APPENDIX B
PERFORMANCE DATA
(HELICOPTERS WITH T58-GE-100 ENGINES)

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INTRODUCTION.

The performance data contained in this Appendix is for CH-3E and HH-3E helicopters equipped with T58-GE-100 engines. Explanatory text pertinent to the use of the charts contained herein precedes the charts. A mission planning section, included after the charts, contains sample problems of normal mission accomplishment. The sample problems used require the use of as many charts as possible in an effort to acquaint the user with the broad scope of information that may be derived from the charts. The charts presented in this Appendix are based on the use of either JP-4 or JP-5 fuel which have a density of 6.5 lb/gal. and 6.8/gal., respectively. A miniature chase-around is provided at the top of each chart to illustrate the manner of obtaining data from the chart.

PURPOSE OF PERFORMANCE DATA.

The charts presented on the following pages are provided to aid in preflight and inflight planning. Through the use of the charts, the pilot is able to select the best power setting, altitude, and airspeed to be used to obtain optimum performance for the mission being flown. Under normal conditions 103% N_r should be used for all computations.

COMPRESSIBILITY EFFECTS.

Rotor compressibility effects have been encountered on this helicopter. This phenomenon is a result of the rotor tip approaching the speed of sound. Compressibility causes an abrupt and large increase in drag and a slight decrease in lift when the velocity of some portion of an airfoil approaches the speed of sound. A convenient parameter to measure the degree of compressibility is Mach number, which is the ratio of the airfoil velocity to the local speed of sound. It is important to remember that the speed of sound is dependent on the ambient temperature. Thus, if the resultant rotor tip velocity remains constant (such as constant rotor rpm in hover), changes in the ambient temperature will change the speed of sound and thus change the tip Mach number. A cold day will produce higher tip Mach numbers than a warm day, all other things being equal. Consequently, the ambient temperature affects the degree of compressibility present and therefore also affects the power required. The charts in this Appendix have been corrected for the effects of rotor blade compressibility.

ALTITUDE DATA.

PRESSURE ALTITUDE.

Pressure altitude is the altitude indicated on the altimeter when the barometric scale is set on 29.92. It is the height above the theoretical plane at which the air pressure is equal to 29.92 inches of mercury.

DENSITY ALTITUDE.

Density altitude is an expression of the density of the air in terms of height above sea level; hence, the less dense the air, the higher the density altitude. For standard conditions of temperature and pressure, density altitude is the same as pressure altitude. As temperature increases above standard for any altitude, the density altitude will also increase to values higher than pressure altitude.

DENSITY ALTITUDE CHART.

The density altitude chart (figure B-1) provides a means of determining density altitude from a known pressure altitude and at OAT. Along the right side of the chart, the reciprocal square root of the density ratio is given to provide a means of computing true airspeed at any altitude from CAS. Figure B-1 also provides a means to convert Fahrenheit temperatures to Centigrade temperatures or vice versa.

EXAMPLE PROBLEM FOR USE OF DENSITY ALTITUDE CHART.

Given:

OAT	20°C
Pressure altitude	2000 feet

Determine:

Density altitude

Solution: (Refer to figure B-1.)

1. Enter chart at 20°C.
2. Move up to 2000 foot pressure altitude line, then move horizontally to the left to the density altitude scale and read 3000 feet.

AIRSPEED CALIBRATION CHART.

An airspeed calibration chart (figure B-2) is provided to supply the correction required to determine calibrated airspeed (CAS). Indicated airspeed (IAS), as read from the instrument and corrected for instrument error, plus or minus installation correction, equals calibrated airspeed (CAS). Because of the speed range through which the helicopter operates, compressibility corrections to airspeed are negligible and were intentionally omitted.

EXAMPLE PROBLEM FOR USE OF AIRSPEED CALIBRATION CHART.

Given:

Airspeed	60 KIAS
Flight condition	Climb and acceleration takeoff

Determine:

Calibrated airspeed

Solution: (Refer to figure B-2.)

1. Enter chart at 60 KIAS.
2. Move up to the takeoff line, then move horizontally to the left to the calibrated airspeed scale and read 45 knots.

TRUE AIRSPEED CORRECTION.

True airspeed (TAS) is obtained by multiplying CAS by the conversion factor $\frac{1}{\sqrt{\sigma}}$ shown in figure A-1, for the density altitude at which the CAS reading is taken.

Given:

OAT 20°C

Pressure altitude 2000 feet

Determine:

CAS and TAS.

Solution: (Refer to figures A-1 and A-2.)

1. Enter the density altitude chart (figure A-1) at 20°C and move up to intersect the 2000-foot pressure altitude line.
2. From this intersection, move horizontally to the right and read $\frac{1}{\sqrt{\sigma}}$ equal to 1.045.
3. Enter the airspeed calibration chart (figure A-2) at 60 KIAS and move up to intersect the takeoff line.
4. From this intersection, move horizontally to the left and read a CAS of 45 knots.
5. Multiply CAS X $\frac{1}{\sqrt{\sigma}}$ to obtain TAS, or 45 KCAS X 1.045 = 47 KTAS.

POWER AVAILABLE CHARTS.

Various atmospheric conditions, such as OAT and pressure altitude, have an effect on the capability of the engine to produce power. Data for power available at three power settings is shown: maximum power available (figure B-3); military power available (figure B-4); and maximum continuous power available (figure B-5). OAT and pressure altitude effects on power available are shown on the charts. Also shown on the charts is a wheel height correction for engine exhaust recirculation effects that exist while hovering in a dead calm wind condition. Figures B-3, B-4, and B-5 provide power available data that is the minimum power output expected of a properly tuned specification T58-GE-100 engine operating at 745°C T_5 for figure A-3; 696°C T_5 for figure A-4; and 660°C T_5 for figure B-3; 721°C T_5 for figure B-4; and 685°C T_5 for figure B-5. The performance of the charts in this Appendix are based on the power output shown in figures B-3, B-4, and B-5. No allowance for engine deterioration below a specification engine is contained in the charts.

CAUTION

The power output capability of the engine can exceed the structural limit of the transmission under certain conditions. Therefore, the power limitations in Section V should be observed to prevent exceeding the power limitations imposed by the transmissions. These limitations are also shown on the charts.

NOTE

- Head or crosswinds of 3 knots or more reduce exhaust gas recirculation effects. Tailwind conditions aggravate recirculation.
- Engines received from jet engine base maintenance facility may be 3% below maximum power available chart value. New or newly overhauled engines should meet maximum power available values during initial installation check. Maximum power available charts do not reflect engine operation with anti-icing on.
- If the power available is being computed in forward flight, adjust pressure altitude by the amount indicated when the selected factors are applied to figure B-7 Airspeed Effects on Power Available on Fuel Flow Charts.
- When using figure B-7 to correct the altitude for airspeeds above 3 KIAS on figures B-3, B-4 and B-5, use the wind temperature scale.

EXAMPLE PROBLEM FOR USE OF POWER AVAILABLE CHART.

The power available charts are illustrated in the same manner, therefore, figure B-3, Maximum Power Available -10-Minute Limit-One Engine, is used to illustrate the example problem.

Given:

OAT	20°C
Wind	5 knots
Wheel height	30 feet
Pressure altitude	4000 feet
N_r	103% N_r

Determine:

Torque available at maximum power.

Solution: (Refer to figure B-3.)

1. Enter chart at 20°C OAT on the WITH WIND temperature scale.
2. Move horizontally to 4000 feet pressure altitude without wheel height correction.
3. From this intersection, move vertically downward to the 103% N_r line.
4. From this point move horizontally to the indicate torque scale and read 102% Q.

TORQUE VS FUEL FLOW CHART.

The torque vs fuel flow chart (figure B-6) provides the means for computing fuel consumption for a selected altitude and power rating. To find the fuel flow in pounds per hour for one engine, enter the chart at the indicated torque on the bottom scale and proceed vertically to the proper altitude line. From this point of intersection move horizontally left to the scale and read the fuel flow in pounds per hour.

NOTE

If fuel flow is being computed in forward flight, OGE, apply the indicated torque to a pressure altitude that has been adjusted by the factors computed from figure B-7, Airspeed Effects on Power Available and Fuel Flow Chart. If the fuel flow is being computed at zero airspeed no pressure altitude adjustment is necessary.

EXAMPLE PROBLEM FOR USE OF TORQUE VS FUEL FLOW CHART.

Given:

Torque	99% Q
Pressure altitude	2000 feet
Airspeed	0 knots

Determine:

Fuel flow per engine.

Solution: (Refer to figure B-6.)

1. Enter chart at 99% Q.
2. Move vertically up to the intersection of the 2000-foot altitude curve.
3. From this intersection, move horizontally to the fuel flow curve and read a fuel flow of 790 pounds per hour per engine.
4. Add 2% of 790 pounds (16 lbs), in accordance with note (2) on the chart, to obtain 806 pounds per hour per engine.

AIRSPEED EFFECTS ON POWER AVAILABLE AND FUEL FLOW CHART.

The airspeed effects on power available and fuel flow chart (figure B-7) graphically illustrates the effects of airspeed on power available and fuel flow, with the FOD shield on or off, at selected pressure altitudes and outside air temperatures. The chart presents the pressure altitude adjustment to be added or subtracted algebraically from the selected pressure altitude when being applied to the power available and fuel flow charts. Further, when applying the adjusted pressure altitude to the power available charts it will also be necessary to reduce the selected OAT by 2.5°C to compensate for the difference in engine inlet temperature rise between OGE hover and forward flight.

EXAMPLE PROBLEM FOR USE OF AIRSPEED EFFECTS ON POWER AVAILABLE AND FUEL FLOW CHART.

Given:

Indicated airspeed	60 KIAS
OAT	20°C
Selected pressure altitude	2000 feet
FOD shield	ON

Determine:

Pressure altitude adjustment necessary to apply to power available and fuel flow charts.

Solution: (Refer to figure B-7.)

1. Enter the chart at 60 KIAS.
2. Follow the guideline to the baseline of the OAT scale, then continue to follow the guideline to a point that intersects the 20°C OAT line.
3. From this intersection, move vertically upward to the pressure altitude baseline, then follow the guideline to a point that intersects the 2000-foot pressure altitude line.
4. From this point, move vertically to a point that intersects the shield on line.
5. From this point, move horizontally to the left to the pressure altitude adjuster scale and read plus 175 feet.

HOVERING CHARTS.

The hovering charts (figures B-8, B-9, B-10, and B-11) provide a means of computing the maximum gross weight and indicated torque required to hover at all wheel heights in ground effect, out of ground effect, and the effect of headwinds.

MAXIMUM GROSS WEIGHT FOR HOVERING - ZERO WIND - TWO ENGINES.

The maximum gross weight for hovering - zero wind - two engines chart (figure B-8) provides a means of computing the maximum gross weight at which the helicopter can be hovered in ground effect and out of ground effect. The gross weight is based on zero wind with various combinations of pressure altitude, OAT, rotor speed, and wheel height.

EXAMPLE PROBLEM FOR USE OF MAXIMUM GROSS WEIGHT FOR HOVERING CHART.

Given:

Pressure altitude	4000 feet
OAT	20°C
Rotor speed	103% N_r
Wheel height	30 feet

Determine:

Maximum gross weight for hovering at maximum power and 30-foot wheel height.

Solution: (Refer to figure B-8.)

1. Enter chart at 4000 feet pressure altitude.
2. Move horizontally to intersect the 20°C OAT line.
3. From this intersection, move downward through the rotor speed grid to the wheel height baseline. If the rotor speed had been other than that established for a baseline, movement would have been to the rotor speed baseline, the influence line followed

to the appropriate rotor speed, then downward to the wheel height baseline.

4. From the wheel height baseline, follow the influence line to intersect the 30-foot wheel height line, then down to the gross weight scale and read 19,250 pounds.

TORQUE REQUIRED TO HOVER - ZERO WIND - TWO ENGINES.

The torque required to hover - zero wind - two engines chart (figure B-10), provides a means of computing the torque required to hover in ground effect and out of ground effect. The torque requirement indication is based on zero wind with various combinations of gross weight, density, altitude, OAT, and wheel height.

EXAMPLE PROBLEM FOR USE OF TORQUE REQUIRED TO HOVER CHART.

Given:

Gross weight	19,700 pounds
Density altitude	3000 feet
Rotor speed	103% N_r
Air temperature	20°C
Wheel height	30 feet

Determine:

Torque required to hover.

Solution: (Refer to figure B-10.)

1. Enter the chart at 19,700 pounds gross weight and move horizontally to the right to intersect the 3000-foot density altitude line.

2. From this intersection, move downward to the baseline of the OAT influence lines, then follow the influence line to the 20°C OAT line.

3. From this intersection, move downward to the wheel height baseline.

4. From the baseline, follow the influence line to the 30-foot wheel height line, then move downward to the torque scale and read 99% Q.

NOTE

To compute out of ground effect power required to hover, proceed vertically down from the baseline and read 105% Q (wheel height correction is not required for OGE hover).

HEADWIND INFLUENCE ON MAXIMUM GROSS WEIGHT FOR HOVERING.

The headwind influence on maximum gross weight for hovering chart (figure B-9), provides a means of computing the headwind influence on the maximum gross weight that can be hovered at various wheel heights.

NOTE

The chart depicts headwind influence on gross weight due to changes in power required to hover. Weight correction for headwind less than 3 knots is negligible.

EXAMPLE PROBLEM FOR USE OF HEADWIND INFLUENCE ON MAXIMUM GROSS WEIGHT FOR HOVERING CHART.

Given:

Gross weight	19,700 pounds
Headwind	10 knots
Wheel height	30 feet

Determine:

Influence of 10-knot headwind on maximum gross weight to hover at 30-foot wheel clearance.

Solution: (Refer to figure B-9.)

1. Enter the chart for the 30-foot wheel clearance graph at 19,700 pounds gross weight on the baseline.

2. Move vertically downward to the 3 knot headwind line and follow the influence line to intersect the 10 knot headwind line.

3. From this intersection, move downward to the gross weight scale and read 20,750 pounds.

HEADWIND INFLUENCE ON TORQUE REQUIRED TO HOVER.

The headwind influence on torque required to hover chart (figure B-11), provides a means of computing the headwind influence on the torque required to hover at various wheel heights.

EXAMPLE PROBLEM FOR USE OF HEADWING INFLUENCE OR TORQUE REQUIRED TO HOVER CHART.

Given:

Torque	100%
Headwind	10 knots
Wheel height	30 feet

Determine:

Influence of 10-knot headwind on torque required to hover at 30-foot wheel height.

Solution: (Refer to figure B-11.)

1. Enter the chart at 30-foot wheel clearance graph where the 100% torque line intersects the baseline.

2. From this intersection, follow the influence line to intersect the 10-knot headwind line.

3. From this intersection, move downward to the torque scale and read 95.5% torque.

HEIGHT VELOCITY DIAGRAMS.

Figures B-12 and B-13 are plots of minimum heights versus speed for a safe single engine or autorotative landing following failure of one or two engines. The single engine height velocity curve is based upon test points flown in low wind conditions at a mid CG and 17,000 and 19,500 pounds gross weight. The points obtained at the knee of the curve (low speed, low altitude) were simulated single engine failure from a takeoff condition and the others from level flight. The single engine height-velocity capabilities of the helicopter, in the low speed range (0 to 24 knots), are a function of power remaining in the operating engine and the weight of the helicopter. The height-velocity capabilities in the high speed range (24 knots to Vmax) are less affected by power remaining and weight. The low speed portion of the height velocity curve can be adjusted as a function of weight, temperature, and altitude. This is done by sliding the whole low speed portion of the height velocity curve to the right until the part furthest to the right meets the computed airspeed.

EXAMPLE PROBLEM FOR USE OF HEIGHT VELOCITY ONE DIAGRAM - ENGINE FAILURE CHART.

Given:

Gross weight	19,700 pounds
Pressure altitude	2000 feet
OAT	20°C

Determine:

Height velocity curve speed.

Solution:

1. Enter bottom of chart at 19,700 pounds gross weight and move vertically to intersect the 2000-foot pressure altitude line.

2. From this intersection, move horizontally to the right to intersect the 20°C OAT line.

3. From this intersection, move downward to the airspeed scale and read 26 KIAS.

4. Apply the 26 KIAS to the top portion of the chart to determine the avoid area.

TAKEOFF CHARTS.

The takeoff charts (figures B-14 through B-19), each for a particular type takeoff, provide the takeoff distance required to clear a 50-foot obstacle at various combinations of gross weight, excess power margin, climb speed, and headwinds. The excess power margin is an index of the difference between the maximum power available at the 50-foot obstacle and the power required to hover at a 3-foot wheel height. (The numerical values on the charts are not percent Q.) When operations are conducted within the region noted in the block on the upper right hand corner, excess power noted in the left-hand excess power margin grid is reduced by the amount indicated in the upper right-hand block, and the takeoff distance computed from that point. However, when the additional excess power margin block is on the right-hand side of the chart, and operations are conducted within that region, excess power noted in the left-hand excess power margin grid is reduced by the amount indicated in the upper right-hand block, and the takeoff distance computed from that point. As all the takeoff charts are used in a similar manner, figure B-15, Distance to Clear a 50-Foot Obstacle - Climb and Acceleration Takeoff - Two Engines, is used for the example problem.

EXAMPLE PROBLEM FOR USE OF TAKEOFF CHARTS.

Given:

Gross weight	19,700 pounds
Pressure altitude	2000 feet
OAT	20°C
Climb out airspeed	60 KIAS
Headwinds	10 knots

Determine:

1. Takeoff distance to clear a 50-foot obstacle.

Solution: (Refer to figure B-15.)

1. Apply the 60 KIAS to figure B-2, Airspeed Calibration, to determine CAS so that true airspeed can be computed. Enter chart at 60 KIAS, move up to intersect the takeoff line, then move left to the CAS grid and read 45 knots CAS.

2. Refer to figure B-1, Density Altitude, to compute the true airspeed conversion factor. Enter the chart at 20°C OAT, move up to intersect the 2000-foot pressure altitude line, then move horizontally to the right to read a conversion factor of 1.045. Multiplying 45 knots CAS X 1.045 = 47 KTAS. (Retain this value.)

3. Enter chart at 19,700 pounds gross weight.

4. Move horizontally to intersect the 2000-foot pressure altitude line.

5. From this intersection, move upward to intersect the 20°C OAT line in the excess power margin grid. Note in the excess power margin block that 2000 feet pressure altitude crosses the 20°C OAT line at 1 unit.

6. From this intersection move down 1 unit, then move horizontally to the right to intersect the all other conditions deflector line, then move down to the minimum takeoff distance.

7. From the baseline, follow the influence line to intersect the 47 KTAS line, then move down to the headwind baseline.

8. From the headwind baseline, follow the influence line to the 10-knot headwind line, then move down to the takeoff distance scale and read 380 feet.

CLIMB CHARTS.

The climb charts (figures B-20 through B-25) provide a means of computing the time to climb, the horizontal distance covered, the fuel consumed, and the rate-of-climb for various gross weights. These values are computed by applying the gross weights to various conditions of pressure altitude and temperature. The fuel used does not include the fuel used for warmup and takeoff. (Approximately 25 pounds for each T58-GE-100 engine.) Also included is a climb speed schedule, based on a decrease of approximately one knot indicated airspeed for every thousand feet increase in altitude, to provde the climb speed for various pressure altitudes. A temperature scale is also provided to relate the OAT at various pressure altitudes. The temperature scale is either based on a warm day (0°C to 40°C) or a cold day (-40°C to 0°C), for each series of charts. Figures B-20 (warm day) and B-21 (cold day) provide climb data for two-engine operation at military power. Figures B-22 and B-23 provide data at comparable conditions for one-engine operation. Figures B-24 and B-25 provide climb data at comparable temperature conditions for two-engine operation at maximum continuous power.

NOTE

- If OAT is 0°C, use the warm day charts. If OAT is colder than -40°C, use values determined at -40°C.
- Best climb performance is obtained at a constant 75 KTAS. The speed schedules on the climb charts provide appropriate indicated airspeeds to maintain best climb performance.

EXAMPLE PROBLEM FOR USE OF CLIMB CHARTS.

Given:

Gross weight	20,750 pounds
Temperature (cruise)	18°C
Pressure altitude (cruise)	3000 feet
Temperature (takeoff)	20°C
Pressure altitude (takeoff)	2000 feet

Determine:

Rate-of-climb speed, rate-of-climb, time-to-climb, fuel consumed, and horizontal distance covered to climb from 2000 feet to 3000 feet pressure altitude at military power.

Solution: (Refer to figure B-20.)

Since takeoff is from above sea level, it will be necessary to determine climb data from sea level to 2000 feet pressure altitude and from sea level to 3000 feet pressure altitude. The difference between the data necessary to climb to both altitudes will then be the data necessary to climb from 2000 feet pressure altitude to 3000 feet pressure altitude.

1. Enter the chart at 20,750 pounds gross weight.

2. From the intersection of the 20,750-pound gross weight line and the 3000-foot pressure altitude lines in the time, distance, fuel, and rate-of-climb grids, proceed horizontally to the left to the OAT baseline. Follow the influence line in each grid to the 18°C OAT line then proceed horizontally to the left to note the following values:

Time to climb	2.5 minutes
Distance covered	3.0 nautical miles
Fuel consumed	70 pounds
Rate-of-climb	1150 feet per minute

3. Repeat the procedures outlined in step 2 using the 2000-foot pressure altitude lines and 20°C OAT. However, as 20°C OAT is the temperature baseline, trace through the temperature grid to determine climb data and note the following values:

Time-to-climb	1. 5 minutes
Distance covered	1. 5 nautical miles
Fuel consumed	40 pounds
Rate-of-climb	1300 feet per minute

4. Subtract the climb data factors to determine climb data to climb from 2000 feet to 3000 feet pressure altitude as follows:

   Time to climb (2.5 - 1.5) = 1 minute

   Distance covered (3.0 - 1.5) = 1.5 nautical miles

   Fuel consumed (60 - 40) = 20 pounds

5. Enter the climb speed schedule at 2000 and 3000 feet pressure altitude and note the climb speeds. When related to the rate-of-climb data, note that the initial rate-of-climb of 1300 fpm at 71 KIAS decrease to 1250 fpm at 70 KIAS.

