Pipework solutions

TIG or plasma welded pipework high diameter

Vertical solutions

Light alloy vertical cylinder with AC TIG process

Stainless steel vertical cylinder with Key hole plasma process
TIG and PLASMA installations

Multi-purpose welding installation to enable the following processes to be used in automatic applications:
- DC TIG with smooth or pulsed current
- AC TIG with variable polarity,
- DC plasma with smooth or pulsed current,
This equipment is offered in several versions.

Process control
- 50 welding programs
  (voltage, current, wire speed, movement)
- Clear text LCD screen display
- Parameter modification while welding
- Cycle start/stop, manual control of gas/wire, AVC

TIG/plasma direct current basis
- PC 104 central unit and interface
- Pulser 450 A/100 %
- Control arc circuit 25 A/100 %
- Primary three-phase power supply
  50/60 Hz - 230/400/415/440 V

Optional alternating module
- Variable polarity TIG operation on aluminium
- Variable polarity current 450 A/100 %
- Variable polarity frequency from 50 to 200 Hz

Basic installation:
- NERTAMATIC 450 power source
- HF module + torch connection
- Remote control unit box, welding control
  with 50 memorised programs
  (display/control of current, voltage, wire speed)
- Diskette drive for uploading or downloading programs
- Parameter print-out
- Power controller module
- Harness length 10, 17 or 22 meters compatible
  with cable hanger chain

NERTAMATIC 450 add-ons
- Wire, AVC, gas control box

Machine add-ons
- Movements, mecacycles, PLCs etc...
This installation meets the highest quality standards for welding and productivity for industries as diverse as boiler-making using stainless steels, aeronautics using noble metals, chemical engineering, energy production, transformation and transport as well as prefabrication of gas and petrol pipelines etc.

Nertamatic 450 HPW plasma or TIG

The system is based on the same components of the NERTAMATIC 450. Only the control unit is changed by an industrial PC allowing the complete management of the machine starting from only one control panel, giving:

- Numerical management of the welding process, its associated movements and drive units
- Traceability, a program integrates all the parameters allowing the repetitiveness of the welding
- Quality follow-up in option, record and storage of the essential parameters of welding (current, voltage, wire feeding, movement)
- User friendly and intuitive interface allowing the programming, controls and follow up
- Intuitive built up of cycle machine thanks to a graphic programming
- Touch screen facilitating the HPW use
- Off line programming on PC, data exchange via USB key
- Optimisation of the machine integration
- Control via industrial PC

User friendly and intuitive interface allowing the programming, controls and follow up

Intuitive, interactive and user friendly, this HPW interface software allows an easy navigation, facilitating the dialogue between the machine and the operator, also the flexibility of the welding to your production constraints.

HPW interface is divided according to the type of work to carry out in four indexes:

- Configuration
- Programming
- Welding
- Quality (as a option)

For an easy navigation, management and control of the machine, the dialogue with HPW is done starting from a touch screen, industrial LCD of 15 inches.
This installation was developed and built for large-capacity stainless steel boiler makers (basic activity transport and storage of chemical products and foodstuffs with series 300 stainless steels, thickness from 1 to 8-10 mm).

**Welding equipment**
The plasma + TIG installation is made up of two NERTAMATIC 450 installations:
- a plasma installation with SP7 torch and arc voltage regulation,
- a TIG installation with MEC4 torch, arc voltage regulation, wire feed, arc oscillation and gas protection carriage.

Two welding controls are available, the standard or the HPW

**Standard**
Plasma and TIG get its own control unit which stores all the welding parameters. Then, a PLC unit drives the complete P+T sequence in order to synchronise welding torch starts and stops and to control the speed and length of weld. This digital control memorises and manages the movement parameters.

**HPW**
Control device for the complete management of the machine starting from only one control panel, allowing:
- Numerical management of the welding process, its associated movements and drive units
- Traceability, a program integrates all the parameters allowing the repetitivity of the welding
- Quality follow-up in option, record and storage of the essential parameters of welding (current, voltage, wire feeding, movement)
- User friendly and intuitive interface allowing the programming, controls and follow up
- Intuitive built up of cycle machine thanks to a graphic programming
- Touch screen facilitating the HPW use
- Off line programming on PC, data exchange via USB key
- Optimisation of the machine integration
- Control via industrial PC

This tool is ideal for assembling panels for the prefabrication of vessels longer than 4 meters and carrying out circular welds for diameters greater than 2 meters.

