

# DESERT HARVESTERS' HAMMERMILL OPERATION / MILLING MANUAL

June 27, 2016

## TABLE OF CONTENTS

LIST OF EQUIPMENT, TOOLS, & SUPPLIES	p. 2
HOOING TRAILER UP TO TRUCK FOR TRANSPORT	p. 6
SET UP AT SITE	p. 7
MESQUITE POD SIGN IN, INSPECTION, TICKETING, AND MILLING PAYMENT – set up and operation	p. 13
MESQUITE POD SIGN IN, INSPECTION, TICKETING, AND MILLING PAYMENT – talking points	p. 17
OPERATION OF MILL	p. 19
CLEANING THE MILL AT MILLING SITE	p. 23
CLEANING MILL AT CARWASH	p. 24
STORING THE MILL BETWEEN MILLINGS	p. 25
TROUBLESHOOTING	p. 26
HOW WE RUN THE DESERT HARVESTERS MESQUITE MILLINGS	p. 30
INFORMATION YOU CAN SHARE IF PEOPLE QUESTION THE COST/ VALUE OF OUR MILLING SERVICE	p. 33
DESERT HARVESTERS RENTAL & MESQUITE MILLING TERMS	p. 34
HAMMERMILL MANUAL FROM MEADOWS MILLS	p. 38

**NOTE: All mill operators must wear closed toe shoes and eye and ear protection. Ideally, they also all wear a Desert Harvesters t-shirt.**

## **List of Equipment, Tools, & Supplies**

for Desert Harvesters Hammermill

as of 2/1/2016

### **MILL EQUIPMENT (ON TRAILER)**

- MASTER LOCKS, 9 (TO LOCK AMMO BOXES AND TRAILER HITCH)
- OTHER LOCKS, 1 FOR GARAGE DOOR (NOT SAME KEY AS MASTER LOCKS)
- SUPPORT POLE FOR FLOUR BAG AND BLOWER TUBES (DUCTWORK)
- LONG BLOWER TUBE
- J-SHAPED BLOWER TUBE
- U-SHAPED BLOWER TUBE (2 J-SHAPED TUBES BOLTED TOGETHER)
- BLOWER VAT (HOPPER)
- RUBBER BOOT COUPLINGS WITH LARGE METAL HOSE CLAMPS: 3  
(2 ATTACHED TO LONG BLOWER TUBE, 1 ATTACHED TO BLOWER VAT (HOPPER))
- BRUTE GARBAGE CAN, 2 LARGE (FOR COLLECTING LARGE AMOUNTS OF FLOUR)
- GARBAGE CANS, 2 LARGE (FOR STORAGE (MISSING 1 LID))
- WATER BUCKETS, 8 (CLOTH - BUNGEE CORDS INSIDE ONE)
- BUNGEE CORDS :
  - 48" - 3
  - 24" - 6
  - 18" - 2
  - 12" - 8
  - 8" - 2
- ASSORTED OTHER-LENGTH BUNGEE CORDS = 6-8
- RATCHETING TIEDOWNS, AT LEAST 2 (KEEP IN ONE WATER BUCKET IN BRUTE CAN)
  - TAN - 3 (OLD)
  - ORANGE - 5
  - RED - 1
- GAS CAN (FULL, UNLEADED GAS)
- WHITE 5-GALLON BUCKETS W/ LIDS & HANDLES, 30 (TO COLLECT PODS, FLOUR)
- CANVAS TARP (IN CASE OF RAIN)
- BROOM, 1
- BUCKET-VAC VACUUM (FOR FLOUR/CHAFF ONLY = FOOD GRADE)
- WET/DRY VACUUM (FOR VACUUMING TRAILER, ETC. (NOT FOR FLOUR/CHAFF))
- STEP LADDER, ALUMINUM 6 FT
- 4 METAL POSTS (FOR BOUNDARY ROPE TO KEEP PUBLIC SAFELY AWAY FROM MILL)
- SPARE TIRE FOR TRAILER
- HAND CART WITH WHEELS (FOR PULLING TRAILER BY HAND)

- SPRING SCALE POLE STAND
- TICKETING BOX - WITH INSPECTION MATERIALS FOR MILLINGS - CHECK TO SEE IT IS COMPLETE (WITH JEAU ALLEN OFF-SEASON)

#### **MILL EQUIPMENT/SUPPLIES BESIDE TRAILER**

- SANDWICH BOARD SIGN - DESERT HARVESTERS
- TICKETING SIGN-IN SIGN (LARGE, WITH JEAU ALLEN OFF SEASON)
- TENTS, 2 (LARGE/PORTABLE, WITH COVERS AND BUNGEEES INSIDE THEIR BAGS)

#### **MILL EQUIPMENT/SUPPLIES IN CLEAR PLASTIC TOTE BESIDE TRAILER**

- TASTING PODS (CHECK THAT ALL CATEGORIES OF TYPES OF PODS ARE INCLUDED)
- PAPER BAGS (FOR PODS TO TASTE)
- STUFF TO SELL (TAKE INVENTORY BEFORE & AFTER EVENT):
  - COOKBOOKS, 6
  - T-SHIRTS (\$15/\$20)
  - ZIPLOCK BAGS, 1 GALLON (FOR \$1 DONATION FOR FLOUR, IF NEEDED)
- BLACK TRASH BAGS, 2 BOXES
- WIPE CLOTHS, 1 PACKAGE
- PAPER TOWELS, 3 ROLLS
- ENVELOPES, 1 SMALL BOX
- TICKET ROLLS, 3 (1 YELLOW, 1 RED, 1 BLUE)
- BLUE TAPE, 1 ROLL
- PANCAKE SIGN
- DUST MASKS, 1 PACKAGE DISPOSABLE
- PENS & PENCILS, 20-30
- SCISSORS, 2
- BLEACH-WATER SPRAY BOTTLE
- BACK-UP BLEACH

#### **SUPPLIES FOR BAGGING FLOUR:**

- FUNNELS, 2 (1 LARGE, 1 MEDIUM (BOTH FOOD-GRADE))
- ZIPLOCK BAGGIES (EXTRA)
- SPOONS, 2 LARGE

#### **MILL TOOLS/SUPPLIES**

##### **AMMO BOX #1:**

- MILL ENGINE KEY AND AMMO BOXES LOCK KEYS (2 SETS)
- LARGE SCALE (SMALL ONE IN TICKETING BOX)
- PENS, SHARPIES

- 12-FT LINK CHAIN
- PLASTIC GAS SIPHON
- GAS TANK FILTER, EXTRA
- BLACK MILL ENGINE PART
- MOTOR OIL (1 PINT, SYNTHETIC 10/30W)
- EXTRA MASTER LOCKS, 2
- COUNTER
- GARAGE DOOR KEY (KEEP HERE UNTIL YOU GIVE BACK TO MILL COORDINATOR)

**AMMO BOX #2:**

- WASHERS, LARGE, 2 (FOR TRAILER TAILGATE)
- BOLT WRENCH
- JUMPER CABLES
- TIRE IRON
- CLIMBING CORD
- HAND PUMP (TIRE)
- ELECTRICAL TAPE, BLACK, 1 ROLL
- METAL TAPE, SILVER, 1 ROLL
- REFLECTOR TAPE
- WRENCH, MISC. (ROUND KEY)
- BANDO POWER KING BELT, B-75
- NUTS, BOLTS, PLASTIC BOTTLE #1 (ASSORTED)
- ROPE (TO GO AROUND AND THROUGH THE METAL POSTS)
- TOOLS, PLASTIC BOTTLE #2:
  - SCREWDRIVERS, 2 STANDARD
  - SCREWDRIVER, 1 PHILLIPS
  - CRESCENT WRENCH, 1
  - WRENCH, 5/16-INCH
  - WRENCH, 10 MM

**AMMO BOX #3:**

- 2 STEEL MILL SCREENS (KEEP IN AMMO BOX WHEN NOT IN USE)
- LARGE CLOTH BAG W/ZIPPER (FOR FLOUR DUST/PASTRY FLOUR)
- FUNNEL-SHAPED FLOUR BAG (ATTACH BY BUNGEE CORD TO 5-GALLON BUCKETS)
- FLOUR BAG, 1 (OLD ONE FOR PREVIOUS DUCTWORK SETUP)

**AMMO BOX #4:**

- MONEY BOX (\$20, "SQUARE" FOR TRANSACTIONS, PENS, TRANSACTION NOTEBOOK)

- 3 RUBBER BOOT COUPLINGS W/ HOSE CLAMPS (IF NOT ALREADY ATTACHED TO TUBES: 2 TO LONG BLOWER TUBE, 1 TO BLOWER VAT/HOPPER)
- TRASH BAGS (MORE)
- ZIPLOCK BAGGIES (MORE)
- FIRE EXTINGUISHER
- WHITE TOWELS, 12 (TO KEEP CHAFF OUT OF BLOWER WHEN CLEANING)
- CLEANING BRUSHES, 2
- HOSE CLAMPS, 2 (EXTRA)
- FLANGES WITH HOSE CLAMPS, 4

**AMMO BOX #5:**

- HONDA ENGINE MANUAL
- MILL OPERATOR MANUAL
- GREEN MILL-EVENT BOOKLET (LISTS, EVENT DETAILS, WORKERS' COMP FORMS)
- FIRST-AID KIT
- SAFETY GLASSES – 6 PAIRS
- EAR PLUGS – MULTIPLE (DISPOSABLE)
- EAR MUFFS FOR EAR PROTECTION, 2
- DUST MASKS AND VENTILATORS (MORE, KEEP EXTRAS IN PLASTIC TOTE)
- EYE/EAR PROTECTORS, 2
- GLOVES, 3 PAIR HEAVY DUTY WORK

