

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 +39.02.7210 5548
marketing@resinextrad.com

Torbiato di Adro
Via Artigiani, 15
Ph +39.030.745 7245
Fax +39.030.735 6185
production@resinextrad.com

Adro
Via Laveni, 14
Ph +39.030.745 1194
Fax +39.030.735 6185
r&d@resinextrad.com

Resinex CoSeMa
Via Campania, 29
61122 Pesaro (Italy)
Ph +39.0721 455337
info@cosema.biz
marketing@resinextrad.com

Resinex Asia
Level 49, One Raffles Quay
North Tower, Singapore 048583
Ph. +65.66225532
sales@resinexasia.com
www.resinexasia.com

360° Solutions for the Seven Seas

Over the years, Resinex has successfully combined the high quality of its surface and deepwater products, mastering two distinct yet equally challenging environments. Our commitment to maritime safety has led to a significant expansion of the NavAids range, including the advanced CoSeMa Resinex marine lanterns. Likewise, our materials, built to withstand extreme depths, have achieved exceptional standards. It might be a great challenge merging these two opposing worlds, but our future efforts remain focused on covering all 360 degrees of the marine compass rose.



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Qatargas North Field: the future of gas relies on Resinex

Qatar continues to consolidate its leading position in the international energy market, in part thanks to the development projects of the North Field gas reservoir, the world's largest natural gas field, owned by the state-owned company Qatargas.

The North Field Production Sustainability EPCL Project and the North Field Expansion Project (NFXP) represent two of the most ambitious and crucial initiatives for the country's energy sector. Both projects aim to ensure sustainable and continuous natural gas production. The EPCL Project focuses on the engineering, procurement, construction, and installation (EPCI) of offshore export pipelines and related onshore works. In parallel, the North Field Expansion Project (NFXP) aims to increase the country's liquefied natural gas (LNG) production capacity from 77 million tonnes per annum (Mtpa) to 110 Mtpa, further consolidating Qatar's position as a leader in the global LNG market.

Resinex is playing a key role in both projects by providing complete floating systems for pipeline deployment to two major operators in the sector: Saipem and McDermott.

In 2022, Resinex supplied over 300 Pipe Deployment Floats (PDF) for the North Field Production Sustainability Project EPCL, with a total net buoyancy of 1510



tonnes and an operational depth of 80 meters for two years. These floats were delivered to the operator in just three months. For the North Field Expansion in 2024, further 300+ PDFs were required, with a total net buoyancy of 800 tonnes at 30 meters depth, and the supply was completed in only two months. Resinex's presence in the pipeline deployment area is now well-established, backed by over thirty years of experience.

One piece high buoyancy float for Gastrade Alexandroupolis project



In 2023, Resinex supplied Saipem with 90 pipe deployment floats for the offshore pipeline project in the North-East of Greece, off the coast of Alexandroupolis. These floats, each with a net buoyancy of 4.4 tonnes, were designed to support the positioning of a 24-kilometre-long pipeline at a water depth of up to 40 meters.

The floats were crucial in ensuring the precise installation of the pipeline, which connects the floating storage and regasification unit (FSRU) to the Greek National Natural Gas Transmission System (NNGTS).

Resinex's contribution was essential in providing stability and reliability during the installation process, supporting the successful completion of this significant offshore infrastructure project.



Powerful Floating Solution Supplied to Allseas

In January 2024, Resinex provided Allseas with 10 tie-in float modules, shipped to the Netherlands. These modules are designed to operate at a depth of 20 meters and offer a net buoyancy of 4500 kg each.

Resinex's ability to deliver single tie-in modules with such a high net uplift showcases our technical expertise and innovation in advanced floating solutions. These modules are essential for pipeline deployment operations, ensuring stability and reliability even in challenging subsea conditions.





