

CATEGORY 8 - MARINE

A. SYSTEMS, EQUIPMENT AND COMPONENTS

8A001 Submersible vehicles and surface vessels, as follows (see List of Items Controlled).

License Requirements

Reason for Control: NS, AT

Control(s) Country Chart

NS applies to entire entry NS Column 2

AT applies to entire entry AT Column 1

License Requirement Notes: See §743.1 of the EAR for reporting requirements for exports under License Exceptions.

License Exceptions

LVS: \$5000; N/A for 8A001.b and .d

GBS: N/A

CIV: N/A

List of Items Controlled

Unit: Equipment in number; parts and accessories in \$ value

Related Controls: 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.

Related Definitions: N/A

Items:

a. Manned, tethered submersible vehicles

designed to operate at depths exceeding 1,000 m;

b. Manned, untethered submersible vehicles, having any of the following:

b.1. Designed to operate autonomously and having a lifting capacity of all the following:

b.1.a. 10% or more of their weight in air; *and*

b.1.b. 15 kN or more;

b.2. Designed to operate at depths exceeding 1,000 m; *or*

b.3. Having all of the following:

b.3.a. Designed to carry a crew of 4 or more;

b.3.b. Designed to operate autonomously for 10 hours or more;

b.3.c. Having a range of 25 nautical miles or more; *and*

b.3.d. Having a length of 21 m or less;

Technical Notes:

1. For the purposes of 8A001.b, "operate autonomously" means 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. For the purposes of 8A001.b, "range" means half the maximum distance a submersible vehicle can cover.

c. Unmanned, tethered submersible vehicles

designed to operate at depths exceeding 1,000 m, having any of the following:

c.1. Designed for self-propelled manoeuvre using propulsion motors or thrusters controlled by 8A002.a.2; *or*

c.2. Having a fiber optic data link;

d. Unmanned, untethered submersible vehicles, having any of the following:

d.1. Designed for deciding a course relative to any geographical reference without real-time human assistance;

d.2. Having an acoustic data or command link; *or*

d.3. Having a fiber 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 any of the following:

e.1. Dynamic positioning systems capable of position keeping within 20 m of a given point provided by the navigation system; *or*

e.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) having all of the following characteristics:

f.1. A maximum design speed, fully loaded, exceeding 30 knots in a significant wave height of 1.25 m (Sea State 3) or more;

f.2. A cushion pressure exceeding 3,830 Pa; *and*

f.3. 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 having any of the following:

i.1. A full load displacement exceeding 500 tons 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*

i.2. A full load displacement exceeding 1,500 tons 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 draught less than 2 x (displaced volume at the operational design draught)^{2/3}.

8A002 Systems and equipment, as follows (see List of Items Controlled).

License Requirements

Reason for Control: NS, AT

<i>Control(s)</i>	<i>Country Chart</i>
NS applies to entire entry	NS Column 2
AT applies to entire entry	AT Column 1

License Requirement Notes: See §743.1 of the EAR for reporting requirements for exports under License Exceptions.

License Exceptions

LVS: \$5000; N/A for 8A002.o.3.b

GBS: Yes for 8A002.e.2 and manipulators for civil end-uses (e.g., underwater oil, gas or mining operations) controlled by 8A002.i.2 and having 5 degrees of freedom of movement

CIV: Yes for 8A002.e.2 and manipulators for civil end-uses (e.g., underwater oil, gas or mining operations) controlled by 8A002.i.2 and having 5 degrees of freedom of movement

List of Items Controlled

Unit: Equipment in number

Related Controls: See also 8A992 and for underwater communications systems, see Category 5, Part I - Telecommunications).

