aquatherm®

Corrosion-resistant pipe systems made of polypropylene
For supply networks and ship operating systems

NEXT GENERATION OF MARITIME PIPES

© Francisco Martinez

We are part of the solution!

Efficient and lightweight piping systems for shipbuilding

For many years, the global shipbuilding market has been growing steadily, experiencing simultaneously a process of profound changes. Large ships are now dominant in shipping due to a significant increase in traffic and tourism. This trend is accompanied by stricter environmental and pollution control standards as a result of expanding trade and the tourism sector. aquatherm supports the maritime industry in solving emerging technical and operational problems by offering high-quality polypropylene piping.

Resistant to corrosion, wear and chemical attack, aquatherm piping systems are ideal for:

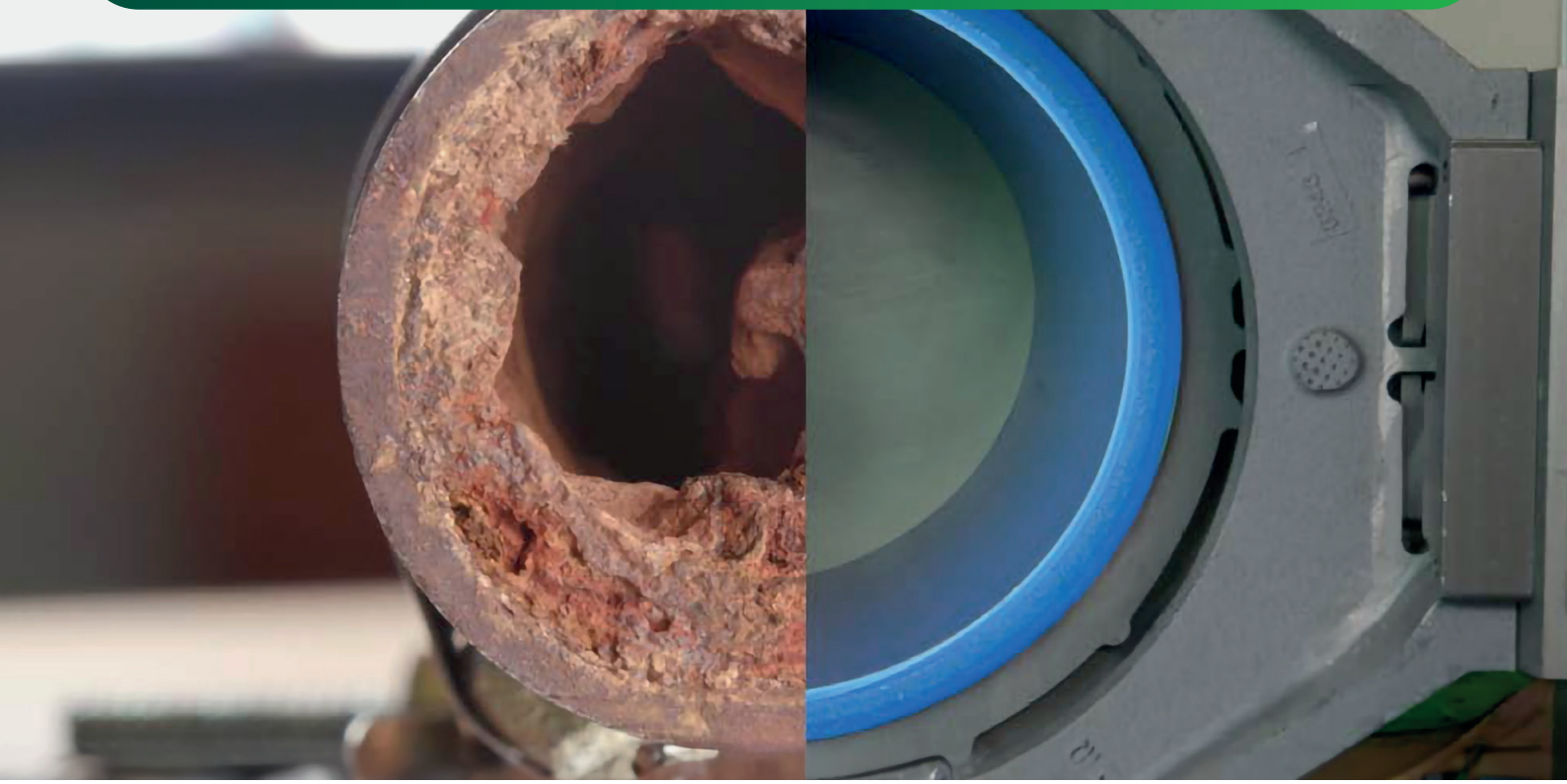
- Extreme high sea conditions
- Providing excellent economic efficiency
- Long life

Salt water resistance:	**100 years**
Deep sea approved:	**3000 m**
Temperatur range:	**-40 °C to +90 °C**
Thermal conductivity:	**0.15 W/mK**

- Cruisers
- RO-PAX
- Commercial vessles
- Offshore & accommodation vessles
- Icebreaker & expedition
- Naval

fusiolen®

All aquatherm products are made of fusiolen® polypropylene. It is characterised by high chemical and mechanical resistance, temperature resistance and fatigue resistance. These properties have a positive impact on the longevity of our products.



Less weight, greater efficiency: Potential for savings on board

Thanks to a wide range of superior products, integrated systems and additional technologies for the shipbuilding industry, aqua-therm covers all major installations onboard the vessel: ballast and cooling systems, solutions for water treatment as well as hot and cold water distribution systems.

Lower densitiy and weight

aquatherm polypropylene pipes help you to save weight. While steel has a nominal weight of 7800 kg/m³ and GFK of 2000 kg/m³ our pipes feature only 980 kg/m³.

Iron-free is rust-free

Rust is an iron oxide formed by the redox reaction of iron and oxygen in the presence of water or air moisture. Several forms of rust are distinguishable both visually and by spectroscopy, and form under different circumstances.

aquatherm polypropylene pipes are corrosion resistant and rust free.

This has a positive effect on the service life of the piping.

For many years, customers around the world have been relying on professional support in the development of efficient, durable and cost-effective systems, benefiting from increased productivity through lower frequency of maintenance and docking, and lower overall operating costs.

aquatherm polypropylene pipes provide various benefits such as:

- Light weight
- Fast installation
- Corrosion resistance

Jointing Technology

Butt welding & socket welding

High accuracy, very high bond strength and at the same time ease of use are convincing advantages that make this cost-effective and reliable technology ideal for large diameter pipes. aquatherm offers a wide range of processing machines from manual devices to CNC controlled welding machines while ensuring the highest flexibility of application and quality. The pipe and fitting become a single piece with no potential leak path.

Flange connection

While butt welding is done mostly at the workshop, flanges may be used for connection at site. This will save time and cost. Flanges can be delivered in PN 10 and on special demand also PN 16, all seawater resistant. Flange adapters are available as standard and for special butterfly valves on request. Gaskets are delivered in EPDM-quality.

Suitable for many maritime applications:

- Hot & cold fresh water
- Ballast & trim water
- Black & grey water
- Fresh water flushing lines
- Water treatment
- HVAC & chilled water

HVAC and chilled water

Onboard ships and offshore structures the right HVAC system is most important for a well controlled climate and the comfort of passengers and crew. The system needs to be planned and designed in the best possible way considering the type of vessels, health, safety, and environmental aspects to ensure safe and efficient operation.
In case of chilled water units and absorption chillers, there is usually a long-distance pipe network connecting the cooling plant with the air handling units in the cabins/workspaces or with the electric equipment cooling units.

