



Alloy 709 Code Qualification Status

November 2021

Changing the World's Energy Future

Ting-Leung Sham



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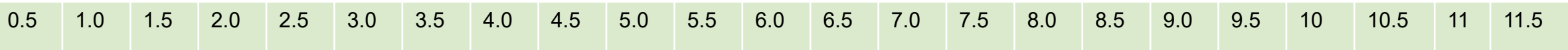
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November 5, 2021

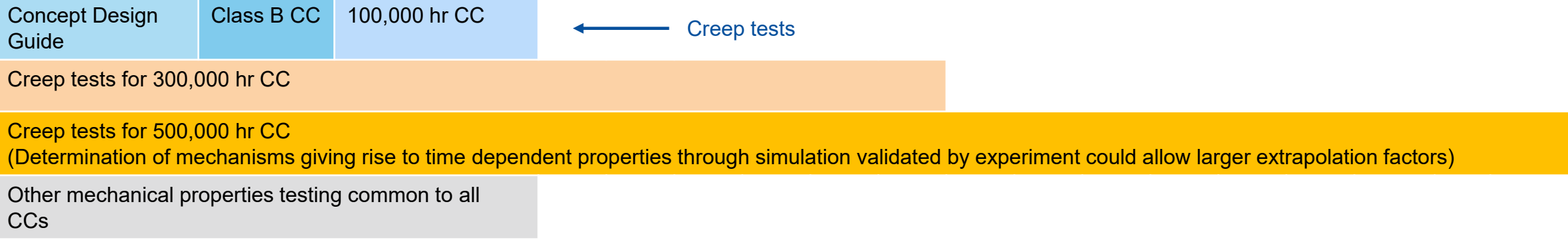
A “Staged” Qualification Approach for Alloy 709 Code Cases Is Being Executed by the Fast Reactors Campaign

Creep rupture time extrapolation factor = 5, per current Section III, Division 5 guidance

Time from initiation of long-term testing (years)



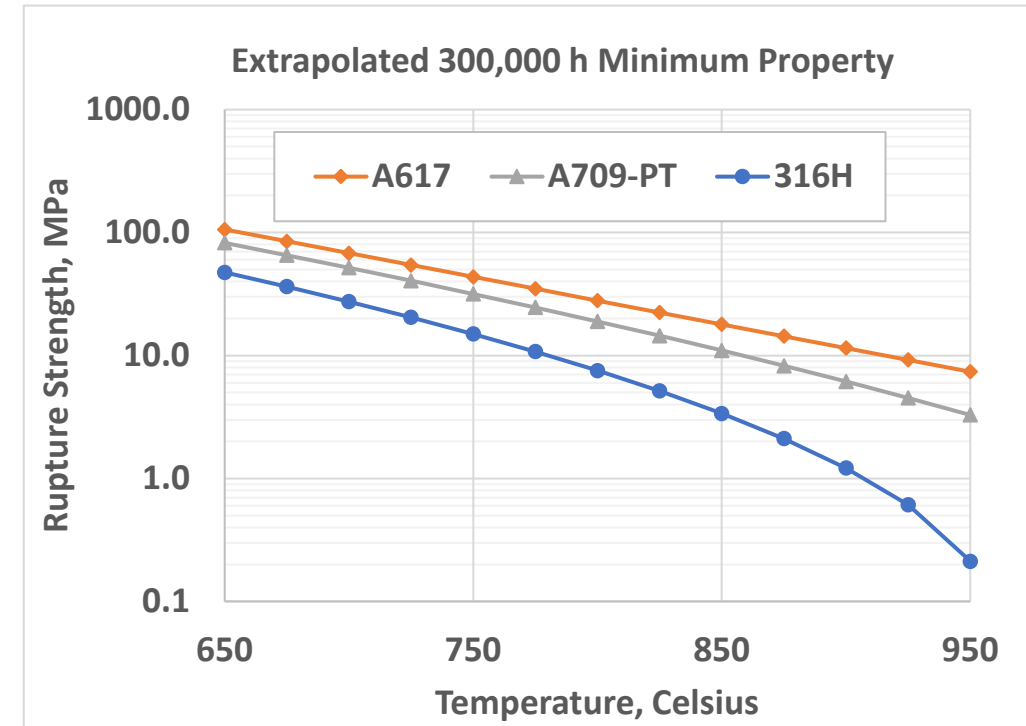
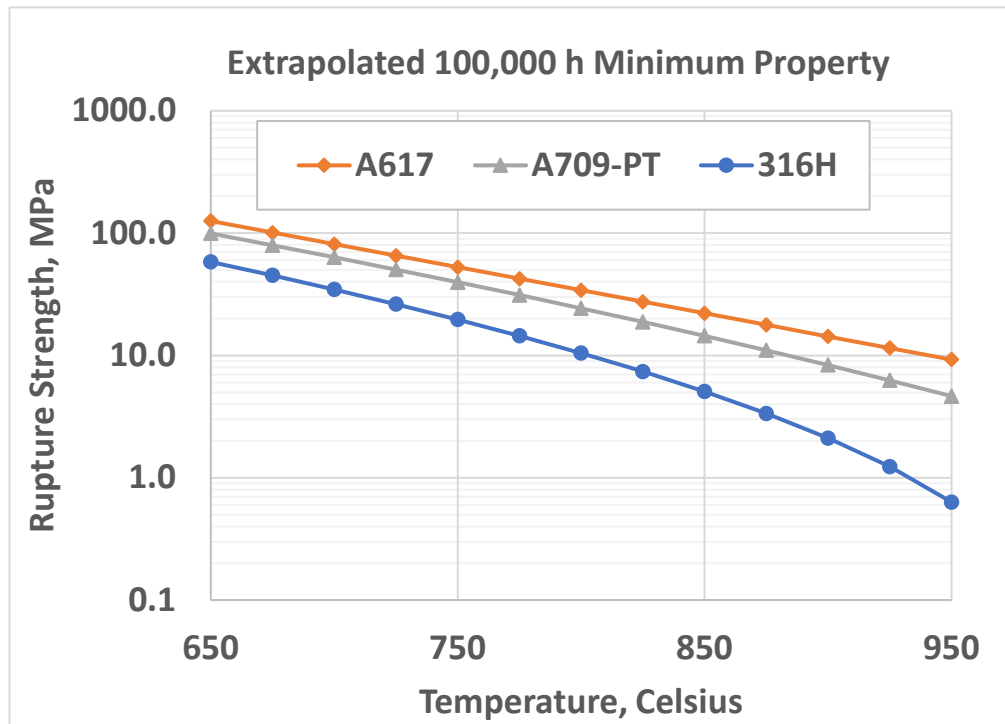
Tests initiated at the same time



