



## M'News

Issue No.15

**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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## HIGH PRESSURE EXPANSION JOINTS FOR A WATER TRANSFER PIPELINE IN NORTH AFRICA

MACOGA has completed the production of 6 units **High Pressure** Universal Untied Reinforced expansion joints MFD Series DN1800 and DN1000.

These expansion joints, designed to operate at 33 barg pressure and tested at 47,2 barg incorporate reinforced rings around the convolutions.



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## MACOGA EXPANSION JOINTS FOR SOYO COMBINED CYCLE POWER PLANT IN ANGOLA

MACOGA has completed the production of a large **Universal Untied expansion joints** MFD Series DN4600 for the steam surface condenser at the Soyo Combined Cycle power plant in Angola.

This power plant will produce 750 megawatts of electricity, which will be able to supply much of the country's energy needs, whether household or industrial and is expected to start operating in 2017.

A combined cycle power plant is a power plant where thermal energy from fuel is converted into electricity through two thermodynamic cycles: first from burning natural gas and then making use of the steam produced.

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## MACOGA RECTANGULAR EXPANSION JOINTS FOR PETRONAS RAPID PROJECT

MACOGA has successfully designed, manufactured and tested 2 large Universal Rectangular expansion joints **MRUD** Series NB 2685 x 1042 mm and 3 meters long units for the PETRONAS Rapid Project.

Petronas is developing a refinery and petrochemical integrated development project (RAPID) and other associated facilities in Pengerang, Southern Johor, Malaysia.

The RAPID project refinery will produce gasoline and diesel that will meet Euro 4 and Euro 5 fuel specifications. It will also supply feedstock for the petrochemical complex, which will create highly specialised chemicals. The refinery will use modern technologies to develop these products and follow stringent environmental regulations.

Petroleum Nasional Berhad (PETRONAS) is Malaysia's fully integrated oil and gas multinational ranked among the largest corporations on Fortune Global 500®. Operating core business in the Upstream and Downstream sectors, has a presence in more than 60 countries.

Petronas is among the top five oil and gas companies (in terms of production) and the most profitable company in Asia.



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## LARGE M-LENS EXPANSION JOINTS FOR CEMENT PLANTS

MACOGA has successfully designed, manufactured and tested very large **M-Lens expansion joints** NB 5400, NB 2600 and NB 1200 for cement plants.

These multi-convolution M-Lens units are manufactured in one ply of 3 mm thickness and supplied in sections to make transport feasible.



