

Project

HYDROGEN READY POWER PLANT


Customer

GREENFIELD SOUTH POWER INC.

Applique

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GEK 116662e
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GE Energy

Operation and Maintenance Recommendations for Gas Turbine Exhaust Diffuser Ducts

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes the matter should be referred to the GE Company.

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The below will be found throughout this publication. It is important that the significance of each is thoroughly understood by those using this document. The definitions are as follows:

NOTE

Highlights an essential element of a procedure to assure correctness.

CAUTION

Indicates a potentially hazardous situation, which, if not avoided, could result in minor or moderate injury or equipment damage.

WARNING

INDICATES A POTENTIALLY HAZARDOUS SITUATION, WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY

*****DANGER*****

INDICATES AN IMMINENTLY HAZARDOUS SITUATION, WHICH, IF NOT AVOIDED WILL RESULT IN DEATH OR SERIOUS INJURY.

TABLE OF CONTENTS

I. GENERAL OVERVIEW.....	4
II. COMPONENT DESCRIPTION.....	4
A. F and HA Class Forward Expansion Joint (Flex Seal).....	4
B. F and HA Class Aft Expansion Joint.....	5
C. F and HA Class Conical Exhaust Diffuser Duct	5
D. F and HA Class Support Structure	5
E. B, C & E Class Wing, Cowl.....	5
F. B, C & E Class Expansion Joint.....	5
G. B, C & E Class Exhaust Plenum	6
H. 5N & 5P Class Base Plenum	7
I. 5N & 5P Class Side Panel, Roof Panel	7
III. OPERATION AND MAINTENANCE.....	7
A. F and HA Class Forward Expansion Joint (Flex seal) and B, C, E, 5N & 5P Flex Seal Expansion Joint 7	8
B. B, C & E Class Expansion Joint and F Class Aft Expansion Joint	8
C. F and HA Class Conical Exhaust Diffuser Duct and B, C & E Class Wing, Cowl and 5N, 5P, B, C & E Class Plenum.....	9
D. F and HA Class Support Structure	10
E. Grid Frequency Events	10
IV. GENERAL MAINTENANCE.....	10
A. Corrosion and Paint Repair	11
B. Hardware Replacement	11
C. Welding Repair.....	11
D. Crack Repair.....	12
E. Replacing Missing/Broken Studs	14
F. Replacing damaged gasket for B, C & E class.....	15
V. ANNEX. A042 EXHAUST DIFFUSER INSPECTION CHECKLIST	17
This section will highlight some of the important inspection inspections to undertake; on the components shown in the figure.6. This will be elaborated in the following sections, A, B, C, D &E.	17
Figure.6 Exhaust diffuser duct :	17
Figure.6 is representing MLI A042 that connect upstream with HSRG for combine cycle configuration & Exhaust stack for simple cycle,Figure.7 is representing the components to be inspected.....	17
A. Rope Seal Inspection	17
B. Tadpole Gasket Inspection	21
C. Flex Seal Inspection	22
A042 Hardware Inspection	25
D. Axial/Radial Alignment Check	26
Figure.23 : (refer annex C: Flex Seal Inspection).....	27

LIST OF FIGURES

Figure 1. Typical F and H class MLI A042 Arrangement	4
Figure 2. Typical B, C & E class MLI A042 & 1625 Arrangement	6
Figure 3. Typical 5N and 5P class MLI 1625 Arrangement	6
Figure 4. Typical Stud & Scallop Bar arrangement	15

I. GENERAL OVERVIEW

This document introduces internal insulated MLI A042 (Exhaust Diffuser Duct) for F-class and HA-class turbines; internal insulated MLI A042 (Wing, Cowl, Expansion Joint) and internal insulated MLI 1625 (Exhaust Plenum) for B, C, and E-class turbines; internal insulated MLI 1625 (Exhaust Plenum) for 5N and 5P frame size unit. This document also provides operation and maintenance recommendation for them.

A042 /1625 exhaust system is that portion of the turbine in which the exhaust gases are directed to the HRSG, a bypass stack, or simple cycle stack.

The standard components of the F and H class A042 include the forward flex seal expansion joint, the internally insulated conical diffuser duct, outlet expansion joint and support steel bolted to the foundation.

The standard components of the B, C and E class A042 include wing, cowl and the outlet expansion joint. The standard components of the B, C and E class 1625 include base plenum and the forward & aft flex seal expansion joint.

The standard components of the 5N and 5P class 1625 include base plenum, side panel and / or roof panel.

- F and HA class A042 arrangement (See Figure 1)
- B, C and E class A042 and 1625 arrangement (See Figure 2)
- 5N and 5P class 1625 arrangement (See Figure 3)

All concerns regarding the applicability of this GEK to the site plant configuration shall be addressed to the local representative for GE Product Services.

II. COMPONENT DESCRIPTION

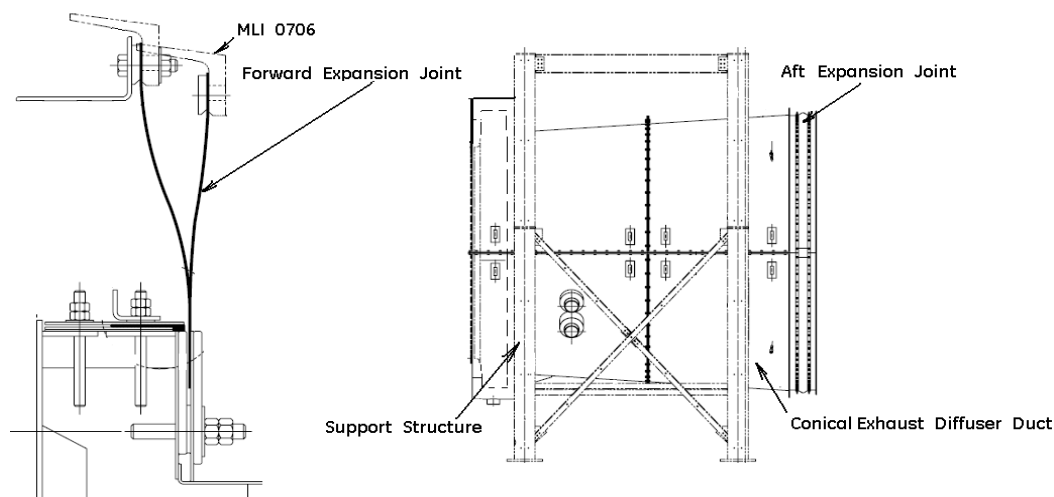


Figure 1. Typical F and HA class MLI A042 Arrangement

A. F and HA Class Forward Expansion Joint (Flex Seal)

The forward expansion joint for F and HA class turbine is composed of overlapping INCO718 or HASTELLOY X plates bolted the power turbine aft flange (MLI 0706) and clamped in guide plates mounted on the MLI A042 inlet. The overlapping plates form a flexible gas seal. This gas seal is a labyrinth seal, relying on the overlapping of the plates to create a more tortuous path for the exhaust to go through the flex seal plates versus out the exhaust stack or HRSG. The flex plates are externally insulated (MLI A151 for F-class or MLI 0186 for HA-class) in the field with a layer of insulation and a sheet metal weather shield that ties into the gas turbine external insulation package. It is a “hot to hot” design.

