

A component journey

Tight seal – Honeycomb seal

Honeycomb is one of the strongest structures occurring in nature. Within an aircraft engine, optimum gas flow and prevention of leakage is of vital importance for combustion. An effective seal is achieved by brazing lightweight, yet strong, metallic honeycomb structures to create a gas-tight seal between the rotating ceramic-tipped turbine blades and the engine housing. The first time the engine is started, the blades cut into the sacrificial honeycomb, which wears in-situ to form a gas-tight seal, thereby improving engine efficiency, fuel economy and extending the service life of critical engine components.



The honeycomb seal begins life as two separate components - pre-annealed steel forgings to create the steel outer ring, and strips of nickel-based superalloy for the honeycomb.



The outer ring is stress-relieved prior to being joined with the honeycomb, to prevent unexpected distortion of the ring.



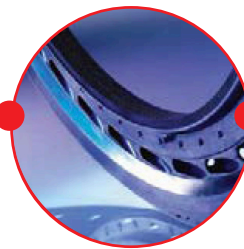
The honeycomb is assembled to the ring and then vacuum brazed onto the outer steel ring in a vacuum furnace and simultaneously solution annealed.



The honeycomb is formed into the honeycomb shape by spot welding to create the desired length, width and height.



The honeycomb ring seals are visually inspected under the microscope to check conformity.



Finally, the seals are precipitation hardened to increase strength and mechanical properties ready for use in the engine.



End application,
aircraft engine.

 Denotes the parts of the component journey undertaken by Bodycote