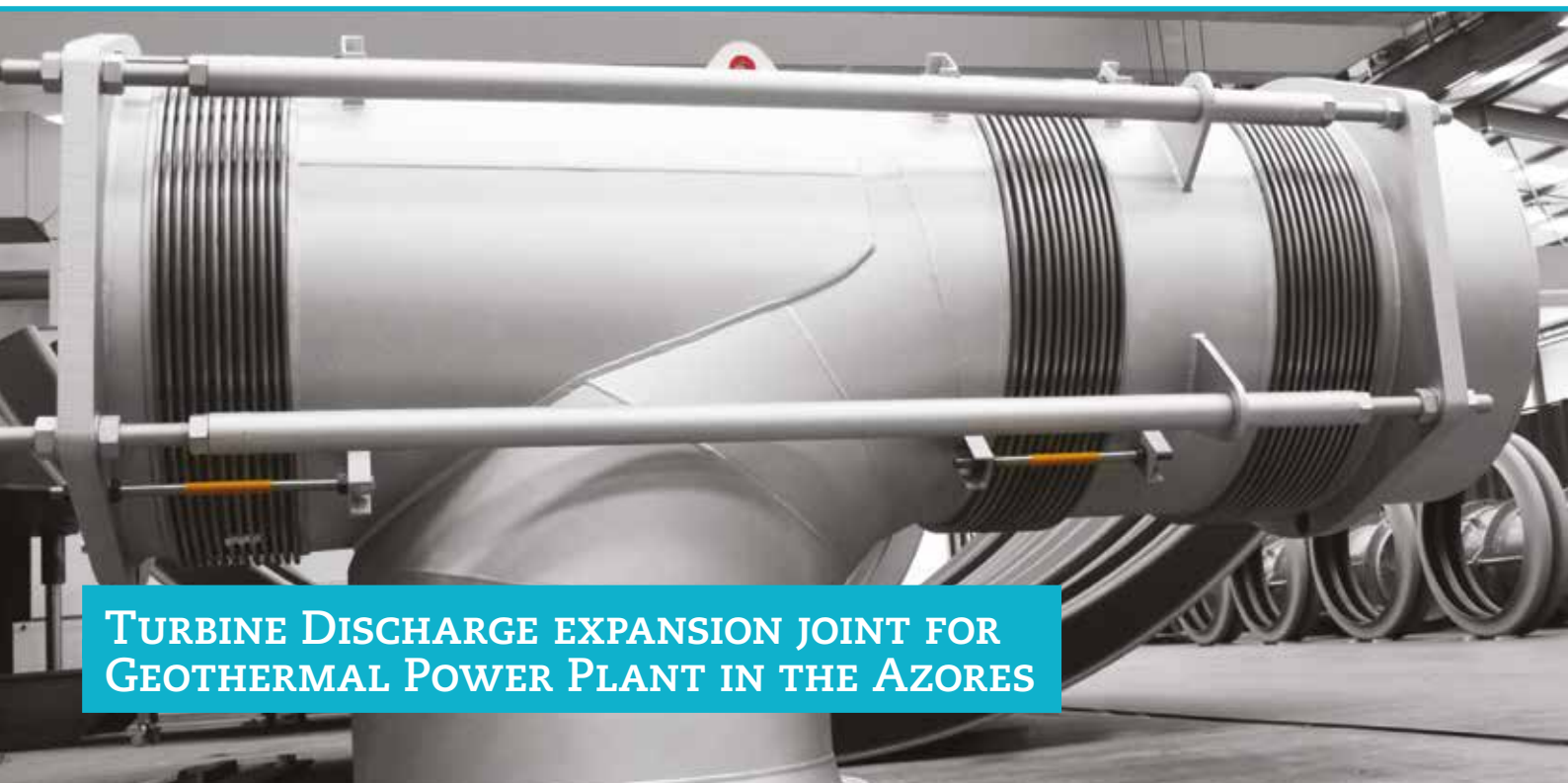
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## TURBINE DISCHARGE EXPANSION JOINT FOR GEOTHERMAL POWER PLANT IN THE AZORES

An **Elbow Pressure Balanced** MPB-E Series expansion joint DN 1200 mm and 3780 mm long has been successfully designed, manufactured and tested for the Pico Alto Geothermal Power Plant in the Terceira Island, Azores Archipelago (PT).

The plant, that is planned to be fully operational by the beginning of 2017, will exploit the resource by means of an efficient cycle design that utilizes the heat available either in the geothermal brine and steam flows in its heat exchangers. No extra water will be used thanks to the direct air cooling of the working fluid.

Geothermal power plants use the natural heat of the earth to generate electricity for homes and businesses. Geothermal power is a renewable source of energy and does not rely on coal or other fossil fuels to create

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 Kipaş 2 Geothermal Power Plant, Turkey
- Sultanhisar 1+2 Geothermal Power Plant Project, Turkey
- Anadolu Cam Yenişehir power plant, Turkey
- BJE SARAYKÖJ DENİZ 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

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## POWER PROJECTS IN THE US, CANADA AND MEXICO

- Ft. Wainwright, Alaska, US
- University of Alaska Power Plant, Fairbanks, Alaska, US
- Nikiski Co-Generation, Alaska, US
- Grande Prairie Alberta Canada
- University of Alberta Edmonton, Canada
- Dalkia Merrit, British Columbia, Canada
- Dalkia Fort St. James, BC – Canada
- Anacortes (Tesoro) Washington US
- Chehalis 500 MW Washington US
- Klickitat Public Utility, WA – US
- Apex 500 MW Nevada US
- Bighorn 500 MW Nevada US
- Harry Allen 484 MW Nevada US
- Silverhawk 800 MW Nevada US
- Tracy 500 MW Nevada US
- Hobbs 500 MW New Mexico US
- Deer Creek 300 MW South Dakota US
- Covanta Energy - Durham York, Canada
- Burnaby Montenay, Canada
- Goreway 800 MW, Ontario, Canada
- Halton Hills 670 MW, Ontario, Canada
- Lamar Colorado US
- TIC Front Range Colorado US
- Big Spring Texas US
- Hays 250 MW Texas US
- Midlothian 6 x 250 MW Texas US
- Fluor / Sasol Chemicals (USA), Louisiana, US
- Dominion Cove Point Liquefaction Expansion MD, USA
- Bellingham 250 MW Massachusetts US
- Blackstone 250 MW Massachusetts US
- Fore River 800 MW Massachusetts US
- Mystic River 2 x 800 MW Massachusetts US
- Lake Road 250 MW Connecticut US
- Astoria 500 MW New York US
- Athens Generating New York US
- Poletti 650 MW New York US
- Ravenswood 250 MW New York US
- Dominion Energy 585 MW Virginia
- Dominion Virginia Power 1358 MW
- Brunswick Power Project, WV - US
- 1329 MW Warren County Power Station, VA - US
- KBR – Palm Beach Power Project, US
- El Sauz 350 MW Sonora Mexico
- Hermosillo 350 MW Sonora Mexico
- La Laguna 300 MW Sonora Mexico
- Chihuahua 500 MW Chihuahua Mexico
- El Bajio Mexico
- El Encino Mexico
- Monterrey 2 x 250 MW Nuevo Leon Mexico
- Rio Bravo PP, Mexico
- El Segundo, Mexico
- Baja California, La Paz – Mexico
- Agua Prieta, Mexico
- Norte II, Mexico
- Maui Electric 230 MW Maalaea, Hawaii US

## MACOGA EXPANSION JOINTS FOR THE UNIVERSITY OF ALASKA POWER PLANT, USA

MACOGA has been selected to design and supply large size **Lateral and Hinged expansion joints** for a new combined heat and power (CHP) plant for the University of Alaska Power Plant, Fairbanks, USA.

A combined heat and power (CHP) plant can simultaneously produce electricity and heat from a single fuel source. The new University plant will use two circulating fluidized-bed (CFB) boilers to provide up to 280,000 pounds per hour of steam to heat both the Fairbanks Campus and produce up to 22 megawatts of electric power using a steam turbine.

University of Alaska Power Project is added to the extensive portfolio that MACOGA has conducted in North America, where MACOGA has delivered the expansion joints to more than 50 large combined-cycle power stations like:

- Ft. Wainwright, Alaska, US
- University of Alaska Power Plant, Fairbanks, Alaska, US
- Nikiski Co-Generation, Alaska, US
- Anacortes (Tesoro) Washington US
- Chehalis 500 MW Washington US
- Klickitat Public Utility, WA – US
- Grande Prairie Alberta Canada
- University of Alberta Edmonton, Canada
- Dalkia Merrit, British Columbia, Canada
- Dalkia Fort St. James, BC – Canada
- Bellingham 250 MW Massachusetts US
- Blackstone 250 MW Massachusetts US
- Fore River 800 MW Massachusetts US
- Mystic River 2 x 800 MW Massachusetts US
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- Big Spring Texas US
- Hays 250 MW Texas US
- Midlothian 6 x 250 MW Texas US
- Fluor / Sasol Chemicals (USA), Louisiana, US
- Dominion Cove Point Liquefaction Expansion MD, USA
- Hobbs 500 MW New Mexico US
- Deer Creek 300 MW South Dakota US
- Apex 500 MW Nevada US
- Bighorn 500 MW Nevada US
- Harry Allen 484 MW Nevada US
- Silverhawk 800 MW Nevada US
- Tracy 500 MW Nevada US
- Lamar Colorado US
- TIC Front Range Colorado US
- Maui Electric 230 MW Maalaea, Hawaii US
- El Sauz 350 MW Sonora Mexico
- Hermosillo 350 MW Sonora Mexico
- La Laguna 300 MW Sonora Mexico
- Chihuahua 500 MW Chihuahua Mexico
- El Bajio Mexico
- El Encino Mexico
- Monterrey 2 x 250 MW Nuevo Leon Mexico
- Rio Bravo PP, Mexico
- El Segundo, Mexico
- Baja California, La Paz – Mexico
- Agua Prieta, Mexico
- Norte II, Mexico

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## PRESSURE BALANCED EXPANSION JOINTS FOR KARBALA REFINERY, IRAQ

MACOGA has successfully designed, manufactured and tested 4 units large **Pressure Balanced** expansion joints DN2200 and 8 Lateral tied units DN1600 for Karbala Refinery Project in Iraq.

Karbala Oil Refinery is located in South Karbala province, around 100 km away from Iraq's capital Baghdad. The refinery will produce liquefied gas, gasoline, gas oil, fuel oil, jet fuel and asphalt. The oil produced at the refinery will meet international standards equivalent to European production, and will serve the growing domestic demand for oil in Iraq.

