Carbon-Carbon Spring Fixture Design Benefits

- The Carbon-Carbon (C/C) spring fixture has been extremely successful due to its lightweight, high compression force, and unique spring design, which allow you to customize the fixture to match your needs.

- Drastic cost reduction of energy expense

- Spring made of C/C composites (Carbon Fiber Reinforced Carbon)

How to Use Carbon Springs for Fixturing

C/C springs function as weights to apply constant force to parts as temperature is increased and processing begins.
Simulation of Energy Reduction

Conditions
- Furnace brazing 20 sheets of SUS304 (200 x 150 x 0.5mmT)
- Inconel Weight and Bottom Plate
- Force 20kg (using Type-A 2 CFC C/C Springs)

<table>
<thead>
<tr>
<th>Parts Weight</th>
<th>Jig Weight</th>
<th>Total Weight</th>
<th>Total Heat Capacity J/K</th>
<th>Ratio of Parts Heat Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Weights</td>
<td>2.38kg</td>
<td>31.58kg</td>
<td>33.96kg</td>
<td>15425</td>
</tr>
<tr>
<td>Carbon Spring Jig</td>
<td>2.38kg</td>
<td>0.96kg</td>
<td>3.34kg</td>
<td>2128</td>
</tr>
<tr>
<td>Effect</td>
<td>-</td>
<td>97% Less</td>
<td>90% Less</td>
<td>86% Less</td>
</tr>
</tbody>
</table>

Benefit of Carbon-Carbon Springs

1. Drastic Reduction of Cost of Energy
   - C/C springs can generate forces up to 24.5kg each, but weighs only 26~84 grams.
   - Achieves equivalent heating effect with much smaller heat capacity.

2. Processing Speed
   - Decreased heat capacity make for faster heating time possible.

3. Less Need of Replacement by Fatigue
   - C/C springs are not damaged in vacuum and inert gases atmosphere.

4. Less Need of Maintenance
   - Carbon does not deform by repeated heat cycle.
   - Maintains spring constant during many heat cycles.