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RESEARCH & DEVELOPMENT TECHNICAL CENTER
315 WEST RING ROAD
ELIZABETHTOWN, KY 42701

TLW 1005

M/1100
COMPETITION MASTER™
12 Gauge Shotgun

Design Acceptance Test (DAT #1)
Test Plan

Project # 241299

Revision # 1.0

12/17/02

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M/1100 CM 12 Gauge Shotgun DESIGN ACCEPTANCE TEST PLAN - DAT #1

Introduction:

A test sample for the Design Acceptance Test (DAT) consisting of twenty (20) shotguns is scheduled for delivery in November 2002. An additional four (4) M/1100 standard shotguns will be made available to be used as control guns.

After completing basic measurements and inspections on the shotguns in the sample, a 200 round per gun jack-function test is planned for all test shotguns in the sample using a variety of ammunition to determine the probable malfunction rate and determine if the expenditure of additional ammunition for testing is justified. This test will be followed by a 100 round live fire test shot in the long range from the shoulder in a standing position using a variety of ammunition.

After completing the shoulder-fired function test, a random selection of 10 shotguns will be shot for Patterns using selected 12-gauge ammunition. The point of impact will be determined for the patterned shots. This will be followed by an extended function and endurance test on a selected number of test shotguns.

A selection of sample shotguns will also be tested under various environmental conditions.

Finally, a sample of shotguns will be tested under various conditions of intentional abuse.

Initial Inspections, Measurements and Tests:

TLW1005A -Incoming Parts Inspection:

Component parts for the Model 1100 CM will be measured for critical dimensions prior to assembly of the DAT sample shotguns. Records of the measurement results will be made available for inclusion in the DAT report. The parts used to fabricate the DAT sample shotguns must meet the model drawing for dimension and/or for specified characteristic or the drawings will be changed accordingly prior to transmittal to production. Design will provide a list of part drawings and associated dimensions/characteristics to be inspected.

TLW1005B -Measure Headspace:

All test sample shotguns will be measured for headspace before being tested in either the jack or shot from the shoulder. The barrel, bolt, and the receiver will be inspected for the presence of dirt or debris. Special attention will be paid to the chamber, bolt face, locking block & locking notch areas. Headspace measurements can be affected by the presence of dirt and debris. If dirt or debris is found, clean the shotgun before using the gauges.

Note that excessive headspace can result in blown case heads and/or split cases which can allow high pressure gases to escape in the chamber area potentially throwing debris in the shooters direction. Headspace that is below minimum specifications may result in the shotgun failing to lock-up. A firearm with the headspace out of specification can also result in other functional problems such as hard closing, misfires, poor extraction, etc. (See S.A.A.M.I. Technical Committee Manual Volume VIII, Shotgun, Sections 8-80.01-.02 Rev. 3/23/94.)

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Method:

- Graduated headspace gauges will be used and the headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge. The 12-gauge chamber for the Model 1100 CM will be found on drawing D-240355 and will be used for referenced chamber dimensions. (Note that: If graduated headspace gauges are not available then, as a minimum, use Min/Max headspace gauges to assure that the shotguns are at least within headspace specifications.)
- The headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge.
- If the measurement is taken at the start of the test then headspace should be less than or equal to Min. + .007" (note that some of the M/1100 shotguns received from production were in excess of this specification and are noted on other documentation.)
- As the test progresses, headspace will be taken as designated by any specific test in the plan and in addition, at each scheduled "Safety Inspection" as well as at each "Clean & Inspect" activity scheduled by the test plan.
- The headspace readings for each firearm at each inspection will be recorded on the "Daily Test Data Sheet" to be kept with each firearm in the accompanying data packet.
- For any firearms where the headspace appears to be increasing at each inspection point the firearm will be withdrawn from test and examined for the probable cause.
- In no case will any shotgun in the test program be allowed to continue in the test if the headspace exceeds Min. + .013"

Data Required:

- Shotgun serial number
- Headspace measurements for each sample
- Testers' Names
- TLW Number

TLW1005C -Proof Test:

As a safety precaution the Proof Test procedure will be completed before test lab personnel can use the firearm for any additional firing tests.

All test sample firearms will be subjected to a standard 12-gauge Definitive Proof load shot in the blow-up room using lanyards. Because of the higher pressures involved in shooting proof cartridges, adequate precautions, both mechanical and procedural, must be taken to protect personnel performing the firearms proof testing. To this end, the firearm should be securely mounted, completely shielded from the operator and firing accomplished by a remote control method such as loading the chamber and firing by use of lanyards.

Any firearms components, such as bolts, bolt heads, receivers including chambers, etc. which were previously subjected to proof testing and, which subsequently, have any proof sensitive components changed, altered, or substituted, should be re-proofed.

Method:

- Record headspace before proof testing *see previous procedure "TLW1005B Measure Headspace."*
- Before proof testing the firearm should be inspected for:
 - Barrel Obstructions
 - Bore and chamber are free of grease or oil and other debris.
- After firing the proof round, the firearm will be carefully examined to determine if any damage to the product has occurred due to exposure to the proof pressure
- This inspection includes:
 - Visual inspection for damage
 - Damaged receiver, locking block or bolt.
 - Bulged chamber or bore; split, cracked or otherwise damaged barrel, with special attention to the locking notch in the barrel extension.
 - Broken stock.
 - Any other part subjected to the proofing stress, which can be visually examined for damage.
 - Any "suspicious" areas should be submitted to magna-flux inspection before proceeding.
- The fired proof round should be examined to determine that no firearm fault has introduced round failure, such as:
 - Expanded case head.
 - Excessive roughness, rings, or bulging, which would affect extraction.

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- Beginning separation or material stretching in front of the case head indicating excessive headspace or excessive pressure as stated above.
- Any cartridge case failure indicating a firearm fault.
- In addition, the spent proof round should be examined for the presence of unusual deformation, split case or split head, and for any evidence of a pierced primer. Any of these conditions may be indicative that high-pressure gases may have vented into the action where other damage to components may have occurred.
- Take note of any indication of significant gas leakage. If present, it may indicate that the firearm was not subjected to full proof pressures and the proof test would then be invalid and would require re-proofing.
- A firearm is only properly proofed when the cartridge has been fired without evidence of significant gas leakage.
- Save the spent proof case in a Zip-Lock plastic bag and label and place in the data packet for possible future reference. If any parts were broken or otherwise damaged, place these parts in the same bag as the proof case and label. Place a warning label on the firearm and withdraw the firearm from the test.
- Each sample firearms' headspace (see following procedure "TLW1005D, Re-Measure Headspace after Proof") must remain in range from min. to min. + 0.009" (this is to allow for normal growth due to wear before reaching extreme Max.) after proofing, with no individual firearm's headspace to grow more than .002" after firing one proof round.
- After successful proofing without observable damage and the headspace is within allowed specifications, stamp the barrel with an authorized Proof stamp. Locate the proof mark on the right rear of the barrel in the specified location for the Remington proof stamp. **DO NOT STAMP** if the headspace exceeds Min + .013". If this is a barrel that has previously been proofed and already has a Remington proof mark, do not re-stamp.

Data Required:

- Shotgun serial number
- Record and note any headspace growth and the corresponding round level.
- Record significant gas leakage and/or firearm damage
- Record any case damage or other ammunition related malfunctions.
- Record any damage to the firearm resulting from the proof test. Document with photographs if necessary.
- TLW Number
- Testers' Names

TLW1005D -Re-Measure Headspace after Proof

All test samples will be re-measured for headspace after proof and before being tested in either the jack or shot from the shoulder. The chamber, bolt face, locking block and locking notch will be inspected for the presence of dirt or debris. If dirt or debris that could affect headspace measurement is present then these areas of the firearm will be thoroughly cleaned before using the gauges.

