

RESINEX *News*

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Resinex Trading S.r.l
Via Cappuccio, 14
20123 Milan (Italy)
www.resinextrad.com

Milan
Via Cappuccio, 14
Ph +39.02.7201 3463
Fax +39.02.7201 6182
marketing@resinextrad.com

Torbiato di Adro
Via Artigiani, 15
Ph +39.030.745 7245
production@resinextrad.com

Adro
Via Laveni, 14
Ph +39.030.745 1194
r&d@resinextrad.com

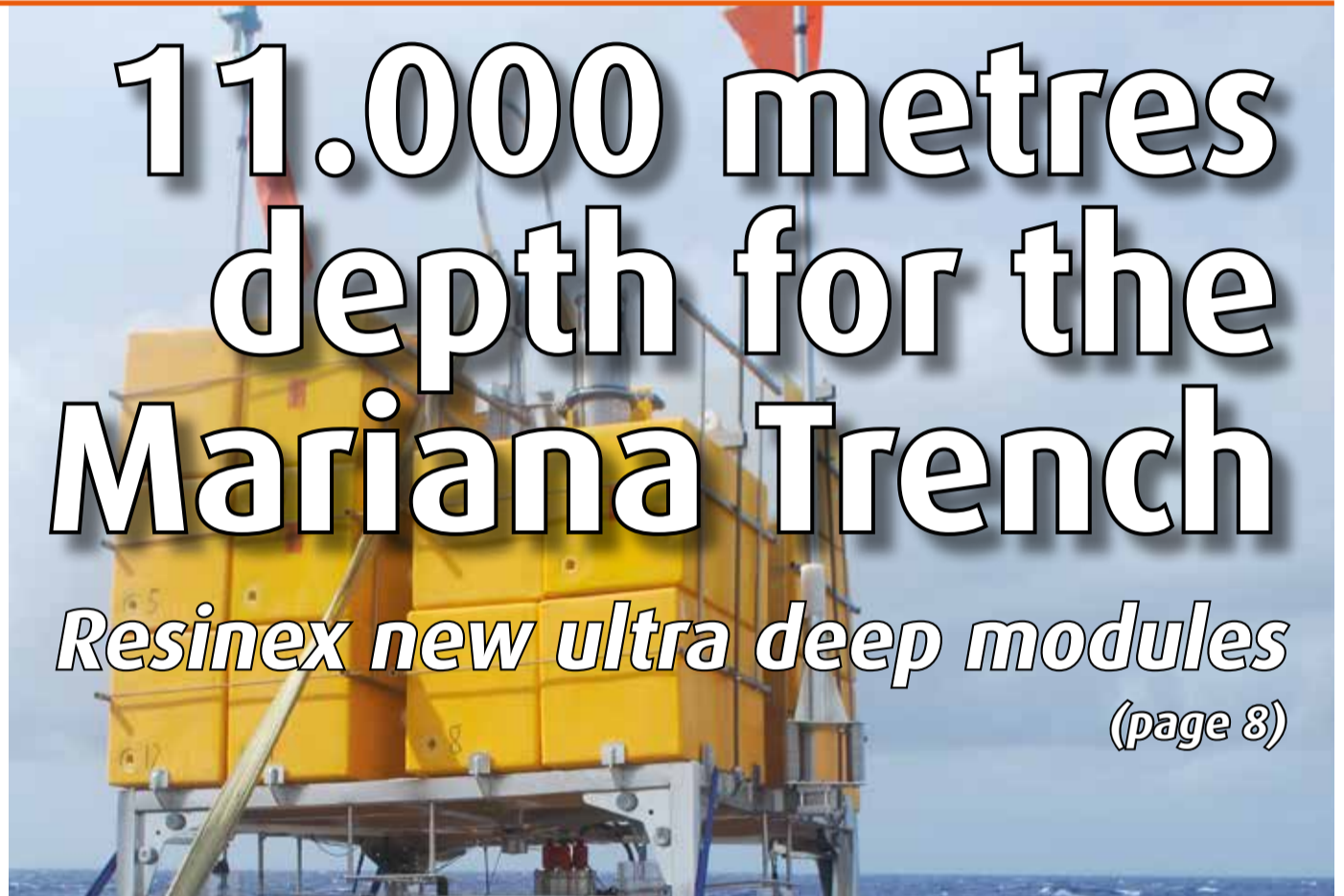
Resinex Asia
Level 25, One Raffles Quay
North Tower, Singapore 048583
Ph. +65.66225532
sales@resinexasia.com

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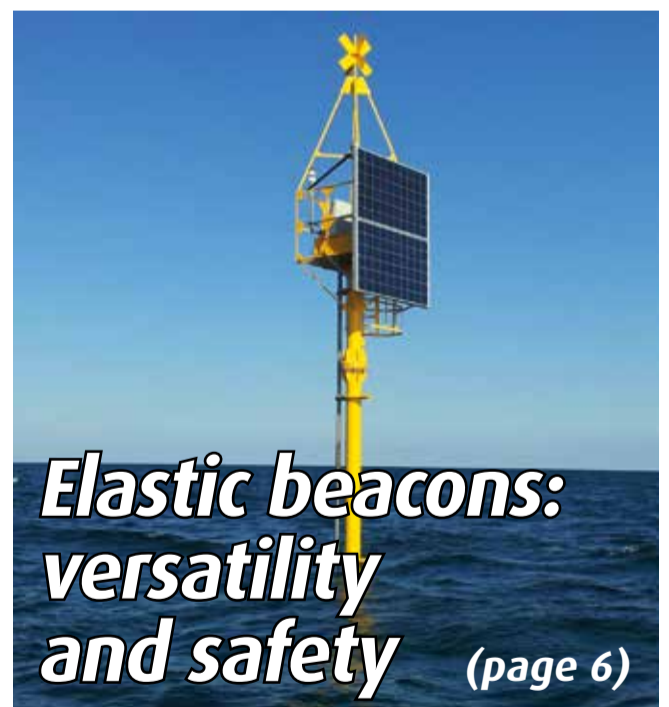


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13 November - 16 November 2017
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Gas maxi mooring in Port Said

Resinex proves itself as leader of big moorings for large oil and gas tankers.

The huge oil and gas tankers need to have multi-buoy moorings safe and easy to operate.

After the positive experiences in Angola, Albania, Cameroon, Malaysia, Italy, Spain, Indonesia, Mozambique, Azerbaijan, United Arab Emirates, Malta, Montenegro, Yemen, Saudi Arabia and Venezuela, Resinex was called again to supply a Conventional Buoy Mooring (CBM) to the Egyptian company EPPC, main producer of propylene and polypropylene of the North African country.

In this case, 6 big modular buoys type PEM 50 catamaran buoys were projected, supplied and assembled.

The PEM 50 buoys are modular, in plastic, with a diameter of 5 m, a height of 2.2 m and a net buoyancy of 28 tons. These buoys are equipped with the exceptional Resinex MLS (Multi Lever

System), which assures the stability of the buoy even during the strong tensions of the vessel mooring.

All the six buoys are also provided with Quick Release Hooks (QRH) type Straatman with remote control system powered by solar system and batteries. Each buoy is complete of two QRHs of 90 tons.

As all the big Resinex buoys, even the PEM 50 are modular (16 plastic modules per buoy), thus: unsinkable, with minimal maintenance costs and easy to be carried.

Seven days were enough for Resinex engineers to arrange the assembly at Port Said and to perform the final test.

The Egyptian company Maridive, national leader in maritime and offshore operations, handled the installation and the mooring of the buoys to the seabed through the use of six anchors type Stevpris MK6 High Holding Power.



Made in Italy for cables in the Philippines

Prysmian, world leader in the underwater cable industry, commissioned Resinex the realization of a signalling system in the Philippines.

Resinex supplied 8 light buoys composed of a float with 2100 mm diameter and 1150 mm height; a focal plane of 3 m and a lantern with 5 NM range.

The project inserts itself in a wide development plan for a cable link amongst the islands of Cebu, Negros and Panay each other reinforcing the Country's power transmission network. The commissioner is NGCP (National Grid Corporation of the Philippines).

In 2005, Resinex already supplied to Pirelli Cavi (now Prysmian), 8 steel buoys for the submarine cables laying in the Philippines, in implementation of the electricity transmission plan from Leyte Island to Cebu Island.

Entrance of ports: stainless steel land beacons

Resinex signalling systems are always required to signal ports.

In 2017, Resinex has completed the supply of the marine signalling for the Italian ports of Vasto, Rimini and Porto Garibaldi.

In the port of Vasto, situated at Punta Penna in the province of Chieti, 2 stainless steel land beacons were installed, one red and one green, equipped with an access base, a man guard and a walkable turret.

Focal plane height is 7 m and its weight is 1100 kilos. They are provided with marine lanterns (red light and green light) with a nominal range up to 10 NM. This new supply, follows the enlargement and renewal works of the port, begun at the beginning of 2017.

It is a regional port with a merchandise movement of about 200-300.000 tonnes /per year of bulk disembarkation and of a few tens of thousand tonnes of embarkation.

The port of Rimini, with its 622 boat mooring points, has required a yellow stainless steel land beacon, complete of an access base of 1400 mm of diameter, a focal plane height of 4.5 m and a weight of 1150 kilos. Lantern is yellow with a range of 3 NM.

Porto Garibaldi, district of Comacchio, in the province of Ferrara, is on the coast of the Adriatic Sea. It is an important fishing and leisure port and a seaside resort.

2 red land beacons were manufactured for this port. One land beacon is 5 m high, has a lantern with 3 NM of range and equipped with instruments located at the top. Moreover, it has a ladder, a man guard and a focal plane of 3 m.

Also in this case the other structure is in stainless steel, with an access base of 1400 mm of diameter, man guard and walkable turret. Focal plane is 6.5 m.



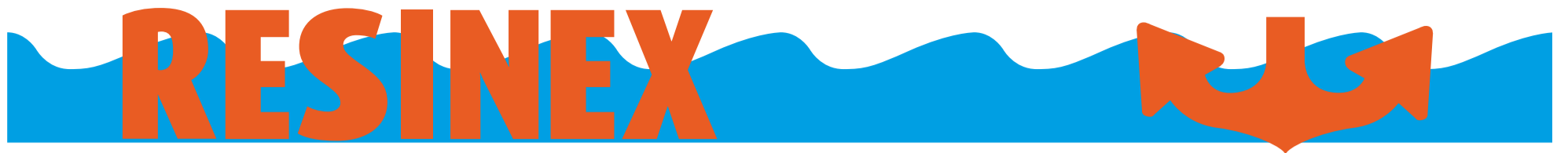
Porto Garibaldi



Rimini



Vasto



Resinex in the luxury waters

During the years, Resinex has cooperated with the main ports for the mooring of the biggest and most luxurious yachts in the world, such as Porto Montenegro, Port Vauban, Grand Harbour Marina (Malta), Port of Civitavecchia and with the private deluxe moorings of the Smeralda coast.

Porto Montenegro is one of the most important ports of the Mediterranean Sea, thanks to its facilities to get yachts of huge dimensions.

Since 2009, Resinex has been charged with the project and the supply of the moorings for the various phases of the port development.

In 2009, Resinex supplied 17 mooring buoys type PEM 21 and PEM 30. In 2014 and 2015, in view of the port expansion, Resinex delivered 15 buoys first and successively further 19 buoys together with 330 m of antipollution boom and 3 elastic beacons, fit with instruments and accessories.

Port Vauban, well-known as the port of the leisure boats of the Yacht Club Antibes, is the greatest port in terms of tonnages of the boats moored in the Mediterranean Sea.

After a first supply in 1980, between 2007 and 2009, a quantity of 54 modules of 2.1 m of diameter were installed to modify the buoyancy of Resinex elastic pilons.

Resinex supplied to **Grand Harbour Marina** (Valletta, Malta), one of the deepest natural ports, big mooring buoys type PEM 30 (three metres of diameter and 13600 kg of net buoyancy), destined to the mooring of the valu-



Mooring in Porto Montenegro



Resinex elastic pilons in Port Vauban



Resinex Dilbar mooring

able yachts which stop in this beautiful Mediterranean island.

In the **Port of Civitavecchia**, built in 108 A.D. by the Emperor Traiano, 14 big yachts more than 100 m long and 150 super luxury boats are moored.

Resinex has supplied 26 mooring buoys from 1100 to 1500 mm of diameter for this project of exemplary innovation.

