PLASMEQ

Activities & Technology

October 2011

Activities

- ✓ **industrial equipment**
  - R&D
  - production
  - sales
- ✓ **medical equipment**
  - R&D
  - production
  - sales
- ✓ **services**
  - repair and manufacture of single and small-scale components and structures of aluminum alloys
  - outsourcing for large companies: serial production and repair of products from aluminum alloys
  - serial production of own developed products from aluminum alloys
  - implementation and construction of integrated production lines in factories
  - maintenance and repair of plasma equipment
  - training and certification of professionals working with plasma welding and cutting equipment

Technology: A Key Development

A key development - plasmatron

✓**Metalworking**

- manual and automatic reverse polarity welding of aluminum alloys
- plasma welding of copper, titanium, nickel
- plasma surfacing
- spraying the surface layers of metal parts
- plasma brazing of aluminum alloys using low-temperature solders
- plasma cutting of metals
- plasma surface thermal treatment
- plasma surface hardening

✓ **Medicine**

- treatment of infected wounds and chronic nonhealing ulcers

Technology: metalworking

Plasma welding of aluminum alloys

Application

- manufacturing and repair of aluminum alloy constructiions in both automatic and manual mode on the shop floor and “on the spot”(mounting)

Advantages

- high quality welds (even outdoors in the wet and windy weather);
- high-performance welding of metal thicknesses of 5-30 mm
- possibility of welding of virtually any alloy
- lower requirements on the quality of metal preparation for welding
- preheating for welding is not required
- high reliability, mobility, efficiency and easy maintenance of equipment

Technology: metalworking

Straight polarity plasma welding

Application

- manufacturing of welded non-ferrous and high alloy constructions in the fields of specialized engineering, aerospace, chemical engineering etc.(high-alloy steels, titanium alloys, special-purpose alloys based on nickel and other metals)

Advantages

- reduction of costs for mechanical processing in the preparation of the joints and welded seams after welding in 3-5 times
- reduced consumption of welding materials in 3-5 times
- improving the quality of welds up to 100%

Technology: metalworking

Surfacing on straight and reverse polarity

Application

- manufacturing and recovery of parts of power equipment, electrical and hydraulic equipment, engines

Advantages

- high power and reliability of plasma torches, the possibility of prolonged operation at a high power of welding arc, adjustment of surfacing modes in a wide range, high quality of deposited metal at a high performance

Technology: metalworking

“Cold" electrode plasma cutting

Application

- plasma cutting of any metal up to 50 mm in automatic or manual mode

Advantages

- high reliability and continuous operation in automatic plasma cutting mode
- unlimited number of starts and reduced costs of the electrode and the nozzle of the plasma torch, which is especially important for manual cutting
- stability of cutting and durability of cutting torch does not depend on the cut metal contamination, cleanliness and air humidity
- low rate of sensitivity of cutting speed on the length of welding arc
- cost per meter of cut is reduced in 1.5 - 2 times in comparison with known methods of plasma cutting

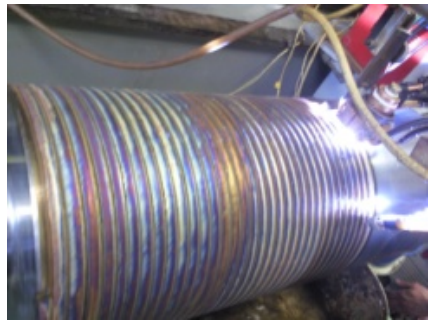
Technology: metalworking

Plasma surface thermal processing

Application

- surface finishing
- surface hardening
- surface cleaning

An example of a plasma surface thermal treatment



Advantages

- increase of the surface hardness of parts in 3-4 times
  various depth of thermal processing
- finishing surface processing with or without melting of the surface

