

# Koolhoven F.K.51 single seat Steelwork<sup>1</sup> injection kit

## Biplane fighter and training

Scale 1:72

The Koolhoven F.K.51 was the most successful Dutch built airplane of the inter-bellum. In total 142 FK.51s have been built. The prototype has been designed and built in thirteen weeks, and obtained its airworthiness certificate one month after the first flight on May 25, 1935. The two-seat training and reconnaissance aircraft has been ordered by the Dutch Army Air Department (LVA), the Dutch Naval Air Service (MLD), the Dutch East Indies Air Department (KNIL LA) and Spain.



The Spanish order for the F.K.51 is the source for the construction of the single seat version. Although the original order asked for the F.K.51s to be equipped with Wright Whirlwind engines, as were the F.K.51 aircraft for the MLD, there was an apparent problem in the supply of these engines (possibly due to export restrictions), and a switch was made to second hand ex-Armstrong Whitworth Argosy 14 cylinder Armstrong Siddeley Jaguar engines, which Koolhoven purchased second hand. Due to the larger weight and diameter of these engines the design of the F.K.51 had to be revised quite a lot; the diameter of the fuselage increased, as well as the length of the cowling due to the larger propeller and the length of the undercarriage. The wood covering of the forward fuselage was changed to cloth covering and the forward cockpit was suppressed to adjust the center of gravity and the aft one was provided with a canopy<sup>2</sup>. The aircraft has been used as a night fighter and for training purposes. Allegedly according to the text in the kit's documentation, one copy survived the Spanish Civil War, but hardly did fly with the Nationalists; it was used as a source for spares for the three surviving two seat F.K.51s.



The first F.K.51 single seater flew in May 1937 and deliveries started in July of that year. Some single seaters have been transported by ship under a load of potatoes to harbours in the neighbourhood of Barcelona. In total ten have been delivered; the last six could not be delivered and have been stored at the Koolhoven factory. They have been destroyed in May 1940 in the bombing of the factory. Very little is known about the use of the aircraft and only a couple of photographs exist.



The kit comes in a sturdy carton box and contains resin parts for fuselage. Engine, cowling and some details, injection plastic parts for wing, tail planes and undercarriage, a clear injection plastic canopy, PE parts to add detail, decals to build three versions and a double-sided A4 instruction sheet. Injection moulded parts, resin parts, clear plastic parts and decals and PE are packed in separate bags.

The instruction sheet contains a short description of the aircraft and identifies the parts in the kit. An exploded view indicates the place of the parts and offers several choices for the assembly. It also presents a rigging scheme for the F.K.51, which is rather exceptional for this kind of kit.

The decals allow constructing three versions of the airplane: the PH-APK in its Dutch "export" livery, the Spanish Republican air force EK-001 and the Spanish Nationalist air force EK-001. According to Wesselink (ref. 26) ten single seat F.K.51s have been delivered, construction numbers 51102 to 51111. The PH-APK was c/n 51108. According to the same source the single seat F.K.51s received registration numbers starting with EJ, so it is unlikely that it carried the registration EK-001<sup>3</sup>.

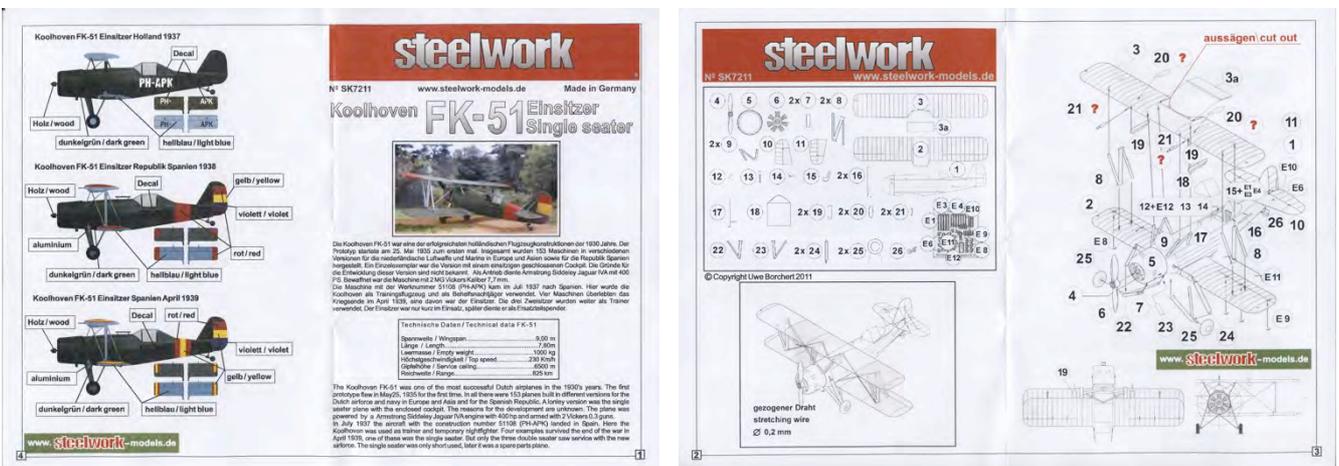


The first two seat F.K.51 has been delivered in December 1936, and carried a similar Dutch registration PH-AMK, which may explain the confusion. It is more likely that the PH-APK received in July 1937 the Spanish registration AJ-008, being the eighth single seat F.K.51 delivered.

Uwe Borchert of Steelwork has been very helpful to provide two references (ref. 27 and 28) on the F.K.51 as has been used in Spain. However, all references contain very contradictory information on the Spanish F.K.51s, especially on the single seaters.

There are few pictures of the single seat F.K.51. Ref. 6 contains one photograph of the PH-AKP in the Koolhoven factory, which shows clearly the straight leading edge of the vertical tail plane (p. 333). Another picture of this version can be found on p. 287. All other pictures (pp. 284, 285 and 288) show a round leading edge of the tail plane, or carry no information for this aspect (p. 278). The pictures of the single seat F.K.51s taken in the Netherlands show, an aluminium cowling with (probably) olive mounting strips, aluminium wing strut fittings and sometimes aluminium oleo struts. These all have disappeared on the pictures taken in Spain, except an aluminium band around the oleo struts. Copies of these pictures are included in the appendix.

Painting instructions in the instruction sheet are limited, but sufficient. I will build the aircraft in Spanish Republican air force livery.



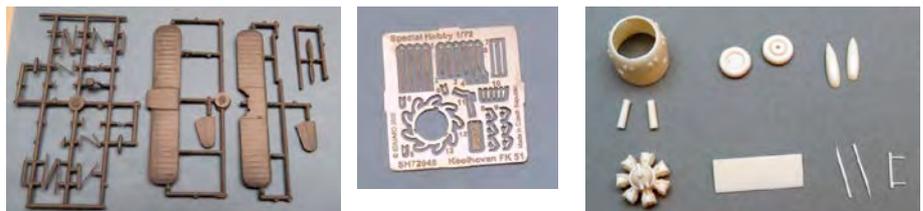
References 1 through 12 report the dimensions of the F.K.51, while Wesselink (ref. 8), ref. 9 and Hooftman (ref.10) also give a three-view drawing. Wesselink (ref. 26) contains quite extensive information on the Spanish F.K.51s.

	Ref.	1:72	model
Span	9.00 m	125.0 mm	126.7 mm
Length	7.40-7.85 m	102.8-109.0 mm	111.2 mm
Height	2.80-2.85 <sup>4</sup> m	38.9-39.6 mm	47.1 mm
Engine	Armstrong-Siddeley Jaguar IVa , 420 hp		
Crew	1		
Armament	2 Vickers 0.303 machine guns		

The model is reasonably to scale, except for the height<sup>5</sup>.

**Parts**

The injection-moulded parts have been taken from the Special Hobby F.K.51 kit, which is confirmed by the inscription on the PE parts. The PE parts for the Wright engine are not required for this model.



