1. BASIC SPECIFICATION LIST

IMPORTANT: Much of the information in this section needs to be filled in upon completion of your aircraft's flight test period. Always refer to the Operational Data Charts in section 6 for flight planning.

Engine	_____
Propeller	_____
Length	18 Feet, 1 Inches
Height	see diagram, next pages
Wing Span	22 Feet
Wing Area	98.0 Square Feet
Wing Loading	_____
Seats	2
Empty Weight	_____
Useful Load (Utility category)	_____
Maximum Useful Load	_____
Payload w/full Fuel & Oil	_____
Max. Gross Weight (Utility Category)	1100 lbs with 80 HP engine 1220 lbs with ≥100 HP engine
Max. Gross Weight (Aerobatic Cat.)	950 lbs
Fuel Capacity (20 Gallons nominal)	_____

Performance

Minimum Runway Required (T.O. Distance @ Gross Weight @ SL)	_____
Rate of Climb @ Gross	_____ fpm @ _____ mph
Maximum Speed	197 mph (TAS)
Cruise @ 75%	_____
Range @ 75% (45 minute reserve)	_____
Duration @ Max. Cruise (No Reserve)	_____
Stall Speed @ Gross (w/Full Flaps)	40 mph (CAS)
Maneuvering Speed (V_A)	125 mph (CAS)
Stress Factors	Utility Category: +4.4 / -2.2 Gs Aerobatic Category: +6 /-3 Gs

4. WEIGHT and BALANCE

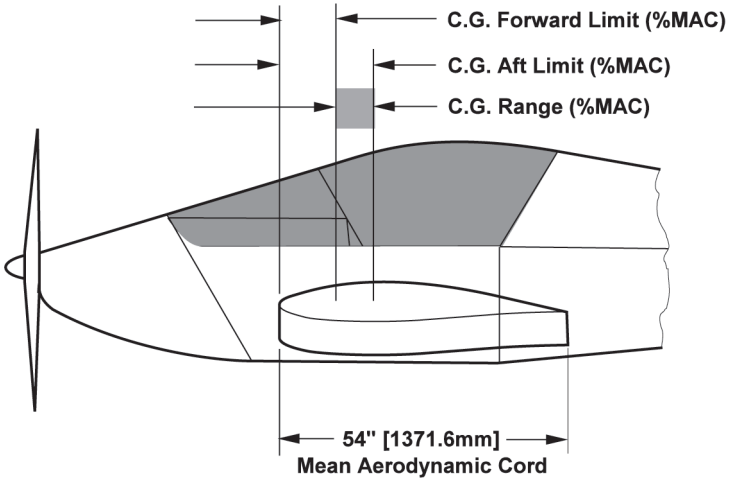
The information on pages 20-25 will help you determine your aircraft's empty weight and center of gravity. The information provided on pages 24-25 will help you determine your aircraft's loaded center of gravity. Sample weight and balance calculations are provided on pages 25.

IMPORTANT: Operating your aircraft at a weight or C.G. outside the designed envelope is dangerous and is not permitted. Operating near the edges of the design envelope (near the fore or aft C.G. limits or near maximum gross weight) must be done with caution.

Allowable Weight and Balance Range

The center of gravity is defined as a percent of the Mean Aerodynamic Cord (MAC). Your aircraft must be operated within the designed center of gravity range of 20% to 32% of the MAC *at all times*. If the center of gravity is outside this range, the aircraft will be dangerous.

ALLOWABLE CENTER OF GRAVITY RANGE



	Utility Category	Aerobatic Category
Maximum Forward C.G.	20% MAC	23% MAC
Maximum Aft C.G.	32% MAC	29% MAC

ALLOWABLE MAXIMUM GROSS WEIGHT

Your Sonex must be operated at or below the following gross weights:

	Utility Category	Aerobatic Category
Max. Gross Weight - 80 hp	1100 lbs	950 lbs
Max. Gross Weight - ≥100 hp	1220 lbs	950 lbs

Calculating Weight and Balance of the Loaded Aircraft

Use these steps to determine your aircraft's weight and center of gravity for any loading situation. Sample loading tables are provided on the facing page as well as a blank worksheet for use in determining your aircraft's weight and balance for any loading situation.

1. Enter the aircraft's empty weight, arm, and moment, as calculated and recorded on page 21 or 23, in the worksheet on the following page.
2. Calculate the combined weight of the pilot (and parachute, if one is worn) and passenger. Record the total weight in the worksheet and calculate the moment.
3. Calculate the fuel weight in the aircraft (full fuel is 120 lbs). Record the fuel weight in the worksheet and calculate the moment.
4. Calculate the baggage weight in the aircraft (the maximum baggage allowed is 40 lbs in the Utility category 10 lbs in the Aerobatic category). Record the baggage weight in the worksheet and calculate the moment.
5. Add the empty aircraft, pilot and passenger, fuel, and baggage weights together and record the total in the worksheet. *The total weight must not exceed 1100 lbs. for flight in the Utility Category (1220 lbs with a ≥100hp engine), or 950 lbs for flight in the Aerobatic Category.*
6. Add the empty aircraft, pilot and passenger, fuel, and baggage moments together and record the total in the worksheet.
7. Record the aircraft's "Leading Edge Datum" below. It is the "Calculated Distance 'E' " from page 20 or 24. You will use this in Step 9.

