



M'News

Issue No.20

M'News is MACOGA's online news bulletin featuring the latest development of significant projects, achievements, events and expansion joints related news.

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FCC EXPANSION JOINTS FOR EUROPEAN REFINERY

We have successfully completed the design, manufacturing and testing of 6 units FCC Expansion Joints for a refinery in Europe.

The supplied FCC Expansion Joints have been the following and with the following parameters:

2 units SPENT CATALYST STANDPIPE –WITH PANTOGRAPH - HOT WALL DESIGN

- I.D. 980 mm L: 3600 mm
- 2 ply testable bellows in ASTM B 443 UNS N06626 # Inconel 625 LCF
- With bellows sealing system and thermocouples
- Abrasion resistant lining RESCOBOND AA 22 S (UOP 3-25)
- Design Pressure: 5,97 kg/cm2(g)
- Temperature: Bellows 538 °C - Pipe/medium 566 °C
- Medium: Catalyst

2 units RECIRCULATION CATALYST EXPANSION JOINT – WITH PANTOGRAPH - COLD WALL DESIGN

- I.D. 950 mm L: 3600 mm
- 2 ply testable bellows in ASTM B 443 UNS N06626 # Inconel 625 LCF
- With bellows sealing system and thermocouples
- Refractory lining installed on-site
- Design Pressure: 5,24 kg/cm2(g)
- Temperature: Bellows 538 °C - Pipe/medium 343/775 °C
- Medium: Catalyst

2 units RECIRCULATION CATALYST EXPANSION JOINT – WITH PANTOGRAPH - COLD WALL DESIGN

- I.D. 1230 mm L: 4000 mm
- 2 ply testable bellows in ASTM B 443 UNS N06626 # Inconel 625 LCF
- With bellows sealing system and thermocouples
- Refractory lining installed on-site
- Design Pressure: 4,25 kg/cm2(g)

- Temperature: Bellows 538°C - Pipe/medium 343/775°C
- Medium: Catalyst

MACOGA FCC Expansion Joints undergo a comprehensive and rigorous quality control and testing programme including:

- 3D Drawings
- Advanced Review of Calculations
- Check Material and welding consumables certificates
- Review and update WPS, PQR and WQR
- Review NDE Procedures & Operator Qualification
- RT- Radiographic Examination
- PT - Liquid Penetrant Examination
- MT - Magnetic Particle Examination
- Hardness Testing of Welds
- Pressure & Leak Detection Test
- PMI - Positive Material Identification
- Inspection of Refractory Lining
- Surface Preparation & Paint System
- Check Packing & Marking





ON-SITE SERVICE. SUCCESSFUL INSPECTION OF 2 PLY TESTABLE BELLOWS IN THE MIDDLE EAST

In two ply testable bellows each ply is designed for the full operating conditions (pressure, temperature and movements). If a hole or stress crack develops in the inner ply during service, the outer ply takes over without exposing operators to increased risk or creating the need for an unscheduled shutdown.

On this occasion, our engineers provided our client with an exhaustive inspection and check of a large number of 2 ply testable bellows installed at his plant in the Middle East.

The life of the expansion joints varies with the design, storage conditions, installation practices, application, and service. Appropriately timed inspections, repairs, and/or replacement of critical joints will ensure the reliable operation of the associated equipment and of the whole plant.

The objective of this test is to confirm that there are no leaks in the outer ply or in the inner ply and that there is no leaking in the connection welds either. The test is carried out pressurizing the existing space between layers, and observing that there is no decrease in pressure. If the bellows fails to maintain pressure, a soapy bubble check on the exterior surfaces and welding attachments can be performed to determine the location of the leak.





LARGE DOUBLE HINGED EXPANSION JOINT DN 4730 MM AND HOT BOX FOR MIDDLE EAST POWER PLANT

MACOGA has completed the design, manufacturing and testing of a large size MWY DN 4730 mm (186") Double Hinged Expansion Joint plus a Hot Box Steam Duct with nozzles for a gas-fueled plant in the Middle East.

The Hot Box and the Expansion Joint connect the Turbine to the Steam Duct of the Condenser.

The power plant will be fueled by natural gas and it is due to start operating in the second half of 2020. The plant will supply 3.5% of the country's electricity needs and produce power at 60% efficiency, which will make it the most efficient power plant in the country.





DELIVERY OF EXPANSION JOINTS FOR BIOMASS POWER PLANT IN SOUTHWESTERN EUROPE

We have successfully completed the design, manufacturing, testing and shipping of 2 units Universal Tied MWL Series DN 2100 (83") and 1 unit Single Untied MFA Series DN 2800 (110") Expansion Joints for a Biomass Power Plant in Southwestern Europe.

