

1.0 Scope

This instruction covers replacement of an infrared lamp emitter in an IR furnace chamber. Applies to RTC, GBT and LCI infrared furnaces with quartz infrared lamps.

2.0 Time Required

For standard furnace systems, allocate approximately 15-30 minutes to replace a single lamp. Add 5 minutes for each additional lamp to be replaced.

For hermetically sealed (HC) furnace systems, allocate approximately 30-45 minutes to replace a single lamp including opening and closing the plenum covers. Add 5-10 minutes for each additional lamp to be replaced within in the same chamber and 15 minutes for each additional plenum that must be accessed.

3.0 Tools and Materials Required

Collect the following tools to perform the work:

- Replacement lamp(s)
- Kaowool packing material (910-073327-01 Seals)
- (2) Open ended wrenches (3/8 inch)
- Lamp Rod Tool (1-1/8" long rod with looped ends as shown in Figure 3-1).
Make rod at least long enough to reach through furnace casing with 6 inches on either side.
- Allen wrench (1/8 inch)
- Flashlight
- Lint free cloth or protective gloves
- Scissors (shears or secateurs)



Figure 3-1 Lamp Rod Tool

4.0 Procedure

4.1 Lamp Removal

- 4.1.1 Make sure the furnace is cool. Remove all power from the furnace.
- 4.1.2 If Plenum covers are supplied, remove the setscrews securing the plenum clamps and carefully remove plenum covers. Care must be taken not to damage the rubber seal between the plenum chamber and the chamber cover.
- 4.1.3 Short one lamp from each zone to the furnace frame to remove any charge residing in the lamps and eliminate any capacitance discharge shock.
- 4.1.4 At one end of an element, take care not to disturb the ceramic insulating blocks and use one of the 3/8" wrenches to hold the base nut while you loosen the fastening nut. Disconnect the element lead from the insulating terminal block.

Warning: If the furnace is equipped with the hermetic seal (HC), any cracks to the insulating block will result in furnace chamber leaks and should be replaced if broken.

- 4.1.5 Use an ohm-meter to verify that the lamp filament is open. To proceed with replacement, remove the nut and washers from both ends and disconnect the element lead from the opposite side. *Note: You may not be able to determine if an element is bad by visual inspection.*
- 4.1.6 Remove old packing material (seals) from both ceramic ends.
- 4.1.7 Remove old lamp element from chamber. Before removing the old lamp, you may wish to connect a new lamp or Lamp Rod Tool to the lead on one end of the bad lamp to make it easier to install.

4.2 Lamp Installation

- 4.2.1 Make sure the red sealant securing the ceramic lamp holder is intact. Unsealed ceramic lamp holders may be resealed with RTV Red Silicone Sealant (GE Type 106).
- 4.2.2 Using a lint free cloth or protective gloves, remove the lamp from its carton being very careful not to touch the glass with bare hands.

Warning: Do not touch the quartz glass surface of the lamp. If a lamp is touched, carefully clean the quartz surface with a clean cotton cloth and isopropyl alcohol to remove any oils or impurities from the glass surface.

4.2.3 If old lamp is in place see 4.1.8. Otherwise, straighten lamp leads and feed through the opposite end. If you have a Lamp Rod Tool, bend the lamp lead back about a half an inch as shown in Figure 4-2. Feed it through the ceramic lamp holder and through the lamp holder on the other side.

4.2.4 Pull the lamp lead through having the assistant hold the lamp straight until it comes out on your side. Pull the end of the lamp all the way through the furnace chamber and center.

