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Issuer: Carlton Jones Approved By: Sales Manager	

Fraen Applications Notes – Heat staking of FHS lens holder

1. Purpose and Scope

PURPOSE

To provide recommendations for heat staking the Fraen FHS lens holder to a thin heat sink or metal-core printed circuit board.

SCOPE

Heat staking can be performed at low rates using a single heated tool (flat tip attached to a hand-held soldering iron) or high rates using a pneumatic press and 4 point tool (to stake all 4 legs simultaneously). These instructions apply to both cases. This process is proven for heat staking the lens holder assembly to a heat sink or metal-core printed circuit board 1.5 to 2.0 mm thick.

2. Definitions

Heat Staking – The process of joining two or more parts by applying heat and force to the plastic to deform it and secure the parts.

3. Application Recommendation

NOTES:

- **Safety - Heat staking involves high heat and force. If a pneumatic press is employed, it must be guarded or controlled with dual palm switches, light curtains, or similar safety devices.**
- Part Handling - Avoid touching or scratching the lens when handling the lens/holder assembly. Do not attempt to clean the lens or holder with alcohol or solvents. Oil (including oil from finger prints) can affect optical performance.

Manual heat Staking with Hand Tool
Equipment:



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- Variable temperature soldering station (must be adjustable down to 300°F or less), e.g., Pace Model # ST20SP.
- Custom tip for soldering tool. This can be machined from brass or steel. The end should be blunt, and 4 to 5mm diameter.
- Fixture to support the lens/holder assembly upside-down (legs up).

Process:

1. The assembly will be a sandwich of the following parts: lens/lens-holder assembly, Luxeon Star LED, thermal transfer paste, and your heat sink (or metal-core printed circuit board).
2. Place this assembly (with 4 legs upward) into your fixture and while holding the assembly together use the soldering tool with custom tip to deform the feet of the lens holder. The resulting heat stake should be similar to Figure 1.

Automated Heat Staking with Pneumatic Press

Equipment:

- Pneumatic press with 2-inch diameter bore cylinder.
- 4-post heat staking fixture with variable temperature heater band (Figure 2). This fixture with heater band should be attached to your pneumatic press.
- Fixture to support the lens/holder assembly upside-down (legs up). The fixture must be carefully positioned so that the 4 heat staking surfaces align with the 4 feet on the lens holder.

Process:

1. Set air pressure to 80-90 PSI to achieve 250 to 280 pounds force for heat staking.
2. Use a flow valve to control/limit the speed of the ram to prevent the heat staking tool from slamming the lens holder.
3. Use an air-switch timing control to set the dwell time (the duration of time that the ram is applying force). This dwell time should be between 5 and 7 seconds.
4. Adjust the temperature of the band heater to achieve 270 +/- 5°F on the working surface of the heat staking tool.
5. The assembly will be a sandwich of the following parts: lens/lens-holder assembly, Luxeon Star LED, thermal-transfer paste, and your heat sink (or metal-core printed circuit board).

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WARNING: Use safety precautions and machine guarding to assure that the press can not be actuated when fingers or hands are in the path of the moving ram.

6. Place this assembly (with 4 legs upward) into your fixture.
7. Activate the press to perform the heat staking cycle. The resulting heat stake should be similar to Figure 1.

Heat staking tips:

- If the temperature of the tool is too high, the plastic will melt and the tool will pull strings of plastic from the holder. If the temperature is too low, you will need a longer dwell time (slower process) than necessary to produce a rattle-free assembly.
- Tool steel is the best material for maximizing tool life.
- The four thru holes in the heat sink should be 3.5 mm diameter on 18mm x 18mm centers.

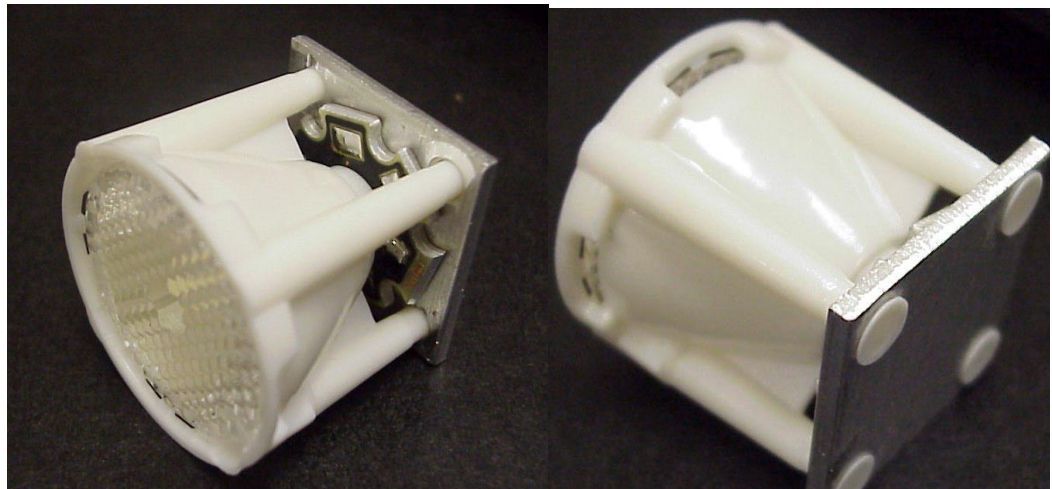


Figure 1. Heat-staked assembly of lens/lens holder to aluminum heat sink with Luxeon Star LED sandwiched between.

