

Orbital pipe welding for improved safety

ARTIS – *Atlantique Réalisation Tuyauterie Industrielle Soudage* (Atlantic fabricator of Industrial pipework) – is a company with a factory in Derval in the district of Loire-Atlantique in the west of France. The company specialises in the production of industrial pipe networks and buried pipelines for the transport of fluids such as gas, oil and water. This article highlights the advantages of using Polysoude orbital welding systems to meet the quality and safety requirements for ARTIS’ welded pipe.

A key objective for ARTIS is to support and contribute to the projects of its customers from the outset, using its experience and extensive welding technology knowledge. Furthermore, when it comes to quality and safety, ARTIS does not tolerate compromises with respect to people, products or service. The importance placed on safety awareness is shown by the fact that, in addition to its ISO 9001 certification, the company also holds a MASE-UIC certificate – *Manuel d’Amélioration Sécurité des Entreprises from the Union des Industries Chimiques* (Company Safety Improvement Manual for petrochemical industries from the Union of Chemical Industries).

One important ARTIS customer is a major supplier in the field of fluid transportation that not only insists on meeting the EN 12732 standard, but has also developed internal specifications for the construction of gas pipelines subject to pressures from 16 to 80 bar.

In order to meet these demanding spec-

ifications without problems, while guaranteeing continuous quality and repeatability of the products and reducing manual work as far as possible, ARTIS decided to purchase additional equipment for orbital TIG (GTAW) welding with filler wire.

The order was won by the French company Polysoude, situated in Nantes, France. Although the proximity of the companies is perhaps an additional advantage, the decisive reasons for the choice were undoubtedly the precise knowledge of Polysoude’s welding specialists, together with their guaranteed support, advice and fast response to technical problems.

Ultimately though, the equipment proposed by Polysoude fulfilled all the requirements and could be put into operation very quickly. The equipment delivered comprised two open orbital welding heads of the MU family, a wire feeding device and a power source of the type P6.

To guarantee the safety of pipework across its entire life span, companies must produce high quality welds without any imperfections, spatter or oxidation. With regard to pipe networks for the transportation of dangerous substances, the approval of a certification body has to be obtained before the production of welded joints can be started.

Due to its high level of responsibility and in accordance with the demands of the customer, ARTIS was required to establish Welding Procedure Specifications (WPSs) to qualify the pipe welding processes to be used. “We considered this to be a must, because we are using the equipment on site,” explains Fabrice Chailloux, assistant manager of ARTIS. “Procedure qualification is an important investment: destructive material testing, X-ray inspection, training of the



Orbital TIG (GTAW) welding for mild steel pipes being completed using an open type MU Polysoude welding head.

staff, preparation of the specimen and so on incurs significant costs, which have to be recovered,” he adds.

To enable reliable penetration of the root pass when using orbital welding, a J-preparation without a gap is required, whereas manual welding is commonly carried out using a V-preparation with a root gap. Unfortunately, the pipes concerned had already been prepared by the manufacturer with a V-preparation for manual welding.

After comprehensive preliminary tests at Polysoude’s application department, the specialists proposed an unusual and innovative approach, which was eventually accepted by the parties involved. The J-preparation required for orbital welding with a flange angle of 37° at the end of one pipe section would be joined to a pipe section with an existing 30° V-preparation at the opposite end. This enabled mismatching of up to 1.0 mm to be tolerated.

“Respecting the specified tolerances is very important in achieving reliable penetration of the root pass and ensuring repeatability of results when applying the WPS,” notes Chailloux. Most specifications focus on a high-quality level on the inside of the root pass, as this is the surface that comes into direct contact with the medium being transported and guarantees the service life of the joint.

ARTIS’s decision to invest sufficient time and money to achieve the necessary qualifications for the process was driven by its primary aim to maintain a high level of quality and reliability. Performance and economic efficiency were considered to be less important.

One of its young technicians who had



Orbital welding of a joint between a pipe and an elbow using an open orbital welding head of the MU family with arc voltage control and filler wire.

already qualified in boiler construction participated in a thorough training programme on the new equipment. After basic lessons given by the experienced welding experts from Polysoude’s application laboratory, he was given the opportunity to familiarise himself with the machines for three weeks, whilst preparing specimens for process qualification. “Due to the successful training, the orbital welding equipment was put



A real-time view of a welding cycle on the user Interface (GUI) of the Polysoude power source.

into operation very quickly,” says Chailloux. “The relevant welding parameters can be adjusted very precisely and this, together with the installed arc voltage control, meant we were able to improve our quality and decisively increase our competitive advantage,” he points out.

As a result of close cooperation between the teams involved, all necessary qualifications for the process



Pipe specimens prepared for the qualification of the orbital welding process by a certification body.



The joint preparation of the pipe ends is different. A J-preparation is used on one pipe section end while the existing 30° V-preparation is used at the opposite end.

The Right CNC Solution for Your Fabrication Needs!

PLASMA ROUTER WATERJET LASER

www.multicam.com
972.793.0122

3000 Series Plasma

Apex3R CNC Router

V-Series CNC Waterjet

Quantus Fiber Laser

cnc@ecotek.org
+27 (82) 566-4488
www.ecotek.com

1989-2019