INCREMENTAL CHANGE Release Notification Date: 03/08/2023

SPM 70-42-00 BLENDING AND REMOVAL OF HIGH METAL PROCEDURES

DISCLAIMER

The Incremental Changes published by GE Aviation are considered Instructions for Continued Airworthiness. These Incremental Changes, along with the current Manual revision and published Temporary Revisions, constitute the latest Instructions for Continued Airworthiness.

GE Designated: -CONFIDENTIAL-

HIGHLIGHTS

HIGHLIGHT REFERENCE	DESCRIPTION OF CHANGE
sk70-42-00-350-034	Technical Change: Changed the minimum blend length in the blending guidelines table.

TASK 70-42-00-350-002

1. General.

NOTE: Refer to the specific Engine/Shop Manual section or Service Bulletin for the blend limits of the piece part under review. Use the limits in this procedure only when no specific limits are specified for the component in the Engine/Shop Manual or applicable Service Bulletin.

A. Blending is a repair procedure that is used to remove stress concentrations caused by nicks, scratches, or other sharp-edged damage marks on critical parts. Removal of the material surrounding the stress concentration, so that the sharp edges are blended into a smooth contour, relieves the stress concentration and permits further use of the part by lessening the danger of cracking.

NOTE: General procedures Subtask 70-42-00-350-021 (paragraph 4.A.) and Subtask 70-42-00-350-027 (paragraph 4.B.) apply to all blending procedures included in this SPM.

B. Blending is also used to remove sharp edges resulting from machining, drilling, etc., and to restore the original contour and/or surface finish to parts that have been repaired by welding, brazing, etc.

C. Defects more then 0.25 inch (6.4 mm) apart shall be blended separately. Those less than 0.25 inch (6.4 mm) apart (except splines) shall be blended together. Splines that are closer together than 0.25 inch (6.4 mm) and defects shall be repaired separately.

D. The finish on the blended area must be as close as possible to the original finish of the part.

E. Linear Indication is defined as a visual surface indication that has a linear length three times its width or greater. The maximum allowable indication size is defined in the ‘Fluorescent Penetrant Inspection' and/or the ‘Visual Inspection' section of the Engine Inspection Manual for that part.

F. Removal of High Metal is addressed in several paragraphs, make sure you use the correct procedure for your component as follows:

(1) General Removal of High Metal (No Shot Peening), refer to Subtask 70-42-00-350-029, (paragraph 4.D.).

(2) Rotating part high metal removal (like disks, shafts, boosters, blisks, impellers, spools, disk like seals, cooling plates, spacers thermal shields, torque couplings and main rotor shafts) refer to Subtask 70-42-00-350-038, (paragraph 4.C.(3)(e)). This subtask requires FPI and shot peening after high metal removal.

2. Equipment.

Subtask 70-42-00-350-025

A. The following tools are required for the application of this process.

(1) Standard Tools - Blending: 3 - 10X Magnifying Glass

(2) Power Blending: Power Tool (Electric Or Air)

(3) Manual Blending: Files (Assorted)

3. Materials.

Subtask 70-42-00-350-026

A. The following consumable materials are required for the application of this process.

Consumable Product	**No.**
Power Blending:	
Wheel, Abrasive (Silicon Carbide Grit, wet/dry, Impregnated Nylon) (Assorted Grits)	--
Wheel, Abrasive (Aluminum Oxide Grit, Impregnated Nylon) (Assorted Grits)	--
Abrasive Wheel	C10-025
Abrasive Wheel, Rubberized	C10-036
NOTE: Only use 120 grit or finer.	
Abrasive Wheel, Rubberized	C10-043
Manual Blending:	
Stones, Abrasive (Assorted Grits)	--
Abrasive Paper, Aluminum Oxide Grit (Assorted Grits)	--
Abrasive Cloth	C10-010
Tape, Plastic	C10-021
Compound, Polishing	C10-096
Abrasive, Sandpaper, Roll	C10-105
Abrasive Paper, Aluminum Oxide	C10-120
Abrasive Paper, Silicon Carbide Wet/Dry	C10-121
Abrasive Paper	C10-141
Abrasive Cloth, Aluminum Oxide Super-flexible	C10-187
NOTE: Only use 120 grit or finer.	

4. Procedure.

Subtask 70-42-00-350-021

A. Manual (Hand) Blending.

WARNING: DO NOT BREATHE THE PARTICLES FROM BLENDING OR LET THE PARTICLES TOUCH YOU. PARTICLES FROM BLENDING CAN CAUSE DAMAGE, INJURY, OR IRRITATION TO YOU. USE PERSONAL PROTECTION EQUIPMENT. USE LOCAL MECHANICAL EXHAUST VENTILATION OR AN APPROVED RESPIRATOR.

(1) Sharp edges can be blended out, using abrasive stones or papers, files, or crocus cloth. Coarse grades of abrasives or files may be used for fast metal removal, but the parts must then be given a smooth surface finish with fine grades of abrasives or crocus cloth.

(a) When blending compressor rotor blades, stator vanes, turbine blades, and similar parts, blend in a radial direction in relation to the engine. Avoid removing metal from leading and trailing edges of airfoil sections in such a way that the edges become thin or sharp; blend so as to maintain approximately the original contour.

NOTE: Refer to the inspection and repair limits for specific instructions on blending limits applicable to each part of the engine.

(b) When blending a cylindrical part, blend in a circumferential direction, not along the axis of the part.

(c) The finish on the blended area must be as close to the original finish as possible.

(d) When blending on a part involving a radius, keep the radius as specified in the repair section. If the radius is not specified, keep it as close as possible to the original contour. Refer to a similar part, if necessary to determine original radius.

(e) After blending, etch the reworked area per TASK 70-24-00-110-033, Etching Procedures for Fluorescent-Penetrant Inspection. Inspect per TASK 70-32-03-230-002, Spot-Fluorescent-Penetrant Inspection.

Subtask 70-42-00-350-027

B. Power Blending.

WARNING: DO NOT BREATHE THE PARTICLES FROM BLENDING OR LET THE PARTICLES TOUCH YOU. PARTICLES FROM BLENDING CAN CAUSE DAMAGE, INJURY, OR IRRITATION TO YOU. USE PERSONAL PROTECTION EQUIPMENT. USE LOCAL MECHANICAL EXHAUST VENTILATION OR AN APPROVED RESPIRATOR.

CAUTION: POWER BLENDING OF AIRFOIL SECTIONS MAY BE DONE ONLY WHEN SPECIFIED BY INDIVIDUAL PART INSTRUCTIONS.

(1) Blending on most parts may be done by using a power-driven polishing wheel or rubber-bonded abrasive points. Special instructions for the individual part must be followed.

