# REPORT No. 481

## WORKING CHARTS FOR THE DETERMINATION OF PROPELLER THRUST AT VARIOUS AIR SPEEDS

By Edwin P. Hartman


### SUMMARY

*A set of propeller performance charts, based on a "torque speed" coefficient $C_{QS}$, has been constructed from full-sized metal propeller data obtained in the N.A.C.A. propeller-research tunnel.*

*The simplifying assumption that the torque of the engine remains constant (which appears to be nearly true except for highly supercharged engines) is utilized in the application of the coefficient $C_{QS}$ which is defined as follows: $C_{QS}=\frac{V}{n\,D}\sqrt{\frac{1}{C_Q}}=V\sqrt{\frac{\rho D^3}{Q}}$ from which the troublesome variable n (engine revolution speed) has been eliminated. The coefficient $C_{QS}$ when plotted against the ratio $C_T/C_Q$, which is equal to $TD/Q$, provides a useful chart from which propeller thrust may be quickly calculated for any air speed. Twenty-four tables are included to present the data from which the charts previously published in Technical Report No. 350 were obtained.*


### INTRODUCTION

In the construction of working charts for propeller-performance calculations, utility is and should be of first importance. The usefulness of any propeller chart is often largely a function of the form of coefficients used in its construction.

Owing to the large number of variables involved in propeller calculations it is nearly impossible to devise one coefficient suitable for all phases of propeller work; for example, the charts given in N.A.C.A. Technical Report No. 350 (reference 1) based on the coefficient $C_S$ and charts from other sources based on similar coefficients, although eminently suitable for the selection of propellers, are not entirely suitable for calculating propeller performance at low air speeds.

The growing importance of take-off considerations for seaplanes and high-speed landplanes has emphasized the need for appropriate data and methods with which to calculate propeller thrust in the take-off range.

With this need in mind a set of propeller-performance charts based on a coefficient $C_{QS}$ has been prepared from the same propeller test data that were used in reference 1. These charts, while of little use in selecting propellers, are well adapted for calculating propeller performance not only in the take-off range but in the whole full-throttle flight range.

The coefficient $C_{QS}$ and the method of calculating propeller thrust given in this report were suggested by Mr. J. M. Shoemaker of the N.A.C.A. tank staff.

### APPARATUS AND METHODS

The propeller data used in reference 1 and also in this report were taken in the N.A.C.A. propeller-research tunnel, a description of which is given in reference 2. A brief description of the apparatus and methods used in obtaining the original data will be given here; if more detailed information is desired, it may be obtained from reference 1.

The tests were made with a 9-foot diameter adjustable metal propeller having Navy plan form no. 4412. The propeller was set 11.5°, 15.5°, 19.5°, 23.5°, and 27.5° at 0.75 radius and tested in conjunction with each of the six different engine-fuselage combinations listed below.

No. 1—Open cockpit fuselage with 400 hp. Curtiss D–12 engine (fig. 1).

No. 2—Complete VE–7 airplane with 180-hp. Wright E–2 water-cooled engine with nose radiator (fig. 2).

No. 3—Open cockpit fuselage with Wright Whirlwind J–5 9-cylinder radial engine (fig. 3).

No. 4—Cabin fuselage with monoplane wing and J–5 engine (fig. 4).

No. 5—Cabin fuselage without wing and with J–5 engine (fig. 5).

No. 6—Cabin fuselage with J–5 engine and N.A.C.A. engine cowling (fig. 6).

In each case the engine was mounted on a torque dynamometer enclosed in the fuselage. The power output of the engine was calculated from dynamometer readings after a correction based on special tests (see reference 1) had been made to allow for the effect of propeller-slipstream torque on the projecting engine cylinders. The resultant horizontal force and the engine revolution speed were also measured.

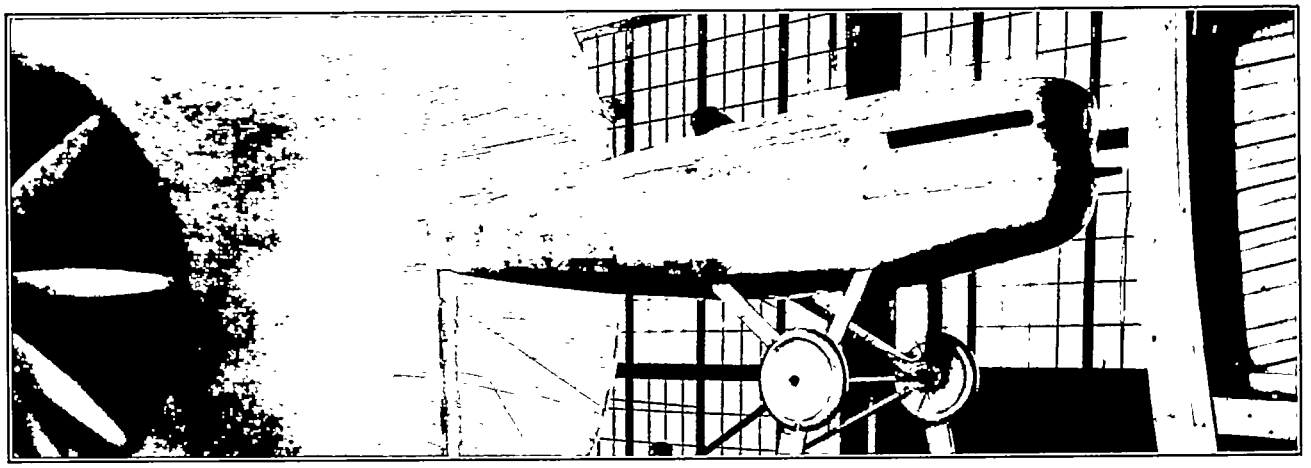

FIGURE 1.—Open-cockpit fuselage with 400-horsepower Curtiss D-12 engine.

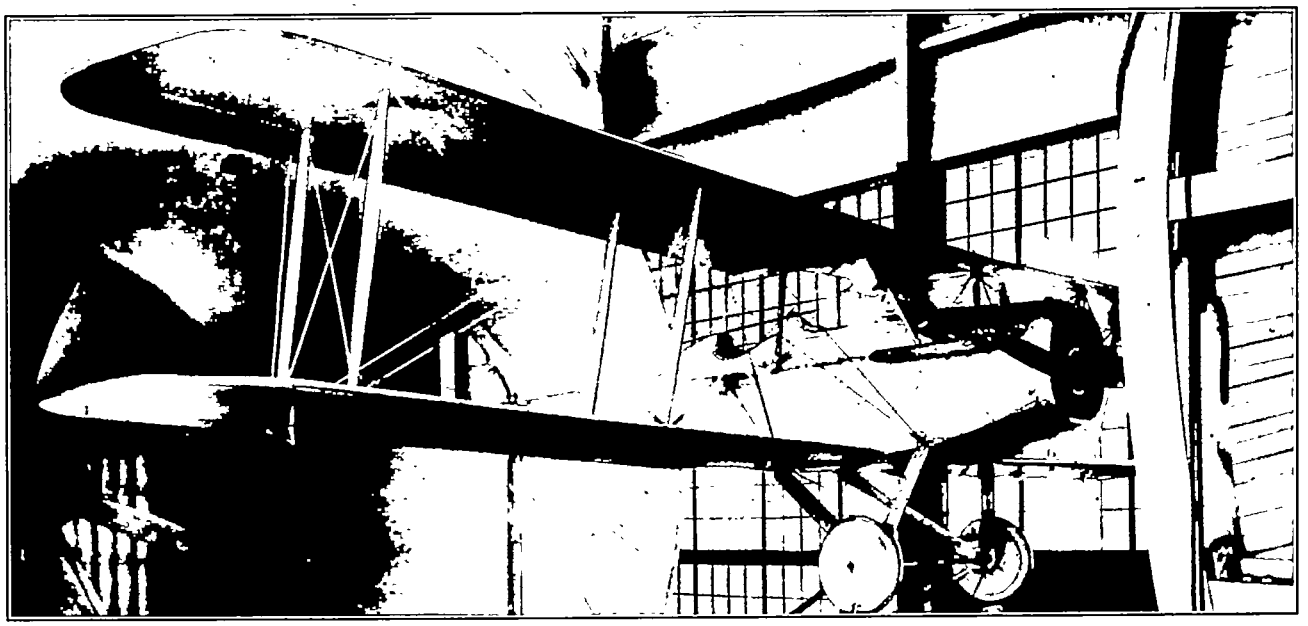

FIGURE 2.—Complete VE-7 airplane with 180-horsepower Wright E-2 water-cooled engine with nose radiator.

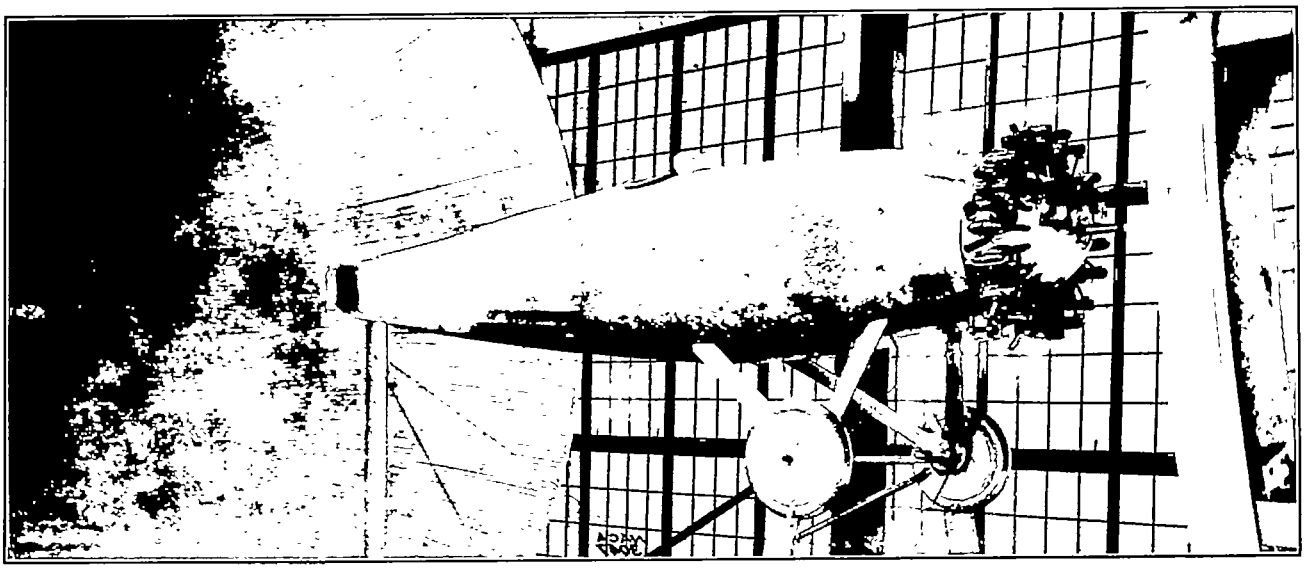

FIGURE 3.—Open-cockpit fuselage with Wright Whirlwind J-5 9-cylinder engine.

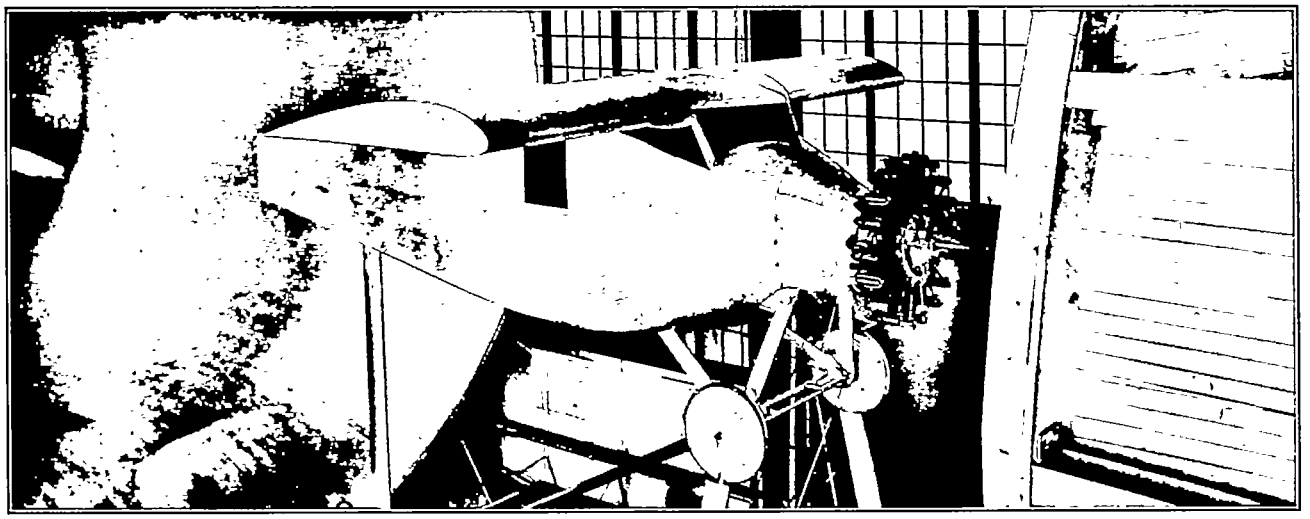

FIGURE 4.—Cabin monoplane with J-5 engine.

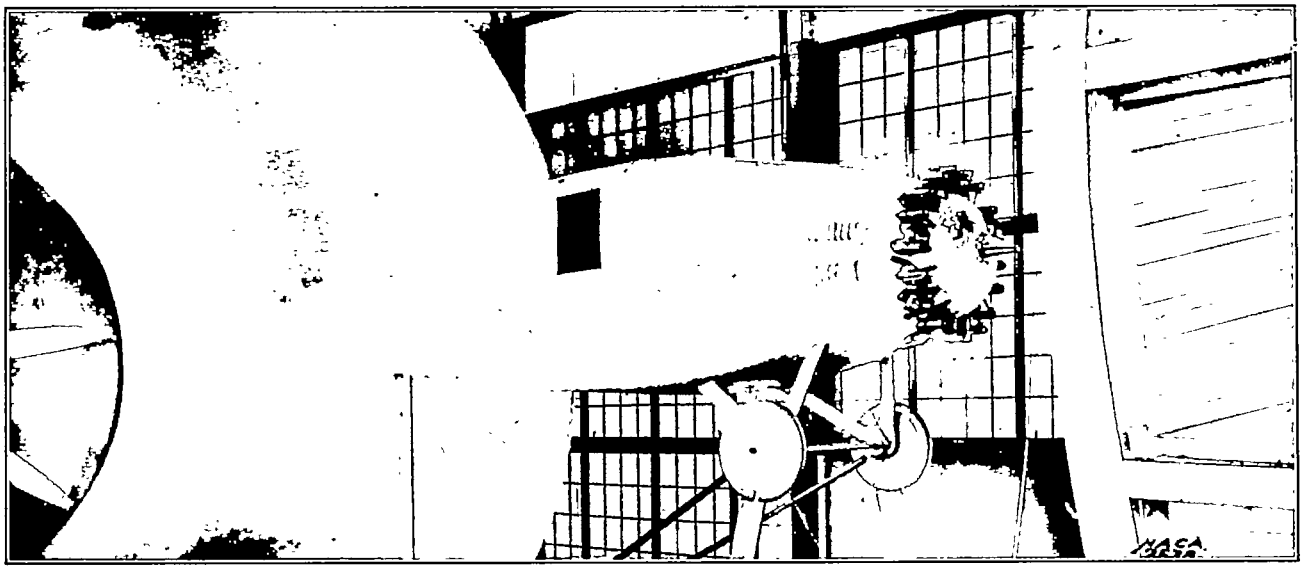

FIGURE 5.—Cabin fuselage with J-5 engine.

