

RESINEX *news*

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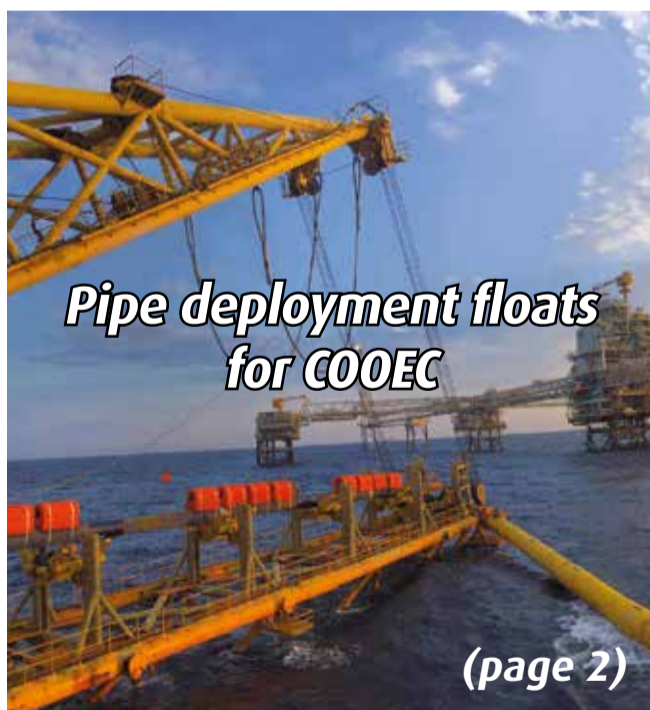
**25 years
of Resinex
syntactic
foam**

(pages 4-5)



**A giant buoy
for the JPS power plant
in Jamaica**

(page 3)



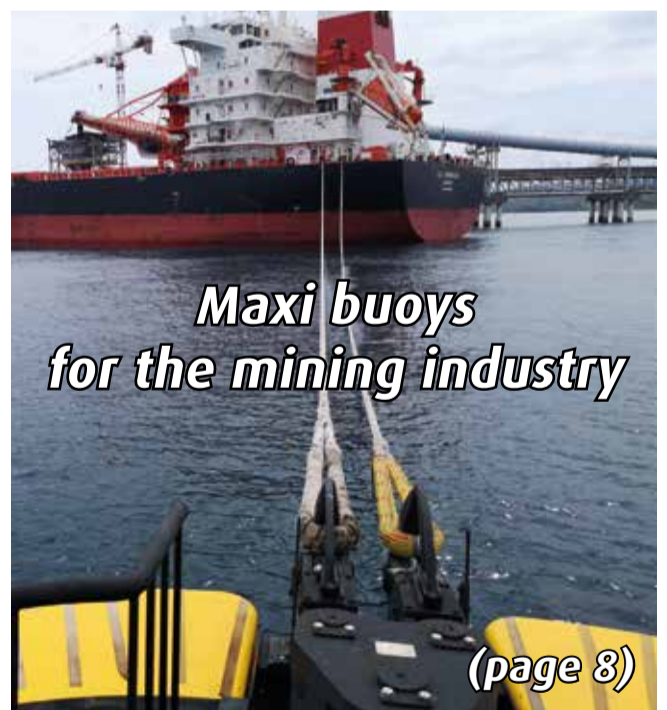
**Pipe deployment floats
for COOEC**

(page 2)

**A support buoy
for the Ichthys Gas Field
(page 2)**

**Resinex for the Navies
all over the world
(page 6)**

**Polynesia: Seawater Air
Conditioning for luxury hotels
(page 7)**



**Maxi buoys
for the mining industry
(page 8)**

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June 18-20, 2019
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Stand 4



October 15-17, 2019
Stand K19



November 11-14, 2019
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COOEC chose Resinex's experience

Pipe deployment floats in Qatar and Nigeria

Resinex has recently manufactured a stock of 266 buoyancy modules, the so-called "tie-in floats", for two offshore projects in Nigeria and Qatar. The final customer is **China Offshore Oil Engineering Co. Limited**, which in turn supplied **Dangote Oil Refining Company** and **Qatar Petroleum**. COOEC, leader in the petroleum engineering field, when approaching the pipe laying deployment activities chose Resinex for its long experience in the field. Out of the 266 tie-in floats, 156 modules were allocated to the **Dangote Refinery Pipeline Project**, while the remaining 110 to the **EPIC for Pipeline Deployment for the NFA Wellhead Platform** in Qatari waters. They were all utilized for pipe positioning till 60 m depth. Resinex was one of the world's first producers of pipe deployment floats: starting from the early 1990s, more than 3000 floats have been manufactured for the world's largest pipe laying projects. The tie-in floats are used to support the weight of the tubes during the launch of a pipeline before it touches the seabed. These floats are a flagship product of the wide Resinex range, and they have been designed with a saddle in the lower part in order to match several pipeline sizes and diameters.

