1-CUBE s. r. o.

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Grain Cutter

- *Simple design principles ensures non-skilled operatives achieve rapid and reliable splitting*
- *Stainless steel construction for easy cleaning.*
- *Large field population attests the product's durability and reliability*
- *Minimal maintenance*
- *Simple lubrication.*

The Pneumac grain splitter has been designed to reliably and accurately split barley or wheat grains with the intention of exposing the germ in readiness for viability stain testing.

Constructed from stainless steel for visual durability and ease of cleaning, the simple design was conceived for use by unskilled operatives in either laboratory or field environments. The split grains are separated and then collected in small trays that lock into the machine to ensure minimal spillage.

A few simple design elements have been combined here to produce a reliable functional machine that is both intuitive to use and maintain. Demand, rather than advertising, has resulted in a significant field population. The product has been well proven in many parts of the world.

OPERATING LEVER
"V" CLAMP/BLADE GUARD /EJECTOR
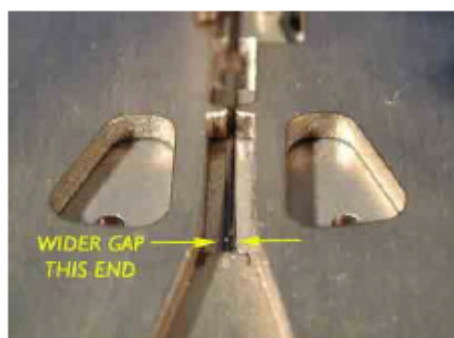CUTTING BLADE
SPLIT ZONE & END STOP
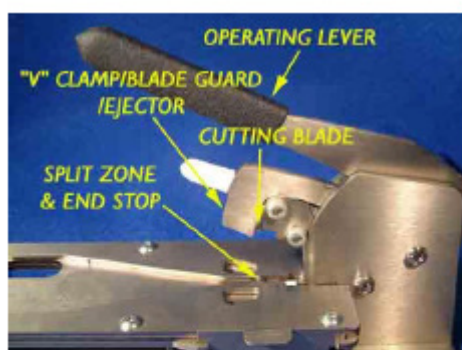
The Pneumac grain/seed splitter has been designed to give accurate cutting over long periods without significant maintenance. To help achieve this goal it has been manufactured from stainless steel which is a hard wearing and mechanically stable material. It is important that the seed/grain samples are not contaminated with lubricant. However, without lubrication at certain key points, premature wear WILL occur. The following procedures show how careful and regular lubrication can be achieved without risk of contaminating the samples.


To achieve good splitting it is desirable that the germ end of the grain is slid into the small slot in the end stop. This guarantees the germ is centrally split even if the rest of the grain is not aligned properly. Experience has shown that the "V" shaped clamp will usually pull the grain into good alignment and symmetrical splitting will occur even if the germ end is not against the end stop.
This picture shows a grain that has been clamped (and thus aligned) and been cleanly cut but not ejected..


WIDER GAP THIS END

The gates are purposely designed with a wider slot at one end to allow for distortion at the blade tip that occurs when cutting low moisture content wheat grains. For this reason, it is important that the grain is slid up to the end stop and ideally located into the central gap. If a very thin grain is placed into the split zone, its small cylindrical geometry (plus the fact that it will usually be very hard) will often mean that IT, not the "tooth," will force the shutters apart and the blade will then push it through without splitting it.

GRAIN CLAMPED
ZERO GAP SHOWS KNIFE STILL UP
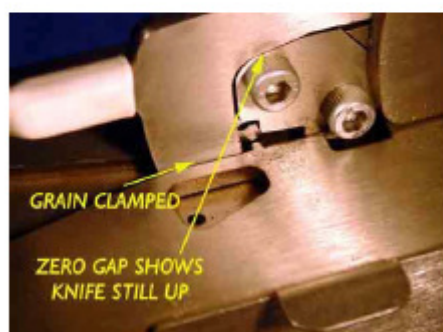
When the operating lever is pulled down there are three distinct phases to the cutting cycle which can be felt. The first resistance is felt when the "V" clamp aligns and locks the grain. At this point the knife has still not yet started cutting the grain.