Method:

- Graduated headspace gauges (if available) will be used and the headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge. The 12-gauge chamber drawing D-240355 will be used for referenced chamber dimensions.
- The headspace measurement taken prior to the proof test should be less than or equal to Min. + .007". (See previous note under Measure Headspace.) If, after proof, the growth of the headspace is more than + .002" from the pre-proof condition, then stop and review the results with the test manager before continuing to the next phase of the test.
- In no case should the measurement for headspace after initial proof test be greater than min. + 0.009" for a new firearm.
- If at any time during the test program the headspace exceeds an extreme maximum of Min. + .013" do not continue to fire the shotgun, tag the gun with a label reading "Do Not Shoot This Firearm - Exceeds Maximum Allowable Headspace" and return the firearm to the Test Manager for proper disposition.

Data Required:

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- Shotgun serial number
- Record and note any headspace growth and round level.
- TLW Number
- Testers' Names

TLW1005E -Measure Trigger Pull Forces:

Trigger pull (force required to manually operate the trigger)

Method:

- Trigger pull is to be performed to the SAAMI standard, with a horizontal pull at the center of the finger radius of the trigger with force measured parallel to the bore.
- Use the Dvorak trigger pull device to make these measurements. Note: if Dvorak trigger pull device is not setup for the model 1100 then the spring scale may be used to make these measurements.
- Three pulls are to be taken on each sample shotgun and the results averaged.
- A printout of the force/distance curve will be retained for record.
- The average force for the three trials must be between 3-1/2 lb. and 6-3/4 lb. for each shotgun. (Ref: *Ilion Process Record, Operation, 725, M1100 Final Assembly, Step 12D*) The (3-trial average) minimum trigger pull force must not be below 3.0 lb. force for any sample - (This is the established S.A.A.M.I. minimum for trigger pull force for non-target type guns.) (Ref: *SAAMI Technical Manual Vol. VIII, Shotgun, Section 8-170.01, issued 9/21/78*)

Data Required:

- Shotgun Serial numbers tested
- All three trigger pull force data points for each sample shotgun
- The average of the three measurements for each sample shotgun
- A force/distance curve from the Dvorak system (use the third trial) for each shotgun tested.
- TLW Number
- Testers' Names

TLW1005F -Measure Bolt Opening Force / Bolt Release Closing Forces (for information only):

The force required to open the bolt (using the operating handle) and close the bolt (i.e. the force required to push on the carrier release to close the bolt) will be measured for each sample. Both of these forces will be taken with the chamber empty and then repeated, this time with a new dummy round in the chamber. There is not a specification for these forces and the readings will be taken for information only.

Method:

Bolt Opening Force (chamber empty)

- Lock the firearm in a horizontal position, (i.e. shooting position) before taking the measurements.
- Locate the shotgun in vise and/or other fixture and securely lock in place, (it may be necessary to clamp the fixture and/or holding device to the bench if not already securely fixed in place.)
- Check to be sure the shotgun contains no live ammunition in either the chamber or in the magazine tube.
- With the chamber empty and the bolt closed, use the Chatillon gauge (0-50 lb. range) and locate the hook of the force gauge at the point on the operating handle at the approximate center. Pull the gauge straight back and parallel to the bore, measure the force required to open the bolt.
- Take three readings for each gun in the sample.

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- Record all three readings.

Bolt Close Force (chamber empty):

- Lock the firearm in a horizontal position, (i.e. shooting position) before taking the measurements.
- Locate the shotgun in vise and/or other fixture and securely lock in place. (it may be necessary to clamp the fixture and/or holding device to the bench if not already securely fixed in place.)
- Check to be sure the shotgun contains no live ammunition in either the chamber or in the magazine tube.
- With the chamber empty and the bolt closed, use the Chatillon gauge (0-50 lb. range) and locate the rod of the force gauge at the point on the carrier release button at the approximate center. Push the gauge straight up and perpendicular to the bore, measure the force required to release the bolt so that it closes on the chamber.
- Take three readings for each gun in the sample.
- Record all three readings.

Bolt Opening & Bolt Closing Forces (dummy round in chamber)

- Repeat the above procedures, this time with a new, unused dummy round in the chamber.

Data Required:

- Shotgun serial numbers used for this test.
- Each of the three readings taken for each of the 4 states (i.e. opening force and closing force and with and without a dummy in the chamber) for each test sample.
- The average of each set of three measurements per each of the 4 states.
- TLW Number
- Testers' Names

TLW1005G -Function Check of ISS:

To check the ISS System for proper function perform the three-step procedure that follows. If the system fails during any of the steps stop the test for that gun and continue with the next sample. To be considered a proper functioning ISS system each sample must pass all three of the steps outlined below. For proper operation of the ISS system refer to "Remington Instruction Book Supplement To Be Used with the following Instruction Book Model 1100. (Remington Form RD 7054, Orig. 10/99)

Note: Start this procedure with the gun empty, the bolt locked open, the safety in the "On-Safe" position (red band not showing), and the ISS White pointer lined up with the Red dot.

Method:

1. Make sure the chamber and magazine tube are completely empty of live ammunition.
 - With the bolt in the locked open position and safety in the "On-Safe", using the ISS key, lock the ISS System in the secure mode (White pointer lined up with the White dot -See Pictures, Fig. 1) and then remove the key.
 - Push the carrier release to close and lock-up the bolt
 - Attempt to push the safety to the "Off-Safe" position. With the ISS system engaged you should not be able to push the safety to the "Off-Safe" position. If the safety can be pushed from the "On-Safe" position to the "Off-Safe" position then the test fails.
 - Attempt to pull the trigger. The hammer must not fall. If the hammer releases and falls then the test sample fails the test.
 - Record outcome of steps taken.
2. If the test sample passes the above test then perform the following procedure.

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- Start with the safety in the "On Safe" position and ISS system in the locked position (**White** pointer lined up with the **White** Dot - See Figure 1).
 - Unlock the ISS System (**White** pointer will be lined up with the **Red** dot visible on the side of the housing - See Figure 3) using the ISS key.
 - Place the Safety in the "Off Safe" position (Red band showing - See Figure 2) and pull the trigger. The hammer must fall. If the hammer does not fall then the test sample fails.
 - Put the Safety in the "On" position.
 - Record results.
3. If the system passes both tests above then perform this procedure:
- Make sure the gun is completely unloaded.
 - Open the bolt to the rear, locked open position and put the safety in the "On Safe" position, if not already in the "On-Safe" position.
 - Rotate the ISS to the locked position (**White** pointer lined up with the **White** dot - See Figure 1) using the ISS key.
 - Remove the ISS key from the ISS keyhole.
 - Attempt to unlock the ISS first using your fingers and then using a small flat bladed screwdriver. You must not be able to unlock the ISS System with anything except the ISS key. (Be careful, do not use excessive force when using the screwdriver, you just want to determine that the system will not unlock without the use of the key.)
 - Record results.

Data required:

- Shotgun serial number
- Record results for all steps of the ISS System function check.
- Record Testers' Names
- Record TLW Number.

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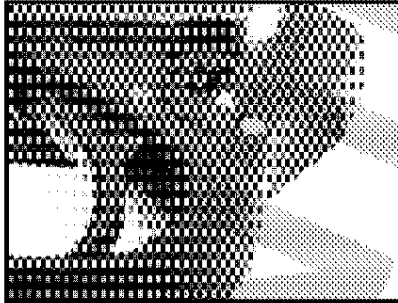


Figure 1 - ISS locked, safety in "On-Safe" Position

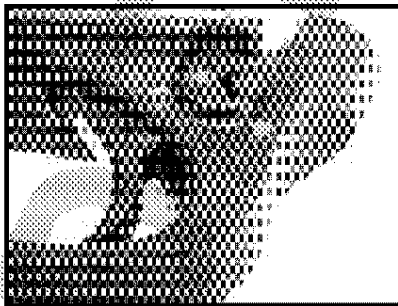


Figure 2 - ISS unlocked, safety in "Off-Safe" position

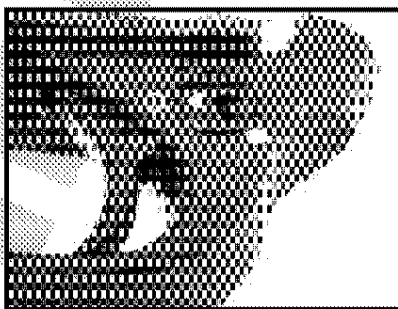


Figure 3 - ISS unlocked, safety in "On-Safe" Position

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TLW1005H -Measure Firing Pin Indent:

The firing pin indent will be measured for each of the sample shotguns using SAAMI qualified copper indent crushers. The average of three trials per sample shotgun will be calculated. The Average of three indents must be equal to or greater than 0.012" (see SAAMI Technical Committee Manual Volume VIII, Shotgun, Section 8-50.03, Issued 9/21/78).

Method:

- Using copper indent crushers (see SAAMI Technical Committee Manual Volume VIII, Shotgun, for proper crusher indent specification to use for this test) "burnish" both ends of the crusher slug by gently rubbing both ends on the granite base of the dial indicator stand (use outside edge of the plate, not the top working surface.)
- Place the copper indent crusher in a 12-gauge shotgun crusher holder (for crusher holder specification see SAAMI Technical Committee Manual Volume VIII, Shotgun, Section 8-50.05, Revised 5/28/02). Place the crusher holder on the base of the dial indicator and zero the dial indicator with the point of the indicator in the approximate center of the crusher. Remove the crusher from the crusher holder.
- Carefully, with the gun held so that the muzzle is pointed down toward the floor, gently insert the firing pin indent crusher into the chamber.
- While maintaining a firm hold on the bolt handle, gently and slowly ease (do not release) the bolt forward until it is firmly seated in the full forward position.
- Holding the firearm in a horizontal and level position, and pointing the firearm in a safe direction, pull the trigger until the firing pin releases.
- Carefully open the action and remove the crusher indent, being careful not to drop the copper crusher, which might potentially nick the edge.
- Return the crusher in the holder and place under the dial indicator. (For specifications for the dial indicator, dial indicator point and measurement position specifications see SAAMI Technical Committee Manual Volume VIII, Shotgun, Section 8-50.02, Issued 9/21/78.)
- Move the crusher holder so that the point of the dial indicator finds the deepest portion of the firing pin indent.
- Record the dial indicator reading to the nearest .001".
- Repeat procedure two more times and record the dial indicator readings using a new copper crusher for each trial.
- Each firearm sample should have three readings that will be averaged.

Data Required:

- Shotgun serial number
- Each of the three trial indents
- The calculated average indent by shotgun
- Record all three readings for the data file
- TLW #
- Testers' Names

TLW1005I -Magazine Capacity Test:

The purpose of this test is to assure that each magazine can be fully loaded to a magazine's designed capacity. The Model 1100 CM, 12-gauge Shotgun must be able to accept 8 rounds in the magazine.

Note that this model is chambered for 2-3/4" shotgun shells only. This test will be performed using 2-3/4" dummy rounds only.

Method:

- Check the firearm's chamber and magazine for the presence of live ammunition. The firearm must not contain any live rounds.
- Make sure the safety is in the "On-Safe" position.
- Hold the test shotgun in a horizontal position and the muzzle pointed in a safe direction, close the bolt over an empty chamber.
- Load 8 dummy rounds into the magazine.

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- Cycle the 8 dummy rounds through the chamber and eject each round manually. do not pull the trigger between rounds.
- Proceed to the next test shotgun and repeat the test procedure.

Data Required:

- Shotgun serial number.
- Record any failures to load and cycle properly by shotgun.
- TLW Number
- Testers' Names

TLW1005J -Safety Operation (SAAMI Test):

This S.A.A.M.I. required test measures the operation of the manual safety to determine if the force required to move the safety from the "safe" to the "fire" position is less than 1 lb. In addition, an examination of the safety is made to determine if the "fire" and "safe" position of the safety are clearly discernible to the user. Finally, a 40 lb. load is applied to the trigger from several directions with the safety in the "on" or "safe" position to determine that the mechanical operation of the safety is not impaired.

Method:

- Inspect and verify the shotgun is not loaded and the safe is in the "On-Safe" position.
- Close the action.
- With the shotgun's safety in the "On-Safe" position, use the Chatillion 10 lb. gauge with a "V" notch attached and carefully push the safety to the "fire" position and measure the force required to move the safety. Perform 3 trials for each shotgun and record all three force measurements. These will be averaged to determine the final force measurement for each shotgun.
- Make a specific observation as to the location of the "on-safe" and the "fire" positions and determine if there is a discernible "detent" detectable when the safety is moved between the two positions. Record the observation that there either is or that there isn't a discernable "detent" for each sample shotgun.
- Finally, lock the shotgun securely in a holding device and proceed to apply a 40-lb. load to the trigger. Place the Chatillion 50 lb. gauge v-notch in each of four locations from the front (or as close as you can get from the front.) Then from the rear of the trigger (or as close as you can get from the rear). Finish by applying the 40 lb. load to the trigger, first from the left side and then from the right side) in turn and apply a 40-lb. load. In each application of the 40-lb. load, placement of the load should be at about the center of the finger curve of the trigger. After each application of the load test the fire control mechanism by attempting to pull the trigger with the safe in the "on-safe" position and the shotgun pointed in a safe direction. Gun must not fire. Push the safety to the "fire" position. Gun must not fire when the safety is moved to the "fire" position. Finally, with the shotgun still pointed in a safe direction, pull the trigger, the hammer must release to the fired position.

Data required:

- Shotgun serial number
- Measurements of Trigger pull, engagement, over-travel and trigger/trigger guard clearance before and after loading.
- Note that the shotgun "fired" or did not fire when the safety was pushed to the "Fire" position.
- Note that the shotgun did "fire" when the trigger was pulled.
- TLW Number
- Testers' Names

TLW1005K - 40 lb. Trigger Pull Test (Remington Test):

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This test is conducted to determine if the safety mechanism will release the trigger mechanism and cause the firearm to discharge if the shooter pulls the trigger intentionally or accidentally with the safety in the "On-Safe" position. In addition, sufficient force is applied to the trigger with the safe in the "On-Safe" position to assure that the trigger dimensions or shape will not change thereby affecting hammer/sear engagement.

