

## Coated Stellite 1<sup>st</sup> Stage Turbine Nozzle

**Engine Application(s):** 250-C20, C20B, C20F, C20J, C20S, C20W

**Subject:** Inspection and Rework Procedures for the Coated A23038218-C505 & E23038218-C505 1<sup>st</sup> Stage Turbine Nozzle Assembly.

**Compliance:** Any time the nozzle assembly is removed for overhaul. Refer to the appropriate Figures for Inspection and Rework Procedures. Fluorescent Penetrant Inspect per AMS 2647 or equivalent.

Extex does not recommend more than two airfoil repairs to this part.

When repair or rework is required, strip coating per approved procedure prior to performing repair.

After repair or rework, re-coat per approved procedure. Re-identify as A23038218-C505R1 & E23038218-C505R1 (after 1<sup>st</sup> re-coat), A23038218-C505R2 & E23038218-C505R2 (after 2<sup>nd</sup> coat), etc. It will be necessary to separate vane ring from diaphragm assembly when re-coating.

Repaired Nozzle Assemblies shall meet dimensional requirements of Figure 2.

Table 1: Acceptance and rework limits and procedures

Figure 1: Inspection

Figure 2: Dimensional Inspection

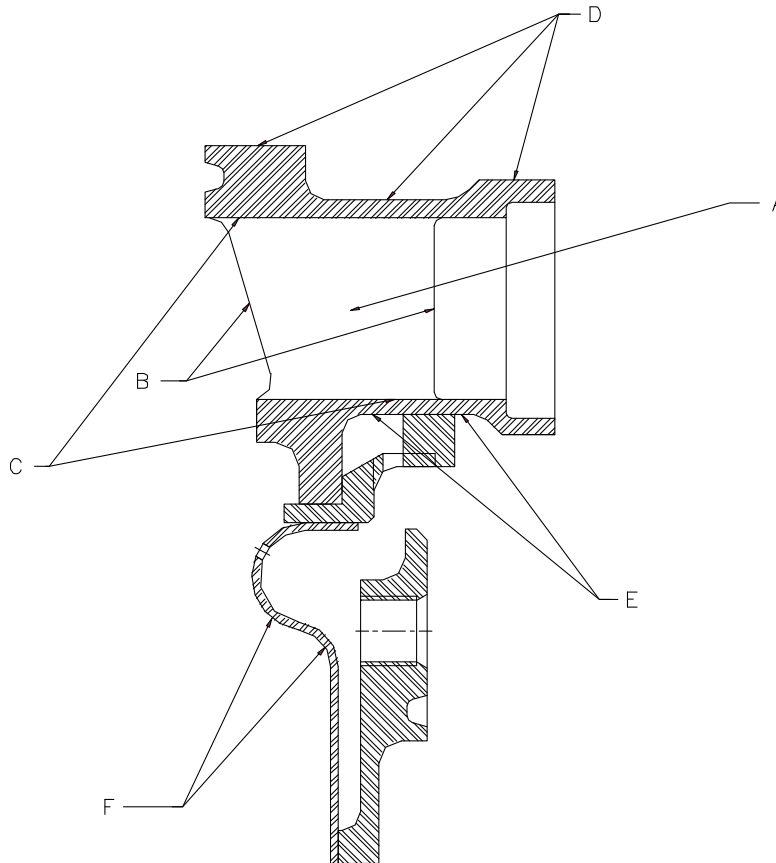
**Notes:** It is not necessary to re-coat nozzle. If nozzle is not re-coated, re-identify as A23038218-C505XX & E23038218-C505XX. Once run, A23038218-C505XX & E23038218-C505XX nozzles may not be re-coated and Inspection Limits & Repair T-001 inspection and rework procedures apply.

Replaces Service Letter T95-009 issued by Superior Turbine on July 26, 1995. Refer to OEM's published data for installation, engine operation and disassembly.

**Revisions:**

N/C	Dated: 01/30/97	Initial Release.
A	Dated: 12/02/97	Updated format; added "FAA/DER procedure for airfoil repair".
B	Dated: 06/28/99	Removed sources.
C	Dated: 01/25/01	Updated format.
D	Dated: 09/09/09	Updated EXTEX to TIMKEN.
E	Dated: 2/02/16	Updated Timken to EXTEX Engineered Products.

**A23038218-C505 & E23038218-C505**  
**First Nozzle Inspection**



Code Letter	Location	Description of Condition
A	Vane Airfoil	Cracks
B	Vane Leading Edge Vane Trailing Edge	Nicked, Dented Nicked, Dented, Warped, Burned
C	Vane Fillet	Cracks
D	Outer Band	Cracks
E	Inner Band	Cracks
F	Diaphragm	Cracks

**FIGURE 1**

**T-013 Inspection Limits and Repair**

**A23038218-C505 & E23038218-C505 First Nozzle (Coated)**

**Inspection and Rework Limits**

Condition	Service and/or Repair	Corrective Action
<b>Airfoil Crack Indications, Visual and FPI</b>	Leading Edge: 0.25 inch maximum is acceptable.* Trailing Edge: 0.25 inch maximum is acceptable.*  *Acceptance is contingent upon the following: 1) Two or more cracks cannot lie in the same plane. 2) Multiple cracks are separated by at least 0.25 inch. 3) Two or more cracks do not propagate towards another.	Install new or serviceable Nozzle or replace Vane Ring per approved procedure if Service Limit cannot be met.  Repair using approved braze procedure. Repair using approved weld procedure when braze capability is exceeded. EFA to be between 3.30 and 3.31 after repair. Airfoils may be repaired using FAA/DER approved procedure.
<b>Machined Surfaces, Visual Damage</b>	Machined Surface Damage is not acceptable after blending.  Damage greater than 0.12 inch dia and 0.010 depth cannot be repaired.	Blend damaged surface(s) with Arkansas stone or emery cloth.  Replace Nozzle Assembly when damage cannot be repaired.
<b>Damaged Airfoils**</b>	Leading Edge: 0.156 inch maximum after blending is acceptable provided the EFA is between 3.30 and 3.33. Trailing Edge: 0.156 inch maximum after blending is acceptable provided the EFA is between 3.30 and 3.33.	Install new or serviceable Nozzle or replace Vane Ring per approved procedure if Service Limit cannot be met. Blend airfoil to remove damage. <b>*** See Note on Page 4</b> Weld repair or replace vane ring when damage exceeds limits. Replace vane ring when service limit cannot be met. Airfoils may be repaired using FAA/DER approved procedure.
<b>Airfoil Fillet Crack Indications, Visual and FPI</b>	At Inner Band: 0.19 inch maximum from Leading or Trailing edge. At Outer Band: 0.19 inch maximum from Leading or Trailing edge. <b>NOTE:</b> Length specified is for cracks along the airfoil measured parallel to the adjacent band. Two or more cracks are acceptable provided they do not propagate towards another.	Install new or serviceable Nozzle or replace Vane Ring per approved procedure if Service Limit cannot be met. Repair using approved braze procedure. Repair using approved weld procedure when braze capability is exceeded. EFA to be between 3.30 and 3.31 after repair. Airfoils may be repaired using FAA/DER approved procedure.

