P8-0600-00023S
aircraft
specification

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1 SUMMARY

In this report Pik-28 dimensions are defined in accordance to CS-LSA amd 1 and ASTM F2245-13b Requirements.

Statement of Conformity

I certify that this report here has been made in accordance with the requirements of CS-LSA amd 1 and ASTM F2245-13b that the information furnished herein is true and correct to the best of my knowledge.

2 AEROPLANE SPECIFICATION

Type IPR holder	Osuuskunta Hyvä Tapa Harrastaa Koppönkatu 4 D 8, 64100 Kristiinankaupunki Finland
Licence for usage	as defined in webpages: www.hooteehoo.org CERN Open Hardware license strongly-reciprocal
Maximum weight	600 kg
Maximum zero-fuel weight	??? kg
Maximum weight of non-Lifting parts	??? kg
Maximum cockpit load	?? kg
Control surface movements	
Aileron	up 26° +2° -2° down 10° +2° -2°
Elevator	up 35° +2° -2° down 35° +2° -2°
Rudder	right 25° ±2° left 25° ±2°
Airspeed limits	Design Dive speed (V_D) 360 km/h Never-Exceed (V_{NE}) 310 km/h Cruise speed (V_C) 255 km/h Manoeuvring (V_A) 218 km/h Flaps down (V_F) 160 km/h
c.g range	17% to 39,8 % MAC, 625 mm to 862 mm behind datum.
Manouvering g-limits	+4,4 g ... -2,0 g

/ cg range is to be checked and probably changed after weight check and test flights. /

Datum	Vertical plane at firewall forward face.
Levelling means	Vertical line at front face of firewall frame.
Coordinate system	X increases back from datum Y increases from symmetry plane to right Z increases up.
Fuel capacity	Total 120 liters (gross) in two wing tanks, plus ?? liters in fuselage collector tank. Wing fuel tank is at position X=605 mm Y=1250mm, Z=-266 mm. gasoline, methanol, ethanol resistant

	tanks with stainless steel inner liner, Composite outer shell.
No. of seats	One seats. Position of persons c.g 1200 mm (TBC).
Design basis	F2245-13b + CS-LSA amd 1

2.1 Engine

Several possibilities:

2.1.1 option #1

Manufacturer	Bombardier-Rotax GmbH, Gunskirchen, Austria
Model	Rotax 912 UL
Type	Liquid/air cooled, 1211 cm³, four-stroke, four-cylinder boxer engine with a integrated 2,27:1 transmission to the propeller.
Exhaust	
Max rpm	5800
Max continuous rpm	5500
max available take-off power	59,6 kW (80 hp) at 5800 rpm
max continous performance	58 kW (78 hp) at 5500 rpm
Fuel	Normal automobile gasoline EN228, minimum octane number 95, E10 or aviation gasoline, AVGAS 100 LL.

2.1.2 option #2

Manufacturer	Bombardier-Rotax GmbH, Gunskirchen, Austria
Model	Rotax 912 ULS /S / F
Type	Liquid/air cooled, 1352 cm³, four-stroke, four-cylinder boxer engine with a integrated 2,43:1 transmission to the propeller.
Exhaust	
Max rpm	5800
Max continuous rpm	5500
max available take-off power	73,5 kW (100 hp) at 5800 rpm
max continous performance	69 kW(93 hp) at 5500 rpm
Fuel	Normal automobile gasoline EN228, minimum octane number 95, or aviation gasoline, AVGAS 100 LL.

2.1.3 option #3

Manufacturer	Continental Motors inc Mobile, Alabama, USA
Model	O-200-D, O-200-X, O-200-AF

Type	Air cooled, 3290 cm³, four-stroke, four-cylinder boxer engine, direct drive to the propeller.
Exhaust	
Max rpm	2750
Max continuous rpm	2750
max available take-off power	74,6 kW (100 hp) at 2750 rpm
max continous performance	74,6 kW (100 hp) at 2750 rpm
Fuel	aviation gasoline, AVGAS 100 LL. Unleaded Avgas

2.1.4 option #4

Manufacturer	ULPower Aero Engines, Ieper, Belgium
Model	UL260i, UL260iS
Type	Air cooled, 2592 cm³, four-stroke, four-cylinder boxer engine, direct drive to the propeller.
Exhaust	
Max rpm	3300
Max continuous rpm	2800
max available take-off power	72,3 kW (97 hp) at 3300 rpm (i) 79,8 kW (107 hp) at 3300 rpm (iS)
max continous performance	64,9 kW (87 hp) at 2800 rpm (i) 70,8 kW (95 hp) at 2800 rpm (iS)
Fuel	Regular unleaded automotive gasoline with min. 95 Octane RON, UL260iS 98 octane, aviation gasoline, AVGAS 100 LL.

2.2 Propeller

several possibilities:

2.2.1 option 1 for engine #1

Manufacturer	Helix Propeller
Model	
Diameter	1650 mm
Type	Two blade, composite, fixed pitch propeller
Direction of rotation	clockwise looking from tail of aircraft towards front.