The resin parts include a new fuselage, an insert for the upper wing, fairing for the wing mounted machine guns, a cowling, rails for the canopy, a gun sight, a pair of wheels and a pair of engine exhausts and a single row, seven cylinder engine. This corresponds not to the 14-cylinder Jaguar engine, but might be acceptable, as very little is visible of the second cylinder row.

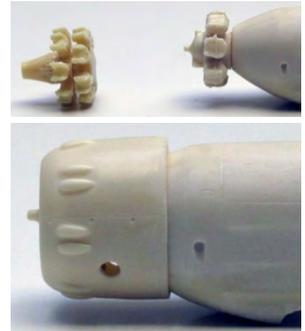


The resin parts are of very good quality. Only the cowling, which has very thin walls, is slightly deformed. No modifications or alternatives for the lengthened undercarriage and the larger propeller are included.

Comparing an assembled twin row Jaguar engine from the Omega Models Fokker D.XVI kit with the single row part in the Steelwork kit shows quite some difference in length, even when neglecting the long forward part of the Omega Models version. However, when fitting the short Steelwork engine temporarily to the fuselage, the dimensioning is quite all right; the double row engine cannot be fitted inside the cowling without taken off part of the heads of the first cylinder row.



Two clear plastic vacuum formed canopies are provided. They contain no detail, but are of good quality.

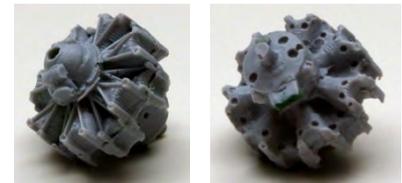


### Engine and propeller

I have enlarged the diameter of the propeller with 4 mm by using the blades of a scrap Fokker C.X propeller and the hub of the original propeller in the kit and reworking the base of the blades with putty and filing. Although these blades have a slightly smaller chord, the result is acceptable.



I have ordered a new Armstrong Siddeley Jaguar engine from Engines & Things in the USA. This engine is very well detailed, but the diameter is slightly too large to fit the cowling. Also, it has quite some auxiliary equipment on the rear side, which has to disappear when mounting it to the F.K.51 fuselage.

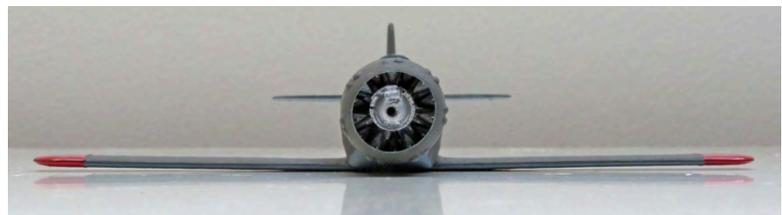


The cowling has had a warm bath treatment to make it circular. I had to rework the forward opening a bit to give it an acceptable appearance. I have sanded down the outer diameter of the E&T Jaguar, the forward row a bit more than the second row, to fit it in the cowling. I have mounted an axle to the cleaned propeller and fitted propeller, engine and cowling together.



I have painted the engine crank case aluminium, the cylinders gun metal and the housing of the valves and valve pusher rods black. The spark plug leads were guided over the cylinder head towards the rear and on some pictures they had a light grey shielding. As I found that this colour would give an attractive contrast, I have modelled them by white painted 0.2 mm metal strand.

I have not attached the engine to the fuselage with cyanoacrylate glue, as I usually do, but have preferred to do so with Kristal Klear, which allows for fine adjustment both in translation and in rotation about all axes. I have used the cowling, which has not been glued to the engine, to align the engine correctly to the fuselage.



I have painted the propeller with Humbrol Natural wood as a base colour and have given it a wood structure with a wash of gasoline thinned Burnt Sienna oil paint. The hub I have painted with Vallejo gun metal. When dry-fitting the exhaust stubs, they were sticking out very much below the fuselage, so I have shortened them. This may be caused by the two-row Jaguar engine, as the exhaust stubs are now resting on the second row of cylinders; this may not be the case when the original "7 cylinder" Jaguar engine is used. I have also widened the holes in the cowling to 2.2 mm, and have drilled the hole a bit skewed downwards.

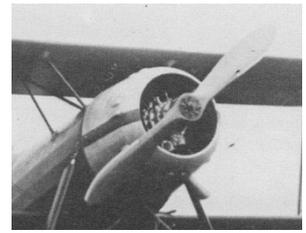


However, the propeller did not have the correct appearance in my opinion; it does not have the characteristic, wide blades. I have made a new propeller by modifying a (spare) propeller for a Cheetah engine from a Special Hobby F.K. 51 kit by cutting



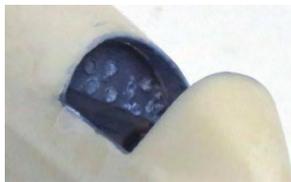
the blades at the widest part and inserting two pieces of 3.5 mm long

and 1.5 mm thick plastic at that place. After letting the (plastic) cement dry for 24 hours sanding the insert flush with the other parts of the propeller gave the right result. The new propeller has been finished the same way as the old one.



## Cockpit

The instrument panel and fuselage frame tubes in the cockpit are moulded integrally with the fuselage<sup>6</sup> and the details are difficult to paint in the very limited space. I have painted the cockpit floor and the forward and rear wall light grey, the instrument panel dark grey and the sidewalls light olive to simulate the outside applied olive drap dope shining through the cloth fuselage covering. An attempt to paint the fuselage tubes dark grey failed miserably, so I have simulated those by pieces of dark grey painted 0.6 x 0.2 mm plastic strip.



It was even more difficult to "paint" instruments on the dashboard, as the space is too limited to use a dry brush technique. I have first tried to apply a water based white wash, as that can be removed easily with a bit of water if not successful. It was not, so after removing the wash I have decorated the individual instrument dials by touching them with a toothpick wetted with the white wash. The result is about acceptable.



I have dry brushed with white paint the PE front of the console that has to be placed at the right side of the cockpit and have glued the rudder bar and the console in place.

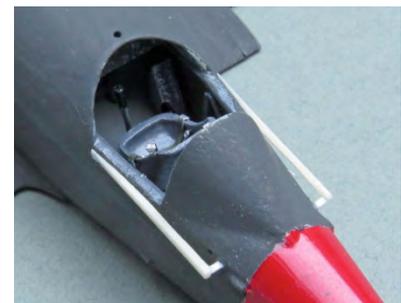
The seat belts have been painted green, buckles and fittings aluminium, and have been glued to the seat, which I have mounted on a piece of plastic strip to get it on the correct height over the cockpit

floor<sup>7</sup>. I have also glued a lever for the seat height adjustment to the seat. Clockwise on the picture starting from the seat: stick, elevator trim wheel, some control lever, throttle and another control lever. All elements except stick and seat are located at the left side of the cockpit, as they were in the pilot's cockpit of the two-seat version.



Placing and fixing the parts in the cockpit was not easy; the room to manoeuvre them is very limited. But in the end the result was satisfactory. The room behind the seat I have used to place an oxygen bottle.

The cockpit roof slides over two rails attached to the sides of the cockpit. As the fuselage tapers off quite sharply, I had to sand the end of the resin rails down quite a lot to fit them parallel to the longitudinal axis. There were two mounting points on the fuselage for the rear end of the rails, but I did not see corresponding pins on the rails, when I cleaned the parts. I have made supports from 0.2 x 0.6 mm strip to replace these missing pins. I have painted the rails olive drap, except the top surface which I have made dark grey.



As I wanted to mount the canopy in an open position, I had to separate the windscreen from the rest. I have first put a piece of tape next to the separation line, which was very vague on the thin vacuum formed canopy, and have then supported it with a cylindrical shape of about the same diameter (in this case a marker pen). Carefully cutting with a very sharp scalpel along the tape did the job: the windshield came off nicely and needed hardly any rework.



I have also made the top half of an oxygen bottle and have glued that at the right side of the cockpit behind the seat.

I have painted the frame of the windscreen and canopy first light grey and then olive drab. As usual, the paint adhered badly to the clear plastic, so I had to repaint part of the frame, where the tape had damaged the paint, by hand.