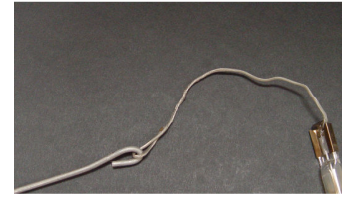


Figure 4-2: Lead wire through Rod Tool

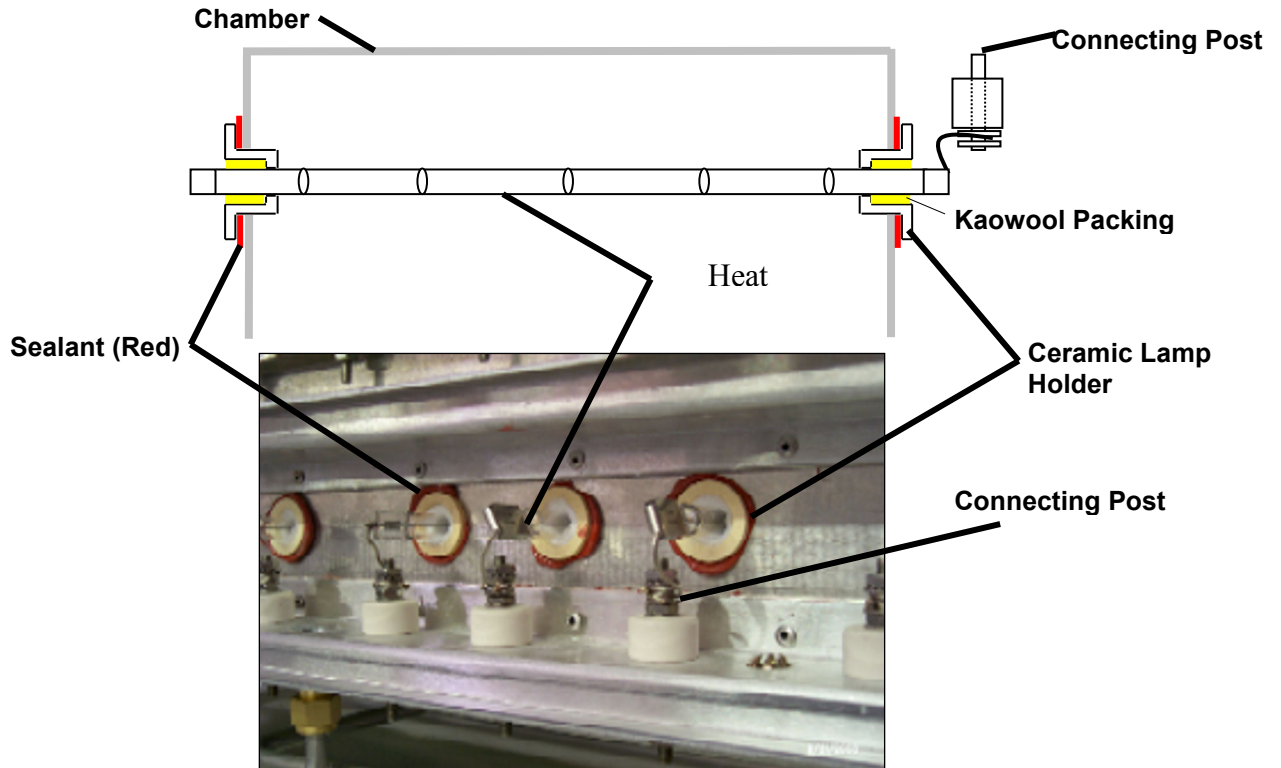


Figure 4-3: Lamp Cross-section Across-the-Belt (diagram at top), End View (photo at bottom)

4.2.5 Carefully pack the ceramic holders on both sides with the Kaowool seals. You can pre-soak the seals in hot water prior to installation and wrap around the lamp. **Trim seal with scissors** to make certain the seal does not cover the lamp metal tab end or it will cause the tab to overheat. Do not allow the packing material to be pushed into the chamber as packing material can cause almost immediate lamp burnout. A slim tool may help with seal insertion. See Fig 4-4 and 4-5.



Figure 4-4: Insert seal around lamp



Figure 4-5: Finished lamp (2nd from right)

4.2.6 Re-center the lamp as necessary to $\pm 1/32$ -in. (± 0.8 -mm) and recheck the packing.

4.2.7 Wrap the lamp leads around the connection terminals in the same direction as the nut will be tightened. Use two wrenches, as you did when removing the connection, to ensure the connection post is not disturbed.

4.2.8 Cut off excess connection wire. Check for wire whiskers which can cause a short.

4.2.9 Replace plenum covers being careful not to damage the silicone rubber seal.

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Make rod at least long enough to reach through furnace casing with 6 inches on either side.

Allen wrench (1/8 inch)

Flashlight

Lint free cloth or protective gloves

Scissors (shears or secateurs)



Figure 3-1 Lamp Rod Tool

4.0 Procedure

4.1 Lamp Removal

4.1.1 Make sure the furnace is cool. Remove all power from the furnace.

4.1.2 If Plenum covers are supplied, remove the setscrews securing the plenum clamps and carefully remove plenum covers. Care must be taken not to damage the rubber seal between the plenum chamber and the chamber cover.

4.1.3 Short one lamp from each zone to the furnace frame to remove any charge residing in the lamps and eliminate any capacitance discharge shock.

