

## **An overview of the intake process from the vehicle and load entering the site.**

### **IN BRIDGE**

Ensure that the vehicle is correctly positioned for weighing. Stripe the Driver Passport and then the **Grower's Identification Card (GIC)** through the reader. The grower details and validity of delivery appear on the screen. If the details are correct the barrier will raise to allow the drive onto the site.

The computer will show a flag for quality. If a grower has been flagged, the local system for flagged grower inspection shall be instigated.

Stripe the **Vehicle Identification Card (VIC)** through the reader and the weight will then be displayed indicating whether an official sample is required or if single or double stub card(s) shall be issued. The stub card(s) is printed; it is not very often two cards are printed. This is usually for a very small contract and double sample or a random double sample.

The in-bridge receipt is printed and the top copy is handed to the driver together with the GIC, stub card(s), Inspection card (if issued) and VIC. The drivers are used to the system and the whole procedure takes less than a minute if there are no issues.

### **OUT BRIDGE**

The out bridges are driver operated but monitored should there be an issue. The driver shall stripe the VIC and then his Driver Passport through the reader to collect his out bridge receipt.

In the event of a lorry unable to weigh out due to a missing ABS striping, a supervisor shall be informed. The supervisor shall carry out an investigation, and if necessary apply an ES (Extra Sample) flag to the grower.

### **WEIGHBRIDGE ERRORS**

If an error appears after completion of either an in bridge or out bridge transaction, the British Sugar person shall be informed and if necessary the NFU is informed either immediately or during the day depending on the type of incident. These are recorded by the NFU.

### **STUB CARDS**

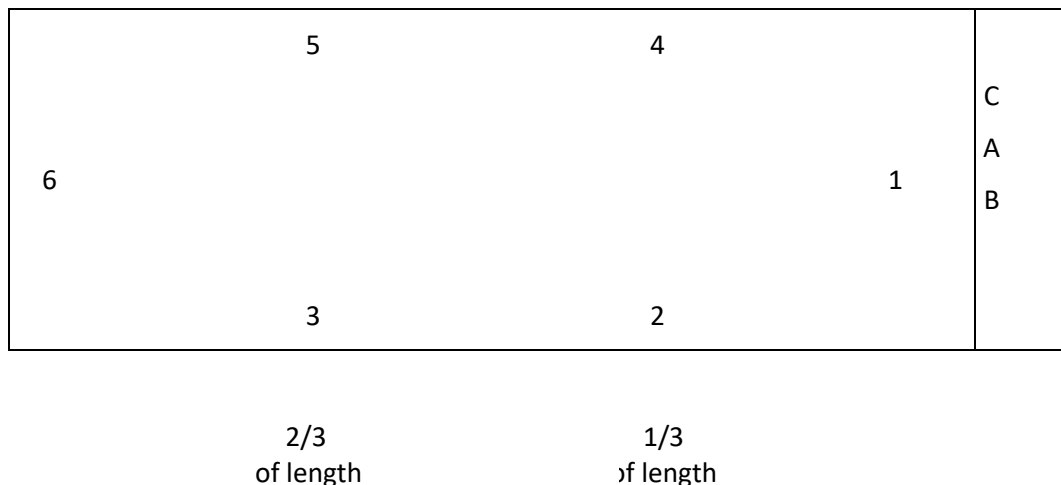
Each sample of beet taken is identified by a Stub card. These bar coded cards are serially numbered and are the means of control to validate entries into the account. In all cases the 6 digit numbers on the cards are prefixed by the factory number. Where a sample is required, a stub card shall be automatically printed. Double samples shall be taken from small growers (Contract size is less than 300 tonnes and load size is over 15000 Kg). Small growers tend to bring in their beet with a tractor and trailer.

### **PROCEDURE**

Take stub card from the driver and stripe through reader, this action records and displays stub card number, sampler number, sample position and if an official sample is required. It also alerts the operator to loads requiring inspection. Where a 'double' has been issued, two samples shall be taken, from different sampling positions. When two samples are taken, the grower received and average figure for payment.

The driver will position the lorry in the bay so as to enable the sample to be taken from the position indicated. The ABS stations have a visible means of identifying the sample position by means of a light system or number system. The BIR can check against this to make sure the correct procedure is being followed. If you are not satisfied then STOP the process and call the Supervisor to make sure the correct sample point is being used.

### **SAMPLING POSITIONS**



The edge of the barrel must not be more than 300 mm from the side/front/back of the vehicle. Where vehicle design prevents this (curved base, easy sheet fitting, hidden ram etc), the side/front/back of the vehicle shall be defined as the point at which the probe barrel is able to sample the full depth of the vehicle.

Depth of sampling shall be such that the tip of the flights on the lower edge of the barrel shall reach to approximately 50 mm from the vehicle bottom.

Care shall be taken to ensure that vehicle bottoms are not damaged. If the barrel hits an obstruction when the sample is being taken, a supervisor shall be informed, who shall undertake a further depth check of that equipment and check the vehicle markings.

The positions are subject to being free of metal ties or if there is a dip in the load at this point the ABS operator has the option to position the probe as close as possible to the site but be also to take a full sample (approx.120Kg)

Handling of official samples in the shaker shall be prohibited. All of the sample must be used as sometimes a large beet will be on top and the temptation is to knock it off.

### Official Samples

**This is a very important part of the procedure and is monitored by CCTV cameras overseen by the NFU.**

**Important points are:**

- **Ensure the whole sample is used**
- **Ensure the sample is not handled in any way**
- **Ensure the sample bucket is not stopped or removed until the whole sample has gone down the shuttle chute. (Stopping the chute early is actually to the grower's advantage as some dirt will be left behind).**
- **Ensure the bucket is spinning before the sample is allowed to drop**
- **Ensure the sample is at least 12Kg if not ask for another sample to be taken and the operator MUST NOT ADD EXTRA BEET to make up the sample**

Move sampler probe out over the load and lower the barrel towards the beet. The sampler unit will penetrate the load, retract, go back to the shaker feeder and discharge the sample. The 'flight shake' mechanism shall be used to ensure that the barrel and flights are completely clear of sample material.

If the contents of the sampler are lost before discharge into the shaker then a new sample shall be taken. If necessary, the operator shall record the presence of any required quality parameters on the computer

terminal. The operator will also record any observations onto the screen. These will then track with the sample and be added to the overall comments for the load.

During the sampling cycle a clean and empty bucket shall be placed in the splitter, there must be no other soil or contamination in the bucket as this will affect the results for the next sample. The stub card is placed into a screw top plastic container and placed in the bucket for that sample. The stub card inside its container placed in the bottom of the bucket and the splitter rotation started.

When all the contents of the sample including soil, stones, clods and suchlike have moved down the shaker (including any material cleaned from the shaker surfaces), the splitter shall be stopped, and the sample removed. The sample is placed into a cage and the time of the first sample is written on the cage so the lab knows which samples to process first. This is very important as there is a time limit of 24 hours for each sample to be processed within.

When a sample of the correct size has been taken and the operator is satisfied that the load is acceptable, the wagon shall be given the signal to move off. The operator can hold a wagon for any reason and will usually radio the Supervisor to notify them. The BIR has a radio so will also be informed and able to attend the incident to observe the correct procedures are being taken. The BIR has the right to ask /demand another sample to be taken.

The NFU has a good relationship with the intake teams and it would be unusual for a request to be turned down. If you are not happy then don't be afraid to escalate the situation as the NFU team is there to make sure the grower is fairly represented and will not be out of pocket.

## **OVERWEIGHT'S**

Set 2.5% (overweight) & 5% (grossly overweight)

These are also subject to the transport laws and the police may be watching the wagons. It is not unusual for the police to be at the yard and sample wagons as they enter the site.

The NFU keeps a record of these and a copy is kept in the office. Drivers will be banned from delivering if they flout the rules as they are a health and safety issue as well as a legal issue.