CAUTION: WHEN DOING POWER BLENDING, BE SURE TO AVOID BUILDING UP EXCESSIVE HEAT AND RESULTING THERMAL STRESSES IN THE PART.

(a) Rough-out defects using coarse grades of resilient flexible abrasive impregnated wheels, brushes, or points. Use fine or extra fine grades to finish the blend areas.

(b) When doing power blending, follow the requirements described in Subtask 70-42-00-350-021, Hand-Blending.

NOTE: After power blending of a titanium part is completed, hand-blend the same area approximately 0.002 inch (0.05 mm) deeper to remove residual stresses in the surface material.

(c) After blending, etch the reworked area per TASK 70-24-00-110-033, Etching Procedures for Fluorescent-Penetrant Inspection. Inspect per TASK 70-32-03-230-002, Spot-Fluorescent-Penetrant Inspection.

Subtask 70-42-00-350-028

C. Component Specific Requirements.

WARNING: DO NOT BREATHE THE PARTICLES FROM BLENDING OR LET THE PARTICLES TOUCH YOU. PARTICLES FROM BLENDING CAN CAUSE DAMAGE, INJURY, OR IRRITATION TO YOU. USE PERSONAL PROTECTION EQUIPMENT. USE LOCAL MECHANICAL EXHAUST VENTILATION OR AN APPROVED RESPIRATOR.

(1) Blending Airfoils.

NOTE: The instructions in the Engine/Shop Manual section or applicable Service Bulletin take precedence over the following procedures. Use the instructions that follow with the Engine/Shop Manual or Service Bulletin criteria, or when no criteria are specified.

(a) The types of airfoil damage described below may be repaired by hand-blending or by power-blending. Always refer to applicable part inspection paragraph for a description of airfoil defect limits as follows:

1 Nick. A V-shaped depression in the airfoil made by a sharp-edged object pushing the metal inward.

2 Pit. A round, sharp-edged hole with a rounded bottom caused by corrosion.

3 Scratch. A V-shaped line or furrow in the airfoil, such as would be made by dragging a sharp object across the surface.

4 Dent. A smooth, rounded depression in the airfoil made by impact with a rounded object. If there is a noticeable sharp discontinuity in the depression, it should be considered a nick. Waviness of leading or trailing edge is to be treated as a dent.

5 Erosion. A sand- or shot-blasting effect on the leading edges or the leading portion of the concave side, caused by sand or dust going through the engine.

6 Torn Metal. A separation or pulling apart of material by force, leaving jagged edges.

(b) Hand-blending of airfoils may be done as specified below:

1 Blending is done to remove stress caused by nicks, pits and scratches to prevent blade failure. Remove high metal and straighten dents (where permitted) to restore the airfoil shape as closely as possible to its original aerodynamic contour.

2 Blending shall be finished with fine stone or crocus cloth. Coarser tools may be used for the initial removal of material. Finish the blending in a direction along the length of the blade or vane, and remove all evidence of marks across the airfoil that may have been made during initial blending.

3 Defects more than 0.25 in (6.4 mm) apart shall be blended separately; those 0.25 in (6.4 mm) or less apart may be blended together. All blends must have a minimum radius of 0.25 in (6.4 mm). The total reduction in chord width may be taken on either side or divided between the sides. The amount of rework is controlled by the minimum chord width limit. The minimum allowable chord is given for the root and tip of airfoil, and the minimum chord at other points is proportional.

To minimize the possibility of having the engine stall, keep the shape of the blended airfoil leading edge as close as possible to the original contour. Refer to Figure 1.

4 Blending limits are given as depth dimensions to make it easier to see how much can be repaired. Experience has shown that depth limits are used for most rework. However, the minimum chord limit is the most important dimension; it should be checked in borderline cases or where previous rework is evident in the same area. For convenience, the depth limits and minimum chord limits are given in both decimals and fractions. In borderline cases where depth limits and minimum chord limits conflict with one another, use the decimal minimum chord dimension to decide if the part is usable.

5 Defect limits are given as depth dimensions since this is the dimension that affects strength. However, accurate depth measurements require special equipment not normally available. Comparing the depth of a defect with the thickness of a thickness gage leaf, or with the thickness of a piece of safety wire, is a reasonably accurate way of measuring depth. Refer to Figure 2.

6 Swab-etch the reworked area per TASK 70-24-00-110-033, Etching Procedures for Fluorescent-Penetrant Inspection. Inspect per TASK 70-32-03-230-002, Spot-Fluorescent-Penetrant Inspection. Brush or swab on penetrant where air passages are present, to prevent excessive penetrant entrapment.

(c) Power-blending of rotor blades, variable vanes, and vane segments may be done as follows:

1 To avoid damaging the airfoil, use masking tape and mask off the airfoil next to the rework area.

2 Use coarse grade, silicon-carbide-impregnated rubber wheels and points for the initial benching of the blades and vanes.

NOTE: During finish-blending of defects, make a radius on both the leading and trailing edges of the airfoil. To do this, apply light pressure with the rubberized abrasive wheel, and let the cushion action of the wheel do both the blending of the radius and the buffing of the defect.

3 Finish blending the defects, using the fine and extra fine grade of rubberized abrasive wheels. Remove only enough material to repair the defect.

4 Swab-etch the reworked areas per TASK 70-24-00-110-033, Etching Procedures for Fluorescent-Penetrant Inspection. Inspect per TASK 70-32-03-230-002, Spot-Fluorescent-Penetrant Inspection.

5 Place the repaired blades and vanes in separate containers to prevent damage during handling.

6 Carefully inspect the blades and vanes.

(2) Blending Minor Indications in Tubing.

(a) Use a fine abrasive stone, a small needle file with fine teeth, emery cloth, or crocus cloth for blending.

(b) Blend around the circumference of the tubing. The finished blend shall be as close as practical to the original finish of the part.

Subtask 70-42-00-350-030

(3) Blending And Shot Peening of Rotating Parts - Forged and Powdered Metal Components.

NOTE: For Thin Walled components. Refer to Subtask 70-42-00-350-040, (paragraph C.(4)).

CAUTION: THIS PROCEDURE MAY NOT BE APPLICABLE TO CERTAIN CRITICAL AREAS, FOR EXAMPLE: DISK DOVETAIL AREAS, CRITICAL BOLT HOLES AND CRITICAL EMBOSSMENTS. REFER TO THE SPECIFIC ENGINE INSPECTION MANUAL AND/OR REPAIRS FOR THOSE LOCATIONS.

