DEPARTMENT OF COMMERCE

Bureau of Industry and Security

15 CFR Parts 772 and 774

[Docket No. 0908271249–91275–01]

RIN 0694–AE71

Implementation of the Wassenaar Arrangement's (WA) Task Force on Editorial Issues (TFEI) Revisions

AGENCY: Bureau of Industry and Security, Commerce.

ACTION: Final rule.

SUMMARY: The Wassenaar Arrangement (WA) Task Force on Editorial Issues (TFEI) made revisions, editorial in nature, to clarify, remove extraneous text or correct text that appears in Export Control Classification Numbers (ECCNs) on the Commerce Control List of the Export Administration Regulations. The TFEI revisions (over 2,000) were agreed upon by the WA in December 2007. The WA implementation rules for 2007 and 2008 contain only the TFEI revisions that coincided with the revisions to ECCNs affected by the 2007 and 2008 WA agreements. This rule implements the remaining TFEI revisions.

DATES: *Effective Dates:* This rule is effective: December 10, 2009.

FOR FURTHER INFORMATION CONTACT: Sharron Cook, Office of Exporter Services, Regulatory Policy Division 202–482–2440, *scook@bis.doc.gov.*

SUPPLEMENTARY INFORMATION:

Background

Task Force on Editorial Issues (TFEI)

The Wassenaar Arrangement Task Force on Editorial Issues (TFEI) made revisions, editorial in nature, to clarify, remove extraneous text or correct text that appears in the Wassenaar Dual-Use List. This was assigned to the TFEI by the Wassenaar Arrangement in order to bring the Wassenaar Dual-Use List into conformity with TFEI guidelines. The TFEI revisions (over 2,000) were agreed upon by the WA in December 2007. Some of these revisions were made on October 14, 2008 (73 FR 60910) in the rule entitled ''Wassenaar Arrangement Plenary Agreements Implementation: December 2007 Categories 1, 2, 3, 5 Parts I and II, 6, 7, and 9 of the Commerce Control List, Definitions; December 2006 Solar Cells.'' More of these revisions are made in the rule entitled ''Wassenaar Arrangement 2008 Plenary Agreements Implementation: Categories 1, 2, 3, 4, 5 Parts I and II, 6, 7, 8 and 9 of the Commerce Control List, Definitions, Reports.'' This rule implements the remaining TFEI revisions not included in either of the aforementioned rules.

Revisions to the Commerce Control List

This rule revises a number of entries on the Commerce Control List (CCL) to implement the 2007 and 2008 WA TFEI agreed revisions to the Wassenaar List of Dual Use Goods and Technologies. As described below, the amendments apply to ECCNs 1A001, 1B001, 1C001, 1C002,1C003, 1C004, 1C005, 1C007, 1C009, 1C011, 1C012, 2A001, 2B001, 2B004, 2B005, 2B009, 2E003, 3A002, 3B002, 3C001, 3C003, 3D002, 3D003, 3D004, 3E002, 3E003, 4A001, 4A003, 4A004, 6A007, 6B004, 6B008, 6C002, 6C004, 6C005, 6E003, 7A001, 7A002, 7A004, 7A006, 7A008, 7B001, 7B002, 7D002, 7D003, 7E001, 7E003, 7E004, 8B001, 8C001, 8D001, 8E001, 8E002, 9A001, 9A002, 9A003, 9A005, 9A006, 9A010, 9A011, 9B001, 9B002, 9B003, 9B004, 9B005, 9B007, 9B009, 9B010, 9D001, 9D003, 9D004, 9E001, and 9E003.

Category 1 Special Materials and Related Equipment, Chemicals, ''Microorganisms,'' and Toxins

ECCN 1A001 is amended by:

a. Adding two commas to 1A001.a to clarify that the modifiers in the sentence apply to each of the listed items;

b. Adding two commas to 1A001.b to clarify that the modifiers in the sentence apply to each of the listed items; and

c. Adding a comma to 1A001.c to clarify that the modifier in the sentence applies to each of the listed items.

ECCN 1B001 is amended by:

a. Adding a comma to the Heading to clarify that the modifier applies to each item listed before it;

b. Adding a comma in 1B001.a, .b, and .c to clarify that the modifier applies to each item listed before it; and

c. Adding two commas in 1B001.d.2 to clarify that the modifier applies to each item listed before it.

ECCN 1C001 is amended by:

a. Removing the word ''characteristics'' from Note 1.c because it was unnecessary;

b. Adding the phrase ''all of the following'' to Note 1.d to clarify that all the parameters of the subparagraphs apply; and

c. Adding single quotes around the two terms in 1C001.c and the Technical Note that follows 1C001.c.5 to indicate these terms are defined in this entry.

ECCN 1C002 is amended by:

a. Replacing the word ''or'' with ''and'' in the Note to harmonize with the WA text;

b. Adding a comma in the Note to clarify that the modifier applies to each of the items before it;

c. Adding single quotes around two terms in the Technical Notes to indicate that these terms are defined in the entry;

d. Replacing words ''percent'' with ''% by'' in 1C002.a.1 and a.2 to clarify the meaning of the text;

e. Replacing ''with'' with ''having any of the following'' for clarity of meaning in 1C002.b.1, b.2, and b.3;

f. Adding single quotes around terms in 1C002.b.1, b.2, and b.3 to indicate that these terms are defined in the entry;

g. Replacing ''with a tensile strength of:'' with ''having any of the following'' in 1C002.b.4, because we moved ''tensile strength'' into the subparagraphs for clarity;

h. Replacing ''with a tensile strength of:'' with ''having all of the following'' in 1C002.b.5 to clarify the text;

i. Removing the word ''characteristics'' in 1C002.c, because it was superfluous;

j. Removing the word ''and'' from 1C002.c.1.e because it was superfluous;

k. Adding an ''and'' in 1C002.c.2.g to conform to the WA text;

l. Adding paragraph 1C002.c.3 to conform to the WA text;

m. Removing the term ''characteristics'' in 1C002.d because it is superfluous; and

n. Replacing ''in'' with ''by'' in 1C002.d.1 to conform to WA text.

ECCN 1C003 is amended by:

a. Replacing the word ''characteristics'' with ''following'' in the Heading for clarity;

b. Removing the superfluous word ''characteristics'' in 1C003.b and .c, and removing a superfluous comma in 1C003.b;

c. Adding single quotes around 'nanocrystalline' in 1C003.c and the Technical Note to indicate that this term is defined in this entry; and

d. Replacing the word ''percent'' with the percent symbol in 1C003.c.1 for clarity.

ECCN 1C004 is amended by replacing the word ''characteristics'' with ''following'' in the Heading to clarify the text.

ECCN 1C005 is amended by adding single quotes around the term 'filaments' in 1C005.a, .b, .c, and the Technical Note to indicate that the term is defined in this entry.

ECCN 1C006 is amended by:

a. Removing the phrase ''compounds or materials'' from 1C006.a, .b and .c because it was superfluous;

b. Adding single quotes around the term 'silahydrocarbon oils' in 1C006.a.1 and Technical Note to indicate that this term is defined in the entry;

c. Adding single quotes around multiple terms in 1C006.a to indicate that these terms are defined in this entry;

d. Moving a Technical Note from after 1C006.d to 1C006.a to place it closer in location to where the terms are used in this entry;

e. Adding a comma in 1C006.c to clarify that the modifier applies to both the listed items before it;

f. Removing a comma in 1C006.d to correct the punctuation; and

g. Removing the word ''characteristics'' from 1C006.d because it was superfluous.

ECCN 1C007 is amended by adding a comma to 1C007.a to indicate that the modifier applies to all the items before it.

ECCN 1C009 is amended by deleting a superfluous comma in the Heading.

ECCN 1C011 is amended by:

a. Replacing the words ''of these'' with ''thereof'' in 1C011.a to clarify the text; and

b. Revising the identical Notes after 1C011.a and .b by adding the phrase ''also refer to'', removing the phrase ''are controlled whether or not the'' and the word ''are'' to clarify the text.

ECCN 1C012 is amended by re-indexing the Note 1C012.a, and adding double quotes around the term ''previously separated'' in 1C012.b to indicate that it is defined in Part 772.

Category 2 Materials Processing

ECCN 2A001 is amended by:

a. Removing the redundant Note at the beginning of the Items paragraph in the List of Items Controlled section, and replacing ''tolerance'' with ''tolerances'' to correct the grammar in the Note; and

b. Adding commas to indicate the modifiers apply to each item listed before it in 2A001.a and .b.

ECCN 2B001 is amended by removing a superfluous comma in the Note following 2B001.c.

ECCN 2B004 is amended by:

a. Removing a comma from the Heading to correct the punctuation; and

b. Adding the word ''Having'' in 2B004.b to harmonize with WA text.

ECCN 2B005 is amended by:

a. Adding a comma to Note 1 of the Related Controls paragraph of the List of Items Controlled section;

b. Adding the word ''A'' to 2B005.a.1 to clarify the text;

c. Adding the word ''Having'' to 2B005.a.2 to clarify the text;

d. Adding the missing word ''deposition'', and replacing a comma with the word ''and'' in 2B005.c to conform to the WA text;

e. Removing the word ''characteristics'' in 2B005.d, because it is superfluous; and

f. Adding the missing word ''production'' in 2B005.f to conform to the WA text.

ECCN 2B009 is amended by moving a phrase from the middle of the sentence to the beginning to clarify the text of the Technical Note following 2B009.b.

ECCN 2E003 is amended by:

a. Removing single quotes and replacing upper case with lower case letter in the phrase ''Resultant Coating'' in the Nota Bene after 2E003.f, because it was not a defined term in this entry; and

b. Removing the capitalization from the phrase 'coating process' in the Nota Bene after 2E003.f to correct the capitalization.

Notes to Table on Deposition Techniques in Category 2 are amended by:

a. In Note 5, replacing the word ''percent'' with the percent symbol in multiple places;

b. Replacing ''this category'' with ''Category 2'' in Note 10 to conform to the WA text; and

c. Adding two commas and an ''or'' to Note 17 to conform to the WA text.

Category 3 Electronics

ECCN 3A002 is amended by replacing the word ''includes'' with ''include'' in Note 1 that follows 3A002.d.4 to correct the grammar.

ECCN 3B002 is amended by removing commas to correct the punctuation in the Heading.

ECCN 3C001 is amended by:

a. Removing the definition in the Related Definitions paragraph of the List of Items Controlled section, because this term is defined in Part 772;

b. Adding chemical symbols in 3C001.a, .b, and .c for clarity; and

c. Adding double quotes around the term ''III/V compounds'' in 3C001.d to indicate that this term is defined in Part 772.

ECCN 3C003 is amended by:

a. Removing a comma in the Heading to correct the punctuation; and

b. Adding a comma in 3C003.a and .b to indicate that the modifier applies to each item listed before it.

ECCN 3D002 is amended by removing the subparagraphs in the Items paragraph of the List of Items Controlled and adding them to the Heading.

ECCN 3D003 is amended by adding single quotes around the term 'Physics-based' in the Heading to indicate that the term is defined in the entry.

ECCN 3D004 is amended by removing the superfluous word ''the'' from the Heading.

ECCN 3E002 is amended by:

a. Adding single quotes around the term 'vector processor unit' in 3E002.a and the Technical Note, as well as changing the word ''processing'' to read ''processor'' in the Technical Note;

b. Adding double quotes around the term ''signal processing'' in 3E002.c to indicate that this term is defined in Part 772; and

c. Adding double quotes around the term ''technology'' in the Note to 3E002.c to indicate that this term is defined in Part 772.

ECCN 3E003 is amended by:

a. Revising the Heading to conform to WA text; and

b. Adding double quotes around the term ''technology'' in the Note to 3E003.b to indicate that this term is defined in Part 772.

Category 4 Computers

ECCN 4A001 is amended by:

a. Revising the Heading to conform to WA text;

b. Replacing the word ''either'' to read ''any'' in 4A001.a to conform to WA text;

c. Removing the superfluous word ''characteristics'' in 4A001.a; and

d. Adding the word ''or'' to 4A001.a.1 to conform with WA text.

