

P8 – 0140 – 00029S  
Compliance of 51% rule



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## 1 SUMMARY

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This report contains basic calculation of tasks performed by builder of Pik-28 based on these instructions.

In purest form, percentage of tasks performed is 93,8 %.

So there is lot of possibilities to buy services / parts.

## 2 BASIC DEFINITIONS

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Basic definition of what is self made aircraft is almost equal everywhere.

Wording has small variations, but usually it is defined as:

" aircraft, including those supplied in kit form, where at least 51 % of the fabrication and assembly tasks are performed by an amateur, or a non-profit making association of amateurs, for their own purposes and without any commercial objective;"

FAA has published AC20-27G which has listing of all tasks that must be evaluated.

This listing is transferred to spreadsheet (HTO-001), which will calculate the result, and display the total tasks performed by builder.

*Note: You should follow rules of your country.*

References:

- FAA AC 20-27G
- Amateur-Built Fabrication and Assembly Checklist (2009) Job Aid

## 3 SPREADSHEET

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Attached is spreadsheet HTO-001 which will perform calculations.

## 4 INSTRUCTIONS

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In its aviation bulletin AC 20-27G, the FAA (the United States authority) provides a procedure that can be used to determine in a fairly simple way how large the ratio of labor used to manufacture self-manufactured parts and subassemblies of a recreational aircraft is compared to the labor used to manufacture ready-made parts and subassemblies.

After all, the goal is that at least 51% of the tasks (tasks) required to manufacture the aircraft have been done by the builder. This is how the matter is defined in the EASA basic regulation and also in Finland.

The procedure is implemented as a table, where each mentioned sub-entity is worth one point. The table therefore does not take a position on how many working hours have actually been used to build each part or sub-assembly, but rather relates the amount of work to the whole.

The table can also be used to look at the degree of completion of a project purchased as a building kit in order to fulfill the 51% rule.

The builder must specify for each sub-assembly, with an accuracy of one tenth (0.1), how large of it has been implemented:

- A: Pre-purchased as part/parts,
- B: As work purchased from a subcontractor,
- C: Assembled by the builder and
- D: As a part manufactured by the builder

This assessment is only made when the aircraft is being manufactured. If changes are made to a completed, registered and airworthy aircraft, e.g. floats are installed, this assessment does not need to be made.

#### 4.1 Instructions for determining the share

Then what tenth does a different level mean. The following four main groups

Own work share	tenths
Acquired completely finished part	0
Little work share	0.1 ... 0.2
Average amount of own work	0.3 .. 0.5
Significantly own work	0.6 ... 0.9
Made from raw materials	1.0

For example, a part received from the supplier of the series. If it involves sanding, drilling and finishing the holes (deburring), it is a minor part. 0.1 points or a maximum of 0.2 points.

If the work done is more significant. Such as cutting to size, drilling and finishing, fitting edges and other minor tasks. In this case, the average credit is about 0.3 or 0.4 points.

In those cases where the builder does more manufacturing such as cutting the pipe, fitting the ends of the pipe, bending it and drilling mounting holes for fixing points or significant fitting by grinding, a more significant credit is allowed, 0.6 or 0.7 points.

If the builder makes part of the drawings using raw materials, full credit can be given for the task, 1.0 points.

For example, the builder uses a raw material such as an aluminum plate supplied by the kit supplier and the builder measures, marks, cuts, fits, bends, shapes, removes the members and drills rivet holes to make the wing surface plate, the builder gets full credit for this task.

In most cases, the builder may record a full refund for the assembly, unless he uses commercial subcontracting.

The user of the table should make sure that the sum of the above items A-D is not greater than 1.

This therefore allows the use of semi-finished products in construction work and the purchase of professional subcontracting.

The essential information for using the table is the state in which the builder has received the part from the supplier of the kit. Once the builder has started working on it, it is almost impossible to find out the original situation.