Some newer F and HA-class turbines have a double tadpole gasket design vs. a single tadpole gasket.

B. F and HA Class Aft Expansion Joint

The aft expansion joint for F and HA class turbine is located at the end of exhaust diffuser duct. It uses a fabric belt that is fully insulated from the hot exhaust gases by field installed liner plates. It is a “cold to cold” design.

C. F and HA Class Conical Exhaust Diffuser Duct

This duct for F and HA Class turbine contains a drain system to accommodate off-line water wash and false starts with liquid fuel. The drain connects with MLI 0976. The compressor bleed lines (MLI 0909) are connected to this duct and allow compressor bleed air to flow into the duct during startup and shutdown. The diffuser duct is internally insulated and is supported by four centerline mounts and positioned by two keys at bottom dead center. This duct gradually diffuses the exhaust flow for maximum pressure recovery of the exhaust flow thereby enhancing the performance of the gas turbine. Floating liner system is applied over the internal insulation for free thermal expansion and internal insulation protection.

D. F and HA Class Support Structure

The support structure for F and HA Class turbine provides the mounting flanges at the diffuser duct horizontal centerline. The flanges are engineered to allow axial and radial thermal growth. The support structure is bolted to the foundation through a standardized footprint. The support structure is painted or hot dipped galvanized per ASTM A123 or equivalent.

E. B, C & E Class Wing, Cowl

The wing and cowl for B, C & E class turbine complete the exhaust gas flow path from the exhaust plenum to the expansion joint that interfaces with the downstream exhaust system. The wing and cowl direct the exhaust gas to the right or left-hand side of the unit. Some units use 2 wings and redirect the exhaust gas straight up. The wing and cowl design incorporates static pressure probes, as well as cooling-and-sealing air bleed port. Floating liner system is applied over the internal insulation for free thermal expansion and internal insulation protection.

F. B, C & E Class Expansion Joint

The exhaust expansion joint for B, C & E class turbine compensates for the thermal expansion of the exhaust ductwork system. It is located between the exhaust plenum / cowl and the exhaust transition duct. It is a “cold to cold” design that requires field installed liner sheets.

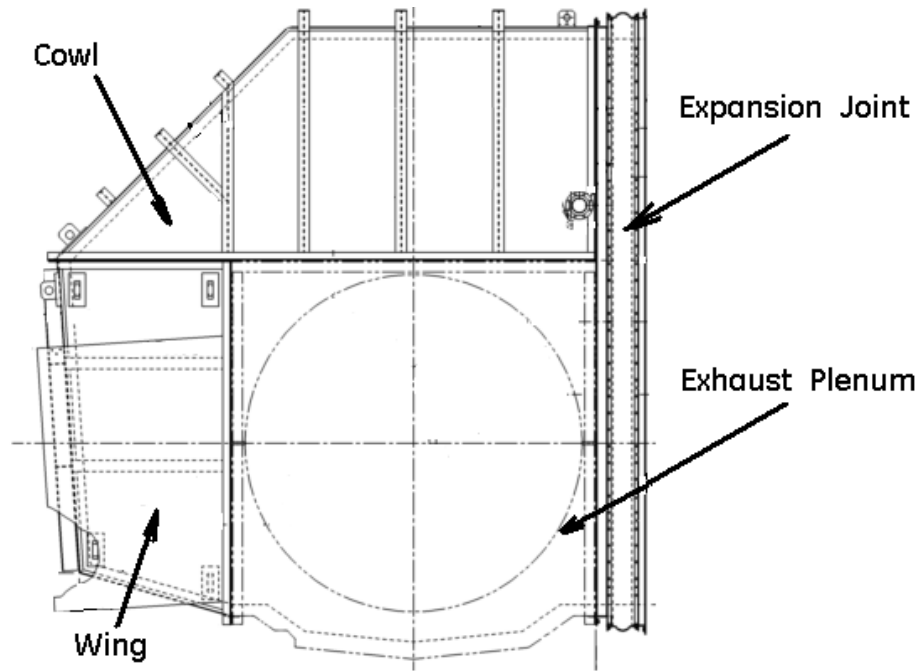


Figure 2. Typical B, C & E class MLI A042 & 1625 Arrangement

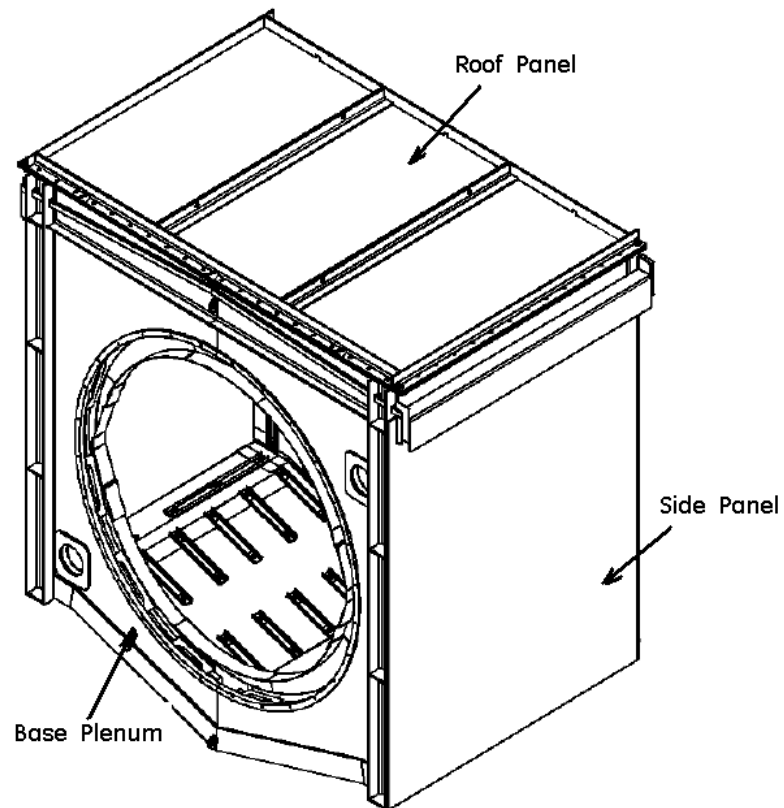


Figure 3. Typical 5N and 5P class MLI 1625 Arrangement

G. B, C & E Class Exhaust Plenum

The exhaust plenum for B, C & E class turbine is the first component to receive the gas flow from the exhaust diffuser. It consists of a box shape base plenum, open at each side and at the top, which is welded to an extension of the turbine base. The base plenum is connected to the exhaust frame / exhaust diffuser assembly with flex-plate expansion joints in both front and rear. Some configurations of the plenum include pipe penetrations for compressor bleed during startup and shut down. Refer to the installation instruction for details regarding a specific installed unit. Floating liner system is applied over the internal insulation for free thermal expansion and internal insulation protection.

H. 5N & 5P Class Base Plenum

5N & 5P class base plenum receives gas flow from the exhaust diffuser. It is a box shape one, open at each side and at the top, which is welded to an extension of the turbine base. The base plenum is connected to the exhaust frame / exhaust diffuser assembly with flex-plate expansion joints in both front and rear. Pipe penetrations for compressor bleed during startup and shut down are provided. Refer to the installation instruction for details regarding a specific installed unit. Floating liner system is applied over the internal insulation for free thermal expansion and internal insulation protection.