The tie-in floats designed in the last months for COOEC have quite compact dimensions and have been specifically conceived to match the particular



dimension of the pipelines: the ones destined for the Qatar project were just 800x1000x1400 mm, a very reduced size compared to the standard one. The Nigerian floats were 1100x1150x1650 mm instead.

In order to validate the resistance to external pressure, Resinex carries out internal tests in water-filled pressure autoclaves, which simulate the operating

conditions in the sea. Also fitting tests are performed at Resinex Marine Research Centre.

Everything has also been specifically designed to optimize the storage/packing operations in standard shipping containers, and to maximize the number of items that can be transported inside the containers to be delivered all over the world.

The rambling buoy

What do Italy, Senegal and the American East Coast have in common? In the marine technology field there is one obvious answer only: a Resinex signalling buoy, manufactured and sold to a Senegalese client in 2009. Indeed, many years after the delivery and the installation in the port of Dakar, when the project had already become history, something unusual happened: a Sea Turtle Protection Association contacted Resinex, sending some pictures of the buoy on a Florida beach and asking if it belonged to the Company. It was May 2018. That was



2009: Light buoys in the Torbiato Plant before the shipment



2018: The wandering light buoy found on a Florida beach

a Resinex buoy for sure! The clearly visible and legible logo on the buoy shell could leave no doubt. But how could it have arrived in the South of the USA, nine years after being positioned in the Senegalese waters?

Obviously, something went wrong during the positioning, made by a local company: the buoy detached and started a sea trip around the Atlantic Ocean, until it crushed into an American sandy beach. The most surprising fact, in addition to the incredible itinerary, was the condition of the buoy material: it was in excellent conditions indeed, even after many years of service and a 10.000 km route in the Atlantic Ocean at the mercy of bad weather and unpredictable events. Once again, Resinex is proud of having proved the quality of its products, even though in an unconventional way.

Resinex for Ichthys LNG Project

In November 2018 Resinex supplied to Go Offshore a support buoy for an offtake support vessel to the FPSO **Venturer** on the **Ichthys Field**, managed by **INPEX** and located 220 km offshore Western Australia.

At the very beginning the buoy request was a little bit unusual, as the customer required a subsea buoy filled with syntactic foam despite the expected use was at 30-40 m of depth.

This happened because they considered that a subsea buoy design, with 10 tons of net buoyancy, could have endured and moved better on the water surface than a traditional surface buoy, because of the hard environmental conditions imposed on it. Therefore, Resinex proposed to use a **special mixed foam composed of macrospheres**, that occupy most of the volume of the buoy and do not absorb water, and **high-density polyurethane foam**, that occupies only the small interstices between the macrospheres.

This brought to have a buoy with an internal compound with a very reduced capacity to absorb water, a high resistance against the harsh environmental conditions and reduced costs compared to the only syntactic foam option.

The buoy, shipped at the beginning of November 2018, is 5,3 m high, has a diameter of 1,8 m and a net buoyancy of 10 tons. This is not the first supply of Resinex buoys for the Ichthys Field: in 2017 Resinex also manufactured for McDermott 6 deep-water buoys rated 550 metres for the same project.





