

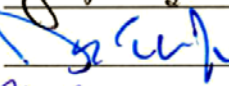
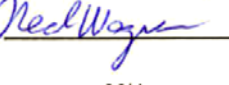

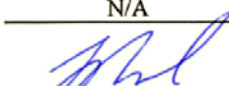



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INTERPRETATION AND CONTROL OF CRITICAL PART CHARACTERISTICS			

Approvals:

Operations:	Print	<u> Matt Burg </u>	Signature	<u></u>	Date:	<u>3/26/21</u>
Engineering:	Print	<u> John McKinley </u>	Signature	<u></u>	Date:	<u>3/30/21</u>
Quality:	Print	<u> James West </u>	Signature	<u></u>	Date:	<u>3/30/21</u>
Process Owner:	Print	<u> Neal Wagner </u>	Signature	<u></u>	Date	<u>3-30-2021</u>
Finance:	Print	<u> N/A </u>	Signature	<u> N/A </u>	Date:	<u> N/A </u>
Sales & Marketing:	Print	<u> N/A </u>	Signature	<u> N/A </u>	Date:	<u> N/A </u>
Legal:	Print	<u> N/A </u>	Signature	<u> N/A </u>	Date:	<u> N/A </u>
President:	Print	<u> N/A </u>	Signature	<u> N/A </u>	Date:	<u> N/A </u>
Inspection	Print	<u> N/A </u>	Signature	<u> N/A </u>	Date:	<u> N/A </u>
Other:	Print	<u> Mike Reiner </u>	Signature	<u></u>	Date:	<u>3-26-2021</u>
Other:	Print	<u> N/A </u>	Signature	<u> N/A </u>	Date:	<u> N/A </u>
FAA:	Print	<u> N/A </u>	Signature	<u> N/A </u>	Date:	<u> N/A </u>
Author:	Print	<u> Lars Novak </u>	Signature	<u></u>	Date:	<u>3-25-2021</u>
			Release Date (initial/date):	<u></u>		<u>3/30/21</u>

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1.0 PURPOSE:

1.1 The purpose of this procedure is to provide detailed instructions on how to identify, interpret, and control critical part characteristics on engineering drawings.

2.0 SCOPE:

2.1 Interpretation and Critical Characteristic Control Requirements / Objective.

Federal Aviation Administration (FAA) and Joint Aviation Authority (JAA) requirements necessitate special control of parts determined to be critical. Critical Parts are defined as, “A part, the failure of which could have a catastrophic effect on the rotorcraft, and for which critical characteristics have been identified, and must be controlled to ensure the required level of integrity.” (References: FAR’s 27 & 29, Section 602. AC’s 27 & 29, Section 602 / JAR’s 27 & 29, Section 602, and ACJ Subpart D).

2.1.1 Critical Parts are derived from Fault Tree, and Stress and Fatigue Analysis results.

2.1.2 The objective of identifying critical parts is to ensure critical part features are controlled during design, manufacture, fielding, service life / life cycle, so the risk of failure in service is minimized. This is done to maintain the critical characteristics on which original part certification is based.


2.1.3 Parts designated as critical are required to be segregated, controlled, and handled with special procedures / precautions outside the normal realm of part processing and handling.

2.1.4 Personnel involved in the design, manufacture, maintenance, inspection, and overhaul of a critical part must be educated as to the special nature of the part, as well as the unique instructions and processing associated with it.

3.0 REFERENCES & DEFINITIONS:

3.1 Procedures

- 3.1.1 OP 04.2 “Critical Part Identification and Characterization.”
- 3.1.2 E 04.005 “Procedure for Fault Tree Analysis.”

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- 3.1.3 E 04.006 “Procedure for Stress and Fatigue Analysis.”
- 3.1.4 BPC-283-242 “Vital Point Procedure.”
- 3.1.5 BPC-283-255 “Critical Part Serialization Procedure.”
- 3.1.6 OP 06.1 “Purchasing and Supplier Control”
- 3.1.7 OP 16.1 “Documented Information Retention”
- 3.1.8 QP-137 “Purchase Order Quality Codes”

3.2 Forms

- 3.2.1 CM-001 Engineering Change Order (ECO) Form.