<p>A four-year testing program, not accounting for resource constraints, would generate data package to support:</p> <ul style="list-style-type: none"> • Conceptual design <ul style="list-style-type: none"> - Conceptual Design Guide for 500,000-hour lifetime • Preliminary design <ul style="list-style-type: none"> - 100,000-hour Class A code case - Class B material code case 	<p>Additional creep data at 7-year mark from start:</p> <ul style="list-style-type: none"> • Final design <ul style="list-style-type: none"> - 300,000-hour Class A code case
	<p>Additional creep data at 12-year mark from start:</p> <ul style="list-style-type: none"> • Nth-of-a-kind material insertion <ul style="list-style-type: none"> - 500,000-hour Class A code case

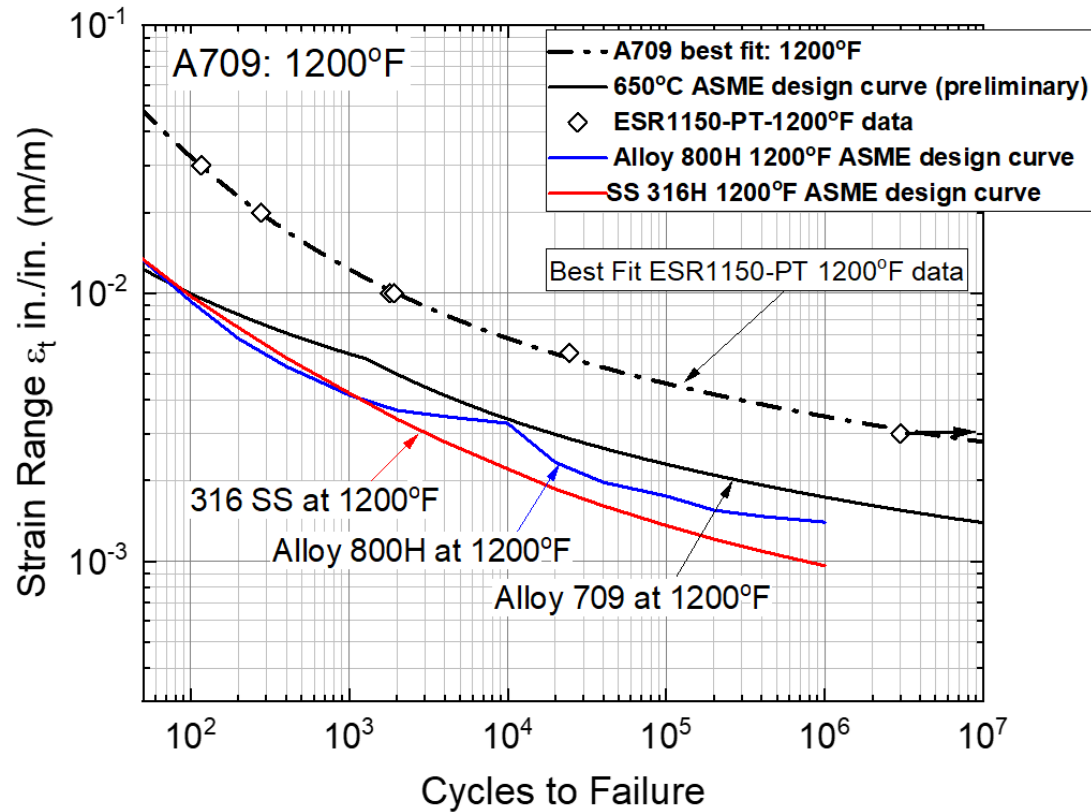
Alloy 709-PT Has Very Good Creep Rupture Properties