Method:

- Inspect and verify the shotgun is not loaded and the safe is in the "On-Safe" position.
- Measure the trigger pull.
- Close the bolt.
- Locate the firearm in a horizontal position with the muzzle pointed in a safe direction.
- Using the set of plug gauges determine the amount of minimum clearance between the rear of the trigger and the inside rear of the trigger guard. This dimension will be used as a reference to determine if the loading in the next steps has deformed the trigger.
- With the safe in the "On-Safe" position, "load" the trigger with the equivalent of a 40-lb. weight using the Chatillon 0-50 lb. digital force gauge.
- Remove the load from the trigger.
- Move the Safety to the "Fire" position; the shotgun must not discharge.
- Return the Safety to the "On-Safe" position.
- Carefully remove the shotgun from the holding device and with the muzzle pointed in a safe direction, pull the trigger. The hammer must fall.
- Using the plug gauges measure the minimum clearance between the rear of the trigger and the inside rear of the trigger guard with the firing pin fully cocked.
- Measure the trigger pull to insure that it has not changed from the beginning of the test.

Data required:

- Shotgun serial number
- Measurements of Trigger pull, engagement, over-travel and trigger/trigger guard clearance before and after loading.
- Note that the shotgun "fired" or did not fire when the safety was pushed to the "Fire" position.
- Note that the shotgun did "fire" when the trigger was pulled.
- TLW Number
- Testers' Names

TLW1005L -Live Round Extraction:

This test will ensure that the shotgun, as designed, will successfully extract live rounds from the chamber. This test uses a selection of Remington and competitor's 12-gauge 2-3/4" shotshell rounds. Each ammunition type used will be cycled at least two cycles for each type through the firearm, each cycle consisting of a full eight (8) round load in the magazine. All rounds will be fed from the magazine.

CAUTION! -

- This test will involve the use of live ammunition.
- Use Safe Gun handling Safety Procedures.
- Do not leave live rounds in the belly protectors after completion of the test procedure!
- This test must be done with the muzzle in the shooting port anytime live rounds are present in the firearm.

Method:

- Clean all spent rounds from the belly-protector that will be used to conduct this test.
- All live rounds will be collected after live round extraction and returned to inventory unless damaged by the test procedure.

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- Place the test shotgun in the shooting port with the butt located in the saddle of the test jack.
- Make sure that the safety is in the on safe or ("On-Safe") position throughout this test.
- Select eight (8) rounds of the first type of ammunition.
- Load the eight (8) rounds into the magazine.
- Load the first round into the chamber by releasing the carrier latch. Make sure the bolt is the fully locked position.
- Do not fire the shotgun.
- When ready draw the bolt slowly to the rear. The round must be extracted from the chamber and ejected from the receiver. Repeat slow extraction with the 2nd round, and then repeat with the 3rd round.
- For rounds 4, 5, and 6 close the bolt by pressing the carrier release, and then open the bolt at a "medium" speed.
- For rounds 7 and 8 open the bolt "smartly & quickly".
- Repeat this eight (8) round cycle with the same type of ammunition.
- Collect and account for all extracted rounds from the bottom of the belly protector.
- Repeat the preceding process of slow, medium, and fast extraction for each of the other ammunition types.

Data Required:

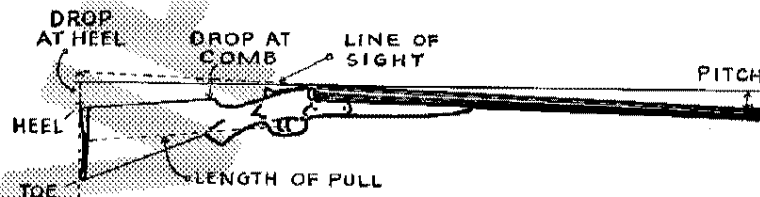
- Types of ammunition used for the test
- Test Jack used for test.
- Results of each trial by round number, ammunition type and feed/extraction rate (i.e. "slow", "medium", or "fast")
- Shotgun serial number
- TLW Number
- Testers' Names

TLW1005M -Measure Miscellaneous Shotgun Characteristics:

Several standard shotgun characteristics will be measured for this portion of the evaluation. The overall length of the gun, the pitch, the stock drop at the heel and drop at comb.

Method:

- To measure gun length use the standard S.A.A.M.I. procedure as outlined in SAAMI Technical Committee Manual Vol. VIII, Shotgun, Section 8-40.02, Issued 9/21/78. The drop/pitch board may used to facilitate making this measurement.
- To measure drops and length of pull use the pitch/drop test board and standard measurement procedures. Use TLW1005 – Figure 1 – below for reference.



TLW1005M - Figure 4 – Diagram of Pitch, Drop and Length of Pull

TLW1005M -Measure Weight of Shotgun:

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The overall weight of the shotgun will be taken and recorded. The average weight of ten guns in the shotgun sample and the weight's standard deviation for the shotgun sample will be calculated and recorded.

Method:

- The shotguns will be weighed with the chamber empty and the magazine empty and without the additional ammo storage belt (i.e. the "side saddle") attached to the side of the receiver.
- The shotguns will also be weighed with dummy rounds in the ammo storage belt, a dummy round in the chamber and 8 dummy rounds in the magazine for comparison to an 'empty' shotgun.
- Use the digital scale located in the Metrology Lab – Mettler Toledo SM34-K DeltaRange®, Ser. Num. 2115047651
- If not already on, turn digital scale on; (Note: if scale needs to be turned on, allow scale electronics to warm up approximately 15 minutes before use); zero-out the scale.
- Carefully place shotgun on scale and round the readout to the nearest 0.01 lb. for each of the two conditions.

Data Required:

- Shotgun serial numbers
- Measurements of each shotgun's weight (in lb.) under each condition and listed by serial number
- The calculated average weight and the calculated standard deviation for the shotgun sample.
- Testers' Names
- TLW Number

FUNCTION & ENDURANCE TESTING:

TLW1005N -Basic Jack Function Test (to 208 Rounds):

To get a picture of the product's functional capability, a 204 round per shotgun jack function test will be conducted. All test sample shotguns and control guns will be used for this test.

The test will be conducted in the test jacket with the "belly-protectors" in place and fully closed for each shot. All malfunctions and any unusual behavior will be noted on the data forms. The expected maximum average malfunction rate for new shotguns is 4% total (see SAAMI Technical Committee Manual, Volume VII, Shotgun, 8-60.01, issued 9-21-78). In no case should the average malfunction rate for this shotgun type exceed 4%.

Up to four shotguns from the sample of 20 (i.e. ~20% of the submitted sample) can be removed from the averaging process if they have excessive malfunction rates (i.e. more than 5% difference than the group average of the shotguns that are within the 0%-4% malfunction rate limit) relative to the remaining group of 16 samples. These shotguns will be investigated by engineering to determine the probable source of the problem and engineering will then provide written documentation for possible inclusion in the DAT report. Guns pulled for examination/repair should be retested after repair to confirm that the malfunction rate is now at or below the specified malfunction rate.

In addition to the 4% maximum average overall, the following limits (for the entire sample) are established: (see SAAMI Technical Committee Manual, Volume VII Shotgun, 8-60.01, issued 9-21-78).

Misfeed – all types	2%
Extractor – Ejection	2%
Failure to Lock Open	
after last round	1%
Total Malfunction	4%

No major mechanical failures are allowed in the test sample. Major mechanical failures are defined as those failures that cannot easily be repaired with simple tools and/or readily available replacement parts. At the conclusion of this test the firearms will be carefully examined for signs of excessive wear, especially with respect to any of the plastic components that may be present, signs of damage or potential failure.

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Note that evaluation will be combined with the results of the following test, shoulder function test.