## Fuselage

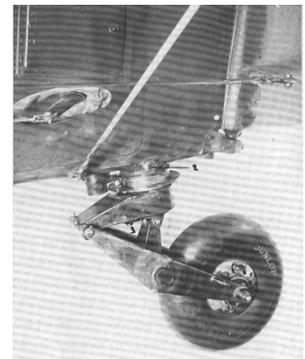
I have drilled 0.3 mm holes in the six fairings for the elevator and rudder control cables and four holes in the top of the fuselage to accommodate the cabane rigging lines. I have also widened the two holes in front of the cockpit to 0.4 mm to accommodate the gun sight.

The fairings for the rudder and elevator control cables have been nicely modelled. I have drilled a slanted 0.3 mm hole in each of them to enable easy mounting of the cables later on.



I have painted the fuselage top and sides olive drab and the fuselage bottom light blue and have also applied the red band around the fuselage, relying completely on the instruction sheet in the kit, as none of this is visible on the scarce photographs of the aircraft.

The fuselage does not have the detailed provisions for the tail wheel actuation, as shown in the handbook of the F.K.51, reproduced in ref. 10. To model it I have drilled two holes of 0.7 mm next to each other and have connected them with a knife. This "cavity" I have painted leather. At the same time I have drilled two holes at each side on the bottom corner of the aft fuselage to accommodate the tail rigging lines.



## Wings

The lower wing was fitting quite well in the recess of the resin fuselage; only the leading edge and forward part of the center section needed some correction to obtain a smooth fit.

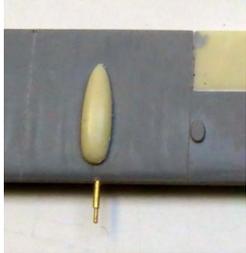


I have cut out the rear part of the upper wing center section and have glued the resin part in the cutout as indicated in the instruction sheet. For the single seat F.K.51 this cutout was not required



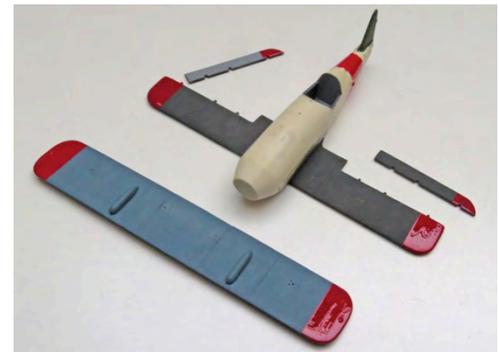
any more, as the pilot was accommodated in the rear cockpit.

Next I have removed the ailerons from the lower wing by means of a panel line scribe. I have removed the engraved hinges from the ailerons and have glued small ends of 0.7 x 1.0 strip to the wing at the location of the hinges. When these had well dried, I have sanded them to the correct length and rounded them off a bit to fit the ailerons. I have also drilled the 0.3 mm holes for the rigging cables in both wings and 0.4 mm superficial holes for the brass pins, which I have glued in the N-struts.



The fairings for the machine guns accommodated in the upper wing have been glued in place and the plastic machine gun have been replaced by a combination of 0.3 x 0.1 mm and 0.8 x 0.4 mm bras tubes, glued in a 0.8 mm hole drilled in the wing leading edge. Prior to painting these fairings needed some putty treatment to fit well to the curvature of the upper wing surface.

I have glued the lower wing to the fuselage and have painted the tips of both upper and lower wing, the corresponding part of the ailerons and a band around the rear fuselage red, as indicated in the instruction sheet. After two coats the coverage was sufficient.



The fuselage, the top surface of the lower wing and the bottom surface of the upper wing have received a final coat of paint and a coat of Vallejo satin varnish and I have cleared again all holes for the rigging wires.



I have fitted the N-struts and have adjusted the depth of the holes in the wings such that the struts were flush with the wing surface. I have fixed them in place with thick cyanoacrylate glue. When fitting the upper wing on the struts, it was alignment well when seen from the top, but it was sitting rather wobbly; the right forward strut apparently was too short. I could not sand down the left forward strut much without risking giving the upper wing a negative angle of attack and adjusting the rear struts was no option any more, as it meant removing the pins, etc.



So I have sanded the top of the forward strut well flat and have glued a slice of 0.5 mm plastic on it with the ultra-thin Tamiya glue to get a strong joint. When dry I have adjusted the strut until the upper wing was lying smooth on the struts. The piece of plastic has been sanded flush with the lower part of the strut and has been painted dark grey.



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I have glued the upper wing to the N-struts, which fitted well; both from top and front view the upper wing is perfectly parallel to the bottom one. Even without the cabane struts the construction is quite sturdy. The cabane struts needed some minor adjustment to fit well.

## Rigging

As the wings were in place the rigging lines could be applied. I have painted a length of 0.06 mm fishing line silver, which will be better visible on the dark finish of the model.

I have started with the four rigging lines that run from the top of the rear canine struts to the top of the fuselage. I have led these through the pre-drilled holes in the upper wing, inserting them in the holes in the fuselage, where they have been fixed with a drop of thin cyanoacrylate glue, applied with a



thin metal wire.



When that had dried well I have tensioned the line on the wing surface with pieces of tape, but have not yet applied glue, as that would probably clog up the neighboring holes for the other rigging lines.

I have then threaded the lines running from the cabane struts to the bottom of the N-struts through the holes, have tensioned these and have fixed them on the bottom surface of the lower wing and the top surface of the upper wing with small pieces of tape.



I have applied drops of thin superglue on all lines and holes in top wing and have set the model aside to wait for the glue to set.



When the glue had dried I have cut off the excess line together with the glue bubble on the surface with a new, sharp knife. I done well, only

the black core of the fishing line remains visible, and a light sanding is sufficient to achieve a good surface finish.

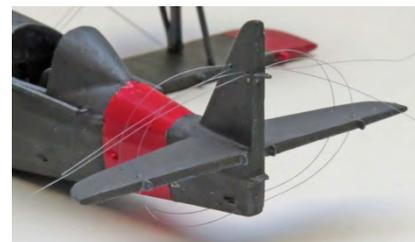
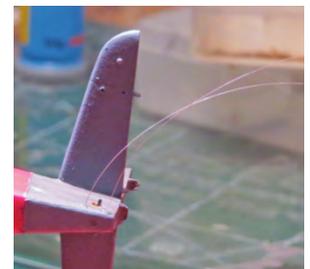


Next I have introduced the rigging lines from the top of the N-struts to the lower wing root. They have received the same

treatment as the other wing rigging lines. To finish the job I have given the top surface of the upper wing and the bottom surface of the lower wing a final coat of paint.



The streamlined rigging profiles connecting fin and stabilizer to the fuselage I have modeled by 0.06 fishing line, painted black. I have first inserted two ends of line in the predrilled 0.3 mm holes at each side of the rear fuselage and fixed them with a small drop of thin cyanoacrylate glue applied with a thin metal wire. When that had set well I have guided the line through the holes in the stabilizer and in the top of the fin.

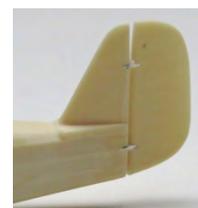


The fishing line has been tensioned with small pieces of tape, taking care of separating the ends that have to be cut off well from the lines that have to stay intact. The rigging lines have been secured at the fin only with thin superglue. When the glue had dried well, I have cut off the excess line and have given wing and tail surfaces a coat of satin varnish.

**Tail**



I have separated the rudder and elevator halves from the tail planes with a saw and have made 0.15 mm wide cuts in the tail planes and 0.3 mm wide cuts in elevator halves and rudder at the location of the hinges. The hinges themselves are made from 0.2 mm thick strip, sanded in the correct shape.