- Alloy 709-PT, solution anneal plus precipitation treatment at 775C for 10 hours

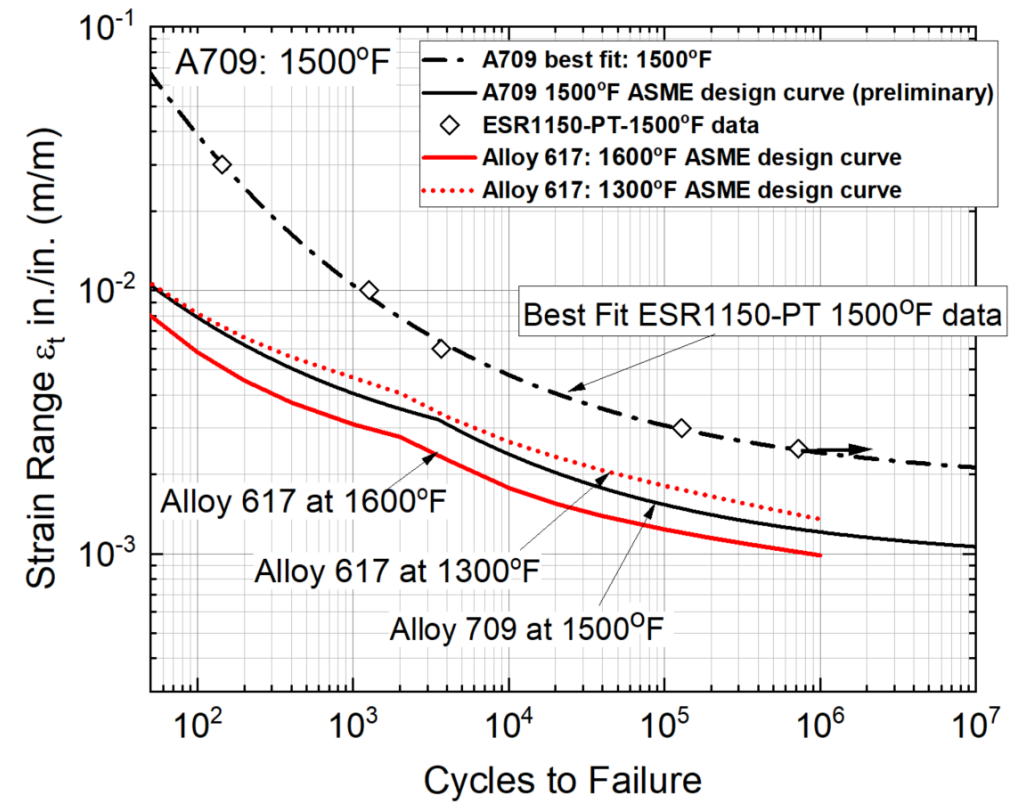


Alloy 709-PT Has Enhanced Fatigue Properties

Alloy 709-PT better than Alloy 800H and 316H at 1200F (650C)

