



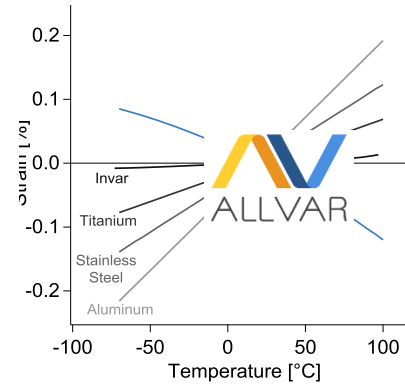
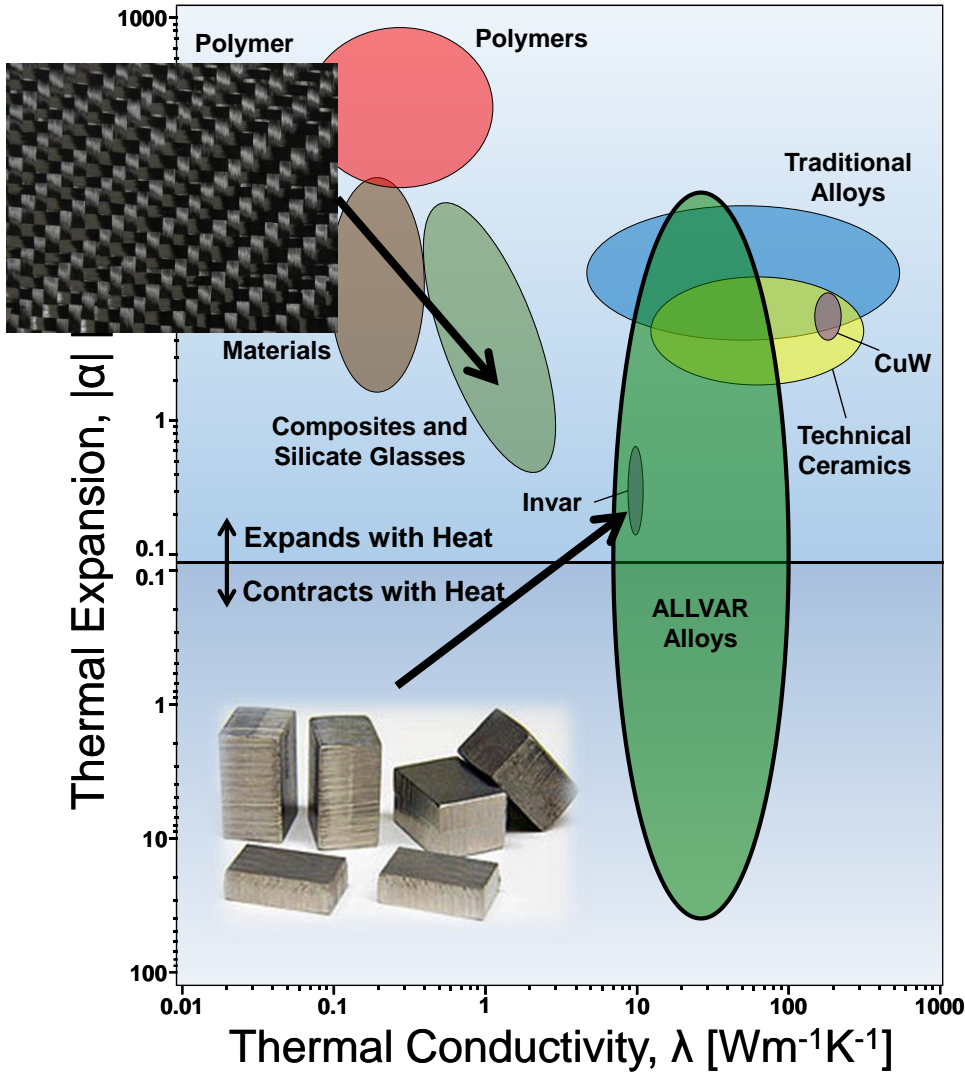
# New Developments in Allvar Alloys