It uses Air Liquide Welding's original plasma + TIG process whereby the first "plasma" torch penetrates the butt-joined panels. The second "TIG" torch equipped with metal filler, electromagnetic arc oscillation and a gas protection carriage produces a perfect surface finish which can often be left without further treatment.

This process of using 2 torches in tandem gives a productivity gain of 30-50 % over a single-torch plasma installation.
Additional to those TIG/plasma installations, optional functions can be added as video system, arc oscillation, hot wire, automatic seam tracking system...

**Video system: VISIOARC**
The TIG/plasma video system can be easily integrated into Air Liquide Welding installations. It uses a greatly enlarged image which enables the precise position of the welding torch to be viewed thus making the operator’s work easier and improving the quality of the welding operation.

**OSCILLARC 3**
Deviation or electromagnetic oscillation of the TIG arc

**Arc deviation**
This technique is used to electrically deflect the TIG arc which considerably increases the heat affected zone along the weld axis and increases speed by the order of 30 to 50% for thicknesses of less than 2 mm. This facility is particularly suited to the continuous welding of thin tubes formed from strip, cable conduit, electrical resistance shielding etc. i.e. all mass-produced parts welded without filler metal.

**Arc oscillation**
An extension of the arc deviation technique described above, arc oscillation is used to deposit metal over areas up to 20 mm wide to fill bevels or reconstitute surface coating.

**Hot wire TIG and plasma**
Productivity improvement by increasing the deposition rate
For filling bevels 40 mm deep, the use of hot filler wire provides a good solution and is particularly suited to applications where a high specification of the welded joint is required. This special technique uses an auxiliary current to bring the end of the wire to nearly melting point. Viable for plates of thickness 10 mm and above, the use of hot filler wire enables 2.5 to 3 kg of metal to be deposited per hour for filling bevels using multiple passes or for quality hard-surfacing.

**AVC (Arc Voltage Control) and wire system autonomous units**
These devices can be used to update older automatic TIG and plasma welding installations, but also to create simplified installations for manual welding stations.
**In line pipe**

Air Liquide Welding proposes solutions for in line pipe welding, process to be integrated into pipe mills
- Monocathode equipment in TIG or plasma
- Tricathode torch with 3 x TIG or TIG + plasma + TIG

**Typical performances**

```
+-----------------+-----------------+-----------------+
| Tube thickness  | Possible        | Recommended     |
| E 16            | TIG             | TIG + PLASMA + TIG torches assembly |
| E 25            |                 |                 |
```

Welding speeds are indicative and depend on the material, quality required and pipe mill quality.

**Monocathode welding**

Two installations based on N450 or 400i:
- Nertamic 450 (450 A/100%)
- Power cycle 400i (400 A/100%)

**Basic system composition:**
- 1 power source (N450 or 400i)
- HF starting unit
- Control panel for N450 or remote control for 400i
- MEC4 TIG torch or SP7 plasma torch
- Cable set and pipe work for connecting the welding sets (10 m)

**Optional extras**
- REFRIJET GR5 or FRIOJET 3B cooling unit,
- System primary power supply cabinet.

**Welding heads**

**MEC4**: 450 A at 100%, typical application welding thickness from 0.5 to 3 mm

**SP7**: 450 A at 100%, typical application welding thickness from 2.5 to 8 mm
E 16: Implements the dual flow tricathode process. 200 Amps per electrode (total 600 Amps). Independent adjustment of each electrode to the shoe (one piece design). Fit tungsten Ø 2.4 mm. Typical application (wall thickness) 0.5 to 1.5 mm.

E 25: Implements the dual flow tricathode process. 400 Amps per electrode (total 1200 Amps). Independent adjustment of each electrode to the shoe (modular design). Fit tungsten Ø 3.2 and Ø 4.0 mm. Typical application (wall thickness) 1 to 3.5 mm.