NOTE: Always obey the procedures and limits in the Engine Inspection Manuals. The specific procedures and limits in the Engine Inspection Manual for that part always supersede those in this SPM section.

NOTE: Always obey the appropriate general requirements specified in paragraph (a) and, the hand blend or power blend procedures and the limits specified in paragraph (b) and paragraph (c).

NOTE: Rotating parts are defined as: (rotors: i.e., fan, booster, high pressure compressor, high pressure turbine, low pressure turbine), blisks (excluding airfoil portion above the platform fillet radius), impellers, disks and disk like seals, spools, cooling plates, spacers, thermal shields, torque couplings, and main rotor shafts.

NOTE: Shot peening after blending is only required at the piece part level. Components that are part of an assembly or module do not require shot peening unless specifically required by the module level inspection or module level repair for that component.

NOTE: Blending may be used to remove sharp edges after machining, drilling, etc. and to restore the original contour and/or surface finish to parts that have been repaired.

NOTE: Blending may be used to reduce stress concentrations and/or residual stress caused by nicks, scratches, and other surface irregularities by intentional removal of base metal. Manual or power methods are used to produce shallow and smooth surface depressions. This method reduces the residual stress and stress concentration in the damaged area by the redistribution of the stress concentration over a larger area.

NOTE: Shot peening the surface after blending forms a compressive layer of material at the surface of the part, increasing its resistance to stress corrosion and cyclic fatigue.

NOTE: If there are concerns or questions for a specific component, please contact GE Aviation ‘Customer Support Center' (email: geae.csc@ae.ge.com) or ‘Product Support Engineering' for your specific engine model.

(a) General Specifications.

1 The preferred blend shape is smooth, continuous, and round-bottomed, extending as far as necessary from the damaged area. Refer to Figure 4.

NOTE: A blend repair is preferable over accepting sharp impact damage, even when the damage is within engine manual specified acceptable limits.

Subtask 70-42-00-350-031

2 Size, Separation, and Location of Blends.

a A single blend is preferred when the blending of adjacent damage would result in intersecting or nearly intersecting blends.

b The length of the blend must be a minimum of 10 times the depth of the blend in all directions, if the local surface area allows, larger length to depth ratios are preferable. Blend to approximately 1.25 times (for reference only) the depth of the damage. Refer to Table 1 and Figure 4. Remove all sharp edges. Blend depth is not to exceed the Engine Inspection Manual limits after blending.

Subtask 70-42-00-350-032

3 Direction of Blends.

a When blending a cylindrical part, blend in a circumferential direction, not along the axis of the part, unless the damage is radially oriented.

b Damage that is radially oriented must be blended in a radial direction.

c When blending a feature that involves a radius, shape the radius as specified in the repair section. If the radius is not specified, shape it as close as

possible to the original contour. Refer to an undamaged location in the feature or a similar part if necessary to determine original radius.

NOTE: Be careful not to produce a localized notch. Blend to produce a smooth transition to the adjacent surfaces.

Subtask 70-42-00-350-033

4 Finish of Blends.

a If the blended area intersects a corner, break the sharp edges to those specified in the Engine Inspection Manual for that feature. If not specified, use one of two options: Option 1: blend the corner to a radius of 0.015-0.030 inch (0.38-0.76 mm), Option 2: blend to match the general radius of the corner. Refer to a nearby, non-blended location of the corner or a similar part if necessary to determine original radius.

b If the blended area intersects a curved feature, restore the general shape of the original contour. Refer to a nearby, non-blended location of the feature or a similar part if necessary to determine the original contour.

c All transitions from blended to non-blended areas must be smooth and continuous.

d The surface finish of the blended area must be as smooth as or smoother than adjacent non-blended surfaces. Polishing is optional.

Subtask 70-42-00-350-034

5 Blending Guidelines. Refer to Figure 4.

TABLE 1. Blending Guidelines

Damage Depth Inch (mm) X	Blend Depth Inch (mm) 1.25X	Blend Length (Minimum) Inch (mm) Minimum 10 Times of the Blend Depth
0.001 (0.03)	0.002 (0.05)	0.02 (0.5)
0.002 (0.05)	0.004 (0.10)	0.04 (1.0)
0.004 (0.10)	0.005 (0.13)	0.05 (1.3)
0.005 (0.13)	0.006 (0.15)	0.06 (1.5)
0.010 (0.25)	0.013 (0.33)	0.13 (3.3)
0.020 (0.51)	0.025 (0.64)	0.25 (6.4)
0.025 (0.64)	0.031 (0.79)	0.31 (7.9)
0.030 (0.76)	0.038 (0.97)	0.38 (9.7)
0.035 (0.89)	0.044 (1.12)	0.44 (11.2)
0.040 (1.02)	0.050 (1.27)	0.50 (12.7)

NOTE: The guidelines in Table 1 are for reference only. Total blend depth is not to exceed the Engine Manual Inspection Limits.

NOTE: If guidance is needed for complex areas or if the 10X blend length cannot be met, contact the GE Aviation ‘Customer Support Center' or ‘Product Support Engineering'.

Subtask 70-42-00-350-035

(b) Titanium Blending - (Rotating Parts).

WARNING: TITANIUM DUST IS EXTREMELY FLAMMABLE. DO NOT LET IT COLLECT. DISCARD ALL TITANIUM WASTE IN AN APPROVED CONTAINER.

WARNING: DO NOT USE WATER TO EXTINGUISH A TITANIUM FIRE. EXTINGUISH WITH AN APPROVED CHEMICAL FOR METAL FIRES.

CAUTION: DO NOT USE ABRASIVES THAT INCLUDES A VITRIFIED BOND MATRIX ON TITANIUM ROTATING PARTS OR DAMAGE TO THE PART CAN OCCUR.

CAUTION: FOR ALL ABRASIVES USED, CONFIRM WITH SUPPLIER IF THE PRODUCTS HAVE "VITRIFIED BOND MATRIX". THE ABRASIVES WITH "VITRIFIED BOND MATRIX" ARE EXCLUDED FROM TITANIUM ALLOYS.

CAUTION: DO NOT USE CUTTING TOOLS THAT HAVE BEEN USED ON OTHER MATERIALS. IT WILL CAUSE CONTAMINATION OF THE TITANIUM. KEEP THE BLENDING ABRASIVE TOOLS USED FOR TITANIUM SEPARATE FROM TOOLS USED FOR OTHER METALS. IF YOU ARE NOT SURE OF THE PREVIOUS USE, DISCARD AND USE A NEW ABRASIVE TOOL.

CAUTION: DRESS THE ABRASIVE TOOL BEFORE USING. A CONTAMINATED WHEEL CAN CAUSE DAMAGE TO THE TITANIUM PARTS.

