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VENVULAS v ¦ ! [L¢ ¸

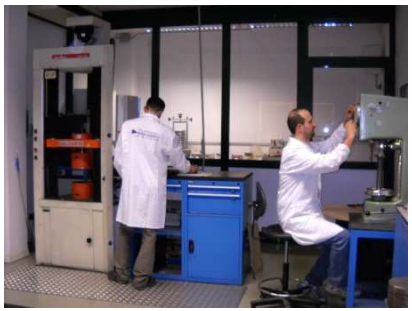
±ŜyØdzfl·ă takes all aspects relating to total quality management and control very seriously. The corporate quality system is ISO 9001:2008 certified. It is part of the ethos of the company. Very high quality standards, therefore, is a work ethic shared by all employees of ±ŜyØdzfl·ă. Everyone in the organisation shares and supports this principle, being fully aware that “a quality product and service = a satisfied customer”. Product quality management and product improvement is part of this initiative. The internal Quality Control Department is equipped with the most modern instruments and machinery suitable to evaluate with extreme accuracy the required quality and quantity of raw materials, semi-finished and finished products. Because of the commitment to technical standards and quality the most widely-used solid and cored wire products of ±ŜyØdzfl·ă being an acknowledged EU welding wire manufacturer, have passed test approvals conducted by the most important internationally accredited certification bodies, such as RINA, TÜV, ABS, LR, DNV, BV, GL, DB, MMI, CWB and RS.

Rigorous QA assesstment are continually done in the well equipped laboratories of the internal Quality Control Department

RESEARCH AND DEVELOPMENT

±ŜyØdzfl·ă is always at the customer's disposal and service to offer complete technical support, and to advise either on how to use its products or on solving problems arising from the customer's welding projects. The Customer Service Department offers commercial assistance with promptness and professionalism.

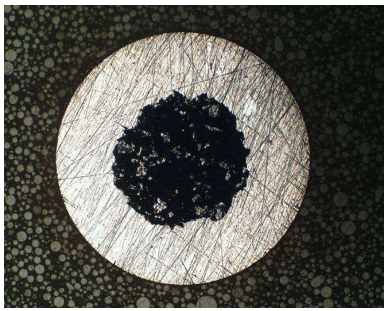
To grant our customers the best support team is always ready to answer to any request for additional information or help. Any suggestion is seriously taken into account, studied, analysed and then, if valid, put into practice for the benefit of product quality and usefulness.



In the QC and R&D Departments, each product is always subject to continuous improvement to assure utmost customer satisfaction.

SEAMLESS FLUX CORED WIRE PROCESS

Seamless flux-cored wires are manufactured from a closed welded steel tube. This is subsequently filled with a suitable mix of minerals, appropriately measured, based upon the welding project: the manufacturing of basic flux-cored wires, metal-cored wires or rutile flux-cored wires.



Section of seamless flux cored wire

Closed welded steel tube

Flux preparation with agglomerated powders

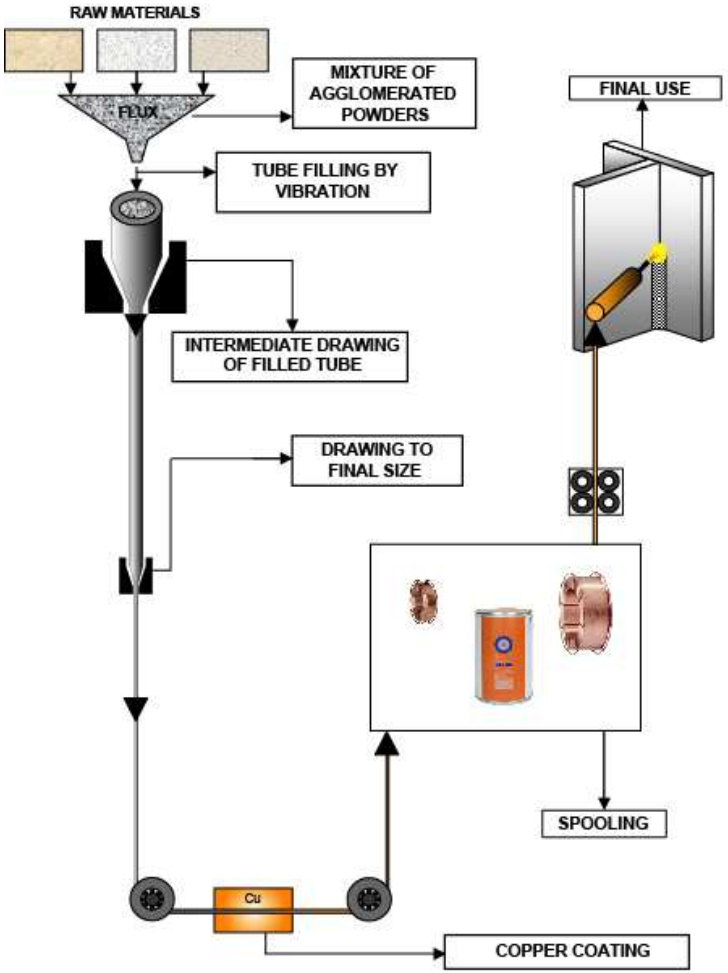
The tube is thus filled through a sequence of drawing operations until the required size is achieved. It is then copper coated by means of copper coating baths, appropriately monitored, so that an optimum copper coating is always assured. Coating in turn assures high resistance to the wire's surface oxidation thereby reducing hydrogen contents and additionally improving current flow.