SERVICE CEILING CHARTS.

The service ceiling charts (figures B-26 and B-27) show the highest altitude at which a rate-of-climb of 100 feet per minute can be attained at a specific gross weight and temperature. Figure B-26 reflects the service ceiling for two-engine operation at maximum continuous power and figure B-27 reflects the service ceiling for one-engine operation at military power. Since the service ceiling is affected by gross weight, it can be raised by reducing the gross weight.

EXAMPLE PROBLEM FOR USE OF SERVICE CEILING CHARTS.

Given:

Gross weight	19,700 pounds
Temperature	10°C

Determine:

Service ceiling.

Solution: (Refer to figure B-26.)

1. Enter chart at 19,700 pounds gross weight.
2. Move vertically to intersect the 10°C OAT line.
3. From this intersection, move horizontally to the left and read 11,000 feet.

NOTE

Temperature lapse rate is not included in the service ceiling charts.

OAT ESTIMATION AT ALTITUDE.

To estimate the OAT at flight altitude, first determine the OAT at the ground pressure altitude. Enter the chart at the gross weight scale and move vertically upward to intersect the ground pressure altitude. Note the chart OAT value. If the ground OAT is higher than the OAT from the chart, service ceiling is less than ground pressure altitude. If ground OAT is lower than the chart OAT, proceed as follows: Move vertically up the required gross weight line. Reduce the ground OAT by 2°C for each 1000 ft that you go above ground pressure altitude. The service ceiling is found when the reduced ground OAT is approximately equal to the chart OAT. The pressure altitude where this occurs is the service ceiling.

CRUISE CHARTS.

The cruise charts (figures B-28 through B-33) provide the means of computing cruise performance at various outside air temperatures. Cruise performance is computed by referencing the appropriate cruise chart for the operating outside air temperature and flight condition, then applying a gross weight to pressure altitude and true airspeed parameters to determine specific fuel consumption and fuel flow. The charts also contain a service ceiling line, optimum cruise altitude line, recommended cruise speed baseline, and a maximum endurance line. Maximum endurance is computed by decreasing true airspeed from the recommended cruise speed baseline.

EXAMPLE PROBLEM FOR USE OF CRUISE CHARTS.

Given:

Gross weight	20,730 pounds
Pressure altitude	3000 feet
OAT	18°C

Determine:

Recommended airspeed and fuel flow and unit range.

Solution: (Refer to figure B-29.)

1. Enter the chart on sheet 1 at 20,730 pounds gross weight and move vertically to intersect the 3000-foot pressure altitude line.

2. From this intersection, move horizontally, to the right to the recommended cruise speed baseline, then down to the true airspeed scale and read 123 KTAS.

3. Continue to move down to the airspeed baseline, then follow the influence lines to a point that intersects the 3000-foot pressure altitude line.

4. From this intersection, move down to the airspeed scale and read 117 KIAS.

5. From the intersection at the recommended cruise speed baseline, move horizontally to the right to the transfer scale and read 5.0.

6. Enter the transfer scale on sheet 2 at 5.0 and move horizontally to the right to intersect the 3000-foot pressure altitude line.

7. From this intersection, move down to the unit range scale and note a unit range of .10 NM/lb of fuel.

8. Continue to move down to intersect the true airspeed line, then move horizontally to the left and note a fuel flow of 1240 lbs/hr.

9. Determine fuel required for cruise by dividing the distance by the unit range.

SINGLE ENGINE CAPABILITY CHART.

The single engine capability chart (figure B-34) illustrates the gross weight capability to maintain level flight at 70 KIAS for various pressure altitudes and temperatures with one engine at military power. The chart also portrays the indicated torque and fuel flows associated with military power for the various pressure altitudes and temperatures. If conditions of gross weight, pressure altitude, and temperature do not permit level flight at 70 KIAS, a rate of descent grid is provided for estimating rate of descent for actual flight conditions.

EXAMPLE PROBLEM FOR USE OF SINGLE ENGINE CAPABILITY CHART.

Given:

Temperature	18°C
Pressure altitude	3000 feet
Gross weight	21,000 pounds

Determine:

Gross weight capability to maintain level flight at 70 KIAS and associated torque and fuel flow values. If capability does not exist for given gross weight, determine the resulting rate of descent.

Solution: (Refer to figure B-34.)

1. Enter the chart at 18°C OAT.

2. Move vertically to the 3000-foot pressure altitude line in the indicated torque grid.

3. From the intersection of the 18°C OAT line and the 3000-foot pressure altitude line in the gross weight, fuel flow, and indicated torque grids, move horizontally to the left and note the following values:

Gross weight	20,800 pounds
Fuel flow	800 pounds per hour
Torque	98%

4. As the aircraft gross weight is 21,000 pounds, and the gross weight capability to maintain level flight is 20,800 pounds, it is necessary to determine the resulting rate-of-descent in the following manner.

5. From the intersection of the 18°C OAT and 3000-foot pressure altitude lines in the gross weight grid, move horizontally to the right to the rate-of-descent baseline.

6. From the baseline, follow the influence line up to the 21,000-pound gross weight line, then move downward to the rate-of-descent scale and read 40 feet per minute. This indicates a rate of descent will be realized at a gross weight of 21,000 pounds until the helicopter descends to a pressure altitude where level flight can be maintained at 70 KIAS.

BLADE STALL CHART.

The function of the blade stall chart (figure B-36) is to provide a means of determining the speed at which blade stall occurs under various altitude, rotor rpm, gross weight, and angle of bank conditions.

EXAMPLE PROBLEM FOR USE OF BLADE STALL CHART.

Given:

Pressure altitude	3000 feet
Temperature	18°C
Rotor speed	100% N_r
Gross weight	19,680 pounds
Angle of bank	20 degrees

Determine:

The indicated airspeed at which blade stall will occur.

Solution: (Refer to figure B-35.)

1. Enter the chart at 3000 feet pressure altitude.

2. Move horizontally to the right to intersect the 18°C OAT line.

3. From this intersection, move downward to the rotor speed baseline, then follow the influence line to intersect the 100% rotor speed line.

4. From this intersection, move downward to the gross weight baseline, then follow the influence line to intersect the 19,680 pound gross weight line.

5. From this intersection, move downward to the angle of bank baseline, then follow the influence line to intersect the 20-degree angle of bank line.

6. From this intersection, move downward to the airspeed scale and read 110 KIAS.

MAXIMUM AIRSPEED AS LIMITED BY ADVANCING BLADE TIP MACH NUMBER CHART.

The maximum airspeed as limited by advancing blade tip Mach number chart (figure B-36) provides a means of computing the advancing blade tip Mach number speed limit. The speed limit is based on unaccelerated level flight with various combinations of pressure altitude, OAT, and rotor speed (N_r). The maximum airspeed limitation that should not be exceeded is indicated on the chart.

EXAMPLE PROBLEM FOR USE OF THE MAXIMUM AIRSPEED AS LIMITED BY ADVANCING BLADE TIP MACH NUMBER CHART.

Given:

Pressure altitude	3000 feet
Temperature	18°C
Rotor speed	103% N_r

Determine:

The maximum airspeed limited by blade tip Mach number.

Solution: (Refer to figure B-36.)

1. Enter the chart at 3000 feet pressure altitude.
2. Move horizontally to the right to intersect the 18°C OAT line.
3. From this intersection, move downward to the rotor speed baseline, 103% N_r.
4. From this intersection move downward to the airspeed scale and read 180 KIAS.

MAXIMUM AIRSPEED CHART.

The function of the maximum airspeed chart (figure B-37) is to reflect the variation in maximum airframe airspeed due to variations in density altitude, gross weight, and rotor speed (N_r).

EXAMPLE PROBLEM FOR USE OF THE MAXIMUM AIRSPEED CHART.

Given:

Density altitude	4000 feet
Gross weight	20.730 pounds
Rotor speed	103% N_r

Determine:

The maximum airframe airspeed limit.

Solution: (Refer to figure B-37.)

1. Enter the chart at 4000 feet density altitude.
2. Move horizontally to intersect the 20,730 gross weight line.
3. From this intersection, move downward to the rotor speed baseline, 103% N_r.
4. From this intersection move downward to the airspeed scale and read 127 KIAS.

MISSION PLANNING.

TAKEOFF AND LANDING DATA (TOLD) CARD.

The TOLD card is designed to aid in mission planning. The back side of the TOLD card includes space to enter either initial or enroute cruise information, as desired. Use of the cruise information portion of the TOLD card is optional.

Example Problem for Use of the TOLD Card in Mission Planning.

The following discussion includes an example of mission planning, including the use of the TOLD card and cruise information. In addition to the performance charts covered in this section, the pilot should refer to the following items and charts, as required:

1. Design maximum gross weight information in Section I.

2. Center of Gravity Limitations Chart, figure 5-3, (used in conjunction with T.O. 1-1B-40, Manual of Weight and Balance, T.O. 1H-3(C)C-5).

3. Cargo Loading Manual, T.O. 1H-3(C)C-9 and the load adjuster in Section IV.

4. Refer also to PREPARATION FOR FLIGHT, Section II. Mission. The following mission is assigned:

Distance	200 nautical miles
Payload	Maximum
Takeoff field elevation	1000 feet
Landing field elevation	2000 feet
Enroute altitude (to provide sufficient terrain clearance)	3000 feet

Usually one of the two following situations will determine how to begin planning a mission:

1. Determine the mission weight, if a specific payload and/or range is given, and check that it is within the maximum weight limits for takeoff at the given ambient conditions.

2. Determine the maximum takeoff weight condition and then adjust the payload and/or fuel, as necessary, to accomplish the given mission.

NOTE

- The weight limits for the landing site should also be checked; however, this may not be necessary if conditions are more favorable than for takeoff.
- The sample problem is based on situation 2.

Weather Data – Departure.

Temperature	20°C
Pressure altitude	2000 feet
Wind	10 knots

Weather Data – Destination.

Temperature	24°C
Pressure altitude	2000 feet
Wind	10 knots

NOTE

In initial flight planning, if weather at destination is not available, estimate the pressure altitude and apply the standard lapse rate by decreasing temperature 2°C for each 1000 feet increase in altitude. When arriving at a site for which weather was not available, recheck the temperature using the OAT gage and estimate the pressure altitude for the landing site by setting 29.92 (corrected for initial instrument error) in the altimeter setting window. Read the pressure altitude shown on the altimeter and correct for estimated height above the ground when the check is made. For this sample problem, both temperature and pressure altitude are estimated.

Density Altitude. Refer to density altitude chart figure B-1.

Takeoff (20°C and 2000 feet pressure altitude)	3000 feet
Landing (24°C and 2000 feet pressure altitude)	3500 feet
Cruise (18°C and 3000 feet pressure altitude)	4000 feet

Operating Weight.

Operating weight	12,768 pounds

Power Available.

Refer to Power Available Chart for Maximum Power figure B-3.

Torque available at takeoff	103% Q
Torque available at landing site	103% Q

Maximum Gross Weight.

Refer to figure B-8, Maximum Gross Weight for Hovering - Zero Wind - Two Engines. For purposes of this example, maximum gross weight is based on the capability of the helicopter to hover with 30 feet wheel clearance.

Maximum gross weight for 30 feet hover at takeoff site	19,250 pounds
Maximum gross weight for 30 feet hover at landing site	19,200 pounds

Torque Required to Hover for Takeoff.

Refer to figure A-10. Torque Required to Hover - Zero Wind - Two Engines.

Torque required to hover at takeoff gross weight	96% Q

Mission Gross Weight and Torque Required to Hover.

For purposes of this example, the mission gross weight for takeoff is either limited by the capability to hover with a 30 feet wheel clearance at takeoff or (after deducting fuel required for climb and cruise) the capability to hover at 30 feet wheel clearance at the landing site. To realize the effects of the 10-knot headwind, it is necessary to apply the maximum gross weight to hover (19,250 pounds) to figure B-9, Headwind Influence on Maximum Gross Weight for Hovering, to realize a mission gross weight of 20,700 pounds. It is now necessary to reenter figure B-10 (Torque Required to Hover) with the mission gross weight of 20,700 pounds and obtain a torque required to hover of 108%. When the torque required to hover (106% Q) is applied to figure B-11, Headwind Influence on Torque Required to Hover, a torque requirement of 103% is realized to hover at mission gross weight.

Mission gross weight to hover at 30 feet wheel clearance and 10 knot headwind at takeoff site.	20,700 pounds
Torque required to hover mission gross weight at 30 feet wheel clearance and 10 knot headwind at takeoff site.	103% Q

Determining Fuel Required for Climb.

Determine the fuel required to climb from 2000 feet pressure altitude to a cruising altitude of 3000 feet pressure altitude by referencing figure B-20, Climb-Military Power (0°C to 40°C OAT) - Two Engines. At a gross weight of 20,700 pounds and a temperature of 20°C, 20 pounds of fuel are required to climb from 2000 feet to 3000 feet pressure altitude.

Determining Fuel Required for Cruise.

Refer to figure B-29, Cruise (0°C to 20°C OAT) - Two Engines, to determine the cruise data at 3000 feet pressure altitude and an initial cruise gross weight of 20,680 pounds. It is planned to cruise at the recommended cruise speed reflected on the chart. The distance is computed by subtracting the distance covered during climb from the original distance (200 - .8 - 199.2 nautical miles). When the cruise conditions are applied to the chart, a unit range of .10 nautical miles per pound of fuel, a fuel flow of 1240 pounds per hour and a true airspeed of 123 KTAS (117 KIAS) is realized. The cruise fuel can now be computed by dividing the distance by the unit range (199.2 ÷ .10 = 1992 pounds).

NOTE

This sample problem is based on no wind conditions; therefore, to obtain fuel consumed for cruise, distance is divided by unit range. When wind conditions exist, TAS and ground speed must be determined by using the pilot's navigation computer. Determine the time for mission by dividing distance by ground speed. Determine fuel required for cruise by multiplying time by fuel consumption in pounds per hour.

Total Fuel Used.

Fuel used for warmup and takeoff	45 pounds
Fuel used for climb	20 pounds
Fuel used for cruise	1992 pounds
Total fuel used	2057 pounds
Reserve 10% (2059 X 10%)	206 pounds
Total fuel	2263 pounds

NOTE

Ten percent fuel reserve was used for this sample problem: however, appropriate fuel reserve as required by current operating instructions should be used.

Determining Payload.

From the mission gross weight, subtract the sum of the operating weight and the fuel required. 20,700 - (12,768 + 2263) = 5669 pounds payload.

Determining Mission Gross Weight at Landing.

Gross weight for landing is the takeoff gross weight minus fuel consumed (except reserve). 20,700 - 2057 = 18,643 pounds.

Power Required for Hover at Landing Gross Weight.

Refer to figure B-10, Torque Required to Hover - Zero Wind - Two Engines, and figure B-11, Headwind Influence on Torque Required to Hover.

Power required to hover at landing gross weight is:

Zero Wind - 92% Q
10 Kts Wind - 88% Q

Power Reserve for Landing.

Subtract power required from power available 103 - 92 = 11% Q.

Maximum Airspeed.

Refer to figure B-37, Maximum Airspeed Chart.

Maximum airspeed at 103% N_r for takeoff and landing.

Maximum Airspeed.

Refer to figure B-37, Maximum Airspeed Chart.

Maximum airspeed at 103% N_r for takeoff gross weight is 128 KIAS and 138 KIAS for landing gross weight.

Topping Limits.

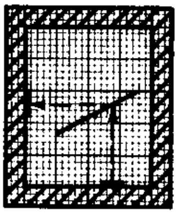
Refer to figure B-39, Topping Chart.

SAMPLE TOLD CARD.

DATA	TAKEOFF	LANDING	UNITS
FIELD ELEVATION	1000	2000	FT
PRESSURE ALTITUDE	2000	2000	FT
FREE AIR TEMPERATURE	20	24	°C
WIND	10	10	KT/DEG
DENSITY ALTITUDE	3000	3500	FT
OPERATING WEIGHT	12,768	12,768	LB
EXTRA CREW AND EQUIPMENT	0	0	LB
FUEL	2263	206	LB
PAYLOAD	5669	5669	LB
MISSION GROSS WEIGHT	20,700	18,643	LB
POWER AVAILABLE	103	103	% Q
MAXIMUM GROSS WEIGHT	20,700	19,200	LB
WHEEL HEIGHT FOR HOVER	30	30	FT
POWER REQUIRED	103	92	% Q
POWER RESERVE	0	11	% Q
MAXIMUM AIRSPEED	123	138	KT
TOPPING LIMITS			% N_g
			°C T_5

CRUISE INFORMATION:

PRESSURE ALTITUDE	3000	FT
TEMPERATURE	18	°C
DENSITY ALTITUDE	4000	FT
TORQUE	69	% Q
FUEL CONSUMPTION	1240	LB/HR
TAS	123	KT
CAS	117	KT
WIND	0	KT/DEG
GROUND SPEED	123	KT



DENSITY ALTITUDE

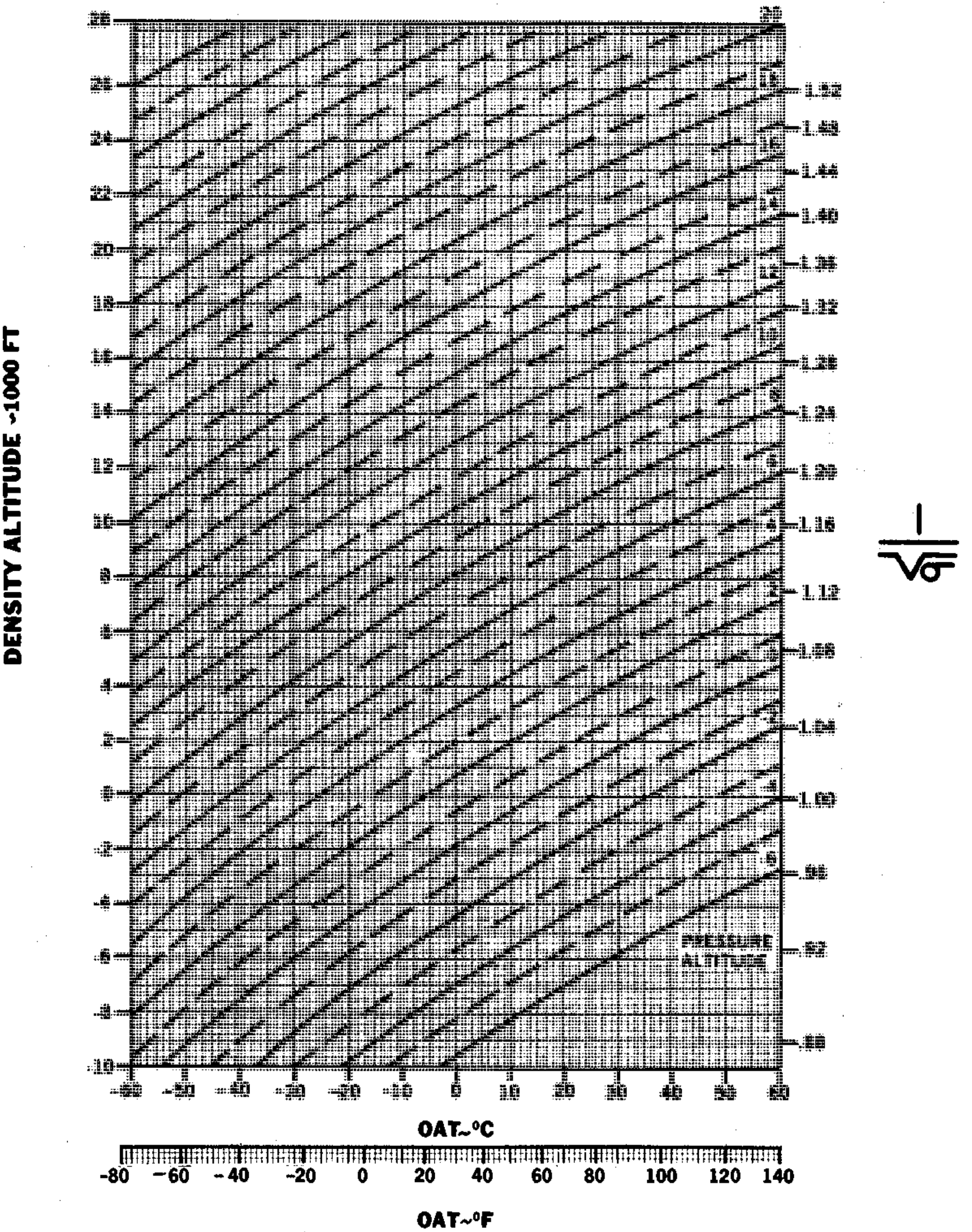
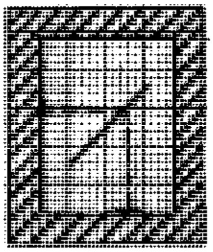


Figure B-1. Density Altitude

AIRSPEED CALIBRATION



CONDITIONS:
LANDING GEAR UP
EXCEPT FOR
TAKEOFF

DATE: 15 APRIL 1971
DATA BASIS: FLIGHT TEST (AIR FORCE)