A Reliable partner in ultra-deep waters



Baleine SURF project 1200-meter depth



Buzios 7 project 2100-meter depth



Hollandse Kust West Beta project 3000-meter depth

Resinex, with over 60 years of experience in the industry, continues to be a global reference point in the supply of cutting-edge equipment for deepwater operations. The projects, ranging from oil & gas to oceanology, require highly specialized solutions capable of ensuring safety and reliability in extreme underwater conditions. In the past two years, Resinex has solidified its role as an essential partner for various offshore operations, providing a wide range of buoys and buoyancy modules used in challenging environments worldwide by major oil & gas companies, including Saipem, Subsea7, and McDermott. In 2024, special floats were supplied to Boskalis for the Hollandse Kust West Beta project, operating at a depth of 3,000 meters. These products were designed to ensure maximum efficiency and safety in offshore operations. Meanwhile, in the Búzios 7 project, off the coast of Rio de Janeiro, Resinex supported Saipem with buoyancy modules intended for operation at a depth of 2,100 meters, crucial for the positioning and maintenance of Steel Lazy Wave Risers (SLWR). In Senegal, buoys were supplied for the Tortue Offshore project and for the Tortue Facilities Extension project, designed to operate at depths of up to 3,000 meters. These products were employed to ensure stability in underwater operations related to the expansion of offshore structures. In 2023, in collaboration with Subsea7 for the CLOV Phase 3 project off the coast of Luanda, Angola, buoys were provided, designed to operate at depths between 1,100 and 1,400 meters. These buoys were essential for the extension of the subsea infrastructure. In the same year, Resinex also supported the Baleine SURF project in Ivory Coast, with buoys designed to operate at a depth of 1,200 meters, contributing to the expansion of marine infrastructure in the country. Moreover, at the beginning of 2023, Resinex supplied spherical buoys to Saipem for the Shah Deniz 2 project in the Caspian Sea, designed to operate at depths between 500 and 1,000 meters. These buoys were developed to withstand the extreme conditions of the Caspian Sea. These supplies highlight Resinex's ability to support complex and highly significant projects on a global scale.



Shah Deniz 2 project 1000-meter depth



CLOV Phase 3 project 1400-meter depth



Tortue Facilities Extension Project 3000-meter depth



Tortue Offshore Project 3000-meter depth

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Resinex CoSeMa New Marine Lanterns CL 301 and CL 401

- **Integrated Fresnel Lens:** Compliant with IALA regulations, the Fresnel lens ensures optimal LED emission for superior visibility at sea compared to more common lenses. The maximum luminous range for the new CL 301 is 6 nautical miles, while for the CL 401, it is 8 nautical miles.
- **Wide Coverage:** the lanterns are equipped with two new internal lenses for adjusting vertical divergence (FWHM): a narrow divergence, optimized for achieving greater distances, and a wider divergence designed to ensure maximum visibility even when the lantern is installed on buoys or elastic beacons. This flexibility allows for precise adaptation to the specific needs of the marine environment where the lanterns are deployed.
- **Satellite Synchronization:** Through the satellite connectivity, it will be possible to program multiple lanterns for synchronized flashing (UNI-FLASH).



- **Advanced Protection:** The IP68 classification guarantees a complete protection of the marine lantern from dust (level 6) and allows the resistance to continuous immersion in water (level 8). This ensures high reliability of the device even in extreme marine environments or adverse weather conditions.
- **Optimized Design:** The metal structure with a handle lets an easy handling.
- **Electromagnetic Compatibility:** The lantern emits no interference, enabling radio communications even near the signal in total safety.
- **Infrared Programmer for Advanced Control:** The CR01 electronic circuit features an integrated remote control that allows for the adjustment of flashing characteristics and luminous range of the lantern remotely, without the need for any manual intervention.



QUALITY TEST

The Resinex-CoSeMa marine lanterns, after being tested in the black room set up at our CoSeMa center in Pesaro, have passed the following international tests at the certification institute "Istituto Giordano" in Rimini:



Electromagnetic compatibility



Photometric and Colorimetric test



Degree of protection IP68

SELF-CONTAINED MARINE LED LANTERN
MODEL CL-301

This marine lantern has a nominal range which goes up to 6 NM. It is made of 9 high intensity LEDs with a life expectancy of 100.000 hours. The lantern's body is made of enamelled aluminium. Signal colours are compliant to IALA R0201 (E200-1) and quality is assured by ISO 9001:2015.