Drawing the filled tube

Drawing to final size and copper coating

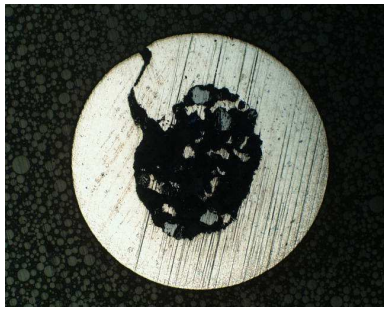
Spool of seamless flux cored welding wire

SEAMLESS FLUX CORED WIRE PROCESS



SEAMED FLUX CORED WIRE PROCESS

Seamed flux-cored wires are manufactured from a steel strip, continually filled, by means of a feeding process, with a suitable mixture of minerals, appropriately measured, based upon the welding project: the manufacturing of basic flux-cored wires, metal-cored wires or rutile flux-cored wires. The resulting wire is subsequently laminated until the required size is achieved, without additional annealing and final copper coating. A polished and brilliant-looking wire is obtained. Thanks to this excellently devised process, also this product keeps contents of diffusible hydrogen limited.



Section of seamed flux cored wire

strip from selected suppliers;

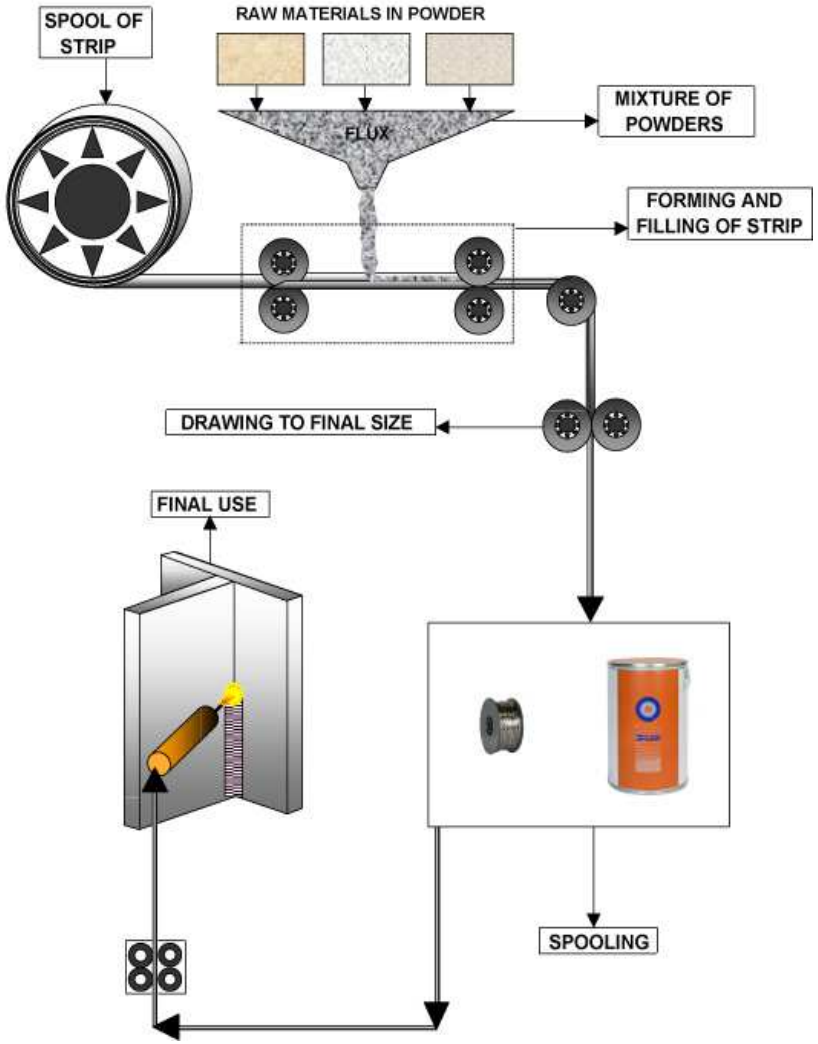
forming process of the strip

drawing to final size

spool packing

Spool of seamed flux cored wire

SEAMED FLUX CORED WIRE PROCESS



ADVANTAGES SEAMLESS FCW – SEAMED FCW

CHARACTERISTICS

- High resistance to moisture pick-up: thanks to the protection given by the copper coating.
- Low diffusible hydrogen content: HDM<5ml/100mgWM(*): thanks to the intermediate dehydrogenation processes, the water in the flux is converted into atomic hydrogen, which easily spreads outside:

$$Me + H_2O \longrightarrow MeO + H_2$$

Me: deoxidizer agent; H_2O: water imprisoned in the flux.