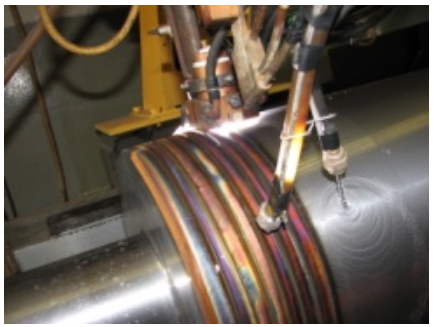
An example of cathodic cleaning

Technology: metalworking

Combined plasma technology

A combination of energy sources in the working area gives sinergetic effect

Plasma welding with consumable electrode



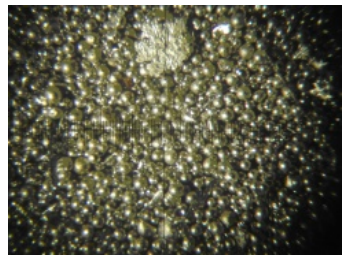
- The use of plasma welding with consumable electrode increases the speed of welding and surfacing of non-ferrous metals and high-alloys in 3 to 10 times
- Provides control over the transfer of electrode metal, which enables to adjust the depth of penetration of the base metal
- The interaction of electromagnetic fields of the plasma arc and the arc of consumable electrode enhances the stability of the process that produces defect-free welds

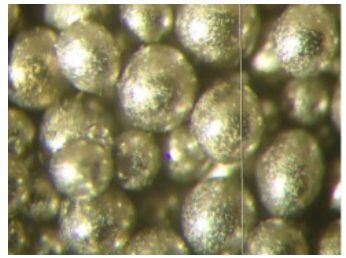
Technology: metalworking

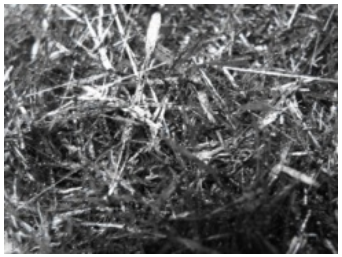
Metal powders for nanotechnology

Plasma technology can produce powders of metals with a given particle size and chemical composition for nanotechnology

We have improved the properties of the nanopowder - granules of powder acquired regular spherical shape, and porosity of the surface oxidation is not observed







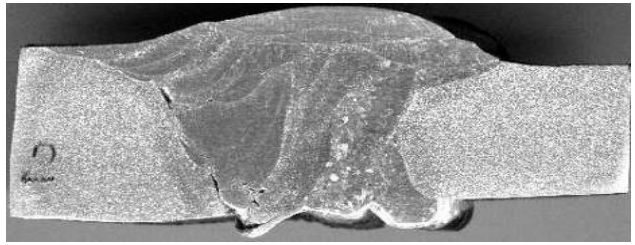
In addition, during the experiments were obtained filiform spraying products (accepted definition is a needle or tube). Obtained powders are suitable for use in the chemical industry as fillers for filters

Technology: examples of work

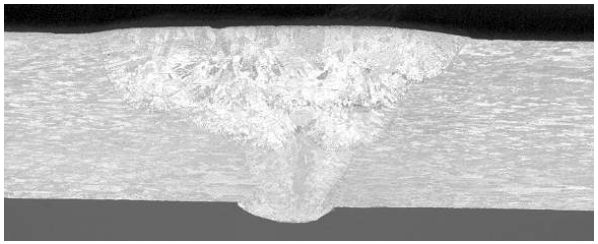
Repair welds performed by TIG welding contain a large number of unacceptable defects .

These defects are caused by low-power heat source, a large number of passes, and low quality of metal preparation for welding

δ=16мм + 12мм, manual TIG welding with consumable electrode



δ=20мм, manual plasma welding



Manual plasma welding provides defect-free welds of a required thickness.
The seam is formed with a smooth transition to the base metal, the internal defects are absent.

Technology: medicine

In medical equipment developed by PLASMEQ, torch is used as a generator of eradiation.

During irradiation of plasma flow is used a wide range of light emission.

Therapeutic effect is achieved by controlling the emission spectrum and modulation of specific ranges of the plasma radiation.

The key difference between the equipment developed by PLASMEQ and existing radiotherapy techniques and methods of light exposure is a wide range of radiation over the entire wavelength range (from infrared to ultra-short) with the modulation of power in certain range.

In PLASMEQ medical equipment is used the resultant effect of the following factors:

- ✓ heat
- ✓ emission of elementary particles
- ✓ eradiation

This cumulative impact has a synergistic effect when diseased tissue exposed to eradiation, which leads to significant positive results.

Technology: medicine

Preliminary experience has shown high efficacy in treating a wide range of skin diseases and cutaneous manifestations of the somatic and infectious diseases:

- ✓ effective in treatment of acute infectious lesions of the skin and mucous membranes (eczema, neurodermatitis, lichen, diathesis, herpes);
- ✓ in treatment of nonhealing ulcers and fistulas of different origin
- ✓ post surgical treatment

Thank you