TUBE BENDING WITH MICROLUBRICATION

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INTRODUCTION

Metalloid is a leading supplier of fluids to the tube processing industry. The main areas of production using Metalloid fluids are tube manufacturing, endforming, bending, sawing, cleaning, and protecting. Metalloid also supplies cleaners, corrosion preventatives, machining and grinding coolants, stamping and forming lubricants, and wiredrawing lubricants to its customers, having numerous green, botanical options for many areas of work.

Metalloid has 2 main production facilities in the United States and each of the facilities is well staffed with chemists and laboratory instruments that are capable of testing raw materials and finished products for meeting quality standards, research and development of new generation products, and assisting customers with requests of all types.

DISCUSSION/RESEARCH

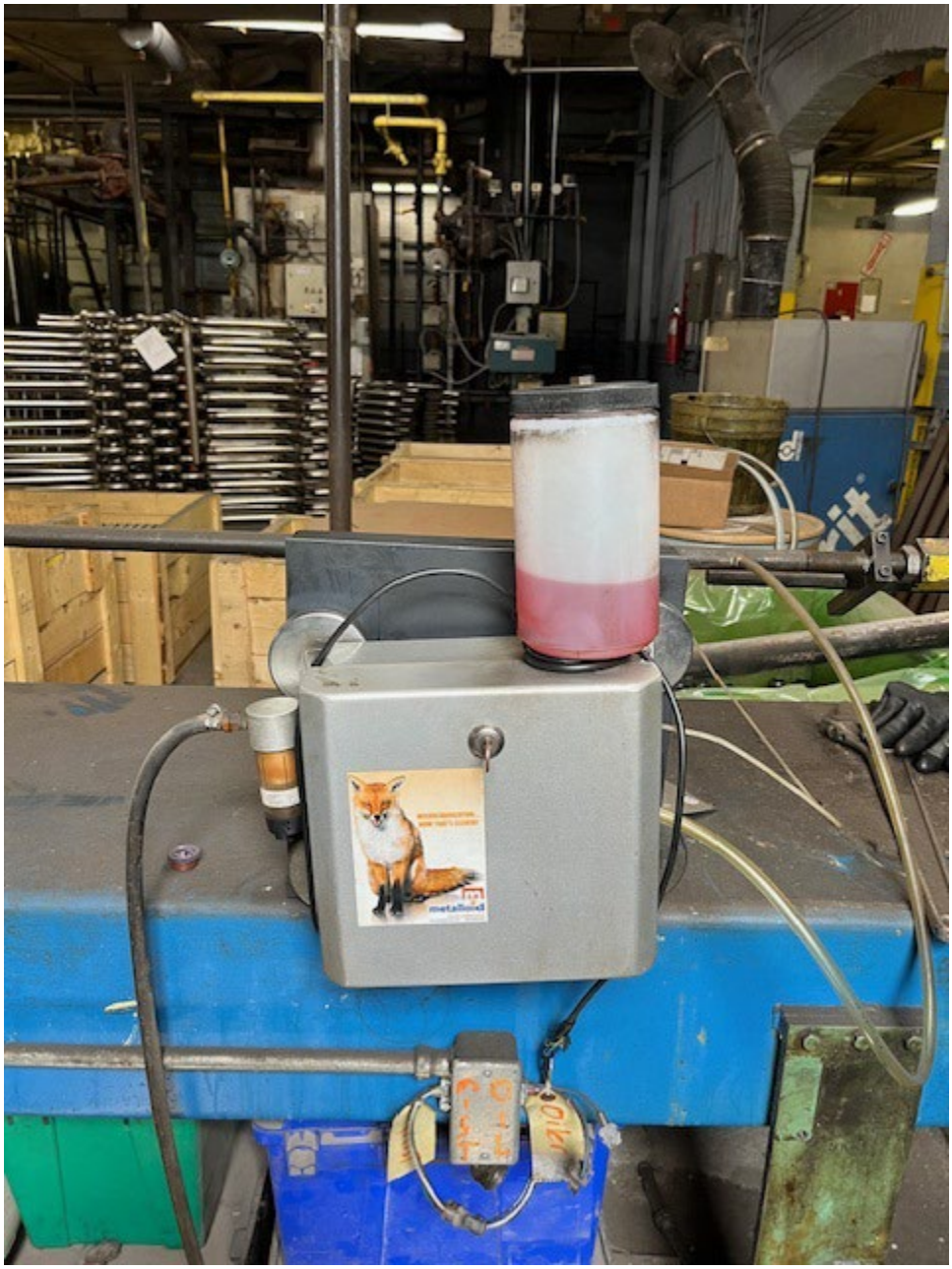
A current customer bends stainless steel tubing into serpentine configuration for use in the boilers they manufacture (figure 1). Customer was using Metalloids **METDRAW 5110** for their tube bending operations. The **5110** is a heavy-duty paste lubricant that is applied either through the mandrel rod with a pumping system, or manually applied to the inside of the tube with a brush.

The **METDRAW 5110** works very well for tube bending, and the customer was not having any bending issues. They did, however, need to hang the serpentine tubes up on a rack after bending to allow the excess bending lubricant to run out of the ends of the tube.

To solve the excess lubricant issue, we recommended microlubrication technology (MQL) for their mandrel lubrication, using our **Microlubricant ML-725**. This is accomplished using an MQL system (figure 2). This system supplies minimal lubricant through a 1/8" tube that runs inside the mandrel rod up to the mandrel, and also supplies air pressure to the mandrel rod to push lubricant through the lubricant supply holes on the mandrel. The microlubrication system is controlled by a signal from the bender control, and a precisely determined amount of lubricant is applied during each bend.

Figure 1

Figure 2



FINDINGS

Finding #1

Microlubrication with **ML-725** applied through an MQL system was successful at bending 2” diameter stainless steel tubing into a serpentine shape for use in their boiler units.

Finding #2

With minimal lubricant being applied during the multiple bend cycles, there was no more need to hang the tubes up to allow excess lubricant to drip out.

Finding #3

The amount of lubricant used in the bend process was greatly decreased and the bend area was much cleaner.

CONCLUSION

The use of Metalloids **Microlubricant ML-725** through a**n MQL system** was a success. The bent tubing met all their specifications, with a great reduction in the amount of lubricant being used, and the tubes no longer needed to be hung up to allow excess lubricant to drip out. The belief that a heavy-duty paste or oil lubricant is needed for successful tube bending is no longer true. The key is to apply the proper lubricant in the right amount at the correct time. This will result in lubricant savings and less mess from excess lubricant.