ENGINEERING INSTRUCTION

For the Manufacture of OC-ALC/GKG Engine Parts identified as Critical Application Items and Critical Safety Items except Flight Safety Critical Parts (This EI replaces EIM-1 for CSI & CAI Parts Rev D, 12 July 2007)

1. DEFINITIONS.

1.1. **Cognizant Engineering Authority (CEA) or Design Control Activity (DCA) are the same for this Engineering Instruction (EI):** OC-ALC/GKG_ _ Engineering Office as applicable.

1.2. **Cognizant Engineering Authority Head or Head of the Design Control Activity for this EI:** The USAF engineering section chief for the respective propulsion system.

1.3. **Critical Application Item (CAI):** An item that is essential to weapon system performance or operation, or the preservation of life or safety of operating personnel, as determined by the military services. The subset of CAIs whose failure could have catastrophic or critical safety consequences (Category I or II as defined by MIL-STD-882) is called CSIs.

1.4. **Critical Safety Item (CSI) or Propulsion Critical Safety Item or Aviation Critical Safety Item all mean the same thing for this EI as follows:**

A "critical safety item" is a part, an assembly, installation equipment, launch equipment, recovery equipment, or support equipment for an aircraft or aviation weapon system if the part, assembly, or equipment contains a characteristic any failure, malfunction, or absence of which could cause:

(1) A catastrophic or critical failure resulting in the loss of or serious damage to the aircraft or weapon system;

(2) An unacceptable risk of personal injury or loss of life; or

(3) An uncommanded engine shutdown that jeopardizes safety.

1.5. **Flight Safety Critical Parts (FSCP):** A subset of **Critical Safety Items** defined as engine components which meet ALL of the following criteria:

- Component failure results in death or weapon system loss
- Or results in a non-recoverable in-flight shutdown (NRIFSD) rate of 0.05 per 100,000 engine flying hours
- And component is highly stressed
- And component contains critical characteristics which cannot be fully inspected by non-destructive inspection (NDI)
- And component failure mode is fatigue and/or stress corrosion

- And component is manufactured from high strength steel, titanium, high-temperature nickel or cobalt alloy.

1.6 **MQR-1:** Air Force Propulsion Sustainment Division (OC-ALC/GKG) engine new manufacturing qualification requirements for CSI parts except FSCP's.

1.7 **MQR-2**: Air Force Propulsion Sustainment Division (OC-ALC/GKG) engine new manufacture qualification requirements for CAI parts except CSI parts.

1.8. **Original Equipment Manufacturer (OEM) or Prime Contractor for this EI means the following:** Term typically applied to the source responsible for the original design and development of a product or system. In this case it shall refer to sources primarily responsible for the design and development of aircraft gas turbine engines for a US DoD activity or a NATO country.

1.9. **Significant Process:** A process which is capable of producing alterations in the material structure of a part which cannot normally be evaluated without destructive testing and which can compromise the mechanical properties and ultimately the reliability of the part. Examples of processes that are considered to be significant by OC-ALC/GKG_ _ are listed in Appendix A of MQR-1, and MQR-2.

1.10. **Sub-vendor:** A source supplying material, products, and/or services to the Supplier as required in the performance of the contract. This term applies to all facilities other than the Supplier's facility including those of the same company.

2. PURPOSE AND SCOPE:

2.1 This EI is applicable to Propulsion Sustainment Division engine part numbers identified as CAI parts or CSI except FSCP's.

2.2 The requirements of this EI are intended to supplement the basic contract requirements. In the event that these engineering instructions conflict with other contract requirements, this engineering instruction shall take precedence.

2.3 The term "approval", as used in the context of this document, in all instances shall refer specifically to approval by OC-ALC/GKG_ _, the Cognizant Engineering Authority (CEA).

2.4 The term "contractor", as used in the context of this document, in all instances shall refer to the vendor providing a quotation to government or contracted by government to deliver the part.

2.5 This Engineering Instruction supersedes all specific Module and Part Specific Engineering Instruction. Appendix A will specifically state which specific Engineering Instructions are still applicable.

3. DATA REQUIREMENTS:

3.1 Contractors shall notify the procuring activity in writing, at the time of quotation, of any drawing, specification, or standard which is of more current data revision than those shown on the data listing provided with the Request for Proposal. The CEA of this procuring activity will make the determination of acceptability of the more current data.

3.2 The data listing which may accompany this contract is intended to assist the contractor in obtaining the required data. Drawings, specifications, and lower tier specifications listed in or referenced by first tier specifications may not be included in the data listing accompanying this contract, but are still required by this contract for compliance. Exceptions would occur only when such lower tier requirements have been specifically waived or substitute specifications/requirements/procedures have been approved in writing by the CEA.