To produce this energy, the plant will use forest biomass. In this way, the project will contribute to the maintenance of the forests of the area and the prevention of fires, encouraging the collection of small-sized wood waste that is normally discarded for industrial use. The biomass used by the plant will come from forests certified by the FSC or PEFC systems.

Once in operation, scheduled for 2020, the plant will increase the generation of energy from renewable sources and thus meet the objectives of reducing carbon dioxide emissions.





FCCU RECIRCULATION CATALYST AND REGENERATED CATALYST EXPANSION JOINTS FOR REFINERY IN THE FAR EAST

We have successfully completed the design, manufacturing and testing of two units FCC Expansion Joints for a Refinery in the Far East.

The supplied FCC Expansion Joints have the following parameters:

- Recirculation Catalyst Expansion Joint
- Pantograph system
- I.D. 1140 mm (45")
- Length: 4000 mm (157.48")
- 2 ply testable bellows in ASTM B 443 UNS N06626 # Inconel 625 LCF
- With bellows sealing system and thermocouples
- Refractory lining
- Design Pressure: 4,53 barg (65,70 psi)
- Temperature: Bellows 538 °C - Pipe/medium 343 / 775 °C
- Medium: Catalyst

Regenerated Catalyst Expansion Joint

- Pantograph system
- I.D. 940 mm
- Length: 4000 mm (157.48")
- 2 ply testable bellows in ASTM B 443 UNS N06626 # Inconel 625 LCF
- With bellows sealing system and thermocouples
- Refractory lining
- Design Pressure: 4,9 barg (71 psi)
- Temperature: Bellows 538 °C - Pipe/medium 343 / 775 °C
- Medium: Catalyst

MACOGA FCC Expansion Joints undergo a comprehensive and rigorous quality control and testing programme including:

- Review Drawings
- Advanced Review of Calculations
- Check Material and welding consumables certificates
- Review and update WPS, PQR and WQR

- Review NDE Procedures & Operator Qualification
- RT- Radiographic Examination
- PT - Liquid Penetrant Examination
- MT - Magnetic Particle Examination
- Hardness Testing of Welds
- Pressure & Leak Detection Test
- PMI - Positive Material Identification
- Inspection of Refractory Lining
- Surface Preparation & Paint System
- Check Packing & Marking

In addition, our experience is reinforced through continuous training and qualification programmes, which ensures that we are constantly attentive to the latest technological advances, regulatory requirements and test methodologies.





IN-LINE PRESSURE BALANCED AND HIGH PRESSURE EXPANSION JOINTS FOR GEOTHERMAL POWER PROJECTS IN TURKEY

We have successfully completed the design, manufacturing and testing of 4 units In-Line Pressure Balanced and 8 units Single Axial Unrestrained Expansion Joints for a geothermal Power Project in Asia.

The design and construction parameters are:

In-Line Pressure Balanced MPB-I Series

- DN 750 mm (30")
- L: 3885 mm
- Multiply Bellows in SS321
- Design Pressure: 8,3 barg
- Temperature: 112 °C °C
- Medium: pentane

Single unrestrained MFW Series

- DN 500 mm (20")
- L: 1820 mm
- Multiply Bellows in SS321
- Design Pressure: 30,1 barg
- Test pressure: 45.15 barg