Presenter: James A. Monroe

ALLVAR: Jay Zgarba, Jeremy McAllister

Texas A&M University: Ibrahim Karaman, Xavier Huerta

# Introduction



# Anisotropic

# Potential Application Areas



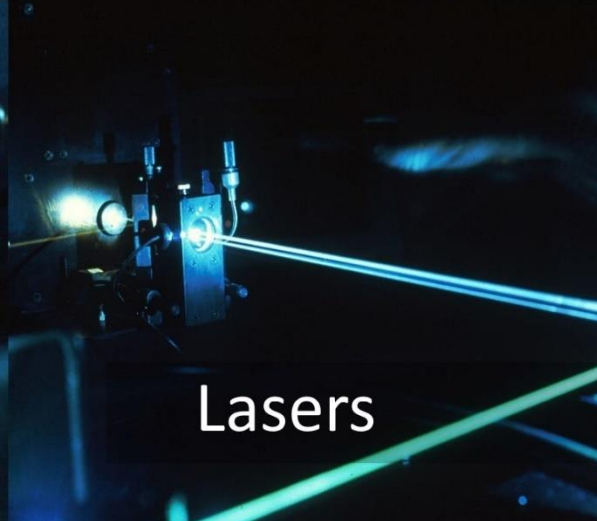
Infrared Optics



Satellites



UAV Optics



Lasers

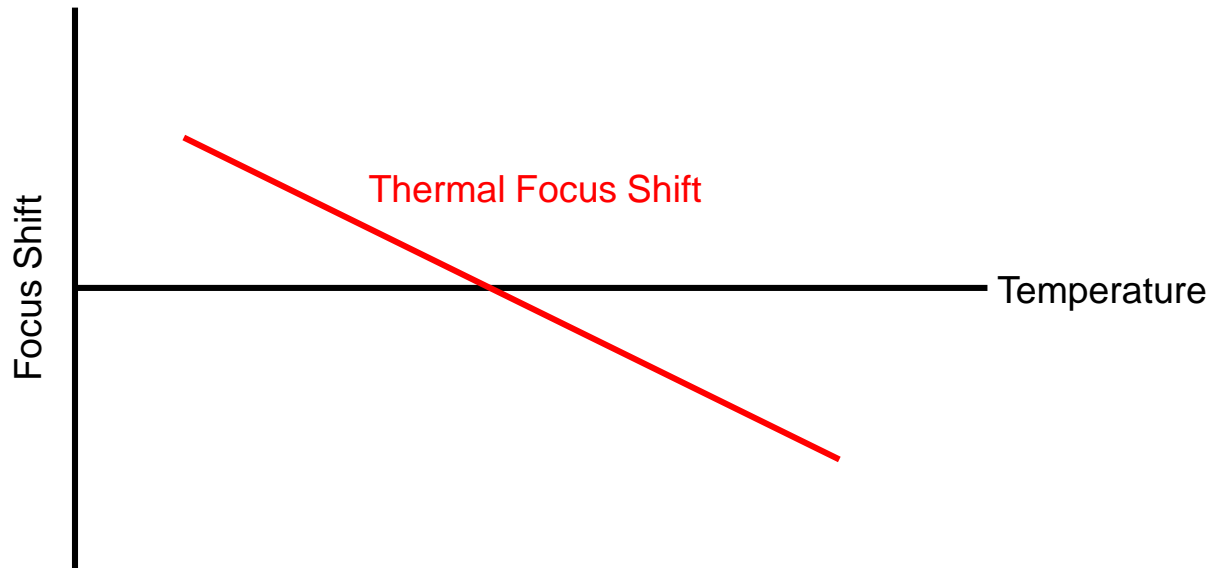
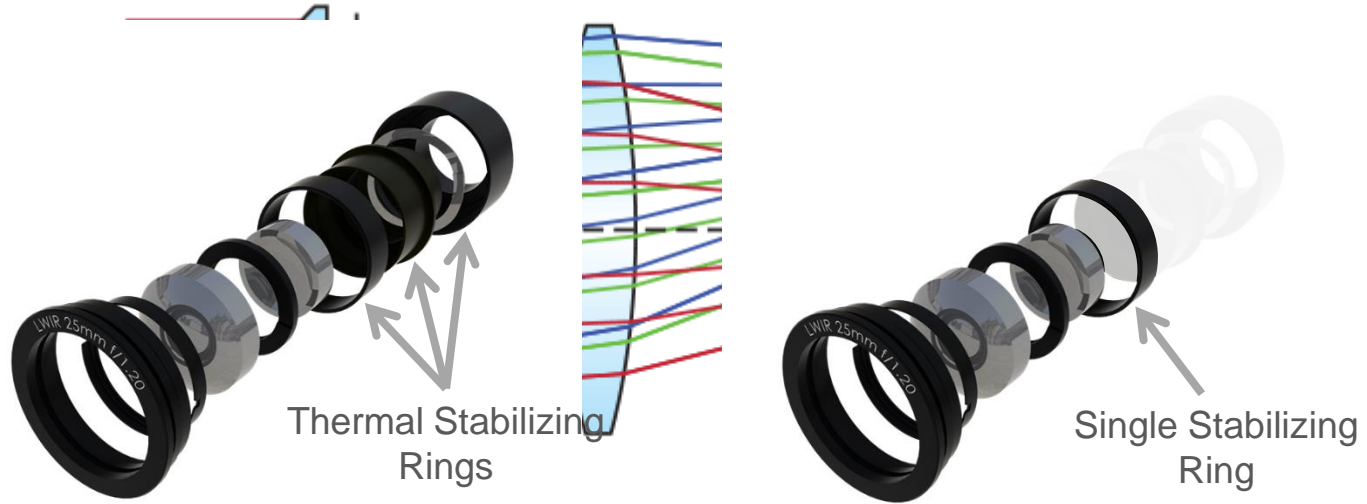