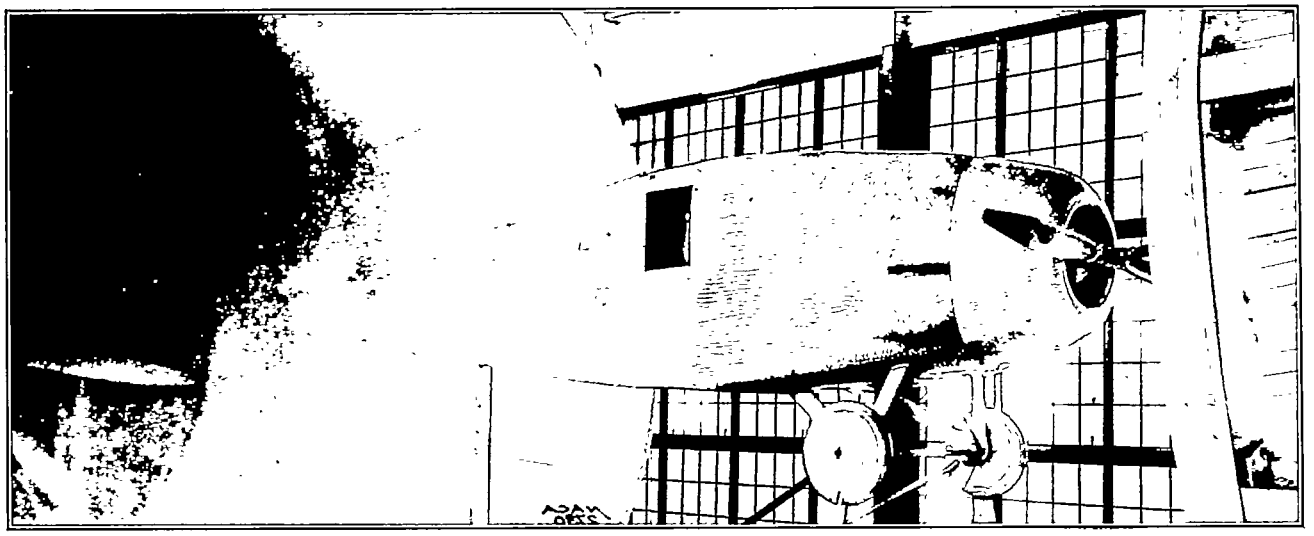

FIGURE 6.—Cabin fuselage with J-5 engine and N.A.C.A. engine cowling.

The test data were converted to the following coefficient forms and plotted against $V/nD$:

$$\text{Thrust coefficient } C_T=\frac{T_e}{\rho n^2 D^4}$$

$$\text{Power coefficient } C_P=\frac{P}{\rho n^3 D^5}$$

$$\text{Propulsive efficiency } \eta=\frac{T_e V}{P}$$

The significance of the terms in these coefficient forms is as follows:

$T_e$, effective thrust $T-\Delta D$.
$T$, thrust of propeller (tension in propeller shaft).
$\Delta D$, change in drag of airplane due to propeller slipstream.
$P$, input power of engine.
$D$, propeller diameter.
$n$, revolutions per unit of time.
$V$, air speed.
$\rho$, mass density of air.

The thrust, power, and efficiency curves for the five blade angles were faired, cross-plotted, and replotted and in this way smooth curves for all blade angles from 10° to 28° at 0.75 $R$ were obtained. The $C_S$ charts in reference 1 were prepared from these faired data.

The values of $C_T$, $C_P$, $\eta$, and $C_S$ corresponding to the charts given in Technical Report No. 350 are given in tables I to XXIV. The use of the tabular values may improve the accuracy in certain parts of the charts and may also be of help to designers in reducing the data to coefficients of another form.

It is possible to obtain propeller thrust by using the $C_S$ propeller charts in reference 1, but the usefulness of these charts for such calculations is impaired by the following existing conditions: (1) In the low-speed (low $V/nD$) range of propeller operation, which for take-off is of particular interest, the curves on the $C_S$ charts are either entirely missing or so congested as to render them of little practical value. (2) Owing to the fact that $C_S$ involves the factor $n$ which varies with the air speed, an indirect method of some length has generally been used in the past. Recently, however, a direct method of calculating propeller thrust from $C_S$ charts has been evolved (reference 3). This method also suffers from the above-mentioned limitations of the $C_S$ charts although the tables given here will facilitate the calculations to some extent.

### DERIVATION OF $C_{QS}$

If the propeller characteristics are plotted using coefficients in which the propeller revolution speed is not involved, these difficulties may be eliminated. Such a chart is found in the plot of the ratio $C_T/C_Q$ against a "torque speed" coefficient $C_{QS}$ which was developed in the following manner:

Propeller torque $Q$ is expressed by $Q=C_Q\rho n^2 D^5$ from which is obtained the torque coefficient $C_Q=\frac{Q}{\rho n^2 D^5}$. As $C_Q$ is a function of $V/nD$ and as both are nondimensional, any number of other nondimensional torque coefficients may be developed by multiplying $C_Q$ by powers of $V/nD$. By the use of the proper power of $V/nD$ it is often possible to produce coefficients in which some objectionable variable is eliminated.

If $C_Q$ is multiplied by $(V/nD)^{-2}$ a torque coefficient, which may be designated $K$, is produced in which the variable $n$ is absent.

$$K=\frac{Q}{\rho n^2 D^5}\times\left(\frac{nD}{V}\right)^2=\frac{Q}{\rho D^3 V^2}$$

As $V$ is to be an active variable it is desirable to have it in its first power. The coefficient $C_{QS}$, which provides this feature, is defined by

$$C_{QS}=\frac{1}{\sqrt{K}}=V\sqrt{\frac{\rho D^3}{Q}}$$

Since the torque of an unsupercharged engine is nearly constant throughout the ordinary flight range of full-throttle operation, it is evident that the value of $C_{QS}$ is practically independent of the engine revolution speed in that range.

The diameter $D$ is determined by the method given in reference 1 or by other means and $Q$, the engine torque, may be calculated from the rated power and speed of the engine by the equation $Q=\frac{\text{hp.}\times 5250}{\text{r.p.m.}}$. Since $\rho$, $D$, and $Q$ for a given altitude and diameter are constant $C_{QS}=V\times\text{constant}=kV$.

The coefficients $C_{QS}$ and $C_T/C_Q$ both being single-valued functions of $V/nD$ may be plotted against each other. Now

$$C_T/C_Q=\frac{T_e\rho n^2 D^5}{Q\rho n^2 D^4}=\frac{T_e D}{Q}$$

and, since $D$ and $Q$ remain constant throughout the velocity range, $C_T/C_Q=T_e\times(\text{constant})=k\ T_e$. It is therefore evident that the propeller thrust for unsupercharged engines may be directly and easily obtained for any velocity from a plot of $C_T/C_Q$ against $C_{QS}$. The fact that engine torque varies with altitude must of course be considered in making altitude calculations.

Problems involving supercharged engines present complications that can be solved only with a fuller knowledge of the characteristics of the particular engine being used. Moderately supercharged engines with critical[1] altitudes of 5,000 feet or less may, however, be regarded as unsupercharged engines without much loss in the accuracy of thrust calculations.

Engines with critical altitudes over 5,000 feet usually require manifold-pressure limiting devices for protec-

[1] Critical altitude is that altitude to which the rated or maximum allowable sea-level manifold pressure can be maintained with rated altitude engine revolution speed.

tion in sea-level operation. At sea level when such a device is used the manifold pressure remains constant at its limiting value and, since the brake mean effective pressure and torque are dependent mainly upon manifold pressure, they also remain nearly constant. It appears therefore that no modification of the unsupercharged engine method of thrust calculation is necessary except for highly supercharged engines operating at or above critical altitude.

The construction of $C_{QS}$ charts is facilitated by the use of the following relations:

$$\frac{C_T}{C_Q}=\frac{\dfrac{\eta C_P}{V/nD}}{\dfrac{C_P}{2\pi}}=\frac{\eta C_P 2\pi}{VC_P/nD}=\frac{2\pi\eta}{V/nD}$$

and

$$C_{QS}=\frac{V}{nD}\times\sqrt{\frac{1}{C_Q}}=\frac{V}{nD}\sqrt{\frac{2\pi}{C_P}}$$

Propeller-performance charts for each of the six engine-fuselage arrangements were prepared from the data originally obtained for reference 1. These charts, which are given in figures 7 to 12, cover the normal flight and blade-angle range of most present-day airplanes.

Although the primary purpose of the charts is to permit the determination of propeller thrust throughout the flight range, the superimposed lines of constant $V/nD$ enable one to obtain the efficiency and engine revolution speed at any air speed. Although reasonably good at high speeds, the accuracy of the latter determinations becomes increasingly poorer at low speeds and they should not be relied upon below a $V/nD$ of 0.3. Since the curves in the present report and those in reference 1 were independently faired, they cannot be expected to give exactly the same results, even though they were prepared from the same data.

The use of the propeller-performance charts will be illustrated by an example of an airplane with a cowled engine (similar to fig. 6) having a high speed of 180 miles per hour and powered with a radial engine rated at 450 brake horsepower at 2,000 r.p.m.

The propeller selection will be made from reference 1. At sea level,

$$C_S=\frac{0.638\times\text{m.p.h.}}{(\text{hp.})^{1/5}\times(\text{r.p.m.})^{2/5}}$$

At high speed for this airplane,

$$C_S=\frac{0.638\times 180}{3.4\times 20.95}=1.61$$

If a propeller giving maximum speed is selected from figure 14 of reference 1, the value of $V/nD$ at high speed is found to be 0.91, the blade angle $\beta$ to be 25°, and the propulsive efficiency $\eta$ to be 0.845.

The diameter $D$ is then $\frac{88\times 180}{2{,}000\times 0.91}=8.7$ feet and the engine torque of the propeller shaft is

$$\frac{\text{hp.}\times 5{,}250}{\text{r.p.m}}=\frac{450\times 5{,}250}{2{,}000}=1{,}180 \text{ pound-feet}$$

$$C_{QS}=V\sqrt{\frac{\rho D^3}{Q}}=V\sqrt{\frac{0.002378\times\overline{8.7}^3}{1{,}180}}=0.0364\ V$$

($V$ in feet per second) or 0.0534 $V$ ($V$ in miles per hour). $Q/D=1{,}180/8.7=135.7$ pounds.

It is convenient to put the remaining calculations in tabular form.

PROPELLER THRUST CALCULATION

| $V$ (m.p.h.) | 0 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 |
|---|---|---|---|---|---|---|---|---|---|---|
| $C_{QS}$ | 0 | 1.07 | 2.13 | 3.20 | 4.27 | 5.34 | 6.40 | 7.47 | 8.54 | 9.60 |
| $C_T/C_Q$ | 7.60 | 7.75 | 7.88 | 7.90 | 7.83 | 7.60 | 7.14 | 6.63 | 6.19 | 5.82 |
| $T_e$ (lb.) | 1,030 | 1,050 | 1,069 | 1,070 | 1,060 | 1,030 | 967 | 898 | 838 | 789 |
| t.hp.$_a$ | 0 | 56 | 114 | 171 | 226 | 274 | 310 | 335 | 358 | 378 |

The values of $C_T/C_Q$ in the table were obtained from figure 12. The thrust $T_e$ equals $C_T/C_Q\times Q/D=TD/Q\times Q/D$ and the thrust horsepower available (t.hp.$_a$) equals $T_e\times$ (m.p.h.)/375.

The efficiency at 180 miles per hour is 378/450 = 0.0840, which checks with the value (0.845) obtained from reference 1. If the efficiency and engine revolution speed at the climbing air speed (100 miles per hour) be desired, the procedure for finding them is as follows: The $V/nD$ at 100 miles per hour is about 0.565 (from fig. 12) and the efficiency is equal to

$$\frac{C_T}{C_Q}\times\frac{V}{nD}\times\frac{1}{2\pi}$$

which for this example equals $(7.60\times 5.65)/2\pi=0.68$.

The engine speed at 100 miles per hour is equal to

$$\frac{V\times 88}{\dfrac{V}{nD}D}=\frac{100\times 88}{0.565\times 8.7}=1{,}790 \text{ r.p.m.}$$

LANGLEY MEMORIAL AERONAUTICAL LABORATORY,
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS,
LANGLEY FIELD, VA., *December 4, 1933.*

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1. Weick, Fred E.: Working Charts for the Selection of Aluminum Alloy Propellers of a Standard Form to Operate with Various Aircraft Engines and Bodies. T.R. No. 350, N.A.C.A., 1930.
2. Weick, Fred E., and Wood, Donald H.: The Twenty-Foot Propeller Research Tunnel of the National Advisory Committee for Aeronautics. T.R. No. 300, N.A.C.A., 1928.
3. Ober, Shatswell: Estimation of the Variation of Thrust Horsepower with Air Speed. T.N. No. 446, N.A.C.A., 1933.

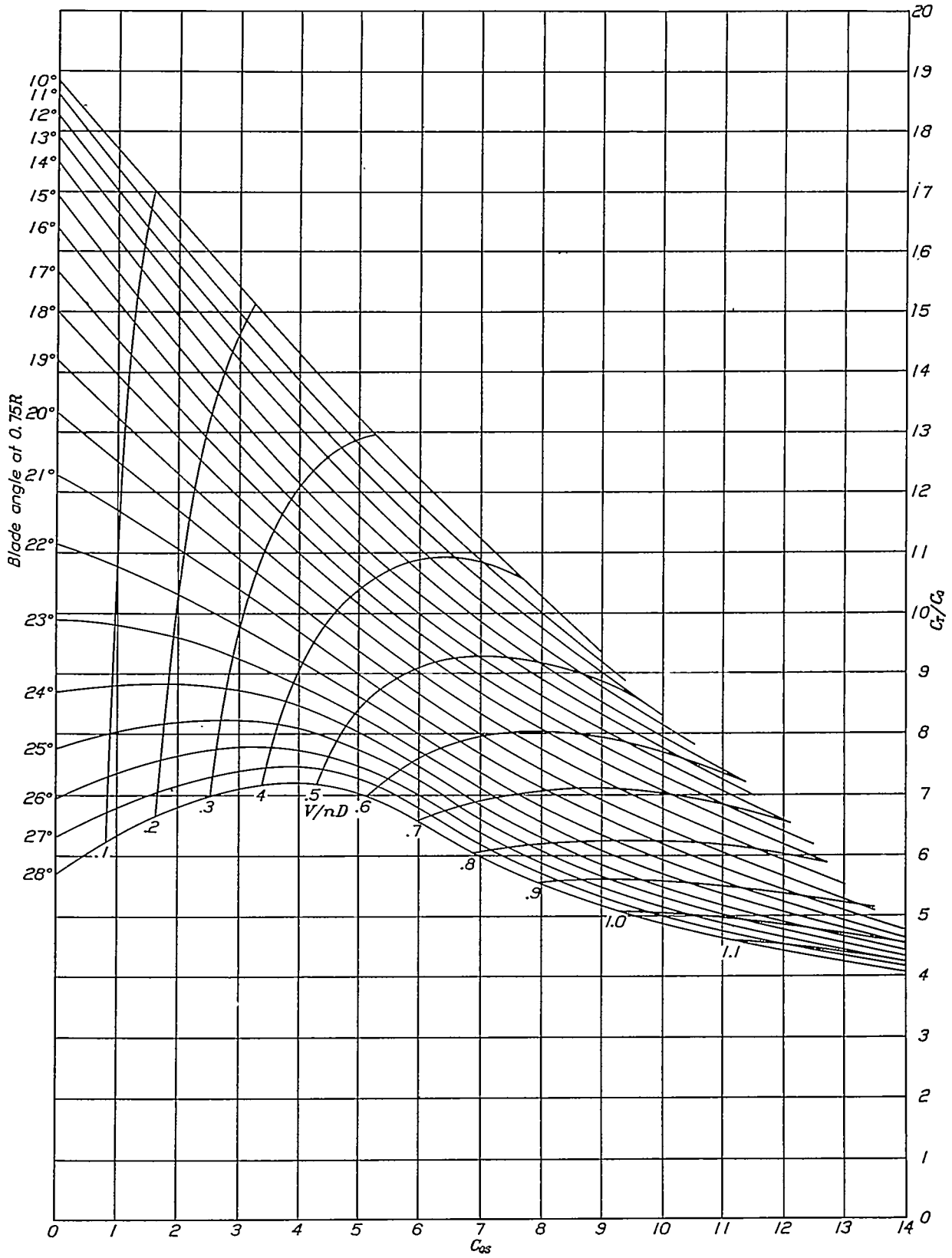


FIGURE 7.—Propeller-performance chart for an open-cockpit fuselage with a 400-horsepower Curtiss D-12 engine. $C_{QS}$ is proportional to $V$; $C_T/C_Q$ is proportional to $T$.