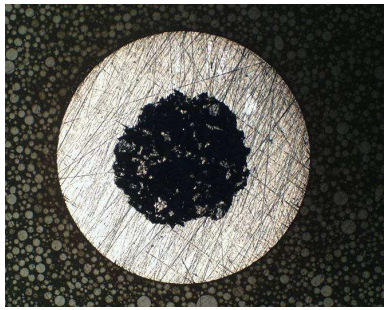
- Copper coating: improves current flow in the touching point.
- No need to re-dry: thanks to the employment of the closet tube, even if stored in dump places.
- No wire feeding problems: thanks to the copper coating and to the absence of problems with wire guide needles, resulting from the more resistant wire section.
-Opportunity to weld at high current conditions even with thin diameters: high flexibility of employment.

ADVANTAGES

- Enhanced arc stability and less spatter.
- Spray arc welding possible in all positions.
- Spray arc at low parameters (180 A).
- High resistance to cracks.
- Low heat input.
- Can be used for primers without porosity or worm holes on the bead.
- Easy slag removal and excellent bead appearance.
- Use of micro-alloyed technology is possible.
- High deposition rate.
- Low fume emission.

(*) Diffusible hydrogen content is determined according to AWS A4.3-93 using the chromatography method on a sample taken directly from the production.

DIFFERENCE BETWEEN SEAMLESS AND SEAMED FCW



Section of seamless flux cored wire

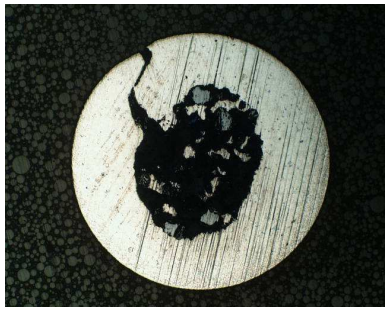
- High resistance to the humidity permeability.

- Low content of diffusible hydrogen, time constant.

- Excellent stability of the arc with elevate atmospheric corrosion resistant thanks to the superficial external copper.

- Possibility of welding before without porosity or superficial sings in the welding bead.

- Excellent sliding in sheath, without the addition of lubricant.



Section of seamed flux cored wire

- Tendency to absorb during the time the external humidity.

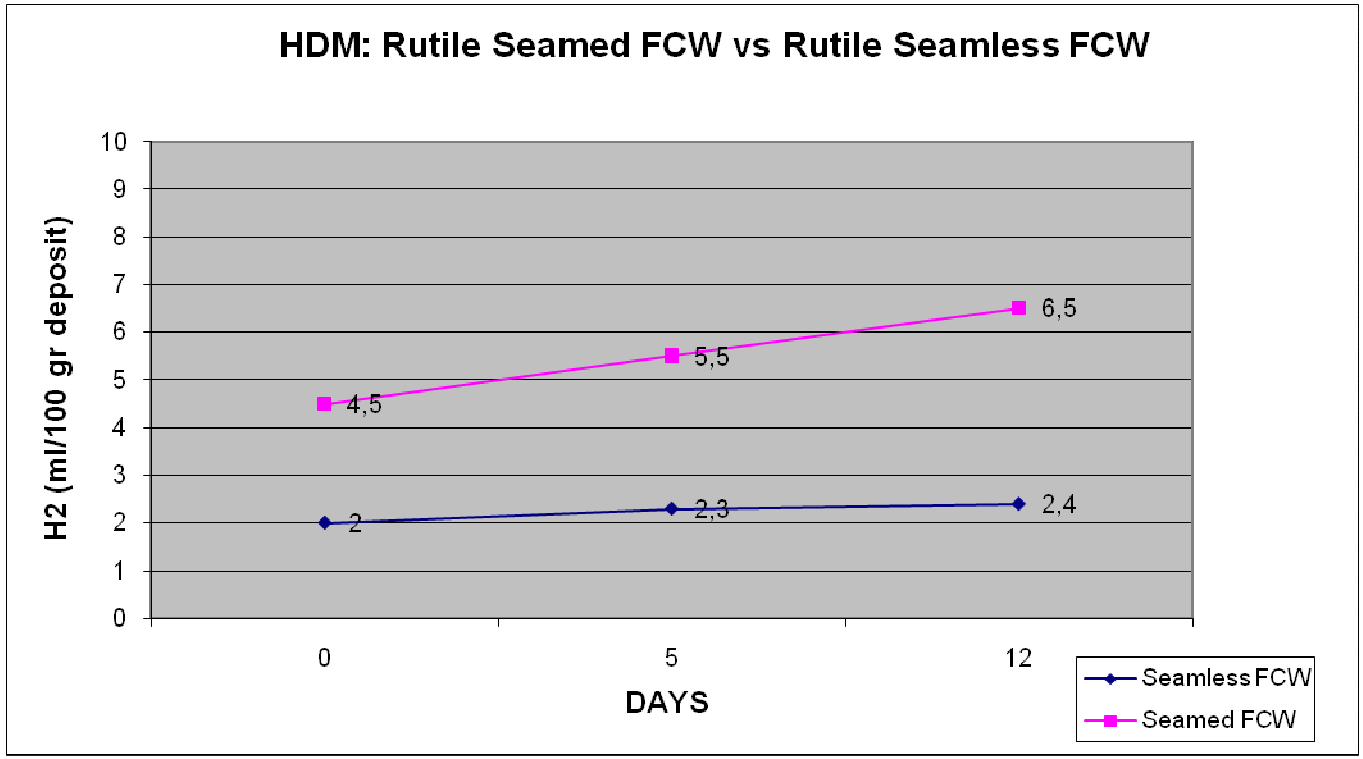
- Initial content of diffusible hydrogen low but that during the time quickly increase.

