

# PTA PHE

Do you really need  
Laser Cladding ?

PREMIUM

EQUIPMENT

PROCESS

SAINT-GOBAIN COATING SOLUTIONS

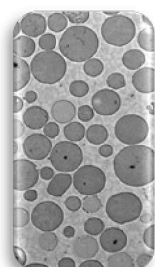


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# PTA PHE

The Saint-Gobain PTA PHE equipment is a 2 in 1 equipment which allows the user to produce thick overlays at high welding rates as well as thin overlays with low distortion and low dilution rates. The PTA principle consists in a plasma arc created between the PTA-PHE torch and the part to be welded. The plasma arc generates a pool of metal in fusion, in which a powder is fed. Rapidly, the pool solidifies forming a track; 100% dense and metallurgy bonded to the substrate.



## PHE derives from PTA :

PHE concentrates more of the arc energy, which allows melting only a few tenths of millimeters of the substrate. The PHE plasma arc is narrow and stable, making it possible to weld thin overlays with a low dilution of the substrate. Less dilution and less damage of the WC particles occur when Ni-WC composites are welded. This results in higher hardness and abrasion wear resistance.



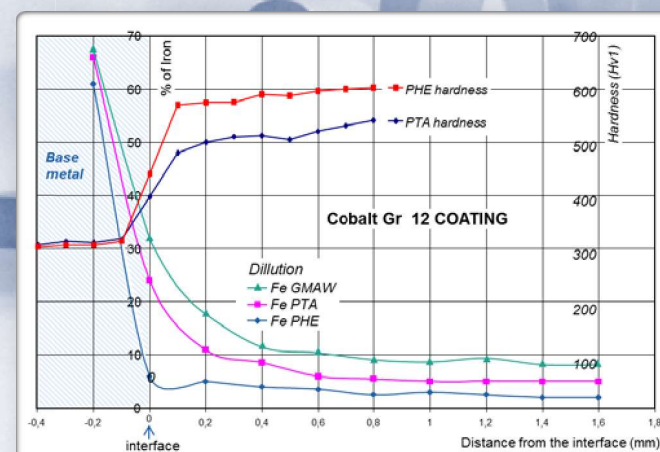
Up to 65%  
time savings,  
Up to 80%  
material savings.

Compared to electrodes, TIG, submerged arc, GMAW, the PTA-PHE process results in minimum heat transfer into the part. This leads to numerous benefits:

While welding, PTA-PHE achieves a faster cooling and quenching of the overlay material, the Heat Affected Zone (HAZ) is practically non-existent with a reduced growth of the metal crystals at the interface. The dendritic structure is finer, increasing the hardness and improving the wear and corrosion resistance properties.



Finer dendritic structure



With very low dilution rate such as 3 to 5%, the nominal hardness can be reached at thicknesses as low as 0.5 mm. So that thin overlays such as 1.2 mm are possible, with the nominal hardness and the maximal abrasion resistance achieved.

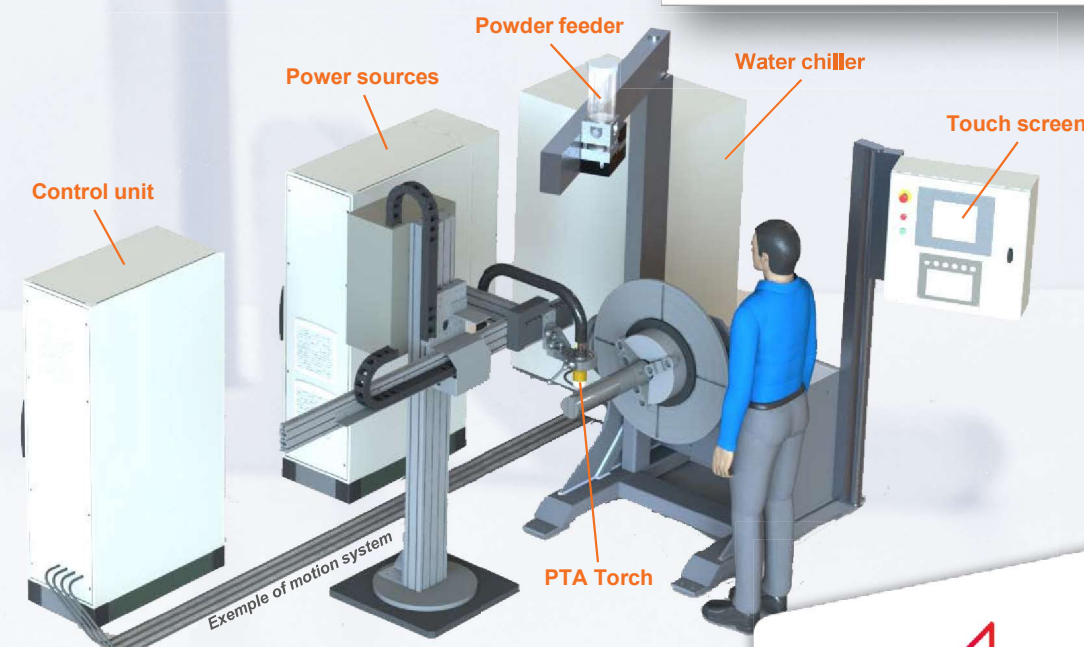
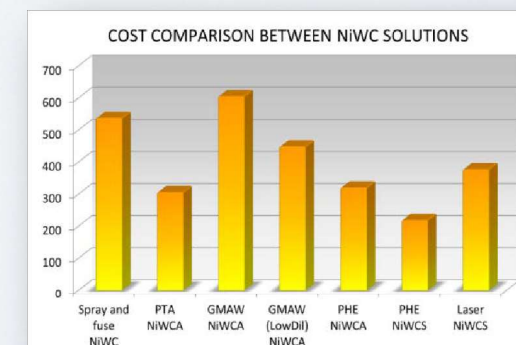
The heat transfer to the coated part is lowered, reducing the residual stresses by 25% to 100%. The part distortion is minimized with a perfect geometry control of the overlay, close to the final geometry. This feature is a major advantage when cladding wear plates, thin wall parts and to reduce the machining of overlays harder than 50 HRC.

