

DEPARTMENT OF CUSTOMS AND EXCISE

**List of goods subject to strategic
export control**

Supplement to Overseas Trading



DEPARTMENT OF CUSTOMS AND EXCISE

Customs and Excise Notice

LIST OF GOODS SUBJECT TO STRATEGIC EXPORT CONTROL

In accordance with recent statements by the Government the attached list of goods subject to strategic export control is published for the information of manufacturers, exporters and others who may be interested. The items listed are those for which special approval is required in terms of the strategic controls imposed under the Customs (Prohibited Exports) Regulations for export to the People's Republic of China and to European Communist countries excluding Yugoslavia. These lists do not affect the more extensive controls applied to North Vietnam, North Korea and Cuba.

The exportation of the goods listed is prohibited unless the consent in writing of the Minister for Customs and Excise is first obtained.

Applications to export goods listed in the attachments to this Notice should be addressed as follows:

- . for goods appearing in List A (Munitions List) and List B (Industrial List)

The Comptroller-General,
Department of Customs and Excise,
CANBERRA, A.C.T. 2600

- . for goods appearing in List C (Atomic Energy List)

The Executive Commissioner,
Australian Atomic Energy Commission,
Box 41 P.O.,
COOGEE, N.S.W. 2034

Any enquiries concerning the pending or potential exportation of goods listed may be directed to:

- . the Department of Customs and Excise, Canberra, A.C.T.
or Collectors of Customs in capital cities.
- . the Department of Trade and Industry, Canberra, A.C.T.
or Regional Offices in capital cities.

CANBERRA, A.C.T.

31/5/71

A. T. Carmody
A. T. Carmody
Comptroller-General

(Valid to 31/12/71 - Exports - CG 71/5597)

STRATEGIC EXPORT CONTROL LISTS

- LIST A - MUNITIONS LIST
- LIST B - INDUSTRIAL LIST
- LIST C - ATOMIC ENERGY LIST

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LIST A - MUNITIONS LIST

Item No.	Description
1	Small arms and machine guns, as follows: (a) Rifles, carbines, revolvers, pistols, machine pistols and machine guns; (b) All specifically designed components and parts therefor.
2	Artillery and projectors, as follows: (a) Guns, howitzers, cannon, mortars, tank destroyers, rocket launchers, military flame throwers, recoilless rifles; (b) Military smoke, gas and pyrotechnic projectors; (c) All specifically designed components and parts for the foregoing.
3	Ammunition, and all specifically designed components and parts thereof, for the weapons enumerated under Items 1 and 2.
4	Bombs, torpedoes, rockets, and missiles guided or unguided, as follows: (a) Bombs, torpedoes, grenades (including smoke grenades), smoke canisters, rockets, mines, missiles guided or unguided, depth charges, fire bombs, incendiary bombs; and all specifically designed components and parts therefor; (b) Apparatus and devices specifically designed for the handling, control, activation, launching, laying, sweeping, discharging, detonation or detection of items enumerated in sub-item (a); and all specifically designed components and parts therefor; (c) Military fuel thickeners, including but not limited to compounds (e. g., octal) or mixtures of such compounds (e. g., napalm) specifically formulated for the purpose of producing materials which, when added to petroleum products, provide a gel-type incendiary material for use in bombs, projectiles, flame throwers or other implements of war.
5	Fire control equipment and range finders, as follows: (a) Fire control, gun laying, night sighting, missile tracking and guidance equipment; (b) Range, position and height finders, and spotting instruments specially designed for military purposes; (c) Aiming devices, electronic, gyroscopic, acoustic and optical, specially designed for military purposes;

LIST A - MUNITIONS LIST

Item No.	Description
5 Cont'd.	<ul style="list-style-type: none">(d) Bomb sights, bombing computers, gun sights and periscopes, specially designed for military purposes;(e) Television sighting units specially designed for military use;(f) Components, parts, accessories, and attachments specifically designed for the articles enumerated in sub-items (a), (b), (c), (d) and (e) above.
6	<p>Tanks and vehicles specially designed for military purposes, as follows:</p> <ul style="list-style-type: none">(a) Tanks and self-propelled guns;(b) Military type armed or armoured vehicles, and vehicles fitted with mounting for arms;(c) Armoured railway trains;(d) Military half-tracks;(e) Military type recovery vehicles;(f) Gun-carriers and tractors specially designed for towing artillery;(g) Trailers specifically designed to carry ammunition;(h) Amphibious and deep water fording military vehicles;(i) Military mobile repair shops specifically designed to service military equipment;(j) All other specially designed military vehicles;(k) Pneumatic tyre casings (excluding tractor and farm implement types), of a kind specially constructed to be bullet proof or to run when deflated;(l) All specifically designed components and parts for the foregoing.
7	<p>Toxicological agents, as follows:</p> <ul style="list-style-type: none">(a) Biological, chemical and radioactive materials adapted for use in war to produce casualties in men or animals, or to damage crops;(b) Equipment specifically designed and intended for the dissemination of the materials described in sub-item (a);

LIST A - MUNITIONS LIST

Item No.	Description
7 Cont'd.	(c) Equipment specifically designed and intended for defence against the materials described in sub-item (a), and for their detection and identification; (d) Components and parts specially designed for the items listed in (b) and (c) above.
8	Powders, explosives and propellants, as follows: (a) Powders and liquid or solid propellants for the articles enumerated in Items Nos. 3, 4 and 7, and stabilizers therefor; (b) Military high explosives, and stabilizers therefor; (c) Chemical base high energy solid or liquid fuels specially formulated for military purposes.
9	Vessels of war, and special naval equipment, as follows: (a) Combatant vessels or vessels designed for offensive or defensive action (surface or underwater) whether or not converted to non-military use and regardless of current state of repair or operating condition, and hulls or parts of hulls for such vessels; (b)(1) diesel engines of 1,500 hp and over with rotary speed of 700 rpm or over specially designed for submarines; (2) electric motors specially designed for submarines, i. e., over 1,000 hp quick reversing type, liquid cooled and totally enclosed; (3) non-magnetic diesel engines, 50 hp and over, specially designed for military purposes; (c) Magnetic, pressure, and acoustic underwater detection devices specially designed for military purposes; controls and components thereof; (d) Submarine and torpedo nets; (e) Compasses and equipment therefor and ship's course indicators, specially designed for submarines; (f) Components, parts, accessories and attachments for the foregoing, such as turrets, naval gun mounts, submarine batteries and catapults.

LIST A - MUNITIONS LIST

Item No.	Description
10	Aircraft and helicopters, of the pilot or pilotless types and aero-engines and aircraft or helicopter equipment, associated equipment and components, specially designed for military purposes as set out below: <ul style="list-style-type: none"><li data-bbox="395 814 1534 1079">(a) Combat aircraft and helicopters and other aircraft and helicopters specially designed for military purposes, including military reconnaissance, assault, military training and logistic support, and all aircraft and helicopters having special structural features such as multiple hatches, special doors, ramps, reinforced floors and the like, for transporting and airdropping troops, military equipment and supplies; aero-engines specially designed or adapted for use with such aircraft and helicopters; and component parts thereof;<li data-bbox="395 1108 1560 1226">(b) Airborne equipment, including airborne refuelling equipment, specially designed for use with the aircraft and helicopters and the engines of the types of aircraft and helicopters covered by sub-item (a) and component parts thereof;<li data-bbox="395 1255 1499 1402">(c) Pressure refuellers, pressure refuelling equipment, equipment specially designed to facilitate operations in confined areas and ground equipment, not elsewhere specified, developed specially for aircraft and helicopters, and aircraft and helicopter engines covered by sub-item (a);<li data-bbox="395 1432 1525 1633">(d) Pressurized breathing equipment and partial pressure suits for use in aircraft and helicopters, anti-"G" suits; military crash helmets, parachutes used for combat personnel, cargo-dropping, and aircraft deceleration; liquid oxygen converters used for aircraft, helicopters and missiles; catapults and cartridge actuated devices utilized in emergency escape of personnel from aircraft and helicopters.
11	Electronic equipment specially designed for military use, and components and parts therefor.

LIST A - MUNITIONS LIST

Item No.	Description
12	<p>Photographic equipment, as follows:</p> <ul style="list-style-type: none"><li data-bbox="427 533 1557 590">(a)(1) Air reconnaissance cameras and associated equipment designed and used for military purposes;<li data-bbox="466 592 1557 648">(2) Film processing and printing machines designed and used for military purposes;<li data-bbox="427 678 1557 793">(b) Other cameras and other devices recording on film specially designed and used for military purposes, and specialized equipment designed to make the recorded information militarily useful;<li data-bbox="427 823 1557 852">(c) All specially designed components and parts for the foregoing.
13	<p>Special armoured equipment:</p> <ul style="list-style-type: none"><li data-bbox="427 968 743 997">(a) Armoured plate;<li data-bbox="427 1026 760 1056">(b) Military helmets;<li data-bbox="427 1085 939 1115">(c) Body armour and flak suits;<li data-bbox="427 1144 1420 1199">(d) Components and parts specially designed for equipment in (c) above.
14	<p>Specialized military training equipment:</p> <ul style="list-style-type: none"><li data-bbox="427 1314 1121 1344">(a) Specialized military training equipment;<li data-bbox="427 1373 1482 1430">(b) Components, parts, attachments, and accessories specifically designed for such equipment.
15	<p>Military infra-red equipment and specialized components therefor.</p>
16	<p>Munitions components and materials, as follows:</p> <ul style="list-style-type: none"><li data-bbox="427 1631 1482 1717">(a) Brass and bronze fabrications for primer anvils, fabrications for bullet cups (gilding metal clad steel), cartridge link, primer cap, shell rotating band;<li data-bbox="427 1747 1473 1803">(b) Copper rotating bands for shells, and other copper munitions components;<li data-bbox="427 1833 874 1862">(c) Gilding metal clad steel;<li data-bbox="427 1892 1442 1942">(d) Rough steel forgings, steel and alloy castings for guns and for arms.

LIST A - MUNITIONS LIST

Item No.	Description
17	<p>Miscellaneous equipment and materials, as follows:</p> <ul style="list-style-type: none"><li data-bbox="435 516 1373 548">(a) Tear gas and equipment for the dissemination thereof;<li data-bbox="435 573 1512 789">(b) Self-contained diving and underwater swimming apparatus, as follows:<ul style="list-style-type: none"><li data-bbox="496 632 1442 663">(1) closed and semi-closed circuit (rebreathing) apparatus;<li data-bbox="496 663 1512 726">(2) specially designed components for use in the conversion of open-circuit apparatus to military use;<li data-bbox="496 726 1459 789">(3) articles exclusively designed for military use with self-contained diving and underwater swimming apparatus;<li data-bbox="435 804 644 835">(c) Bayonets;<li data-bbox="435 863 1008 894">(d) Fire arms silencers (mufflers);<li data-bbox="435 921 1584 984">(e) Power controlled searchlights and control units therefor, designed for military use;<li data-bbox="435 1010 1546 1073">(f) Construction equipment built to military specifications, specially designed for airborne transport.
18	<p>Specialized machinery, equipment and gear specially designed for the examination, manufacture, testing and checking of the arms, ammunition, appliances and machines referred to in this List.</p>
19	<p>Environmental chambers capable of pressures of 26 Torr or less, including those with a pressure capability only and those which also have a capability of simulating other environments, such as radiation and temperature; specialized parts, controls and devices therefor.</p>
20	<p>Cryogenic equipment, the following:</p> <ul style="list-style-type: none"><li data-bbox="435 1524 1512 1734">(a) Equipment designed for maintaining an ambient temperature below -274°F (-170°C):<ul style="list-style-type: none"><li data-bbox="505 1587 1321 1650">(1) designed for use in marine, airborne or space applications; or<li data-bbox="505 1650 1164 1682">(2) ruggedized for mobile ground use; or<li data-bbox="505 1682 1512 1734">(3) designed to maintain operating temperatures for electrical, magnetic or electronic equipment or components;<li data-bbox="435 1755 1459 1871">(b) Electrical, magnetic or electronic equipment or components and electrical conductors specially designed for operation continuously or discontinuously at ambient temperatures below -274°F (-170°C);<li data-bbox="435 1892 1442 1955">(c) Specially designed accessories, sub-assemblies, parts or components for sub-items (a) and (b).

LIST A - MUNITIONS LIST

Item No.	Description
21.	Instruments or devices capable of automatically measuring the speed of sound <u>in situ</u> in water, and rated for differential sensitivity measurements of 1 part in 5,000 parts or better, specialized parts therefor; equipment containing such instruments or devices.
22.	Electrically triggered shutters of the carbon injection or photochromic function type having a shutter speed of less than 100 micro-seconds, <u>except</u> shutters which are an essential part of a high speed camera.

(LIST B - INDUSTRIAL LIST follows)

LIST B - INDUSTRIAL LIST

Item No.

Description

METAL-WORKING MACHINERY

Cutting Machines

- 1002 Jig borers and jig grinders with accuracies of better than ± 3 microns ($\pm 0.00012''$).
- 1016 Grinding heads and spindle assemblies (consisting of spindles and bearings as a minimal assembly) designed or rated for operation at speeds in excess of 120,000 rpm; machines specially designed for the utilisation of such grinding heads.

NOTE: This definition does not cover hand-held drills.

Forming Machines

- 1072 Presses and specialised controls, accessories and parts therefor, as follows:
- (a) Presses (stabilised equipment using rams) for applying high impact energy work forces through use of explosives or compressed gases including air;
 - (b) Presses specially designed or re-designed for the working or forming of metals, alloys or other materials with a melting point exceeding $1,900^{\circ}\text{C}$ ($3,452^{\circ}\text{F}$);
 - (c) Hydraulic presses, as follows:
 - (1) vertical presses having a total rated force of over 10,000 tons;
 - (2) horizontal presses having a total rated force of over 5,000 tons.
 - (d) Isostatic presses, as follows:
 - (1) capable of achieving a maximum working pressure of 20,000 psi ($1,406 \text{ kg/cm}^2$) or greater and possessing a chamber cavity with an inside diameter in excess of 16 inches (40.6 cm), or
 - (2) capable of achieving a maximum working pressure of 5,000 psi (351 kg/cm^2) or greater and having a controlled thermal environment within the closed cavity, except those possessing a chamber cavity with an inside diameter of less than 5 inches (127 mm) and which are also capable of achieving and maintaining a controlled thermal environment only between $+80^{\circ}\text{C}$ ($+176^{\circ}\text{F}$) and -35°C (-31°F).