CAUTION: DO NOT PERMIT SPARKS TO TOUCH THE BLEND AREA OR OTHER AREAS OF A TITANIUM PART. IF SPARKS HIT UNPROTECTED TITANIUM, DAMAGE CAN OCCUR. USE A MASK OR SHIELD TO HELP KEEP SPARKS AND REMOVED MATERIAL FROM CONTAMINATING OTHER AREAS OR CAVITIES.

CAUTION: POWER BLENDING MUST BE ACCOMPLISHED IN A MANNER THAT DOES NOT GENERATE EXCESSIVE HEAT AND THERMAL STRESSES. START THE BLEND WITH COARSER GRADES OF ABRASIVES FOR FAST INITIAL REMOVAL OF DAMAGED MATERIAL. FINISH THE BLEND WITH FINER GRADES OF ABRASIVES OR CROCUS CLOTH UNTIL THE SURFACE IS AS SMOOTH AS OR SMOOTHER THAN THE ADJACENT SURFACES.

CAUTION: USE ALL APPLICABLE SAFETY PRECAUTIONS WHEN WORKING WITH TITANIUM PARTS. IT IS RECOMMENDED THAT PERSONNEL PERFORMING THESE BLENDING PROCEDURES BE THOROUGHLY TRAINED AND/OR CERTIFIED TO WORK WITH TITANIUM MATERIALS. DO NOT USE HALOGEN-CONTAINING CLEANING COMPOUNDS, DO NOT USE TOOLS THAT CONTAIN CADMIUM OR

THAT ARE CADMIUM PLATED. IF PRESSURE SENSITIVE ADHESIVE TAPES ARE USE, THE ADHESIVES MUST BE CHEMICALLY CLEANED AND REMOVED IMMEDIATELY AFTER USE.

NOTE: When possible, perform the benching operation in a ventilated booth (approved for titanium dust removal) to control the dust and reduce the risk of fire.

1 Blend per ‘General Specifications' section specified in Subtask 70-42-00-350-030 (paragraph C.(3).(a)). Either the ‘Manual Blending Procedure' Subtask 72-42-00-350-036 (paragraph C.(3).(c) or the ‘Power Blending Procedure' Subtask 72-42-00-350-036 (paragraph C.(3).(d) may be used.

a If the ‘Power Blending Procedure' was used, manually remove an additional 0.002 inch (0.05 mm). Final blend depth must be within the limits specified in the Engine Inspection Manual after blending.

2 Examine the blend area for any signs of overheating (discoloration).

a Overheating (discoloration) is not permitted.

3 Clean the part again, if necessary, in preparation for Fluorescent Penetrant Inspection, refer to Engine Inspection Manual cleaning section for directions for that part.

4 Swab-etch the blended area. Refer to TASK 70-24-01-110-034, Swab Etching Procedure and refer to the Class specified in the Engine Inspection Manual for that part.

5 Do a spot Fluorescent Penetrant Inspection. Refer to TASK 70-32-03-230-002, Spot-Fluorescent-Penetrant Inspection of the blended area. Refer to the Fluorescent Penetrant Inspection Class specified in the Engine Inspection Manual for that part. No relevant linear indications allowed. If guidance is needed, contact GE Aviation ‘Customer Support Center' (email: geae.csc@ae.ge.com) or ‘Product Support Engineering' for specifications.

6 Clean the part after all Fluorescent Penetrant Inspection's are completed. Refer to TASK 70-32-02-230-001, Fluorescent Penetrant Inspection, paragraph 6.D.(3), ‘Cleaning of Parts After Inspection'.

CAUTION: MASK AND PROTECT SPLINES, THREADS, SERRATIONS, CRITICAL AREAS, HOLES AND COATED AREAS IN CLOSE PROXIMITY BEFORE SHOT PEENING.

7 Do a shot peen of the blended areas. Refer to TASK 70-47-01-380-016, Shotpeening. Follow the shot peen requirements specified for the blended area by using the appropriate Repair Procedure, Service Bulletin, or engine manual Inspection Section. If no shot peen procedure is specified, use the following shot peen parameters: use CCW 14 or S110 shot with an intensity of 6-12N, verified with Type N Test Almen strips (as noted in TASK 70-47-01-380-016, Shotpeening, paragraph 4.E., Intensity Determination). Do not over peen. Mask areas that do not require shot peening with plastic tape (C10-021).

NOTE: Unless specified differently in the process document, CCW14 must be used on parts made from Rene 88, Rene 95 or Rene 104 (Rene 88 may also be listed as R88, R88DT and Rene 88DT). Refer to the IPC (Illustrated Parts Catalog) and the applicable Engine Manual Cleaning sections to identify the alloy type. If the alloy cannot be determined, contact ‘GE Aviation Customer Support Center' or ‘Product Support Engineering' for clarification.

Subtask 70-42-00-350-036

(c) Manual Blending Procedure (Hand Blending Method) (Rotating Parts).

WARNING: DO NOT BREATHE THE PARTICLES FROM BLENDING OR LET THE PARTICLES TOUCH YOU. PARTICLES FROM BLENDING CAN CAUSE DAMAGE, INJURY, OR IRRITATION TO YOU. USE PERSONAL PROTECTION EQUIPMENT. USE LOCAL MECHANICAL EXHAUST VENTILATION OR AN APPROVED RESPIRATOR. IF YOU DO NOT, INJURY CAN OCCUR.

1 Manually blend to a minimum length of 10 times the depth of the blend in all directions, if the local surface area allows, larger length to depth ratios are preferable. Blend to approximately 1.25 times (for reference only) the depth of the damage. Refer to Table 1 and Figure 4. Remove all sharp edges. Blend depth is not to exceed the Engine Inspection Manual limits after blending.

2 Use typical abrasive tools. Refer to the Consumable Materials List.

3 To keep abrasives working properly, do not permit the abrasive to become loaded up with removed material.

4 Start the blend with coarser grades of abrasives or files for fast initial removal of damage but not coarser than needed to remove the damage.

5 Finish the blends with the finer grades of abrasives or crocus cloths until the surface is as smooth as or smoother than the adjacent surfaces.

6 Clean the part again, if necessary in preparation for Fluorescent Penetrant Inspection; refer to Engine Inspection Manual cleaning section for directions for that part.

7 Swab etch the blended area. Refer to TASK 70-24-01-110-034, Swab Etching Procedure.

8 Do a spot Fluorescent Penetrant Inspection. Refer to TASK 70-32-03-230-002, Spot-Fluorescent-Penetrant Inspection of the blended area. Refer to the Fluorescent Penetrant Inspection Class specified in the Engine Inspection Manual for that part. No relevant linear indications allowed. If guidance is needed, contact GE Aviation ‘Customer Support Center' (email: geae.csc@ae.ge.com) or ‘Product Support Engineering' for specifications.