Method:

- Draw ammunition from stores.
- The muzzle of each shotgun will be inserted into the shooting port and the shotgun placed securely in the test jack before the shotgun is loaded. For the first hundred rounds use the heavy side of the jack.
- Close the bolt over the empty chamber.
- Choose the first ammunition type per the Ammunition Schedule.
- Load eight (8) rounds into the magazine.
- Cycle the bolt to feed the 1st round into the chamber.
- Push the safe to the "off-Safe" position; be sure that the barrel is far enough within the porthole so that the muzzle will stay in the port when the shotgun recoils. If there is any question, re-adjust the jack into a better position.
- Note that the port opening will need to be modified to accept the magazine tube extension.
- With the lid on the belly protector closed, fire the first round in the chamber, listen for any off-sounds, and be alert for any other unusual behavior.
- Note any extraction or ejection problems.
- Continue to fire the remaining rounds in the magazine until the last round is fired.
- Push the Safety to the Safe position. Note that the safety will be pushed to the fire position at the start of every eight (8) round trial and will be pushed to the On Safe position at the end of every eight (8) round trial.
- After firing 104 rounds the shotgun will be checked carefully for the presence of any live ammunition and if empty will be removed from the test jack and placed in the cooling rack. The safety will be placed in the "On Safe" position and the bolt will be unlocked and fully open at all times. Compressed air may be used, if necessary, to cool the inside of the chamber area if the shotgun is excessively hot from firing.
- After cooling, the second cycle of 104 rounds will be fired in the shotgun to complete the test. For the second 100 rounds use the light side of the jack. Repeat the cycle according to the attached Ammunition Schedule.
- All malfunctions will be recorded on the data sheets.

Ammunition Schedule for the Basic Jack Function Test

Note: use Lead shot rounds only

Round	Manufacturer	Type	Code	RAC
1-8	Remington	High Velocity Game Load	HV12-6	20065
9-16	Remington	Premiere Target	STS12LH-8	20252
17-24	Remington	Gun Club Light Target	GC12T-8	20230
25-32	Remington	Express Mag. Buckshot	12SB00	20632
33-40	Remington	Heavy Field Load	RP12H-8	28120
41-48	Remington	Sluggo Rifle Slug	SP12RS	20300
49-56	Winchester	Target Load	AAST12-7	
57-64	Winchester	Light Target	AA12-7-1-2	
65-72	Winchester	Rifle Slug	X12RS15	
73-80	Winchester	Rifle Slug	X12XC-5	
81-88	Federal	Magnum	F130-BB	
89-96	Federal	International	N110-7-1-2	
97-104	Federal	Gold Metal	S113-9	

Data Required:

- Shotgun serial number
- Any malfunctions noted or other unusual items of note.
- The ammunition used for the test with the ammo lot code number of the rounds actually used.
- Jack Number used to test shotgun
- The TLW Number

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- Tester's name

TLW1005O -Basic Shoulder Function Test (to 100 rounds):

To get an early picture of the product's functional capability from the perspective of the customer, a 100 round per shotgun shoulder function test will be conducted to evaluate the potential for feeding problems. Use all test shotguns and control guns for this test.

These malfunctions may be different from those noted in the jack test due to shooter reactions to recoil potentially affecting bolt velocity. The test will be conducted in the long range shooting from a standing position.

Use the Ammunition Schedule as listed in TLW1005N above.

All malfunctions and any unusual behavior will be noted on the data forms. The overall average of all sample shotguns should be at or below the 4% total malfunction rate. (See the malfunction criteria as listed in TLW1005N above for details.)

No major mechanical failures are allowed in the test sample. Major mechanical failures are defined as those failures that cannot easily be repaired with simple tools and/or readily available replacement parts.

Method:

- Draw ammunition from stores. Use the Ammunition Schedule as listed in TLW1005N above.
- Perform all range preparations required for shooting in the long range. Make sure the range ventilation is turned on.
- Wear safety glasses with side shields and double hearing protection.
- When ready to fire, the tester should stand in the doorway of the long range and when firing should be careful to keep the shot in the center of the range to prevent damage to shields, lights, etc.
- Load the eight (8) rounds into the magazine and cycle the bolt to feed the 1st round into the chamber.
- Push the safety to the "Off-Safe" position.
- Fire the first round in the chamber, listen for any off-sounds, and be alert for any other unusual behavior.
- Note any extraction or ejection problems.
- Continue to fire the remaining rounds in the magazine until the last round is fired.
- Push the Safety to "On-Safe" position.
- The safety will be pushed to the "Off-Safe" position at the start of every eight (8) round trial and will be pushed to the "Off-Safe" position at the end of every eight (8) round trial.
- After firing 100 rounds the shotgun will be checked carefully for the presence of any live ammunition and if empty will be placed in the cooling rack. The safety will be in the "On Safe" position and the bolt will be unlocked and fully open at all times while gun is stored with the muzzle outside of the shooting port.
- Compressed air may be used, if necessary to cool the inside of the chamber area if the shotgun is excessively hot from firing.
- All malfunctions will be recorded on the data sheets.

Data Required:

- Shotgun serial number
- Tester's name
- Date of test firing
- The TLW Number
- The ammunition used for the test with the ammo code number of the rounds actually used.
- Any malfunctions noted or other unusual items of note.

TLW1005P -Extended Function & Endurance:

This Endurance Test will be shot to accomplish two purposes. The first purpose is to determine an estimate of the product's expected malfunction rate over an extended period of shooting. The second is to determine both the estimated life of individual components as well as the expected life (in rounds) of the product before system failure occurs. For purposes of definition, a

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component failure will be one that prevents (or could prevent) the firearm from functioning as intended. These are failures that can be fixed relatively easily by the simple replacement of a part such as could be done by the gun owner using only simple household tools. System failures are defined as failures of a major nature, the extent of which would require specialized tooling or methods to repair not normally available to the average gun owner. Such a repair would be most likely made by a qualified gunsmith or by return to the factory.

This Endurance Test will be shot in the test jacks. Only ten (10) shotguns will be used for this test. The test will be performed according to Remington's standard endurance test procedures for shotguns. The test "pyramid" for this test will use the test schedule tabulated on the test process flowchart.

Use any 2-3/4" lead round of Remington manufacture that are currently in inventory.

The covers on the "belly-protectors" will be down and in place for each test shot. Careful monitoring of each test gun is essential to evaluate the malfunction rate for each firearm. The standard Remington test jacks will be used for all jack-related testing.

Each shotgun will be shot no more than 100 rounds before being put aside for cooling. Compressed air applied to the inside of the chamber will be an acceptable method to assist in the cool-down process.

The S.A.A.M.I. recommendation for the minimum acceptable total malfunction rate for a auto-loading shotgun is a malfunction rate of $\leq 4\%$. For this test, if the overall malfunction rate average for the test samples is $> 4\%$, the DAT test will be stopped and the guns returned to Design for modification and improvement before being re-submitted for continuation of the endurance test. If the overall average malfunction rate is $\leq 4\%$ but two (i.e. 20% of the test sample) of the firearms is significantly greater than the 4% malfunction rate, the test may continue with the other eight test samples while Design attempts to fix the problem with malfunctioning gun. After repair, this gun will again be required to pass the 200 round jack function test (only) at $\leq 4\%$ malfunction rate before being again submitted for endurance testing. If the gun passes these criteria it will then be re-introduced into the Endurance test at the appropriate total round level for the endurance test. It is important that total endurance rounds on the gun include any rounds that are put through the gun for re-test purposes.

Record all instances of malfunctions and failures, and replace parts when they become unserviceable noting the round level when they were replaced.

After every 100 rounds one live round will be extracted and ejected from the chamber to check on live round ejection. The ejected round will then be re-inserted into the chamber and fired to help keep the endurance round count accurate.

