

# Program Notice

FGIS PN-26-03

April 27, 2026

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## **APPROVAL OF CGRAIN EQUIPMENT FOR DETERMINING WHOLE KERNELS IN MEDIUM GRAIN ROUGH RICE**

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## 1. PURPOSE

This program notice announces the approval of the Cgrain Value Analyzer, the Cgrain Value Pro Analyzer, and the Cgrain Value Sorter (for displayed-value mode only) for official use in analyzing whole kernels (in the form of WK40) for medium grain rough rice in Western Production (Rice grown in California and surrounding areas) under the [Agricultural Marketing Act of 1946 \(AMA\)](#). This program notice also transmits instrument installation, use, and maintenance requirements; quality control provisions; and review inspection procedures.

**Note: The Cgrain Value Sorter is only approved for displayed-value mode only. The sorting option is not approved for official use.**

## 2. BACKGROUND

In 2023, FGIS, with industry encouragement and cooperation with Cgrain AB and its North American representative, TAS Scientific, Inc., initiated an evaluation of an automated grading system developed by Cgrain AB to replace the aging GrainCheck 2312 from Foss North America. This evaluation determined that the Cgrain Value Analyzer produces equivalent results to the FGIS approved methods of measuring whole kernels percent (WK) in medium grain rough rice samples as established by the Board of Appeals and Review (BAR). Conditional approval was granted but additional evaluations of performance factors needed to be conducted before final approval was granted.

## 3. EQUIPMENT

The Cgrain Value is an automated optical inspection instrument that registers and analyzes images of grain. The system is fully computerized and is operated using simple menu-based commands, complete with a touchscreen user interface with the option of attaching a mouse, keyboard, monitor, and other peripherals. Samples are poured into a vibratory bowl that feeds the kernels through a collating chute. This chute allows only one kernel at a time through a mirror block and a camera. When the instrument detects a kernel, it automatically takes a photo of the kernel, with the mirrors providing side views. A blue colored insert acts as the background color, in accordance with the Rice Inspection Handbook and the images are then processed by the ANN to make a determination of whether kernel is damaged or not.

### System Overview.

The instrument is a standalone computer system running on a modified form of Linux. The main components of the system include a vibratory bowl feeder, mirror block, and camera. Because of the Linux operating system, various peripheral devices can be connected via USB connection and use of USB hubs is possible to expand functionality. These peripherals can include barcode scanners, flash drives, balances, Wi-Fi dongles, etc.

## Installation.

A TAS Scientific service technician will perform the installation of a new instrument, ensuring that the component parts are correctly connected, the mirror block is properly installed, and the vibratory bowl calibrated for feed rate and gap between the bowl and chute feeler gauged. Before the technician's arrival, be sure a sturdy table is available to place the system on and that a grounded main outlet is nearby. It is imperative that the instrument be installed in a room that is as dust-free and vibration-free as possible. The field offices are not allowed to install and/or adjust Cgrain instruments on their own.

Upon receiving approval, proceed with the installation according to the instructions prescribed in the Cgrain User Manual.

**Note: The Cgrain should not be moved after installation. Moving may result in loss of standardization and proper operation would need to be verified with acceptable test samples.**

## Environmental Conditions.

As with many objective testing devices, certain environmental factors, such as temperature and humidity, may affect instrument performance. To ensure safe operation and maintain equipment in proper working order, the testing site must be routinely monitored to ensure the laboratory environment is maintained within the following operational parameters:

Room temperature: 50F (10C) – 85F (30C)

Relative humidity: 20-80% noncondensing, Max alt 2000m

Power Supply: 100-240 VAC 50-60Hz

The instrument must be placed indoors on a hard, level, and stable surface to ensure optimal performance. A spirit level is mounted inside the instrument. Open the cover and use the spirit level to verify that the instrument is properly level. The instrument is considered level when the bubble is within the black circle. It is vital to ensure that the instrument is level. If the surface is not level, adjust the table or support surface until proper levelling is achieved.

Official testing must be immediately suspended if laboratory conditions fall outside these acceptable ranges. Once the condition returns to the acceptable operational range, testing may be resumed after verifying instrument stability according to [Section 6, Daily Check Samples](#).

## Safety Precautions.

The Cgrain utilizes LEDs to act as the flashing system for the camera. Technicians are to keep the cover of the instrument closed during inspection to eliminate the possibility of seizures.