9 Clean the part after all Fluorescent Penetrant Inspection's are completed. Refer to TASK 70-32-02-230-001, Fluorescent Penetrant Inspection, paragraph 6.D.(3), ‘Cleaning of Parts After Inspection'.

10 Do a shot peen of the blended areas. Refer to TASK 70-47-01-380-016, Shotpeening. Follow the shot peen requirements specified for the blended area by using the appropriate Repair Procedure, Service Bulletin, or engine manual Inspection Section. If no shot peen procedure is specified, use the following shot peen parameters: use CCW 14 or S110 shot with an intensity of 6-12N, verified with Type N Test Almen strips (as noted in TASK 70-47-01-380-016, Shotpeening, paragraph 4.E., Intensity Determination). Do not over peen. Mask areas that do not require shot peening with (C10-021) plastic tape.

NOTE: Unless specified differently in the process document, CCW14 must be used on parts made from Rene 88, Rene 95 or Rene 104 (Rene 88 may also be listed as R88, R88DT and Rene 88DT). Refer to the IPC (Illustrated Parts Catalog) and applicable Engine Manual Cleaning sections to identify the alloy type. If the alloy cannot be determined, contact 'GE Aviation Customer Support Center' or 'Product Support Engineering' for clarification.

Subtask 70-42-00-350-037

(d) Power Blending Procedure (Rotating Parts).

WARNING: DO NOT BREATHE THE PARTICLES FROM BLENDING OR LET THE PARTICLES TOUCH YOU. PARTICLES FROM BLENDING CAN CAUSE DAMAGE, INJURY, OR IRRITATION TO YOU. USE ALL NECESSARY PERSONAL PROTECTION EQUIPMENT. IF YOU DO NOT, INJURY CAN OCCUR.

CAUTION: DO NOT OVERHEAT (OR CAUSE ANY DISCOLORATION TO) THE PART. USE ONLY MINIMUM PRESSURE WHEN YOU APPLY POWER BLENDING TOOLS TO PARTS. OVERHEATING OF PARTS DURING BLENDING CAN CAUSE EMBRITTLEMENT AND DAMAGE TO THE PART.

1 Blend per the 'General Specifications' section specified in Subtask 70-42-00-350-030 (paragraph C.(3).(a)).

2 Use typical abrasive tools. Refer to the 'Materials' section.

3 To keep abrasives working properly, do not permit the abrasive to become loaded up with removed material.

4 Do not overheat or cause any discoloration to the part. Use only minimum pressure when you apply power blending tools to parts. Overheating of parts during blending can cause damage or reduce the mechanical properties of the part.

a Overheating (discoloration) is not permitted.

5 Blend with the tools and the sequence that follows.

a Start the power blend with coarser grades of resilient flexible abrasive impregnated wheels, brushes or points for the initial removal of damage but not coarser than needed to remove the damage.

b Finish the blend with the finer grades of abrasives or crocus cloth until the surface is as smooth as or smoother than the adjacent surfaces.

6 If necessary, polish the blend, refer to Subtask 70-42-00-350-033 (paragraph C.(3).(a)4). 'Finish of Blends', using a polishing wheel and polishing compound, use Polishing Compound 240 grit aluminum oxide in soft grease or equivalent.

7 Clean the part again, if necessary in preparation for Fluorescent Penetrant Inspection. Refer to Engine Inspection Manual cleaning section for directions for that part.

8 Swab-etch the reworked area. Refer to TASK 70-24-01-110-034, Swab Etching Procedure and refer to the Class specified in the Engine Inspection Manual for that part.

9 Do a spot Fluorescent Penetrant Inspection. Refer to TASK 70-32-03-230-002, Spot-Fluorescent-Penetrant Inspection of the reworked area. Refer to the Fluorescent Penetrant Inspection Class specified in the Engine Inspection Manual for that part. No relevant linear indications allowed. If guidance is needed, contact GE Aviation 'Customer Support Center' (email: geae.csc@ae.ge.com) or 'Product Support Engineering' for specifications.

10 Clean the part after all Fluorescent Penetrant Inspection's are completed. Refer to TASK 70-32-02-230-001, Fluorescent Penetrant Inspection, paragraph 6.D.(3), 'Cleaning of Parts After Inspection'.

CAUTION: MASK AND PROTECT SPLINES, THREADS, SERRATIONS, CRITICAL AREAS, HOLES AND COATED AREAS IN CLOSE PROXIMITY BEFORE SHOT PEENING.

11 Do a shot peen of the blended areas. Refer to TASK 70-47-01-380-016, Shotpeening. Follow the shot peen requirements specified for the blended areas by using the appropriate Repair Procedure, Service Bulletin, or engine manual Inspection Section. If no shot peen procedure is specified, use the following shot peen parameters: use CCW 14 or S110 shot with an intensity of 6-12N, verified with Type N Test Almen strips (as noted in TASK 70-47-01-380-016, Shotpeening, paragraph 4.E., Intensity Determination). Do not over peen. Mask areas that do not require shot peening.

NOTE: Unless specified differently in the process document, CCW14 must be used on parts made from Rene 88, Rene 95 or Rene 104 (Rene 88 may also be listed as R88, R88DT and Rene 88DT). Refer to the IPC (Illustrated Parts Catalog) and applicable Engine Manual Cleaning sections to identify the alloy type. If the alloy cannot be determined, contact 'GE Aviation Customer Support Center' or 'Product Support Engineering' for clarification.

Subtask 70-42-00-350-038

(e) High Metal Removal Procedure (Rotating Parts).

NOTE: The instructions in the engine/shop manual section or applicable service bulletin take precedence over the following procedures. Refer to the instructions that follow with

the engine/shop manual or service bulletin criteria, or when no criteria are specified.

NOTE: High or raised metal is the displacement of metal above the original surface contour, refer to Figure 3.

1 Remove high metal as follows:

a Use a fine abrasive stone, emery cloth, or crocus cloth to remove high metal.

b Remove only the material that is projecting above the original surface contour.

c Finish the blend with the finer grades of abrasives or crocus cloth until the surface is as smooth as or smoother than the adjacent surfaces. Polishing is optional.

2 Clean the part again, if necessary in preparation for Fluorescent Penetrant Inspection. Refer to engine manual cleaning section for directions for that part.

3 Swab-etch the reworked area. Refer to TASK 70-24-01-110-034, Swab Etching Procedure and refer to the Class specified in the Engine Inspection Manual for that part.

