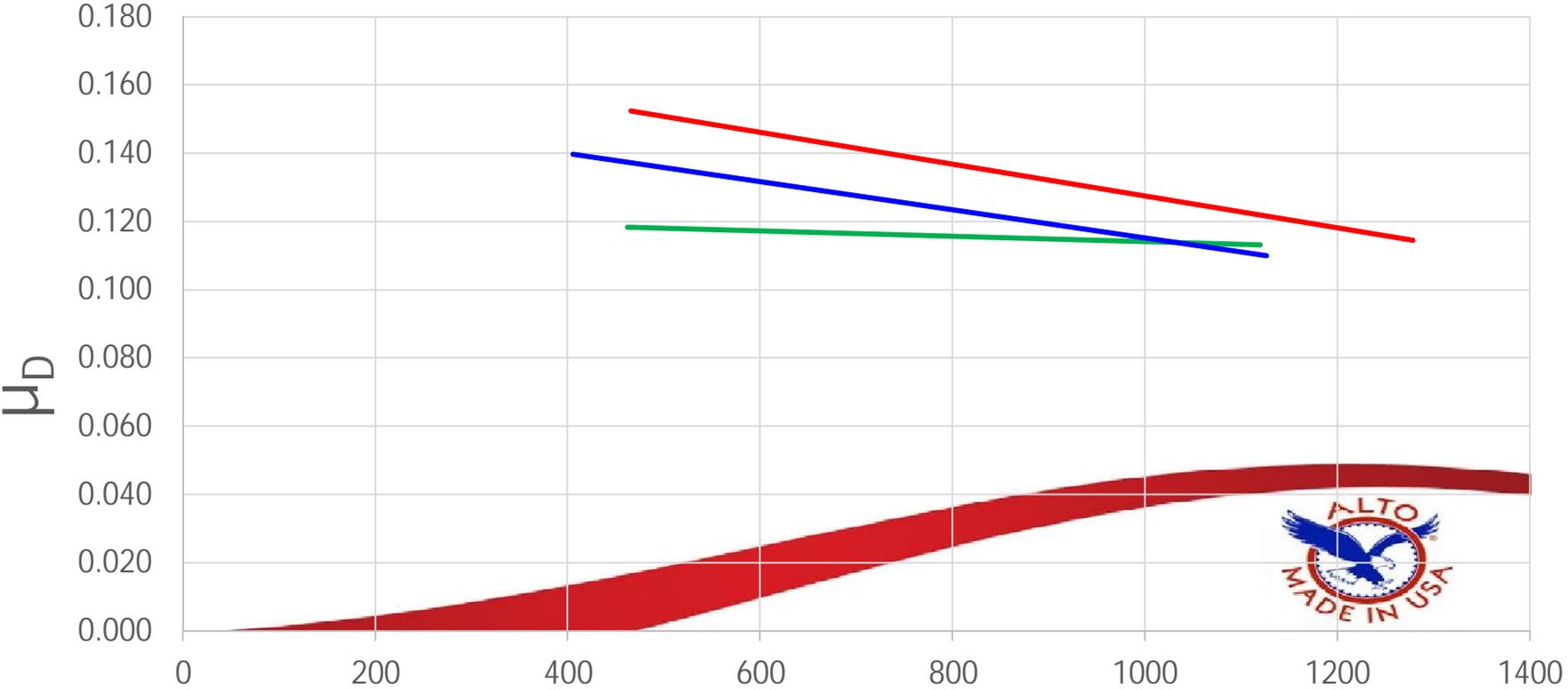


# Alto Red Eagle® Friction Material Test Criteria

- Using a modified version of the standard SAE test procedure, J2487 3,600 RPM Step Level test, Alto's Red Eagle friction material was evaluated against two leading competitor's friction materials.
- Reviewed Parameters:
  - Dynamic Coefficient of Friction – Torque Capacity
  - Friction Material Wear (degradation as a function of Kinetic Energy)



# Results - Dynamic Coefficient



Kinetic Energy Density ( $\text{kJ/m}^2$ )

