

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



Xc: C. B. Workman  
P. G. Johnson

*[Handwritten signature]*

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" \_\_\_\_\_

*7/26 m/700*

Ilion, New York  
June 11, 1981

Norman A. Nielsen  
E. I. duPont deNemours, Inc.  
Experimental Station, Building E-304  
Wilmington, Delaware 19898

Dear Norm:

As I indicated in our telephone conversation yesterday, we periodically experience a problem with surface finish on our gun barrels which appears to be a result of the GFM barrel swaging operation. Remington's barrel fabrication process involves swaging of a cylindrical blank (either pierced or drilled) to size and shape on the GFM, machining to finish dimensions, and coloring in an NaOH solution. The problem manifests itself as surface blemishes which appear only after the final coloring and apparently can not be detected prior to that operation. The plant Process Engineering and Control (PE&C) Department (Phil Johnson) is responsible for the process. However, I have been consulting with them on possible causes and solutions to the problem and agreed to contact you to seek additional assistance. The barrel material is a low carbon steel containing approximately 0.55% C, 1.45% Mn, 0.25% Si, 0.15% Mo, 0.04% Max.P, and 0.08% S. If you need additional details, you may contact Phil Johnson on Ducom 2461-342.

A section of a barrel exhibiting typical surface blemishes is being mailed to you in a separate package. Please inspect that section and let me know if you feel that you can determine the cause of the problem. Potential causes include marks due to non-uniform polishing, variations in residual stress and/or composition, and/or an etching effect during the coloring operation. I propose use of the following analytical techniques to help identify the predominant cause:

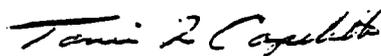
- 1) SEM to document the surface morphology,
- 2) Microprobe to determine compositional variations,
- 3) X-Ray to measure residual stresses, and
- 4) Light metallography to document microstructure.

Norman A. Nielsen  
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page 2

However, you have much more experience than I do in this area and I will rely on your judgement regarding what tests might be helpful in identifying the problem. Based on your initial inspection, we can discuss an objective and the required funding to support the investigation. I understand the procedure will require that you submit a Work Request for our approval.

We appreciate your help and look forward to your analysis of the problem.

Very truly yours,



Tami L. Capeletti  
Firearms Research Division

TLC:ws