Establishing a Preventative Maintenance Plan

To create a suitable preventative maintenance plan, divide and conquer. Begin by understanding the heat treat process(es) you will be requiring of the unit and compare these to the design ratings/limitations of the equipment. Factors to consider include:

**Temperature rating**
- Normal and maximum operating temperatures
- Cyclic operating conditions
- Idling conditions

**Loading**
- Load size including volume or weight limitations
- Load distribution and the necessity for load ballast
- Maximum and minimum gross load weight as a function of temperature

**Atmosphere requirements**
- Type and function of gas(es); process and heating
- Gas flow rate, pressures, etc.

**Quench requirements**
- Type of quenchant
- Volume of quenchant (in relation to gross load weight)
- Quenchant temperature
- Flow characteristics of the quenchant around the part

**Special requirements**
- Baskets and fixturing
- Quench restrictions
- Access and site ports
- Water systems

**Design specific features**
- Type of furnace (batch, continuous, pit, rotary retort, etc.)
- Support items (heat exchangers, water circulating systems, etc.)

Next, understand the external constraints being placed on the equipment (use, budget, etc.). These factors are important in tailoring your plan to meet expectations. Identify critical spare parts and have them in stock. Understand which spare parts must come from the OEM manufacturer and which ones can be purchased through alternative suppliers.

Now take the time to divide the equipment into logical sections so the maintenance on each of these areas focuses on those components or assemblies that are critical to their functionality (and ultimately that of the entire machine). Then walk around the exterior and inspect the interior. (Note: confined entry training/permits may be required.) Observe how all components interact. This takes a surprisingly short amount of time and yields a significant amount of information.

Finally, put this information into a useable form (such as a spreadsheet), review with management, and implement your planned preventative maintenance program. Remember that feedback and refinements to the plan will occur continually. Make sure that the reasons for the changes are captured in the documentation for later use, and make the system independent of changes that will inevitably occur in either the maintenance department, the heat treat department, or in management.

Establish a mean-time-between-failure (MTBF) for critical components, and be sure to conduct a cause-and-effect analysis whenever a part fails prematurely.

To realize the benefits of a planned preventative maintenance program, irrespective of the type of equipment being used, a carefully structured, well-disciplined, and rigorous plan must be created, implemented, and followed.