

Building instructions 1/72 scale Pander E

Aircraft history

The two seat, single engine Pander E has been built by the Pander furniture factory in the Hague. It was the second design of the enterprise, made by Theo Slot. The prototype registered H-NADI flew on February 18th 1926 with a six cylinder 45 hp Anzani engine. The aircraft appeared to be underpowered and the engine was replaced by a five cylinder 60 hp Walter NZ series IV engine. With that engine it obtained its Certificate of Airworthiness in June 1926. It got the type identification EC, the EA being the prototype with the Anzani engine, the EB a single seat version, which has never been built.



The Pander E was a sesquiplane aircraft, both wings being braced by struts, no rigging was present. Wings, aft fuselage and tailplanes were a wooden construction, covered with thin plywood. The forward fuselage was a steel tube construction, covered by aluminum plates. Rudder and elevator had a tube framework, covered with cloth. The aircraft had dual controls, making it fit for training and touring. The cockpit configuration varied, a limited number had one big tub-type cockpit, seating the student pilot and the instructor, the others had two individual cockpits. Behind the cockpit was a closed luggage compartment.

Further versions were developed, major differences being the engine. The EC II with a 70 hp Walter NZ Series VI engine, the EF 85 with a 85 hp Walter Vega engine, both engine configurations being quite close to the original Series IV, other versions had De Havilland Gipsy engines and one an Armstrong Siddeley Genet. Other differences between the versions were the undercarriage, being either rubber band sprung with a single axle carrying both wheels or two versions with individually, hydraulically sprung wheels. And the exhaust of the NZ and Vega engines were different.

The first two aircraft were ordered by the Rotterdamsche Aero Club (RAC), founded in July 1926, in January 1927 and were delivered 31st of May 1927. After September 1927 the aircraft were transferred to the Nationale Luchtvaart School NLS (National Flying School), also based in Rotterdam, which was owned by the RAC. The Pander E became the standard training aircraft of the NLS. At this moment a flying replica of the Pander EC with the single tub cockpit is being built by Dick Funcke.

Aircraft characteristics

Span upper wing:	10.00 m
Span lower wing:	5.00 m
Length:	6.20 m
Height:	2.71 m
Empty weight:	358-412 kg (NZ-Vega)
Take-off weight:	595-720 kg (NZ-Vega)
Engine:	60 hp Walter NZ series IV, 70 hp Series VI or 85 hp Walter Vega engine
Accommodation:	Pilot and trainee.

