

- a. Total Dose  $5 \times 10^5$  Rads (Si)
- b. Dose Rate Upset  $5 \times 10^8$  Rads (Si)/sec; or
- c. Single Event Upset  $1 \times 10^7$  Error/bit/day;

**NOTE:**

Equipment designed or rated for transient ionising radiation is embargoed by the Munitions List.

- b. Having characteristics or performing functions exceeding the limits in Category 1150 ("Information Security");
1041. 2. "Hybrid computers", as follows, and "assemblies" and specially designed components therefor:

- a. Containing "digital computers" embargoed by 1041.3.;
- b. Containing analogue-to-digital or digital-to-analogue converters having both of the following characteristics:
  - 1. 32 channels or more; and
  - 2. A resolution of 14 bits (plus sign bit) or more with a conversion rate of 200,000 conversions/s or more;

1041. 3. "Digital computers", "assemblies", and related equipment therefor, as follows, and specially designed components therefor:

**NOTES:**

- 1. 1041.3. includes vector processors, array processors, logic processors, and equipment for "image enhancement" or "signal processing".
- 2. The embargo status of the "digital computers" or related equipment described in 1041.3 is governed by the embargo status of other equipment or systems provided:
  - a. The "digital computers" or related equipment are essential for the operation of the other equipment or systems;
  - b. The "digital computers" or related equipment are not a "principal element" of the other equipment or systems; and

**N.B.:**

- 1. The embargo status of "signal processing" or "image enhancement" equipment described in 1041.3.g. and specially designed for other equipment with functions limited to those required for the other equipment is determined by the embargo status of the other equipment even if it exceeds the "principal element" criterion.
  - 2. For the embargo status of "digital computers" or related equipment for telecommunications equipment, see Category 1050 (Telecommunications).
  - c. The technology for the "digital computers" and related equipment is governed by 1045.
3. "Digital computers" or related equipment are not embargoed by 1041.3 provided:
- a. They are essential for medical applications;
  - b. The equipment is substantially restricted to medical applications by nature of its design and performance;
  - c. The equipment does not have "user-accessible programmability" other than that allowing for insertion of the original or modified "programmes" supplied by the original manufacturer;
  - d. The "composite theoretical performance" of any "digital computer" which is not designed or modified but essential for the medical application does not exceed 20 million theoretical operations per second (Mtops); and
  - e. The technology for the "digital computers" or related equipment is governed by 1045.

1041. 3. a. Designed for combined recognition, understanding and interpretation of image or continuous (connected) speech;
- b. Designed or modified for "fault tolerance";

**NOTE:**

For the purposes of 1041.3.b., "digital computers" and related equipment are not considered to be designed or modified for "fault tolerance", if they use:

- 1. Error detection or correction algorithms in "main storage";
- 2. The interconnection of two "digital computers" so that, if the active central processing unit fails, an idling but mirroring central processing unit can continue the system's functioning;
- 3. The interconnection of two central processing units by data channels or by use of shared storage to permit one central processing unit to perform other work until the second central processing unit fails, at which

time the first central processing unit takes over in order to continue the system's functioning; or

- 4. The synchronisation of two central processing units by "software" so that one central processing unit recognises when the other central processing unit fails and recovers tasks from the failing unit.

1041. 3. c. "Digital computers" having a "composite theoretical performance" (CTP) exceeding 12.5 million theoretical operations per second (Mtops);

1041. 3. d. "Assemblies" specially designed or modified to enhance performance by aggregation of "computing elements", as follows:

**NOTES:**

- 1. 1041.3.d. applies only to "assemblies" and programmable interconnections not exceeding the limit in 1041.3.c., when shipped as unintegrated "assemblies". It does not apply to "assemblies" inherently limited by nature of their design for use as related equipment embargoed by 1041.3.e. to k.
- 2. 1041.3.d. does not embargo "assemblies" specially designed for a product or family of products whose maximum configuration does not exceed the limit of 1041.3.c.

- 1. Designed to be capable of aggregation in configurations of 16 or more "computing elements"; or
- 2. Having a sum of maximum data rates on all data channels available for connection to associated processors exceeding 40 MBytes/s;

1041. 3. e. Disk drives and solid state storage equipment, as follows:

- 1. Magnetic, erasable optical or magneto-optical disk drives with a "maximum bit transfer rate" exceeding 25 Mbit/s;
- 2. Solid state storage equipment, other than "main storage" (also known as solid state disks or RAM disks), with a "maximum bit transfer rate" exceeding 36 Mbit/s;

1041. 3. f. Input/output control units designed for use with equipment embargoed by 1041.3.e.;

1041. 3. g. Equipment for "signal processing" or "image enhancement" having a "composite theoretical performance" exceeding 8.5 million theoretical operations per second (Mtops);

1041. 3. h. Graphics accelerators or graphics coprocessors exceeding a "3-D Vector Rate" of 400,000 or, if supported by 2-D vectors only, a "2-D vector rate" of 600,000;

**NOTE:**

1041.3.h. does not apply to work stations designed for and limited to:

- 1. Graphic arts (e.g., printing, publishing); and
- 2. The display of two-dimensional vectors.

1041. 3. i. Colour displays or monitors having more than 12 resolvable elements per mm in the direction of the maximum pixel density;

**NOTES:**

- 1. 1041.3.i. does not embargo displays or monitors not specially designed for electronic computers.
- 2. Displays specially designed for Air Traffic Control (ATC) systems are treated as specially designed components for ATC systems under Category 1060.

1041. 3. j. Equipment performing analogue-to-digital or digital-to-analogue conversions exceeding the limits in 1031.1.a.5.;

1041. 3. k. Equipment containing "terminal interface equipment" exceeding the limits in 1051.b.3.;

**NOTE:**

For the purposes of 1041.3.k., "terminal interface equipment" includes "local area network" interfaces, modems and other communications interfaces. "Local area network" interfaces are evaluated as "network access controllers".

1041. 4. Computers, as follows, and specially designed related equipment, "assemblies" and components therefor:

- a. "Systolic array computers";
- b. "Neural computers";
- c. "Optical computers";

## 1042. Test, Inspection and Production Equipment

1042. Equipment for the development and production of magnetic and optical storage equipment, as follows: