



M'News

Issue No.12

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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FORTY YEARS OF SUCCESS

2015 marks the 40th anniversary of MACOGA's operations.

In December 1974 the company was founded and in February 1975 Manuel Concheiro and his sons Mario and Carlos started dealing with technical products serving the Spanish industry.

This space housed some of the company's first breakthrough expertise and big ideas that would later come into the present production of expansion joints.

Four decades later, MACOGA is an international, multi-million euro business with headquarters in Ordenes, La Coruña, Spain and offices and representatives worldwide.

We have accomplished a lot during this 40 but what matters most now is what we do next.

We have a lot to be proud of but without the support of our excellent team it would never have been this big.

We are also grateful to our clients who trusted us to help them provide excellent services and products. Their demands, challenges and feedback have pushed us to go ahead and improve vigorously.

We plan to keep our business and relations growing and continue to provide our clients nothing less than the best.

Thank you for helping make MACOGA an extraordinary company now and for years to come.

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EXPANSION JOINTS FOR CRYOGENIC APPLICATIONS

MACOGA has successfully manufactured **Lateral Tied expansion joint MFL Series** DN700 and DN750 mm for one of the world's largest global cryogenic gases companies in the world.

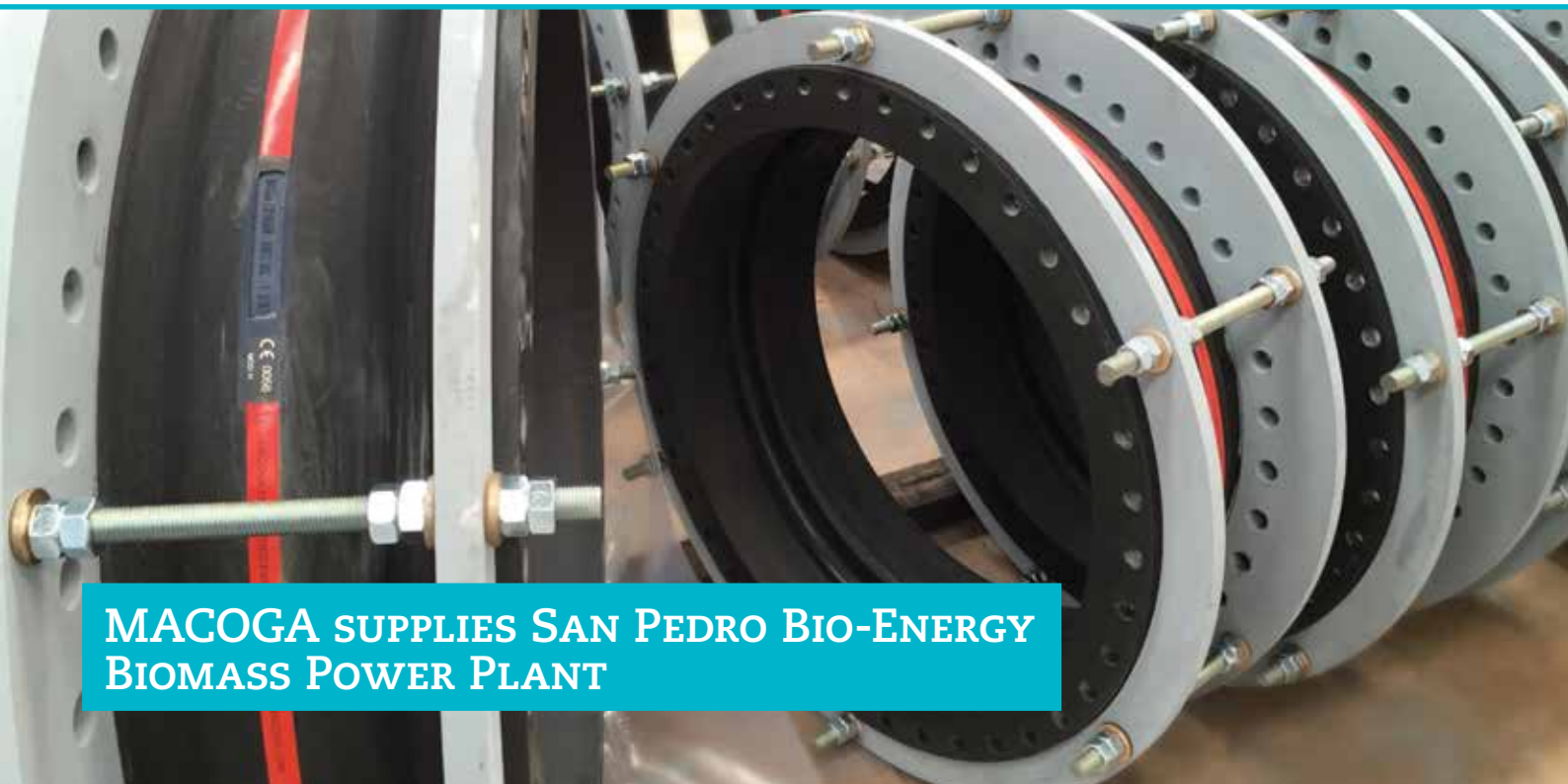
Expansion joints conveying cryogenic gases shall be specially cleaned and the process shall guarantee the removal of all contaminants that could cause mechanical malfunctions, system failures, fires, or explosions.