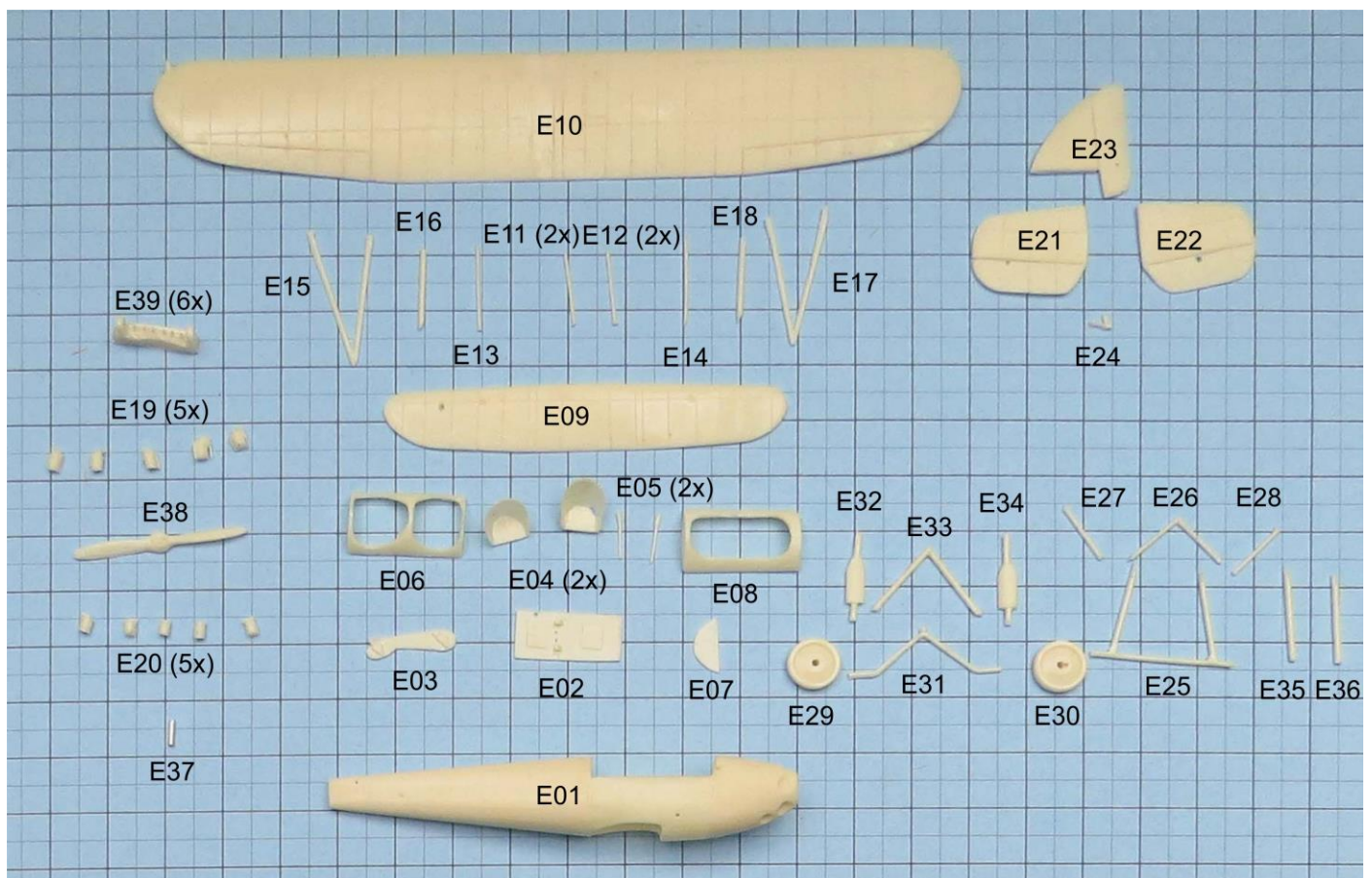
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Parts

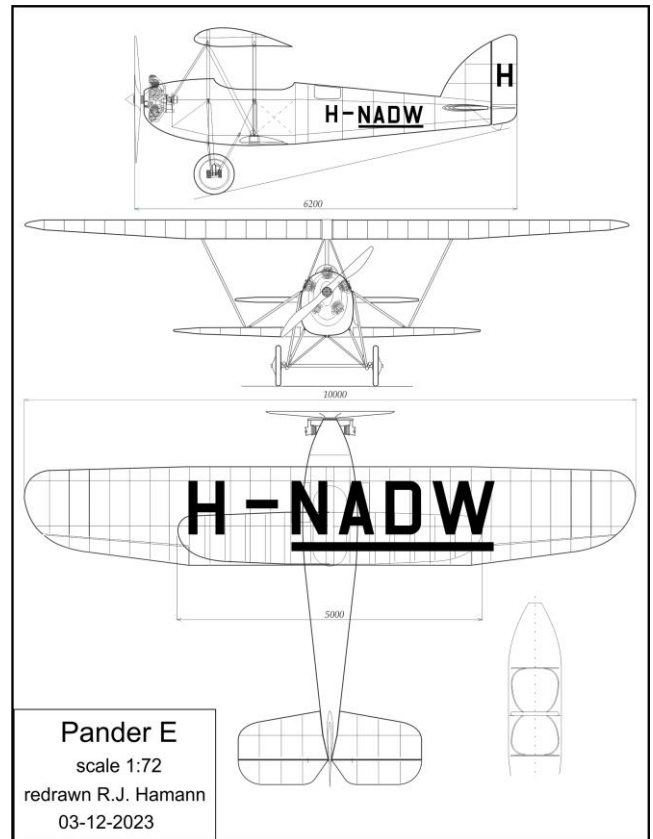




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Kit contents

- 50 resin parts.
- 5 x 20 mm of 0.5 mm thick styrene sheet for control horn production.
- 80 x 60 mm 0.75 mm thick styrene sheet to produce the assembly rigs.
- 25 mm of 0.5 mm styrene rod to produce the tail plane struts.
- 10 mm of 1.0 mm styrene rod to repair the navigation lights.
- 5 mm of 1.2 mm styrene rod for the propeller axis.
- 10 mm of 0.5 mm brass rod for tail surfaces assembly.
- A transparent plastic sheet of 15 x 25 mm for the windscreens.
- Decal sheet for registration numbers, company logos, inscriptions, decorative strips and instrument panels.
- A sheet with a 1/72 scale three view drawing and a paper template to produce a rig to assembly the wing and to fit and align the engine cylinders.