   Datum to Leading Edge = _____
8. Calculate your loaded aircraft's Arm and enter it in the worksheet:

   Total Arm = Total Moment / Total Weight
9. Calculate your loaded aircraft's Center of Gravity (C.G.):

   C.G. = (Total Arm - Leading Edge Datum) / 54
10. The result of step 9 is the aircraft's C.G. expressed as a percentage of the MAC. It **must** fall within the range shown on page 19 and it **must** remain within that range for the duration of your flight. **Flight outside the C.G. envelope is dangerous and prohibited.**

5. OPERATING LIMITATIONS

Your Sonex or Waiex exceeds the requirements of airworthiness set forth by Sonex Aircraft, Ltd. as submitted to the FAA.

The airplane is approved for VFR operation only.

Your aircraft must be operated in accordance with all FAA-approved markings, placards and check lists in the airplane. If there is any contradiction to FAA approved markings, placards, etc., in this section, it is to be disregarded.

Airspeed Limitations

The following airspeed limitations must be observed:

Never Exceed Speed (Vne), smooth air, dive or glide	197 MPH (TAS)
Maximum Flap Extension Speed	100 MPH (CAS)
Maximum Structural Cruise (Vc)	136 MPH (CAS)
Placard Maneuvering Speed (Va)	125 MPH (CAS)

Maneuvers - Aerobatic Category

When operating in the Utility category, no aerobatic maneuvers - including intentional spins - are permitted. In the Utility category the following gross weight and maximum flight load factors apply:

Gross Weight, 80 hp:	1100 lbs.
Gross Weight, ≥100 hp:	1220 lbs.
Flight Load Factors:	4.4 Gs positive (Max.)
	2.2 Gs negative (Max.)

Maneuvers - Aerobatic Category

Aerobatics that may impose high loads must not be attempted. The airplane is clean in aerodynamic design and will build up speed quickly with the nose down. Proper speed control is essential for execution of any maneuver and care must be taken to avoid excessive speed which can impose excessive loads. In the execution of all maneuvers, avoid abrupt use of controls.

In the Aerobatic category the following gross weight and flight load factors apply:

Gross Weight:	950 lbs.
Flight Load Factors:	6.0 Gs positive (Max.)
	3.0 Gs negative (Max.)

RATE of CLIMB at GROSS WEIGHT

Elevation and Temperature	Best Rate (Vy)		Best Angle (Vx)	
	IAS MPH	Rate of Climb Ft./Min.	IAS MPH	Rate of Climb Ft./Min.
Sea Level @ 59° F				
2500 Ft. @ 50° F				
5000 Ft. @ 41° F				

1. Gross Weight: 1100 lbs. w/80 hp; 1220 lbs. w/≥100 hp
2. Full Throttle
3. For hot weather, decrease rate of climb 15ft./min. for each 10° F above standard day temperature for the particular altitude.

TAKE-OFF DISTANCE from HARD SURFACE at GROSS WEIGHT

Elevation and Temperature	Head Wind Knots	IAS MPH	Ground Run (Feet)	To Clear 50 Ft. Obs. (Feet)
Sea Level @ 59° F				
2500 Ft. @ 50° F				
5000 Ft. @ 41° F				

1. Gross Weight: 1100 lbs. w/80 hp; 1220 lbs. w/≥100 hp
2. Full Throttle
3. Increase the distance 10% for each 35° F increase in temperature above standard day temperature for the particular altitude.
4. For operation on dry grass runway, increase distances (both ground run and "To Clear 50 Ft. Obs") by 7% of the "To Clear 50 Ft. Obs" figure.
5. Figures for clean, level, hard surface runway.

LANDING DISTANCE - POWER OFF, NO WIND, FULL FLAPS, HARD SURFACE at GROSS

Elevation and Temperature	Approach Speed IAS - MPH	Ground Roll (Feet)	Total to Clear 50 Ft. Obs. (Feet)
Sea Level @ 59° F			
2500 Ft. @ 50° F			
5000 Ft. @ 41° F			

1. Gross Weight: 1100 lbs. w/80 hp; 1220 lbs. w/≥100 hp
2. Decrease the distances shown by 10% for each 4 knots of head wind.
3. Increase the distances shown by 10% for each 60° F increase in temperature above standard day temperature for the particular altitude.
4. For operation on a dry, grass runway, increase distances (both ground run and "To Clear 50 Ft. Obs") by 7% of the "To Clear 50 Ft. Obs" figure.
5. Figures for clean, level, hard surface runway.

MAXIMUM GLIDE at _____ MPH IAS, PROPELLER WINDMILLING, ZERO WIND