I. 5N & 5P Class Side Panel, Roof Panel

5N & 5P class side panel and roof panel complete the exhaust gas flow path from the base plenum to the interfaces with the downstream exhaust system. The side panel and roof panel direct the exhaust gas to the right of left-hand side of the unit. Some units use 2 side panels and redirect the exhaust gas straight up. Floating liner system is applied over the internal insulation for free thermal expansion and internal insulation protection.

III. OPERATION AND MAINTENANCE

All sections of the A042 / 1625 must be completely installed prior to turbine start up.

The GE recommendation for preventative maintenance of the A042 / 1625 includes regular visual inspections (at least once a year) during planned plant and/or turbine outages using the visual inspection guidelines for each component that is described in section II. While the unit is shutdown, the A042 / 1625 shall be inspected with permission by the owner with conformity to plant guidelines for confined space entry.

A. F and HA Class Forward Expansion Joint (Flex seal) and B, C, E, 5N & 5P Flex Seal Expansion Joint

Recommended maintenance inspection of the F and HA class forward Expansion Joint (Flex seal) and B, C, E, 5N & 5P Flex-Plate Expansion Joints is as follows:

- Inspect the metal backing bar, clamping bar and hardware on the flex plates for tightness.
- Look for cracks or wear on flex plates.
- Ensure that all clamp plates that are in contact with the flex seals in either the “hot” or “cold” positions have broken edges (rounded corners) where the clamp interfaces with the flex seals. See Figure 4. For more information, please refer to Figure. 16 ANEX C.

Flex plates must be replaced if wear or cracks are found on surfaces. The replacement must conform to GE's process or that from the qualified vendor. Contact the local GE Energy Services representatives for all concerns.

For hardware tightness, refer to the torque instruction on GE drawings or drawings from GE's qualified vendor or contact the GE Energy Services local representative for assistance.



Figure 4. Flex seal wear due to sharp edges on flex seal clamp plates

B. B, C & E Class Expansion Joint and F Class Aft Expansion Joint

Recommended maintenance inspection of the Expansion Joint belt is as follows:

- Inspect the exterior belt for cuts, worn sections, burns or cracks.
- Inspect the metal batten strips, clamping bars and hardware on the flanges for tightness.

For hardware tightness, refer to the torque instruction on GE drawing. Lacerations in the expansion joint belt will allow hot gas out of diffuser duct creating a safety concern and must be replaced. For replacement parts, contact your local GE Energy Services dealer. Contact the local GE Energy Services representatives for all concerns.

C. F and HA Class Conical Exhaust Diffuser Duct and B, C & E Class Wing, Cowl and 5N, 5P, B, C & E Class Plenum

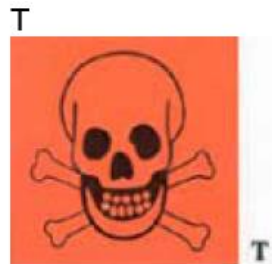
Due to the direction path for the scallop bar insulation supports, temperature hot spots expected in casing can be as high as 400°F [200°C] for higher firing temperature turbines. These hot spots will follow a regular pattern that matches the scallop bar interface pattern with the casing. Large hot spots that do not follow this pattern, or hot spots well in excess of 400°F [200°C] may indicate that insulation has been lost, or improperly installed.

Recommended maintenance inspection of these internally insulated ducts is as follows:

- Inspect for loose scallop bar hardware (nuts and washers) and loose studs
- Inspect for the exposure of insulation material.
- Look for missing or broken studs
- Look for missing or damaged liner sheets
- Look for missing batten hardware.
- Look for cracks in shell
- Inspect bleed pipe penetration
- Inspect gasket for wear, tears or corrosion.

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Personal Protective Equipment (PPE) must be worn when handling insulation due to potential exposure to carcinogenic materials. Many exhaust diffusers used ceramic fiber, which is a suspected carcinogen, for the internal insulation. If the site is unsure as to what insulation material is present, consult with your local GE Energy Services Representative for any concern.

For the repair of broken / missing studs, damaged gasket, missing batten angles, cracked liner sheets and/or cracked duct shell, refer to the General Maintenance section of this document.

D. F and HA Class Support Structure

Recommended maintenance inspection of the Support Structure is as follows:

- Inspect for signs of corrosion on structure and hardware.
- Inspect for loose hardware on structure.

For corrosion repair on structures and hardware replacement, refer to the General Maintenance section of this document for the recommended touch up procedure.

E. Grid Frequency Events

During operation of the gas turbine, it may become necessary to over fire the turbine, and thereby increase the exhaust gas temperature, to maintain grid frequency. This is called a grid frequency event. After each grid frequency event, the exhaust diffuser duct shall be inspected for possible damage from the increased exhaust gas temperature.

The minimum inspection points are:

- Inspect the interior for broken, loose or missing studs, nuts, washers, and clamp bars. Broken studs are to be replaced. Loose hardware is to be tightened to the specifications on the A042 / 1625 installation drawings.
- Inspect the liner plates for distortions or cracks. Pay special attention to the areas where the studs penetrate through the plates. Damaged liner sheets are to be replaced.
- Inspect the flex seal at the connection to the Exhaust Diffuser, MLI 0706, for cracks or warped plates. Damaged flex seals are to be replaced.
- Inspect the exterior of the expansion joint for burns or tears.
- Inspect the exterior of the shell for damage to paint system.
- Inspect the bleed pipe penetrations for cracks using NDT (dye penetrant).

The inspection shall be recorded and the inspection record shall include, at a minimum:

- Date and time of the grid event
- Date and time of the inspection
- Detailed system map indicating each component checked

Repairs for any damages shall be carried out as outlined in sections III and IV.

IV. GENERAL MAINTENANCE

The following section provides instructions for general maintenance of the exhaust diffuser duct for any of the exhaust system components listed in Section III while performing the recommended routine maintenance inspections. Proper Personal Protective Equipment (PPE) must be worn during all maintenance repairs.

NOTE

If issues observed during visual inspection are not addressed in this section or doubts are raised of the applicability of this section to the issues found, consult with your local GE Energy Services Representative for clarification and/or recommended course of action.

A. Corrosion and Paint Repair

The exhaust diffuser system is typically painted with inorganic zinc in shop. Support steel is typically painted or Hot Dip Galvanization per ASTM A123. High temperature aluminum paint shall be applied for field painting for exterior surfaces of exhaust system after final installation. For information on the paint used for a specific unit, refer to the installation drawing for the diffuser duct to determine which paint product(s) was used or contact the GE Energy Services local representative for assistance.

For paint repair, follow the instructions in MLI 0108. If MLI 0108 does not contain instructions for paint repair, the recommend process for paint repair is as follows:

- Consult the installation drawings for the manufacturer of the paint system applied.
- Contact the Paint Manufacturer for information on the paint system applied.
- Obtain the recommended amount of paint necessary and information for application from the paint manufacturer.
- Power tool or sand blast clean the area that requires paint repair due to rust or other forms of paint damage.
- Prepare the area to the metal surface profile recommended by the paint manufacturer for proper adhesion of the intended paint.
- Apply the recommended thickness of the paint and abide to the manufacturer guidelines for curing time, temperature, dew point, etc

The recommend process for repair of damaged and uncoated areas of Hot-Dip Galvanized shall follow ASTM A780 / A780M.

