LEAK TESTING OF COMPONENTS

Wheel Rims

DESCRIPTION OF TECHNICAL CHALLENGE

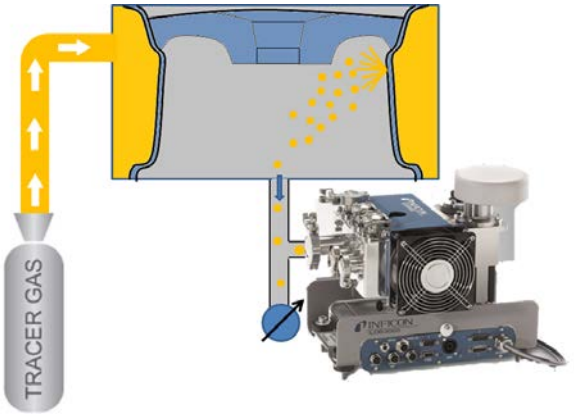
Today's strict fuel economy requirements are increasing the demand for light-weight components, such as aluminum wheel rims. Aluminum wheels are usually made through a casting process and thus bear the risk of porosity leaks from the casting process. Steel wheels are usually produced from two rolled bodies that are welded across the width to form the complete wheel. In this case, the welded seam needs to be tested for porosity leaks or cracks.

A typical leak rate specification for a wheel rim is defined as maximum air loss of 0.2 bar (3 psi) in six months (at a fill pressure of 2 bar / 29 psi). This is equivalent to a helium leak rate of ~ $3 \cdot 10^{-4}$ mbar l/s at a typical tire volume of 25 liter.

Porosity leaks of this size cannot be detected by water bath testing. The overall leak rate is created from a million of very small holes in the casting, each of these holes having a leak rate well below the detection limit of water bath testing.

THE INFICON SOLUTION

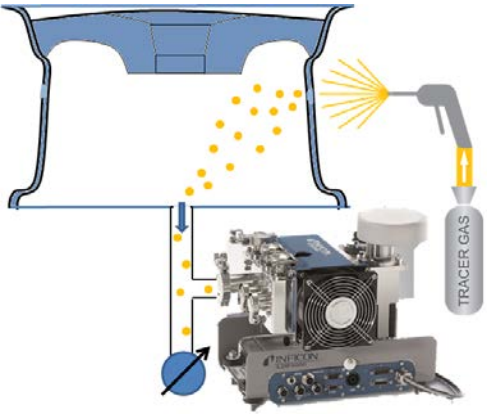
Integral Testing of Aluminum Wheels



For leak testing, the wheel rim is covered with a connecting tool that seals the rim to the outside to create a surrounding volume on the exterior of the rim (simulating the tire volume). The tool simultaneously seals the inner volume on the inside of the wheel rim. The outer volume is then charged with a helium-air mixture while a vacuum is pulled on the volume of the rim inside. An INFICON LDS3000 Helium Leak Detector is connected to the vacuum on the rim inside. In the event of a leak, the helium atoms pass through micro porosity off the rim into the vacuum. The leak detector detects the sum of all micro leaks and the wheel rim is rejected if the leakage threshold is exceeded.

Cycle times for helium leak testing of wheel rims can be as low as a few seconds with a well-designed vacuum system guaranteeing high throughput.

Courtesy of: W.v.d. Heyde GmbH, Stade, Germany



Leak Testing of Steel Wheels

For leak testing, the inner volume of the wheel rim is also connected to an LDS3000 helium leak detector. Subsequently, the weld of the wheel rim is sprayed with helium. In the event of a leak, helium will penetrate through the wheel rim and get detected by the leak detector.

BENEFITS OF HELIUM LEAK TESTING WHEEL RIMS

- Accurate and repeatable measurements for reliable results of leak testing
- High throughput due to short cycle times of leak testing process
- Test method independent of temperature and moisture
- Cost efficient leak testing
- High sensitivity

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