4. SUB-VENDOR APPROVAL: All detail parts, process consumables, laboratory services, and significant processes, as defined in MQR-1 or MQR-2, shall be procured from or performed by the CEA approved sub-vendors (normally listed in the OC-ALC/GKG_ _ letter granting source approval) except for Prime contractor. Use of CEA approved sub-vendors does not relieve the contractor including the Prime contractor of their responsibility to deliver components complying with the contract requirements. Sub-vendors other than those listed in the OC-ALC/GKG_ _ letter granting source approval shall not be used without the written consent of the CEA except for the Prime contractor.

5. QUALITY ASSURANCE:

5.1 The CEA approved Quality Plan(s) as identified in the OC-ALC/GKG_ _ letter notifying the contractor of source approval shall be followed by the contractor and the contractor's sub-vendors, as applicable. Changes to procedures and plans referenced in approved Quality Plans shall not be implemented without the prior written consent of the CEA. Changes to Quality Plans shall be submitted to the CEA in writing unless the contractor is under contract, in which case, the request for change shall be submitted through the Government Procuring Contract Officer (PCO) for review by the CEA.

5.2 The contractor's Quality Assurance System (QAS) must comply with the requirements as described in this document and also comply with the higher level contract quality requirements prescribed by FAR 52.246-11 which are ISO 9001:2008, NATO AQAP-2070, AS9100, or an equivalent standard. Proof of compliance shall be provided to the CEA, must be dated within the last three years, and meet one of the following:

> 5.2.1 The contractor QAS is certified to ISO 9001:2008, NATO AQAP-2070, or AS9100 by the American National Standards Institute (ANSI) or the International Standards Organization (ISO); or

5.2.2 The contractor QAS is approved by an Original Equipment Manufacturer (OEM) or approved by the government CEA (OC-ALC/GKG_ _); or

5.2.3 Evidence from a DCMA Quality Assurance Representative (QAR) demonstrates that the contractor QAS is compliant to one of the above.

5.3 The following is a list of Quality documents for various processes used on engines. All contractors supplying parts shall comply with the document(s) as applicable to the parts being supplied.

5.3.1 LPF-QAR-005 Rev E, LPFR QUALITY LETTER OF INSTRUCTION FOR F100-100/-200/-220 AUGMENTOR SPRAYRING MANIFOLD ASSEMBLIES

5.3.2 LPF-QAR-1270 Rev D, TOP COATING FOR USAF 461204

5.3.3 LPF-QAR-1271 Rev C, BOND COATING FOR USAF 461204

5.3.4 Propulsion-QPR-1 Rev Basic

6. PART SPECIFIC REQUIREMENTS: Some of the parts identified covered by this EI have specific requirements that are not identified in the part number drawing, sub-tier drawing, or specification. The parts for which specific requirements apply and the requirements are identified in Appendix A to this Engineering Instruction. These requirements may slightly differ from current drawing requirements, but always incorporate current repair limits. In the future some of these requirements will be incorporated into the drawings. These instructions are contractual requirements and shall be met by the contractor. Appendix A also identifies specifications, procedures, and/or standards that shall be used as alternates to specifications, procedures, and/or standards identified in part number drawings or specification referenced therein.

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APPENDIX A

1. PURPOSE:

1.1 This Appendix identifies specifications, procedures, and/or standards that shall be used, and which may supersede specifications, procedures, and/or standards identified in part number drawings or specification referenced therein.

2. ALTERNATE SPECIFICATIONS, PROCEDURES, AND STANDARDS:

The following table identifies OC-ALC/GKG approved alternatives for the listed PWA specifications.

SPECIFICATION	ALTERNATE
AMS 2447 (-3,-7,-8)(HVOF)	T.O. 2-1-111, Section 19
701HE & 702HE (High Energy Wear Coat)	T.O. 2-1-111, Section 19
PWA 53 Acceptance Standards	T.O. 2-1-111, Section 19
PWA 11, paragraph 3.10.2.1 Microexamination of titanium for alpha case and other surface contamination	T.O. 2-1-111, SPOP 483
PWA 255 Acceptance Standards	T.O. 2-1-111, Section 19
PWA 37	AMS2487, plus the following periodic test requirement • Tensile Strength as identified in PWA 37
	AMS 2488, plus the following periodic test requirements • Galvanic Corrosion Resistance and Abrasion Resistance as identified in AMS 2487 • Tensile Strength as identified in PWA 37
PWA 53-69	Metco 57NS
PWA 36545-3	Ensalube 382

3. MODULE SPECIFIC REQUIREMENTS AND ALTERNATES:

Module	Specific Engineering Instructions
Augmentor Module	EIM-Augmentor (current Rev)