The special cleaning process is monitored and controlled and ensures that the cleaning process meets all customer's requirements. All components are cleaned in multistep processes that ensure thorough cleaning, rinsing, draining, and drying.



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MACOGA SUPPLIES SAN PEDRO BIO-ENERGY BIOMASS POWER PLANT

MACOGA has successfully manufactured a large number of **metallic** and **rubber expansion joints** for the San Pedro Bio-Energy Biomass Power Plant.

San Pedro Bio-Energy (SPBE) it is a power plant project located in the Dominican Republic, this power plant was designed for the use of biomass as a primary source of energy, the biomass will be a sugar cane bagasse.

At the end of its development, this project will become the largest Biomass Power Plant in the Dominican Republic, its structure will be a 2 x 30MW (60MW) of installed capacity.

The facility will produce 34 megawatts of electricity, which is enough to power the equivalent of 50,000 homes and could also provide heat to local businesses.



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DELIVERY OF LARGE ORDER FOR SAUDI ELECTRICITY COMPANY

MACOGA has successfully delivered the expansion joints for SEC (Saudi Electricity Company) PP13 and PP14 Power Plants in Saudi Arabia.

A number of 28 units **Lateral MWL** DN2500, 28 units **Hinged MWP** DN2500 and 4 units **turbine to condenser Dog Bone** DN6350 are being manufactured.

MACOGA has been the first supplier of metallic and dog bone expansion joints for SEC Power Plants.

For PP13 a number of 11 complete trucks are being loaded at MACOGA and delivered to KSA via Antwerp sea port.

Now, PP13 and PP14, with a combined capacity of 3,600 MW, would come online in August 2017.



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LARGE FCCU EXPANSION JOINT FOR GAZPROM NEFT REFINERY

MACOGA has successfully designed, manufactured and tested a **FCCU expansion joint** Universal Double Hinged Cold Design ND 1850 (64") with a length of 6300 mm for Gazprom Neft Refinery.

The expansion joints includes:

- Inconel 625 LCF two ply testable and monitored sealed bellows.
- Hexmesh SS 310.
- Rescobond AA 22 S Abrasion resistant lining.
- Resco RS17 EC Refractory lining.

The expansion joint, designed for 0,68 bar and a temperature of 768 °C (medium) and 538°C (bellows), weights 12,200 Kg.

Gazprom Neft Group consists of more than 70 production, refining and sales subsidiaries in Russia, neighboring countries and further afield.

