

CATEGORY 8-MARINE

8A SYSTEMS, EQUIPMENT AND COMPONENTS

8A001 Submersible vehicles and surface vessels, as follows:

Note:

For the control status of equipment for submersible vehicles, see:

Category 5, Part 2 'Information Security' for encrypted communication equipment;

Category 6 for sensors;

Categories 7 and 8 for navigation equipment;

Category 8A for underwater equipment.

- (a) Manned, tethered submersible vehicles designed to operate at depths exceeding 1000 m;
- (b) Manned, untethered submersible vehicles, having any of the following:
 - (1) Designed to 'operate autonomously' and having a lifting capacity of all the following:
 - (a) 10% or more of their weight in air; and
 - (b) 15 kN or more;
 - (2) Designed to operate at depths exceeding 1000 m; or
 - (3) Having all of the following:
 - (a) Designed to continuously 'operate autonomously' for 10 hours or more;
 - (b) 'Range' of 25 nautical miles or more; (L.N. 226 of 2009)

Technical Notes:

- 1. For the purpose of 8A001(b), 'operate autonomously' means fully submerged, without snorkel, all systems working and cruising at minimum speed at which the submersible vehicle 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. For the purposes of 8A001(b), 'range' means half the maximum distance a submersible vehicle can 'operate autonomously'. (L.N. 226 of 2009)
- (c) Unmanned, tethered submersible vehicles designed to operate at depths exceeding 1000 m, having any of the following:
 - (1) Designed for self-propelled manoeuvre using propulsion motors or thrusters controlled by 8A002(a)(2); or
 - (2) Having a fibre optic data link;
 - (d) Unmanned, untethered submersible vehicles, having any of the following:
 - (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 1000 m;
 - (e) Ocean salvage systems with a lifting capacity exceeding 5 MN for salvaging objects from depths exceeding 250 m and having any 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 1000 m with positioning accuracies to within 10 m of a predetermined point;
 - (f) Surface-effect vehicles (fully skirted variety) having all of the following characteristics:
 - (1) A maximum design speed, fully loaded, exceeding 30 knots in a significant

- (a) Television systems (comprising cameras, monitoring and signal transmission equipment) having a limiting resolution when measured in air of more than 800 lines and specially designed or modified for remote operation with a submersible vehicle;
- (b) Underwater television cameras having a limiting resolution when measured in air of more than 1100 lines;
- (c) Low light level television cameras specially designed or modified for underwater use containing all of the following:
 - (1) Image intensifier tubes controlled by 6A002(a)(2)(a); and
 - (2) More than 150000 "active pixels" per solid state area array;

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 Institution of Electrical and Electronic Engineers (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;
- (e) Photographic still cameras specially designed or modified for underwater use below 150 m having a film format of 35 mm or larger, and having any of the following:
 - (1) Annotation of the film with data provided by a source external to the camera;
 - (2) Automatic back focal distance correction; or
 - (3) Automatic compensation control specially designed to permit an underwater camera housing to be usable at depths exceeding 1000 m;
- (f) Electronic imaging systems specially designed or modified for underwater use and having any of the following:
 - (1) Image intensifier tubes specified in 6A002(a)(2)(a) or 6A002(a)(2)(b), and using electron image amplification other than by microchannel plate;
 - (2) Non-"space qualified" "focal plane arrays" specified in 6A002(a)(3)(g); (L.N. 226 of 2009)
- (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 and a flash rate of more than 5 flashes per second;
 - (2) Argon arc light systems specially designed for use below 1000 m;
- (h) "Robots" specially designed for underwater use, controlled by using a dedicated computer, having any of the following: (L.N. 95 of 2006)
 - (1) 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) The ability to exert 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, having any of the following:
 - (1) 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 computer, and having 5 degrees of freedom of movement or more; (L.N.

95 of 2006)

Note:

Only functions having proportional control using positional feedback or by using a dedicated computer are counted when determining the number of degrees of freedom of movement. (L.N. 95 of 2006)

- (j) Air independent power systems, specially designed for underwater use, as follows:
 - (1) Brayton 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;
 - (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;
 - (3) Fuel cell air independent power systems with an output exceeding 2 kW having any 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;
 - (4) Stirling cycle engine air independent power systems, having all 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; and
 - (b) Specially designed exhaust systems which discharge the products of combustion against a pressure of 100 kPa or more;
- (k) Skirts, seals and fingers, having any of the following:
 - (1) Designed for cushion pressures of 3830 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) controlled by 8A001(f); or
- (2) Designed for cushion pressures of 6224 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) controlled by 8A001(g);
- (l) Lift fans rated at more than 400 kW specially designed for surface effect vehicles controlled by 8A001(f) or 8A001(g);
 - (m) Fully submerged subcavitating or supercavitating hydrofoils specially designed for vessels controlled by 8A001(h);
 - (n) Active systems specially designed or modified to control automatically the sea-induced motion of vehicles or vessels controlled by 8A001(f), 8A001(g), 8A001(h) or 8A001(i);
 - (o) Propellers, power transmission systems, power generation systems and noise reduction systems, as follows:
 - (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 controlled by 8A001(f), 8A001(g), 8A001(h) or 8A001(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;
 - (2) Water-screw propeller, power generation systems or transmission systems designed 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;
 - (3) Noise reduction systems designed for use on vessels of 1000 tonnes displacement or more, as follows:
 - (a) Systems that attenuate underwater noise 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;

- (p) Pumpjet propulsion systems having 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;
- (q) Self-contained, closed or semi-closed circuit (rebreathing) diving and underwater swimming apparatus;

Note:

8A002(q) does not control an individual apparatus for personal use when accompanying its user. (L.N. 132 of 2001)

8B TEST, INSPECTION AND PRODUCTION EQUIPMENT

- 8B001 Water tunnels, having a background noise of less than 100 dB (reference 1 μ Pa, 1 Hz) in the frequency range from 0 to 500 Hz, designed for measuring acoustic fields generated by a hydro-flow around propulsion system models;

8C MATERIALS

- 8C001 Syntactic foam designed for underwater use, having all of the following:

- (a) Designed for marine depths exceeding 1000 m; and
- (b) A density less than 561 kg/m³;

Technical Note:

Syntactic foam consists of hollow spheres of plastic or glass embedded in a resin matrix.

N.B.:

See also 8A002(a)(4). (L.N. 254 of 2008)

8D SOFTWARE

- 8D001 "Software" specially designed or modified for the "development", "production" or "use" of equipment or materials controlled by 8A, 8B or 8C;
- 8D002 Specific "software" specially designed or modified for the "development", "production", repair, overhaul or refurbishing (re-machining) of propellers specially designed for underwater noise reduction;

8E TECHNOLOGY

- 8E001 "Technology" according to the General Technology Note for the "development" or "production" of equipment or materials controlled by 8A, 8B or 8C;
- 8E002 Other "technology", as follows:
 - (a) "Technology" for the "development", "production", repair, overhaul or refurbishing (re-machining) of propellers specially designed for underwater noise reduction;
 - (b) "Technology" for the overhaul or refurbishing of equipment controlled by 8A001, 8A002(b), 8A002(j), 8A002(o) or 8A002(p);