DURMAT® PTA Welding Equipment:

- PTA Power Sources
- PTA Manual Torches, Robot Torches, Special Torches
- PTA Accessories
WEAR SOLUTIONS
With Creative Ideas for Practical Solutions

DURUM VERSCHLEISS-SCHUTZ GMBH was established in 1984 as a manufacturer of advanced hard-facing products. Today DURUM has production and service centres in Brazil, France and the USA and exports to more than 80 countries all over the world!

DURUM provides high performance products for Welding and Thermal Spraying. DURUM is a global market leader in the supply of specialized overlaying consumables that can be applied by a range of processes including: Flux-Cored Wire Welding, Plasma Transferred Arc (PTA) Welding, Oxy-acetylene Welding, Shielded Metal Arc Welding, Thermal Spraying.

Besides Willich (Germany) DURUM Group maintains production and workshop facilities in Brazil (São Paulo), France (Saint Victor) and the USA (Houston TX). We also support a network of independent agencies throughout the world. We meet demanding requirements of today’s industry with a wide array of Welding and Thermal Spray technologies.

The company employs national and international PhD’s; welding engineers and independent experts from well known and respected universities, which ensures that constant material and process development is achieved to the highest standards.

DURUM focuses on “continuous development” and sets a significant annual budget aside for research and development including new product development, product enhancement and the development of highly specialised solutions to the most challenging applications in the industry.

Our wide range of specialized surface hard-facing materials includes:

- Tungsten Carbide Rods for Oxy-acetylene Welding
- Nickel-, Cobalt- and Iron-based Flux-Cored Wire
- FCAW wires with Tungsten Carbide and complex carbides to provide extremely hard and tough coatings, used principally for extreme wear applications
- Tungsten Carbides, Complex Carbides and Chromium Carbides for manual Arc Welding
- PTA Welding Powders
- PTA machines, torches and powder feeders
- Powders and Wires for Laser Cladding
- Powders for Oxy-acetylene Welding and Spraying
- Fused Crushed and Spherical Fused Tungsten Carbides
- Pre-manufactured replacement wear parts
- Thermal Spray Powders (conforming to DIN EN 1274)
- Thermal Spray Wires (conforming to DIN EN 14919)

Please observe all appropriate safety regulations in their entirety. The technical informations given in this data sheet reflects the present state of knowledge. They do not form part of any sales contract as guaranteed properties of the delivered materials. Our delivery and sales conditions apply to all contracts included. Rev. 1.1 (12/2017)
Plasma-Transferred-Arc process (PTA) has been in use since 1962. The application for PTA welding is very extensive.

Plasma-Transferred-Arc (PTA) is used to protect parts, which are subject to extreme wear conditions such as: heat, abrasion, corrosion, erosion, adhesive and abrasive wear etc.

PTA-welding is split up into micro (MPTA), conventional (NPTA) and high performance (HPTA) plasma-powder-welding. The deposition rate varies from 0.1 to 0.5 kg/h for smallest components with MPTA, over 6 kg/h for the conventional PTA and up to 20 kg/h for HPTA.

Depending on chosen welding parameters we can expect dilution rates below 10%. Special torches and powder feeding systems have been developed to meet the specific demands. The process preserves its positive properties concerning low dilution and good controllability during the whole application process.

The principle of the PTA process is illustrated in the picture below.
DURWELD 250T PTA

As a result of customer requests we have introduced a new durable, reliable, and affordable mobile PTA machine into the market. The system is designed for ease of automation into heavy-duty industrial environments.

Developed and manufactured by DURUM in Germany. This mobile and cost-efficient plasma powder welding system DURWELD 250T PTA is PLC-controlled, equipped with a HMI-interface and a separate water cooling unit. Gas flows are controlled by manual gas flow meters. The main inverter power source is primary-switched and generates a very stable arc that ensures consistent and repeatable coatings.