- Scarce atmospheric corrosion resistant, also in presence of average climatic situations the wire tend to became rusty.

- Critical welding of painted plate, due to the formation of porosity in the welding bead.

- It's necessary artificially lubricant the surface of the wire to guarantee a discreet sliding in sheath. Frequency stop during the welding.

DIFFUSIBLE HYDROGEN OF METAL WELDING



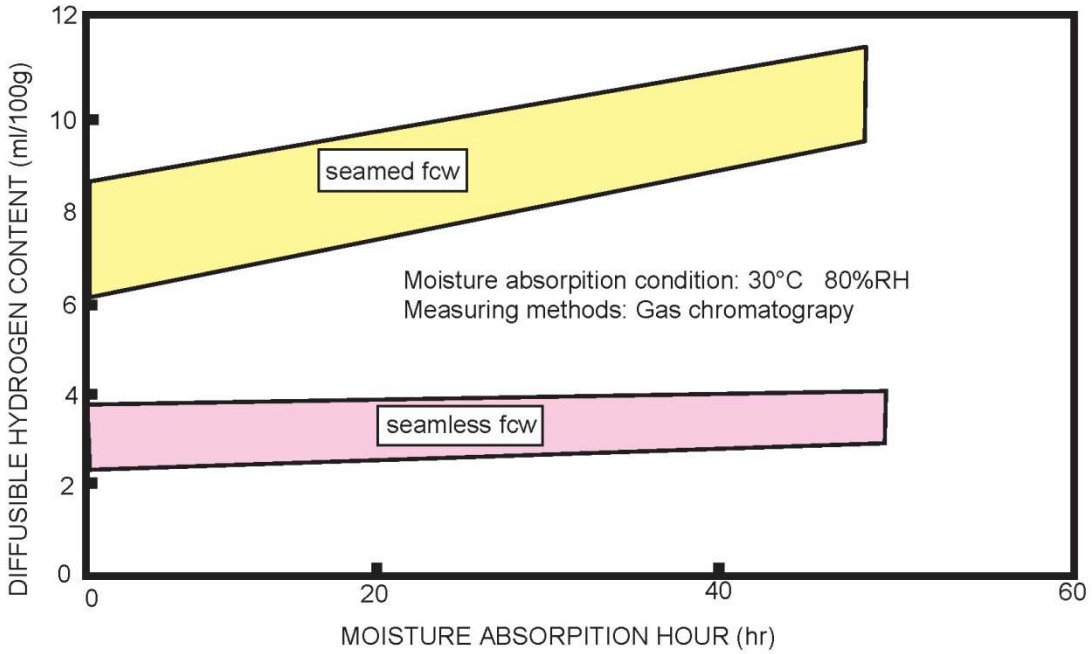
WELDING CONDITIONS: 25V – 250A – STICK-OUT: 17 mm - GAS: M21

Diffusible hydrogen content determined according to AWS A4.3-93, using the chromatography method.