ECCN 4A003 is amended by:

a. Removing a comma in the Heading to correct the punctuation;

b. Replacing the alphabetic indexing with hyphens in Note 1;

c. Adding single quotes around the term 'vector processors' and adding a parenthetical statement to indicate the location of the definition; and

d. Replacing double quotes with single quotes around the terms 'Adjusted Peak Performance' and 'APP' in 4A003.b and .c to indicate that this term is defined in the Technical Note on the 'Adjusted Peak Performance' located at the end of Category 4.

ECCN 4A004 is amended by removing the comma in the Heading to correct the punctuation.

Technical Note on ''Adjusted Peak Performance'' (''APP'') is amended by adding double quotes around the abbreviation ''APP'' throughout the Technical Note, and replacing the double quotes with single quotes around the term 'vector processor(s)' in Notes 4 and 7.

Category 6 Sensors

ECCN 6A007 is amended by:

a. Adding the word ''and'' in 6A007.a and .b to conform to WA text; and

b. Removing the phrase ''for ground, marine, submersible, space or airborne use,'' from 6A007.b to conform to the WA text.

ECCN 6B004 is amended by removing a superfluous comma in the Heading to correct the punctuation.

ECCN 6B008 is amended by adding a comma to the Heading to correct the punctuation.

ECCN 6C002 is amended by:

a. Removing a superfluous comma in the Heading to correct the punctuation; and

b. Adding single quotes around the term ''mole fraction'' in 6C002.b.1 and the Technical Note that follows to indicate that this term is defined in the entry.

ECCN 6C004 is amended by:

a. Removing a superfluous commas in Heading;

b. Replacing a comma with the word ''and'' in 6C004.a and .e to conform to the WA text;

c. Replacing ''having'' with ''and'' in 6C004.a.2;

d. Adding the phrase ''any of'' in 6C004.b to conform to WA text; and

e. Adding an ''or'' in 6C004.b.2 to conform to the WA text.

ECCN 6C005 is amended by removing a superfluous comma in the Heading to correct the punctuation.

ECCN 6E003 is amended by:

a. Removing a superfluous commas in the Heading and 6E003.d to correct the punctuation;

b. Moving the word ''optics'' from inclusion in 6D003.d to above 6D003.d to read ''Optics'' in order to create a section heading within the list; and

c. Adding a comma in 6E003.d.1 to correct the punctuation.

Category 7 Navigation and Avionics

ECCN 7A001 is amended by:

a. Removing superfluous commas from the Heading and 7A001.a.1 and a.2;

b. Replacing a period with a semi-colon in 7A001.a.3 to correct the punctuation; and

c. Adding a comma in 7A001.b to correct punctuation.

ECCN 7A002 is amended by:

a. Removing a superfluous comma and the word ''characteristics'' from the Heading to conform with WA text;

b. Adding single quotes around the phrase 'spinning mass gyros' in the Note that follows 7A002.b to indicate that the term is defined in the entry; and

c. Moving the parenthetical phrase from the Note after 7A002.b into a new Technical Note to conform with the WA text.

ECCN 7A004 is amended by removing a superfluous comma from the Heading to correct the punctuation.

ECCN 7A006 is amended by replacing a comma with the word ''and'' and removing the word ''characteristics'' in the Heading to conform to the WA text.

ECCN 7A008 is amended by replacing a comma with the word ''and'' and removing two commas in the Heading to correct the grammar.

ECCN 7B001 is amended by:

a. Adding a comma to the Heading to correct the punctuation;

b. Adding single quotes to the terms 'Maintenance Level I' and 'Maintenance Level II' in the Related Controls and Related Definitions paragraphs of the List of Items Controlled section because those terms are defined in the entry; and

c. Adding capitalization to ''Line Replaceable Unit'' and ''Shop Replaceable Assembly'' in the Related Definitions paragraph of the List of Items Controlled section to conform with the WA text.

ECCN 7B002 is amended by moving the phrase ''as follows (*see* List of Items Controlled)'' to the end of the Heading and removing a superfluous comma to correct the punctuation.

ECCN 7D002 is amended by:

a. Adding a comma and removing the parenthetical to the Heading to conform with WA text;

b. Adding single quotes around the term 'AHRS' in the Heading and in the Related Controls and Related Definitions paragraphs in the List of Items Controlled section to indicate that this term is defined in this entry; and

c. Capitalizing ''Inertial Navigation Systems'' in the Related Definitions paragraph of the List of Items Controlled section to conform to WA text.

ECCN 7D003 is amended by:

a. Removing a superfluous comma from the Heading to correct the punctuation;

b. Replacing the word ''that'' with ''which'' in 7D003.b and .c to conform to WA text;

c. Capitalizing the term ''Computer-Aided-Design'' in 7D003.e to conform to WA text; and

d. Adding a comma in 7D003.e to correct the punctuation.

ECCN 7E001 is amended by adding a comma in the Heading to correct the punctuation.

ECCN 7E003 is amended by clarifying the text in the Related Definitions section of the List of Items Controlled section.

ECCN 7E004 is amended by:

a. Removing a superfluous comma from the Heading to correct the punctuation;

b. Adding the phrase ''any of the following'' to 7E004.a to conform with the WA text;

c. Replacing the word ''that'' with ''which'' in 7E004.a.2 and c.1 to conform to the WA text;

d. Adding commas to 7E004.a.3, a.4, a.7, b.5, Note to 7E004.b.5, b.6, c.1, and c.3 to correct the punctuation; and

e. Adding the word ''or'' to 7E004.a.6 to conform with WA text.

Category 8 Marine

ECCN 8B001 is amended by removing a comma and replacing a comma with the word ''and'' in the Heading to conform with WA text.

ECCN 8C001 is amended by:

a. Adding single quotes around 'syntactic foam' in the Heading and in the Related Definitions paragraph in the List of Items Controlled section, to indicate that the term is defined in the entry; and

b. Replacing a comma with the word ''and'' in the Heading to conform with WA text.

ECCN 8D001 is amended by adding a comma in the Heading to correct the punctuation.

ECCN 8E001 is amended by adding a comma in the Heading to correct the punctuation.

ECCN 8E002 is amended by removing a superfluous comma from Heading to correct the punctuation.

Category 9 Propulsion Systems, Space Vehicles and Related Equipment

Product Group A is amended by revising the Nota Bene that appears at the beginning by adding the missing word ''radiation'' to conform with the WA text.

ECCN 9A001 is amended by:

a. Re-indexing the Note that follows 9A001.a to conform to the WA text;

b. Replacing a period with a colon in what is now paragraph b of Note to 9A001.a to correct the punctuation;

c. Removing capitalization on ''type certificate'' in paragraph b.1 of Note to 9A001.a to conform with WA text; and

d. Adding a comma in 9A001.b to correct the punctuation.

ECCN 9A002 is amended by adding single quotes around the term 'Marine gas turbine engines' in the Heading and replacing double quotes with single quotes around the same term in the Related Definitions paragraph of the List of Items Controlled section to conform with the WA text.

ECCN 9A003 is amended by:

a. Replacing the phrase '', as follows'' with ''and having any of the following'' in the Heading to conform with WA text; and

b. Adding the word ''or'' in 9A003.a to conform to WA text.

ECCN 9A005 is amended by adding a comma to the Heading to correct the punctuation.

ECCN 9A006 is amended by adding a comma to the Heading to correct the punctuation.

ECCN 9A010 is amended by adding a comma to the Heading to conform with WA text.

ECCN 9A011 is amended by adding a comma to the Heading to conform with WA text.

ECCN 9B001 is amended by moving the phrases ''specially designed'' and ''as follows (*see* List of Items Controlled)'' within the Heading to conform to WA text.

ECCN 9B002 is amended by adding the word ''and'' to the Heading to conform with WA text.

ECCN 9B003 is amended by removing a superfluous comma from the Heading to correct the punctuation.

ECCN 9B004 is amended by adding a comma to the Heading to correct the punctuation.

ECCN 9B005 is amended by:

a. Removing the phrase ''wind tunnels or devices'' from the Heading to conform with WA text; and

b. Moving the a phrase from 9B005.a to a new Note for 9B005.a and adding single quotes around the phrase 'test section size' in that same Note and the associated Technical Note because the term is defined in the entry.

ECCN 9B007 is amended by adding the word ''and'', capitalizing ''Non-Destructive Test'' and removing the capitalization on ''x-ray'' in the Heading to conform with WA text;

ECCN 9B009 is amended by capitalizing the phrase ''Ultimate Tensile Strength'' in the Heading to conform with WA text;

ECCN 9B010 is amended by adding a comma to correct the punctuation in the Heading.

ECCN 9D001 is amended by adding a comma to correct the punctuation in the Heading.

ECCN 9D003 is amended by capitalizing and adding double quotes around the phrase ''Full Authority Digital Electronic Engine Controls'' in the Heading to indicate that this term is defined in Part 772. (*Note:* WA defines this term under ''FADEC'')

ECCN 9D004 is amended by:

a. Removing commas from Heading and 9D004.b to correct the punctuation;

b. Adding commas to 9D004.a, .d, .e, and .g.2 to correct the punctuation;

c. Replacing periods with semi-colons in 9D004.d and .e to correct the punctuation;

d. Revising the Note to 9D004.d by removing the word ''uncontrolled'' and adding the phrase ''not controlled in the Commerce Control List (Supplement No. 1 to Part 774)'' to conform with the WA text;

e. Removing the superfluous word ''characteristics'' from 9D004.g to conform to the WA text; and

f. Removing the superfluous word ''Being'' and ''Having'' from 9D004.g.1 and g.2, respectively, to conform with WA text.

Note at the beginning of Category 9 Group E is amended by adding the phrase ''9E001 to 9E003'' in the second sentence and adding a period to the end of the second sentence to conform to WA text.

ECCN 9E001 is amended by:

a. Adding a comma to the Heading to correct the punctuation; and

b. Removing the text in the Related Definitions paragraph with ''N/A'' because this is redundant to the Note at the beginning of Product Group E of Category 9.

ECCN 9E003 is amended by:

a. Replacing a comma with the word ''or'' in 9E003.a to conform with WA text;

b. Adding a comma in Note 1 to 9E003.a.10 to correct punctuation;

c. Adding single quotes to the term 'incidence angle' in the Technical Note after 9E003.c.2.c to indicate that the term is defined in the entry; and

d. Removing a comma from 9E003.f to correct the punctuation.

Part 772 is amended by revising the terms ''specific modulus'' and ''specific tensile strength'' by adding a comma after the term ''N/m^2'' in each definition to clarify the meaning.

Since August 21, 2001, the Act has been in lapse. However, the President, through Executive Order 13222 of August 17, 2001 (3 CFR, 2001 Comp. 783 (2002)), which has been extended by successive Presidential Notices, the most recent being that of August 13, 2009 (74 FR 41,325 (August 14, 2009)), has continued the Regulations in effect under the International Emergency Economic Powers Act (50 U.S.C. 1701–1707).

Saving Clause

Shipments of items removed from license exception eligibility or eligibility for export without a license as a result of this regulatory action that were on dock for loading, on lighter, laden aboard an exporting carrier, or en route aboard a carrier to a port of export, on December 10, 2009, pursuant to actual orders for export to a foreign destination, may proceed to that destination under the previous license exception eligibility or without a license so long as they have been exported from the United States before February 8, 2010. Any such items not actually exported before midnight, on February 8, 2010, require a license in accordance with this regulation.