B. Hardware Replacement

The recommended replacement hardware shall be the same as the original hardware. Refer to the material stamping on the hardware and/or the installation drawings for details. For further assistance, contact your local GE Energy Services representative.

C. Welding Repair

The recommended process for weld crack repair is as follows:

1. Dye Penetrant shall be used to identify the ends of the cracked/broken weld to be repaired.
2. Mask off the welds from the adjoining areas to prevent contamination of metal debris during grinding and welding.

3. Grind out the cracked/broken welds (and adjacent paint or galvanization to prevent weld defects or toxic fumes during the welding process).
4. Re-weld the section using the appropriate weld electrode from the list Table.1 and per the requirements of GE welding specification P8A-AG1:

Base Metals	Electrode Designation
Carbon Steel – Carbon Steel	E7018
Carbon Steel – 304	309
Carbon Steel – 304L	309L
Carbon Steel – 409	309
304 – 304	308
304 – 409	309
304L – 304L	308L
409 – 409	409Cb

Table : 1

5. Thoroughly clean the weld including removal of all loose weld spatter, slag, excess brazing or welding materials, weld flash, metal chips/burrs and all other foreign, materials.
6. Visually inspect the weld for defects and perform weld repair if defects are found. Welds shall be 100% free of defects; crack indications, porosity, lack of fusion, undercutting, etc.
7. Paint or cold galvanize the exposed carbon steel if it is present. Any burnt paint from welding shall be removed and repainted (in accordance with Paint Repair section of this document). For galvanized structures, apply cold galvanization touch up in accordance with ASTM A780 – Standard Practices for Repair of Damaged Hot Dip Galvanized Coating. For all painted structures, please refer to the section for Paint Repair.

D. Crack Repair

Any cracks in the Liners, Support Structure and Shell shall be reported to your local GE Energy Services representative for resolution.

The recommended process for repairing cracks is as follows:

1. Dye Penetrant shall be used to identify the length and ends of the cracks. It is imperative that the end of the crack is found so that it can be properly repaired.
2. The crack tip shall be center punched and as a minimum a 1/8 inch [3.175 mm] diameter drill bit be used to drill the end of the crack to prevent further propagation. The holes need only penetrate the metal structure containing the crack.

3. The crack should be back gouged or ground to a convenient opening size. Full penetration of the parent material is required to extend the life of the repair.
4. Any adjacent paint or galvanization shall be removed to prevent weld defects or toxic fumes during the welding process.
5. The cracks shall be welded using the appropriate weld electrode from the list Table.2 :

Base Metals	Electrode Designation
Carbon Steel – Carbon Steel	E7018
Carbon Steel – 304	309
Carbon Steel – 304L	309L
Carbon Steel – 409	309
304 – 304	308
304 – 409	309
304L – 304L	308L
409 – 409	409Cb

Table.2

6. Thoroughly clean the weld including removal of all loose weld spatter, slag, excess brazing or welding materials, weld flash, metal chips/burrs and all other foreign, materials.
7. Visually inspect the weld for defects and perform weld repair if defects are found. Welds shall be 100% free of defects; crack indications, porosity, lack of fusion, undercutting, etc.
8. Paint or cold galvanize the exposed carbon steel if it is present. Any burnt paint from welding must be removed and repainted (in accordance with Paint Repair section of this document). For galvanized structures, apply cold galvanization touch up in accordance with ASTM A780 – Standard Practices for Repair of Damaged Hot Dip Galvanized Coating. For all painted structures, please refer to the section for Paint Repair.

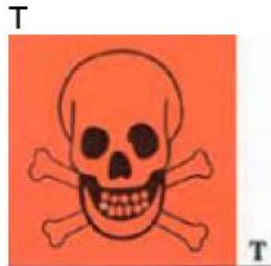
E. Replacing Missing/Broken Studs

The recommended process for repairing missing or broken studs is as follows:

1. Personal Protective Equipment (PPE) must be worn due to exposure to insulation.

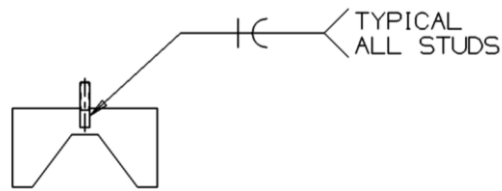
WARNING

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S: 53-45

2. Cut an access hole through the liner plate to create an access window to the scallop bar supporting the missing/broken stud. Keep the removed liner plate section.
3. Remove insulation around the scallop bar area.
4. Cut the remnants of the broken stud off of the scallop bar (if present). Do not cut the scallop bar.
5. Install/weld in place a new replacement stud in the location of the removed/missing stud. Stud shall be ASTM A193 and have the same size and grade as what was originally supplied (If the site is unsure as to the grade, contact GE Product Service). Ensure stud will be centered in the removed liner plate section when it is reinstalled. The stud shall not be all thread, the studs shall not be threaded on the weld zone, see Figure 5.
6. Replace insulation; be sure there are no voids in the insulation material. The insulation shall be compressed by ½ inch (in all directions) when the liner plate is placed back over the hole. This may require having extra insulation material on hand to provide adequate compression. Insulation shall be kept dry at all times. Wet insulation must be replaced.
7. Replace and weld back in place the liner plate section removed in step 2. The insulation material shall be compressed as stated in step 6. Ensure that the liner is only welded to the original piece cut, and not to any overlapping liner sheets.



TYPICAL STUD INSTALLATION

Figure 5. Typical Stud & Scallop Bar arrangement

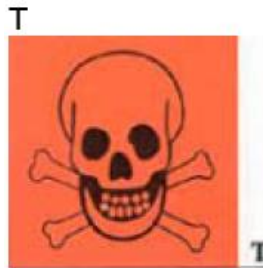
F. Replacing damaged gasket for B, C & E class

The recommended process for replacing damaged gasket material between Wing / Cowl / Plenum / Expansion Joint is as follows:

1. Personal Protective Equipment (PPE) must be worn due to exposure to insulation.

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2. Remove the nuts, washers and batten channels that hold the field liners in the opposite side of the flange. Take off the field liner. Nuts and washers shall be replaced. Studs shall be inspected for damage after removal of the liner system. Damaged studs shall be replaced per the Missing / Broken Studs Process. Field liners & batten channels can be reused if not damaged or else replace them with new ones as per GE specification or drawings or contact GE Product Service for assistance.
3. Take out the insulation between scallop bars. Insulation can be reused if not damaged or it can be replaced it with new insulation. Insulation shall be kept dry at all times. Wet insulation must be replaced. (Contact GE Product Service for assistance.)

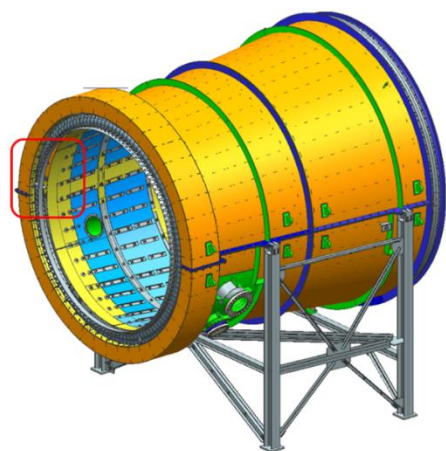
4. For Expansion Joint and Wing, support the weight of the duct pieces with a crane prior to loosening the exterior flange bolts.
5. Loosen and take out the exterior flange hardware (bolts, nuts and washers). This hardware can be reused if it is not damaged. Damaged hardware shall be replaced (contact GE Product Service for assistance.)
6. Separate Wing / Cowl /Expansion Joint from Plenum with the lifting of a crane. Temporary braces shall be used to prevent duct component deformation during lifting. Set the components on a layer of protection material (blanket as one example) on the ground. Care shall be taken to ensure no damage occurs to the flange surfaces.
7. Replace the damaged gasket with new gasket (contact GE Product Service for assistance.)
8. Using a crane, lift and reattach Wing / Cowl /Expansion Joint to the Plenum per the installation drawing. Install exterior fasteners with TURN-OFF- THE-NUT method as outlined in Research Council on Structural Connections Publication Specification for Structure Joints using ASTM A325 or A409 Bolt (Section 8.2.1). Remove the temporary bracing after the duct components have been reattached. Contact GE Product Service for assistance as needed.
9. Install undamaged insulation back between scallop bars. Insulation that is wet or has been wet shall be discarded and replaced with new dry material.
10. Install field liners and batten channels as indicated on the installation drawings.
11. Install new washers and nuts per the installation drawings. Contact to GE Product Service for assistance as needed.

V. ANNEX. A042 EXHAUST DIFFUSER INSPECTION CHECKLIST

This section will highlight some of the important inspection inspections to undertake; on the components shown in the figure.6. This will be elaborated in the following sections, A, B, C, D &E.

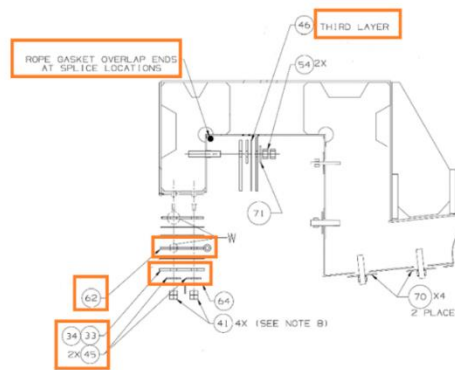
FIGURE.6 EXHAUST DIFFUSER DUCT :

FIGURE.6 is representing MLI A042 that connect upstream with HSRG for combine cycle configuration & Exhaust stack for simple cycle, FIGURE.7 is representing the components to be inspected.



A042 – Exhaust diffuser duct

Figure.6: Exhaust diffuser duct



Flex seal components (Parts to be inspected or replaced are highlighted)

Figure.7 : Flex seal components parts

A. Rope Seal Inspection

- Scaffolding will need to be erected within the exhaust to have access to all sections of the A042 Exhaust Diffuser for inspection.
- Using a mirror, inspect the full circumference of the rope seal to ensure the rope seal is entirely in place and there are no missing sections. Figure.8 are some example photos of what should be seen with the inspection mirror. Example photos of rope seal out of position.



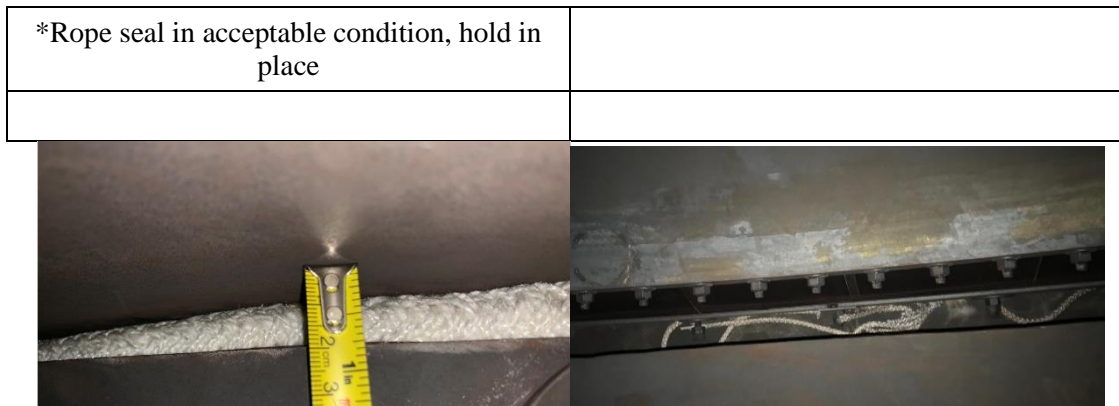


Figure.8 *Rone seal in unaccetable condition. out of position

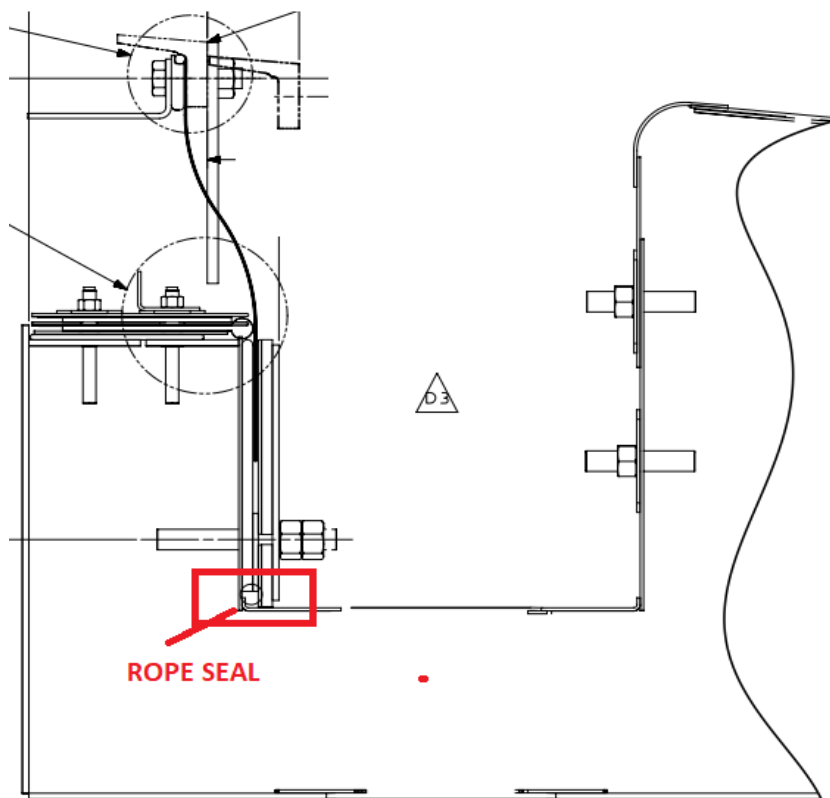


Figure.9: Rope seal is compressed and set in position all around the A042 by the 3rd layer clamp.