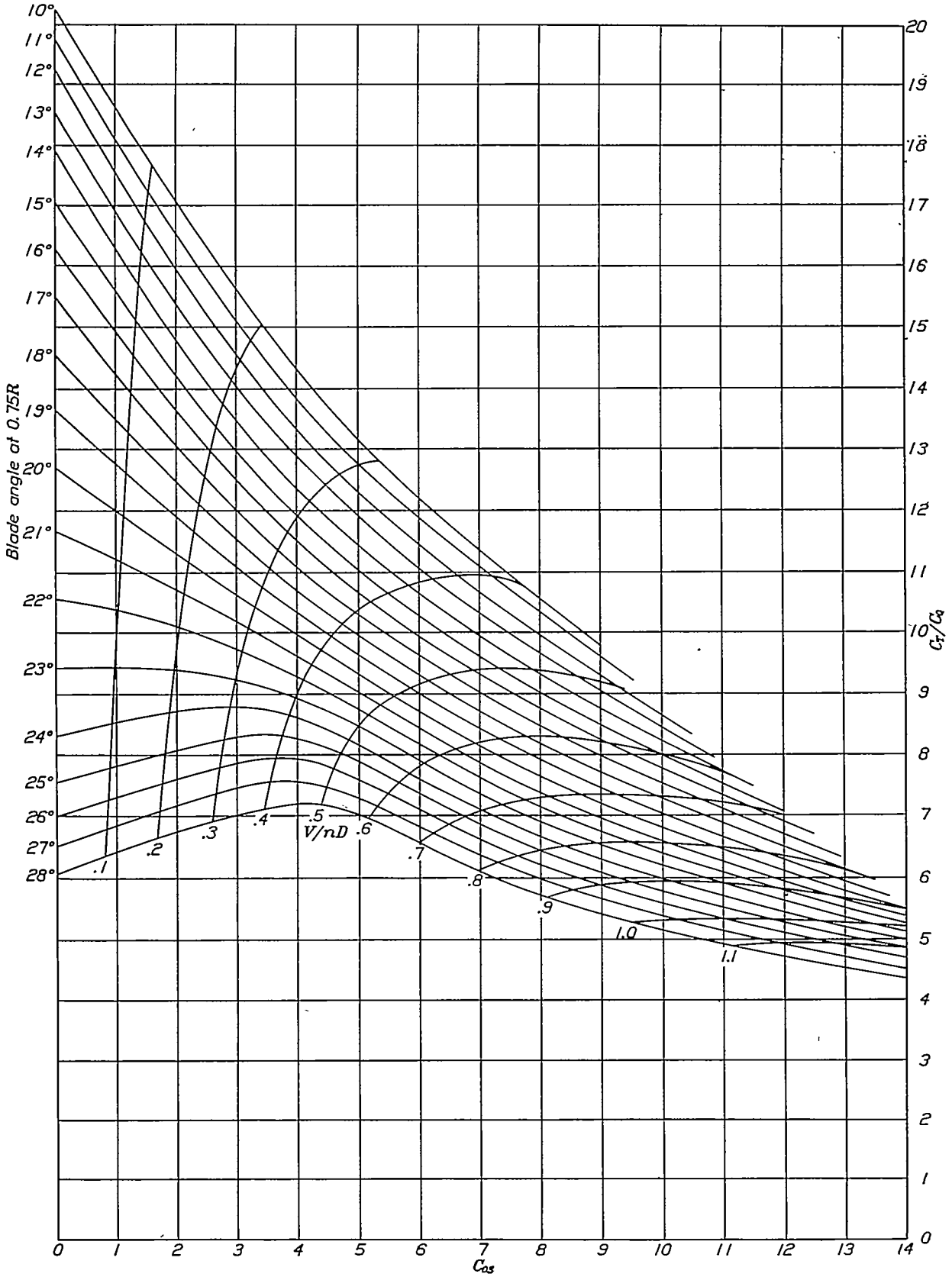


FIGURE 8.—Propeller-performance chart for a complete VE-7 airplane with 180-horsepower Wright E-2 water-cooled engine with nose radiator. $C_{Qs}$ is proportional to $V$; $C_T/C_Q$ is proportional to $T_s$.

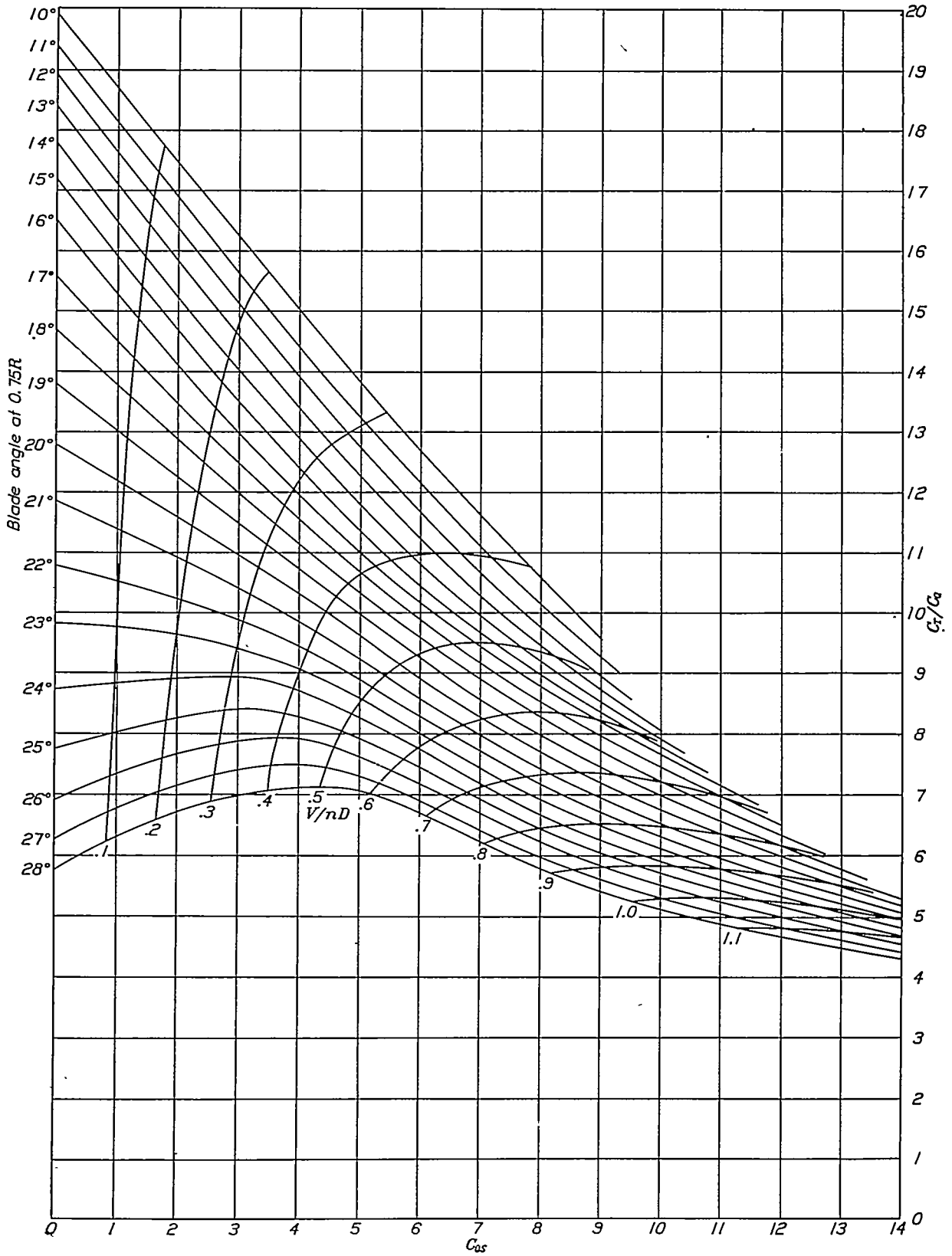


FIGURE 9.—Propeller-performance chart for an open-cockpit fuselage with Wright Whirlwind J-5 9-cylinder engine. $C_{QS}$ is proportional to $V$; $C_T/C_Q$ is proportional to $T$.

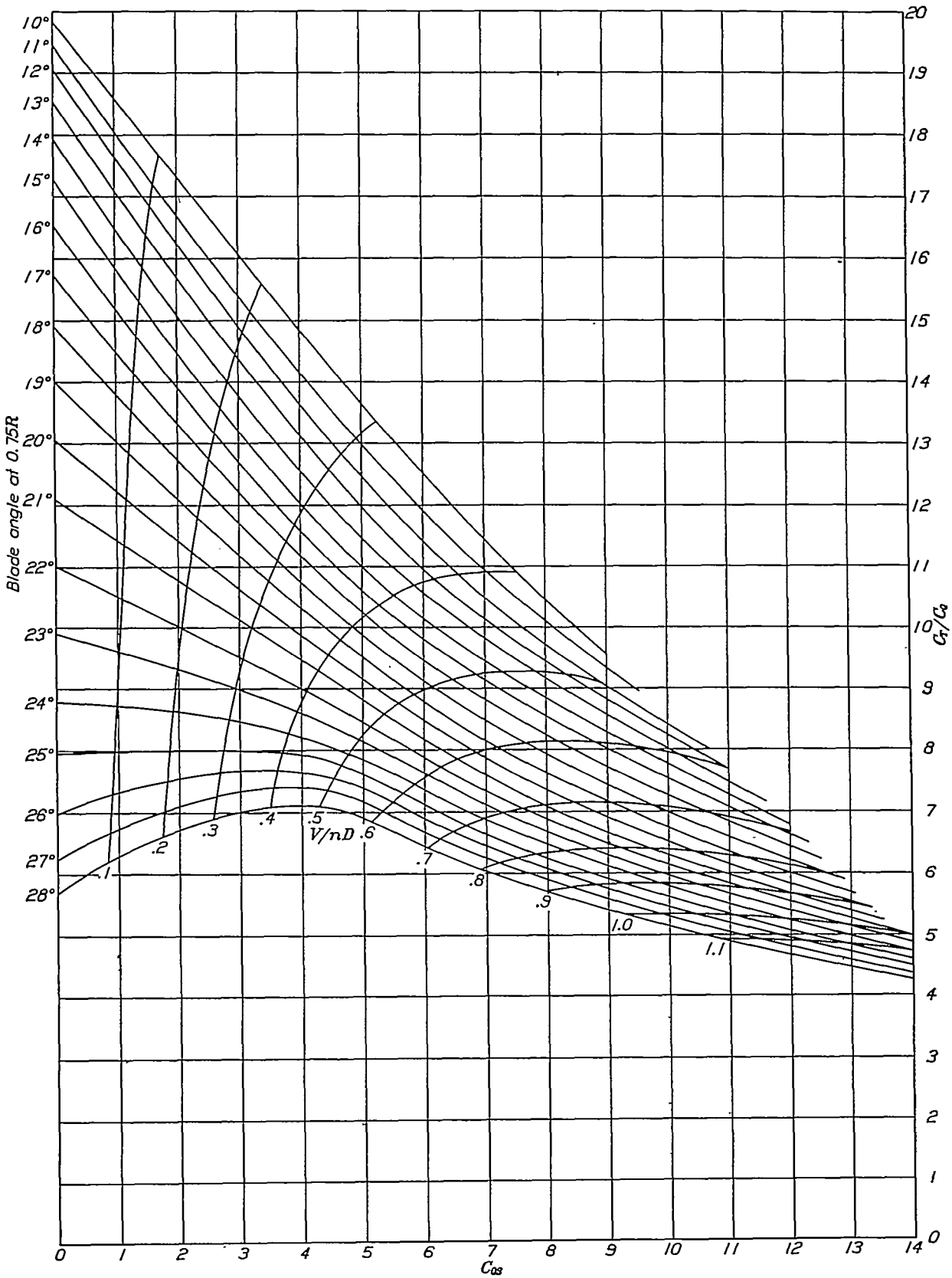


FIGURE 10.—Propeller-performance chart for a cabin monoplane with J-5 engine. $C_{Q_s}$ is proportional to $V$; $C_T/C_Q$ is proportional to $T_s$.