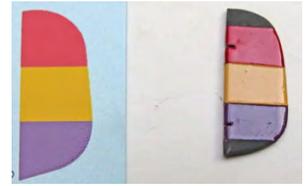
The horizontal tail planes have received the same treatment, but in

that case I have mounted 0.13 mm thick strips for the hinges. The joint between these tail planes and the fuselage needed some rework to obtain an acceptable fairing.

The kit contains a decal for the rudder, but, as the colours are rather standard, I have decided to paint the on the rudder. I have also glued the stabilizer halves to the fuselage. The fairing of these parts to the fuselage needed quite some correction.



I have prepared the locations where control horns had to be mounted by drilling superficial holes with a diameter of 0.7 mm, taking care that they were symmetrically placed. I have mounted the PE control horns included in the kit by applying a small drop of thin cyanoacrylate glue in these holes and positioning the tiny parts in the hole with a pair of tweezers with fine points.



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### Undercarriage

The undercarriage legs of the single seat F.K.51 were longer due to the larger propeller of the Jaguar engine. To investigate how to achieve that I have first “dry” fitted one leg on the fuselage by temporarily gluing it with Kristal Klear, which can be removed easily without leaving any trace. When I had fitted the leg I have also drilled a 0.4 mm hole for a pin to be mounted in the main strut in order to ensure a firm connection.



I have first sanded a piece of 3.25 mm chord styrene streamline profile down to 2.5 mm to form a new oleo damper strut of 4 mm (0.3 m in scale) longer than the original in the kit, using the end fittings of the original strut. Next I have cut the transverse undercarriage strut in half and have glued a piece of 3 mm streamline profile between the halves. When that had dried well, I have covered the joints with thick cyanoacrylate glue to reinforce them. I was planning to mount this enlarged strut on the model, ensuring perfectly mirrored angles relative to the original strut.

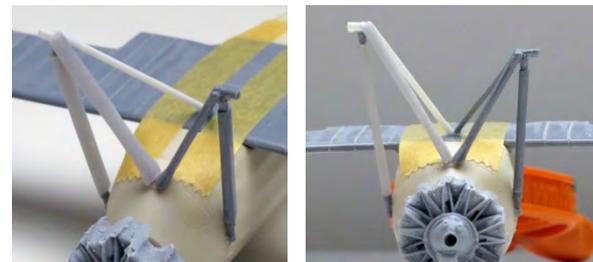


Unfortunately I have lost this strut in manipulating the model, so I had to produce a new strut from scratch. I have done so by means of streamline profile sanded to the correct width and thickness and cut to a length 3 mm longer than the original (equal to  $4/\sqrt{2}$ ) thickening the end interfacing with the fuselage with some slivers of profile material, sanded to shape to represent the strut fairing. The axle



I have modeled with a piece of plastic rod of the correct dimension. I have measured the required length of the rear support struts for the lengthened undercarriage legs and have produced two copies from 1.0 mm plastic rod.

The picture at the right shows the dry fit of the new main legs.



### Decals

For the registration I have made a rather arbitrary choice in view of the scarce and in most cases contradictory information. No pictures exist of a single seat F.K.51 with Jaguar engine, on which the Spanish registration is visible. Also, the only picture of a single seat F.K.51 with a straight fin leading edge is the PH-APK, which was the eighth Jaguar-engined F.K.51 according to Hooftman and Wesselink, who give the most complete list of F.K.51 deliveries to Spain. Both authors also state that the EK- registrations were assigned to the two-seaters, while the single seaters got an EJ- registration. So I have opted for the registration EJ-008 in black (all authors agree at least for that), to be applied on the fuselage sides only. As I had to



print a number of decals for other projects, the F.K.51 registrations have been taken along in that print run. Prior to application of the decals I have sealed them with Microscale Liquid Decal Film.

I have coated both sides of the fuselage with Vallejo gloss varnish and have placed the decals on it. On one side this did not work well; some silvering could be observed. My attempts to repair that with Microscale Set and Sol resulted in complete destruction of the decal, so the fact that I had printed three copies came in handy. The second attempt worked well



### Final assembly

First thing I did was to glue the gun sight, which I had painted black, in place. I have given the complete model a coat of satin varnish, as in its current state it is still relatively easy to handle.



Next I have mounted the undercarriage. It was quite a job to fit that into place and at the same time ensure that the wing was horizontal, when the model was resting on its legs. I had to adjust the length of the rear support struts to get a correct attitude of the model when viewing it from the side.

I have glued the wheels in place. No adjustment was necessary to get the wing horizontal, but due to the difficult mounting of the



legs (many attempts with fresh cyanoacrylate glue) the paintwork on the underside needed quite some restoration.



I have assembled some small stuff: the brass tube machine guns, painted Humbrol gun metal, the tail wheel in neutral position corresponding to the position of the rudder bar and the exhaust stubs. These last ones I had to modify slightly, as their opening was slanted backwards on pictures of the original. I



have also enlarged the inner diameter of the exhaust tubes; only a wall thickness of 0.2 mm remained.

Next I have mounted the control surfaces. The elevator halves have been mounted in a downward position, corresponding to the position of the control stick. I had to



adjust the width of the "hinge" slits, removing the paint to fit them properly. The rudder has been mounted in a neutral position and the ailerons left one up and right one down, again corresponding to the stick position.



I have made the control cables from 0.06 black painted fishing line. The eight pieces have been inserted in the holes in the aft fuselage, secured with a drop of thin cyanoacrylate glue applied with a thin metal wire and left to dry well. I have tensioned them over their respective control horns, fixed

them temporarily with a piece of tape and secured them again with a small drop of glue.



The six PE aileron mechanisms have been glued in place and the olive drab painting at the place of the control surface hinges has been retouched.

Next I have painted the navigation lights at the upper wing tips aluminium, and when dry have painted the left ones transparent red and the right ones transparent green.



I have bent a pitot tube from 0.2 mm metal wire and attached it to the bottom of the left wing N-strut, where it was also located on the standard F.K.51.



I have made the rigging line stabilization rods from 0.2 mm metal wire and to fix them with thick cyanoacrylate glue to the crossing of the wing rigging lines.



A comparison with the two seat version of the F.K.51, as produced for the Dutch services, clearly shows the difference in profile between the aircraft.



Finally I have glued the windscreen and the sliding cockpit roof in place with sparingly applied Microscale Kristal Klear. Cleaning and retouching the model here and there with satin varnish completed the build.



### Summary

The Steelwork Models Koolhoven F.K.51 single seater was a nice model to build. I have met no specific difficulties in building the kit; if any, they have been caused by modifications I have made myself.

Major shortcoming in the model is the incorrect engine; the kit contains a seven cylinder Armstrong Siddeley Cheetah engine instead of the double row 14 cylinder Jaguar engine. As a consequence the cowling is also a little short. The kit uses the same undercarriage as the Special Hobby standard F.K.51, while that of the single seater original has been lengthened by 0.3 m to accommodate the larger propeller of the more powerful Jaguar engine. However, as the Special Hobby model height is too large, unmodified application of the landing gear legs would have resulted in a correct scale height, but would not distinguish it from the standard aircraft. Modifications of engine and landing gear are foreseen by Steelwork Models for a reissue of the kit.

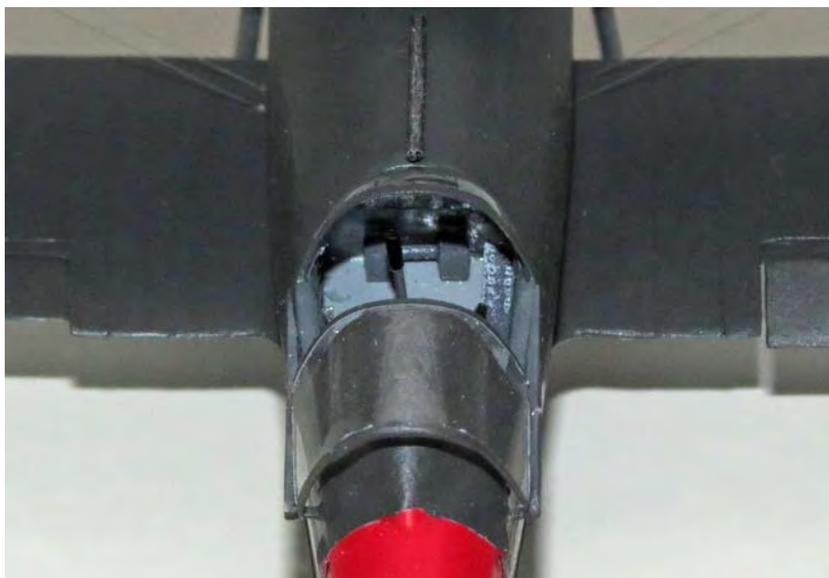
Showing the standard and single seat F.K.51 next to each other is a nice illustration of the improvisation in aircraft construction in the late 1930's.

