

# HAYNES<sup>®</sup> 242<sup>®</sup> alloy

## Fatigue Properties

### Strain-Controlled LCF Properties (Hot-Rolled Plate)

The following LCF properties were generated from hot-rolled and fully heat-treated plate. Testing was performed in the transverse direction utilizing a smooth, round bar specimen geometry. The specimens were tested by fully reversed axial strain cycling, R-ratio of -1.0, and a cycle frequency of 20 cpm (0.33 Hz) at a strain range of 1%.

<b>Cycles to Failure at 1200°F (650°C), N<sub>F</sub></b>			
<b>242<sup>®</sup></b>	<b>X</b>	<b>188</b>	<b>HR-120<sup>®</sup></b>
2000	4000	2100	3600

### Stress-Controlled Notched LCF Properties (Hot-Rolled Rings)

The following test results were generated from hot-rolled and fully heat-treated rings destined for actual gas turbine engine part applications. Testing was performed in the tangential direction utilizing a round test bar geometry with a double notch design ( $K_t=2.18$ ). Loading was uniaxial cycling with an R-ratio of 0.05 stress and a cycle frequency of 20 cpm (0.33 Hz).

<b>Maximum Stress</b>		<b>Cycles to Failure at 1200°F (650°C), N<sub>F</sub></b>	
<b>ksi</b>	<b>MPa</b>	<b>242<sup>®</sup></b>	<b>909</b>
110	760	<b>845</b>	2,835
100	690	<b>12,220</b>	22,568
95	655	<b>32,587</b>	13,796
90	620	<b>76,763</b>	55,679; 40,525
85	585	<b>297,848</b>	47,707; 43,701
80	550	<b>304,116*</b>	129,573**

\* No crack observed at 198,030 cycles. 8 mil (200µm) crack observed at 200,000 cycles.

\*\*No crack observed at 45,800 cycles. 8 mil (200µm) crack observed at 47,770 cycles.