

---

Sensitive List

---

**THE SENSITIVE LIST OF DUAL-USE GOODS AND TECHNOLOGIES**

N.B. Where abbreviated entries are used, see the List of Dual-Use Goods and Technologies for full details. Text that differs from that in the List of Dual-Use Goods and Technologies is shaded.

Category 1

- 1.A.2. "Composite" structures or laminates...
- 1.C.1. Materials specially designed for use as absorbers of electromagnetic waves...
- 1.C.7.c. & 1.C.7.d. Ceramic-ceramic "composite" materials...
- 1.C.10.c. & 1.C.10.d. "Fibrous or filamentary materials"...
- 1.C.12. Materials as follows...
- 1.D. 2 "Software" for the "development" of organic "matrix", metal "matrix" or carbon "matrix" laminates or "composites" specified by this List.
- 1.E.1. "Technology" according to the General Technology Note for the "development" or "production" of equipment and materials specified by 1.A.2. or 1.C. of this List.
- 1.E. 2.e. & 1.E.2.f. Other "technology"...

Category 2

- 2.B.1.a. Not used since 2002
- 2.B.1.b. Not used since 2002
- 2.B.1.d. Not used since 2002
- 2.B.1.f. Not used since 2002
- 2.B.3. Not used since 2002
- 2.D.1. "Software", other than that specified by 2.D.2., specially designed for the "development" or "production" of equipment as follows:
- a. Machine tools for turning having all of the following:
1. Positioning accuracy with "all compensations available" equal to or less (better) than 3.6  $\mu\text{m}$  according to ISO 230/2 (1997) or national equivalents along any linear axis; and
  2. Two or more axes which can be coordinated simultaneously for "contouring control".

---

## Sensitive List

---

### Category 2 contd.

- 2.D.1.
- b. Machine tools for milling having any of the following:
    - 1.a. Positioning accuracy with "all compensations available" equal to or less (better) than **3.6 µm** according to ISO 230/2 (1997) or national equivalents along any linear axis; and
    - b. Three linear axes plus one rotary axis which can be coordinated simultaneously for "contouring control";
  - 2. Five or more axes which can be coordinated simultaneously for "contouring control" and have a positioning accuracy with "all compensations available" equal to or less (better) than **3.6 µm** according to ISO 230/2 (1997) or national equivalents along any linear axis; or
  - 3. A positioning accuracy for jig boring machines, with "all compensations available", equal to or less (better) than **3 µm** according to ISO 230/2 (1997) or national equivalents along any linear axis;
- c. Electrical discharge machines (EDM) as specified in 2.B.1.d.
- d. Deep-hole-drilling machines as specified in 2.B.1.f.
- e. "Numerically controlled" or manual machine tools as specified in 2.B.3.

2.E.1. "Technology" according to the General Technology Note for the "development" of "software" specified by 2.D. of this List or for the "development" of equipment as follows:

- a. Machine tools for turning having all of the following:
  - 1. Positioning accuracy with "all compensations available" equal to or less (better) than **3.6 µm** according to ISO 230/2 (1997) or national equivalents along any linear axis; and
  - 2. Two or more axes which can be coordinated simultaneously for "contouring control".

---

**Sensitive List**

---

Category 2 contd.

- 2.E.1.
- b. Machine tools for milling having any of the following:
    - 1.a. Positioning accuracy with "all compensations available" equal to or less (better) than  $3.6\ \mu\text{m}$  according to ISO 230/2 (1997) or national equivalents along any linear axis; and
    - b. Three linear axes plus one rotary axis which can be coordinated simultaneously for "contouring control";
  - 2. Five or more axes which can be coordinated simultaneously for "contouring control" and have a positioning accuracy with "all compensations available" equal to or less (better) than  $3.6\ \mu\text{m}$  according to ISO 230/2 (1997) or national equivalents along any linear axis; or
  - 3. A positioning accuracy for jig boring machines, with "all compensations available", equal to or less (better) than  $3\ \mu\text{m}$  according to ISO 230/2 (1997) or national equivalents along any linear axis;
- c. Electrical discharge machines (EDM) as specified in 2.B.1.d.
- d. Deep-hole-drilling machines as specified in 2.B.1.f.
- e. "Numerically controlled" or manual machine tools as specified in 2.B.3.
- 2.E.2.
- "Technology" according to the General Technology Note for the "production" of equipment as follows:
- a. Machine tools for turning having all of the following:
    - 1. Positioning accuracy with "all compensations available" equal to or less (better) than  $3.6\ \mu\text{m}$  according to ISO 230/2 (1997) or national equivalents along any linear axis; and
    - 2. Two or more axes which can be coordinated simultaneously for "contouring control".

