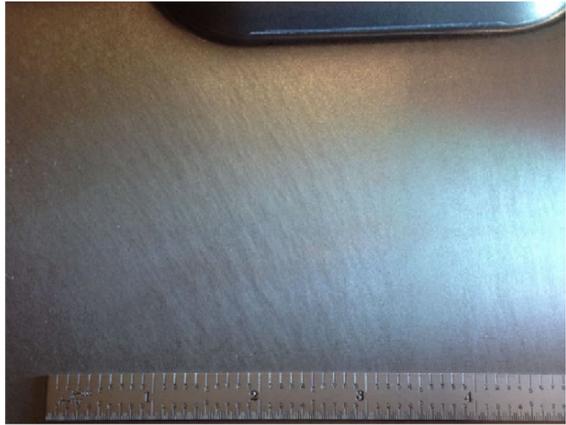


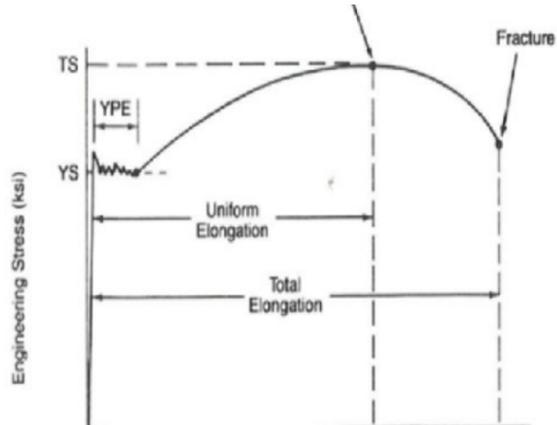
# Improving Surface Imperfection

Learn how our Material Support & Solutions team solved this customer material issue.



## THE PROBLEM

The customer was experiencing occurrences of surface ripples on drawn components. The problem was sporadic across different lots and could not be detected until after forming.



## THE ANALYSIS

The ripples were a result of Luders lines (stretcher strains), which are a result of discontinuous yielding. Defective material was analyzed and compared with successful material. Processing paths were the same, but defective material showed higher levels of yield point elongation (YPE).



## THE SOLUTION

A modified/restricted chemistry was implemented to increase robustness of the material against Luders lines. Prior to producing sheets, additional mechanical testing was used to determine presence of YPE, eliminating the issue.

## — THE ACTION

When encountering surface imperfections, contact the Material Support & Solution team at Worthington.