LIST B - INDUSTRIAL LIST

Item No.

Description

1072
Cont'd

NOTE: Isostatic presses are those capable of pressurizing a closed cavity through various media (gas, liquid, solid particles, etc.) to create equal force in all directions within the cavity upon a workpiece or material.

(e) Control equipment, accessories and parts which are specially designed for the above presses.

1075

Spin-forming machines, except those with a spindle drive motor of less than 50 hp.

Other Metal-working Machinery

1080

Machines and equipment specially designed for making or measuring gas turbine blades, including but not limited to the following:

- (a) Blade belt grinding machines;
- (b) Blade edge radiusing machines;
- (c) Blade aerofoil milling and/or grinding machines;
- (d) Blade fillet radiusing and/or platform forming machines or equipment;
- (e) Blade root milling machines;
- (f) Blade blank pre-forming machines;
- (g) Blade rolling machines;
- (h) Blade aerofoil shaping machines;
- (i) Blade root grinding machines;
- (j) Blade aerofoil scribing equipment;
- (k) Blade aerofoil and/or root automatic measuring equipment.

NOTE: It is not the intention of this definition to restrict metal removing types of blade aerofoil shaping machines under sub-item (h).

LIST B - INDUSTRIAL LIST

Item No.	Description
1081	Machinery for use in the manufacture of aircraft, as follows: <ul style="list-style-type: none">(a) Machinery specially designed for the working or forming of aircraft sheet, plate or extrusion;(b) Machinery specially designed for the milling of aircraft skin.
1086	Machines specially designed for the manufacture of jet engines, the following: <ul style="list-style-type: none">(a) Jet engine compressor case boring machines;(b) Jet engine compressor or turbine disc turning machines;(c) Jet engine rotor grinders.
1088	Gear making and/or finishing machinery, as follows: <ul style="list-style-type: none">(a) Gear grinding machines, generating type, capable of accepting gear blanks of 36 inches (914 mm) work diameter or more;(b) Gear grinding machines, generating type, designed to grind gears to a face-width of 7 inches (177 mm) or more, for the production of helical or herring-bone gears;(c) Capable of the production of gears of a module finer than 0.5 mm (diametral pitch finer than 48) and meeting a quality standard better than DIN 58405 Class 7. <p>NOTE: If rated in AGMA or Admiralty standards and not rated in DIN 58405, AGMA 10 or Admiralty Class II shall be considered to be the equivalent of DIN 58405 Class 7.</p>
1091	Numerical control systems, as follows: <ul style="list-style-type: none">(a) Numerical control systems specially designed for controlling co-ordinated simultaneous (contouring and continuous path) machining movements in a machine-tool in two or more axes; and machine-tools designed for or equipped with such controls;(b) Numerical control servo-driven measuring or gauging machines specially designed for measuring at any point of the contour the dimensional shape and contour characteristics of two-or three-dimensional objects, including objects of revolution.

LIST B - INDUSTRIAL LIST

Item No.	Description
1092	<p>Tracer controlled machine tools, as follows:</p> <ul style="list-style-type: none"><li data-bbox="427 842 1576 926">(a) Milling and boring machines with an accuracy of ± 0.001 inch (± 0.025 mm) and a repeatability of ± 0.0005 inch (± 0.0125 mm) or better;<li data-bbox="427 957 1506 1031">(b) Lathes with an accuracy of ± 0.0004 inch (± 0.01 mm) and a repeatability of ± 0.0002 inch (± 0.005 mm) or better;<li data-bbox="427 1052 1367 1083">(c) Specialised accessories and components for the above.
	<p>NOTES: 1. Accuracy should be measured by using a twin template check: one template is mounted on the template stand and is traced in one plane with the template stylus; a second identical template is mounted on the work stand, is traced by an electronic pick-up, and the tracing is recorded. The machine is restricted if the recorded deviation between the two tracings does not exceed the accuracy figure stated in sub-items (a) or (b) above.</p> <p>2. Repeatability should also be measured by using the twin template check. The machine is restricted if the mean deviation, as recorded from at least seven successive checks, does not exceed the repeatability figure in sub-items (a) or (b) above.</p>

LIST B - INDUSTRIAL LIST

Item No.

Description

CHEMICAL AND PETROLEUM EQUIPMENT

Specialised Processing Equipment

- 1110 Gas liquefying equipment, as follows:
- (a) Equipment for the fractional separation of air into its various components, except helium, which has been specially designed for the withdrawal of liquid end-products to the total amount of 60 tons or more per 24-hour day, provided that the withdrawal of liquid oxygen or nitrogen exceeds 50 tons per 24-hour day, except plants not capable of producing more than 15% of their total daily product as extractable gas in liquid form, provided that the withdrawal of liquid oxygen or nitrogen does not exceed 12.5% of their total daily product;
 - (b) Equipment for the production of liquid hydrogen, except plants with a capacity of less than $1\frac{1}{2}$ tons per 24-hour day and not designed for, or capable of, the production of hydrogen slush;
 - (c) Liquid fluorine producing equipment;
 - (d) Equipment for helium, as follows:
 - (1) equipment for the separation of helium from natural gases; and
 - (2) equipment for the production of liquid helium except equipment which has a capacity of no more than 20 litres per hour.
- 1118 Equipment for the production of military explosives and solid propellants, as follows:
- (a) Complete installations;
 - (b) Specialised components;
 - (c) Nitrators: continuous types.

Pumps and Valves

- 1129 Vacuum pumps, as follows:
- (a) Ion vacuum pumps (that is, those using the principle of ionization) except those having pumping speeds of less than 800 litres of hydrogen per second at a pressure of 10^{-6} mm of mercury or more (that is, 10^{-5} , 10^{-4} , etc.);
 - (b) Turbo-molecular pumps having a higher capacity than 2,000 litres of nitrogen per second;

LIST B - INDUSTRIAL LIST

Item No.	Description
1129 Cont'd	<ul style="list-style-type: none">(c) Diffusion pumps rated for unbaffled pumping speeds of more than 50,000 litres of nitrogen per second at pressures of 10^{-4} mm of mercury or less;(d) Cryopump systems (that is, systems in which the circulation of liquefied gas is used to achieve a vacuum (static or dynamic) by lowering the temperature of the environment);(e) Specially designed parts, controls and accessories for the above pumps.
1131	<p>Pumps (except vacuum pumps (see Item 1129)) delivering liquids separately or in combination with solids and/or gases and having any of the following characteristics:</p> <ul style="list-style-type: none">(a) Designed to move molten metals by electromagnetic forces;(b) Specially designed for operation at temperatures below -274°F (-170°C) <u>except</u> pumps with a flow rate of 100 gallons (379 litres) per minute or less which are not designed for operation at temperatures below -328°F (-200°C);(c) Having all flow contact surfaces made of any of the following materials:<ul style="list-style-type: none">(1) 90% or more tantalum, titanium or zirconium, either separately or combined, <u>except</u> materials containing more than 97% and less than 99.7% titanium;(2) polytetrafluoroethylene or the copolymers of tetrafluoroethylene and hexafluoropropylene.
1133	<p>Valves, cocks and pressure regulators, as follows:</p> <ul style="list-style-type: none">(a) Specially designed to operate at temperatures below -274°F (-170°C) <u>except</u> those of 2 in. (50.8 mm) diameter or less specially designed for operation at temperatures from -274°F (-170°C) to -328°F (-200°C); or(b) Having all flow contact surfaces made of any of the following materials:<ul style="list-style-type: none">(1) 90% or more tantalum, titanium or zirconium, either separately or combined, <u>except</u> materials containing more than 97% and less than 99.7% titanium;(2) polytetrafluoroethylene or the copolymers of tetrafluoroethylene and hexafluoropropylene.
4133	<p>Valves less than three centimetres in diameter, with bellows seal, wholly made of or lined with aluminium, nickel, or alloy containing 60% or more nickel, either manually or automatically operated, and with other than metal to metal seats.</p>

LIST B - INDUSTRIAL LIST

Item No.

Description

Other Chemical Equipment

1142 Pipe, tubing and fittings made of, lined with or covered with polytetrafluoroethylene, polyvinylidene fluoride, or the copolymers of tetrafluoroethylene and hexafluoropropylene, chlorotrifluoroethylene and vinylidene fluoride or hexafluoropropylene and vinylidene fluoride.

1145 Containers, jacketed only, for the storage or transportation of liquefied gases at temperature below -274°F (-170°C), including mobile units, as follows:

(a) Specially designed for liquefied gases boiling at temperatures below -328°F (-200°C), as follows:

- (1) with multi-laminar type insulation under vacuum; or
- (2) with other types of insulation, having a liquid capacity of more than 250 gallons (946 litres) and an evaporation loss rate of less than 3% per day as determined at an ambient temperature of 75°F (24°C) and without exposure to direct sunlight;

(b) Specially designed for liquid fluorine;

(c) Specially designed for liquid oxygen, nitrogen or argon, as follows:

- (1) with multi-laminar type insulation under vacuum; or
- (2) with other types of insulation:
 - (i) fixed storage tanks having a capacity of 500 tons or more; or
 - (ii) mobile equipment having a capacity exceeding 1,200 gallons (4,542 litres) and an evaporation loss rate of less than 1.5% per day as determined at an ambient temperature of 75°F (24°C) and without exposure to direct sunlight.

ELECTRICAL AND POWER-GENERATING EQUIPMENT

1203 Electric vacuum furnaces, as follows:

(a) Consumable electrode vacuum arc furnaces with a capacity in excess of 5 tons;

(b) Skull type vacuum arc furnaces;

(c) Electron beam vacuum furnaces;

(d) Induction vacuum furnaces, as follows:

- (1) cold crucible vacuum induction furnaces designed to operate at pressures lower than 0.1 mm of mercury and at temperatures higher than $2,012^{\circ}\text{F}$ (1100°C);

LIST B - INDUSTRIAL LIST

Item No.

Description

1203
Cont'd

- (2) other vacuum induction furnaces designed to operate at temperatures higher than 3,002°F (1650°C), excluding furnaces with a work piece space of not more than 13,000 cc and designed to operate not higher than 3,452°F (1900°C), and furnaces with a work piece space of not more than 3,200 cc with no single dimension (length, width, height or diameter) of that space in excess of 10 in, and designed to operate at temperatures not higher than 4,172°F (2300°C);
- (e) Resistance vacuum furnaces designed to operate at temperatures higher than 3,002°F (1,650°C), excluding:
 - (1) furnaces for heat treatment:
 - (i) up to 12 in. (304 mm) x 12 in. (304 mm) x 12 in. (304 mm)(28,320 cc), designed for temperatures not higher than 4,172°F (2,300°C);
 - (ii) up to 600 cc, designed for temperatures not higher than 4,860°F (2,700°C);
 - (2) melting furnaces up to 3,200 cc designed for temperatures not higher than 4,172°F (2,300°C);
- (f) Specialised parts and controls for the above furnaces.

1204

Electron beam equipment, as follows:

- (a) Welding and/or machining equipment, except non-vacuum electron beam welders;

NOTE: The term "non-vacuum" means that the actual welding takes place in an atmospheric or a non-vacuum environment, although the electron beam gun is in a vacuum.

- (b) Equipment for the deposition of thin film, the coating of thin film, or the working thereof;

- (c) Specialised parts for the above equipment.

NOTE: It is not the intention of this definition to control:

- (1) equipment using the "sparking" technique;
- (2) continuous vacuum roll coating machines having a voltage not in excess of 20 kV, having a fixed electron beam gun and no accurate control of the thickness of the deposited layer.

LIST B - INDUSTRIAL LIST

Item No.	Description
1205	<p>Electro-chemical, semi-conductor and radio-active devices for the direct conversion of chemical, solar or nuclear energy to electrical energy, as follows:</p> <ul style="list-style-type: none">(a) Electro-chemical devices, as follows:<ul style="list-style-type: none">(1) Fuel cells, including regenerative cells, i.e., cells for generating electric power, to which all the consumable components are supplied from outside the cell;(2) primary cells having any of the following characteristics:<ul style="list-style-type: none">(i) possessing a means of activation and having an open circuit storage life in the unactivated condition, at a temperature of 70°F (21°C), of 10 years or more;(ii) capable of operating at temperatures from below -13°F (-25°C) to above 131°F (55°C), including cells and cell assemblies (other than dry cells) possessing self-contained heaters;(b) Photo-voltaic cells with a power output of 8 milliwatts or more per square centimetre under 100 milliwatts per square centimetre tungsten (2,800°K) illumination; all gallium arsenide photo-voltaic cells, excluding those having a power output of less than 4 milliwatts measured by the above technique;(c) Power sources other than nuclear reactors based on radioactive materials systems, excluding:<ul style="list-style-type: none">(1) those having an output power of less than 0.5 watt and a total weight of more than 200 lb (99.7 kg);(2) those specially designed and developed for medical use within the human body;(d) Specialised parts, components and sub-assemblies of the above devices.
1206	<p>Electric arc devices for generating a flow of ionized gas in which the arc column is constricted (<u>except</u> devices wherein the flow of gas is for isolation purposes only and devices of less than 80 kW for cutting, welding, plating and/or spraying); equipment incorporating such devices; specially designed parts, accessories and control or test equipment for such devices.</p>

LIST B - INDUSTRIAL LIST

Item No.