## HOOKING TRAILER UP TO TRUCK FOR TRANSPORT

- Put *all* loose items from trailer into back of vehicle towing the trailer, making sure all items are secure. Remove fire extinguisher from its holder on trailer, and place in more secure place for transport (may fall out of holder on bumpy road)
- Use hand dolly hitch to move trailer closer to hitch if needed (bike pump is in ammo box if needed to pump up tires). NOTE: It is much easier to move trailer manually if you temporarily put weight on the back of the trailer (4 steel posts work great for this), because the trailer is otherwise too front-heavy.
- Make sure hitch lock is open, then lift trailer onto a 2-inch ball hitch. Lock the hitch lock onto the ball hitch, and secure it in place with cotter pin.
- Hook up trailer taillights to taillight jack on truck.
- Hook trailer chains to truck, making sure the chains cross each other under the hitch (this way the trailer won't be lost if the hitch fails).
- Walk around trailer to inspect if all is road worthy.
  - Tail lights are working
  - All stabilizing jacks are *up* and locked securely in place with cotter pins all the way in.
  - There are no loose items in the trailer
  - All ammo box lids are securely locked in place
  - Trailer hitch is securely attached to truck's 2-inch ball hitch

## SET UP AT SITE

**Can have volunteers set up sign-in, pod inspection, and ticketing tables and shade canopies (weigh down canopies as soon as they are set up) as mill crew sets up mill**

### **AT MILLING SITE, ORIENT MILL TO WIND**

- At milling site, place the mill so the garbage can and/or bucket collecting flour and the flour dust bag are downwind of the mill. The bucket collecting the flour is set near the mill's fan on the rear right corner near (if you are looking to front/hitch of trailer) of trailer, while garbage can collecting the flour is set on the ground by the rear right corner of the trailer.

NOTE: collect flour in bucket for small milling batches (less than 15 gallons of whole pods). Collect flour in garbage can for large mill batches (more than 15 gallons of whole pods).

- If you can set up the mill in a spot that will be in shade for the duration of the milling (perhaps under a shade tree), you will not need to set up (and then clean after the milling) a shade canopy over the mill.

### **STABILIZE & LEVEL TRAILER, and check oil**

- Park trailer on level ground
- Put down stabilizing jacks, making sure trailer is level
  - If trailer is not more or less level, but rather sloped, this will affect the level of oil in the engine, and it may not turn on, because the sensor will think the oil level is too low.
  - Check oil level in motor – should be  $\frac{3}{4}$  full on dip stick, assuming trailer is level. Replace and tighten dip stick.
- Put fire extinguisher back into its holder on the trailer frame.

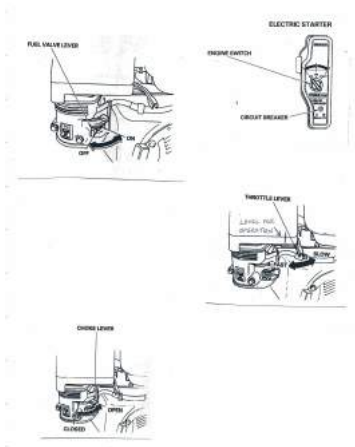
### **SET UP METAL POSTS AND ROPE AROUND MILL**

- Place them 10 feet from the mill to keep the public away from the mill when in operation
- Remove tailgate from back of trailer (hold washers in place with tailgate's cotter pins)

### **BLOW OUT ANY DEBRIS THAT MAY BE IN MILL BOX AND FAN**

- Look inside mill box to make sure there is no large debris or critters that need to be removed before running the motor. Clean out if needed – but do NOT use the chaff vacuum (marked CHAFF ONLY), which is only for food-grade chaff (not rodent droppings and dirt). Close box lid.
- Run the mill motor at full throttle for 60 seconds to clear out any debris that may be in the mill box or fan housing.

- Turn motor ON with the following steps:
  1. *Put on ear and eye protection*
  2. *Make sure the area around the mill, motor, and belts is clear*
  3. *Move throttle level to ON*
  4. *Turn fuel valve level ON*
  5. *The choke may need to be open full, half open, or closed depending on how warm the engine is. If cold the choke will likely be needed to be full ON. If the engine is warm, the choke will likely only need to be partially on.*
  6. *Turn motor ON by inserting engine key and turning to START*
  7. *Once the motor starts, turn the choke OFF or the motor will run weak and sputter.*

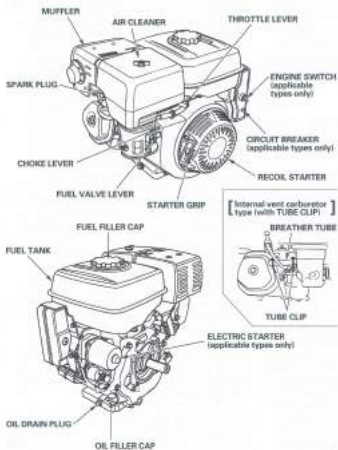


- Turn motor OFF with the following steps:
  1. *Turn key to OFF, and remove key from motor*
  2. *Turn OFF throttle.*
  3. *Turn OFF fuel valve lever*
  4. *Wait for motor to completely shut off*



## CONTROLS & FEATURES

### COMPONENT & CONTROL LOCATIONS



7

### PUT MILL DUCT WORK TOGETHER AND INSPECT MILL

- Set up the black steel support bar on the fan side of the mill (if not already in place), then place "triangle" black steel support bars atop it. You will tighten bolts to secure all in place AFTER you get the ductwork where you want it. The ductwork will hang on this steel support.

- Set up ductwork so flour bag will be over the rear right corner of the trailer. The exhaust/dust duct and bag should be over the rear right wheel/fender of the trailer. *See image*. This should be the downwind side of mill so the motor, mill, and millers won't be covered in mesquite dust.
- Do NOT put cloth bag on the end of the blower vat yet. First...

### **BLOW OUT DUCTWORK & LISTEN TO MOTOR**

- Turn motor ON, and run for 60 seconds at full throttle to blow out the ductwork (old flour can crust and mold on inside of ductwork if it was not thoroughly cleaned after last use).
- Listen to the motor, all should sound smooth and even (belts should not be hitting the belt guard, if they are shut the motor off and adjust the belts). There is a bolt on the grey base plate below the motor, facing the hitch side of the trailer. This bolt can be loosened or tightened to adjust belt tension. 3800 rpm is ideal for operating mill.
- When all is good, shut the motor OFF (remove key from motor, turn off throttle, turn off gas). **Attach mill key and its cord to motor via carabiner so key does not get pocketed or lost during operation.**
- Turn motor OFF (remove key from motor, turn off throttle, turn off fuel valve lever)
- Insert screen into milling chamber (beneath blades)
- Close milling chamber and tighten lid with wing nut (make sure mill box is correctly closed – there should be no visible gap between closed red lid and red metal base of mill box)  
NOTE: if you loose bolts, nuts, or washers during set up, there are spares in plastic jar in ammo box. Tell hammermill coordinator if we need more spares
- After testing the motor, put narrow end of dust/pastry flour bag over the dust/pastry flour outlet of the duct (see image on next page). Use bungee cord to hold the bag tight to the duct. Make sure zipper (beneath Velcro) at bottom of bag is closed to hold in the mesquite dust/pastry flour.



- Tightly attach the narrow end of the cloth funnel "skirt" to the bottom of the blower vat. Use the small funnel "skirt" to collect flour in a 5-gallon bucket. Use the large funnel "bag" if needed on the grey Brute container can. NOTE: If Brute container is not in use make sure it is not left in a place where people will mistake it for a garbage can and put garbage in it.
- Place the bucket or Brute garbage can below the funnel bag (**make sure the bucket or Brute container is clean** – there can be residual flour, but nothing else in flour bucket or Brute container). Then put one flap of the bag's skirt on the *inside* of the bucket/Brute, and put the other flap of the skirt on the *outside* of the bucket/Brute. Bungee the outer skirt tightly against the bucket/Brute. The bucket/Brute will collect the flour.
- If using the 5-gallon bucket for flour, put an extra empty clean bucket beside the bucket attached to the funnel skirt. After milling a batch of pods, the empty bucket will replace the one with flour.



- Set CHAFF vacuum on same side of mill as the motor switch to keep vacuum hose AWAY FROM the hot black exhaust box/muffler on top of the motor. Get chaff containers ready for milling—one extra clean bucket and TWO clean Brute containers, one marked GOOD CHAFF the other BAD CHAFF, referring to the flavor quality of the pods being milled). After milling a batch of pods, bucket underneath CHAFF vacuum will get taken to table where flour and chaff are put into containers provided by harvester. If harvester does not want their chaff, the CHAFF bucket is emptied into the appropriate Brute container (flavor quality of pods should be marked on mill ticket).
- Make sure all ammo boxes are closed, and everything not needed for milling is put away (otherwise it will get covered in sticky mesquite dust and may trip someone) and trailer is clear of loose items and ready to mill pods.
- Shade canopy can now be placed over mill and millers, if needed. Make sure canopy is weighed down with a canvas bucket filled with water, dirt, or sand and long bungee cords at each leg of canopy. There should be a folding camping shovel with the trailer to fill the canvas buckets with dirt.

## **MESQUITE POD SIGN-IN, INSPECTION, TICKETING, AND MILLING PAYMENT – set up and operation**

Thanks to Jeau Allen of Aravaipa Heirlooms for creating the sign-in, inspection, ticketing, & payment system!