Rulemaking Requirements

1. This final rule has been determined to be not significant for purposes of Executive Order 12866.

2. Notwithstanding any other provision of law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*) (PRA), unless that collection of information displays a currently valid Office of Management and Budget (OMB) Control Number. This rule involves two collections of information subject to the PRA. One of the collections has been approved by OMB under control number 0694 0088, ''Multi Purpose Application,'' and carries a burden hour estimate of 58 minutes for a manual or electronic submission. The other of the collections has been approved by OMB under control number 0694 0106, ''Reporting and Recordkeeping Requirements under the Wassenaar Arrangement,'' and carries a burden hour estimate of 21 minutes for a manual or electronic submission. Send comments regarding these burden estimates or any other aspect of these collections of information, including suggestions for reducing the burden, to OMB Desk Officer, New Executive Office Building, Washington, DC 20503; and to Jasmeet Seehra, OMB Desk Officer, by e-mail at *jseehra@omb.eop.gov* or by fax to (202) 395–7285; and to the Office of Administration, Bureau of Industry and Security, Department of Commerce, 14th and Pennsylvania Avenue, NW., Room 6622, Washington, DC 20230.

3. This rule does not contain policies with Federalism implications as that term is defined under Executive Order 13132.

4. The provisions of the Administrative Procedure Act (5 U.S.C. 553) requiring notice of proposed rulemaking, the opportunity for public participation, and a delay in effective date, are inapplicable because this regulation involves a military and foreign affairs function of the United States (5 U.S.C. 553(a)(1)). Further, no other law requires that a notice of proposed rulemaking and an opportunity for public comment be given for this final rule. Because a notice of proposed rulemaking and an opportunity for public comment are not required to be given for this rule under the Administrative Procedure Act or by any other law, the analytical requirements of the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) are not applicable. Therefore, this regulation is issued in final form. Although there is no formal comment period, public comments on this regulation are welcome on a continuing basis. Comments should be submitted to Sharron Cook, Office of Exporter Services, Bureau of Industry and Security, Department of Commerce,

14th and Pennsylvania Ave., NW., Room 2705, Washington, DC 20230.

List of Subjects

15 CFR Part 772

Exports.

15 CFR Part 774

Exports, Reporting and recordkeeping requirements.

■ Accordingly, parts 772 and 774 of the Export Administration Regulations (15 CFR Parts 730–774) are amended as follows:

PART 772—[AMENDED]

■ 1. The authority citations for part 772 continue to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.;* 50 U.S.C. 1701 *et seq.;* E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of August 13, 2009, 74 FR 41325 (August 14, 2009).

■ 2. Section 772.1 is amended by revising terms ''specific modulus'' and ''specific tensile strength'' to read as follows:

§ 772.1 Definitions of terms as used in the Export Administration Regulations (EAR).

* * * * *

''Specific modulus''. (Cat 1)—Young's modulus in pascals, equivalent to N/m^2, divided by specific weight in N/m^3, measured at a temperature of (296 ± 2) K ((23 ± 2)° C) and a relative humidity of (50 ± 5)%.

''Specific tensile strength''. (Cat 1)—Ultimate tensile strength in pascals, equivalent to N/m^2, divided by specific weight in N/m^3, measured at a temperature of (296 ± 2) K ((23 ± 2)° C) and relative humidity of (50 ± 5)%.

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PART 774— [AMENDED]

■ 3. The authority citations for part 774—continue to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.;* 50 U.S.C. 1701 *et seq.;* 10 U.S.C. 7420; 10 U.S.C. 7430(e); 22 U.S.C. 287c, 22 U.S.C. 3201 *et seq.,* 22 U.S.C. 6004; 30 U.S.C. 185(s), 185(u); 42 U.S.C. 2139a; 42 U.S.C. 6212; 43 U.S.C. 1354; 46 U.S.C. app. 466c; 50 U.S.C. app. 5; 22 U.S.C. 7201 *et seq.;* 22 U.S.C. 7210; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of August 13, 2009, 74 FR 41325 (August 14, 2009).

■ 4. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1A001 is amended by revising the items paragraph in the List of Items Controlled section, to read as follows:

Supplement No. 1 to Part 774—Commerce Control List

* * * * *

1A001 Components made from fluorinated compounds, as follows (*see* List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. Seals, gaskets, sealants or fuel bladders, specially designed for ''aircraft'' or aerospace use, made from more than 50% by weight of any of the materials controlled by 1C009.b or 1C009.c;

b. Piezoelectric polymers and copolymers, made from vinylidene fluoride materials, controlled by 1C009.a:

b.1. In sheet or film form; and

b.2. With a thickness exceeding 200 μm;

c. Seals, gaskets, valve seats, bladders or diaphragms, made from fluoroelastomers containing at least one vinylether group as a constitutional unit, specially designed for ''aircraft'', aerospace or missile use.

■ 5. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1B001 is amended by:

■ a. Revising the Heading; and

■ b. Revising paragraphs .a, .b., .c. and .d.2, in the Items paragraph of the List of Items Controlled to read as follows:

1B001 Equipment for the production of fibers, prepregs, preforms or ''composites'', controlled by 1A002 or 1C010, as follows (*see* List of Items Controlled), and specially designed components and accessories therefor.

* * * * *

List of Items Controlled

* * * * *

Items:

a. Filament winding machines of which the motions for positioning, wrapping and winding fibers are coordinated and programmed in three or more axes, specially designed for the manufacture of ''composite'' structures or laminates, from ''fibrous or filamentary materials'';

b. Tape-laying or tow-placement machines, of which the motions for positioning and laying tape, tows or sheets are coordinated and programmed in two or more axes, specially designed for the manufacture of ''composite'' airframe or ''missile'' structures;

c. Multidirectional, multidimensional weaving machines or interlacing machines, including adapters and modification kits, for weaving, interlacing or braiding fibers, to manufacture ''composite'' structures;

Technical Note: For the purposes of 1B001.c the technique of interlacing includes knitting.

Note: 1B001.c does not control textile machinery not modified for the above end-uses.

d. * * *

d.2. Equipment for the chemical vapor deposition of elements or compounds, on heated filamentary substrates, to manufacture silicon carbide fibers;

* * * * *

■ 6. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C001 is amended by:

■ a. Revising the introductory paragraph to Note 1 paragraph c in the Items paragraph;

■ b. Revising the introductory paragraph to Note 1 paragraph d in the Items paragraph;

■ c. Revising the introductory paragraph to c in the Items paragraph;

■ d. Revising the Technical Note that follows paragraph c, to read as follows:

1C001 Materials specially designed for use as absorbers of electromagnetic waves, or intrinsically conductive polymers, as follows (*see* List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. * * *

Note 1: * * *

c. Planar absorbers, having all of the following:

* * * * *

d. Planar absorbers made of sintered ferrite, having all of the following:

* * * * *

c. Intrinsically conductive polymeric materials with a 'bulk electrical conductivity' exceeding 10,000 S/m (Siemens per meter) or a 'sheet (surface) resistivity' of less than 100 ohms/square, based on any of the following polymers:

* * * * *

Technical Note: 'Bulk electrical conductivity' and 'sheet (surface) resistivity' should be determined using ASTM D–257 or national equivalents.

■ 7. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C002 is amended by revising the Items paragraph in the List of Items Controlled section, to read as follows:

1C002 Metal alloys, metal alloy powder and alloyed materials, as follows (*see* List of Items Controlled)

* * * * *

List of Items Controlled

* * * * *

Items:

Note: 1C002 does not control metal alloys, metal alloy powder and alloyed materials, for coating substrates.

Technical Note 1: The metal alloys in 1C002 are those containing a higher percentage by weight of the stated metal than of any other element.

Technical Note 2: 'Stress-rupture life' should be measured in accordance with ASTM standard E–139 or national equivalents.

Technical Note 3: 'Low cycle fatigue life' should be measured in accordance with ASTM Standard E–606 'Recommended Practice for Constant-Amplitude Low-Cycle

Fatigue Testing' or national equivalents. Testing should be axial with an average stress ratio equal to 1 and a stress-concentration factor (K_t) equal to 1. The average stress is defined as maximum stress minus minimum stress divided by maximum stress.

a. Aluminides, as follows:

a.1. Nickel aluminides containing a minimum of 15% by weight aluminum, a maximum of 38% by weight aluminum and at least one additional alloying element;

a.2. Titanium aluminides containing 10% by weight or more aluminum and at least one additional alloying element;

b. Metal alloys, as follows, made from material controlled by 1C002.c:

b.1. Nickel alloys having any of the following:

b.1.a. A 'stress-rupture life' of 10,000 hours or longer at 923 K (650 °C) at a stress of 676 MPa; or

b.1.b. A 'low cycle fatigue life' of 10,000 cycles or more at 823 K (550 °C) at a maximum stress of 1,095 MPa;

b.2. Niobium alloys having any of the following:

b.2.a. A 'stress-rupture life' of 10,000 hours or longer at 1,073 K (800 °C) at a stress of 400 MPa; or

b.2.b. A 'low cycle fatigue life' of 10,000 cycles or more at 973 K (700 °C) at a maximum stress of 700 MPa;

b.3. Titanium alloys having any of the following:

b.3.a. A 'stress-rupture life' of 10,000 hours or longer at 723 K (450 °C) at a stress of 200 MPa; *or*

b.3.b. A 'low cycle fatigue life' of 10,000 cycles or more at 723 K (450 °C) at a maximum stress of 400 MPa;

b.4 Aluminum alloys having any of the following:

b.4.a. A tensile strength of 240 MPa or more at 473 K (200 °C); or

b.4.b. A tensile strength of 415 MPa or more at 298 K (25 °C);

b.5. Magnesium alloys having all the following:

b.5.a. A tensile strength of 345 MPa or more; and

b.5.b. A corrosion rate of less than 1 mm/year in 3% sodium chloride aqueous solution measured in accordance with ASTM standard G–31 or national equivalents;

c. Metal alloy powder or particulate material, having all of the following:

c.1. Made from any of the following composition systems:

Technical Note: X in the following equals one or more alloying elements.

c.1.a. Nickel alloys (Ni-Al-X, Ni-X–Al) qualified for turbine engine parts or components, *i.e.* with less than 3 non-metallic particles (introduced during the manufacturing process) larger than 100 µm in 10^9 alloy particles;

c.1.b. Niobium alloys (Nb-Al-X or Nb-X–Al, Nb-Si-X or Nb-X–Si, Nb-Ti-X or Nb-X–Ti);

c.1.c. Titanium alloys (Ti-Al-X or Ti-X–Al);

c.1.d. Aluminum alloys (Al-Mg-X or Al-X–Mg, Al-Zn-X or Al-X–Zn, Al-Fe-X or Al-X–Fe); or

c.1.e. Magnesium alloys (Mg-Al-X or Mg-X–Al);

c.2. Made in a controlled environment by any of the following processes:

c.2.a. ''Vacuum atomization'';

c.2.b. ''Gas atomization'';

c.2.c. ''Rotary atomization'';

c.2.d. ''Splat quenching'';

c.2.e. ''Melt spinning'' and ''comminution'';

c.2.f. ''Melt extraction'' and ''comminution''; *or*

c.2.g. ''Mechanical alloying''; *and*

c.3. Capable of forming materials controlled by 1C002.a or 1C002.b;

d. Alloyed materials, having all the following:

d.1. Made from any of the composition systems specified by 1C002.c.1;

d.2. In the form of uncomminuted flakes, ribbons or thin rods; *and*

d.3. Produced in a controlled environment by any of the following:

d.3.a. ''Splat quenching'';

d.3.b. ''Melt spinning''; or

d.3.c. ''Melt extraction''.

■ 8. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C003 is amended by revising the Heading and the Items paragraph in the List of Items Controlled section, to read as follows:

1C003 Magnetic metals, of all types and of whatever form, having any of the following (*see* List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. Initial relative permeability of 120,000 or more and a thickness of 0.05 mm or less;

Technical Note: Measurement of initial permeability must be performed on fully annealed materials.

b. Magnetostrictive alloys having any of the following:

b.1. A saturation magnetostriction of more than 5×10^{-4}; or

b.2. A magnetomechanical coupling factor (k) of more than 0.8; or

c. Amorphous or 'nanocrystalline' alloy strips, having all of the following:

c.1. A composition having a minimum of 75% by weight of iron, cobalt or nickel;

c.2. A saturation magnetic induction (B_s) of 1.6 T or more; and

c.3. Any of the following:

c.3.a. A strip thickness of 0.02 mm or less; or

c.3.b. An electrical resistivity of 2×10^{-4}; ohm cm or more.