- Temperature: 200 °C
- Medium: pentane

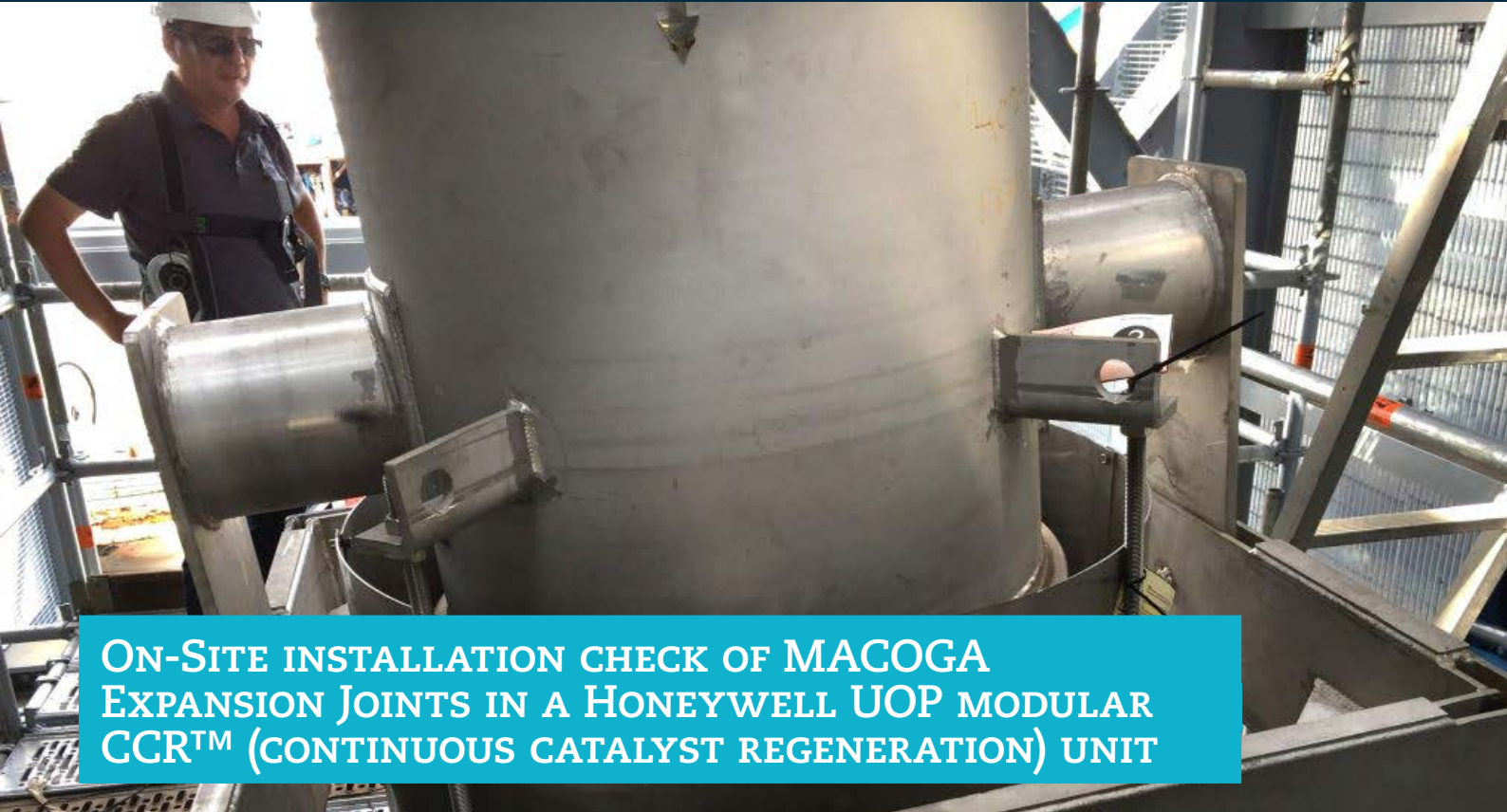
Geothermal energy is the heat from the Earth. It's clean and sustainable. Resources of geothermal energy range from the shallow ground to hot water and hot rock found a few kilometers beneath the Earth's surface, and down even deeper to the extremely high temperatures of molten rock called magma.

In the last years MACOGA has successfully delivered highly engineered Expansion Joints to quite a few number of Geothermal Plants all over the world like the:

- Ken Kipas 2 Geothermal Power Plant, Turkey
- Salihi Manisa Geothermal Power Plant, Turkey
- Sultanhisar 1+2 Geothermal Power Plant Project, Turkey
- Anadolu Cam Yenisehir power plant, Turkey
- BJE SARAYKÖJ DENIZ II Geothermal Power Station, Turkey
- SALVATT II, Turkey
- AMATITLAN Geo Power Project, Guatemala
- Hellisheiði Geothermal Power Plant Island

- PICO VERMELHO Geothermal, Azores, Portugal
- LLI Blundell Geothermal Power Station, Utah, USA
- Heber II Geothermal Plant, Imperial Valley California USA
- Ormesa II Geothermal IH (OGIH) California, USA
- Solargenix Energy, Nevada, USA
- Desert Peak GeoThermal Project, Churchill County, Reno, Nevada-USA
- OSERIAN Geothermal Plant, Kenya
- Mokai and Wairakei projects, Tahupo Volcanic Zone, New Zealand
- Noa Project, Spain
- Dora II Geothermal Power Station, Turkey
- Tuzla Geothermal, Turkey
- Landau Geothermal Power Plant, Germany
- Raft River Geothermal Project, Idaho-USA
- Bereket geothermal, Turkey
- ICQ Energetica - Italy





ON-SITE INSTALLATION CHECK OF MACOGA EXPANSION JOINTS IN A HONEYWELL UOP MODULAR CCR™ (CONTINUOUS CATALYST REGENERATION) UNIT