3.3 Other Documents

3.3.1 Applicable Government Documents:

- 3.3.1.1 Federal Aviation Regulation 27 & 29, “Certification of Normal / Transport Category Rotorcraft.”
- 3.3.1.2 Advisory Circular 27 & 29, “Certification of Normal / Transport Category Rotorcraft.”
- 3.3.1.3 Advisory Circular 20-95, “Fatigue Evaluation of Rotorcraft Structure.”
- 3.3.1.4 Federal Aviation Administration System Safety Handbook (Chapters 8 & 9)


3.4 Abbreviations and Definitions

3.4.1 Abbreviations:

- 3.4.1.1 FAA Federal Aviation Administration
- 3.4.1.2 JAA Joint Aviation Authority
- 3.4.1.3 CPF Critical Part Feature. (Category A Critical Part – Load Bearing)
- 3.4.1.4 ULCPF Unlimited Life Critical Part Feature
- 3.4.1.5 VP Vital Point
- 3.4.1.6 ECO Engineering Change Order
- 3.4.1.7 MRB Material Review Board

3.4.2 Definitions:

- 3.4.2.1 Life Limited Critical Part a part, which does not meet its specified design life

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4.0 REGULATIONS AND RESPONSIBILITIES

4.1 Regulatory Requirements

- 4.1.1 References: FAR's 27 & 29, Section 602. AC's 27 & 29, Section 602 / JAR's 27 & 29, Section 602, and ACJ Subpart D)


4.2 Departmental Responsibilities

- 4.2.1 The Engineering Services Manager has the primary responsibility for:
- 4.2.1.1 the proper identification, interpretation, and control of the critical part characteristics on an engineering drawing.
 - 4.2.1.2 or designee, will direct how the engineering drawing will be notated, as well as the necessary inspections, controls, and requirements associated with the critical part notations.
- 4.2.2 It is the responsibility of the Overhaul & Repair management to ensure that a system is in place to properly track, and replace Life Limited Critical Parts.

5.0 PROCEDURE:

5.1 The general features and controls of a critical parts plan address the following.

- 5.1.1 Federal Aviation Administration (FAA) and Joint Aviation Authority (JAA) requirements necessitate the control of parts determined to be critical. Critical Part classification is derived from Fault Tree and Stress and Fatigue Analysis results.
- 5.1.2 B-E Documentation includes comprehensive instructions for the maintenance, inspection, and overhaul of critical parts.
- 5.1.3 Indicate to engineers, operators, overhaul / repair facilities, and suppliers that unauthorized repairs, or modifications, to critical parts may have hazardous consequences.
- 5.1.4 Emphasize the need for careful handling and protection against damage, or corrosion, during maintenance, overhaul, storage, transportation, and accurate recording and control of service life (if applicable).
- 5.1.5 Require Breeze-Eastern certified service centers to notify Breeze-Eastern of any unusual wear, or deterioration, of critical parts, and return them for proper analysis when appropriate.

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- 5.1.6 Control of critical characteristics, procedures, and processes for manufacturing critical parts (including test articles) such as; material source, forging procedures, machining operations, sequence inspection techniques, acceptance test, and rejection criteria. Procedures for changing these manufacturing procedures should also be established.
- 5.1.7 Changes to any manufacturing procedures, to the design of a critical part, to the approved operating environment, or to the design load spectrum used to establish the effects, if any, on the fatigue evaluation of the part.
- 5.1.8 Review of material procedures for critical parts (i.e. procedures for determining the disposition of parts having manufacturing errors, or material flaws) are in accordance with paragraphs 5 and 6 above.
- 5.1.9 Critical parts require relevant records relating to identification be maintained such that it is possible to establish, and trace the manufacturing history of individual parts, or batches of parts.
- 5.1.10 Critical characteristics of critical parts produced in whole, or in part, by suppliers, are maintained.

5.2 DOCUMENTATION STANDARDIZATION AND GUIDELINES


5.2.1 Standardization and Guideline Details

Engineering drawing critical part features consist of, but are not limited to, dimensions, diameters, radii, materials, tolerances, surface finishes, geometric characteristics, datum's, and processes affecting material properties such as; heat treat (hardness), material conditions (shot peening, carburize, nitriding, etc.), plating, or any feature, deemed by engineering as being a critical part feature.

The Breeze-Eastern drawing for a critical part will be annotated as follows:

In the top left hand corner of the engineering drawing, to the right of the limited rights legend (if applicable), a summary of critical part features will be provided under the words "CRITICAL PART," Three annotated designators, encapsulated in diamonds, are identified in capital letters. They are "CPF," "ULCPF," and "VP." The words "CRITICAL PART" will also be identified above the part number title block. The designator definitions and example are as follows.