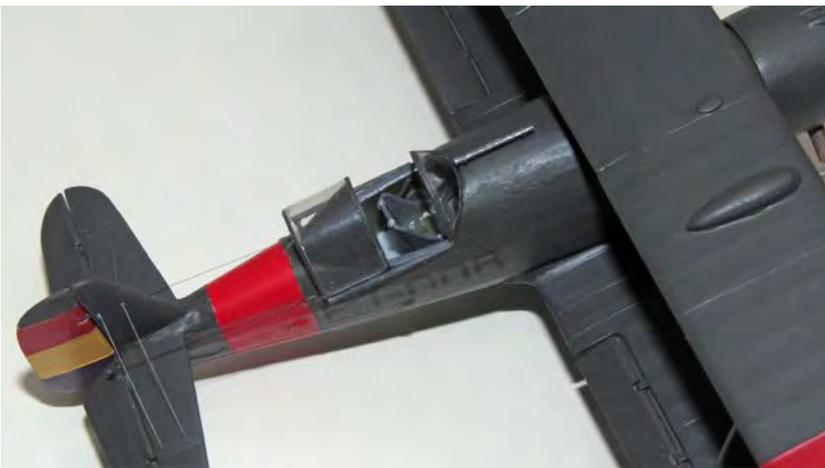
Below some pictures of the completed model are shown.













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## Appendix Single Seat F.K.51 documentation

### Modifications & corrections

M = modification, C = correction

Change	Location/part	Modification or correction
C	Engine	Two-row Armstrong Siddeley Jupiter by Engines & Things implemented
C	Engine	8 mm increased propeller diameter
M	Wing	Ailerons separated, hinges introduced
M	Wing	Pin-hole connection of wing N-struts
M	Tail	Rudder and elevator halves separated, hinges introduced
C	Undercarriage	4 mm lengthened oleo damper struts; adapted length main undercarriage legs and support struts
M	Undercarriage	Pin-hole connection of undercarriage main legs
C	Fuselage	Nose section shortened to accommodate longer engine
C	Fuselage	Recesses enlarged for oleo struts
M	Fuselage	0.3 mm holes in control cable fairings
M	Fuselage	Openings for tail wheel control horns

### Paint table

H = Humbrol, R = Revell Aqua, V = Vallejo, M = Marabu paint stick

Code	Colour	Where
H21	Black	Valve housing, valve pusher rods housing
H53	Gun metal	Exhaust stubs
H62	Leather	Openings for tail wheel control horns
H66	Olive drap	Fuselage, upper surface of

Code	Colour	Where
		wings and tail
H86	Light olive	Cockpit side walls, seat belts
H110	Natural wood	Propeller
H113	Rust	Exhausts (dry brushed)
H125	US dark grey	Wing and undercarriage struts, instrument panel, control horns
H127	US ghost grey	Cockpit floor and front & rear walls
H230	PRU blue	Underside wings
H1321	Transparent red	Navigation lights
H2325	Transparent green	Navigation lights
M011203	Silver	Rigging lines
M012132	Black	Control cables
R36178	Tank grey	Tires
V71.062	Aluminium	Engine crank case, seat belt fittings
V71.072	Gun metal	Engine cylinders, propeller hub
V70.522	Satin varnish	All model surfaces
--	White wash	Instrument dials
--	Burnt sienna oil paint	Propeller wood structure

### Pictures

If no source is mentioned, pictures have been copied from various Internet sites.



[Source: Top; ref. 11]

[Source: Wesselink; ref. 26]



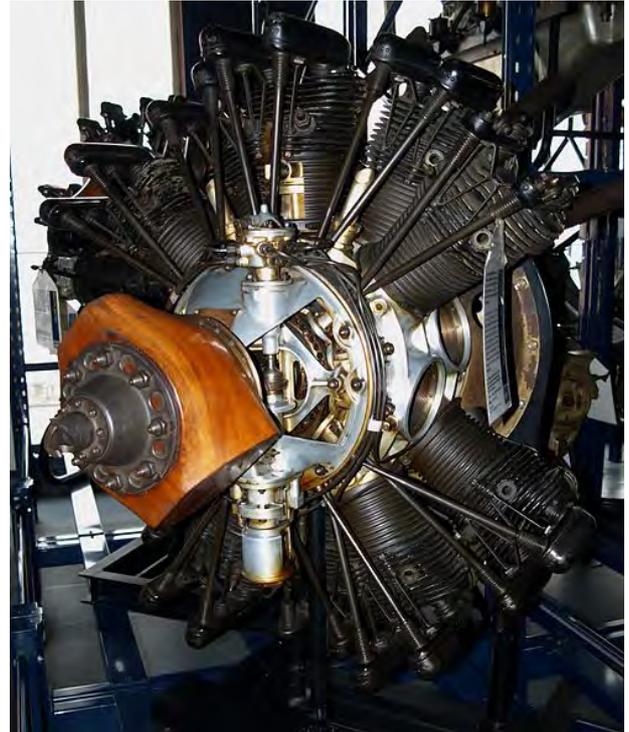
[Source: Wesselink; ref. 26]



[Source: Wesseling & Postma; ref. 8]



[Source: Wesselink; ref. 26]



[Source: Wikipedia]

**Documentation provided by the IPMS NL SIG  
Spanish Civil War**



[Source: Wesselink; ref. 26]



KOOLHOVEN FK 51, FK 51bis AND FK 52 213

LATÉCOÈRE 28 213



The Klemm L.32.

**Klemm L.32**

The Klemm L.32, which appeared in 1932, was a low-wing cantilever monoplane seating a pilot and two passengers in an enclosed cabin. It was of wooden construction, with plywood covering, and had a wide-track, fixed undercarriage. The powerplant was usually an uncowled 130-150hp Siemens SH 14A radial. Three were delivered to Spain early in 1937, and, with the military serials 30-65, -66 and -68(?), were employed by the Condor Legion as liaison aircraft. In 1939 they were taken over by the Ejército del Aire, and in 1945 their type code was changed to L.4.

Span 12m; length 7.7m; height 2.05m; wing area 17sq m.  
Empty weight 575kg; gross weight 950kg.  
Maximum speed 205km/h; cruising speed 180km/h; ceiling 6,000m; range 750km.

KLM. No others were built, and on 5 September 1936 PH-AES was bought by E. Jacobs, who is believed to have sold it to a Spanish Republican agent. Nothing is known of its history in the Spanish Civil War.

Span 14.06m; length 11.25m; height 3.4m; wing area 30sq m.  
Empty weight 1,050kg; loaded weight 2,000kg.  
Maximum speed 200km/h; cruising speed 180km/h; ceiling 4,400m; range 500km.