MODEL	NM	LED COLOUR	NUMBER OF LEDS	MINIMUM SUNLIGHT	LENS, SOLAR PANELS, BATTERIES
CL 301	6	WHITE RED GREEN YELLOW BLUE	9	3 HOURS	REPLACEABLE

TESTING AND CERTIFICATION

CE: approved according to 2014/30/UE
IALA: signal colours compliant to IALA R0201 (E200-1)
Quality assurance: ISO 9001:2015

www.resinextrad.com e-mail: marketing@resinextrad.com tel.: +39 030/7457245

SELF-CONTAINED MARINE LED LANTERN
MODEL CL-301

TECHNICAL DATA

Nominal range (20% duty cycle): up to 6 nautical miles
Number of LEDs: 9 high intensity LEDs
LEDs life expectancy: 100.000 hours
Horizontal Output: 360 degrees
Light colour: white, red, green, yellow, blue
Lens: 155 mm clear
Vertical Divergence (FWHM): 4° (CL-301) or > 8° (CL-301H)
Lantern body: enamelled aluminium
Daylight control on/off: 70/100 lux
Flashing characteristics: all IALA flash patterns (others on demand)
Minimum sunlight: 3 hours
Charge regulator: included
On/Off switch: with remote control
Solar Panels: crystalline high efficiency sealed lead battery 12 volt
Battery: replaceable
Lens and Battery: replaceable
Temperature Range: -30° / +50° C
Waterproof: IP 68
Battery protective vent: included at the top of the lantern body
Assembly flange: 4 holes 12mm diameter 220mm PCD
Weight: 10 kg
Dimensions: 265 x 265 x 560 h mm
GPS Synchronization: Optional GPS enables two or more lanterns to flash in unison

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SELF-CONTAINED MARINE LED LANTERN
MODEL CL-401

This marine lantern has a nominal range which goes up to 8 NM. It is made of 9 high intensity LEDs with a life expectancy of 100.000 hours. The lantern's body is made of enamelled aluminium. Signal colours are compliant to IALA R0201 (E200-1) and quality is assured by ISO 9001:2015.

MODEL	NM	LED COLOUR	NUMBER OF LEDS	MINIMUM SUNLIGHT	LENS, SOLAR PANELS, BATTERIES
CL 401	8	WHITE RED GREEN YELLOW BLUE	9	3 HOURS	REPLACEABLE

TESTING AND CERTIFICATION

CE: approved according to 2014/30/UE
IALA: signal colours compliant to IALA R0201 (E200-1)
Quality assurance: ISO 9001:2015

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SELF-CONTAINED MARINE LED LANTERN
MODEL CL-401

TECHNICAL DATA

Nominal range (20% duty cycle): up to 8 nautical miles
Number of LEDs: 9 high intensity LEDs
LEDs life expectancy: 100.000 hours
Horizontal Output: 360 degrees
Light colour: white, red, green, yellow, blue
Lens: 155 mm clear
Vertical Divergence (FWHM): 4° (CL-401) or > 8° (CL-401H)
Lantern body: enamelled aluminium
Daylight control on/off: 70/100 lux
Flashing characteristics: all IALA flash patterns (others on demand)
Minimum sunlight: 3 hours
Charge regulator: included
On/Off switch: with remote control
Solar Panels: crystalline high efficiency sealed lead battery 12 volt
Battery: replaceable
Lens and Battery: replaceable
Temperature Range: -30° / +50° C
Waterproof: IP 68
Battery protective vent: included at the top of the lantern body
Assembly flange: 4 holes 12mm diameter 270mm PCD
Weight: 14 kg
Dimensions: 325 x 325 x 650 h mm
GPS Synchronization: Optional GPS enables two or more lanterns to flash in unison

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Navigation: a spotlight on safety

In recent years, Resinex has solidified its reputation as a leader in maritime safety solutions, successfully completing a series of significant projects in various ports and marinas, demonstrating out-of-the-box creativity.