KNIFE PASSES
THROUGH GRAIN
(GAP OPENS)
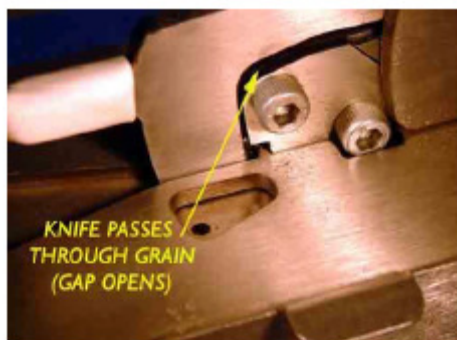
Phase two occurs as the knife passes right through the grain whilst it is still clamped. The handle then experiences distinct resistance as the "tooth" cam engages with the shutters.

"V" CLAMP
BECOMES EJECTOR
(GAP CLOSES AGAIN)
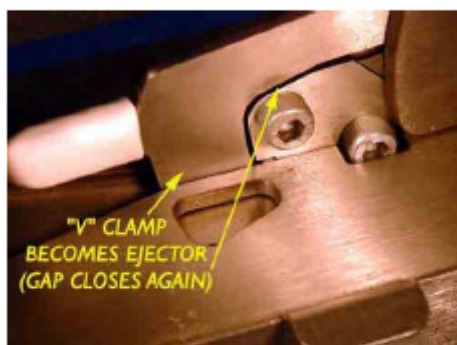
Further pressure on the operating lever opens the shutters and allows the sprung loaded "V" clamp to pass through the shutters, thus acting as an ejector to send the split grain into the two collecting trays.

Provision to clear any residual test grains has been made. One of the sample trays can act as a collector tray.

RECOMMENDED LUBRICATION

The splitter is supplied with a small oiler pen that contains a suitable lubricant. DO NOT USE LIGHT MULTIPURPOSE LUBRICANT. Any multi-grade engine oil or gearbox oil can be used. These oils contain additives that will resist high pressures (surface stresses) and will protect key features against wear, HOUSEHOLD OILS WILL NOT! It is not possible to accurately recommend a lubrication interval because all users will operate at different capacities. Typical test sample batches are 50 grains (50 operations). Some sites may be doing several thousand cuts per day (heavy users) and others several hundred. (Light users)

For both heavy and light users, 3 or 4 drops of oil each side of the operating lever each WEEK will be adequate.
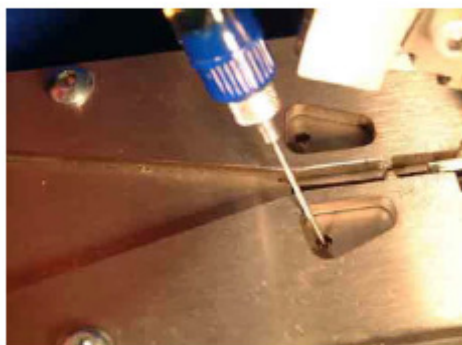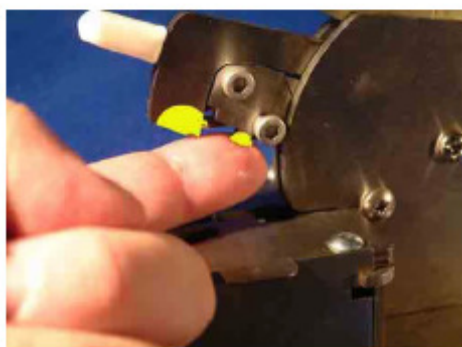
For both heavy and light users, 1 or 2 drops of oil in each shutter each WEEK will be adequate.

For heavy users "tooth" lubrication should be done approximately every 2000 operations (40 to 50 tests) For light users, once a day would be ideal.

Put 2 or 3 drops of oil onto a finger and ....

Apply a film of oil to both faces of the "tooth" and then apply a smear to each face of the "V" clamp. Note! Too much oil on the face of the "V" clamp will transfer to the shutters and could contaminate the sample. So, make sure it is just a film by wiping away the excess with a clean finger or a paper wipe. An invisible film will remain but this is adequate to ensure smooth operation.

LOW LEVEL MAINTENANCE

The shutters have a tendency to collect husk debris beneath them. This is not normally a problem because the shutters have been designed to be self purging. A quick test to check the shutter action is to use something pointed in the shutter lubrication hole. Pull the shutter open 3 or 4mm then release the shutter quickly and it should move back to centre quickly and sit against its stop. If the response seems sluggish, then it's likely that the long term combination of oil and husk dust has combined to make a sticky "grease".

The machine has been designed to make maintenance of the shutter system very easy. Use a 4mm hexagon key to remove the 6 top plate retaining screws. Place them in one of the sample trays for safe keeping

Slide the top plate off and wipe any oil from the underside
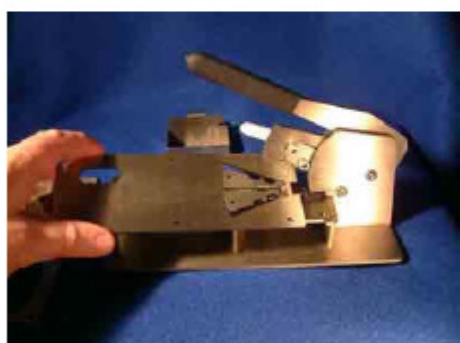
Carefully remove the shutter plate and place it on a clean flat surface before dissembling the shutters and springs. The polymer springs are circular when new but after a short time take up a distorted shape close to their assembled "squashed" shape. This does NOT impair their effectiveness.

Wipe any debris from the plate and from the shutters

Remove the shim plate and wipe it clean. Note the shim plate is not stainless and some additives in certain oils may cause staining.
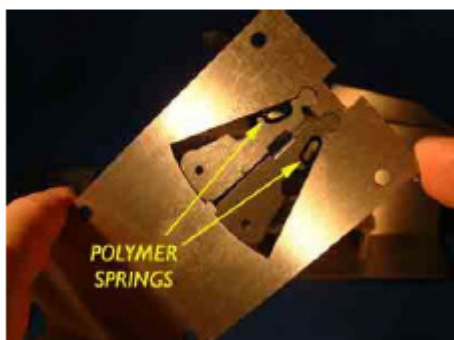
The main bed plate will now be exposed. Wipe any debris and oil from the surface.

The bed plate should be oiled all over with a THIN film of oil (5 or 6 drops of oil smeared around with a finger tip) and the shim plate aligned on top

A thin film of lubricant should also be smeared on the top face of the shim plate to prevent the risk of moisture ingress.

POLYMER SPRINGS

After cleaning, reassemble the shutter plate, making sure that the polymer springs are in the correct slot and pushed flush/sub-flush to the surface. Assemble and align it on top of the shim plate.

NOTE CUT-OUT FOR THIS SCREW
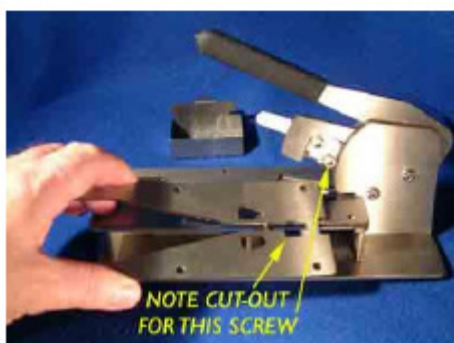
Slide the top plate into alignment with the other plates and drop the 6 screws back into position. Screw the 6 fixings in about 2 turns each to ensure full alignment of all plates and then fully tighten all screws.

CHANGING THE BLADE

Changing the blade is not a regular task because blades last a long time on normal moisture content grain. The first time you change a blade it may be a good idea to completely remove the clamp screws and the blade clamp plate to see the blade location shim and understand how it locates the blade into a specific position. Replace the clamp plate and tighten the screws without the blade in place. You can now proceed as if it was a normal blade change.

Loosen the two clamp screws by about 1/3 of a turn each.

The blade can now be withdrawn and replaced by a new blade, sliding it CAREFULLY back into the location slot. Make sure it is fully home in the slot before re-tightening the two clamp screws.

When the blade has been fitted, take a few seconds to carry out this simple check to ensure correct functionality. Lift the "V" clamp clear of the blade with the white handle and check that the blade passes into the gates before they start to open.