**TABLE 1** (sheet 1 of 2)

**T-013 Inspection Limits and Repair**

**A23038218-C505 & E23038218-C505 First Nozzle (Coated)  
Inspection and Rework Limits**

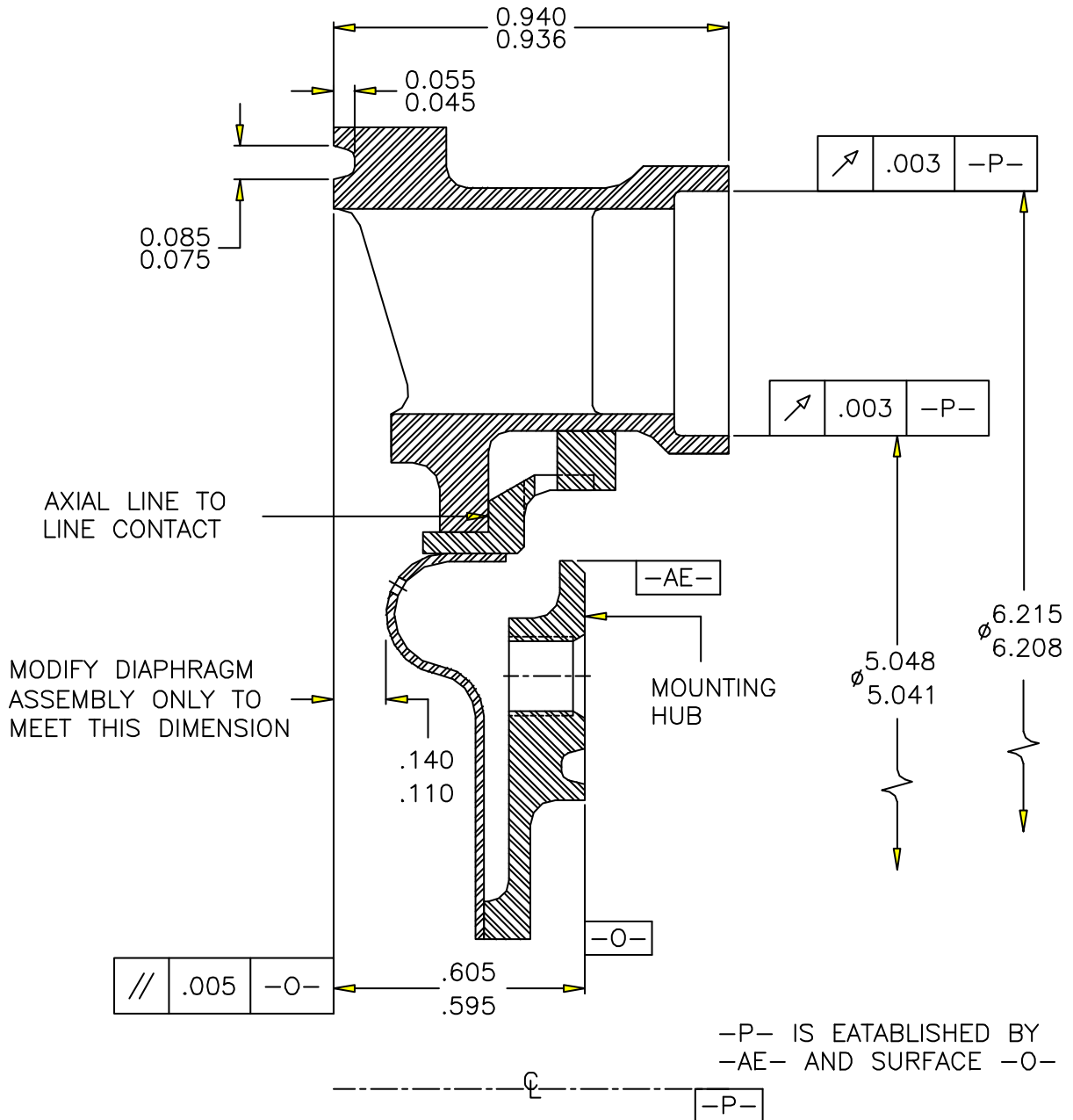
Condition	Service and/or Repair Limits	Corrective Action
Inner & Outer Band Crack Indications, Visual and FPI	<b>Outer Band:</b> Axial: 0.38 inch maximum into band provided there are not cracks in line on the opposite edge. Circumferential: 0.50 inch maximum provided cracks are between vanes.	Install new or serviceable Nozzle or replace Vane Ring per approved procedure if Service Limit cannot be met. Repair using approved braze procedure. Repair using approved weld procedure when braze capability is exceeded. EFA to be between 3.30 and 3.31 after repair.
Inner & Outer Band Crack Indications, Visual and FPI (cont'd)	<b>Inner Band:</b> Axial: 0.19 inch maximum into band provided there are not cracks in line on the opposite edge. Circumferential: Circumferential cracks are not acceptable.	Install new or serviceable Nozzle or replace Vane Ring per approved procedure if Service Limit cannot be met. Repair using approved braze procedure. Repair using approved weld procedure when braze capability is exceeded. EFA to be between 3.30 and 3.31 after repair.
Diaphragm Cracking, Visual and FPI***	Cracks are not acceptable.	Install new or serviceable Nozzle or replace Diaphragm assembly per approved procedure.

TABLE 1 (sheet 2 of 2)

**NOTES:**

- 1 Extex considers airfoil restoration of this part a Major Repair, (as defined in FAR 1,) and should be performed under FAA authorization.
  - 2 Airfoil repairs to be performed by an FAA Approved repair facility with Major Repair experience.
  - 3 Blending to remove L.E. and/or T.E. damage may affect airflow.
  - 4 Recommended airflow to be 3.30 to 3.31 EFA (as determined with a Fleming Flow Rig.)
  - 5 FPI indications less than 0.005 inch are acceptable.
  - 6 Blend and polish acceptable vane edge damage in a radial direction using a fine file or 320 grit abrasive paper. Optimum blend should produce scallops with a 3:1 width to depth ratio. Maintain a smooth blend with the basic airfoil. Trailing edge radius after blend to be greater than 0.005 inch.  
During inspection, care must be taken to discern coating imperfections from base metal imperfections. The inspection criteria apply only to the base metal. Coating cracks of any size or length are not cause for rejection.
- \*\* Blend and polish acceptable vane edge damage in a radial direction using a fine file and 320 grit abrasive paper. Maintain a smooth blend with the basic airfoil. Trailing edge radius after blend to be greater than 0.005 inch.
- \*\*\* FPI per approved water washable technique. Indications less than 0.005 inches are not interpretable. Airfoils may be repaired using FAA/DER approved procedure.

**A23038218-C505 & E23038218-C505**  
**First Nozzle Inspection**



**FIGURE 2**