

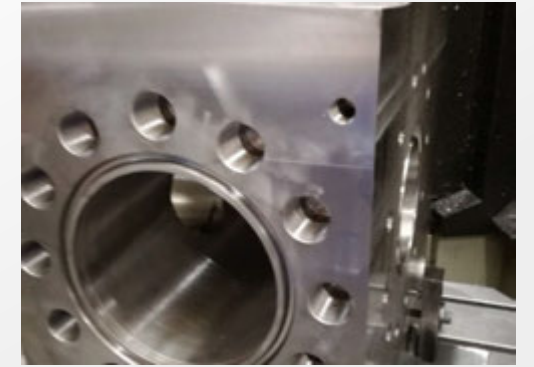
**Bodycote**

# HIP Powdermet® Technologies

Jim Sheard

# Agenda

- What is Powdermet<sup>®</sup>?
- Broad applications
- Current processes
- New process development
- Market and capacity growth
- Summary



**Bodycote's brand name for a group of additive processes used to manufacture components using HIP technology**

# Powdermet<sup>®</sup> Technologies



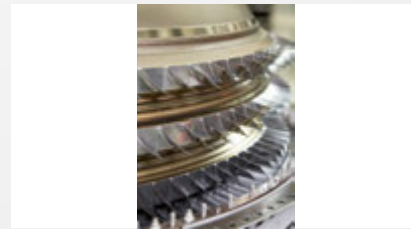
Innovative solutions to broad market applications

## Aerospace

**Simple Shape part**  
(machined to final shape)



**Net / Near Net Shape part**  
(finish machining to final shape)



**Net / Near Net Shape  
+ 3D printed hybrid**  
(finish machining only)



## Energy



## General Industrial



# Near Net Shape (NNS) component production



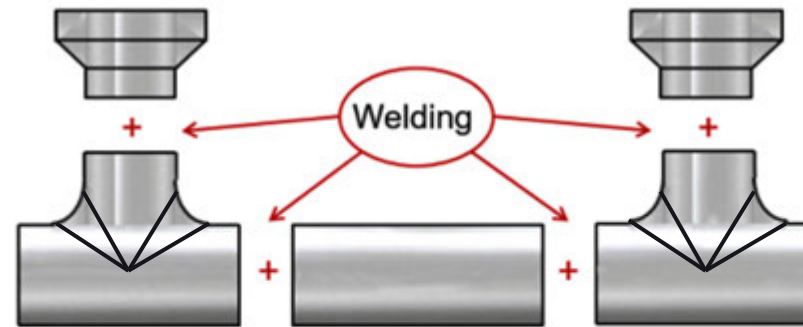
# Value proposition

- Significant reduction in welding
- Significant reduction in machining
- Significant reduction in material requirements

## Provide customer solutions with:

- Process simplification
- Design optimisation
- Higher quality
- Reduced cost
- Shorter lead time

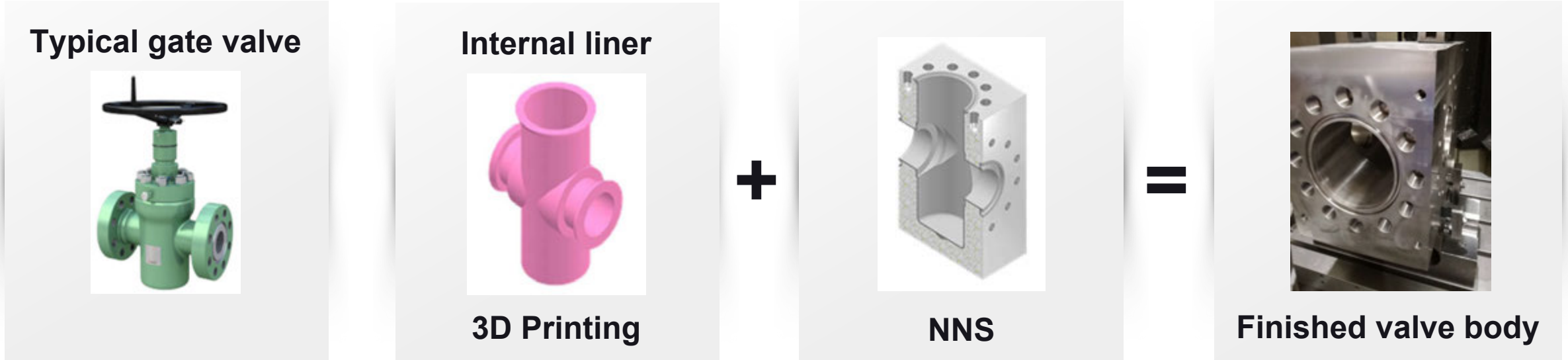
**Conventional Manufacture** - Forged, machined and welded from 5 pieces



**Powdermet® Solution** - 1 solid piece in 1 step



# Near Net Shape (NNS) + 3D printed hybrid\*



## Customer Response

“Properties meet / far exceed specification requirements on conventionally produced valves”

“Technical feasibility of producing high pressure valves successfully demonstrated”

