CASE STUDY

2026 Grand Prize winner in the Lawn & Garden category for conventional PM components

Inlet Flange

Process:
Conventional Press & Sinter (PM)

Material:
SS-409LNi ferritic-martensitic stainless steel

Final density:
7.1 g/cm^3

Weight:
2.12 kg

Service temperature:
300-700 °C

End Use and Function
The inlet flange serves in a diesel-engine exhaust after-treatment system as a V-band coupling and as a fastening point for two exhaust-gas sensors.

Fabrication
The large, high-density stainless steel flange is compacted hub-side up with contoured punches, die surfaces, and a matched feed shoe. After delubrication, hydrogen-atmosphere sintering establishes final density. Grit blasting precedes single-chucking machining of the V-band groove, faces, bores, and radial holes. The contoured hub and flange support a seamless welded joint to a cylindrical housing.

Results
The PM design integrates multiple functions that would otherwise require separate components. Its weldability, heat resistance, strength, and corrosion resistance support demanding under-hood service while near-net-shape production manages a large and complex geometry.