#### **4. OPERATION**

To power on the instrument, press the power button on the front panel. The instrument will be ready as soon as the touchscreen shows relevant fields, which include model type, sample ID, etc.

The instrument will default to the Standard Start Menu. Press the “Model” button to switch to the Medium Rice prediction model. Pressing this button again will cycle through the available prediction models.

Input sample ID into the Sample ID field. Activate the field by either touching it or using a mouse and clicking on it. Input via either keyboard or barcode scanner.

Load sample into the vibratory bowl feeder and press start. The instrument will run a self-test and blow the mirror block clean and then start the inspection process.

After the last kernels have been fed through, the instrument will continue running until it determines the bowl is empty. A prompt will be displayed asking if the bowl is empty. Check the bowl by lifting the cover to confirm. Press “Yes” to continue to the results screen or press “No” to allow the analysis to continue.

If the operator wishes to export data, press “History” on the Start Menu. Select samples by clicking and dragging the sample range (or by pressing, holding, and dragging if using finger) to highlight multiple samples, then select “Export”. A file directory will appear, allowing the user to save the resulting XML file to an external device.

Results and image backups are automatically performed by the instrument at midnight (assuming the clock has been set correctly). Backups are stored on an external device connected to the USB port at the back of the instrument. Storage devices can be filled quickly due to the sheer number of images. These backups can be moved to another storage device if needed. If unable to offload backups from a full drive, the instrument will prioritize saving newer sample images, deleting the oldest entry to make room. The results of the oldest samples are still retained, only the images are deleted.

#### **5. ACCEPTANCE TEST**

To make certain that the instrument has been correctly installed, critical components are functioning properly, and the ANN model has been successfully transferred, the accuracy of the instrument must be validated before any official analyses may be performed. Validation/acceptance testing must also be performed whenever the instrument is relocated to a new site, or after any adjustment or repair that may affect the performance of the instrument (e.g., bowl, mirror, camera replacement).

The procedure requires the processing of standardized samples prepared by the Technology and Science Division (TSD) for medium grain rough rice that has been milled. The sample set includes 3 samples from a high WK range (100%-95%), 3 samples from a medium WK range (80-95%), and 3 samples from the low WK range (<80%). Each sample is analyzed 2 times. Compare the values obtained from the “test” Cgrain to the established “master” WK values for each sample set to verify that average differences (bias) and standard deviation of differences in each grade range are within the established statistically based tolerance limited defined in the following table.

**TABLE 1 – WHOLE KERNEL ACCEPTANCE TEST TOLERANCE**

<b>Milling Yield Range (%WK40)</b>	<b>Average Bias Tolerance</b>	<b>Standard Deviation of Differences Tolerance</b>
> 95%	0.53	0.26
80 – 95%	0.74	0.43
< 80%	0.93	0.62

The tolerances selected were derived from a statistical analysis of the medium grain rice WK market sample measurement data obtained from X number of Cgrain instruments. Acceptable performance under the Acceptance Test is achieved when the average difference and standard deviation of the differences of the six samples/replicates in each range are within the specified tolerance limits. **A new instrument cannot be accepted from the manufacturer unless the instrument passes the Acceptance Test.**

Upon completion of the acceptance test, the standardized sample set(s) should be retained for future use.

If an existing “approved” instrument requires re-evaluation (following repair, adjustment, modification, etc.), acceptance testing is to be performed prior to performing any official analysis, and the same tolerance applied. If these tolerances are exceeded, contact the BAR immediately.

[FGISBoardofAppealsandReviewSubjectiveAnalysisGroup@usda.gov](mailto:FGISBoardofAppealsandReviewSubjectiveAnalysisGroup@usda.gov).

The acceptance test need not be performed after any regularly scheduled maintenance routine such as cleaning the mirror block.