One of the world leaders of the luxury navigation, the yard **Azimut Benetti** in Viareggio, has selected Resinex to protect the moorings of the manufactured yachts, employing 5 buoys with a diameter of 2.1 m.

Resinex products are designed and manufactured also for private moorings.

In 2016 the gigayacht **Dilbar**, the world's biggest superyacht measured by volume, has requested Resinex 2 mooring buoys type PEM 43x1100 composed of 6 modules, it has 4.5 m of diameter, 1.5 m of height, 3.750 kg of weight and 11.4 tonnes of net buoyancy. They are equipped with a double mooring hook of SWL 85 tonnes and with a self powered marine lantern. Moreover, the mooring system includes a very big jumper underwater buoy which is installed at a water depth of 5 m, having a net buoyancy of 4.65 tonnes.

Also the previous Dilbar of 110 m, now renamed Ona, uses Resinex buoys type PEM 30x1000, to moor close to the "bigger sister".

Other important supplies in terms of private moorings have been realized for **Lady Sarya, Engelberg, Lady Moura, Madame Gu, Savannah, Pacific, Amels Ilona** and so on.

Brand new products

DONUT FENDERS composed by polyethylene foam and elastomer polyurethane. Diameter 1800 mm, weight 600 kg.



CABLE RISERS installed in South Korea. Diameter 150 mm, nett buoyancy 2 kg, water depth 70 m.

TELEMARK BUOYS requested for supporting cable operations in open sea in the United Arab Emirates.

Width 1800 mm, total height 5570 mm, weight 950 kg and net buoyancy 6000 kg.



FLANGE PROTECTORS installed in Japan. Manufactured in heavy duty elastomer of 80 ShA and 100 kg/m³ of density which guarantees high resistance and flexibility.

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Denise project



Sealine Gubco project



Zohr project



Moheshkhali project



Moho Nord project



Tanap project



The wide of pipe deployment

Resinex was one of the first manufacturers of pipe deployment floats. Since the earliest 90's, more than 2000 pieces have been produced destined to major projects of pipelaying of the world. Resinex, as a matter of fact, has supplied various types of floats for the most important jobs in this field: Denise (Egypt), Hasdrubal (Tunisia), El Burullus (Egypt), LTA Aramco-Saipem (Saudi Arabia), Sealine Gupco (Egypt), Dragon Cigma Export Pipeline (Venezuela), Moho Nord (Congo), Zohr (Egypt), Tanap (Turkey), Moheshkhali Floating LNG (Bangladesh) and many others. The secret of Resinex lies in its wide range able to adapt to the most assorted needs of clients creating a tailor-made product. Range goes from 900 kg to 3000 kg of net buoyancy for each single module which can be combined to reach 5000 kg and more. They are usually utilized from 10 to 200 m of depth, if necessary higher depths can be reached. Thanks to the modularity of the single modules, it is possible to combine them in order to make buoys with different buoyancies. Although tie-in floats manufacturing procedure is long and complex, Resinex is able to produce a high quantity of modules in a short time. The particular concave "V" shape of the lower part, has been specifically designed to limit the pipe mobility and to ease the operation phases reducing time and costs of the operations. There are some different types of installation which require the usage of the floats to position the pipes underwater.

MODULAR PIPE DEPLOYMENT (TIE-IN) FLOATS

TYPE	W x H x L (mm)	DEPTH [m]		
		0 - 50	50 - 100	100 - 200
NET BUOYANCY [kg]				
	1200x1200x1200	905	865	775
	1200x1200x2400	1935	1855	1675
	1200x1200x3600	2965	2845	2575
	1200x1200x4800	4000	3840	3480
	1100x1150x1350	1060	940	880
	1100x1150x2700	2220	2100	2040
	1100x1150x4050	3320	3190	3120
	1100x1150x5400	4520	4360	4260

Note: The net buoyancy is in function of the foam density.

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Best range Tie-in floats (Tie-in)



One of the main installation ways of the pipelines, in which the usage of the floats is needed, is the Shore Pull. This consists in positioning the pipe with the floats in shallow water near the coast; then the pipe is pulled from the bottom and the friction that happens on the seabed is reduced thanks to the presence of the floats which make it much lighter in the water.