### **STEP 1 / TABLE 1 — SIGN-IN & TASTE (RED)**

1. Have harvester sign in on Inspection Sign In (see sign in sheet). A letter is assigned to each name.
2. Fill out RED Inspection Pass with name and queue (letter), and give to harvester. Explain to harvester that the pass and others to come, make sure they will get the flour from their pods, that their pods are ready to be milled, and enable us to monitor quality and quantity of what goes through mill.
3. Do snap/dryness test on some of the pods the harvester has brought. Pods should be so dry that they snap in two when you try to bend them. Moist, bendy pods will turn into a gooey mess, not flour, in the mill and bog down the milling.
4. Ask the harvester if they've tasted their pods...and if so, are they satisfied with the taste? If they haven't tasted them, have them taste them with you.
5. Compare the flavor of their pods with those in the sample bags. Pods should have a sweetish flavor. The tastes/sensations to avoid are: bitter, chalky, a burning sensation in the back of the throat, or drying of the mouth (samples will be available for comparison).
6. If harvester is satisfied with taste of their pods and wants to continue with grinding, go over fees and send to next table (with Inspection Pass).  
NOTE: No one is turned away from milling based on flavor of pods. Pods are only turned away if they are too moist and bendy, moldy, or dirty.
7. Let people know they have a will call option at the Desert Harvesters milling. After their pods are inspected, and they've received a ticket having paid for the milling their pods, they can leave their pods with us and we'll call them within a week with info on where to pick up their flour and chaff. They can find out more at the mill ticketing table after pod inspection.

### **STEP 2 / TABLE 2 — INSPECTION (RED to YELLOW)**

1. Clip RED Inspection Pass to "Now Inspecting Queue" tag on table.
2. Take pods out by handful (don't dump) from containers the client brought their pods in, and spread pods onto table for inspection.
3. Ask harvester WHEN harvested (before/after rains), WHERE harvested (on trees/ground, sprayed areas, close to roads, etc.), HOW harvested (did they wash the pods, increasing invisible mold/*afatoxin* risk?)
4. Explain that in the low desert the best practice is to harvest BEFORE the rains and off the tree (not the ground) as this dramatically reduces the risk of unhealthy invisible molds growing on the pods. Refer to Best Harvesting

Practices laminated sheet on inspection table and info at [www.DeserHarvesters.org](http://www.DeserHarvesters.org))

5. If harvester wishes to proceed, inspect pods for visible mold, rot, debris, rocks, moisture content/dryness, etc., and remove undesirables. (If milling in an area free of non-native mesquite (such as Cascabel), all undesirable pods and their seeds should be removed from site so any non-native seed don't accidentally germinate in the area).
  6. Reject any pods that are not dry enough that they do not snap in two when you try to bend them. Folks can lay moist pods out on a tarp or hood of a car in the full sun to dry out moist pods. Once dry they can try going through inspection again.
  7. Transfer clean, inspected pods (by handful) into DESERT HARVESTERS containers ONLY (this way we know they've been inspected).
  8. Inspector signs off on RED Inspection Pass, including Inspector Name and number of gallons to be milled, and:
    - a. mark a "+" sign in upper right hand corner of ticket if pods have no bad flavor characteristics.
    - b. Mark a "-" sign in upper right hand corner of ticket if pods DO have bad flavor characteristics (bitter, chalky, drying, burning).
- Give pass back to harvester, direct to next table.
9. Clean off table with spray bleach solution

### **STEP 3 / TABLE 3 – TICKETING, WEIGHING, & PAYMENT (YELLOW to GREEN)**

1. Collect RED Inspection pass, and fill in Harvester's name on Ticketing Log (see log sheet; note that identifying "letter" now becomes "number").
2. Weigh Desert Harvesters bucket(s) with pods and record weight/total gallons, and amount due on Ticketing Log.
3. Collect fees (See rates below...pods are paid for on the basis of gallons, not weight.)
4. Fill out green Mill Ticket (harvester keeps red Inspection Pass) with Mill Ticket "number", name, and number of buckets, and tape to *outer* rim of bucket(s). (Number each of multiple bucket with labels, e.g., 1 of 3, 2 of 3, and 3 of 3, etc.)
5. Ask harvester if they want to keep "chaff", if so, **note on green Mill Ticket "WANT CHAFF"**
6. Ask harvester if they have a container for their flour, and one for their chaff (if not, they can purchase zip lock bags for \$1.00 each). They **MUST** put their name and contact information (phone and email) on *all* their containers.
7. Ask harvester if they plan to leave the premises for the day and not return (if so, their pods are placed in WILL CALL, and will be ground later, and can be picked up another day; time and location to be determined). They will receive a call from Desert Harvester staff within a week. If they plan

- to stay on the premises, however, they can check back at the table and pick up their flour when ready.
- Keep harvester's containers together with their pods, and have a Desert Harvester's volunteer or miller (ONLY) take the pods and containers to table 4 / the mill.
  - NOTE: We only mill up to 15 gallons of whole pods at a time. This way people who harvested smaller amounts are not waiting behind those that harvested large amounts. Those bringing more than 15 gallons of whole pods, can have extra pods inserted in the back of the milling line in 15 gallon increments, or they can arrange to leave their pods in WILL CALL and have the resulting flour picked up later – MAKE SURE WE HAVE THEIR PAYMENT AND CONTACT INFO (phone and email), and that all has been inspected before pods are placed in will call.

#### **STEP 4 / TABLE 4 – READY TO MILL (GREEN)**

- Only a Desert Harvesters volunteer or miller will take ticketed buckets of pods to Table 4 / the mill or will call. Only the millers are allowed on the inside of the rope surrounding mill.
- Ticketed buckets are to be kept in separate groups – each group being for a different harvester. The containers into which the resulting flour will be placed must be kept with ticketed buckets. All flour containers must have harvesters' contact info (phone and email).
- As desert harvesters buckets are emptied at the mill, the millers must return the empty buckets to Table 4. From there a volunteer must keep taking the empty Desert Harvesters' buckets back to Table 2 / Inspection.

#### **WILL CALL / OPTIONAL STEP 5 / DESIGNATED AREA 5 – PODS STORED FOR LATER MILLING**

- If at the event we are accepting inspected and paid for pods for milling at a later time (potentially within a non-public milling set up within a week of the milling event) – then a location must be identified where these pods can be stored where they won't be interfered by the public.

*- Should there be a lull in the milling, the millers should then begin milling batches of the stored pods in will call, until batches needing to be milled at the milling again pick up.*

- Harvesters of the stored pods must be called within a week of dropping off their pods with the location of where they can pick up their flour.

- NOTE: Desert Harvesters must collect the fees for all milling that will be done AFTER the public event

#### **MILLING FEES for Desert Harvesters' events:**

**\$3 per gallon of whole pods, with a minimum of \$10.**

This generally works out to a cost of about \$3 per pound of flour milled. This is a bargain considering that the flour usually sells for \$14 to \$20 per pound.

NOTE: Milling fees may be different (lower, but never higher) at events organized by other organizations that hire Desert Harvesters. Head miller should have this squared away with the host organization BEFORE the event.

**EQUIVALENCIES:**

One gallon of pods mills to one pound of flour.

5 gallons of pods mills to a bit more than 1 gallon of flour.



## **MESQUITE POD SIGN IN, INSPECTION, TICKETING, AND MILLING PAYMENT – talking points**

### **KEY TALKING POINTS FOR THE PUBLIC**

This is the first point of interaction we have with the public. The following are key points to convey to them:

#### **1. THANKS**

Thank and welcome folks for engaging with our abundant, delicious and nutritious wild native foods! They are part of a growing, vibrant movement.

#### **2. QUALITY**

Ask people if they tasted the pods before they picked.

Then taste their pods and have them taste them too.

Ask them how they taste

Any of the 4 unwanted flavor present (or as aftertaste)?

Then invite folks to taste our samples of the 4 unwanted characteristics. Finish with a good tasting sweet pod. **GIVE PEOPLE PIECES OF THE PODS NOT WHOLE PODS SO OUR SAMPLES LAST.**

Explain we are doing this to increase people's awareness of the diversity of flavors available for harvest, and to improve the quality of harvests, because the quality of the pod ultimately determines the quality and flavor of any foods made with it. Encourage them to only harvest from, and plant good- to great-tasting trees.

Refer them to the TASTE BEFORE YOU PICK poster.

#### **3. SAFETY**

Ask people when did they harvest – before or after the rains?

Ask people how they harvested their pods – off ground, off tree?

Recommend people in the hot, low desert (below 4,000 feet elevation) harvest BEFORE the rains to avoid unhealthy invisible molds (and associated aflatoxins) that grow on mesquite pods (and other grain crops like wheat and corn) when the ripe pods/crop comes into direct contact with high temperatures and moisture.

In higher, cooler elevations (above 4,000 feet), pods ripen later, often after the rain. The cooler temperatures reduce the invisible mold growth, so harvest the pods as soon as you can after they ripen, dry them out, and store them dry.

It is best to harvest pods off the tree so they don't come into contact with herbicides, feces, or moisture on the ground.

Do not wash or wet harvested pods. Dry them out right after harvest and store them dry.

Refer people to the AFLATOXINS AND HOW TO AVOID THEM poster.

#### **4. INVITATION**

Let them know about the Eat Mesquite Cookbook for sale (should bring 6 books per event to sell). Refer them to the Eat Mesquite poster.

Invite the public to sign up to Desert Harvesters list serve on our website and to check our Calendar of Events for workshops, fiestas, millings, harvest tours and more.

Invite the public to become Desert Harvesters members & volunteers.

## OPERATION OF MILL

**Note: never touch the very hot exhaust box/muffler during operation or after the mill has been run. Also never let the vacuum hose touch the hot exhaust box.**

**Only Desert Harvesters staff can run the mill. However a trained volunteer could feed pods into the mill with a Desert Harvesters staff person running the motor and supervising (this may need to occur if one of the Desert Harvesters crew needs to take a break, or if you are trying to give newly trained personnel more time on the mill).**

- Put on safety glasses and ear protection – must be worn by anyone working the mill and feeding pods into the mill
- Close all ammo boxes and make sure the work area is clear. The vacuum and a towel/cloth should be the only loose items on the trailer during operation. The vacuum should be on the same side of the mill as where the operator is when turning the engine on and off. This is to ensure the vacuum hose is never accidentally placed atop the very hot exhaust of the motor – which would melt the hose.