CPF - Critical Part Feature. (Category A Critical Part – Load Bearing)

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ULCPF - Unlimited Life Critical Part Feature. (Category B Critical Part – Unlimited Life / Load Bearing)

VP - A Critical Part made a Vital Point. (Category C Critical Part – Not Load Sensitive [Note: Interpret in accordance with Vital Point Procedure BPC-283-242])



Immediately following the designator will be a number indicating the quantity of critical part, or vital point, features that exist on the drawing. An example is, “CPF 0 ULCPF 2 VP 1.” In this example the designator quantities identify zero (0) critical part features, two (2) unlimited life critical part features, and one (1) vital point feature, or process.

In the body of the drawing, the applicable critical part feature callout (diamond) will be placed next to the feature to be controlled.

In the drawing notes the following is stated, “Interpret Critical Part Characteristics per Work Instruction, E 04.007.”

Refer to the following example:

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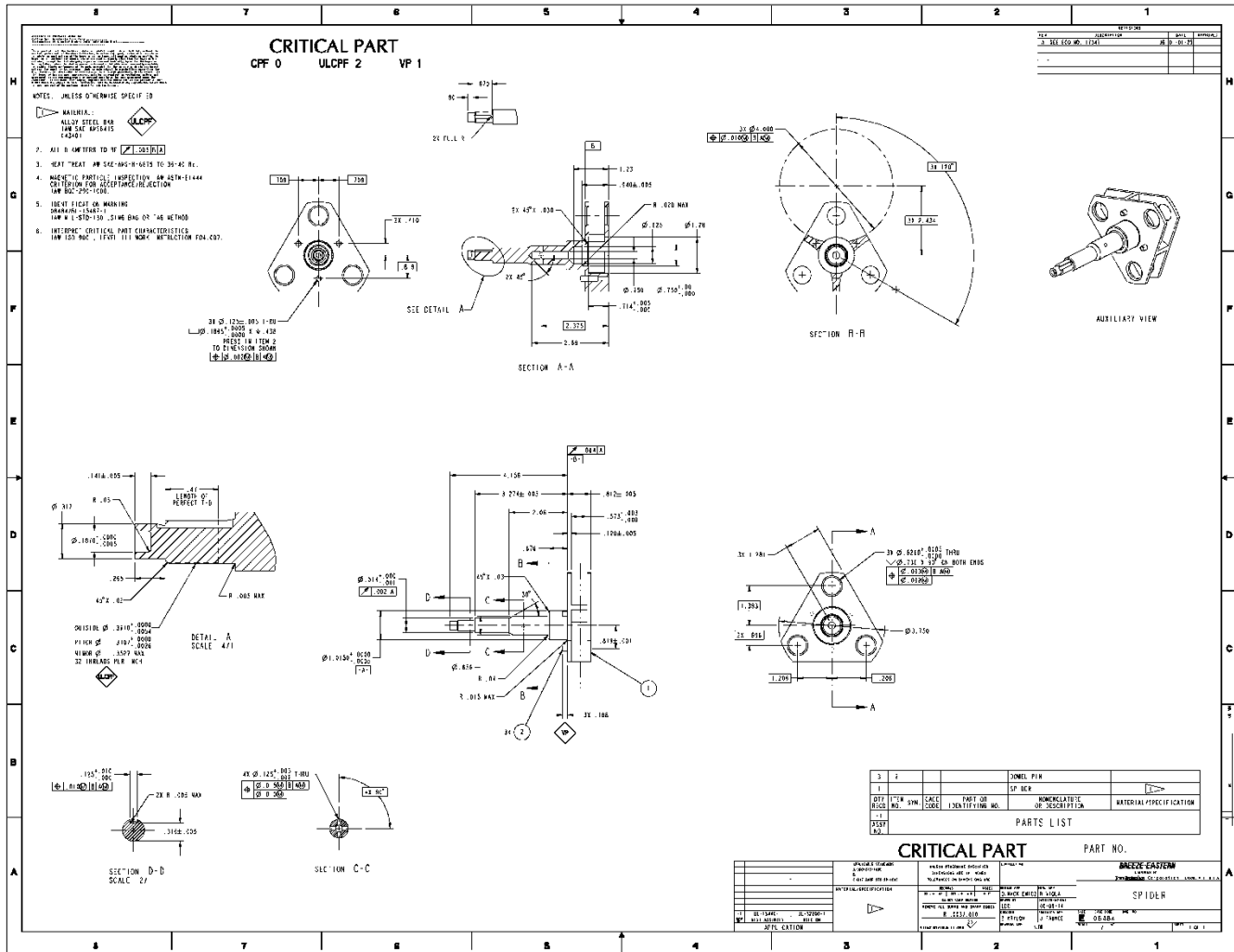



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Sample of a Critical Part Drawing Annotation.



