



# Challenge - Heat Resistant Super Alloys



## Machining Inconel 718 and other HRSA Alloys

While machine shops seem to be a plentiful commodity, many aren't able to successfully and efficiently machine Heat Resistant Super Alloys (HRSA) like **nickel alloy Inconel 718 and titanium**.

Inconel 718 and other super alloys are often used for combustion and turbine sections of aircraft engines.

Because these materials are metallurgically able to provide high strength at elevated temperatures, machining stresses are also greater. These nickel, iron and cobalt-based super alloys are capable of maintaining structural integrity at near the melting point of their basic metal. While that's an **essential advantage for parts in high temperature applications, it poses a problem for milling and turning**.

Poor thermal conductivity of super alloys results in a concentration of high temperatures at the tool-workpiece and tool-chip interfaces, which accelerates tool wear and increases manufacturing costs.

In specifics, some HRSA materials have poor machinability because their resistance to high temperatures make them challenging to form, deform, and weaken for malleability. These materials chip and break during machining and other processes. With high failure rates and attendant costs due to improper tooling or lack of knowledge of appropriate processes, many machine shops simply pass on bidding projects calling for HRSA materials. Or they win them, and fail.

MD Engineering's highly skilled engineers, programmers and machinists tackle many of the most challenging materials, **planning the processes and appropriate machines for maximum manufacturability**.



On the equipment side, MDE has invested extensively in the latest technology to mill **the most demanding complex geometry or free-form parts** from materials ranging from conventional aluminum to super alloys.

Working with our quality inspection team, MDE professionals and machines produce innumerable parts from HRSA materials for the world's largest aerospace and defense companies.

The key to MD Engineering's success with heat resistant super alloys hinges on three important investments the company has made – **planning, equipment investment, and management of the process to reduce tool wear and improve high quality throughput.** This coupled with our highly skilled machinists and engineers gives MDE a large competitive advantage over other machine shops serving the aerospace and defense industries.

For more information on the world class capabilities and dedicated, highly skilled people of MD Engineering, **please visit our website at [www.mde-us.com](http://www.mde-us.com).**

### Challenge... met!



#### Our Value Proposition

- MDE is a problem solver, providing effective solutions for tough part problems
- We are responsive, providing quick turnaround, to meet or beat customer requirements and expectations with regard to cost, quality and delivery
- Fully capable to machine all Aerospace Alloys; specialists in hard metals like Inconel and Titanium
- Experts in achieving complex geometries and sophisticated product designs
- Providing concurrent engineering to help design for manufacturability
- Utilizing Lean manufacturing methodologies and techniques for continuous improvement
- State of the art equipment including robotics and "Lights Out" manufacturing
- The cellular manufacturing that we employ enables efficient production of low volume / high mix of aerospace and defense parts
- Our expertise includes an extraordinary range of machining and assembly capabilities at industry competitive pricing

Located approximately 35 miles east of Los Angeles, 52 miles east of Los Angeles International Airport and 19 miles south of Ontario International Airport, MD Engineering is a privately held company, proudly serving the world's leading aerospace and defense companies since 1999. We employ a highly skilled workforce of over 45 employees and house 33 CNC machines in our facilities of 20,000 square feet.



1550 Consumer Circle  
Corona, CA 92878

951.736.5390  
[info@mde-us.com](mailto:info@mde-us.com)