Tricathode 400i E16 or E25
Combinaison of 3x TIG double flux arcs (E16 or E25)
Smooth current welding up to 3 x 400 A/100% (inverter).
- E25 torch (thicknesses from 1 to 3.5 mm).
- E16 torch (thicknesses from 0.5 to 1.5 mm).

Basic system composition:
- 3 x power cycle 400 i welding sets 400 A each 100% (inverter),
- HF starting unit,
- Control panel with:
  - current regulation, digital voltage & current displays for each arc,
  - adjustment and displays of gas flow settings,
  - adjustment of electromagnetic arc (first electrode),
- Welding head mounting assembly,
- E25 or E16 welding torch,
- Cable set and pipework for connecting the welding sets, head and control panel (15 m).

Optional extras
- REFRIJET GR5 or FRIOJET 3B cooling unit,
- System primary power supply cabinet.

Tricathode TPT N450
Combinaison of TIG + plasma + TIG process
Smooth or pulsed current welding up to 3 x 450 A at 100% (chopper technology)

Basic system composition:
- 3 x NERTAMATIC 450 welding sets, 450 A at 100 % each,
- Control panel with:
  - current regulation, digital voltage & current displays for each arc,
  - adjustment and displays of gas flow settings,
  - adjustment of electromagnetic arc movement.
- Torch interface including HF source,
- Mechanical torch adjustment,
- Cable set and pipework for connecting the welding sets, head and control panel (10 m).

Optional extras
- REFRIJET GR5 (x3) or FRIOJET 3B cooling unit,
- System primary power supply cabinet.

Welding heads, tricathode dual flow TIG

Welding heads
TPT head: Two MEC4 TIG torches and one SP7 plasma torch. Ideal for thickness betnesses between 2.5 and 8 mm.
**TIG and plasma welding processes**

### Welding sets for automatic TIG or plasma welding processes

**A** Power cycle 400 i
An inverter technology unit for plasma or TIG DC welding systems.
- Power supply: 400 V, 3-phase, 50-60 Hz
- Welding current: 400 A at 100%

**B** NERTAMATIC 450
A transistorised chopper technology unit for DC TIG or plasma welding systems (optional AC module for TIG AC).
- Power supply: 230/400/415/440 V, 3-phase, 50/60 Hz.
- Welding current: 450 A at 100%.
- Pulse frequency: 1 to 100 Hz in DC / 1 to 200 Hz in AC.

### Water cooled welding torches

<table>
<thead>
<tr>
<th>Torches</th>
<th>C TIG MEC 4</th>
<th>D SP 150</th>
<th>E PLASMA SP 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classic</td>
<td>straight</td>
<td>straight</td>
<td>straight</td>
</tr>
<tr>
<td>Quick connectors*</td>
<td>W 000 315 611</td>
<td>W 000 315 612</td>
<td>W 000 315 615</td>
</tr>
<tr>
<td>Thoriated tungsten electrodes 3% (2%*)</td>
<td>straight</td>
<td>curved</td>
<td>straight</td>
</tr>
<tr>
<td>Ø 1.6 mm</td>
<td>S03710258*</td>
<td>S03710258*</td>
<td>-</td>
</tr>
<tr>
<td>Ø 2.4 mm</td>
<td>W 000 315 768</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ø 3.2 mm</td>
<td>W 000 315 769</td>
<td>W 000 315 769</td>
<td>W 000 315 769</td>
</tr>
<tr>
<td>Ø 4 mm</td>
<td>W 000 315 770</td>
<td>-</td>
<td>W 000 315 770</td>
</tr>
<tr>
<td>Ø 4.8 mm</td>
<td>W 000 315 771</td>
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<td>W 000 315 771</td>
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</table>

<table>
<thead>
<tr>
<th>Nozzles</th>
<th>straight</th>
<th>curved</th>
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</thead>
<tbody>
<tr>
<td>Ø 1.5 mm</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ø 2 mm CD</td>
<td>-</td>
<td>W 000 315 780</td>
</tr>
<tr>
<td>Ø 2.5 mm</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ø 3 mm</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ø 3 mm CD</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ø 4 mm</td>
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</table>

<table>
<thead>
<tr>
<th>Constricting nozzles</th>
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<tbody>
<tr>
<td>Ø 5 mm</td>
<td>-</td>
<td>W 000 315 790</td>
</tr>
<tr>
<td>Ø 6 mm</td>
<td>-</td>
<td>-</td>
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</table>

