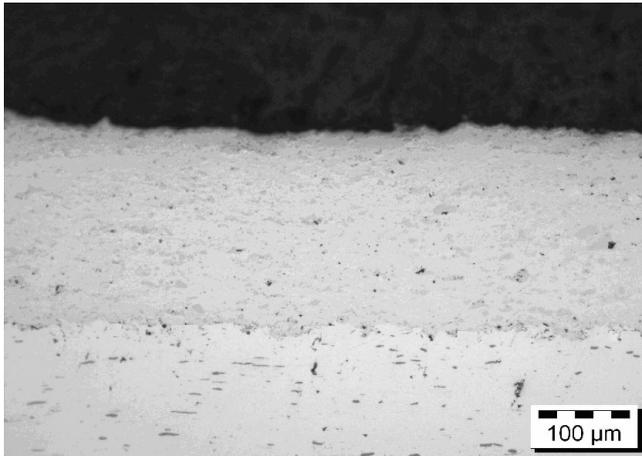
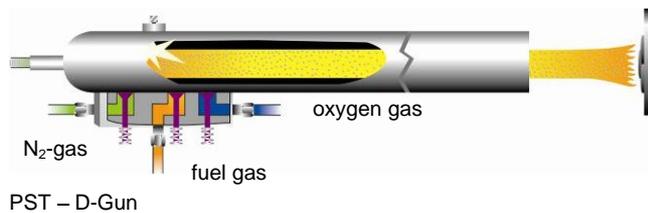


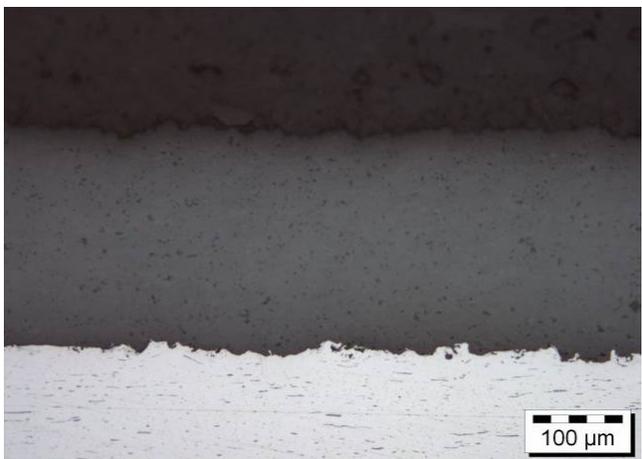
PST – D-Gun

The Technology

Praxair detonation gun, or D-Gun, coating technology is based on the discontinuous combustion of a fuel gas-oxygen mixture that is periodically introduced into a reaction chamber and ignited. In every cycle, nitrogen is used to inject the coating powder into the acceleration tube. The combustion gases undergo an explosive expansion, accelerating the powder particles to speeds between 750 and 1000 m/sec in the gun's outlet. Owing to the high particle impact speeds, coatings manufactured in this way are denser and more adherent than average and since particle retention time in the flame is relatively short, they are generally only incipiently melted. During the coating process, the temperature of the workpiece can also be reduced to a minimum because of short-term exposure to the flame front. Thus, detrimental effects such as retardation or structural changes can be prevented. D-Gun coating technology is suitable both for the manufacturing of carbidic anti-abrasion layers and for purely ceramic or metallic layers. The coating distance is approximately between 60 to 120 mm. The coating process itself is done at an angle of at least 40 degrees although best coating properties are achieved with the angle of deposition is close to 90 degrees to surface.



WC-Co on unalloyed steel



Al₂O₃ on unalloyed steel

D-Gun Characteristic Features:

- Explosive combustion
- Coating tube approx. 1m in length
- $V_{\text{Particles}}$ 750 - 1000 m/s
- Suitable for composite materials with carbides and metallic matrix as well as for purely ceramic and metallic materials
- The coating is made of many "overlapping disks"

D-Gun Process Advantages:

- Small thermal stress of injection molding die and workpiece provides for:
 - Less oxidation
 - Prevention of thermally induced residual tensile stress
 - Prevention of uncontrolled structural transformation and retardation
- Very high adhesive strength, up to a workpiece hardness of 58 HRC and without pretreatment with corundum radiation

D-Gun Coatings:

- Porosity < 0,5 %
- Adhesive strength > 70 MPa
- Coating thickness 0,03 to 0,5 mm
- Roughness unprocessed 2,5 to 5 $\mu\text{m Ra}$, processed < 0,05 $\mu\text{m Ra}$
- Residual compression stresses
- Outstanding resistance against abrasive and erosive wear