Industrial



Extreme Environments

# Example Athermal Problem



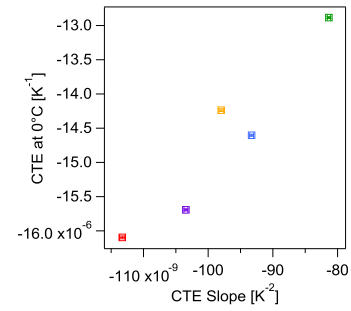
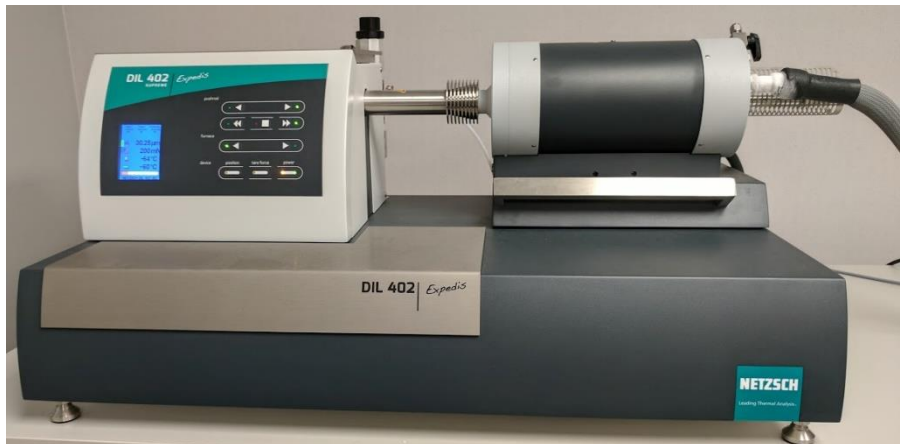
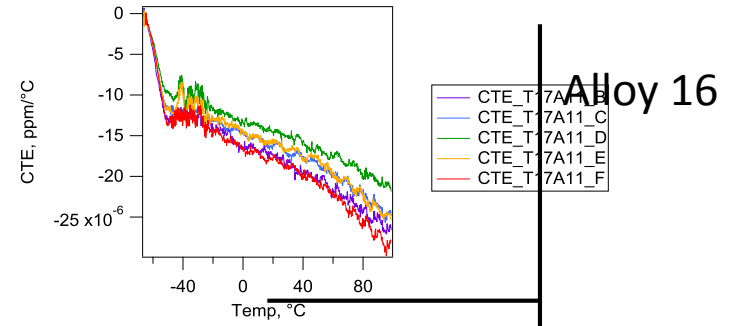
# Alloy 16

