



Advanced technology for cladding

Oil and Gas



COMMERSALD IMPIANTI

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english version

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The requirements are growing

New requirements concerning the measurement level of the iron content into deposit make problematic in many cases the use of current **CLADDING** processes.

The **ptaw hot wire** welding process made by **Commersald Impianti** allows to get the result, drastically decreasing the deposit layer and consequently the costs, in meanwhile increasing the metallurgical quality of the deposit.



Anti-wear cladding with Stellite

Valves and other accessories for Oil&Gas industry are commonly cladded to resist to solicitations. When the work piece to clad is subjected to abrasive and combined wear, the most common welding materials in this sector are mainly Cobalt base alloys. **In this case** the best cost-performance ratio can be obtained with metallic powder filler material deposited with PTAW process.



Ball valves 2"

Referring process

High metallurgical quality of the deposit also because of the constant reliability of the powder filler material.



PTAW powder for welded deposits and Commersald Impianti

PTAW (plasma transferred arc welding) process with powder is the most common and used method in the world for Cobalt base powder welded deposits. The totally reliable level of this process – gradually and deeply renewed by our Company – is confirmed by the large presence on worldwide market of our Cartesian axis equipments managed by N.C

In nuclear valves sector – where the specifications are severe – PTAW process is largely used and our presence is absolutely consolidated.

Commersald Impianti is spending large part of its efforts researching high productivity Cladding techniques and obtaining in this sector very important results.

Anti-wear cladding with INCONEL 625

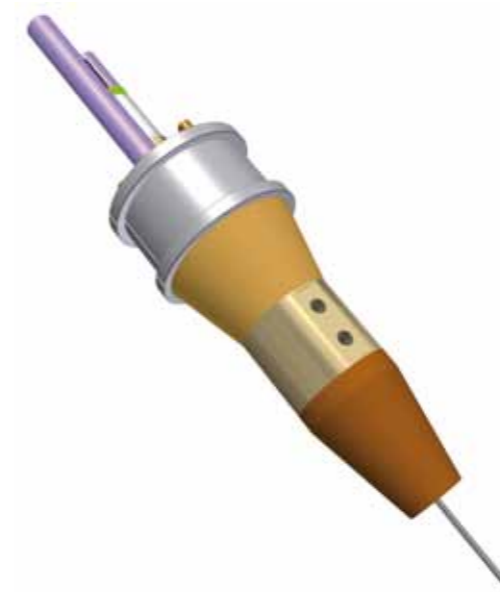
Anti-wear cladding is a well-known process in Oil&Gas sector. **Inconel 625** but also **Inconel 825**, AISI 309 Mo stainless steels, AISI 316, Duplex etc

The welding processes now in use are: SMAW (submerged arc), ESW (electro-slag), GMAW (wire MIG) e GTAW with wire external feeding (Tig). Many requests are now addressing to hot wire cladding, favoring in this way the quality of the deposition.

The most common welding method is GMAW (Mig with continuous wire feeding material). In this process the energy passes through the consumable wire melting it. Anyway, in presence of oxidisable or poor conductor material like eg. Inconel 625 there may be porosities or inclusions.

Hot wire technique

The external wire feeding to electric arc, typical method used in GTAW (Tig with wire filler material) is always been considered the best condition to obtain high quality deposits. The low use of it until now has been determined by the high cost of welding because of the low deposition rate.



GTAW HOT WIRE (Tig with hot wire)

The heating of welding material affects positively on productivity as, without lowering power to the welding machine but on the contrary giving more energy to the welding pool, helps to increase the rate time deposit up to double.

PTAW HOT WIRE

Process similar to GTAW Hot Wire with a higher deposit rate and more control of penetration

PTAW POWDER

This is the point of reference. Absolute metallurgical quality of deposition even considering the consolidate powder quality constancy.

Comparison of processes

GTAW hot wire and PTAW hot wire are two welding processes characterized by a very stable arc, total absence of spreads, quality of the deposit and by top metallurgical features. However the two processes are very different

Welding arc

The GTAW process produces a free arc with the typical conical shape and temperature between 4000°C and 10000°C. There's a big energy dispersion around the arc and this makes the process low productive, anyway there's a soft and joined transition between base metal and welded material.

The plasma arc of PTAW – thanks to gas plasma ionization inside the torch and the bottleneck in nozzle outflow – produces a plasma column dense and concentrated with variable temperature between 10.000° C and 15.000°C. The high temperature, together with its column shaped arc and combined with density and energy concentration, allows very high deposit rates.

