

## BABY LAKES & BUDDY BABY LAKES

### MAC

### CENTER + OF LIFT

#### NOTES:

1. The airfoil *section* is a *modified* M-6 for all except the last 18" of span where it transitions to a USA-15 on both upper and lower wing tips.
2. *Stagger* between upper and lower wings is approximately 30% of the chord at the root becoming nil at the tips due to upper wing *sweep-back*.
3. The upper wing is set at 1° *more* angle of incidence (2 ½°) than the lower wing (1 ½°).
4. There should be *no dihedral* in the lower wing and from 0° to 2° dihedral in the upper wing.
5. Flight testing has shown that the *lift* (pressure) *profile* resulting from this wing configuration produces the following results:
  - a) In cruise level flight at about 115-120 MPH, with a gross weight of about 800 pounds, *all* lift is being generated by the *upper* wing with the lower wing being essentially streamlined with the relative wind.
  - b) In condition a) above, the *mean* aerodynamic chord *center of lift* is at midpoint between the forward and aft *cabane attachments* for the upper wing.
  - c) As the *angle of attack* (for both wings) is increased, the lower wing begins to generate lift *aft* of the upper wing center of lift. The *combination* of both upper and lower lift profiles has the overall effect of maintaining a *combined* center of lift that remains almost constant *relative to the center of gravity* at all angles of attack right up through full stall of the *upper wing*.
  - d) As the upper wing *stalls*, the center of lift is then (initially) *well aft* of position described in b) above (mid point between fwd and aft cabane attach points) which causes an immediate *pitch down* of the aircraft's attitude.
6. The *ideal loaded* (pilot, fuel, oil, etc.) *center of gravity* is from 0" to 1" forward of the mid point between upper wing cabane forward and aft attach points.
7. *Loaded center of gravity limits* should be held to from 4" forward to 3" aft of the *mid point* of the cabane attached points. (Even though the aircraft has been found to be controllable when the center of gravity was well outside these limits.)
8. *Before* fabricating an engine mount for a Baby Lakes or Buddy Baby Lakes, a calculation should be made to determine how far forward of the MAC center of lift (for the upper wing) will the engine, cowl, prop, wheel pants, etc. have to be in order to provide a *plus moment* that is about equal to the *minus moment* of the (intended) pilot (and passenger in the Buddy Baby).
9. It is important to use the cabane struts attachment mid point as the *primary* reference for weight and balance calculations since firewall (the usual datum) position and seat back positions are often adjusted to accommodate pilot size and comfort considerations. (See sheets on weight and balance.)
10. **Loaded Gross Weight vs. Structural "G" Limits**  
850 pounds max. for 9 "G" positive and negative.  
1000 pounds max. for 7.5 "G" positive and negative.