Carlo Riva Port, Rapallo

In 2023, Resinex contributed to the restoration of Porto Carlo Riva in Rapallo, which was damaged by the storm surge in 2018. A land beacon with a 4 meters focal plane and four Resinex CoSe-Ma Cs 155 marine lanterns, offering a range of



three nautical miles, were installed. Additionally, a complete power supply system was provided, including a stainless-steel box and charge regulators, to ensure the continuous and safe operation of the signaling system.

Cala del Forte Port, Ventimiglia

Also in 2023, Resinex supplied two light buoys to Porto Cala del Forte, managed by SEPM. The buoys, one red and one green, each with a range of five nautical miles, were accompanied by two land beacons equipped with marine lanterns with a range of three nautical miles. To facilitate boats coming from the sea, the marine lantern on the land beacon was shaded. This supply was designed to enhance safety and visibility in the port, particularly important given the risk of nighttime collisions with breakwaters.



Capraia island

In 2023, Resinex expanded its offering in Capraia by supplying four light buoys and four radar-reflective top marks, requested by the company Talas after winning a public tender. The light buoys, with a 3.7 meters focal plane and a signal range of five nautical miles, were positioned on the southwest coast of the island. Due to the great depth of the seabed, four jumper buoys were provided for anchoring. On the island, four radar-reflective top marks were positioned, thus contributing to the safety and reliability of maritime traffic around the island.



Port of Peschici



In 2023, at the request of the Navy and through the company Di Salvia, a red land beacon was installed in the port of Peschici. The land beacon, with a height of three meters and a marine lantern with a range of four nautical miles, was positioned to improve maritime traffic in the area.

Vado Ligure

At the end of 2023, at the request of Fincosit - 2F for Vado Scarl, a light buoy composed of three floats with a 3.5 meters focal plane and a self-powered marine lantern with a range of four nautical miles, colored red, was installed as a temporary replacement for the red lighthouse of Vado Ligure. This installation was carried out following the specifications provided by the Lighthouse and Maritime Signaling Service (Servizio dei Fari e del Segnalamento Marittimo) and shared with the Savona Harbor Office. Added safety lights and beacon during restoration.



Port of Fano

In 2022, Resinex completed a major contract for the renewal of maritime signals at the entrance to the port of Fano. The supply included two land beacons, one red and one green, with a focal plane height of five meters and a range of eight nautical miles. These land beacons were designed to ensure clear and reliable signaling for vessels approaching the port.



Lignano Sabbiadoro

In 2022, Resinex supplied a land beacon mounted on a platform at Lignano Sabbiadoro. This project, commissioned by the company Cicuttin Costruzioni, follows a previous installation of a green Resinex marine lantern in 2011. Satisfied with the quality of our products, Cicuttin Costruzioni requested a new red land beacon, with a 3.5 meters focal plane, to further improve the safety of the port. This project demonstrated our ability to adapt safety solutions to the specific needs of ports, enhancing visibility and safety for vessels operating in the area.



Port of Piombino

Another significant project was the installation of a red land beacon in the port of Piombino, completed in 2022. This land beacon, with a 5 meters focal plane and a nominal range of three nautical miles, was designed to ensure 360° visibility and improve the safety of ships entering the port.



Innovation in Design: The Chesa De Vein Restaurant

Imagine entering a restaurant and finding a land signal as a design element. Only those who dare can think of such an idea, and Resinex has succeeded brilliantly! We're talking about the Chesa De Vein restaurant in Rimini, where the large red land beacon branded Resinex at the entrance certainly doesn't go unnoticed. This choice, which might seem unusual, highlights two great qualities of Resinex: the ability to think outside the box and its reputation extending even to the food sector.



With extensive experience and a constant commitment to innovation, Resinex continues to be a reliable partner for maritime safety and an innovator in design. Every completed project

demonstrates our dedication to providing high-quality solutions, both for protection in ports and marinas and for unique and creative applications.