Related Definitions: N/A

Items:

a. Systems and equipment, specially designed or modified for submersible vehicles, designed to operate at depths exceeding 1,000 m, as follows:

a.1. Pressure housings or pressure hulls with a maximum inside chamber diameter exceeding 1.5 m;

a.2. Direct current propulsion motors or thrusters;

a.3. Umbilical cables, and connectors therefor, using optical fiber and having synthetic strength members;

b. Systems specially designed or modified for the automated control of the motion of submersible vehicles controlled by 8A001 using navigation data and having closed loop servo-controls:

b.1. Enabling a vehicle to move within 10 m of a predetermined point in the water column;

b.2. Maintaining the position of the vehicle within 10 m of a predetermined point in the water column; *or*

b.3. Maintaining the position of the vehicle within 10 m while following a cable on or under the seabed;

c. Fiber optic hull penetrators or connectors;

d. Underwater vision systems, as follows:

d.1. Television systems and television cameras, as follows:

d.1.a. Television systems (comprising camera, 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;

d.1.b. Underwater television cameras having a limiting resolution when measured in air of more than 1,100 lines;

d.1.c. Low light level television cameras specially designed or modified for underwater use containing all of the following:

d.1.c.1. Image intensifier tubes controlled by 6A002.a.2.a; *and*

d.1.c.2. More than 150,000 "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 IEEE Standard 208/1960 or any equivalent standard.

d.2. Systems, specially designed or modified for remote operation with an underwater vehicle, employing techniques to minimize 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:

e.1. Annotation of the film with data provided by a source external to the camera;

e.2. Automatic back focal distance correction; *or*

e.3. 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:

g.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;

g.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 program controlled" computer, having any of the following:

h.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*

h.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:

i.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*

i.2. Controlled by proportional master-slave techniques or by using a dedicated "stored program controlled" 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 program controlled" computer are counted when determining the number of degrees of freedom of movement.

j. Air independent power systems, specially designed for underwater use, as follows:

j.1. Brayton or Rankine cycle engine air independent power systems having any of the following:

j.1.a. Chemical scrubber or absorber systems specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust;

j.1.b. Systems specially designed to use a monoatomic gas;

j.1.c. Devices or enclosures specially designed for underwater noise reduction in frequencies below 10 kHz, or special mounting devices for shock mitigation; *or*

- j.1.d. Systems specially designed:
- j.1.d.1. To pressurize the products of reaction or for fuel reformation;
 - j.1.d.2. To store the products of the reaction; *and*
 - j.1.d.3. To discharge the products of the reaction against a pressure of 100 kPa or more;
- j.2. Diesel cycle engine air independent systems, having all of the following:
- j.2.a. Chemical scrubber or absorber systems specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust;
 - j.2.b. Systems specially designed to use a monoatomic gas;
 - j.2.c. Devices or enclosures specially designed for underwater noise reduction in frequencies below 10 kHz or special mounting devices for shock mitigation; *and*
 - j.2.d. Specially designed exhaust systems that do not exhaust continuously the products of combustion;
- j.3. Fuel cell air independent power systems with an output exceeding 2 kW having any of the following:
- j.3.a. Devices or enclosures specially designed for underwater noise reduction in frequencies below 10 kHz or special mounting devices for shock mitigation; *or*
 - j.3.b. Systems specially designed:
 - j.3.b.1. To pressurize the products of reaction or for fuel reformation;
 - j.3.b.2. To store the products of the reaction; *and*
 - j.3.b.3. To discharge the products of the reaction against a pressure of 100 kPa or more;
 - j.4. Stirling cycle engine air independent power systems, having all of the following:
 - j.4.a. Devices or enclosures specially designed for underwater noise reduction in frequencies below 10 kHz or special mounting devices for shock mitigation; *and*
 - j.4.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:
- k.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) controlled by 8A001.f; *or*
 - k.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) 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:

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 controlled by 8A001.f, 8A001.g, .8A001.h or 8A001.i:

o.1.a. Supercavitating, super-ventilated, partially-submerged or surface piercing propellers rated at more than 7.5 MW;

o.1.b. Contrarotating propeller systems rated at more than 15 MW;

o.1.c. Systems employing pre-swirl or post-swirl techniques for smoothing the flow into a propeller;

o.1.d. Light-weight, high capacity (K factor exceeding 300) reduction gearing;

o.1.e. Power transmission shaft systems, incorporating "composite" material components, capable of transmitting more than 1 MW;

o.2. Water-screw propeller, power generation systems or transmission systems designed for use on vessels, as follows:

o.2.a. Controllable-pitch propellers and hub assemblies rated at more than 30 MW;

o.2.b. Internally liquid-cooled electric propulsion engines with a power output exceeding 2.5 MW;

o.2.c. "Superconductive" propulsion engines, or permanent magnet electric propulsion engines, with a power output exceeding 0.1 MW;

o.2.d. Power transmission shaft systems, incorporating "composite" material components,

capable of transmitting more than 2 MW;

o.2.e. Ventilated or base-ventilated propeller systems rated at more than 2.5 MW;

o.3. Noise reduction systems designed for use on vessels of 1,000 tons displacement or more, as follows:

o.3.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;

o.3.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.

8A018 Items on the International Munitions List.

License Requirements

Reason for Control: NS, AT, UN

Control(s) Country Chart

NS applies to entire entry NS Column 1

AT applies to entire entry AT Column 1

UN applies to entire entry Rwanda; Federal Republic of Yugoslavia (Serbia and Montenegro)

gaskets, and fuel, lubrication and other supply lines, or its nonmagnetic content exceeds 75 percent of total weight.);

b.4. Marine boilers designed to have any of the following characteristics:

b.4.a. Heat release rate (at maximum rating) equal to or in excess of 190,000 BTU per hour per cubic foot of furnace volume; or

b.4.b. Ratio of steam generated in pounds per hour (at maximum rating) to the dry weight of the boiler in pounds equal to or in excess of 0.83;

b.5. Submarine and torpedo nets; and

b.6. Components, parts, accessories, and attachments for the above.

License Exceptions

LVS: \$5000, except N/A for Rwanda and the Federal Republic of Yugoslavia (Serbia and Montenegro)

GBS: N/A

CIV: N/A

8A992 Underwater systems or equipment, not controlled by 8A002, and specially designed parts therefor.

License Requirements

Reason for Control: AT

Control(s) Country Chart

AT applies to entire entry AT Column 1

License Exceptions

LVS: N/A

GBS: N/A

CIV: N/A

List of Items Controlled

Unit: \$ value

Related Controls: N/A

Related Definitions: N/A

Items:

List of Items Controlled

Unit: \$ value

Related Controls: N/A

Related Definitions: N/A

Items:

a. Closed and semi-closed circuit (rebreathing) apparatus for diving and underwater swimming, and specially designed components for use in the conversion of open-circuit apparatus to military use;

b. Naval equipment, as follows:

b.1. Diesel engines of 1,500 hp and over with rotary speed of 700 rpm or over specially designed for submarines;

b.2. Electric motors specially designed for submarines, i.e., over 1,000 hp, quick reversing type, liquid cooled, and totally enclosed;

b.3. Nonmagnetic diesel engines, 50 hp and over, specially designed for military purposes. (An engine shall be presumed to be specially designed for military purposes if it has nonmagnetic parts other than crankcase, block, head, pistons, covers, end plates, valve facings,

- a. Underwater vision systems, as follows:
 - a.1. 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*
 - a.2. 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.
- b. Photographic still cameras specially designed or modified for underwater use, having a film format of 35 mm or larger, and having autofocussing or remote focussing specially designed for underwater use;
- c. Stroboscopic light systems, specially designed or modified for underwater use, capable of a light output energy of more than 300 J per flash;
- d. Other underwater camera equipment, n.e.s.;
- e. Other submersible systems, n.e.s.;
- f. Boats, n.e.s., including inflatable boats, and specially designed components therefor, n.e.s.;
- g. Marine engines (both inboard and outboard) and submarine engines, n.e.s.; and specially designed parts therefor, n.e.s.;
- h. Other self-contained underwater breathing apparatus (scuba gear) and related equipment, n.e.s.;
- i. Life jackets, inflation cartridges, compasses,

- wetsuits, masks, fins, weight belts, and dive computers;
- j. Underwater lights and propulsion equipment;
- k. Air compressors and filtration systems specially designed for filling air cylinders.