---

## Sensitive List

---

### Category 2 contd.

- 2.E.2.
- b. Machine tools for milling having any of the following:
    - 1.a. Positioning accuracy with "all compensations available" equal to or less (better) than **3.6 µm** according to ISO 230/2 (1997) or national equivalents along any linear axis; and
    - b. Three linear axes plus one rotary axis which can be coordinated simultaneously for "contouring control";
  - 2. Five or more axes which can be coordinated simultaneously for "contouring control" and have a positioning accuracy with "all compensations available" equal to or less (better) than **3.6 µm** according to ISO 230/2 (1997) or national equivalents along any linear axis; or
  - 3. A positioning accuracy for jig boring machines, with "all compensations available", equal to or less (better) than **3 µm** according to ISO 230/2 (1997) or national equivalents along any linear axis;
- c. Electrical discharge machines (EDM) as specified in 2.B.1.d.
- d. Deep-hole-drilling machines as specified in 2.B.1.f.
- e. "Numerically controlled" or manual machine tools as specified in 2.B.3.

### Category 3

- 3.A.2.g.2. Atomic frequency standards...
- 3.B.1.a.2. Metal Organic Chemical Vapour Deposition (MOCVD) reactors...
- 3.D.1. "Software" specially designed for the "development" or "production" of equipment specified by **3.A.2.g.** or **3.B.** of this List.
- 3.E.1. "Technology" according to the General Technology Note for the "development" or "production" of equipment specified by **3.A.** or **3.B.** of this List.

---

Sensitive List

---

Category 4

- 4.A.1.a.2. Electronic computers...radiation hardened...  
4.A.3.b. Not used since 2002  
4.A.3.c. Not used since 2001
- 4.D.1. "Software" specially designed for the "development" or "production" of equipment specified by 4.A. of this List or for the "development" or "production" of "digital computers" having an "Adjusted Peak Performance" ("APP") exceeding 0.1 Weighted TeraFLOPS (WT).
- 4.E.1. "Technology" according to the General Technology Note for the "development" or "production" of any of the following equipment or "software":  
- Equipment specified by 4.A. of this List;  
- "Digital computers" having an "Adjusted Peak Performance" ("APP") exceeding 0.1 Weighted TeraFLOPS (WT); or  
- "Software" specified by 4.D. of this List.

Category 5 - Part 1

- 5.A.1.b.3. Being radio equipment...  
5.A.1.b.5. Being digitally controlled radio receivers...
- 5.B.1.a. Equipment and specially designed components or accessories therefor, specially designed for the "development", "production" or "use" of equipment, functions or features in Category 5 - Part 1 of this List.
- 5.D.1.a. "Software" specially designed for the "development" or "production" of equipment, functions or features, specified by Category 5 - Part 1 of this List.
- 5.D.1.b. "Software" specially designed or modified to support "technology" specified by 5.E.1. of this List.
- 5.E.1.a. "Technology" according to the General Technology Note for the "development" or "production" of equipment, functions, features or "software" specified by Category 5 - Part 1 of this List.

Category 5 - Part 2

- None

---

**Sensitive List**

---

Category 6

- 6.A.1.a.1.b. Object detection or location systems, having any of the following:
1. A transmitting frequency below 5 kHz or a sound pressure level exceeding 224 dB (reference 1  $\mu$ Pa at 1 m) for equipment with an operating frequency in the band from 5 kHz to 10 kHz inclusive;
  2. Sound pressure level exceeding 224 dB...
  3. Sound pressure level exceeding 235 dB...
  4. Forming beams of...
  5. Designed to operate...
  6. Designed to withstand...
- 6.A.1.a.2.a.1. Hydrophones...Incorporating...
- 6.A.1.a.2.a.2. Hydrophones...Incorporating flexible assemblies...
- 6.A.1.a.2.a.3. Hydrophones...Having any...
- 6.A.1.a.2.a.5. Hydrophones...Designed to operate...
- 6.A.1.a.2.a.6. Hydrophones...Designed for...
- 6.A.1.a.2.b. Towed acoustic hydrophone arrays...
- 6.A.1.a.2.c. Processing equipment, specially designed for real time application with towed acoustic hydrophone arrays, having "user accessible programmability" and time or frequency domain processing and correlation, including spectral analysis, digital filtering and beamforming using Fast Fourier or other transforms or processes;
- 6.A.1.a.2.d. Heading sensors...
- 6.A.1.a.2.e. Bottom or bay cable systems, having any of the following:
1. Incorporating hydrophones... or
  2. Incorporating multiplexed hydrophone group signal modules...
- 6.A.1.a.2.f. Processing equipment, specially designed for real time application with bottom or bay cable systems, having "user accessible programmability" and time or frequency domain processing and correlation, including spectral analysis, digital filtering and beamforming using Fast Fourier or other transforms or processes.
- 6.A.2.a.1.a., b., and c. "Space-qualified" solid-state detectors...