ADVANTAGES OF LOW HYDROGEN CONTENT

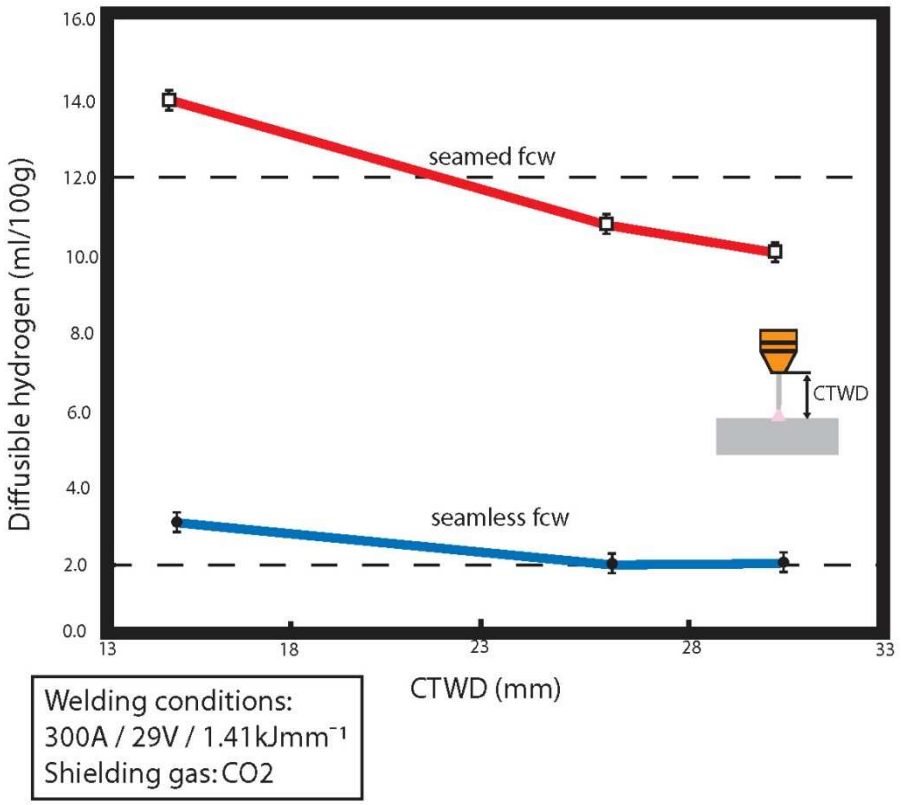
- Opportunity to weld steels at high yield strength (>690 Mpa), even with rutile flux cored welding wires at low content of diffusible hydrogen.
- High resistance to cracks.
- Reduction of temperatures of pre and post heating and consequently reduction of the global welding costs.
- The flux cored welding wire has not to be reconditioned, even if stored in dump places.

HYDROGEN CONTENT vs MOISTURE ABSORPTION TIME



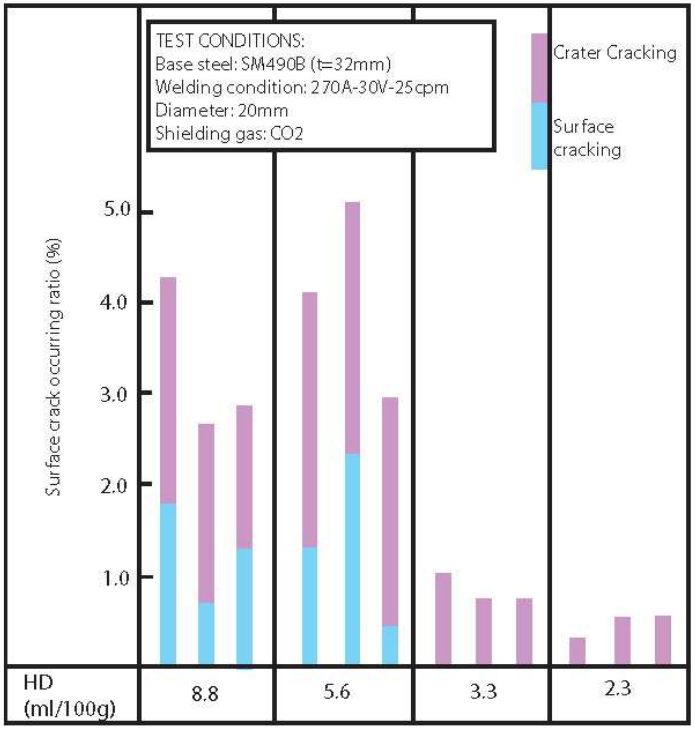
ADVANTAGES OF LOW HYDROGEN CONTENT

H2 LEVEL VS CTWD (STICK-OUT)



