

# HAYNES<sup>®</sup> HR-235<sup>®</sup> alloy

## Metal Dusting

HAYNES<sup>®</sup> HR-235<sup>®</sup> alloy has been tested alongside competitive materials in a controlled atmosphere, thermal cycling rig. The reaction gas was H<sub>2</sub> + 68% CO + 6% H<sub>2</sub>O, the carbon activity of which was 2.9 at the reaction temperature. The cycling operation, which was controlled automatically, comprised 45 minutes at the reaction temperature of 1256°F (680°C), followed by a cooling period of 15 minutes, during which the samples rapidly reached a temperature of about 194°F (90°C). The samples were tested for 1,200 (one hour) cycles, with the following results. The formation of filamentary carbon deposits with metallic nanoparticles (coking) is an indicator of the onset of surface damage (pitting).

Alloy	Approximate Number of Cycles to Coking	Form of Coke
601	48	Grain boundary deposits, pits
602CA	48	Adherent coke, no metal visible
617	48	Numerous small pits, grain boundary deposits
693	24	Numerous small pits
696	100	Attack on grain boundaries
HR-235 <sup>®</sup>	400	Grain boundary deposits, minor pits

Time to Onset of Coking, h