4.1.4 At one end of an element, take care not to disturb the ceramic insulating blocks and use one of the 3/8" wrenches to hold the base nut while you loosen the fastening nut. Disconnect the element lead from the insulating terminal block.

Warning: If the furnace is equipped with the hermetic seal (HC), any cracks to the insulating block will result in furnace chamber leaks and should be replaced if broken.

4.1.5 Use an ohm-meter to verify that the lamp filament is open. To proceed with replacement, remove the nut and washers from both ends and disconnect the element lead from the opposite side. *Note: You may not be able to determine if an element is bad by visual inspection.*

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4.1.7 Remove old lamp element from chamber. Before removing the old lamp, you may wish to connect a new lamp or Lamp Rod Tool to the lead on one end of the bad lamp to make it easier to install.

4.2 Lamp Installation

4.2.1 Make sure the red sealant securing the ceramic lamp holder is intact. Unsealed ceramic lamp holders may be resealed with RTV Red Silicone Sealant (GE Type 106).

4.2.2 Using a lint free cloth or protective gloves, remove the lamp from its carton being very careful not to touch the glass with bare hands.

Warning: Do not touch the quartz glass surface of the lamp. If a lamp is touched, carefully clean the quartz surface with a clean cotton cloth and isopropyl alcohol to remove any oils or impurities from the glass surface.

4.2.3 If old lamp is in place see 4.1.8. Otherwise, straighten lamp leads and feed through the opposite end. If you have a Lamp Rod Tool, bend the lamp lead back about a half an inch as shown in Figure 4-2. Feed it through the ceramic lamp holder and through the lamp holder on the other side.

4.2.4 Pull the lamp lead through having the assistant hold the lamp straight until it comes out on your side. Pull the end of the lamp all the way through the furnace chamber and center.

