

1080. Marine

1081. Equipment, Asemblies and Components

1. Submersible vehicles or surface vessels, as follows:

Note:

For the embargo status of equipment for submersible vehicles, see: Category 1150 "Information Security" for encrypted communication equipment; Category 1060 for sensors; Categories 1070 and 1080 for navigation equipment; Category 1081. for underwater equipment.

1. a. Manned, tethered submersible vehicles designed to operate at depths exceeding 1,000 m;
- b. Manned, untethered submersible vehicles:
 1. Designed to operate autonomously and having a lifting capacity of:
 - a. 10% or more of their weight in air; **and**
 - b. 15 kN or more;
 2. Designed to operate at depths exceeding 1,000 m; **or**
 3. a. Designed to carry a crew of 4 or more;
 - b. Designed to operate autonomously for 10 hours or more;
 - c. Having a range of 25 nautical miles or more; **and**
 - d. Having a length of 21 m or less;

Technical Notes:

1. Operate autonomously: fully submerged, without snorkel, all systems working and cruising at minimum speed at which the submersible can safely control its depth dynamically by using its depth planes only, with no need for a support vessel or support base on the surface, sea-bed or shore, and containing a propulsion system for submerged or surface use.
 2. Range: half the maximum distance a submersible vehicle can cover.
1. c. Unmanned, tethered submersible vehicles designed to operate at depths exceeding 1,000 m:
 1. Designed for self-propelled manoeuvre using propulsion motors or thrusters embargoed by 1081.2.a.2.; **or**
 2. Having a fibre optic data link;
 - d. Unmanned, untethered submersible vehicles:
 1. Designed for deciding a course relative to any geographical reference without real-time human assistance;
 2. Having an acoustic data or command link; **or**
 3. Having a fibre optic data or command link exceeding 1,000 m;
 - e. Ocean salvage systems with a lifting capacity exceeding 5 MN for salvaging objects from depths exceeding 250 m and having either of the following:
 1. Dynamic positioning systems capable of position keeping within 20 m of a given point provided by the navigation system; **or**
 2. Seafloor navigation and navigation integration systems for depths exceeding 1,000 m with positioning accuracies to within 10 m of a predetermined point;
 - f. Surface-effect vehicles (fully skirted variety) with a maximum design speed, fully loaded, exceeding 30 knots in a significant wave height of 1.25 m (Sea State 3) or more, a cushion pressure exceeding 3,830 Pa, and a light-ship-to-full-load displacement ratio of less than 0.70;
 - g. Surface-effect vehicles (rigid sidewalls) with a maximum design speed, fully loaded, exceeding 40 knots in a significant wave height of 3.25 m (Sea State 5) or more;
 - h. Hydrofoil vessels with active systems for automatically controlling foil systems, with a maximum design speed, fully loaded, of 40 knots or more in a significant wave height of 3.25 m (Sea State 5) or more;
 - i. Small waterplane area vessels with:
 1. A full load displacement exceeding 500 tonnes with a maximum design speed, fully loaded, exceeding 35 knots in a significant wave height of 3.25 m (Sea State 5) or more; **or**
 2. A full load displacement exceeding 1,500 tonnes with a maximum design speed, fully loaded, exceeding 25 knots in a significant wave height of 4 m (Sea State 6) or more;

Technical Note:

A small waterplane area vessel is defined by the following formula: waterplane area at an operational design draft less than $2 \times (\text{displaced volume at the operational design draft})^{2/3}$.

2. Systems or equipment, as follows:

- a. Systems or equipment, specially designed or modified for submersible vehicles, designed to operate at depths exceeding 1,000 m, as follows:
 1. Pressure housings or pressure hulls with a maximum inside chamber diameter exceeding 1.5 m;
 2. Direct current propulsion motors or thrusters;
 3. Umbilical cables, and connectors therefor, using optical fibre and having synthetic strength members;
- b. Systems specially designed or modified for the automated control of the motion of equipment for submersible vehicles embargoed by 1081.1. using navigation data and having closed loop servo-controls to:
 1. Enable a vehicle to move within 10 m of a predetermined point in the water column;
 2. Maintain the position of the vehicle within 10 m of a predetermined point in the water column; **or**
 3. Maintain the position of the vehicle within 10 m while following a cable on or under the seabed;
- c. Fibre optic hull penetrators or connectors;
- d. Underwater vision systems, as follows:
 1. a. Television systems (comprising camera, lights, monitoring and signal transmission equipment) having a limiting resolution when measured in air of more than 500 lines and specially designed or modified for remote operation with a submersible vehicle; **or**
 - b. Underwater television cameras having a limiting resolution when measured in air of more than 700 lines;

Technical Note:

Limiting resolution in television is a measure of horizontal resolution usually expressed in terms of the maximum number of lines per picture height discriminated on a test chart, using IEEE Standard 208/1960 or any equivalent standard.

2. Systems, specially designed or modified for remote operation with an underwater vehicle, employing techniques to minimise the effects of back scatter, including range-gated illuminators or "laser" systems;
3. Low light level television cameras specially designed or modified for underwater use containing:
 - a. Image intensifier tubes embargoed by 1061.2.a.2.a.; **and**
 - b. More than 150,000 "active pixels" per solid state area array;
- e. Photographic still cameras specially designed or modified for underwater use, having a film format of 35 mm or larger, and:
 1. Annotating the film with data provided by a source external to the camera;
 2. Having autofocussing or remote focussing specially designed for underwater use;
 3. Having automatic back focal distance correction; **or**
 4. Having automatic compensation control specially designed to permit an underwater camera housing to be usable at depths exceeding 1,000 m;
- f. Electronic imaging systems, specially designed or modified for underwater use, capable of storing digitally more than 50 exposed images;
- g. Light systems, as follows, specially designed or modified for underwater use:
 1. Stroboscopic light systems capable of a light output energy of more than 300 J per flash;
 2. Argon arc light systems specially designed for use below 1,000 m;
- h. "Robots" specially designed for underwater use, controlled by using a dedicated stored programme computer:
 1. Having systems that control the "robot" using information from sensors which measure force or torque applied to an external object, distance to an external object, or tactile sense between the "robot" and an external object; **or**
 2. Capable of exerting a force of 250 N or more or a torque of 250 Nm or more and using titanium based alloys or "fibrous or filamentary" "composite" materials in their structural members;
- i. Remotely controlled articulated manipulators specially designed or modified for use with submersible vehicles:
 1. Having systems which control the manipulator using the information from sensors which measure the torque or force applied to an external object, or tactile sense between the manipulator and an external object; **or**