

**Keeney, Mike**

**From:** Zajk, Joseph J  
**Sent:** Monday, August 09, 1999 4:02 PM  
**To:** Morgan, Metty E.; Golemboski, Matt R.; Keeney, Mike; Sietsema, Glen  
**Subject:** Model 710 Barrel Steel  
**Importance:** High

I just finished talking with Mark Sullivan of Republic Steel about the Model 710 steel we would like to use for button rifling. Based on his knowledge of our competitors' barrel steel, I asked him to quote the following basic material & process based on his recommendations:

**HEAT-TREATED OPTION**

**Steel:** 4140 Re-sulfurized  
**Diameter:** 1-5/16"  
**Process:** Cold Draw  
Heat treat (quench & temper) to Bhn 255-302; yields a tempered martensitic grain structure  
Turn to remove surface defects  
Stress relieve  
(as a second option, cold draw, Q&T, stress relieve)

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This would represent a high-spot cost for barrel raw material. Turning was recommended after Heat Treat to remove surface defects that could propagate during the button rifling process (I'm assuming due to the hoop stress the barrel is subjected to by button rifling, we'd have to confirm that).

**NON HEAT-TREATED OPTION**

**Steel:** 4140 Re-sulfurized  
**Diameter:** 1-5/16"  
**Process:** Cold Draw & Anneal

This would represent a low-spot cost for barrel material.

The first steel is based on what everyone else in the industry basically gets (there are some variations in the number of stress reliefs, etc). I think it would more closely resemble the finished barrel hardness on a hammer-forged barrel, but I need confirmation on that from Glen or Mike on what the 710 barrel hardness is after GFM and before induction harden. The second option would be the easiest to rifle and machine, but would have lower strength away from the induction hardened region. I don't know if that matters or not.

Either one of these processes should yield a blank that will button rifle well; the cold drawn/annealed-only version would be easier to machine.

Glen and Mike Please let me know which of the two versions you think will meet the 710 design specifications; or if there is another alloy/processing method that you think we should quote, please let me know that, too. If you wish to talk directly with Republic, you can talk with Mark Sullivan, at (800) 433-1242

Thanks,

Joe Zajk