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Amec Foster Wheeler Energy Fakop



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❑ Amec Foster Wheeler Energy Fakop being part of global Amec Foster Wheeler company is known worldwide as a reliable power industry partner. Founded in 1880, Fakop still manufactures high-quality products for customers all over the world.

❑ Fakop is joint venture, its major shareholder is Amec Foster Wheeler Energia Polska with rough 54% shares. Other shareholders – French company CNIM, Finnish environmental fund – NEFCO, Japanese company MARUBENI, Polish company – Warsaw Equity Holding and physical persons do represent totally 46% of shares. Amec Foster Wheeler Energy Fakop is 100% private owned company.

❑ As a part of Amec Foster Wheeler GPG group we have whole set of technological skills necessary to deliver product of excellent quality. Components for circulating fluidized bed boilers (CFB) in the last 20 years formed a major part of products supplied by Fakop, it doesn't mean however that other types of boilers are not in Fakop's area of capabilities.

Amec Foster Wheeler Energy Fakop

Fakop's overall manufacturing program includes:

- ☐ **Pressure parts for :**
 - CFB and PC boilers,
 - gas boilers,
 - waste heat boilers,
 - recovery boilers,
 - heat recovery steam generators,
 - package boilers,
- ☐ **Solids separators,**
- ☐ **Coils, bundles, and membrane walls,**
- ☐ **Testing and technical approvals certified by internationally recognized agencies,**
- ☐ **Spare parts.**

Reliable Manufacturer

Our operations have been evaluated and approved by a number of international recognized approval bodies such as:

- ☐ **UDT (Office of Technical Inspection), manufacturing, assembling, repairs, training and examination of welders, Poland**
- ☐ **ASME Code S and U stamp for boilers and pressure vessels, USA**
- ☐ **TUV AD 2000 Merkblatt HPO, TRD 100 and TRD 201, Germany**
- ☐ **Approval for welding according to EN ISO 3834-2 (Quality requirements for fusion welding)**
- ☐ **PED Directive 2014/68/EU Annex III Module H1, H & D1 (Design and manufacture of boiler parts, piping and pressure vessels and their parts)**
- ☐ **PED Directive 2014/68/EU Annex I, Section 3.1 manufacture of pressure parts of boilers up to category IV**
- ☐ **TUV AD-2000 Merkblatt HP 7/1 Ch. 2 and EN ISO 17663 – heat treatment activities**
- ☐ **Approval of the laboratory PN-EN ISO/IEC 17025:2005**

Engineering Office and Workshop Documentation Dept.

**Engineering Office is capable to design all boiler components.
Designer's software / tools used for this purpose:**

PDMS,

TEKLA STRUCTURE,

AUTOCAD,

FLUENT,

ANSYS,

AUTOPIPE

and other necessary software

Workshop Documentation Department as a part of Engineering Office prepares detail documentation of the boiler pressure parts (based on 2D drawings or 3D PDMS model) and workshop documentation with all the technological specifics for Amec Foster Wheeler Energy Fakop workshop.

Workshop

AREA:

AFWE Fakop's total area is equal to : 99 700 m²
Production area about : 11 750 m²

Panel welding ; Membrane wall assembly
Header fabrication; Heavy modules assembly division

Mechanized coils line with bending area

Storage area about : 8 000 m²

CRANE CAPACITIES:

Overhead / mobile cranes up to 100 ton

KEY MACHINES AND PRODUCTION LINES:

- ☐ Shot blasting machines (2 pcs)
- ☐ Automatic lines (3) for membrane walls
- ☐ Automatic lines for coils (2) (cold bending up to 1.0-1.1 R/d ratio)
- ☐ Gantry welding machine (1 pc) (SAWx4pcs or SMAWx4pcs)
- ☐ Hot bending stand up to 0.6 R/d ratio (100T bending press, inductor)
- ☐ Bending machine for panels (1 pc)
- ☐ Cold and hot swaging equipment (2 pcs)
- ☐ Drilling machine WK 600 CNC for header fabrication (1 pc)
- ☐ Lathes for mechanical operations (beveling, grinding) (2 pcs)
- ☐ Spiral overlay stand for 360 round overlaying
- ☐ Other needed for pressure parts fabrication



Our experience and new technologies

Modern low- and high-alloy steels used in manufacturing and in development process:

MEMBRANE WALLS:

- 7CrWMoNb9-6 (T23)
- 7CrMoVTiB10-10 (T24)
- X10CrMoVNb9-1 (T91)



COILS:

- 7CrMoVTiB10-10 (T24)
- SA-213 TP304H
- SA-213 TP310H
- X10CrMoVNb9-1 (T91)
- X10CrNiCuNb18-9-3 (Super304HCu)
- X12CrCoWMoVNb12-2-2 (VM12SHC)
- X20CrMoV12-1
- X6CrNiNbN25-20 (HR3C)
- X7CrNiNb18-10 (TP347H), X8CrNi19-11 (TP347HFG)
- Duplex and super duplex

HEADERS:

- 15NiCuMoNb5 (WB36)
- X10CrMoVNb9-1 (P91)
- X11CrMoWVNb9-1-1 (E911)
- X10CrWMoVNb9-2 (P92)
- X20CrMoV12-1



Heat Treatment Possibilities

HEAT PROCESSES:

- Preheating for welding and plastic forming
- Stress relieving, tempering
- Normalizing
- Solution annealing (up to 1200 °C)

EQUIPMENT:

- Chamber electric furnace PK-1000
chamber's dimensions: 6m x 2m x 1,5m
max. weight of batch: 5 t
max. temperature: 1000 °C
- Mobile resistance heat treatment power sources
quantity: 10 pcs.
max. temperature: 1000 °C
power: 65 kW
- Chamber electric furnace for higher alloyed tube panels (up to 20 m length)
- System for preheating of higher alloyed tube panels to welding – based on electric resistance heating elements (max. temperature: 300 °C)



Heat Treatment Possibilities

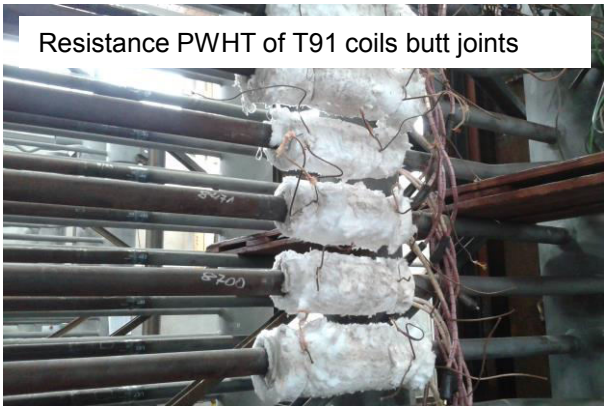
HEAT PROCESSES APPLICATIONS



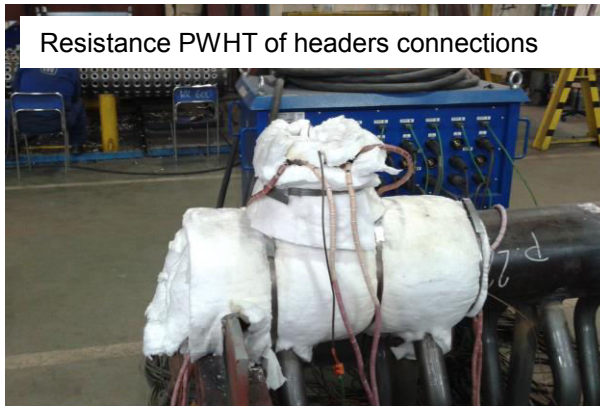
Resistance preheating of headers for welding



Solution annealing process - Heatmasters

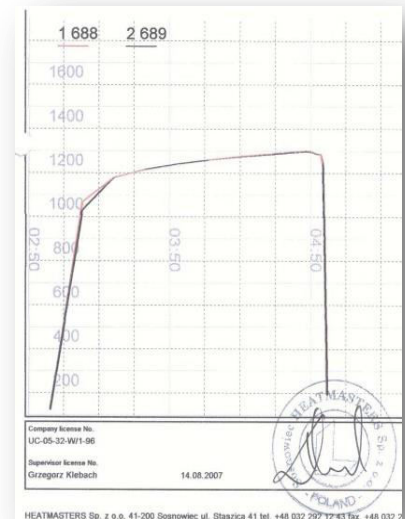


Resistance PWHT of T91 coils butt joints



Resistance PWHT of headers connections

Heat treatment of large size boiler elements and solution annealing process are executed in cooperation with Heatmasters, renowned worldwide subcontractor, located in neighborhood.



Factory Testing

NON – DESTRUCTIVE TESTING

- Radiographic (RT)
- Ultrasonic (UT)
- Phase array ultrasonic (PAUT)
- Magnetic particle (MT)
- Dye penetrant (PT)
- Chemical composition testing



DESTRUCTIVE TESTING

- Hardness
- V-Charpy
- Tensile strength
- Bend tests
- Membrane tensile strength
- Micro studies by photos
- Macro studies by photos
- Intergranular corrosion testing





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Interesting Experiences in Manufacturing



HOT BENDING

ASSEMBLING OF FINNED TUBE BENDING



HRSG – SUPERHEATER P91



SPIRAL OVERLAYING



OVERLAYING OF MEMBRANE
WALLS

On Site Mobility



Complete Assembling and Transportation

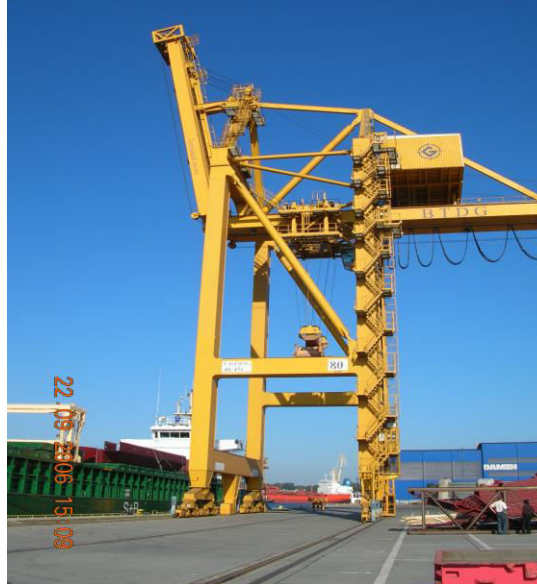


SHIPPING AND TRANSPORTATION



INLAND ROAD TRANSPORTATION - Amec Foster Wheeler Energy Fakop has a possibility to ship out on the wheels elements up to 30 m long, 5,5 m wide and 4 m high with weight up to 90 tons.

SHIPPING AND TRANSPORTATION



OCEAN FREIGHT - assuming access to the assembly area at the polish export seaports Gdynia and Szczecin where the final assembly takes place there are almost no limitations with reference either to dimensions as well as unit weight.

Some pics from Workshop