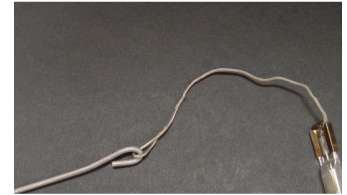


Figure 4-2: Lead wire through Rod Tool

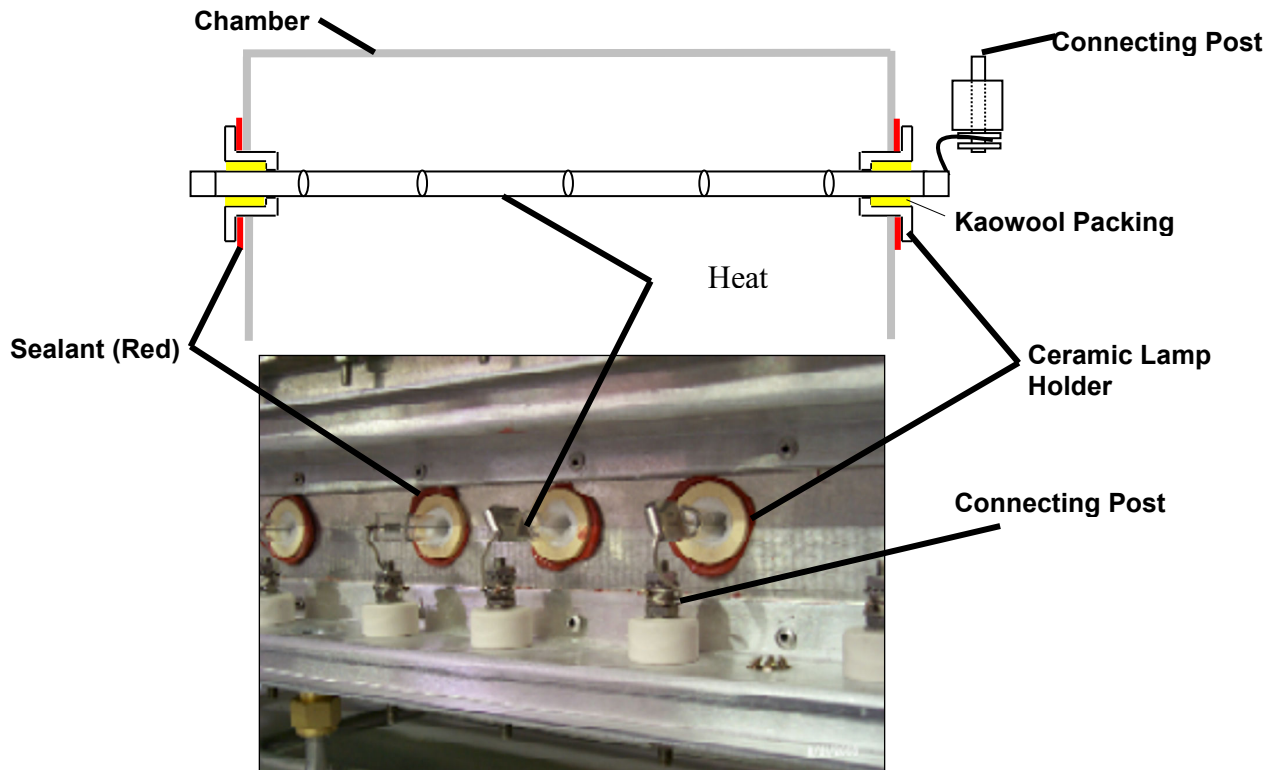


Figure 4-3: Lamp Cross-section Across-the-Belt (diagram at top), End View (photo at bottom)

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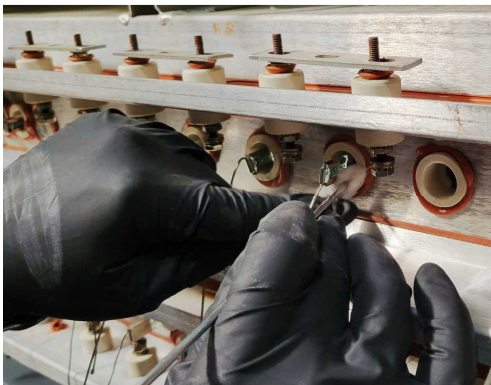


Figure 4-4: Insert seal around lamp



Figure 4-5: Finished lamp (2nd from right)

4.2.6 Re-center the lamp as necessary to $\pm 1/32$ -in. (± 0.8 -mm) and recheck the packing.

4.2.7 Wrap the lamp leads around the connection terminals in the same direction as the nut will be tightened. Use two wrenches, as you did when removing the connection, to ensure the connection post is not disturbed.

4.2.8 Cut off excess connection wire. Check for wire whiskers which can cause a short.

4.2.9 Replace plenum covers being careful not to damage the silicone rubber seal.

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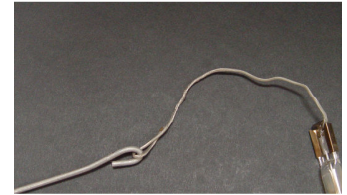


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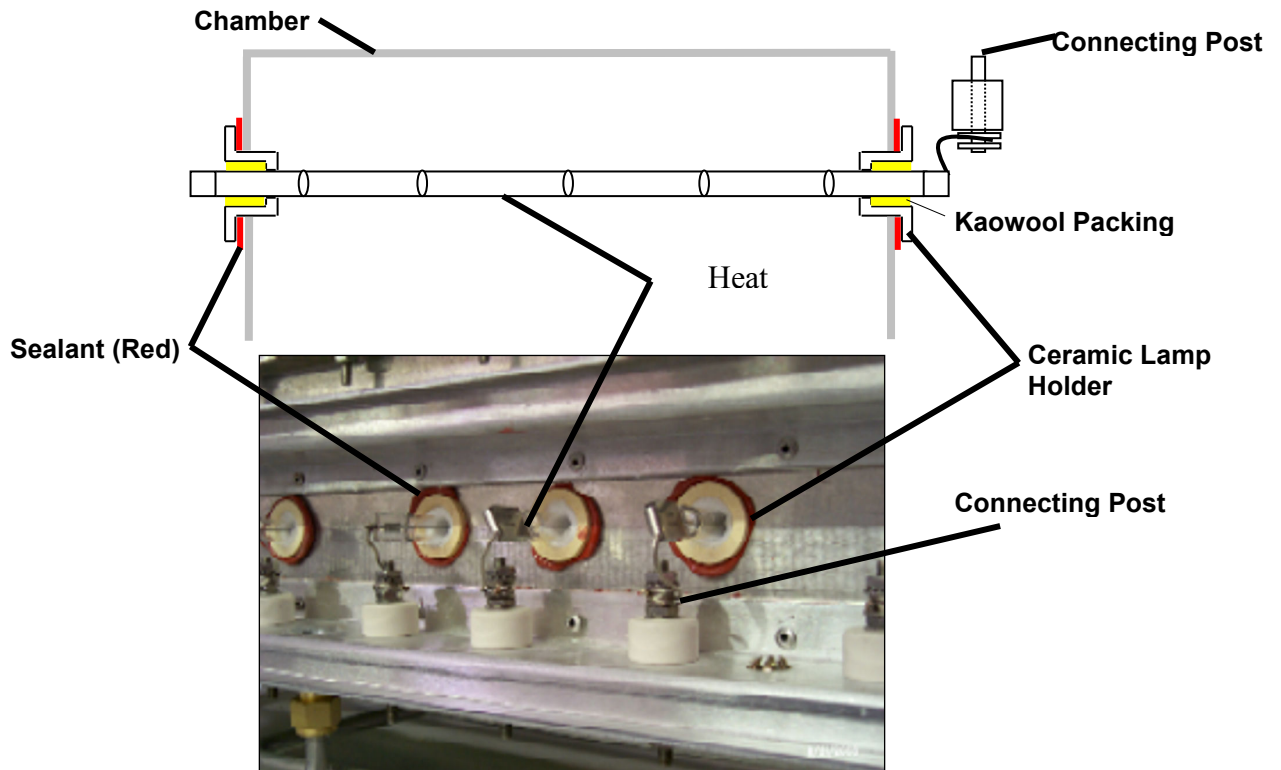


