Sintering Powdered Metals for Satellite Positioning System

**Objective**
Heat tantalum tubing to sinter tungsten and tantalum material to tubing.

**Material**
Tantalum tubing 0.13" (330.2mm) diameter with tungsten and tantalum powdered material, quartz support tube & quartz container and nitrogen gas.

**Temperature**
4172°F (2300°C)

**Frequency**
162 kHz

**Equipment**
- Ambrell 3.5kW induction heating system equipped with a remote workhead containing one capacitor equaling 1.25 µF
- An induction heating coil designed and developed specifically for this application.

**Process**
A four turn helical coil is used for the sintering process. Power is applied for thirty minutes under a nitrogen flooding atmosphere and temperature is held at 4172°F (2300°C). The tungsten successfully sinters, the tantalum does not.

**Results/Benefits**
Induction heating provides:
- More consistant structure
- Create high heat intensity very quickly
- Energy efficient & environmentally friendly