Chapter 1. Forward Closure Assembly

1-1. Apply a light coat of Synco® Super Lube™ or other grease to all threads and all 4 o-rings. This will facilitate assembly and prevent the threads from seizing.

1-2. Fig.-1: Chamfer both inner edges of the delay insulator with your fingernail. Assemble the RMS-Plus delay element, delay insulator, alt delay spacer and delay o-ring as shown. NOTE: It is not necessary to tape the delay element or delay insulator, the hot gas seal is provided by the delay o-ring alone.

1-3. Fig.-2: Insert the forward delay spacer (1-1/8” O.D. neoprene washer) into the delay cavity until it is seated against the forward end of the cavity. Apply a light film of grease to the inner circumference of the delay cavity (but not the forward end of the cavity).

1-4. Fig.-3: Insert the delay charge assembly shown in Fig. 1 into the delay cavity, o-ring end first, until it is seated against the forward end of the cavity. NOTES: When using a plugged forward closure ONLY, fill the opening in the forward delay spacer with grease prior to installing the delay charge assembly, and install the delay charge components in this order: Forward delay spacer, delay o-ring, delay element, delay insulator and alt delay spacer.

Chapter 2. Case Assembly

2-1. Fig.-4: Place the greased liner (1/16” thick X 2 O.D.) o-ring over the large end of the nozzle insert until it rests against the nozzle flange.

2-2. Fig.-4: Using a hobby knife or similar tool, remove the burr (rough, raised edge) from both inside ends of the outer (phenolic) liner tube. Insert the nozzle assembly into one end of the outer liner tube until the liner o-ring is seated against the outer liner.

2-3. Fig.-5: Push the outer liner assembly, open end first, into the motor case until the nozzle protrudes from the case about 1/8”. There will be some resistance as the liner o-ring passes into the motor case. NOTE: A light coat of grease on the outside surface of the outer liner will facilitate installation and casing cleanup after motor firing.

2-4. Fig.-5: Place the greased aft (1/16” thick X 2 O.D.) o-ring into the groove in the nozzle insert.

2-5. Fig.-6: Thread the aft (gold) closure into the motor case by hand until about 1/16” gap remains between the case and the closure. Final tightening will be done after the other motor components are loaded into the case.

2-6. Fig.-7: Install the propellant grain into the inner (paper) liner. Then install the inner liner assembly into the phenolic liner, with the chamfered end of the propellant grain facing the nozzle.

2-7. Fig.-8: Place the forward insulator (2” O.D. washer) into the motor case until it is seated against the end of the phenolic liner.

2-8. Fig.-8: Place the greased forward (1/8” thick X 2 O.D.) o-ring into the case, seated against the forward insulator.

2-9. Fig.-9: With the motor case held in a horizontal position, thread the completed forward closure assembly into the open end of the motor case by hand until it is seated against the case.

2-10. Finish tightening the aft (gold) closure by hand until it is seated against the case. NOTE: There will be some resistance to threading in the closure during the last 1/32” to 1/16” of travel. It is normal if a slight gap remains between the closure and the case after tightening and the grain rattles slightly inside the liner.

Chapter 3. Ejection Charge Installation

3-1. Fig.-10: Thoroughly clean the outside of the motor of any grease or other residue. Dispense enough ejection charge (FFFFG black powder) into the ejection charge well of the forward closure to fill the well approximately 3/4 full. NOTE: For 6” and larger diameter rockets, fill the well completely.
**Chapter 3. Ejection Charge Installation (Cont’d)**

3-2. Fig.-11: Apply the ejection charge cap (adhesive paper disk) to the center of the end of the forward closure. With the motor held in a NOZZLE DOWN position, gently shake the motor to settle the ejection charge into the cavity above the delay element.

**Chapter 4. Preparation For Flight**

Ejection Charge Cap

Apply the ejection charge cap (adhesive paper disk) to the center of the end of the forward closure. With the motor held in a NOZZLE DOWN position, gently shake the motor to settle the ejection charge into the cavity above the delay element.

**Chapter 5. Post-Recovery Cleanup**

NOTE: Perform motor clean-up as soon as possible after motor firing. Propellant and delay charge residues become difficult to remove after 24 hours and can lead to corrosion of the metal parts. Place the spent motor components in the reload kit plastic bag and dispose of properly.

1. After the motor has cooled down, unthread and remove the forward and aft closures.

2. Remove the delay charge assembly components from the forward closure and discard. Using wet wipes or damp paper towels, remove all delay charge and propellant residue from the closures. **WARNING: FAILURE TO COMPLETELY REMOVE DELAY CHARGE RESIDUE FROM THE INSIDE OF THE FORWARD CLOSURE CAN LEAD TO GAS LEAKAGE ON A SUBSEQUENT FLIGHT AND DAMAGE TO YOUR RMS MOTOR FORWARD CLOSURE AND ROCKET VEHICLE.**

3-3. Install the motor into the rocket's motor mount tube. Ensure that the motor is securely retained in the rocket by using positive mechanical means to prevent it from being ejected during recovery system deployment.

4. Prepare the rocket's recovery system and then launch the rocket in accordance with the Tripoli Rocketry Association (TRA) Safety Code and National Fire Protection Association (NFPA) Code 1127.