## **6. DAILY CHECK SAMPLES**

The Cgrain Value must be supplied by FGIS with three sets of daily check samples (Set A, B, and C) with each set containing two samples (Sample 1 and Sample 2). A sample which weighs approximately 40 grams is assigned an upper level (UL) and lower level (LL) acceptable whole kernel value. Procedures for determining UL and LL acceptable WK values as well as procedures for logging of data are given in [Appendix A, Daily Check Instructions](#) and recorded according to [Table 6, Daily Check-Test Log Information](#). Set B is used to verify that Set A UL and LL values have not changed, and Set C is used as replacements for Set A samples if unacceptable changes have occurred. Retain each sample at room temperature in a small airtight screw-top bottle or similar container having a label showing the date of preparation, sample identification number, upper limit value, lower limit value, and instrument serial number. This protects sample integrity from large changes in moisture content as the sample ages and possible fissure forming due to relatively rapid changes in temperature. Samples will be replaced every month. Contact Jeff Vanfossan to request new sets of daily check samples. [Jeffery.L.Vanfossan@usda.gov](mailto:Jeffery.L.Vanfossan@usda.gov)

## 7. MONITORING

To provide customers with consistently accurate inspection results, it is necessary to monitor both instrument and inspector performance and make adjustments to ensure proper alignment of the objective and subjective measurement techniques. Instrument performance will be compared and aligned to two designated master Cgrain instruments maintained at TSD. Each week an agency randomly selects an individual 40-gram portion to run on each Cgrain instrument. At the end of each month, 4 separate 40-gram samples (if agency only has one Cgrain instrument) are recorded and then sent to TSD to be handpicked and run through 2 other Cgrain instruments. Results are then documented to compare handpicking and the instrument. Inspector performance will continue to be monitored in the traditional manner (i.e., visual to visual) at those locations that do not have direct access to a Cgrain. However, in these instances, a small percentage of the SIMS monitoring samples will be forwarded to TSD for Cgrain comparison analysis as well to verify that visual and instrument alignment is being maintained. For those locations that have a Cgrain, all rice whole kernel monitoring will be performed using the instrument.

Due to the instrument's enhanced performance with respect to repeatability and reproducibility, inspector alignments will be linked to the instrument. Quality Assurance Supervisor (QAS) interpretations will be constantly monitored to effectively identify and control natural drift associated with visual analyses. QAS's are responsible for conveying the proper interpretation to front-line inspectors and managing inspector inconsistencies.

To evaluate the stability of the "master" Cgrain instruments maintained by TSD, the BAR will regularly provide visual comparisons on randomly selected monitoring samples.

All samples submitted for this program must be sealed in plastic Ziplock bags, then sealed again in plastic sample bags to prevent moisture changes and spillage. It is not recommended to use paper coin envelopes.

### Instrument to Instrument Monitoring.

To ensure that field Cgrain instruments remain properly aligned to the FGIS master Cgrain units, each inspection service point location, using the instrument for official measurements, are to submit 3 market samples per instrument as prescribed in [Table 7, Weekly Monitoring Market Sample Ranges](#) weekly to the Inspection Instrumentation Branch (IIB). If the samples representing a targeted range are not available for a given week, it is not necessary to create sample(s) or submit past samples (file samples) to produce a complete set. Refer to [Appendix B, Monitoring of On-Line Instrument Procedures](#) for procedures, selecting market samples, and submission to IIB.

Market samples received by the IIB will be measured for WK using the master instrument. Comparison results will be recorded and analyzed for trends and gross differences (i.e. differences that exceed expected variability).

The TSD will notify inspection locations of any alarming trends that develop or unexplained differences that occur to investigate and resolve the problem. Testing locations are expected to cooperate in the investigation and immediately initiate corrective action on all identifiable and correctable causes creating accuracy problems.

## Visual to Instrument Monitoring.

While traditional visual to visual WK monitoring will continue until the conversion of the subjective inspection method is complete, visual to instrument monitoring is necessary to provide consistency in inspection results. Inspection locations that have access to the Cgrain are to monitor inspector performance using the Cgrain. To eliminate sample variability, the same portion used for the visual analysis will be forwarded to TSD and used in the objective analysis.

Maintaining visual alignment to the instrument is critical for the continued success of the rice inspection program. Recognizing the need for and controlling adjustments to inspector interpretations is vital to maintaining national consistency and customer confidence. As such, the BAR will be responsible for monitoring the QASs' interpretation and communication and controlling needed changes. The QAS will be responsible for monitoring and working with local Quality Control (QC) team members and on-line inspectors to ensure proper alignment with the instrument.

### **8. CROSS-CHECK SAMPLES**

Cross-check samples have proven to be a useful tool in evaluating the capability of the national testing program and the accuracy of individual testing locations. TSD is including this tool in its assessment procedures to supplement the monitoring program and will be used at TSDs' discretion to investigate questionable instrument results, collect WK comparison data in ranges market samples do not provide, periodically evaluate overall instrument performance in all ranges, and test the capability of the national testing program.