Technical Note: 'Nanocrystalline' materials in 1C003.c are those materials having a crystal grain size of 50 nm or less, as determined by X-ray diffraction.

■ 9. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C004 is amended by revising the Heading, to read as follows:

1C004 Uranium titanium alloys or tungsten alloys with a ''matrix'' based on iron, nickel or copper, having all of the following (*see* List of Items Controlled).

* * * * *

■ 10. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C005 is amended by revising the items paragraph in the List of Items Controlled section, to read as follows:

1C005 ''Superconductive'' ''composite'' conductors in lengths exceeding 100 m or with a mass exceeding 100 g, as follows (*see* List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. ''Superconductive'' ''composite'' conductors containing one or more niobium-titanium 'filaments', having all of the following:

a.1. Embedded in a ''matrix'' other than a copper or copper-based mixed ''matrix''; and

a.2. Having a cross-section area less than 0.28×10^{-4} mm^2 (6 µm in diameter for circular 'filaments');

b. ''Superconductive'' ''composite'' conductors consisting of one or more ''superconductive'' 'filaments' other than niobium-titanium, having all of the following:

b.1. A ''critical temperature'' at zero magnetic induction exceeding 9.85 K (−263.31 °C); and

b.2. Remaining in the ''superconductive'' state at a temperature of 4.2 K (−268.96 °C) when exposed to a magnetic field oriented in any direction perpendicular to the longitudinal axis of conductor and corresponding to a magnetic induction of 12 T with critical current density exceeding 1750 A/mm^2 on overall cross-section of the conductor.

c. ''Superconductive'' ''composite'' conductors consisting of one or more ''superconductive'' 'filaments' which remain ''superconductive'' above 115 K (−158.16 °C).

Technical Note: For the purpose of 1C005, 'filaments' may be in wire, cylinder, film, tape or ribbon form.

■ 11. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C006 is amended by revising the Items paragraph in the List of Items Controlled section, to read as follows:

1C006 Fluids and lubricating materials, as follows (*see* List of Items Controlled).

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List of Items Controlled

* * * * *

Items:

a. Hydraulic fluids containing, as their principal ingredients, any of the following:

a.1. Synthetic 'silahydrocarbon oils', having all of the following:

Technical Note: For the purpose of 1C006.a.1, 'silahydrocarbon oils' contain exclusively silicon, hydrogen and carbon.

a.1.a. A 'flash point' exceeding 477 K (204 °C);

a.1.b. A 'pour point' at 239 K (−34 °C) or less;

a.1.c. A 'viscosity index' of 75 or more; and

a.1.d. A 'thermal stability' at 616 K (343 °C); or

a.2. 'Chlorofluorocarbons', having all of the following:

Technical Note: For the purpose of 1C006.a.2, 'chlorofluorocarbons' contain exclusively carbon, fluorine and chlorine.

a.2.a. No 'flash point';

a.2.b. An 'autogenous ignition temperature' exceeding 977 K (704 °C);

a.2.c. A 'pour point' at 219 K (−54 °C) or less;

a.2.d. A 'viscosity index' of 80 or more; and

a.2.e. A boiling point at 473 K (200 °C) or higher;

Technical Note: For the purpose of 1C006.a the following determinations apply:

i. 'Flash point' is determined using the Cleveland Open Cup Method described in ASTM D–92 or national equivalents;

ii. 'Pour point' is determined using the method described in ASTM D–97 or national equivalents;

iii. 'Viscosity index' is determined using the method described in ASTM D–2270 or national equivalents;

iv. 'Thermal stability' is determined by the following test procedure or national equivalents:

Twenty ml of the fluid under test is placed in a 46 ml type 317 stainless steel chamber containing one each of 12.5 mm (nominal) diameter balls of M–10 tool steel, 52100 steel and naval bronze (60% Cu, 39% Zn, 0.75% Sn);

The chamber is purged with nitrogen, sealed at atmospheric pressure and the temperature raised to and maintained at 644 ± 6 K (371 ± 6 °C) for six hours;

The specimen will be considered thermally stable if, on completion of the above procedure, all of the following conditions are met:

a. The loss in weight of each ball is less than 10 mg/mm^2 of ball surface;

b. The change in original viscosity as determined at 311 K (38 °C) is less than 25%; and

c. The total acid or base number is less than 0.40;

5. 'Autogenous ignition temperature' is determined using the method described in ASTM E–659 or national equivalents.

b. Lubricating materials containing, as their principal ingredients, any of the following:

b.1. Phenylene or alkylphenylene ethers or thio-ethers, or their mixtures, containing more than two ether or thio-ether functions or mixtures thereof; or

b.2. Fluorinated silicone fluids with a kinematic viscosity of less than 5,000 mm^2/s (5,000 centistokes) measured at 298 K (25 °C);

c. Damping or flotation fluids, with a purity exceeding 99.8%, containing less than 25 particles of 200 μm or larger in size per 100 ml and made from at least 85% of any of the following:

c.1. Dibromotetrafluoroethane;

c.2. Polychlorotrifluoroethylene (oily and waxy modifications only); or

c.3. Polybromotrifluoroethylene;

d. Fluorocarbon electronic cooling fluids having all of the following:

d.1. Containing 85% by weight or more of any of the following, or mixtures thereof:

d.1.a. Monomeric forms of perfluoropolyalkylether- triazines or perfluoroaliphatic-ethers;

d.1.b. Perfluoroalkylamines;

d.1.c. Perfluorocycloalkanes; or

d.1.d. Perfluoroalkanes;

d.2. Density at 298 K (25 °C) of 1.5 g/ml or more;

d.3. In a liquid state at 273 K (0 °C); and

d.4. Containing 60% or more by weight of fluorine;

e. Autogenous ignition temperature is determined using the method described in ASTM E–659 or national equivalents.

■ 12. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C007 is amended by revising paragraph .a in the Items paragraph in the List of Items Controlled section, to read as follows:

1C007 Ceramic base materials, non-''composite'' ceramic materials, ceramic-''matrix'' ''composite'' materials and precursor materials, as follows (*see* List of Items Controlled).

* * * * *

List of Items Controlled

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Items:

a. Base materials of single or complex borides of titanium, having total metallic impurities, excluding intentional additions, of less than 5,000 ppm, an average particle size equal to or less than 5 μm and no more than 10% of the particles larger than 10 μm;

* * * * *

■ 13. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C009 is amended by revising the Heading, to read as follows:

1C009 Unprocessed fluorinated compounds as follows (*see* List of Items Controlled).

* * * * *

■ 14. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C011 is amended by revising the Items paragraph in the List of Items Controlled section, to read as follows:

1C011 Metals and compounds, as follows (*see* List of Items Controlled).

* * * * *

List of Items Controlled

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Items:

a. Metals in particle sizes of less than 60 μm whether spherical, atomized, spheroidal, flaked or ground, manufactured from material consisting of 99% or more of zirconium, magnesium and alloys thereof;

Technical Note: The natural content of hafnium in the zirconium (typically 2% to 7%) is counted with the zirconium.

Note: The metals or alloys specified by 1C011.a also refer to metals or alloys encapsulated in aluminum, magnesium, zirconium or beryllium.

b. Boron or boron carbide of 85% purity or higher, and a particle size of 60 μm or less;

Note: The metals or alloys specified by 1C011.b also refer to metals or alloys encapsulated in aluminum, magnesium, zirconium or beryllium.

c. Guanidine nitrate;

d. Nitroguanidine (NQ) (CAS 556–88–7).

■ 15. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C012 is amended by revising the Items paragraph in the List of Items Controlled section, to read as follows:

1C012 Materials, as follows (*see* List of Items Controlled).

* * * * *

List of Items Controlled

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Items:

a. Plutonium in any form with a plutonium isotopic assay of plutonium-238 of more than 50% by weight;

Note: 1C012.a does not control:

a. Shipments with a plutonium content of 1 g or less;

b. Shipments of 3 ''effective grams'' or less when contained in a sensing component in instruments.

b. ''Previously separated'' neptunium-237 in any form.

Note: 1C012.b does not control shipments with a neptunium-237 content of 1 g or less.

■ 16. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 2, ECCN 2A001 is amended by revising the Items paragraph of the List of Items Controlled to read as follows:

2A001 Anti-friction bearings and bearing systems, as follows, (see List of Items Controlled) and components therefor.

* * * * *

List of Items Controlled

* * * * *

Items:

Note: 2A001 does not control balls with tolerances specified by the manufacturer in accordance with ISO 3290 as grade 5 or worse.

a. Ball bearings and solid roller bearings, having all tolerances specified by the manufacturer in accordance with ISO 492 Tolerance Class 4 (or ANSI/ABMA Std 20 Tolerance Class ABEC–7 or RBEC–7, or other national equivalents), or better, and having both rings and rolling elements (ISO 5593), made from monel or beryllium;

Note: 2A001.a does not control tapered roller bearings.

b. Other ball bearings and solid roller bearings, having all tolerances specified by

the manufacturer in accordance with ISO 492 Tolerance Class 2 (or ANSI/ABMA Std 20 Tolerance Class ABEC–9 or RBEC–9, or other national equivalents), or better;

Note: 2A001.b does not control tapered roller bearings.

c. Active magnetic bearing systems using any of the following:

c.1. Materials with flux densities of 2.0 T or greater and yield strengths greater than 414 MPa;

c.2. All-electromagnetic 3D homopolar bias designs for actuators; or

c.3. High temperature (450 K (177°C) and above) position sensors.

■ 17. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 2, ECCN 2B001 is amended by revising the introductory text to the Note that follows paragraph c in the Items paragraph of the List of Items Controlled to read as follows:

2B001 Machine tools and any combination thereof, for removing (or cutting) metals, ceramics or ''composites'', which, according to the manufacturer's technical specifications, can be equipped with electronic devices for ''numerical control''; and specially designed components as follows (*see* List of Items Controlled).

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List of Items Controlled

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Items:

* * * * *

c. * * *

Notes: 2B001.c does not control grinding machines as follows: * * *

* * * * *

■ 18. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 2, ECCN 2B004 is amended by revising the Heading and the introductory paragraph .b in the Items paragraph of the List of Items Controlled to read as follows:

2B004 Hot ''isostatic presses'' having all of the characteristics described in the List of Items Controlled, and specially designed components and accessories therefor.

* * * * *

List of Items Controlled

* * * * *

Items:

* * * * *

b. Having any of the following:

* * * * *

■ 19. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 2, ECCN 2B005 is amended by revising the Related Controls and Items paragraph of the List of Items Controlled to read as follows:

2B005 Equipment specially designed for the deposition, processing and in-process control of inorganic overlays, coatings and surface modifications, as follows, for non-electronic substrates, by processes shown in the Table and associated Notes following 2E003.f, and specially designed automated handling, positioning, manipulation and control components therefor.