Room Temperature



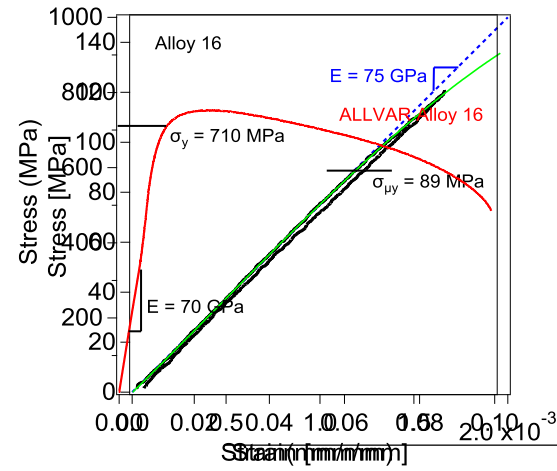


# Material Development



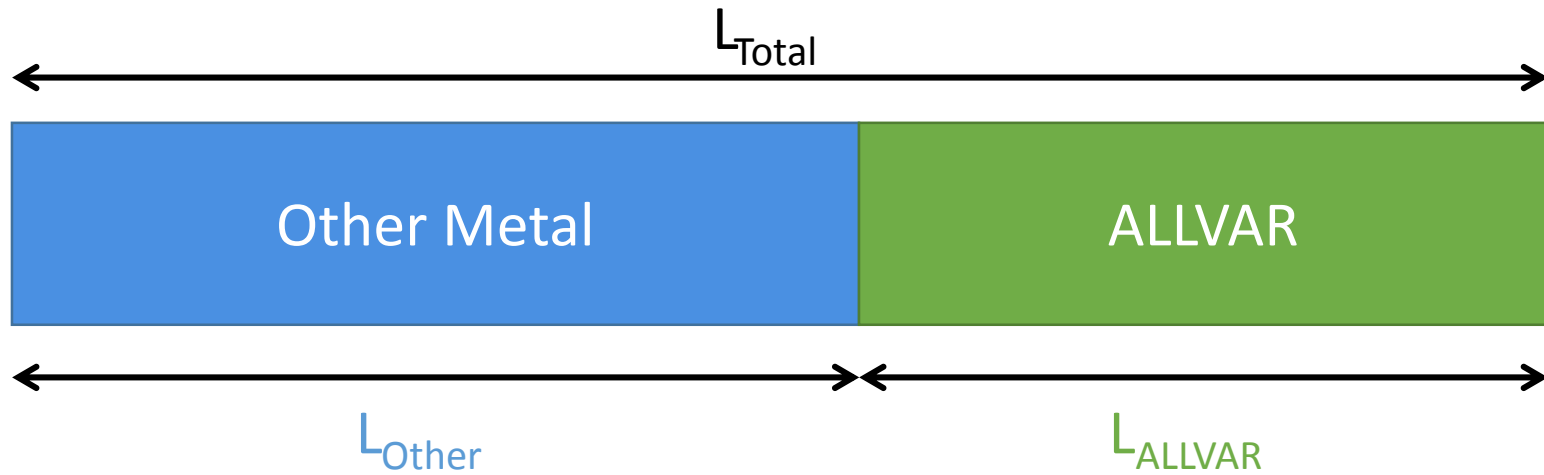
Alloy 16

# Mechanical Properties



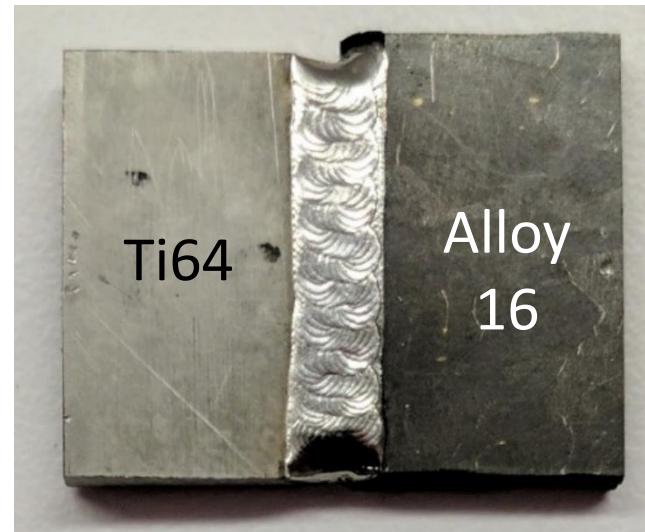
Invar  
 $\sigma_{\mu y} = 70 \text{ MPa}$

# A New Design Paradigm



$$\alpha_{tot} = \frac{L_{AV}^o}{L_{tot}^o} (\alpha_{AV} - \alpha_{Other}) + L_{tot}^o \alpha_{Other}$$

