TOOL OF THE MONTH 2023

ADVANCING KNOWLEDGE

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ADVANCING THE CANADIAN POULTRY ENTERPRISE

The Poultry Innovation Partnership (PIP) is a collaboration of the Poultry Industry, Government of Alberta and University of Alberta created to foster a healthy Canadian poultry enterprise. Excellence in research and innovation, knowledge management, technology transfer and mentoring tomorrow's poultry professionals are the Centre's hallmark.

Together, PIP partners collaborate to create an environment where research, extension and tech transfer can flourish far beyond the reach of a single entity.

This booklet compiles tools published in PIP`s newsletter by Dr. Mohammad Afrouziyeh. We hope these tools can help producers manage ventilation, water, and feed, providing better care for their birds.

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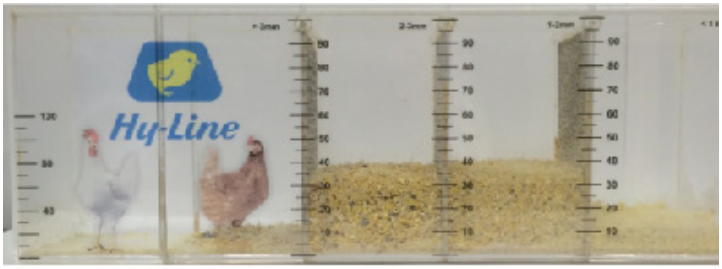
FEED SIEVE SHAKER

By Dr. Mohammad Afrouziyeh, January 2023



Name: Feed sieve shaker

Cost: Cost is unavailable for the Aviagen and Hy-Line sieve shakers (pictures shown above). The average price for similar manual feed sieves is about $250

Availability: A variety of feed sieve shakers (manual and electrical) are available on Amazon and manufacturers' website

Intended use

A sieve shaker is used to measure the size distribution of feed particles. This tool can be used to check feed particle size in the deliveries from the feed mill and the feeding system. The uniformity of feed particle size throughout the feeding system is an important factor affecting flock performance. Feed samples from various points should be taken and tested for particle size uniformity regardless of the feed form. Feed with a high content of fine particles creates many potential issues such as compromised feed intake and nutrient absorption and air quality issues. On the other hand, particles that are too coarse increase the risk of feed separation, a situation where the birds do not receive a balanced diet by selectively eating large particles.

How does it work?

Taking feed samples for the size distribution test is a critical step. The samples should be taken from the beginning and end of the feed line and compared to each other. The sieving procedure involves passing feed through a series of sieves of progressively smaller diameters for one minute. Then the percentage of each particle size category can be calculated. As a standard method, the following classes of feed particle size are used: Particles less than 1 mm, 1 – 2 mm, 2 – 3 mm, and particles greater than 3 mm.

Standard feed particle size for broiler chickens and laying hens

The obtained results from the size distribution of feed particles at the farm level should be compared to the recommended standard values.

Table 1. Ideal particle size distribution for broiler mash feed using the Aviagen Sieve Shaker

Particles	Coarse Mash	Medium Mash
Coarser than 3mm	25%	5%
2-3mm	25%	10%
1-2mm	25%	35%
Finer than 1mm	25%	50%
Reference: Aviagen		

Table 2. Target particle size distribution for broiler crumble and pellet feed using the Aviagen Sieve Shaker

Feeding phase	Starter	Grower	Finisher
Feed form	Crumble	Pellet (3.5mm)	Pellet (3.5mm)
Coarser than 3mm	15	>70	>70
2-3mm	40	NA	
1-2mm	35		
Finer than 1mm	<10	<10	<10
Reference: Aviagen			

Table 3. Optimal feed particle profile for laying hens using the Hy-Line Sieve Shaker