4 Do a spot Fluorescent Penetrant Inspection. Refer to TASK 70-32-03-230-002, Spot-Fluorescent-Penetrant Inspection of the reworked area. Refer to the Fluorescent Penetrant Inspection Class specified in the Engine Inspection Manual for that part. No relevant linear indications allowed. If guidance is needed, contact GE Aviation ‘Customer Support Center' (email: geae.csc@ae.ge.com) or ‘Product Support Engineering' for specifications.

5 Clean the part after all Fluorescent Penetrant Inspection's are completed. Refer to TASK 70-32-02-230-001, Fluorescent Penetrant Inspection, paragraph 6.D.(3), ‘Cleaning of Parts After Inspection'.

CAUTION: MASK AND PROTECT SPLINES, THREADS, SERRATIONS, CRITICAL AREAS, HOLES AND COATED AREAS IN CLOSE PROXIMITY BEFORE SHOT PEENING.

6 Do a shot peen of the blended areas. Refer to TASK 70-47-01-380-016, Shotpeening. Follow the shot peen requirements specified for the blended area by using the appropriate Repair Procedure, Service Bulletin, or engine manual Inspection Section. If no shot peen procedure is specified, use the following shot peen parameters: use CCW 14 or S110 shot with an intensity of 6-12N, verified with Type N Test Almen strips (as noted in TASK 70-47-01-380-016, Shotpeening, paragraph 4.E., Intensity Determination). Do not over peen. Mask areas that do not require shot peening with (C10-021) plastic tape.

NOTE: Unless specified differently in the process document, CCW14 must be used on parts made from Rene 88, Rene 95 or Rene 104 (Rene 88 may also be listed as R88, R88DT and Rene 88DT). Refer to the IPC (Illustrated Parts Catalog) and applicable Engine Manual Cleaning sections to identify the alloy type. If the alloy cannot be determined, contact ‘GE Aviation Customer Support Center' or ‘Product Support Engineering' for clarification.

Subtask 70-42-00-350-039

(f) Corrosion Pitting Rework Procedure (Rotating Parts).

CAUTION: MASK AND PROTECT SPLINES, THREADS, SERRATIONS, CRITICAL AREAS, HOLES AND COATED AREAS IN CLOSE PROXIMITY BEFORE SHOT PEENING.

NOTE: The instructions in the engine/shop manual section or applicable service bulletin take precedence over the following procedures. Refer to the instructions that follow with the engine/shop manual or service bulletin criteria, or when no criteria are specified.

1 Wet blast clean the effected area. Refer to TASK 70-21-05-120-A02, Wet Abrasive Blast Cleaning Method No. 5A or, alternate TASK 70-21-05-120-B02, Wet Abrasive Blast Cleaning Method No. 5B, using 500 grit. Mask areas in close proximity that are not affected.

a Make sure that the corrosion products are removed. Measure the depth of remaining pitting and make sure that it is acceptable. Refer to the limits noted in the engine inspection manual. If the corrosion limits are not specified in the engine manual, then contact ‘GE Aviation Customer Support Center' for clarification.

2 Clean the part again, if necessary in preparation for Fluorescent Penetrant Inspection. Refer to engine manual cleaning section for directions for that part.

3 Swab-etch the affected area. Refer to TASK 70-24-01-110-034, Swab Etching Procedure and refer to the Class specified in the Engine Inspection Manual for that part.

4 Do a spot Fluorescent Penetrant Inspection. Refer to TASK 70-32-03-230-002, Spot-Fluorescent-Penetrant Inspection of the reworked area. Refer to the Fluorescent Penetrant Inspection Class specified in the Engine Inspection Manual for that part. No relevant linear indications allowed. If guidance is needed, contact GE Aviation ‘Customer Support Center' (email: geae.csc@ae.ge.com) or ‘Product Support Engineering' for specifications.

5 Clean the part after all Fluorescent Penetrant Inspection's are completed. Refer to TASK 70-32-02-230-001, Fluorescent Penetrant Inspection, paragraph 6.D.(3), ‘Cleaning of Parts After Inspection'.

CAUTION: MASK AND PROTECT SPLINES, THREADS, SERRATIONS, CRITICAL AREAS, HOLES AND COATED AREAS IN CLOSE PROXIMITY BEFORE SHOT PEENING.

6 Before shot peen, measure the depth of remaining pitting and make sure that it is

acceptable. Refer to the limits noted in the engine inspection manual. If the corrosion limits are not specified in the engine manual, then contact ‘GE Aviation Customer Support Center' for clarification.

7 Do a shot peen of the affected areas. Refer to TASK 70-47-01-380-016, Shotpeening. Follow the shot peen requirements specified for the affected area by using the appropriate Repair Procedure, Service Bulletin, or engine manual Inspection Section. If no shot peen procedure is specified, use the following shot peen parameters: use CCW 14 or S110 shot with an intensity of 6-12N, verified with Type N Test Almen strips (as noted in TASK 70-47-01-380-016, Shotpeening, paragraph 4.E., Intensity Determination). Do not over peen. Mask areas that do not require shot peening with (C10-021) plastic tape.

NOTE: Unless specified differently in the process document, CCW14 must be used on parts made from Rene 88, Rene 95 or Rene 104 (Rene 88 may also be listed as R88, R88DT and Rene 88DT). Refer to the IPC (Illustrated Parts Catalog) and applicable Engine Manual Cleaning sections to identify the alloy type. If the alloy cannot be determined, contact ‘GE Aviation Customer Support Center' or ‘Product Support Engineering' for clarification.

Subtask 70-42-00-350-040

(4) Blending And Shot Peening of Thin Walled Rotating Parts.

NOTE: Thin Walled Rotating parts are defined as: HPT Pressure Tube, Cooling Plates, etc. or, components with features less than 0.060 inch (1.52 mm) in thickness. Part minimum thickness dimensions must be maintained after shot peening.

(a) Thin walled life limited rotating parts must be blended and shot peened to the specific methods specified in the engine inspection manual and/or to the repair procedures for that part. If there are concerns or questions for a specific component, please contact GE Aviation ‘Customer Support Center' (email: geae.csc@ae.ge.com) or ‘Product Support Engineering' for your specific engine model.