## Benefits – Return on invest – ROI :

- The Saint-Gobain PTA is a cost effective solution requiring a capital investment of ~70% lower versus a laser cladding equipment.
- The productivity and versatility of the Saint-Gobain PTA equipment allows quick return on investment, no matter if it is integrated on a robot or an X-Y motion system.
- Compared to arc welding, when welding WC composites, the dilution of the tungsten carbide particles is extremely low, so that the abrasion wear resistance is highly improved up to 100%, allowing important savings and return on investment.
- The nominal hardness can be reached at thicknesses as low as 0.5 mm, due to the very low dilution rate of 3 to 5%. This allows to reduce the overlay thickness and the hardfacing time by 30% : up to 65% time savings and up to 80% material saving.
- Versus GMAW, MIG, TIG or Submerged Arc Welding using cored wires, the PTA technology utilizes materials that are 30% to 50% less expensive for the same ratio power/welding rate.
- PTA - PHE has a very high deposit efficiency: up to 95% of the powder is welded onto the part.
- PTA-PHE reduces the excessive distortion of the part which allows to clad wear plates and thin wall parts. PTA-PHE avoids the post-straightening of the parts and reduces the customer claims.
- The high coating thickness accuracy of PTA-PHE allows considerable gains in productivity up to 100%. For specific applications, the post-machining operation can be avoided.

## Typical PTA PHE equipment set - up:

The Saint-Gobain PTA is recognized as one of the most reliable and accurate systems on the market. A minimum maintenance is required. The PTA control unit is built from best in class components available all over the world (Siemens, Schneider...).



PTA-PHE produces overlays for corrosion resistance, oxidation resistance, wear resistance or abrasion resistance. A wide range of commercial metal alloys are weldable with our PTA-PHE: nickel alloys, cobalt alloys, stainless steel, HSS steels, Tungsten carbides... One of the main advantages of the Saint-Gobain PTA-PHE cladding system is its capability to produce abrasion resistant overlays by using spherical or angular Tungsten Carbide powders (Cr3C2, TiC... can also be cladded).





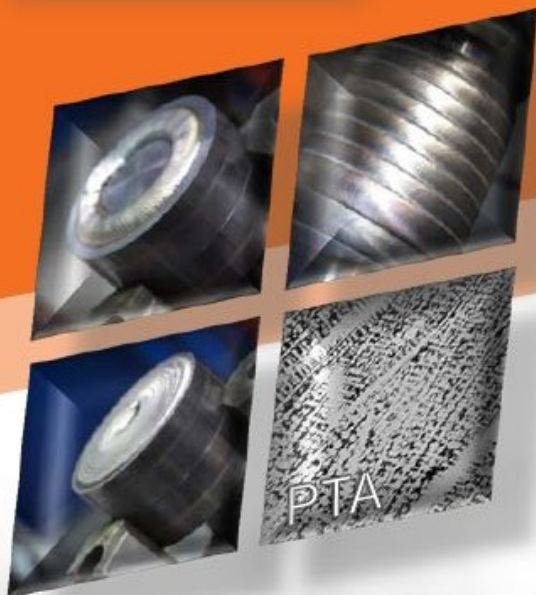
## PTA PHE - Equipment integration

The Saint-Gobain PTA Plasma Transferred Arc and its extended PHE version are designed to achieve higher performance over-lays with an exceptional accuracy.

To match this challenge, each item composing our PTA system is carefully designed and assembled in our factory.

Our PTA can easily be integrated to any powered motion system (Turn table, Oscillator, Arc Voltage Control) or to a fully robotized system (Fanuc, ABB, Mitsubishi, Kuka, Motoman, Reitz...).

An I/O electronic board allows communication between the PTA unit and the robot.



### PTRD 60 torch:

~3,7kW - 150AMPS max. It can weld Nickel, steel, Cobalt alloys, Tungsten Carbide+Ni, from 1mm to 12mm in 1 or 2 layers.



**PTA control unit:** a SIEMENS PLC controls the cladding sequences as well as the mass flow meters, the powder feeder and the power sources. The 2 power sources are located in a separate cabinet for efficient cooling.



### PTA powder feeder capabilities:

- DP1 is ideal for feeding atomized, spherical powders (including Tungsten carbide WC+Ni).
- DP2 is suitable for abrasive and angular powders; suitable for blends with fused & crushed WC powders.



**PTA control board:** a SIEMENS touch screen display controls the hardfacing sequences, ignition, arc fading, stop, electrical power for the torch, welding programs ...

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