Jamaica: a giant buoy in the new JPS power plant

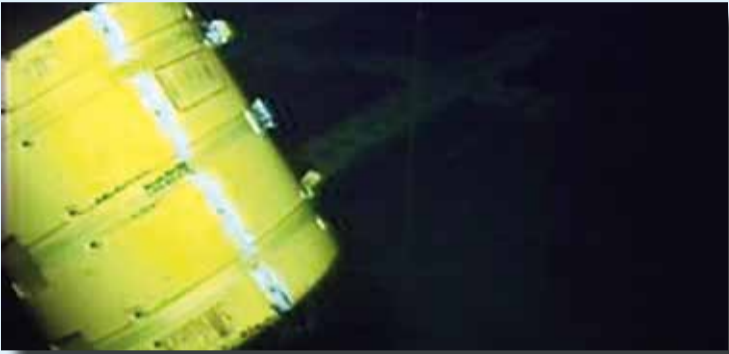
Resinex is well-known for the manufacturing of maxi buoys, real giants of the sea utilized for different offshore applications. One of the latest relevant production was in January 2019, when Resinex supplied a new giant monitoring and communication buoy to **TSK**. The Spanish company signed the Engineering, Procurement and Construction contract for the **Renaissance Project**, consisting in the turnkey construction of a 190 MW power plant for the **Jamaican power utility JPS**. The site is located in **Old Harbour Bay**, 50 km west of Kingston, Jamaica; it started in June 2010 and will be completed in summer 2019, managed by the subsidiary **South Jamaica Power Company (SJPC)**. The plant will operate both with natural gas and diesel, will use a seawater cooling system and will allow the retirement of the actual ageing plant in Old Harbour Bay. It will be **the largest of its kind in Jamaica** and will significantly improve the energy landscape of the island, reducing the CO₂ emission and the import of oil in the country. An offshore pipeline extending from the fuel supplier's mooring station to the on-shore storing facility was laid down over the seabed, and this is where Resinex came in. The Resinex buoy was installed on the sea surface just over the PLET (Pipeline End Terminal), the substructure for the pipe-to-pipe connection point, that is connected to the buoy through a cable. A special cabin of control installed on the top of the buoy allows to open and close the connection valve. Thanks to a telemetry system it is possible to control the valve operations of the PLET from remote. The Resinex giant buoy has a net buoyancy of 49 tons, a diameter of 5 m, a height of 3,3 m and it is composed of 24 modules filled with polyurethane foam. It is part of the wide range of giant buoys manufactured by Resinex in the last years for various industries and applications such as Oil&Gas terminals and FPSO, mining terminals and energy power plants.



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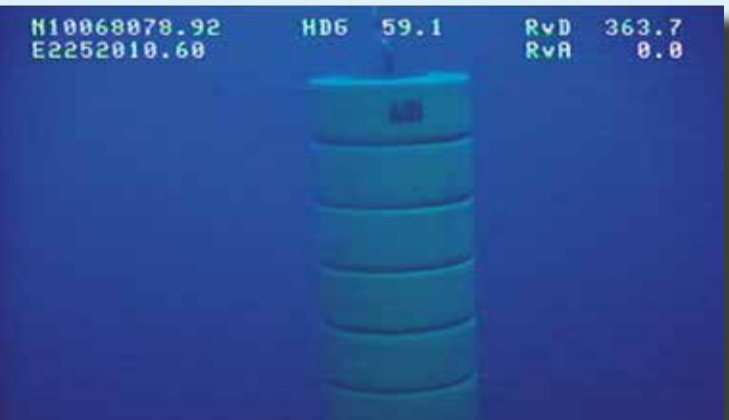
Scarabeo 9 Vessel, 3.700 m WD



Jack St. Malo Project, Gulf of Mexico, 2.200 m WD



Deep Pioneer Vessel, Angola, 1.200 m WD



Phoenix Project, Gulf of Mexico, 300 m WD



Liwan Project, China, 1.500 m WD



Siakap North-Petai Project, Malaysia, 1.500 m WD



High resistance up to 11.000 metres of depth

Resinex started manufacturing syntactic foam buoys in the early 1990s: after years of research and experimentations, it succeeded in creating the perfect compound suitable for floats that have to reach the deepest areas of the oceans.

The specific composition of Resinex syntactic foam allows the underwater use up to 11.000 metres of depth, where a high resistance to pressure and to different external factors are necessary. The key points are a **very high strength of the material** and a **zero water absorption rate**. The excellent performance of Resinex syntactic foam modules is always confirmed by the routine quality tests carried out at Resinex Marine Research Centre in Adro (Brescia).

The quality tests are essential, as Resinex always looks for improvement and product refinement. Another key point is the excellent **versatility**: Resinex can customize the syntactic floats according to the specific application and the depth of positioning. Syntactic foam buoys are mainly requested in the **Oil&Gas** and the **Scientific Research** sectors, where Resinex floats are used for pipeline installation, anchoring, medium and long-term positioning of submarine structures at different depths.