**Koolhoven FK 51, FK 51bis and FK 52**

Frederick ('Frits') Koolhoven established his reputation as an aircraft designer with the Armstrong Whitworth

and BAT aircraft companies in Britain during the First World War, but in 1926 founded his own company at Waalhaven Airport near Rotterdam, Holland. He did not achieve much success, however, until his FK 51 won a competition, against the Avro Tutor, for a new two-seat trainer for the Netherlands air force (LVA) in June 1935. The Koolhoven FK 51 was a single-bay, equal-span staggered biplane. Its wings were built of wood, with plywood covering, only the lower wings being provided with long, narrow-chord ailerons. The fuselage was a welded-steel-tube structure covered with fabric, and the tail assembly was a separate unit attached to the fuselage by four bolts. In the later production aircraft the rounded fin was replaced by a larger triangular unit. The undercarriage was of the split-axle type, comprising two oleo-sprung shock-absorber legs and two bracing struts. The FK 51 could be fitted with dual controls, night- or blind-flying equipment, or a gun mount in the rear cockpit. The prototype was powered by a 270hp Armstrong Siddeley Cheetah V radial engine in a long-chord NACA cowling, but alternative engines included the 210hp Lycoming R-670, 225hp Continental R-680-4, 215hp Armstrong Siddeley Lynx, 250hp Hispano-Suiza 9 Qa, or 530hp Lorraine-Dietrich Super 135c. On 16 September 1935 the celebrated Dutch pilot Dirk L. Asjes demonstrated the FK 51 prototype (c/n 5101, PH-AJV) at Cuatro Vientos, Madrid, and a few days later at Getafe. Lacalle relates that, after a

The Koolhoven FK 40.

**Koolhoven FK 40**

The Koolhoven FK 40 was a single-engine, four- to six-passenger high-wing cantilever monoplane powered by an uncowled 230hp Gnome-Rhône Titan radial engine. It had plywood-covered wooden wings, and a welded-steel-tube fuselage with fabric covering. The tailplane was wood, and the fin and rudder were metal framed, with fabric covering. The undercarriage consisted of two Koolhoven oleo-sprung legs, each braced to the lower fuselage by a pair of V-struts. The prototype FK 40 (c/n 101, PH-AES) first flew in November 1929 and was bought by



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The Koolhoven FK 51 in Republican service.

brilliant display of aerobatics, Asjes landed and invited a Spanish pilot to fly with him. The invitation was accepted by Teniente Ramiro Pascual, one of the finest fighter pilots of the Aviación Militar. After a few manoeuvres Asjes, in the front cockpit, released the stick and put his hands on his head as a sign to Pascual to take over. The Koolhoven bucked and reared violently before going into a prolonged dive. Seeing the ground racing towards them, and with no indication that Pascual intended to pull out, Asjes seized the control column and, to his astonishment, found it completely free. He only managed to level the machine when its wheels were skimming the ground. Turning his head, he was surprised to see Pascual with his chin resting on his hands and quite unperurbed. The Spaniard had assumed that, by letting go the controls, Asjes was simply demonstrating the flying qualities of the aeroplane.

The Spanish government ordered twenty-eight machines, including the prototype, to be fitted with Wright Whirlwind engines. None were delivered before the Spanish Civil War broke out in July 1936, and Koolhoven feared he might be left with twenty-seven half-finished airframes on his hands until a Republican delegation visited his factory in October 1936 (probably during the same visit to Holland in which it ordered the Fokker G.I - see Fokker D.XXI and C.X) and authorised full payment in cash through SFTA (see Appendix II). To circumvent the



June 1937; 51108 'PK, 4 July 1937; 5128 'PS and 5129 'PT, 19 July 1937; 51102 'PH, 29 July 1937; 51106 'PL, -07 'PI and -09 'PV, 2 August 1937; 51110 'PW and -11 'PX, 3 November 1937.  
Aircraft c/n 5124, PH-AMT, is reported to have been a genuine single-seater. Dutch pilots flew them to the Potez aerodrome at Meaulne (Albert, France), and French pilots took them on to Toulouse-Montaudran, the Air France airport, where they were collected by Spanish



A Koolhoven FK 51 disguised as a ground-seat mailplane for its transit flight across France to Spain. (Laureau)

Non-Intervention regulations, the Koolhoven FK 51s were disguised as mailplanes ordered by the King of Siam (Thailand). The rear cockpits were faired over, and the word 'POST' was stencilled on the fuselage. The prototype, re-registered PH-XYZ, was flown to Barcelona in November 1936 by a French pilot using the non-de-guerre 'Soufflé'. For this, an intermediary in the affair, HJ van der Velde, director of the Autogiro Import Company at Hillersberg, was brought to trial in Holland and fined a nominal six Guilders. The next twenty-one FK 51s were struck off the Dutch register on the following dates, the actual delivery flights being several weeks earlier in every case:

c/n 5117 PH-AMK, 11 January 1937; 5118 'ML, 18 January 1937; 5120 'MO, 12 February 1937; 5121 'MP and 5122 'MR, 2 March 1937; 5123 'MS and -24 'MT, 8 March 1937; -25 'MU, 30 March 1937; 51103 'MV and -04 'MW, 26 April 1937; -05 'MX and 5127 'MY, 5

pilots. The route was changed each time, and French provincial newspapers of the day are full of reports of mysterious Dutch aircraft landing in remote fields and flying clubs and taking off again before the gendarmerie arrived. Flights were stopped by the Dutch authorities in November 1937, following denunciations in the French anti-Republican newspapers, and the last six FK 51s (51112 'ARM, -3 'N, -4 'ASE, -6 'G and -7 'H) were never delivered.

Until June 1937 the FK 51s were fitted with old, and generally worn out, 385hp Armstrong Siddeley Jaguar III and IVA radials taken from Armstrong Whitworth Argosy airframes that Imperial Airways had scrapped in 1933, but the remainder were delivered with the 425-450hp Wright Whirlwind R-925F engines contracted for, and were given the Spanish designation FK 51bis.

The first Koolhovens were used for transition training at San Javier, Cartagena, where the American mercenary pilot Frank Tinker found their control layout and handling qualities almost identical to those of the Vought Corsair he had flown in the US Navy. Between April and June 1937 eleven FK 51s and three

FK 51bis were flown, via Catalonia and France, to the northern zone, the groups being led in each case by José Rivera Llorente. On 3 May the crew of one machine deserted at Pont Long Aerodrome, Pau, in France. In the north, the Koolhovens were used as light bombers until all but one were destroyed, the survivor crashing when its pilot tried to land at Biarritz. In the main zone the Koolhovens, with the type codes EJ (FK 51) and EK (FK 51bis), were used additionally for night-flying training at El Carmol, Cartagena. For a time two patrols of three aircraft each were used experimentally for the night defence of Barcelona and Valencia.

The Koolhoven FK 52 was a two-seat biplane fighter, superficially resembling an enlarged Gloster Gladiator. The prototype first flew on 9 February 1937, but crashed in August that year. It was followed by a second prototype and four production aircraft in 1938. Koolhoven always claimed that the type was a private venture, but evidence shows that it was designed, built and produced to the order of the Spanish Republican government, though it was never delivered.

After the civil war the Franco government in Spain tried to claim the four production FK 52s and six undelivered FK 51bis, but the outbreak of the Second World War curtailed negotiations. During the Soviet attack on Finland in the winter of 1939-40, Count von Rosen bought

the second prototype and one of the production aircraft and presented them to the Finnish government. The others were destroyed in 1940.

**Koolhoven FK 51**

No figures are available for the FK 51 with the Jaguar engine, or for the FK 51bis. The following are for the FK 51 with the Armstrong Siddeley Cheetah V.

Span 9m; length 7.4m; height 2.85m; wing area 27sq m.  
Empty weight 870kg; loaded weight 1,260kg.  
Maximum speed 217km/h; ceiling 5,000m; range 500km.

**Latécoère 28**

In the years after the First World War, Les Lignes Aériennes Latécoère, which became Aéropostale in 1927, was one of the best and most adventurous airlines in the world. Its pilots, whose hazardous mail flights over the Sahara and the Andes are unfortunately described in the books of Antoine de Saint-Exupéry, simply called it *La Ligne*, as though no other airline existed or was worth flying to. Pierre Latécoère had inherited from his father a railway rolling-stock factory which, in 1917, he had turned over to the production of one

One of the Latécoère 28s that went to Republican Spain. (Liron)

thousand Salmson biplanes for the French air force. Having created his airline after the Armistice, he decided to supply it with aircraft built by his own factory, and for the next ten years La Société Industrielle d'Aviation Latécoère (SIDAL) produced a series of biplane and monoplane single-engined transports remarkable for their ugliness.

