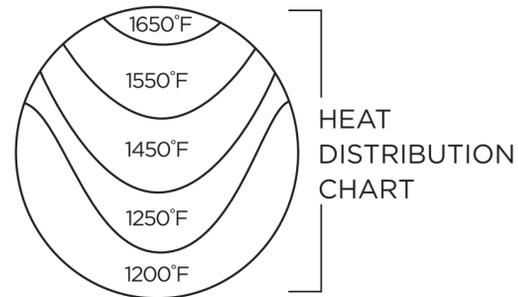


# ANATOMY OF A VALVE FAILURE

Burned exhaust valves have long been a leading cause of cylinder failures and power loss in piston aircraft engines. Modern borescopes allow us to look deep inside cylinders—and this guide will help you interpret what you see through the viewfinder.

**OVERVIEW:** Valves that fail to seat properly are subject to severe and uneven heating that can cause them to weaken and fail in predictable patterns.



## GREEN MEANS STOP

PROGRESSION OF FAILING VALVES



**1** First indication: Circular color pattern is slightly uneven and nonsymmetrical.



**2** Crescent-shape, discolored burn pattern developing at upper edge.



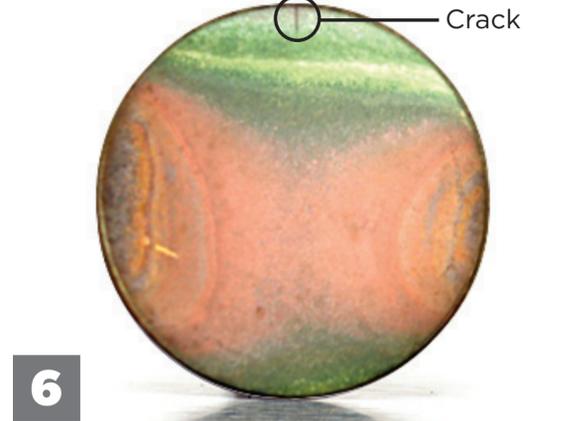
**3** Burn pattern migrates inward.



**4** **GREEN MEANS STOP.** The green area at the top shows this **valve should be replaced immediately.** (Note how the uneven burn patterns match the heat distribution chart.)



**5** Green crescent progresses toward center with valve cracking and failure a serious danger.



**6** Crack at 12 o'clock shows valve failure is imminent.



## BURNED PIZZAS ARE OK

COLORFUL BUT HEALTHY



Don't be alarmed by the bright color, or deposits around the edges. The symmetrical pattern shows this valve is just fine.



A symmetrical, circular pattern shows a healthy valve. Red and orange deposits are harmless.



Thick lead deposits from an overly rich mixture give this healthy valve the appearance of an overcooked pizza.

### LEARN MORE:

[www.airsafetyinstitute.org/valves](http://www.airsafetyinstitute.org/valves)

Special thanks to Adrian Eichhorn and Dr. Peter Wu.

