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LASER TECHNOLOGY AND EQUIPMENT FOR

# MANUFACTURE OF MULTILAYER BELLOWS

PWI has developed the technology and equipment for laser welding of thin-wall pipes of stainless steel for manufacture of multilayer bellows, which carry and divide liquid and gaseous media, including aggressive ones.

Following the developed technology the bellow consists of several laser-welded thin-wall pipes (from 3 to 10 layers) of 0.15–0.20 mm thickness each. The bellow will keep working capacity in such a multi-layer bellow structure, even if one welded joint breaks in process of operation.

## Development advantages:

- > reduced amount of rejects from 50% in argon-arc welding to 0.5 % in laser welding
- > 4 times rise of productivity
- > cyclic strength, corrosion resistance and other characteristics of laser-welded multilayer bellow 1.5–4 times exceed the characteristics of single layer bellow made by argon-arc welding (depending on number of layers and bellow sizes).



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## UNIT FOR MANUAL LASER WELDING

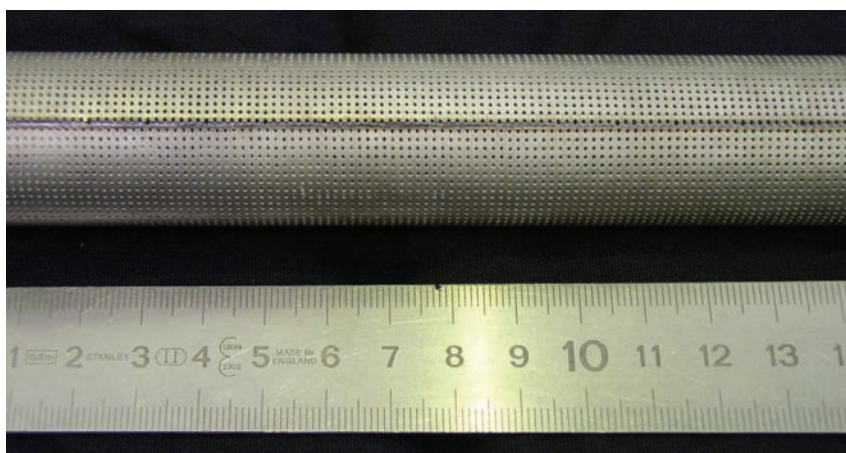
PWI by the order of carriage works (Changchun, China) has developed the unit for manual laser welding of car elements of modern high-speed trains. Weight-dimensions characteristics of the developed tool allow welding in different spatial positions. Carried metallographic investigations and mechanical tests of the welds produced with developed manual laser tool showed that the level of mechanical characteristics of given welded joints are as good as characteristics of the joints made using automatic laser welding.



## LASER WELDING

### OF BODY ELEMENTS WITH LOOSE EDGES

A technology for brazing of body elements of filters of 0.5–0.6 mm thickness stainless steels for paints and lacquers was replaced with laser welding using filler material in form of metallic powder. As a result, amount of defective products became 10 times smaller (spoilage in laser welding is 0.5 %). Strength and corrosion resistance of the joint is on the level of body base metal.



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