RESINEX

In Cleopatra's waters



During the year 2023, Resinex supplied FP 500 elastic beacons in the city of Marsa Matruh, located on the Mediterranean Sea, in Almaza Bay. The area, well-known for its beautiful beaches, is also famous for historical accounts that Queen Cleopatra used to bathe in these waters with Mark Anthony. In partnership with Maritime Group, Resinex elastic beacons received positive evaluations from the Red Sea Port Authority and the Egyptian Authority for Marine Safety (EMAS), recognized as the most suitable for the navigation assistance near the city's port. Almaza Bay, namely "the pearl" in Arabic, has a seabed of only 5 meters. The main challenge was the optimisation of the anchoring of the beacons: on rough sea days, the low point of the waves could decrease the sea level furtherly, creating turbulence. To deal with this issue, Resinex studied and created a robust float PEM 21X1940 with a net buoyancy of 4200 kg, ensuring stability even in particularly rough sea conditions in shallow waters.



Resinex spar buoys all around Cyprus

From 2020 to 2023, Resinex collaborated with the Cypriot company Brasal Marine to successfully participate in international tenders proposed by the Ministry of Fisheries and Marine Research of Cyprus.

The initial project entailed supplying and installing 15 spar buoys in the Dasoudi zone near Limassol. Of these buoys, 11 have a diameter of 255 mm, while the remaining 4 have a diameter of 300 mm. They play a crucial role in monitoring the marine environment.

To ensure the stability and safety of the buoys on the seabed, Resinex also provided 15 RS3x700 jumper underwater floats.

Positioned at a depth of 5 meters, these floats support the buoy mooring system without damaging the seabed.

Thanks to the outstanding work, in 2023, the Ministry of Fisheries and Marine Research of Cyprus commissioned Resinex's spar buoys for an Artificial Reefs project. This initiative aimed to create artificial structures on the seabed to foster underwater habitats, promote biodiversity growth and establish recreational diving sites.

Artificial reefs now line the entire perimeter of the island, including locations in Ayia Napa, Dasoudi, Larnaca, Yeroskipou, and Paralimni.

For this project, Resinex produced 73 yellow spar buoys with a diameter of 600 mm to delineate the areas of the artificial reefs and 10 red spar buoys to mark exact diving spots.

In addition, 15 cardinal buoys with a focal plane of 1.5 meters were provided to ensure maximum safety by guiding vessels around the artificial reefs.





Brand new 2,6 mt monoblock float for safe navigation in Egypt

SCzone, the organization in charge of the economic development of industrial zones along the Suez Canal, has recently completed an ambitious modernization project of the port of Al-Arish, on the shores of the Mediterranean Sea in Egypt. These works aimed to enhance maritime signal through the installation of light signal buoys. In collaboration with Maritime group, Resinex was able to secure the contract, thanks to its innovation capacity. In fact, for this tender, Resinex studied and



developed a new buoy with a diameter of 2600 mm, made with a monoblock float, a completely innovative and unique product in the market. This solution offers greater safety, strength, and resistance compared to normal buoys with modular floats. Furthermore, a light buoy of type FP 400 PEM 30 with a diameter of 3 m was installed. It was characterized by white and red vertical stripes, in accordance with IALA recommendations, for signalling safe waters for navigation.



Ice Border Buoys

Between Lithuania and Belarus, where the Lithuanian border crosses the Drukšiai, Apvardai, and Prūtas lakes, Resinex supplied 53 Spar Buoys in 2022 to mark the border line between the two countries, accurately and visibly.

These buoys expand Resinex's range of Nav Aids, particularly the Spar buoy type. This model is called ICE because it was designed to withstand the extremely low temperatures of the Lithuanian winter when the cold freezes all bodies of water.

They have a net buoyancy of 35 kg, with a diameter of 160 mm and a height of 4 meters. They are equipped with:

- An outer structure made of polyethylene filled with high-density polyurethane foam, ensuring resistance in temperatures ranging from -40 to -60 degrees Celsius.
- Internal ballast for optimal stability.
- Steel mooring eye: located at the bottom, it securely connects the buoy to the mooring body on the seabed.
- Reflective band for maximum visibility.
- Recognition stickers: two stickers with numbers and warning messages are provided.
- Radar reflector: located inside the buoy to communicate its exact position in the water.



New Compact Buoys for river flow

An international tender was announced by the Lithuanian authorities for the supply of river buoys.