* * * * *

List of Items Controlled

* * * * *

Related Controls: (1) This entry does not control chemical vapor deposition, cathodic arc, sputter deposition, ion plating or ion implantation equipment, specially designed for cutting or machining tools. (2) Vapor deposition equipment for the production of filamentary materials are controlled by 1B001 or 1B101. (3) Chemical Vapor Deposition furnaces designed or modified for densification of carbon-carbon composites are controlled by *2B104.* (4) *See also 2B999.i.*

* * * * *

Items:

a. Chemical vapor deposition (CVD) production equipment having all of the following:

a.1. A process modified for one of the following:

a.1.a. Pulsating CVD;

a.1.b. Controlled nucleation thermal deposition (CNTD); or

a.1.c. Plasma enhanced or plasma assisted CVD; and

a.2. Having any of the following:

a.2.a. Incorporating high vacuum (equal to or less than 0.01 Pa) rotating seals; or

a.2.b. Incorporating in situ coating thickness control;

b. Ion implantation production equipment having beam currents of 5 mA or more;

c. Electron beam physical vapor deposition (EB–PVD) production equipment incorporating power systems rated for over 80 kW and having any of the following:

c.1. A liquid pool level ''laser'' control system which regulates precisely the ingots feed rate; *or*

c.2. A computer controlled rate monitor operating on the principle of photo-luminescence of the ionized atoms in the evaporant stream to control the deposition rate of a coating containing two or more elements;

d. Plasma spraying production equipment having any of the following:

d.1. Operating at reduced pressure controlled atmosphere (equal or less than 10 kPa measured above and within 300 mm of the gun nozzle exit) in a vacuum chamber capable of evacuation down to 0.01 Pa prior to the spraying process; *or*

d.2. Incorporating in situ coating thickness control;

e. Sputter deposition production equipment capable of current densities of 0.1 mA/mm^2 or higher at a deposition rate 15 μm/h or more;

f. Cathodic arc deposition production equipment incorporating a grid of electromagnets for steering control of the arc spot on the cathode;

g. Ion plating production equipment allowing for the in situ measurement of any of the following:

g.1. Coating thickness on the substrate and rate control; *or*

g.2. Optical characteristics.

■ 20. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 2, ECCN 2B009 is amended by revising the Items paragraph of the List of Items Controlled to read as follows:

2B009 Spin-forming machines and flow-forming machines, which, according to the manufacturer's technical specifications, can be equipped with ''numerical control'' units or a computer control and having all of the following characteristics (*see* List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. Two or more controlled axes of which at least two can be coordinated simultaneously for ''contouring control''; *and*

b. A roller force more than 60 kN.

Technical Note: For the purpose of 2B009, machines combining the function of spin-forming and flow-forming are regarded as flow-forming machines.

■ 21. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 2, ECCN 2E003 is amended by revising the Nota Bene after 2E003.f in the Items paragraph of the List of Items Controlled to read as follows:

2E003 Other ''technology'', as follows (*see* List of Items Controlled)

* * * * *

List of Items Controlled

* * * * *

Items:

* * * * *

f. * * *

N.B. *This table should be read to control the technology of a particular 'Coating Process' only when the resultant coating in column 3 is in a paragraph directly across from the relevant 'Substrate' under column 2. For example, Chemical Vapor Deposition (CVD) 'coating process' technical data are controlled for the application of 'silicides' to 'Carbon-carbon, Ceramic and Metal ''matrix'' ''composites'' substrates, but are not controlled for the application of 'silicides' to 'Cemented tungsten carbide (16), Silicon carbide (18)' substrates. In the second case, the resultant coating is not listed in the paragraph under column 3 directly across from the paragraph under column 2 listing 'Cemented tungsten carbide (16), Silicon carbide (18)'.*

■ 22. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 2—Materials Processing, Notes to Table on Deposition Techniques are amended by revising Notes 5, 10, and 17, to read as follows:

Note: Notes to Table on Deposition Techniques:

* * * * *

5. MCrAlX refers to a coating alloy where M equals cobalt, iron, nickel or combinations thereof and X equals hafnium, yttrium, silicon, tantalum in any amount or other intentional additions over 0.01% by weight in various proportions and combinations, except:

a. CoCrAlY coatings which contain less than 22% by weight of chromium, less than 7% by weight of aluminum and less than 2% by weight of yttrium;

b. CoCrAlY coatings which contain 22 to 24% by weight of chromium, 10 to 12% by weight of aluminum and 0.5 to 0.7% by weight of yttrium; or

c. NiCrAlY coatings which contain 21 to 23% by weight of chromium, 10 to 12% by weight of aluminum and 0.9 to 1.1% by weight of yttrium.

* * * * *

10. ''Technology'' for single-step pack cementation of solid airfoils is not controlled by Category 2.

* * * * *

17. ''Technology'' specially designed to deposit diamond-like carbon on any of the following is not controlled: magnetic disk drives and heads, equipment for the manufacture of disposables, valves for faucets, acoustic diaphragms for speakers, engine parts for automobiles, cutting tools, punching-pressing dies, office automation equipment, microphones, medical devices or molds, for casting or molding of plastics, manufactured from alloys containing less than 5% beryllium.

* * * * *

■ 23. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3, ECCN 3A002 is amended by revising Note 1 that follows paragraph d in the Items paragraph of the List of Items Controlled section to read as follows:

3A002 General purpose electronic equipment and accessories therefor, as follows (*see* List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

* * * * *

d. * * *

Note 1: For the purpose of 3A002.d., frequency synthesized signal generators include arbitrary waveform and function generators.

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■ 24. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3, ECCN 3B002 is amended by revising the Heading to read as follows:

3B002 Test equipment specially designed for testing finished or unfinished semiconductor devices as follows (*see* List of Items Controlled) and specially designed components and accessories therefor.

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■ 25. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3, ECCN 3C001 is amended by revising the Items paragraph of the List of Items Controlled section to read as follows:

3C001 Hetero-epitaxial materials consisting of a ''substrate'' having stacked epitaxially grown multiple layers of any of the following (*see* List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. Silicon (Si);

b. Germanium (Ge);

c. Silicon Carbide (SiC); *or*

d. ''III/V compounds'' of gallium or indium.

■ 26. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3, ECCN 3C003 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section to read as follows:

3C003 Organo-inorganic compounds as follows (*see* List of Items Controlled)

* * * * *

List of Items Controlled

* * * * *

Items:

a. Organo-metallic compounds of aluminum, gallium or indium, having a purity (metal basis) better than 99.999%;

b. Organo-arsenic, organo-antimony and organo-phosphorus compounds, having a purity (inorganic element basis) better than 99.999%.

■ 27. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3, ECCN 3D002 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section to read as follows:

3D002 ''Software'' specially designed for the ''use'' of equipment controlled by 3B001.a to .f, or 3B002.

* * * * *

List of Items Controlled

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Items:

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

■ 28. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3, ECCN 3D003 is amended by revising the Heading to read as follows:

3D003 'Physics-based' simulation ''software'' specially designed for the ''development'' of lithographic, etching or deposition processes for translating masking patterns into specific topographical patterns in conductors, dielectrics or semiconductor materials.

* * * * *

■ 29. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3, ECCN 3D004 is amended by revising the Heading to read as follows:

3D004 ''Software'' specially designed for the ''development'' of equipment controlled by 3A003.

* * * * *

■ 30. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3, ECCN 3E002 is amended by revising the Items paragraph of the List of Items Controlled section to read as follows:

3E002 ''Technology'' according to the General Technology Note other than that controlled in 3E001 for the ''development'' or ''production'' of a ''microprocessor microcircuit'', ''micro-computer microcircuit'' and microcontroller microcircuit core, having an arithmetic logic unit with an access width of 32 bits or more and any of the following features or characteristics (*see* List of Items Controlled).

* * * * *

List of Items Controlled

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Items:

a. A 'vector processor unit' designed to perform more than two calculations on floating-point vectors (one dimensional arrays of 32-bit or larger numbers) simultaneously;

Technical Note: A 'vector processor unit' is a processor element with built-in instructions that perform multiple calculations on floating-point vectors (one-dimensional arrays of 32-bit or larger numbers) simultaneously, having at least one vector arithmetic logic unit.

b. Designed to perform more than two 64-bit or larger floating-point operation results per cycle; or

c. Designed to perform more than four 16-bit fixed-point multiply-accumulate results per cycle (*e.g.,* digital manipulation of analog information that has been previously converted into digital form, also known as digital ''signal processing'').

Note: 3E002.c does not control ''technology'' for multimedia extensions.

Notes:

1. 3E002 does not control ''technology'' for the ''development'' or ''production'' of microprocessor cores, having all of the following:

a. Using ''technology'' at or above 0.130 µm; *and*

b. Incorporating multi-layer structures with five or fewer metal layers.

2. 3E002 includes ''technology'' for digital signal processors and digital array processors.

■ 31. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3. ECCN 3E003 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section to read as follows:

3E003 Other ''technology'' for the ''development'' or ''production'' of the following (*see* List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. Vacuum microelectronic devices;

b. Hetero-structure semiconductor devices such as high electron mobility transistors (HEMT), hetero-bipolar transistors (HBT), quantum well and super lattice devices;

Note: 3E003.b does not control ''technology'' for high electron mobility transistors (HEMT) operating at frequencies lower than 31.8 GHz and hetero-junction bipolar transistors (HBT) operating at frequencies lower than 31.8 GHz.

c. ''Superconductive'' electronic devices;

d. Substrates of films of diamond for electronic components;

e. Substrates of silicon-on-insulator (SOI) for integrated circuits in which the insulator is silicon dioxide;

f. Substrates of silicon carbide for electronic components;

g. Electronic vacuum tubes operating at frequencies of 31.8 GHz or higher.

■ 32. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 4, ECCN 4A001 is amended by revising the Heading and Items paragraph of the List of Items Controlled section to read as follows:

4A001 Electronic computers and related equipment, having any of the following (*see* List of Items Controlled), and ''electronic assemblies'' and specially designed components therefor.

* * * * *

List of Items Controlled

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Items:

a. Specially designed to have any of the following:

a.1. Rated for operation at an ambient temperature below 228 K (−45EC) or above 358 K (85EC); or

Note: 4A001.a.1. does not apply to computers specially designed for civil automobile or railway train applications.

a.2. Radiation hardened to exceed any of the following specifications:

a.2.a. A total dose of 5 x 10^3 Gy (Si);

a.2.b. A dose rate upset of 5 x 10^6 Gy (Si)/s; or

a.2.c. Single Event Upset of 1 x 10^{-7} Error/bit/day;

b. Having characteristics or performing functions exceeding the limits in Category 5, Part 2 (''Information Security'').

■ 33. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 4, ECCN 4A003 is amended by revising the Heading and Items paragraph of the List of Items Controlled section to read as follows:

4A003 ''Digital computers'', ''electronic assemblies'', and related equipment therefor, as follows and specially designed components therefor.

* * * * *

List of Items Controlled

* * * * *

Items:

Note 1: 4A003 includes the following:

—'Vector processors' (as defined in Note 7 of the ''Technical Note on ''Adjusted Peak Performance'' (''APP'')'');
—Array processors;
—Digital signal processors;
—Logic processors;
—Equipment designed for ''image enhancement'';
—Equipment designed for ''signal processing''.

Note 2: The control status of the ''digital computers'' and related equipment described in 4A003 is determined by the control 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 control status of ''signal processing'' or ''image enhancement'' equipment specially designed for other equipment with functions limited to those required for the other equipment is determined by the control status of the other equipment even if it exceeds the ''principal element'' criterion.

N.B. 2: For the control status of ''digital computers'' or related equipment for telecommunications equipment, *see* Category 5, Part 1 (Telecommunications).

c. The ''technology'' for the ''digital computers'' and related equipment is determined by 4E.

a. Designed or modified for ''fault tolerance'';

Note: For the purposes of 4A003.a., ''digital computers'' and related equipment are not considered to be designed or modified for ''fault tolerance'' if they utilize any of the following:

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 synchronization of two central processing units by ''software'' so that one central processing unit recognizes when the other central processing unit fails and recovers tasks from the failing unit.

b. ''Digital computers'' having an ''Adjusted Peak Performance'' (''APP'') exceeding 0.75 weighted TeraFLOPS (WT);

c. ''Electronic assemblies'' specially designed or modified to be capable of enhancing performance by aggregation of processors so that the ''APP'' of the aggregation exceeds the limit in 4A003.b.;

Note 1: 4A003.c applies only to ''electronic assemblies'' and programmable interconnections not exceeding the limit in 4A003.b. when shipped as unintegrated ''electronic assemblies''. It does not apply to ''electronic assemblies'' inherently limited by nature of their design for use as related equipment controlled by 4A003.e.