<table>
<thead>
<tr>
<th>Nozzles</th>
<th>straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø 11 mm = S92579701</td>
<td>water = S92579891</td>
</tr>
<tr>
<td>Ø 13 mm = S92579698</td>
<td>air = S92579830</td>
</tr>
<tr>
<td>Ø 18 mm = S92579696</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trailing shield water</th>
<th>straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>W 000 315 603</td>
<td>-</td>
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</tbody>
</table>

For TIG welding, twin HF ignition for better arc striking.
- Current 500 A at 100%.
- Standard electrode length 150 mm, simple to replaced.
Optional extra:
- Gas trailer to protect welds in sensitive metals (eg, titanium) or improve the quality of stainless steel welds,
- Magnetic arc oscillation equipment may be used to fill in large weld grooves.

For dual-flow TIG welding, key hole plasma welding (up to 4 mm edge to edge) or soft (unconstricted) plasma welding.
- Current: - up to 150 A at 100% for plasma,
  - up to 200 A at 100% for dual-flow TIG,
- Standard electrode length 150 mm, simple to replace, with automatic alignment.

For single or dual-flow TIG welding and key hole plasma welding.
- Current 450 A at 100%.
- Standard electrode length 150 mm, simple to replace.
Self-aligning.
Optional extra:
- Gas trailer to protect welds in sensitive metals (eg, titanium) or improve the quality of stainless steel welds.

**Quick interface torch, for quick connectors torch type: W 000 315 574.**
The constant changes in the economic markets in which our industrial customers operate lead them to a continual commitment to a rapid response. Robotisation of welding or cutting processes is one of the possible options to optimise productivity and flexibility.

The Air Liquide Welding group offers a great number of applications in varied activity sectors: automotive subcontracting, metal furniture manufacturing, agricultural pieces fabrication etc... These solutions are often the outcome of a personalized approach leading to a unique proposal, although some components can be made on our standard JUNIOR and SENIOR installations.

Some examples of products that have been produced with Air Liquide Welding robotic installations:
Turnkey fork-liftable robotic cell equipped with two workstations. Easy to install and run, it is the perfect tool for fast welding of a large variety of steel parts.

Among our complete range of standard robotic cells you will surely find the perfect solution for enhancing your performance through a simple and flexible turnkey system.

**Highly Productive**
Equipped with two workstations thus the operator can load and unload a work-piece on one side of the cell, while the robot is welding on the other side. In addition, our cells are pre-assembled and fork-liftable for reducing installing and setup to a few hours.

**Flexible**
All equipped with two workstations our workcells are successfully used for welding thousands of different parts. With or without external axis, they are designed for making it easy and fast to re-set the cell end resume welding a different part.

**Profitable**
Simplicity and flexibility are keystone concepts for securing your investment. Comparing to highly complicated custom-tailored thus expensive solutions, work-cells will boost the profitability of your project.

**Easy to use**
Robot programming through teaching, pre-settings for welding process and finally station changeover through a simple table rotation; it simply could not be easier and faster to get a workcell to weld your parts.
Custom-made solutions

A large choice of kinematics components and manipulators are available to enhance robot reach and weld-part positioning. We will match your specific needs and we will go beyond offering you the best suiting solutions.
TOPTIG process is a major innovation in the world of automatic or robotized welding. Developed in the Air Liquide Welding research centre, TOPTIG is a new process development from arc welding classical solutions. This new process can be used effectively on carbon or stainless steel plates up to 3 mm or on galvanized sheets with weld brazing.

Advantages:
- A better accessibility for welding complex structures;
- Very good performances concerning speed, tolerance and quality (projections free).

