



SOUTHWEST RESEARCH INSTITUTE



Coating Services Titan-X Series 3100, 4100 & 5100

Southwest Research Institute® (SwRI®) uses plasma enhanced magnetron sputtering (PEMS) nanotechnology to produce corrosion-resistant coatings with high adhesion and cohesion. SwRI designed and developed the super-hard Titan-X coatings to reduce friction and withstand severe erosion, abrasion, and wear.

- Series 3100 – Maximum abrasion and erosion protection
- Series 4100 – Abrasion and erosion protection with friction reduction
- Series 5100 – Corrosion resistance

Used for coatings ranging from thick to ultra-thin, PEMS can be applied to a completed machined part and requires no secondary machining. These coatings are ideal for oil and gas applications such as ball and gate valves, fittings, impellers, water pump and BOP components, nozzles, and drilling tools.

Characteristics

- **Hardness:** 2,500–4,500 Vickers/Knoop (approximately 80 RC)
- **Thickness:** Up to 500 μm (10–50 μm typical)
- **Young’s Modulus:** ~300 GPa
- **Temperature of Use:** ≤1650°F
- **Coefficient of Friction:** 0.2–0.7
- **Reactivity:** Inert
- **Thermal Conductivity:** High
- **Density:** ~5.4 g/cm³
- **Electrical Resistivity:** Conductive
- **Optical Transparency:** Opaque
- **Biocompatibility:** Similar to TiN
- **Finish:** Depends on thickness

Facilities

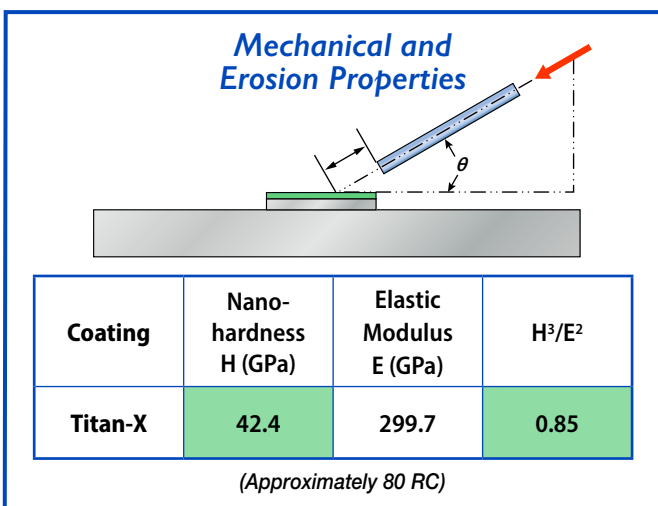
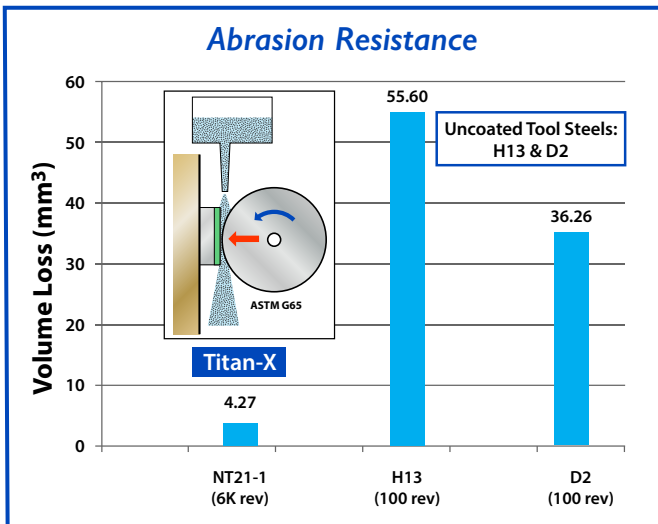
More than 5,000 square feet of laboratory facilities are dedicated to:

- Vacuum surface modification
- Atmospheric pressure plasma modification
- Wet chemistry-based surface modification
- Coating of advanced materials

Examples of Components with Titan-X Coating



Top photo: PEMS deposition of 3D part



D019204_2365

We welcome your inquiries.

For more information, please contact:

Josh Mangum, Ph.D.

Program Manager

210.522.3928

josh.mangum@swri.org

**Materials Engineering Department
Mechanical Engineering Division**

Southwest Research Institute

6220 Culebra Road

San Antonio, Texas 78238-5166

surfaceengineering.swri.org

SOUTHWEST RESEARCH INSTITUTE

Southwest Research Institute® is a premier independent, nonprofit research and development organization. With eleven technical divisions, we offer multidisciplinary services leveraging advanced science and applied technologies. Since 1947, we have provided solutions for some of the world's most challenging scientific and engineering problems.

An Equal Employment Opportunity/Affirmative Action Employer
Race/Color/Religion/Sex/Sexual Orientation/Gender Identity/National Origin/Disabled/Veteran
Committed to Diversity in the Workplace

Like. Share. Follow. Listen.

210.522.2122

ask@swri.org



swri.org

©2022 Southwest Research Institute.
All rights reserved.

Designed & printed by SwRI MPS 18-1122 JCN 268725 bl