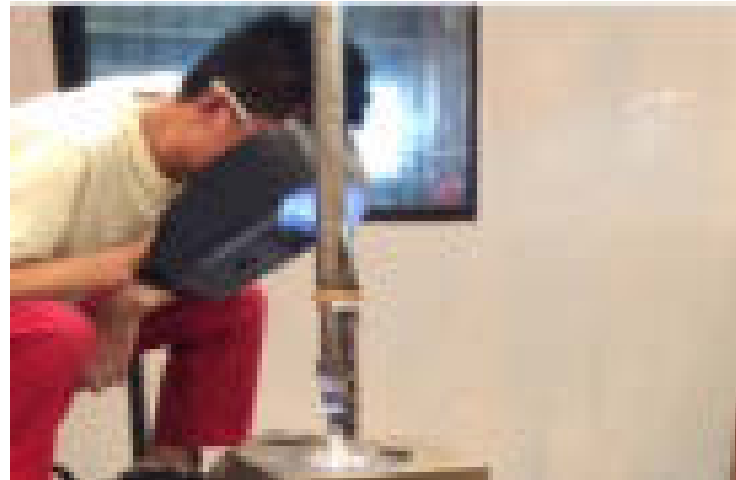
\*Patents pending

# Value proposition

- Matching materials within a component to their specific requirements

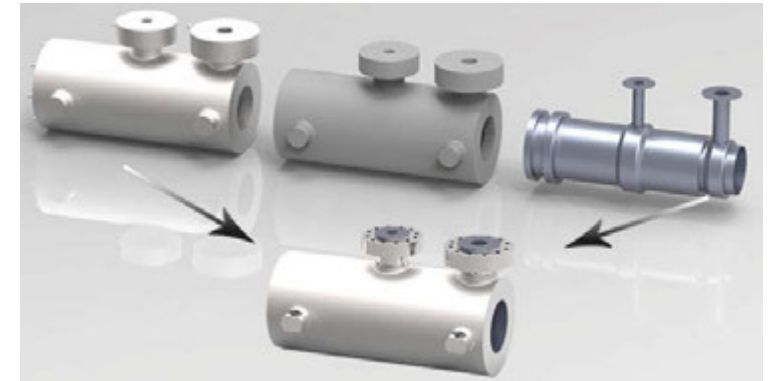
## New process delivers:

- Improved quality
- Reduced lead time
- Lower inventory
- Increased productivity
- Least non-conformance



### Conventional Manufacture

TIG welded cladding of inner liner



### Powdermet® Solution

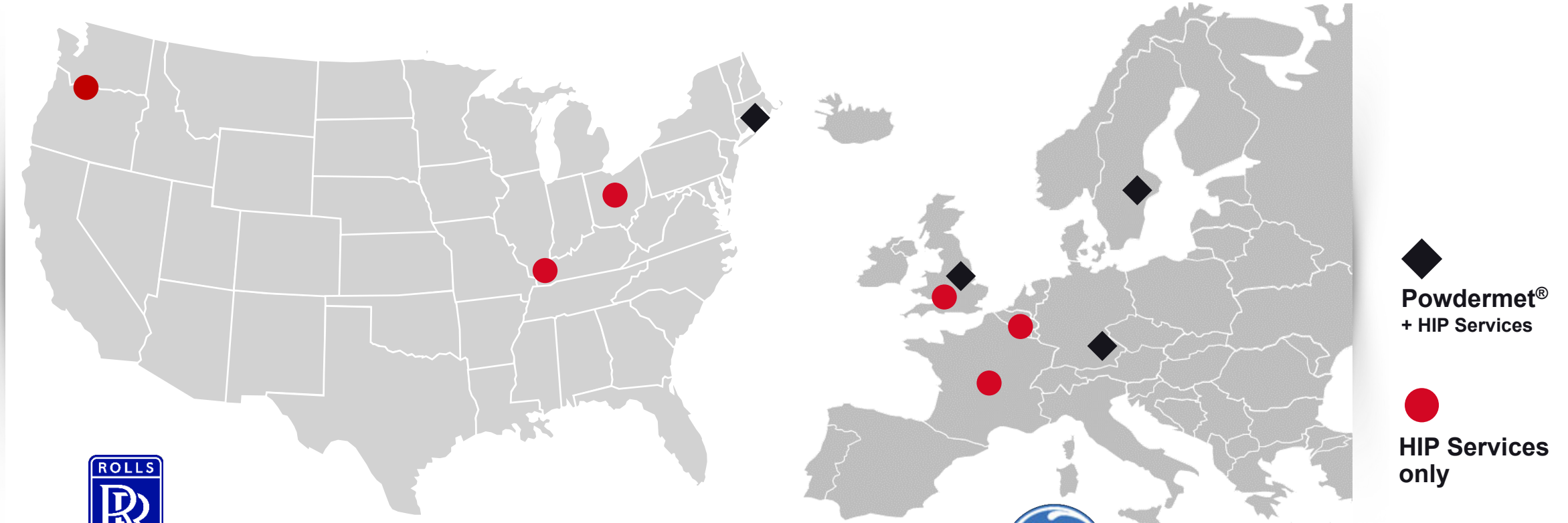
NNS body + 3D printed liner produces finished product in one step



# Powdermet® Technologies



Capacity growth to meet customer global demand



## Summary

Powdermet<sup>®</sup> is an additive manufacturing technology whose potential **market size is measured in £ billions** – it will progressively replace forging plus machining

**Rate of market adoption is the growth constraint** – broadening existing applications and diversifying into new market sectors e.g. aerospace, nuclear

**Very limited competition**, none of which match Bodycote's technology and breadth of service

# CAPITAL MARKETS DAY

2019