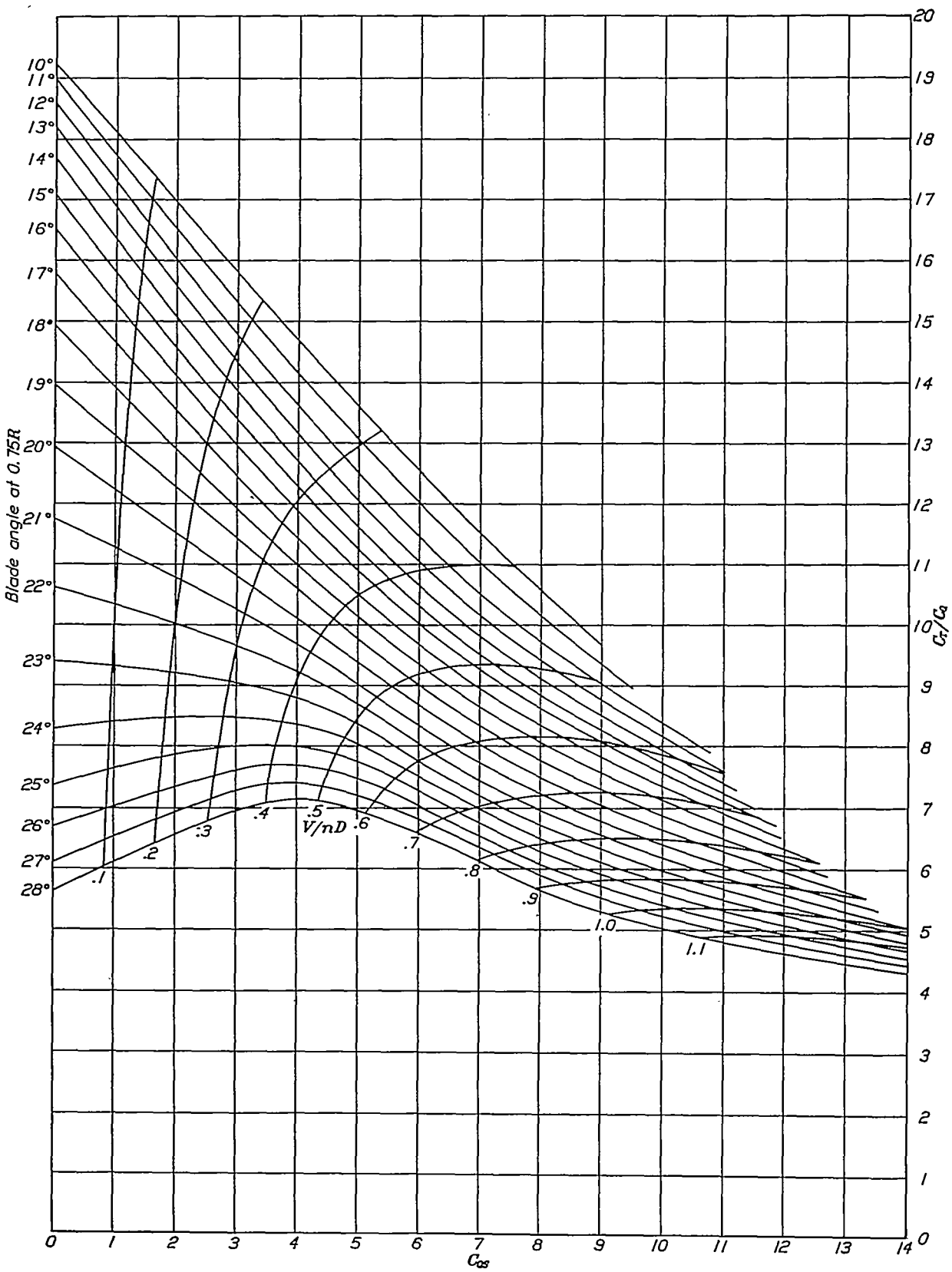


FIGURE 11.—Propeller-performance chart for a cabin fuselage with J-5 engine. $C_{QS}$ is proportional to $V$; $C_T/C_Q$ is proportional to $T_s$.

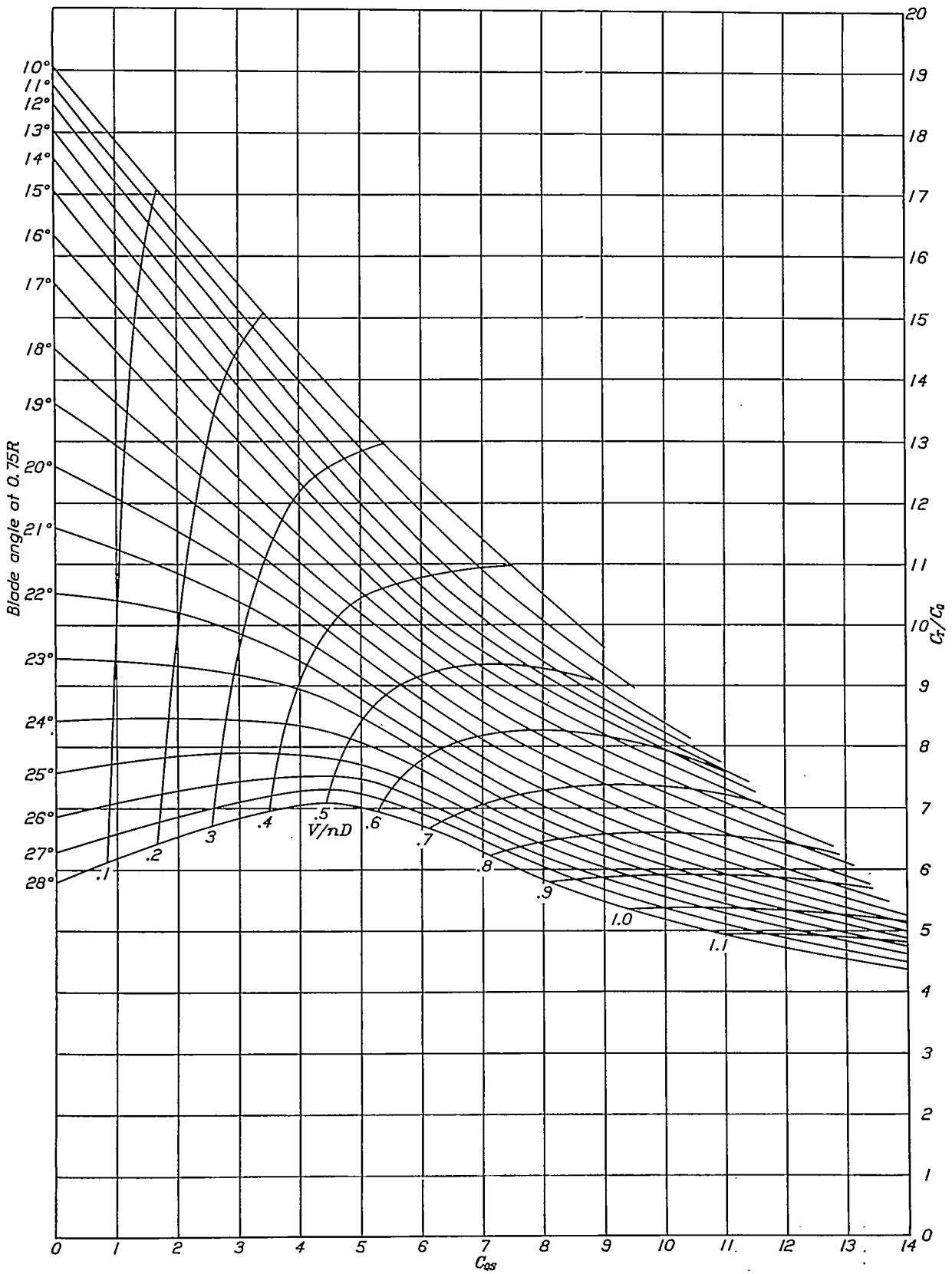


FIGURE 12.—Propeller-performance chart for a cabin fuselage with J-5 engine and N.A.C.A. engine cowling. $C_{Q_S}$ is proportional to $V$; $C_T/C_Q$ is proportional to $T$.

## TABLE I

## OPEN-COCKPIT FUSELAGE WITH D-12 ENGINE

VALUES OF $C_T$

(See fig. 1)

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.0648 | 0.0540 | 0.0422 | 0.0290 | 0.0148 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 11 | .0689 | .0593 | .0476 | .0350 | .0206 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 12 | .0733 | .0638 | .0528 | .0408 | .0263 | 0.0122 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 13 | .0773 | .0686 | .0578 | .0463 | .0319 | .0179 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 14 | .0813 | .0727 | .0627 | .0514 | .0376 | .0237 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 15 | .0849 | .0767 | .0675 | .0565 | .0432 | .0294 | 0.0165 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 16 | .0880 | .0802 | .0716 | .0611 | .0486 | .0352 | .0214 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 17 | .0912 | .0838 | .0758 | .0658 | .0539 | .0410 | .0275 | 0.0146 | ---- | ---- | ---- | ---- | ---- | ---- |
| 18 | .0942 | .0871 | .0797 | .0703 | .0593 | .0467 | .0337 | .0209 | ---- | ---- | ---- | ---- | ---- | ---- |
| 19 | .0970 | .0910 | .0836 | .0747 | .0646 | .0524 | .0400 | .0272 | 0.0150 | ---- | ---- | ---- | ---- | ---- |
| 20 | .0987 | .0943 | .0875 | .0792 | .0698 | .0580 | .0462 | .0336 | .0208 | ---- | ---- | ---- | ---- | ---- |
| 21 | .1010 | .0971 | .0910 | .0837 | .0750 | .0638 | .0521 | .0395 | .0266 | 0.0143 | ---- | ---- | ---- | ---- |
| 22 | .1017 | .0987 | .0939 | .0876 | .0798 | .0694 | .0577 | .0453 | .0327 | .0204 | ---- | ---- | ---- | ---- |
| 23 | .1016 | .1001 | .0962 | .0909 | .0843 | .0747 | .0636 | .0514 | .0390 | .0265 | 0.0141 | ---- | ---- | ---- |
| 24 | .0998 | .0993 | .0971 | .0936 | .0883 | .0796 | .0694 | .0573 | .0453 | .0329 | .0204 | ---- | ---- | ---- |
| 25 | .0997 | .0993 | .0975 | .0959 | .0912 | .0839 | .0753 | .0633 | .0617 | .0395 | .0270 | 0.0139 | ---- | ---- |
| 26 | .0987 | .0991 | .0979 | .0970 | .0936 | .0878 | .0809 | .0692 | .0580 | .0462 | .0336 | .0200 | ---- | ---- |
| 27 | .0993 | .0986 | .0980 | .0975 | .0950 | .0912 | .0855 | .0752 | .0643 | .0527 | .0403 | .0263 | 0.0132 | ---- |
| 28 | .1002 | .0991 | .0992 | .0975 | .0960 | .0938 | .0890 | .0811 | .0707 | .0592 | .0468 | .0329 | .0192 | 0.0097 |

## TABLE II

## OPEN-COCKPIT FUSELAGE WITH D-12 ENGINE

VALUES OF $C_P$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.0240 | 0.0224 | 0.0205 | 0.0172 | 0.0121 | 0.0076 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 11 | .0260 | .0250 | .0233 | .0203 | .0155 | .0105 | 0.0040 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 12 | .0281 | .0275 | .0261 | .0235 | .0188 | .0135 | .0066 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 13 | .0302 | .0302 | .0290 | .0266 | .0221 | .0166 | .0096 | 0.0028 | ---- | ---- | ---- | ---- | ---- | ---- |
| 14 | .0325 | .0328 | .0320 | .0299 | .0256 | .0200 | .0128 | .0057 | ---- | ---- | ---- | ---- | ---- | ---- |
| 15 | .0348 | .0355 | .0351 | .0332 | .0292 | .0236 | .0165 | .0093 | 0.0022 | ---- | ---- | ---- | ---- | ---- |
| 16 | .0373 | .0382 | .0380 | .0365 | .0329 | .0275 | .0206 | .0132 | .0064 | ---- | ---- | ---- | ---- | ---- |
| 17 | .0400 | .0410 | .0411 | .0399 | .0367 | .0318 | .0253 | .0178 | .0108 | ---- | ---- | ---- | ---- | ---- |
| 18 | .0430 | .0440 | .0443 | .0433 | .0408 | .0364 | .0303 | .0229 | .0155 | 0.0062 | ---- | ---- | ---- | ---- |
| 19 | .0464 | .0474 | .0478 | .0470 | .0450 | .0411 | .0355 | .0283 | .0205 | .0114 | ---- | ---- | ---- | ---- |
| 20 | .0501 | .0511 | .0516 | .0511 | .0494 | .0461 | .0409 | .0340 | .0258 | .0169 | 0.0063 | ---- | ---- | ---- |
| 21 | .0546 | .0555 | .0553 | .0555 | .0540 | .0513 | .0463 | .0397 | .0316 | .0227 | .0123 | ---- | ---- | ---- |
| 22 | .0595 | .0602 | .0602 | .0600 | .0587 | .0564 | .0517 | .0456 | .0379 | .0290 | .0186 | 0.0069 | ---- | ---- |
| 23 | .0651 | .0654 | .0650 | .0646 | .0634 | .0615 | .0575 | .0518 | .0445 | .0356 | .0252 | .0135 | ---- | ---- |
| 24 | .0713 | .0707 | .0697 | .0691 | .0680 | .0664 | .0635 | .0581 | .0513 | .0426 | .0323 | .0206 | 0.0085 | ---- |
| 25 | .0785 | .0764 | .0746 | .0736 | .0723 | .0711 | .0696 | .0645 | .0582 | .0499 | .0397 | .0282 | .0165 | 0.0031 |
| 26 | .0851 | .0822 | .0796 | .0779 | .0765 | .0757 | .0756 | .0710 | .0653 | .0575 | .0474 | .0361 | .0232 | .0106 |
| 27 | .0930 | .0880 | .0845 | .0821 | .0804 | .0800 | .0808 | .0776 | .0725 | .0652 | .0554 | .0445 | .0313 | .0180 |
| 28 | .1012 | .0939 | .0894 | .0863 | .0842 | .0839 | .0852 | .0843 | .0800 | .0731 | .0636 | .0531 | .0401 | .0271 |

## TABLE III

## OPEN-COCKPIT FUSELAGE WITH D-12 ENGINE

VALUES OF $\eta$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.270 | 0.483 | 0.617 | 0.675 | 0.610 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 11 | .265 | .474 | .613 | .689 | .664 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 12 | .261 | .464 | .607 | .695 | .699 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 13 | .256 | .454 | .598 | .696 | .722 | 0.647 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 14 | .250 | .443 | .588 | .688 | .735 | .710 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 15 | .244 | .432 | .577 | .680 | .740 | .747 | 0.701 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 16 | .236 | .420 | .565 | .670 | .739 | .768 | .726 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 17 | .228 | .409 | .553 | .660 | .735 | .773 | .760 | 0.654 | ---- | ---- | ---- | ---- | ---- | ---- |
| 18 | .219 | .396 | .540 | .649 | .727 | .770 | .779 | .729 | ---- | ---- | ---- | ---- | ---- | ---- |
| 19 | .209 | .384 | .525 | .636 | .718 | .765 | .788 | .770 | 0.660 | ---- | ---- | ---- | ---- | ---- |
| 20 | .197 | .369 | .509 | .620 | .706 | .755 | .790 | .790 | .726 | ---- | ---- | ---- | ---- | ---- |
| 21 | .185 | .350 | .489 | .603 | .694 | .746 | .788 | .796 | .759 | 0.629 | ---- | ---- | ---- | ---- |
| 22 | .171 | .328 | .468 | .584 | .680 | .738 | .781 | .795 | .777 | .702 | ---- | ---- | ---- | ---- |
| 23 | .156 | .306 | .444 | .563 | .665 | .729 | .774 | .794 | .789 | .745 | 0.616 | ---- | ---- | ---- |
| 24 | .140 | .281 | .418 | .542 | .649 | .719 | .765 | .789 | .795 | .772 | .696 | ---- | ---- | ---- |
| 25 | .127 | .260 | .392 | .521 | .631 | .708 | .757 | .785 | .799 | .791 | .747 | 0.590 | ---- | ---- |
| 26 | .116 | .241 | .369 | .498 | .612 | .696 | .749 | .780 | .799 | .803 | .780 | .664 | ---- | ---- |
| 27 | .107 | .224 | .348 | .475 | .591 | .684 | .741 | .775 | .798 | .809 | .800 | .710 | 0.550 | ---- |
| 28 | .099 | .211 | .333 | .452 | .570 | .671 | .731 | .770 | .795 | .810 | .810 | .743 | .621 | 0.500 |