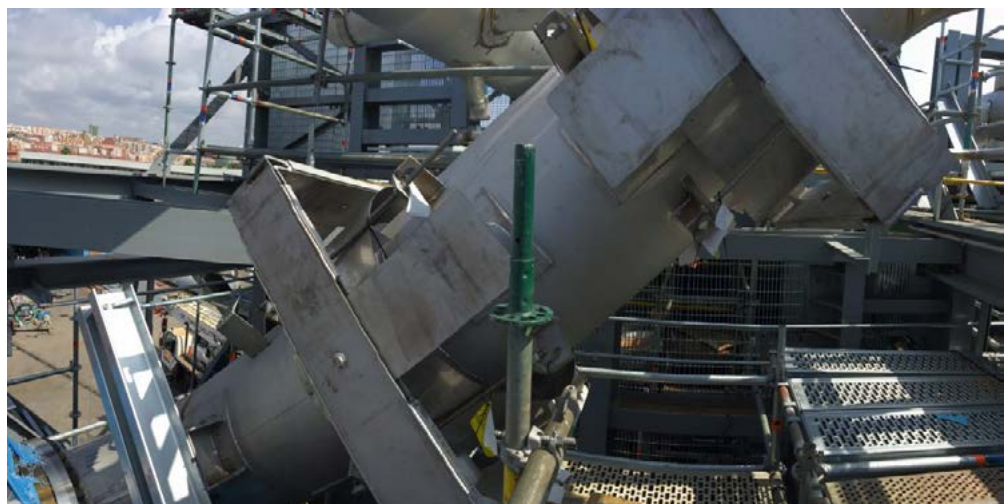
Expert assistance when and where you need it.

This time, our engineers provided UOP and the construction company with an exhaustive inspection and check of the installation of the Expansion Joints supplied for a new Honeywell UOP modular CCR™ (Continuous Catalyst Regeneration) unit for a Petrochemical Plant in Texas, USA.

Qualified and trained Engineers are available for guidance and instruction during assembly and/or installation process (by others) of our Expansion Joints and site inspections to evaluate the condition of the Expansion Joints.

We offer pre-instruction and guidance for starting assembly and periodical inspections that guarantee the correct procedures are being carried out.

The life of the expansion joints varies with the design, storage conditions, installation practices, application, and service. Appropriately timed inspections, repairs, and/or replacement of critical joints will ensure the reliable operation of the associated equipment and of the whole plant.





HIGH PRESSURE GIMBAL EXPANSION JOINT FOR A CHEMICAL PLANT IN EUROPE

We have successfully completed the design, manufacturing and testing of one unit High Pressure Gimbal Expansion Joint for a Chemical Plant in Europe.

What makes this a special unit is that the bellows are manufactured in Alloy C276 (2.4819) UNS N10276 and all its hardware (gimbal system, flanges, supports, reinforcement rings, etc. in A240 Tp 304H and that it has been designed for 20.0 barg (290 psi) and has been tested at 42.76 barg (609 psi).

Alloy C276 is a nickel alloy which exhibits excellent corrosion resistance in harsh environments. It is known as the most universally corrosion resistant material available today.

Type 304H has a high carbon content making the steel more suitable for use in applications where elevated temperatures are present. It is an austenitic chromium-nickel steel alloy and the greater carbon content delivers an increased tensile and yield strength.

The material is recommended for use in ASME pressure vessels in working service above 525 °C due to the grade's heat resistant properties





UOP FCC REACTOR INTERNAL EXPANSION JOINT DN1068 (42") FOR CENTRAL EUROPEAN REFINERY

A Universal Untied FCC Reactor Internal Expansion Joint for a UOP Fluid Catalytic Cracking Process (Resid) have been successfully designed, manufactured and tested for a Central European Refinery.

Fluid Catalytic Cracking (FCC) technology involves high tech Expansion Joints and each technology provider or licensor has exclusive designs for these components. MACOGA has worked with all the major FCC licensors and is familiar with their designs.

The design and construction details of this unit are:

- Medium: Catalyst
- Design Pressure: 0.35 barg (5.07 psi)
- Bellows Temperature: 538 °C (1000 °F)
- Axial movement: - 85 mm / + 95 mm
- Lateral movement: 16 mm
- Angular movement: 0.5 deg
- Bellows: Incoloy 825
- Pipes: A387 Gr11 Cl 2
- Hexmesh: SS410 (UOP 3-25-7)
- Lining: Actchem 85



GLOBAL PRESENCE WORLD-CLASS COMMITMENT

Our expansion joints are present in more than 90 countries across all continents performing demanding tasks. MACOGA is always ready to provide support exceeding customer expectations.

We are conveniently located in NW Spain near two international airports (SCQ and LCG) and two deepwater oceanic sea ports (Vigo and La Coruna).