Description

GENERAL INDUSTRIAL EQUIPMENT

Metallurgical, Mill and Foundry Equipment

- 1305 Metal rolling mills, as follows:
- (a) Sheet and strip mills more than 3-high (including dual-purpose mills which can operate as either 2- or 4-high) which achieve special lateral and/or longitudinal contour control by one or more of the following means:
 - (1) work rolls having a ratio of roll face length to roll diameter which exceeds either:
 - 6 : 1 for rolls with roll face length up to and including 30 inches (762 mm), or
 - 5 : 1 for rolls with roll face length exceeding 30 inches (762 mm);
 - (2) work roll contour control achieved by concurrent deforming of back-up rolls, back-up shafts or work rolls;
 - (3) any other feature achieving special lateral and/or longitudinal contour controls comparable to those achieved by (1) and (2) above;
 - (b) Mills specially designed or re-designed for the rolling of metals and alloys with a melting point exceeding 1900°C;
 - (c) Specialised controls, parts and accessories for the above mills.
- 4305 Rolling mills other than those covered by Item 1305.

Equipment for other Specific Industries

- 1352 Machinery specially designed for the extrusion of tetrafluoroethylene polymer and copolymer coagulated dispersions or powders or pastes derived therefrom, and parts and components therefor, and other machinery specially designed for the manufacture of wire and cable controlled by sub-item 1754(c).
- 1353 Equipment specially designed for the manufacture of communication cable restricted by Item 1526.

LIST B - INDUSTRIAL LIST

Item No.	Description
1355	<p>Machinery and equipment for the manufacture of electronic equipment, components and materials and related test gear, parts and specialised controls and accessories, as follows:</p>
	<p>(a) For tubes (valves) and parts and sub-assemblies thereof:</p> <ol style="list-style-type: none">(1) equipment specially designed for the manufacture of restricted types, and(2) equipment for automatic or semi-automatic assembly, testing and/or sorting, <u>except</u> standard equipment for the assembly of entertainment-type receiver tubes or television picture tubes not restricted by Item 1541;
	<p>NOTES: 1. The term "automatic" refers to machinery not requiring the assistance of a human operator to complete its function or functions during each complete cycle of operations.</p> <p>2. The term "semi-automatic" refers to machinery requiring the assistance of a human operator to complete part but not all of its function during each complete cycle of operations.</p> <p>3. The term "functions" in Notes 1 and 2 does not include the initial loading or final unloading of material from the machine.</p>
	<p>(b) For semi-conductor devices for electronic equipment and components subject to control under Item 1564 (a) and (c) and for parts, materials and sub-assemblies thereof:</p> <ol style="list-style-type: none">(1) equipment specially designed for the manufacture of restricted types and of any silicon transistor;(2) equipment for slicing, dicing, scribing, slice breaking, probing, testing and/or sorting;(3) bonders and welders;(4) masks;(5) equipment for the manufacture of masks or the creation of a photosensitive pattern on the surface of a semi-conductor or insulating substrate; and(6) equipment for purifying or processing semi-conductor materials, <u>except</u> equipment specially designed for the zone purification of germanium;
	<p>NOTE: It is understood that equipment for purifying and processing includes equipment which performs one or more of the following operations on semi-conductor materials:</p> <ol style="list-style-type: none">(a) purifying beyond 99.9%;(b) equalising distribution of residual impurities;(c) achieving controlled introduction of impurities (in one or more stages of operation);(d) producing monocrystalline material or forms (e.g., by drawing, pulling, deposition) including forming on substrates;

LIST B - INDUSTRIAL LIST

Item No.	Description
1355 Cont'd	(c) For depositing or printing on insulating materials, or otherwise forming, <u>in situ</u> , component parts other than basic wiring.
1356	Machinery for the working of synthetic film used as a dielectric (condenser tissue) or as magnetic recording tape, as follows: (a) Vacuum metallizing machinery specially designed for the continuous coating with metallized sheathing of synthetic film for dielectric use in the manufacture of capacitors controlled by Item 1560; and (b) Equipment specially designed for the continuous coating of polyester base magnetic tape intended for the equipment subject to restriction under Item 1572.
1357	Machines of which the motions for positioning, wrapping and winding of fibres are co-ordinated and programmed in three or more axes, specially designed to fabricate composite structures or laminates from fibrous and filamentary materials, and the mechanical parts of the machines, co-ordinating and programming controls, and specialised parts, components and accessories therefor.
1361	Wind tunnels, as follows: (a) Supersonic (Mach 1.4 to Mach 5.5), hypersonic (Mach 5.5 to Mach 15) and hypervelocity (above Mach 15) wind tunnels, <u>except</u> wind tunnels specially designed for educational purposes and having a test section size (measured internally) of less than 25 cm (By "test section size" is understood the diameter of the circle, or the side of the square, or the longest side of the rectangle constituting possible shapes of the test section.); (b) Devices for simulating environments at Mach 1.4 and above, including hot shot tunnels, plasma arc tunnels, shock tubes, shock tunnels, gas tunnels and light gas guns; (c) Specially designed parts and accessories.

LIST B - INDUSTRIAL LIST

Item No.

Description

TRANSPORTATION EQUIPMENT

Vessels

1416

Vessels, as follows:

- (a) Fishing vessels and hulls therefor designed for speeds of 17 knots or over when in full load (design) condition;
- (b) Hydrofoil vessels;
- (c) Sea-going vessels including coasters and hulls therefor, designed for speeds of over 23 knots when in full load (design) condition, taking into consideration hull form (configuration) as well as power plant;

NOTE: For passenger-carrying liners having at least four decks and whose specifications, as far as hull construction is concerned, correspond to the Conventions on the Safety of Human Life at Sea in force at the time of their construction, this cut-off is 25 knots.

- (d) Vessels with hulls and propulsion machinery made wholly or primarily of non-magnetic materials;
- (e) New ships with decks and platforms specially designed or strengthened to receive weapons.

4416

Passenger-carrying liners having at least 4 decks and whose specifications, as far as hull construction is concerned, correspond to the Conventions on the Safety of Human Life at Sea in force at the time of their construction, when designed for speeds of over 23 knots but not higher than 25 knots.

Marine Equipment

1430

Buoyant electric conducting cable suitable for sweeping magnetic mines.

1431

Gas turbine engines for marine propulsion, whether originally designed as such or adapted for such use from aero-engines.

LIST B - INDUSTRIAL LIST

Item No.

Description

Aviation Equipment

1460 Aircraft and helicopters, aero-engines and aircraft and helicopter equipment, as follows:

- (a) Helicopters over 10,000 lb (4,530 kg) empty weight, and power transmission systems therefor;

NOTE: Empty weight is understood to include normal installation and normal minimum crew, but does not include fuel or pay-load.

- (b) Aircraft and helicopters, except those which do not contain equipment covered by the Munitions List or Item 1485 or Item 1501 which are of types which have been in bonafide normal civil use for more than one year, or which are powered by piston engines;

- (c) Aero-engines, as follows:

- (1) gas turbine-engines:

- (i) jet engines of 5,000 lb (2,265 kg) thrust or more;
(ii) turbo-prop or turbo-shaft engines of 2,500 horsepower or more or with a residual thrust of 1,000 lb (453 kg) or more;

- (2) aircraft and helicopter engines of other than gas turbine types, except piston engines.

- (d) Ground and airborne equipment developed solely or used mainly for aircraft and helicopters, except ground or airborne equipment of types in normal civil use.

4460 Civil aircraft and helicopters other than those covered by Item 1460.

Other Equipment

1485 Compasses, gyroscopes, accelerometers and inertial equipment as follows:

- (a) Gyro compasses possessing one or more of the following characteristics:
- (1) automatic correction for the effects on compass accuracy of changes in ship's speed, acceleration, or latitude. (Manually set mechanical corrective devices such as the speed-course-latitude corrector on the Sperry MK 14 MOD 1 compasses are specifically excepted);
 - (2) provision for accepting ship's data as an electrical input;
 - (3) provision for setting in corrections for current set and drift;

LIST B - INDUSTRIAL LIST

Item No.	Description
1485 Cont'd.	(4) utilisation of accelerometer, rate gyro, rate integrating gyros, or electrolytic levels as sensing devices; (5) provision for determining and electrically transmitting ship's level reference data (roll, pitch) in addition to own ship's course data;
	(b) Integrated flight instrument systems for aircraft which include gyro-stabilisers and/or automatic pilots.
	NOTE: An integrated flight instrument system is a primary instrument display system of attitude and azimuth with facilities for giving manoeuvre guidance information to the Pilot and often integrated with an autopilot to the extent of embodying a common unit for setting up the required demands.
	(c) Gyro-astro compasses and other devices which derive position and/or orientation by means of automatically tracking celestial bodies;
	(d) Gyro-stabilisers used for other purposes than aircraft control, except those for stabilising an entire surface vessel;
	(e) Automatic pilots used for other purposes than aircraft control except marine types for surface vessels;
	(f) Accelerometers with a threshold of 0.005 g or less and/or a linearity of less than 0.25% of output over the operating range, which are designed for use in inertial navigation systems or in guidance systems of all types;
	(g) Gyros and gyro compasses, as follows: (1) gyros with a rated free directional drift rate (rated free precession) of less than 0.5 degree (1 Sigma or r.m.s) per hour in a 1 g environment; (2) gyro compasses which incorporate gyros embargoed by sub-item (g)(1) above or which, when operated in a gyro compass mode, have a compass error, before compensation, due to gyro drift of less than 1/30 of a radian (6/π degrees or 1.918 degrees approximately) at 0 degree latitude;
	(h) Inertial equipment using accelerometers restricted by sub-item (f) above and/or gyros restricted by sub-item (g)(1) above, and systems incorporating such equipment;
	(i) Specially designed parts, components, and test, calibration and alignment equipment for the above.

LIST B - INDUSTRIAL LIST

Item No.

Description

ELECTRONICS AND PRECISION INSTRUMENTS

Radio, Radar and other Telecommunications Apparatus

1501

Communication, navigation, direction finding and radar equipment, as follows:

- (a) Airborne communication equipment and specialised parts and components therefor;
- (b) Navigation and direction finding equipment (and specialised parts and accessories, specialised testing or calibrating equipment and training or simulating equipment therefor), as follows:
 - (1) airborne navigation equipment and direction finding equipment, as follows:
 - (i) designed to make use of "Doppler" frequency phenomena;
 - (ii) utilising the constant velocity and/or the rectilinear propagation characteristics of electro-magnetic waves having frequency less than 4×10^{14} Hz (0.75 micron);
 - (iii) radio altimeters, the following:
 - (a) pulse modulated;
 - (b) frequency modulated having an electrical output accuracy better than ± 3 feet over the range between 0 and 100 feet or better than $\pm 3\%$ above 100 feet;
 - (c) frequency modulated which have been in normal civil use for less than four years;
 - (iv) direction finding equipment operating at frequencies greater than 5 MHz, other than equipment designed for search and rescue purposes provided that the receiver operates on a crystal controlled fixed frequency of 121.5 MHz and that the determination of the DF bearing is not independent of the heading of the aircraft and provided that the DF antenna array is designed for operation at a fixed frequency of 121.5 MHz;
 - (v) pressurized throughout;
 - (vi) rated for continuous operation over a range of ambient temperatures extending from below -55°C to above $+55^{\circ}\text{C}$;
 - (2) ground and marine equipment for use with airborne navigation equipment utilising the constant velocity and/or the rectilinear propagation characteristics of electromagnetic waves having frequency less than 4×10^{14} Hz (0.75 micron);
 - (3) ground and marine direction finding equipment operating at frequencies greater than 12 MHz;

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Item No.	Description
1501 Cont'd	<p>(c) Radar equipment (and specialised parts and accessories, specialised testing or calibrating equipment and training or simulating equipment therefor), as follows:</p> <ul style="list-style-type: none">(1) airborne radar equipment;(2) ground and marine radar equipment having one or more of the following features:<ul style="list-style-type: none">(i) operating at a frequency not in normal civil use or at a frequency of more than 10.5 GHz;(ii) having a peak output power from the transmitter greater than 160 kW;(iii) having an 80% or better cumulative probability of detection for a 20 square metre target at a free space range of 50 nautical miles;(iv) utilising other than pulse modulation with a constant and/or staggered pulse repetition frequency, in which the carrier frequency of the transmitted signal is not changed deliberately between groups of pulses, from pulse to pulse or within a single pulse;(v) utilizing a Doppler technique for any purpose, other than M.T.I. systems using a conventional double or triple pulse delay line cancellation technique;(vi) including signal processing techniques which have been in normal civil use for a period of less than 4 years;(vii) having been in commercial use for a period of less than 2 years.
1502	<p>Communication, detection or tracking equipment of a kind using ultra-violet radiation, infra-red radiation or ultrasonic waves; and specialised parts therefor.</p> <p>NOTES: 1. This item is not intended to cover ultrasonic devices which operate in contact with a controlled material to be inspected.</p> <p>2. This item is not intended to restrict industrial equipment employing cells not covered by Items 1548 or 1550, or to restrict flame detectors for industrial furnaces.</p>
1507	<p>"Jamming" apparatus, (i.e., apparatus specially designed to jam or otherwise interfere with radio reception); and specialised parts therefor.</p>

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Item No.	Description
1510	<p>Location apparatus, underwater: apparatus for detecting or locating objects under water by magnetic or acoustic or ultrasonic methods, and specialised components of such apparatus, <u>except</u></p> <ul style="list-style-type: none"><li data-bbox="401 600 1494 695">(a) Marine depth sounders of a kind used solely for measuring the depth of water or the distance of submerged objects or fish and/or whales vertically below the apparatus;<li data-bbox="401 720 1390 783">(b) Specific types of horizontally operated fish and/or whale finding equipment.
1514	<p>Pulse modulators capable of providing electric impulses of peak power exceeding 200 kW or of a duration of less than 0.1 micro-second, or with a duty cycle in excess of 0.002; and pulse transformer, pulse-forming equipment or delay lines being specialised parts of such modulators.</p>
1516	<p>Panoramic radio receivers as follows:</p> <ul style="list-style-type: none"><li data-bbox="409 1104 1546 1276">(a) Panoramic radio receivers (being receivers which search automatically a part of the radio-frequency spectrum and indicate the signals received); <u>except</u> ancillary equipment for commercial receivers, with which the frequency spectrum searched does not exceed either $\pm 20\%$ of the intermediate frequency of the receiver or ± 2 MHz.<li data-bbox="409 1304 1494 1360">(b) Specialised parts for the panoramic radio receivers restricted by this item.
1517	<p>Radio transmitters and components, except radio relay communications equipment (see Item 1520), as follows:</p> <ul style="list-style-type: none"><li data-bbox="418 1507 1477 1858">(a) Transmitters or transmitter amplifiers designed to operate at output frequencies greater than 235 MHz, <u>except</u>:<ul style="list-style-type: none"><li data-bbox="522 1566 1402 1623">(1) television broadcasting transmitters and amplifiers therefor operating between 470 and 960 MHz;<li data-bbox="522 1623 1477 1766">(2) frequency-modulated and amplitude-modulated ground communications equipment for use in the land mobile service and operating in the 420 to 470 MHz band with a power output of not more than 25 W for mobile units and 100 W for fixed units;<li data-bbox="522 1766 1459 1858">(3) amplitude-modulated radiotelephone equipment used for search and rescue work operating on a frequency of 243 MHz with a carrier power not exceeding 100 mW.