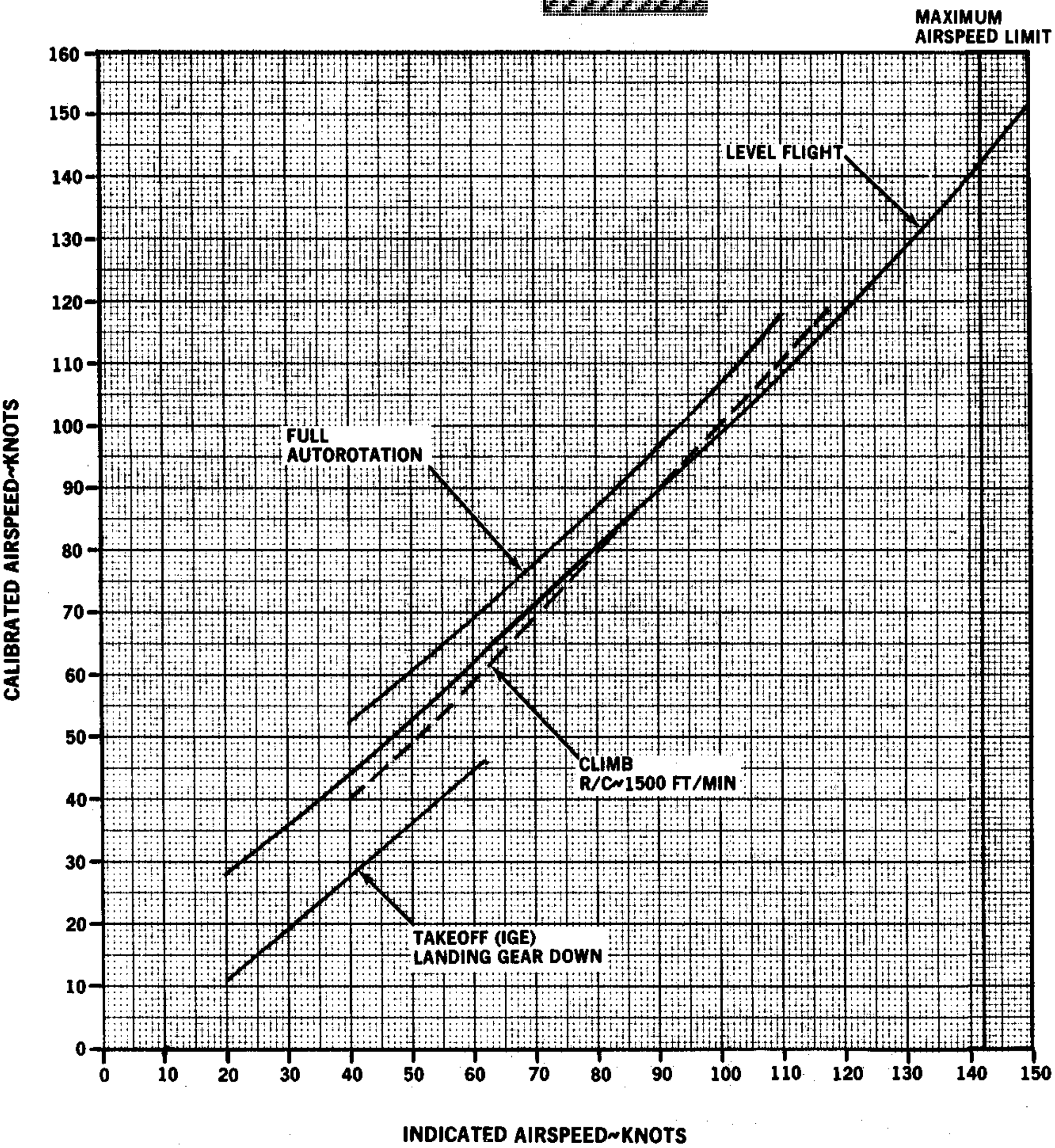


Figure B-2. Airspeed Calibration

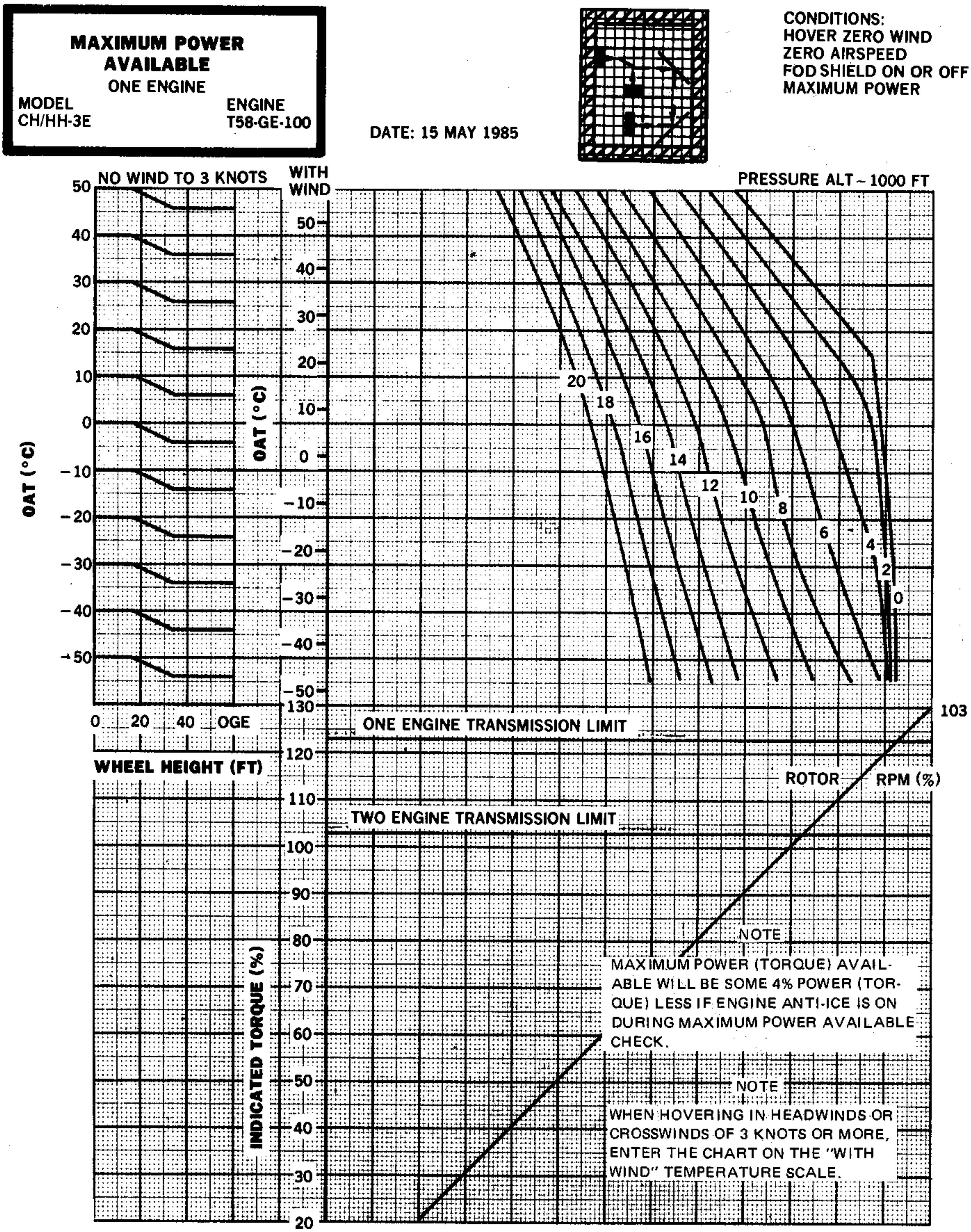


Figure B-3. Maximum Power Available - 10 Minute Limit (One Engine)

CONDITIONS:
HOVER ZERO WIND
ZERO AIRSPEED
FOR SHIELD ON OR OFF
MILITARY POWER

MILITARY POWER AVAILABLE
ONE ENGINE
MODEL CH/HH-3E
ENGINE T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: ENG MFG SPEC E1096-A

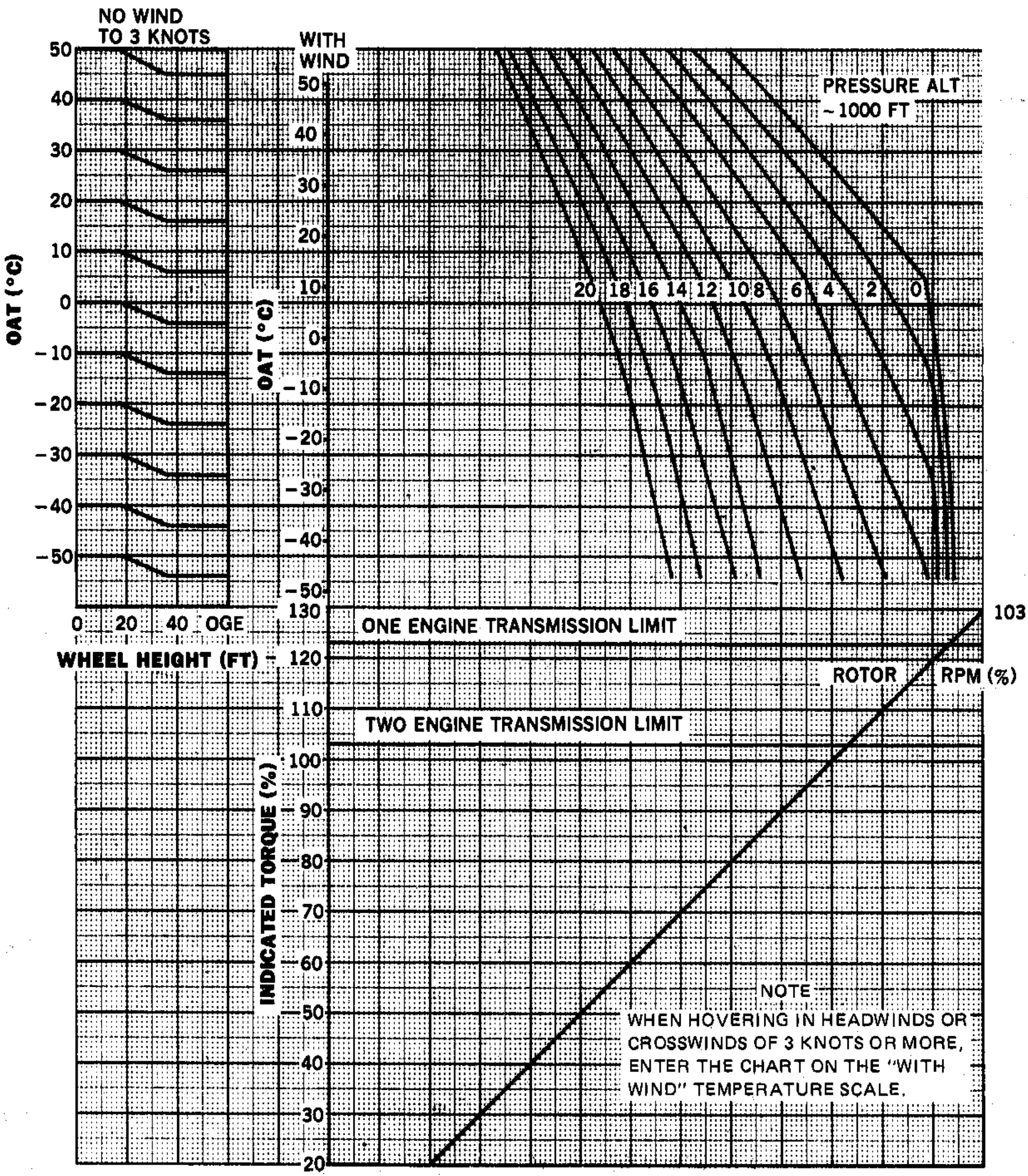


Figure B-4. Military Power Available -30 Minute Limit (One Engine)

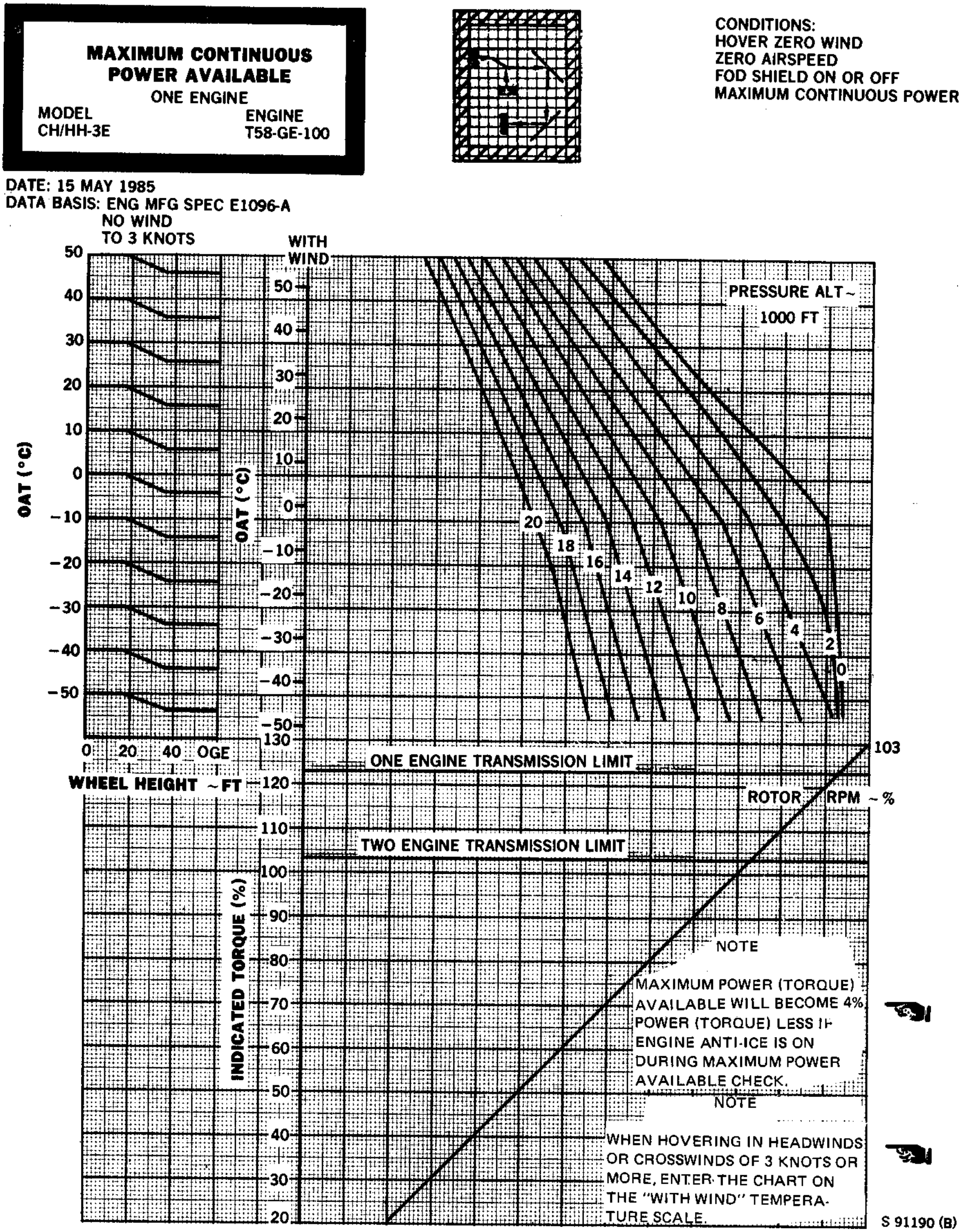
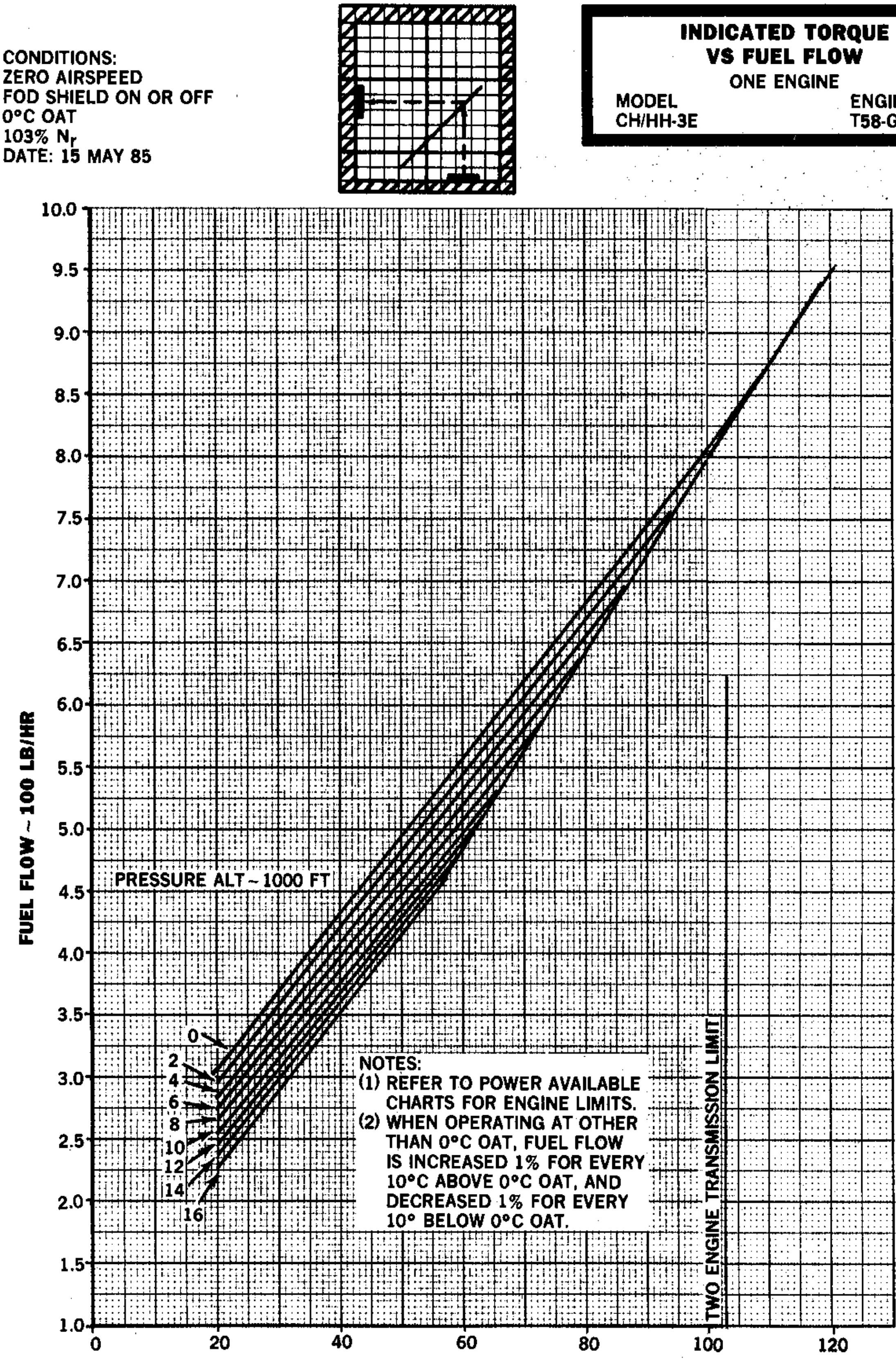


Figure B-5. Maximum Continuous Power Available (One Engine)

CONDITIONS:
ZERO AIRSPEED
FOD SHIELD ON OR OFF
0°C OAT
103% N_r
DATE: 15 MAY 85

INDICATED TORQUE VS FUEL FLOW
ONE ENGINE
MODEL CH/HH-3E — ENGINE T58-GE-100



S 91191 (B)

Figure B-6. Indicated Torque vs. Fuel Flow (One Engine)

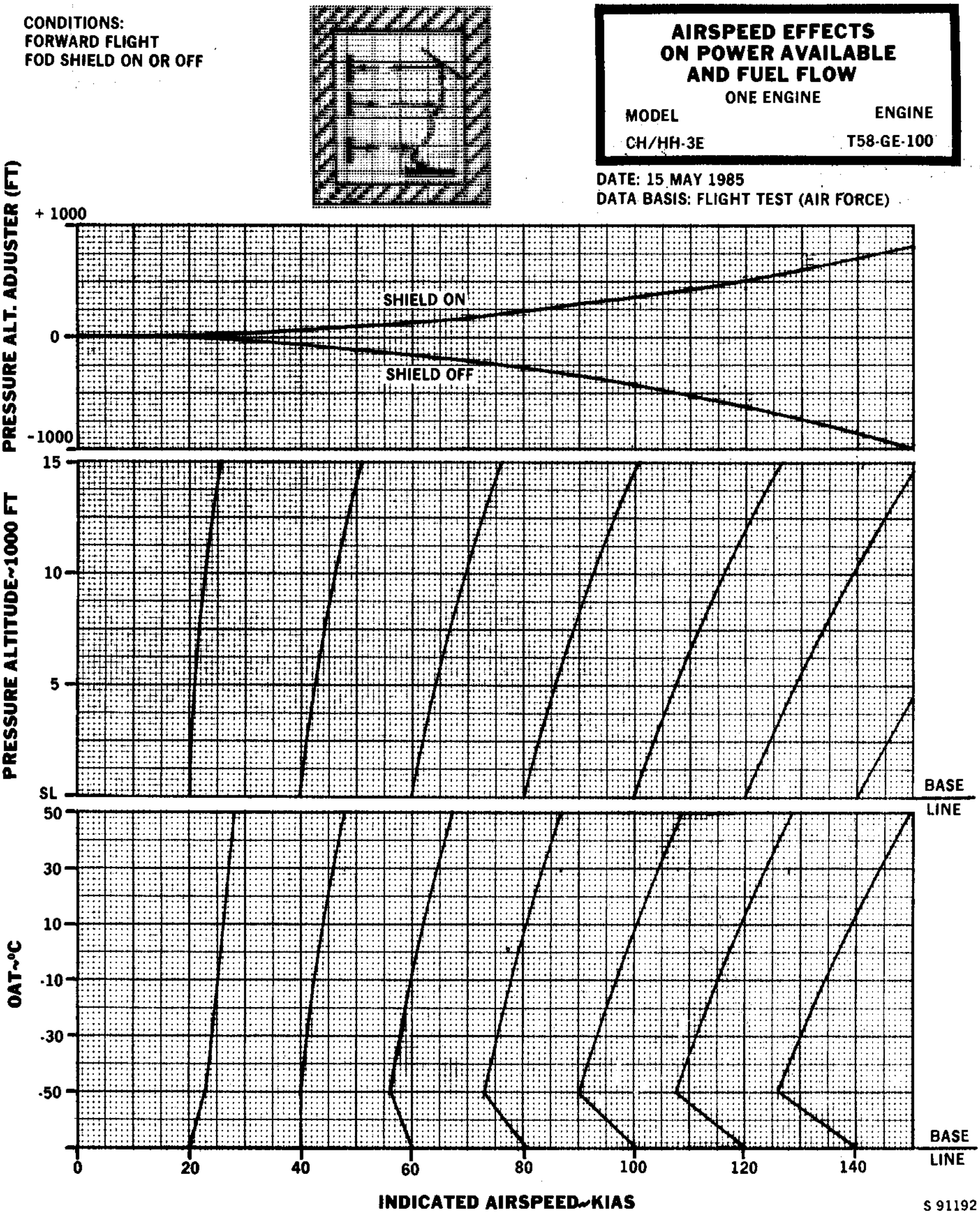


Figure B-7. Airspeed Effects on Power Available and Fuel Flow (One Engine)

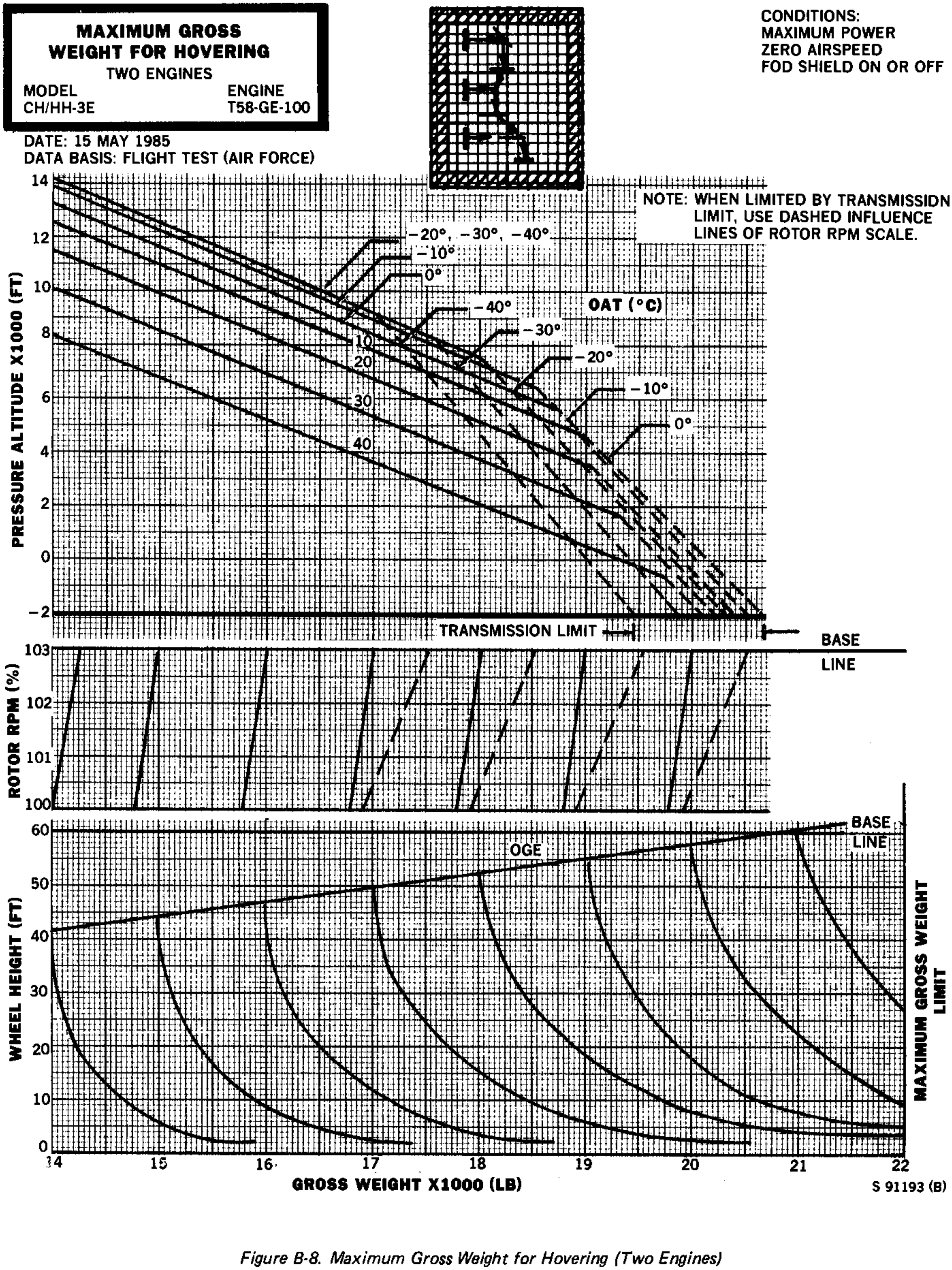


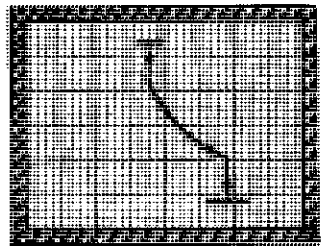
Figure B-8. Maximum Gross Weight for Hovering (Two Engines)

HEADWIND INFLUENCE ON MAXIMUM GROSS WEIGHT FOR HOVERING

TWO ENGINES

MODEL	ENGINE
CH/HH-3E	T58-GE-100

NOTE: WEIGHT CORRECTION FOR HEADWINDS LESS THAN 3 KNOTS IS NEGLIGIBLE



DATE: 15 MAY 1985

DATA BASIS: ESTIMATED

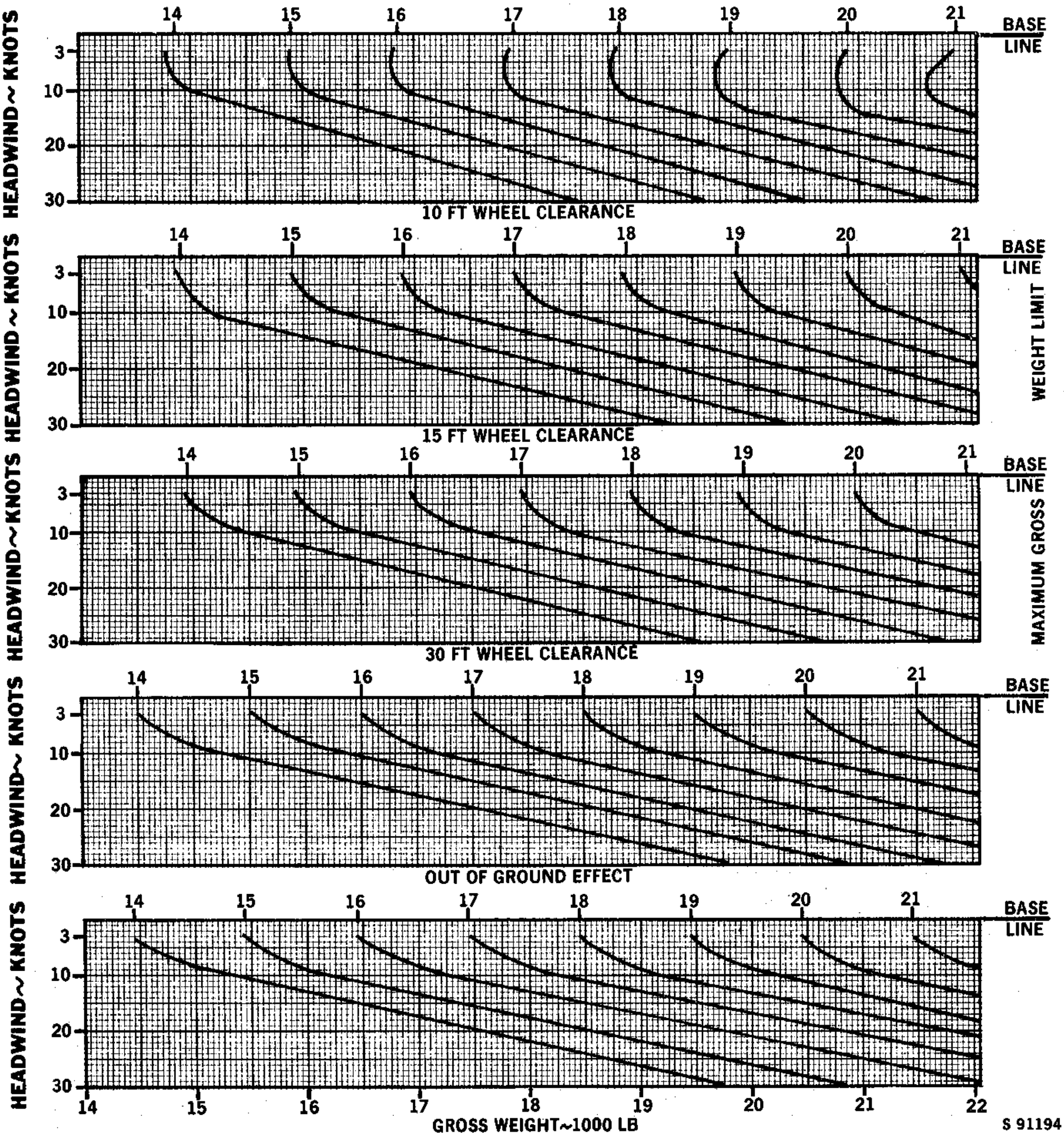


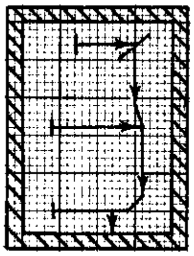
Figure B-9. Headwind Influence on Maximum Gross Weight for Hovering (Two Engines)

TORQUE REQUIRED TO HOVER

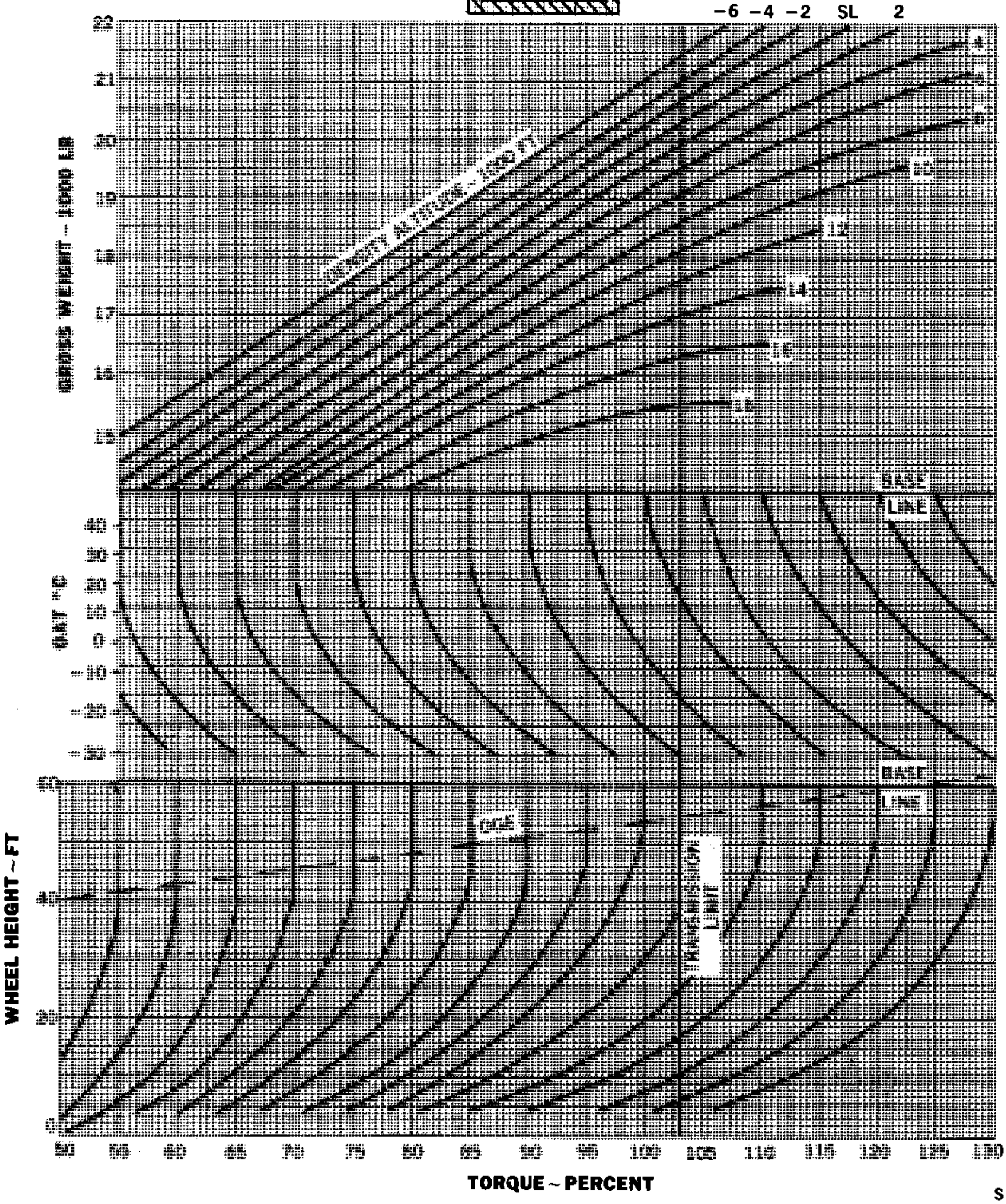
TWO ENGINES

MODEL:	ROTOR RPM	ENGINE:
CH/HH-3E	103 PERCENT	T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST



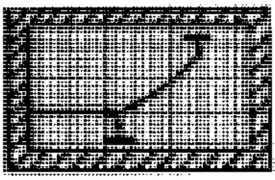
CONDITIONS:
HOVER, ZERO AIRSPEED
FOD SHIELD ON OR OFF



S 91195 (B)

Figure B-10. Torque Required to Hover (Two Engines)

CONDITIONS:
HOVER WITH WIND



HEADWIND INFLUENCE ON TORQUE REQUIRED FOR HOVERING
TWO ENGINES

MODEL	ENGINE
CH/HH-3E	T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: ESTIMATED

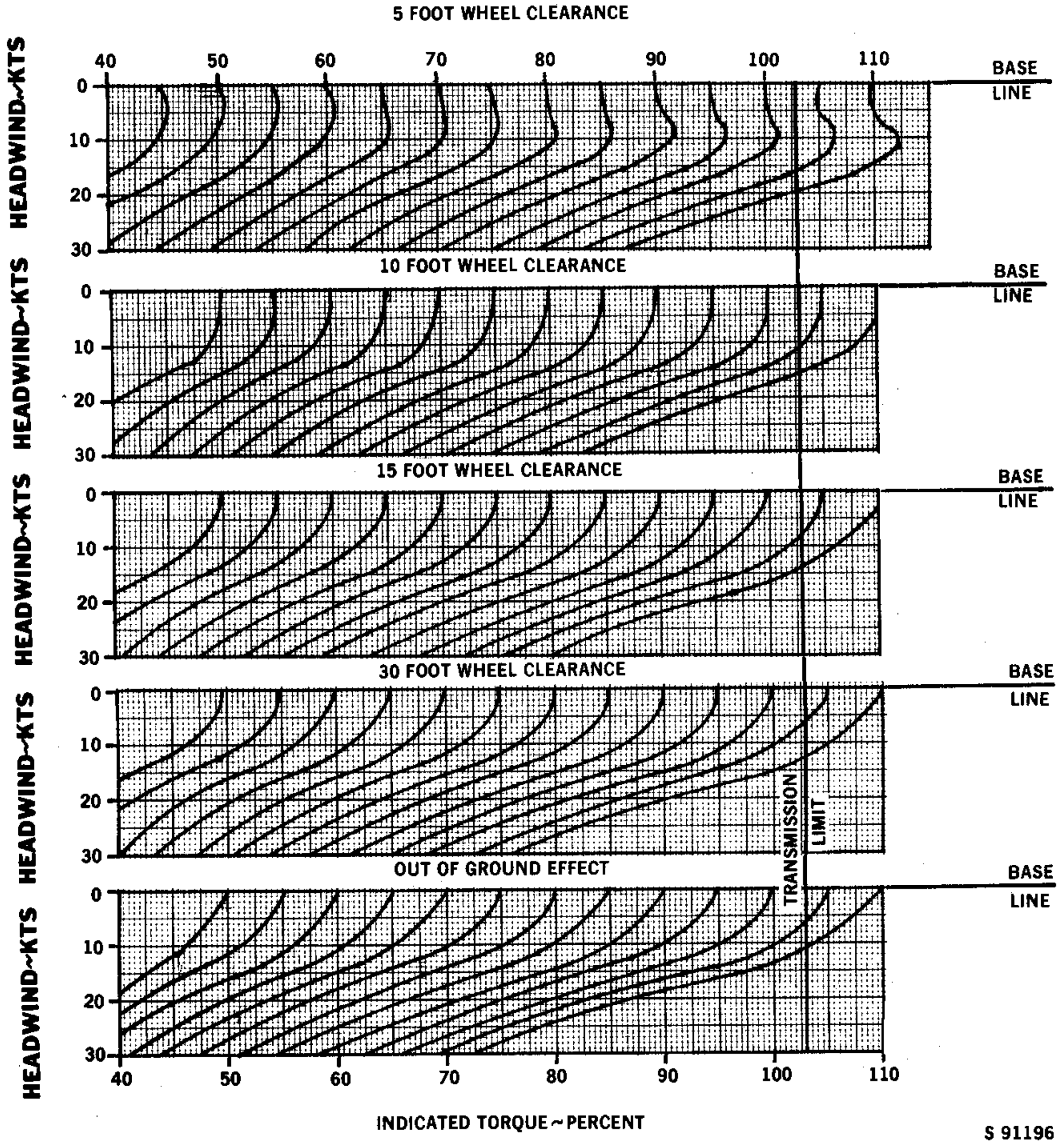


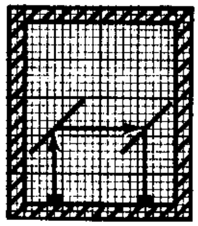
Figure B-11. Headwind Influence on Torque Required for Hovering (Two Engines)

HEIGHT VELOCITY DIAGRAM
ONE ENGINE FAILURE

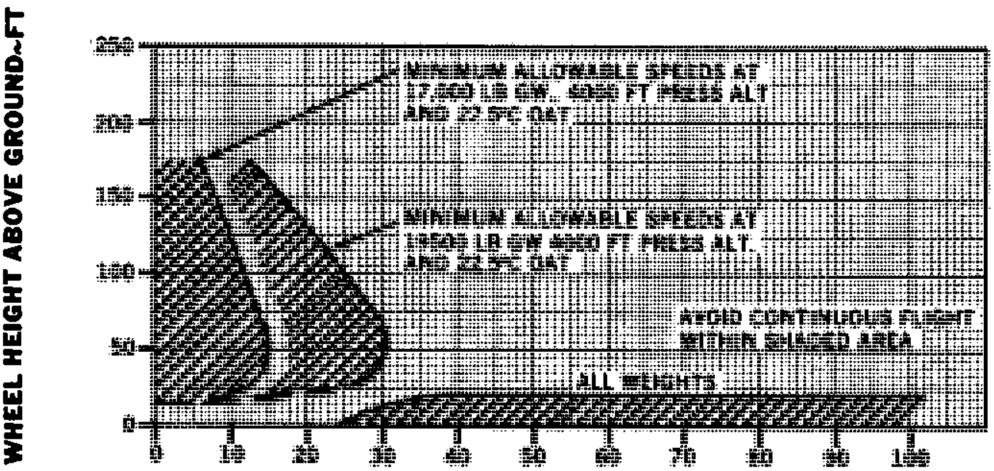
MODEL	ENGINE
CH/HH-3E	T58-GE-100

DATE: 15 MAY 1985

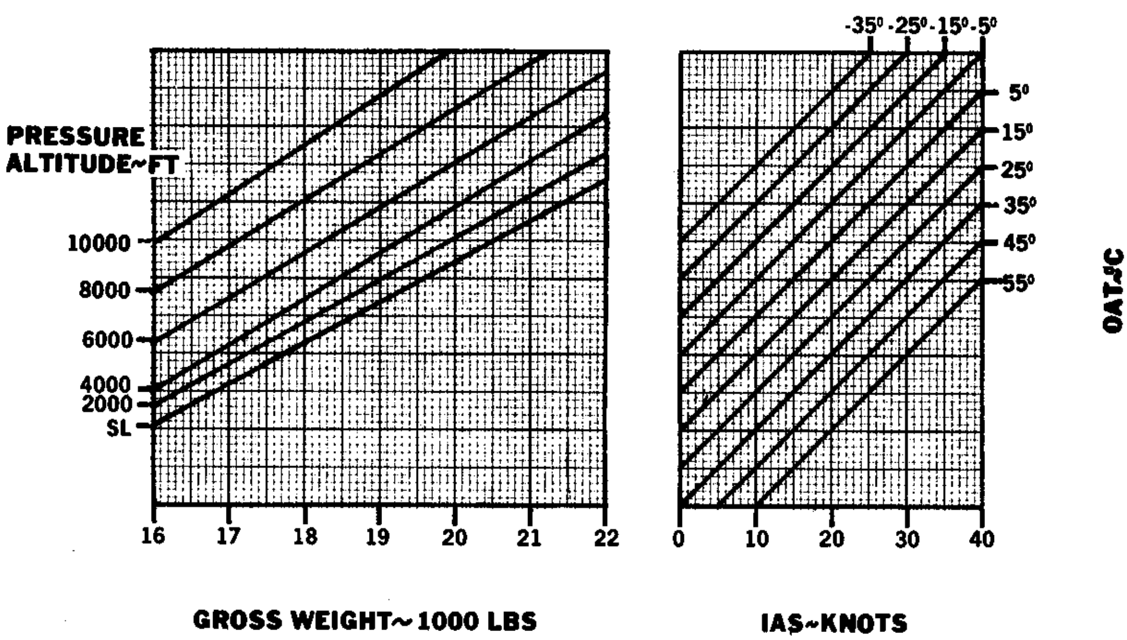
DATA BASIS: FLIGHT TEST (AIR FORCE)



CONDITIONS:
4000 FT PRESS ALT
17,000 AND 19,500 LB
GROSS WEIGHT:
22.5° C OAT
103% Nr
CG = 267.0



DETERMINATION OF H-V CURVE SPEED



S 91197

Figure B-12. Height Velocity Diagram (One Engine Failure)