After the first medium-small projects in the 1990s and early 2000s, with companies such as Sonsub (Eni Group) and Sonardyne, Resinex acquired the necessary experience to deal with major projects all over the world. Until today, in the Oil & Gas sector, the application water depth usually varies from 500 to 5.000 metres.



Resinex synt 1000 at electronic microscope

Resinex synt 1000 at electronic microscope



Hydrostatic pressure test

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Resinex syntactic foam water projects

Oil & Gas: an overview

Over the last 25 years, Resinex has been supplying syntactic foam modules for Oil & Gas companies operating in the main oil fields all around the world.

As for South America, one of the most relevant projects which Resinex took part in was the **Frade Field Project (Chevron)**, when it supplied SBM Offshore with support floats in the Brazilian waters. Also the Offshore Supply Ships **Up Coral** and **Up Pearl** were furnished with installation subsurface buoys in Brazil. Resinex also participated in different projects in the Gulf of Mexico, firstly supplying the Texan company **Helix** with deep-water floats for the **Phoenix Oilfield (ERT)**, and then **Saipem America** for the **Jack St. Malo Project (Chevron)**, the **Big Foot Project (Enbridge)** and the **Keathley Canyon Project (Williams DPS)**.

Moreover, for the assembly of **Scarabeo 9 Vessel**, the **Saipem** ultra-deepwater semi-submersible drilling rig, Resinex was requested to manufacture hundreds of riser shims for 3.700 m depth, then shipped and assembled in Cuba.

Resinex took part in the first construction of the **Saipem 12000 Vessel** too, in South Korea, where other riser shims for 3.700 m depth were required in order to equip the steel pipes used for oil drilling.

As for China, Resinex produced buoyancy modules for the **Liwan Project (Husky Oil China)** and the **Panyu Project**, with **CNOOC** as main partner; few years later other syntactic foam modules were supplied to Tianjin Yada, with **COOEC** as final customer.

Through the years, the EPCI company **McDermott** often required Resinex syntactic buoys for installations all around the world, in Malaysia, Indonesia and Australia particularly.

Concerning Malaysia, **McDermott** required deep-water floats for the the **Siakap North-Petai Project**, with **Murphy Oil** as main operator.

McDermott involved Resinex also in the **Ichthys Project** in Australia, whose field is owned by **Inpex**.

Among the other relevant projects, we also find the **R3454 Project** for **McDermott Indonesia**. **Fendercare**, over the years, requested different kind of Resinex syntactic floats in Southeast Asia as well.

Related to the African area, Resinex focused mainly on Angola, Nigeria and Egypt.

In Angola, **Technip** was supplied with floats for the **Deep Pioneer Vessel** and the **Pazflor Field**, owned by **Total E&P Angola**.

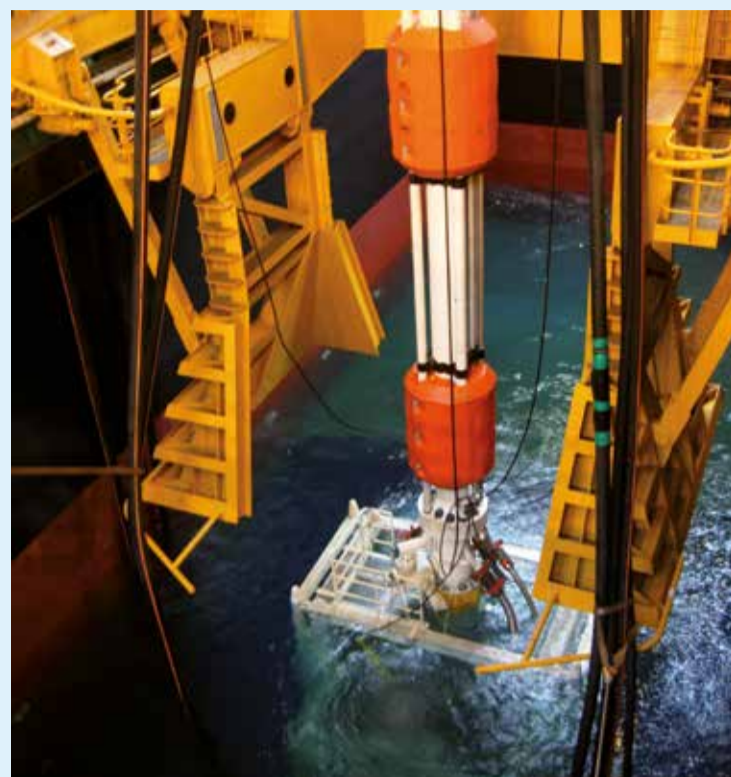
Saipem requested buoyancy modules for the **Kizomba Satellites Project**, with **Esso Angola** as main end user.