Configurations which can be built with this kit

	Tub cockpit, parts (E07) and (E08)	Two cockpits, part (E06)	Rubber band/axle UC, parts (E25) through (E28)	UC without axle, parts (E31), (E33), (E35) and (E36)	Damper UC, parts (E31) through (E34)	Walter NZ Series IV	Walter NZ Series VI	Walter Vega	RAC	NLS Holland
H-NADI		X	X			X				
H-NADV, PH-ADV, H-NADW, PH-ADW	X		X			X			X	X
H-NAEJ, PH-AEJ		X	X			X			X	X
SOPLA (formal registration PH-AEX)		X		X			X			X
PH-AEX		X			X		X			X
PH-AFJ	X				X		X			X
PH-AIA, PH-AIB		X			X			X		X
PH-AFX		X		X				X		
PH-AFZ	X				X			X		X
PH-AKA		X			X			X		

Building instructions

Painting of parts and (sub) assemblies should be done at convenient points in the building process.

Note that most pictures illustrating the instructions below have been made during the assembly of the two prototypes for the kit, so small differences in assembly order and configuration may be present. Also, the model has been painted with a brush; if an airbrush is used, the painting and assembly order will probably be slightly different. And of course these guidelines reflect my building routine. The parts of these first kits show more air bubbles than later production kits; the moulds have been corrected to avoid them.











These building instructions follow the method I use to apply control cables (no rigging lines are required for the Pander): Drilling a hole through the wing, leading 0.05 mm fishing line through them, tensioning them at

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the other side of the wing with pieces of tape, gluing them with a drop of cyanoacrylate glue at the reverse side of the control cable and when dry, cutting off the excess glue and fishing line. If you use another method, adapt your building order accordingly.

A copy of the building instructions can be downloaded from www.hollandaircraft.nl/resin_kits.html

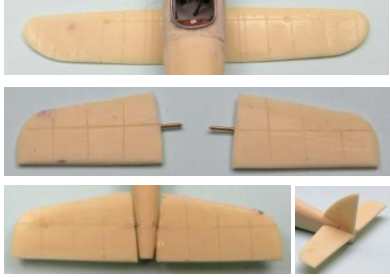


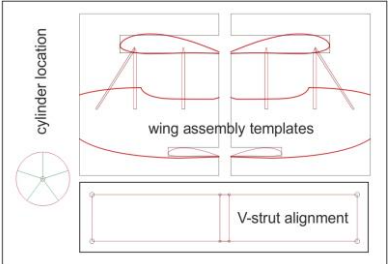

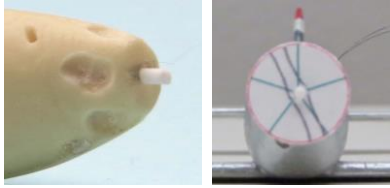
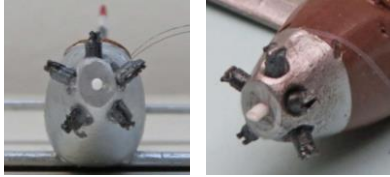
1. Remove the resin parts carefully from the sprues; this can best be done with a razor saw. Don't cut off the thinner parts at the end of the struts; you can shorten them later if need arises. Clean the flash. Clean all parts with water and detergent or IPA to remove traces of casting agents. Adjust bent parts by dipping them in hot water and letting them dry on a flat surface. Probably you will have to repair the air bubbles in some parts with small thickness. This is best done by using Revell Plasto, as it attaches well to the resin, and reinforcing the repair with a very thin layer of thin cyanoacrylate glue.
2. Probably one of the navigation lights on the wing tips is missing a piece. Correct it with a piece of 1.0 mm styrene rod, which you have given a rounded tip by sanding. 
3. Remove the thin sheet covering the opening in the bottom of the fuselage (E01) to accommodate the lower wing. Dry fit the lower wing and adjust if necessary to get the lower wing surface flush with the fuselage underside. 
4. If you want to build the model with deflected control surfaces, separate the ailerons from the upper wing (E10), the elevator halves from the stabilizer halves (E21) and (E22) and the rudder from the fin (E23). Use a razor saw, panel scribe and sharp knife to do so. The location of control horns and exit points of the control cables have already been marked on the parts. 
5. Decide which version you are going to build and select the undercarriage (see steps 37 and following) and cockpit cover version parts you will need for that.
6. If you have selected to build the early version with a bathtub cockpit (H-NADV or H-NADW) jump to step 8.
7. If you have selected to build another version with a bathtub cockpit in the later configuration, glue the instrument panel (E07) in the cockpit cover (E08). 
8. Paint the inner walls of the cockpit (E01), the cockpit floor (E02), the engine controls panel (E03), the seats (E04), the control sticks (E05) and the underside of the cockpit covers (E06) or (E08). 
9. Apply seat belts to the seats (E04) and the instruments panel decals to (E06), (E07) or (E08) as applicable and drill two holes of 0.7 mm in the cockpit floor for the control sticks. 
10. Glue the cockpit floor (E02) in the fuselage and feed two 70 mm long ends of black lacquered fishing line for the aileron control cables through the small holes in the floor. Glue the fishing line at the underside of the floor. When dry, cut off the excess fishing line. 
11. Glue the engine controls panel (E03) to the port side of the fuselage. Keep the fishing line well away from the glue. 
12. Glue the seats (E04) to the cockpit floor after checking their position by means of the cockpit cover (E06). After cutting the control sticks (E05) to the correct length (fitting just below the instrument panels), glue them to the cockpit floor in front of the seats. 
13. Glue the cockpit cover (E06) or (E08) to the fuselage. Again, avoid to touch the ends of fishing line with glue. 