Method:

- Disassemble, thoroughly clean, lubricate per the design team's instructions, and reassemble.
- Fire each test firearm in accordance with the firing procedure (number of rounds, firing cycle) specified by engineering and the test plan.
- Before commencing design acceptance testing, calibrate, adjust, or re-build the shooting jacks, if necessary.
- Allow the firearm to completely recover in the shooting jack between each shot and do not lean or "stiff arm" the firearm while shooting the gun.
- All ammunition is to be functioned through the magazine - no "single shot" hand feeding permitted.
- Allow the shotgun to cool between cycles. One cycle is 100 rounds. The use of forced air to accelerate cooling of the barrels between firing trials is permitted. The air should be directed from the chamber toward the muzzle to prevent it from washing the lubricant from the firearm's action.
- Cycle the safety from the "Off-Safe" to the "On-Safe" position at the end of every eight (8) rounds, and from the "On-Safe" to the "Off-Safe" position at the start of the next eight (8) round cycle.
- After every 500 rounds, disassemble, inspect, clean and lubricate the entire mechanism and take all required measurements.
- The standard Remington Jacks are to be used for this test. Alternate light and heavy jack position between every 100 rounds.

Data Required:

- Shotgun serial number
- Tester's name
- The Test Jack Identification
- TLW Number
- Date of actual testing

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- Malfunctions per ammo type, breakage, and replacement parts used.
- Any failure that requires the gun to be removed from testing completely.
- Notify management of any unusual events or malfunctions immediately.
- Record ammunition lot code information as it is used throughout the test.

TLW1005Q -Clean Shotguns and Inspect:

After each 500 rounds of endurance, unless other wise specified, each shotgun will be disassembled, cleaned and thoroughly inspected.

A list of inspection points will be provided in the gun packet for check-off and sign-off by the inspector. The inspector will be looking for any signs of unusual wear, especially on critical components and surfaces as well as for anything such as cracks or deformed material that might present a safety concern. Photographs will be taken to document unusual wear, damage or other notable characteristics. Use a facsimile of the following Clean & Inspect Checklist.

Special Note: When re-assembling after cleaning and/or inspection the magazine tube extension must be installed with hand-tight force only.

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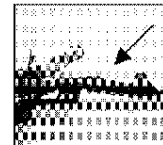
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Model 1100 Competition Master™ DAT #1
Clean & Inspect Checklist

Test Gun Number: _____ Project: 241299
Shotgun Serial#: _____ TLW# 1005
Date: _____ Inspector: _____
Round Level: _____

- ☐ Measure and Record Headspace
- ☐ Clean Receiver, Barrel Assembly, & Bolt Assembly
- ☐ Check the following parts and areas for signs of unusual wear or breakage:
 - ☐ Barrel Extension Locking Notch
 - ☐ Locking Block
 - ☐ Firing Pin
 - ☐ Bolt
 - ☐ Trigger Plate and Carrier
 - ☐ Check the Carrier Dog for wear -
 - ☐ Check Carrier - Right Rear Tab - check for excessive wear. See picture at right
 - ☐ Bolt Buffer
 - ☐ Link for cracks or breakage
 - ☐ Stock
 - ☐ Fore End
 - ☐ Front Sight
 - ☐ Operating Handle
 - ☐ Recoil Pad
 - ☐ Receiver for cracks, unusual wear or other damage



Take digital photographs to record unusual wear, damage or other noteworthy observations. List the digital filename for reference along with any comments below.

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ACCURACY TESTING:

TLW1005R - Patterns & POI at 40 yards

The forty-yard accuracy testing will be completed utilizing standard factory ammunition. Ten (10) shotguns, selected at random, will be used for this test. The test will consist of five patterns per test gun. The choke tube to be used for the shotgun patterns will be the modified choke tube. For the Rifled slugs the choke tube will be the Rifled Slug choke tube.

Patterns will be measured from actual targets and recorded. Average Patterns (for all ten shotguns as a group) must be at 65% at 40 yards. Patterns will be measured for group size and for POA vs. POI.

In addition, the same ten shotguns will be shot using rifled slugs for group size and POI vs. POA. The rifled slug test will be shot at 50 yards.

The same code of ammunition and same type of ammunition will be used for all Patterns test shots and the same code of ammunition will be used when shooting the rifled slug test.

The attached sight picture will be used for all patterns and rifled slug tests. See sight picture diagram below for reference.

Method:

- Shoot patterns from the bench
- Use standard pattern test procedures and standard procedures for the rifled slug portion of the test.

Data Required:

- Record Pattern Percentages
- Record POA vs. POI for each pattern, average all five POI for each test gun
- Record any malfunctions that occur during the test.
- Record the type of choke tube used
- Record the type(s) of ammunition used
- TLW Number
- Testers' Names

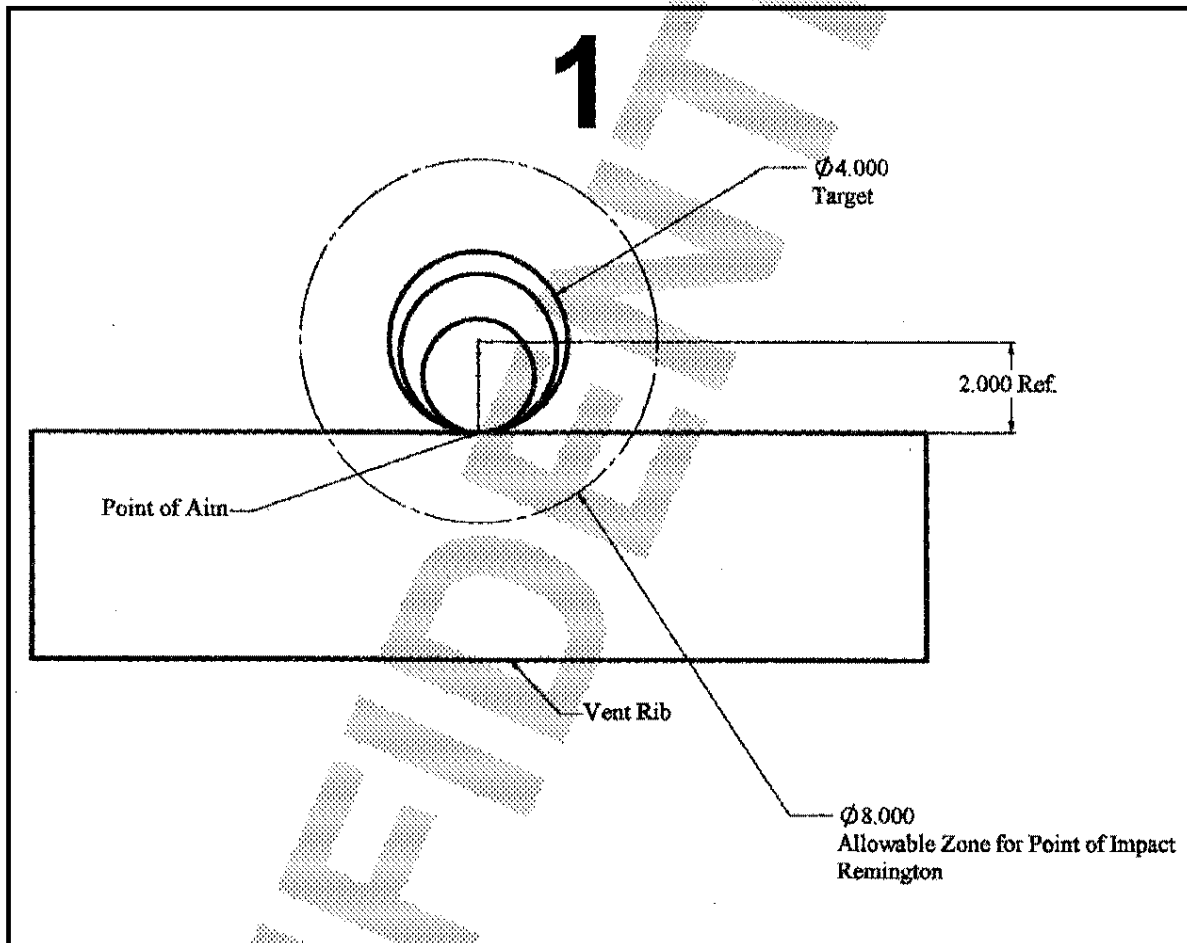


Figure 5

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ENVIRONMENTAL TESTING:

TLW1005S - Hot Function Test

This test evaluates the effect of extreme high temperatures on the functioning performance of firearms.