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5.2.2 Life Limited Critical Part.

A Life Limited Critical Part is a part, which does not meet its specified design life. Therefore, the part will have to be replaced within a specified period within its design life.

It is identified in the top left hand corner of the engineering drawing, to the right of the limit rights legend. It will have a summary of critical part features provided under the words “LIFE LIMITED CRITICAL PART,” three annotated designators, encapsulated in diamonds, are identified in capital letters.

5.2.2.1 They are “CPF,” “ULCPF,” and “VP.”

5.2.2.2 The words “LIFE LIMITED CRITICAL PART” will also be identified above the part number title block.

The designator definitions and example are as follows.

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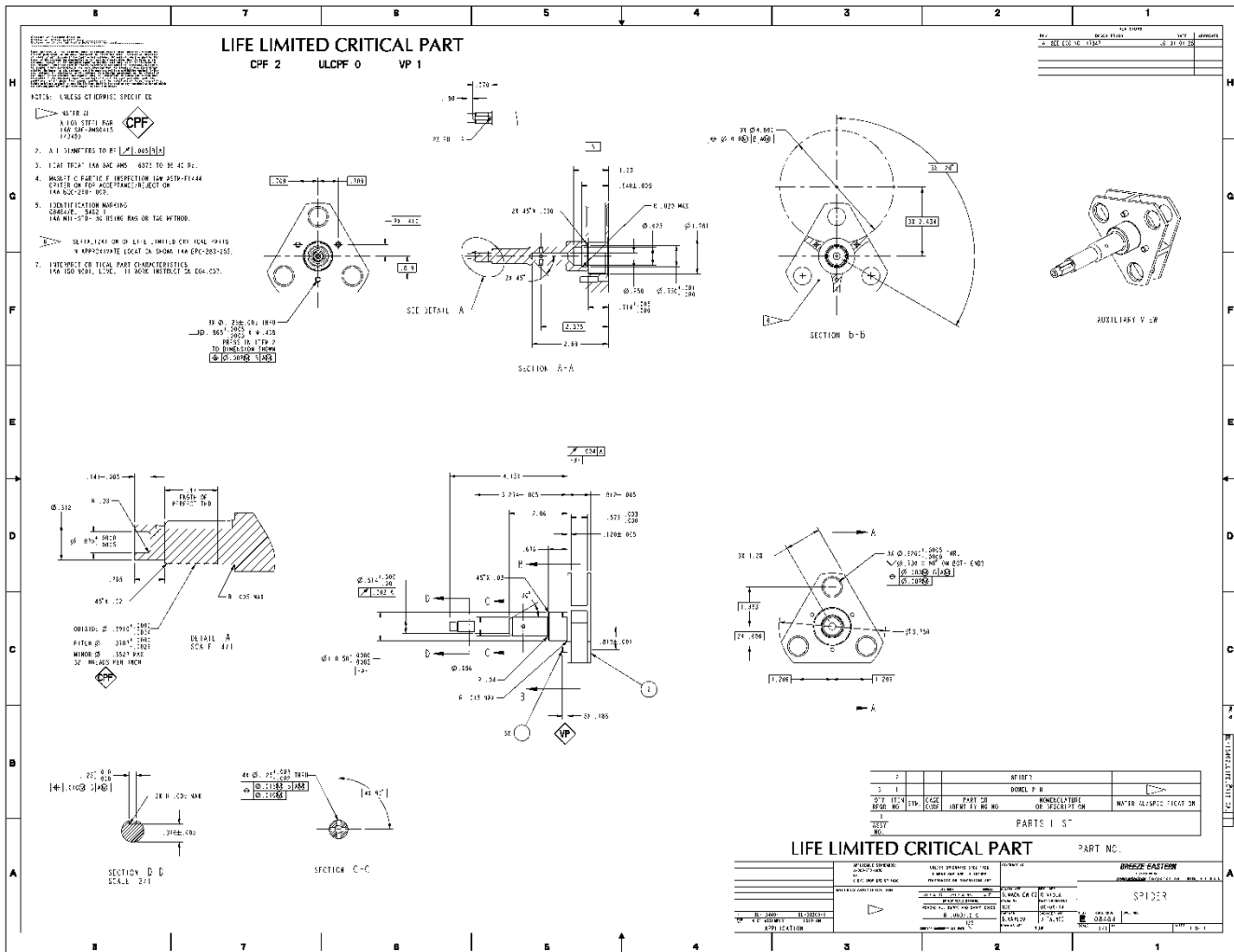



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Sample of a Life Limited Critical Part Drawing Annotation.