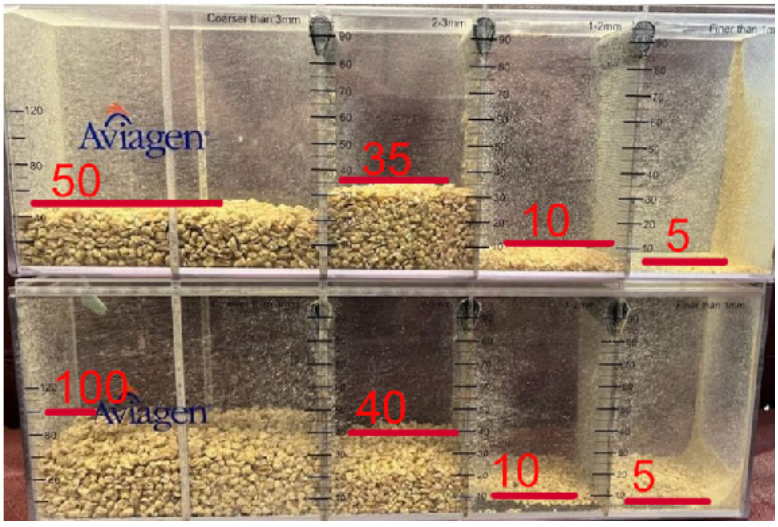
Particle size	Starter	Grower	Developer	Finisher
Coarser than 3mm	1-3 mm crumble feed should contain <10% fine particles	-	5-10%	10-15%
2-3mm		10-25%	25-40%	30-40%
1-2mm		45-60%	25-40%	20-30%
Finer than 1mm		<15%	<15%	<15%
Reference: Hy-Line Management Guide				

Using the device

1. Remove the shaker lid by sliding it horizontally
2. Slide the lid vertically into the groove in the center of the first compartment that is labeled greater than 3 mm (>3mm)
3. Fill the left compartment with the feed sample
4. Take the lid out of the vertical groove and slide the lid back horizontally on the shaker to close the shaker
5. Turn the sieve and hold it vertically upright with the largest compartment at the top of the shaker
6. Shake the sieve vigorously for about one minute
7. Stop shaking the sieve after one minute and return it to the horizontal position
8. Ensure the feed particles are level within each compartment before reading the measurements
9. Read and record the values indicated beside each compartment (for the particles greater than 3 millimeters in the first compartment, use the values of the left-hand scale and for all other compartments, use the values on that compartment to calculate the percentages of feed in each compartment)
10. Add the values of all four compartments together to get the total value
11. Divide the value of each compartment by the total value to get the percentage for that section

Example calculations:

The following picture was taken by Rob Renema (Alberta Chicken Producers) at the Feed and Water Flock Talk event organized by the Poultry Innovation Partnership in Red Deer on October 19, 2022. The picture compares pellet quality (size distribution) from the beginning of the feed line (lower picture) versus the end of the feed line (upper picture). I have added the recorded numbers to each compartment of the sieve shakers in the picture to demonstrate the calculations below.



According to steps 10 and 11, add the values of all four compartments together to get the total value and then Divide the value of each compartment by the total value to get the percentage for that section

1. Calculations for the sieve shaker at the bottom:
   Total value = 100 + 40 + 10 + 5 = 155
   Calculate the percentage of feed in each compartment from the left side:

First compartment (coarser than 3 mm): (100 ÷ 155) × 100 = 64.5%
Second compartment (2 – 3 mm): (40 ÷ 155) × 100 = 26%
Third compartment (1 – 2 mm): (10 ÷ 155) × 100 = 6.5%
Fourth compartment (finer than 1 mm): (5 ÷ 155) × 100 = 3%

2. Calculations for the upper sieve shaker:
   Total value = 50 + 35 + 10 + 5 = 100
   Calculate the percentage of feed in each compartment from the left side:

First compartment (coarser than 3 mm): (50 ÷ 100) × 100 = 50%
Second compartment (2 – 3 mm): (35 ÷ 100) × 100 = 35%
Third compartment (1 – 2 mm): (10 ÷ 100) × 100 = 10%
Fourth compartment (finer than 1 mm): (5 ÷ 100) × 100 = 5%

The above calculations show that the pellet feed from the end of the feed line contains more fine particles and less coarse than 3 mm particles compared to the feed sample from the beginning of the feed line. In an ideal situation, the changes in particle size distribution at different points of the feed distribution system should be minimal.