---

Sensitive List

---

Category 6 contd.

- 6.A.2.a.2.a. Image intensifier tubes ...
1. A peak response...
  2. Electron image amplification...
  3. Photocathodes, as follows:
    - a. S-20, S-25 or multialkali photocathodes with a luminous sensitivity exceeding 700  $\mu\text{A}/\text{lm}$ ;
    - b. GaAs or GaInAs photocathodes;
    - c. Other "III/V compound" semiconductor photocathodes.

- 6.A.2.a.2.b. Image intensifier tubes...

- 6.A.2.a.3. Non-space qualified "focal plane arrays" ...;

Note 3

6.A.2.a.3. does not apply to the following "focal plane arrays" in this List:

- a. Platinum Silicide (PtSi) "focal plane arrays" having less than 10,000 elements;
- b. Iridium Silicide (IrSi) "focal plane arrays".

Note 4

6.A.2.a.3. does not apply to the following "focal plane arrays" in this List:

- a. Indium Antimonide (InSb) or Lead Selenide (PbSe) "focal plane arrays" having less than 256 elements;
- b. Indium Arsenide (InAs) "focal plane arrays";
- c. Lead Sulphide (PbS) "focal plane arrays";
- d. Indium Gallium Arsenide (InGaAs) "focal plane arrays".

Note 5

6.A.2.a.3. does not apply to Mercury Cadmium Telluride (HgCdTe) "focal plane arrays" as follows in this List:

- a. 'Scanning Arrays' having any of the following:
  1. 30 elements or less; or
  2. Incorporating time delay-and-integration within the element and having 2 elements or less;
- b. 'Staring Arrays' having less than 256 elements.

Technical Notes

1. 'Scanning Arrays' are defined as "focal plane arrays" designed for use with a scanning optical system that images a scene in a sequential manner to produce an image;
2. 'Staring Arrays' are defined as "focal plane arrays" designed for use with a non-scanning optical system that images a scene.

---

**Sensitive List**

---

Category 6 contd.

6.A.2.a.3.

Note 6

6.A.2.a.3. does not apply to the following "focal plane arrays" in this List:

- a. Gallium Arsenide (GaAs) or Gallium Aluminum Arsenide (GaAlAs) quantum well "focal plane arrays" having less than 256 elements;
- b. Microbolometer "focal plane arrays" having less than 8,000 elements.

Note 7

6.A.2.a.3.g. does not apply to the linear (1-dimensional) "focal plane arrays" specially designed or modified to achieve 'charge multiplication' having 4,096 elements or less.

Note 8

6.A.2.a.3.g. does not apply to the non-linear (2-dimensional) "focal plane arrays" specially designed or modified to achieve 'charge multiplication' having a maximum linear dimension of 4,096 elements and a total of 250,000 elements or less.

6.A.2.b.

"Monospectral imaging sensors" and "multispectral imaging sensors"...

6.A.2.c.

'Direct view' imaging equipment incorporating any of the following:

1. Image intensifier tubes having the characteristics listed in 6.A.2.a.2.a. or 6.A.2.a.2.b. of this List;
2. "Focal plane arrays" having the characteristics listed in 6.A.2.a.3. of this List or 6.A.2.e.; or
3. Solid-state detectors having the characteristics listed in 6.A.2.a.1.;

6.A.3.b.3.

Imaging cameras incorporating image intensifier tubes having the characteristics listed in 6.A.2.a.2.a. or 6.A.2.a.2.b. of this List;

6.A.3.b.4.

Imaging cameras incorporating "focal plane arrays" having any of the following:

- a. Incorporating "focal plane arrays" specified by 6.A.2.a.3.a. to 6.A.2.a.3.e. of this List;
- b. Incorporating "focal plane arrays" specified by 6.A.2.a.3.f. of this List;
- c. Incorporating "focal plane arrays" listed in 6.A.2.a.3.g. of this List; or
- d. Incorporating "focal plane arrays" specified by 6.A.2.e.

---

Sensitive List

---

Category 6 contd.

6.A.3.b.4.