Activities sectors:
- Subcontracting automation
- Fine boiler making
- “Noble” tack welding and metal furniture
- Aeronautics subcontracting

Characteristics:
- A new wire feeding concept allowing a new design of the torch.
The TOPTIG welding process offers:
• the TIG quality welding and guaranteed spatter free
• good global productivity
• excellent appearance of the weld bead
• torch accessibility
• flexible solution and reasonable cost

TOPTIG innovative process principle
In TIG automatic welding mode, the filler wire is fed into the weld pool in front of the torch. A feature of the TOPTIG process is that the melting of the filler wire is equivalent to MIG.
Indeed, the support wire is fed through the welding nozzle into precisely that area of the arc where the temperatures are the highest. The wire therefore melts into small droplets exactly as in the MIG process.
The use of a pulsed current synchronized with wire gives a better control over the welding operation.

Comparison of the main welding processes

<table>
<thead>
<tr>
<th>Feature</th>
<th>Speed</th>
<th>Quality</th>
<th>Spatter</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processes</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TIG</td>
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<tr>
<td>MIG</td>
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</tr>
<tr>
<td>LASER</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOPTIG</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

😊 Excellent ☹️ Good ☹️ Fair

Torch accessibility and simplified robot trajectories
The TOPTIG torch compactness gives accessibility and a good access angle. Welding is multidirectional, so the robot trajectories are simplified and the scope of robotization is widened.
On classical robotic TIG torches, the filler metal is brought by an external cross and the wire is oriented with an angle close to 90° relative to the electrode. Moreover, the cross can only be positioned ahead of the torch and these features bring problems in terms of access, positioning and reliability.
To optimise the TOPTIG process, the torch is interfaced to a push-push high-quality wire feeder which guarantees the precision of the wire feeding. In order to prevent damage in case of a trajectory error (for robot) the torch is installed via an anti-collision device. Depending on the application and the welding current, an air-cooled or water-cooled torch nozzle, the size of the electrode and the appropriate wear parts can be chosen.

TOPTIG Installation
A TOPTIG torch
B Torch support
C Anti-collision device
D Harness L 5 m
E Wire feeder with spool support
F TOPTIG 220 DC power source
G Remote control

TOPTIG 220 DC power source
TOPTIG 220 DC supplies 220 A at 100% duty cycle with flat or pulsed current. It can drive a constant or pulsed wire feeding which is synchronized with the welding current. The RC-JOB permits a complete welding cycle to be programmed. Programs selection and chaining is done by analog signals.

NERTAMATIC 450 power source
NERTAMATIC 450 supplies 450 A at 100% duty cycle with flat or pulsed current. It can drive a constant or pulsed wire feeding which is synchronized with the welding current. The console permits a complete welding cycle to be programmed. Program selection is done by binary code, and program chaining by pulse.

TOPTIG push-push wire feeder
The complete push-push wire feeder system includes the spool support with slave feeding equipment, the electronic card driver, the 5 m harness, the anti-collision device, the torch support and the master head micro-motor.

Electrode changer (for robotic applications)
Especially designed for TOPTIG, the electrode changer permits an improvement to the global productivity of the installation. The electrode changing cycle lasts 20s, and this system avoids any manual intervention during production, and allows the electrodes, to be sharpened off-line.

6 electrodes cylinder for the electrode changer
Welding quality ensured by the high performance of the DIGI@WAVE and CITOWAVE power sources.

Advanced and fast communication between OTC robot and power source via digital bus.

Provided with the latest digital technology, DIGI@WAVE and CITOWAVE provide precision and simplicity even for the most complex robotic applications.

All-in-one simplified programming with a smart teach pendant for both power source and OTC robot.

**MIG/MAG welding CITOWAVE and DIGI@WAVE: total quality.**

- Digital control MIG/MAG current sources fitted with the latest generation inverter with synergic welding parameter management.
- Several models with various power ranges from 20 to 280 A at 100% and up to 440 A at 100%.
- Graphic screen for easy and user-friendly adjustment.
- New arc transfer modes.
- New synergy laws (up to 152).
- Digitally adjusted wire feed for constant, controlled output.
- Smooth or pulsed welding current up to 500 Hz with reduced noise and pollution (no projections).
- Process control and traceability functions.

Welding quality ensured by the high performance of the DIGI@WAVE and CITOWAVE power sources.

Advanced and fast communication between OTC robot and power source via digital bus.
AIR LIQUIDE Welding has developed a specific NERTAJET plasma cutting pack for robotics. Complete and easy-to-use, this system is suitable for plasma cutting of a large variety of 3D work-parts.