## TABLE IV

## OPEN-COCKPIT FUSELAGE WITH D-12 ENGINE

VALUES OF $C_S$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.211 | 0.428 | 0.652 | 0.900 | 1.204 | 1.590 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .208 | .420 | .632 | .871 | 1.152 | 1.499 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .205 | .410 | .620 | .848 | 1.110 | 1.422 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .201 | .400 | .608 | .828 | 1.077 | 1.362 | 1.797 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .200 | .391 | .596 | .808 | 1.043 | 1.313 | 1.688 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .198 | .387 | .589 | .790 | 1.017 | 1.270 | 1.600 | 2.086 | -------- | -------- | -------- | -------- | -------- | -------- |
| 16 | .192 | .380 | .579 | .773 | .990 | 1.230 | 1.526 | 1.902 | -------- | -------- | -------- | -------- | -------- | -------- |
| 17 | .190 | .375 | .570 | .760 | .969 | 1.197 | 1.463 | 1.781 | 2.350 | -------- | -------- | -------- | -------- | -------- |
| 18 | .189 | .370 | .561 | .748 | .949 | 1.164 | 1.412 | 1.693 | 2.132 | -------- | -------- | -------- | -------- | -------- |
| 19 | .184 | .363 | .551 | .738 | .930 | 1.137 | 1.370 | 1.629 | 1.979 | 2.522 | -------- | -------- | -------- | -------- |
| 20 | .180 | .360 | .543 | .722 | .912 | 1.110 | 1.330 | 1.572 | 1.868 | 2.288 | -------- | -------- | -------- | -------- |
| 21 | .179 | .353 | .537 | .711 | .900 | 1.082 | 1.299 | 1.526 | 1.786 | 2.138 | 2.680 | -------- | -------- | -------- |
| 22 | .176 | .350 | .529 | .700 | .885 | 1.061 | 1.270 | 1.481 | 1.723 | 2.030 | 2.460 | -------- | -------- | -------- |
| 23 | .172 | .343 | .520 | .690 | .870 | 1.040 | 1.246 | 1.445 | 1.676 | 1.948 | 2.305 | 2.842 | -------- | -------- |
| 24 | .170 | .340 | .512 | .680 | .851 | 1.023 | 1.221 | 1.411 | 1.632 | 1.880 | 2.188 | 2.619 | -------- | -------- |
| 25 | .168 | .333 | .508 | .670 | .848 | 1.010 | 1.200 | 1.383 | 1.596 | 1.820 | 2.093 | 2.455 | 2.980 | -------- |
| 26 | .162 | .330 | .500 | .661 | .838 | 1.001 | 1.180 | 1.360 | 1.560 | 1.770 | 2.020 | 2.330 | 2.742 | -------- |
| 27 | .160 | .325 | .491 | .657 | .828 | .994 | 1.165 | 1.340 | 1.530 | 1.728 | 1.960 | 2.231 | 2.581 | 3.110 |
| 28 | .158 | .320 | .487 | .650 | .819 | .990 | 1.151 | 1.321 | 1.505 | 1.690 | 1.910 | 2.159 | 2.470 | 2.875 |

## TABLE V

## "VE-7" AIRPLANE

VALUES OF $C_T$

(See fig. 2)

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 |
| ° | | | | | | | | | | | | |
| 10 | 0.0646 | 0.0528 | 0.0409 | 0.0293 | 0.0167 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .0712 | .0581 | .0467 | .0349 | .0227 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .0761 | .0633 | .0520 | .0400 | .0278 | 0.0141 | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .0802 | .0681 | .0571 | .0450 | .0326 | .0195 | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .0845 | .0726 | .0621 | .0501 | .0380 | .0250 | 0.0133 | -------- | -------- | -------- | -------- | -------- |
| 15 | .0871 | .0766 | .0674 | .0555 | .0436 | .0309 | .0188 | -------- | -------- | -------- | -------- | -------- |
| 16 | .0903 | .0806 | .0721 | .0609 | .0494 | .0369 | .0244 | -------- | -------- | -------- | -------- | -------- |
| 17 | .0930 | .0846 | .0762 | .0659 | .0554 | .0431 | .0301 | 0.0169 | -------- | -------- | -------- | -------- |
| 18 | .0943 | .0873 | .0804 | .0709 | .0611 | .0492 | .0362 | .0230 | 0.0108 | -------- | -------- | -------- |
| 19 | .0956 | .0904 | .0840 | .0759 | .0666 | .0554 | .0418 | .0295 | .0164 | -------- | -------- | -------- |
| 20 | .0973 | .0927 | .0880 | .0805 | .0718 | .0611 | .0484 | .0353 | .0223 | -------- | -------- | -------- |
| 21 | .0975 | .0944 | .0910 | .0844 | .0764 | .0667 | .0546 | .0415 | .0284 | 0.0162 | -------- | -------- |
| 22 | .0970 | .0962 | .0930 | .0882 | .0809 | .0719 | .0603 | .0476 | .0346 | .0231 | -------- | -------- |
| 23 | .0950 | .0971 | .0953 | .0912 | .0845 | .0768 | .0657 | .0536 | .0407 | .0281 | 0.0158 | -------- |
| 24 | .0929 | .0952 | .0968 | .0935 | .0876 | .0809 | .0710 | .0592 | .0471 | .0341 | .0216 | -------- |
| 25 | .0930 | .0948 | .0972 | .0954 | .0906 | .0849 | .0757 | .0649 | .0529 | .0400 | .0277 | -------- |
| 26 | .0941 | .0952 | .0967 | .0967 | .0926 | .0879 | .0804 | .0703 | .0587 | .0460 | .0341 | -------- |
| 27 | .0970 | .0956 | .0963 | .0965 | .0939 | .0907 | .0849 | .0755 | .0642 | .0521 | .0406 | -------- |
| 28 | .1005 | .0974 | .0960 | .0961 | .0948 | .0928 | .0888 | .0802 | .0694 | .0582 | .0470 | 0.0357 |

## TABLE VI

## "VE-7" AIRPLANE

VALUES OF $C_P$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 |
| ° | | | | | | | | | | | | |
| 10 | 0.0230 | 0.0220 | 0.0201 | 0.0171 | 0.0130 | 0.0077 | 0.0000 | -------- | -------- | -------- | -------- | -------- |
| 11 | .0260 | .0247 | .0230 | .0200 | .0160 | .0103 | .0030 | -------- | -------- | -------- | -------- | -------- |
| 12 | .0285 | .0275 | .0259 | .0230 | .0190 | .0132 | .0062 | -------- | -------- | -------- | -------- | -------- |
| 13 | .0311 | .0304 | .0289 | .0261 | .0220 | .0165 | .0096 | 0.0000 | -------- | -------- | -------- | -------- |
| 14 | .0338 | .0332 | .0320 | .0294 | .0254 | .0200 | .0133 | .0044 | -------- | -------- | -------- | -------- |
| 15 | .0363 | .0362 | .0354 | .0330 | .0291 | .0240 | .0173 | .0090 | -------- | -------- | -------- | -------- |
| 16 | .0391 | .0392 | .0387 | .0366 | .0322 | .0282 | .0216 | .0136 | 0.0044 | -------- | -------- | -------- |
| 17 | .0419 | .0424 | .0421 | .0403 | .0374 | .0327 | .0261 | .0185 | .0097 | 0.0008 | -------- | -------- |
| 18 | .0447 | .0456 | .0456 | .0442 | .0418 | .0373 | .0310 | .0236 | .0150 | .0059 | -------- | -------- |
| 19 | .0478 | .0490 | .0492 | .0481 | .0461 | .0421 | .0361 | .0288 | .0202 | .0110 | 0.0030 | -------- |
| 20 | .0512 | .0525 | .0530 | .0520 | .0504 | .0469 | .0413 | .0341 | .0257 | .0163 | .0076 | 0.0010 |
| 21 | .0548 | .0562 | .0569 | .0560 | .0546 | .0518 | .0468 | .0396 | .0313 | .0219 | .0125 | .0043 |
| 22 | .0588 | .0603 | .0609 | .0601 | .0588 | .0567 | .0522 | .0453 | .0371 | .0277 | .0177 | .0083 |
| 23 | .0633 | .0645 | .0650 | .0640 | .0630 | .0615 | .0576 | .0511 | .0430 | .0338 | .0235 | .0129 |
| 24 | .0688 | .0690 | .0693 | .0680 | .0670 | .0662 | .0631 | .0570 | .0493 | .0402 | .0297 | .0181 |
| 25 | .0750 | .0741 | .0738 | .0720 | .0711 | .0708 | .0685 | .0632 | .0557 | .0468 | .0363 | .0244 |
| 26 | .0818 | .0797 | .0782 | .0761 | .0752 | .0753 | .0740 | .0694 | .0624 | .0539 | .0437 | .0318 |
| 27 | .0898 | .0857 | .0828 | .0801 | .0793 | .0798 | .0794 | .0758 | .0694 | .0614 | .0518 | .0403 |
| 28 | .0995 | .0923 | .0873 | .0841 | .0832 | .0842 | .0848 | .0822 | .0766 | .0693 | .0603 | .0500 |

## TABLE VII

### "VE-7" AIRPLANE

VALUES OF $\eta$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 |
| ° | | | | | | | | | | | | |
| 10 | 0.281 | 0.480 | 0.610 | 0.686 | 0.641 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .274 | .470 | .609 | .699 | .709 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .267 | .460 | .602 | .696 | .732 | 0.639 | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .258 | .448 | .593 | .690 | .742 | .707 | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .250 | .437 | .582 | .681 | .749 | .749 | 0.700 | -------- | -------- | -------- | -------- | -------- |
| 15 | .240 | .423 | .571 | .673 | .749 | .772 | .761 | -------- | -------- | -------- | -------- | -------- |
| 16 | .231 | .411 | .559 | .665 | .744 | .786 | .791 | -------- | -------- | -------- | -------- | -------- |
| 17 | .222 | .399 | .543 | .654 | .740 | .791 | .808 | 0.732 | -------- | -------- | -------- | -------- |
| 18 | .211 | .383 | .529 | .642 | .731 | .791 | .817 | .781 | 0.649 | -------- | -------- | -------- |
| 19 | .200 | .369 | .512 | .631 | .722 | .789 | .811 | .820 | .730 | -------- | -------- | -------- |
| 20 | .190 | .353 | .498 | .619 | .712 | .781 | .820 | .829 | .782 | -------- | -------- | -------- |
| 21 | .178 | .336 | .480 | .603 | .700 | .772 | .816 | .838 | .816 | 0.740 | -------- | -------- |
| 22 | .165 | .319 | .460 | .587 | .638 | .761 | .809 | .840 | .840 | .797 | -------- | -------- |
| 23 | .150 | .301 | .440 | .570 | .671 | .749 | .799 | .839 | .852 | .830 | 0.740 | -------- |
| 24 | .135 | .276 | .419 | .550 | .654 | .733 | .788 | .831 | .859 | .848 | .802 | -------- |
| 25 | .124 | .255 | .395 | .530 | .637 | .719 | .774 | .821 | .855 | .854 | .840 | -------- |
| 26 | .115 | .239 | .371 | .508 | .616 | .700 | .761 | .810 | .846 | .853 | .859 | -------- |
| 27 | .108 | .223 | .349 | .482 | .592 | .682 | .749 | .797 | .832 | .849 | .862 | -------- |
| 28 | .101 | .211 | .330 | .457 | .570 | .661 | .733 | .780 | .815 | .840 | .858 | 0.857 |

## TABLE VIII

### "VE-7" AIRPLANE

VALUES OF $C_S$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 |
| ° | | | | | | | | | | | | |
| 10 | 0.212 | 0.431 | 0.660 | 0.910 | 1.190 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .207 | .420 | .640 | .879 | 1.146 | 1.492 | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .203 | .411 | .621 | .852 | 1.108 | 1.429 | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .199 | .402 | .609 | .829 | 1.071 | 1.370 | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .197 | .393 | .594 | .809 | 1.040 | 1.315 | 1.650 | -------- | -------- | -------- | -------- | -------- |
| 15 | .194 | .388 | .585 | .790 | 1.012 | 1.269 | 1.580 | 2.020 | -------- | -------- | -------- | -------- |
| 16 | .191 | .380 | .576 | .773 | .988 | 1.228 | 1.514 | 1.901 | -------- | -------- | -------- | -------- |
| 17 | .189 | .376 | .566 | .759 | .962 | 1.190 | 1.455 | 1.790 | -------- | -------- | -------- | -------- |
| 18 | .186 | .370 | .557 | .743 | .942 | 1.158 | 1.402 | 1.710 | 2.080 | -------- | -------- | -------- |
| 19 | .184 | .362 | .548 | .731 | .923 | 1.130 | 1.360 | 1.638 | 1.963 | 2.430 | -------- | -------- |
| 20 | .181 | .360 | .540 | .720 | .907 | 1.105 | 1.322 | 1.575 | 1.870 | 2.291 | -------- | -------- |
| 21 | .179 | .354 | .532 | .710 | .892 | 1.081 | 1.292 | 1.526 | 1.793 | 2.170 | -------- | -------- |
| 22 | .177 | .350 | .528 | .700 | .880 | 1.062 | 1.270 | 1.482 | 1.736 | 2.065 | 2.460 | -------- |
| 23 | .174 | .348 | .520 | .691 | .869 | 1.047 | 1.246 | 1.450 | 1.686 | 1.976 | 2.326 | 2.861 |
| 24 | .171 | .341 | .511 | .685 | .858 | 1.030 | 1.226 | 1.419 | 1.641 | 1.901 | 2.219 | 2.670 |
| 25 | .168 | .338 | .508 | .678 | .848 | 1.018 | 1.204 | 1.390 | 1.602 | 1.840 | 2.128 | 2.510 |
| 26 | .165 | .332 | .500 | .670 | .838 | 1.005 | 1.184 | 1.368 | 1.570 | 1.790 | 2.051 | 2.332 |
| 27 | .162 | .330 | .492 | .662 | .829 | .992 | 1.162 | 1.341 | 1.538 | 1.746 | 1.983 | 2.275 |
| 28 | .159 | .327 | .488 | .659 | .819 | .982 | 1.143 | 1.320 | 1.507 | 1.706 | 1.923 | 2.181 |

## TABLE IX

### OPEN-COCKPIT FUSELAGE WITH J-5 ENGINE

VALUES OF $C_T$

(See fig. 3)