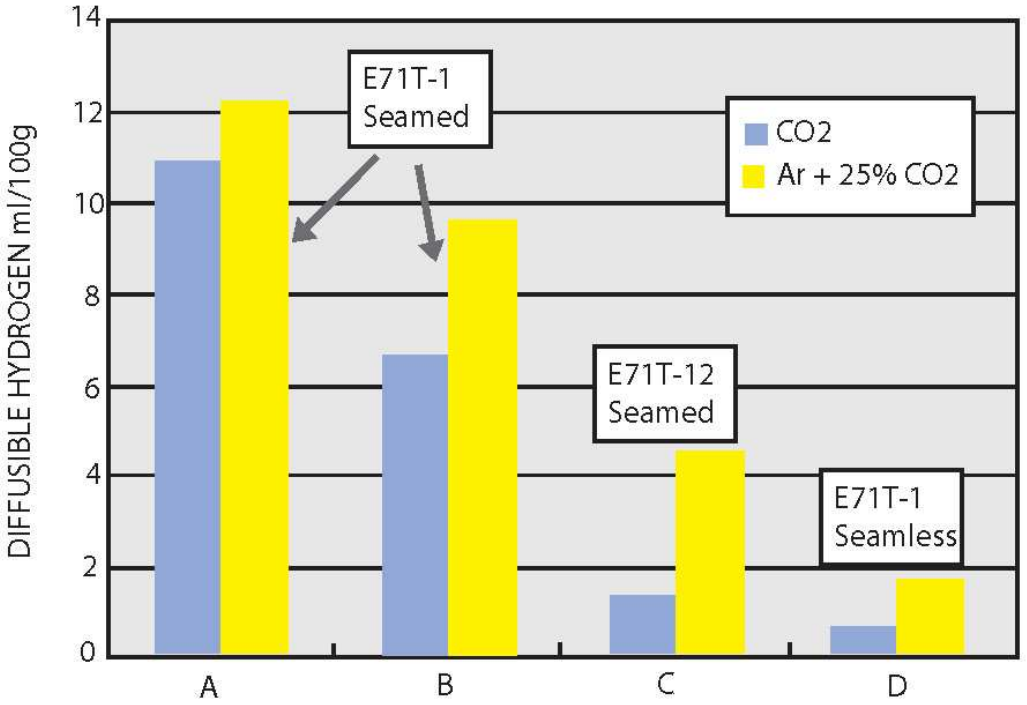
ADVANTAGES OF LOW HYDROGEN CONTENT

EFFECT OF DIFFUSIBLE HYDROGEN CONTENT ON CRACK RESISTANCE



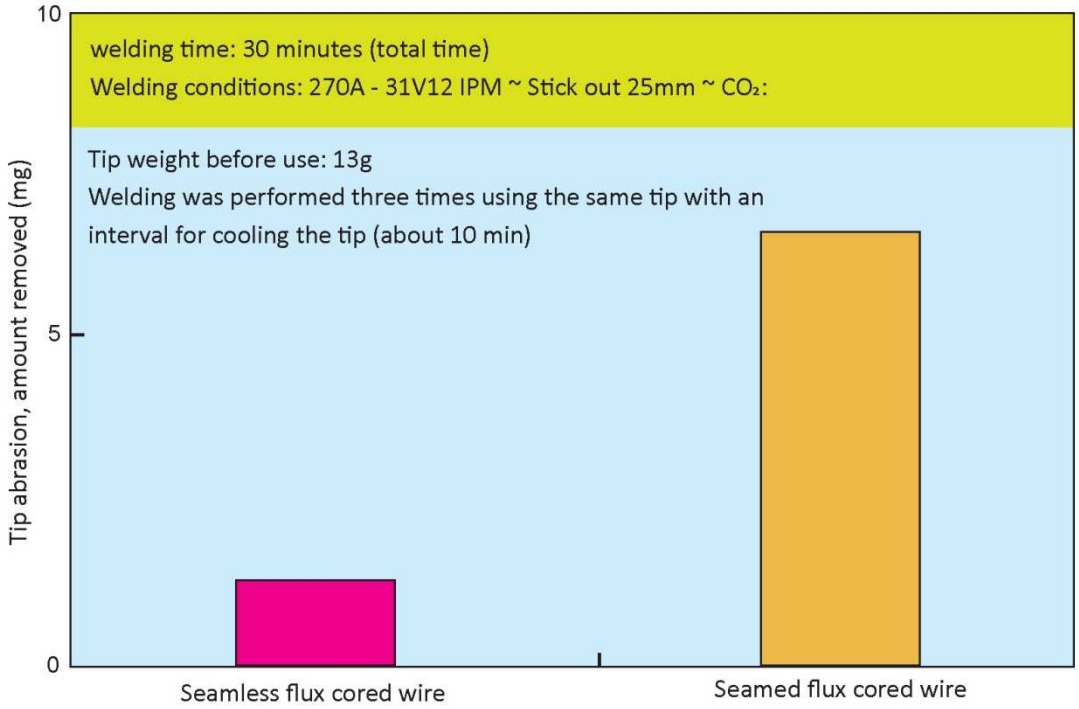
ADVANTAGES OF LOW HYDROGEN CONTENT

EFFECT OF SHIELDING GAS ON DIFFUSIBLE HYDROGEN



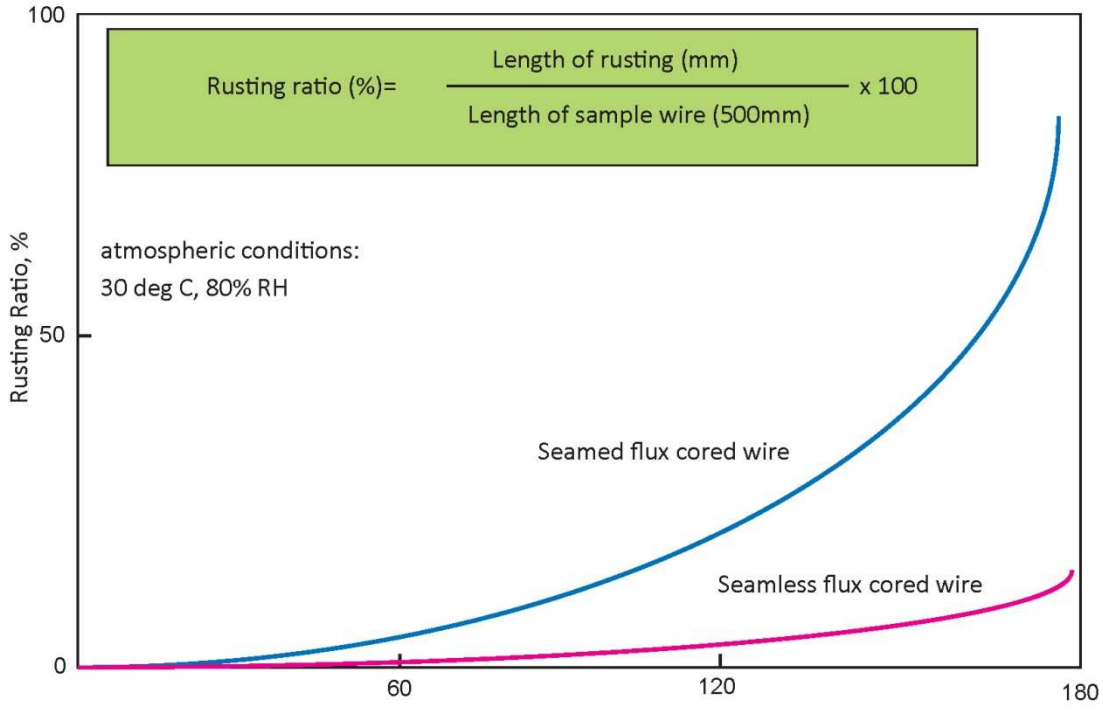
ADVANTAGES OF SEAMLESS FCW - FEEDABILITY

Contact Tip Abrasion Test



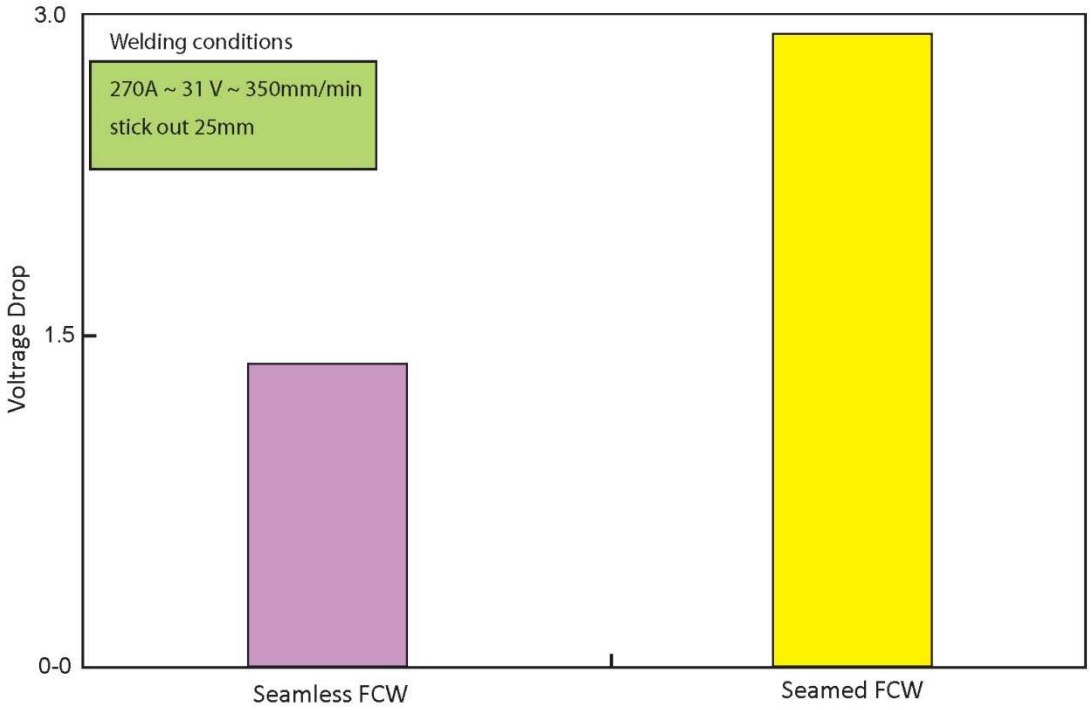
ADVANTAGES OF SEAMLESS FCW – RUST RESISTANCE

Influence of cooper Plating with Inhibitor on rust resistance



ADVANTAGES OF SEAMLESS FCW – ELECTRICAL CONDUCTIVITY

Influence of copper plating on Voltage Drop



ENHANCED APPLICATIONS FOR SEAMLESS FCWs

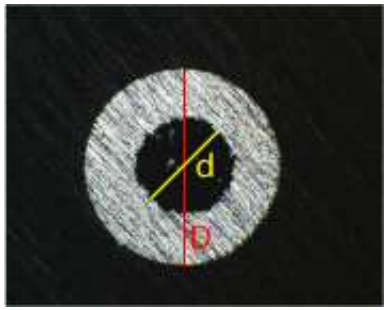
1. Robotic / Automatic work (targetability, feedability)

2. High welding / Wire speed (electrical conductivity, feedability)

3. Thick and / or Alloy Plate (Low hydrogen)

DIFFERENCE BETWEEN SEAMLESS FCW AND SOLID WIRE

Cross section solid wire



Cross section seamless flux cored wire

D= 1.20mm Area= 1.13mm2

Job conditions:
Current= 300A Wire speed= 9m/min
Linear weight wire: 8.6gr/m

Current density=300A/1.13mm2=266A/mm2

D= 1.20mm Area= 1.13mm2
d= 0.60mm Area= 0.28mm2

Job conditions:
Current= 300A Wire speed= 11m/min
Linear weight wire: 8.3gr/m

Current density= 300A/0.85mm2=353A/mm2

Thanks to the highest current density, due to a smaller section of area, seamless flux cored wires can reach the same welding parameters of solid wires with a higher wire speed, as a result the deposition rate is higher than the one obtained by solid wires .To reach this performances solid wires should be welded with non applicable operative parameters.