It is therefore important to document the original condition of the parts that come with the construction kit. Photographs are a good method for a construction report.

In the attached version made by HTH, the table is made as a standard spreadsheet, in which case the calculation takes place automatically. The advantage of the updatable calculation base is also that the builder can use it to cleverly plan in what different ways the 51% construction share can be implemented.

The options for points A, B, C and D should be marked as 0.1-1. The spreadsheet warns if the sum in one line is more than 1.0.

## 4.2 The first stage of evaluation

The self-manufacturing degree according to AC 20-27G is considered as the first step. Using the attached table (HTO-001.ods), either on PC or on paper. With a spreadsheet program on a PC, you can get the results in real time.

Let's go through the sub-areas below, which have rows named according to the following table:

Fuselage	F1 ... F24
Wings	W1 ... W 51
Tail	E1 ... E57
Landing gear (wheel landing gear)	LG1 ... LG12
Firewall forward	P1 .... P27
Inside the cockpit	C1 .... 11

Depending on the aircraft type, not all lines are there and are left blank. The lines that have the issue on the machine are evaluated according to the previous paragraph and 1.0 points are allocated according to the four options. In some tasks the box is darkened, it means that the ko option cannot be used. This is usually an alternative to another task, which is evident from the name of the task.

The points of each sub-area are added up column by column and marked on the bluish line at the beginning of the sub-area.

Add the values in the cell of these total rows to the "total points from each group" row at the beginning of the table.

Add the values in cells A,B,C,D) to get the number of tasks in row 9.

The total share of each group in the construction of the entire aircraft is  

$$= \text{total points from each group} / \text{\#number of assignments} * 100\%$$

the sum of the percentages in row 7 must be exactly 100%.

The sum of groups C and D is the builder's self-made degree.

If it is 51% or more, the construction of the plane meets the degree of self-manufacture of a recreational aircraft according to the FAA definition.

### 4.3 Evaluation of the second phase

If the aircraft to be built has following tasks:

- the builder himself to do the design
- self-built skis
- self-built/installed floats
- self-made power line.

These elements can be included in the evaluation.

Here, for these, points are calculated in the same way as in the evaluation of the first stage.

But these points are not added to the total number of points of the first stage, but they increase the degree of self-building directly.

### 4.4 Commercial support

#### 4.4.1 *Receiving commercial educational aid.*

You may receive commercial training support in the manufacture or assembly of certain parts to perform certain aircraft construction tasks or processes.

The receipt of the training is not counted as commercial support if: Commercial training support may be other than the teaching, presentation and evaluation of the work you do. As an amateur builder, you must do the actual flying part to get the job classified as DIY (D). If doing the task requires the work of several people, the commercial trainer can participate in doing a larger task if you are involved the whole time. For example, lamination of a larger composite part.

For commercial training assistance, the following must be recorded in the machine's construction report:

Company/trainer name, address/contact information/phone number, what kind of training was involved.

#### 4.4.2 *Commercial assistance (B)*

The performance of manufacturing or assembly tasks by another person or company is counted as commercial support (B), which is not counted in the contribution made by the amateur builder.

Asking in advance how a task is classified can be worthwhile if it is not clear.

#### 4.4.3 *No commercial help*

It is not intended that the entire aircraft be made by one and the same person. There can be several factors. The presence of several authors must be registered in the construction report. And the one who makes a part, marks his own name as the author in the construction report.

The final airworthiness responsibility can only be taken by one person who is aware of all the work that has been done on the aircraft. And finally he answers that they are made of the right materials, correctly and in accordance with good aircraft construction methods.

#### **4.4.4 Identify those items can be installed with commercial help**

You can use unlimited commercial assistance for those items that are not on the checklist.

A non-checklist item is a task or process that is not listed in the Checklist for the Manufacture and Assembly of Amateur Built Aircraft. These items include painting and interior trim and avionics installation. An amateur builder does not have to personally carry out such a task or process. Other non-checklist products/tasks include the manufacture of engines, propellers, wheels and brake assemblies, and the manufacture of standard aircraft parts.