The typical medium for energy transport is water or a water/glycole mixture, mainly to avoid large refrigerant pipe systems. In some applications, seawater can be used as cost free cooling medium. For these challenging applications it is very important to select the right pipe system.

aquatherm blue pipe, available in dimensions from 20 to 630 mm, is the best choice due to its chemical resistance allowing a service life up to 100 years. Compared to metal or GFR pipes, aquatherm polypropylene pipes feature lower weight which can help to reduce fuel costs.

aquatherm blue SDR 7,4 MF

MF = multilayer, with fibre reinforced

Article no.	d	s
Socket welding process		
2012020006	20	2.8
2012025008	25	3.5

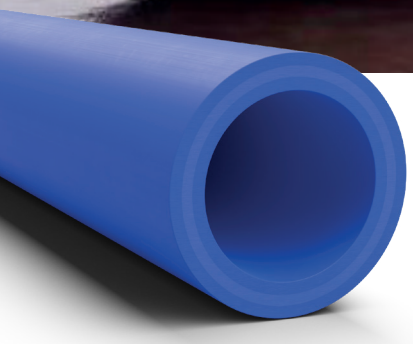
Legend:
d: diameter in mm
s: wall thickness in mm

aquatherm blue SDR 11 MF RP

MF = multilayer, with fibre reinforced
RP = Increased pressure resistance

Article no.	d	s
Socket welding process		
2014040012	40	3.7
2014050014	50	4.6
2014063016	63	5.8
2014075018	75	6.8
2014090020	90	8.2
2014110022	110	10.0
2014125024	125	11.4

Article no.	d	s
Butt welding process		
2014160026	160	14.6
2014200028	200	18.2
2014250030	250	22.7
2014315032	315	28.6
2014355034	355	32.2
2014400036	400	36.3
2014450038	450	40.9



AQUATHERM BLUE MF

aquatherm blue MF is a multi-layer, fibre-reinforced composite pipe. The composite pipes manufactured using the multi-layer extrusion process have increased stability thanks to the fibre filling in the middle layer.

REFERENCE

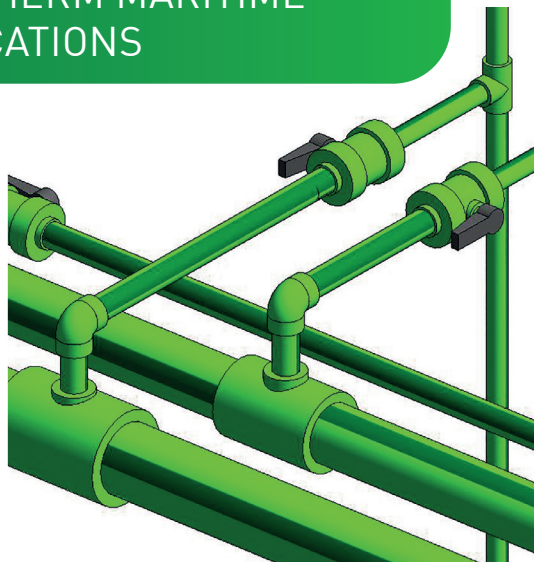
Snow Dragon 2

The corrosion-resistant piping system aquatherm green pipe was used for potable water, and aquatherm blue pipe for the ship's grey and black water system. During the renovation of the sister ship "Snow Dragon 1", aquatherm products also replaced existing metal pipes in the areas of potable water as well as grey and black water.

Why trust AQUATHERM BLUE?

- High corrosion resistance
- High temperature resistance
- Resistance to chemicals
- Lighter than metallic materials*
- High pressure resistance
- Thinner insulation than required for metallic pipes

*Comparative LCA: 100 ft of pipe weighs: aquatherm blue: 7.44 kg; copper pipe: 13.5 kg; steel pipe: 48 kg



Hot and cold fresh water

According to the German "Drinking Water Ordinance" and many other international regulations of health organisations such as the WHO, the consumption or use of water should never pose a risk to human health. The chemical and microbiological composition of the water must be monitored by the health authorities, but also by the facility management to ensure high drinking water quality.