Theorical deposition rate for solid wire:8.6 gr/m.×9m/min=77.4gr/min.

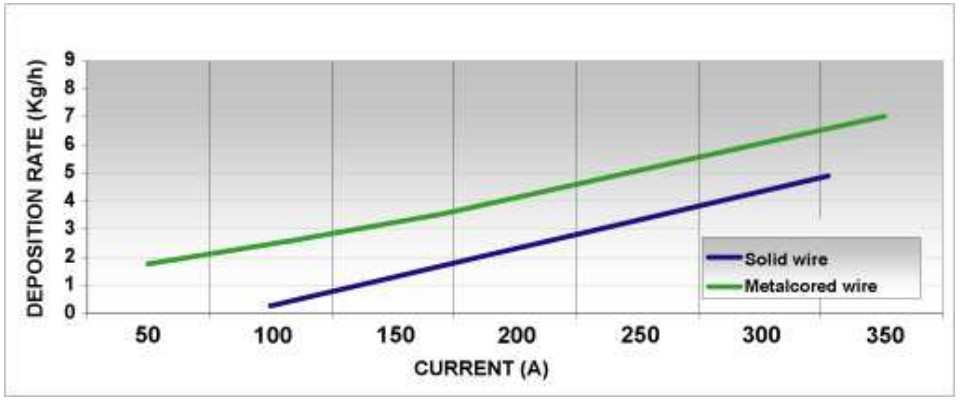
Theorical deposition rate for seamless fcw:8.3 gr/m.×11m/min=91.3gr/min.

Deposition rate flux and metalcored wire >20% Deposition rate solid wire

Solid wire
353A/mm2 x 1.13mm2=398A

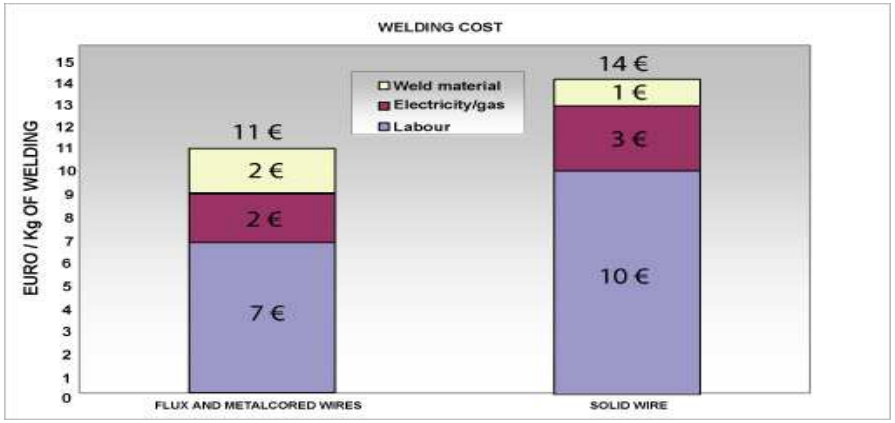
DIFFERENCE BETWEEN SEAMLESS FCW AND SOLID WIRE

From the comparison between flux cored wires (FCW) and solid wires (SW) it is clear that flux cored wires feature a much higher deposition rate. By deposition rate we mean the amount of weld material (kg) deposited on a base material in a given time (h).



Difference in desposition rate between solid wires and flux cored wirea

High deposition rates imply less labour and lower welding costs of the final product.



Welding cost ratios for different types of consumables.

COMPARING FLUX AND METALCORED WIRES WITH SOLID WIRES

Submerged arc welding, tube beam, basic material 15Mo-3 W-Nr. 1.5415 Ø 38 mm; Spessore: 5.8 mm

AMC 35 AS Ø 2.00 mm
Rutile agglomerate flux
Vs
Solid wire S2 Mo
Basic agglomerate flux

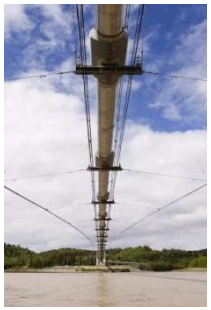
Speed of flux cored welding wire feed : 1.6 – 1.7 m/min

Speed of SOLID wire feed : 80-90 cm/min

INVOLVEMENT IN SOME PRESTIGIOUS INTERNATIONAL PROJECTS

Petronas towers

Offshore



Pipeline

Oresund bridge

Ship cruise

Ship container

Petrolchemical