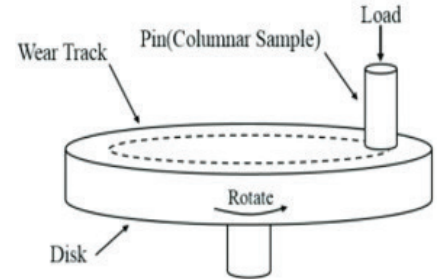


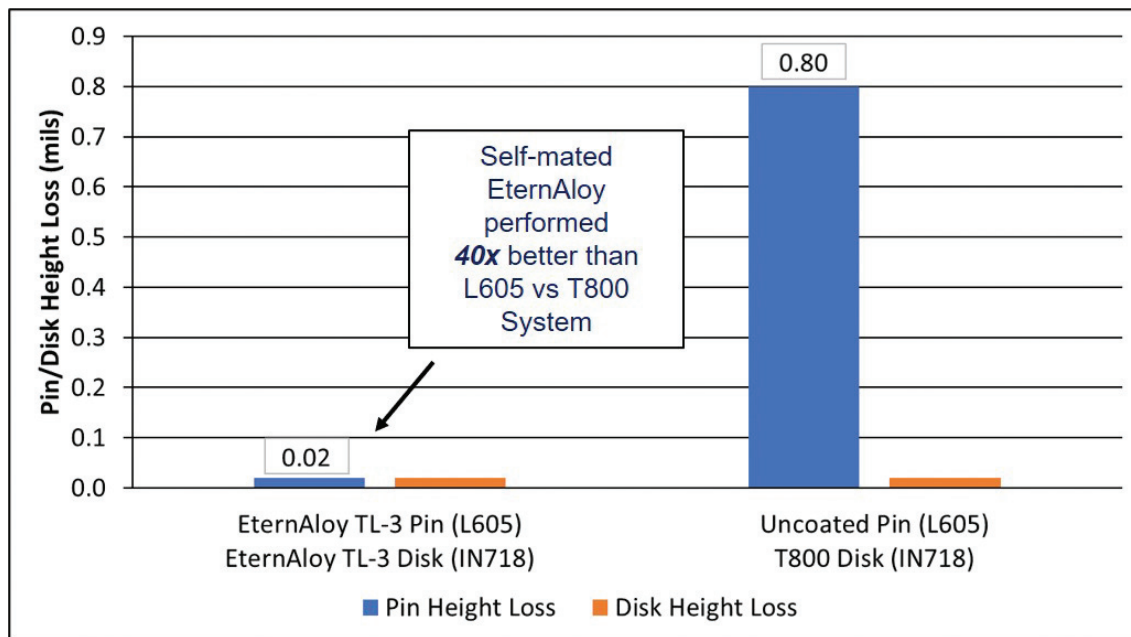
## EternAloy® TCHP HVOF Sliding Wear Data

### Pin-on-Disk Sliding Wear Tests

- EternAloy TL-3 versus Aeronautical Grade T800
- Elevated temperature of 550°F (288°C)
- Test designed and performed by GE Aviation




### 40x Performance Advantage of Self-mated EternAloy TL-3



Thermal cycling tests at ~7Ksi and sliding velocity of 2 in/s (50 mm/s) for 19.7K inches (500m) at 150°F (66°C) followed by 19.7K inches (500m) at 550°F (288°C)

**EternAloy TCHP TL-3 surface coatings significantly outperform industry standard aerospace coatings in sliding wear applications at elevated temperatures.**

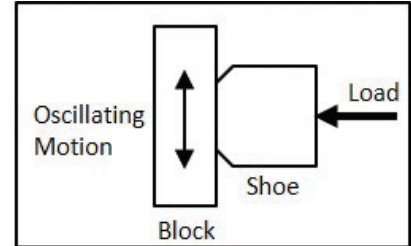
Data obtained in collaboration with GE Aviation 

EternAloy® TCHP HVOF grades are manufactured by an exclusive patented process. Grade TL-3 contains Ti(C,N) core particles and grade NL-3-2 contains Al<sub>2</sub>O<sub>3</sub> core particles. In both grades, the core particles are encapsulated with layers of WC and Co to create individual composite powder particles for producing wear resistant HVOF surface coatings.

