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Pro75/98® Moonburners

M520-P, M795-P, M840-P, N1100-P

Special instructions for loading (supplement standard Pro75/98® instruction sheets)

Introduction to moonburners

The moonburning grain, characterized by the port being located tangent to the grain, results in burn times roughly double that of the same propellant in a standard core-burning design. The thrust profile of a moonburner grain results in maximum thrust at ignition, followed by a fully regressive thrust profile that minimizes dynamic flight stresses thus allowing relatively light weight construction methods to be used. These motors are not meant for heavy, low altitude flights, but for high altitude flights with light to medium weight rockets. We recommend launching as close to vertical as allowed at your launch site; however, to date, weather-cocking or arcing over has not been an issue with these motors flown in reasonable conditions.

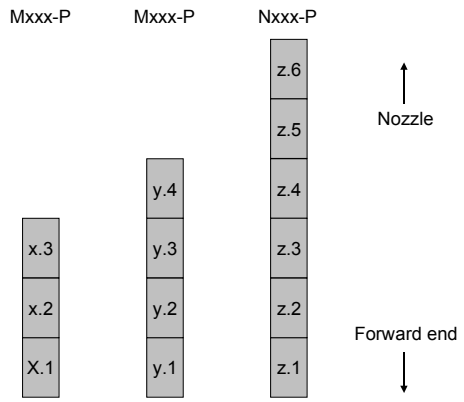
These motors incorporate a small starter grain similar to the starter pellets used in our Pro38® and Pro54® series of rocket motors. The supplied igniter is sufficient to ignite this motor, and no additional pyrogen is required. Simply ensure the igniter is pushed all the way up and in contact with the top of the motor core. There will be an ignition delay of 2-3 seconds so use appropriate care if clustering with outboard motors having faster ignition characteristics.

The Pro98® Moonburner series of reloads are certified for use in both Pro98® and RMS™ motor hardware. Enjoy!

Procedure of assembly of the grain segments

Moonburner motors require assembly (bonding) of the different propellant segments into a single grain before they can be used. The procedure for this is detailed in this supplement to the Pro75/98® instructions. Make sure you have read and understood these instructions completely before starting the process of grain assembly.

The grain segments are labeled 'x.#' where the letter x is a identifier ensuring that all grains came from the same original grain. When assembling your moonburner ensure that all grain letters are the same. The second part of the identifier is a consecutive number. Each grain assembly has the same number of segments as the Pro75/98 casing type. For example the Pro98 4-grain casing has segments A.1, A.2, A.3 and A.4. The grain closest to the forward end to the motor is grain number '1'. The grains are stacked in numerical order, starting with grain number '1'.



Step 1: Identify the supplied components:

- Adhesive (part A and part B)
- Vinyl gloves
- Applicator brush
- Assembly mandrel (supplied with Pro98 motors only, user supplied for Pro75)
- Liner with taped forward insulator disk
- Grain segments

Step 2: Mix adhesive

Put on vinyl gloves. Mix the two adhesive components thoroughly in a clean container. Make sure to mix for at least 3 minutes. Once mixed the rubbery-like adhesive will start to cure rapidly.

Make sure to complete all steps 2-10 within 10 minutes after mixing of the adhesive !

The temperature should be above 20°C/68°C. Keep your mixing cup to verify the cure before motor assembly

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Step 3: Inspect liner and forward insulator disk

Ensure forward insulator disk is properly taped to the case liner.
Make sure that the insulator disk is seated in the case liner.

Note: Pro98 grain assembly shown in photos. The Pro75 assembly is identical except no central mandrel is supplied. Use a rod/tube with approximately ¾" OD to line up grains (such as a ¾" copper tube).

Step 4: Install mandrel in grain #1

Slide mandrel in first grain (grain #1) (see image on the right). Note the orientation of the grain as indicated by the arrow on the grain inhibitor.

Step 5: Apply adhesive on grain #1

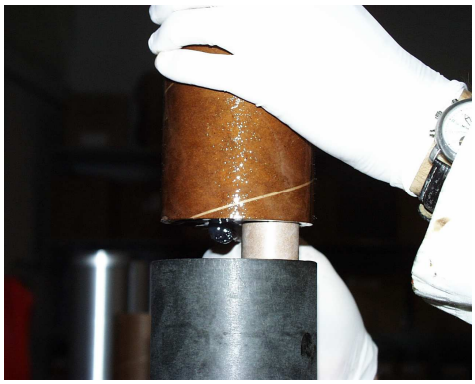
Using the brush, apply adhesive on outside and top of the propellant grain.

Step 6: Install grain #1

Slide grain into the case insulator using the mandrel to push it all the way down.

Step 7: Apply adhesive on following grain

Apply adhesive on the next grain. The adhesive should be brushed on the outside as well as the two propellant faces.



Step 8: Install following grain

Noting the orientation of the grain as indicated by the arrow, slide the grain over the mandrel and push it all the way down. Make sure the grain is properly seated on the previous grain by pushing down on it using a piece of plastic tubing, airframe or yard tool handle.

Step 9: Repeat

Repeat steps 6 and 7 for all other remaining grains. The last grain does not require application of adhesive on the top surface.

Step 10: Clean up case liner

Wipe of any excess adhesive using paper towel along the top edge of the case liner to ensure that the nozzle will fit inside the case liner once the adhesive is cured. Also any spilled adhesive on the outside of the liner should be wiped off.

Step 11: Remove the mandrel

While pushing down on the top grain remove the mandrel. Ensure that the grains do not move during mandrel removal.

Step 12: Adhesive curing

Set grain aside for a minimum of 2 hours before handling it and keep it upright at all times.

Note that the assembled grain is now no longer certified for transportation or storage and has to be fired at the launch site.

Step 13: Start motor assembly

Start by verifying the cure of the adhesive in the mix cup. Next, remove the electrical tape that holds the forward insulator disk to the case liner.

Follow the standard Pro75/98 instructions, ignoring the loading of the individual grains into the liner. Instead, simply remove the tape from the nozzle and forward insulator and insert the entire assembly as supplied into your motor case. Then resume assembly at the steps immediately following grain installation in the supplied instructions.

NOTES: