ALLOY
C27450

Machining Trouble Shooting Guide

General Material Characteristics

The significant chemistry difference of Alloy C27540 when compared to the C36000 alloy is the reduced lead content. In general, lead adds lubricity to the machining process and facilitates desirable chip formation. Machining characteristics of C27450 will tend to be similar to that of mild steel alloys such as AISI 12L14. Mechanical property differences between C27450 and C36000 are minimal.

General Machining Characteristics

The absence of lead in the C27450 affects machining primarily through the reduced lubricity and chip formation during the removal of material. The following general characteristics have been observed:

- Relatively easy to machine alloy
- Heavy depths of cut and feedrates are achievable
- High speed machining is possible
- Material is perceived to be soft, somewhat gummy during the machining process.
- Chip control can be difficult
- Temperature related issues may need to be addressed
- Horsepower requirements increase
- Oil based coolants preferred
- High concentration (>10% in most cases) water soluble coolants also used
- Secondary operations such as polishing and plating are not adversely affected

Alloy C27450 is a no lead alloy developed and designed to be compliant with the new California legislation AB 1953 which requires lead content (weighted average) in potable water products of 0.25% or less. With the end users and their manufacturing processes in mind, C27450 was developed to minimize additional costs while maximizing efficiencies and cycle counts. However, the absence of lead in this product requires some modifications to the machining set-ups and tooling when compared to machining standard and free cutting C36000 and similar alloys.

This Trouble Shooting Guide is a quick reference summary that suggests possible solutions to specific machining issues that may arise when machining this alloy. This Trouble Shooting Guide is designed to work in conjunction with the **Machining Reference Guide** that is available directly from Mueller Brass or from your local sales representative.

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• **Chip Control**	• Use "chip breaker" tool geometries • Increase feed rates and decrease RPM to optimize chip thickness • Use high pressure coolant directed to facilitate chip breakage and flushing • Modify tool geometry to optimize lead angles and nose radii
• **Temperature Related Issues:** ◦ Excessive Heat Build Up In Tooling Or Work Piece	• Additional coolant to flood work area • High pressure and/or through the tool coolant • Increase coolant concentration (>10% with water soluble) • Oil based lubrication preferred • Reduce speeds
• **Surface Finish Issues:** ◦ Chatter ◦ Tom Finish On Work Piece ◦ Work Piece Burrs And Sharp Edges	• Reduce depth of cut • Increase speed • Modify cutting path • Increase work holding/machine rigidity • Free Cutting Tooling Geometries: ◦ low helix tooling ◦ knock sharp corners of cutting tools ◦ high positive rake inserts
• **Drilling Issues**	• 118 degree cutting angels with cip breakers on lands • Slow spiral drills improve chip evacuation • Through the tool coolant
• **Tapping / Threading Issues** ◦ Excessive Chip Build-up ◦ Binding During Tapping ◦ Gouging Of Threads	• (3) flute, slow Spiral/Low Helix taps work well. (4) flute, straight and high spiral taps tend to plug with chips • Increase in horsepower may be required due to reduced lubricity in work piece • High hook angles of generous clearance reduces binding • TIN (Titanium Nitride) coating and coolant through the taps help evacuate chips
• **Staining** ◦ On Work Piece After Machining	• Do not allow machining fluids to dry on work piece • Do not use cutting oils containing sulfur • Oil based cutting fluids, or water soluble coolant with at least 10% concentration

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