Sphere journal supplemental material:
Supported welds lat & long forces:

Lateral Force vs. Rotation Rate

- Y-dir Force(N)
- Rotation Rate (Rpm)

- 7.8 lpm
- 10.4 lpm
Supported welds lat & long forces:

**Longitudinal Force vs. Rotation Rate**

**Lateral Force vs. Rotation Rate**
Above: (from left: Tapered retraction over welded material (100º snub-cup); bead on plate tapered retraction (100º snub-cup); 0.09” depth weld made with a 140º spiral-cut, conical tool)