LIST B - INDUSTRIAL LIST

Item No.	Description
1517 Cont'd	<p>(b) Transmitters or transmitter amplifiers designed to provide any of the following features:</p> <ul style="list-style-type: none">(1) any system of pulse modulation; (This does not include amplitude, frequency or phase modulated television or telegraphic transmitters).(2) rated for operation over a range of ambient temperatures extending from below - 40°C to above + 55°C;(3) designed to provide a multiplicity of alternative output frequencies controlled by a lesser number of piezo-electric crystals, <u>except</u> equipments in which the output frequency is selected only by manual operation either on the equipment or on a remote control unit and:<ul style="list-style-type: none">(i) those forming multiples of a common control frequency; or(ii) those in which the output frequency is a multiple of a common frequency which is not less than 1/1000 part of the oscillator frequency and is in steps of 1 KHz or greater. <p>(c) Components and sub-assemblies, including but not limited to intermediate-frequency and power amplifiers and their parts, modulators and modulation amplifiers, aerials, their filters and their connecting devices, control equipment placed in racks, and maintenance equipment, specially designed for transmitters covered by sub-items (a) and (b) above, except quartz crystals which are covered by Item 1587.</p>
1518	Telemetry and telecontrol equipment suitable for use with aircraft (piloted or pilotless), space vehicles or weapons (guided or unguided), and test equipment specially designed for such equipment.
1519	<p>Data communication equipment employing digital transmission with digital input and output, including telegraphic and data transmission, having any of the following characteristics:</p> <ul style="list-style-type: none">(a) Designed for operation at a data signalling rate in bits per second, excluding servicing and administrative channels, numerically exceeding either:<ul style="list-style-type: none">(1) 1,200; or(2) 65% of the channel (or sub-channel) bandwidth in Hertz;(b) Employing automatic error detection and correction systems having both of the following characteristics:<ul style="list-style-type: none">(1) re-transmission is not required for correction;(2) transmission speed exceeding 300 bits per second;(c) Components, accessories and sub-assemblies, specially designed for the above equipment.

LIST B - INDUSTRIAL LIST

Item No.

Description

1519
Cont'd

- NOTES: 1. "Data signalling rate" is as defined in the I. T. U. Recommendation 53-56, taking into account that for non-binary modulation systems "bauds" and "bits per second" are not equal. Bits for coding, checking and synchronisation functions are to be included.
2. In the case of systems designed to operate in one voice channel, "bandwidth" will be as defined in C. C. I. T. T. Recommendation G.131, namely 3,100 Hz. In the case of C. C. I. T. T. or C. C. I. R. voice frequency telegraph systems, "bandwidth" may be considered as the number of channels times the channel spacing.

1520

Radio relay communications equipment, as follows:

- (a) Equipment employing tropospheric, ionospheric or meteoric scatter phenomena, and specialised test equipment therefor;
- (b) Other radio relay equipment designed for use at frequencies exceeding 300 MHz, except equipment having none of the following characteristics:
 - (1) designed for use at frequencies exceeding 470 MHz;
 - (2) power output exceeding 10 watts;
 - (3) signal bandwidth at the input to the modulator exceeding the limit specified in sub-item 1523(a);
 - (4) for other than fixed service;
- (c) Components, accessories and sub-assemblies, specially designed for the above equipment.

Other related Equipment and Parts
for Radio, Radar and Telecommunications Apparatus

1521

Amplifiers, oscillators and related equipment, as follows:

- (a) Amplifiers designed to operate at frequencies in excess of 500 MHz;
- (b) Tuned amplifiers having a bandwidth which exceeds 10 MHz or 10% of the mean frequency, whichever is less, except those specially designed for use in community television distribution systems;
- (c) Untuned amplifiers having a bandwidth which exceeds 10 MHz, but excluding those having a bandwidth up to 30 MHz provided the power output does not exceed 5 watts;
- (d) D. C. amplifiers, amplifying by whatever means, having a noise level (referred to the input circuit) of 10⁻¹⁶ watts or less and/or zero drift in 1 hour corresponding to a change in input power of 10⁻¹⁶ watts or less;

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Item No.

Description

1521
Cont'd

- (e) Parametric amplifiers with a noise figure of merit of 5 decibels or less measured at a temperature of 170C; paramagnetic amplifiers; other amplifier or oscillator devices which amplify or oscillate by means of stimulated electromagnetic radiation (including but not limited to MASERS, LASERS and IRASERS), specially designed parts therefor; and any equipment containing such amplifiers, oscillators or devices.

- NOTES: 1. The bandwidth is defined as the band of frequencies over which the power amplification does not drop to less than one-half of its maximum value. The mean frequency is defined as the arithmetic mean between the frequencies at which the power amplification is one-half of its maximum value.
2. The term "specially designed parts" in part (e) of the above definition, insofar as it refers to stimulated emission radiation devices, is intended to include the active component in semi-fabricated form as well as fabricated forms.

1523

Single and multi-channel communications transmission equipment, including line or radio terminal, modem, multiplex, and intermediate amplifier or repeater equipment, as follows:

- (a) Employing analogue techniques, including frequency division multiplex (FDM), designed to deliver, carry or receive frequencies higher than 150 KHz into, or in, a communications system, except carrier communications terminals specially designed for power lines and operating at frequencies below 1,500 KHz;
- (b) Employing digital transmission with analogue input and output, including pulse code modulation (PCM), designed for use on communication circuits, and specialised test equipment therefor;
- (c) Components, accessories and sub-assemblies, specially designed for the above equipment.

1526

Communications cable, as follows:

- (a) Submarine cable;
- (b) Coaxial cable using a mineral insulator dielectric;
- (c) Coaxial cable using a dielectric aired by discs, beads, spiral, screw or any other means.

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Item No.	Description
4526	Communication cable containing more than one pair of conductors, of which any one of the conductors, single or stranded, has a diameter exceeding 0.9 mm, except cable controlled under Item 1526.
1527	All cipher machines, cryptographic and/or coding devices and equipment, and associated equipment, useable on any transmission system (telegraphy, telephony, facsimile, video, data), that are designed to ensure the secrecy of communications and thus prevent clear reception by anyone other than the intended receiver. NOTES: 1. This item is intended to cover all the related equipment for cipher machines and cryptographic and/or coding devices and equipment, such as: (a) teleprinters, perforators, automatic transmitters having special characteristics for use in association with cipher machines, and cryptographic and/or coding devices and equipment; Random generators (including those for games of chance); (b) bandwidth compression equipments, including but not limited to those which digitize speech (VOCODER); (c) modulation and demodulation devices developed for the ciphering of any transmission system (telephony, facsimile, video, data); (d) video systems, whatever the technique, including those used with pay television, which use a digital transmission or digital techniques to modify an analogue transmission for video or facsimile secrecy; (e) authentication equipment, equipment designed to provide protection against fraudulent transmission or to establish the authenticity of a message or communications system; (f) specialised assemblies, sub-assemblies and components for the equipment restricted by this item; (g) equipment containing components restricted by this item. 2. This item is not intended to cover simple coding devices or equipment only ensuring the privacy of communications, as follows: (a) equipment for voice transmission making use of fixed frequency inversions and/or fixed band scrambling techniques in which the transposition changes occur not more frequently than once every 10 seconds; (b) standard civil facsimile and video equipment designed to ensure the privacy of communications by an analogue transmission using non-standard practices for intended receivers only (video system equipment effecting the transposition of analogue data);

LIST B - INDUSTRIAL LIST

Item No.	Description
1527 Cont'd	NOTES: 2. (c) video systems for pay television and similar restricted audience television, including industrial and commercial television equipment using other than standard commercial sweep systems, except the equipment covered under sub-paragraph 1(d) above.
1529	<p>Electronic measuring, calibrating, counting, testing and/or time interval measuring equipment, whether or not incorporating frequency standards, having any of the following characteristics:</p> <ul style="list-style-type: none">(a) Consisting of, or containing, frequency measuring equipment or frequency standards designed for:<ul style="list-style-type: none">(1) other than ground laboratory use, with an accuracy better than 1 part in 10^7; or(2) ground laboratory use, with a stability over 24 hours of 1 part in 10^9 or better;(b) Designed for use at frequencies exceeding 1,000 MHz, except radio spectrum analysers (see Item 1533);(c) Designed to provide a multiplicity of alternative output frequencies controlled by a lesser number of piezo-electric crystals or by an internal or external frequency standard, except equipment in which the output frequency is selected only by manual operation either on the equipment or on a remote control unit, and:<ul style="list-style-type: none">(1) those forming multiples of a common control frequency; or(2) those in which the output frequency is a multiple of a common frequency which is not less than 1/1,000 part of the oscillator frequency and is in steps of 1 KHz or greater;(d) Counting equipment capable of resolving at normal input levels successive input signals with less than 0.1 microsecond time difference;(e) Time interval measuring equipment containing counting equipment as specified in sub-item (d) above;(f) Testing equipment rated to maintain specified operating data when operating over a range of ambient temperatures from below -25°C to above $+55^{\circ}\text{C}$.
1533	<p>Radio spectrum analyzers (being apparatus capable of indicating the single-frequency components of multi-frequency oscillations) as follows:</p> <ul style="list-style-type: none">(a) Designed to operate at frequencies over 1,000 MHz;

LIST B - INDUSTRIAL LIST

Item No.	Description
1533 Cont'd	<ul style="list-style-type: none">(b) Designed to operate at frequencies over 300 MHz and using interchangeable heads (i. e., R. F. tuning units) and incorporating integral sweep facilities;(c) Having a display bandwidth in excess of 12 MHz;(d) Specialised components, accessories and parts.
1537	Electromagnetic waveguides and components therefor, as follows: <ul style="list-style-type: none">(a) Rigid and flexible waveguides and components designed for use at frequencies in excess of 12.5 GHz;(b) Waveguides having a bandwidth ratio greater than 1.5:1;(c) Waveguide components, as follows:<ul style="list-style-type: none">(1) directional couplers having a bandwidth ratio greater than 1.5:1 and directivity over the band of 15 decibels or more;(2) rotary joints capable of transmitting more than one isolated channel or having a bandwidth greater than 5% of the centre mean frequency;(3) magnetic including gyro-magnetic waveguide components.(d) Pressurized waveguides and specialised components therefor;(e) TEM mode devices using magnetic including gyro-magnetic properties;(f) TR and anti-TR tubes and components therefor, <u>except</u> those designed for use in waveguides operating at a peak power not exceeding 160 kW and at a frequency of 10.5 GHz or less which are in normal civil use for ground or marine radar.
1541	Cathode-ray tubes, as follows: <ul style="list-style-type: none">(a) with a resolving power of 500 lines or more per inch (20 lines per mm), using the shrinking raster method of measurement;(b) with writing speeds of more than 3,000 km/s;(c) alpha-numeric and similar display tubes in which a symbolmask within the tube can be scanned to display any of the symbols on any part of the phosphor.
1542	Cold cathode tubes and switches, as follows: <ul style="list-style-type: none">(a) Triggered spark-gaps, having an anode delay time of 15 microseconds or less and rated for a peak current of 3,000 amps or more; specially designed parts therefor, and equipment incorporating such devices;

LIST B - INDUSTRIAL LIST

Item No.	Description
1542 cont'd	<p>(b) Cold cathode tubes, whether gas-filled or not, operating in a manner similar to a spark-gap, containing three or more electrodes and having all of the following characteristics:</p> <ol style="list-style-type: none">(1) rated for an anode peak voltage of 2,500 volts or more;(2) rated for peak currents of 100 amps or more;(3) an anode delay time of 10 microseconds or less; and(4) an envelope diameter of less than 1 inch (25.4 mm). <p>NOTES: 1. Triggered spark-gaps are tubes with a structure consisting of two opposed anodes with shapes resembling flattened hemispheres, and with one or more triggering probes placed approximately in the centre of one anode. The structure is sealed and contains a mixture of gases, principally nitrogen, under less than atmospheric pressure.</p> <p>2. Sub-item (b) above covers gas "krytron" tubes, vacuum "krytron" tubes and similar tubes.</p>
1544	<p>Semi-conductor diodes and thyristors, except photodiodes (see Item 1548), as follows:</p> <ol style="list-style-type: none">(a) Diodes having a bulk material other than silicon, germanium, selenium or copper oxide;(b) Silicon and germanium diodes (including mixer, detector, frequency-changing and variable capacitance diodes, and diodes used for the direct conversion of DC to RF power), designed or rated for use at input or output frequencies greater than 300 MHz; <u>except:</u><ol style="list-style-type: none">(1) point-contact diodes designed for use at input frequencies not exceeding 1 GHz;(2) voltage-variable capacitance diodes designed for tuning and automatic frequency control in entertainment-type television and radio receivers, having all of the following characteristics:<ol style="list-style-type: none">(i) a rated power dissipation of less than 0.5 watt at 25°C;(ii) a series inductance higher than 3 nanoHenries;(iii) a typical figure of merit Q of less than 800 measured at a reverse voltage of 4 volts and a frequency of 50 MHz;(c) Silicon and germanium diodes having a rated maximum reverse recovery time of less than 30 nanoseconds. <p>NOTES: 1. When average reverse recovery time is quoted instead of maximum reverse recovery time, the maximum may be regarded as 2 times the average.</p>