Deposit rates

PROCESS	RATE
GTAW (2 layers)	Kg/hr 1,5
PTAW HW (2 layers)	Kg/hr 2,8
PTAW powder (1 layer)	Kg/hr 3,0
PTAW powder (2 layers)	Kg/hr 2,8

The deposit rate comparison between GTAW (Tig hot wire) and PTAW hot wire has been performed with a MultiClad system produced by Commersald Impianti, keeping as more a possible the same working conditions.

Penetration into base metal

This is one of main features, especially in anti-wear coatings that must keep low the base metal percentage into deposit otherwise could affect decrease of corrosion resistance values.

With GTAW hot wire the penetration is strictly connected to different other factors including the tungsten electrode sharpening angle, the stick-out and the current intensity – which could also influence the deposition rate.

In safe conditions is not possible to deposit a layer higher than 2.5 mm.

As expressed above we can confirm that penetration determines the welding parameters.

In PTAW welding process, the penetration control obtained by the regulation of the plasma gas flow is an important part of the innovative Commersald Impianti process.

PTAW Hot wire GTAW Hot wire

OPERATING CONDITIONS

In GTAW hot wire process the rigidity of the stick-out – that should be as lower as possible – sometimes makes it difficult the feeding of the hot wire especially in angle.

With PTAW hot wire process the cylindrical shape of the arc column and its power make possible to operate with a stick-out between 10mm and 15mm, facilitating the view of the welding pool and the feeding of the hot wire in all conditions.

ARC STRIKING AND RE-START OF WELDING

With GTAW process, every time the welding cycle starts – even with programmed cycles – the HF runs up with all concerning problems. When cycle turns-off the shielding gas remains to prevent oxidations on the welding pool.

With PTAW process all these problems are avoided.

AUTOMATIC WELDING

In automatic welding every situation that causes a stop of the process reflects negatively on the costs.

The stops to sharpen the tungsten electrode with PTAW process are reduced of 20:1 compared to GTAW process because the PTAW electrode is inside the torch and protected from the external oxidation.



Ptaw process: hot wire or powder?

In our equipments these two alternatives are always present with the use of the same PTAW welding torch.

In PTAW hot wire cladding is preferred to deposit two overlays, for constancy and safety of results.

The requested chemical analysis in this case is over 2,0 mm from raw material.



With PTAW powder is possible to operate in a single layer in total safety conditions, to keep the iron content percentage under 5% even at 0,5 mm.

Multiprocess Ptaw Welding Machines



VERSATILITY

PTAW MULTICLAD 600

GTAW HOT WIRE
PTAW HOT WIRE
PTAW POWDER

Last development in anti-wear corrosion PTAW cladding in Oil&Gas is represented by the new MULTICLAD welding machines, evolution of the standard Commersald Impianti welding generators, where control of the penetration has been further improved by a fine tuning of the pilot gas.

This feature, impossible to obtain with any other welding process, makes possible to operate with unchained parameters to obtain the same penetration into base metal in every condition, making this process extremely flexible, productive and reliable.

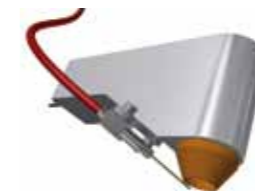


INCONEL 625
INCOLO Y 825
AISI 316 - AISI 309
DUPLEX - STELLITE
TRIBALLOY-ULTIMET
DUBLE HOT WIRE
TANDEM

PTAW MULTICLAD 900

POWER

Multiclad welding machines are assembled by different Commersald Impianti standard components to have tested solutions in innovative contest, giving us the opportunity to propose the best customized solutions at the lowest price.