Note 1 'Imaging cameras' described in 6.A.3.b.4. include "focal plane arrays" combined with sufficient "signal processing" electronics, beyond the read out integrated circuit, to enable as a minimum the output of an analogue or digital signal once power is supplied.

Note 2 6.A.3.b.4.a. does not apply to imaging cameras incorporating linear "focal plane arrays" with 12 elements or fewer, not employing time-delay-and-integration within the element and designed for any of the following:

- a. Industrial or civilian intrusion alarm, traffic or industrial movement control or counting systems;
- b. Industrial equipment used for inspection or monitoring of heat flows in buildings, equipment or industrial processes;
- c. Industrial equipment used for inspection, sorting or analysis of the properties of materials;
- d. Equipment specially designed for laboratory use; or
- e. Medical equipment.

Note 3 6.A.3.b.4.b. does not apply to imaging cameras having any of the following:

- a. A maximum frame rate equal to or less than 9 Hz ;
- b. Having all of the following:
  1. Having a minimum horizontal or vertical 'Instantaneous-Field-of-View (IFOV)' of at least 10 mrad/pixel (milliradians/pixel);
  2. Incorporating a fixed focal-length lens that is not designed to be removed;
  3. Not incorporating a 'direct view' display; and

Technical Note

'Direct view' refers to an imaging camera operating in the infrared spectrum that presents a visual image to a human observer using a near-to-eye micro display incorporating any light-security mechanism.

4. Having any of the following:
  - a. No facility to obtain a viewable image of the detected field-of-view; or
  - b. The camera is designed for a single kind of application and designed not to be user modified; or

---

**Sensitive List**

---

Category 6 contd.

*Note 3 to 6.A.3.b.4.b. contd.*

Technical Note

*'Instantaneous Field of View (IFOV)' specified in Note 3.b. is the lesser figure of the 'Horizontal FOV' or the 'Vertical FOV'.*

*'Horizontal IFOV' = horizontal Field of View (FOV)/number of horizontal detector elements*

*'Vertical IFOV' = vertical Field of View (FOV)/number of vertical detector elements.*

- c. *The camera is specially designed for installation into a civilian passenger land vehicle of less than 3 tonnes (gross vehicle weight) and having all of the following:*
1. *Is only operable when installed in any of the following:*
    - a. *The civilian passenger land vehicle for which it was intended; or*
    - b. *A specially designed, authorized maintenance test facility; and*
  2. *Incorporates an active mechanism that forces the camera not to function when it is removed from the vehicle for which it was intended.*

Note *When necessary, details of the item will be provided, upon request, to the appropriate authority in the exporter's country in order to ascertain compliance with the conditions described in Note 3.b.4. and Note 3.c. above.*

Note 4 *6.A.3.b.4.c. does not apply to 'imaging cameras' having any of the following characteristics:*

- a. *Having all of the following:*
  1. *Where the camera is specially designed for installation as an integrated component into indoor and wall-plug-operated systems or equipment, limited by design for a single kind of application, as follows:*
    - a. *Industrial process monitoring, quality control, or analysis of the properties of materials;*
    - b. *Laboratory equipment specially designed for scientific research;*
    - c. *Medical equipment; or*
    - d. *Financial fraud detection equipment; and*
  2. *Is only operable when installed in any of the following:*
    - a. *The system(s) or equipment for which it was intended; or*
    - b. *A specially designed, authorised maintenance facility; and*
  3. *Incorporates an active mechanism that forces the camera not to function when it is removed from the system(s) or equipment for which it was intended;*

---

Sensitive List

---

Category 6 contd.

*Note 4 to 6.A.3.b.4.c. contd.*

- b. *Where the camera is specially designed for installation into a civilian passenger land vehicle of less than three tonnes (gross vehicle weight), or passenger and vehicle ferries having a length overall (LOA) 65 m or greater, and having all of the following:*
1. *Is only operable when installed in any of the following:*
    - a. *The civilian passenger land vehicle or passenger and vehicle ferry for which it was intended; or*
    - b. *A specially designed, authorised maintenance test facility; and*
  2. *Incorporates an active mechanism that forces the camera not to function when it is removed from the vehicle for which it was intended;*
- c. *Limited by design to have a maximum radiant sensitivity of 10 mA/W or less for wavelengths exceeding 760 nm, having all of the following:*
1. *Incorporating a response limiting mechanism designed not to be removed or modified; and*
  2. *Incorporates an active mechanism that forces the camera not to function when the response limiting mechanism is removed; or*
- d. *Having all of the following:*
1. *Not incorporating a 'direct view' or electronic image display;*
  2. *Has no facility to output a viewable image of the detected field of view;*
  3. *The "focal plane array" is only operable when installed in the camera for which it was intended; and*
  4. *The "focal plane array" incorporates an active mechanism that forces it to be permanently inoperable when removed from the camera for which it was intended.*

Note *When necessary, details of the item will be provided, upon request, to the appropriate authority in the exporter's country in order to ascertain compliance with the conditions described in Note 4 above.*

6.A.3.b.5.