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**Pilot arc current**: 2 - 20 A (100 % Duty Cycle)
**Main arc current**: 5 - 280 A (180 A 100 % Duty Cycle)
**Voltage supply**: 3 x 400 V + N ±10 %
**Supply frequency**: 50 / 60 Hz
**Supply fuse**: 32 A
**Degree of protection**: IP 23
**Plasma gas adjustment**: Manual gas flow meter, 0.2 - 15 l/min
**Shielding gas adjustment**: Manual gas flow meter, 0.2 - 15 l/min
**Transport gas adjustment**: Manual gas flow meter, 0.2 - 15 l/min
**Recommended (max) gas inlet**: 1 bar (1.5 bars)
**Dimensions (W x D x H)**: 60 x 100 x 120 cm (without powder feeder)
**Chiller Unit**: 4.5 kW cooling capacity

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**Job Control**

Automation setup and control is handled by user friendly, industrial strength touch screen panel. The main screen gives access to all relevant welding parameters. The integrated job management provides, apart from recipe storage, the possibility to fix all critical parameters in the jobs. This way you can create your specific recipes tailored to your welding jobs. An optional automation interface is available.

**PLC-controlled**

The use of a modern PLC system provides reliable operation and allows the easy integration in automatic production lines or robot cells.

**HMI-Interface**

The intuitive menu structure and the combination of a touch screen with haptic controls provides easy operation. The HMI-interface is also available as a mobile version which is ideal for remote operation and monitoring tasks.
Made by DURUM in Germany.

This new high performance PTA welding system DURWELD 400T PTA is the latest DURUM development of Plasma Welding Units for industrial applications. The mobile plasma powder welding system is PLC-controlled and equipped with a HMI-interface, gas mass flow meters and a separate 4.5 kW water cooling system. Based on a 400 Amps** welding inverter our DURWELD 400T offers a powerful and reliable power source. The main inverter power source is primary-switched and generates a very stable arc which ensures consistent and repeatable coatings.

Pilot arc current*: 2 - 20 A (100 % Duty Cycle)
Main arc current*: 5 - 400** A (250 A 100 % Duty Cycle)
Voltage supply*: 3 x 400 V + N ±10 %
Supply frequency*: 50/60 Hz
Supply fuse*: 32 A
Degree of protection: IP 23
Plasma gas adjustment: Mass flow meter, 0.2 - 15 l/min
Shielding gas adjustment: Mass flow meter, 0.2 - 15 l/min
Transport gas adjustment: Mass flow meter, 0.2 - 15 l/min
Recommended (max) gas inlet: 1 bar (1.5 bars)
Dimensions (W x D x H): 75 x 120 x 130 cm (without powder feeder)
Chiller Unit: 4.5 kW

* Depending on the user country electric datas can differ! ** at 20% Duty Cycle!

Job Control
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DURWELD 400T PTA

Typical program design
## Manual Hand-held Torches

### DURMAT® PT 150M

The plasma-powder-welding torch DURMAT® PT 150M is designed for manual hard-facing of small areas. The torch is light and handy, allowing deposition rates up to 1.8 kg/h. The shielding gas nozzle is made from ceramic, so short circuits can be avoided. The non melting electrodes are generally tungsten electrodes with oxide additions. The standard length of the tube package is 4 m. Longer tube packages are available on request. Optional a foot pedal is available to adjust welding current.

<table>
<thead>
<tr>
<th>Construction</th>
<th>Manual hand held torch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max current</td>
<td>150 A</td>
</tr>
<tr>
<td>Powder flow rate</td>
<td>Max. 30 g/min (depending on powder density)</td>
</tr>
<tr>
<td>Description</td>
<td>Water cooled hand-held torch</td>
</tr>
</tbody>
</table>

### DURMAT® PT 300M

The plasma-powder-welding torch DURMAT® PT 300M is designed for manual hard-facing with higher deposition rate up to 3 kg/h. The torch is strong and handy and shows excellent properties with high lifespan under rough industrial working conditions. The shielding gas nozzle is made from ceramic, so short circuits can be avoided. The non melting electrodes are generally tungsten electrodes with oxide additions. The standard length of the tube package is 4 m. Longer tube package are available on request. Optional a foot pedal is available to adjust welding current.