Resinex, in cooperation with the Lithuanian Garant group, was awarded this tender, thanks to the quality of its new design and the solidity of its product. In 2022, 32 Resinex buoys with a diameter of 1.3 meters were installed along the Nemunas River.

Each of them has a weight of 160 kg, a net buoyancy of 340 kg, and is composed of the following elements:

- Linear polyethylene float: with a diameter of 1300 mm and a core made of polyurethane foam, it ensures strength and durability.
- Lantern mounting plate: the upper part of the buoy is equipped with a steel plate for the installation of a lantern.
- Reflective band: the buoys are provided with a reflective band to ensure better visibility at night.
- Polyethylene (PE) daymark: a polyethylene daymark is included to ensure maximum visibility even during the day.
- Steel handles: two steel handles are placed to facilitate the handling of the buoys.
- Holes for ropes or snap-hooks: four holes are provided for anchoring and securing the buoys.
- Internal ballast: internal ballast ensures the stability and the correct positioning of the buoy.





The magic of Curaçao

In summer of 2023, Resinex and the Curacao Port Authority cooperated on the replacement and installation of a large mooring buoy to improve safety in Caribbean port, Resinex has been able to provide an innovative state-of-the-art catamaran buoy.

Upon the delivery to the site, Resinex team has been capable of making the product operational in just two days. The installed Catamaran buoy consists of three levels with 4 mooring hooks, with a net buoyancy of 50 tons, ensuring:

- **Advanced Stability:** thanks to its design and lever system, the buoy offers a greater stability even in rough sea conditions, giving a high level of safety.
- **Advanced Mooring Systems:** the buoy has been equipped with 4 mooring hooks, each certified for a capacity of 100 tons, ensuring the possibility of anchoring ships of various sizes in a safe way.
- **Improved Visibility:** the new buoy has been provided with integrated lighting and a radar reflector, enhancing its visibility and increasing the mooring safety.



Multiple Buoy Mooring in Colombia

In Colombia, the company Cenit, a subsidiary of the Ecopetrol Group specialized in the transport and logistics of hydrocarbons, issued a tender in December 2022 for the replacement of a monobuoy undergoing revamping.

The main purpose was to maintain the activity of the La Valeria refinery in Cartagena during the works to replace the monobuoy used during the unloading of the oil tankers. The construction of an alternative system for vessel offloading was required, involving the installation of a hot tap in the existing pipeline, a system which was able to maintain the flow of hydrocarbons from the vessel to the storage terminal in Pozos Colorados near Santa Marta.

Resinex provided a winning solution with the Multiple Buoy Mooring, which, in only three months from the tender opening, was delivered to the destination. Three Resinex catamaran buoys were supplied (product details here), offering several advantages over traditional large single-point mooring buoys. **The anchoring system** allows them to maintain a horizontal position even under the worst tension conditions.

The catamaran design of the buoys also provides greater resistance compared to standard buoys that tend to tilt under tension, thereby enhancing safety during adverse weather conditions. Each buoy is composed of 22+2 modular unsinkable floats with a net buoyancy of 57 tons and four quick release hooks, each with a capacity of 75 tons.



A yellow Catamaran buoy for a Black Sea

Black Sea Oil & Gas, in collaboration with the ABL group, recently enlisted the expertise of the Resinex team, commissioning the production of a PEM 58x1300 catamaran buoy.

The catamaran buoy is a special type of mooring buoy patented by Resinex in the late 1980s. It is designed with a unique Multi-Lever System that, supporting the mooring tension, allows the buoy to remain always in a horizontal position.

The modular design of these buoys enables adjustable buoyancy to ensure high stability even in extreme sea conditions. The buoy is made up of unsinkable modular floats, surrounded by rubber fenders to absorb impacts and equipped with a non-slip surface. It weighs 18 tons and has a net buoyancy of 27 tons.

The buoy was fitted with a marine lantern with a range of 4 nautical miles, an integrated AIS system, a top mark with radar reflector, and a mooring shackle with a safe working load (SWL) of 150 tons.

The buoy was shipped disassembled to the Black Sea Oil & Gas facility in Romania, on the Black Sea, where a Resinex technician will assist with the assembly process.