Turn motor ON with the following steps:

- Move throttle level to ON (all the way to the left)
  - Move fuel lever to ON (all the way to the right)
  - The choke may need to be open full, half open, or closed depending on how warm the engine is. If cold the choke will likely be needed.
  - Turn motor ON by inserting engine key and turning to START
- 
- Run the pods of only one person through the mill at a time, then empty the ground flour from the 5-gallon bucket or Brute flour container before running the next person's pods through the mill. This ensures everyone fairly reaps the product and quality of their own harvest.
  - All pods to be milled should only be in Desert Harvesters buckets with green tickets that tell you they have been inspected, whose pods they are, if they want their chaff, if their chaff will taste good = "+" sign or bad = "-" sign, and how many buckets there are in their batch to be milled.
  - Keep all containers from each batch of pods to be milled together (green ticket Desert Harvesters buckets of pods and the harvester's containers that will take their flour and chaff)
  - Feed pods into mill by hand (YOU MUST BE WEARING EYE AND EAR PROTECTION ALONG WITH CLOSED-TOE SHOES). Do NOT dump pods into mill from bucket. Your last chance to inspect pods before milling is as you feed

them into the mill by hand. Pods should be dry enough to snap when bent; and free of mold, dirt, or debris. If the pods do not appear to be inspected / sorted, you can send them back to the sign-in table, and have the person running sign in find the harvesters that brought the pods, then run them through inspection and ticketing again.

- Listen to the motor, if it sounds as though it is straining you must stop feeding pods into the mill until the mill can grind what is in the mill box, or stop the motor/mill and clean out the chaff from the milling chamber.
- Typically, 5 gallons (one bucket) of whole pods are milled before having to shut off the mill and vacuum out the chaff. Once chaff is vacuumed out, milling can resume.
- Mill feeder and motor operator should continually check and communicate with one another.
  - Does the harvester of this batch of pods want their chaff?
  - If not, will it go in + or – Brute container?
  - Is weather and pods dry enough to speed up feeding of pods into the mill?
  - Or is the motor sounding a bit boggy or flour starting to get a bit goopy and feeding of pods into the mill needs to slow down?
  - How does the motor sound?
  - Ready to go?
  - Head miller does not need to run the mill motor the whole time, but rather must supervise all, and get other millers to run the mill to in order to gain experience.

#### **CLEANING OUT CHAFF FROM THE MILLING CHAMBER**

- *Turn motor OFF with ALL the following steps:*
  1. *Turn key to OFF, and remove key from motor*
  2. *Turn OFF throttle.*
  3. *Turn OFF fuel valve lever*
  4. *Wait for motor to completely shut off*
- Loosen the wing nut on the milling chamber lid and open the lid
- Make sure no chaff will fall into the chamber beneath the screen or this will blow into the flour bucket, so *fill the gap between screen and mill box with towel.*
  - If cleaning out chaff with the wet/dry vacuum marked "CHAFF" just suck up the chaff with the vacuum. You don't need to get all the chaff out, just most of it. THE ENGINE MUST BE COMPLETELY OFF OR YOU COULD LOOSE YOUR HAND!

- If cleaning out chaff by hand, wedge a folded towel into the opening between the screen and mill box, then scoop out most of the chaff by hand into a bag or bucket. **THE ENGINE MUST BE COMPLETELY OFF OR YOU COULD LOOSE YOUR HAND!**
- Once the milling chamber is relatively clear of chaff, close the chamber lid and tighten down the wing nut. You are then ready to fire up the motor again and run more pods through.
- Give chaff to harvesters that want it—check green mill ticket to see if they do want it.
- For unwanted chaff, empty it in the appropriate Brute container, either "+ GOOD" for good tasting chaff, or "- BAD" for chaff having one or more bad flavor characteristics. See corner of green mill ticket to see if it has a + or – minus symbol.
- NOTE: mesquite chaff can be used to make mesquite beer, non-alcoholic drinks, boiled down with water to make mesquite syrup, or used as livestock fodder. Give it away to those who want it.

#### **GET EMPTY DESERT HARVESTERS BUCKETS BACK TO THE POD INSPECTION TABLE**

- Once millers empty buckets, the buckets need to get back to the pod inspection table(s) a volunteer should be assigned to this job.

#### **GETTING THE FLOUR**

- Once you have finished milling ALL the pods in a batch brought by a harvester...
- *Turn motor OFF with ALL the following steps (turn key to OFF, remove key from motor, turn OFF throttle, turn OFF fuel valve lever, wait for the motor completely shut off).*
- Push any bulges of flour (accumulated on the rim of the bucket or Brute container) into the bucket/container. Slap sides of flour skirt "bag" to get flour on skirt to drop into bucket/container. Then take the bungee cord off the bucket/Brute container. Put all of the funnel bag skirt into the bucket/Brute container and shake the remaining flour into the bucket/Brute container.

- Then empty the flour bucket/Brute container into the container(s) provided by the harvester. All containers should be marked with the harvesters' name, phone number and email. If needed you can use the metal funnel in the ammo box when pouring flour into containers.
- Reattach the skirt bag to the bucket/Brute container. Put one flap of the bag's skirt on the *inside* of the bucket/Brute container, and put the other flap of the skirt on the *outside* of the bucket/Brute container. Bungee the outer skirt tightly against the bucket/Brute.
- You are ready to mill again once the chaff has been vacuumed out of the mill.

**KEEP TRACK OF HOW MANY GALLONS OF WHOLE PODS YOU MILL AT EVERY EVENT (in mill ticket log), AND GIVE THIS INFORMATION TO MILL COORDINATOR ONCE YOU RETURN HOME**

Make sure you get all the sign-in sheets and ticketing sheets. Bring these home and give them to the Mill Coordinator

This is how we determine if our pricing is fair, if demand is growing or decreasing, the value of our services, etc.

## CLEANING THE MILL AT MILLING SITE

- When all milling is done, *turn motor OFF with ALL the following steps (turn OFF throttle, turn key to OFF, remove key from motor, turn OFF fuel valve lever, wait for motor to completely shut off).*
- Take the mill ductwork apart.
- Knock accumulated flour out of ducts into a bucket – this will be very fine pastry flour – prime stuff to be saved.
- If an air compressor and high pressure air blower is at hand – blow out the ducts and mill, otherwise vacuum them out. Only use CHAFF vacuum for vacuuming flour or chaff out of mill, mill skirt or bag, mill screen, or mill ductwork—nothing else so only food-grade materials go into it. All else should be swept with broom, not vacuumed.
- Remove the screen from the milling chamber and clean out the chamber. *And* make sure to clean the screen tracks once screen is removed.
- Sweep off the trailer
- Clean out the buckets
- Clean out the Brute containers
- Fully empty out the cloth bag and skirt, and vacuum or blow them clean
- When all vacuuming is done, empty the vacuum
- Give away the chaff if you haven't already (it makes great goat feed, mulch, you can cook it down to make syrup, and more)

## CLEAN UP AT CARWASH

(Auto Wash Express at 1435 W. Saint Marys Road in Tucson is conveniently close to our mill storage site)

- Take mill to a car wash and rinse off trailer, mill, and parts with water only – NO SOAP.
- Get everything off trailer and laid out for easy access / cleaning BEFORE you put money in car wash. \$10 should be plenty to do the whole job if you are organized. \$10 cash should be in moneybox for this purpose.  
NOTE: If you had a shade canopy over the mill during milling, it likely is now coated in mesquite flour and must be set up and rinsed off at the carwash.
- Use brushes in ammo box only for scrubbing surfaces that touch food, flour, pods.
- Car wash brush can be used to scrub trailer, motor, etc if needed.
- Buckets may need to be scrubbed with brushes – in ammo boxes
- Toilet bowl brush in ammo box useful for cleaning out cyclone duct
- Hold onto buckets when washing or they will fly with the water pressure. When they are upside down you can hold bucket in place by stepping on bucket. Remove mill ticket tape from buckets.
- When you are almost done with clean up RUN MOTOR AND BLOW ALL WATER OUT OF FAN HOUSING. Do this when you are almost done. Fan will spray gunk up and out, so make sure cleaned items are far enough away that they won't get soiled again. Shut motor off then carefully spray trailer down one last time, *making sure NO water gets into fan housing this time.*
- Cloth filter bag and cloth funnel bag should both be banged out then washed in washing machine with COLD water and a mild no scent detergent, such as Oasis laundry detergent. Hot water would shrink the bags. You can bring the bags to Brad as he is all set up to wash the bags.
- Make sure bag is completely clean of flour and dry before putting away from storage. Otherwise mold could result.



## STORING THE MILL BETWEEN MILLINGS

- Disconnect mill from truck.
- Move mill into place with hand dolly hitch and secure with stabilizing jack at hitch side of trailer.
- Put all mill items from truck into back of trailer
- LOCK TRAILER WITH HITCH LOCK
- Cover trailer with canvas tarp to ensure nothing gets wet while in storage, and to hide loose parts from potential thieves' eyes.
- If buckets are not yet dry, set them out upside down on concrete pad beside mill to dry. Try not to block parking space beside mill.
- If shade canopy is not yet dry, set it up and over the mill. Weigh the canopy down with canvas buckets and bungee cords so it won't blow away.
- Get milling/sales/donation money to the mill coordinator ([chaff@desertharvesters.org](mailto:chaff@desertharvesters.org))
- Report any issues (needed repairs, missing items, etc.) with the mill to the mill coordinator ([chaff@desertharvesters.org](mailto:chaff@desertharvesters.org)) ASAP so they can be addressed before the next milling.
- Is there anything we need to add or edit within the manual? Let us know ASAP so we can have it all ready for the next milling.

## TROUBLESHOOTING

### ENGINE SPUTTERS

Why?