Parts numbers for hardware replacement need to be confirmed for services team or engineering team after A042 condition evaluation..

Table 3 . Example for components required for general A042 maintenance and repair.

Rope seal replacement installation:

- Prior installation, make sure the adjacent area is free of moisture, dust, contamination and any other exogenous material (including grease), rope braiding allows for particle entrapment, leading to potential heterogeneities detrimental to thermal behavior.
 - Prevent unnecessary bents on the rope seal, particularly during handling and installation.
 - Avoid usage of sharp-edge tools (screws, knives, plates, etc.) to get the rope-seal in position. Rope Seal
 - Plan installation to place the seal in a single-continued operation, meaning final plate installation will result in a one-pressing operation making the splice at the bottom section of the A042 duct.
- 1) Cut the **rope seal** to the exact dimension to cover the exhaust diffuser circumference making the joint at the bottom section.
 - 2) Peel off 14" - 16" of side A



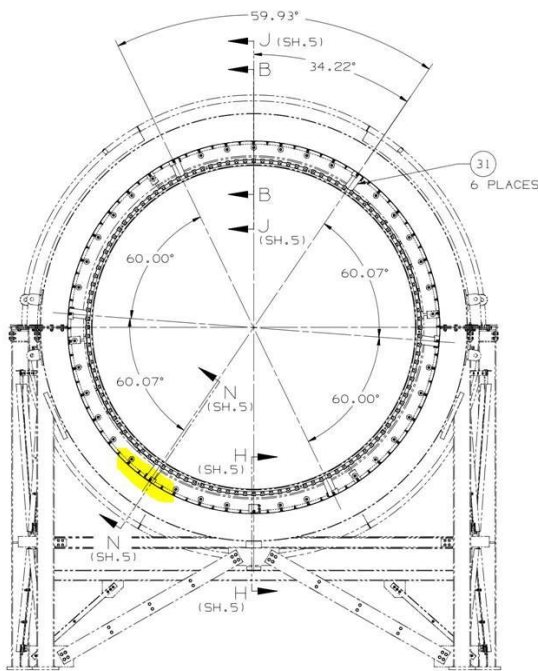
Figure 10: Core joint making points using masking

- 3) Make the core joint of the 2 tips A and B using masking tape in **Figure 10**
- 4) Pull back the gasket shell covering 8" over the splicing section and cut off the shell of the side B. Figure.11



Figure 11: Discarded rope seal shell

- 5) Make the splice at the bottom section of the exhaust diffuser, the work is complete, the joint should look like as Figure 12



Rope seal joint.

Figure 12: splice at the bottom section of the exhaust diffuser & Rope seal joint.

B. Tadpole Gasket Inspection

Remove partially the 0706 insulation that covers the forward wall of the trough/flex seals. All the insulation as shown in Figure.13 that is removed needs to be replaced. Insulation replacement shall be made per MLI 0816.

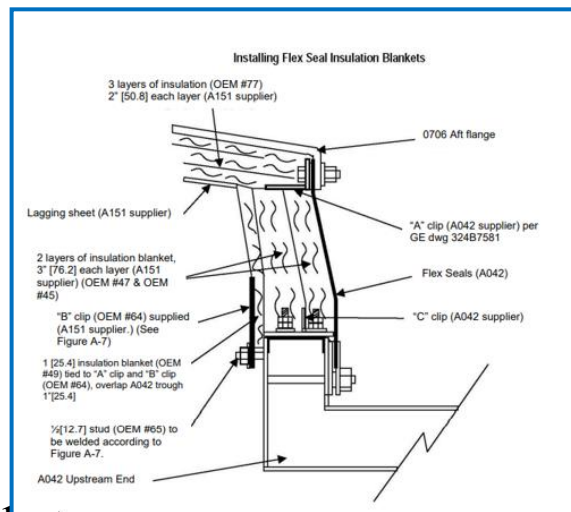


Figure.13. (a) Insulation arrangement (refer MLI 0816)

- Inspect the tadpole gasket to ensure it is installed in the correct orientation shown in Figure.14 . If tadpole gasket, hardware or tadpole clamp plates are not installed properly or worn out a new tadpole gasket, hardware or clamp plate need to be installed/replaced correctly.

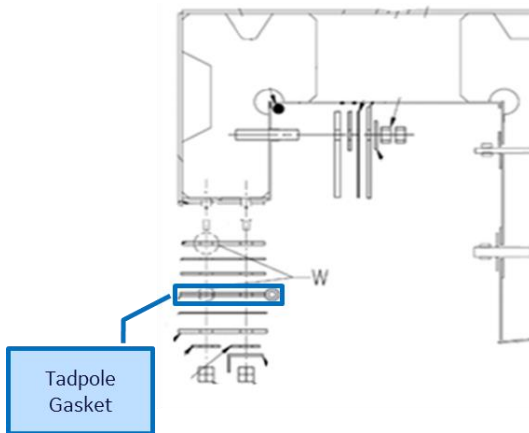


Figure.14: Broken bolt

- Broken bolt needs to be repaired as per GEK116662, section IV.

C. Flex Seal Inspection

Visually inspect the first two (2) layers of flex seals #47 and #48 circled in red in the drawing Figure.15. These inspections should be performed from inside the exhaust checking for any of the indicators listed below.

- Discoloration
- Fractured/broken
- Distortion
- Buckling
- Gaps and/or foreign material between the first 2 layers of flex seals (#47 & #48) which prevent the first layer (#47) from sitting perfectly flush on top of the second layer (#48).

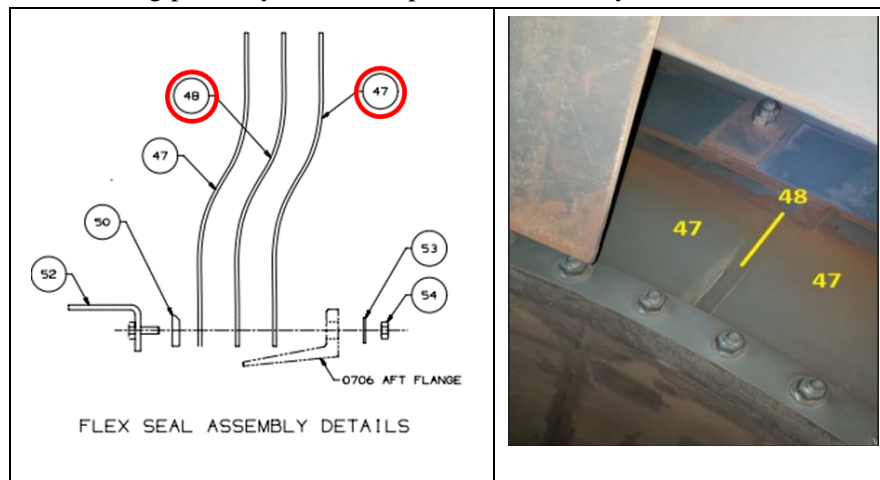


Figure.15: Visual inspection of the first two (2) layers of flex seals

Perform same Inspections from outside (Figure.16 : examples photos of findings for repair)