## **SUSPECT DELIVERIES**

**The following procedure is to be used for dealing with suspect deliveries. This applies only to deliveries which are reasonably believed to have been deliberately rigged to deceive beet reception staff.**

**Incidents of this type are rare. When they do occur, however they are usually contentious and can lead to legal proceedings.**

Sample the vehicle using normal procedures. It is important to do this to confirm whether any non-beet material has been picked up in the sample. The vehicle is moved from the sampling bay to an area where it can be inspected. This is so a careful inspection of the vehicle can be carried out by the Agricultural Operations Manager and the Beet Intake Supervisor with the BIR or the Manager observing the process. We are there to watch and cannot offer comments or take pictures. If the load is cleared then it goes back into the system and if it is not then the load is rejected and the farm may be investigated.

## **FACTORY AVERAGES**

In the event of machine failure and as a last resort to avoid long delays for vehicles in the Beet Intake area or when samples cannot be analysed in the Tare house then the system below can be used to obtain growers average for payment purposes. This has happened when all of the ABS's broke down and no samples could be taken. All of the growers were given and factory average.

The **Head of Agricultural Operations who will discuss the situation with the NFU Chairman** to ensure the figures used will be a fair reflection for that period of time and not disadvantage the growers.

## **ACCEPTANCE OR REJECTION OF DELIVERIES**

All incoming loads shall be visually inspected and conditions for acceptance shall be in accordance with clause 16a of the IPA. This is done at the wash off or when unloading on the pad. If there is an issue the BS staff will call the BIR to watch and record. The BIR can ask for the load to be put on hold until they can observe the load as a NFU representative must be present whenever a load may be rejected. If BS accepts the load, then that is their decision the NFU is there to observe and not offer an opinion.

A load may be rejected for a number of reasons:

- Excessive dirt or mud
- Excessive clods
- Deteriorated roots, which will be low in sugar and also slow down processing as they can be sticky
- Excessive grass and greenery

British Sugar will contact the grower should a load be rejected.

## **Automatic Beet Sampler (ABS)**

Depth control test operation (monitored by the BIR)

Sample position lights on (monitored by the BIR)

The ABS has a number of specifications for manufacture which are checked. Every ABS has the same equipment made to the following specifications.

	<b>MkII</b>	<b>MkIII</b>
<b>Barrel</b>		
Sampler barrel diameter	482mm	482mm
Sampler barrel length	3.6m	4.2m
Ground Clearance	3.96m	4.6m
Stroke of main cylinder	3.05m	3.7m
Depth of sampling band	0.92-2.14m above ground level	
Barrel Rotation speed	19 r.p.m.	
Traverse speed	27.4 m/min	
Fast downward speed	16.8 m/min	
Retraction speed	16.8 m/min	
<b>Shaker/Feeder</b>		
Trough length	3.6m	

Trough Stroke	38mm
Trough inclination	1:33
Number of baffles	2
Baffle plate and related dimensions	see STD-BP-032 App B
Revolution speed of motor	1420 r.p.m.
Revolution speed of flywheel	306 r.p.m.
Crank throw from flywheel	19mm

### **Splitter**

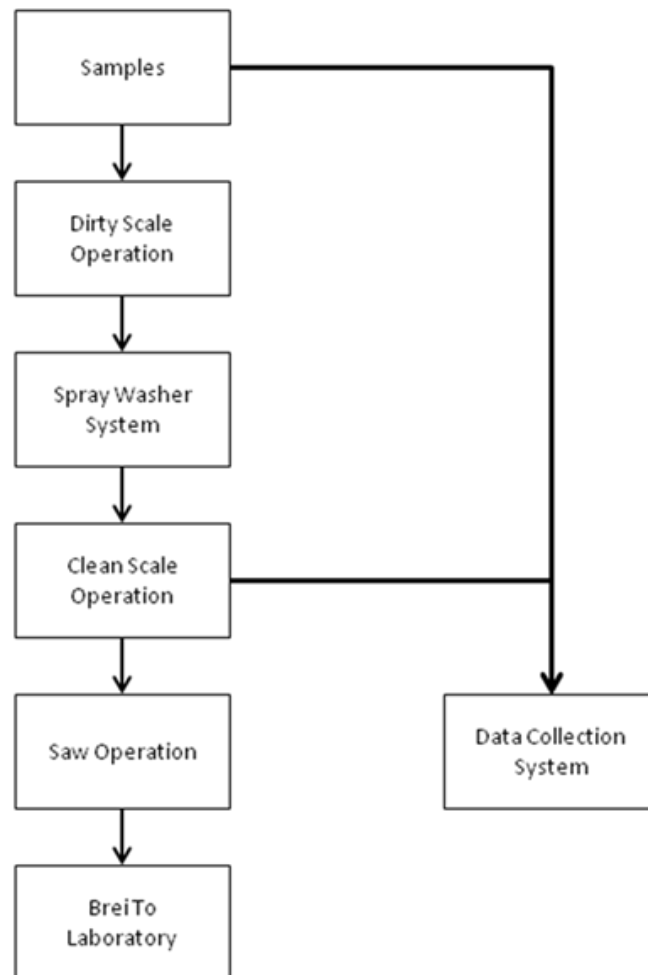
Bucket holders	800mm centres mounted 180 degrees across centre shaft
Depth of rim of bucket in bucket holder from top edge of outer casing	25mm
Depth of splitter casing below end of shaker feeder	76mm
Bucket Holder drive shaft	21 rpm ( $\pm 1$ )