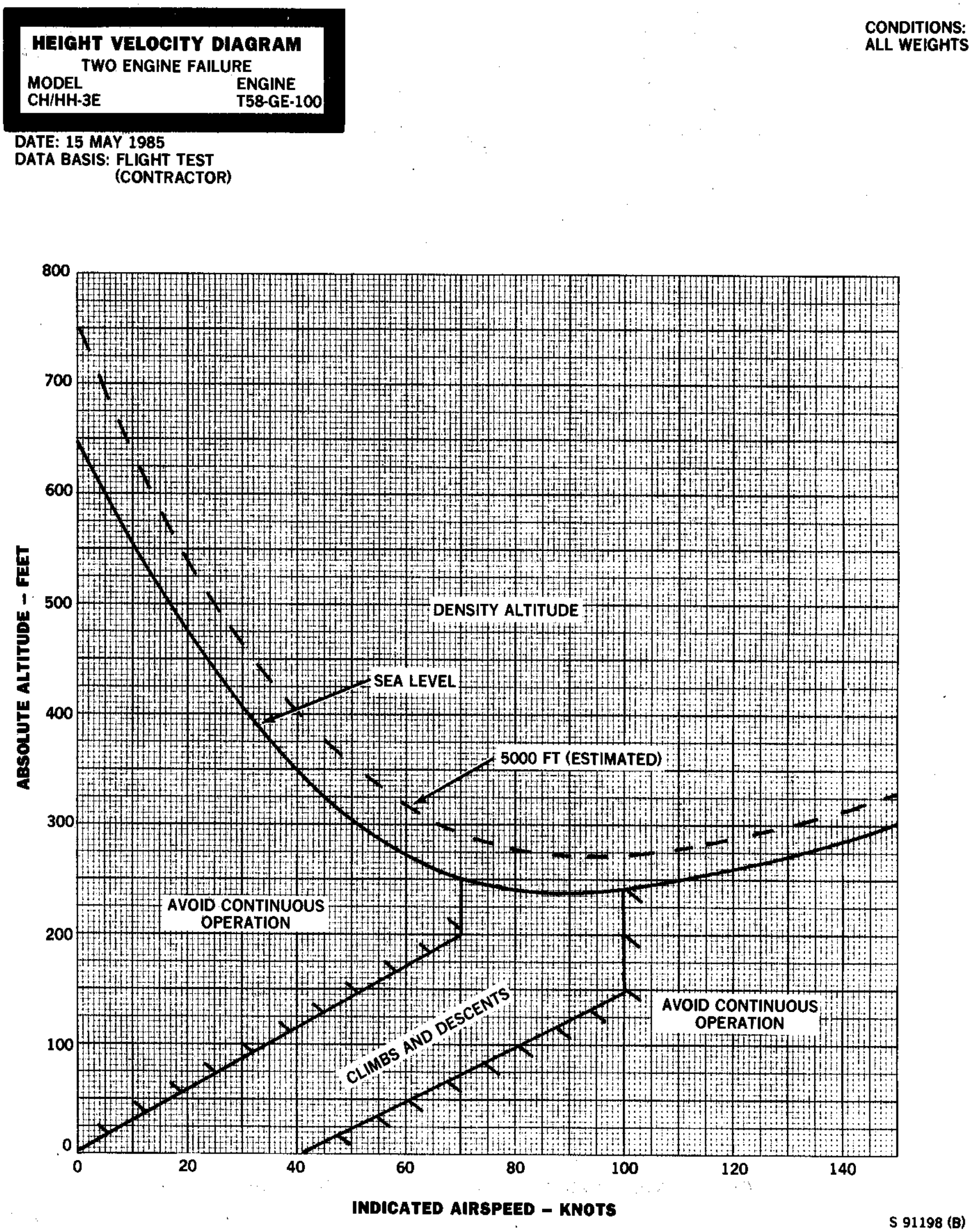


Figure B-13. Height Velocity Diagram (Two Engine Failure)

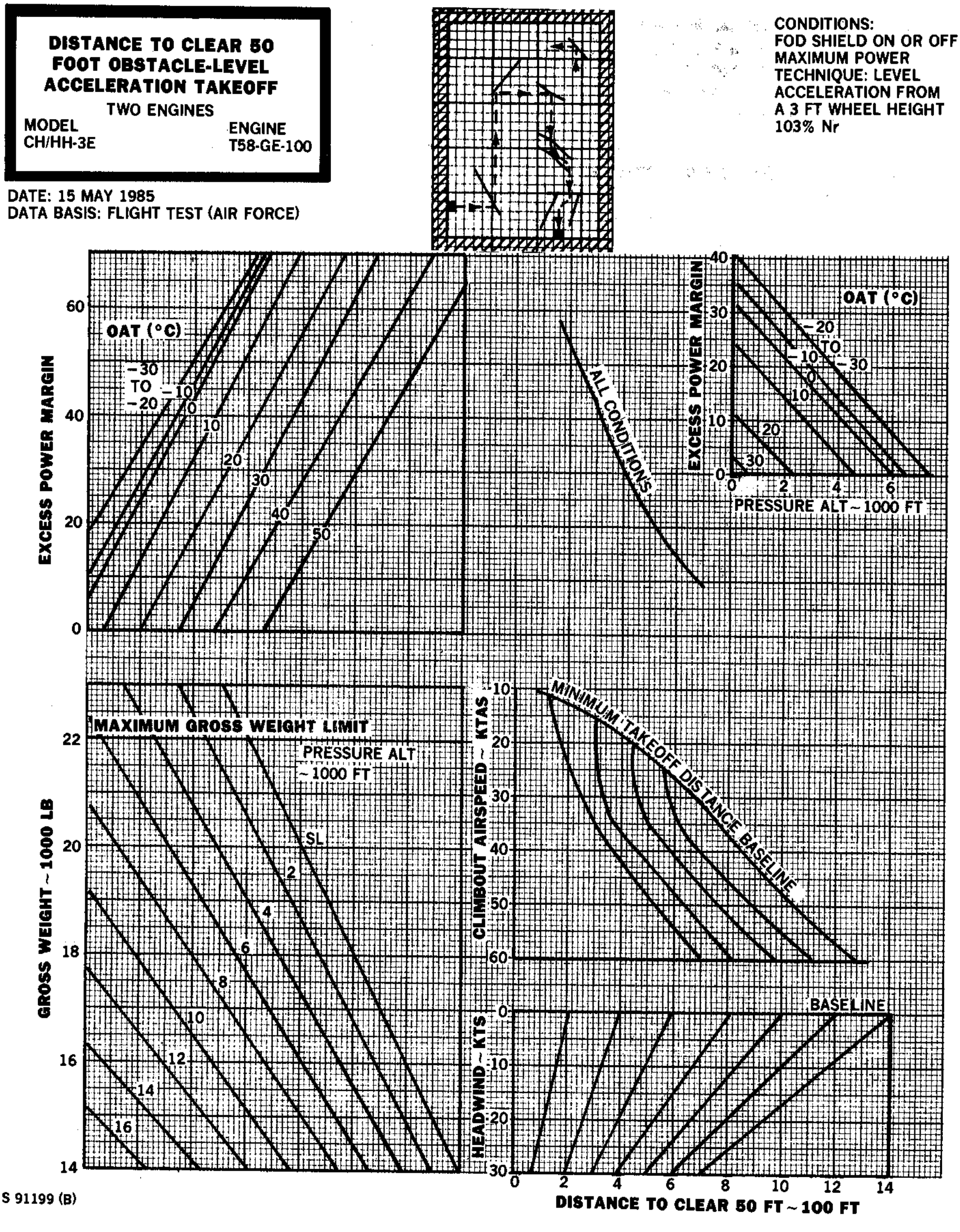


Figure B-14. Distance To Clear 50-Foot Obstacle - Level Acceleration Takeoff (Two Engines)

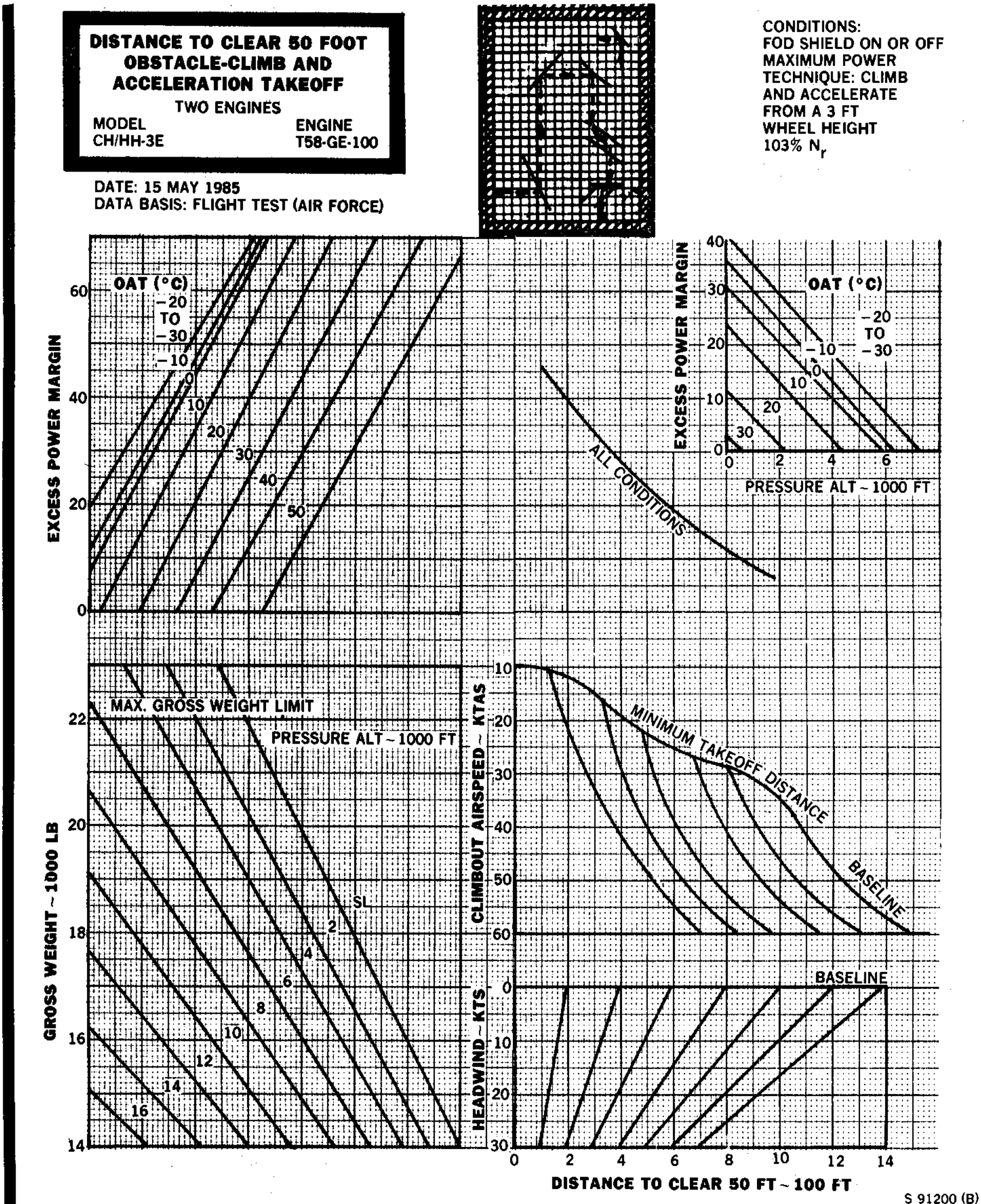


Figure B-15. Distance To Clear 50-Foot Obstacle - Climb and Acceleration Takeoff (Two Engines)

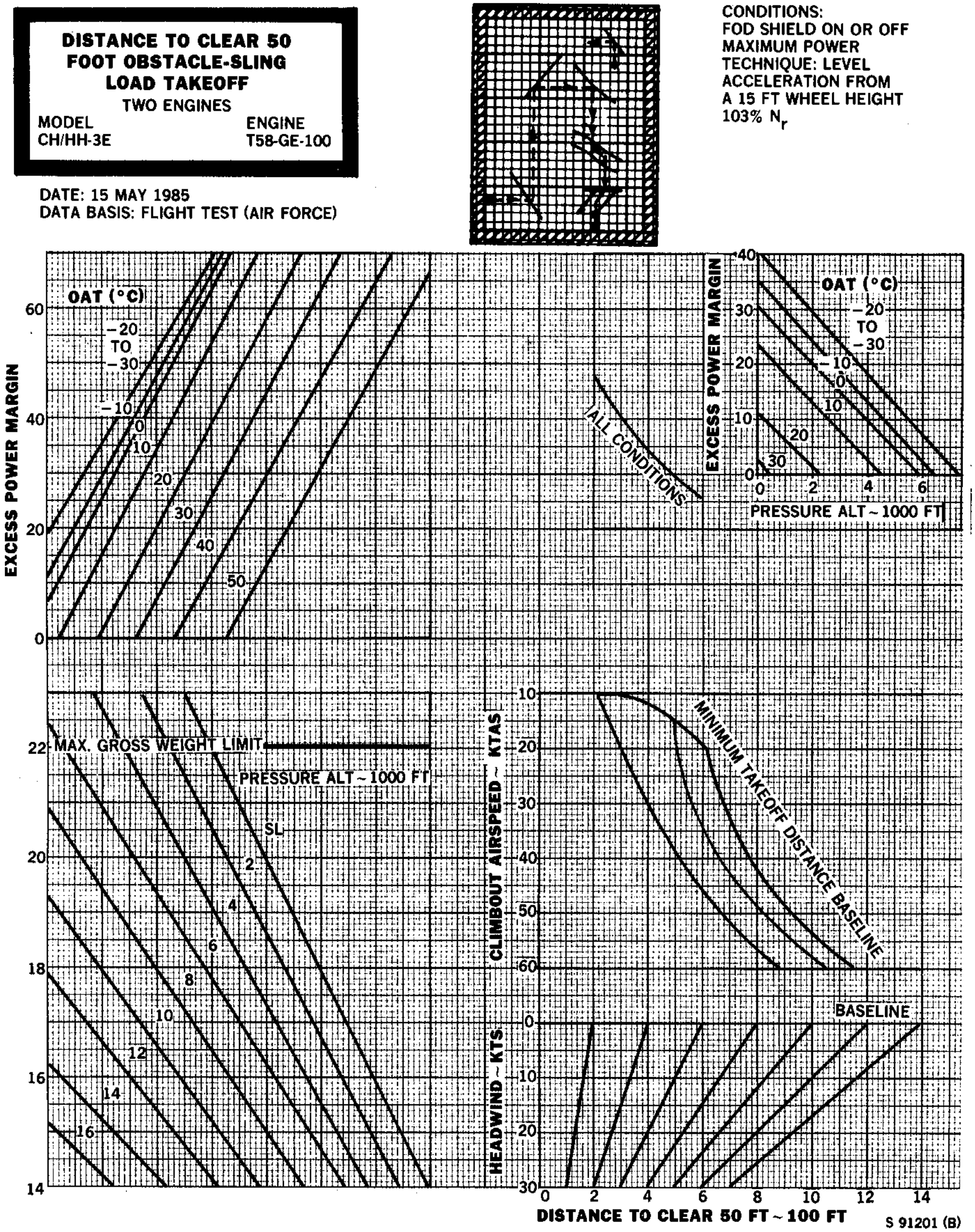


Figure B-16. Distance to Clear 50-Foot Obstacle - Sling Load Takeoff (Two Engines)

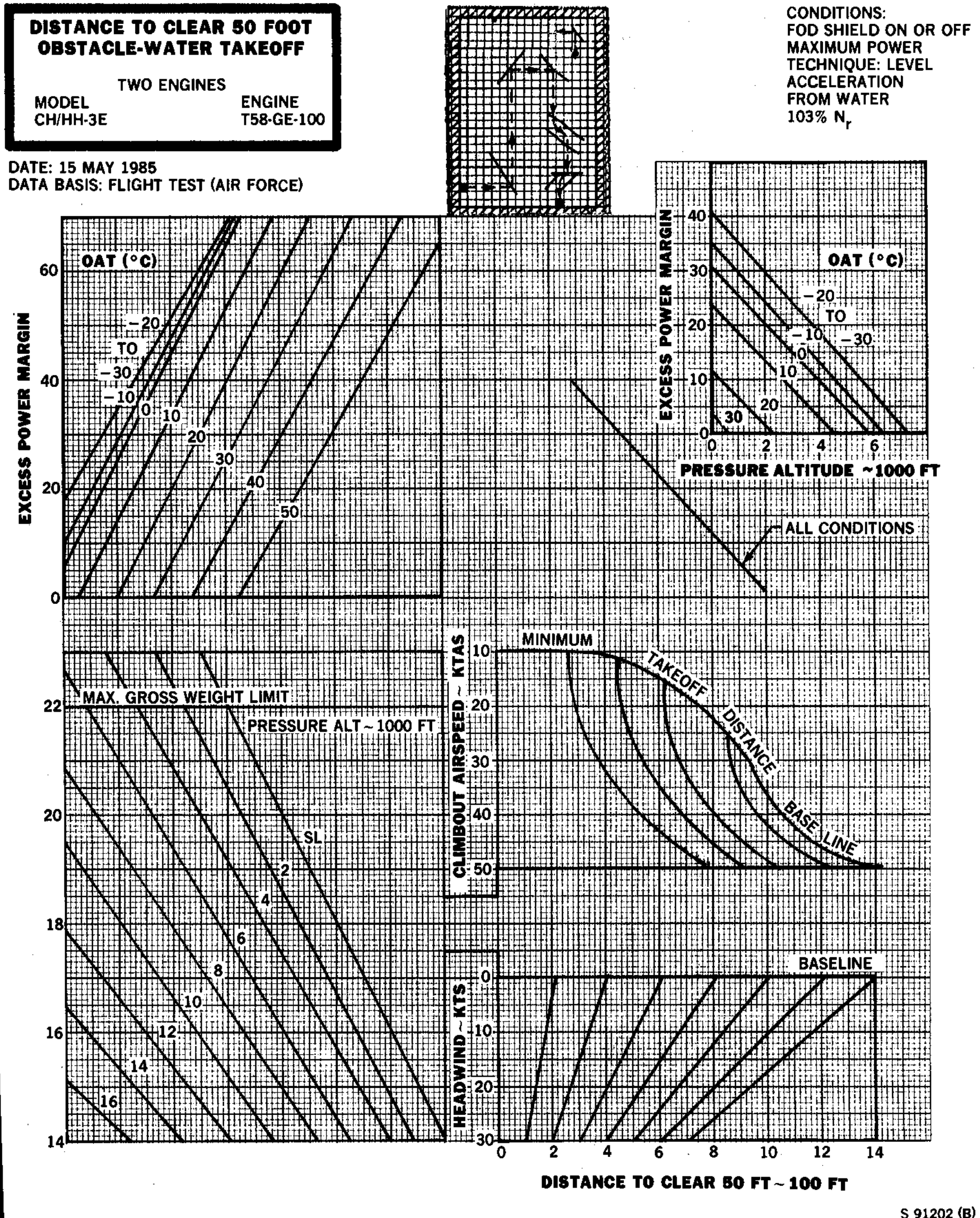


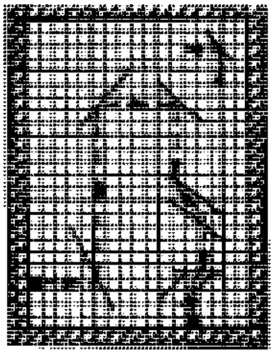
Figure B-17. Distance To Clear 50-Foot Obstacle - Water Takeoff (Two Engines)

DISTANCE TO CLEAR 50 FOOT OBSTACLE – ROLLING TAKEOFF

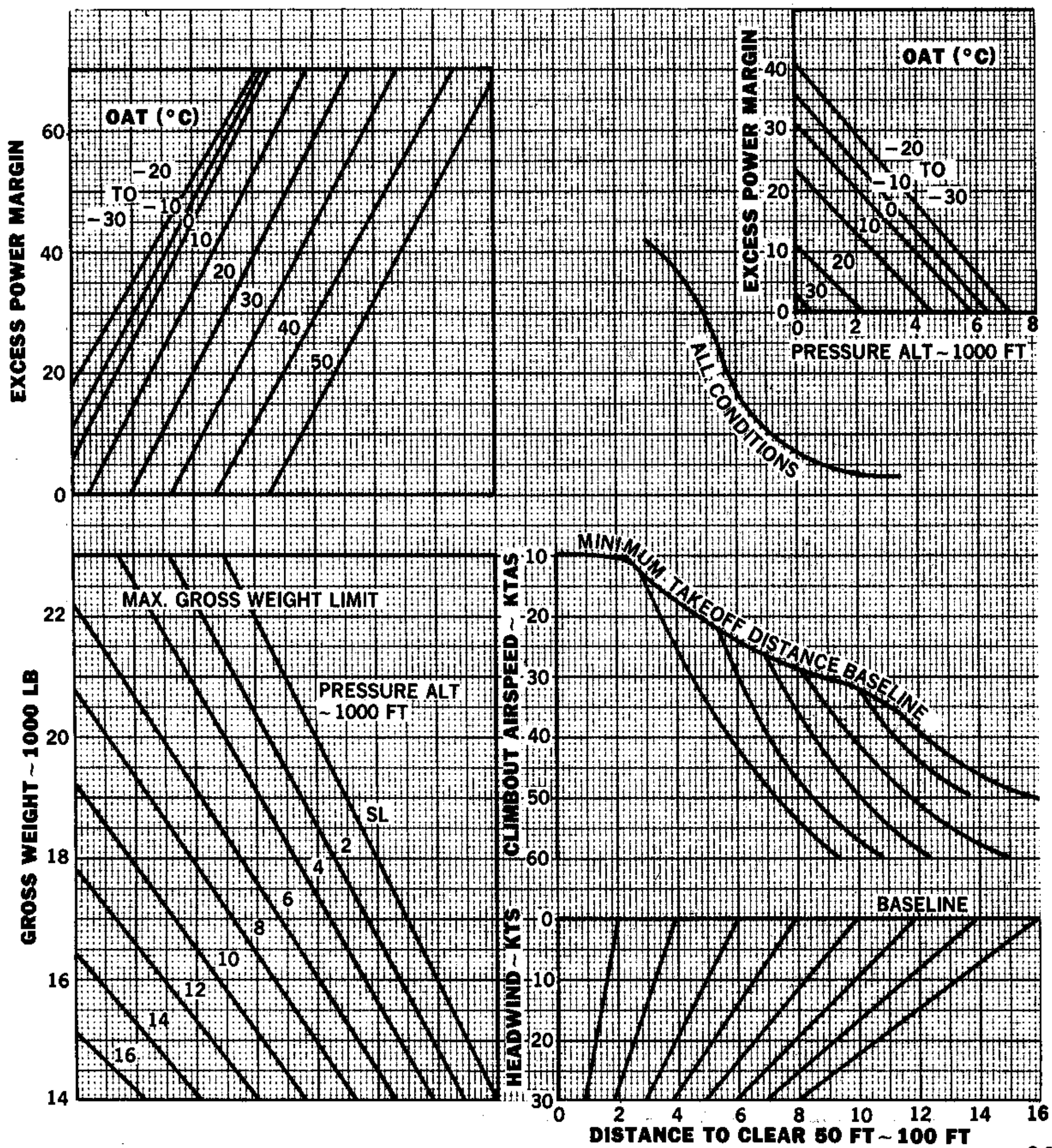
TWO ENGINES

MODEL	ENGINE
CH/HH-3E	T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)