- Inspect the 6.4 mm [0.25 in] radius at the AFT flange of MLI 0706 (near flex seal).
 - If not provided, make this radius by field grinding.
- Remove sharp edges on 1st layer , 3rd layer clamps, tadpole clamps and shims Figure 16
- Check if 0706B flange has no sharp edges, if flange has sharp edges then grind the edge as shown in fig.5
- Tadpole gasket bulb must face towards the flex seal tadpole gasket axial position to be set such that bulb is flush with the flex seal with no gap all over the 360 length. Tadpole gasket outer clamp plate shall compress the gasket bulb. Tadpole gasket outer clamp shall not touch the flex seal sheets

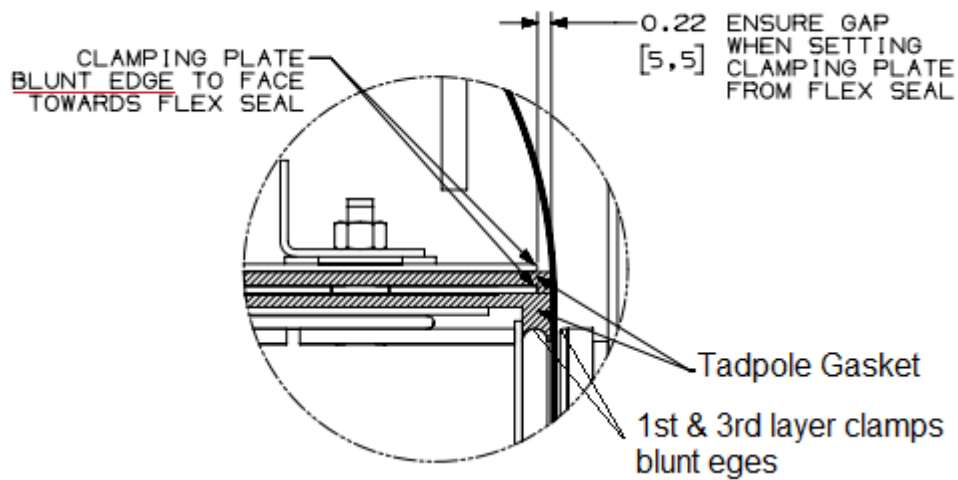
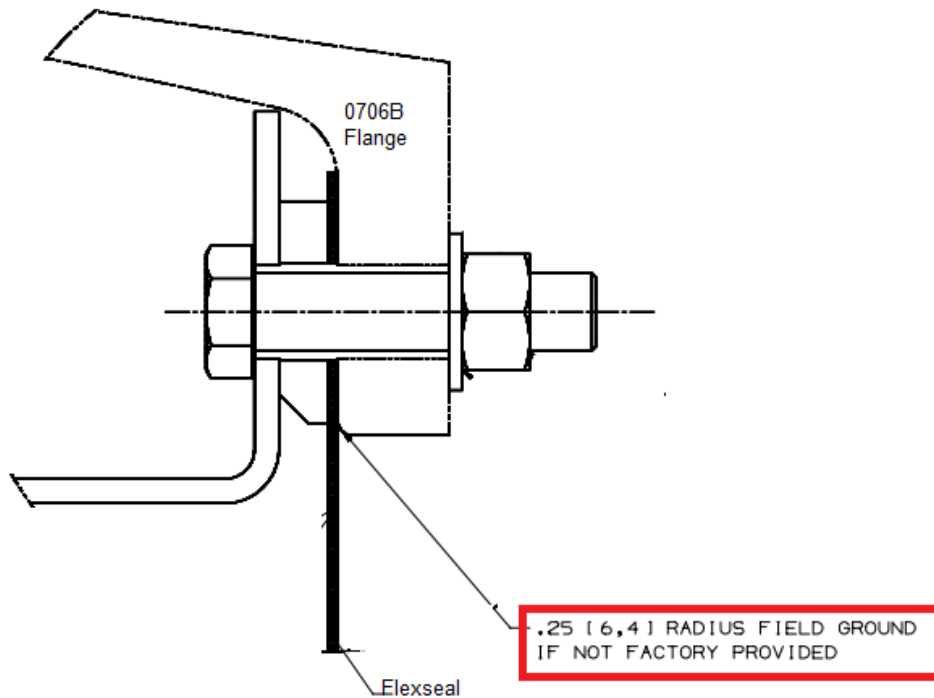


Figure .16 : Tadpole clamp plates and 1st and 3rd layer clamps edges

*Verify that tadpole clamp plates and 1st and 3rd layer clamps edges are rounded as shown on the picture if not rounded already from factory.



- Figure:5 Inspect that outer flex seals surface for any damage due to the tadpole gasket clips being installed backwards or buckling as shown in Figure.18

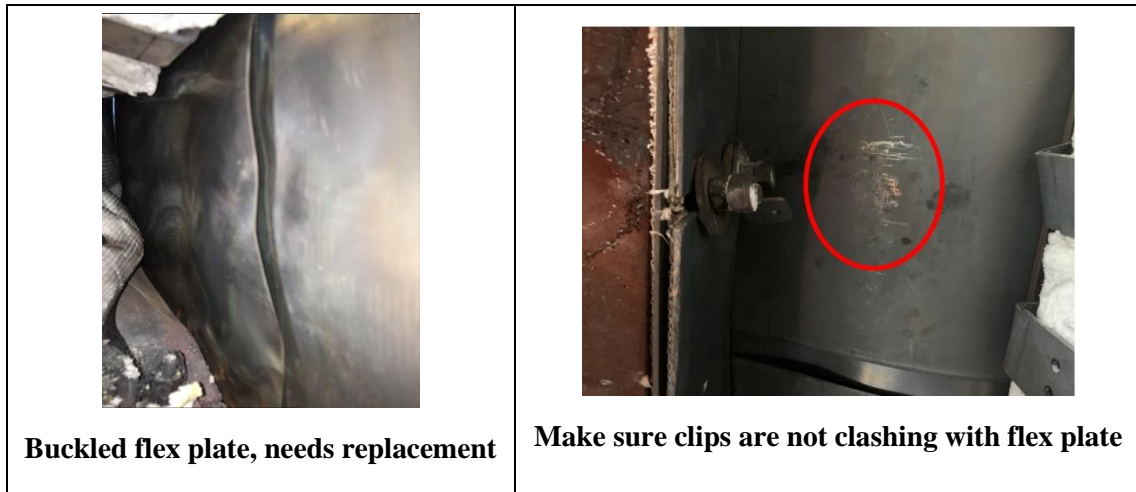


Figure.18: Hardware Inspection

A042 Hardware Inspection

- Inspect for any missing/loose hardware (nuts, broken studs, etc.) The broken bolt needs to be repairs as per GEK116662, section IV.
- The torque of the third layer clamping bar nuts should be properly torqued following the double nut method in Figure.19.

Install all the first nuts and torque them to 50-55 ft-lbs [68-75 Nm] using a calibrated torque wrench. Repeat tightening the nuts a second time to 50-55 ft-lbs [68-75 N-m]. Use a wrench to hold the first nut and prevent it from rotating and install/torque the second nut to 35 ft-lbs [47-N-m] using a calibrated torque wrench. Stud must be lubricated with anti-seize compound before torquing.