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Item No.	Description
1544 cont'd	<p>NOTES: 2. When reverse recovery time is not quoted, diodes rated for a stored charge of 100 pico-coulombs or less shall be regarded as restricted by sub-item (c) above.</p> <p>3. Diodes constructed with a rectifying deposited metal semi-conductor junction or barrier, such as hot-carrier or Schottky-barrier diodes, will normally be considered under sub-item (c) above.</p> <p>(d) Tunnel diodes;</p> <p>(e) Thyristors having a rated turn-off time of less than 10 microseconds.</p>
1545	<p>Transistors and specialised parts therefor, except photo-transistors (see Item 1548), as follows:</p> <p>(a) Of any type using any semi-conductor material having 4 or more active junctions within any single block of semi-conductor material;</p> <p>(b) Of any type using a bulk semi-conductor material other than germanium or silicon;</p> <p>(c) Using germanium as the bulk semi-conductor material and having any of the following characteristics:</p> <ul style="list-style-type: none">(1) an average f_T of 40 to 240 MHz and designed to have a maximum collector dissipation greater than 150 mW;(2) an average f_T greater than 240 MHz; <p>(d) Using silicon as the bulk semi-conductor material and having any of the following characteristics:</p> <ul style="list-style-type: none">(1) an average f_T of up to 500 KHz and designed to have a maximum collector dissipation greater than 5 W;(2) an average f_T from over 500 KHz to 3 MHz and designed to have a maximum collector dissipation greater than 500 mW;(3) an average f_T from over 3 MHz to 20 MHz and designed to have a maximum collector dissipation greater than 250 mW;(4) an average f_T greater than 20 MHz;(5) majority carrier devices, including but not limited to field effect transistors and metal oxide semi-conductor transistors;(6) a modulus of the current gain in the common emitter configuration of 10 or more for collector currents of 100 micro-amperes or less.

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Item No.	Description
1546	Dendritic produced forms of any semi-conductor material, or combinations thereof, suitable for use in diodes or transistors. NOTE: The term "dendritic" signifies a ribbon-like product of semi-conductor material which may be drawn in various widths, thicknesses and lengths and which may represent processing stages from a relatively pure form of the material through advanced stages of treatment.
1548	Photo cells, as follows: (a) Photoelectric cells, photo-conductive cells (including photo-transistors and similar cells) with a peak sensitivity at a wavelength longer than 12,000 Angstrom units or shorter than 3,000 Angstrom units; (b) Photo-transistors (photo-conductive cells including photodiodes) with a response time constant of 1 millisecond or less measured at the operating temperature of the cell for which the time constant reaches a minimum. NOTES: 1. The time constant is defined as the time taken from the application of a light stimulus for the current increment to reach a value of $1-1/e$ times the final value (i. e., 63% of the final value). 2. The above restriction is not intended to apply to germanium photo devices with a peak sensitivity at a wavelength shorter than 17,500 Angstrom units.
1549	Photomultiplier tubes, as follows: (a) For which the maximum sensitivity occurs at wavelengths longer than 7,500 Angstrom units or shorter than 3,000 Angstrom units; or (b) Having an anode pulse rise time of less than 1 nanosecond.

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Item No.	Description
1550	Thermal detecting cells, i. e. , bolometers and thermocoupled detectors, radiant energy types only, with a response time constant of less than 10 milliseconds measured at the operating temperature of the cell for which the time constant reaches a minimum.
1553	Flash-discharge type X-ray systems, including tubes, <u>except</u> those systems or tubes having all of the following specifications: <ul style="list-style-type: none">(a) Peak power of 500 MW or less;(b) Output voltage of 500 kV or less;(c) Pulse width of 0.2 microsecond or more.
1555	Image intensifiers, image converters and specialised components, electronic storage tubes including memory transformers of radar pictures, and ruggedized vidicon-type tubes (<u>except</u> commercial standard television camera tubes and commercial standard X-ray amplifier tubes).
1556	Non-flexible fused fibre optic plates or bundles, having all the following characteristics: <ul style="list-style-type: none">(a) A. fibre pitch (centre-to-centre spacing) of less than 15 microns;(b) A light-absorbing medium surrounding each fibre, or interstitially placed between fibres;(c) A diameter greater than $\frac{1}{2}$ inch (13 mm).
1558	Valves (tubes) electronic, and specialised parts, as follows: <ul style="list-style-type: none">(a) (1) valves rated for continuous-wave operation above 1,000 MHz at the maximum rated anode dissipation;(2) valves rated for pulse operation above 300 MHz at the maximum rated anode dissipation;(3) valves rated for continuous-wave operation over the frequency range 300 to 1,000 MHz and for which, under any conditions of cooling, the product of the maximum rated anode dissipation (expressed in watts) and the square of the maximum frequency (expressed in MHz) at the maximum rated anode dissipation is greater than 10^8, or where applied to external anode tubes rated only without a radiator, and rated only for free air circulation, the product is greater than 5×10^6;

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Item No.

Description

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cont'd

- (a) (4) valves constructed with ceramic envelopes and rated for operation above 300 MHz.

NOTE: Sub-item (a) of the definition is not intended to restrict any single-ended glass envelope tube which has a standard 7-pin miniature or 9-pin Noval base and is in standard use in civilian electronic equipment.

- (b) Valves in which the velocity of the electrons is utilised as one of the functional parameters, including but not limited to klystrons, travelling wave tubes and magnetrons, except fixed frequency pulsed magnetrons designed to operate at frequencies in the range 9.3 to 9.5 GHz with a maximum peak power output exceeding 25 kW.
- (c) Indirectly heated valves of a kind that can be passed through a circular hole of 7.2 mm in diameter;
- (d) Valves designed to withstand an acceleration of short duration (shock) greater than 1,000 g;
- (e) Valves designed for operation in ambient temperatures exceeding 200°C;
- (f) Vacuum tubes specially designed for use as pulse modulators for radar or for similar applications, having a peak anode voltage rating of 100 kV or more; or rated for a peak pulse power of 2 MW or more.

(For TR and anti-TR tubes, see Item 1537(f)).

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Hydrogen thyratrons, as follows:

- (a) Rated for a peak pulse power output of 2 MW or more; or
- (b) Of metal-ceramic construction.

NOTE: A thyratron is any hot cathode gas-filled tube containing 3 or more electrodes in which anode current flow is initiated by a control electrode.

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Item No.	Description
1560	<p>Components and parts used as inductive and capacitive elements in electronic circuits, designed for and/or capable of reliable performance in relation to their electrical and mechanical characteristics and maintaining their design service lifetime while operating:</p> <ul style="list-style-type: none">(a) Over the whole range of ambient temperatures from below - 45°C to above +100°C; or(b) At ambient temperatures of 200°C or higher. <p>NOTE: Included in this definition are such item as capacitors, transformers, chokes, relays, etc.</p>
1561	<p>Materials specially designed and manufactured for use as absorbers of electromagnetic waves having frequencies greater than 2×10^8 Hz, and less than 3×10^{12} Hz.</p>
1562	<p>Tantalum and niobium electrolytic capacitors, as follows:</p> <ul style="list-style-type: none">(a) All types designed to operate permanently at temperatures exceeding 85°C;(b) Sintered electrolytic capacitors, <u>except</u> those having a casing made of epoxy resin or sealed with epoxy resin;(c) Electrolytic capacitors constructed with foils.

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Item No.	Description
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Other Electronic Apparatus and Precision Instruments

1564 Electronic components, as follows:

- (a) Assemblies and sub-assemblies constituting one or more functional circuits with a component density greater than 75 parts per cubic inch (4.575 parts per cubic cm);
- (b) Modular insulator panels (including wafers) mounting single or multiple electronic elements and specialised parts therefor;

NOTE: Circuit boards and panels which do not contain restricted components and which do not contravene the provisions of sub-item (a) above are not restricted by sub-item (b) unless they are constructed of insulating materials other than paper base phenolics, glass cloth melamine, glass cloth epoxy resin or of materials with an operating temperature range not exceeding that of the above-mentioned materials.

- (c) Integrated circuits, i.e., assemblies and sub-assemblies containing one or more functional circuits in which there are both components and interconnections formed by the diffusion or deposition of materials into or on a common substrate.

1565 Electronic computers and related equipment, as follows:

- (a) Analogue computers with one or more of the following characteristics:

(1) rated errors less than:

(i) summers, inverters and integrators:

- (a) static 0.02%
- (b) total at 1 KHz 0.15%

(ii) multipliers:

- (a) static 0.1%
- (b) total at 1 KHz 0.25%

(iii) fixed function generators: Log x and sine/cosine:
static 0.1%

- NOTES: 1. The percentage for sub-item (a)(1)(i)(a) applies to the actual output voltage; all other percentages apply to full scale, that is from maximum negative to maximum positive reference voltages.
2. Total errors at 1 KHz are to be measured with those resistors incorporated in the inverter, summer or integrator which provide the least error.

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- NOTES: 3. Total error measurements include all errors of the unit resulting from, for example, tolerances of resistors and capacitors, tolerances of input and output impedances of amplifiers, the effect of loading, the effects of phase shift, and the generating of functions.
- (2) more than 75 operational amplifiers;
 - (3) more than four integrator time scales switchable during one programme;
- (b) Analogue computers designed or modified for use in airborne vehicles, missiles or space vehicles and rated for continuous operation at temperatures from below - 45°C to above + 55°C; and equipment or systems incorporating such computers;
- (c) Other analogue computers capable of accepting, processing and putting out data in the form of one or more continuous variables and capable of incorporating a total of at least 20 summers, integrators, multipliers or function generators with facilities for readily varying the interconnection of these components;
- (d) Digital computers with one or more of the following characteristics:
- (1) the Central Processing Unit (CPU) implements floating point operations by hardware;
 - (2) the sum of either the "I/O bus rate" or the "total effective bit transfer rate", whichever is less, and the "CPU bus rate" exceeds 10.8 million bits per second;
 - (3) the internal memory has a total connected capacity (excluding parity, word marker and flag bits) of more than 0.8 million bits;
 - (4) the computer is equipped with peripheral memory devices as follows:
 - (i) more than 12;
 - (ii) the "total effective bit transfer rate" (excluding data channels not equipped with peripheral memory units) exceeds 0.7 million bits per second;
 - (iii) any magnetic tape transport with:
 - (a) more than 800 bits per inch per track;
 - (b) more than 75 inches (197 cm) per second tape speed;
 - (c) more than 9 tracks per $\frac{1}{2}$ inch (12.7 mm) tape width; or
 - (d) more than $\frac{1}{2}$ inch (12.7 mm) tape width.
 - (iv) for peripheral memory devices other than magnetic tape transports:
 - (a) total connected "net capacity" exceeds 3 million bits;
 - (b) "total number of accesses" exceeds 120 per second;

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Description

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Cont'd.

- (5) computers with cathode-ray tube displays as follows:
 - (i) used to display alpha-numeric and similar data or information, excluding those displays for which circuitry and character-generation devices external to the tube limit displays to alpha-numeric characters in fixed formats or to graphs composed only of the same basic elements as used for alpha-numeric character composition (this exclusion is limited to graphic displays for which the sequence of symbols and basic elements of symbols are fixed by the format and character generators in the unit and cannot be generated arbitrarily by the computer);
 - (ii) with light gun or other graphic input devices, excluding those which are parts of displays for which circuitry and character-generation devices external to the tube limit displays to alpha-numeric characters in fixed formats or to graphs composed only of the same basic elements as used for alpha-numeric character composition;
- (6) the computer is equipped with "terminal devices" located remote from the "computer operating area" as follows:
 - (i) the "total effective bit transfer rate" (excluding parity, word marker and flag bits) as limited by any communication channel exceeds 1,400 bits per second;
 - (ii) the "effective bit transfer rate" of any "terminal device" exceeds 1,200 bits per second;
- (7) the computer has interface equipment for which:
 - (i) the "effective bit transfer rate" of any interfaced "communication channel" exceeds 200 bits per second;
 - or
 - (ii) any interfaced "communication channel" is not dedicated full time to the given application.
- (e) Digital computers and digital differential analyzers (incremental computers) designed or modified for use in airborne vehicles, missiles or space vehicles and rated for continuous operation at temperatures from below - 45°C to above + 55°C; and equipment or systems incorporating such computers or analyzers;
- (f) Other digital computers operated by one or more common control units and capable of all of the following:
 - (1) accepting, storing, processing and producing an output in numerical or alphabetical form;
 - (2) storing more than 512 numerical and/or alphabetical characters or having an internal memory of more than 2,048 bits;
 - (3) performing a stored sequence of operations that are modifiable by means other than a physical change in circuitry; and
 - (4) selecting a sequence from a plurality of stored operations based upon data or an internally computed result;

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Description

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- (g) Computers capable of operating in both analogue and digital modes and related equipment as follows:
- (1) equipment whose analogue portion meets the conditions of sub-item (c) and whose digital portion meets the conditions of sub-item (f) and which also provides facilities for processing in the digital section numeric data from the analogue section and/or vice versa;
 - (2) equipment for interconnecting the analogue and digital portions of computers as defined in sub-item (g)(1);
 - (3) digital or analogue computers containing interconnecting equipment as defined in sub-item (g)(2);
- (h) Specialised parts, components, peripherals, sub-assemblies, accessories, and spare parts for the above, including those which are also described in Items 1572 and 1588.