B. TEST, INSPECTION AND PRODUCTION EQUIPMENT

8B001 Water tunnels, having a background noise of less than 100 dB (reference 1 µPa, 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.

License Requirements

Reason for Control: NS, AT

<i>Control(s)</i>	<i>Country Chart</i>
NS applies to entire entry	NS Column 2
AT applies to entire entry	AT Column 1

License Exceptions

LVS: \$3000
 GBS: N/A
 CIV: N/A

List of Items Controlled

Unit: \$ value
Related Controls: N/A
Related Definitions: N/A
Items:

The list of items controlled is contained in the ECCN heading.

C. MATERIALS

8C001 Syntactic foam designed for underwater use, having all of the following (see List of Items Controlled).

License Requirements

Reason for Control: NS, AT

Control(s) *Country Chart*

NS applies to entire entry NS Column 2

AT applies to entire entry AT Column 1

License Exceptions

LVS: N/A

GBS: N/A

CIV: N/A

List of Items Controlled

Unit: \$ value

Related Controls: N/A

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

Items:

a. Designed for marine depths exceeding 1,000 m; *and*

b. A density less than 561 kg/m³.

D. SOFTWARE

8D001 "Software" specially designed or modified for the "development", "production" or "use" of equipment or materials controlled by 8A (except 8A018 or 8A992), 8B or 8C.

License Requirements

Reason for Control: NS, AT

Control(s) *Country Chart*

NS applies to entire entry NS Column 1

AT applies to entire entry AT Column 1

License Requirement Notes: See §743.1 of the EAR for reporting requirements for exports under License Exceptions.

License Exceptions

CIV: N/A

TSR: Yes, except for the following:

- 1) Items controlled for MT reasons; or
- 2) Exports or reexports to destinations outside of Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, Portugal, Spain, Sweden, or the United Kingdom of "software" specially designed for the "development" or "production" of equipment controlled by 8A001.b, 8A001.d, or 8A002.o.3.b.

List of Items Controlled

Unit: \$ value

Related Controls: N/A

Related Definitions: N/A

Items:

The list of items controlled is contained in the ECCN heading.

8D002 Specific "software" specially designed

destinations outside of Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, Portugal, Spain, Sweden, or the United Kingdom of "technology" for items controlled by 8A001.b, 8A001.d or 8A002.o.3.b.

Related Controls: See also 8E992

Related Definitions: N/A

Items:

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.

List of Items Controlled

Unit: N/A

Related Controls: N/A

Related Definitions: N/A

Items:

The list of items controlled is contained in the ECCN heading.

8E992 "Technology" for the "development", "production" or "use" of equipment controlled by 8A992.

License Requirements

Reason for Control: AT

<i>Control(s)</i>	<i>Country Chart</i>
-------------------	----------------------

AT applies to entire entry	AT Column 1
----------------------------	-------------

8E002 Other "technology", as follows (see List of Items Controlled).

License Requirements

Reason for Control: NS, AT

<i>Control(s)</i>	<i>Country Chart</i>
-------------------	----------------------

NS applies to entire entry	NS Column 1
----------------------------	-------------

AT applies to entire entry	AT Column 1
----------------------------	-------------

License Exceptions

CIV: N/A

TSR: N/A

License Requirement Notes: See §743.1 of the EAR for reporting requirements for exports under License Exceptions.

List of Items Controlled

Unit: N/A

Related Controls: N/A

Related Definitions: N/A

Items:

The list of items controlled is contained in the ECCN heading.

License Exceptions

CIV: N/A

TSR: Yes

List of Items Controlled

Unit: N/A

EAR99 Items subject to the EAR that are *not* elsewhere specified in this CCL Category or in any other category in the CCL are designated by the number *EAR99*.