Precise and solid Moving Systems

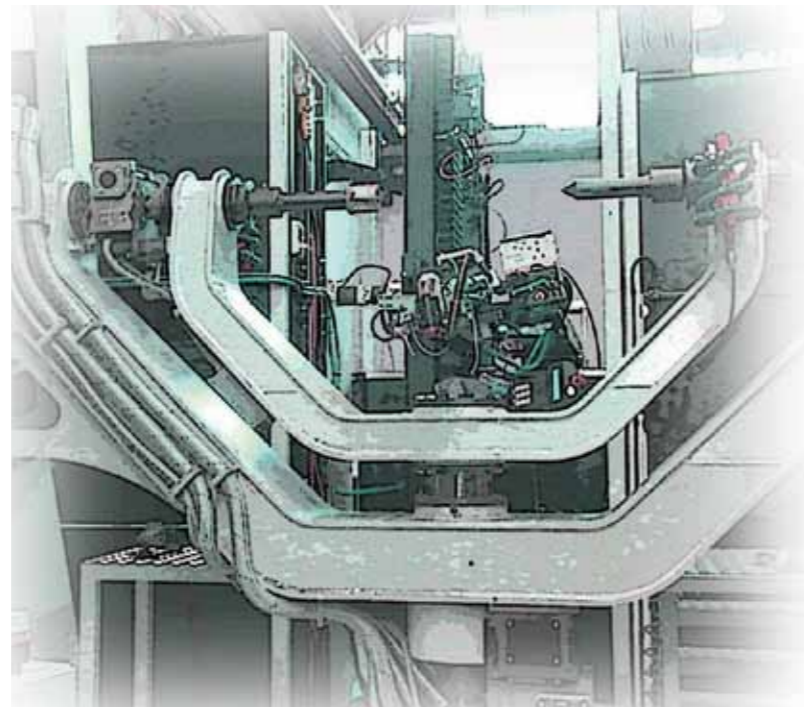


Modern and functional moving systems

Our customized robotized systems are designed and produced by our Engineering department: they can be completely integrated with our welding machines to give to customers the complete warranty of the whole process.

Robosfera

Welding equipment designed for full automatic cladding cycle on ball valves of every size, with single positioning on the fixture until the end of the cycle. Programmed control of the temperature and dimensional check of quotes. Continuous vision and monitoring of welding, set up and print of the programs during the cladding cycle.



Automotive valves hard-facing



Full automatic cycle

- Pick-up from tray with double pliers robot
- Rapid cleaning of the valve with ultrasound and liquids, dry by air
- Induction pre-heating
- Cladding
- Weight

The two welding generators and all the Multiclad devices are connected with the moving system by a control panel that can be programmed according to the type of moving system requested by the customer.



Axis Management by Plc

Remote control panels of Multiclad welding machines integrate welding inputs, the oscillation and the management of three external axis.

Hi-tech devices

To make easier the programming and the control of the automatic cycles we equip our machines with external vision and laser joint research devices of last generation.

Robots

Even if considered more suitable for GMAW welding then for cladding, robots can be used in some cases as alternative of Cartesian axis managed by N.C.



Numeric control

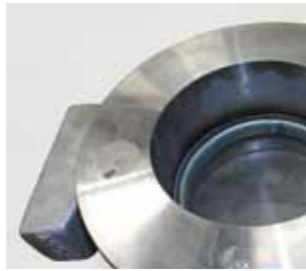
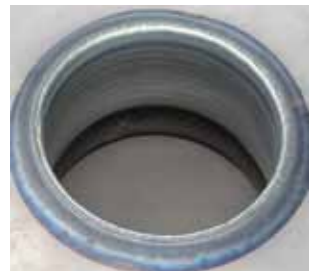
In version equipped with N.C. all the components of the welding machine are located in the electric panel and drivers are incorporated into the console that will manage the whole process.

This extremely flexible configuration allows to adjust all the welding programs in real time without any welding cycle interruption.

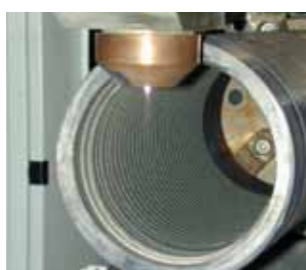
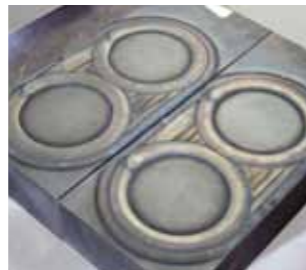
Applications



