

M-100 Repair Limits

E3844038-4 – Stator 1st Stage GTCP 331-200

Subject:	Braze repair of inner and outer band cracks
Extex Part Number(s):	E3844038-4 Stator 1 st Stage GTCP 331-200
Engine Application(s):	Honeywell GTCP 331-200 Series Auxiliary Power Unit (APU)
Compliance:	Any time the stator fails FPI on the inner or outer band and cannot be hand finished; it is to be repaired per the attached instructions.
Revisions:	N/C Dated: 09/27/10 Initial Release. A Dated: 02/12/16 Updated Timken to EXTEX Engineered Products.

REASON:

E3844038-4 Stator 1st Stage GTCP 331-200 has FPI indications on the inner or outer band which cannot be hand finished. Rounded indications and/or micro-cracks in cluster areas no greater than 40% of I.D. or O.D. of either band can be repaired per these instructions.

DESCRIPTION:

This bulletin provides braze repair instructions for the inner and outer band of 1st Stage Stators.

APPROVAL:

The Repair Instructions section of this document is FAA Approved.

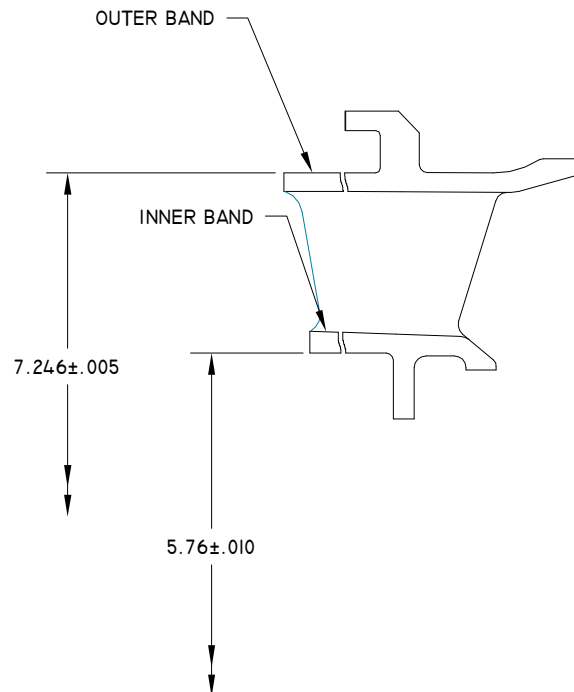


FIGURE 1

M-100 Repair Limits

Repair Instructions

Instructions are provided for braze repair of inner and outer band cracks. Figure 1 depicts key features of the subject stators.

Furnace Braze Repair of Inner and Outer Ring: Furnace brazing is an excellent method to repair cracks or to fill shallow voids on the stator features such as the inner and outer bands. Furnace brazing can fill cracks up to .020" wide and creates less distortion than welding.

Surfaces to be braze repaired must be cleaned. Cracks cannot be cleaned via abrasive media or carbide burrs because the crack would be opened beyond the bridging capability of the braze alloy. Instead, cracks should be cleaned in a reducing atmosphere. Examples of reducing atmospheres include heating the stator in hydrogen atmosphere up to 2100°F in some kind of furnace or retort. An alternate and better method, known as Fluoride Ion Cleaning (FIC), places the part to be brazed in an atmosphere of hydrogen fluoride at very high temperature (i.e. 2050°F - 2150°F).

All brazing must be performed in a reliable vacuum furnace which is capable of controlling temperature to within $\pm 10^\circ\text{F}$. This measure of control is necessary to insure melting of the braze alloy while avoiding melting of the base metal MAR-M-247. Braze temperature and time cycle will be controlled by the braze alloy employed. Extex recommends that the braze alloy AMS 4777 be used for this repair.

Braze filler can be applied via a simple syringe or can consist of precut preforms. Extex recommends that an appropriate "stop off" be used to contain braze to those areas being repaired. Following brazing, hand finishing, or machining should be employed to restore part to its original dimensions and features.

Once the stator is restored to its original dimension, the repaired area should be fluorescent penetrant inspected (FPI) per ASTM E 1417, Type 1, Method A or D, Sensitivity Level III. No indications permitted. A dimensional inspection of the repaired diameter should be performed.

Summary of repair process:

- Clean surfaces to be brazed
- Braze inner or outer band per AMS 2675 using AMS 4777 braze alloy
- Hand finish or machine to original dimensions (Figure 1)
- FPI per ASTM E 1417, Type 1, Method A or D, Sensitivity Level III. No indications permitted
- Dimensional inspection