Upon receipt of these samples, inspection points must complete the analysis of these samples within 10 working days. Whenever possible, submit results to the BAR to expedite the preparation of the check sample report.

The field will be notified immediately if the test results indicate a problem at a test location. Otherwise, results will be released in a report prepared by the BAR and distributed to all participating service points.

When requested, field offices will assist in the collection of bulk samples to be used in the check sample program.

### **9. REVIEW INSPECTIONS**

Under the AMA, customers offering graded commodities for official inspection are entitled to two review inspections: an appeal and board appeal inspection. If available, due to the consistency that Cgrain offers, WK appeal inspections will be performed using this instrument, however board appeal inspections will be handpicked as is the standard reference method.

Locations not having direct access to the Cgrain may continue to provide the requested service using the visual method. However, if the applicant specifically requests that an objective analysis be performed, arrangement should be made to honor the request. The applicant must be informed/reminded that the issuance of the certificate will be delayed pending receipt of the objecting test results.

When requested, offices performing the appeal service should perform all analyses, except WK. Sub-offices may forward the representative portion intended for WK to their respective field office or, if one is not available, to any field location that has instrument access. If no field-based unit is available, or the intended service point is unable to provide timely service, the WK portion may be forwarded to TSD for analysis.

## 10. MAINTENANCE

### Daily Maintenance.

#### Instrument Cleaning.

External. The instruments exterior is cleaned by using a lint free cloth. Be particularly careful not to touch the connections for USB, Internet, and power cords on the rear panel. The touch screen is cleaned using the special cleaning agents and cloths for touch screens. To remove dust and particles from the power supply mesh, use a gentle vacuum clean.

Internal. The inside Cgrain Value should be cleaned, removing dust and debris regularly by gentle vacuuming. The vibrating bowl and the surfaces surrounding it are cleaned using a soft cloth.

### Weekly Maintenance.

Internal. The mirrors must be free and clear of any dust in order to capture good images. Although the instrument has a self-cleaning system that is activated before each sample, deeper cleaning may be needed. Remove the mirror block as noted in the Cgrain manual and use a dry cloth or dedicated lens wipes. Do not use any force when wiping mirrors. Replace mirror. **Take great care when handling the fragile mirror block.**

Although this item is listed as weekly, the mirrors should be cleaned on an as-needed basis. If analyzing dusty or dirty grain, there comes a point to where the instrument will initiate the self-cleaning process about every 15 seconds. If this occurs, let the current sample finish, then manually clean the mirror block. This should be done even if the mirror block looks clean.

### Monthly Maintenance.

Internal. The Cgrain comes with an air filter that is installed at the bottom of the unit. This filter needs to be checked and replaced if necessary. New filters can be procured from Cgrain AB at [support@cgrain.se](mailto:support@cgrain.se).

### Yearly Maintenance.

Cgrain AB recommends a yearly preventative maintenance service by a TAS Inc. technician.

## 11. APPROVED RICE APPLICATIONS

Per this program notice, the approved application for the Cgrain instrument is for a 40-gram portion of milled medium grain rough rice in the determination of whole kernels percentage for all ranges.

## 12. POLICY

TSD is responsible for maintaining the ANN model in cooperation with Cgrain AB, maintaining the master Cgrain instruments, and monitoring performance.

## 13. QUESTIONS

Direct any questions concerning this program notice or to request new sets of daily check samples to the Inspection Instrumentation Branch at [Jeffery.L.Vanfossan@usda.gov](mailto:Jeffery.L.Vanfossan@usda.gov).

For exceeded tolerances, contact the BAR [FGISBoardofAppealsandReviewSubjectiveAnalysisGroup@usda.gov](mailto:FGISBoardofAppealsandReviewSubjectiveAnalysisGroup@usda.gov).

New filters can be procured from Cgrain AB at [support@cgrain.se](mailto:support@cgrain.se).

TA Scientific contact information:

[Terry.allen@tascientific.com](mailto:Terry.allen@tascientific.com)

Text or call: (763)-670-5392

For Troubleshooting Guide, refer to [Appendix C](#).