**Chapter 6. First Aid**

For a minor burn, apply a burn ointment. For a severe burn, immerse the burned area in ice water at once and see a physician as quickly as possible. In the unlikely event of oral ingestion of the propellant, induce vomiting and see a physician as quickly as possible.

**Chapter 7. Disposal**

Damaged or defective reload kits should be returned to RCS.

**Chapter 8. Fire Safety**

Tests show that the pyrotechnic components of RMS™ reload kits will not explode in fires and normally will not ignite unless subjected to direct flame and then will burn slowly. Use water to fight any fires in which AeroTech/RCS RMS™ reload kit pyrotechnic components may become involved. Direct the water at the AeroTech/RCS RMS™ reload kit pyrotechnic components to keep them below their 550 deg. F autoignition temperature. Foam and carbon dioxide fire extinguishers will NOT extinguish burning propellants of the type used in RMS™ reload kit pyrotechnic components. Keep reload kit pyrotechnic components away from flames, sources of heat and flammable materials.

**Disclaimer and Warranty**

NOTICE: As we cannot control the storage and use of our products, once sold we cannot assume any responsibility for product storage, transportation or usage. RCS shall not be held responsible for any personal injury or property damage resulting from the handling, storage or use of our product. The buyer assumes all risks and liabilities therefrom and accepts and uses AeroTech/RCS products on these conditions. No warranty either expressed or implied is made regarding AeroTech/RCS products, except for replacement or repair, at RCS’s option, of those products which are proven to be defective in manufacture within one year from the date of original purchase. For repair or replacement under this warranty, please contact RCS. Proof of purchase will be required. Note: Your state may provide additional rights not covered by this warranty.

**Chapter 9. Fire Safety**

Tests show that the pyrotechnic components of RMS™ reload kits will not explode in fires and normally will not ignite unless subjected to direct flame and then will burn slowly. Use water to fight any fires in which AeroTech/RCS RMS™ reload kit pyrotechnic components may become involved. Direct the water at the AeroTech/RCS RMS™ reload kit pyrotechnic components to keep them below their 550 deg. F autoignition temperature. Foam and carbon dioxide fire extinguishers will NOT extinguish burning propellants of the type used in RMS™ reload kit pyrotechnic components. Keep reload kit pyrotechnic components away from flames, sources of heat and flammable materials.

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**Typical Time-Thrust Curves:**

- **K185W**
- **J135W**
- **J90W**

**RMS™ 54MM MOONBURNING RELOAD KIT DATA**

<table>
<thead>
<tr>
<th>Hardware Designation</th>
<th>Performance Designation</th>
<th>Total Impulse (Maximum)</th>
<th>Propellant Weight</th>
<th>Loaded Motor Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMS™-54/852</td>
<td>J90W</td>
<td>770 N·s</td>
<td>391.4 g (0.86 lb)</td>
<td>834 g (1.84 lb)</td>
</tr>
<tr>
<td>RMS™-54/1280</td>
<td>J135W</td>
<td>1,200 N·s</td>
<td>587.1 g (1.29 lb)</td>
<td>1,126 g (2.48 lb)</td>
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<tr>
<td>RMS™-54/1706</td>
<td>K185W</td>
<td>1,500 N·s</td>
<td>782.8 g (1.72 lb)</td>
<td>1,418 g (3.12 lb)</td>
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**RMS™ 54MM MOONBURNING HARDWARE DATA**

<table>
<thead>
<tr>
<th>Hardware Designation</th>
<th>Motor Diameter</th>
<th>Motor Length</th>
<th>Hardware Weight</th>
<th>Reload(s) Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMS™-54/852 w/Ext Fwd Clos</td>
<td>2.125&quot; (54mm)</td>
<td>9.99&quot;</td>
<td>288 g (0.63 lb)</td>
<td>J90W</td>
</tr>
<tr>
<td>RMS™-54/1280 w/Ext Fwd Clos</td>
<td>2.125&quot; (54mm)</td>
<td>13.32&quot;</td>
<td>348 g (0.77 lb)</td>
<td>J135W</td>
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<tr>
<td>RMS™-54/1706 w/Ext Fwd Clos</td>
<td>2.125&quot; (54mm)</td>
<td>16.65&quot;</td>
<td>409 g (0.90 lb)</td>
<td>K185W</td>
</tr>
</tbody>
</table>

**NOTE:** All these reload kits must use the 54mm extended forward closure. Total impulse shown is optimum.

**NOTE:** Use of a plugged forward closure will eliminate the possibility of this failure mode.

**NOTE:** Perform motor clean-up as soon as possible after motor firing. Propellant and delay charge residues become difficult to remove after 24 hours and can lead to corrosion of the metal parts. Place the spent motor components in the reload kit plastic bag and dispose of properly.

**WARNING:** FAIL-URE TO COMPLETELY REMOVE DELAY CHARGE RESIDUE FROM THE INSIDE OF THE FORWARD CLOSURE CAN LEAD TO GAS LEAKAGE ON A SUBSEQUENT FLIGHT AND DAMAGE TO YOUR RMS MOTOR FORWARD CLOSURE AND ROCKET VEHICLE.

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