

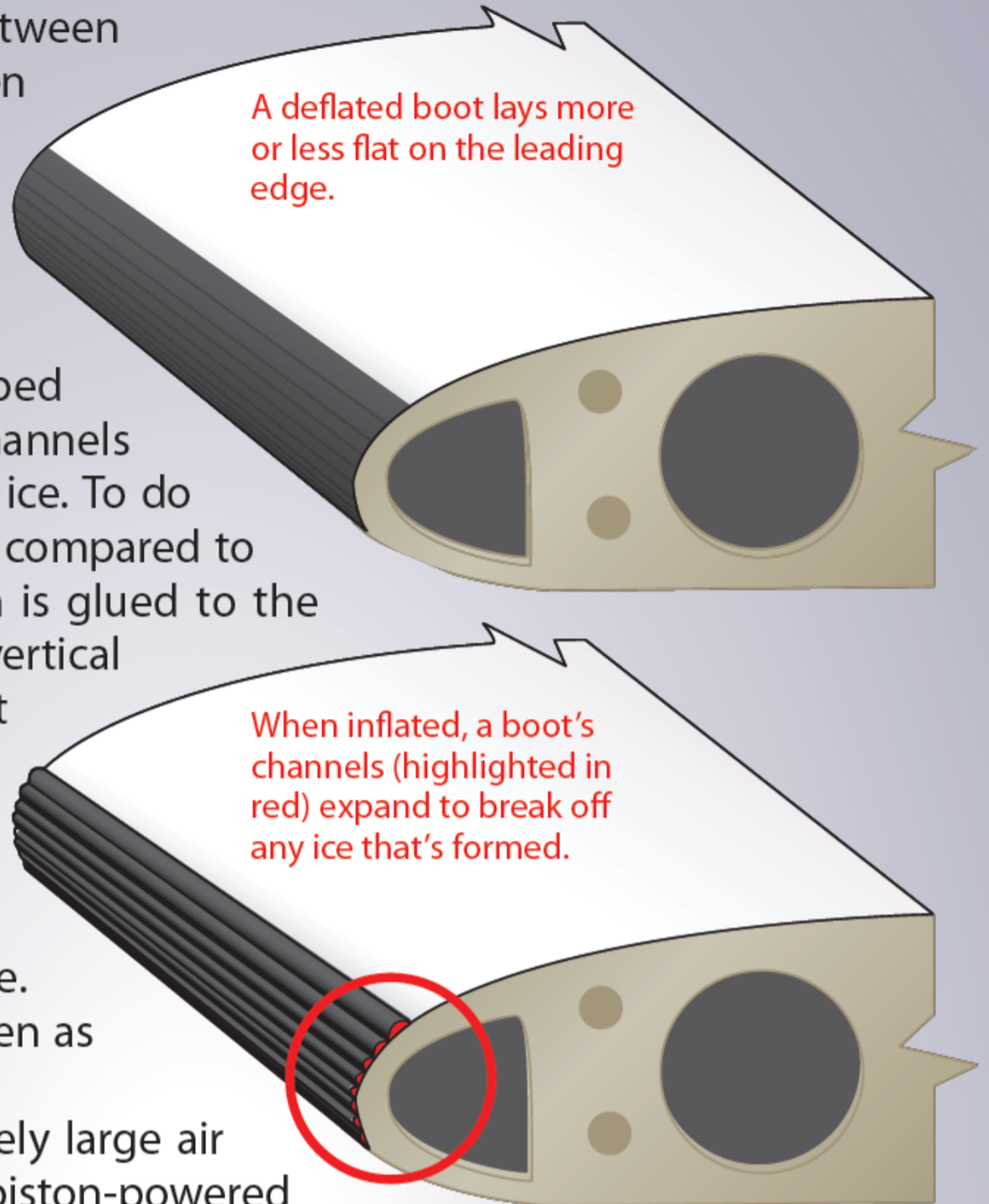
# How It Works: Boots Vs. TKS

There's a world of difference between the ways de-icing boots work when compared with TKS systems. Let's explore some of them.

## BOOTS

As mentioned in this article's main text, boots work when air is pumped into them, expanding rubber channels and (hopefully!) breaking off the ice. To do all that, a relatively heavy (when compared to no boot at all) rubber extrusion is glued to the wing, horizontal stabilizers and vertical stabilizer leading edges. The boot is then plumbed into a system capable of pumping air. Air pressure in the boot is released via a dump valve, allowing it to collapse back to its former shape. The cycle can be repeated as often as necessary.

As such, boots require a relatively large air volume, usually supplied aboard piston-powered aircraft via at least one engine-driven pressure pump (vacuum-only aircraft need not apply). There's also the need to run the appropriate tubing to supply the air to the boots, plus valving and the cockpit controls necessary to operate the system. Finally, boots are relatively fragile, at least when compared to omitting them from leading edges, and require regular maintenance plus eventual overhaul/replacement.



## TKS

The TKS system, also known as the "weeping wing," pumps a deicing fluid through small perforations in the wing's and tail's leading edges, a slinger ring attached to the propeller(s) and/or a distribution bar mounted low and in front of the windshield. The fluid chemically breaks down any ice that's already formed on the surface (de-icing) and prevents any new ice from forming (anti-icing). Since the fluid runs back with the slipstream, TKS systems also can prevent ice from forming on unprotected surfaces.

Installing a TKS system requires replacing existing leading edges with perforated ones plus appropriate plumbing, valving, controls and a fluid reservoir. The drawing above depicts a typical Cirrus SR22 installation. Depending on the system, the reservoir can last around three hours. CAV Aerospace, which offers an aftermarket, known-ice system for Beech Bonanzas, says their installation weighs 43.4 lbs empty and 108 lbs when filled with 7.5 gallons of the 9.2-lbs/gallon fluid. Finally, the TKS fluid isn't free; the best online price we found is \$85 for five gallons, plus shipping.