The piping system aquatherm green ensures that excellent drinking water quality is maintained over the long term. It is not only corrosion-resistant, tasteless and odourless, but also complies with the necessary international regulations on hygiene and drinking water.

Its technical suitability and performance has been proven worldwide for decades. A variety of 450 different pipes and fittings with dimensions from 20 to 355 mm ensures safe and easy installation. Pre-fabricated pipe spools are also available.

Legend:
d: diameter in mm
s: wall thickness in mm

aquatherm green SDR 7,4 MF

MF = multilayer, with fibre reinforced

Article no.	d	s
Socket welding process		
1012020506	20	2.8
1012025508	25	3.5

aquatherm green SDR 9 MF RP

MF = multilayer, with fibre reinforced
RP = Increased pressure resistance

Article no.	d	s
Socket welding process		
1013032010	32	3.6
1013040012	40	4.5
1013050014	50	5.6
1013063016	63	7.1
1013075018	75	8.4
1013090020	90	10.1
1013110022	110	12.3
1013125024	125	14.0

Article no.	d	s
Butt welding process		
1013160026	160	17.9
1013200028	200	22.4
1013250030	250	27.9
1013315032	315	35.2

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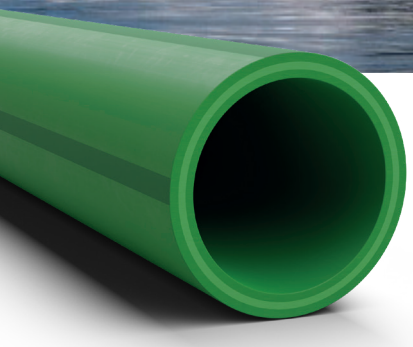


AQUATHERM GREEN MF RP

aquatherm green MF RP is a multi-layer, fibre-reinforced composite pipe with increased compressive strength.