INSTANT ON-SITE ANIMAL FEED ANALYZER

By Dr. Mohammad Afrouziyeh, February 2023

Name: Instant on-site animal feed analyzer

Cost: From CAD$9200

Available at manufacturers' websites

Intended use

The on-site feed analyzer is a portable NIR (Near Infra-Red) analyzer of feed ingredients and compound feed on the farm or feed mill level. A real-time feed analysis provides reliable input into a robust feed formulation system. The device can measure moisture, protein, starch, fiber, ash, and oil. The device has been calibrated to analyze the following ingredients and compound feeds: wheat, wheat middlings, corn, barley, DDGS (Dried Distillers Grains), fishmeal, oat, broiler feed, layer feed, beef feed, sheep feed, pig feed, rapeseed, rapeseed meal, soybean, soybean meal, soybean hulls, full-fat soya, sunflower seed, sunflower meal, rice bran, biscuit meal, cotton meal, cottonseed cake, corn germ meal, corn gluten meal, calf feed, and dairy feed. For running analysis on other ingredients, check the manufacturer's website to see if calibration database is available.

Using the device

The device calibration models are designed to best predict consistently ground samples up to a particle size of less than 3mm. This can be achieved using various grinders following the manufacturer's recommended procedure. However, careful consideration should be given to what material must be ground, the volumes required, and the heat produced. Samples should be scanned at room temperature (18 to 24 °C). To use the device, follow the following steps:

1. Connect your Scanner with the mobile app
2. Perform background measurement
3. Place the scanner on top of your sample
4. Start scanning
5. Move the scanner to another spot of the sample and scan again
6. Repeat step 5 five times
7. Wait for the results

Based on the nutrients values obtained by the NIR device, real-time adjustments to feed formulation can be applied to get the level of nutrients you need in your diet.

DIGITAL VIDEO INSPECTION CAMERA

By Dr. Mohammad Afrouziyeh, March 2023

Name: Digital video inspection camera

Cost: Starts from $85

Available at Amazon, Hardware stores, manufacturer's website

Intended use

An inspection camera is a multipurpose device that can be used to monitor inside the drinker lines and water systems in poultry farms. If you are concerned about biofilm in the water line, consider detecting biofilm using sensors as an advanced monitoring system.

How does it work?

To begin, raise the end of the water line. This allows you to insert the camera cable without a great deal of water flowing out but always handy to have a bucket there to catch the water. Insert the camera cable and push it forward to monitor the inside of the water line for any debris, buildup scales, and biofilm.

Using the device

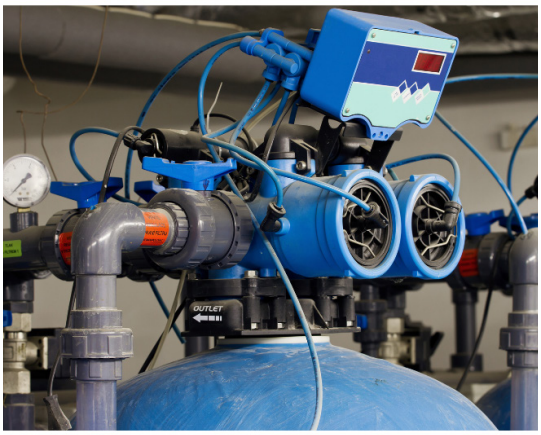
Important note: Before inspecting pipes that may contain an electric charge, have them checked by a qualified electrician.

To use an inspection camera to monitor inside a drinker line or water system, follow the following steps:

1. Connect the inspection cable to the device by pushing the cable's key into the cable connector's slot.
2. Turn the cable connector counterclockwise until the cable and cable connector is securely attached.
3. Press the power button to turn the camera on
4. To adjust the light, press the left light button either to dim or turn off the light. Press the right light button to turn on the light and increase brightness.
5. To flip the image, press the flip image button to flip the image horizontally or vertically.
6. When finished, press the power button to turn the camera off, then clean and store it according to the manufacturer's "Inspection and Maintenance" guide.
7. If you encounter any biofilm or debris in the water line, follow the relevant protocols to clean it out. Read our previous article to get an idea of how to disrupt and clean biofilm in water lines.