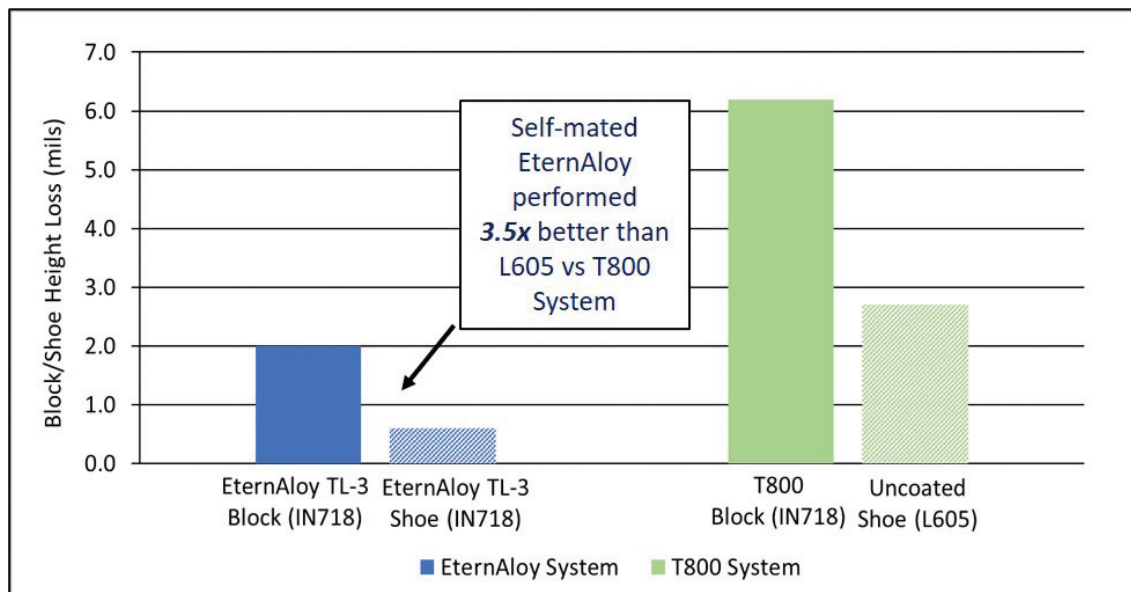
## EternAloy® TCHP HVOF Sliding Wear Data

### Block on Shoe Sliding Wear Test

- EternAloy TL-3 versus Aeronautical Grade T800
- Elevated temperature of 600°F (315°C)
- Test designed and performed by GE Aviation




### 3.5x Performance Advantage of EternAloy TL-3



Measured wear on block and shoe at elevated temperature of 600°F (315°C), pressure of 2.5Ksi, displacement of 40 mils (1mm) peak-to-peak, and frequency of 35 Hz for 1,000,000 cycles

**EternAloy TCHP TL-3 surface coatings significantly outperform industry standard aerospace coatings in sliding wear applications at elevated temperatures.**

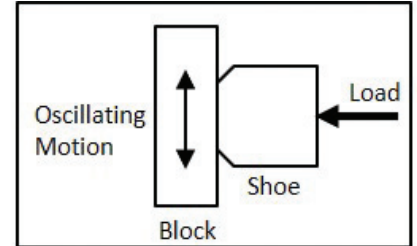
Data obtained in collaboration with GE Aviation 

EternAloy® TCHP HVOF grades are manufactured by an exclusive patented process. Grade TL-3 contains Ti(C,N) core particles and grade NL-3-2 contains Al<sub>2</sub>O<sub>3</sub> core particles. In both grades, the core particles are encapsulated with layers of WC and Co to create individual composite powder particles for producing wear resistant HVOF surface coatings.