¹ Note that the PH-AIA has flown with a straight fin leading edge, rudder unmodified, so modify the fin for the PH-AIA accordingly.

² The pictures show a cockpit edge made of 0.5 mm solder (not provided with the kit).



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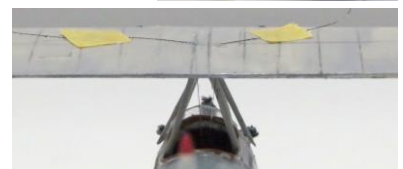
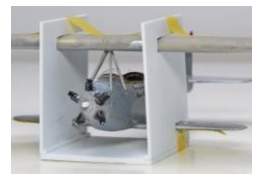
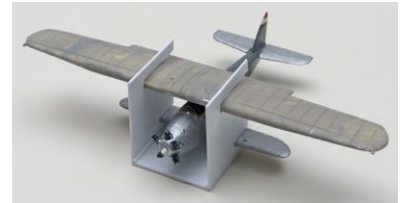
14. Glue the lower wing (E09) in the recess under the fuselage.³
15. Drill 0.5 mm holes in the marked location in the root of the stabilizer halves and the fin. Cut three 5 mm long pieces from the brass 0.5 mm rod supplied with the kit. Glue them in the holes you have drilled. Dry fit the tail surfaces in the holes in the aft fuselage. Deepen the holes if required and cut off the excess brass rod. Glue the tail surfaces in place. Make sure the horizontal tail plane is parallel to the lower wing and that the fin is normal to the horizontal tail planes.
16. If you are building a model with two cockpits, drill a slanted 0.7 mm hole 11.5 mm behind the slanted hole casted just before the forward cockpit at each side of the fuselage and at the same height as those forward holes.
17. Drill 0.4 mm holes through the upper wing centre section next to the two central ribs and the aft wing spar for the aileron control cables. Paint the fuselage, the lower wing and the lower surface of the upper wing. Paint the top of the rudder red, white and blue, as it was for all Pander E's. When dry, apply a coat of gloss varnish to the fuselage, the fin and lower surface of the upper wing as preparation for decal application.
18. Cut the paper printed templates from the scale drawing included in the kit and glue them on a piece of styrene of at least 0.75 mm thick. Cut out the jig parts. Drill 1.2 mm holes in the circles at the outer corners of the large rectangle and 0.6 mm holes in the circles at the corners of the small rectangle. Fit the jig on the casted superficial holes in the underside of the upper wing and use it to drill two 0.6 mm superficial holes near the wing trailing edge.
19. Glue the wing assembly jig sides on a 30 x 32 mm piece of styrene of at least 1 mm thick. Reinforce the joints with a piece of strip. Fit a piece of sturdy styrene strip between the top of the sides to keep these on constant distance from each other and glue it in place. Dry fit the wings in the slots. It should be possible to move them, but they should not fall out.
20. Select which set of engine cylinders (E19) or (E20) you are going to use. Paint the cylinders.
21. Drill a hole of 1.3 mm and 2 mm deep in the nose, 2.5 mm below the top of the nose. Insert the 5 mm piece of 1.2 mm styrene rod in it and glue it. Cut out the cylinder location jig. Drill a 1.2 mm hole in the centre of the jig and place it on the nose, keeping one of the green lines vertical and pointing to the top. Fix the jig temporarily with Kristal Klear or equivalent. The circle indicates the position of the top of the cylinders.
22. If you are going to use the cylinders (E19) carefully enlarge the five holes in the nose to 2.5 mm. When using the cylinders (E20) make the 2.2 mm holes somewhat deeper. Keep the direction of the drill well aligned with the green lines.
23. Dry fit one by one the cylinders (E19) or (E20) and shorten them until they just reach the red circle on the jig. For the cylinders (E19; left) this probably means you will have to remove a bit of the tubing at the rear of the cylinders. The cylinders (E20; right) should be mounted with the two stubs pointing to the front. Glue the cylinders in place with a drop of Kristal Klear or equivalent. Remove the jig from the nose. Adjust the position of the cylinders if necessary (the Kristal Klear stays a bit flexible). Fix the cylinder position with a drop of (thick) cyanoacrylate glue.