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 |
| ° | | | | | | | | | | | | |
| 10 | 0.0606 | 0.0526 | 0.0419 | 0.0288 | 0.0174 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .0662 | .0578 | .0472 | .0348 | .0224 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .0718 | .0630 | .0523 | .0408 | .0279 | 0.0133 | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .0768 | .0675 | .0572 | .0466 | .0331 | .0196 | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .0813 | .0719 | .0621 | .0522 | .0385 | .0258 | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .0849 | .0757 | .0670 | .0579 | .0442 | .0321 | 0.0169 | -------- | -------- | -------- | -------- | -------- |
| 16 | .0871 | .0792 | .0718 | .0631 | .0498 | .0380 | .0233 | -------- | -------- | -------- | -------- | -------- |
| 17 | .0884 | .0822 | .0759 | .0678 | .0554 | .0436 | .0296 | 0.0161 | -------- | -------- | -------- | -------- |
| 18 | .0899 | .0852 | .0802 | .0727 | .0611 | .0491 | .0358 | .0222 | -------- | -------- | -------- | -------- |
| 19 | .0908 | .0877 | .0839 | .0769 | .0666 | .0544 | .0418 | .0319 | 0.0161 | -------- | -------- | -------- |
| 20 | .0919 | .0899 | .0870 | .0807 | .0713 | .0597 | .0477 | .0344 | .0222 | -------- | -------- | -------- |
| 21 | .0936 | .0920 | .0896 | .0842 | .0760 | .0648 | .0538 | .0405 | .0284 | 0.0159 | -------- | -------- |
| 22 | .0948 | .0934 | .0915 | .0870 | .0802 | .0701 | .0597 | .0467 | .0345 | .0219 | -------- | -------- |
| 23 | .0958 | .0952 | .0934 | .0896 | .0840 | .0749 | .0654 | .0528 | .0403 | .0280 | 0.0150 | -------- |
| 24 | .0959 | .0955 | .0955 | .0915 | .0871 | .0795 | .0705 | .0587 | .0461 | .0342 | .0214 | -------- |
| 25 | .0950 | .0956 | .0956 | .0931 | .0896 | .0834 | .0756 | .0646 | .0520 | .0405 | .0281 | 0.0154 |
| 26 | .0952 | .0956 | .0957 | .0938 | .0917 | .0873 | .0804 | .0701 | .0581 | .0467 | .0345 | .0220 |
| 27 | .0963 | .0959 | .0962 | .0949 | .0932 | .0908 | .0850 | .0757 | .0642 | .0528 | .0409 | .0288 |
| 28 | .0969 | .0961 | .0955 | .0948 | .0945 | .0938 | .0891 | .0809 | .0702 | .0587 | .0474 | .0356 |

## TABLE X

## OPEN-COCKPIT FUSELAGE WITH J-5 ENGINE

VALUES OF $C_P$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 |
| ° | | | | | | | | | | | | |
| 10 | 0.0215 | 0.0210 | 0.0196 | 0.0167 | 0.0128 | 0.0069 | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .0240 | .0236 | .0225 | .0201 | .0162 | .0105 | 0.0010 | -------- | -------- | -------- | -------- | -------- |
| 12 | .0267 | .0263 | .0253 | .0235 | .0197 | .0140 | .0050 | -------- | -------- | -------- | -------- | -------- |
| 13 | .0293 | .0289 | .0282 | .0268 | .0230 | .0176 | .0091 | 0.0008 | -------- | -------- | -------- | -------- |
| 14 | .0320 | .0316 | .0311 | .0301 | .0264 | .0212 | .0133 | .0051 | -------- | -------- | -------- | -------- |
| 15 | .0345 | .0344 | .0342 | .0335 | .0299 | .0250 | .0175 | .0096 | -------- | -------- | -------- | -------- |
| 16 | .0369 | .0372 | .0374 | .0369 | .0335 | .0289 | .0220 | .0142 | 0.0045 | -------- | -------- | -------- |
| 17 | .0391 | .0399 | .0405 | .0401 | .0372 | .0328 | .0264 | .0189 | .0099 | -------- | -------- | -------- |
| 18 | .0416 | .0428 | .0439 | .0437 | .0412 | .0369 | .0310 | .0237 | .0155 | 0.0056 | -------- | -------- |
| 19 | .0443 | .0459 | .0473 | .0472 | .0451 | .0412 | .0357 | .0287 | .0210 | .0113 | -------- | -------- |
| 20 | .0476 | .0494 | .0508 | .0507 | .0492 | .0457 | .0406 | .0339 | .0265 | .0171 | 0.0035 | -------- |
| 21 | .0517 | .0533 | .0545 | .0544 | .0533 | .0502 | .0459 | .0394 | .0321 | .0228 | .0098 | -------- |
| 22 | .0564 | .0575 | .0583 | .0582 | .0574 | .0551 | .0513 | .0451 | .0379 | .0287 | .0164 | 0.0044 |
| 23 | .0618 | .0622 | .0623 | .0621 | .0616 | .0599 | .0569 | .0510 | .0437 | .0348 | .0233 | .0111 |
| 24 | .0680 | .0675 | .0668 | .0663 | .0658 | .0647 | .0623 | .0571 | .0498 | .0413 | .0305 | .0183 |
| 25 | .0748 | .0730 | .0715 | .0705 | .0700 | .0696 | .0678 | .0632 | .0563 | .0482 | .0380 | .0259 |
| 26 | .0821 | .0790 | .0766 | .0750 | .0744 | .0744 | .0732 | .0694 | .0631 | .0555 | .0456 | .0338 |
| 27 | .0900 | .0852 | .0818 | .0796 | .0787 | .0791 | .0787 | .0758 | .0701 | .0629 | .0534 | .0420 |
| 28 | .0979 | .0915 | .0871 | .0841 | .0830 | .0839 | .0841 | .0820 | .0771 | .0704 | .0614 | .0506 |

## TABLE XI

## OPEN-COCKPIT FUSELAGE WITH J-5 ENGINE

VALUES OF $\eta$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 |
| ° | | | | | | | | | | | | |
| 10 | 0.282 | 0.501 | 0.641 | 0.690 | 0.678 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .276 | .490 | .630 | .692 | .692 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .269 | .479 | .620 | .695 | .707 | 0.571 | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .262 | .467 | .609 | .695 | .720 | .670 | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .254 | .455 | .599 | .694 | .730 | .731 | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .245 | .440 | .588 | .691 | .739 | .770 | 0.676 | -------- | -------- | -------- | -------- | -------- |
| 16 | .236 | .426 | .576 | .684 | .744 | .789 | .742 | -------- | -------- | -------- | -------- | -------- |
| 17 | .226 | .412 | .562 | .676 | .744 | .798 | .785 | 0.681 | -------- | -------- | -------- | -------- |
| 18 | .216 | .398 | .548 | .665 | .741 | .798 | .809 | .749 | -------- | -------- | -------- | -------- |
| 19 | .205 | .382 | .532 | .652 | .738 | .793 | .819 | .779 | 0.689 | -------- | -------- | -------- |
| 20 | .193 | .364 | .514 | .637 | .725 | .784 | .822 | .811 | .755 | -------- | -------- | -------- |
| 21 | .181 | .345 | .493 | .619 | .713 | .774 | .821 | .823 | .796 | 0.699 | -------- | -------- |
| 22 | .168 | .325 | .471 | .598 | .699 | .763 | .815 | .829 | .819 | .763 | -------- | -------- |
| 23 | .155 | .306 | .450 | .577 | .682 | .750 | .804 | .828 | .830 | .805 | 0.707 | -------- |
| 24 | .141 | .283 | .429 | .552 | .662 | .737 | .792 | .823 | .833 | .829 | .772 | -------- |
| 25 | .127 | .262 | .401 | .528 | .640 | .719 | .781 | .818 | .831 | .840 | .812 | 0.713 |
| 26 | .116 | .242 | .375 | .500 | .616 | .704 | .769 | .808 | .829 | .842 | .833 | .782 |
| 27 | .107 | .225 | .353 | .477 | .592 | .689 | .756 | .799 | .824 | .840 | .843 | .823 |
| 28 | .099 | .210 | .329 | .451 | .569 | .671 | .742 | .789 | .820 | .834 | .850 | .844 |

## TABLE XII

## OPEN-COCKPIT FUSELAGE WITH J-5 ENGINE

VALUES OF $C_S$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 |
| ° | | | | | | | | | | | | |
| 10 | 0.210 | 0.428 | 0.652 | 0.890 | 1.174 | 1.630 | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .208 | .420 | .640 | .869 | 1.131 | 1.500 | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .204 | .411 | .627 | .849 | 1.098 | 1.412 | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .200 | .404 | .613 | .829 | 1.080 | 1.350 | 1.760 | -------- | -------- | -------- | -------- | -------- |
| 14 | .199 | .398 | .600 | .810 | 1.037 | 1.300 | 1.637 | -------- | -------- | -------- | -------- | -------- |
| 15 | .197 | .390 | .590 | .792 | 1.010 | 1.252 | 1.562 | 2.015 | -------- | -------- | -------- | -------- |
| 16 | .192 | .384 | .580 | .778 | .985 | 1.213 | 1.505 | 1.889 | -------- | -------- | -------- | -------- |
| 17 | .190 | .378 | .570 | .764 | .961 | 1.182 | 1.453 | 1.790 | 2.285 | -------- | -------- | -------- |
| 18 | .189 | .372 | .561 | .750 | .941 | 1.158 | 1.407 | 1.705 | 2.086 | -------- | -------- | -------- |
| 19 | .188 | .369 | .551 | .740 | .924 | 1.133 | 1.364 | 1.632 | 1.969 | 2.500 | -------- | -------- |
| 20 | .184 | .361 | .542 | .728 | .910 | 1.110 | 1.328 | 1.572 | 1.862 | 2.272 | -------- | -------- |
| 21 | .180 | .358 | .533 | .718 | .892 | 1.090 | 1.292 | 1.523 | 1.795 | 2.152 | -------- | -------- |
| 22 | .179 | .351 | .528 | .707 | .881 | 1.070 | 1.265 | 1.485 | 1.736 | 2.048 | 2.487 | -------- |
| 23 | .178 | .347 | .520 | .697 | .870 | 1.052 | 1.240 | 1.450 | 1.684 | 1.961 | 2.328 | 2.886 |
| 24 | .172 | .340 | .512 | .688 | .859 | 1.040 | 1.220 | 1.420 | 1.640 | 1.892 | 2.206 | 2.670 |
| 25 | .169 | .332 | .508 | .680 | .850 | 1.026 | 1.201 | 1.392 | 1.600 | 1.832 | 2.130 | 2.586 |
| 26 | .162 | .329 | .500 | .671 | .840 | 1.012 | 1.188 | 1.367 | 1.565 | 1.783 | 2.045 | 2.382 |
| 27 | .160 | .322 | .492 | .662 | .831 | 1.000 | 1.171 | 1.341 | 1.531 | 1.740 | 1.980 | 2.273 |
| 28 | .158 | .318 | .489 | .655 | .822 | .988 | 1.159 | 1.318 | 1.498 | 1.696 | 1.926 | 2.172 |

## TABLE XIII

## CABIN MONPOLANE WITH J-5 ENGINE

VALUES OF $C_T$

(See fig. 4)

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.0620 | 0.0517 | 0.0419 | 0.0319 | 0.0202 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .0674 | .0573 | .0472 | .0368 | .0251 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .0721 | .0627 | .0524 | .0419 | .0298 | 0.0171 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .0767 | .0675 | .0573 | .0466 | .0348 | .0222 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .0811 | .0721 | .0620 | .0512 | .0398 | .0271 | 0.0148 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .0847 | .0760 | .0662 | .0558 | .0447 | .0321 | .0197 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 16 | .0876 | .0792 | .0704 | .0601 | .0498 | .0378 | .0252 | 0.0133 | -------- | -------- | -------- | -------- | -------- | -------- |
| 17 | .0887 | .0820 | .0737 | .0645 | .0547 | .0434 | .0309 | .0188 | -------- | -------- | -------- | -------- | -------- | -------- |
| 18 | .0905 | .0844 | .0772 | .0686 | .0597 | .0491 | .0371 | .0247 | 0.0137 | -------- | -------- | -------- | -------- | -------- |
| 19 | .0920 | .0867 | .0806 | .0730 | .0649 | .0549 | .0433 | .0307 | .0194 | -------- | -------- | -------- | -------- | -------- |
| 20 | .0934 | .0894 | .0841 | .0773 | .0697 | .0601 | .0492 | .0368 | .0255 | 0.0132 | -------- | -------- | -------- | -------- |
| 21 | .0947 | .0920 | .0874 | .0818 | .0745 | .0651 | .0546 | .0429 | .0316 | .0188 | -------- | -------- | -------- | -------- |
| 22 | .0947 | .0932 | .0897 | .0855 | .0789 | .0698 | .0600 | .0494 | .0376 | .0247 | 0.0138 | -------- | -------- | -------- |
| 23 | .0947 | .0945 | .0915 | .0901 | .0829 | .0745 | .0650 | .0546 | .0436 | .0308 | .0197 | -------- | -------- | -------- |
| 24 | .0942 | .0942 | .0924 | .0902 | .0865 | .0785 | .0696 | .0602 | .0495 | .0369 | .0257 | 0.0130 | -------- | -------- |
| 25 | .0949 | .0942 | .0927 | .0917 | .0894 | .0825 | .0739 | .0654 | .0551 | .0429 | .0318 | .0188 | -------- | -------- |
| 26 | .0956 | .0949 | .0944 | .0938 | .0918 | .0861 | .0783 | .0707 | .0606 | .0491 | .0380 | .0252 | 0.0147 | -------- |
| 27 | .0961 | .0948 | .0957 | .0951 | .0940 | .0896 | .0824 | .0755 | .0658 | .0553 | .0441 | .0324 | .0213 | 0.0103 |
| 28 | .0980 | .0955 | .0950 | .0949 | .0946 | .0928 | .0862 | .0802 | .0708 | .0612 | .0505 | .0402 | .0287 | .0168 |

## TABLE XIV

## CABIN MONOPLANE WITH J-5 ENGINE

VALUES OF $C_P$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.0219 | 0.0206 | 0.0195 | 0.0181 | 0.0143 | 0.0086 | 0.0045 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .0245 | .0235 | .0225 | .0211 | .0175 | .0118 | .0070 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .0270 | .0265 | .0256 | .0242 | .0205 | .0150 | .0095 | 0.0019 | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .0296 | .0294 | .0287 | .0272 | .0237 | .0182 | .0124 | .0051 | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .0323 | .0324 | .0318 | .0302 | .0268 | .0215 | .0156 | .0085 | 0.0003 | -------- | -------- | -------- | -------- | -------- |
| 15 | .0347 | .0352 | .0348 | .0333 | .0302 | .0250 | .0191 | .0121 | .0047 | -------- | -------- | -------- | -------- | -------- |
| 16 | .0371 | .0380 | .0380 | .0365 | .0338 | .0291 | .0233 | .0161 | .0091 | -------- | -------- | -------- | -------- | -------- |
| 17 | .0396 | .0408 | .0409 | .0399 | .0375 | .0334 | .0278 | .0208 | .0138 | 0.0043 | -------- | -------- | -------- | -------- |
| 18 | .0421 | .0434 | .0441 | .0433 | .0416 | .0380 | .0329 | .0258 | .0187 | .0093 | -------- | -------- | -------- | -------- |
| 19 | .0451 | .0465 | .0474 | .0471 | .0460 | .0429 | .0382 | .0311 | .0238 | .0144 | 0.0049 | -------- | -------- | -------- |
| 20 | .0484 | .0501 | .0511 | .0511 | .0503 | .0476 | .0434 | .0366 | .0295 | .0197 | .0103 | -------- | -------- | -------- |
| 21 | .0523 | .0541 | .0551 | .0555 | .0549 | .0523 | .0484 | .0422 | .0353 | .0254 | .0161 | 0.0046 | -------- | -------- |
| 22 | .0567 | .0586 | .0593 | .0600 | .0593 | .0570 | .0534 | .0479 | .0413 | .0313 | .0221 | .0102 | -------- | -------- |
| 23 | .0619 | .0634 | .0637 | .0644 | .0637 | .0618 | .0584 | .0537 | .0475 | .0376 | .0284 | .0162 | 0.0052 | -------- |
| 24 | .0678 | .0685 | .0683 | .0685 | .0680 | .0663 | .0634 | .0595 | .0537 | .0441 | .0349 | .0226 | .0118 | -------- |
| 25 | .0747 | .0739 | .0728 | .0722 | .0721 | .0710 | .0684 | .0653 | .0598 | .0508 | .0419 | .0298 | .0190 | 0.0058 |
| 26 | .0824 | .0794 | .0774 | .0757 | .0760 | .0755 | .0738 | .0711 | .0659 | .0578 | .0492 | .0379 | .0270 | .0140 |
| 27 | .0907 | .0850 | .0818 | .0791 | .0799 | .0801 | .0792 | .0769 | .0720 | .0650 | .0567 | .0467 | .0358 | .0230 |
| 28 | .0993 | .0905 | .0864 | .0824 | .0837 | .0846 | .0847 | .0826 | .0780 | .0721 | .0646 | .0559 | .0452 | .0330 |