Resinex flexibility has been really appreciated by the big offshore operators, such as Saipem, Technip, Petroleum Marine Services, Snamprogetti, Sapura Energy and others. Details of buoys and fixing procedures have been chosen accordingly with them.

After the completion of the deployment operations of the pipelines, regarding the release systems, Resinex has developed together with its clients, also with experimental tests on a real scale, diverse manners which adapt to the features of each project.

Buoys can be fixed on the pipes with different types of strap according to the operational necessity: steel strap, steel and textile strap, special plastic material strap.

The release can take place under water through the usage of a ROV (Remotely Operated Vehicles) or through dive specialist operators who work to release the fixing system; otherwise, quick release systems have been studied which allow to activate quick release hooks directly from a service boat.

SINGLE MODULE PIPE DEPLOYMENT (TIE-IN) FLOATS					
TYPE	W x H x L (mm)	DEPTH [m]			
		0 - 50	50 - 100	100 - 200	
NET BUOYANCY [kg]					
	1100x1150x1150	1075	1025	950	
	1100x1150x1350	1325	1250	1150	
	1100x1150x1950	1875	1775	1625	
	1100x1150x2150	2000	1900	1750	
	1100x1150x2450	2300	2175	2000	
	1100x1300x1150	1250	1175	1100	
	1100x1300x1350	1475	1400	1275	
	1100x1300x1950	2125	2000	1850	
	1100x1300x2150	2300	2175	2000	
	1100x1300x2450	2650	2500	2325	
	1400x1270x2200	3150	2950	2700	



Aramco LTA project

Tests in the Marine Research Centre

The reliability of Resinex is guaranteed by the continuous tests made at Resinex Marine Research Centre in Adro (Brescia) which are: Impact tests (photo 1), Fit up tests (2), Release tests (3), Pressure tests (4), Buoyancy tests (5).



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Elastic beacons: versatility and safety

South Korea: high reliability in extreme conditions

Resinex has accepted the challenge to supply elastic beacons which withstand extreme meteorological marine conditions.

After the supply of 3 instrumental elastic beacons in 2015, installed in the South Korean eastern coast, in 2017 Resinex has replayed with the manufacturing of further 3 big elastic beacons for monitoring, destined to the western coast (Yellow Sea).

The South Korean western coast is known to be subject to extreme tides and typhoons.

Kigam (The Korean Institute for Geoscience and Mineral Resources) contacted Resinex to have the best support for the geophysical research and monitoring activities.

During the initial phase of the project, Resinex technical department received from Kigam real information about the meteorological marine conditions during a typhoon: wave height 11.2 m, wind speed 180 km/h, current speed 4 knots.

Once completed the framework of the technical information, Resinex has ad hoc studied and projected three

instrumental elastic beacons with peculiar characteristics. Two types of innovative software have been utilized: Orcaflex and Resinex Tethered Buoy System, specifically developed for Resinex from the Politecnico of Milan.

The intersection of the data coming from the two software programmes of simulation, has allowed to identify the best solution for the given parameters. Then, ad hoc elastic beacons have been projected with a float of 4.3 m of diameter, 2.5 m of height and 16 tonnes of net buoyancy.

Beacons have an average height of 51 m, a focal plane of 14 m to keep the visibility against high tide variations and have been realized for depths of 34.5 m, 34.6 m and 35.5 m.

They are also complete of an upper platform on which the necessary instruments for the monitoring are applied.

The installation in the Yellow Sea has been locally supervised by Resinex technicians.



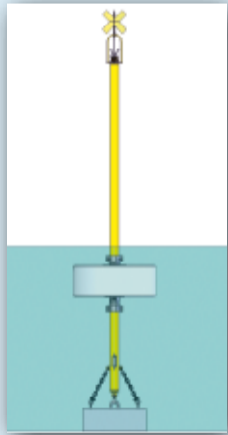
Signalling shallow water in Abu Dhabi

To signal a dredged access canal to the harbour and the dredged areas of two small landings adjacent to two artificial islands, in Autumn 2016 there were installed in the Al Dabb'iyah area of Abu Dhabi, 18 Resinex

elastic beacons, 1 land beacon and 8 light buoys.

The peculiarity of this area is the shallow water: the depth is only 4.4 metres.

