**Soldering a kovar piece with glass to a copper base for a photon light source**

**Objective**
To solder a kovar piece with glass insert into copper base and then desoldering same pieces for repair.

**Material**
Kovar piece with glass insert 0.9375” (23.8mm) diameter, 0.5625”(14.3mm) wide and a copper base 1.5” (38.1mm) square.

**Temperature**
423ºF (217ºC) for soldering, 536ºF (280ºC) for desoldering.

**Frequency**
350 kHz

**Equipment**
- Ambrell 9.0 kW induction heating system, equipped with a remote workhead containing two 1.5µF capacitors for a total of 0.75µF.
- An induction heating coil designed and developed specifically for this application.

**Process**
A one turn coil of square tubing is used to heat the copper and kovar insert with solder to 423ºF (217ºC) in 1.5 minutes. The copper heats slowly and expands so the kovar piece with glass drops in place and is soldered. Care is taken to cool the pieces slowly so that the glass insert does not break as the copper contracts. The desoldering application is for repair purposes. The soldered pieces are placed in the same coil and are heated to 536ºF (280ºC) for 2.5 minutes so the solder melts and pieces are separated while hot.

**Results/Benefits**
Induction heating provides:
- Same equipment for both assembly and repair.
- Hands-free heating that involves no operator skill for manufacturing.
- Uniform control of heat from part to part.
End view of assembly before heating

Top view of assembly prior to heating