

## 1 DEBRIS TESTING - TLW0010AL THROUGH TLW0010AN

### TLW0010AL - Dynamic Sand & Dust Test:

This test evaluates the effects of blowing sand and dust on firearm performance, but the test firing is conducted after the firearm is removed from the sand and dust environment. Use the same sand and dust mixture used in the Sand and Dust Test,

(See Table No. 1.)

#### Method:

- Clean and lubricate one test firearm and close the muzzle with tape.
- Close the bolt. Set the safety in the SAFE position. Load the firearm using one primed case.
- Expose the firearm as follows:
- Place the firearm in the center of the box, and fasten the box lid.
- After 1 minute, stop the blowing air, remove the lid, and turn the firearm upside down in the box.

Replace the lid and repeat the sand and dust blast for another minute.

- Remove the gun from the box after first attempting to wipe clean the firearm with gloved hands. Clean parts as much as possible by blowing the rifle with compressed air or shaking the firearm. Carefully remove the tape from the muzzle. REMEMBER THAT THE RIFLE HAS A PRIMED CASE IN THE CHAMBER.

- Take the rifle to a test jack in the short range.
- Place the Safe in the fire position and attempt to fire the round. Make one attempt only. If the primed case does not fire, carefully open the action and remove the primed case, dispose of properly.
- Load the magazine with live rounds and fire a full magazine from the firearm while in the test jack.
- If firing is unsatisfactory, attempt to fire with a clean magazine loaded with clean ammunition. If repeated malfunctions make it impossible to fire all of the ammunition, field strip and clean the firearm in

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accordance with the applicable operator's manual. Then attempt to fire the remaining ammunition, (from a box of 20 cartridges.) If repeated malfunctions make it impractical to fire the remaining ammunition, stop the test. Cycle the safety from fire to safe every 5 rounds.

- At every 5 round interval verify the firearm is not loaded.
- Close the firearm as if to fire it and put the safety to the SAFE position
- Pull the trigger firmly (10 lb. maximum) - firearm must not fire.
- With the finger off the trigger, move the safety to the FIRE position - firearm must not fire.
- Disassemble the firearm over a large white paper and weigh the amount of debris present in the main mechanism

Data Required:

- Record malfunctions.
- Record number of rounds fired.
- Record weight of debris found in the gun.
- Record any firing of the firearm without the trigger being pulled.
- Record any misfires.

**TLW0010AM – Static Sand & Dust Test:**

This test is the second of two that evaluates the effect of sand and dust on firearm performance, where the test firing is conducted after the firearm has sand and dust directly placed in the action. Thus, an exposure box is not required. For Sand & Dust composition see Table No. 1.

Method:

- Clean and lubricate one test gun to the procedure supplied by the design team.

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- Remove the bolt. Set the safety in the SAFE position and verify that the firearm is unloaded.
- Record the weight of one level tablespoon of debris mixture.
- Expose the firearm as follows:
  - Place the firearm in a shooting jack, bottom of rifle up, and apply a tablespoon of sand in the firecontrol mechanism from the bottom. Tap the firearm three times, in the middle of the receiver, to jar the rifle and to assist getting sand into the mechanism.
  - Turn the firearm to its normal upright horizontal position and apply a <sup>83</sup>tablespoon of sand and dust to the top of the firecontrol mechanism from the top. Tap the firearm three times, in the middle of the receiver, to jar the rifle and aid sand getting into the mechanism.
- Replace the bolt. Wipe away any sand that prevents the bolt from closing.
- Load the magazine. Fire a full magazine from the firearm. If there are repeated malfunctions, attempt to fire with another magazine. If firing is still unsatisfactory, attempt to fire with a clean magazine, container, etc., loaded with clean ammunition. If repeated malfunctions make it impractical to fire the remaining ammunition (from a box of 20 cartridges), stop the test.
- At every 5 round interval verify the firearm is not loaded.
- Close the firearm as if to fire it and put the safety to the SAFE position.
- Pull the trigger firmly (10 lb. maximum) - firearm must not fire.
- With the finger off the trigger, move the safety to the FIRE position - firearm must not fire.
- Carefully disassemble the firearm over large sheet of white paper and weigh the amount of debris that finds its way into the main mechanism area.

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**TABLE No. 1. COMPOSITION OF SAND AND DUST MIXTURE**

(by percent particles, by weight, retained in sieves)

<u>Sieve Size (US gage sieve no.)</u>	<u>Percent of weight retained</u>	<u>Particle Size (microns)</u>
20	3	842 to 1000
30	5	595 to 841
45	17	355 to 595
60	14	251 to 354
100	10	150 to 250
pass 100	less than 1	----
140-mesh silica flour		
140	1	105 to 149
200	4	74 to 105
325	7.5	44 to 74
pass 325	37.5	less than 44

Data Required:

- Record malfunctions.
- Record number of rounds fired.
- Record weight of debris found in the gun.

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- Record any firing of the firearm without the trigger being pulled.
- Record any hang fires.

**TLW0010AN - Field Debris Test:** B7

This test determines the effect of "field debris" on firearm performance, where the firing is conducted after the firearm has field debris directly placed in the action. *See Table No. 2 for field debris composition.*

Method:

- Clean and lubricate one test gun to the procedure supplied by the design team.
- Remove the bolt. Set the safety in the SAFE position and verify that the firearm is unloaded.
- Record the weight of one level tablespoon of field debris mixture per following table.
- Expose the firearm as follows:
  - Place the firearm in a shooting jack, turn bottom side up, and apply a tablespoon of debris in the firecontrol mechanism from the bottom. Tap the firearm three times, in the middle of the receiver, to jar the rifle and aid field debris getting into the mechanism.
  - Turn the firearm to its normal upright horizontal position and apply a tablespoon of field debris to the top of the firecontrol mechanism from the top. Tap the firearm three times, in the middle of the receiver, to jar the rifle and aid the debris getting into the mechanism.
- Wipe away any debris that prevents the bolt from closing. Clean parts as much as possible by blowing sharply or wiping.
- Fire a full magazine from the firearm. If repeated malfunctions make this impossible, attempt to fire with another magazine. If firing is still unsatisfactory, attempt to fire with a clean magazine, container, etc., loaded with clean ammunition. If repeated malfunctions make it impractical to fire the remaining ammunition (from a box of 20 cartridges), stop the test.
- Cycle the safety from fire to safe every 5 rounds.
- At every 5 round interval verify the firearm is not loaded.

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- Close the firearm as if to fire it and put the safety to the SAFE position
- Pull the trigger firmly (10 lb. maximum) - firearm must not fire.
- With the finger off the trigger, move the safety to the FIRE position - firearm must not fire.
- Disassemble the firearm over white paper and weigh or measure the amount of debris present in the main mechanism area. Debris should be removed from the parts for weighing.

Data Required:

- Record malfunctions.
- Record number of rounds fired.
- Record weight of debris in the gun at the conclusion of the test.
- Record any firing of the firearm without the trigger being pulled.
- Record any hang fires.

**Table No. 2 - Field Debris Mixture (By Volume)**

Dried Grass Clippings	2 parts
Toothpicks (round, .25" long max.) to represent twigs	1 part
Bird Seed	1 part
Table Salt	1 part
Small Stones (.015" dia. to .125" dia.)	1 part
Crushed Dry Leaves	2 parts
Pine Needles	1 part
Hair Samples (no longer than 2 inch)	1 part

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