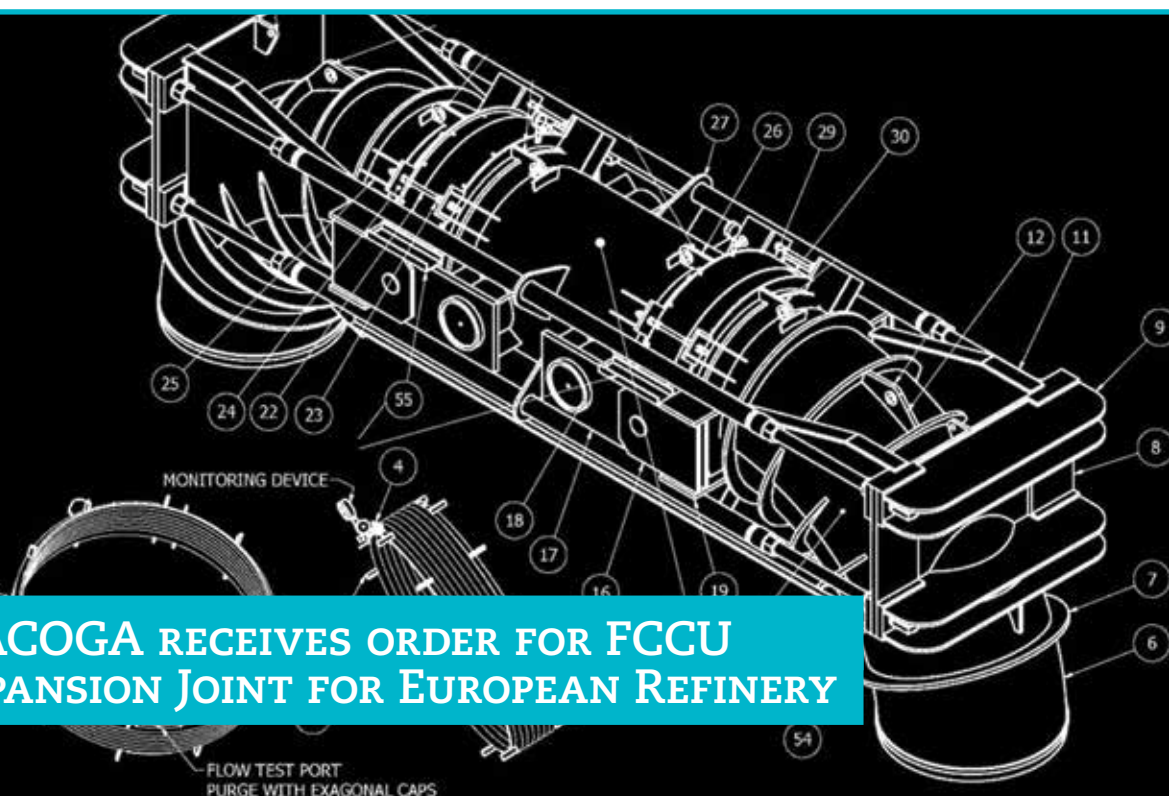
The company refines approximately 80% of all the oil it produces, one of the highest ratios of all Russian companies in the sector.

Gazprom Neft is the third-largest oil company in Russia by refining volume and fourth largest in terms of production.

MACOGA is a leading international engineering and manufacturing company for oil and gas, refining and petrochemicals and power generation expansion joints for a broad spectrum of customers throughout the world.

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MACOGA RECEIVES ORDER FOR FCCU EXPANSION JOINT FOR EUROPEAN REFINERY

MACOGA has been awarded a contract for the detailed engineering, manufacturing, testing and shipping a large tied universal **FCCU expansion joint** for one of the largest crude oil processing locations in Europe.

The scope of work at the refinery comprises a high-tech flue gas line expansion joint DN1290 (hot wall) and 8660 mm long.

The expansion joint includes:

- 2 ply testable & packed Bellows in ASTM B443 inconel 625 LCF.
- Internal sleeve, pipes, elbows, floating plates, etc. in ASTM A 240 Tp 304 H.
- Internal and external super wool insulation.
- Hexagonal mesh, sealing anchors and sealing rope.
- Abrasion lining rescobond AA 22 S.

Bellows will be post formed heat treated in a vacuum furnace with molybdenum shell (in order to avoid surface contamination): Annealing at 960 °C with cooling system under N2 or Ar.

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MACOGA EXPANSION JOINTS FOR DOHUK CGPP, IRAQ

MACOGA has been awarded a contract to design and manufacture a significant number of large size expansion joints for the Dohuk Power Project in Northern Iraq, Kurdistan region.