WATER IRON FILTER

By Dr. Mohammad Afrouziyeh, April 2023



Name: Water Iron Filter

Cost: approximately $ 9,000 CAD

Available at: Manufacturer's website and hardware stores

Intended use

Water Iron filters are used to treat drinking water by removing iron and a number of other contaminants, such as manganese, sediments, and hydrogen sulfide gas. If combined levels of iron and manganese in water exceed 10 mg/L, the most effective treatment involves oxidation followed by filtration. In this process, an oxidant agent, such as chlorine, chlorine dioxide, potassium permanganate, hydrogen peroxide, or ozone, is used to convert any dissolved iron and manganese into solid oxidized forms that can then be easily filtered from the water. The oxidation process changes the iron from its ferrous (Iron+2) state (soluble) to a ferric (Iron+3) colloidal particle, which then can be filtered out.

The following diagram illustrates the oxidation followed by a filtration process. During this process, water goes through a coarse sediment filter to remove any coarse particles. Then water pH is monitored to inject the required amount of an oxidizing agent (such as chlorine) into the water system. The water must then sit in the mixing/contact tank to be mixed thoroughly with chlorine. In this step, iron is oxidized into colloidal particles that can be removed by the backwashing (self-cleaning) iron filter in the next step. Notice that in this article, we are covering the filtration part by introducing a potential backwashing filter to remove iron particles from the water.

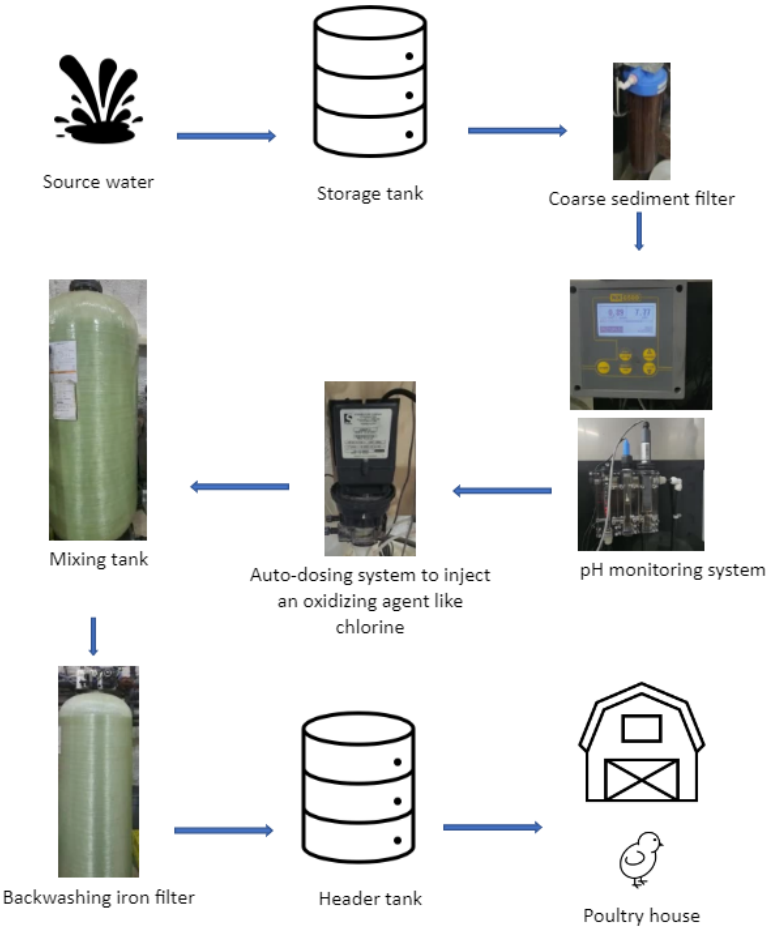
How does it work?

The water flows into the backwashing filter system through the valve and down into the filtration media. As water passes through the filter media, the contaminants, such as iron particles, are trapped within the media bed. Water is then forced into the center distributor tube and up through the valve, where filtered water flows into the plumbing system. When a backwash cycle is initiated, the valve will send water down the center distributor tube and up through the media bed. This lifts and washes the media of trapped contaminants, flushing the water out through the drain line.