— Alto Red Eagle    — Competitor B    — Competitor A

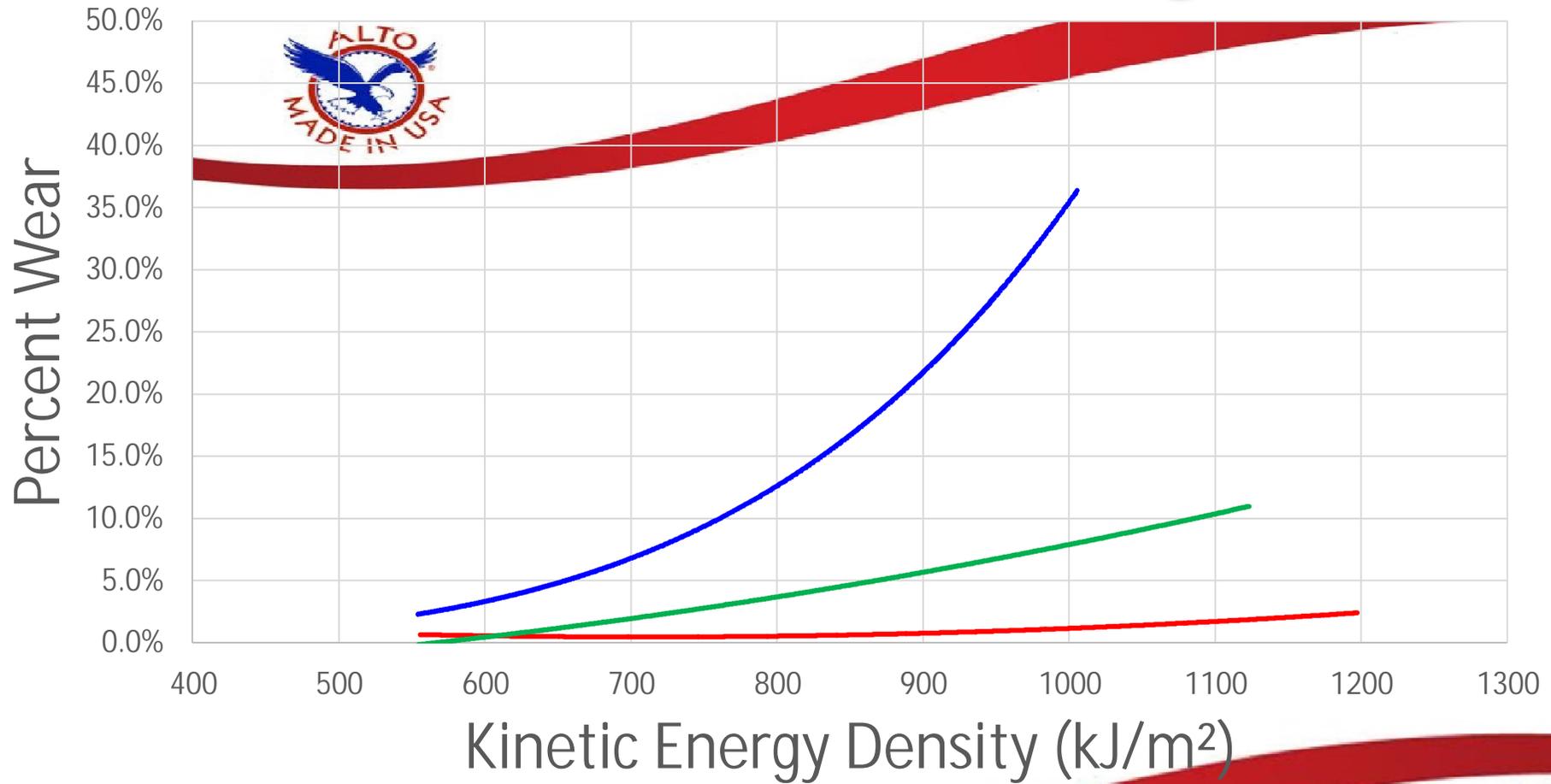


# Results – Dynamic Coefficient

- The Dynamic Coefficient Graph shows Alto's Red Eagle gives a higher coefficient throughout a large range of shift energies.
- Red Eagle offers a range of 6 to 10 % increased torque capacity over Competitor's A friction material.
- Red Eagle offers a range of 5 to 30 % increased torque capacity over Competitor's B friction material.



# Results - Durability



— Alto Red Eagle    — Competitor A    — Competitor B



# Results – Durability

- The Durability Graph shows Alto's Red Eagle has less wear across the same energy levels as the Competitor's A & B grade counterparts.
- The horizontal (x) axis specifies the energy and the vertical (y) axis is percent friction material thickness loss across 3 double-sided clutch pack.
- At the similar energy level, Alto Red Eagle has almost 2 % wear compared to Competitor's A at +35 % and Competitor's B 10 % wear.



# Alto Red Eagle® Friction Material Results Summary

- Higher Torque Capacity
- Increased Thermal/Energy Capacity
- Reduced clutch burn out

**Alto Red Eagle® is a superior material**