For this reason, Resinex has studied a solution that can maintain, even in shallow water, the whole functionality of the elastic beacons. Therefore they have been designed, they are without turret, with a PEM 21 float with a great buoyancy but short and wide (diameter 2100x800 mm), to ensure high stability even at low depths.



A safety area in Portofino

The Port Authority of Santa Margherita Ligure (province of Genoa) has changed the coordinates of the mooring area of the cruise ships which dock at Portofino. To signal and to create a safe zone for the mooring

of the cruise ships, Marina of Portofino required the Resinex cooperation in supplying 2 elastic beacons type PEM 21, equipped with subsurface float with a net buoyancy of 4700 kg and a platform able to host two operators. The elastic beacons are 7 m high on the sea level and are positioned at a depth of 18 m and visible at 4 NM around the horizon. One elastic beacon is complete of a position transmitter for the A.I.S. localisation of the beacon itself, of an anemometer for the detection of speed and direction of surface wind (placed at 7 m from the sea level) and a wave height device with an ultrasound probe.



Monitoring natural hazards in the Black Sea

GeoEcoMar (Romania) has requested Resinex an instrumental elastic beacon for its first major initiative related to a regional early-warning system for marine geohazards of risk to the western Black Sea coastal area.

The need to kickstart this activity came from the proven vulnerability of the Black Sea area to the natural extreme events, such as earthquakes, submarine landslides, extreme storms, some of them with a high tsunamigenic risk. The elastic beacon is anchored to the sea bottom at 15 m depth, through a shackle SWL 35 tons, two stabilizing chains, connected to a concrete sinker of 20 tons. The emerged side is a steel platform that can host a high number of solar panels with a top mark, radar reflector and a self contained marine lantern with a range of 4 NM. The focal plane is 6 metres.



Abu Qir: innovative Nav Aids for the Egyptian Navy

Resinex has been chosen from the Egyptian Navy to design an innovative system of Navigational Aids for the port of Abu Qir, situated north of Alexandria (Egypt), able to withstand particular meteorological marine conditions.

In March 2017, these buoys were installed with the supervision of the Resinex staff in cooperation with Maritime Group.

These new signals allow to identify and mark the entrance and the whole route of the channel for the very big vessels arriving from the Mediterranean Sea. Resinex supplied 8 elastic beacons, equipped with



5 NM lanterns and more precisely: six elastic beacons (composed of three pairs of green and red lateral mark elastic beacons), one elastic beacon to signal a danger area (shallows and rocks near an island in a bay) and one safe water elastic beacon deployed near the waiting zones of the passage ships.

All elastic beacons are composed of a steel part (ultra light, but very strong), which allows to stand the weather conditions of the gulf and of the Alexandria coast which every year put to the test the old signalling system composed of steel buoys.



Aquaculture: a return to the past



Heavy duty buoys for cages

Resinex has been a precursor in the manufacturing of floats for fishing and for aquaculture since the beginning of the 1960s.

This field has become little by little a secondary one for Resinex due to a demand more and more linked to a restraint of the investment costs.

The field of the sea fish farming has nowadays entered into a maturity stage of its life cycle. Market is leaving the research of reducing the investment costs, requesting a higher and higher quality.

The key of success is not only the price, but also the quality of the materials and their reliability in the course of time.

For these reasons, Resinex has returned to be a more and more requested supplier by the highest category of the market.

The experience gained during the years in leading sectors of the qualitative research of marine products, allows Resinex to be one of the first suppliers of the high range.

The variety of products in the Resinex Catalogue allows to offer a wide range of floats going from few kilos to dozens of tons of net buoyancy.

Moreover, the request is moving toward floats which give a net buoyancy in depth. Signalization systems (nav aids) are also requested for fish farming fields.

Light buoys and especially elastic beacons guarantee visibility and safety of the fish farming. Italy, Canada, Spain, Malta, Middle East and Far East are the first end markets of our products in the open sea fish farming.



Signalling the fish farms

Multifunction barriers in the world

Anti-pollution kit for Montenegro



Besides being a leader in the mooring of maxi yachts, Resinex supplied barriers for the delimitation of the bunkering area of the huge yachts in Porto Montenegro, which is one of the most equipped areas.