- choke is still on. (Turn choke off)
- throttle is not up to white mark. (Move throttle up to white mark on motor's air filter)
- gas is not on. (Make sure gas lever is fully ON)
- mill box is full of pods/flour. (Stop feeding pods into mill. Stop motor. Clean out chaff from mill box).
- mill is running out of gas. (Check gas level in motor, and add if necessary).

### ENGINE STOPS

- out of gas. (Check gas level in motor, and add if necessary).
- trailer is not level, so oil level sensor thinks engine is out of oil. (Level trailer with foot jacks).
- oil level is low. (Check oil level in motor, should be  $\frac{3}{4}$  up on gauge stick. If oil is low add some. Oil is in small ammo box on trailer).

### PODS MILL INTO A GOOPY MASS INSTEAD OF FLOUR

Why?

- pods are too moist. How would you know? (Don't snap in two when you try to bend them).
- humidity is too high to mill and pods are taking up atmospheric moisture.
- pods may have a very high sugar content.

What do you do?

- Go let inspection table know they can't let such pods through. Tell owner of the pods they need to dry their pods out before we can mill them (they can put them out on the hood of their car in full sun). Refund them their money.

- Clean out all gummy pods stuff from mill before you continue to mill.

- If humidity is up, feed pods into the mill slower. If pods continue to gum up mill you may have to stop milling until things dry out.

- Never run mill out in the rain

- If the pods bog the mill due to very high sugar content, they may need to be roasted before milling.

These pods must go to back of line if they keep bogging the mill, because they cannot hold up entire event. Give harvester a refund if necessary.

#### **WHEN MOTOR IS SHUT OFF AND MILL BOX IS OPENED THERE ARE UNMILLED PODS OR POD PIECES IN MILL BOX**

Why might this be the case?

- The mill was shut off too quickly. (Let the motor run for 30 seconds after the last of the pods have been fed into the mill to ensure more thorough milling).

- Pods were put into the mill too quickly or at too great a volume. (Feed pods by hand into the mill more slowly. Don't mill more than 5 gallons of whole pods before stopping motor and cleaning chaff out of mill box.

#### **BELT COMES OFF MOTOR OR MILL PULLEY**

What do you do?

- Stop motor

- Check belt. If it is not broken, try to get it back on pulleys. Ideally you can do this without taking off belt guard. Get belt back onto pulley and then turn pulley to get rest on belt back on. If need be you can temporarily remove yellow belt housing, but this takes a lot of time, so if possible try to get belts back on pulleys without removing the belt housing. DO NOT run mill when people are working on belts or belt housing.

- You may need to tighten belt tension if belt keeps coming off. You can do this by turning bolt at back of mill to increase distance between motor and mill. Make sure you turn the belt the right way.

**WE NEED TO PROVIDE MORE INFO ON THIS including photo must keep motor and pulley aligned with mill and pulley**

### **MOTOR SOUNDS LIKE IT IS STRAINING, OR MILL BOX IS OVERFLOWING WHEN YOU OPEN IT UP TO CLEAN OUT CHAFF**

Why might this be the case?

- May be feeding pods into mill too quickly. (Feed pods into mill more slowly)
- May be milling more than one five-gallon bucket at a time before you clean out chaff. (Don't mill more than one 5-gallon bucket of pods at a time, before you stop motor and vacuum out the chaff from the mill box)

### **VACUUM IS CLOGGED OR WEAK**

Why might this be the case?

- Vacuum is full. (Empty out the chaff into chaff bucket)
- Vacuum hose is kinked. (Straighten out hose – make sure it does not touch hot exhaust box)
- Towel gets sucked up into vacuum hose. (Reverse flow of vacuum to blow out clog – you do this by taking hose off vacuum hole on the vacuum, and putting it on the exhaust hole on vacuum [opposite side of vacuum hole]).

### **VACUUM HOSE STARTS TO MELT**

Why might this be the case?

- Hose has or is touching the hot exhaust box on motor. (Make sure hose does not touch hot exhaust box. Place vacuum on the same side of mill and motor as the mill operator – away from the exhaust box.)
- Might be able to temporarily repair hose with duct tape (in ammo box)

- Notify Mill Coordinator ASAP after the event if a new hose is needed for next milling.

**FLOUR IS COMING OUT OF CRACKS IN DUCTWORK**

- Tape cracks with aluminum tape in ammo box

**FLOUR IS COMING OUT OF SEAMS BETWEEN DUCTWORK AND RUBBER BOOTS**

- Wrap seams with towels and bungee cords

## HOW WE RUN THE DESERT HARVESTERS MESQUITE MILLINGS (from Desert Harvesters website)

The following information describes how we run DESERT HARVESTERS-hosted milling events; events hosted by other organizations will be organized in nearly or entirely the same manner. *Please note that the pod-tasting, -quality, and -safety/health requirements are non-negotiable and must be observed at every event at which Desert Harvesters is providing milling and educational services.*

### MILLING SEASON

- Our DESERT HARVESTERS milling event is held in June *before* the summer rains, and during the peak of the traditional bean-tree harvests. Harvesting pre-rains is the best practice to **avoid invisible toxic molds**. See [here](#) for more on why pre-rain harvests are the traditional practice, and so important.
- Other organizations hire us for millings in October and November, when we are well out of the humid summer monsoon weather. This ensures that stored mesquite pods (not milled at the ideal time of June) have a chance to dry well and will not reabsorb moisture from the high dew point of the monsoon season. Moist pods bind up the mill.

### PIONEERING BEST PRACTICES

- Cultivating a **more attuned flavor palette**. We offer the opportunity to sample a wide variety of pod flavors, so you can determine where in the spectrum the flavor of your pods lies. You can then consciously seek out your preferred flavors in future harvests.
- Advancing the **safety of the harvest**. We share the latest best practices to promote a safe harvest free of toxic molds (visible and invisible) as well as educating you on the latest options for testing mesquite flour for aflatoxin.

### MILLING COST & VALUE

- **We charge \$3 per gallon of whole pods, with a minimum of \$10.** This generally works out to a cost of about **\$3 per pound of flour**. This is a bargain considering that the flour usually sells for \$14 to \$20 per pound.
  - Our milling process ensures that you always get the flour from the pods *you* harvested. (Your flour will have a greater value to you and your friends and family, as the flour you receive from our mill comes directly from the pods you harvested. Thus the flour is *uniquely of you* and your experience.)
  - In addition, you have the option of taking home the chaff from the milling of *your* pods at no additional charge. (Chaff can be boiled

down to make mesquite-based drinks, beer, broth, and more—yet another reward for selecting only the best-tasting pods.)

- This process allows you to attain the highest-quality mesquite products, as the flavor of your flour and chaff is ultimately determined by the flavor of the pods you harvest. See [Best Practices for Harvest & Processing of Mesquite](#), and be sure to read the Taste Before You Pick section.

## QUANTITIES OF PODS

- We encourage all those wanting to mill mesquite pods to harvest at least 3 to 5 gallons of whole pods so they will have at least a gallon of flour after milling. We charge a minimum of \$10 to mill any amount of whole pods, both to encourage folks to harvest more pods, as well as to cover the costs of operating, maintaining, and insuring the mill, as well as paying our staff.
- **We typically will allow individuals/households to mill up to 15 gallons of whole pods each at the public milling event.** (For those wanting to mill more than 15 gallons of whole pods, please see and make good use of our will-call service described in the next bulleted item below.) The reason for all this is because in the past, many people with only a few pods had to wait hours behind a few people with many pods. However, if there is no one else waiting to mill their pods at a public event, we could mill more than 15 gallons of pods for an individual.
- No individual, household, or family will be allowed to mill more than 45 gallons of whole pods, unless they rent the mill and pay staff at the daily/hourly rate. This is to lessen the chance of folks grinding pods for sale rather than personal use. If you want to grind pods for sale, we have a commercial rental rate for the mill and staff.

## MILLING-EVENT REQUIREMENTS

- Only clean, *dry* seedpods that readily “snap” when bent will be milled. If they bend rather than snap, they are too moist and will clog the mill. (See the [Harvesting and Storage tips page](#)). Pods must be clean and free of stones, dirt, leaves, and black mold otherwise they will not be milled. We will not risk damaging the mill or contaminating the flour. *Please note that these pod-quality safety and health requirements are non-negotiable and must be observed at every event at which Desert Harvesters is providing milling services.* Note: Carob pods can also be milled as long as at least 10 gallons of mesquite pods are also provided with which we can flush the carob out of the mill. This “flushing” will produce a delicious mesquite/carob flour blend that will go to whoever provides the carob and mesquite pods for milling.
- Those having their pods milled must bring food-grade containers into which we can place your flour (and optional chaff). If you don’t bring a

container, we can provide one-gallon zip-close bags to those who make a small donation to Desert Harvesters.

### CONVENIENT MILLING SERVICES

- Once your pods have passed inspection and the milling fee has been paid, you will be given a voucher for your pods, allowing you to enjoy other aspects of the event while your pods are moved through the milling process in your absence.
- We offer a **convenient will-call service** whereby you can drop your pods off for milling (*after inspection and payment*). Within about a week Desert Harvesters staff will mill the pods and **will call** the owners when the flour is ready for pick up at a location near Speedway & Stone. *If the flour is not picked up within 10 days of notification it becomes property of Desert Harvesters. There will be no refunds.* To take advantage of this service, we require the following:
  1. Bring your pods in *sealed food-grade containers*. We prefer 5-gallon plastic buckets with lids—you can often get these buckets with lids for free or at very low cost from bakeries, doughnut shops, and delis.
  2. Label each container *with your name, email, and phone number(s)* on *all* the containers.
  3. Get your pods *inspected* at the milling event and *prepay* for their milling.



## **INFORMATION YOU CAN SHARE IF PEOPLE QUESTION THE COST / VALUE OF OUR MILLING SERVICE**

Our mill typically grinds over 5 gallons of whole mesquite pods into about 1 gallon of flour in about 5 minutes.