### **UNLOADING**

After the load has been sampled the wagon proceeds to either the pad to unload or to the wash off area (depending on the factory). The wash off area is a good place to observe the loads to get an overall view of the beet being delivered. The pads are used for storage for the factory and will usually hold no more beet than can be processed within two days.

The Elfa Wash operators will control the amount of beet being sent to the factory as the process needs to flow smoothly and simply swamping the flume will result in backing up and possible breakdown of equipment. The operators have readout of beet being processed and work to maintain this figure because sometimes it may seem that the loads are being stopped but the reason is to maintain the slice rate figure rather than unload all the beet at once.

### **Overview of the Testing Laboratory**



## **TAREHOUSE**

### **DIRTY SCALE**

The operator is responsible for correct weighing and data collection of the contents of each sample bucket at the dirty scale operation. This involves the sample buckets being off loaded from the cages in chronological order following the times written on the cage.

The scales are checked hourly with the weights provided. The system will freeze the scale and it cannot be used again until a successful check has been completed and recorded into the system. It cannot be overridden or by passed. The NFU Tarehouse Representative will check the scales and note any issues.

The contents of the sample bucket shall be transferred to the pan which has previously been tared to zero. The bucket will be scraped to ensure that as far as practicable complete transfer of the bucket contents is achieved so there is no mud or bits of beet left in the bucket.

The plastic pot with the stub card is opened and scanned to record the identity and weight of the sample. The stub card has no way of identifying the grower so the operator cannot manipulate a sample should they want to. The TR will also monitor the process to ensure all the contents of the sample are included. The TR has the authority to stop the process and ask the Supervisor to review a sample. It is also important to check the floor as sometimes bits can fall out and not be included in the sample. Even a small amount can affect the results so keep vigilant.

Each sample shall then be weighed and the weight recorded against the specific stub card identification on the data collection system.

The weighed and recorded sample shall then be put into an empty sample spray washer. The doors cannot be opened if there is already a sample in them to prevent cross contamination of samples. If this does happen it is obvious at the clean scale due to the sample size.

A corrective action is to average the growers results and manually enter this into the system to give a result. This is recorded in the Tarehouse diary and under manual inputs so it can be traced should there be a grower complaint.

The spray washer is now in use by activating the button and this turns the light from green to red and the door cannot be opened.

## WASHERS

PARAMETER	SPECIFICATION	TOLERANCE
Washer speed	7.0 r.p.m. *	+/- 0.5 r.p.m.
Slat gap size	7.00mm	+0.02/-0.35mm
End gap size	=<7.00mm	N/A.
Nozzle orifice	2.4mm	+0.6/-0.0mm
Spray water pressure at nozzles	11 bar	+/- 1 bar
Spray water temperature	<30 °C	N/A.

The washer has two spray bars and the barrel is made up of 42 slats with gaps of not more than 7mm. The washers are measured at the end of each season and those within the tolerance are used again with the out of tolerance barrels being replaced. The water temperature is monitored by the NFU from the gauge on the wall. Warm water will affect the result in favour of BS so ensure the water is the correct temperature and the NFU will stop the process if necessary as this will affect the sugar result.