³ You may construct small fairings between the lower wing trailing edge and the fuselage using thin styrene sheet material.



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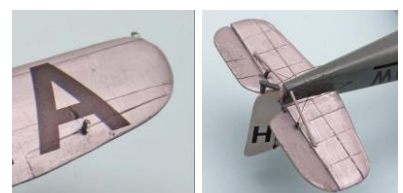
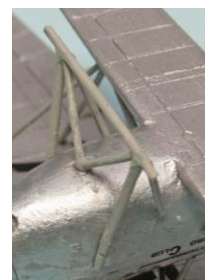
24. Paint the edge of the cockpit opening(s) to simulate the leather padding.
25. Select the decals for the aircraft you are going to model and cut them out as close as possible to the printed surface. Apply the decals on the fuselage, the fin and the registration on the lower surface of the wing. Use the pictures at the end of the document to determine the correct location. All aircraft have the Pander logo on the fin. If you are modelling the SOPLA aircraft, first apply the spiralling strip, running from middle of the nose to the tail. Interrupt it if you have not enough room to pass it in between the two cockpits. When dry apply the SOPLA text. Seal the decals when they have well set and are well dried.
26. Apply the decal under the upper wing. If you are building the SOPLA variant or variants with underlined registrations with deflected ailerons, mount the ailerons before applying the large SOPLA decal. Open up the holes for control cables and mounting points for struts. Open up the superficial holes in the upper wing underside and the 0.4 mm holes in the centre section for the aileron control cables. Be careful not to damage the registration decal.
27. Cut the one or two windshields (pending the bathtub or two cockpit configuration you are building) from the piece of transparent plastic included in the kit, form and dry fit them, adjusting the curvature of the lower edge if necessary, and glue them to the fuselage with white glue or Microscale Kristal Klear.
28. Place the lower and upper wing the wing assembly jig. Make sure they are placed in the middle of the jig. Secure them with some pieces of tape at the top and the bottom.
29. Dry fit the short vertical cabane struts (E11) and (E12) between the upper wing and the slanted holes in the nose just before the cockpit section. Correct the length if required and glue them in place.
30. Dry fit the longer cabane struts (E13) and (E14) between the forward holes in the nose and the top of the vertical struts. Correct the length if required and glue them in place.
31. Check that the length of both the short and the long leg of both slanted V-struts (E15) and (E17) have the same length. Dry fit them in the superficial holes in lower and upper wing. They should not be bent. Adjust the length if required and glue them in place.
32. If you build a model with the bathtub cockpit, dry fit the aft short vertical cabane struts (E11) and (E12) between the upper wing and the edge of the cockpit opening. Adjust the length if required and glue them in place. If you build a model with two cockpits, dry fit the short vertical cabane struts between the upper wing and the slanted holes you have drilled in step 16 in the fuselage sides. Adjust the length if required and glue them in place. Remove the model from the jig.
33. Clean the holes for the aileron control cables. Feed the fishing line through the holes, tension them on the top of the wing with a piece of tape, glue them with some drops of thin cyanoacrylate glue. When dry remove the excess fishing line and glue with a sharp knife and sand the surface.
34. Glue the struts (E16) and (E18) between the lower attachment point of the V-strut and the attachment point of the aft vertical fuselage-upper wing strut.