10 units **Lateral MWL** DN3300, 10 units **Hinged MWP** DN3300 and 2 units turbine to condenser **Dog Bone** DN7400 are being delivered.

With these new project, MACOGA will be the largest supplier of expansion joints to the Iraqi Power market providing our customers with a number of 60 units Lateral MWL and Hinged MWP expansion joints 3300 mm diameter and 6 units Dog Bone expansion joints of 7400 mm diameter.

The existing simple cycle Dohuk Gas Power Station has been developed by MGH - Mass Group Holding Ltd. with a capacity of 1,000 MW with eight GE - 9E gas turbines. The combined-cycle gas turbines (CCGT) conversion will add an additional 500 MW to the project making the overall capacity of 1,500 MW, by using turbines manufactured by GE.



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NEW ORDER FOR SAUDI ARAMCO SHAYBAH COMBINED CYCLE POWER GENERATION PROJECT

MACOGA has been awarded a contract to design and manufacture a significant number of large size expansion joints for the SAUDI ARAMCO Shaybah combined cycle power generation project in K.S.A.

The scope of work in this package includes 8 units **Lateral** MWL DN2100, 8 units **Hinged** MWP DN2100 and 2 units turbine to condenser expansion joints.

Shandong Electrical Power Construction Co., based in Beijing, China, was selected for the Shaybah Combined Cycle Facility Package to convert the existing six simple cycle gas generators to two blocks (three each) of combined cycle power generation.

Each block will be coupled with a 120 MW steam turbine generator to produce a total of 240 MW of power from wasted heat. The conversion will include retrofitting the Gas Turbine Generator (GTG) with six once-through steam generators along with an associated cooling and water treatment facility, a new 13.8 KV substation and expansion of the existing 230 KV Gas Insulated Switchgear substation, new process interface building, as well as other auxiliary systems.



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NEW TECHNICAL ARTICLE: FATIGUE LIFE TESTING

FATIGUE LIFE TESTING

Fatigue life testing is a verification of the ability of a bellows to withstand a given number of flexing cycles.

The expansion joint is placed on a test machine and allowed to cycle continually until the bellows fails.

Fatigue life testing will render the expansion joint or at least the bellows unsuitable for installation in an operating system and therefore this test must be performed on a prototype expansion joint.

A prototype expansion joint is defined as one having the same pressure and temperature rating as production models, identical diameter, height, pitch, and general shape of the convolution, the thickness and type of bellows materials, bellows reinforcement, method of manufacture, and maximum movement per convolution.

MACOGA performs fatigue testing at constant pressure or at varying pressure. This latter condition more closely approximates the service to which the expansion joint will be subjected.

It is acceptable to cycle test at room temperature any expansion joint which will be furnished for operating temperatures up to the active creep range. For expansion joints operating above this range, consideration should be given to testing at elevated temperatures.

With all other shape factors remaining constant, cycle life will generally increase with diameter; for prototype testing, it may be acceptable to cycle test the smallest size expansion joint being furnished for a given series for identical service condition.

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FATIGUE LIFE EXPECTANCY

The fatigue life of a metal joint is affected by many factors such as temperature, pressure, movement, vibration and how the joint was initially designed. Typically, metal joints have a defined cycle or fatigue life that can be calculated.

Excessive cycle life requirements will not necessarily ensure desired results. An overly conservative estimate of cycles is not recommended because it will tend to increase the number of corrugations and will lead to a bellows more prone to squirm.

Fatigue life depends on the maximum stress range to which the bellows is submitted during each complete operational cycle. The stress range due to deflection generally affects the fatigue more than the stress range due to static or variable pressure.

Accordingly, the cycles to fatigue will be reduced if the deflection is increased and vice versa.

In addition to the shape of the corrugations, the fatigue life is affected by the type of material and the manufacturing process. The cold work hardening of austenitic steel for instance, induced during the forming process of the corrugations, generally improves the fatigue life.

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MACOGA
ENGINEERED EXPANSION JOINTS

40
YEARS

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).