The water pressure must be sufficient to clean the beet of soils to ensure clean beet is sampled. The reason for this is that soil contamination will affect the angle of refraction in the polarimeter giving a false reading which will affect the grower. The washer nozzles are checked weekly and any spray bars are replaced if they fall out of tolerance.

## CLEAN SCALE

The operators are responsible for correctly weighing, sorting, and data collection of the component parts of the clean scale sample tray.

They record any

- excessive soil or mud
- Stones (including concrete, bricks tarmac)
- Greenery
- Deteriorated roots
- Clods or clumps of soil

This is always the area of contention with growers as they will usually argue if there are stones or clods or excessive soil. It is very important that the NFU is monitoring this area constantly to ensure all the procedures are followed. Check on the floor or make sure the tray is empty before the final weight is recorded.

The scales are weight checked hourly the same as the dirty scales.

The operator shall ensure that all sample material is in the clean scale tray and the sample spray washer is clear. The operator will check the beet for cleanliness and scrape dirt off if necessary with the scraper provided. This is very important as any crevice with soil attached may affect the result.

The operator shall then remove the tray, indicate that the washer is ready for use by pressing the button to allow the next sample to enter.

The plastic container is opened to remove the stub card. This is then scanned into the data collection system and will follow the sample. This can be monitored on the computer in the lab. The stub card is placed into a container for disposal.

The beet is removed from the tray, placed on the scale and the weight recorded. Any clods, stones or greenery will be removed and weighed on the scale underneath the scanner. These are entered and recorded in units of 100g. Only beet will enter the saws as stones will obviously damage the saws.

When the data is secure the saw sequence shall be put into operation and the beet presented to the saw to allow a sample to be taken. The saw, (in effect makes a sawdust of beet) cuts at random points and the paddles allows the beet to be pushed around for 28 seconds before the trap door opens and the beet is sent into the main flume and onto the factory.

The sample is called a BREI and is passed to the metal containers which transport the sample to the testing laboratory.

If a stub card is missing a supervisor shall be called and every effort is made to identify the sample. The NFU must be vigilant and keep up with the processing of the samples.

Samples shall not be stacked during the clean scale operation, i.e. only one sample shall be in process on the bench at any one time otherwise the samples may be cross contaminated.

## **TESTING LABORATORY**

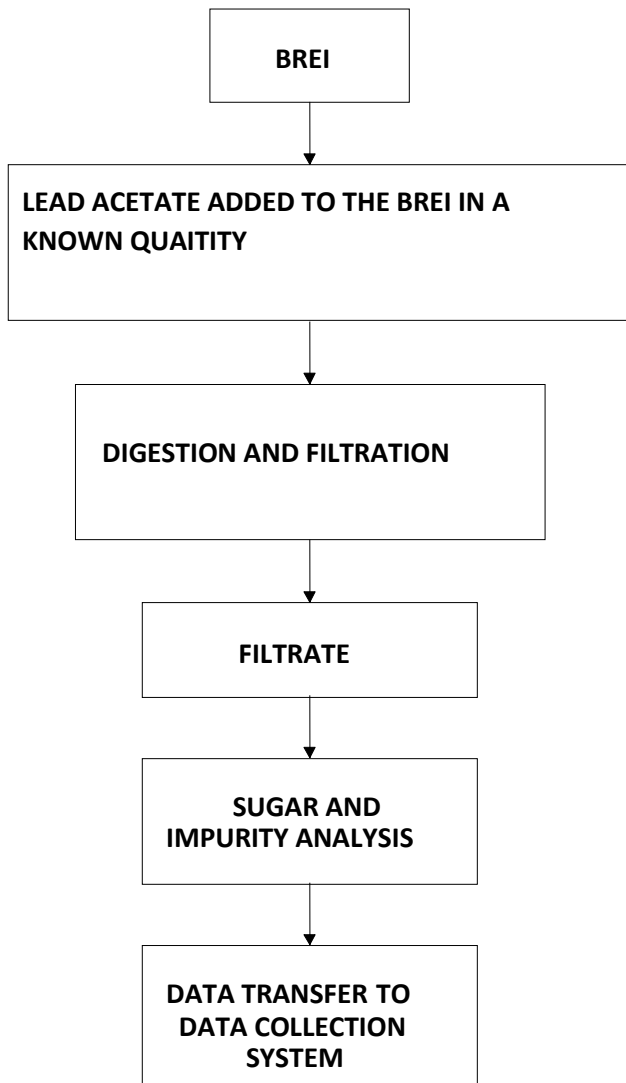
### **START UP**

Ensure all brei bowls are in place.

