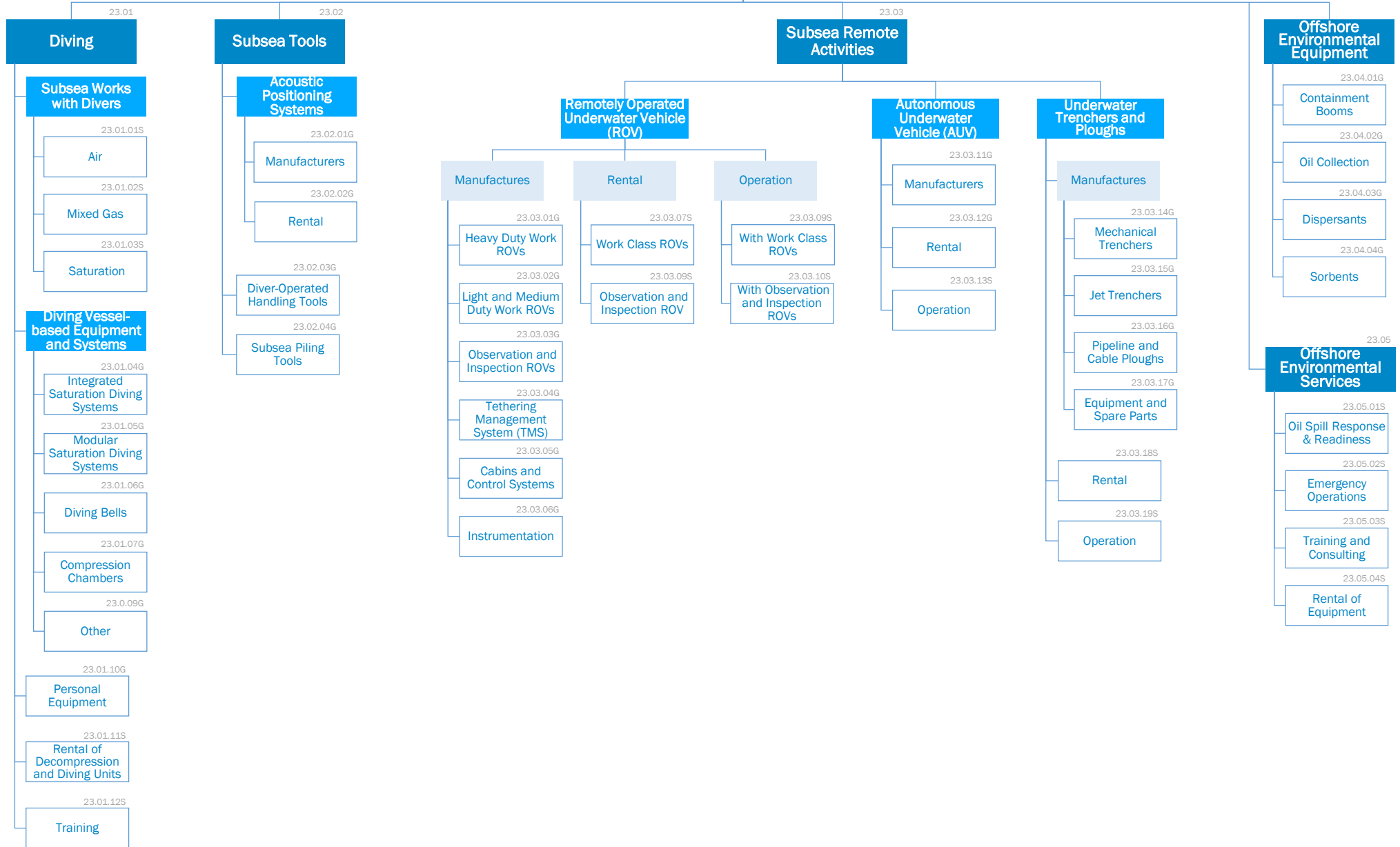


23 Marine and Diving Equipment and Services



Marine and Diving Equipment and Services

Equipment and Services for Marine and Diving operations are critical goods and services that support activities performed offshore, at different water depths and environments.

Reliability and operability of the equipment and service in critical conditions is key for the ability to deliver goods and services in this Group of Categories.

The activity is generally moving toward deeper and harsher waters. However, shallow waters still playing a major part in the market. Unmanned and remotely operated vehicles are increasingly preferred - also for HSE reason - to diving activities and there is an increasing number of subsea sensors and robotics to improve efficiency and allow for preventive maintenance.

MAIN RATIONALES BEHIND THE STANDARD CATEGORIZATION

Diving

- The Subsea Works with Divers include Air, Mixed Gas, and Saturation diving services. Those professionals can be leveraged for several subsea activities, Offshore, Inshore (Inland / Onshore) and Hazmat with no differentiation for the purpose of this categorization:
 - Inspection, Repair & Maintenance (IRM) of existing field infrastructures, including extensive NDT campaigns, interventions for pipeline repairs (including hot-tapping and spool tie-ins), wellhead intervention, appurtenances replacement such as boat fenders, chains & hoses change out at SPMs/FPSOs;
 - Installation activities (tie-ins, risers, hoses and installation services on platform, pipelines, SPMs and loading terminals);
 - Pipeline and dropped object protection;
 - Pre-commissioning activities: pigging and pressure test operations;
 - In-water Survey of Ships and Mobile Offshore Units;
 - Offshore decommissioning such as platform removal, subsea well abandonment, pipeline and umbilical deburial and recovery, subsea structure recovery, subsea protection mattress recovery.
- In terms of water depth, Air Diving is typically performed in Shallow Waters (from 0 to 50 msw Meters Sea Waters or 160 fsw – Feet Sea Waters), while Mixed Gas and Saturation Diving in Deep waters (above 50 msw)
- Saturation diving is a diving technique that allows divers to reduce the risk of decompression sickness by operating in a pressurized environment.
- Integrated saturation diving systems are typically built according to the specifications of the Ship on which they will be placed.
- Modular Saturation Diving Systems, are designed to be deck-deployed on existing work vessels and can be quickly removed and re-installed on other vessels.
- Others Diving Vessel-based Equipment include: Cylinders and Gas Banks, Dive Panels, Launch and Recovery, Divers Heaters,
- Personal Equipment for Diving include: Helmets, Masks and Scuba, Diving Suits & Accessories, Communications, Lighting, Gauges, Camera & TV Systems, ...

Subsea Tools

- Underwater Acoustic Positioning Systems (e.g. Sonar Transponders) are commonly used in a wide variety of underwater work, including oil and gas exploration, ocean sciences, salvage operations, marine archaeology, and military activities. These systems are used for the tracking and navigation of Vehicles (e.g. ROV) or divers by means of acoustic distance and/or directional measurements, and subsequent position triangulation.
- Diver-operated Handling tools are devices designed to facilitate and allow the operator to work underwater. This category includes devices suitable for tasks such as: cutting and welding, securing/anchoring, enlarging, cleaning, dragging.
- Subsea Piling Tools refers to the technologies used to (remotely) install conductors and drive piles. It refers to Stabframes (which keep Hammers in position while operating on the seabed), Internal Lifting Tools (used for the safe lifting and upending of tubular piles for insertion into the seabed) and Hydraulic Underwater Hammers.

Subsea Remote Activities

- ROVs are unoccupied, highly manoeuvrable, and operated by a crew aboard a vessel. They are used for offshore Oil&Gas, Defence and marine geoscience. ROV are segmented according to work capability at seabed:
 - Heavy Duty Work ROVs have the ability to carry at least two manipulators. They have a working depth up to 3500 m.
 - Light and Medium Duty Work ROVs are typically powered by an engine with less than 50 HP. Their chassis may be made from polymers such as polyethylene rather than the conventional stainless steel or aluminum alloys. They typically have a maximum working depth of less than 2000 m.
 - Observation Class is used primarily for deep ocean research,, search and salvage missions. This category includes, but is not limited to, Micro, Mini and Ultra deep ROVs
 - Tethering Management systems are used for stores and deploy the ROV tether cable so that the ROV is decoupled from motion of the surface vessel and is able to operate at a larger radius.
 - The category 23.03.06G (instrumentation) includes any kind of additional tool (for working and survey purposes) used to increase the capabilities of Subsea Robots.

- An autonomous underwater vehicle (AUV) is unmanned vehicle which travels underwater without requiring input from an operator.
- Operations with Trenchers and Ploughs include any Seabed preparation works, required before installation of subsea equipment and systems. This includes the levelling of the seabed prior to laying of cables and line pipes or for seabed clean-up campaigns.

Offshore Environmental Equipment

- This family refers to the most common equipment needed in order to prevent offshore incidents that release oil or hazardous substances into the environment and limit the amount released during those incidents, making the recovery easier.

Offshore Environmental Services

- Oil Spill Response & Readiness consists in keeping boats and crew available and ready for any environmental accidents, according to a schedule previously determined, in a preventive way.
- Emergency Services are unscheduled service, providing response to oil or any other residue spills in the open sea.
- Trainings refer to the performance of theoretical and practical trainings about how to prevent and how to react to an environmental accident on the coast or on the sea. While Consulting includes the environmental impact assessment and evaluation of the Equipment and skills.
- The rental refers to the rental and maintenance of environmental protection equipment for sea.