

Memorandum

DATE: May 20, 1999
TO: Jay M. Bunting
Tim J. McCormick
FROM: Dale R. Danner
SUBJ: M/700 Titanium Investment Cast Receivers

Gentlemen,

Several months ago Jay Bunting and I had a brief discussion around lightweight centerfire rifle products and the acquisition of Ultra Lite Arms by Colt Manufacturing. This in turn caused me to again see if we could develop a lower cost version of the titanium cast M/700 receiver that was developed in 1998 by Glen Sietsema as a research endeavor here in Elizabethtown.

The research program was focused principally on demonstrating that there was no strength or galling issues with the Titanium alloy (Ti-6-4 – Titanium 6% Aluminum 4% Vanadium) with little focus paid to production cost. This effort was completed successfully and a final report on that effort is available.

The principle obstacle to transitioning the concept to a product was the high cost of finish machining and specifically the finish machining required on the interior of the receiver. Wire EDM was the method of choice during the research effort with costs approaching \$500 / piece. Through recent discussions with the casting vendor a broaching house has been identified with the background and capability required to broach titanium. To broach this investment casting alterations will be required to the mold. Given that the mold will have to be changed anyway I would propose further altering the exterior dimensions of the receiver to yield a "very near" netshaped part.

The resultant incoming receiver blank will require the following finish machine operations to complete the receiver:

- Feed Well Cuts / Magazine Opening (BDL or DM dependent)
- Fire Control Detail (including the cross pins)
- Bolt Stop Release Slot
- Drill and Tap all Threaded Holes
- Squaring and Thread Cut for the Barrel
- Roll Mark / Engrave / Serialize
- Minor Exterior Cleanup and Polish

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Titanium cannot be black oxidized but it can be painted, anodized, or powder coated. It is also possible to leave the material uncolored and allow it to develop a silver-gray oxide layer.

The incoming receiver blank will consist of the investment cast blank to net exterior dimensions, broached interior dimensions, heat treatment, and quality inspection (X-Ray, Zyglo void inspection, etc). Piece price will be \$71.75 with a setup charge of \$250 per lot for lots smaller than 1K pieces. No attempt at negotiation has been made with the vendor to this point – this was the initial quote.

Development costs of the mold alteration and broach will be \$13.5K. During the last budget revision I allocated sufficient Technology funding to cover the mold and broach as well as some very limited testing. I have indicated to Tommy Millner that I would solicit interest from Firearms Marketing and/or the Custom Shop before commitment of any resource or funding and that if there was no interest the proposal would be dropped.

Which brings me to the purpose of this letter and the obvious question. . . . Is there any interest in developing a M/700 product around a titanium receiver from either of your areas? If there is no opportunity here please do not hesitate to say so!!! As always I welcome your questions, suggestions, and comments.

Regards,

Dale

cc: T.L. Millner
M.R. Jiranek