Also **Fendercare** ordered numerous deep-water floats for the **GirRI Surf 2 Field**, with **Total E&P Angola** as owner and **Technip** as main contractor.

In Port Harcourt, Nigeria, **Saipem** requested syntactic buoys for the **Egina Project**, with **Total Upstream** as end user, and for the **Usan Deepwater Project** where **Total E&P Nigeria** was the final customer.

One of the most recent projects in which Resinex was involved is the one concerning the **Eni's Zohr Field** in Egypt, that represents the largest natural gas reserve in the Mediterranean Sea, when **Saipem** asked for numerous buoyancy modules and riser buoyancy modules.

Resinex is proud of having participated to the main Oil & Gas projects all around the world, consolidating year after year the partnership with the principal Oil Companies and Engineering Contractors.



Saipem 12000 Vessel, 3.700 m WD



Egina Project, Nigeria, 2.000 m WD



Zohr Project, Egypt, 1.500 m WD



Frade Field Project, Brazil, 2.000 m WD



Kizomba Satellites Project, Angola, 2.200 m WD

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Nav-aid systems for Maritime Forces

Navies all over the world can rely on Resinex's expertise

Through the years, Resinex has often provided light and marker buoys for Navies all around the world.

As for the latest projects, in 2018 Resinex won a tender for the supply of 19 light buoys for three main Egyptian ports for *al-Quwwāt al-Baḥriyya al-Miṣriyya*, the **Egyptian Naval Force**. All the signalling buoys were equipped with marine lanterns and remote monitoring systems.

The company through which Resinex completed the order is Maritime Group, a company based in Alexandria, that is the main Resinex partner in the Egyptian market. Another recent relevant cooperation has been with the **Royal Thai Navy**, that asked Resinex to manufacture 16 light buoys with different colours and sizes for the Gulf of Thailand.

All the buoys were composed of polyethylene foam and covered in elastomer polyurethane. They were provided with a top mark with internal radar reflector and equipped with steel lattice tower with ladders.

It is not a surprise that Resinex cooperates a lot also with the **Italian Navy**: the first signalling buoys for the Italian Naval Force were manufactured in the 1960s, and since that moment the business relationship never stopped. After more than thirty years, the collaboration between the Italian Navy and Resinex is consolidated: different agreements for the supply of elastic beacons,



Thai Navy



Italian Navy



Egyptian Navy

land beacons and light buoys are negotiated every year. The latest order consisted of 2 innovative "all plastic" light buoys with a diameter of 2,20 m to be positioned in the Ligurian Sea, off La Spezia (Italy).

Through the years Resinex supplied light and marker buoys to different **government organizations** too, especially in Brazil, Argentina, Singapore and Western Europe.

The enlargement of Gaeta port

In the port of Gaeta (near Naples), where important works of renovation and enlargement of the commercial dock have been recently made, 3 Resinex elastic beacons were installed in October 2017 to signal the dredged canal, which reaches now 12 metres of depth. The elastic beacons were placed in less than 10 hours with the supervision of the Resinex staff.



Elastic beacons for the methane gas pipelines



In June 2017 works were carried out to secure the underwater methane gas pipelines, from Bacoli (Naples) to Procida Island, using 2 Resinex elastic beacons. The first one was realized for a depth of 15,5 m while the second one for 28,5 m.

Signalization is composed of a top mark complete of radar reflector and a self-powered marine lantern with a range of 5 NM. They have a focal plane of 5 m and are equipped with man guard and ladders to reach the upper part.

The most visited natural museum in the world: the Blue Grotto

In July 2018 Resinex supplied two of its brand-new 1.500 mm plastic light buoys to be placed in front of the famous **Blue Grotto**, the most visited natural museum in the world.