3 AEROPLANE DESCRIPTION

3.1 Fuselage

Frame and skin plywood constructed stressed skin construction. Plywood/PETfoam sandwich ribs.

Single seat closed cockpit. Fixed tailwheel type landing gear. Main gear attached to fuselage.

Engine mounted at front of fuselage. Tractor propeller.

3.2 Wings

Cantilevel double taper chord low wing. Plywood torsion box, with wooden /glass/carbon spars. Plywood/PETfoam sandwich ribs to auxiliary spar. Fabric covered rear section (?).
Composite wing tips.
Main fuel tanks of stainless steel liner with composite outer shell, mounted inside wings leading edge.
Movable aileron of rib/fabric covering construction in the outer taper section of wings. Fully mass balanced aileron.
Split flaps on trailing edge of inner tapered section of wing.

3.3 Tail unit

Vertical tail of same type structure as wings. Horizontal tail mounted on top of fuselage rear.
Movable rudder and elevator of rib/fabric covering construction. Fully mass balanced.

3.4 Flight controls

Elevator: cables
Rudder: cables
Aileron: cables
Trim: push-pull cable to trim tab
Landing flaps: plain flaps

4 AEROPLANE DIMENSIONS

4.1 Wing

Geometry		
span	b =	8,14 m
Wing area	S =	9,08 m²
angle of incidence	i =	-1,02 °
swept angle	25% chord	0,0 °
dihedral angle		5,1 °
Aspect ratio	AR =	7,29
mean aerodynamic chord	$\bar{c}$ =	1,171 m
leading edge of $\bar{c}$	x =	0,413 m
	Y =	1,808 m
wing apex X coordinate		0,374 m
Aerodynamics		
Profile	NASA NLF(1)-0115	
	root thickness	17,28%
	mid kink t/c	15%
	tip section t/c	15%
Wing lift curve gradient	$\partial C_l / \partial \alpha$ =	5,0042 [1/rad]
Moment coefficient (CL = 0)	c_{m0} =	-0,0705 @ -2,29°
Zero lift angle	α_0 =	-2,29°

4.2 Ailerons

Aileron		
span	b =	2,32 m
location (y-coord)		1,752 – 4,044 m
area (total both sides)	S =	0,77 m²
Relative chord		16 %
Deflection		+ 10°
		- 26°
Landing flap		
span	b =	1,332 m
location (y-coord)		0,369 – 1,701 m
area (total both sides)	S =	0,675 m²
Relative chord		20%
max deflection		50 °

4.3 Fuselage

Length (firewall to tail)	4,702 m
Total length (spinner – tail, typical)	5,74 m
Width (not engine)	0,775 m
Height (level attitude)	2,4 m
Height (on ground)	1,7 m

4.4 Vertical stabilizer

Geometry		
Span	b_s =	1,045 m
Area	S_s =	0,815 m²
Root chord (z=363)	c_{sr} =	1,136 m
Tip chord (z=1314)	c_{st} =	0,433 m
Rudder span	b_r =	1,006 m
Rudder root chord (z=363)	c_{rr} =	0,364 m
Rudder tip chord (z=1314)	c_{rt} =	0,203 m
Rudder area	S_r =	0,283 m²
Rudder/stabilizer ratio	k =	0,53
Sweep angle	0,25 c	21,1 °
Rudder deflection		±25°
Aerodynamics		
Profile		Wortman FX 71-L-150/30 mod.
Lift curve gradient	$\left(\frac{\P C_l}{\P \alpha}\right)_s$ =	2,73 [1/rad]
Moment coefficient	c_{m0} =	0,0
Moment arm (wing apex to stab apex)	r_s =	2,754 m
Radius of gyration in yaw	K	1,326 m

4.5 Horizontal stabilizer

Geometry		
Span	b_e =	2,530 m
Area	S_e =	1,83 m²
Root Chord	c_e =	0,934 m
Tip Chord	c_e =	0,572 m
Aspect ratio	A_e =	3,50
Hor tail M.A.C		0,768 m
Elevator chord root (hinge back) m	c =	0,294
Elevator chord root (LE to hinge)		0,042m
Elevator area		0,57 m²
Sweep angle /1/4 chord		6,7 °
Dihedral angle		0 °
angle of incidence	i =	+1,1 °
Elevator deflection		± 35 °
Aerodynamics		
Profile		Wortman FX 71-L-150/30 mod.
Lift curve gradient	$\left(\frac{\P C_l}{\P \alpha}\right)_e$ =	4,67 [1/rad]
Moment coefficient	c_{m0} =	0,0
MAC leading edge		3,875 m
Moment arm (wing apex to tail apex)	r_e =	3,405 m
For gust calculations;		

Lift arm (1/4 c of both surf.)	l_{HT}	3,301 m
Downwash factor	$1-\left(\frac{\partial \varepsilon}{\partial \alpha}\right)$	0,6328

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