#### **4.4.5 Use of assemblies obtained from type-approved airplanes**

The use of used or new parts/assemblies removed from type-approved aircraft (e.g. landing gear, altitude stabilizer and engine mount) is permitted as long as they are in airworthy condition. However;

- (1) Contact us before using a large assembly or subassembly such as a wing, fuselage, or tail assembly from a type-approved aircraft. As an amateur builder, you should be aware that excessive use of a large assembly or subassembly obtained from another aircraft will probably make the end result unacceptable for approval.
- (2) You will not receive credit for work done on or use of a part obtained from a type-approved aircraft in determining whether an amateur-built aircraft is becoming one. Work done on a part of a type approval is considered to be "rebuilding" or "altering" it, the purpose of which is to return those components to airworthy condition.
- (3) All manufacturing, installation and assembly tasks in an amateur-built aircraft that use used or new assemblies from a type-approved aircraft can only be marked under A or B.

*Note: Manufacturing is defined as working on any material, part or component, such as shaping, bending, dipping, straightening, cutting, sewing, gluing/binding, laminating, shaping, cutting to size, drilling, deburring, machining, spreading protective coating, surface pretreatment and primer painting, riveting, welding or heat treatment and converting the material, part or component towards the end result or the finished state.*

### **4.5 Buying a partially built aircraft that has been built to plan**

If you purchase a project that is partially built from a plan/build kit, you should receive all fabrication and assembly records, such as material receipts, construction logbook. The construction diary should contain an explanation of the state in which the previous builder received the parts, for example photos.

As well as all possible parts and accessories, such as the airplane itself, engine and propeller and their log books, from the previous owner.

This information will ultimately help determine if your aircraft is eligible for an amateur build.

All stages are taken into account when examining the final airworthiness, and all stages must be certified by the manufacturer. If there is no

evidence of the author, the object in question is considered to have been received ready (i.e. A or B class).

#### **4.6 Building an aircraft from a construction kit**

The manufacturer is not responsible for proving that using the kit you meet the requirements for self-construction. So be careful what you order. The manufacturer may offer quick construction options that do not meet the conditions for self-construction.

So ask the manufacturer of the set for a task-specific breakdown of which parts are ready, which are semi-finished, which are made of materials, etc. A responsible seller of the set will have these, and from these you can make sure for yourself that the 51% rule is fulfilled. Also see that you order the set according to the specification and document the parts as they arrive. Again, it is not possible to conclude from a finished aircraft who made the part, and if you don't have proof that you received the part as material/semi-finished, it has to be listed as received as finished (i.e. in A or B category)..

#### **4.7 Modifying**

If you make a machine from a construction kit and want to make changes, it is possible. It is recommended to discuss changes with the kit manufacturer or an equally qualified person. Even if you make a completely kit-compliant airplane, you are responsible for the validity of the solutions used. So in any case, you are responsible for the plane being flyable and not falling apart right away.

So if you want changes, design them yourself, or get the plans from somewhere. Design is the kind of work you can get without straining 51% of the budget.

You should record all changes you make in your construction journal.

#### **4.8 Documentation**

The builder is required to document the work steps in the construction report in any case. For the airworthiness inspection of the tasks for which the builder wants to use the self-build points, the documentation has to find out at what level of readiness the parts of the task have been obtained. From the finished part, it is not possible to conclude what the builder's initial situation was.

Using the "Amateur-Built Fabrication and assembly Checklist (2009) Job Aid" booklet (from FAA) is good practice even if it not mandatory..

### **5 FEEDBACK**

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If there are gaps in the spreadsheet, mainly in the evaluation part of the second phase, additions are welcomed. For example, if a task is missing or an entity is missing, make a suggestion. We will happily update this guide.

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