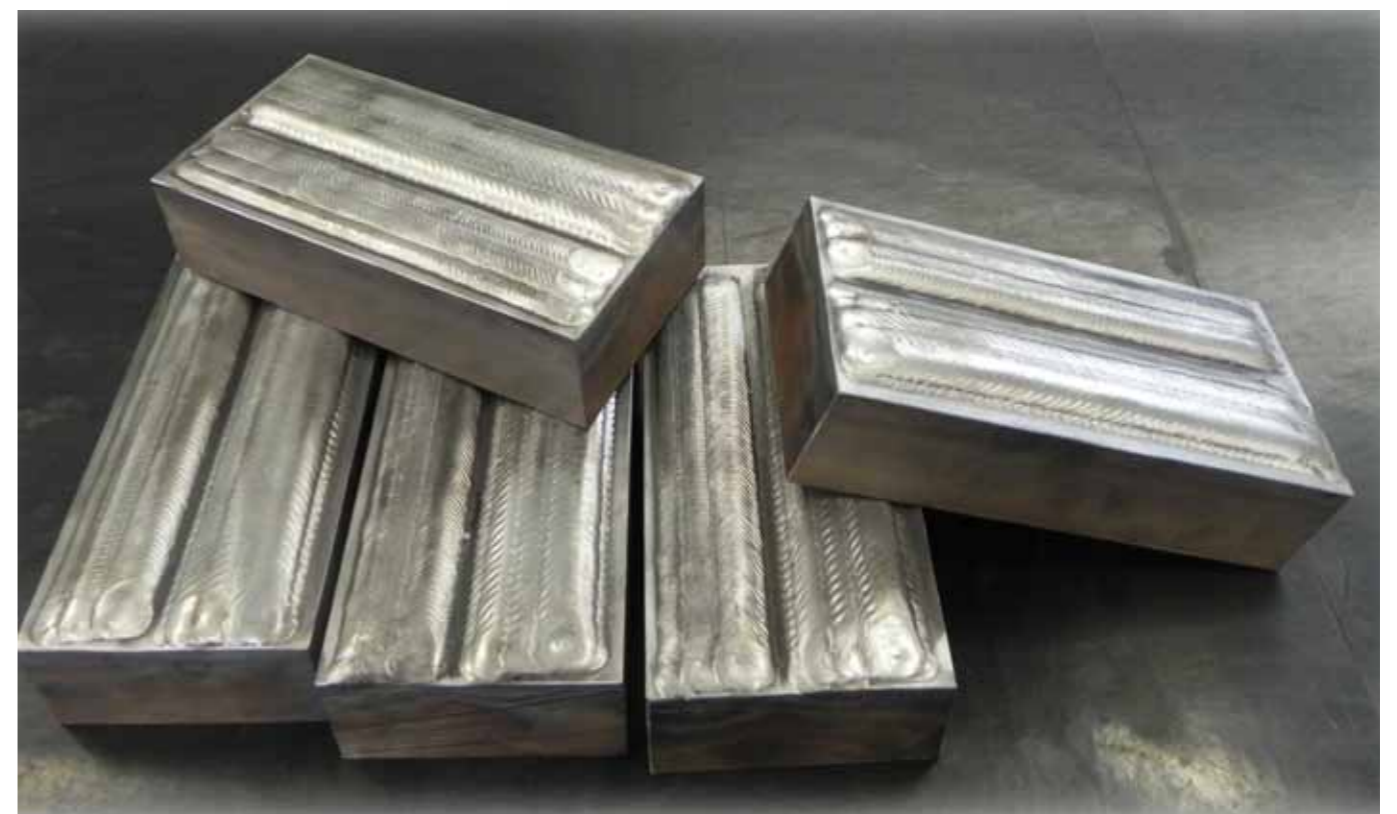
R & D



Anti-wear and anti-corrosion welded deposits of every type and with every kind of filler material in powder or wire, deposited with PTAW powder process or PTAW hot wire.



The combined torch for external coatings, completely cooled, is suitable to identify the angle of incidence of entry of the hot wire into the pool, in relation with different needs of thickness, deposit rate etc.



Service



Commersald Impianti has different welding robotized equipments with industrial features to make cladded coatings with Plasma Transferred Arc technology. This service activity is finalized to show the features of the process and of the equipments. As complementary activity Commersald Impianti also makes some welding service on complex handcrafts or with peculiar metallurgical features.

Our service is supported by some quality certifications on welding metallic materials – UNI EN ISO 3834-3 in Oil & Gas sector.



**PTAW POWDER
FOR WELDED DEPOSITS
ANTI-WEAR RESISTENT**

**PTAW HOT WIRE AND PTAW
POWDER FOR CORROSION
RESISTENCE COATINGS**



12" Valve Internal cladding Stellite thickness mm 0,8 finished.

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LAST NEWS

Accepted procedure PTAW powder internal cladding: pipes and tubes of small internal diameter minimum 44 mm. and maximum length 3.500 mm with Ni base or Co base alloys.