$$\frac{L_{AV}^o}{L_{tot}^o} = \frac{\alpha_{tot} - \alpha_{Other}}{\alpha_{AV} - \alpha_{Other}}$$

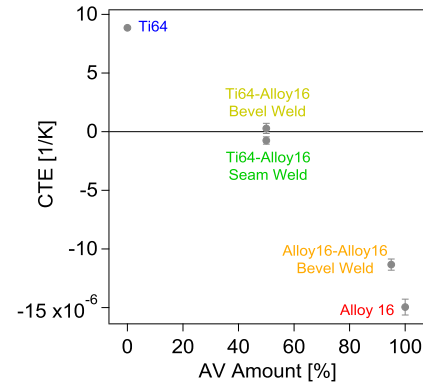
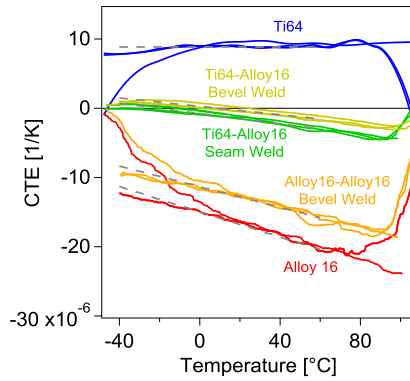
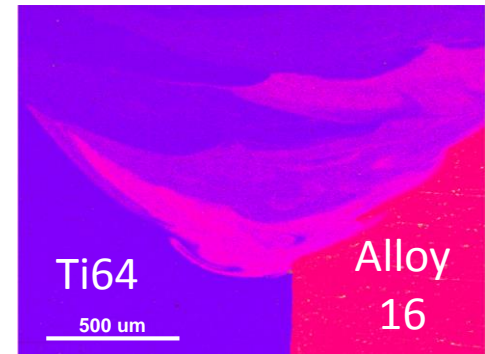
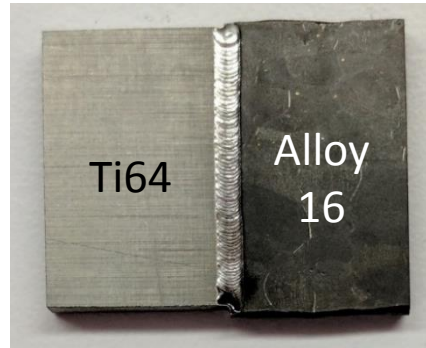
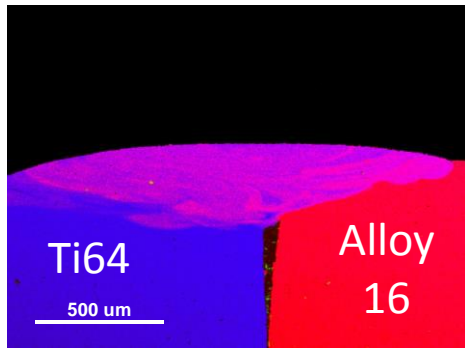