## APPENDIX A: DAILY CHECK INSTRUCTIONS

### Check-test Sample Designation.

Three sets of check-test samples (sets A, B, and C) should be created, with each set consisting of three samples (samples 1, 2, and 3) and weighing approximately 40 grams each. Each sample is assigned an upper limit (UL) and lower limit (LL) WK40 value. The procedure for determining UL and LL WK40 values is given below in this section. Set A comprises the daily check samples. Set B is used to determine if the Set A WK40 values have changed. Set C is used as replacements for Set A samples if unacceptable changes have occurred. The samples selected are as follows:

**TABLE 2 – DAILY CHECK-TEST SAMPLE CRITERIA**

Set	Sample ID	Purpose	Notes
A	1A	Low WK40 Test	Daily Test, 70% WK40
	2A	Mid WK40 Test	Daily Test, 85% WK40
	3A	High WK40 Test	Daily Test, 98% WK40
B	1B	Low WK40 Control	Failure Test Use Only
	2B	Mid WK40 Control	Failure Test Use Only
	3B	High WK40 Control	Failure Test Use Only
C	1C	Replacement for 1A	
	2C	Replacement for 2A	
	3C	Replacement for 3A	

### Check-Test Sample Preparation Procedure.

1. Select the following medium grain rice bulk samples:

**TABLE 3 – DAILY CHECK-TEST SAMPLE BULK CRITERIA**

Sample	WK40 (approx.)	Weight
1	70%	>120 grams
2	85%	>120 grams
3	98%	>120 grams

2. From the bulk samples in Step 1, prepare the following check-test samples:

**TABLE 4 – DAILY CHECK-TEST SAMPLE SET CRITERIA**

Set	Sample ID	WK40 (approx.)	Weight (approx.)
A	1A	70%	40 grams
	2A	85%	40 grams
	3A	98%	40 grams
B	1B	70%	40 grams
	2B	85%	40 grams
	3B	98%	40 grams
C	1C	70%	40 grams
	2C	85%	40 grams
	3C	98%	40 grams

3. Measure each sample five times for percent WK40 using the Cgrain Value unit, and for each sample compute the upper limit (UL) and lower limit (LL) WK40 values as shown below.

MEAN = average of 5 measurements, rounded to nearest 0.1%

**TABLE 5 – DAILY CHECK-TEST UPPER AND LOWER LIMITS**

Set Sample ID	Upper and Lower Mean Percent
70% WK40 Samples (1A, 1B and 1C):	UL = MEAN + 0.84% LL = MEAN – 0.84%
85% WK40 Samples (2A, 2B and 2C):	UL = MEAN + 0.5% LL = MEAN – 0.5%
98% WK40 Samples (3A, 3B and 3C):	UL = MEAN + 0.37% LL = MEAN – 0.37%

Repeat Steps 1-3 for each Cgrain Value unit available.

Retain each sample at room temperature in a small airtight screw-top bottle or similar container having a label showing the date of preparation, sample identification number, upper limit value, lower limit value, and instrument serial number.

Measurement Data Recording Procedure.

Maintain a logbook containing the following and enter all information each time daily check-test procedure is performed.

**TABLE 6 – DAILY CHECK-TEST LOG INFORMATION**

Date	Sample ID	WK40 Value	Upper Limit (UL)	Lower Limit (LL)	Unit Serial Number	Pass/Fail	Notes

Daily Check-Test Procedure.

1. The check-test procedure is performed as the first measurement each day when the Cgrain is used for official measurements. The procedure is performed when the instrument has been turned on for at least 10 minutes.
2. Measure WK40 for samples 1A, 2A and 3A on first instrument. If all measurements are within the UL and LL values specified for those samples the instrument has passed the check-test.
3. If the WK40 of either sample exceeds the UL or LL values specified for the sample, remeasure the sample that failed. If the repeat measurement is within the UL and LL values specified for the sample, the instrument has passed the check-test.
4. If the repeat measurement is not within the UL and LL values specified for the sample, measure the WK40 of the corresponding sample 1B, 2B or 3B.
5. If the sample (1B, 2B or 3B) measurement is within the UL and LL values specified for the sample, then sample 1A, 2A or 3A is no longer usable and should be replaced by the corresponding sample 1C, 2C or 3C. A replacement for sample 1C, 2C or 3C should be prepared in accordance with this section. This can be performed by field personnel or requested from TSD. The instrument has passed the check-test.
6. If sample 1B, 2B, or 3B is not within the UL and LL values specified for the sample, the instrument is out of tolerance and cannot be used for official measurements. Refer to the [Appendix C, Troubleshooting Guide](#) and [Maintenance](#) Section of this Program Notice to diagnose issue or clean the instrument. If unable to resolve issue after contacting Cgrain service representative, inform Inspection Instrument Branch or Board of Appeals and Review.