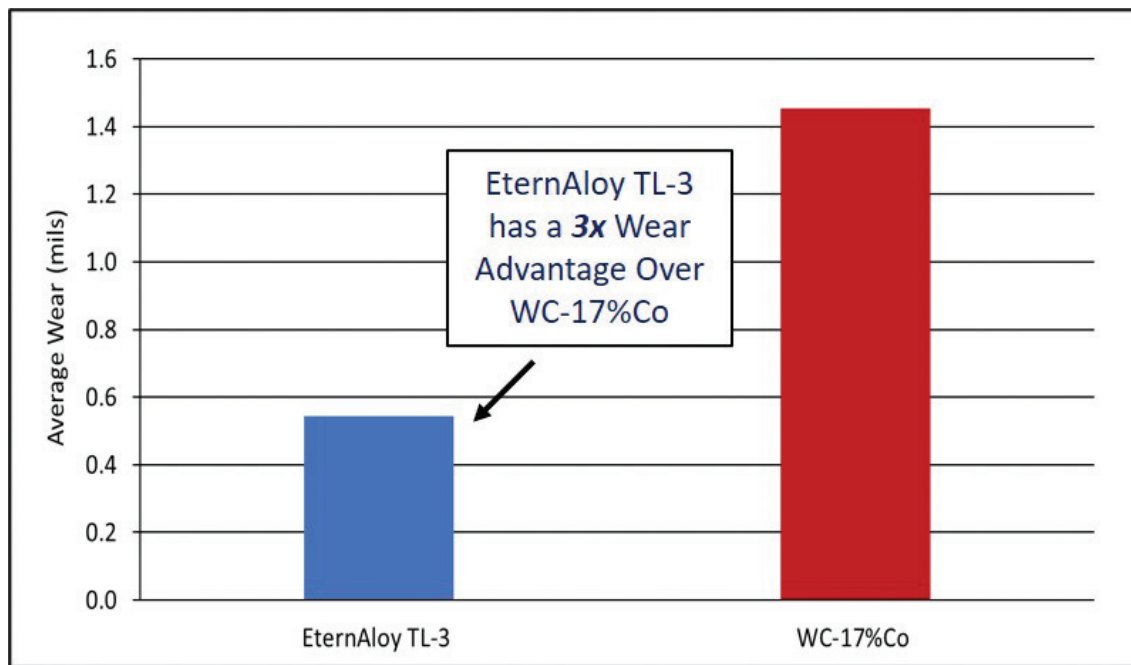
## EternAloy<sup>®</sup> TCHP HVOF Sliding Wear Data

### Block on Shoe Sliding Wear Test

- EternAloy TL-3 versus Aeronautical Grade WC-17%Co
- Elevated temperature of 600°F (315°C)
- Test designed and performed by GE Aviation




### 3.5x Performance Advantage of EternAloy TL-3



Measured wear after reciprocating tests at 700psi stress, 50 mils (1.3mm) stroke, and frequency oscillation between 25 Hz/50,000 cycles and 1 Hz/20 cycles for 1,000,000 cycles at 600°F (315°C)

EternAloy TCHP TL-3 surface coatings outperform a typical tungsten carbide aerospace coating in sliding wear applications and can be considered for coating high value parts where the mating surface is sacrificial. Increased benefits may be achieved at lower temperatures.

Data obtained in collaboration with GE Aviation 

EternAloy<sup>®</sup> TCHP HVOF grades are manufactured by an exclusive patented process. Grade TL-3 contains Ti(C,N) core particles and grade NL-3-2 contains Al<sub>2</sub>O<sub>3</sub> core particles. In both grades, the core particles are encapsulated with layers of WC and Co to create individual composite powder particles for producing wear resistant HVOF surface coatings.