It concerns antipollution barriers substained by elastic beacons, a solution created by Resinex to guarantee a complete stability of the barriers even in the open sea and to withstand all the marine weather conditions, including the most adverse. To protect the sea from any accidental oil spill, 213 m of antipollution barriers have been supplied together with 2 beacons installed at 15 m depth and fixed to the barrier extremities.

Anti-Intrusion barriers for natural gas terminal at Port of Klaipeda (Lithuania)

In 2015 Resinex supplied anti-intrusion barriers to demarcate the area around the LNG carrier FSRU (Floating Storage and Regasification Unit) Independence, situated in the Port of Klaipeda in Lithuania.

The barrier provided by Resinex is composed of an uninterrupted system of 500 spherical buoys linked through wire cables and plastic tie-rods. Its main feature is to be visible in the water and this has a deterrent function against intrusion attempts. Visibility is very high also thanks to the supply of 11 light buoys distributed along the barrier sections.



Demarcation in Vietnam for hydroelectric dams

Resinex supplied barriers for the delimitation of two hydroelectric dams in the territory of Dak Nong and of Lam Dong in Vietnam which have been installed by one of the major dealers of the maritime field in Ho Chi Minh City in February 2016. Barriers are composed of spherical buoys type RS5 and of floats type DF 14 which have the function of a floating door of the protection. The delimitation systems are marked with 5 light buoys type PEM 10x400.



Anti-debris barriers in UAE



In 2016 Resinex has been called to safeguards the desalination facility at Ghalilah in the Emirate of Ras Al Khaimah (UAE) with a protection barrier 126 m long.

The Federal Electricity and Water Authority (FEWA) is the responsible about the construction of 15 MIGD (68,000 m³/d) seawater reverse osmosis (SWRO) desalination facility.

The plant, which produces 15 million Imperial gallons per day (MIGD), supplies drinking water for the Emirate of Ras Al Khaimah.

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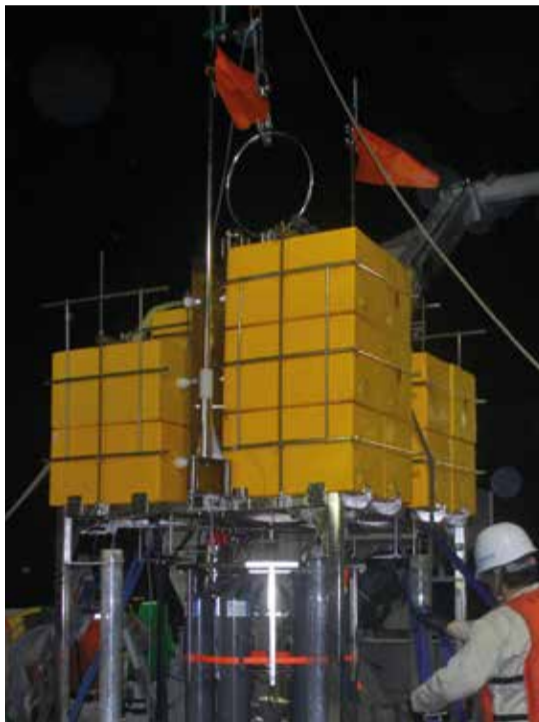
Ultra deep blocks at 11.000 metres in the Mariana Trench

Resinex, with its wide experience in high depths, has been chosen to support each phase of the important project HADES granted to Prof. Ronnie N Glud at University of Southern Denmark, through the supply of syntactic foam blocks tested at 11.500 metres and used at 11.000 metres of depth to explore the deepest marine habitat on Earth.

The purpose is to analyze the processes responsible for the transport of organic material to the trenches, the mineralization processes in the trench sediments and characterization of the unique microbial communities mediating these processes.

This project is 5-years-long and includes various cruises.