Repeat the check-test procedure after instrument adjustment/repair/cleaning. If samples 1A, 2A, and 3A are within the UL and LL values specified for the samples, the instrument has passed the check-test. If samples 1A, 2A, and 3A are not within the UL and LL values specified for the samples, remove the instrument from service and contact Jeff Vanfossan, [Jeffery.L.Vanfossan@usda.gov](mailto:Jeffery.L.Vanfossan@usda.gov), for instructions.

## APPENDIX B: MONITORING OF ON-LINE INSTRUMENT PROCEDURES

### Purpose.

To ensure that field Cgrain instruments remain properly aligned to the FGIS master Cgrain units, each inspection service point location using the instrument for official measurements is to submit 9 market samples weekly to the Inspection Instrumentation Branch (IIB).

### Procedure.

1. Each week, select 3 samples per instrument from each Cgrain unit that spans the range of milling yields from samples tested during the past week according to Table 7 below to submit to IIB.
2. The sample WK values should be evenly spread (as close as possible) across a range of high, mid, and low WK market samples received throughout the week.
3. If the samples representing a targeted range are not available for a given week, it is not necessary to create a sample(s) or submit past samples (file samples) to produce a complete set, although FGIS may request additional samples later if insufficient samples in a specific range are collected throughout harvest.

### Market Sample Designation.

The market samples are defined as milled 40-gram portions of rough rice of various whole kernel levels that are tested on the Cgrain instruments. Each sample is to be labeled and double sealed in plastic bags to ensure stability during storage and transportation. Paper sample envelopes SHOULD NOT be used to submit samples. Below are the defined high, mid, and low market WK ranges.

**TABLE 7 – WEEKLY MONITORING MARKET SAMPLE RANGES**

<b>%WK40 Range</b>	<b>Number of Samples</b>
90% or above	1 sample
89% to 80%	1 sample
79% or below	1 sample

Send market samples to the National Grain Center:

USDA, FGIS  
Inspection Instrumentation Branch  
Attn: Jeff Vanfossan  
10383 North Ambassador Drive  
Kansas City, Missouri 64153

Monitoring Testing Procedure.

Once weekly submitted market samples are received by IIB, the samples will be tested as follows:

1. Each sample will be measured on the TSD master units.
2. Data analysis of submitted samples will be performed to compare the performance of the field units to the master units.
3. TSD will provide feedback to the location on the performance of the field unit.

Measurement Data Recording Procedure.

There are two methods to record data for this test, automatic and manual. It is recommended to use both methods for data redundancy.

- a. Automatic Method. The Cgrain instruments automatically record each run internally. The inspector exports an XML file after all samples have been run on all instruments. These files are then sent via email to [Jeffery.L.Vanfossan@usda.gov](mailto:Jeffery.L.Vanfossan@usda.gov). If it is not possible to export this file, then the manual method will act as a backup. To export the XML file:
  1. After all samples have been run on all instruments, insert a USB flash drive into the instrument.
  2. From the main menu, go to History.
  3. If using a mouse, click and hold then drag the cursor from the first sample to the last to highlight that range. If using a finger, press and hold then drag for the selection.
  4. Select Export, then Results.
  5. A file explorer window will pop up. Navigate to the root of the flash drive and select Open. The XML will then be exported.
  6. After exporting, eject the USB flash drive and proceed to the next instrument.
- b. Manual Method. The manual method involves filling out a printed results sheet similar to Table 8 below. Print as many copies as needed for each instrument. Each result sheet is to be scanned and emailed to the address above. If the automatic method is possible, send both sets in the same email.