The peculiarity of the cave is given by its brilliant blue colour, due to the presence of the underwater threshold near the entrance through which the light penetrates: the red colour is absorbed and only the blue can pass, thus creating a truly spectacular play of lights and colours. Resinex buoys will help to control and regulate the very intense marine traffic

in front of the grotto, which has become very chaotic and unsustainable over the last few years. The Blue Grotto hosts hundreds of thousands of tourists every year, who, coming from all over the world, flock to the enchanting island of the Neapolitan archipelago, especially near this natural cavity. Local administrations hope that this will only be the first step towards the creation of a real Marine Protected Area that could guarantee a better protection of the zone. Resinex is proud to have contributed to enhance one of the most magical natural places of Italy.



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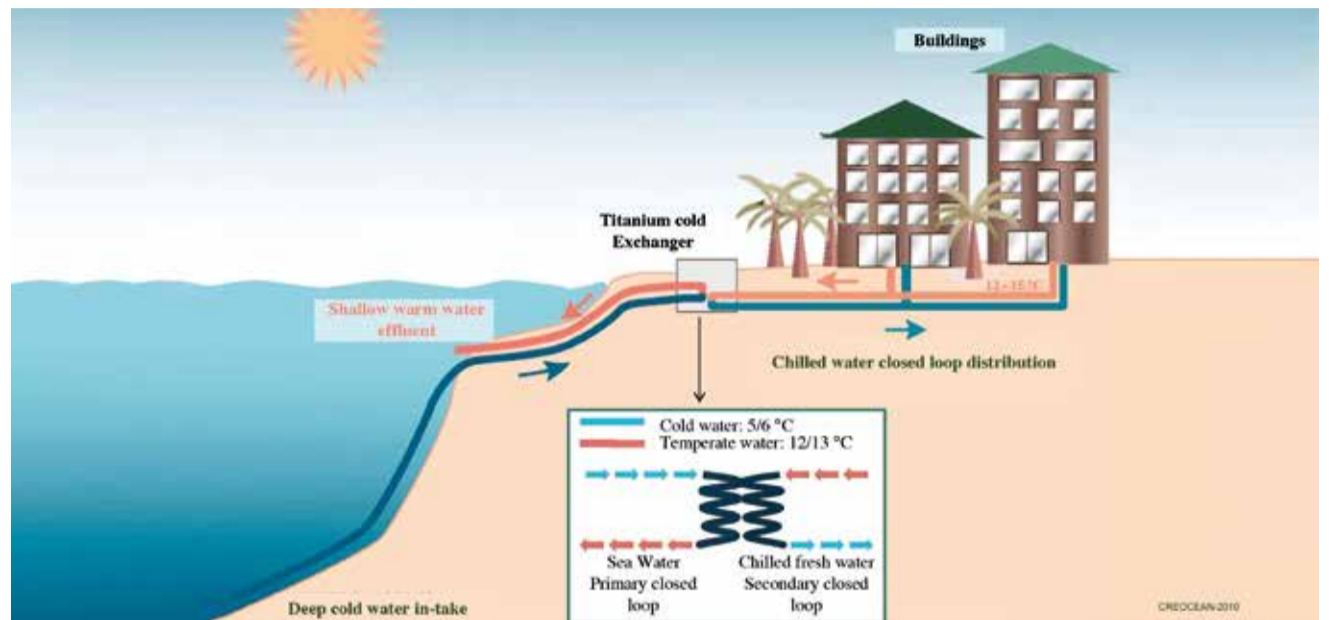
Seawater Air Conditioning for luxury hotels

The search of alternative energy sources has become a crucial aspect in the lives of all of us, and Resinex does not hold back when it comes to participating in projects related to environmental sustainability.

In 2018 it started indeed a cooperation with Rovotik, a Tahiti-based company that deals with inspections and operations upon submarine structures.

Rovotik asked to provide floats and chain-through buoys for 900 m depth filled with syntactic foam material, that guarantees high resistance and a zero-water absorption rate.

The floats were utilized for a **SWAC project**, consisting in the installation of a private **air-conditioning system using deep-sea water** ("SWAC" - Seawater Air Conditioning) for a luxury hotel in Bora Bora, French Polynesia. It has been conceived and developed by Pacific Beachcomber, a company that owns and manages luxury hotels in French Polynesia. With the support of Resinex floats, a pipeline was installed by Rovotik in sea-water at a depth where the water is ice-cold all year. The water is then distributed through the air-conditioning system of the hotel through an exchanger. The project has been a great success, as it shows that it is possible to air condition buildings without the use of highly polluting fuels and at a very competitive cost.