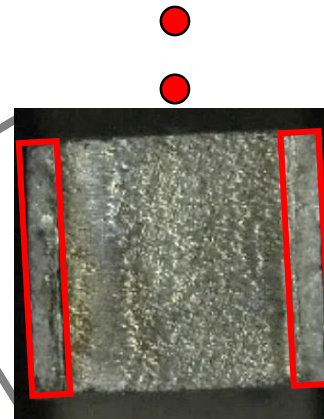
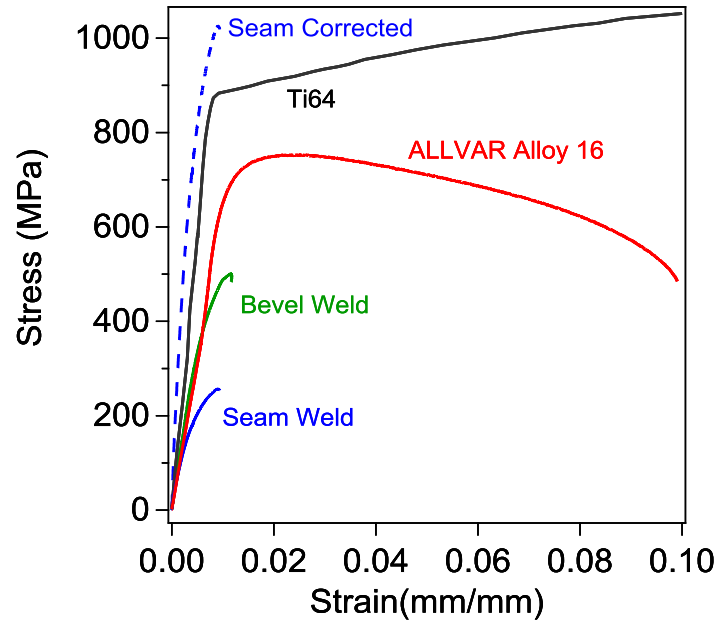
# Welding

## Seam

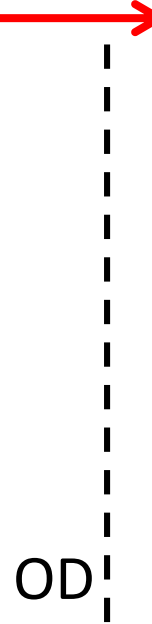
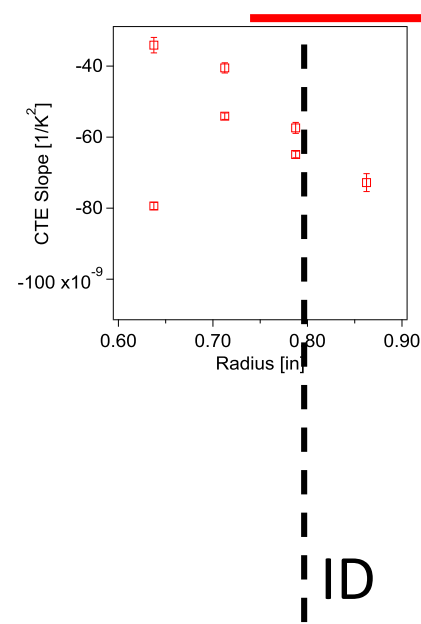
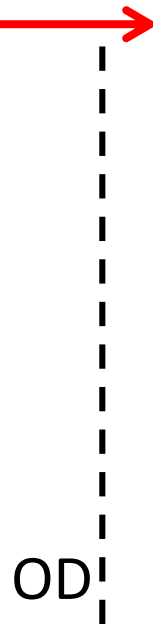
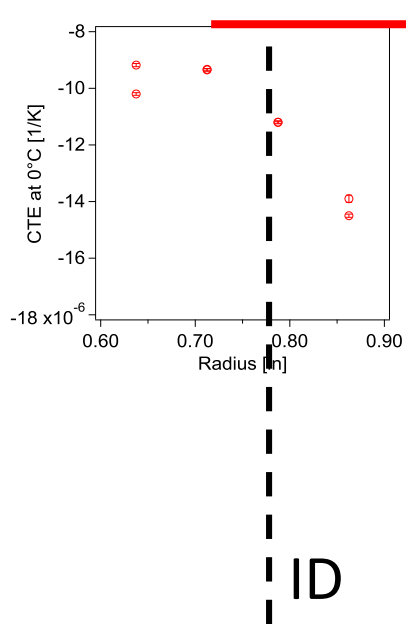
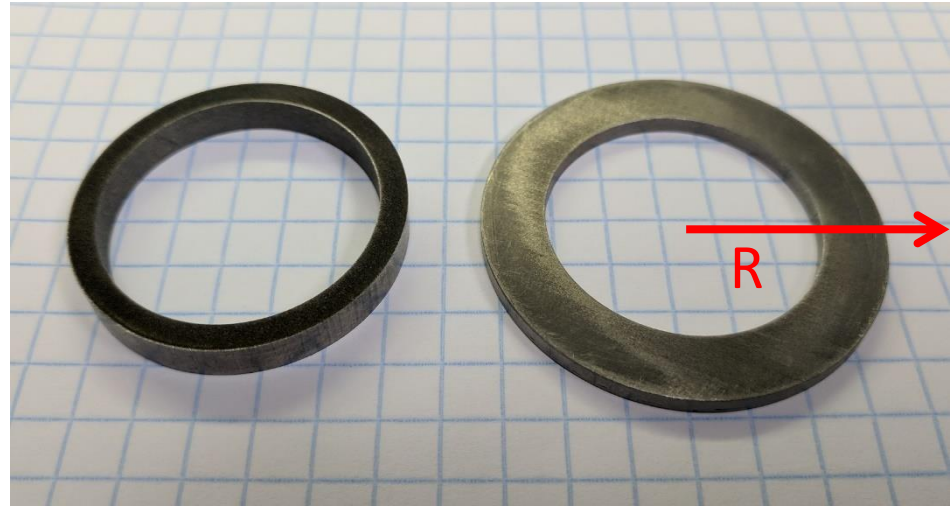
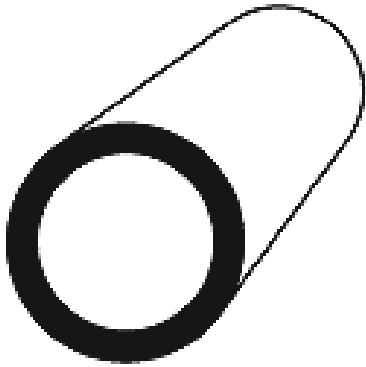
## Bevel