Method:

- Use one shotgun from the submitted sample.
- Condition test firearm and 100 total rounds of ammunition (20 rounds of each type listed in the table below) in a climatic chamber for at least 6 hours at a temperature of 120 degrees F.
- Test each firearm as follows:
 - Remove from chamber and move to Function and Casualty Range for testing in the jack.
 - Use the ammunition schedule listed in the table below.
 - Fire 20 rounds of ammunition (5 rounds of each type at a time from the table below) and return shotgun to chamber for 2 hours and repeat this procedure until all 100 rounds have been fired.
 - Do not perform maintenance during the 100 round cycles.
 - Cycle the safety from fire to safe every 5 rounds.
 - The tester should wear gloves to protect his hands from the hot metal.
- After 100 rounds have been fired through each firearm, disassemble, thoroughly inspect, clean and lubricate.

Table of Ammunition to use for Thermal Tests			
Manufacturer	Type	Code	RAC
Remington	High Velocity Game Load	HV12-G	20063
Remington	Premiere Target	STS121U-8	20252
Remington	Gun Club Light Target	GC12L-8	20230
Remington	Express Mag. Buckshot	12S1300	20632
Remington	Heavy Field Load	RP12H-8	28120

Data Required:

- Record temperature and exposure times
- Record all malfunctions.
- Record damage noted during inspection
- Record all necessary maintenance actions performed
- TLW Number
- Testers' Names

TLW1005T - Cold Function Test:

This test evaluates the effect of extreme low temperatures on the functioning performance of the firearms.

Method:

- Use one shotgun from the submitted sample.
- Condition test firearm and 100 total rounds of ammunition (20 rounds of each type listed in the table below) in a climatic chamber for at least 6 hours at a temperature of -20 degrees F.
- Test each firearm as follows:
 - Remove from chamber and move to Function and Casualty Range for testing in the jack.

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- Use the ammunition schedule listed in the table below.
- Fire 20 rounds of ammunition (5 rounds of each type at a time from the table below) and return shotgun to chamber for 2 hours and repeat this procedure until all 100 rounds have been fired.
- Do not perform maintenance during the 100 round cycles.
- Cycle the safety from fire to safe every 5 rounds.
- The tester should wear gloves to protect his hands from the hot metal.
- After 100 rounds have been fired through each firearm, disassemble, thoroughly inspect, clean and lubricate.

Table of Ammunition to use for Thermal Tests			
Manufacturer	Type	Code	RAC
Remington	High Velocity Game Load	HV12-G	20065
Remington	Premiere Target	ST81211I-8	20252
Remington	Gun Club Light Target	GC121-8	20230
Remington	Express Mag. Buckshot	EM888	20632
Remington	Heavy Field Load	RPT211-8	28120

Data Required:

- Record temperature and exposure times
- Record all malfunctions.
- Record damage noted during inspection
- Record all necessary maintenance actions performed
- TLW Number
- Testers' Names

TLW1005U - Thermal Cycle Test:

This test evaluates the effects of large temperature changes due to expansion and contraction differentials of metallic and non-metallic components used in the test guns. The sample shotgun will be alternately cycled between a temperature of 120°F and -20°F for at least 3 complete temperature cycles and then brought back to ambient temperature and test fired in the test jacks for 100 rounds to evaluate both function and safety related characteristics.

Method:

- Shoot sample shotgun in test jack to determine shotgun's malfunction characteristics and rate. Shoot 100 rounds using the ammunition table below.
- Do not clean shotgun
- Place shotgun in freezer that is pre-set to -20°F and leave undisturbed for at least 24 hours.
- At completion of 24+ hours, remove shotgun and immediately place in the pre-heated test chamber at a temperature of +120°F.
- Leave shotgun undisturbed for at least 24 hours.
- At completion of at least 24 hours, remove shotgun and immediately place in the freezer.
- Repeat this cycle for a minimum of three complete hot and three complete cold cycles.
- At the completion of the final cycle (the heat cycle) remove the shotgun from the chamber and allow cooling to ambient temperature - a minimum of six hours.
- Return the shotgun to the test jack used at the start of the test and fire another 100 rounds recording malfunction types and rates using the ammunition schedule as listed in the table below.
- Remove the action from the stock and examine the shotgun for any obvious signs that the thermal cycling has affected the parts with special attention directed at the metallic and non-metallic interfaces. Look for cracked parts and for signs of material creep.

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Table of Ammunition to use for Thermal Tests			
Manufacturer	Type	Code	RAC
Remington	High Velocity Game Load	HV12-6	20065
Remington	Premiere Target	ST1212LH-8	20252
Remington	Gun Club Light Target	GC12L-8	20230
Remington	Express Mag. Buckshot	12SB00	20632
Remington	Heavy Field Load	RP12H-8	28120

Data Required:

- Shotgun serial number
- Cycle time for each test condition
- Temperature records throughout each cycle. Use the chart feature on the freezer and a temperature-recording device for the chamber.
- Malfunctions type and rates both pre- and post thermal cycles.
- Observations made on cracks, creep or other noteworthy items
- TLW Number
- Testers' Names

TLW1005V - Heat & Humidity Test:

This test evaluates the effects of high heat combined with high humidity such as might be found in some shooting environments. Of special interest for this test is the effect of heat and humidity on the wood stock.

Method:

- Store the gun and test ammunition for a minimum of six hours at a temperature of +100°F and 80-90% Relative Humidity.
- Test each firearm after removing from the chamber.
- Use ammunition schedule as listed in the table below.
- Fire 20 rounds of ammunition. Return the firearm to the chamber. Wait 2 hours and repeat procedure until all 100 rounds have been fired.
- Do not perform maintenance during the 100 round cycles.
- Cycle the safety from fire to safe every 5 rounds.
- After 100 rounds have been fired through the firearm, disassemble, thoroughly inspect, clean and lubricate.

Table of Ammunition to use for Thermal Tests			
Manufacturer	Type	Code	RAC
Remington	High Velocity Game Load	HV12-6	20065
Remington	Premiere Target	ST1212LH-8	20252
Remington	Gun Club Light Target	GC12L-8	20230
Remington	Express Mag. Buckshot	12SB00	20632
Remington	Heavy Field Load	RP12H-8	28120

Data Required:

- Record temperature and exposure times
- Record all malfunctions
- Record damage noted during inspection
- Record Testers' Names
- Record TLW Number

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TLW 1005

ABUSIVE TESTING

TLW1005W - S.A.A.M.I. Jar-Off Test:

The objective of the jar-off test is to simulate the abusive impacting (bumping) of the firearm against a hard surface with the firearm in a condition of maximum readiness. With the firearm in the ready to fire condition, the firearm shall be capable of withstanding a jar-off shock equivalent to being dropped from a height of 12" inches onto a 1" thick 85±5 Durometer (Shore A) rubber mat backed by concrete. The test will be performed according to SAAMI Technical Committee procedures. Magazine will be loaded to maximum capacity (i.e. 8 rounds) with dummy rounds according to SAAMI procedures. A fresh primed case will be chambered prior to each drop. After each drop the primed case will be discharged to verify its validity. This test will be performed on a sample of six firearms. For this test, each sample test gun will be tested with the Velcro extra ammo belt attached and dummy rounds fully loaded into the belt.

