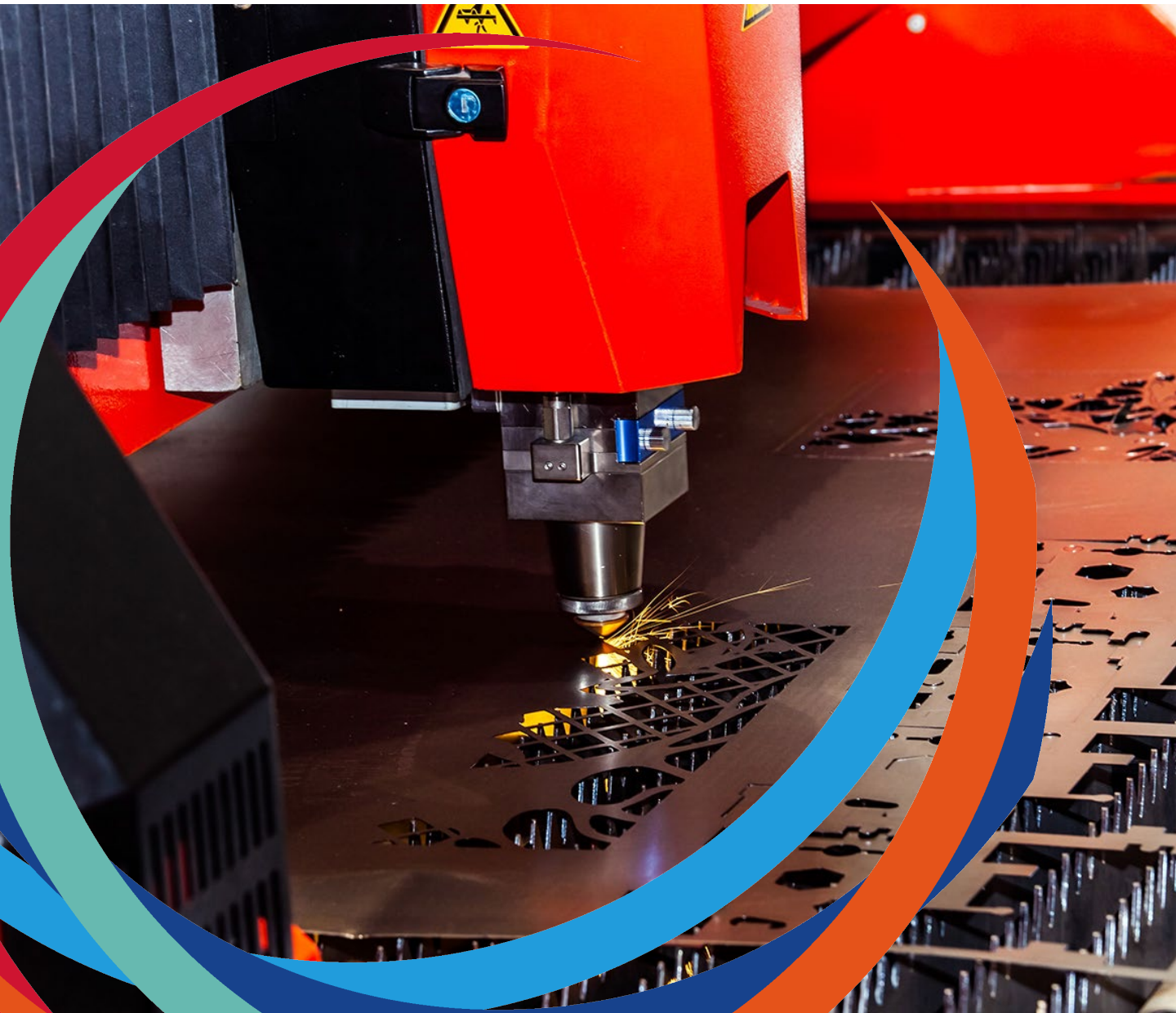
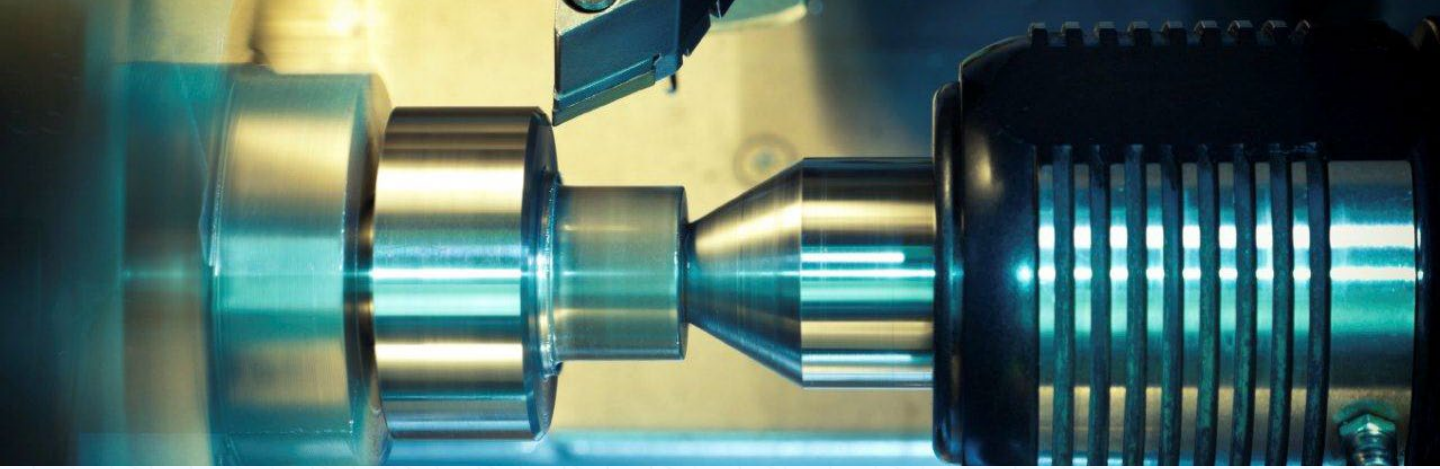




