

# AIR TIGHT GAP SEALS

Improved Performance With Little Effort

by HAROLD D. HUTCHISON

The importance of sealing sailplanes against all manner of aerodynamic leaks to obtain optimum performance is well known. This knowledge has prompted many pilots and builders to seek solutions which solve the immediate problem of "getting into the air"; but, unfortunately, are somewhat unreliable, of questionable effectiveness, of limited life and time consuming. Taping with masking or plastic tape is the most popular; and if applied with care, this method can provide adequate seals. However, the hurry and scurry of normal operations usually produce seals encompassing all of the defects mentioned above in varying degrees. Many are the pilots who have wasted prodigious quantities of man-hours each year carefully taping critical points only to have the tape blow off during flight due to the effects of dirty surface conditions, low temperatures at altitude, moisture near cloud base and aerodynamic forces. The accumulation of pressure sensitive bonding residue baked on by the summer sun is a delightful phenomenon to face at the end of every day. This delight is compounded by the removal of sections of the painted surface during stripping operations. Rubber or plastic extruded tubing is usually inadequate since precise engineering and construction techniques have to be employed to give good results, and most people do not have access to such detailed information nor are those that do willing to accept the additional weight required to produce stiff sections along seal lines. Foam rubber and polyurethane foams are entirely inadequate since they deteriorate rapidly in sunlight, become stiff at low temperatures, and take a permanent set rapidly, thereby eliminating elastic forces used to produce the initial seal. Polyurethane foam suffers another degrading effect peculiar to its open cell structure; i.e., the bubbles making up the body of the foam are connected with open doorways so that slight pressure differentials appearing across canopy gaps, etc., cause these to leak pro-

fusely. One would think that compressing the foam would restrict this flow sufficient for our purposes; not so, as you can readily demonstrate with a household plastic foam cleaning sponge and cigarette smoke. Paul Bikle was able to blow cigar smoke (White Owl) easily through his canopy seal while at a distance of one to two inches.

Does a reasonable solution to this situation exist? Silicone rubber adhesive sealant is a solution. Several manufacturers produce this somewhat remarkable silicone base family of elastomers for applications extending from spacecraft, to aircraft, to electronics, to industrial motors, to home repairs. G-E labels its family "Liquid RTV Silicone Rubber" where RTV stands for Room Temperature Vulcanizing. One of their brochures states that RTV offers:

**RAPID CURE:** Cures at room temperature. By using various catalysts, cure time can be varied from 10 minutes to 24 hours for increased flexibility.

**GOOD PHYSICAL, ELECTRIC PROPERTIES:** Virtually no change in physical properties, even after 24 hours exposure at 400°F. RTV maintains good electrical properties inherent with other silicone rubber.

**HIGH TEMPERATURE RESISTANCE:** From -65° to plus 600°F.

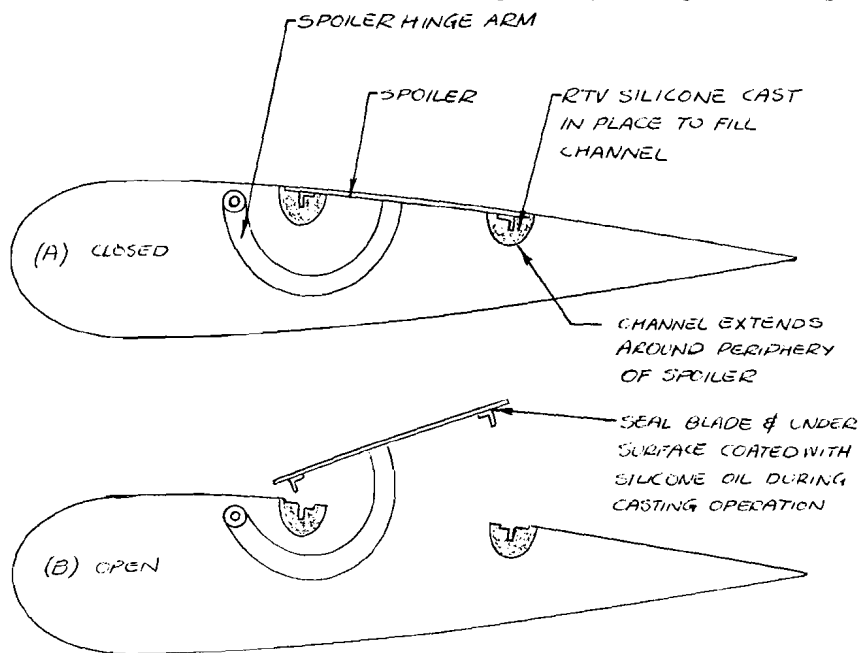
**SOLVENT & OZONE RESISTANCE:** Even though cured at room temperature, RTV offers resistance to fluids at elevated temperatures. Ideal for in-place sealing and caulking applications.

**EASY RELEASE:** RTV compounds possess the inherent ability of silicones to keep components from sticking.

**EXCELLENT BONDING ABILITY:** In spite of its general release properties, RTV forms excellent bonds to *properly primed surfaces*.

**LESS THAN 0.2% SHRINKAGE:** Extremely low shrinkage, especially when compared with standard heat-curing rubbers or heat-forming thermoplastics.

**APPLICATION VERSATILITY:** RTV compounds, available in viscosities from a pourable liquid to a thick paste, can be applied to objects of virtually any size and shape. Easy mixing and curing of



NOTE: IN GENERAL SOME FORM OF LABYRINTH SEAL (BLADE IN THIS APPLICATION) IS REQUIRED

FIG. 1: RTV SILICONE RUBBER SPOILER SEAL ON PRUE 215