If you were to mill 5 gallons of whole mesquite pods (typically weighing about 7 lbs.), this would likely result in about 5 lbs. of flour.

As mesquite flour typically sells for about \$14 per pound, that 5 lbs. of flour would be worth about \$70 (retail).

But at our milling fee of \$3 per gallon, your 5 lbs. of flour would have only cost you \$15, or \$3 per pound.

Furthermore, your flour will have an even greater value to you and your friends and family, as the flour you receive from our mill comes directly from the pods you harvested. Thus the flour is uniquely of you and your experience.

We have tried to keep milling cost as low as possible, while meeting our costs (insurance, training millers, paying millers, training and paying mill coordinators, maintenance of mill and trailer, and getting the word out on the millings). We are not profiting from this endeavor. It is a service we are providing to the community.

## Desert Harvesters Hammermill Rental & Mesquite Milling Terms

*Last updated June 10, 2016*

We, **Desert Harvesters**, barring inclement weather conditions or other circumstances beyond our control, look forward to working with you and providing the following for your Month Day Year milling event:

- a. The hammermill and associated equipment,
- b. Coordination of transportation for the hammermill and our staff,
- c. Gasoline to power only the mill motor, and
- d. *Two (2)* trained operators to run the mill.

**Please read, initial at the end of each item, sign and date at the bottom, and return this sheet with your non-refundable deposit to:** Desert Harvesters, P.O. Box 92, Tucson AZ 85702. \_\_\_\_\_

I, Host Organization Representative, on behalf of **Host Organization**, agree to the following terms in order to support a smooth, safe, and enjoyable event for all staff, volunteers, and attendees. THANK YOU! \_\_\_\_\_

**1.** Desert Harvesters is currently renting its hammermill for public events in hot, low-desert areas (below 3,500-foot elevation) from May 1 through July 4 only The latter date was chosen to assure the milling season concludes before the typical start of the summer rainy season (after which aflatoxin levels have been shown to be higher). The limitation does not apply to private (unadvertised) millings or to those taking place in cooler, high-desert areas. \_\_\_\_\_

This is intended to send a clear message to the public about the importance of harvesting mesquite pods *before* the rains to help ensure higher-quality harvests safe from [aflatoxin](http://www.desertharvesters.org/harvesting-processing/aflatoxins-how-to-avoid-them) (www.desertharvesters.org/harvesting-processing/aflatoxins-how-to-avoid-them). Similarly, this is why any Desert Harvesters-hosted milling events now happen in June.

See [here](#) and [here](#) for information about the study that informed this policy.

**2. Rental fee for the hammermill** is dependent on nature of renters' operations and location of the milling event. **Fees for non-profit groups are listed below. Other renters pay an additional \$100 per day.** \_\_\_\_\_

- \$175 per day for Tucson-area non-profit groups whose events will take place up to 40 miles from Desert Harvesters' mill-storage location in downtown Tucson.
- \$225 per day for Southern-Arizona non-profit groups whose events take place over 40 miles from said mill-storage location. In case the milling time runs

longer than six hours, the host organization must be prepared to provide a free place for mill staff and mill to spend the night. Meals for staff are appreciated.

**Advance payment of the hammermill rental fee is required as a non-refundable\* deposit** to secure your milling date and have your event published on our website and social media. \*Deposit is fully refundable only if Desert Harvesters explicitly fails to uphold its end of this agreement. \_\_\_\_\_

A **rescheduling fee** of \$100 applies to hosts wishing to reschedule their confirmed event who do so **at least 24 hours before the scheduled start time of their event.** \_\_\_\_\_

A **rescheduling fee** of \$100 **plus** any labor &/or travel expenses incurred applies to hosts wishing to reschedule their confirmed event who do so **less than 24 hours before the scheduled start time of their event.** \_\_\_\_\_

Hosts who **cancel** their milling for any reason, including weather, and opt *not* to reschedule will **forfeit one day's hammermill-rental fee plus any labor &/or travel costs incurred.** Note that the mill will not be operated in the event of *any* precipitation at the milling site. In addition, under humid conditions milling can take 3 times longer than normal, or more, while producing lower yields. \_\_\_\_\_

**3.** In addition to the hammermill fee, a **volunteer deposit** is due in advance to schedule your event with Desert Harvesters. If conditions in item 8, below, are met, this deposit will be credited toward payment of Desert Harvesters milling staff. If conditions in item 8 are not fully met, deposit will be used to pay an additional Desert Harvesters staff to oversee tasting, inspection, and ticketing station. Volunteer deposits are listed below. \_\_\_\_\_

- \$150 per day for Tucson-area groups whose events will take place up to 40 miles from Desert Harvesters' mill-storage location in downtown Tucson.
- \$200 per day for Southern-Arizona groups whose events take place > 40 miles from mill-storage location.

**4.** When conducting **publicity for its milling event** (e.g., press releases, flyers, website posts, etc), Host Organization must include a **link to the Best Practices for Harvest & Processing page on Desert Harvesters' website.** \_\_\_\_\_

**5.** Desert Harvesters strongly encourages Host Organization to:

- a. Send its members to **our annual pre-monsoon in-the-field harvesting workshop** in June, \_\_\_\_\_
- b. Conduct **its own annual pre-monsoon harvesting workshop** in its community, \_\_\_\_\_ and \_\_\_\_\_

- c. Consider organizing **pre-monsoon milling event(s) in its community**. \_\_\_\_\_

**6. *Host Organization*** agrees to use the **same milling-fee structure as Desert Harvesters** unless an alternate fee structure is approved by Desert Harvesters in advance. \_\_\_\_\_

**7. *Host Organization*** will be billed **\$20 per hour for each Desert Harvesters staff person** packing up, transporting, and operating the mill; set up and breakdown at the location of the milling event; cleaning the mill; & unpacking the mill at its storage location. *Note: Mill staff will work up to 8 hours per day (including packing/ unpacking, set-up, milling, breakdown, and cleaning). If completion of event requires working beyond these 8 hours, both host organization and mill staff must agree whether milling will continue that day. If the mill staff are requested to work beyond the 8 hours and agree to this, the overtime hourly rate for mill staff increases to \$30 per hour per person.* \_\_\_\_\_

**8.** Desert Harvesters requires reimbursement from *Host Organization* for **all-inclusive travel costs** to cover transport from mill storage near downtown Tucson to and from the milling site. Travel costs will be billed at the then-current federal per-mile commercial rate. \_\_\_\_\_

**9. *Host Organization*** must **provide trained and competent volunteers** to assist at the milling event. **At least three (3) volunteers must attend and successfully complete Desert Harvesters' annual tasting, inspection, & ticketing training session plus training to feed pods into mill. Volunteers are invited (but not required) to also attend our mill-operation training.** Training sessions are held annually in **June**. *At *Host Organization's* milling event, volunteers must be onsite, ready to work at least 30 minutes before milling is scheduled to begin. **If 3 trained volunteers are not confirmed by name 48 hours in advance, Desert Harvesters will send an additional staff person & retain volunteer deposit (see item 2) in addition to charging *Host Organization* for the 2 millers. We encourage you to send more than 3 volunteers to our training and schedule more than 3 of these trained volunteers for your event.*** \_\_\_\_\_

**10. *Host Organization*** must provide **electricity** to the mill site, via extension cord, to power a shop vac. This is needed for the milling as the hammermill requires frequent, thorough cleaning of its chaff chamber. \_\_\_\_\_

**11. *Host Organization*** must provide a spot with **sufficient natural shade (2 sizeable shade trees) or 2 moveable shade structures** for inspection of pods and ticketing functions. \_\_\_\_\_

12. *Host Organization* must provide a minimum of **four (4) 6-foot tables** (clean non-porous surfaces or covered with clean tablecloths) to be used as pod-inspection stations.

\_\_\_\_\_

13. As a representative of *Host Organization*, I have read the **Mesquite Milling Guidelines and Requirements** online at [www.desertharvesters.org/how-we-run-mesquite-millings](http://www.desertharvesters.org/how-we-run-mesquite-millings). In particular, I agree to inform attendees in advance of the listed pod-quality health & safety requirements and uphold these requirements at our event.

\_\_\_\_\_

\_\_\_\_\_  
Signature of *Host Organization* rep.

\_\_\_\_\_  
Signature of Desert Harvesters rep.

\_\_\_\_\_  
Print name & *Host Organization* role

\_\_\_\_\_  
Print name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date



**THE MARK OF QUALITY  
SINCE 1902**

***MEADOWS OWNER'S MANUAL***

***OWNED BY: DESERT HARVESTERS  
BRAD LANCASTER***

***EQUIPMENT SERIAL NUMBERS: HAMMER MILL - #5B-5419-02***

***5 Meadow Mills, Inc.  
1342 West D Street • Post Office Box 1288  
North Wilkesboro, NC 28659  
1-800-626-2282 • Fax: 336-667-6501  
e mail: meadowmills@worldnet.att.net  
website: www.meadowmills.com***

## BULLETIN 106

## Operating Instructions For Meadows Series 5 Hammer Mills

### No. 5 Mighty Marvel, No. 25 Trojan, And Nos. 35 And 35F Master Grinders

Domestic shipments are made as follows: No. 5 Mill — one cyclone support rod, one crane containing mill, collector, pipe, elbow and screens. Every mill is shipped with one screen installed. Nos. 25 and 35 Mills — one crane of parts containing collector, pipe, elbow and screens; one support rod, mill on skids. When delivery is made by carrier be sure to check carefully for damage or shortage. If any parts are missing or damaged have delivery agent make proper notation on freight bill so that claim may be filed. We are not responsible for loss or damage by carrier.

Export shipments are boxed, each box containing packing list with terminal list of contents.

#### INSTALLATION

**Location.** When located in building be sure to have plenty of space. Allow four or five feet on all sides of mill for inspection, lubrication, operation, etc. Mills placed in inaccessible locations are difficult to maintain and care for.