**TABLE 8 – WEEKLY MONITORING SAMPLE SHEET**

Sample ID	Cgrain Serial Number	%WK40 Result

## APPENDIX C: TROUBLESHOOTING GUIDE

Information taken from the Cgrain Value Family Manual:

**TABLE 9 – TROUBLESHOOTING SOLUTIONS**

Message	Responses/Options	Explanation	Solution
“Bad image quality, clean sample and run again”	Yes	Too many images are classified as bad. This is due to presence of dust in the sample.	Clean the sample, by aspiration or sieving, and run the analysis again.
“Box is not in place”	Retry	The Collecting box is not in place.	Make sure that the collecting box is pulled in properly, then press “Retry”.
“Camera dropped images!”	Yes	The communication between the camera and the hard disk failed. The number of failed images is indicated in the warning message.	Restart the instrument and run the sample again. If the problem appears again, contact Cgrain Support.
“Camera failed to init!”	Yes	The camera didn’t start.	Restart the instrument. If the problem appears again, contact Cgrain Support.
“Camera stopped working!”		The camera stopped working.	Restart the instrument and run the sample again. If the problem appears again, contact Cgrain Support.
“Could not export XML file”	OK		Check that the chosen destination is available, then try again.
“Delete image files?”	Yes/No	Control question	Appears after answering “No” to question “Delete sample from database”. Press “No” to keep the results and the images. Press “Yes” and the images will be deleted but the results are kept.
“Delete sample from database?”	Yes/No	Control question	Press “Yes” to delete both the result and the images. Press “No” to keep the results.

<b>Message</b>	<b>Responses/Options</b>	<b>Explanation</b>	<b>Solution</b>
“Disk is full, remaining images will not be saved!”	Yes/Retry	The disk is full even though pictures have been erased.	Contact TAS Inc. Support
“Disk is full. Move images to USB? Answering ‘No’ will delete them!”	Yes/No		Press “Yes” to save data to an external disk. Make sure a USB-stick or an external disk is mounted. Press “No” and the oldest images are erased so that the sample can be analyzed. Images are deleted from the database avoiding the question to appear for every sample.
“Enter code xx days left”	OK/Cancel	Software license time is due to expire.	Enter the code and press “OK”. Press “Cancel” to run sample anyway. When the software license has finally expired, the instrument will not be possible to use without a code being entered. A new code can be obtained from Cgrain support.
“Images exported successfully”	OK	Information	
“Is the bowl empty?”	Yes/No	Check and verify that the sample is finished and no kernels are still in the vibrating bowl.	Lift the lid and check that the bowl is empty. Press “Yes” to finish the sample and present the result. Press “No” to start the bowl again to get the last kernels out and finalize the analysis.
“Low space on backup”	Yes	If a scheduled backup is installed, the warning message appears if there is no space on the backup destination. This check is performed daily.	Make sure there is sufficient space on the backup destination. After the next scheduled backup, the warning should not appear again.

Message	Responses/Options	Explanation	Solution
"Manual cleaning is needed."	Start/Abort/Ignore	An object has been found stuck to the mirrors or the colors are found to be incorrect.	Check that the mirror is in position. If so, follow the cleaning procedure in Section 3.2, then press "Start". To stop the analysis before cleaning, select "Abort". To run the sample anyway, press "Ignore". If Ignore is selected the sample may be analyzed incorrectly.
"No image from camera! Restart the machine if retry does not help"	Yes	Some results, marked in red in the Results table, are above the specified limit and must be reviewed.	Press "Yes", then "View" and "Save" for the results marked with "Red". The sample can't be finished until the results marked in Red are Viewed and Saved. When Saved the text turns blue.
"Please wait"!		Information	Calculating results
"Sample too small or wrong kind of grain"	Yes	Too few seeds were recognized as the main category. The automated calibration is not performed.	Check if the correct program has been used for this sample.
"Save results and quit?"	Yes/No	Control question	Press "Yes" to Save and quit. Press "No" to continue with the result table.
"Some images could not be read from disk!"	Yes		Contact TAS Inc. Support
"Some images could not be written to disk!"	Yes	Saving images to the external disk has failed.	Check that an external disk or USB stick on is connected. Check that sufficient space for storage is available. Press "Yes". The question about saving images will reappear.
"Some images were not exported successfully"	OK		Check that the chosen folder is available. Try again.

<b>Message</b>	<b>Responses/Options</b>	<b>Explanation</b>	<b>Solution</b>
"Start without a reference?"	Yes/No	The reference field is empty.	Press "No" to fill in the reference information, then press "Start" again. Press "Yes" to start without a reference and/or weight.
"Start without a weight?"	Yes/No	The weight is missing but a reference is filled in.	Press "No" to fill in the weight, then press "Start" again. Press "Yes" to start without entering the weight.
"Unrecognized sample. Check that the correct settings were used!"	Yes	The sample is not recognized.	Check that the sample has been run in the correct program. Run the sample again.