

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

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"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

Ilion, New York
December 2, 1968E. SPARRE
BRIDGEPORTOPERATIONS COMMITTEE - PRODUCT SAFETY

At the November Operations Committee Meeting, the Ilion plant was asked to prepare a report on the current procedures used by the plant to assure a safe product. While the development of a new firearm requires interaction between designers and process engineers to assure quality in mass production quantities, this report covers only the internal control of current firearms. The Ilion plant maintains current control records for processes, procedures, specifications and standard practices which fill approximately 120 bound volumes. Samples of these controls are attached to this report along with a description of these logical consumer safety control points:

- . Raw Material Specifications
- . Raw Material Inspection and Control
- . Heat Treat Inspection and Control
- . Purchased Parts Control
- . Component Quality Control
- . Firearm Assembly Procedures
- . Gallery Testing
- . Firearm Final Inspection
- . Finished Gun Quality Audit

December 2, 1968

Raw Materials Specifications

Early in the design of a firearm, the designer and process engineers select the materials to be used for each component. This selection includes evaluation of strength, ductility, durability and appearance. Without sacrificing quality, the two groups optimize the material selection by considering price, ease of quality control and machinability or equivalent manufacturing ease. Following selection of a raw material, if a component affects customer safety or product function, a formal material specification is prepared (Exhibit A). This specification satisfies both the basic raw material industry standards and our own legal requirements. In cases requiring interpretation of acceptance test techniques, the specification refers to AISI or ASTM standards (Exhibit B).

Raw Materials Inspection and Control

All raw materials and most production supplies are statistically sampled by the Chemical and Metallurgical Control Department before release to production. Rejected material is disposed of in accordance with contract agreements, either as scrap or returned to the vendor. Test procedures are either according to Ilion Test Methods (Exhibit C) or ASTM standards.

Heat Treat Inspection and Control

Heat treat specifications are an integral part of the materials specification. However, standard practices have been established to assure uniform quality (Exhibit D). Furnace control settings and heat treat cycles are tailored for each lot of steel to satisfy specifications. The Production Section, using the process record, statistically samples each load of work from each furnace. Hardness testing machines used by Production are calibrated bi-weekly. Verification hardness tests and destructive strength tests are performed by P E & C. P E & C instruments are calibrated by the manufacturers semi-annually. Inspection results are entered in a permanent record by Production and acceptable product is approved by P E & C.

Purchased Parts Control

Most firearms components are purchased. These include large quantities of non-critical springs, screws and firearms attachments. Critical purchased components such as pistons, seals, action bars and magazines are statistically sampled. Disposition of a rejected lot is negotiated.

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Component Quality Control

In the manufacture of firearms components at Ilion, each production operator is responsible for maintaining the required level of quality established and proven for each operation he performs. This responsibility includes machining, heat treat, wood and metal finishing, coloring, assembling and packaging. In all cases, the Process Record (Exhibit E) establishes operating procedures, tolerances and gaging requirements. While the amount of time expended on inspection by production personnel varies with the job assignment or process complexity, the direct production people at Ilion spend approximately 11% of their time inspecting their work.

The level of quality attained by Production is measured and analyzed by the Quality Control group of the P E & C Section (Exhibit F). Their analysis frequently results in gun design change, tolerance changes or process revisions. The Area Auditors measure approximately 175,000 dimensions per year.

Firearms Assembly Procedures

Purchased parts and manufactured components are fitted into both assemblies and sub-assemblies identified by the assemblers personal stamp. Precise written procedures are prepared for the assembly of firearms. In addition to checking the quality of finishes and the fit of parts and overall appearance, each gun is functioned with dummy ammunition and master plugs to measure capability to handle the extreme range of ammunition sizes. Head space is measured. The approximately 1000 head space gages at Ilion are serially numbered and periodically inspected. Suspect gages are destroyed and replaced.

Gallery Testing

Following assembly, the P E & C Section subjects all firearms to a series of firing tests. All center fire rifles and shotguns are proofed and so stamped on the barrel. In addition a series of functional and accuracy tests establish the capability of the firearm to handle both Remington and competitive ammunition in various loads or bullet weights. The Ilion Gallery fires approximately 8,000,000 rounds of ammunition each year. Firearms which do not pass the gallery tests are returned to the assembler for repair. Passed guns are routed to the finished gun inspector prior to packing.

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Finished Gun Inspection

Finished gun inspection includes an evaluation of overall appearance, a recheck of head space and manual operation of the firearm. The inspector also measures trigger pull and evaluates the feel of the trigger and adequacy of the magazine and safety. By this stage of production, the average gun has been subjected to 1,306 dimensional checks, 100-300 manual tests, 125 metallurgical tests and has 18 identifying test or inspection marks (Exhibit G).

Finished Product Audit

Between final inspect and pack, each product line is subject to a random audit. The sample size each month is 1% of the production or 30 guns, whichever is larger. Finished gun audit in 1968 will include approximately 6,500 guns (Exhibit H). For each model, a finished gun quality audit procedure is prepared which precisely identifies each test to be performed and performance level expected. Failure to attain desired levels of appearance or performance subjects a firearm to demerits according to an exact rating system. Deficiencies are scaled from 1 to 100 demerits. 100 Demerits are charged to any failure affecting the safety of the shooter. 100 Demerits items command immediate corrective action to all guns in process or in the warehouse. Production is resumed when the problem is solved.

R. A. Williamson

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Plant Manager

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Attach.