## TABLE XV

## CABIN MONOPLANE WITH J-5 ENGINE

VALUES OF $\eta$

| Bladge angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.283 | 0.502 | 0.645 | 0.704 | 0.705 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .275 | .488 | .630 | .699 | .716 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .267 | .473 | .614 | .693 | .726 | 0.685 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .259 | .459 | .599 | .686 | .734 | .730 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .251 | .445 | .585 | .678 | .739 | .756 | 0.662 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .244 | .432 | .571 | .670 | .740 | .771 | .721 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 16 | .236 | .417 | .556 | .659 | .736 | .779 | .758 | 0.660 | -------- | -------- | -------- | -------- | -------- | -------- |
| 17 | .224 | .404 | .541 | .647 | .729 | .779 | .779 | .724 | -------- | -------- | -------- | -------- | -------- | -------- |
| 18 | .215 | .389 | .525 | .634 | .718 | .775 | .790 | .765 | 0.658 | -------- | -------- | -------- | -------- | -------- |
| 19 | .204 | .373 | .510 | .620 | .705 | .768 | .794 | .790 | .732 | -------- | -------- | -------- | -------- | -------- |
| 20 | .193 | .357 | .494 | .605 | .693 | .758 | .794 | .805 | .777 | 0.671 | -------- | -------- | -------- | -------- |
| 21 | .181 | .340 | .476 | .590 | .679 | .747 | .790 | .813 | .805 | .741 | -------- | -------- | -------- | -------- |
| 22 | .167 | .318 | .454 | .570 | .665 | .735 | .786 | .815 | .820 | .788 | 0.685 | -------- | -------- | -------- |
| 23 | .153 | .298 | .431 | .560 | .651 | .723 | .779 | .814 | .827 | .818 | .763 | -------- | -------- | -------- |
| 24 | .139 | .275 | .406 | .527 | .636 | .710 | .769 | .809 | .830 | .837 | .810 | 0.693 | -------- | -------- |
| 25 | .127 | .255 | .382 | .503 | .620 | .697 | .756 | .802 | .830 | .845 | .835 | .758 | -------- | -------- |
| 26 | .116 | .239 | .366 | .495 | .604 | .684 | .743 | .795 | .827 | .849 | .849 | .800 | 0.706 | -------- |
| 27 | .106 | .223 | .351 | .481 | .588 | .671 | .728 | .786 | .823 | .850 | .856 | .834 | .775 | 0.625 |
| 28 | .099 | .211 | .330 | .461 | .566 | .658 | .712 | .776 | .817 | .849 | .860 | .863 | .825 | .713 |

## TABLE XVI

## CABIN MONOPLANE WITH J-5 ENGINE

VALUES OF $C_S$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.211 | 0.430 | 0.650 | 0.890 | 1.160 | 1.535 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 11 | .209 | .423 | .637 | .869 | 1.125 | 1.450 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 12 | .205 | .413 | .623 | .846 | 1.091 | 1.392 | 1.821 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 13 | .201 | .403 | .610 | .827 | 1.063 | 1.347 | 1.722 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 14 | .197 | .394 | .598 | .808 | 1.037 | 1.301 | 1.634 | 2.076 | ---- | ---- | ---- | ---- | ---- | ---- |
| 15 | .193 | .387 | .585 | .790 | 1.010 | 1.259 | 1.554 | 1.939 | ---- | ---- | ---- | ---- | ---- | ---- |
| 16 | .190 | .380 | .574 | .775 | .986 | 1.218 | 1.489 | 1.826 | 2.358 | ---- | ---- | ---- | ---- | ---- |
| 17 | .189 | .375 | .564 | .760 | .963 | 1.181 | 1.431 | 1.733 | 2.182 | ---- | ---- | ---- | ---- | ---- |
| 18 | .187 | .371 | .555 | .747 | .944 | 1.148 | 1.384 | 1.659 | 2.030 | 2.568 | ---- | ---- | ---- | ---- |
| 19 | .185 | .368 | .546 | .735 | .926 | 1.120 | 1.343 | 1.597 | 1.908 | 2.348 | ---- | ---- | ---- | ---- |
| 20 | .182 | .363 | .538 | .723 | .910 | 1.100 | 1.308 | 1.545 | 1.817 | 2.189 | 2.725 | ---- | ---- | ---- |
| 21 | .179 | .359 | .530 | .710 | .895 | 1.082 | 1.280 | 1.500 | 1.746 | 2.073 | 2.516 | ---- | ---- | ---- |
| 22 | .175 | .353 | .523 | .700 | .881 | 1.065 | 1.255 | 1.464 | 1.692 | 1.990 | 2.371 | 2.920 | ---- | ---- |
| 23 | .171 | .348 | .517 | .690 | .870 | 1.050 | 1.232 | 1.432 | 1.650 | 1.922 | 2.253 | 2.716 | ---- | ---- |
| 24 | .168 | .343 | .510 | .680 | .858 | 1.037 | 1.212 | 1.405 | 1.612 | 1.867 | 2.150 | 2.550 | 3.065 | ---- |
| 25 | .164 | .337 | .504 | .674 | .846 | 1.023 | 1.193 | 1.380 | 1.580 | 1.816 | 2.069 | 2.420 | 2.830 | ---- |
| 26 | .161 | .331 | .499 | .669 | .835 | 1.008 | 1.174 | 1.359 | 1.549 | 1.769 | 2.002 | 2.310 | 2.656 | 3.186 |
| 27 | .159 | .326 | .493 | .665 | .826 | .993 | 1.159 | 1.337 | 1.524 | 1.728 | 1.947 | 2.217 | 2.523 | 2.954 |
| 28 | .156 | .320 | .486 | .662 | .818 | .979 | 1.144 | 1.317 | 1.500 | 1.690 | 1.900 | 2.133 | 2.412 | 2.782 |

## TABLE XVII

## CABIN FUSELAGE WITH J-5 ENGINE

VALUES OF $C_T$

(See fig. 5)

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.0621 | 0.0525 | 0.0421 | 0.0305 | 0.0190 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 11 | .0667 | .0574 | .0470 | .0361 | .0239 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 12 | .0721 | .0620 | .0518 | .0412 | .0288 | 0.0158 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 13 | .0769 | .0669 | .0566 | .0464 | .0341 | .0215 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 14 | .0811 | .0715 | .0612 | .0516 | .0395 | .0273 | 0.0138 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 15 | .0850 | .0756 | .0662 | .0567 | .0453 | .0331 | .0195 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 16 | .0877 | .0795 | .0707 | .0618 | .0510 | .0390 | .0251 | 0.0135 | ---- | ---- | ---- | ---- | ---- | ---- |
| 17 | .0902 | .0830 | .0750 | .0669 | .0562 | .0445 | .0311 | .0190 | ---- | ---- | ---- | ---- | ---- | ---- |
| 18 | .0911 | .0864 | .0794 | .0720 | .0618 | .0500 | .0372 | .0249 | 0.0130 | ---- | ---- | ---- | ---- | ---- |
| 19 | .0925 | .0890 | .0832 | .0766 | .0676 | .0555 | .0433 | .0312 | .0188 | ---- | ---- | ---- | ---- | ---- |
| 20 | .0941 | .0913 | .0869 | .0813 | .0724 | .0612 | .0495 | .0373 | .0249 | 0.0132 | ---- | ---- | ---- | ---- |
| 21 | .0950 | .0933 | .0904 | .0851 | .0772 | .0670 | .0556 | .0437 | .0312 | .0193 | ---- | ---- | ---- | ---- |
| 22 | .0967 | .0950 | .0930 | .0886 | .0818 | .0727 | .0613 | .0498 | .0377 | .0258 | 0.0138 | ---- | ---- | ---- |
| 23 | .0969 | .0955 | .0943 | .0918 | .0856 | .0778 | .0671 | .0561 | .0441 | .0325 | .0202 | ---- | ---- | ---- |
| 24 | .0959 | .0957 | .0950 | .0924 | .0888 | .0823 | .0725 | .0618 | .0502 | .0390 | .0270 | 0.0149 | ---- | ---- |
| 25 | .0964 | .0956 | .0950 | .0935 | .0912 | .0860 | .0773 | .0673 | .0563 | .0455 | .0337 | .0213 | ---- | ---- |
| 26 | .0966 | .0955 | .0955 | .0946 | .0925 | .0887 | .0820 | .0729 | .0622 | .0517 | .0401 | .0279 | 0.0172 | ---- |
| 27 | .0974 | .0961 | .0963 | .0956 | .0936 | .0913 | .0865 | .0779 | .0680 | .0576 | .0466 | .0348 | .0239 | ---- |
| 28 | .0989 | .0979 | .0970 | .0962 | .0949 | .0931 | .0898 | .0831 | .0735 | .0630 | .0525 | .0414 | .0304 | 0.0194 |

## TABLE XVIII

## CABIN FUSELAGE WITH J-5 ENGINE

VALUES OF $C_P$

| Bladge angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.0225 | 0.0215 | 0.0201 | 0.0175 | 0.0136 | 0.0078 | 0.0016 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 11 | .0247 | .0240 | .0228 | .0206 | .0169 | .0114 | .0047 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| 12 | .0272 | .0265 | .0255 | .0236 | .0201 | .0149 | .0080 | 0.0008 | ---- | ---- | ---- | ---- | ---- | ---- |
| 13 | .0297 | .0292 | .0284 | .0267 | .0235 | .0185 | .0114 | .0044 | ---- | ---- | ---- | ---- | ---- | ---- |
| 14 | .0322 | .0320 | .0312 | .0299 | .0270 | .0221 | .0150 | .0080 | ---- | ---- | ---- | ---- | ---- | ---- |
| 15 | .0347 | .0346 | .0343 | .0331 | .0307 | .0260 | .0190 | .0120 | 0.0035 | ---- | ---- | ---- | ---- | ---- |
| 16 | .0370 | .0374 | .0374 | .0365 | .0345 | .0300 | .0230 | .0163 | .0075 | ---- | ---- | ---- | ---- | ---- |
| 17 | .0394 | .0402 | .0404 | .0401 | .0382 | .0340 | .0275 | .0208 | .0121 | 0.0030 | ---- | ---- | ---- | ---- |
| 18 | .0418 | .0432 | .0437 | .0439 | .0422 | .0382 | .0323 | .0256 | .0174 | .0080 | ---- | ---- | ---- | ---- |
| 19 | .0447 | .0465 | .0472 | .0478 | .0466 | .0427 | .0374 | .0310 | .0228 | .0134 | 0.0029 | ---- | ---- | ---- |
| 20 | .0485 | .0503 | .0513 | .0520 | .0506 | .0476 | .0428 | .0364 | .0285 | .0191 | .0085 | ---- | ---- | ---- |
| 21 | .0531 | .0546 | .0556 | .0562 | .0550 | .0527 | .0485 | .0423 | .0345 | .0255 | .0145 | 0.0035 | ---- | ---- |
| 22 | .0586 | .0595 | .0604 | .0606 | .0596 | .0580 | .0540 | .0483 | .0409 | .0321 | .0211 | .0100 | ---- | ---- |
| 23 | .0650 | .0650 | .0652 | .0652 | .0640 | .0631 | .0598 | .0545 | .0475 | .0391 | .0283 | .0171 | 0.0050 | ---- |
| 24 | .0716 | .0708 | .0700 | .0691 | .0683 | .0680 | .0653 | .0606 | .0541 | .0462 | .0358 | .0245 | .0125 | ---- |
| 25 | .0790 | .0765 | .0746 | .0732 | .0725 | .0725 | .0704 | .0665 | .0608 | .0535 | .0435 | .0324 | .0205 | 0.0073 |
| 26 | .0866 | .0826 | .0796 | .0772 | .0762 | .0765 | .0755 | .0725 | .0675 | .0609 | .0513 | .0405 | .0289 | .0157 |
| 27 | .0946 | .0890 | .0845 | .0812 | .0800 | .0806 | .0806 | .0783 | .0744 | .0682 | .0596 | .0490 | .0375 | .0246 |
| 28 | .1030 | .0955 | .0895 | .0851 | .0837 | .0845 | .0855 | .0841 | .0810 | .0754 | .0676 | .0574 | .0459 | .0334 |

## TABLE XIX

## CABIN FUSELAGE WITH J-5 ENGINE

VALUES OF $\eta$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.276 | 0.488 | 0.628 | 0.698 | 0.698 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .270 | .478 | .618 | .700 | .708 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .265 | .468 | .610 | .699 | .717 | 0.635 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .259 | .458 | .598 | .695 | .725 | .699 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .252 | .447 | .588 | .690 | .732 | .740 | 0.645 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .245 | .437 | .579 | .685 | .737 | .765 | .718 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 16 | .237 | .425 | .567 | .677 | .739 | .780 | .765 | 0.662 | -------- | -------- | -------- | -------- | -------- | -------- |
| 17 | .229 | .413 | .557 | .667 | .736 | .786 | .792 | .732 | -------- | -------- | -------- | -------- | -------- | -------- |
| 18 | .218 | .400 | .545 | .656 | .732 | .786 | .806 | .777 | 0.674 | -------- | -------- | -------- | -------- | -------- |
| 19 | .207 | .383 | .529 | .641 | .725 | .780 | .810 | .805 | .743 | -------- | -------- | -------- | -------- | -------- |
| 20 | .194 | .363 | .508 | .625 | .715 | .771 | .809 | .820 | .787 | 0.689 | -------- | -------- | -------- | -------- |
| 21 | .179 | .342 | .488 | .606 | .702 | .763 | .802 | .826 | .815 | .758 | -------- | -------- | -------- | -------- |
| 22 | .165 | .319 | .462 | .585 | .686 | .752 | .794 | .825 | .830 | .803 | 0.720 | -------- | -------- | -------- |
| 23 | .149 | .294 | .434 | .563 | .669 | .740 | .785 | .823 | .836 | .830 | .786 | -------- | -------- | -------- |
| 24 | .134 | .270 | .407 | .535 | .650 | .726 | .777 | .816 | .835 | .845 | .829 | 0.729 | -------- | -------- |
| 25 | .122 | .249 | .382 | .510 | .629 | .712 | .769 | .810 | .833 | .850 | .851 | .789 | -------- | -------- |
| 26 | .112 | .231 | .360 | .490 | .607 | .696 | .760 | .804 | .829 | .849 | .860 | .826 | 0.775 | -------- |
| 27 | .103 | .216 | .342 | .471 | .585 | .680 | .751 | .796 | .823 | .844 | .860 | .853 | .830 | -------- |
| 28 | .096 | .205 | .325 | .452 | .566 | .661 | .736 | .790 | .817 | .836 | .855 | .865 | .860 | 0.815 |

