft, the builder is responsible to determine what power is appropriate and adequate for the aircraft.

For a rotary wing it is the responsibility of the builder to ensure the power is adequate.

**A sample calculation in SAE (Imperial) follows on the next page.**

**SAMPLE CALCULATION - VALUES IN SAE (IMPERIAL)**

Example: For a **monoplane** of 1650 Lb, with a wing span of 23 feet.

W = Maximum weight from box 19. For this example = 1650 lb.

b = Total span of wings, in this case 23 ft

C = Constant = 0.0118

Pmin = Minimum Permissible Rated Engine Power

The solution to this formula will be in Brake Horsepower (BHP)

$$\begin{aligned} P_{min} &= 0.016(1650) + \frac{0.018 \times \sqrt{1650^3}}{23} \\ &= 26.4 + \frac{0.018 \times \sqrt{4492125000}}{23} \\ &= 26.4 + \frac{0.018 \times 67023.32}{23} \\ &= 26.4 + \frac{1206.42}{23} \\ &= 26.4 + 52.45 \\ P_{min} &= 78.85 \text{ BHP} \end{aligned}$$

Example: For a **biplane** of 1650 Lb, with a wing span of 23 feet.

W = Maximum weight from box 19. For this example use 1650 lb.

b = Total span of wings, in this case 23 ft

C = Constant = 0.023

P = Minimum Rated Power

The solution to this formula will be in Brake Horsepower (BHP)

$$\begin{aligned} P_{min} &= 0.016(1650) + \frac{0.023 \times \sqrt{1650^3}}{23} \\ &= 26.4 + \frac{0.023 \times \sqrt{4492125000}}{23} \\ &= 26.4 + \frac{0.023 \times 67023.32}{23} \\ &= 26.4 + \frac{1541.53}{23} \\ &= 26.4 + 67.02 \\ P_{min} &= 93.4 \text{ BHP} \end{aligned}$$

**For an example in SI (Metric) see next page.**

**SAMPLE CALCULATION - VALUES IN SI (METRIC MEASURE)**

Minimum Rated Engine Power- Metric units.

Builders must use the following formulae

$$P_{min} = 0.0263M + \frac{C\sqrt{M^3}}{b} \quad \text{Solution will be in kW}$$

Where  
Pmin = Total rated power of all engines in kW  
b = Wing Span in M  
M = Declared Take Off Mass in Kg  
C = Constant - 0.01339 for monoplanes or 0.01711 for biplanes or triplanes

Example: For a **monoplane** of 750 Kg, with a wing span of 7.01M

W = Maximum weight from box 19. For this example = 750 Kg.

b = Total span of wings, in this case 7.01M

C = Constant = 0.01339

Pmin = Minimum Permissible Rated Engine Power, solution in kW

$$P_{min} = 0.0263M + \frac{C\sqrt{M^3}}{b} \quad \text{Solution will be in kW}$$

$$0.0263M + \frac{0.01339\sqrt{750^3}}{7.01}$$

$$0.0263M + \frac{0.01339\sqrt{750^3}}{7.01}$$

$$19.5 + \frac{0.01339\sqrt{421875000}}{7.01}$$

$$19.5 + \frac{0.01339 \times 20539.56}{7.01}$$

$$19.5 + \frac{275.025}{7.01}$$

$$19.5 + 39.23 = 58.73 \text{ kW}$$

$$P_{min} = 58.73 \text{ kW}$$

**SAMPLE CALCULATION - VALUES IN SI (METRIC MEASURE)**

For a **biplane** of the same wing span and mass:  
The constant is: 0.1711

$$\begin{aligned} P_{\min} &= 0.0263M + \frac{C\sqrt{M^3}}{b} \quad \text{Solution will be in kW} \\ &= 0.0263M + \frac{0.01711\sqrt{750^3}}{7.01} \\ &= 19.5 + \frac{0.01711\sqrt{750^3}}{7.01} \\ &= 19.5 + \frac{0.01711\sqrt{421875000}}{7.01} \\ &= 19.5 + \frac{0.01711 \times 20539.56}{7.01} \\ &= 19.5 + \frac{351.43}{7.01} \\ &= 19.5 + 50.13 = 69.63 \text{ kW} \\ P_{\min} &= 69.63 \text{ kW} \end{aligned}$$

Disclaimer: The examples above are for educational and demonstration purposes only. The definitive reference for these calculations is found in:

**Exemption from section 549.01 of the Canadian Aviation Regulations and Chapter 549 of the Airworthiness Manual-Airworthiness Standards-Amateur Built Aircraft**

This can be found on the Transport Canada website- [www.tc.gc.ca](http://www.tc.gc.ca), or on the MDRA web site at [www.md-ra.com](http://www.md-ra.com)

**End of sample calculations, let's continue with the remaining boxes.**

25/ Actual estimated power

Answer; from engine specification

26/ Name of manufacturer (propeller) Answer:

enter propeller make

27/ Propeller Model

Answer; from the manufacturer, or use diameter/pitch for a custom made prop.

28/ Amateur built parts:

Answer; Aircraft constructed from a kit or, list the major components that you built.

29/ Prefabricated parts obtained from other sources

Answer; List the major components you used, eg: Engine, Propeller, Wheels, Instruments, etc.

#### FINISHING THE FORM (AT LAST)

The builder must sign and date the Application for C of A form, as must the MD-RA inspector who is doing the inspection. Three copies are required, all with ORIGINAL SIGNATURES.

This form should NOT be embossed with the Transport Canada stamp.

When filling out Box 13 to 25 use Metric (SI) or Imperial (SAE) measurements, not both.

In all the above calculations Transport Canada regulations take precedence and remain the only Transport Canada approved method of calculation.

A last note regarding the final inspection paperwork:

Request your inspection paperwork well ahead of time, give MD-RA office at least two months lead time. Once the final inspection has been paid for, obtain your C of R, fill out all the required paperwork from MD-RA and then request the inspection.