Note 2: 4A003.c does not control ''electronic assemblies'' specially designed for a product or family of products whose maximum configuration does not exceed the limit of 4A003.b.

d. [RESERVED]

e. Equipment performing analog-to-digital conversions exceeding the limits in 3A001.a.5;

f. [RESERVED]

g. Equipment specially designed to provide external interconnection of ''digital computers'' or associated equipment that allows communications at data rates exceeding 1.25 Gbyte/s.

Note: 4A003.g does not control internal interconnection equipment (*e.g.,* backplanes, buses) passive interconnection equipment, ''network access controllers'' or ''communication channel controllers''.

■ 34. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 4, ECCN 4A004 is amended by revising the Heading to read as follows:

4A004 Computers as follows (*see* List of Items Controlled) and specially designed related equipment, ''electronic assemblies'' and components therefor.

* * * * *

■ 35. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 4—Computers is amended by revising Technical Note on ''Adjusted Peak Performance'' (''APP''), located at the end of Category 4, to read as follows:

Technical Note on ''Adjusted Peak Performance'' (''APP'')

''APP'' is an adjusted peak rate at which ''digital computers'' perform 64-bit or larger floating point additions and multiplications.

Abbreviations used in this Technical Note

n number of processors in the ''digital computer''
I processor number (i,....n)
ti processor cycle time (ti = 1/Fi)
Fi processor frequency
Ri peak floating point calculating rate
Wi architecture adjustment factor

''APP'' is expressed in Weighted TeraFLOPS (WT), in units of 1012 adjusted floating point operations per second,

Outline of ''APP'' Calculation Method

1. For each processor i, determine the peak number of 64-bit or larger floating-point operations, FPOi, performed per cycle for each processor in the ''digital computer''.

Note: In determining FPO, include only 64-bit or larger floating point additions and/or multiplications. All floating point operations must be expressed in operations per processor cycle; operations requiring multiple cycles may be expressed in fractional results per cycle. For processors not capable of performing calculations on floating-point operands of 64-bits or more the effective calculating rate R is zero.

2. Calculate the floating point rate R for each processor.

Ri = FPOi/ti.

3. Calculate ''APP'' as

''APP'' = W1 × R1 + W2 × R2 + * * * + Wn × Rn.

4. For 'vector processors', Wi = 0.9. For non-'vector processors', Wi = 0.3.

Note 1: For processors that perform compound operations in a cycle, such as an addition and multiplication, each operation is counted.

Note 2: For a pipelined processor the effective calculating rate R is the faster of the pipelined rate, once the pipeline is full, or the non-pipelined rate.

Note 3: The calculating rate R of each contributing processor is to be calculated at its maximum value theoretically possible before the ''APP'' of the combination is derived. Simultaneous operations are assumed to exist when the computer manufacturer claims concurrent, parallel, or simultaneous operation or execution in a manual or brochure for the computer.

Note 4: Do not include processors that are limited to input/output and peripheral functions (*e.g.,* disk drive, communication and video display) when calculating ''APP''.

Note 5: ''APP'' values are not to be calculated for processor combinations (inter)connected by ''Local Area Networks'', Wide Area Networks, I/O shared connections/devices, I/O controllers and any communication interconnection implemented by ''software''.

Note 6: ''APP'' values must be calculated for (1) processor combinations containing processors specially designed to enhance performance by aggregation, operating simultaneously and sharing memory; or (2) multiple memory/processor combinations operating simultaneously utilizing specially designed hardware.

Note 7: A 'vector processor' is defined as a processor with built-in instructions that perform multiple calculations on floating-point vectors (one-dimensional arrays of 64-bit or larger numbers) simultaneously, having at least 2 vector functional units and at least 8 vector registers of at least 64 elements each.

■ 36. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6A007 is amended by revising the Items paragraph of the List of Items Controlled section, to read as follows:

6A007 Gravity meters (gravimeters) and gravity gradiometers, as follows (*see* List of Items Controlled).

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List of Items Controlled

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Items:

a. Gravity meters designed or modified for ground use and having a static accuracy of less (better) than 10 μgal;

Note: 6A007.a does not control ground gravity meters of the quartz element (Worden) type.

b. Gravity meters designed for mobile platforms and having all of the following:

b.1. A static accuracy of less (better) than 0.7 mgal; *and*

b.2. An in-service (operational) accuracy of less (better) than 0.7 mgal having a time-to-steady-state registration of less than 2 minutes under any combination of attendant corrective compensations and motional influences;

c. Gravity gradiometers.

■ 37. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6B004 is amended by revising the Heading, to read as follows:

6B004 Optical equipment as follows (*see* List of Items Controlled).

* * * * *

■ 38. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6B008 is amended by revising the Heading, to read as follows:

6B008 Pulse radar cross-section measurement systems having transmit pulse widths of 100 ns or less, and specially designed components therefor.

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■ 39. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6C002 is amended by revising the Heading and Items paragraph of the List of Items Controlled section, to read as follows:

6C002 Optical sensor materials as follows (see List of Items Controlled).

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List of Items Controlled

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Items:

a. Elemental tellurium (Te) of purity levels of 99.9995% or more;

b. Single crystals (including epitaxial wafers) of any of the following:

b.1. Cadmium zinc telluride (CdZnTe), with zinc content less than 6% by 'mole fraction';

b.2. Cadmium telluride (CdTe) of any purity level; or

b.3. Mercury cadmium telluride (HgCdTe) of any purity level.

Technical Note: 'Mole fraction' is defined as the ratio of moles of ZnTe to the sum of the moles of CdTe and ZnTe present in the crystal.

■ 40. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6C004 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section, to read as follows:

6C004 Optical materials as follows (see List of Items Controlled).

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List of Items Controlled

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Items:

a. Zinc selenide (ZnSe) and zinc sulphide (ZnS) ''substrate blanks'', produced by the chemical vapor deposition process and having any of the following:

a.1. A volume greater than 100 cm^3; or

a.2. A diameter greater than 80 mm and a thickness of 20 mm or more;

b. Boules of any of the following electro-optic materials:

b.1. Potassium titanyl arsenate (KTA);

b.2. Silver gallium selenide ($AgGaSe_2$); *or*

b.3. Thallium arsenic selenide (Tl_3AsSe_3, also known as TAS);

c. Non-linear optical materials having all of the following:

c.1. Third order susceptibility (chi 3) of 10^{-6} m^2/V^2 or more; *and*

c.2. A response time of less than 1 ms;

d. ''Substrate blanks'' of silicon carbide or beryllium beryllium (Be/Be) deposited materials, exceeding 300 mm in diameter or major axis length;

e. Glass, including fused silica, phosphate glass, fluorophosphate glass, zirconium fluoride (ZrF_4) and hafnium fluoride (HfF_4) and having all of the following:

e.1. A hydroxyl ion (OH-) concentration of less than 5 ppm;

e.2. Integrated metallic purity levels of less than 1 ppm; and

e.3. High homogeneity (index of refraction variance) less than 5×10^{-6};

f. Synthetically produced diamond material with an absorption of less than 10^{-5} cm^{-1} for wavelengths exceeding 200 nm but not exceeding 14,000 nm.

■ 41. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6C005 is amended by revising the Heading to read as follows:

6C005 Synthetic crystalline ''laser'' host material in unfinished form as follows (*see* List of Items Controlled).

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■ 42. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6E003 is amended by revising the Heading and Items paragraphs of the List of Items Controlled section, to read as follows:

6E003 Other ''technology'' as follows (*see* List of Items Controlled).

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List of Items Controlled

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Items:

a. Acoustics. None.

b. Optical sensors. None.

c. Cameras. None.

OPTICS

d. ''Technology'' as follows:

d.1. Optical surface coating and treatment ''technology'', ''required'' to achieve uniformity of 99.5% or better for optical coatings 500 mm or more in diameter or major axis length and with a total loss (absorption and scatter) of less than 5×10^{-3};

N.B.: *See also* 2E003.f.

d.2. Optical fabrication ''technology'' using single point diamond turning techniques to produce surface finish accuracies of better than 10 nm rms on non-planar surfaces exceeding 0.5 m^2;

e. Lasers. ''Technology'' ''required'' for the ''development'', ''production'' or ''use'' of specially designed diagnostic instruments or targets in test facilities for ''SHPL'' testing or testing or evaluation of materials irradiated by ''SHPL'' beams;

f. Magnetic and Electric Field Sensors. None

g. Gravimeters. None

h. Radar. None

■ 43. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7A001 is amended by revising the Heading and Items paragraph in the List of Items Controlled section, to read as follows:

7A001 Accelerometers as follows (*see* List of Items Controlled) and specially designed components therefor.

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List of Items Controlled

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Items:

a. Linear accelerometers having any of the following:

a.1. Specified to function at linear acceleration levels less than or equal to 15 g and having any of the following:

a.1.a. A ''bias'' ''stability'' of less (better) than 130 micro g with respect to a fixed calibration value over a period of one year; or

a.1.b. A ''scale factor'' ''stability'' of less (better) than 130 ppm with respect to a fixed calibration value over a period of one year;

a.2. Specified to function at linear acceleration levels exceeding 15 g and having all of the following:

a.2.a.A ''bias'' ''repeatability'' of less (better) than 5,000 micro g over a period of one year; and

a.2.b.A ''scale factor'' ''repeatability'' of less (better) than 2,500 ppm over a period of one year; or

a.3. Designed for use in inertial navigation or guidance systems and specified to function at linear acceleration levels exceeding 100 g;

b. Angular or rotational accelerometers, specified to function at linear acceleration levels exceeding 100 g.

■ 44. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7A002 is amended by revising the Heading and the Items paragraph, to read as follows:

7A002 Gyros or angular rate sensors, having any of the following (*see* List of Items Controlled) and specially designed components therefor.

List of Items Controlled

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Items:

a. A ''bias'' ''stability'', when measured in a 1 g environment over a period of one month, and with respect to a fixed calibration value, of less (better) than 0.5 degree per hour when specified to function at linear acceleration levels up to and including 100 g;

b. An ''angle random walk'' of less (better) than or equal to 0.0035 degree per square root hour; *or*

Note: 7A002.b does not control 'spinning mass gyros'.

Technical Note: 'Spinning mass gyros' are gyros which use a continually rotating mass to sense angular motion.

c. A rate range greater than or equal to 500 degrees per second and having any of the following:

c.1. A ''bias'' ''stability'', when measured in a 1 g environment over a period of three minutes, and with respect to a fixed calibration value of less (better) than 40 degrees per hour; or

c.2 An ''angle random walk'' of less (better) than or equal to 0.2 degree per square root hour; or

d. Specified to function at linear acceleration levels exceeding 100 g.

■ 45. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7A004 is amended by revising the Heading, to read as follows:

7A004 Gyro-astro compasses and other devices which derive position or orientation by means of automatically tracking celestial bodies or satellites, with an azimuth accuracy of equal to or less (better) than 5 seconds of arc.

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■ 46. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7A006 is amended by revising the Heading to read as follows:

7A006 Airborne altimeters operating at frequencies other than 4.2 to 4.4 GHz inclusive and having any of the following (*see* List of Items Controlled).

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■ 47. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7A008 is amended by revising the Heading to read as follows:

7A008 Underwater sonar navigation systems using Doppler velocity or correlation velocity logs integrated with a heading source and having a positioning accuracy of equal to or less (better) than 3% of distance traveled ''Circular Error Probable'' (''CEP'') and specially designed components therefore.

* * * * *

■ 48. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7B001 is amended by revising the Heading, and the Related Controls and Related Definitions paragraphs in the List of Items Controlled section, to read as follows:

7B001 Test, calibration or alignment equipment, specially designed for equipment controlled by 7A (except 7A994).

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List of Items Controlled

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Related Controls: (1) *See also 7B101, 7B102* and *7B994.* (2) This entry does not control test, calibration or alignment equipment for 'Maintenance level I' or 'Maintenance Level II'.

Related Definition: (1) ''Maintenance Level I'': The failure of an inertial navigation unit is detected on the aircraft by indications from the Control and Display Unit (CDU) or by the status message from the corresponding sub-system. By following the manufacturer's manual, the cause of the failure may be localized at the level of the malfunctioning Line Replaceable Unit (LRU). The operator then removes the LRU and replaces it with a spare. (2) 'Maintenance Level II': The defective LRU is sent to the maintenance workshop (the manufacturer's or that of the operator responsible for level II maintenance). At the maintenance workshop, the malfunctioning LRU is tested by various appropriate means to verify and localize the defective Shop Replaceable Assembly (SRA) module responsible for the failure. This SRA is removed and replaced by an operative spare. The defective SRA (or possibly the complete LRU) is then shipped to the manufacturer. 'Maintenance Level II' does not include the removal of controlled accelerometers or gyro sensors from the SRA.

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■ 49. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7B002 is amended by revising the Heading to read as follows:

7B002 Equipment specially designed to characterize mirrors for ring ''laser'' gyros, as follows (*see* List of Items Controlled).

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■ 50. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7D002 is amended by revising the Heading and the Related Control and Related Definitions paragraphs in the List of Items Controlled Section, to read as follows:

7D002 ''Source code'' for the ''use'' of any inertial navigation equipment, including inertial equipment not controlled by 7A003 or 7A004, or Attitude and Heading Reference Systems ('AHRS').

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List of Items Controlled

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Related Controls: (1) *See also 7D102* and *7D994.* (2) This entry does not control ''source code'' for the ''use'' of gimballed 'AHRS'.

Related Definition: ''AHRS'' generally differ from Inertial Navigation Systems (INS) in that an 'AHRS' provides attitude and heading information and normally does not provide the acceleration, velocity and position information associated with an INS.

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■ 51. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7D003 is amended by revising the Heading and Items paragraph in the List of Items Controlled section, to read as follows:

7D003 Other ''software'' as follows (*see* List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. ''Software'' specially designed or modified to improve the operational performance or reduce the navigational error of systems to the levels controlled by 7A003, 7A004 or 7A008;

b. ''Source code'' for hybrid integrated systems which improves the operational performance or reduces the navigational error of systems to the level controlled by 7A003 or 7A008 by continuously combining heading data with any of the following:

b.1. Doppler radar or sonar velocity data;

b.2. Global navigation satellite systems (*i.e.,* GPS or GLONASS) reference data; or

b.3. Data from 'Data-Based Referenced Navigation' ('DBRN'') systems;

c. ''Source code'' for integrated avionics or mission systems which combine sensor data and employ ''expert systems'';

d. ''Source code'' for the ''development'' of any of the following:

d.1. Digital flight management systems for ''total control of flight'';

d.2. Integrated propulsion and flight control systems;

d.3. Fly-by-wire or fly-by-light control systems;

d.4. Fault-tolerant or self-reconfiguring ''active flight control systems'';

d.5. Airborne automatic direction finding equipment;

d.6. Air data systems based on surface static data; or

d.7. Raster-type head-up displays or three dimensional displays;

e. Computer-Aided-Design (CAD) ''software'' specially designed for the ''development'' of ''active flight control systems'', helicopter multi-axis fly-by-wire or fly-by-light controllers or helicopter ''circulation controlled anti-torque or circulation-controlled direction control systems'', whose ''technology'' is controlled by 7E004.b, 7E004.c.1 or 7E004.c.2.

■ 52. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7E001 is amended by revising the Heading, to read as follows:

7E001 ''Technology'' according to the General Technology Note for the ''development'' of equipment or ''software'', controlled by 7A (except 7A994), 7B (except 7B994) or 7D (except 7D994).

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■ 53. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7E003 is amended by revising the Related Definitions paragraph in the List of Items Controlled, to read as follows:

7E003 ''Technology'' according to the General Technology Note for the repair, refurbishing or overhaul of equipment controlled by 7A001 to 7A004.

* * * * *

List of Items Controlled

Related Definition: Refer to the Related Definitions for 7B001 for 'Maintenance Level I' or 'Maintenance Level II'.

* * * * *

■ 54. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7E004 is amended by revising the Heading and the Items paragraph in the List of Items Controlled section, to read as follows:

7E004 Other ''technology'' as follows (*see* List of Items Controlled).

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List of Items Controlled

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Items:

a. ''Technology'' for the ''development'' or ''production'' of any of the following:

a.1. Airborne automatic direction finding equipment operating at frequencies exceeding 5 MHZ;

a.2. Air data systems based on surface static data only, *i.e.,* which dispense with conventional air data probes;

a.3. Raster-type head-up displays or three dimensional displays, for ''aircraft'';

a.4. Inertial navigation systems or gyro-astro compasses, containing accelerometers or gyros, controlled by 7A001 or 7A002;

a.5. Electric actuators (*i.e.,* electromechanical, electrohydrostatic and integrated actuator package) specially designed for ''primary flight control'';

a.6. ''Flight control optical sensor array'' specially designed for implementing ''active flight control systems''; or

a.7. ''DBRN'' systems designed to navigate underwater, using sonar or gravity databases, that provide a positioning accuracy equal to or less (better) than 0.4 nautical miles;

b. ''Development'' ''technology'', as follows, for ''active flight control systems'' (including fly-by-wire or fly-by-light):

b.1. Configuration design for interconnecting multiple microelectronic processing elements (on-board computers) to achieve ''real time processing'' for control law implementation;

b.2. Control law compensation for sensor location or dynamic airframe loads, *i.e.,* compensation for sensor vibration environment or for variation of sensor location from the center of gravity;

b.3. Electronic management of data redundancy or systems redundancy for fault detection, fault tolerance, fault isolation or reconfiguration;

Note: 7E004.b.3. does not control ''technology'' for the design of physical redundancy.

b.4. Flight controls that permit inflight reconfiguration of force and moment controls for real time autonomous air vehicle control;

b.5. Integration of digital flight control, navigation and propulsion control data, into a digital flight management system for ''total control of flight'';

Note: 7E004.b.5 does not control:

1. ''Development'' ''technology'' for integration of digital flight control, navigation and propulsion control data, into a digital flight management system for ''flight path optimization'';

2. ''Development'' ''technology'' for ''aircraft'' flight instrument systems integrated solely for VOR, DME, ILS or MLS navigation or approaches.

b.6. Full authority digital flight control or multisensor mission management systems, employing ''expert systems'';

N.B.: For ''technology'' for Full Authority Digital Engine Control (''FADEC''), *see* 9E003.a.9.

c. ''Technology'' for the ''development'' of helicopter systems, as follows:

c.1. Multi-axis fly-by-wire or fly-by-light controllers, which combine the functions of at least two of the following into one controlling element:

c.1.a. Collective controls;

c.1.b. Cyclic controls;

c.1.c. Yaw controls;

c.2. ''Circulation-controlled anti-torque or circulation-controlled directional control systems'';

c.3. Rotor blades incorporating ''variable geometry airfoils'', for use in systems using individual blade control.

■ 55. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 8, ECCN 8B001 is amended by revising the Heading, to read as follows:

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

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■ 56. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 8, ECCN 8C001 is amended by revising the Heading and Related Definitions paragraph in the List of Items Controlled section, to read as follows:

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

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List of Items Controlled

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

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■ 57. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 8, ECCN 8D001 is amended by revising the Heading to read as follows:

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

* * * * *

■ 58. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 8, ECCN 8E001 is amended by revising the Heading to read as follows:

8E001 ''Technology'' according to the General Technology Note for the ''development'' or ''production'' of equipment or materials, controlled by 8A (except 8A018 or 8A992), 8B or 8C.

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■ 59. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 8, ECCN 8E002 is amended by revising the Heading to read as follows:

8E002 Other ''technology'' as follows (*see* List of Items Controlled).

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■ 60. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9 Aerospace and Propulsion is amended by revising the Nota Bene at the top of Product Group A to read as follows:

A. Systems, Equipment and Components

N.B.: *For propulsion systems designed or rated against neutron or transient ionizing radiation, see the U.S. Munitions List, 22 CFR part 121.*

■ 61. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9A001 is amended by revising the Items paragraph in the List of Items Controlled section, to read as follows:

9A001 Aero gas turbine engines incorporating any of the ''technologies'' controlled by 9E003.a, as follows (*See* List of Items Controlled).

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List of Items Controlled

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Items:

a. Incorporating any of the technologies controlled by 9E003.a.; or

Note: 9A001.a. does not control aero gas turbine engines which meet all of the following:

a. Certified by the civil aviation authority in a country listed in Supplement No. 1 to Part 743; and

b. Intended to power non-military manned aircraft for which any of the following has been issued by a Participating State listed in Supplement No. 1 to Part 743 for the aircraft with this specific engine type:

b.1. A civil type certificate; *or*

b.2. An equivalent document recognized by the International Civil Aviation Organization (ICAO).

b. Designed to power an aircraft designed to cruise at Mach 1 or higher, for more than 30 minutes.

■ 62. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9A002 is amended by revising the Heading and Related Definitions paragraph of the List of Items Controlled section, to read as follows:

9A002 'Marine gas turbine engines' with an ISO standard continuous power rating of 24,245 kW or more and a specific fuel consumption not exceeding 0.219 kg/kWh in the power range from 35 to 100%, and specially designed assemblies and components therefor.

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List of Items Controlled

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Related Definition: The term 'marine gas turbine engines' includes those industrial, or aero-derivative, gas turbine engines adapted for a ship's electric power generation or propulsion.

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■ 63. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9A003 is amended by revising the Heading and the Items paragraph in the List of Items Controlled section, to read as follows:

9A003 Specially designed assemblies and components, incorporating any of the ''technologies'' controlled by 9E003.a, for gas turbine engine propulsion systems and having any of the following (*see* List of Items Controlled).

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List of Items Controlled

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Items:

a. Controlled by 9A001; *or*

b. Whose design or production origins are either countries in Country Group D:1 or unknown to the manufacturer.

■ 64. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9A005 is amended by revising the Heading to read as follows:

9A005 Liquid rocket propulsion systems containing any of the systems or components, controlled by 9A006. (These items are subject to the export licensing authority of the U.S. Department of State, Directorate of Defense Trade Controls. *See* 22 CFR part 121).

■ 65. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9A006 is amended by revising the Heading to read as follows:

9A006 Systems and components, specially designed for liquid rocket propulsion systems. (These items are subject to the export licensing authority of the U.S. Department of State, Directorate of Defense Trade Controls. *See* 22 CFR part 121).

■ 66. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9A010 is amended by revising the Heading to read as follows:

9A010 Specially designed components, systems and structures, for launch vehicles, launch vehicle propulsion systems or ''spacecraft''. (These items are subject to the export licensing authority of the U.S. Department of State, Directorate of Defense Trade Controls. *See* 22 CFR part 121).

■ 67. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9A011 is amended by revising the Heading to read as follows:

9A011 Ramjet, scramjet or combined cycle engines, and specially designed components therefor. (These items are subject to the export licensing authority of the U.S. Department of State, Directorate of Defense Trade Controls. *See* 22 CFR part 121).

■ 68. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9B001 is amended by revising the Heading to read as follows:

9B001 Equipment, tooling and fixtures, specially designed for manufacturing gas turbine blades, vanes or tip shroud castings, as follows (*See* List of Items Controlled).

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■ 69. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9B002 is amended by revising the Heading, to read as follows:

9B002 On-line (real time) control systems, instrumentation (including sensors) or automated data acquisition and processing equipment, specially designed for the ''development'' of gas turbine engines, assemblies or components and incorporating ''technologies'' controlled by 9E003.a.

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■ 70. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9B003 is amended by revising the Heading, to read as follows:

9B003 Equipment specially designed for the ''production'' or test of gas turbine brush seals designed to operate at tip speeds exceeding 335 m/s and temperatures in excess of 773 K (500°C), and specially designed components or accessories therefor.

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■ 71. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9 Aerospace and Propulsion, Export Control Classification Number 9B004 is amended by revising the Heading, to read as follows:

9B004 Tools, dies or fixtures, for the solid state joining of ''superalloy'', titanium or intermetallic airfoil-to-disk combinations described in 9E003.a.3 or 9E003.a.6 for gas turbines.