Method:

- With the firearm cocked and the safety in the FIRE position the firearm shall be capable of withstanding jar-off shock equivalent to being dropped from a height of twelve inches onto an 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall within the perimeter of the mat striking the mat once. The twelve inches will be measured from the test surface to the lowest point on the firearm. As an alternate to free dropping, other methods may be substituted if they provide equivalent impact characteristics. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
 - Barrel vertical, muzzle down
 - Barrel vertical, muzzle up
 - Barrel horizontal, bottom up
 - Barrel horizontal, bottom down
 - Barrel horizontal, left side up
 - Barrel horizontal, right side up
- Tests shall be conducted with the trigger pull force set at the minimum force specified by design, with trigger/sear engagement set to the minimum specified by design, and with the fire control lubricated per the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record engagement and trigger pull
- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record the round level on the firearm
- TLW Number
- Testers' Name

TLW1005Y - S.A.A.M.I. Rotation Test:

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The test will be conducted according to SAAMI Technical Committee procedures. The firearm will be placed in the "Safe Carrying" condition and dropped from an upright position with its butt resting on the surface of a 1" thick 85±5 Durometer (Shore A) rubber mat backed by concrete. Magazine capacity will as well be according to SAAMI procedures. The firearm shall be tested (dropped) on both the right and left sides. After each rotation, the primed case will be discharged to insure validity of test. This test will be performed on a sample of six firearms. For this test, each sample test gun will be tested with the Velcro extra ammo belt attached and dummy rounds fully loaded into the belt.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the below test criteria when allowed to fall freely from an upright position with its butt resting on the surface of an 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun falls it will come to a rest without interference within the perimeter of the mat. The firearm shall be tested so as to fall once on its right-hand side and once on its left-hand side. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- Tests shall be conducted with the trigger pull force set at the minimum force specified by design, with trigger/sear engagement set to the minimum specified by design, and with the fire control lubricated per the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges, inserted in the firearm.

Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level on the firearm
- TLW Number
- Testers' Names

TLW1005Z - S.A.A.M.I. Drop Test:

This test will simulate abusive dropping of the firearm from a distance of 48 inches onto a 1" thick 85±5 Durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to the minimum specification. Trigger Pull and Engagement will be checked for adjustment to minimum specifications. Test will be performed according to SAAMI Technical Committee procedures. Magazine capacity will as well be according to SAAMI procedures. After each series of test, the primed case will be discharged to insure validity of test. This test will be performed on a sample of six firearms. For this test, each sample test gun will be tested with the Velcro extra ammo belt attached and dummy rounds fully loaded into the belt.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the below test criteria for drop testing from a height of four feet onto an 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall and come to rest without interference within the perimeter of the mat. The four feet shall be measured from the surface of the rubber mat to the center of gravity of the firearm. The center of gravity shall be determined to an accuracy of ± one inch by any recognized method for finding the center of gravity of an irregular shaped object. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
 - Barrel vertical, muzzle down.
 - Barrel vertical, muzzle up.

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- Barrel horizontal, bottom up.
 - Barrel horizontal, bottom down.
 - Barrel horizontal, left side up.
 - Barrel horizontal, right side up.
- Tests shall be conducted with the trigger pull force set at the minimum force specified by design, with trigger/sear engagement set to the minimum specified by design, and with the fire control lubricated per the owner's manual.
 - The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
 - Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level
- TLW Number
- Testers' Names

TLW1005AA - Extended Jar-Off Test: (for information only.) -

To establish design margin this test simulates the abusive impacting (e.g. bumping) of the firearm against a hard surface with the firearm in a state of maximum readiness under conditions more severe than the SAAMI recommendations. This test will be performed on a sample of six (or the number available after performing the std. SAAMI tests) firearms. For this test, each sample test gun will be tested with the Velcro extra ammo belt attached and dummy rounds fully loaded into the belt.

Method:

- With the firearm cocked and in the safety in the FIRE position the firearm shall be dropped from a height of 18 inches, 24 inches, 36 inches, and 48 inches onto an 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall within the perimeter of the mat striking the mat once. The distance of drop will be measured from the test surface to the lowest point on the firearm. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- The firearm or firearms shall be dropped in such a way as to cause it to strike the rubber mat surface in each of the following attitudes:
 - Barrel vertical, muzzle down.
 - Barrel vertical, muzzle up.
 - Barrel horizontal, bottom up.
 - Barrel horizontal, bottom down.
 - Barrel horizontal, left side up.
 - Barrel horizontal, right side up.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the fire control well lubricated with Rem-Oil.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Conduct this test at 18 inches, 24 inches, 36 inches, and 48 inches.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

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- If a failure occurs on a test sample shotgun at a specific height, finish all other orientations at that height and stop testing that shotgun only.

Data required:

- Record engagement and trigger pull
- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record the round level on the firearm
- TLW Number
- Testers Names

TLW1005AB - Extended Rotation Test: (for Information only.)

To establish design margins this test simulates the abusive fall of a firearm when left leaning against a vertical surface under conditions more severe than the SAAMI recommendations. This test will be performed on a sample of six (or the number available after performing the std. SAAMI tests) firearms. For this test, each sample test gun will be tested with the Velcro extra ammo belt attached and dummy rounds fully loaded into the belt.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the following test criteria when allowed to fall freely from an upright position with its butt resting on the surface of a tiled floor backed by concrete. The firearm shall be tested so as to fall once on its right-hand side and once on its left-hand side. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the fire control well lubricated with Rem-Oil.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges, inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level of the firearm
- TLW Number
- Testers' Names

TLW1005AC - Extended Drop Test: (for Information only)

To establish design margins this test simulates abusive dropping of the firearm in conditions more severe than the SAAMI recommendations. This test will be performed on a sample of six (or the number available after performing the std. SAAMI tests) firearms. For this test, each sample test gun will be tested with the Velcro extra ammo belt attached and dummy rounds fully loaded into the belt.

Method:

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- With the firearm safety in the SAFE state, the firearm shall be dropped from a height of 6 feet and 8 feet onto an 85± 5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall and come to rest without interference within the perimeter of the mat. The drop height shall be measured from the surface of the rubber mat to the center of gravity of the firearm. The center of gravity shall be determined to an accuracy of ± one inch by any recognized method for finding the center of gravity of an irregular shaped object.
- The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- Test Procedure - The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
 - Barrel vertical, muzzle down.
 - Barrel vertical, muzzle up.
 - Barrel horizontal, bottom up.
 - Barrel horizontal, bottom down.
 - Barrel horizontal, left side up.
 - Barrel horizontal, right side up.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the fire control well lubricated with Rem-Oil.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.
- If a failure occurs on a test sample shotgun at the 6 ft. height, finish all other orientations at that height and stop testing that shotgun only. If a failure occurs on a test sample at the 8 ft. height, finish all other orientations at that height.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level on the firearm.
- TLW Number
- Testers' Names

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