CONDITIONS:
FOD SHIELD ON OR OFF
MAXIMUM POWER
TECHNIQUE: ROLLING
103% N_r



S 91203 (B)

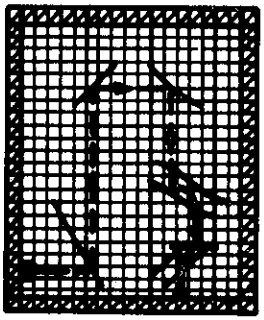
Figure B-18. Distance To Clear 50-Foot Obstacle - Rolling Takeoff (Two Engines)

DISTANCE TO CLEAR 50 FOOT OBSTACLE-ROLLING TAKEOFF

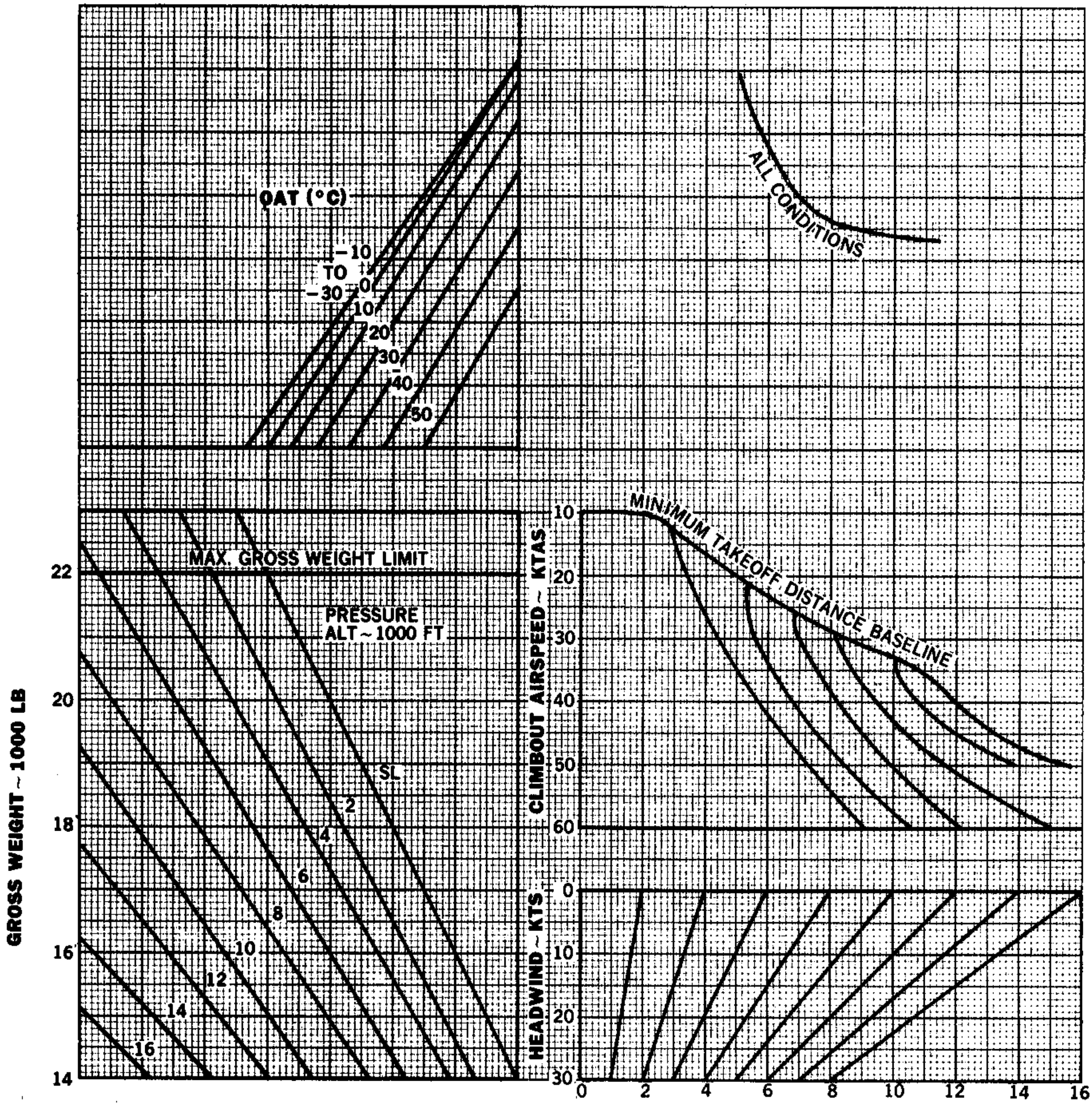
ONE ENGINE

MODEL	ENGINE
CH/HH-3E	T58-GE-100

DATE: 15 MAY 1985
DAT BASIS: FLIGHT TEST (AIR FORCE)



CONDITIONS:
FOD SHIELD ON OR OFF
MAXIMUM POWER
TECHNIQUE: ROLLING
103% N_r



S 91204 (B)

Figure B-19. Distance To Clear 50-Foot Obstacle - Rolling Takeoff (One Engine)

CLIMB
TWO ENGINES
WARM DAY

MODEL	ENGINE
CH/HH-3E	T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)

CONDITIONS:
103% N_T
MILITARY POWER
WARMUP AND TAKEOFF
FUEL NOT INCLUDED
ZERO WIND
FOD SHIELD ON OR OFF

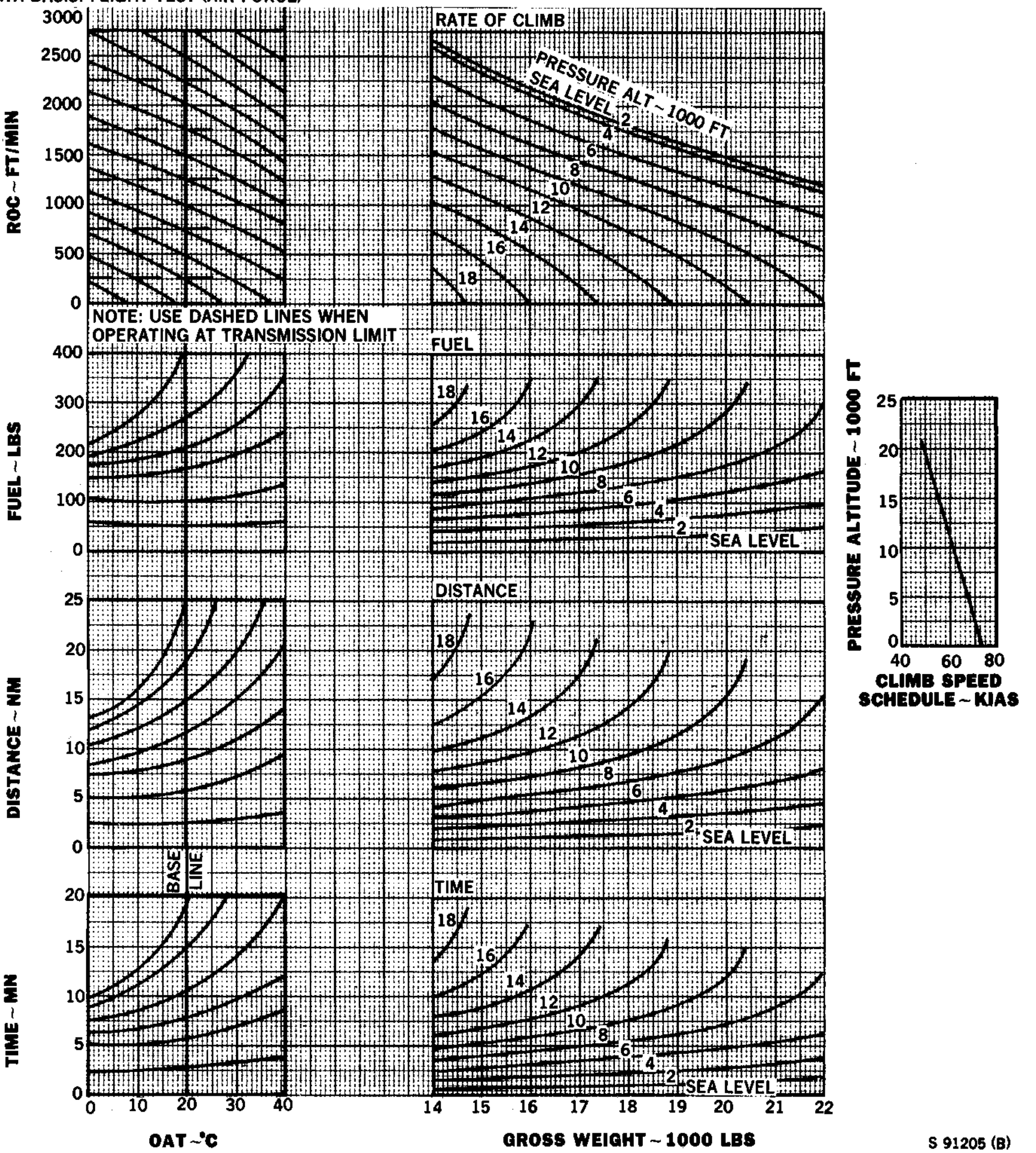


Figure B-20. Climb (Two Engines - Warm Day) Military Power

CLIMB
TWO ENGINES
COLD DAY

MODEL CH/HH-3E | ENGINE T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)

CONDITIONS:
100% N_r
MILITARY POWER
WARMUP AND TAKEOFF
FUEL NOT INCLUDED
ZERO WIND
FOD SHIELD ON OR OFF

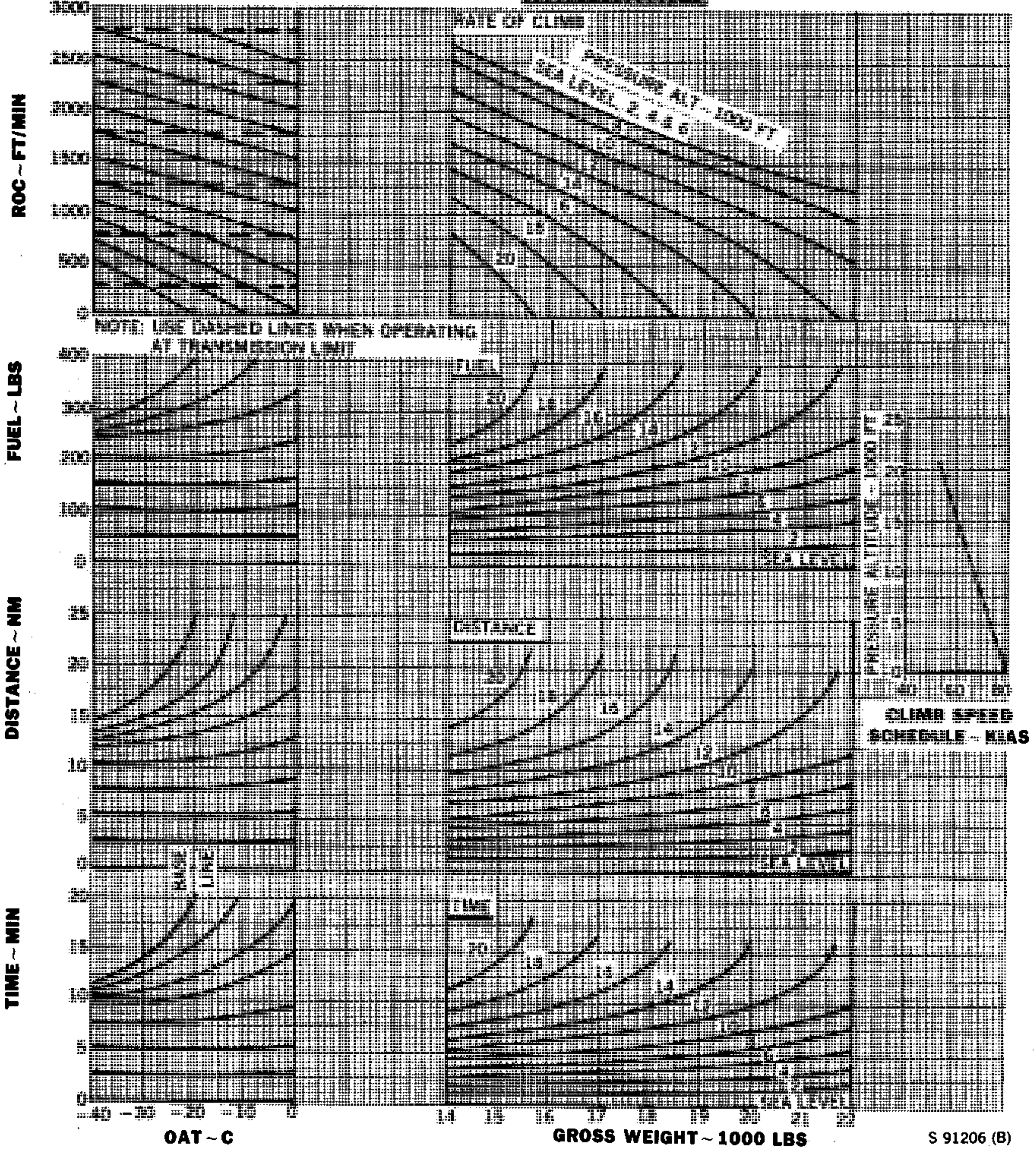


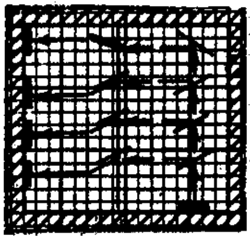
Figure B-21. Climb (Two Engines - Cold Day) Military Power

CLIMB

ONE ENGINE
WARM DAY

MODEL CH/HH-3E

ENGINE T58-GE-100



CONDITIONS:
103% N,
MILITARY POWER
WARMUP AND TAKEOFF
FUEL NOT INCLUDED
ZERO WIND
FOD SHIELD ON OR OFF

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)

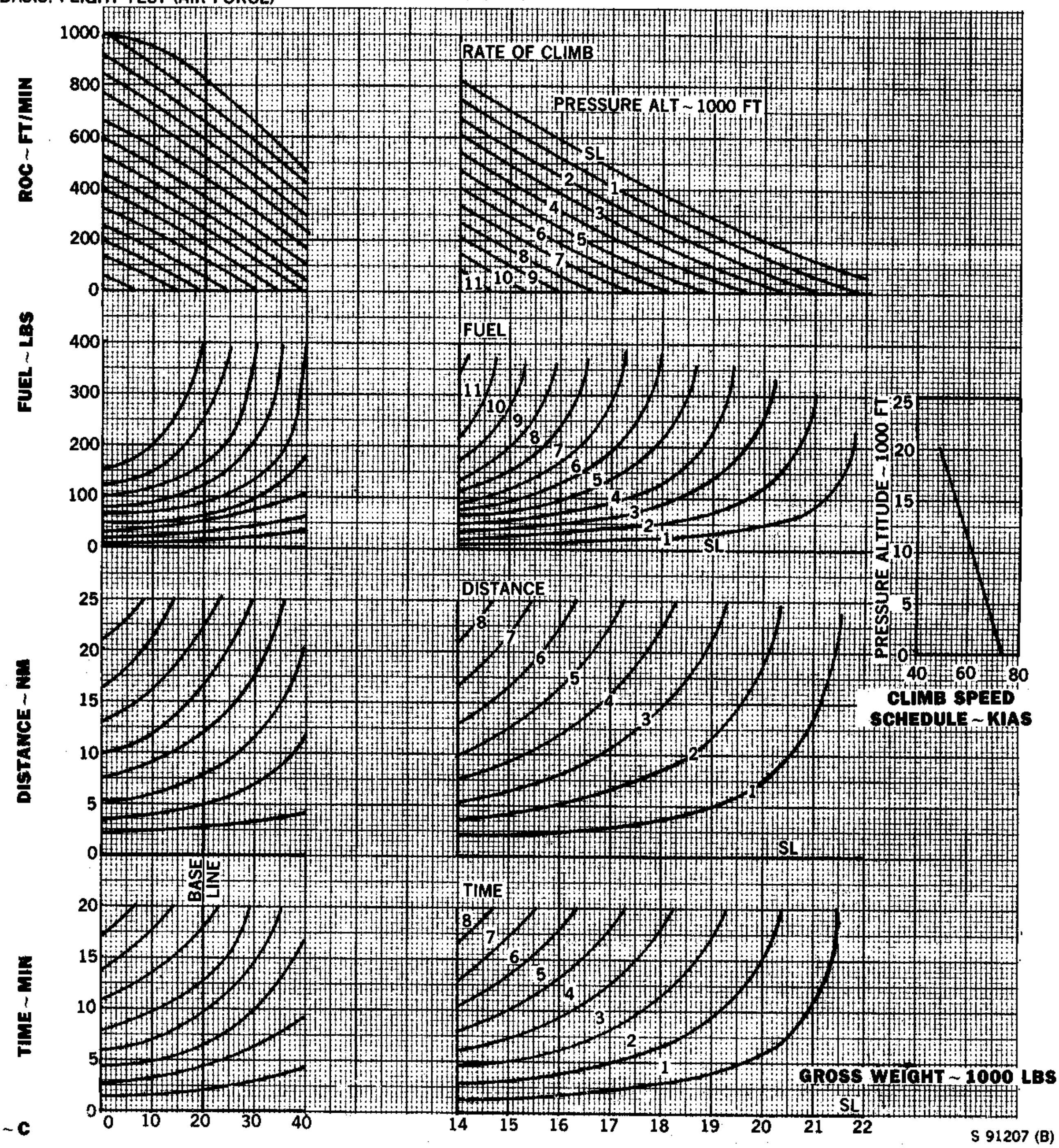


Figure B-22. Climb (One Engine - Warm Day) Military Power

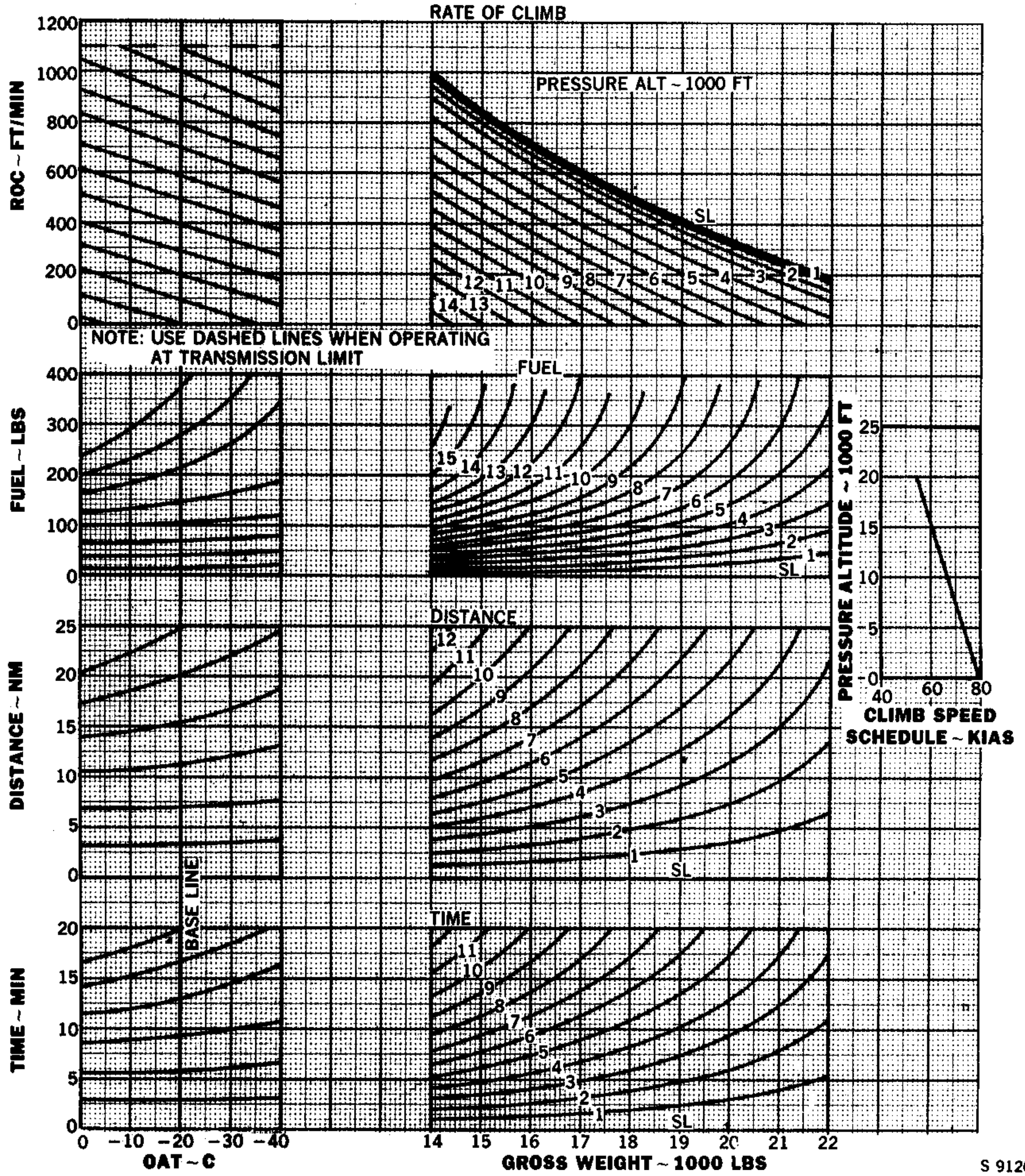
CLIMB
ONE ENGINE
COLD DAY

MODEL CH/HH-3E

ENGINE T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)