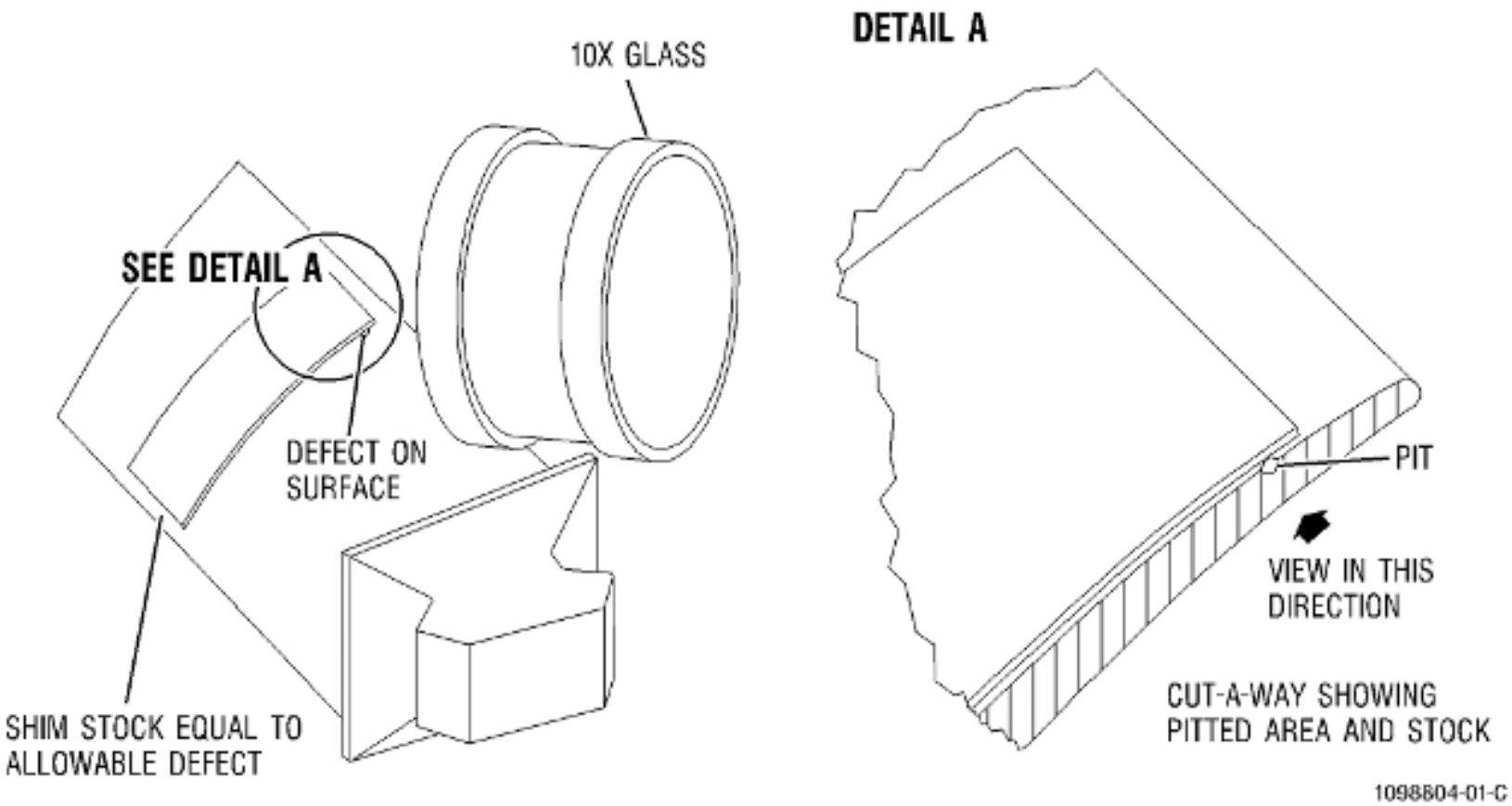


Figure 1 Airfoil Defect - Measurement

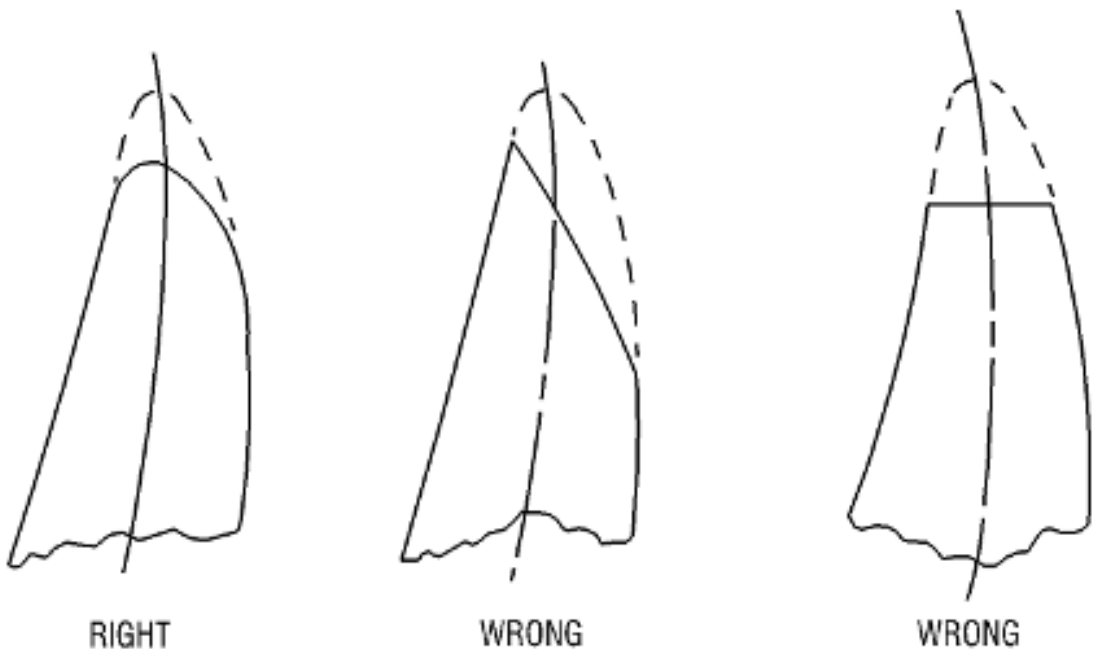


Figure 2 Airfoil Leading Edge - Blending

Subtask 70-42-00-350-029

WARNING: DO NOT BREATHE THE PARTICLES FROM BLENDING OR LET THE PARTICLES TOUCH YOU. PARTICLES FROM BLENDING CAN CAUSE DAMAGE, INJURY, OR IRRITATION TO YOU. USE PERSONAL PROTECTION EQUIPMENT. USE LOCAL MECHANICAL EXHAUST VENTILATION OR AN APPROVED RESPIRATOR.

D. General Removal of High Metal (No Shot Peening).

NOTE: The instructions in the Engine/Shop Manual section or applicable Service Bulletin take precedence over the following procedures. Use the instructions that follow with the Engine/Shop Manual or Service Bulletin criteria, or when no criteria are specified.

