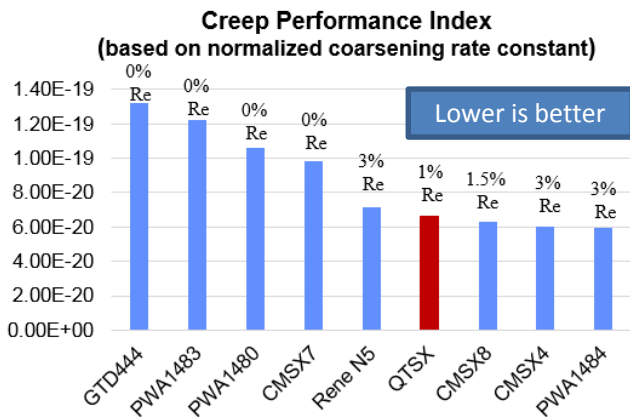


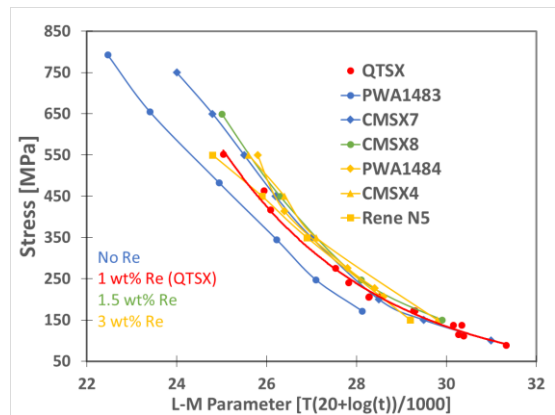
Innovative Castable Single Crystal (SX) Superalloy for Industrial Gas Turbine (IGT) Blade Components

Problem: Incumbent SX alloys are either too costly due to high Re content or exhibit processing constraints in the form of freckle formation in large IGT blade castings.

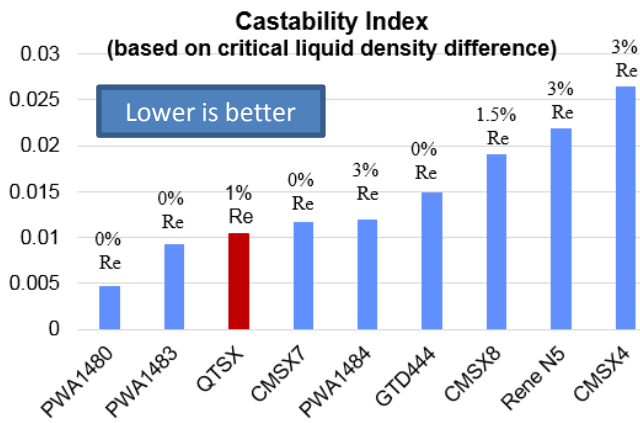
Solution: By applying Integrated Computational Materials Engineering technologies, QuesTek has successfully designed a low rhenium SX nickel superalloy, “QTSX™,” that can be cast effectively as large, defect free IGT components. QTSX alloy offers most cost effective solution with 1 wt.% Re, exhibiting the processability of Re-free alloys, along with comparable performance to second generation SX superalloys that contain 3 wt.% Re.



QTSX demonstrates superior high temperature creep properties, evaluated up to 1700 hours at 870-1150°C.



QTSX has comparable creep properties with lower Re versus 2nd generation alloys, as illustrated by the LMP stress rupture comparison.



QuesTek has further demonstrated freckle-free casting of full-scale IGT blades.



Prototype castings compare Rene N5 (freckles in 3 samples) and QTSX (freckle-free samples with 100% yield rate)