## TABLE XX

## CABIN FUSELAGE WITH J-5 ENGINE

VALUES OF $C_s$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| ° | | | | | | | | | | | | | | |
| 10 | 0.212 | 0.430 | 0.660 | 0.890 | 1.160 | 1.530 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .209 | .420 | .642 | .868 | 1.121 | 1.458 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .205 | .411 | .630 | .845 | 1.088 | 1.391 | 1.830 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .201 | .405 | .616 | .829 | 1.058 | 1.340 | 1.729 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .200 | .398 | .602 | .810 | 1.030 | 1.294 | 1.633 | 2.126 | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .199 | .390 | .590 | .791 | 1.004 | 1.253 | 1.550 | 1.941 | -------- | -------- | -------- | -------- | -------- | -------- |
| 16 | .194 | .384 | .580 | .778 | .980 | 1.218 | 1.482 | 1.810 | 2.410 | -------- | -------- | -------- | -------- | -------- |
| 17 | .191 | .379 | .570 | .761 | .960 | 1.181 | 1.430 | 1.718 | 2.205 | -------- | -------- | -------- | -------- | -------- |
| 18 | .189 | .373 | .560 | .749 | .940 | 1.150 | 1.388 | 1.649 | 2.045 | 2.603 | -------- | -------- | -------- | -------- |
| 19 | .187 | .370 | .552 | .737 | .921 | 1.127 | 1.350 | 1.594 | 1.923 | 2.380 | -------- | -------- | -------- | -------- |
| 20 | .184 | .364 | .545 | .724 | .910 | 1.106 | 1.321 | 1.552 | 1.835 | 2.200 | 2.892 | -------- | -------- | -------- |
| 21 | .180 | .358 | .533 | .710 | .891 | 1.078 | 1.283 | 1.502 | 1.758 | 2.077 | 2.590 | -------- | -------- | -------- |
| 22 | .179 | .350 | .527 | .697 | .880 | 1.058 | 1.254 | 1.462 | 1.698 | 1.981 | 2.390 | 3.030 | -------- | -------- |
| 23 | .174 | .343 | .519 | .688 | .868 | 1.040 | 1.229 | 1.430 | 1.650 | 1.910 | 2.250 | 2.720 | -------- | -------- |
| 24 | .170 | .340 | .510 | .680 | .858 | 1.025 | 1.208 | 1.400 | 1.610 | 1.848 | 2.141 | 2.515 | 3.175 | -------- |
| 25 | .168 | .332 | .505 | .672 | .848 | 1.011 | 1.188 | 1.371 | 1.576 | 1.791 | 2.058 | 2.375 | 2.888 | -------- |
| 26 | .164 | .326 | .499 | .668 | .839 | 1.000 | 1.170 | 1.350 | 1.542 | 1.746 | 1.990 | 2.271 | 2.680 | 3.263 |
| 27 | .161 | .322 | .491 | .660 | .830 | .990 | 1.158 | 1.330 | 1.513 | 1.709 | 1.932 | 2.190 | 2.520 | 2.963 |
| 28 | .159 | .319 | .487 | .652 | .820 | .980 | 1.141 | 1.310 | 1.482 | 1.676 | 1.888 | 2.112 | 2.385 | 2.730 |

## TABLE XXI

## CABIN FUSELAGE WITH COMPLETELY COWLED J-5 ENGINE

VALUES OF $C_T$

(See fig. 6)

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 |
| ° | | | | | | | | | | | | | | | |
| 10 | 0.0588 | 0.0505 | 0.0408 | 0.0316 | 0.0195 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .0641 | .0562 | .0463 | .0365 | .0247 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .0700 | .0615 | .0517 | .0415 | .0297 | 0.0172 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .0745 | .0666 | .0570 | .0464 | .0347 | .0227 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .0794 | .0714 | .0622 | .0513 | .0397 | .0280 | 0.0151 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .0833 | .0759 | .0672 | .0563 | .0451 | .0332 | .0207 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 16 | .0860 | .0792 | .0715 | .0611 | .0504 | .0386 | .0275 | 0.0141 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 17 | .0876 | .0816 | .0755 | .0661 | .0556 | .0441 | .0321 | .0199 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 18 | .0884 | .0842 | .0795 | .0709 | .0608 | .0497 | .0382 | .0261 | 0.0150 | -------- | -------- | -------- | -------- | -------- | -------- |
| 19 | .0900 | .0864 | .0830 | .0755 | .0659 | .0554 | .0440 | .0322 | .0209 | -------- | -------- | -------- | -------- | -------- | -------- |
| 20 | .0916 | .0895 | .0865 | .0800 | .0709 | .0607 | .0493 | .0384 | .0268 | 0.0148 | -------- | -------- | -------- | -------- | -------- |
| 21 | .0933 | .0920 | .0897 | .0844 | .0757 | .0659 | .0556 | .0441 | .0327 | .0206 | -------- | -------- | -------- | -------- | -------- |
| 22 | .0951 | .0946 | .0928 | .0881 | .0803 | .0711 | .0610 | .0496 | .0385 | .0265 | 0.0149 | -------- | -------- | -------- | -------- |
| 23 | .0944 | .0937 | .0933 | .0905 | .0843 | .0757 | .0661 | .0551 | .0441 | .0324 | .0209 | -------- | -------- | -------- | -------- |
| 24 | .0933 | .0922 | .0918 | .0903 | .0870 | .0800 | .0711 | .0604 | .0493 | .0384 | .0269 | 0.0154 | -------- | -------- | -------- |
| 25 | .0932 | .0920 | .0913 | .0894 | .0874 | .0834 | .0757 | .0657 | .0553 | .0440 | .0330 | .0213 | -------- | -------- | -------- |
| 26 | .0935 | .0911 | .0902 | .0891 | .0886 | .0865 | .0800 | .0710 | .0608 | .0493 | .0388 | .0274 | 0.0171 | -------- | -------- |
| 27 | .0937 | .0915 | .0905 | .0895 | .0897 | .0889 | .0842 | .0764 | .0663 | .0556 | .0452 | .0339 | .0235 | 0.0130 | -------- |
| 28 | .0954 | .0921 | .0914 | .0906 | .0906 | .0909 | .0880 | .0819 | .0719 | .0613 | .0511 | .0401 | .0301 | .0190 | 0.0092 |

## TABLE XXII

## CABIN FUSELAGE WITH COMPLETELY COWLED J-5 ENGINE

VALUES OF $C_P$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 |
| ° | | | | | | | | | | | | | | | |
| 10 | 0.0216 | 0.0210 | 0.0198 | 0.0181 | 0.0142 | 0.0086 | 0.0030 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .0240 | .0237 | .0227 | .0210 | .0173 | .0121 | .0060 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .0265 | .0264 | .0256 | .0240 | .0204 | .0155 | .0090 | 0.0013 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .0290 | .0291 | .0285 | .0270 | .0236 | .0189 | .0121 | .0048 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .0315 | .0318 | .0315 | .0301 | .0268 | .0223 | .0155 | .0083 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .0340 | .0345 | .0345 | .0333 | .0303 | .0258 | .0192 | .0121 | 0.0048 | -------- | -------- | -------- | -------- | -------- | -------- |
| 16 | .0363 | .0371 | .0374 | .0365 | .0338 | .0295 | .0233 | .0163 | .0094 | -------- | -------- | -------- | -------- | -------- | -------- |
| 17 | .0386 | .0397 | .0404 | .0399 | .0376 | .0236 | .0276 | .0209 | .0140 | 0.0045 | -------- | -------- | -------- | -------- | -------- |
| 18 | .0411 | .0425 | .0435 | .0433 | .0415 | .0379 | .0325 | .0260 | .0190 | .0100 | -------- | -------- | -------- | -------- | -------- |
| 19 | .0441 | .0455 | .0468 | .0469 | .0455 | .0424 | .0375 | .0313 | .0240 | .0154 | 0.0051 | -------- | -------- | -------- | -------- |
| 20 | .0477 | .0493 | .0505 | .0507 | .0498 | .0469 | .0427 | .0368 | .0294 | .0208 | .0108 | -------- | -------- | -------- | -------- |
| 21 | .0521 | .0535 | .0547 | .0550 | .0541 | .0515 | .0480 | .0422 | .0351 | .0265 | .0166 | 0.0060 | -------- | -------- | -------- |
| 22 | .0573 | .0582 | .0591 | .0592 | .0585 | .0562 | .0531 | .0478 | .0410 | .0325 | .0226 | .0121 | 0.0007 | -------- | -------- |
| 23 | .0629 | .0633 | .0636 | .0635 | .0628 | .0608 | .0582 | .0534 | .0471 | .0386 | .0290 | .0183 | .0074 | -------- | -------- |
| 24 | .0691 | .0686 | .0682 | .0675 | .0669 | .0654 | .0633 | .0590 | .0534 | .0450 | .0355 | .0249 | .0141 | 0.0017 | -------- |
| 25 | .0758 | .0739 | .0725 | .0711 | .0705 | .0696 | .0683 | .0646 | .0595 | .0514 | .0425 | .0318 | .0212 | .0091 | -------- |
| 26 | .0827 | .0792 | .0767 | .0747 | .0740 | .0739 | .0731 | .0703 | .0656 | .0581 | .0492 | .0392 | .0287 | .0163 | 0.0026 |
| 27 | .0901 | .0847 | .0808 | .0782 | .0772 | .0780 | .0780 | .0761 | .0718 | .0650 | .0571 | .0470 | .0366 | .0248 | .0113 |
| 28 | .0978 | .0903 | .0848 | .0816 | .0802 | .0820 | .0827 | .0820 | .0780 | .0719 | .0647 | .0550 | .0448 | .0330 | .0202 |

## TABLE XXIII

## CABIN FUSELAGE WITH COMPLETELY COWLED J-5 ENGINE

VALUES OF $\eta$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 |
| ° | | | | | | | | | | | | | | | |
| 10 | 0.272 | 0.481 | 0.618 | 0.699 | 0.686 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .267 | .474 | .612 | .695 | .715 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .264 | .466 | .606 | .691 | .728 | 0.667 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .257 | .458 | .600 | .687 | .735 | .721 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .252 | .449 | .592 | .682 | .741 | .753 | 0.680 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .245 | .440 | .584 | .676 | .745 | .772 | .754 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 16 | .237 | .427 | .574 | .670 | .745 | .784 | .795 | 0.692 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 17 | .227 | .411 | .561 | .663 | .740 | .788 | .815 | .761 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 18 | .215 | .396 | .548 | .655 | .733 | .787 | .823 | .802 | 0.710 | -------- | -------- | -------- | -------- | -------- | -------- |
| 19 | .204 | .380 | .533 | .644 | .724 | .784 | .821 | .822 | .785 | -------- | -------- | -------- | -------- | -------- | -------- |
| 20 | .192 | .363 | .514 | .631 | .712 | .776 | .817 | .834 | .822 | 0.713 | -------- | -------- | -------- | -------- | -------- |
| 21 | .179 | .344 | .492 | .614 | .700 | .768 | .811 | .835 | .840 | .779 | -------- | -------- | -------- | -------- | -------- |
| 22 | .166 | .325 | .471 | .595 | .686 | .759 | .804 | .831 | .845 | .816 | 0.724 | -------- | -------- | -------- | -------- |
| 23 | .150 | .296 | .440 | .570 | 671 | .747 | .795 | .825 | .844 | .840 | .792 | -------- | -------- | -------- | -------- |
| 24 | .135 | .269 | .404 | .535 | .650 | .734 | .786 | .819 | .840 | .853 | .833 | 0.743 | -------- | -------- | -------- |
| 25 | .123 | .249 | .378 | .503 | .620 | .719 | .776 | .814 | .837 | .857 | .856 | .804 | -------- | -------- | -------- |
| 26 | .113 | .230 | .353 | .477 | .599 | .702 | .766 | .808 | .835 | .858 | .867 | .841 | 0.775 | -------- | -------- |
| 27 | .104 | .216 | .336 | .458 | .581 | .684 | .756 | .803 | .832 | .855 | .871 | .865 | .835 | 0.735 | -------- |
| 28 | .098 | .204 | .323 | .444 | .565 | .665 | .745 | .799 | .830 | .852 | .870 | .875 | .873 | .807 | 0.681 |

## TABLE XXIV

## CABIN FUSELAGE WITH COMPLETELY COWLED J-5 ENGINE

VALUES OF $C_S$

| Blade angle at 0.75 $R$ | $\frac{V}{nD}$ | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 |
| ° | | | | | | | | | | | | | | | |
| 10 | 0.212 | 0.437 | 0.675 | 0.927 | 1.201 | 1.541 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 11 | .210 | .423 | .643 | .877 | 1.138 | 1.454 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 12 | .207 | .411 | .619 | .840 | 1.090 | 1.380 | 1.835 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 13 | .201 | .401 | .602 | .810 | 1.054 | 1.324 | 1.721 | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 14 | .199 | .395 | .590 | .791 | 1.027 | 1.280 | 1.625 | 2.109 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 15 | .197 | .389 | .580 | .779 | 1.004 | 1.241 | 1.544 | 1.943 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| 16 | .192 | .382 | .575 | .765 | .984 | 1.210 | 1.478 | 1.816 | 2.363 | -------- | -------- | -------- | -------- | -------- | -------- |
| 17 | .190 | .379 | .568 | .755 | .961 | 1.180 | 1.425 | 1.722 | 2.177 | -------- | -------- | -------- | -------- | -------- | -------- |
| 18 | .187 | .371 | .560 | .745 | .941 | 1.151 | 1.380 | 1.653 | 2.029 | 2.546 | -------- | -------- | -------- | -------- | -------- |
| 19 | .184 | .369 | .551 | .734 | .924 | 1.126 | 1.345 | 1.598 | 1.912 | 2.313 | -------- | -------- | -------- | -------- | -------- |
| 20 | .180 | .364 | .544 | .722 | .909 | 1.103 | 1.313 | 1.550 | 1.822 | 2.155 | 2.749 | -------- | -------- | -------- | -------- |
| 21 | .175 | .358 | .535 | .710 | .895 | 1.083 | 1.285 | 1.509 | 1.754 | 2.048 | 2.520 | -------- | -------- | -------- | -------- |
| 22 | .174 | .350 | .527 | .700 | .882 | 1.065 | 1.258 | 1.470 | 1.699 | 1.971 | 2.358 | 2.909 | -------- | -------- | -------- |
| 23 | .171 | .346 | .520 | .691 | .871 | 1.049 | 1.234 | 1.438 | 1.655 | 1.910 | 2.237 | 2.675 | -------- | -------- | -------- |
| 24 | .170 | .341 | .514 | .684 | .860 | 1.034 | 1.214 | 1.410 | 1.617 | 1.858 | 2.141 | 2.514 | 3.061 | -------- | -------- |
| 25 | .168 | .337 | .508 | .678 | .849 | 1.020 | 1.198 | 1.385 | 1.584 | 1.809 | 2.060 | 2.387 | 2.814 | 3.510 | -------- |
| 26 | .166 | .331 | .501 | .673 | .839 | 1.008 | 1.183 | 1.361 | 1.553 | 1.763 | 1.999 | 2.285 | 2.641 | 3.155 | -------- |
| 27 | .163 | .327 | .496 | .669 | .830 | .997 | 1.170 | 1.340 | 1.527 | 1.725 | 1.947 | 2.203 | 2.518 | 2.930 | 3.546 |
| 28 | .159 | .321 | .490 | .664 | .823 | .987 | 1.159 | 1.317 | 1.500 | 1.691 | 1.904 | 2.137 | 2.420 | 2.770 | 3.350 |