<table>
<thead>
<tr>
<th>Construction</th>
<th>Manual hand held torch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max current</td>
<td>300 A</td>
</tr>
<tr>
<td>Powder flow rate</td>
<td>Max. 50 g/min (depending on powder density)</td>
</tr>
<tr>
<td>Description</td>
<td>Water cooled hand-held torch</td>
</tr>
</tbody>
</table>

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**DURMAT® PT 300AUT**

The plasma-powder-welding torch DURMAT® PT 300AUT has the same construction like the hand-held torch PT 300M, but is designed for semi-automatic or automatic welding with welding manipulators or robots. The powder filler material is fed by one feeding hose to the plasma nozzle (4 holes). The non melting electrodes are generally tungsten electrodes with oxide additions. The tungsten electrode diameter being 4 mm. The standard length of the tube package is 4 m. Longer tube packages are available on request.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction:</td>
<td>Machine torch</td>
</tr>
<tr>
<td>Max current:</td>
<td>280 A</td>
</tr>
<tr>
<td>Powder flow rate:</td>
<td>Max. 75 g/min (depending on powder density)</td>
</tr>
<tr>
<td>Description:</td>
<td>Water cooled machine torch for high duty applications</td>
</tr>
</tbody>
</table>

**DURMAT® PT 400AUT**

The plasma-powder-welding torch DURMAT® PT 400AUT is designed for semi-automatic or automatic welding with welding manipulators or robots. The powder filler material is fed by two feeding hoses to the plasma nozzle (6 holes). The separately feeding of matrix powder and carbides is possible by using two separate powder feeders. Compared to the PT 300 the deposition rate is much higher. The non melting electrodes are generally tungsten electrodes with oxide additions. The tungsten electrode diameter being 4 mm. The standard length of the tube package is 4 m. Longer tube packages are available on request.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction:</td>
<td>Machine torch</td>
</tr>
<tr>
<td>Max current:</td>
<td>300 A</td>
</tr>
<tr>
<td>Powder flow rate:</td>
<td>Max. 100 g/min (depending on powder density)</td>
</tr>
<tr>
<td>Description:</td>
<td>Water cooled machine torch for high duty applications</td>
</tr>
</tbody>
</table>
ID-Torches for internal hard-facing of pipes

**DURMAT® PT 200i - 80ID**

The PTA torch DURMAT® PT 200i - 80ID is specially designed for ID deposition welding. The minimum diameter which can be coated is 80 mm. Based on a separate air cooling of the torch shaft the torch can be used in preheated bores up to 300 °C (572 °F).

Depending on application and torch construction, the torches can be positioned by automats or by robots. The standard shaft length is 850 mm. Other lengths are available on request. The torch is available with a 5 m tube package with single connectors or (optional) with robot fast connector and robot tube package, see product SK-ROB.

<table>
<thead>
<tr>
<th>Construction:</th>
<th>Horizontal, 300 °C ambient temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max current:</td>
<td>200 A</td>
</tr>
<tr>
<td>Powder flow rate:</td>
<td>Max. 50 g/min (depending on powder density)</td>
</tr>
<tr>
<td>Standard length:</td>
<td>850 mm (others on request)</td>
</tr>
<tr>
<td>Description:</td>
<td>Machine torch for inner coatings (diameter &gt; 80 mm)</td>
</tr>
</tbody>
</table>

**DURMAT® PT 150i - 65ID**

The PTA torch DURMAT® PT 150i - 65ID is specially designed to use special anodes. Those anodes are allowed to hardface pipes with a minimum inner diameter > 65 mm. The standard tungsten electrode diameter being 4 mm.

Depending on application and torch construction, the torches can be positioned by automats or by robots. The standard shaft length is 850 mm. Other lengths are available on request. The torch is available with a 5 m tube package with single connectors or (optional) with robot fast connector and robot tube package, see data sheet SK-ROB.

<table>
<thead>
<tr>
<th>Construction:</th>
<th>Horizontal, 150 °C ambient temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max current:</td>
<td>150 A</td>
</tr>
<tr>
<td>Powder flow rate:</td>
<td>Max. 40 g/min (depending on powder density)</td>
</tr>
<tr>
<td>Standard length:</td>
<td>600 mm (others on request)</td>
</tr>
<tr>
<td>Description:</td>
<td>Machine torch for inner coatings (diameter &gt; 65 mm)</td>
</tr>
</tbody>
</table>

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Special PTA Torches

**DURMAT® PT 200S AUT**

The plasma-powder-welding torch DURMAT® PT 200S AUT is designed to use special anodes, which allow hard-facing in poorly accessible welding areas, e.g. glass moulds. The non melting electrodes are generally tungsten electrodes with oxide additions. The tungsten electrode diameter being 2.4 or 4 mm. Depending on application and torch construction, the torches can be positioned by automats (AUT torches) or by robots (ROB torches). The standard length of the tube package is 4 m. Longer tube packages are available on request.

