

1081. 2. f. Electronic imaging systems, specially designed or modified for underwater use, capable of storing digitally more than 50 exposed images;
1081. 2. 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;
1081. 2. 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;
1081. 2. 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
  2. Controlled by proportional master-slave techniques or by using a dedicated stored programme computer, and having 5 degrees of freedom of movement or more;
- NOTE:**  
Only functions having proportional control using positional feedback or by using a dedicated stored programme computer are counted when determining the number of degrees of freedom of movement.
1081. 2. j. Air independent power systems, as follows, specially designed for underwater use:
1081. 2. j. 1. Brayton, Stirling or Rankine cycle engine air independent power systems having any of the following:
- a. Chemical scrubber or absorber systems specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust;
  - b. Systems specially designed to use a monoatomic gas;
  - c. Devices or enclosures specially designed for underwater noise reduction in frequencies below 10 kHz, or special mounting devices for shock mitigation; or
  - d. Systems specially designed:
    1. To pressurise the products of reaction or for fuel reformation;
    2. To store the products of the reaction; and
    3. To discharge the products of the reaction against a pressure of 100 kPa or more;
1081. 2. j. 2. Diesel cycle engine air independent systems, having all of the following:
- a. Chemical scrubber or absorber systems specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust;
  - b. Systems specially designed to use a monoatomic gas;
  - c. Devices or enclosures specially designed for underwater noise reduction in frequencies below 10 kHz or special mounting devices for shock mitigation; and
  - d. Specially designed exhaust systems that do not exhaust continuously the products of combustion;
1081. 2. j. 3. Fuel cell air independent power systems with an output exceeding 2 kW having either of the following:
- a. Devices or enclosures specially designed for underwater noise reduction in frequencies below 10 kHz or special mounting devices for shock mitigation; or
  - b. Systems specially designed:
    1. To pressurise the products of reaction or for fuel reformation;
    2. To store the products of the reaction; and
    3. To discharge the products of the reaction against a pressure of 100 kPa or more;
1081. 2. k. Skirts, seals and fingers, as follows:
1. Designed for cushion pressures of 3,830 Pa or more, operating in a significant wave height of 1.25 m (Sea State 3) or more and specially designed for surface effect vehicles (fully skirted variety) embargoed by 1081.1.f.;
  2. Designed for cushion pressures of 6,224 Pa or more, operating in a significant wave height of 3.25 m (Sea State 5) or more and specially designed for surface effect vehicles (rigid sidewalls) embargoed by 1081.1.g.;
1081. 2. l. Lift fans rated at more than 400 kW specially designed for surface effect vehicles embargoed by 1081.1.f. or 1081.1.g.;
1081. 2. m. Fully submerged subcavitating or supercavitating hydrofoils specially designed for vessels embargoed by 1081.1.h.;
1081. 2. n. Active systems specially designed or modified to control automatically the sea-induced motion of vehicles or vessels embargoed by 1081.1.f., g., h. or i.;
1081. 2. o. 1. Water-screw propeller or power transmission systems, as follows, specially designed for surface effect vehicles (fully skirted or rigid sidewall variety), hydrofoils or small waterplane area vessels embargoed by 1081.1.f., g., h. or i.:
- a. Supercavitating, super-ventilated, partially-submerged or surface piercing propellers rated at more than 7.5 MW;
  - b. Contrarotating propeller systems rated at more than 15 MW;
  - c. Systems employing pre-swirl or post-swirl techniques for smoothing the flow into a propeller;
  - d. Light-weight, high capacity (K factor exceeding 300) reduction gearing;
  - e. Power transmission shaft systems, incorporating "composite" material components, capable of transmitting more than 1 MW;
1081. 2. o. 2. Water-screw propeller, power generation or transmission systems for use on vessels, as follows:
- a. Controllable-pitch propellers and hub assemblies rated at more than 30 MW;
  - b. Internally liquid-cooled electric propulsion engines with a power output exceeding 2.5 MW;
  - c. "Superconductive" propulsion engines, or permanent magnet electric propulsion engines, with a power output exceeding 0.1 MW;
  - d. Power transmission shaft systems, incorporating "composite" material components, capable of transmitting more than 2 MW;
  - e. Ventilated or base-ventilated propeller systems rated at more than 2.5 MW;
1081. 2. o. 3. Noise reduction systems for use on vessels of 1,000 tonnes displacement or more, as follows:
- a. Noise reduction systems that attenuate at frequencies below 500 Hz and consist of compound acoustic mounts for the acoustic isolation of diesel engines, diesel generator sets, gas turbines, gas turbine generator sets, propulsion motors or propulsion reduction gears, specially designed for sound or vibration isolation, having an intermediate mass exceeding 30% of the equipment to be mounted;
  - b. Active noise reduction or cancellation systems, or magnetic bearings, specially designed for power transmission systems, and incorporating electronic control systems capable of actively reducing equipment vibration by the generation of anti-noise or anti-vibration signals directly to the source;
1081. 2. p. Pumpjet propulsion systems with a power output exceeding 2.5 MW using divergent nozzle and flow conditioning vane techniques to improve propulsive efficiency or reduce propulsion-generated underwater-radiated noise.
- (For underwater communications systems, see Category 1050 - Telecommunications.)