1. The RPS chamber’s coating composition

- **Anodic Layer** is much less susceptible to wear due to plasma exposure than Plasma Electrolytic Oxide (PEO) composition.
- A longer-lasting protective layer means long-term cost savings.

   The sample coupons were exposed to ~64 hours of NF3 plasma.

   Process conditions:
   - Temp: 100°C minimum
   - Gas: NF3 250 sccm
   - Pressure: 250 mT
   - Power: 5 kW
   - Cycle: 20 min on / 10 seconds off

2. The quality of your substrate material

- There is a difference between ‘can grade’ aluminum and high-purity aluminum.
- Better substrate materials produce better coatings that last much longer.
- Find an RPS system that uses a high-purity custom alloy for the construction of the plasma chamber.

   AlFx Particle Generation Mechanism:
   - IMCs create defects which allow fluorine to attack the exposed aluminum substrate and create particles.
   - Exposed to plasma, the defective coating wears away, exposing more aluminum and generating more particles.

3. Temperature control capability

- Thermal expansion mismatch between the substrate and the protective coating can cause cracking which leads to degradation of the chamber.
- Look for RPS systems that maintain temperature below 90°C in the inner surface of the reaction chamber when input water temperature is at 35°C.

   Expansion mismatch cracks the anodic layer at temperatures > 150°C.