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35. If you are building a variant with underlined registrations (H-NADI, H-NADV, H-NADW or H-NAEJ) or the SOPLA and build the model with deflected ailerons, mount the ailerons in the position you want them. Paint the upper wing surface and apply a coat of gloss varnish. Apply the decal on the top wing
36. Cut two pieces of 11 mm length from the 0.5 mm styrene rod provided. Sand one end in a slanted form. Paint them and glue them between the lower edge of the aft fuselage and the second rib and aft spar of the horizontal tail plane.
37. Carefully examine the undercarriage parts that go with the version you are building for air bubbles and fill any you find with thin cyanoacrylate glue. Apply a layer of primer and inspect the parts again. Repeat the process until no air bubbles are visible any more. Sand the parts smooth and apply the final layer of paint.
38. If you build a version with the rubber band sprung axle, glue parts (E25) and (E26) flat together. If you build another version, jump to step 40. Glue the tip of the V-shaped part (E26) in the casted hole under the fuselage such that the tips of part (E25) point towards the forward vertical fuselage-upper wing struts. The bottom of the assembly should be slanted slightly backwards. Make sure the axle part is horizontal. Fix the tips of (E25) temporarily in place, checking that the axle stays horizontal. Glue them to the fuselage and remove the tape.
39. Dry fit struts (E27) and (E28) in the holes in the lower fuselage and lean them to the undercarriage assembly. Cut them to the correct size and glue them to the assembly. Jump to step 44.
40. If you build a version with the oleo damper struts, glue parts (E31), (E35) and (E36) to each other, keeping them flat in a plane. Keep the space between (E35) and (E36) at the top equal to 10.5 mm. If you build another version, jump to step 43.
41. Dry fit the assembly to the fuselage by placing the notch on (E31) in the hole under the nose. Sand the slanted end of (E35) and (E36) a bit more if required. If dry glue (E31) to the fuselage, pointing the slanted ends towards the forward vertical fuselage-upper wing struts. Allow to dry and glue the top ends to the fuselage.
42. Glue part (E33) between the undercarriage assembly and the aft hole under the fuselage. Jump to step 44.
43. If you build the version with the oleo damper struts, use parts (E35) and (E36) to replace parts (E32) and (E34). Keeping the struts in one plane and the damper part normal to that plane. The procedure is the same as described in steps 40 through 42.
44. Glue the wheels (E29) and (E30) to the (stub) axle.
45. If you are building the model with deflected control surfaces, glue them in place with the desired deflection.
46. Open up the four slanted holes in the upper wing close to the ailerons and the six slanted holes in the aft fuselage. Cut ten control horns, four for the ailerons, two for the rudder and four for the elevator halves from the small sheet of 0.4 mm thick styrene, the four for the ailerons about 3 mm high, the six for the elevator and rudder 1.5 mm high to avoid interference with the support struts of the horizontal tail plane and the elevator halves, all control horns with a base of about 0.5 mm. Glue the control horns in the superficial holes of the ailerons and tail control surfaces, slanted slightly forward.



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47. Paint the control horns and apply the ten control cables made from e.g. thin fishing line, first gluing them in the slanted holes in upper wing and aft fuselage and when dry guiding them over the top of the control horns and gluing them there.
48. Paint the air scoop (E37) and glue it under the nose, the slanted opening pointing forward.
49. Paint the small exhausts (E39) while they are still attached to the sprue. Cut them free with a razor saw and glue five of them to the engine cylinders. Note that they are slightly different positioned for the Vega engine and for the other Walter engines (see the table on page 3 and the photographs at the end of these instructions). The SOPLA and H-NADW aircraft both had NZ engines.
50. Paint the tail skid (E24) and glue it to the rudder. Paint the landing lights.
51. Cut the 1.2 mm styrene rod on in the nose to such length that the propeller is close to the nose. Paint the propeller (E38) and glue it in place.



Painting instructions and decal placement

In the painting instructions below the following abbreviations are used: HE = Humbrol enamel, RA = Revell Aqua, VMA = Valejo Model Air, TA = Tamiya. The paints indicated are the ones I have used or matched; of course equivalent colours of other brands may be selected. It is recommended to finish the model with flat or satin varnish.

Cockpit interior

Walls and floor: light grey (HE129). Control elements, seats and frames: dark grey (HE125). Cockpit edges: leather (HE62). Tip of control stick, throttles and rudder pedals: black (HE21).

Outer finish

The forward fuselage until the aft end of the cockpits was covered with aluminium sheet panels (VMA 71.062) with a swirl pattern (steel, VMA 71.065). Engine cylinders aluminium, dry brushed with gun metal (VMA 71.072). The H-N registered aircraft had a white (HE 22) painted rudder. All aircraft had a small red-white blue flag at the top of the fin, except the PH-AIA with the straight fin leading edge, which had the flag on the top of the rudder. The aircraft of the Rotterdamsche Aero Club and the Nationale Luchtvaartschool (NLS) had an aft fuselage and fin painted blue-grey (TA XF-25) and sometimes an aluminium fuselage top, separated by a dark blue cheat line (provided as a decal). The PH-AIB has been photographed in 1938 with the new NLS paint scheme: completely orange fuselage and tail planes and the white shadowed black fuselage registration. The SOPLA plane had a dark brown fuselage (TA XF-68) with a light brown band (provided as a decal) spiralling from the top of the engine compartment to the tail, mimicking the cigar brand it was making publicity for; the fin was probably aluminium. All Pander E's had a red-white-blue flag on the top of the fin. The bands of the flag are 1.5 mm wide. The wings and tail planes of most aircraft were aluminium (VMA



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71.062), except for the underside of the SOPLA aircraft upper and lower wing. For details is referred to the photographs of the individual aircraft. Wheels: tank grey (RA 36178). Wing struts: light grey (TA XF-80). Control horns: dark grey (HE 1255).

Decal placement

See the separate sheet with instructions how to handle the ALPS- and UV-printed decals. Derive the exact location of the decals from the pages with the photographs. To limit the decal sheet size you will have to compose most registrations from individual characters.

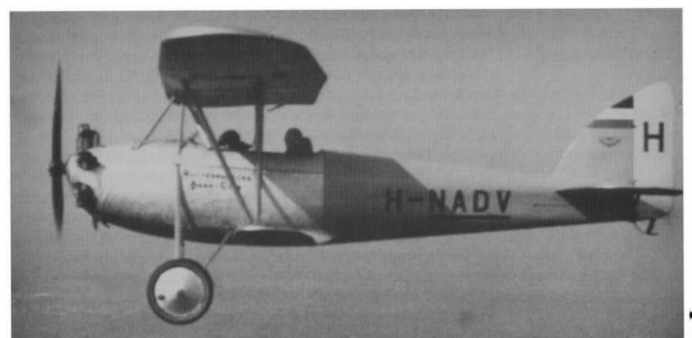
In general the large registrations were placed on top of the upper wing, the smaller one under the upper wing. All aircraft had the Pander logo on the fin. The H-NAEJ had a large *H* on the white rudder, the other H-N registered aircraft had a smaller *H* on the rudder. Place the text *Rotterdamsche Aero Club* or *Nationale Luchtvaart School* as close as possible to the cockpit edge and to the attachment point of the forward vertical upper wing-fuselage strut. The decal with the text *Pander E* belongs to the H-NADI and is placed on the top of the white rudder. Note that one small white *SOPLA* decal is provided separately.



Photographs



[Source: private communication Dick Funcke]



[Source: ref. 1]



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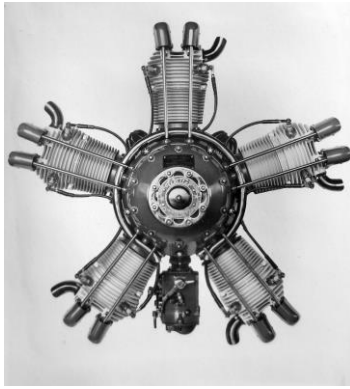


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[Source: ref. 1]

Building instructions 1/72 scale Pander E



[Source: private communication Dick Funcke]

Enjoy your model.

Rob Hamann
HA Models
info@hollandaircraft.nl

Model conception, masters and decal drawings by Rob Hamann, with the technical, commercial (and moral) support of Erwin Stam. Documentation from various books and from information provided by Dick Funcke and the Aviodrome museum. The resin kit has been cast by Tilly Models, the decals have been printed by Arctic Decals.

A building report of the masters and the prototypes of the Pander E model can be found at <http://www.hollandaircraft.nl/P03%20Pander%20E.pdf>.