Check that Impurity Meters, Clarifiers, Thermocirculators, and Polarimeter are switched on, calibrated and functioning correctly. The lab computer will record the start-up results.

The sample follows this path.





**In more detail:**

A vacuum spoon is used to remove a sample from the container of more than 22g and less than 30g. If the sample is out of this range the operator will stop the process and add or remove the brei.

The dispenser shall work in the range of 22-30 grams. It shall add the correct amount of dilute basic lead acetate for any weight of brei within that range.

The rest of the sample is disposed of and the container is cleaned to prevent any cross contamination.

**Lead Acetate**

This is added to the sample following a formula (found in the IPA)

$$\text{Weight of lead dispensed} = \text{Brei weight} \times 6.846$$

Each sample beaker with the brei and lead acetate will be sent along the track to nine points before being tipped into the analyser.

1. Lead acetate is added
2. Stirring clockwise
3. Resting
4. Stirring anti-clockwise
5. Resting
6. Filter aid

7. Stirring clockwise
8. Resting
9. Tipping into the filter paper

After solution discharge, each beaker shall be automatically washed and dried before being used again to avoid cross contamination.

### **Filtration Unit**

The sample passes through two layers of filter paper to leave only a liquid. This liquid passes into the testing machine.

### **Testing**

The sample is now split to be tested for Amino, Potassium and Sodium contents.

The temperature of the incoming sugar sample must be 20°C as a temperature variation can also affect the result due to differing density of water solutions. Each machine has a readout which can be checked.

The solution is now passed through a polarimeter which uses refraction of the light to measure the sugar content. This machine is calibrated every hour and the result recorded on the daily spreadsheet. The actual requirements are once each day but the lab tests every hour.

This is why it is so important to have a clean and uncontaminated sample as the refraction will be affected and can cost the grower money.

The machine will display all of the results alongside the stub number. These are then automatically uploaded to the croplands system. The TR and Shift Leader will continually check these results to look for anomalies and ensure the correct data is being recorded.

All of the information is uploaded to the croplands system and this information is used to generate the growers WEEKLY BEET INVOICE and payments.

The system can deal with approximately 25 samples per hour and there are four lines taking the samples. Ideally, they run best at 80 samples per hour between them.

### **Half Beets**

At the end of the season the machines will be checked against each other by using the half beet system. This is where randomly selected beets are cut in half and the two halves are put into two machines.

The results are recorded and checked to ensure all the machines are returning accurate results.

### **Lab Screen**

**Yencma Automation - Main screen**

**Position data values**

Serial number:  
Brei weight:  
Brei weight dosed:

Move2Position    Change serial number  
Delete position    Delete all positions

**VACDOS**

Off     Tare  
 Ready     Dose  
 Upper     Ready  
 Lower     Upper  
 Fault     Lower  
 Nr / Brei     Fault  
 Cal     Cal

**Vafsys**

17 Funnel  
05374663A  
18 Container

**Process information**

VacDos measurement variance

**Minilyser results**

Data shown:  Amino N     Sodium     Potassium     Sugar

**Analyser information**

01001	25.11.2002	08:31	00,06	00,01	0,01	00,05	grenzv.
01002	25.11.2002	08:32	00,06	-00,00	0,01	00,03	grenzv.
01003	25.11.2002	08:33	-00,00	-00,00	0,00	00,03	grenzv.
02004	25.11.2002	08:35	15,88	07,35	0,73	02,40	grenzv.
02005	25.11.2002	08:35	16,04	07,55	0,75	02,46	grenzv.
02006	25.11.2002	08:37	16,04	07,94	0,79	02,45	grenzv.

Application settings    VACDOS Properties    VAFSYS Properties    OPC Settings