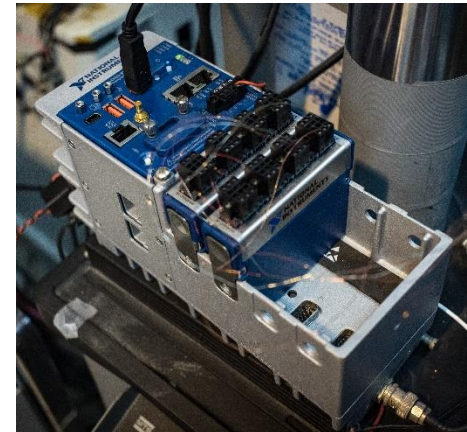
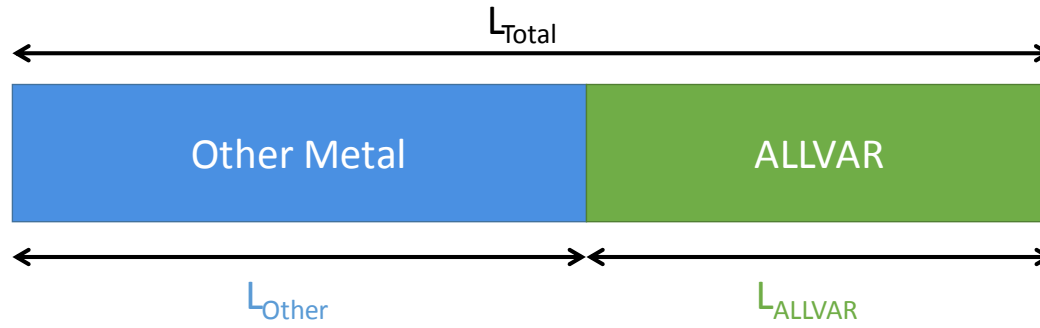
# Welding



# Other Component Geometries



# Conclusions





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