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5.2.2.3 Serialization of a Life Limited Critical Part.

“Life Limited Critical Parts” shall be serialized in accordance with BPC-283-255, with serial number location shown on the engineering drawing, to provide for the tracking and traceability of reference / identification to the materials used, manufacturing processes, and part location. The BPC defining serialization will be referenced in the notes section on the engineering drawing, as shown in the example above.

The BPC defines the method, and numbering system of serialization to be placed on the engineering drawing.

5.2.2.4 Life Limited Critical Part Overhaul Requirements.


A Life Limited Critical Part serial number will indicate to Overhaul / Repair facilities that this limited life critical part shall be properly scrapped, and replaced with a new part at the scheduled assembly overhaul period. There are no exceptions to the requirement of the part being replaced at overhaul.

It is the responsibility of the Overhaul / Repair facility management to ensure that a system is in place to properly track, and replace Life Limited Critical Parts.

5.2.3 Inspection Requirements.

Inspection requirements for the three categories are as follows.

- CPF** - Critical Part Feature (Category A Critical Part – Load Bearing)
100 % visual and dimensional inspections of the critical part features, and radiographic, magnetic particle or penetrant, inspections, as applicable, or engineering approved equivalent methods.
These inspections are documented, independently verified, with complete record traceability.
- ULCPF** - Unlimited Life Critical Part (Category B Critical Part – Unlimited Life / Load Bearing)

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100 % visual inspection, with a 30 % sample size selected for magnetic particle or penetrant inspection, or engineering approved equivalent methods.

This inspection shall be documented, independently verified, with complete record tractability.

VP - Vital Point (Category C Critical Part – Not Load Sensitive)

Requires an individual, other than the technician who performed the operation, to inspect the task completed, due to the criticality of the operation. Refer to Vital Point Procedure BPC-283-242.

This inspection shall be documented, independently verified, with complete record tractability.


5.2.4 Critical Part Change Control.

Engineering Change Orders (ECO) affecting a Critical Part requires additional controls / measures to ensure the critical characteristics to which the original part design certification is based is not altered in anyway, which may adversely affect the integrity of the part. The additional controls employed to achieve this are as follows:

Engineering Change Order (ECO) Form (CM-001).

- 1) The ECO indicates it is affecting a critical part by checking off the mandatory field “CRITICAL PART (YES / NO)” box on the ECO. If the answer is “YES,” its pull down menu will state the following:
 - a) Fault Tree Analysis Change Results are required to process the ECO.
 - b) Stress and Fatigue Change Analysis Results are required to process the ECO.
 - c) Head of Engineering Sign-Off required to process the ECO.
 - d) Configured Customer Change Approval required.

- 2) If the ECO affects the critical part features, then in the body of the ECO it states, “Critical Part Features Affected.” If the change affects critical parts features, this may require a Class I ECO change designation (i.e. customer notification and approval part number change).

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3) If the ECO change does not affect the critical part features, then the ECO will be processed as a normal Class II change.

5.2.5 Material Review Board (MRB) Authority on a Critical Part Feature.

A critical part feature submitted for MRB review shall meet the engineering drawing requirement, without the use of alternate / artificial material build-up processes such as; nickel plate, chrome plate, etc. If the critical part feature cannot be machined / processed to meet the original drawing requirement then the part may be scrapped.

5.2.6 Vendor Flow Down.

Critical Part controls are flowed down to B-E vendors (manufacturers, distributors, etc.) through the Purchasing Department and / or Purchase Orders.

5.2.6.1 Reference OP 06.1 & QP-137, clause 2 (plus 74 & 83 as applicable).

5.3 Records, Audits, & Training

5.3.1 Applicable Records as per OP 16.1.

5.3.2 Applicable internal audits as per OP 17.1.

5.3.3 Applicable training for relevant personnel as per OP 18.1.

6.0 REVISION HISTORY

<i>REV</i>	<i>DATE</i>	<i>OWNER</i>	<i>DESCRIPTION OF CHANGE(S)</i>
-	8/27/03	R. Kajor	Initial release
A	3/25/21	LN	Converted to latest template QC-1298; added 5.3; updated title to "Engineering Services Manager"; changed most of the "...shall..."; added references to OP 06.1 & QP-137 in 3.1 & 5.2.6.1. Removed "RFC" in 5.2.4 & 3.4; corrected to "BPC"-283-242.