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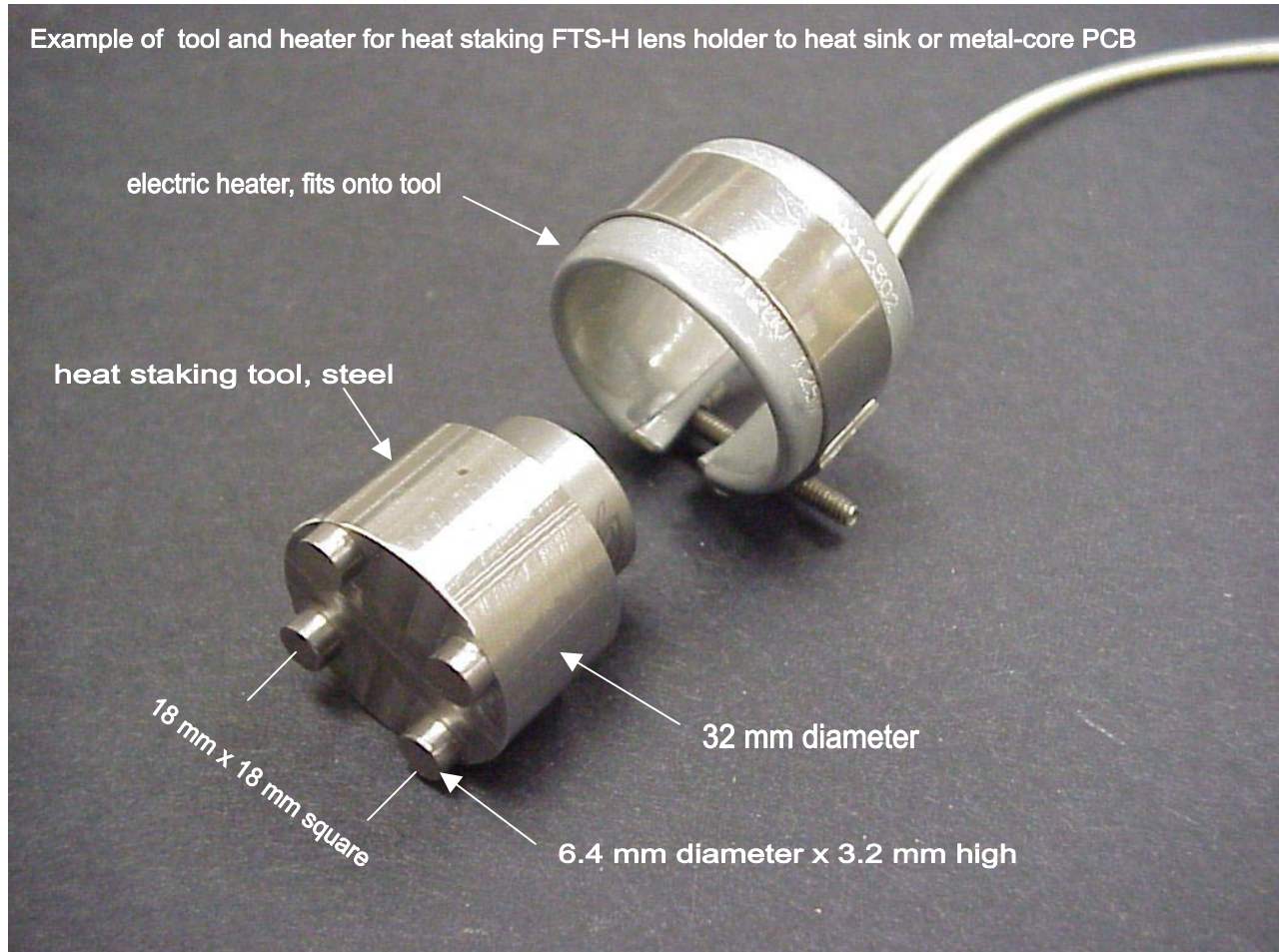


Figure 2. Example of tool and heater band for heat staking FTS-H lens holder to heat sink or metal core PCB

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