

Firearms

Case Study:

Firearms Machining: GARIA® 2600 M-12
Transforms plant economics

The Unique Challenge

An industry leading US firearms manufacturer, specializing in the precision manufacturing of the most accurate and dependable quality rifle barrels, was searching for opportunities to continually improve plant economics.

The plant's primary applications included gun drilling, reaming, and CNC machining. The plant manager was particularly targeting the gun drilling operation:

- **Equipment:** Pratt & Whitney 2-Barrel horizontal gun drill machines. Bar stock rotates as fixed drill is indexed into bar stock
- **Tool:** 4 foot long single flute carbide tipped drill
- **Work pieces:** 3 to 4 foot long alloy steels and 416 stainless steel bar stock
- **Current cutting oil:** high viscosity chlorinated straight oil

The primary objective was to raise the production rate by increasing the feed rate.

Additionally, the gun drilling operations suffered from high maintenance due to sticking pump valves, monthly pump failures, and regular replacement of cutting oil due to build-up of tacky residue.



Machining an AR-15 Barrel

The Houghton Approach

To address production improvement goals, Houghton recommended using GARIA® 2600 M-12, a chlorine-free, low viscosity cutting oil, to replace the high viscosity chlorinated oil in use in critical gun drilling and reaming operations. The trial produced exciting results.

Gun drilling operational improvements:

- **Productivity increased 87%:** Feed rate increased from 1.5 to 2.5 inches per minute. Parts production increased from 1500 to 2800 barrels per 12 hour shift
- **Tool life increased 61%:** Tool breakage went from 8 to 10 drills per 24 hours down to 3 to 4 drills in the same time period
- **Part quality improved:** 67% improvement in center placement of gun barrel drill hole end-to-end. (Reduced Total Indicator Reading from 0.030 to 0.010)
- **Built Up Edge reduction:** Significantly reduced number of ID rings removed in the subsequent reaming process
- **Surface finish improved:** Reaming operation produced parts with a glass-like mirror finish

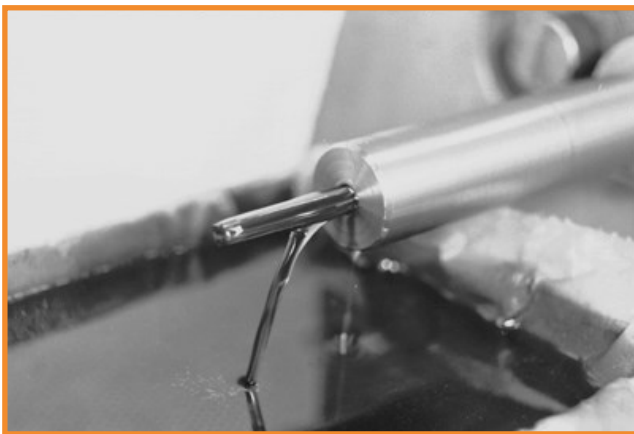
Additional overall operational improvements:

- **Increased machine up-time:** Low viscosity GARIA® 2600 M-12 eliminated sticking pump valves and monthly pump failures caused by the tacky oil residue left by the heavier viscosity cutting oil
- **Minimized waste disposal cost:** Switching to chlorine-free GARIA® 2600 M-12 eliminated disposal upcharges. (Chlorinated oils are considered hazardous waste.)
- **Reduced maintenance:** Both tool and machine tool beds were better protected in the absence of corrosive chlorides in high speed operations using GARIA® 2600 M-12
- **EHS:** Low-misting GARIA® 2600 M-12 improved plant cleanliness and safety

Fluid Partnerships Making A World Of Difference

Results and Benefits

- 87% increase in productivity
- 61% increase in tool life
- 67% improvement in center placement of gun barrel drill hole end-to-end
- Reduced maintenance: Corrosion-free machine tool beds, seals, and coatings. Reliable pump operation. Increased machine up-time
- No chlorine or heavy metals eliminates waste disposal upcharges



Bore Reamer Entering The Barrel

What our customers say...

"I've spent 34 years in the gun drilling and reaming industry. I've tried numerous drilling and reaming oils, but I've never seen an oil produce the productivity gains I've seen with the GARIA® 2600 M-12."

Customer Testimonial: Plant Manager



AR-15 Automatic Rifle

Established Client Relationships

Houghton International has long-standing partnerships with over

13,000 Leading Global Customers

servicing their metalworking fluids needs across a wide range of applications and diversified end-markets including **automotive, aerospace, fabricated metal goods, bearings, energy, non-ferrous and steel.**

For immediate consideration and evaluation of your fluids needs, and to request additional support material, please contact your Houghton International sales representative at houghtonintl.com/en-us/requestinfo.



Houghton International Inc.
P.O. Box 930 • Valley Forge, PA 19482-0930
Phone: 610-666-4000 • Fax: 610-666-1376
Contact: houghtonintl.com/en-us/requestinfo