The first cruise was at the end of 2016 in Mariana Trench, for which Resinex has provided 10 syntactic foam blocks rated 11.500 metres. The blocks are rotationally moulded, manufactured in linear polyethylene and filled with Resinex syntactic foam which guarantees resistance at 1150 bars. The blocks were tested in the Resinex Marine Research Centre

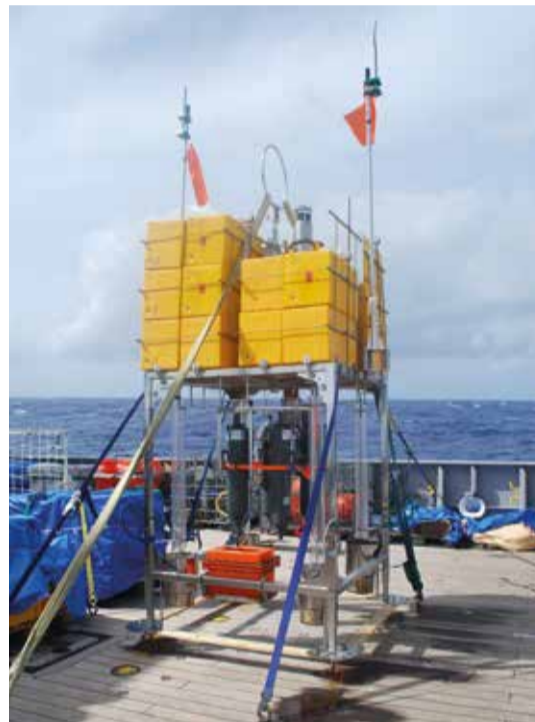


with a hydrostatic pressure of 900 bar and then they have been tested again by the University of Southern Denmark at 1100 bar in Japan. All the tests have been passed successfully.

In Summer 2017 Resinex provided 34 more syntactic foam blocks for new cruises in sites of Kermadec and Atacama Trench with depths ranging from 8.100 to 10.900 metres.

The aim of the expeditions is to provide the first detailed analysis of deposition and mineralization of organic material in some of the most scarcely explored regions of the ocean: the deep hadal trenches. The hadal depth zone reaches from 6000 metres depth to the deepest sites on Earth at 11.000 metres in the Challenger Deep of the Mariana Trench.

Apart from the lead partner at University of Southern Denmark, the research team include researchers from Max-Planck institute for Marine Science (Germany), Marine Biological Laboratory at University of Copenhagen (Denmark) and Scottish Association for Marine Science (Scotland, UK).



Zohr project: quick answer and reliability



The Zohr gas field is an offshore natural gas field of 100 km² located in the Egyptian sector of the Mediterranean Sea. Saipem required to Resinex a very fast realization of modules for deep water depth (1500 mt) able to sustain the extremely heavy grommets used in the operations. Resinex received the order at the end of September 2016 and shipped to Saipem the pieces in record time on December 2016. Modules have a diameter of 1000x2400 mm, a net buoyancy of 600 kg and have been used at 1500 metres of depth. These floats have a thick shell in polyethylene (thickness of 10mm) able to withstand abrasions and impacts. The internal filling is a syntactic foam compound and macrospheres able to bear the pressure of the high depths. Grommets are fastened to the floats through steel clamps making them still and preventing any movement. Modules were tested at 165 bar in the Resinex Research Centre.

Total Angola: maxi buoys at 100 mt depth

Resinex supplied to Total Angola, 2 maxi support buoys able to operate at a depth of 100 m. They are composed of a total of 24 modules which make them unsinkable against hits as float is passed by a passing through steel part with chain stopper plates for stud link chain up to MBL (Minimum Breaking Load) 400 tons. Buoys are also equipped with a radar reflector and a self powered marine lantern with a range of 5 MN. They are 5,2 metres long and have a weight of 13,7 tons and a net buoyancy of 33,5 tons at 100 m of water depth. They have been sold to Total through the company Franklin Offshore (Singapore).



High depth for Total Egina project in Nigeria



Egina oil field, discovered by Total, is located 150 km off the coast of Nigeria at 1700 m of water depth. Total Nigeria commissioned Saipem for engineering, procurement, fabrication, installation and pre-commissioning of 52 km of oil production and water injection flow lines, 12 flexible jumpers, 20 km of gas export pipelines, 80 km of umbilicals and of the mooring and offloading systems. In 2017 Saipem has requested to Resinex spherical buoys for high depth rated 2000 m with a net buoyancy of 11 kg. The supply was completed with ultra deep water buoys with a net buoyancy of 200 kg installed at 1600 m of water depth. The buoys were tested in the Resinex Marine Research Centre with a hydrostatic pressure of 160 bar.