



## Best Practice Update: NEW FILTER-PACKING SPECIFICATION USING CHARCOAL FILTER MEDIA TO REDUCE TARS AND FILTER CLOGGING

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**SUBJECT: Improved Packed-Bed Filtration Using Charcoal Filter Media**

**Models:** PP20, PC20, PP10

**Symptoms:** Fouling of gas plumbing and controls with tar, as well as reduced or unstable power production. Throttle stuck closed and tar buildup in the elbow beneath governor.

**Causes:** Raw feedstock, when used in the filter, can pyrolyze from the heat of the incoming gas, releasing smoke and tar into the governor and engine. Also, fine biomass feedstock particles inside filter can swell and block flow, resulting in backpressure and poor genset performance.

**Action:** Filter should be packed with charcoal rather than raw biomass feedstock as previously recommended. The biochar in the Ash Collection Vessel (ACV) is partially activated by the gasification process and thus has a greater surface area, is much more absorbent, and is better at removing tars from the gas stream. Foam filters are no longer needed with this method.

Use the screens and mesh that are shipped with the Power Pallet (replacement mesh is available from APL) to sift and separate biochar from the ACV or locally-sourced wood charcoal into three grades. Pack the filter vessel in four layers as follows:

Packing Order	Material	Purpose
BOTTOM LAYER: 230 mm (9 in.) deep	Large pieces: 12 - 25 mm (1/2 - 1 inch mesh). If ACV char does not meet these specs, use local or APL-supplied charcoal.	Larger pieces prevent plugging of bottom grate holes. Particles should be more round than flat or chip shaped.
MIDDLE LAYER: 175 mm (7 in.)	Medium pieces: 3 - 6 mm (1/8 - 1/4 inch mesh). Can be sourced from ACV waste char.	Absorbs tar and soot at higher concentrations without plugging rapidly.
UPPER LAYER: 175 mm (7 in.)	Fine pieces: 1 - 3 mm (1/16 - 1/8 inch mesh). Well-sifted to remove dust. Can be sourced from ACV waste char.	Absorbs tar and catches fine soot.
TOP COVER LAYER: 75 mm (3 in.)	Fuel-grade feedstock: 12 - 25 mm (1/2 - 1 inch mesh). SIFT WELL!	Prevents char dust blowing into the engine.

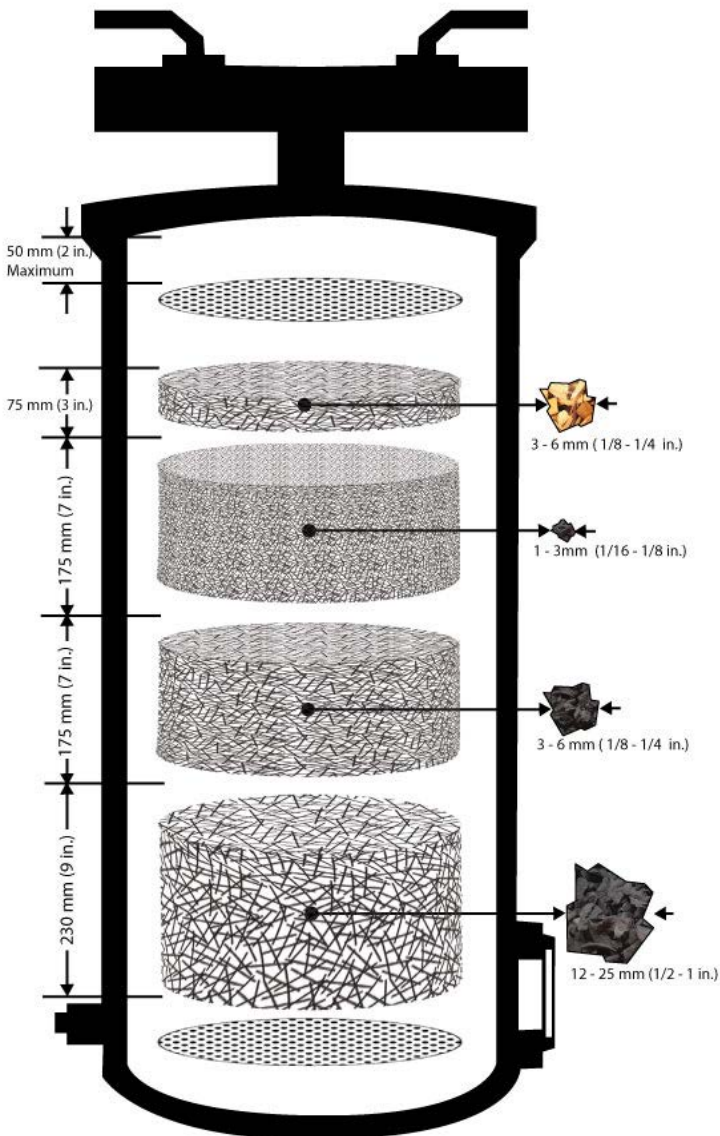
**CAUTION:** Wear dust mask/respirator to avoid breathing charcoal dust while sifting or sorting.



The latest *Operation Manual* and *Technician's Handbook* for your model are available online at [www.allpowerlabs.com/support](http://www.allpowerlabs.com/support)

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NOTE: Depending on type and moisture of feedstock, the life of the filter can vary widely. If Pfilt reading is over 300 during operation on load, the filter will need to be repacked (given good condition of the cyclone and drying bucket). Inspect the top layer of the filter every 25 hours of operation and if it is very dark, wet, or fouled by tar, the filter may need to be repacked with fresh charcoal.

This method replaces the procedures outlined in: Section 3, subheading 7: Gas Filtration System in the Technician's Handbook.

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