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■ 72. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9B005 is amended by revising the Heading and the Items paragraph of the

List of Items Controlled section to read as follows:

9B005 On-line (real time) control systems, instrumentation (including sensors) or automated data acquisition and processing equipment, specially designed for use with any of the following (*see* List of Items Controlled).

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List of Items Controlled

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Items:

a. Wind tunnels designed for speeds of Mach 1.2 or more;

Note: 9B005.a does not control wind tunnels specially designed for educational purposes and having a 'test section size' (measured laterally) of less than 250 mm.

Technical Note: 'Test section size' in 9B005.a means the diameter of the circle, or the side of the square, or the longest side of the rectangle, at the largest test section location.

b. Devices for simulating flow-environments at speeds exceeding Mach 5, including hot-shot tunnels, plasma arc tunnels, shock tubes, shock tunnels, gas tunnels and light gas guns; or

c. Wind tunnels or devices, other than two-dimensional sections, capable of simulating Reynolds number flows exceeding 25×10^6.

■ 73. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9B007 is amended by revising the Heading, to read as follows:

9B007 Equipment specially designed for inspecting the integrity of rocket motors and using Non-Destructive Test (NDT) techniques other than planar x-ray or basic physical or chemical analysis.

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■ 74. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9B009 is amended by revising the Heading, to read as follows:

9B009 Tooling specially designed for producing turbine engine powder metallurgy rotor components capable of operating at stress levels of 60% of Ultimate Tensile Strength (UTS) or more and metal temperatures of 873 K (600°C) or more.

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■ 75. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9B010 is amended by revising the Heading to read as follows:

9B010 Equipment specially designed for the production of ''UAVs'' and associated systems, equipment and components, controlled by 9A012.

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■ 76. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9D001 is amended by revising the Heading, to read as follows:

9D001 Software'' specially designed or modified for the ''development'' of equipment or ''technology'', controlled by 9A (except 9A018, 9A990 or 9A991), 9B (except 9B990 or 9B991) or 9E003.

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■ 77. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9D003 is amended by revising the Heading to read as follows:

9D003 Software'' specially designed or modified for the ''use'' of ''Full Authority Digital Electronic Engine Controls'' (FADEC) for propulsion systems controlled by 9A (except 9A018, 9A990 or 9A991) or equipment controlled by 9B (except 9B990 or 9B991), as follows (*see* List of Items Controlled).

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■ 78. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9D004 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section to read as follows:

9D004 Other ''software'' as follows (*see* List of Items Controlled).

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List of Items Controlled

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Items:

a. 2D or 3D viscous ''software'', validated with wind tunnel or flight test data required for detailed engine flow modelling;

b. ''Software'' for testing aero gas turbine engines, assemblies or components, specially designed to collect, reduce and analyze data in real time and capable of feedback control, including the dynamic adjustment of test articles or test conditions, as the test is in progress;

c. ''Software'' specially designed to control directional solidification or single crystal casting;

d. ''Software'' in ''source code'', ''object code'' or machine code, required for the ''use'' of active compensating systems for rotor blade tip clearance control;

Note: 9D004.d does not control ''software'' embedded in equipment not controlled in the Commerce Control List (Supplement No. 1 to Part 774) or required for maintenance activities associated with the calibration or repair or updates to the active compensating clearance control system.

e. ''Software'' specially designed or modified for the ''use'' of ''UAVs'' and associated systems, equipment and components, controlled by 9A012;

f. ''Software'' specially designed to design the internal cooling passages of aero gas turbine engine blades, vanes and tip shrouds;

g. ''Software'' having all of the following:

g.1. Specially designed to predict aero thermal, aeromechanical and combustion conditions in aero gas turbine engines; and

g.2. Theoretical modeling predictions of the aero thermal, aeromechanical and combustion conditions, which have been validated with actual turbine engine (experimental or production) performance data.

79. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9 Aerospace and Propulsion, Product Group E is amended by revising the Note located at the beginning to read as follows:

E. Technology

Note: ''Development'' or ''production'' ''technology'' controlled by 9E001 to 9E003 for gas turbine engines remains controlled when used as ''use'' ''technology'' for repair, rebuild and overhaul. Excluded from 9E001 to 9E003 control are: technical data, drawings or documentation for maintenance activities directly associated with calibration, removal or replacement of damaged or unserviceable line replaceable units, including replacement of whole engines or engine modules.

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■ 80. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9E001 is amended by revising the Heading and the Related Definitions paragraph of the List of Items Controlled section to read as follows:

9E001 ''Technology'' according to the General Technology Note for the ''development'' of equipment or ''software'', controlled by 9A001.b, 9A004 to 9A012, 9B (except 9B990 or 9B991), or 9D (except 9D990 or 9D991)

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List of Items Controlled

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Related Definitions: N/A.

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■ 81. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9E003 is amended by revising the Items paragraph of the List of Items Controlled section, to read as follows:

9E003 Other ''technology'' as follows (*see* List of Items Controlled).

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List of Items Controlled

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Items:

a. ''Technology'' ''required'' for the ''development'' or ''production'' of any of the following gas turbine engine components or systems:

a.1. Gas turbine blades, vanes or tip shrouds, made from directionally solidified (DS) or single crystal (SC) alloys and having (in the 001 Miller Index Direction) a stress-rupture life exceeding 400 hours at 1,273 K (1,000 °C) at a stress of 200 MPa, based on the average property values;

a.2. Multiple domed combustors operating at average burner outlet temperatures exceeding 1,813 K (1,540 °C) or combustors incorporating thermally decoupled combustion liners, non-metallic liners or non-metallic shells;

a.3. Components manufactured from any of the following:

a.3.a. Organic ''composite'' materials designed to operate above 588 K (315 °C);

a.3.b. Metal ''matrix'' ''composite'', ceramic ''matrix'', intermetallic or intermetallic reinforced materials, controlled by 1C007; or

a.3.c. ''Composite'' material controlled by 1C010 and manufactured with resins controlled by 1C008;

a.4. Uncooled turbine blades, vanes, tip-shrouds or other components, designed to operate at gas path total (stagnation) temperatures of 1,323 K (1,050 °C) or more at sea-level static take-off (ISA) in a ''steady state mode'' of engine operation;

a.5. Cooled turbine blades, vanes or tip-shrouds, other than those described in 9E003.a.1, exposed to gas path total (stagnation) temperatures of 1,643 K (1,370 °C) or more at sea-level static take-off (ISA) in a 'steady state mode' of engine operation;

Technical Note: The term 'steady state mode' defines engine operation conditions, where the engine parameters, such as thrust/power, rpm and others, have no appreciable fluctuations, when the ambient air temperature and pressure at the engine inlet are constant.

a.6. Airfoil-to-disk blade combinations using solid state joining;

a.7. Gas turbine engine components using ''diffusion bonding'' ''technology'' controlled by 2E003.b;

a.8. Damage tolerant gas turbine engine rotating components using powder metallurgy materials controlled by 1C002.b;

a.9. Full authority digital electronic engine control (FADEC) for gas turbine and combined cycle engines and their related diagnostic components, sensors and specially designed components;

a.10. Adjustable flow path geometry and associated control systems for:

a.10.a. Gas generator turbines;

a.10.b. Fan or power turbines;

a.10.c. Propelling nozzles; or

Note 1: Adjustable flow path geometry and associated control systems in 9E003.a.10 do not include inlet guide vanes, variable pitch fans, variable stators or bleed valves, for compressors.

Note 2: 9E003.a.10 does not control ''development'' or ''production'' ''technology'' for adjustable flow path geometry for reverse thrust.

a.11. Hollow fan blades;

b. ''Technology'' ''required'' for the ''development'' or ''production'' of any of the following:

b.1. Wind tunnel aero-models equipped with non-intrusive sensors capable of transmitting data from the sensors to the data acquisition system; or

b.2. ''Composite'' propeller blades or propfans, capable of absorbing more than 2,000 kW at flight speeds exceeding Mach 0.55;

c. ''Technology'' ''required'' for the ''development'' or ''production'' of gas turbine engine components using ''laser'', water jet, Electro-Chemical Machining (ECM) or Electrical Discharge Machines (EDM) hole drilling processes to produce holes having any of the following:

c.1. All of the following:

c.1.a. Depths more than four times their diameter;

c.1.b. Diameters less than 0.76 mm; and

c.1.c. 'Incidence angles' equal to or less than 25°; or

c.2. All of the following:

c.2.a. Depths more than five times their diameter;

c.2.b. Diameters less than 0.4 mm; and

c.2.c. 'Incidence angles' of more than 25°;

Technical Note: For the purposes of 9E003.c, 'incidence angle' is measured from a plane tangential to the airfoil surface at the point where the hole axis enters the airfoil surface.

d. ''Technology'' ''required'' for the ''development'' or ''production'' of helicopter power transfer systems or tilt rotor or tilt wing ''aircraft'' power transfer systems;

e. ''Technology'' for the ''development'' or ''production'' of reciprocating diesel engine ground vehicle propulsion systems having all of the following:

e.1. 'Box volume' of 1.2 m^3 or less;

e.2. An overall power output of more than 750 kW based on 80/1269/EEC, ISO 2534 or national equivalents; *and*

e.3. Power density of more than 700 kW/m^3 of 'box volume';

Technical Note: 'Box volume' is the product of three perpendicular dimensions measured in the following way:

Length: The length of the crankshaft from front flange to flywheel face;

Width: The widest of any of the following:

a. The outside dimension from valve cover to valve cover;

b. The dimensions of the outside edges of the cylinder heads; or

c. The diameter of the flywheel housing;

Height: The largest of any of the following:

a. The dimension of the crankshaft centerline to the top plane of the valve cover (or cylinder head) plus twice the stroke; or

b. The diameter of the flywheel housing.

f. ''Technology'' ''required'' for the ''production'' of specially designed components for high output diesel engines, as follows:

f.1. ''Technology'' ''required'' for the ''production'' of engine systems having all of the following components employing ceramics materials controlled by 1C007:

f.1.a Cylinder liners;

f.1.b. Pistons;

f.1.c. Cylinder heads; *and*

f.1.d. One or more other components (including exhaust ports, turbochargers, valve guides, valve assemblies or insulated fuel injectors);

f.2. ''Technology'' ''required'' for the ''production'' of turbocharger systems with single-stage compressors and having all of the following:

f.2.a. Operating at pressure ratios of 4:1 or higher;

f.2.b. Mass flow in the range from 30 to 130 kg per minute; *and*

f.2.c. Variable flow area capability within the compressor or turbine sections;

f.3. ''Technology'' ''required'' for the ''production'' of fuel injection systems with a specially designed multifuel (*e.g.,* diesel or jet fuel) capability covering a viscosity range from diesel fuel (2.5 cSt at 310.8 K (37.8°C)) down to gasoline fuel (0.5 cSt at 310.8 K (37.8°C)) and having all of the following:

f.3.a. Injection amount in excess of 230 mm^3 per injection per cylinder; and

f.3.b. Electronic control features specially designed for switching governor characteristics automatically depending on fuel property to provide the same torque characteristics by using the appropriate sensors;

g. ''Technology'' ''required'' for the development'' or ''production'' of 'high output diesel engines' for solid, gas phase or liquid film (or combinations thereof) cylinder wall lubrication and permitting operation to temperatures exceeding 723 K (450°C), measured on the cylinder wall at the top limit of travel of the top ring of the piston;

Technical Note: 'High output diesel engines' are diesel engines with a specified brake mean effective pressure of 1.8 MPa or more at a speed of 2,300 r.p.m., provided the rated speed is 2,300 r.p.m. or more.

h. ''Technology'' not otherwise controlled in 9E003.a.1 through a.10 and currently used in the ''development'', ''production'', or overhaul of hot section parts and components of civil derivatives of military engines controlled on the U.S. Munitions List.

Dated: November 30, 2009.

Matthew S. Borman,

Acting Assistant Secretary for Export Administration.

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