CONDITIONS:
103% Nr
MILITARY POWER
WARMUP AND TAKEOFF
FUEL NOT INCLUDED
ZERO WIND
FOD SHIELD ON OR OFF



S 91208 (B)

Figure B-23. Climb (One Engine - Cold Day) Military Power

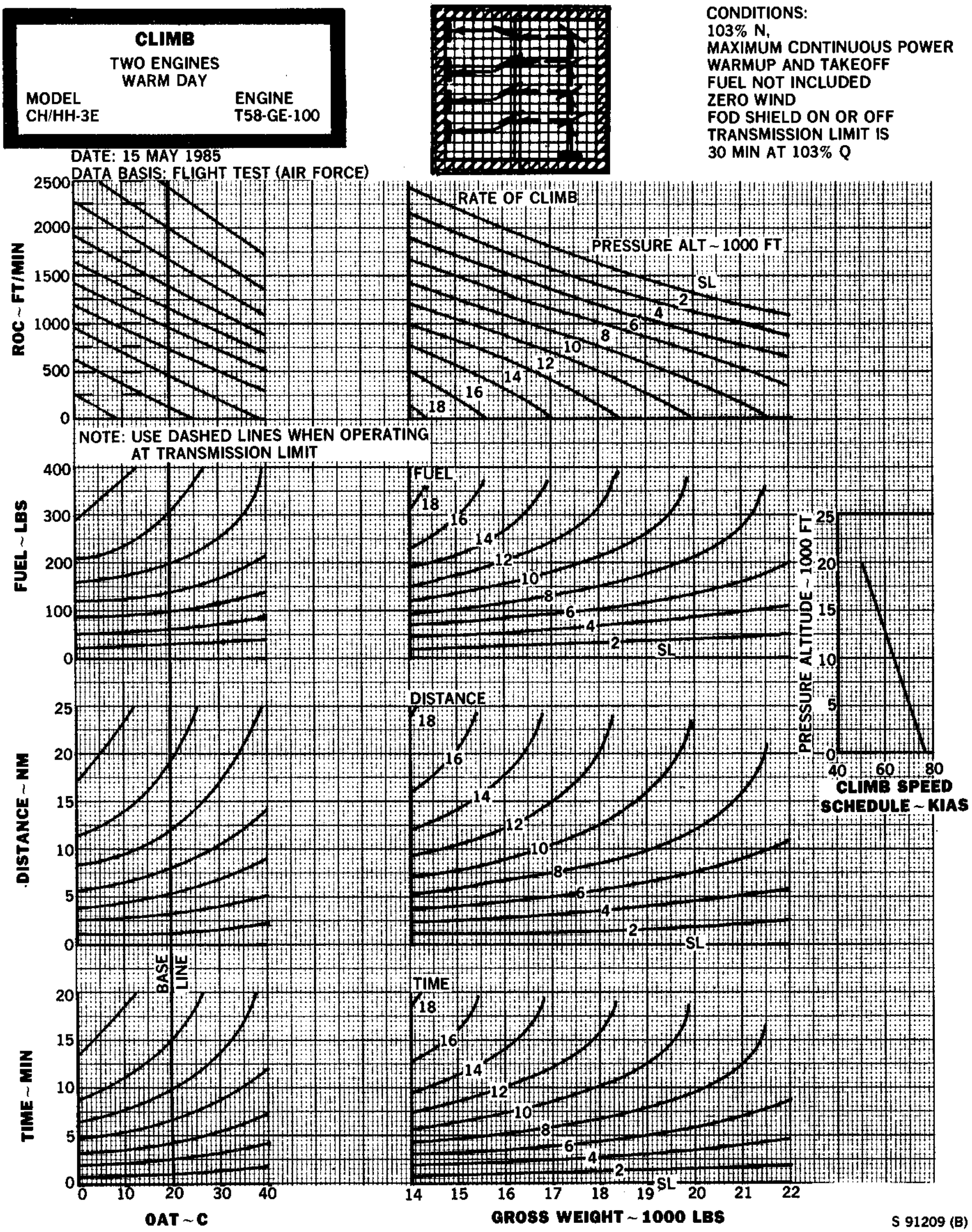


Figure B-24. Climb (Two Engines - Warm Day) Maximum Continuous Power

CLIMB
TWO ENGINES
COLD DAY

MODEL CH/HH-3E
ENGINE T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)

CONDITIONS:
103% N_r
MAXIMUM CONTINUOUS POWER
WARMUP AND TAKEOFF
FUEL NOT INCLUDED
ZERO WIND
FOD SHIELD ON OR OFF
TRANSMISSION LIMIT IS
30 MIN AT 103% Q

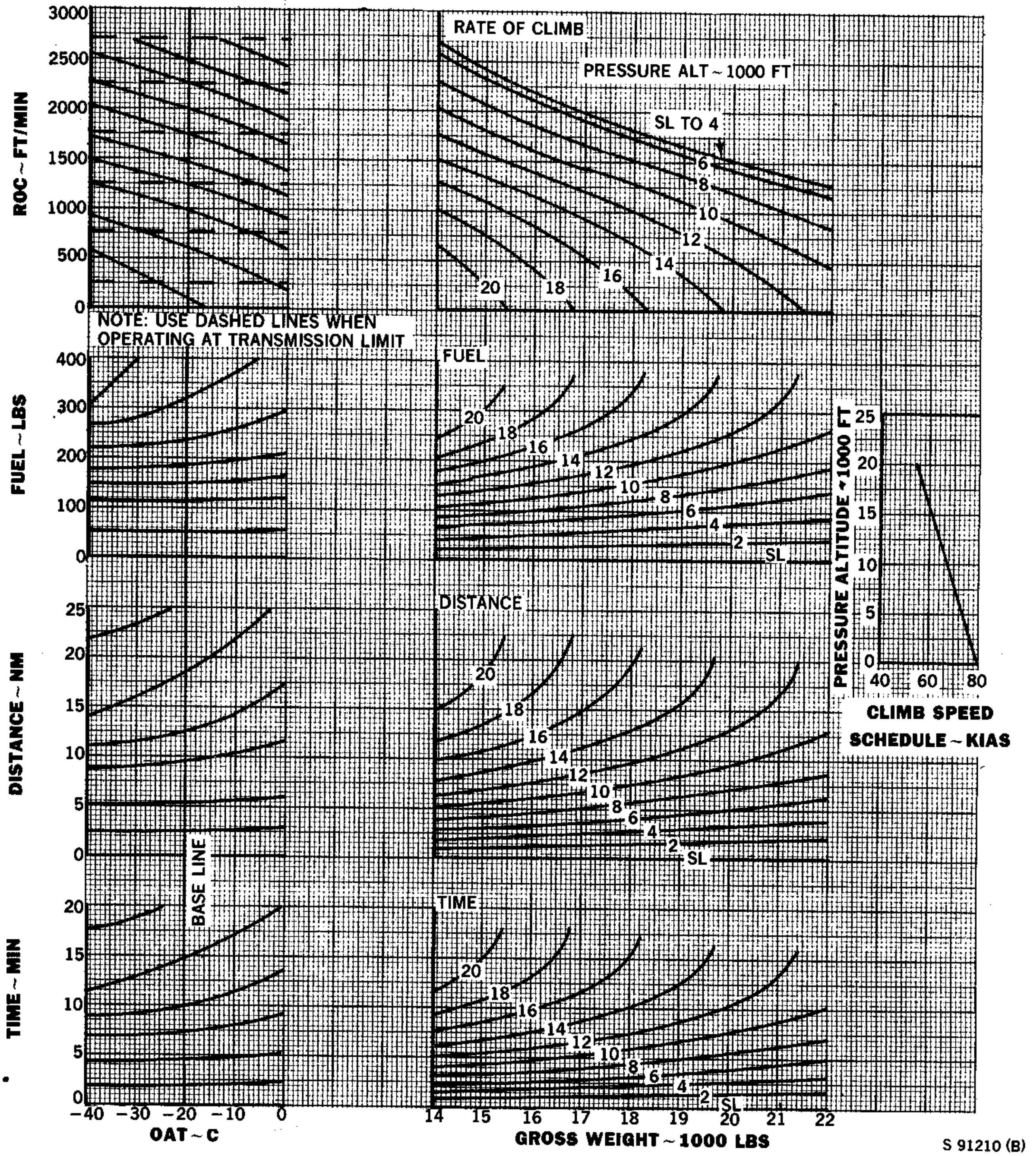
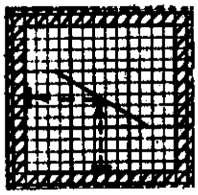


Figure B-25. Climb (Two Engines - Cold Day) Maximum Continuous Power

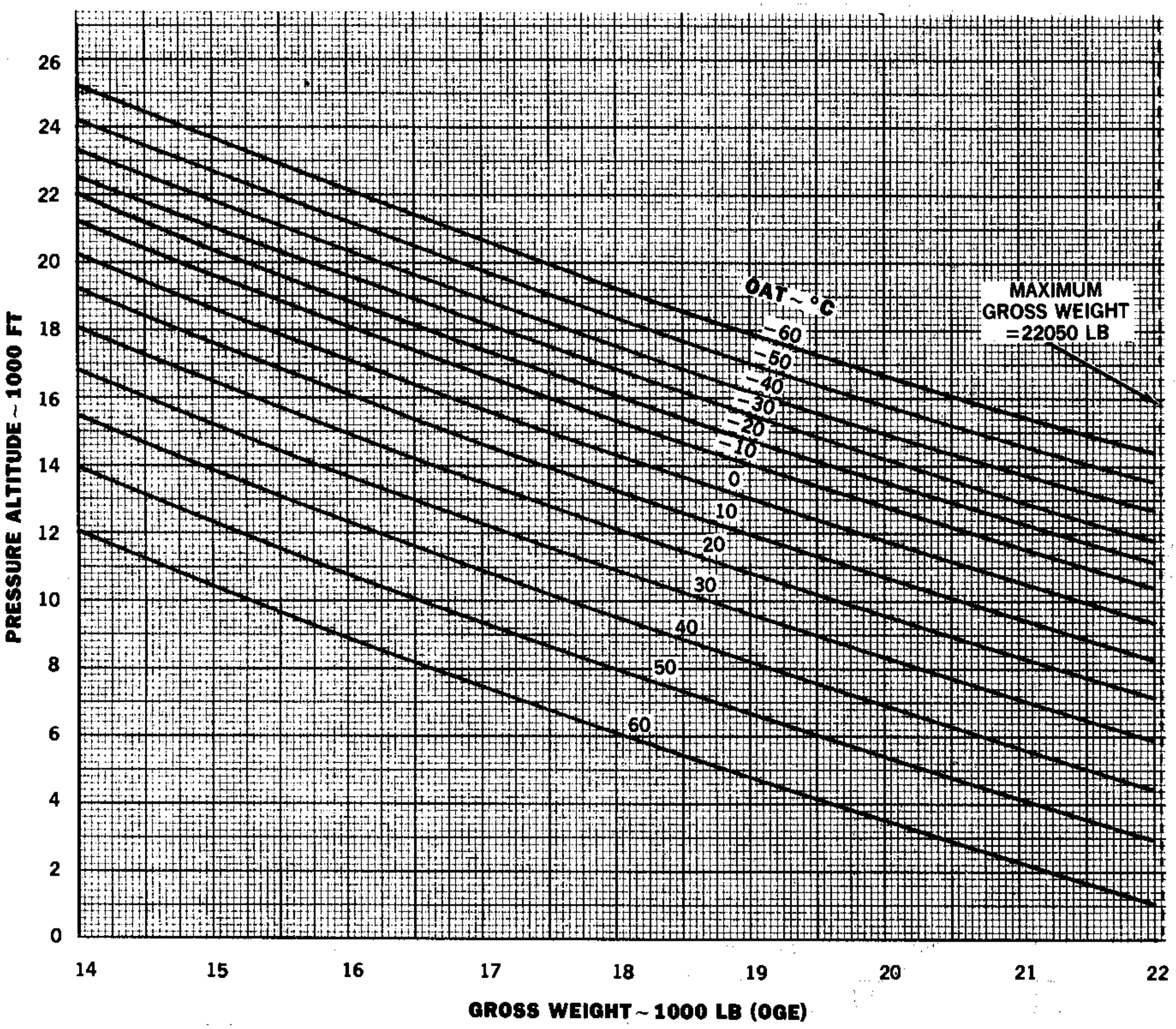
SERVICE CEILING
TWO ENGINES

MODEL CH/HH-3E
ENGINE T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)



CONDITIONS:
MAXIMUM CONTINUOUS POWER
103% N_r
BEST CLIMB SPEED
FOD SHIELD ON OF OFF
100 FT/MIN RATE OF CLIMB



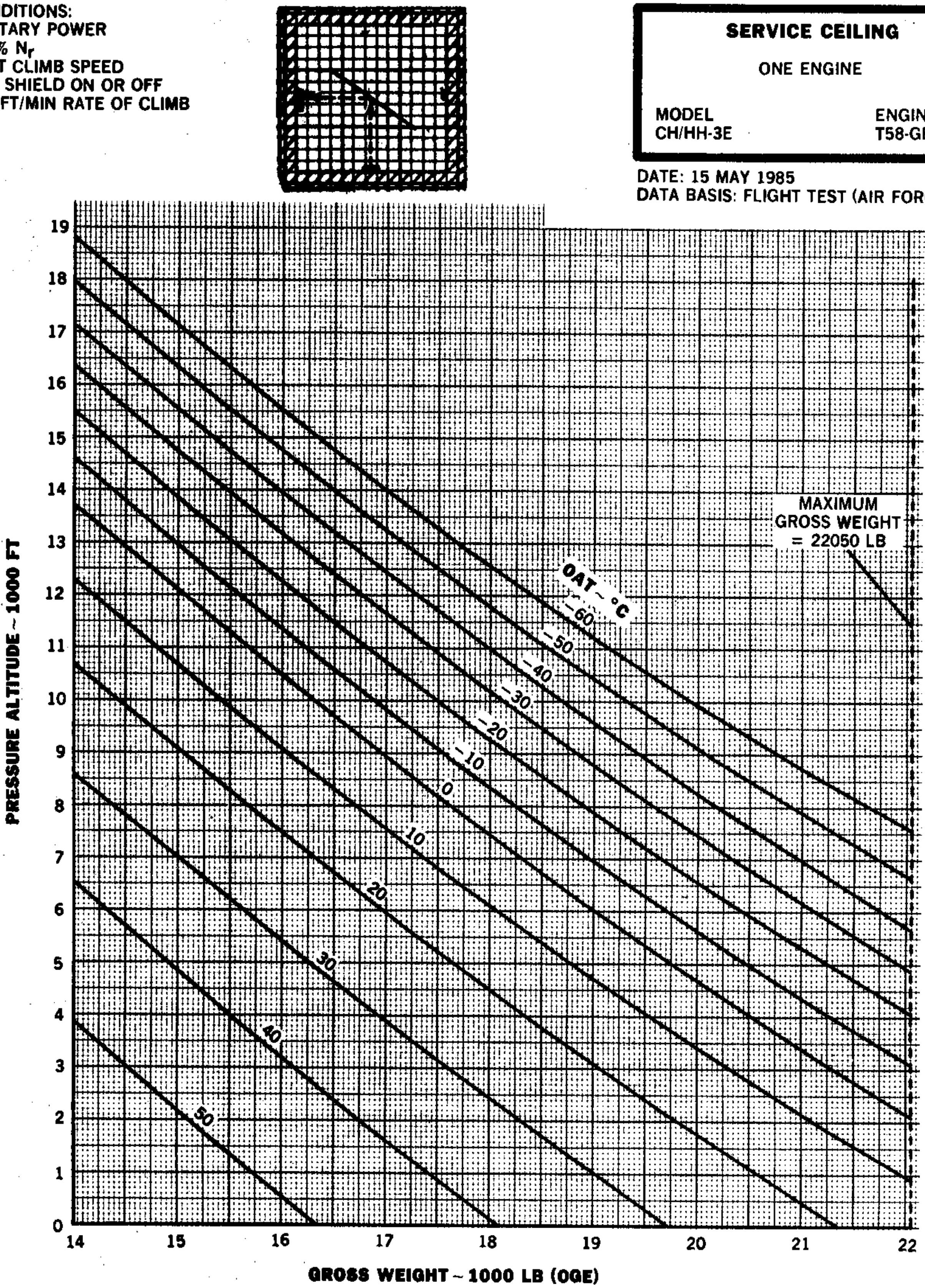
S 91211 (B)

Figure B-26. Service Ceiling (Two Engines)

CONDITIONS:
MILITARY POWER
103% N_r
BEST CLIMB SPEED
FOD SHIELD ON OR OFF
100 FT/MIN RATE OF CLIMB

SERVICE CEILING	
ONE ENGINE	
MODEL CH/HH-3E	ENGINE T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)



S 91212 (B)

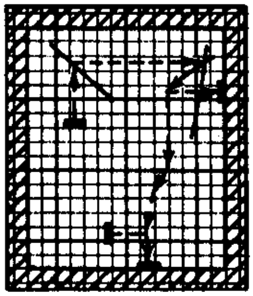
Figure B-27. Service Ceiling (One Engine)

CRUISE

OAT BETWEEN 20° AND 40°C
TWO ENGINES

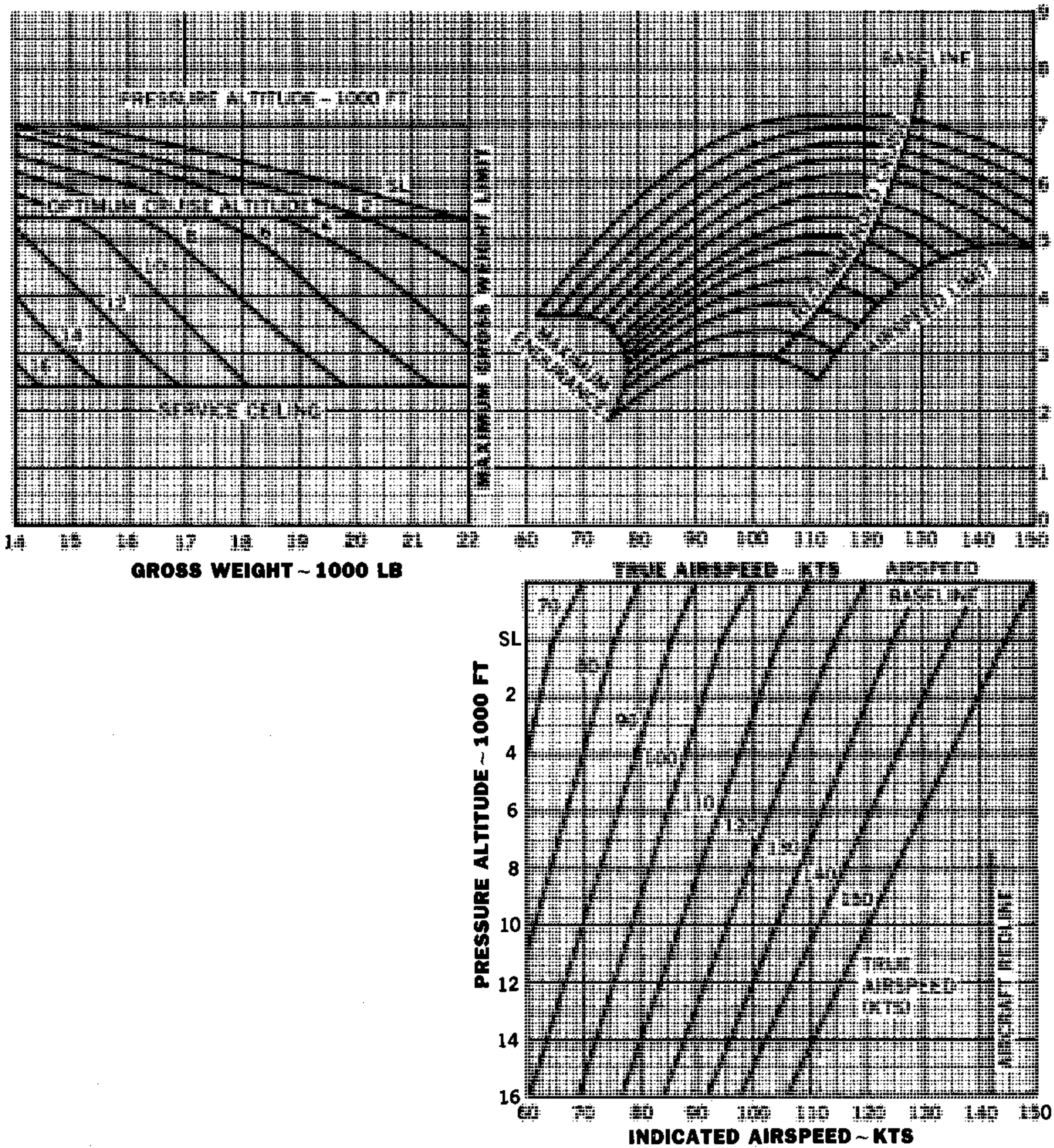
MODEL
CH/HH-3E

ENGINE
T58-GE-100



CONDITIONS:
103% N_r
ZERO WIND
FOD SHIELD ON OR OFF

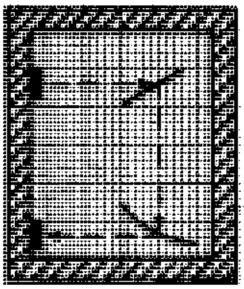
DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)



S 91213.1 (B)

Figure B-28. Cruise - OAT Between 20°C and 40°C (Two Engines) (Sheet 1 of 2)

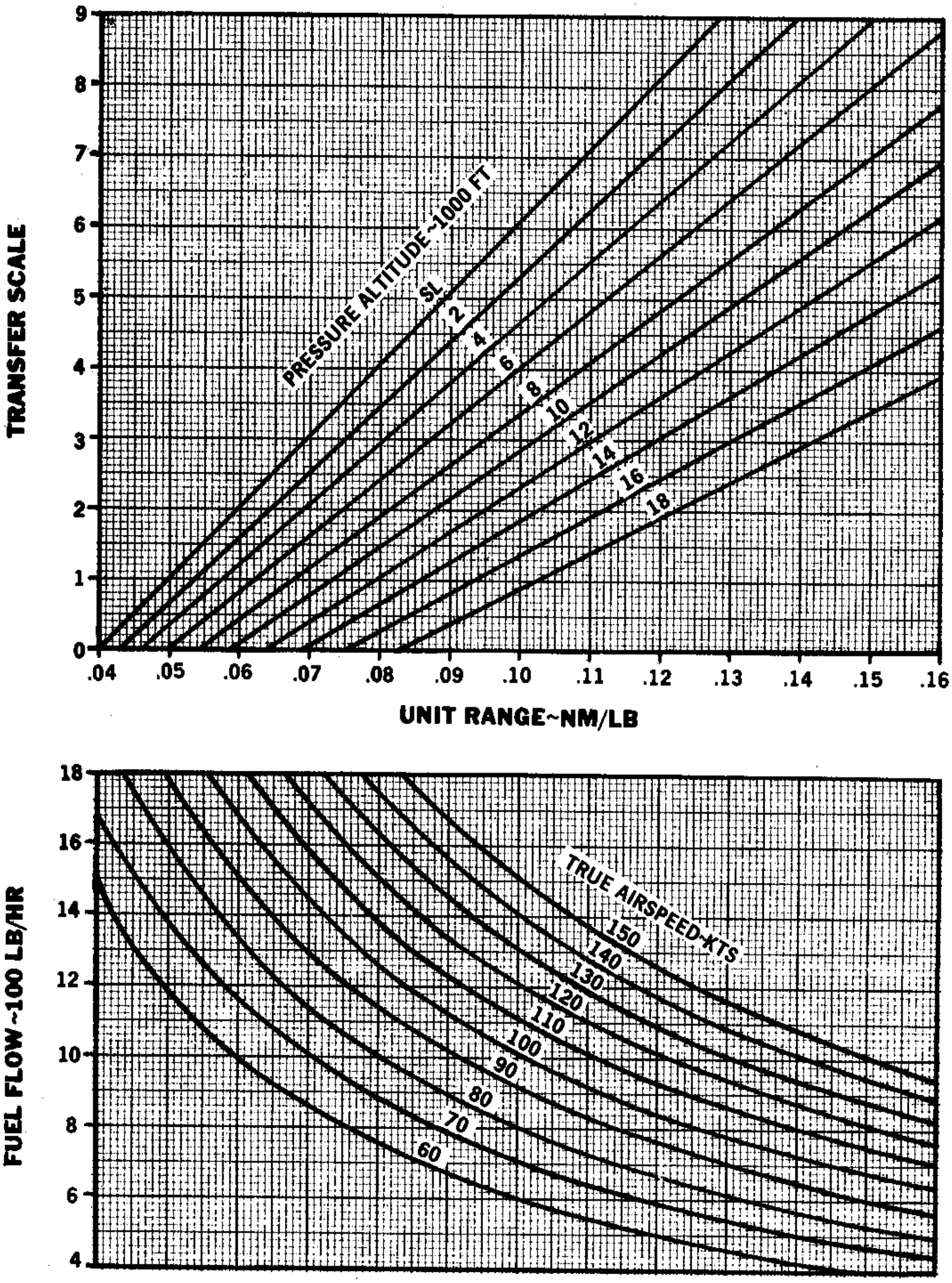
CONDITIONS:
103% Nr
ZERO WIND
FOD SHIELD ON OR OFF



CRUISE
OAT BETWEEN 20° C AND 40°C
TWO ENGINES

MODEL	ENGINE
CH/HH-3E	T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)



S 91213.2

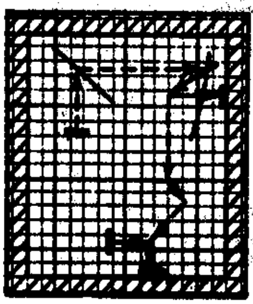
Figure B-28. Cruise - OAT Between 20°C and 40°C (Two Engines) (Sheet 2 of 2)

CRUISE

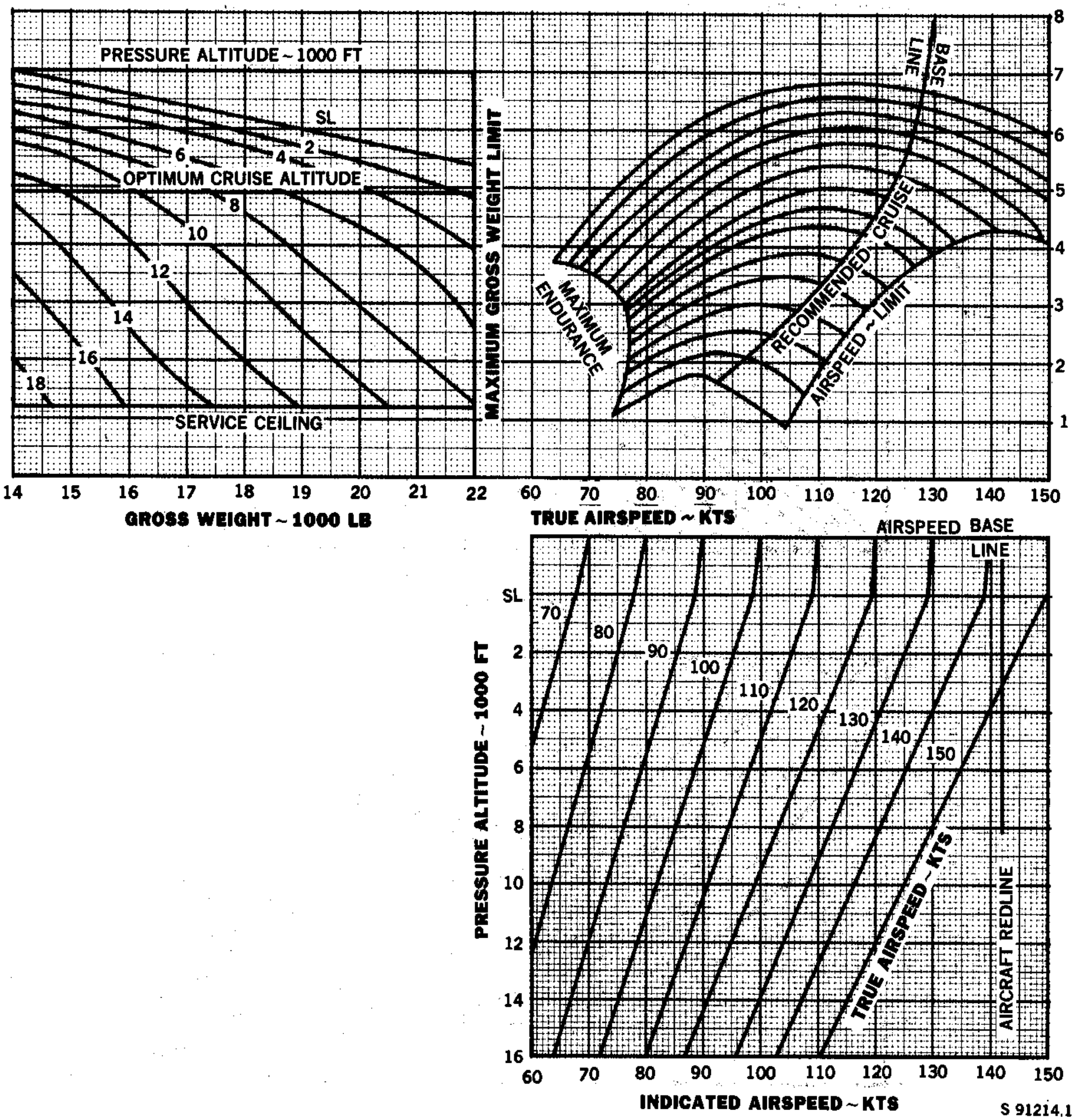
OAT BETWEEN 0°C ND 20°C
TWO ENGINES

MODEL	ENGINE
CH/HH-3E	T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)



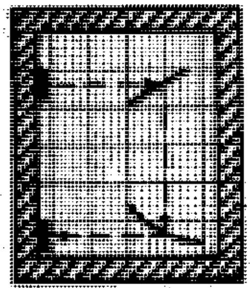
CONDITIONS:
103% N_r
ZERO WIND
FOD SHIELD ON OR OFF



S 91214.1

Figure B-29. Cruise - OAT Between 0°C and 20°C (Two Engines) (Sheet 1 of 2)

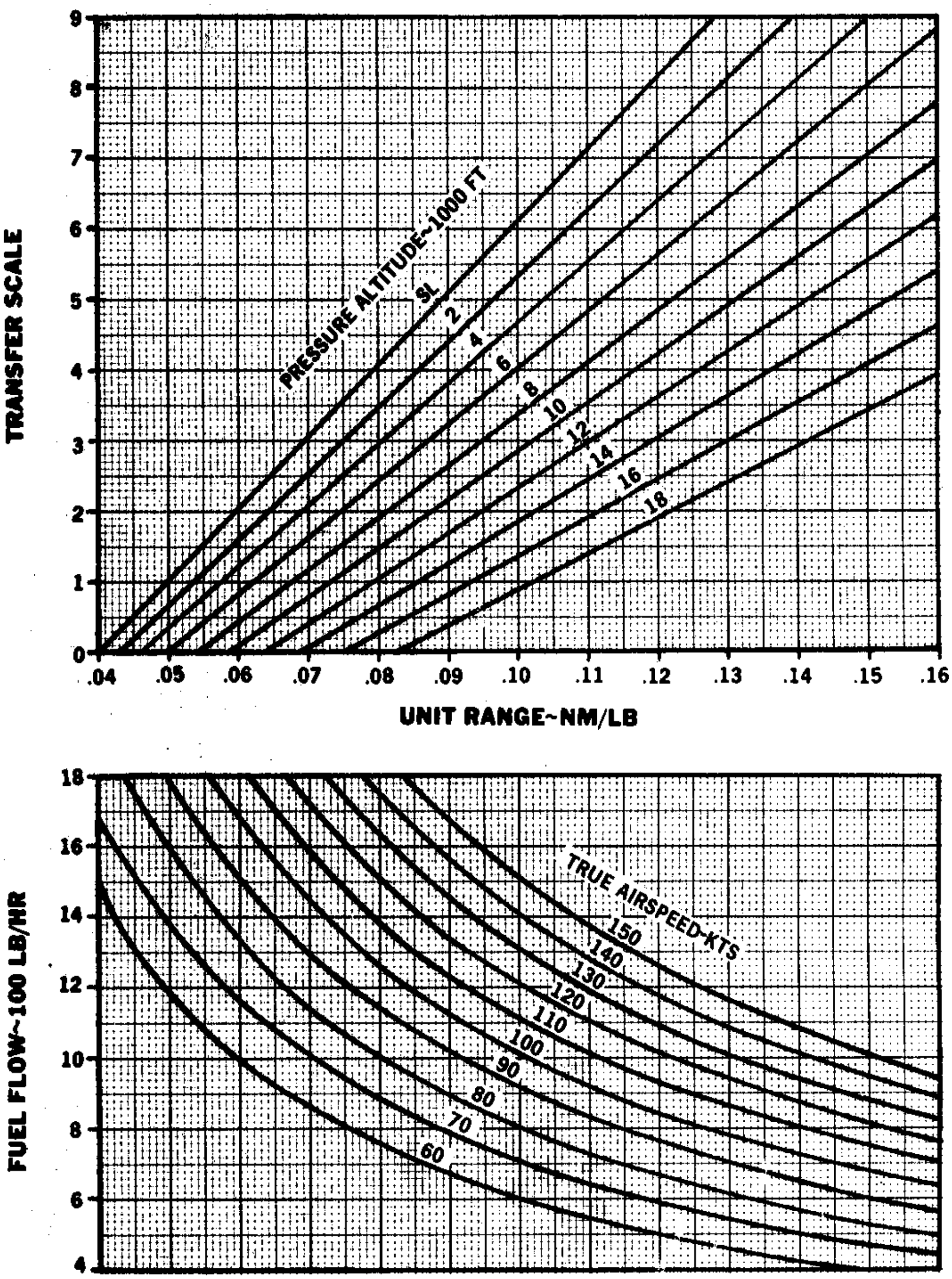
CONDITIONS:
103% Nr
ZERO WIND
FOD SHIELD ON OR OFF



CRUISE
OAT BETWEEN 0°C AND 20°C
TWO ENGINES

MODEL	ENGINE
CH/HH-3E	T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)



S 91214.2

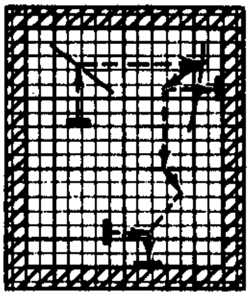
Figure B-29. Cruise - OAT Between 0°C and 20°C (Two Engines) (Sheet 2 of 2)

CRUISE

OAT BETWEEN −20° AND 0°C
TWO ENGINES

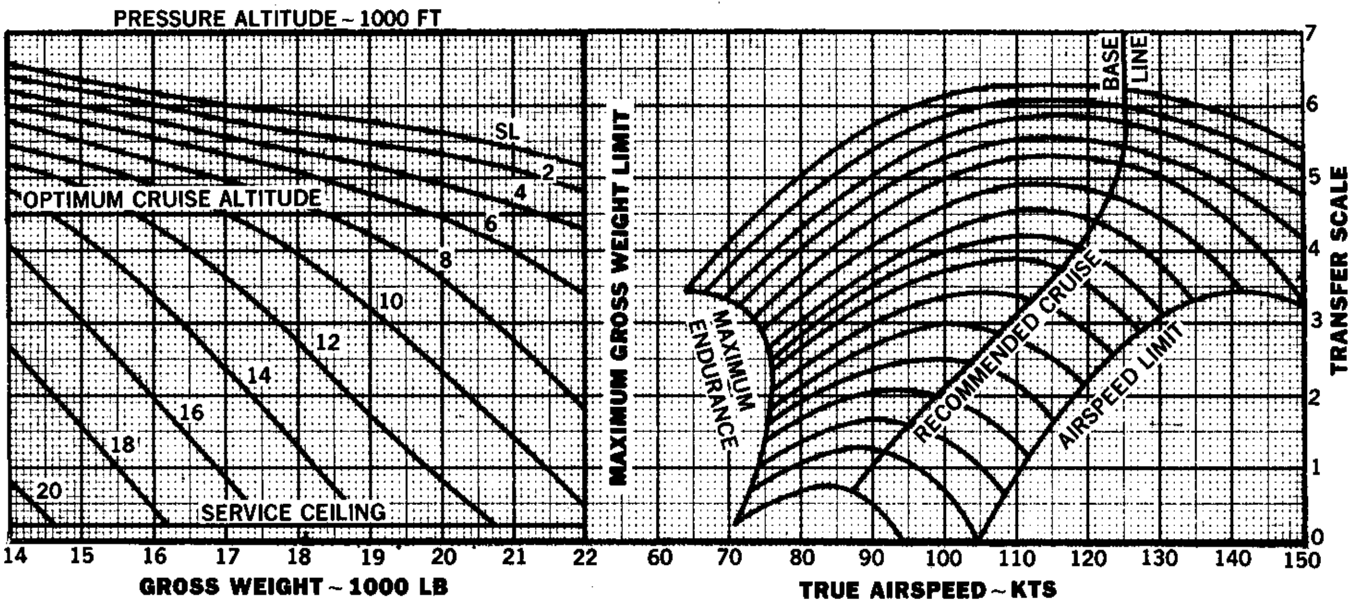
MODEL CH/HH-3E

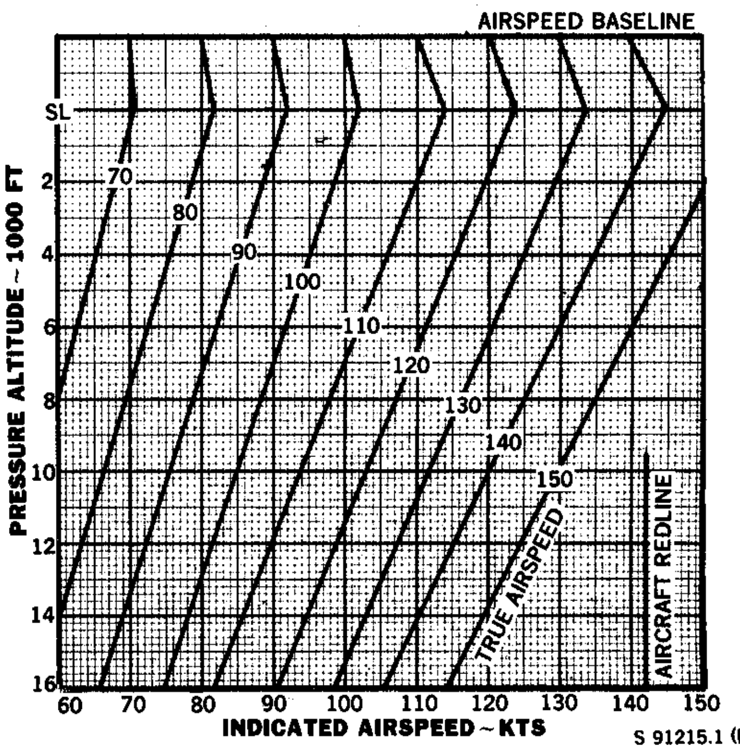
ENGINE T58-GE-100



CONDITIONS:
103% N_r
ZERO WIND
FOD SHIELD ON OR OFF

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)

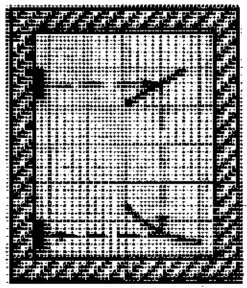




S 91215.1 (B)

Figure B-30. Cruise - OAT Between -20°C and 0°C (Two Engines) (Sheet 1 of 2)

CONDITIONS:
103% Nr
ZERO WIND
FOD SHIELD ON OR OFF



CRUISE
OAT BETWEEN -20° C AND 0°C
TWO ENGINES

MODEL	ENGINE
CH/HH-3E	T58-GE-100

DATE: 15 MAY 1985
DATA BASIS: FLIGHT TEST (AIR FORCE)

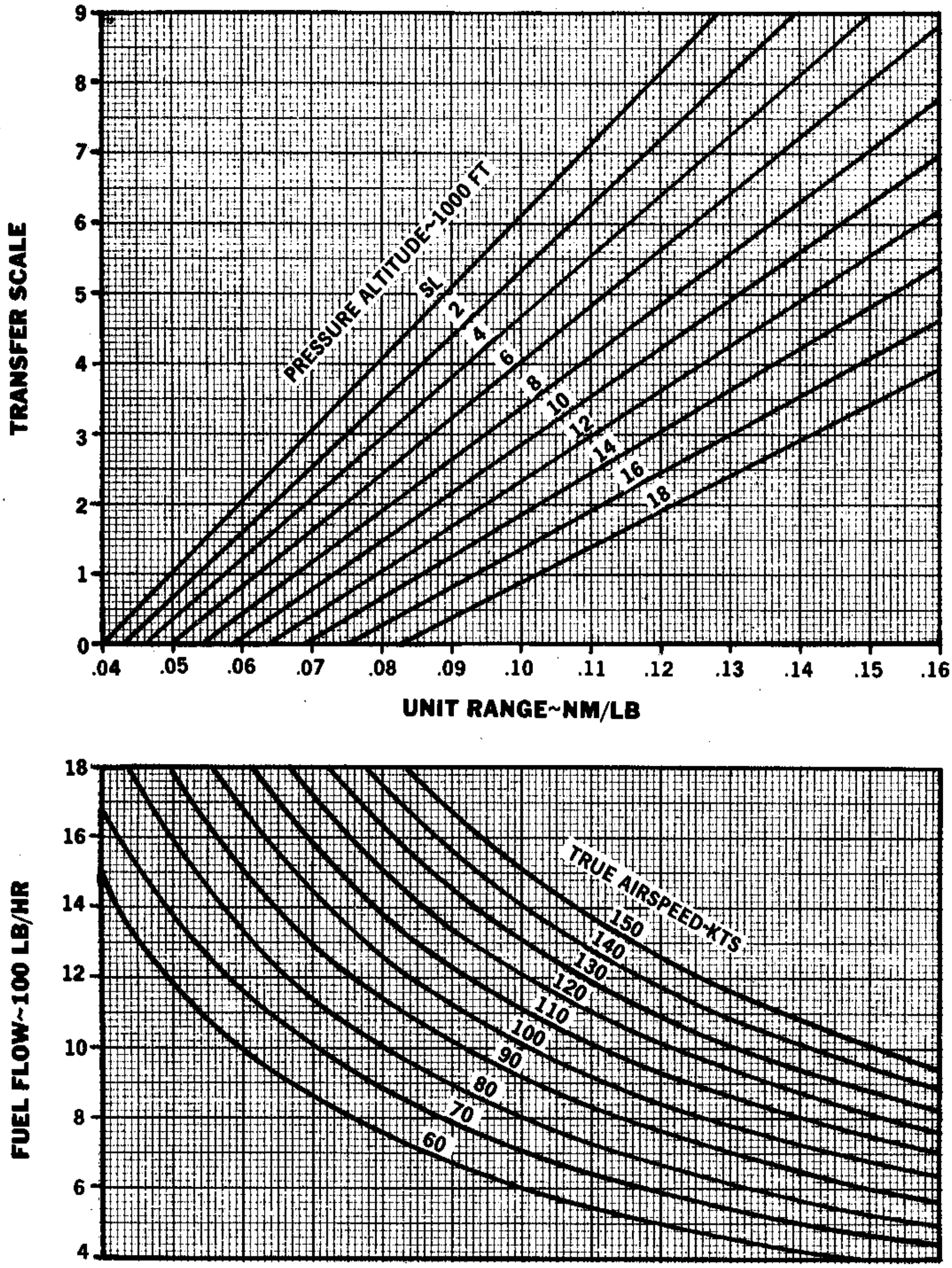


Figure B-30. Cruise - OAT Between -20°C and 0°C (Two Engines) (Sheet 2 of 2)