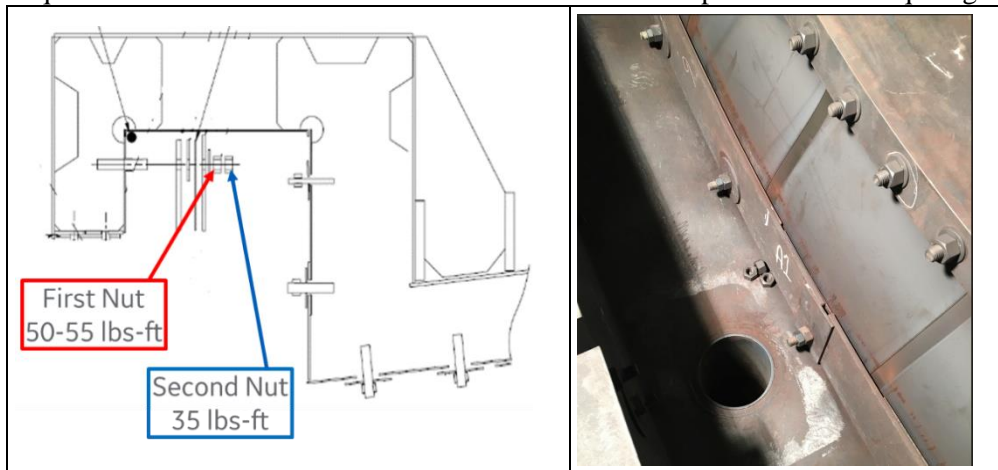


Figure.19: Hardware Inspection

- The flex seal hardware should be inspected to ensure that all the flex seal nuts have been tack welded. If any nut is not tack welded, then retorqued using the torquing method in Figure.20.
- Torque flex seal hardware 75 to 80 ft-lbs. After 3-5 gas turbine starts retorque to 75 to 85 ft-lbs. and tack weld nuts. Stud must be lubricated with anti-seize compound before torquing.
- Records of the retorquing of the flex seal clamping hardware after 3-5 starts.

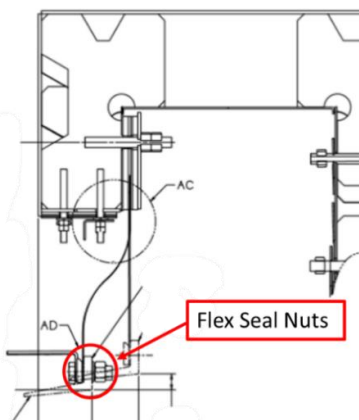


Figure.20: Flex seal clamping hardware

D. Axial/Radial Alignment Check

- Provide the axial/radial alignment report for the designated unit from initial installation, if this report exists. (

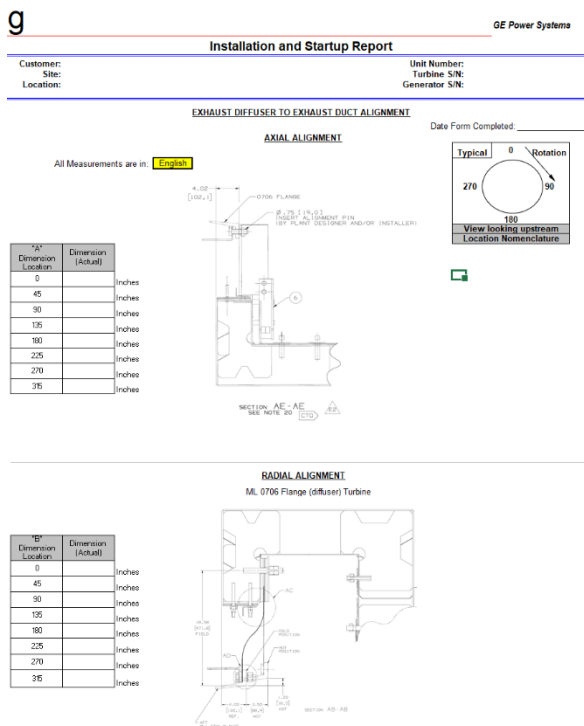


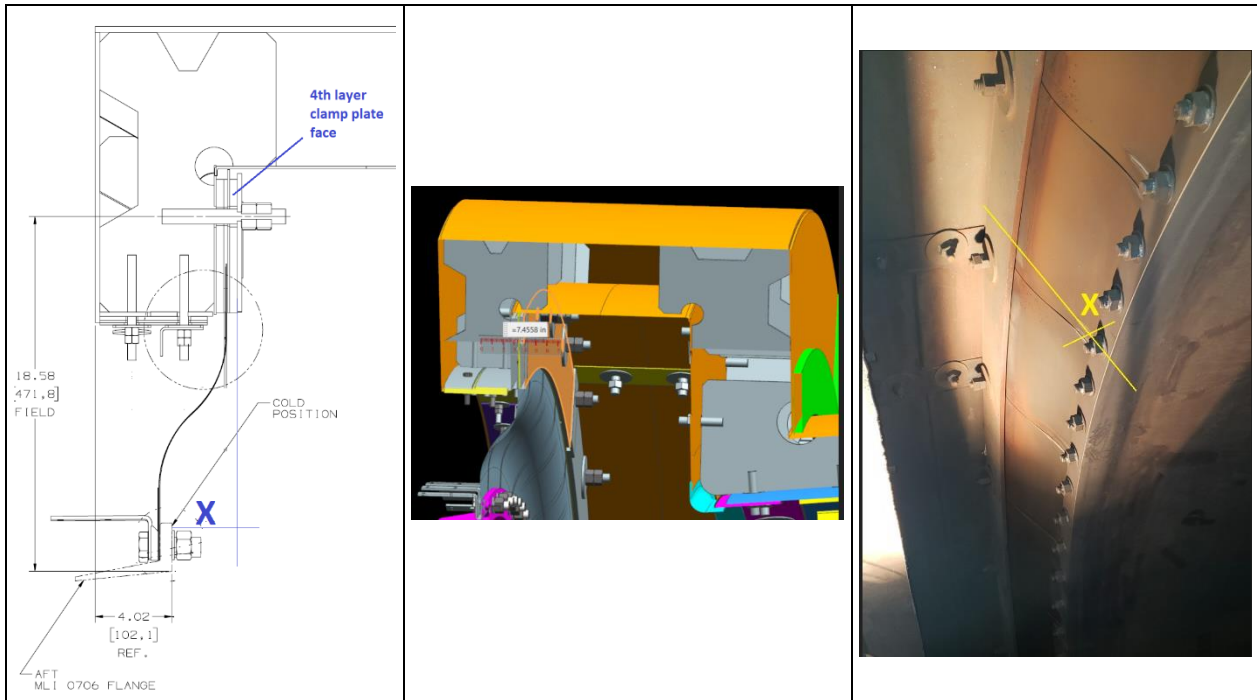
Figure.21: axial/radial alignment report for the designated unit from initial installation

- Record/measure the location of the center tab key “gib key” (shown in Figure.22).



Figure.22: Location of the center tab key

- Site needs to record the axial alignment. The axial alignment can be recorded by taking a measurement “X” as shown in Figure.23 in the drawing and photos, at six locations as indicated on the alignment report.



Per design X=3.43 in

Figure.23 : (refer annex C: Flex Seal Inspection)



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