NOTE: 1. Definitions of terms used above:

- (a) "CPU bus rate" is the number of bits excluding parity accessed in one memory cycle times the number of read-write cycles per second times the number of independent memories (including interleaved) which can be transferred simultaneously between the main memory and the CPU, as limited by any device normally placed between the main memory and the CPU. For systems with multiple CPUs, the "CPU bus rate" is the sum of the individual CPU bus rates as defined above that can be sustained simultaneously.
- (b) "I/O bus rate" is the number of bits excluding parity accessed in one memory cycle times the number of read-write cycles per second times the number of independent memories (including interleaved) which can be transferred simultaneously between the main memory and the I/O bus (or busses) as limited by any device normally placed between the main memory and the I/O bus, and which can be transferred simultaneously with the CPU bus rate.

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NOTE: 1. (c) "Total effective bit transfer rate" is the sum of the effective bit transfer rates of all peripheral memory units and data channels provided with the system, which can have simultaneous access to the I/O bus (or busses) as limited by the I/O control units provided with the system, assuming the configuration of peripheral units and data channels which would maximize this rate. The effective bit transfer rate (R_E) for magnetic tape transports and for data channels is the maximum bit transfer rate excluding parity. For static memory devices, it is the number of bits transferred per access excluding parity divided by the "average access time". For rotating memory devices it is the product of the maximum bit transfer rate excluding parity (R), the number of independent read-write channels (C), and the rotational period (T_R) divided by the sum of the rotational period (T_R) and the sum of the "minimum seek time" (T_{min}) and the "latency time" (T_L) divided by the number of independent seek mechanisms (S).

$$R_E = R \cdot C \frac{T_R}{T_{min} + T_L + \frac{T_R}{S}}$$

- (d) "Average access time" is the sum of the "average seek time" and the "latency time" divided by the number of independent seek means or mechanisms.
- (e) "Average seek time" for moving head and/or moving media devices is the sum of the "maximum seek time" and twice the "minimum seek time" divided by three. "Maximum seek time" is as rated for the particular device, e.g., for moving head devices the time to move between the two most widely separated tracks. "Minimum seek time" for moving head and/or moving media devices is as rated for the particular device, e.g., for moving head devices the time to move from one track to an adjacent track. "Seek time" for static or fixed head devices is zero.
- (f) "Latency time" for static memory devices is the cycle time of the device; "latency time" for rotating memory devices is the rotational period divided by twice the number of independent read-write heads per track.
- (g) "Net capacity" of a memory device is the total capacity designed to be accessible to the digital computing system excluding parity and error correction.

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Cont'd.

- NOTE: 1. (h) "Total number of accesses" is the sum of the number of accesses of all peripheral memory units provided with the system. The number of accesses to a memory device is the reciprocal of the "average access time".
- (i) "Terminal devices" are all peripheral devices excluding memory devices and special process control sensing and actuating equipments, capable of transmitting and/or receiving sequences of binary digits or alpha-numeric characters. Normal groupings of such equipments, e.g., combined paper tape reader/punch and printer, connected to a single data or communication channel, shall be considered as single devices;
- (j) The "computer operating area" is the immediate vicinity of the computer installation where the normal operating, support and service functions take place.
- (k) "Communication channels" are the transmission paths or circuits and the terminal transmitting and receiving equipments (Modems) for transferring digital information between distant locations.

1568

Equipment, as follows:

- (a) All classes of devices, regardless of other characteristics, identified in sub-items (b), (c), (d), (e), (f), (g) and (k) below, which are designed to operate below - 55°C or above + 125°C;
- (b) Synchros and resolvers (and special instruments rated to have the same characteristics as synchros and resolvers in (1) and (2) below, such as Microsyns, Synchro-Tels and Inductosyns), possessing any of the following characteristics:
- (1) a rated electrical error of 10 minutes or less or of 0.25% or less of maximum output voltage;
 - (2) a rated dynamic accuracy for receiver types of 1° or less, except that for units of size 30 (3 inches in diameter) or larger a rated dynamic accuracy of less than 1°;
 - (3) multi-speed from single shaft types;
 - (4) employing solid state Hall effect;
 - (5) designed for gimbal mounting;
- (c) Amplifiers, electronic or magnetic, specially designed for use with resolvers, the following:
- (1) isolation types having a variation of gain constant (linearity of gain) of 0.2% or better;
 - (2) summing types having a variation of gain constant (linearity of gain) or an accuracy of summation of 0.2% or better;
 - (3) employing solid state Hall effect;

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- (d) Induction potentiometers (including function generators and linear synchros), linear and non-linear, possessing any of the following characteristics:
- (1) a rated conformity of 0.5% or less, or of 18 minutes or less;
 - (2) employing solid state Hall effect;
 - (3) designed for gimbals mounting;
- (e) Induction rate (tachometer) generators, synchronous and asynchronous, as follows:
- (1) employing solid state Hall effect;
 - (2) with a housing diameter of 2 inches (50 mm) and smaller and a length (without shaft-ends) of 4 inches (100 mm) and smaller or with a diameter-to-length ratio greater than 2 : 1, having one or more of the following characteristics:
 - (i) with a rated linearity of 0.5% or less;
 - (ii) all temperature-compensated or temperature-corrected types;
- (f) Servo-motors (gear-head or plain) as follows:
- (1) designed to operate from power sources of more than 300 Hz ~~except~~ those designed to operate from power sources of over 300 Hz up to and not exceeding 400 Hz with a temperature range of from - 25°C to + 100°C;
 - (2) designed to have a torque-to-inertia ratio of 10,000 radians per second per second or greater;
 - (3) incorporating special features to secure internal damping;
 - (4) employing solid state Hall effect;
- (g) Potentiometers (and special instruments rated to have the same characteristics as potentiometers in (1) and (2) below, such as Vernistats), as follows:
- (1) linear potentiometers having a constant resolution and a rated linearity of 0.1% or less;
 - (2) non-linear potentiometers having a variable resolution and a rated conformity of:
 - (i) 1% or less when the resolution is inferior to that obtained with a linear potentiometer of the same type and of the same track length; or
 - (ii) 0.5% or less when the resolution is better than or equal to that obtained with a linear potentiometer of the same type and of the same track length;
 - (3) designed for gimbals mounting;

NOTE: This sub-item is not intended to cover potentiometers using only switched elements.

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Item No.	Description
1568 Cont'd.	<ul style="list-style-type: none">(h) Direct current and alternating current torquers, i. e., torque motors specially designed for gyros and stabilised platforms;(i) Electro-optical devices designed to monitor relative rotation of remote surfaces;(j) Synchronous motors, as follows:<ul style="list-style-type: none">(1) of size 30 (3 inches (76.2 mm) in diameter) and smaller and having synchronous speeds in excess of 3,600 rpm;(2) designed to operate from power sources of more than 400 Hz;(3) designed to operate below - 25°C or above + 100°C;(k) Analogue-to-digital and digital-to-analogue converters, as follows:<ul style="list-style-type: none">(1) electrical-input types possessing:<ul style="list-style-type: none">(i) a peak conversion rate capability in excess of 50,000 complete conversions per second;(ii) an accuracy in excess of 1 part in more than 10,000 of full scale; or(iii) a figure of merit of 10^7 or more (derived from the number of complete conversions per second divided by the accuracy);(2) mechanical input types (including but not limited to shaft-position encoders and linear displacement encoders, but excluding complex servo-follower systems), the following:<ul style="list-style-type: none">(i) rotary types having an accuracy or maximum incremental accuracy better than ± 1 part in 10,000 of full scale;(ii) linear displacement types having an accuracy better than ± 5 microns;(3) employing solid state Hall effect;(l) Semi-conductor Hall field probes, as follows:<ul style="list-style-type: none">(1) made of indium-arsenide-phosphide (In As P);(2) coated with ceramic or ferritic materials (e. g., special field probes such as tangential field probes, multipliers, modulators, recorder probes, etc.);(3) with an open circuit sensitivity greater than $\frac{0.12 \text{ V}}{A \times \text{kilogauss}} \quad (V = \text{Volt}, A = \text{Ampere});$ <p>NOTE: Open circuit sensitivity The slope of a straight line that passes through the point of origin and through the point $u_{20} : i_1$ at $B = B_n$ in the characteristic is defined as the open circuit sensitivity. u_{20} = Hall voltage, open circuit; i_1 = Control current; B_n = Rated value of applied magnetic control field.</p> <ul style="list-style-type: none">(m) Specially designed parts, components, sub-assemblies and test equipment (including adapters, couplers, etc.) for the above.

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Item No.	Description
1570	<p>Thermoelectric materials and devices, as follows:</p> <ul style="list-style-type: none"><li data-bbox="427 835 1532 898">(a) Thermoelectric materials with a maximum product of the figure of merit (Z) and the temperature (T in °K) in excess of 0.75;<li data-bbox="427 926 1557 989">(b) Junctions and combinations of junctions using any of the materials in (a) above;<li data-bbox="427 1016 1437 1079">(c) Heat absorbing and/or electrical power generating devices containing any of the junctions in (b) above;<li data-bbox="427 1106 1459 1190">(d) Other power generating devices which generate in excess of 10 watts per pound or of 500 watts per cubic foot of the device's basic thermoelectric components;<li data-bbox="427 1218 1420 1281">(e) Specialised parts, components and sub-assemblies for the above devices. <p>NOTES: 1. The figure of merit (Z) equals Seebeck coefficient squared divided by the product of electrical resistivity and thermal conductivity.</p> <p>2. The weight and cubic measurements in (d) above are not intended to encompass the complete device but to include only the thermoelectric elements and assembly and the components for pumping calories. Other components, such as heating and/or cooling sources or containers, device frames or stands and control equipment are not to be included in the calculations.</p>

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Item No.	Description
1571	Magnetometers having any of the following characteristics, and specialised parts therefor: <ul style="list-style-type: none"><li data-bbox="427 999 1256 1031">(a) A sensitivity below 1.0 gamma (10^{-5} oersteds);<li data-bbox="427 1058 1234 1089">(b) A response time of less than 2 microseconds;<li data-bbox="427 1117 1003 1148">(c) Fluxgate or paramagnetic types. <p data-bbox="427 1173 1541 1293">NOTE: The term "paramagnetic" as used above refers to the sensing of changes in magnetic field strength by measurement of the effects of such changes in the electron spin phenomena.</p>
1572	Recording and/or reproducing equipment, as follows (for equipment which may be exported in conjunction with computer shipments see Item 1565): <ul style="list-style-type: none"><li data-bbox="440 1461 1499 1524">(a) Using magnetic techniques, <u>except</u> those specifically designed for voice or music;

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Item No.	Description
1572 Cont'd	<p>(b) Using electron beam(s) operating in a vacuum, and/or laser-produced light beams (see also sub-item 1521(e)) that produce patterns or images directly on the recording surface, and specialised equipment for image development;</p> <p>(c) Graphic instruments capable of continuous direct recording of sinusoidal waves at frequencies exceeding 20 KHz;</p> <p>(d) Specialised parts, components and recording media for the above.</p> <p>NOTE: The term "recording media" in sub-item (d) above is intended to include all types and forms of specialised recording media used in such recording techniques, including but not limited to tapes, drums, discs and matrices, <u>except</u> magnetic cards, checks and similar discrete non-rigid magnetic media other than tape.</p>
1576	<p>Centrifugal testing apparatus or equipment possessing any of the following characteristics:</p> <p>(a) Driven by a motor or motors having a total rated horsepower greater than 400 hp;</p> <p>(b) Capable of carrying a payload of 250 lb (113 kg) or more;</p> <p>(c) Capable of exerting a centrifugal acceleration of 8 or more "g" on a payload of 200 lb (90.7 kg) or more.</p>
1579	<p>Ion microscopes having a resolving power better than 10 Angstrom units.</p>

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Item No.	Description
1584	<p>Oscilloscopes and specialised parts therefor, as follows:</p> <ul style="list-style-type: none">(a) Cathode ray oscilloscopes possessing any of the following characteristics:<ul style="list-style-type: none">(1) an amplifier bandwidth greater than 30 MHz (defined as the band of frequencies over which the deflection on the cathode ray tube does not fall below 70.7% of that at maximum point measured with a constant input voltage to the amplifier);(2) containing or designed for the use of:<ul style="list-style-type: none">(i) cathode ray memory tubes;(ii) cathode ray tubes with travelling wave or distributed deflection structure or incorporating other techniques to minimize mismatch of fast phenomena signals to the deflection structure;(3) ruggedized to meet a military specification;(4) rated for operation over an ambient temperature range of from below -25°C to above $+55^{\circ}\text{C}$;(5) a rise time of less than 12 nanoseconds;(b) Oscilloscope plug-in units and external amplifiers and pre-amplifiers which have a bandwidth greater than that defined in sub-item (a)(1) above;(c) Electronic devices for stroboscopic analysis of a signal (i.e., sampling devices), whether sub-assemblies or separate units, designed to be used in conjunction with an oscilloscope to permit the analysis of recurring phenomena; and which increase the capabilities of an oscilloscope to permit measurements within the limits of equipment controlled by sub-item (a)(1) above.
1585	<p>Photographic equipment, as follows:</p> <ul style="list-style-type: none">(a) High speed cinema recording cameras, as follows:<ul style="list-style-type: none">(1) cameras in which the film is continuously advanced throughout the recording period, and which are capable of recording at rates exceeding 3,000 frames per second for the full framing height of standard 35 mm wide photographic film or proportionately higher rates for lesser frame heights, or proportionately lower rates for greater frame heights;

