

1095.3.a. con't.

4. Uncooled turbine blades, vanes, tip-shrouds or other components designed to operate at gas path temperatures of 1,323 K (1,050°C) or more;
5. Cooled turbine blades, vanes or tip-shrouds, other than those described in 1095.3.a.1., exposed to gas path temperatures of 1,643 K (1,370°C) or more;
6. Airfoil-to-disk blade combinations using solid state joining;
7. Gas turbine engine components using "diffusion bonding" "technology" controlled by 1025.3.b.;
8. Damage tolerant gas turbine engine rotating components using powder metallurgy materials controlled by 1013.2.b.;
9. "FADEC" for gas turbine and combined cycle engines and their related diagnostic components, sensors and specially designed components;
10. Adjustable flow path geometry and associated control systems for:
 - a. Gas generator turbines;
 - b. Fan or power turbines; **or**
 - c) Propelling nozzles;

Notes:

1. Adjustable flow path geometry and associated control systems in 1095.3.a.10. do not include inlet guide vanes, variable pitch fans, variable stators or bleed valves for compressors.
2. 1095.3.a.10. does not control "development" or "production" "technology" for adjustable flow path geometry for reverse thrust.

- a. 11 Wide chord hollow fan blades without part-span support;
- b. "Technology" "required" for the "development" or "production" of any of the following:
 1. Wind tunnel aero-models equipped with non-intrusive sensors capable of transmitting data from the sensors to the data acquisition system; **or**
 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, ECM or EDM hole drilling processes to produce holes having any of the following sets of characteristics:
 1. All of the following:
 - a. Depths more than four times their diameter;
 - b. Diameters less than 0.76 mm; **and**
 - c) Incidence angles equal to or less than 25°; **or**
 2. All of the following:
 - a. Depths more than five times their diameter;
 - b. Diameters less than 0.4 mm; **and**
 - c) Incidence angles of more than 25°;

Technical Note:

For the purposes of 1095.3.c., incidence angle is measured from a plane tangential to the airfoil surface at the point where the hole axis enters the airfoil surface.

1. A box volume of 1.2 m³ or less;
2. An overall power output of more than 750 kW based on 80/1269/EEC, ISO 2534 or national equivalents; **and**
3. A power density of more than 700 kW/m³ of box volume;

Technical Note:

Box volume: 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 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 the following:

- a. The dimension of the crankshaft centre-line 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, as follows, for high output diesel engines:

1. "Technology" "required" for the "production" of engine systems having all of the following components employing ceramics materials controlled by 1013.7:

- a. Cylinder liners;
- b. Pistons;
- c. Cylinder heads; and
- d. One or more other components (including exhaust ports, turbochargers, valve guides, valve assemblies or insulated fuel injectors);

2. "Technology" "required" for the "production" of turbocharger systems, with single-stage compressors having all of the following:

- a. Operating at pressure ratios of 4:1 or higher;
- b. A mass flow in the range from 30 to 130 kg per minute; and
- c. Variable flow area capability within the compressor or turbine sections;

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)), having both of the following:

- a. Injection amount in excess of 230 mm³ per injection per cylinder; and
- b. Specially designed electronic control features 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, 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: 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.

** For information only, 10 arc minutes is equivalent to 2.9 milliradians.*