Brand new products

SMALL PIPE-DEPLOYMENT FLOAT (TIE-IN) Net buoyancy 750 kg, dimensions 800x1000x1400 mm. It completes the wide Resinex range of tie-in floats.



BUOYANCY MODULE for ultra-deep water installations. Diameter 1000 mm, 3000 m water depth. Range of net buoyancy: 20, 100, 300 kg.

DOUBLE FENDER PROTECTION BUOY for mega yacht hulls. Diameter 2100 mm.



SIGNALLING SPAR BUOYS in stainless steel with reflective band, super reliable for signalization. Diameter 255 mm, net buoyancy 34 kg.

ROTATIVE PENDANT BUOY (WHEEL BUOY) Diameter 3000 mm, net buoyancy 24 tons.



CHAIN THROUGH BUOYS FOR AQUACULTURE PROJECTS Diameter 1200 mm, length 1800 mm, net buoyancy 1400 kg.

"ALL PLASTIC" LIGHT BUOYS with a diameter of 1.250 mm. They complete the Resinex range of "all plastic" buoys. All diameters (mm): 1250, 1500, 1800, 2200.



CONNECTING CLAMP to connect buoy to cables for recovery, weight reduction and fixing operations during offshore activities.



Maxi buoys for the mining industry



Africa and America: the main markets

Resinex has been cooperating with companies in the mining industry for years, providing different kind of buoys for the operations of big vessels that deal with loading and unloading activities of mining materials.

Starting from the early 2000s, Resinex provided 2 catamaran buoys for the **Moma Titanium Minerals Mine**, the world's largest titanium mineral deposit, located 160 km south of the city of Nam-pula in Mozambique, Africa, and operated by the Irish company **Kenmare**.

The mining zone of Moma extended about 58 kilometres along the coast and 7 kilometres inland. About 660.000 tons of ilmenite, zircon and rutile were produced every year.

Resinex started to design and fabricate catamaran buoys since the 1980s and thanks to the engineering improvements and developments through the years, this kind of buoy still represents the excellence in the mooring buoy category.

Also **London Mining**, in 2010, requested various buoys for mine projects in Sierra Leone.

Resinex has recently received two new important orders in the mining industry: the first one for the **Cobre Panama Project** and the second one for the **Mina Justa Copper Project** near the town of Nazca, Perú. In April 2019 Marcobre, owner of Mina Justa, purchased from Resinex mooring buoys in order to ensure safe and smooth vessels' operations. The average annual production is expected to be 102.000 tons of copper concentrate and 58.000 tons of copper cathodes.

Catamaran buoys at Punta Rincon for the Cobre Panama Project

In October 2017, Resinex began an important cooperation with **First Quantum Minerals**, a Canadian multinational company specialized in the mining industry. To guarantee the loading and unloading operations of the mining material from the **Cobre Panama Mine** at Punta Rincon Terminal in Panama, First Quantum asked Resinex to design and manufacture 9 catamaran buoys to moor bulk carriers coming from all over the world.

The buoys manufactured for this project are 18 tons heavy, 2 metres high and they have a maximum diameter of 6,8 metres, with a 37 tons net buoyancy force. They have a double quick release hook with a 100 tons SWL per hook. Each buoy is made up of two levels of 8 modular linear polyethylene floats filled with polyurethane foam; with a total of 16 floats per buoy. Moreover, these buoys have the MLS system (Multi-Lever System), a special and unique system that guarantees the absolute buoy stability and performances even when exceptional sea conditions occur and with a higher pull force.

The first request for one catamaran buoy was made in October 2017, then, a few months later, in February 2018, a second request for other 8 buoys arrived.

They have been designed, manufactured and delivered in record time (only a few months of work), so that at the end of July 2018, even if the first First Quantum ship coming from Colombia arrived one week earlier than the scheduled date, Resinex was ready and able to guarantee the perfect functioning of the Terminal.

Regarding the on-site work, it took only 15 days to assemble, install at sea and perform the Bollard Pull Test of all the buoys.