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Item No.	Description
1585 Cont'd	<p>(2) cameras in which the film moves intermittently during the recording period, being automatically locked in place for each frame, and which are capable of recording at the following rates:</p> <ul style="list-style-type: none">(i) exceeding 250 frames per second for 16 mm film;(ii) exceeding 130 frames per second for 35 mm film;(iii) exceeding 50 frames per second for 70 mm film at full frame heights; <p>(b) High speed cameras in which the film does not move, and which are capable of recording at rates exceeding 250,000 frames per second for the full framing height of standard 35 mm wide photographic film, or proportionately higher rates for lesser frame heights, or proportionately lower rates for greater frame heights;</p> <p>(c) Cameras incorporating image converters and specially designed controls, parts and accessories therefor;</p> <p>(d) Photographic systems specially designed for use in space vehicles;</p> <p>(e) Streak cameras having writing speeds of 8 mm/microsecond and above capable of recording events which are not initiated by the camera mechanism;</p> <p>NOTE: Streak cameras are cameras designed to record the intensity of a light source as a function of time by moving the image of the source along the film in a single direction.</p> <p>(f) Cameras having shutter speeds of less than 1 microsecond per operation, and specialised parts and accessories therefor;</p> <p>(g) High speed film, as follows: (1) having an intensity dynamic range of 1,000,000:1 or more; or (2) having a speed of ASA 10,000 (or its equivalent) or better;</p> <p>(h) High speed plates having an intensity dynamic range of 1,000,000:1 or more.</p>

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Item No.	Description
1587	<p>Quartz crystals and assemblies thereof in any stage of fabrication (i. e., worked, semi-finished or mounted), as follows:</p> <ul style="list-style-type: none">(a) For use as filter elements:<ul style="list-style-type: none">(1) specially designed crystals; or(2) assemblies of crystals;(b) For use as oscillator elements:<ul style="list-style-type: none">(1) designed for operation over a temperature range wider than 180°F (100°C) whose upper limit is above 185°F (85°C);(2) designed for a frequency stability of plus or minus 0.003% or better over the rated temperature range;(3) mounted in metal holders sealed with thermocompression welding; or(4) capable, when mounted, of being passed through a circular hole with a diameter of 0.42 in. (10.7 mm).
1588	<p>Materials composed of crystals having spinel, hexagonal or garnet crystal structures; thin film devices; assemblies of the foregoing; and devices containing them, as follows (for equipment which may be exported in conjunction with computer shipments, see Item 1565):</p> <ul style="list-style-type: none">(a) Monocrystals of ferrites and garnets, synthetic only;(b) Single aperture forms possessing any of the following characteristics:<ul style="list-style-type: none">(1) switching speed of 0.5 microsecond or faster at the minimum field strength required for switching at 104°F (40°C);(2) a maximum dimension less than 45 mils (1.14 mm);(c) Multi-aperture forms with fewer than 10 apertures possessing any of the following characteristics:<ul style="list-style-type: none">(1) switching speed of 1 microsecond or faster at the minimum field strength required for switching at 104°F (40°C);(2) a maximum dimension less than 100 mils (2.54 mm);(d) Multi-aperture forms having 10 or more apertures;(e) Thin film memory storage or switching devices;(f) Electrical filters in which the coupling element makes use of the electromechanical properties of ferrites;(g) Materials suitable for application in electromagnetic devices making use of the gyromagnetic resonance phenomenon.

LIST B - INDUSTRIAL LIST

Item No.	Description
1595	Gravity meters (gravimeters) and specialised parts therefor, designed or modified for airborne or marine use.

METALS, MINERALS AND THEIR MANUFACTURES

Metal and Mineral Manufactures

- 1601 Anti-friction bearings, as follows:
- (a) All ball and cylindrical roller bearings having an inner bore diameter of 10 mm or less and tolerances of ABEC 5, RBEC 5 (or national equivalents) or better and either or both of the following characteristics:
 - (1) made of special materials, i.e., with rings, balls or rollers made from any steel alloy or other material except the following:
low-carbon steel; SAE-52100 high carbon chromium steel; SAE-4615 nickel molybdenum steel; or national equivalents (partial illustrative examples of special materials for this purpose are: high speed tool steels; stainless steels; monels; beryllium);
 - (2) manufactured for use at normal operating temperatures over 150°C (302°F) either by use of special materials or by special heat treatment;

 - (b) All ball and cylindrical roller bearings (exclusive of separable ball bearings and thrust ball bearings), having an inner bore diameter exceeding 10 mm and having tolerances of ABEC 7, RBEC 7 (or national equivalents) or better and either or both of the following characteristics:
 - (1) made of special materials, i.e., with rings, balls, or rollers made from any steel alloy or other material except the following:
low-carbon steel; SAE-52100 high carbon chromium steel; SAE-4615 nickel molybdenum steel; or national equivalents (partial illustrative examples of special materials for this purpose are: high speed tool steels; stainless steels; monels; beryllium);
 - (2) manufactured for use at normal operating temperatures over 150°C (302°F) either by use of special materials or by special heat treatment;

 - (c) Bearing parts, as follows:
Outer rings, inner rings, retainers, balls, rollers and sub-assemblies useable only for bearings covered by sub-items (a) and (b).

LIST B - INDUSTRIAL LIST

Item No.	Description
<u>Basic Metals and Mill Products</u>	
(Note: See also "Chemicals" for some metal compounds)	
1631	Magnetic metals of all types and of whatever form, possession one or more of the following characteristics: <ul style="list-style-type: none">(a) Grain oriented sheet or strip of a thickness of 0.004 in. (0.1 mm) or less;(b) Initial permeability 70,000 gauss-oersteds (0.0875 Henry/m) or over;(c) Remanence 98.5% or over of maximum flux for materials having magnetic permeability;(d) A composition capable of an energy product:<ul style="list-style-type: none">(1) exceeding 8 times 10^6 gauss-oersteds (63,700 joules/cu. m.); or(2) 4.85 times 10^6 gauss-oersteds (38,600 joules/cu. m.) or greater and having a coercive force of 1,800 oersteds (143,200 amperes/m) or greater.
1635	Iron and steels, alloyed as follows: <ul style="list-style-type: none">(a) Containing 10% or more molybdenum (but more than 5% molybdenum in any alloys containing more than 14% chromium); or(b) Containing 1.5% or more niobium and/or tantalum;(c) Nickel bearing stabilised steels, n.e.s., having a total of 38% or more of alloying elements <u>except</u> such steels containing less than 0.4% titanium or less than 0.8% niobium-tantalum;(d) Precipitation hardening steels containing 4% or more nickel.
1648	Cobalt based alloys (i.e., containing a higher percentage by weight of cobalt than of any other element), containing 5% or more of tantalum.
4648	Cobalt bearing alloys (other than those covered by Items 1631, 1635 and 1648) and scrap forms thereof, containing: <ul style="list-style-type: none">(a) 50% or more cobalt; or(b) 19% or more cobalt and 14% or more chromium.

LIST B - INDUSTRIAL LIST

Item No.	Description
1649	Niobium (columbium), as follows: <ul style="list-style-type: none"><li data-bbox="435 825 1538 884">(a) Metal and niobium-based alloys containing 50% or more niobium or 60% or more niobium-tantalum in combination;<li data-bbox="435 915 1494 947">(b) Scrap forms of the metal and alloys covered under (a) above.
1654	Magnesium base alloys containing 0.4% or more of zirconium, or 1% or more of rare earth metals (cerium mischmetal), and scrap forms thereof.
1658	Molybdenum metal with a purity of more than 99.5%, and alloys containing 95% or more of molybdenum, <u>except</u> molybdenum metal wire or molybdenum alloy wire.
1661	Nickel based alloys (i. e., containing a higher percentage by weight of nickel than of any other element), containing more than 1% thorium oxide.
4661	Nickel alloys, as follows: <ul style="list-style-type: none"><li data-bbox="435 1493 1538 1598">(a) Nickel-chromium alloys containing at least 35% nickel, at least 12% chromium and at least 1.5% total titanium plus aluminium plus columbium, either separately or combined;<li data-bbox="435 1619 1468 1661">(b) Nickel-based alloys other than those covered by Item 1661.

LIST B - INDUSTRIAL LIST

Item No.	Description
1668	<p>Tungsten metal, as follows:</p> <ul style="list-style-type: none"><li data-bbox="444 753 1477 821">(a) Pressed-sintered crude and semi-fabricated forms weighing more than 20 pounds (9 kg), <u>except</u> wire and sheet;<li data-bbox="444 842 1506 936">(b) Pressed-sintered porous crude and semi-fabricated forms weighing more than 15 pounds (6.8 kg) before infiltration, or more than 20 pounds (9 kg) after infiltration. <p>NOTE: Sub-item (b) above includes porous forms partially or wholly infiltrated with other metals such as copper, magnesium, silver, tin and/or zinc. Forms shall be regarded as porous if their density prior to infiltration is between 13.5 and 16.4 grs/cc. The term "infiltrated tungsten" does not include tungsten alloys.</p> <p>(For tungsten-based alloys containing uranium, plutonium and/or thorium, see Item 1 in the Atomic Energy List).</p>
1670	<p>Tantalum, as follows:</p> <ul style="list-style-type: none"><li data-bbox="460 1335 1477 1402">(a) Metal and tantalum-based alloys containing 60% or more of tantalum;<li data-bbox="460 1423 1454 1482">(b) Scrap forms of the metal and alloys covered by sub-item (a) above.
1671	<p>Titanium, as follows:</p> <ul style="list-style-type: none"><li data-bbox="460 1598 1430 1665">(a) Metal and titanium-based alloys containing 70% or more titanium;<li data-bbox="460 1686 1524 1730">(b) Scrap forms of the metal and alloys covered under (a) above.

LIST B - INDUSTRIAL LIST

Item No.	Description
1673	Artificial graphite having an apparent relative density of 1.90 or greater when compared with water at 60°F (15.5°C). (See also Item 34 in the Atomic Energy List). NOTES: 1. Since artificial graphite as defined above may sometimes be coated or composited with other elements or compounds to improve its performance at elevated temperatures, or to reduce its permeability to gases, artificial graphite treated in this way is to be regarded as included in the definition. This definition does not, however, apply to artificial graphite which has been impregnated or composited with inorganic materials for the purpose of improving only its electrical conductivity, its mechanical resistance or its mechanical friction properties. 2. This definition is not intended to include electrical resistors, artificial loads for microwave applications, cable waveguide terminations, brush stock, special joints for electrodes, boats and crucibles.
CHEMICALS, METALLOIDS AND PETROLEUM PRODUCTS	
(See also "Metals, Minerals and their Manufactures" for some metal chemical compounds).	
CHEMICALS AND METALLOIDS	
1701	Lead azide, sodium azide and primary explosives or priming compositions (mixtures) containing azides and/or azide compounds or complexes (for example, ortho-fluorophenyl azide, silver chlorazide, cuprammonium azide).
4701	Lead dinitroresorcinate, barium styphnate, mercury fulminate, lead styphnate, lead thiocyanate, tetrazene and diazodinitrophenol; primary explosives or priming compositions (mixtures) containing one or more of these chemicals.

LIST B - INDUSTRIAL LIST

Item No.	Description
1702	<p>Hydraulic fluids which are or which contain as the principal ingredients petroleum (mineral) oils and which have all of the following characteristics:</p> <ul style="list-style-type: none">(a) A pour point of -30°F (-34°C) or lower;(b) A viscosity index of 75 or greater; and(c) Are thermally stable at $+700^{\circ}\text{F}$ ($+371^{\circ}\text{C}$).
1715	<p>Boron, as follows:</p> <ul style="list-style-type: none">(a) Boron element, boron compounds and mixtures in which the boron-10 isotope comprises more than 20% of the total boron content;(b) Boron element (metal) all forms;(c) Boron compounds and mixtures (<u>except</u> pharmaceutical specialities packaged for retail sale) as follows:<ul style="list-style-type: none">(1) boron trifluoride and its complexes;(2) boron carbide having a boron content of 74% or more by weight, boron hydrides and boron nitrides;(3) alloys, compounds and mixtures containing 5% or more of boron, free or combined, but excluding:<ul style="list-style-type: none">(i) boron minerals, crude or refined;(ii) boric oxides;(iii) boric acids, boric acid esters, inorganic borates and perborates;(iv) boron trichloride and its complexes;(v) fluoroboric acids and fluoroborates;(vi) enamel and glass-making compositions or mixtures;(vii) ferro-boron.
4715	Boron trichloride and its complexes.