NOTE: Refer to the engine manual or repair procedure to determine if fluorescent penetrant inspection is required after rework.

(1) High metal is caused by the displacement of metal above a surface. It is found around defects like nicks and scratches. Remove high metal as follows:

(a) Use a fine abrasive stone, emery cloth, or crocus cloth to remove high metal.

(b) Remove only the material that is projecting above the original surface contour. Refer to Figure 3.

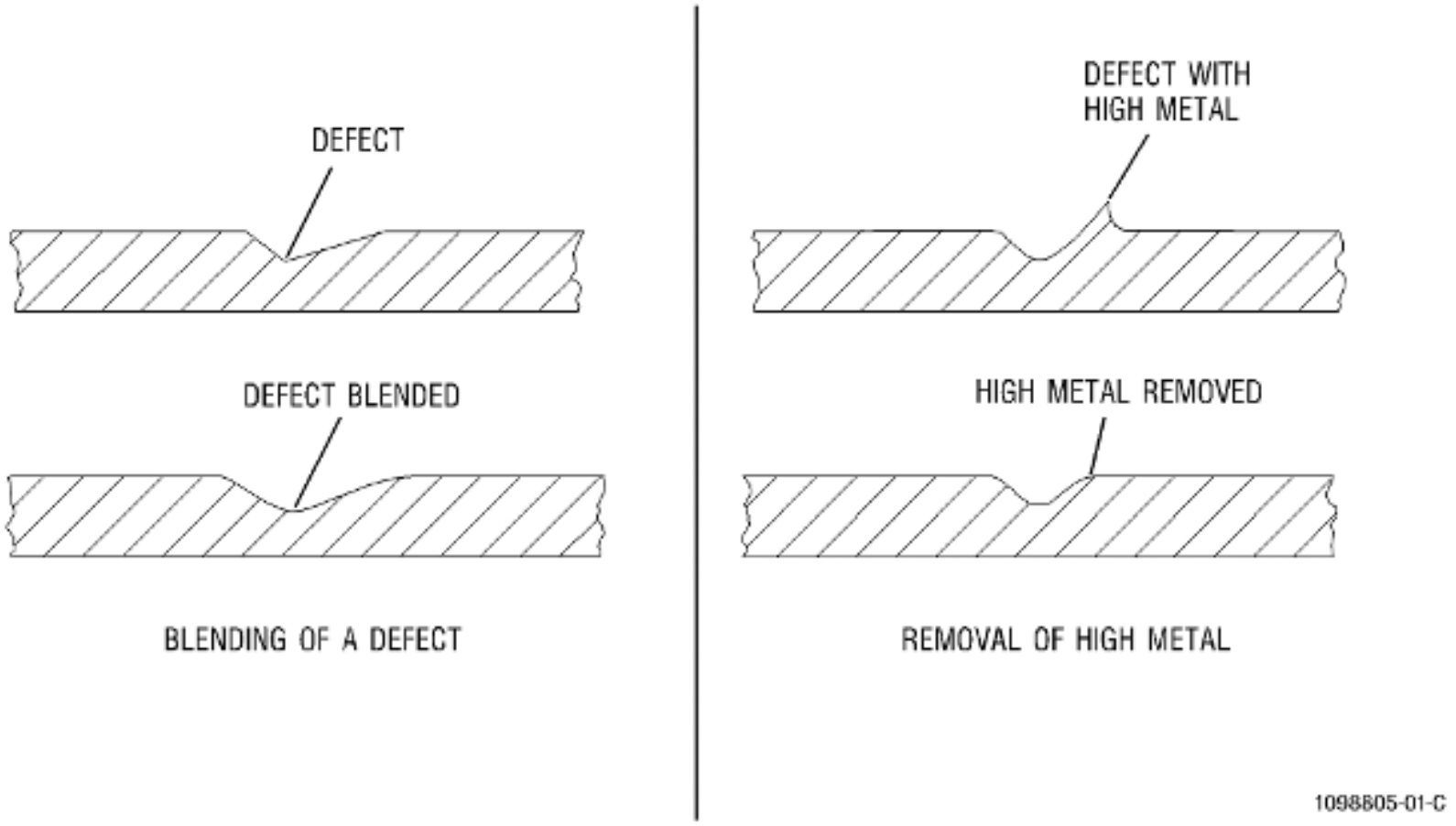
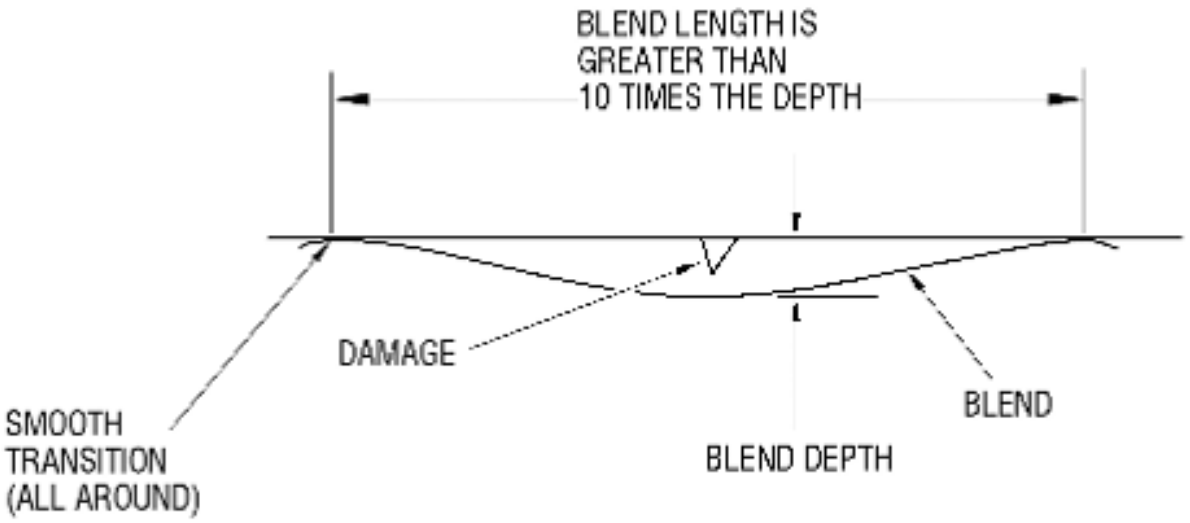


Figure 3 Defect - Blending and High Metal - Removal



1261294-00

Figure 4 Blending guidelines

GE Designated: - CONFIDENTIAL Subject to the restrictions on the media