**Foundation.** For permanent installation secure mill to a solid level foundation. Four holes are provided for this to the angle iron base of the mill. A good, strong level wood floor is satisfactory. A concrete foundation is better, and, if used, wooden sills should be set in or on concrete under the mill. A piece of rubber belting between mill base and wooden sills or concrete floor is recommended. The wooden sills and rubber belting absorb noise, shock, and vibration. For farm use mills may be operated satisfactorily if mounted on heavy timbers and anchored against belt pull.

**Setting Up For Operation.** (1) Assemble collector by placing the support rod in the sockets on the side of mill and securing collector to rod, tightening nut washers or locknuts, and use a large plumb and rigid. Collector may be located some distance away from mill, but in this case another support for collector is used such as an improvised wooden frame. Additional pipe will be required. In placing the collector away from the mill, try to place it so that the pipe from mill to collector will be as nearly straight as possible, avoiding the use of more than one elbow, as elbows or curves will reduce the elevating capacity of the fan. (2) Fasten all pipe joints with wire and seal with friction, adhesive or mauling tape. This also applies to the fan outlet and is to prevent dust and air leakage. (3) Attach sucking spouts to collector under when they are shipped separately. Loops are provided for this purpose. (4) Attach the hopper to mill and fasten with the bolts furnished. (5) The No. 5 Mill should run at a speed of 3500 to 4000 RPM, and in the direction indicated by the arrow indicated on the mill. The Nos. 25 and 35 Mills should be operated at a speed of 5000 to 5600 RPM, running in the direction indicated by arrow. (6) Connect drive belt from mill to power, being certain that the pulley ratio and speed of power are such that the mill will be driven at the correct speed. See note pertaining to "V and F" Belts Drive. (7) See that proper size screen is in mill and that it is closed and locked in place with band clamps. (8) Check lubrication of bearings. Mill is now ready to start.

#### BELT DRIVE CONNECTIONS

**V-Belt Drive.** Care should be taken in align stresses accurately. Do not force belts onto the sheave pulleys, but slack off drive so that belts can be easily inserted. Tighten belts sufficiently so that no slippage occurs under rated load. However, avoid excessive tension. Protect belts from grease and oil and do not use belt dressing at any time.

Do not use a sheave smaller in diameter than recommended by the V-belt manufacturer for the size belt selected. Belt speeds in excess of 5000 feet per minute are not recommended for standard V-belt drives.

**Flat Belt Drive.** The belt should be just tight enough to carry the rated load without slipping. Belts of ample width will do away with the need for excessive tension. Where possible, make the bottom side of the belt the driving side. Vertical belt drive should be avoided.

The smooth side of the belt should be in contact with the pulley surface. Belt driving can be used on flat belts to greatest advantage.

#### OPERATION

**Proper Size Of Screen.** The size of holes in the screen determines the fineness of grinding.

- 1/16" for fine chop and feed
- 3/32" or 1/8" for medium fine feed
- 1/4" for stacked ear corn
- 3/8" for corn in the chaff
- 1/2 to 1" for corn chaff, pea or soy bean hay or other roughage.

**To Install Or Change Screen.** (1) Loosen band clamps which fasten screen down at top opening section. (2) Raise door and turn lock on the top. (3) Insert either end of screen between screen guides and slide into place. (4) By certain that screen is pushed all the way in so that it makes

contact with stop on breast plate on feed side of mill. If screen loads or does not slip into position it has been bent or become distorted and must be reformed or adjusted to fit the curve of guides. (5) Close door. (6) Lock into place with hand clamps. Do not run the mill unless the door is closed and fastened rigidly with hand clamps. To remove screen open top section, grasp exposed section of screen and pull toward you and spread until screen is removed from the guides. Always stop mill before changing screen.

**How To Feed The Mill.** The greatest capacity can be obtained by giving uniform feed that does not slow the speed. This is done in feeding small grains by allowing the feed control door with thumb screw until the grain flows into the mill at a uniform rate according to the ability of the power to maintain full speed. In feeding steeped corn or roughage the control door is turned back out of the way leaving the inside of safety door at a position against unground particles being thrown out. Avoid feeding a big quantity to the mill at one time, as this causes what is known as shock loads which reduce capacity and put unnecessary strain on the mill.

**Pre-Starting Check List.** (1) Check bearings for proper lubrication. (See lubrication instructions below). Bearings have been lubricated at the factory, but they should be checked before mill is started. (2) See that screen with the desired size holes is properly placed in mill, and against screen stop under breast plate, and that screen charge door or top opening section is tightly closed. (3) Check pulley on shafts to see that set screws have been properly tightened. (4) Place bags on stacking spot or bag table. Mill is now ready to do a good grinding job for you.

## MAINTENANCE

**Lubrication.** The bearings on Meadows Hammer Mills are ball bearings that enable the mills to run at high speeds. They are precision, expensive bearings and if they are given proper attention as to lubrication, will give long and satisfactory service. Just a little inattention will cause a bearing to fail, resulting in trouble and expense.

NO. 5 MILLS are equipped with Fabric 1" LAK Pillow Block Type Ball Bearings. The bearing assembly consists of bearing housing, ball bearing, and locking collar. There is an Altemco grease fitting on each bearing housing and this is the only point to be lubricated. Use a grease gun with a good grade of soft ball bearing grease (No. 1 or No. 2 consistency). Changing intervals depend on how much the mill is operated. Generally greasing the bearings should be greased every 100 to 200 hours of operation. Over greasing will cause the bearing to run unnecessarily hot.

NO. 25 and 35 MILLS are equipped with SKF Pillow Block Type Ball Bearings (SAF 1610 and SAF 1612 respectively). This assembly consists of bearing housing, ball bearing, bearing saddle with lock washer and lock nut, two retainer rings for power side bearing only, and two triple and rings for each bearing housing. A good grade of No. 60 weight motor oil is recommended for these bearings. There is an oil plug on the top and the bottom of bearing housings. The top plug is for adding new oil, and the bottom plug is for drawing our old oil and cleaning and flushing the bearing. The bearings are properly lubricated when they leave the factory and should run from 50 to 100 hours before additional

oil is needed. To add oil unscrew the oil cap on top of bearing. THE PROPER OIL LEVEL IS ONLY UP TO THE CENTER OF THE LOWEST BALL IN THE RACE. Do not over-lubricate. To do so will cause bearings to heat and oil to be thrown out through the oil rings and around the shaft. As a general rule add approximately 3 ounces of oil to each bearing every 20 to 60 hours of operation, or enough to maintain the proper oil level. If at doubt as to the amount of oil in the bearing, an accurate check can be made by removing the bearing cap and noting the exact level. To remove cap, unscrew the two nuts which hold the cap in position and lift off. In some cases it may be necessary to tap the side of cap with hammer in order to loosen it.

Be certain to keep your oil or grease container tightly closed and sealed at all times to keep our grit and dirt. Even your oil can become sludged up with corn cobs, wheat or paper when not in use.

At least twice a year, and more often when operating sandy or other dirty or cherty conditions, the oil should be changed in these bearings by draining the old oil out through the bottom hole, cleaning and flushing with kerosene. Be sure to see that all the kerosene is out and bottom plug is screwed in tightly before adding new oil.

Mills shipped from factory are lubricated with No. 60 weight motor oil and this is the lubrication SKF recommends.

A good grade of soft ball bearing grease may be used instead of oil. (No. 1 or No. 2 consistency). If grease is used remove all oil from the bearing housing and pack the housing HALF FULL of bearing grease. The oil plug on top of housing should be removed and replaced with Altemco grease fittings for grease lubrication. Lubrication intervals for grease should be approximately the same as for oil.

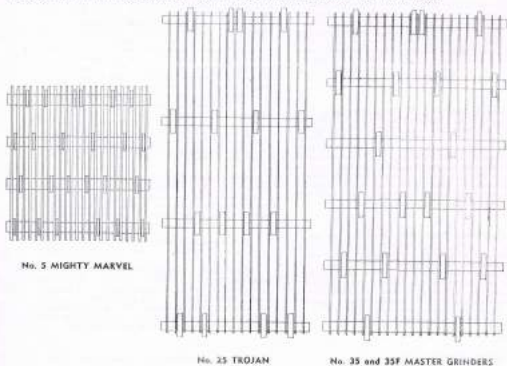
**Hammers.** Hammers are double-ended and have four wearing edges. When the cutting corner has become worn and rounded the capacity of the mill will be reduced and it is time to change cutting edges. The amount of grinding which can be done on each corner of a hammer before it becomes necessary to change depends on the type of material being ground. As a general rule, under average grinding conditions, each corner of a hammer should grind from 100 to 200 tons before becoming worn enough to be resharpened. If there is any sand or grit in the feed the hammers will wear much faster. The time change should be to turn each hammer so that the opposite edge will do the grinding, using the same hole for the pivot rods. The next change is to use the opposite hole and turn the hammers end for end.

To change hammers it is necessary to remove the pivot rods. Usually these rods can be removed easily, but if they have become buried from being in the same position for a long time and are difficult to take out, it is sometimes necessary on No. 5 Mill to disassemble the rotor. From time to time the hammers and pivot rods should be checked for wear and replaced before breakage occurs. It is a good idea to keep an extra set of hammers and pivot rods on hand at all times, as well as a good assortment of different sizes of screens.

**IMPORTANT.** In changing or replacing hammers be certain to see that they are placed in the same order of arrangement as shown by the hammer chart applying to your size mill. If the arrangement is any way other than shown by the chart the assembly will be out of balance and vibration will cause damage to mill and bearings.



DIAGRAMS SHOWING CORRECT ORDER AND ARRANGEMENT OF HAMMERS



**VERY IMPORTANT - NOTE WELL**

In changing or reversing hammers be sure to place exactly as shown by chart above applying to your size mill. Otherwise you will have trouble.