LIST B - INDUSTRIAL LIST

Item No.	Description
1721	Diethylene triamine of a purity of 96% or higher.
1746	Polymeric substances and manufactures thereof, as follows: <ul style="list-style-type: none"><li data-bbox="430 842 683 877">(a) Polyimides;<li data-bbox="430 898 817 934">(b) Polybenzimidazoles;<li data-bbox="430 955 869 991">(c) Polyimidazopyrrolones;<li data-bbox="430 1012 847 1047">(d) Aromatic polyamides;<li data-bbox="430 1068 795 1104">(e) Polyparaxylenes.
NOTE:	This item does not restrict manufactured articles where the value of the polymeric component together with materials restricted by other items is less than 50% of the total value of the materials used.
1754	Fluoro carbon compounds and manufactures, as follows: <ul style="list-style-type: none"><li data-bbox="430 1367 1390 1402">(a) Monomers, homopolymers and co-polymers as follows:<ul style="list-style-type: none"><li data-bbox="499 1402 927 1438">(1) polytetrafluoroethylene;<li data-bbox="499 1438 1489 1474">(2) oily and waxy modifications of polychlorotrifluoroethylene;<li data-bbox="499 1474 909 1509">(3) polyvinylidene fluoride;<li data-bbox="499 1509 1494 1545">(4) co-polymer of tetrafluoroethylene and hexafluoropropylene;

LIST B - INDUSTRIAL LIST

Item No.	Description
1754 Cont'd	<ul style="list-style-type: none">(a) (5) co-polymer of tetrafluoroethylene and chlorotrifluoroethylene;(6) co-polymer of chlorotrifluoroethylene and vinylidene fluoride;(7) co-polymer of hexafluoropropylene and vinylidene fluoride;(8) polybromotrifluoroethylene;(9) co-polymer of bromotrifluoroethylene and chlorotrifluoroethylene;(10) dibromotetrafluoroethane; <p>(b) Manufactures made wholly of the materials in (a) above;</p> <p>(c) Electric wire and cable coated with or insulated with any of the materials in (a) above.</p>
1755	<p>Silicone fluids and greases, as follows:</p> <ul style="list-style-type: none">(a) Fluorinated silicone fluids and chlorinated silicone fluids;(b) Silicone lubricating greases capable of operating at temperatures of 356^oF (180^oC) or higher and having a drop point (method of test being ASTM or ITP) of 428^oF (220^oC) or higher.
1757	<p>Compounds and metallic materials, as follows:</p> <ul style="list-style-type: none">(a) Silicon of a purity of 99.99% or more, and all monocrystalline silicon;(b) Monocrystalline gallium compounds in any form;(c) Monocrystalline indium compounds in any form. <p>NOTE: Sub-items (b) and (c) above shall not be regarded as including electronic grades of monocrystalline materials, containing less than 1% of either gallium or indium.</p>
1760	<p>Compounds of tantalum, niobium (columbium), and tantalum-niobium, excluding compounds containing less than 20% of tantalum or niobium.</p>

LIST B - INDUSTRIAL LIST

Item No.	Description
1762	Aluminium hydride.
1763	Fibrous and filamentary materials which may be used in composite structures or laminates and manufactures thereof, as follows: <ul style="list-style-type: none"><li data-bbox="427 821 1295 909">(a) Having both of the following characteristics:<ul style="list-style-type: none"><li data-bbox="482 846 1225 873">(1) specific modulus greater than 1.25×10^8;<li data-bbox="482 877 1295 905">(2) specific tensile strength greater than 3×10^6;<li data-bbox="427 936 1503 1108">(b) Having both of the following characteristics:<ul style="list-style-type: none"><li data-bbox="482 961 1173 989">(1) specific modulus greater than 1×10^8;<li data-bbox="482 993 1503 1108">(2) melting or sublimation point higher than $3,000^{\circ}\text{F}$ ($1,649^{\circ}\text{C}$) in an inert environment, <u>except</u> carbon fibres having a specific modulus of less than 2×10^8 and a specific tensile strength of less than 1×10^6;<li data-bbox="427 1140 1486 1228">(c) Composite structures and laminates fabricated, by using equipment restricted by Item 1357, from materials restricted by sub-items (a) and (b) above.
NOTES: 1. The term "fibrous and filamentary materials" includes: <ul style="list-style-type: none"><li data-bbox="647 1287 1121 1314">(a) continuous monofilaments;<li data-bbox="647 1318 1182 1346">(b) continuous yarns and rovings;<li data-bbox="647 1350 1338 1377">(c) tapes, woven fabrics and random mats;<li data-bbox="647 1381 1477 1430">(d) chopped fibres, staple fibres and coherent fibre blankets;<li data-bbox="647 1434 1451 1482">(e) whiskers, either monocrystalline or polycrystalline, of any length. 2. "Specific modulus" is Young's modulus in lb / sq. in. (measured at a temperature of $73.4^{\circ}\text{F} \pm 3.6^{\circ}\text{F}$ ($23^{\circ}\text{C} \pm 2^{\circ}\text{C}$) and a relative humidity of $50\% \pm 5\%$) divided by density in lb / cu. in.3. "Specific tensile strength" is ultimate tensile strength in lb / sq. in. (measured at a temperature of $73.4^{\circ}\text{F} \pm 3.6^{\circ}\text{F}$ ($23^{\circ}\text{C} \pm 2^{\circ}\text{C}$) and a relative humidity of $50\% \pm 5\%$) divided by density in lb / cu. in.	

LIST B - INDUSTRIAL LIST

Item No.	Description
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PETROLEUM PRODUCTS

Crude; Fuel; Lubricants

1770 Any liquid fuel, including petroleum products, having a gross calorific value of not less than 13,000 calories/grammes (23,400BTU/lb) which contains high energy components or compounds.

1781 Synthetic lubricating oils and greases which contain as the principal ingredient:

- (a) Esters of saturated aliphatic monohydric alcohols containing more than six carbon atoms with adipic or azelaic or sebacic acids;
- (b) Esters of trimethylol propane or trimethylol ethane or pentaerythritol with saturated monobasic acids containing more than six carbon atoms;
- (c) All fluoro-alcohol esters and perfluoro-alkyl ethers;
- (d) All polyphenyl ethers containing more than 3 phenyl groups.

NOTES: 1. Excepted from parts (a)-(c) above are:
Those oils and greases containing by weight either not less than 50% of neutral castor oil; or not less than 5% of neutral castor oil and not less than 50% of castor oil and petroleum oil together.

RUBBER AND RUBBER PRODUCTS

1801 Synthetic rubber, as follows:

- (a) Alkyl polysulphide liquid polymers having a molecular weight of 1,200 or less and a viscosity of 2,000 centipoises or less;

NOTE: The definition is intended to catch polymers which are in themselves liquid. Water dispersions, otherwise called latices, are not covered.

LIST B - INDUSTRIAL LIST

Item No.

Description

1801
Cont'd

- (b) Fluorinated silicone rubber and other fluorinated elastomeric material and such organic intermediates for their production as contain 10% or more of combined fluorine.
- (c) Polymeric products of butadiene, as follows:
 - (1) carboxyl terminated polybutadiene; hydroxyl terminated polybutadiene; thiol terminated polybutadiene; and cyclised 1,2-polybutadiene;
 - (2) mouldable copolymers of butadiene and acrylic acid;
 - (3) mouldable terpolymers of butadiene, acrylonitrile and acrylic acid or any of the homologues of acrylic acid.
- (d) Carboxyl terminated polyisoprene and polyisobutylene.

MISCELLANEOUS

1920

Synthetic film for dielectric use, of thickness not exceeding 0.001 inch (0.0254 mm), capable of being used for the manufacture of capacitors restricted by Item 1560, except:

- (a) Unmetallized polypropylene film; and
- (b) Untensilized and unmetallized polyethylene terephthalate film, of thickness not less than 0.00035 inch (0.009 mm).

(LIST C - ATOMIC ENERGY LIST follows)

LIST C - ATOMIC ENERGY LIST

Item No.	Description
1	Source (fertile) and fissionable materials, including but not limited to the following eight items: <ul style="list-style-type: none"><li data-bbox="423 596 1529 779">(a) Minerals, raw and treated (including residues and tailings) which contain either uranium or thorium or any combination thereof, exceeding 0.05% by weight, as follows:<ul style="list-style-type: none"><li data-bbox="480 684 1277 716">(1) ores containing uranium including pitchblende;<li data-bbox="480 716 1013 747">(2) monazite and monazite sands;<li data-bbox="480 747 1355 779">(3) ores containing thorium including urano-thorianite;<li data-bbox="423 800 1459 894">(b) Natural uranium, unwrought or wrought, including alloys and compounds of natural uranium, having an uranium content exceeding 0.05%, <u>except</u> medicinals;<li data-bbox="423 915 1433 978">(c) Uranium 233, alloys containing uranium 233 and compounds of uranium 233;<li data-bbox="423 999 1520 1094">(d) Uranium enriched in the isotope 235, alloys containing uranium enriched in the isotope 235, and compounds of uranium enriched in the isotope 235;<li data-bbox="423 1115 1121 1146">(e) Irradiated uranium containing plutonium;<li data-bbox="423 1167 1512 1241">(f) Plutonium, alloys containing plutonium and compounds containing plutonium;<li data-bbox="423 1262 1529 1356">(g) Thorium, unwrought or wrought, and alloys and compounds containing thorium, <u>excluding</u> alloys containing less than 1.5% of thorium by weight, and <u>except</u> medicinals;<li data-bbox="423 1377 1164 1409">(h) Irradiated thorium containing uranium 233.
5	Deuterium and production equipment therefor, as follows: <ul style="list-style-type: none"><li data-bbox="423 1524 1503 1650">(a) Deuterium and compounds, mixtures and solutions containing deuterium, <u>including heavy water and heavy paraffins</u>, in which the ratio of deuterium atoms to hydrogen atoms exceeds 1 : 5,000 by number;<li data-bbox="423 1671 1486 1734">(b) Plant and equipment specially designed for the production and/or concentration of deuterium oxide.
8	Zirconium metal, alloys containing more than 50% zirconium by weight, and compounds, in which the ratio of hafnium content to zirconium content is less than one part to five hundred parts by weight; and manufactures wholly thereof.

LIST C - ATOMIC ENERGY LIST

Item No.	Description
11	Nickel, as follows: <ul style="list-style-type: none">(a) Powder with a nickel content of 99% or more, and a particle size of less than 100 microns;(b) Porous metal with a mean pore size of 25 microns or less, and a nickel purity content of 99% or more, <u>except</u> single porous nickel metal sheets not exceeding 144 square inches (930 cm²) in size, intended for use in batteries with civil applications. <p>(See also Item 4661 List A-of Industrial List)</p> <p>NOTE: Sub-item (b) above refers to porous nickel metal manufactured from nickel powder, defined in sub-item (a) above, which has been compacted and sintered to form a metal material with fine pores interconnected throughout the structure.</p>
12	Beryllium metal and manufactures wholly thereof, <u>except</u> beryllium windows for medical X-ray machines; alloys containing more than 50% of beryllium by weight; oxides and other compounds.
14.	Flourine
15	Chlorine trifluoride
17.	Fluorinated hydrocarbons, as follows: <ul style="list-style-type: none">(a) Trichlorotrifluoroethane;(b) Dichlorotetrafluoroethane.
18.	Equipment specifically designed for the separation of isotopes of uranium and/or lithium.
19	Machines, materials or equipment specially designed for use in the processing of irradiated nuclear materials in order to isolate or recover fissionable materials, such as nuclear reactor fuel chopping machines, countercurrent solvent extractors, and specially designed parts and accessories therefor.

LIST C - ATOMIC ENERGY LIST

Item No.	Description
22	Mass spectrographs and spectrometers, as follows: <ul style="list-style-type: none">(a) All multi-focus types (including double focus, tandem and cycloidal);(b) Single focus types possessing a radius of curvature of 5" (inches) or more;(c) Specialized assemblies, specialized components, and specialized parts for the above.
23	Plant specially designed for the production of uranium hexafluoride (UF ₆).
24	Particle accelerators capable of imparting energies of 500,000 electron volts or more, rated for a peak beam power of 500 MW or more, and specialized parts and accessories therefor.
27	Valves, 3 cm or greater in diameter, with bellows seal, wholly made of or lined with aluminium, nickel, or alloy containing 60% or more nickel, either manually or automatically operated, and with other than metal to metal seats.
29	Gas centrifuges capable of the enrichment or separation of isotopes.
30	Blowers and compressors (turbo, centrifugal, and axial flow types) wholly made of or lined with aluminium, nickel, or alloy containing 60% or more nickel, and having a capacity of 60 cubic feet per minute (1,700 litres per minute) or greater.
31	Electrolytic cells for the production of fluorine with a production capacity greater than 250 grammes of fluorine per hour.
33	Heat exchangers suitable for use in gaseous diffusion plants, i.e., heat exchangers made of aluminium, copper, nickel, or alloys containing more than 60% nickel, or combinations of these metals as clad tubes, designed to operate at sub-atmospheric pressure, with a leak rate of less than 10 ⁻⁴ atmospheres per hour under a pressure differential of 1 atmosphere.
34	Artificial graphite having a boron content of less than, or equal to, 1 part for a million, the total thermal neutron absorption cross section being less than, or equal to, 5 millibarns per atom. (See also Item 1673 of List B - Industrial List)

LIST C - ATOMIC ENERGY LIST

Item No.	Description
35	<p>Lithium, as follows:</p> <ul style="list-style-type: none"> (a) Metal; (b) Hydrides, in which lithium, whether normal, depleted or enriched in the 6 isotope, is compounded with hydrogen or its isotopes or complexed with other metals or aluminium hydride; (c) Alloys, as follows: <ul style="list-style-type: none"> (1) magnesium-based alloys containing 10% or more lithium; (2) containing 50% or more of lithium either normal or depleted in the 6 isotope; or (3) containing any quantity of lithium enriched in the 6 isotope; or (d) Any other material containing lithium enriched in the 6 isotope, including compounds, mixtures, and concentrates.
36	<p>Nuclear reactors, i. e., reactors capable of operation so as to maintain a controlled, self-sustaining fission chain reaction; major components designed or intended for use in a nuclear reactor such as reactor vessels, core support structures, coolant pumps, fuel element handling equipment, heat exchangers and control rod drive mechanisms; and power generating and/or propulsion equipment, n. e. s., specially designed for use with nuclear reactors.</p>
37	<p>Hafnium metal, and alloys and compounds of hafnium containing more than 15% hafnium by weight.</p>
38	<p>Calcium containing both less than one hundredth (0.01) per cent by weight of impurities other than magnesium and less than 10 parts per million of boron.</p>
39	<p>Tritium, its compounds and their mixtures in which the ratio of tritium to hydrogen by atoms exceeds one part in 1,000.</p> <p>NOTE: The only compounds and mixtures of tritium excluded from coverage under the foregoing definition are those where the separation of the tritium from its compounds cannot result in the evaluation of an isotopic mixture of hydrogen in which the ratio of tritium to hydrogen by atoms exceeds one part in 1,000.</p>
40	<p>Neutron generator tubes designed for operation without an external vacuum system, and utilizing electrostatic acceleration to induce a tritium-deuterium nuclear reaction.</p>
41.	<p>Process control instrumentation specially designed or modified for monitoring or controlling the processing of irradiated fissionable or fertile materials or irradiated lithium.</p>