The Latécoère 28, which first flew in 1929, was an improvement on its predecessors in this respect, despite its slab-sided fuselage, and also had a promising performance. It was a high-wing monoplane of metal and wood, with metal and fabric covering, accommodating eight to ten passengers, the pilots and navigator/radio operator being seated in a cabin placed high and forward of the wing leading edge. The wings were braced on each side by a pair of streamlined struts, and a wide-track, divided undercarriage was fitted, with its oleos attached to the forward bracing strut. Of the several versions produced, the 28A/0 was powered by a 500hp Renault 12JH water-cooled engine, the 28A/1 by a 500hp Hispano-Suiza 12Hr water-cooled engine with a retractable radiator, and the 28B/0 seaplane, with greater wing area, by a 600hp Hispano-Suiza 12Lr. About fifty Latécoère 28s were built altogether, including thirty-nine for Aéropostale and three or four adapted for long-distance flying. In a 28/5 named *La Frégate*, the naval pilot Lt de Vaisseau Paris

[Source: Gerald Howson; Aircraft of the Spanish Civil War]

### LE KOOLHOVEN FK-51

Crédit: sur un aérodrôme aux environs de Valencia, un Koolhoven FK-51 affecté à la défense des côtes va le 18 février 1938. Son immatriculation noire est peu visible sur le bas de la queue de l'appareil mais on peut y lire CR-002. La première lettre noire coiffant l'11 s'agit bien d'un avion de chasse affecté à ce type de mission. En bas: le prototype PH-AJV devant la présentation aux autorités espagnoles à Cuatro Vientos en Grèce en septembre 1935. Il s'agit d'un avion en Espagne, d'ailleurs, mais cette fois avec l'immatriculation PH-XYZ.

Above: on a basis near Valencia, we can see on February 18, 1938, this Koolhoven FK-51 used in the coastal defence role. Its black registration CR-002 is difficult to read on the rear fuselage band but the letter C coiffing the leading one. Below: the prototype PH-AJV seen here during its demonstration to the Spanish Air Force authorities at Cuatro Vientos and Getafe in September 1935. This aircraft will definitely come back to Spain but this time with the PH-XYZ registration.

La firme hollandaise Koolhoven qui traverse une grave crise à cette époque, voit dans la guerre d'Espagne un débouché pour ses avions. C'est ainsi qu'elle entre en contact avec le gouvernement espagnol. Les relations entre Koolhoven et les Espagnols ne sont pas nouvelles car le prototype du FK-51 immatriculé PH-AJV, a été présenté à Cuatro Vientos et Getafe par le pilote d'essai de la maison Dirk L. Asjes en septembre 1935. On arrive bientôt à un accord par le biais de sociétés écrans (SEFTA principalement) établies en France, afin d'éviter le Comité de Non Intervention. Les premiers avions commencent à être envoyés en Espagne. Le premier qui arrive est le prototype PH-AJV (c/n 5101) qui a changé son immatriculation qui est devenue PH-XYZ, bien qu'il conserve son

moteur Armstrong Siddeley 'Cheetah IX'. En mars 1937 suivent un total de onze appareils qui arrivent par petits lots. Ils sont équipés de moteurs A.S. 'Jaguar' de 400 ch, il s'agit des PH-AMK (numéro de constructeur 5117), PH-AML (c/n 5118), PH-AMO (c/n 5120), PH-AMP (c/n 5121), PH-AMR (c/n 5122), PH-AMS (c/n 5123), PH-AMT (c/n 5124), PH-AMU (c/n 5125), PH-AMV (c/n 5127), PH-APS (c/n 5128) et PH-APT (c/n 5129). Ils sont être transférés vers les derniers jours d'avril et premiers jours de mai de la Catalogne vers la zone nord en survolant la France. Ils sont sous les ordres du Lieutenant José Luis Rivera Llorente. Le 3 mai 1937, l'un des FK-51 piloté par le sergent José Luis Dominguez Godoy et ayant comme observateur le sergent Alejandro Nalvar

Ruiz sème ses compagnons et se pose à Pau-Pont Long. Ils ont en fait décollé et rejoignent la zone sous contrôle nationaliste. Une semaine après, le 10, le FK-51 immatriculé avec le numéro 8, suite à une panne, se pose sur le village de Louberès près de Tarbes. Quelques jours après, une fois réparé, il est autorisé à décoller pour rentrer en Catalogne, mais il lui est interdit de poursuivre jusqu'à Bilbao. Dans la zone nord ils sont intégrés au sein d'une unité historique connue sous le nom de El Circo Rojo. Ils n'ont vraiment pas l'opportunité de combattre comme avions de chasse et se limitent uniquement aux missions d'appui aux forces terrestres. Lors de la chute des Asturies entre les mains des troupes nationalistes, l'un des derniers FK-51 en état de vol réussit à décoller et se dirige vers la plage de Biarritz qui l'atterrissage forcé sur le front de

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En même temps arrive un FK-51 complètement différent. Il s'agit du PH-APK (n°c 5108) qui a été transformé en monoplace de chasse à cabine fermée, bien que son moteur soit le A.S. "Jaguar". Il faut signaler que le PH-AMP (n°c 5121), contrairement à ce qui a été écrit, est arrivé en Espagne comme biplace. Sa transformation en monoplace, effectuée à l'usine Koolhoven (en bouchant le poste arrière avec des planches) est destinée à permettre son utilisation comme appareil de transport de courrier. Il ne garde cette apparence qu'un bref laps de temps.



Tous ces appareils sont envoyés à l'admiral de El Carmoli où ils constituent la division plus importante de l'Escuela de Vuelo Nocturno qui y est basée.

En plus des activités propres à l'école, il y a pendant quelque temps deux patrouilles de trois avions chacune, détachées sur les aérodromes de Manises et d'El Prat. Elles ont pour mission exclusive la protection des ports de Valence et Barcelone. Ils sont remplacés par la suite par des appareils plus appropriés.

A El Carmoli ils effectuent également des missions de protection sur la très importante base navale de Cartagena. Il s'y a pas d'information sur ces missions. L'auteur a pu consulter le carnet de vol du sergent José Luis Lopez de Santa Maria y Hacia, qui y a généralement mis à sa disposition. On peut y lire que le 25 mai 1938 il effectue avec le EK-007 un vol de 1h 50 de protection sur Cartagena. Un autre du même genre est effectué le 3 juin, suite à une alerte, avec le même appareil et de même durée. Le 7 juin il décolle suite à une alerte avec le EK-009, il réussit à intercepter un Savoia SM-81 nationaliste avec lequel il livre combat. Bien qu'il n'arrive pas à l'abattre, il réussit à lâcher ses bombes sur la base navale. Ceci est un exemple de ce que sont les missions de protection que

réalisaient régulièrement ces appareils. Les FK-51 poursuivent leurs missions jusqu'à 30 jours date de la fin de la guerre. Les troupes nationalistes récupèrent seulement 4 appareils dont le monoplace. Les trois biplaces passent à l'Ejército del Aire et portent les immatriculations 80-176, 80-175 et 80-174, qui changent plus tard pour devenir L.18-174, L.18-175 et L.18-176. Ils restent en service jusqu'en 1952. Le monoplace quant à lui, il est démonté et utilisé comme banc de pièces détachées.

**Codes, emblèmes et camouflages**  
A leur arrivée en Espagne l'immatriculation civile hollandaise est effacée et ils sont peints en vert olive russe sur le fuselage et les parties supérieures des plans, les parties inférieures sont elles peintes en bleu clair. Sur le gouvernail est peint le drapeau tricolore. Sur le fuselage ils ont une énorme bande rouge qui va depuis la partie postérieure de la cabine jusqu'à l'empennage. Au lieu des bandes sur les ailes, ce sont les extrémités des ailes à partir desquelles ils sont peints en rouge.