INDUSTRIAL CASE STUDY

SEALED CARBON DIOXIDE (CO₂) LASER SYSTEMS





OMNISEAL® METAL FACE SEALS

Sealed Carbon Dioxide (CO₂) Laser Systems

Prasad K.R December 2021

INDUSTRIAL METAL C-SEALS LEAKAGE CONTROL

Environment

Lasers are used in industrial production with high success. Some of the advancements in processing industry would not be possible without lasers. Carbon dioxide (CO₂) lasers are among the oldest gas-based lasers. The long lasting legacy of carbon dioxide (CO₂) has ensured that their costs remain extremely attractive compared to competing lasers. These lasers continue to command market share on account of their high, continuous power wave operations. They are known for their superior power conversion efficiency, and values in the range of 30% have been recorded. This makes them suitable for sensitive applications such as medicine, as well as demanding applications such as Industrial cutting and welding.

Carbon dioxide (CO₂) lasers market is projected to reach \$2.2 Billion by 2025 and APAC will account for over 60% of sales. Carbon dioxide (CO₂) laser sales will be driven by the traditional segments like Industrial and Automotive. It is also gaining acceptance in other segments like Energy and Medical which is expected to fuel additional growth.



Omniseal Solutions
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Challenge

Carbon dioxide (CO₂) lasers need periodic maintenance due to gas leak, which includes leakage having consequences on the laser's output. The power will either decrease over time or reduce significantly during operation making the laser beam unstable and affecting production. In addition to these application issues, a couple of hours of downtime is taken to replenish gas, causing monetary losses.

Sealed carbon dioxide (CO₂) laser manufacturers use different sealing techniques to prevent leakage. One of the most common sealant material is Indium. Indium is soft and compressible. Due to the softness of the material, it can extrude between mating parts. The material also experiences creep or flow, as the laser heats up and cools when it is turned on and off. During assembly at the OEM, if leakage is found in testing, it is difficult to remove Indium from the groove. A lot of time is spent in rework of the laser system. Working with Indium is a challenge, especially in clean room where these lasers are manufactured.

Solution

Metal seals can solve challenges created by the use of conventional sealing materials such as Indium and others.

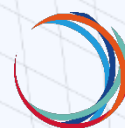
For more than four decades, we have been producing resilient, custom-designed C-Seals that are reliable, easy to install, work with and most importantly, achieve low leakage with minimum load (70-80 N/mm circumference). The metal C-Seals are manufactured in Inconel® material and given tin coating. With our designs, carbon dioxide (CO₂) manufacturers are able to achieve leakage less than 10×10^{-10} cc/sec He ATM.



Laser in on achieving leakage less than 10×10^{-10} cc/sec He ATM. Metal seals are your solution!

Benefits

- No need of gas replenishment during the lifetime of the system
- Custom designed, reliable solution
- Support from global technical teams with agile manufacturing sites in Orange, CT, USA; and Mechelen, Belgium
- Carbon dioxide (CO₂) laser system users enjoy low running, maintenance and service costs



Omniseal Solutions
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Design Expertise & Tailor-made Solutions for Your Critical Applications

Omniseal Solutions™ is a global engineering leader with over 65 years of historical legacy, relentlessly dedicated to the design and manufacture of precision sealing and material solutions that protect critical applications in the most demanding environments and passionately driven to push *Beyond the Boundaries of Possible*.



— About the Author

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