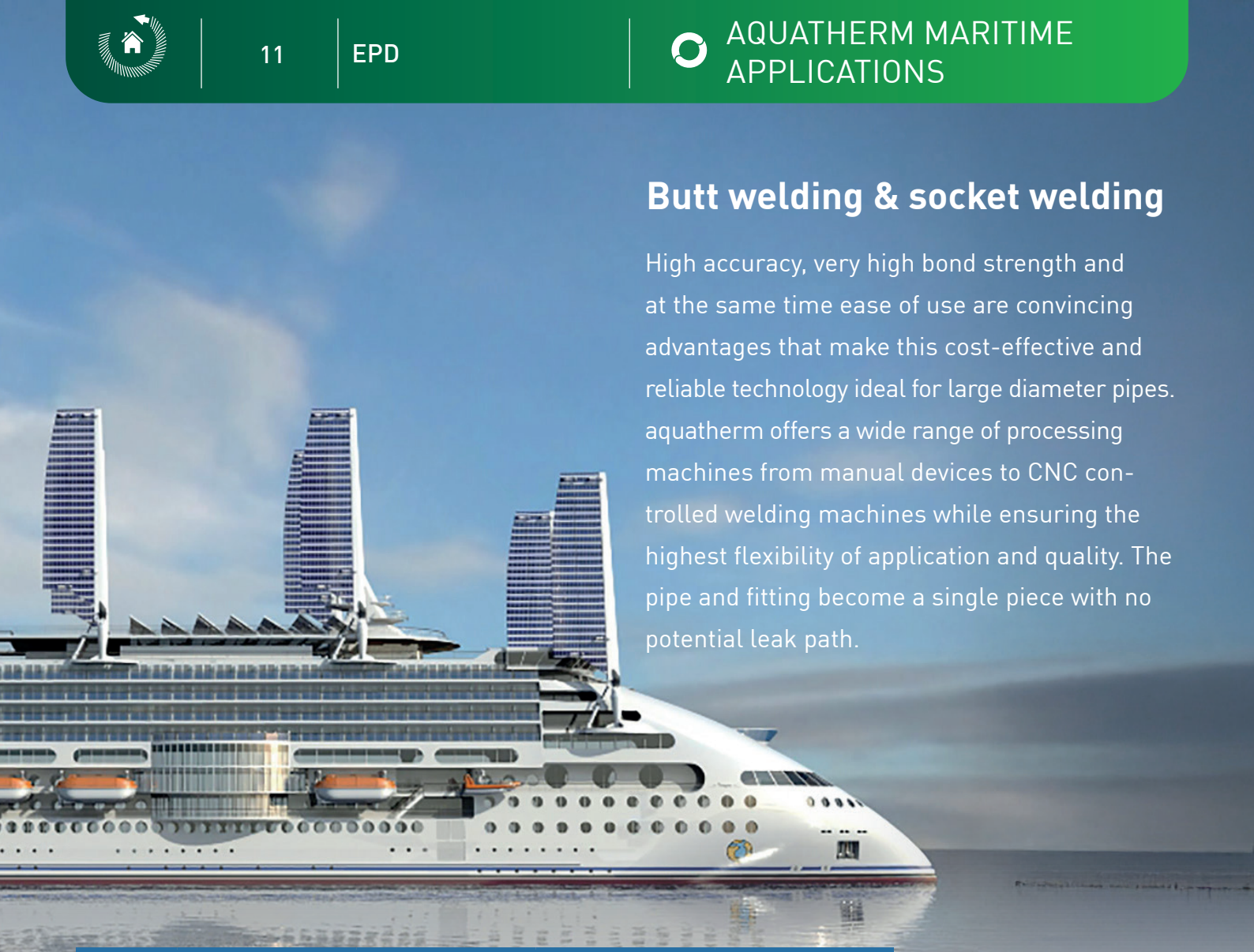
REFERENCE

Hybrid-Superyacht „Artefact“

In order not to have to compromise on quality in the area of the piping systems of the “Artefact”, Nobiskrug Werft also uses products from aquatherm. For the drinking water piping aquatherm green was used. The odourless and tasteless piping system, which is made of the plastic polypropylene, is particularly suitable for drinking water applications as it is completely free of heavy metals and toxic chemicals.

Why trust AQUATHERM GREEN?

- Absolutely corrosion resistant
- Easy processing
- Up to 100% recyclable
- High stability
- Suitable for drinking water



Butt welding & socket welding

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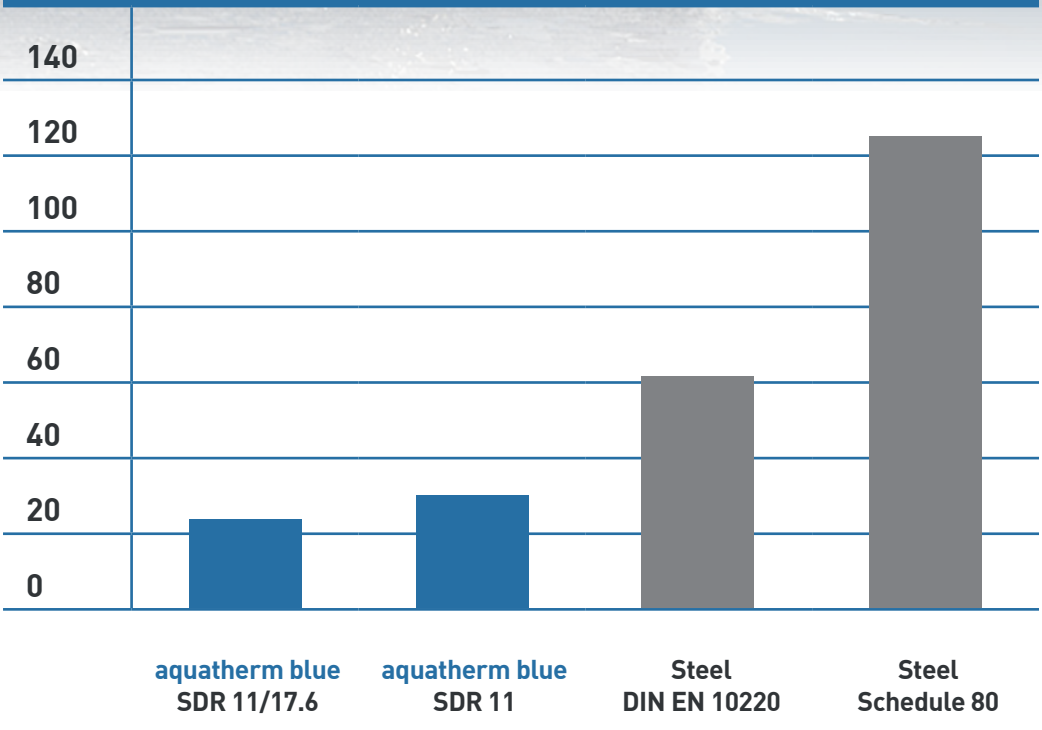
CO_2 emission (tons)* for PP and steel pipes based on the chilles water system for a ship with app. 200 cabins