Au début de leur mise en service ils reçoivent un numéro d'ordre peint en noir sur le bande jaune du drapeau tricolore du gouvernail. Par ailleurs ceux qui sont envoyés à El Carmoli, reçoivent comme le restant des appareils qui y sont basés, une ou deux lettres d'identification sur la partie fixe de la dérive. Plus tard et suite à la nouvelle codification de la n°-37, l'inductif EJ est attribué aux appareils équipés de moteur "Jaguar" et EK à ceux à moteur "Wirlwind". Mais les premiers n'ont jamais l'occasion de le porter car ils sont détruits sur le front du nord. Les seconds vont le porter, suivi du numéro de service, peint en noir sur le bande rouge du fuselage. Le numéro le plus élevé que nous avons pu confirmer est le EK-009. Il faut signaler que certains de ceux envoyés pour la protection des ports de Valence et Barcelone changent le E d'école par le C de chasse, comme c'est le cas pour le CK-009 dont nous publions la photo.

Cette nouvelle codification n'est pas appliquée avec rigueur. C'est ainsi que si nous revenons au journal de marche du sergent José Luis Lopez de Sta. Maria nous voyons qu'il effectue ses premiers vols sur Koolhoven FK-51 en novembre et décembre 1937. Il ne vole alors que sur les appareils immatriculés LL et Y. Avec le premier, le 5 décembre 1937, il casse une jambe de train et atterrit sur une seule roue. L'avion est endommagé. Plus tard, en mai 1938, il effectue des vols sur les appareils immatriculés B, TA, V, EK-001, EK-003, EK-007 et EK-009. TA, V, EK-001, EK-003, EK-007 et EK-009. Ceci nous indique que les deux types d'immatriculation ont coexisté jusqu'à assez tard.

Un dernier mot, pour signaler que la dénomination FK-51 bis est propre à l'aviation républicaine, qui l'utilise afin de distinguer les appareils à moteur "Wirlwind" de ceux à moteur "Jaguar".

*En haut: l'un des FK-51 envoyés dans le Nord. Il porte le n° sur le drapeau de la queue de direction; on remarque à deux millimètres de l'aile supérieure ainsi que le rotor à pilotes. Au milieu: la queue vue de la terre et deux vols de quatre FK-51 arrivants à El Carmoli, dont un sans le moteur "Jaguar"; en compagnie d'un Fokker F.VII. En bas: le sergent Koolhoven effectue la défense des côtes, cette fois sur l'aérodrome de Manises-Ibiza. Il est vu que une seule arme sur l'aile supérieure.*

*Top: one of the few Koolhoven sent to the North; it carries a number on the tail fin (directional fin) as well as the pilot's rotor. In the middle: the tail seen from the ground and two flights of four surviving FK-51 at El Carmoli, of which one without engine, together with a Fokker F.VII. Left: this is航空 coastal defence FK-51, this time seen at Manises-Valencia; it carries only one machine gun in the upper wing.*



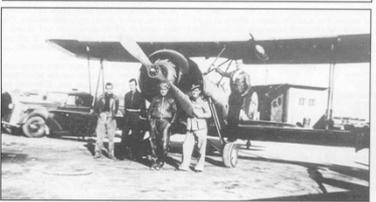
Koolhoven FK-51 basé à El Carmoli, il était utilisé pour les missions de chasse de nuit et comme avion d'entraînement, 1938.



Le seul Koolhoven FK-51 "monoplace de chasse", il était basé à El Carmoli.

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[Source: Juan Arraez Cerda; Avions Hors Series no 003, L'Aviation de Chasse de la République Espagnole<sup>8</sup>]



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CARACTÉRISTIQUES	
envergure:	6,00 m
longueur:	7,80 m
hauteur:	2,80 m
surface alaire:	27,00 m <sup>2</sup>
masse à vide:	1,000 kg
masse max:	1,600 kg
charge alaire:	59,30 kg/m <sup>2</sup>
vitesse max:	253 km/h
vitesse croisière:	230 km/h
vitesse d'atterrissage:	85 km/h
montée:	420 m/min
plafond:	6,500 m
autonomie:	625 km

**Caractéristiques techniques**

Biplace à ailes identiques décalées, à structure en bois recouverte de contreplaqué. Le fuselage métallique est recouvert de toile. Les stabilisateurs ont la même structure que les ailes et allègements. Il y a deux types de dérives, l'une à bord d'attaque arrondie et l'autre à bord d'attaque droit. Le train d'atterrissage qui est fixe, est composé de jambes indépendantes et roulette de queue. Le prototype PH-XYZ (ex-PH-AYV) possède un moteur Armstrong Siddeley "Chester V" de 270 ch qui entraîne une hélice Weybridge de 2,40 mètres de diamètre. Les premiers qui arrivent sont équipés du moteur Armstrong Siddeley "Jaguar" de 400 ch. Les suivants ont le moteur américain Wright "Whirlwind" R-975E1 de 450 ch. Ces appareils utilisent indistinctement les hélices Astra Durabel, Schwarz Martel de 2,54 mètre de diamètre ou Hamilton Standard de 2,67 mètres de diamètre. L'armement comprend deux mitrailleuses Vickers de 7,7 mm, dans le plan supérieur; tant hors du champ de l'hélice. Il paraîtrait que certains des appareils utilisés sur le front du nord sont ceux à l'arrière une mitrailleuse Vickers de même calibre, servie par l'observateur; mais il n'existe aucune preuve photographique ni documentaire à ce sujet.

*En haut: allègement de FK-51 à la bombe de la nuit à El Carmoli. Le second appareil est un monoplace de chasse. L'observateur est assis sur un plus gros moteur et son rotor; on voit, au projecteur qui sert de l'éclairage de terrain. Ci-dessous: les restes d'un FK-51 de la défense des côtes sont rassemblés et mis sur une remorque. Ci-dessous: à l'arrière d'un des hangars de l'usine Koolhoven nous voyons quelques FK-51 qui viennent de sortir des chaînes de construction. En arrière plan le "monoplace de chasse". Il porte déjà l'immatriculation civile PH-APK, ce qui nous indique qu'il a été destiné à servir l'Espagne.*

*Top: one of FK-51 as seen in setting at El Carmoli. The second aircraft is a single-seat fighter easy to identify with its larger engine and the pilot's rotor. Visible background are some projectors used to lighten the landing ground. Above: the remains of a crashed coast defence FK-51 are gathered and put on a trailer. Right: at the Koolhoven factory we have some FK-51 ready finish. On the back side we have the single-seat fighter with the civilian immatriculation PH-APK, it will be sent to Spain shortly after.*



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<sup>1</sup> www.steelwork-models.de

<sup>2</sup> Many of the two seat FK.51s for Spain have been transported also disguised as single seat “mail planes” with the observer’s cockpit closed to escape the embargo on plane deliveries to the Spanish warring factions.

<sup>3</sup> There is quite some discussion about the registration of the single seat and two-seat F.K.51’s, and even about the number of F.K.51 single seat aircraft delivered. There exist photographs of at least two distinct single seat F.K.51, one with a straight fin leading edge (PH-APK) and one with a curved one (P); on some other pictures a registration is absent or cannot be seen. There seems to exist one picture of a two seat F.K.51 carrying a registration CK-007, but my copy is not good enough to distinguish it. In addition there is even disagreement about the engine type of the single seat F.K.51.

<sup>4</sup> This value is probably without the lengthening of the landing gear legs with 0.3 m.

<sup>5</sup> The Special Hobby model of the “standard” F.K.51 had a height of 42.6 mm. As the undercarriage legs are the same for both models and that of the single seat was lengthened by 4 mm this is consistent.

<sup>6</sup> I really wonder how the cockpit with its details could be produced this way. There are no mould marks visible to give a clue.

<sup>7</sup> In reality the seat was mounted to the tubes of the fuselage framework, but these are not present in the model.

<sup>8</sup> The cowling in the profile drawing seems longer than required for the two row Jaguar engine.