Imaging cameras incorporating solid-state detectors specified by 6.A.2.a.1.;

---

## Sensitive List

---

### Category 6 contd.

- 6.A.4.c. "Space-qualified" components for optical systems...
- 6.A.4.d. Optical control equipment...
- 6.A.6.a. Not used since 2006
- 6.A.6.a.1. "Magnetometers" ... Using "superconductive" (SQUID) "technology"...
- 6.A.6.a.2. "Magnetometers" ... Using optically pumped or nuclear precession (proton/Overhauser) "technology" having a "noise level" (sensitivity) lower (better) than 2pT rms per square root Hz;
- 6.A.6.d. "Compensation systems" for the following:
1. Magnetic sensors specified by 6.A.6.a.2. and using optically pumped or nuclear precession (proton/Overhauser) "technology" that will permit these sensors to realize a "noise level" (sensitivity) lower (better) than 2 pT rms per square root Hz.
  2. Underwater electric field sensors specified by 6.A.6.b.
  3. Magnetic gradiometers specified by 6.A.6.c. that will permit these sensors to realize a "noise level" (sensitivity) lower (better) than 3 pT/m rms per square root Hz.
- 6.A.6.g. Not used since 2006
- 6.A.6.h. Not used since 2006
- 6.A.8.d. Radar systems...Capable of...
- 6.A.8.h. Radar systems...Employing processing...
- 6.A.8.k. Radar systems...Having "signal processing"...
- 6.A.8.l.3. Radar systems... Having data processing... Processing for...
- 6.B.8. Pulse radar cross-section...
- 6.D.1. "Software" specially designed for the "development" or "production" of equipment specified by 6.A.4., 6.A.8. or 6.B.8. of this List.
- 6.D.3.a. "Software", as follows:...
- 6.E.1. "Technology" according to...
- 6.E.2. "Technology" according to the General Technology Note for the "production" of equipment specified by 6.A. or 6.B. of this List.

---

Sensitive List

---

Category 7

- 7.D.2. "Source code" for the "use"...
- 7.D.3.a. "Software" specially designed or modified to...
- 7.D.3.b. "Source code" for...
- 7.D.3.c. "Source code" for...
- 7.D.3.d.1. to 4. & 7. "Source code" for the "development" of...
- 7.E.1. & 7.E.2. "Technology" according to the General Technology Note...

Category 8

- 8.A.1.b. Manned, untethered submersible vehicles...
- 8.A.1.c. Unmanned, tethered submersible vehicles...
- 8.A.1.d. Unmanned, untethered submersible vehicles...
- 8.A.2.b. Systems specially designed or modified for the automated control of the motion of submersible vehicles specified by 8.A.1. of this List using navigation data having closed loop servo-controls and having any of the following:
1. Enabling...
  2. Maintaining...
  3. Maintaining...
- 8.A.2.h. "Robots" specially designed for underwater use...
- 8.A.2.j. Air independent power systems...
- 8.A.2.o.3. Noise reduction systems for use on vessels...
- 8.A.2.p. Pumpjet propulsion systems...
- 8.D.1. "Software" specially designed for the "development" or "production" of equipment in 8.A. of this List.
- 8.D.2. Specific "software"...
- 8.E.1. "Technology" according to the General Technology Note for the "development" or "production" of equipment specified by 8.A. of this List.
- 8.E.2.a. Other "technology"...

---

**Sensitive List**

---

Category 9

- 9.A.11. Ramjet, scramjet or combined cycle engines...
- 9.B.1.b. Ceramic cores or shells.
- 9.D.1. "Software" specially designed or modified for the "development" of equipment or "technology", specified by 9.A., 9.B. or 9.E.3. of this List.
- 9.D.2. "Software" specially designed or modified for the "production" of equipment specified by 9.A. or 9.B. of this List.
- 9.D.4.a. Other "software"... 2D or 3D...
- 9.D.4.c. Other "software"... "Software" specially...
- 9.E.1. "Technology" according to the General Technology Note...
- 9.E.2. "Technology" according to the General Technology Note...
- 9.E.3.a.1. Other "technology"... Gas turbine blades...
- 9.E.3.a.2. to 5. & Other "technology"...
- 9.E.3.a.8. & 9.