Ideal for cutting 3D work-parts, our NERTAJET will perfectly match various applications:

- Cutting of holes, slots and saddle-cuts on round and square section tubes of various lengths
- Prefabricated I and H-beams cutting.
- Cutting of slots on lampposts
- Cutting on machinery chassis
- Boiler bodies and convex heads cut

NERTAJET HP125 Plasma Pack.
High-performance plasma cutting through:

- Different levels of current intensity to find the best match with the thickness of the work-part to be cut.
- NERTAJET can be set either:
  - conventionally, to get the highest cutting speed.
  - Or in High-Plasma mode when looking for ultimate quality cut

Example of cutting system:

- Robot on ground track
- Plasma NERTAJET pack
- Headstock and tailstock
- Adjustable tooling

Suitable for cutting:

- Square section tubes
- Round section tubes
- Channels
- Boxes
Electron beam welding

Electron beam’s range of applications extends from thin thicknesses to workpieces over 100 mm thick welding. This directional energy beam has high energy density. The high quality welded parts make them immediately acceptable for the final assembly. These processes are recommended for large batch series or for high value added components.

Take advantage of Air Liquide Welding’s
long experience over 25 years supplying “Electron beam”. Nowadays, our electron beam power supplies are the most reliable on the market.

A new fashion to design your pieces
Since the energy density of the electron beam may be varied widely, it is possible to readily obtain sound welds, presenting satisfactory mechanical characteristics and without almost deformation, on materials for which a conventional welding process would be extremely complex to perform.

The car and aeronautics industry
are intensively using these processes as well as small companies. Hundreds of Air Liquide Welding electron beams machines from 3 to 45 kW are in use every day.
Air Liquide Welding has also many more references in electron beam welding in technological environment:
- Aeronautics
- Mechanic, hydraulic, pneumatic components
- Arment
- Motorcar automobile
- Nuclear
- Boiler construction.
Since the beginning, Air Liquide Welding has been involved in most mobile and fixed platform constructions in the cold waters of the North Sea and in the onshore wind-energy industry. Working closely with engineering departments and major manufacturers in this sector, Air Liquide Welding is constantly working to develop processes, equipments and consumables meeting the ever more demanding requirements of increasingly hostile environments. This constant innovation has resulted in an unsurpassable range of equipment and consumable solutions specially designed for wind-power industries.

**Dedicated solution using our wide range of column and boom, and specially designed for heavy industrial environment.**

**Full range of rotators specially dedicated for windmill application.**

**Special head with automatic join tracking allow longitudinal and circular welding with comfort and reliability.**

**Mono, twin or tandem submerged arc welding associated with our wide range of consumables offers high quality and productivity.**

**Controlled by our modern and friendly mobile control.**
Submerged arc
specific applications

Submerged arc LAMP POST

A: 3 to 17 m
B: 60 mm mini - 600 mm maxi
C: 3 to 6 mm
Round conical, polygonal (32, 16 and 8 sides)
Conicity maxi: 50%

Welding processes:
• ASW single wire diameter from 1.6 to 5.0 mm

Machine cycle:
• SIEMENS controller
• Overview and control in real time of the machine, poles parameters recording, modem connection

Performances / Outstanding points:
• Joint tracking with camera and operator joystick
• Only 1 operator
• Machine availability: 95%
• Fix machine / Movable piece
• Speed range: 1 m/min. to 2.8 m/min.

T-MASTER installations

Small size
Flange a ⇒ min: 160 mm ⇒ max: 700 mm
thickness: 8 ⇒ 40 mm
Web b ⇒ min: 200 mm ⇒ max: 2300 mm (1500 mm maxi)
thickness: 6 ⇒ 25 mm
Length ⇒ min: 6 m ⇒ max: 16 m
Angle max: 30°
≤ 1200 kg/m

Big size
Flange a ⇒ min: 200 mm ⇒ max: 1300 mm
thickness: 8 ⇒ 80 mm
Web b ⇒ min: 300 mm ⇒ max: 3200 mm (3500 mm maxi)
thickness: 6 ⇒ 30 mm
Length ⇒ min: 3 m ⇒ max: 18 m
Angle max: 10°
≥ 1200 kg/m

Other solutions and possibilities on request.