(approx. 5700 m pipe in 32 - 355 mm)



* Source: CO_2 emissions for PP (1.70 kg/kg) are based on EU Plastics association and for steel (1.54 kg/kg) on frauenenhofer institut

Ballast and water treatment

To guarantee safe operating conditions throughout the voyage, it is necessary to determine and constantly maintain certain parameters relating to lateral stability, roll, trim, maneuverability and stresses in the hull of the vessel. Ballast water systems are used to provide the required weight in strategiclocations inside the ship. In order to maintain the optimal ballasting of the vessel afloat and during loading/unloading, the ports install ballasting and ballast tank systems for the accurate pumping and transport of ballast water. aquatherm polypropylene pipes provide:

- High corrosion resistance
- Maximum safety
- High reliability and flexibility
- Low friction value

in the management of ballast water pumping. In combination with fast, reliable and safe welding technologies, these lightweight systems become a convincing argument also for fuel savings. Ships must purify ballast water of a wide variety of marine organisms. To prevent any undesirable effects arising from this, reliable, durable solutions from aquatherm support the shipbuilding industry in all phases of the purification process, from pre-treatment, filtration or coagulation through to disinfection using chemical or physical means, whilst complying with all necessary international regulations.

Customised prefabrication

Due to the diversity of today's application in the maritime engineering sector, there is hardly any chance of being able to cover the distribution of fluid media using standardized or modular manifold design. Every construction project has its own individual requirements.

aquatherm supports its customers with prefabricated manifolds customized on medium type, application, architectural circumstances as well as regulations and laws. Benefit from:

- Tested quality with a 10 years warranty
- Highest accuracy due to detailed planning
- No delays due to missing parts
- Low tooling costs





More than 5000 vessles are equipped with aquatherm pipes worldwide

International Maritime References

Ship	IMO Hull No.	Type
Saipam FDS	1861	Crane vessels
Heerema New	3402	Crane vessels
Costa Victoria	9109030	Cruise
Carnival Conquest	9198355	Cruise
Caribbian Prinzess	9215490	Cruise
AIDAvita	9221554	Cruise
AIDAaura	9221566	Cruise
Odfjell GVA 7500 Semi	3023	Drilling rig
GroupoR 7500 Semi	3026	Drilling rig
97K	1747	Drillship
PPM	1809	Drillship
Pride	1862	Drillship
Schahin	1869	Drillship
DPW Nr.1	2148	Drillship
Mecklenburg Vorpommern	9131797	Ferry
Ulysse	9142459	Ferry
Salammbo 7	9142467	Ferry
Stena Britannica	9419175	Ferry
Tanit	9598579	Ferry
Allseas Platform	3401	Heavylift vessel
Thetris	F357	Naval
Absalom	L16	Naval
Danish Royal Yacht	5437661	Sailing yacht
White Peal - A	1012141	Sailing yacht
BBLS FPSO	1763	Tanker

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