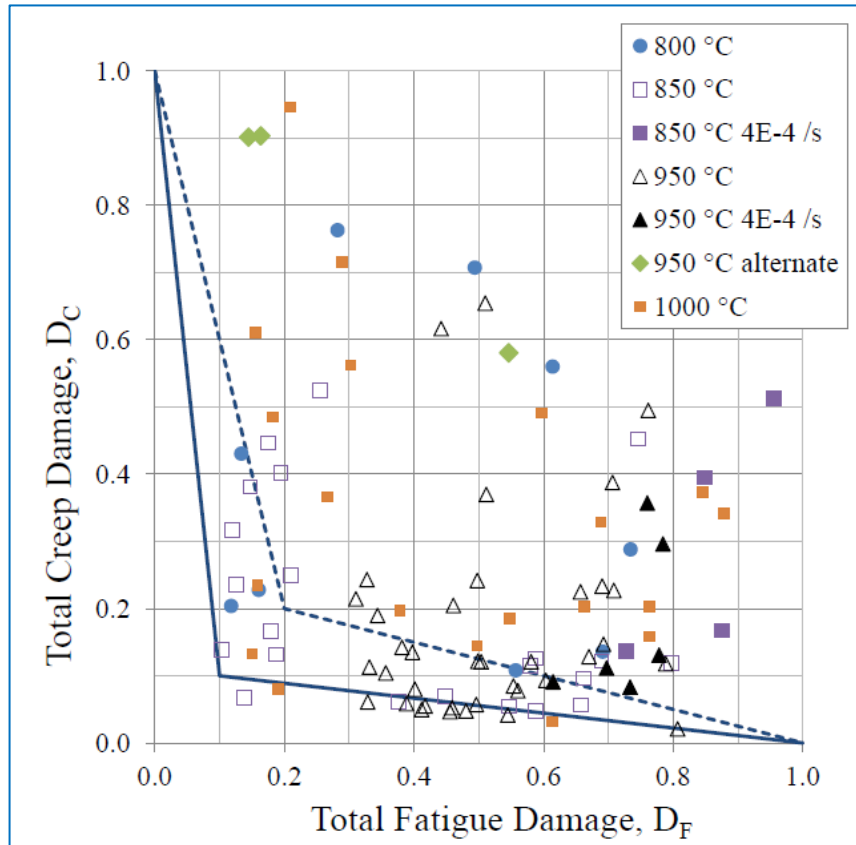


Alloy 709-PT comparable to Alloy 617 at 1500F (816C)

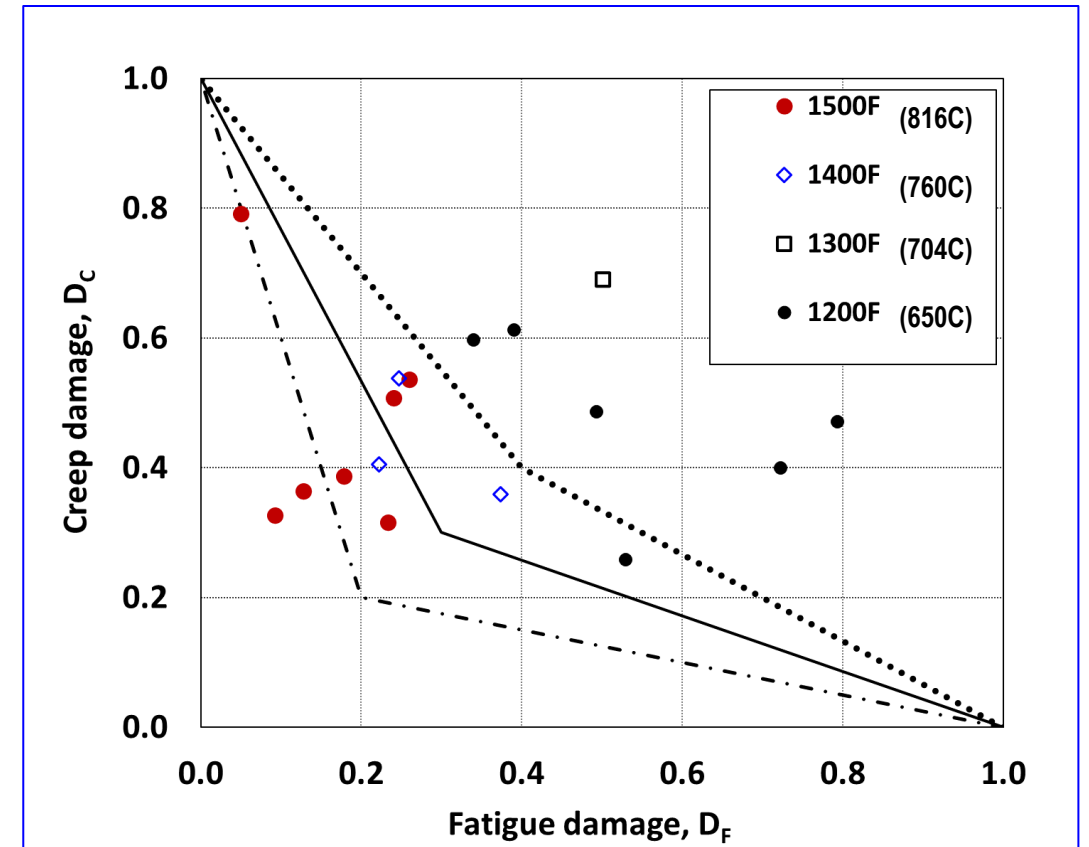


Alloy 709-PT Has Very Good Creep-Fatigue Resistance

Alloy 617 Creep-Fatigue Interaction



Alloy 709-PT Creep-Fatigue Interaction



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- **Alloy 709-PT Continues to Demonstrate Balanced Creep, Fatigue and Creep-Fatigue Performance**