**Construction:** Machine torch

**Max current:** 200 A

**Powder flow rate:** Max. 60 g/min (depending on powder density)

**Description:** Water cooled torch

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**DURMAT® PT 400ROB**

The plasma-powder-welding torch DURMAT® PT 400 ROB is specially designed for continuous PTA hard-facing with high deposition rate. Based on the integrated fast coupling system the torch must be dismantled or changed for maintenance fast and easily. Depending on application and torch construction, the torches can be positioned by automats (AUT torches) or by robots (robot torches).

The torch must be connected ONLY to special robot tube package which is not included.

**Construction:** Robot / machine torch

**Max current:** 150 A

**Powder flow rate:** 5 - 20 g/min (depending on powder density)

**Description:** Water cooled torch

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The powder feeder PFU 4 is available with one or two powder feeding outlets. The maximum feeding rate is 200 g/min*. Two powder feeders PFU 4 can be driven in parallel (only by power sources with the optional second motor control card) for applications that require feeding of different powders in the weld pool, e.g. matrix and carbides.

Feeding rate step controlled via feeding wheel speed directly from PLC. The stand alone system is available on request.

| Carrier gas: | Ar |
| Carrier gas flow rate: | 0 - 6 l/min |
| Powder reservoir: | 2.3 l |
| Dimensions (L x W x H): | 310 x 170 x 470 mm |
| Powder feed rate*: | 2 - 200 g/min |
| Container size: | 12 kg max. (depending on density) |
| Gas pressure: | max. 1 bar |
| Weight: | 7.5 kg |

* Depending on feeding wheel configuration, torch, anode and powder density

The powder feeder PFU 35 is designed for continuous hard-facing process and is available with one or two powder feeding outlets. The maximum powder feeding rate is 200 g/min*). The maximum powder capacity is 35 kg. The powder container has an integrated sensor to monitor the minimum filling level (1 kg).

| Carrier gas: | Ar |
| Carrier gas flow rate: | 0 - 6 l/min |
| Powder reservoir: | 35 kg max (depending on density) |
| Dimensions (L x W x H): | 240 x 260 x 670 mm |
| Powder feed rate*: | 2 - 200 g/min |
| Gas pressure: | max. 1 bar |
| Weight: | 15 kg |

* Depending on feeding wheel configuration, torch, anode and powder density

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Quick coupling for PTA torches

The quick coupling system SK-ROB and the torch holder PTH 45 were developed for the PTA torches DURMAT® PT-series. It can be used for all automatic or semi-automatic welding systems.

Water cooling and welding gases (plasma gas, shielding gas) are lead to the welding head via the central coupling plug. The plug for the powder feed and the pilot current are outside of the central coupling. The whole PTA welding torch combined with the quick coupling system SK-ROB and the torch holder PTH 45 can be exchanged or removed from the machine for maintenance easily without disassembling the hose package.

| Main current: | 10 - 300 Ampere |
| Pilot current: | 10 - 20 Ampere |
| Tube package:  | 10m |

Torch holder DURMAT® PTH 45

The torch holder PTH 45 is available for all DURMAT® PTA torches. It can be connected to robot switch-off sockets or other manipulator equipment. Based on the integrated insulation short circuits between torch and manipulator can be avoided.
DURUM designs and manufactures special PTA welding and manipulator systems, customized to work with our DURMAT® materials on your shop floor.

The systems can be supplied with a variety of torch manipulators and part positioning devices for semi-automatic and automatic welding. All motions of the single axis or complete hard-facing systems are PLC controlled.

Compact single axis  Compact single axis with Z-Liftmodules  Complete X-Y-Z manipulator

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Typical Applications
Typical Applications
We understand Wear Protection

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