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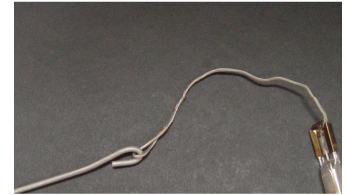


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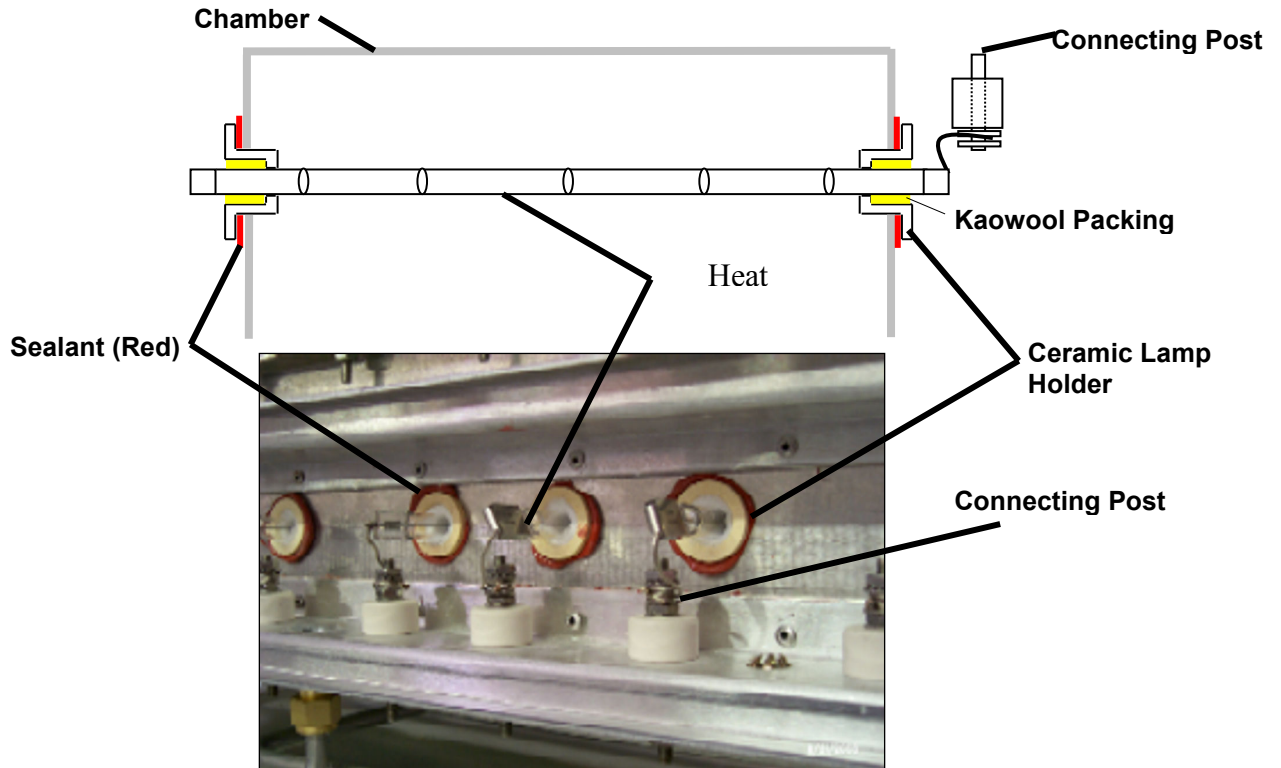


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