Your Hammer Mill is a high speed, heavy duty, precision machine and is built to give long and satisfactory service. As in the case of any machine of this type, it requires proper attention and maintenance just as automobiles or trucks which are being operated daily. In fact, if translated into miles for comparison, the *time* of the average hammer mill being operated 20 hours per week would travel approximately 120,000 miles in six months. The tips of the hammers would travel at a speed of 230 miles per hour. You can readily see that after 6 months of average grinding your mill must be thoroughly checked and inspected for wear. Nothing can be more disconcerting than to be faced with a breakdown just at a time when you have customers waiting or when you have live stock or poultry to feed. You will be out not only the price of the broken part, but also the expense of disassembling and reassembling your mill. Also when a part such as a bearing fails it is likely to cause damage to the shaft and entire rotor assembly.

In order to give your mill the attention and maintenance required, the following points should be carefully inspected after every 50 hours of operation:

- (1) BEARINGS: To see if properly lubricated. The useful life of a bearing which has been properly

mounted and suitably lubricated is limited only by "friction flaking" of some part of the load carrying surface. The bearings used on Meadows Hammer Mills are the best available and the manufacturers say have an average life of 2500 hours, after which they may be expected to fail. This is a conservative estimate and in many cases they will last much longer. However, it will be wise to consider replacement after they have been run for this period in order to avoid breakdown at some crucial time.

(2) **HAMMERS:** To see if they are wearing *uniformly*. If not they must be reversed or replaced with new ones.

(3) **HAMMER PIVOT RODS:** To see if they are wearing round and uniformly, and if not they must be replaced when one-third worn or cut.

(4) **FAN:** To see if it is wearing *uniformly*. Also fan case liner should be examined so that it can be replaced before it wears through and damages the fan case. The liner is an inexpensive part that prevents wear and gives longer life to fan case. If fan is wearing unevenly it must be taken out, repaired or replaced with a new one.

(5) **VIBRATION:** To see if vibration is developing. If it is, your mill must be put in balance. Excessive vibration will knock out bearings, loosen, and shorten life of mill. Every precaution should be taken to avoid vibration, and if it develops it should be eliminated as quickly as possible. Vibration is usually caused by uneven wear of hammers, fan, or both. The hammers can be checked by running the mill with hammers out, and the fan can be checked by running the mill without fan. When the fan or hammers are out of balance this must be corrected at once. A good machine shop should be able to balance the fan. If not, take it up with us and we will give any aid or instructions we can toward eliminating the vibration.

## WARRANTY

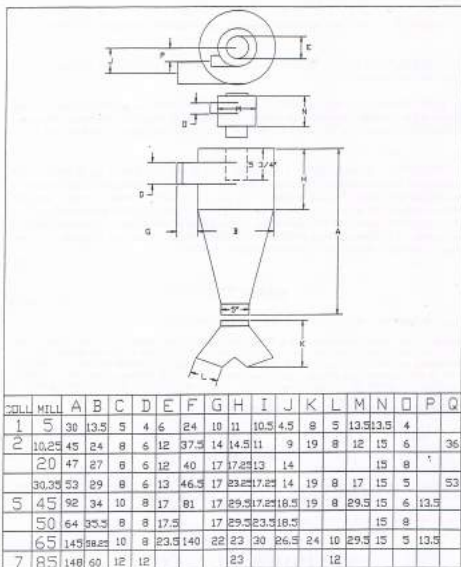
This guarantee applies only if Registration Card is properly filled out and mailed to us.

Meadows Mill Company guarantees each new mill to be free from defects in workmanship and material and will replace in O. B. Factory any defective parts within ninety days from purchase date provided such parts are returned to factory unaltered and subject to our inspection. We will pay no bills for repairs made outside our factory unless authorized by us and the above agreement shall not apply to any defects resulting from misuse, alteration, negligence, or accident. When defective parts are replaced free of charge it is agreed that the manufacturer is not liable for expense covering labor or any other expenditures that may be incurred in the replacement of defective parts. We reserve the right to incorporate changes in design without obligation to make these changes on units previously sold.

## CONCLUSION

Meadows Mills are honestly built by experienced workmen using the finest tools and materials. We do our best to make every machine so that it will give long and satisfactory service. If you will do your part and follow instructions you will be more than pleased with the performance of this splendid mill. If we can give you any information or be of service to you at any time, call on us and we will be happy to promptly respond.

**MEADOWS MILL CO.**  
North Wilkesboro, N. C., U.S.A.



## PRICE LIST

## HAMMER MILL V-BELT DRIVES

NO. 5 HAMMER MILL AND 5 HP 1800 RPM MOTOR

72-5703 MILL SHEAVE BK-40 X 1"	20.25
72-5705 MOTOR SHEAVE BK-80 X 1 1/8"	35.00
72-5126 V-BELTS 1-B-51	6.25
<b>TOTAL</b>	<b>61.50</b>

NO. 5 HAMMER MILL AND 7.5 HP 1800 RPM MOTOR

MILL SHEAVE 2BK-40-1"	34.00
MOTOR SHEAVE 2BK-80-1 3/8"	65.00
72-5126 2 V-BELTS B-51 @ \$6.25	12.50
<b>TOTAL</b>	<b>111.50</b>

NO. 25 HAMMER MILL AND 20 HP 1800 RPM MOTOR

72-5707A MILL SHEAVE 2TB52	52.50
72-5811A BUSHING Q 1 X 1 11/16	21.50
72-5709A MOTOR SHEAVE 2TB110	80.95
72-5819 BUSHING Q 2 X 1 5/8	24.50
72-5164 2 V-BELTS B103 @ \$11.00	22.00
<b>TOTAL</b>	<b>201.45</b>

NO. 25 HAMMER MILL AND 25 HP 1800 RPM MOTOR

72-5707A MILL SHEAVE 2TB52	52.50
72-5811A BUSHING Q 1 X 1 11/16	21.50
72-5709A MOTOR SHEAVE 2TB110	80.95
72-5820 BUSHING Q 2 X 1 7/8	24.50
72-5164 2 V-BELTS B103 @ \$11.00	22.00
<b>TOTAL</b>	<b>201.45</b>

NO. 35 AND 35P HAMMER MILLS AND 40 HP 1800 RPM MOTOR

72-5716 MILL SHEAVE 3TB80	67.40
72-5814 BUSHING Q 1 X 2 3/16	21.50
72-5717A MOTOR SHEAVE 3TB124	124.30
72-5814A BUSHING Q 1 X 2 1/8	21.50
72-5166 3 V-BELTS B-105 @ \$11.15	33.45
<b>TOTAL</b>	<b>268.15</b>

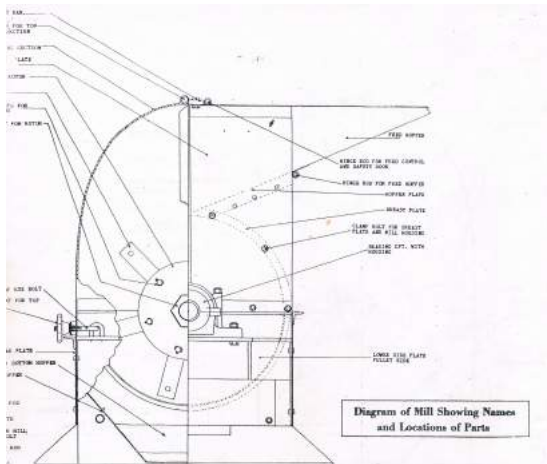
NO. 35 AND 35 F HAMMER MILLS AND 60 HP 1800 RPM MOTOR

72-5722A MILL SHEAVE 5TB54	84.40
72-5814 BUSHING Q 1 X 2 3/16	21.50
72-5723A MOTOR SHEAVE 5TB110	169.75
72-5815B BUSHING Q 1 X 2 3/8	21.50
72-5164 5 V-BELTS B103 @ \$11.00	55.00
<b>TOTAL</b>	<b>352.15</b>









PART NO.	NAME OF PART	WELL. M.D.	NO. 1	NO. 25	NO. 55	NO. 217
			DEEP. WT.	DEEP. WT.	DEEP. WT.	DEEP. WT.
1005	Lower Feed Plate		8	18	11	11
1006	Lower Feed Plate		8	18	11	11
1007	Lower Feed Plate		8	18	11	11
1008	Bottom Hopper		2	21	19	18
1009	Bottom Hopper		2	21	19	18
1010	Bottom Hopper		2	21	19	18
1011	Access for Bottom Hopper		1	1	1	1
1012	Access for Bottom Hopper		1	1	1	1
1013	Access for Bottom Hopper		1	1	1	1
1014	Fan Support Chain		8	21	19	18
1015	Fan Support Chain		8	21	19	18
1016	Fan Support Chain		8	21	19	18
1017	Wood Cover for Fan Support Chain		1	1	1	1
1018	Fan Housing, Outside Wall	15	1	1	1	1
1019	Fan Housing, Inside Wall	18	1	1	1	1
1020	Fan Housing, Outside Bracket	8	1	1	1	1
1021	Fan Housing, Cover Plate	11	1	1	1	1
1022	Fan Housing	11	1	1	1	1
1023	Fan Housing	11	1	1	1	1
1024	Cover for Fan Housing, 24" x 24"	11	1	1	1	1
1025	Cover for Fan Housing, 24" x 24"	11	1	1	1	1
1026	Discharge Tray for Fan Housing	11	1	1	1	1
1027	Discharge Tray for Fan Housing	11	1	1	1	1
1028	Fan Housing Support Bolt, 1/2" x 1 1/2"	11	1	1	1	1
1029	Fan Housing Support Bolt, 1/2" x 1 1/2"	11	1	1	1	1
1030	Fan Housing Support Bolt, 1/2" x 1 1/2"	11	1	1	1	1