The State Company for Oil Project (SCOP) appointed Refinery of Karbala Corporation (RKC) to execute the project under Build, Own and Operate (BOO) terms.



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## MACOGA EXPANSION JOINTS FOR AG2 POWER PLANT IN MARTINIQUE ISLAND

Early this year MACOGA signed a contract for delivery of a large number of **Lateral Tied expansion joints** and a **Pressure Balanced DN2400** unit for the AG2 Power Plant located in La Trinité on the French island of Martinique in the Caribbean.

Martinique is one of the eighteen regions of France (being an overseas region) and an integral part of the French Republic. As part of France, Martinique is part of the European Union.

Electricity generated from Martinique power plant in La Trinité will be utilized by French company EDF for the distribution grid along with delivery to the nearby sugar mill and distillery. AG2 Power Plant will be the largest all-bio-mass power plant in overseas France.

The new facility will help to decrease Martinique's dependence on imported fossil energy, generating enough front-line renewable electricity to cover 15% of the island's energy requirements.



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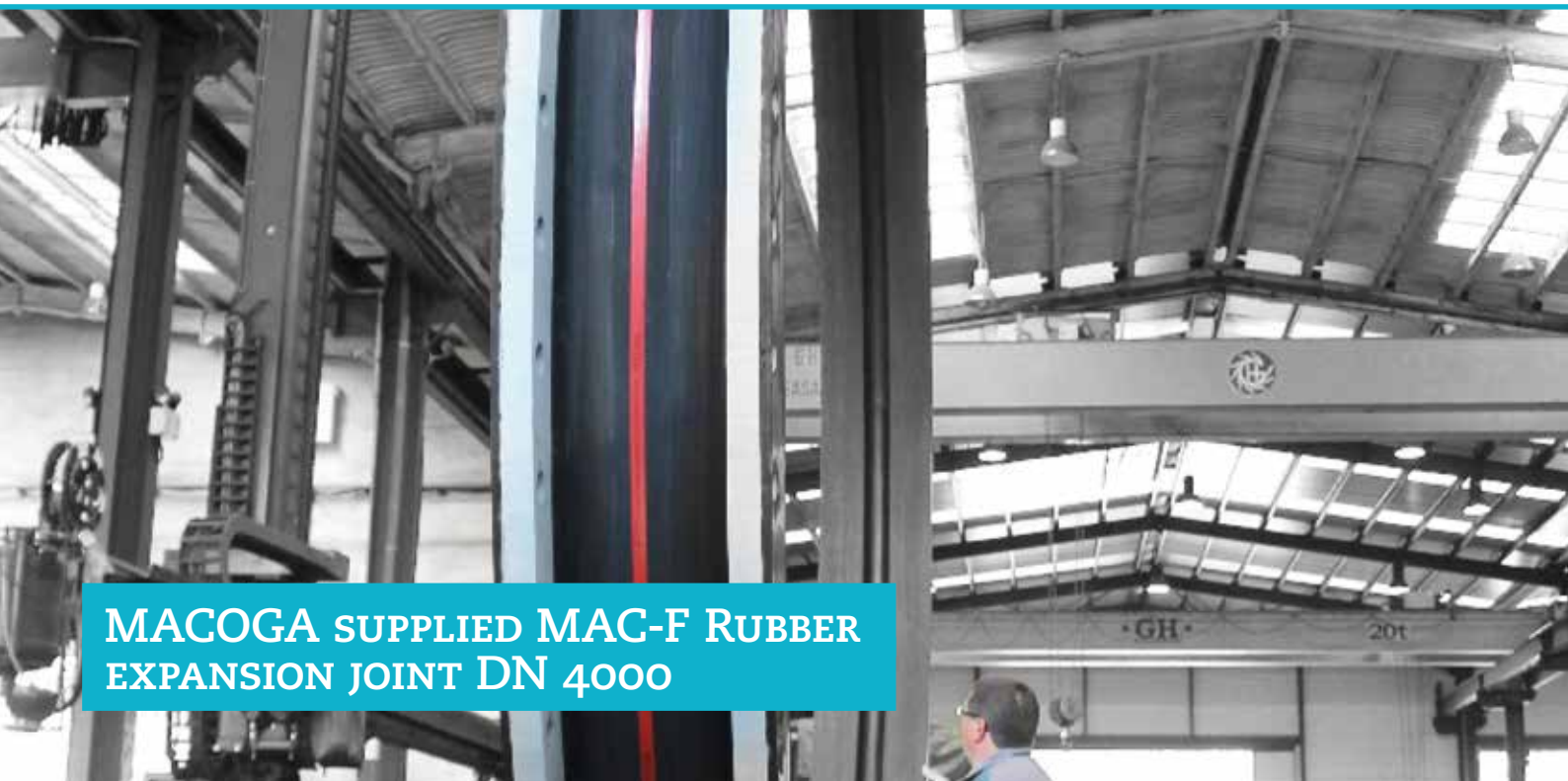


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## MACOGA SUPPLIED MAC-F RUBBER EXPANSION JOINT DN 4000

MACOGA has successfully designed, manufactured and tested a large **MAC-F expansion joint** DN 4000.

Construction details:

- Bellows: EPDM
- Fabric reinforcements: Nylon
- Metal reinforcements: Solid steel strings imbedded in the carcass
- Flanges: Shot-blasted and painted carbon steel

MACOGA Rubber expansion joints are designed following the guidelines of the FSA (Fluid Sealing Association) Non-Metallic expansion joints Technical Handbook, ASTM F1123 - 87(2010) Standard Specification for Non-Metallic expansion joints and always complying with the Pressure Equipment Directive PED 97/23/EC for the specified operating conditions.

Advantages:

- Minimal face-to-face dimensions while absorbing large movements
- Low Spring Rates due to inherent flexibility of rubber
- Corrosion and Erosion resistance
- No gaskets required for installation
- Reduced fatigue factor
- Reduces noise
- Isolates of vibration
- Easy to install



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## EXPANSION JOINTS FOR LONDON'S BATTERSEA POWER STATION DEVELOPMENT

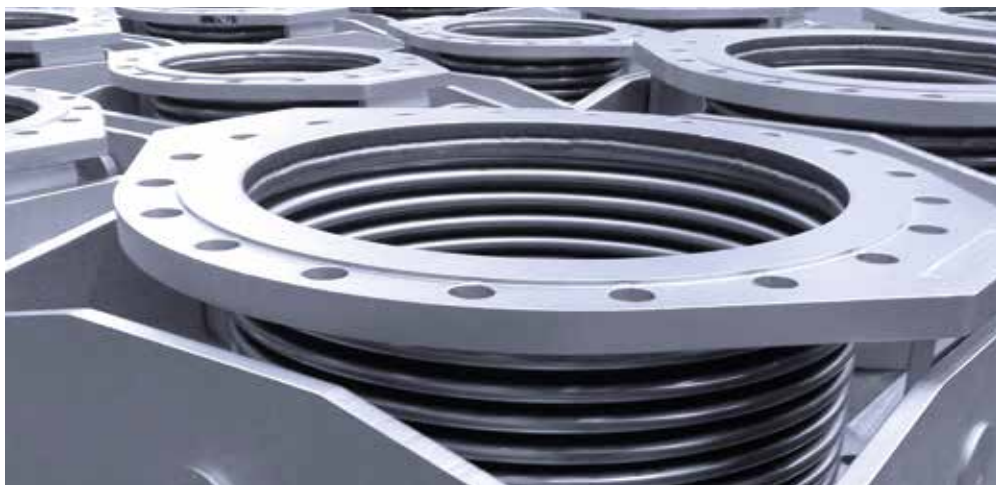
MACOGA has successfully designed, manufactured and tested a large number of **Gimbal MFC Series expansion joints** DN600 and DN400 for London's Battersea Power Station Development.

Battersea Power Station is biggest luxury residential development in the UK. It will also house one of the largest plant rooms ever in the UK. As a listed building it will keep all four chimneys.

Built in the 1930, and designed by one of Britain's best 20<sup>th</sup> century architects, Battersea Power Station is one of London's most loved and recognizable landmarks.

The development that is now underway at Battersea Power Station will transform this great industrial monument into the centerpiece of London's greatest destination development.

Battersea Power Station is one of the world's most famous buildings and is at the heart of Central London's most visionary and eagerly anticipated new development.



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ENGINEERED EXPANSION JOINTS



## GLOBAL PRESENCE WORLD-CLASS COMMITMENT

Our expansion joints are present in more than 80 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).