THE GERMAN HKS-1

by

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Since 1951 when Germany began gliding activities again, great strides have been made both in design and in production. Old pre-war sailplane designs have been modified and re-designed and new more advanced sailplanes have been developed in great numbers.

The "Do-it-yourself" idea, so prevalent in the United States, is also popular in Germany, and many of the new sailplanes are being produced in kit form. This idea is being used in the aircraft industry too, and sailplanes and aircraft are being offered covering a broad price range and with the customers' needs in view. For example, the factory-finished two-place MU-13 costs $2200, but in kit form it is available at $1300, and can be completed for about another $500. Single place sailplanes like the Spatz, Greif or SP-1 sell from the factory at between $1200 and $1500.

In a different class, however, is the HKS-1, a new two-place design which performed so well in England under extremely poor conditions. The letters stand for the initial letters of the names of the designers—Haase, Kensche and Schmetz, all well known engineers and soaring enthusiasts.

There is no definite figure available for the cost of the first HKS-1 but it is rumored to be in the neighborhood of $17,000. It was built as a competition sailplane with a good gliding angle at high speeds, and the object of the designers has obviously been achieved.

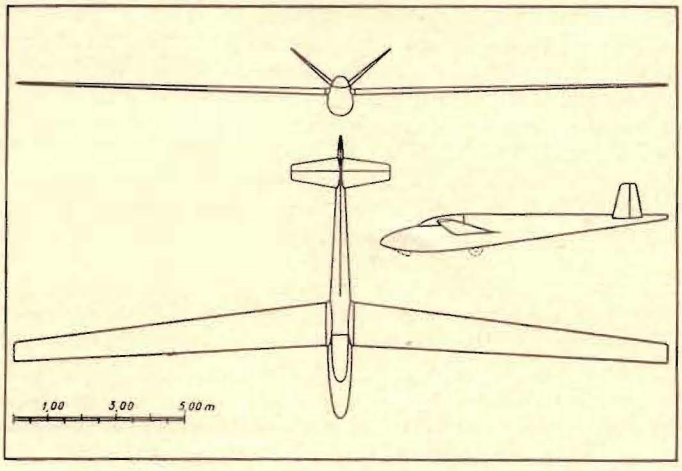
The design shows modern aerodynamic and constructional ideas. To obtain low drag and high lift values, the wing profile 65(215)-714 was chosen, or interpolated. Variable wing-chamber was incorporated, partly to get rid of aileron gaps and partly to avoid angular distortion of the wing profile either in fast or in slow flight. This solution of the problem of camber change and lateral control also made it possible to incorporate a linear change of camber from the wing-root to the tip, thus getting rid of harmful drag during rolling maneuvers.

Both wings have a double box spar. The two spars alone weigh 198 lbs. Ribs are placed at 3.9 in. intervals, both in front of the spar and also behind it as far back as the beginning of the camber changing contour. Between each two main ribs there are further wooden ribs supporting the contour at 1 ft. 3 in. intervals. Between each two of these ribs are three supporting ribs made of foam material.

The leading edge is built up as a plywood/polycell sandwich, except its extremity which is filled in with a pine strip and a balsa fillet. With this method of construction, inaccuracies in the profile are in the order of .008" to .012" and breaking strength in compression of 65½ lb./sq. ft. was tested.

Behind the spar, the outer surface of the wing is built up in the same way as far back as the camber-changing region. The camber changing portion is attached to the rest of each wing at six places.

Foam material is also used in the main ribs as well as in the fuselage bulkheads. The fuselage has on the front a spherical skin which was made on a mould. The whole of this region is also covered internally as well. A retractable wheel, placed behind the center of gravity, a retractable sprung skid and a ribbon parachute at the rear end are built in the fuselage. The parachute has to serve as air brake and can be operated by hand, pulled in again by a cord wound around a drum. Pitot heads and tow hooks are also kept out of the air stream, and a V-shaped tail is used to reduce tail drag.



Courtesy "Thermik"

No accurate performance measurements have yet been released, but the best gliding angle may well be somewhat better than 38 to 1 by further refinement of the surface. However, it will be difficult with plain wood construction to achieve good maintenance of form over a long period. In spite of good preservation distortion of the wood cannot be avoided, and it will be necessary from time to time to shave the outer surface anew where shrinkage has produced unevenness. After half a year the first HKS has shown waviness of the order of .006 in.

DATA:

Wing span	62 ft. 4 in.
Surface area	197 sq. ft.
Empty weight	882 lbs.
Full load	1,280 lbs.
Best gliding angle	1:38

BOOK REVIEW

(Continued from Page 19)

sarily a limit to what can be discovered in this way, it is by no means nearly reached yet."

We then have a chapter on "The Art of Forecasting," followed by one on "The Science of Forecasting," which includes the present and future use of electronic calculating machines for the purpose. "Weather Control" is mostly about artificial production of rain, a subject so new that it has not, we believe, got into a textbook before. Finally comes a rather philosophical chapter called "Uncertainties."