Using the device

Notice that these systems must be installed on a pressurized water line to ensure even pressure. Place the unit where you want to install it on a level and firm base. The unit should be located near a convenient drain and approved electrical outlet. The system should be set up following the three main steps:

1. Filter setup: Set the distributor tube in the tank and load each bag of media slowly into the tank. Once the media is loaded, the system will be heavy, so it should be located near the installation site before loading.
2. Plumbing should be done by a certified plumber.
3. Startup the system by plugging in the control valve. Program the valve and run a manual backwash by pressing the backwash button on the control valve. After backwashing, the system will be ready to use.



GRAIN SAMPLING PROBE

By Dr. Mohammad Afrouziyeh, May 2023

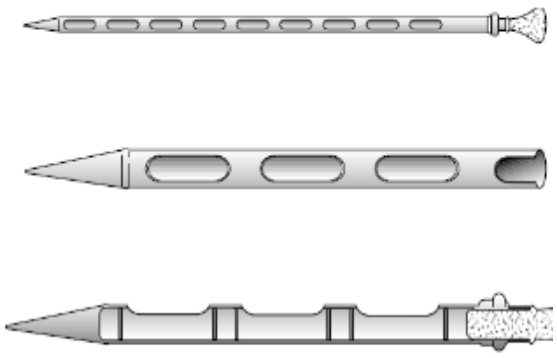


Photo credit: Herrman (2001)

Name: Grain Sampling Probe

Cost: around CAD$ 400 to 600

Available at: Manufacturer's website

Intended use

Grain probes are used for representative sampling of various granular materials, such as grains and dry foods. Results are taken at various levels from stockpiles, bags, drums, bins, and mixers. The samples can be used to run a mixer uniformity test in the feed industry.

How does it work?

Grain probes vary in design and length. Short probes are more commonly used when sampling from drums and bins, while longer probes are optimal for sampling from larger stockpiles such as barges, railcars, large trucks, feed mixers, and hoppers. The grain probe should be long enough to penetrate at least 3/4 (75%) of the depth of the feed. There are a variety of grain probes, such as open-handled probes, partition/compartment probes, and spiral probes. Open-handled probes are used to take feed and grain samples from the entire depth of a container. The contents of the probe are emptied from the handle end and then can be mixed to get a representative sample. Spiral probes are designed to allow openings on the inside tube to rotate, opening first at the bottom and then in gradual steps to the top, which guarantees a sample from the bottom up. Partition probes individually separate each sample across the depth of the container. These probes consist of two tubes, one inside the other. The inner tube is divided into compartments (individual openings) that allow collecting samples across the profile (depth) of the container to detect inconsistencies in feed quality.

Using the device

If the intention of the test is to evaluate feed quality across the container depth, use a partition probe to take samples from different levels of the batch. Push the probe into the container to take the sample, and then empty the probe onto a tarp or trough and inspect it. You can then mix the samples taken from each level (compartment of the probe) together and mix thoroughly before transferring them to their containers.

To take feed samples from a horizontal mixer (for example, to run a feed mixing uniformity test), a spiral or an open-handled probe can be used. Take samples from 10 different locations in the mixer (Figure 1). To take the sample, push the probe in your sample and open the compartments to simultaneously take a sample throughout the entire probe. Then close the probe, pull it out of your sample, and dump your sample through the handle. Empty the contents of each probe into a container and repeat the sampling to collect about 500 grams of sample from each location. Mix the contents of each probe location together prior to reducing the final sample size. To reduce the sample size, spread the mixed sample from each location of the mixer on a clean plastic or paper to form an even layer. Then split each sample into quarters (Figure 2). Take two opposite quarters, mix, and repeat until the two quarters selected give the desired sample size (usually 100 grams). Put the final samples in plastic bags, zip-lock bags, paper bags, or plastic containers with lids and label them with the sampling date, sample number, and contents. Store the samples in a cool and dry location before being shipped to the lab for nutrient analysis. To interpret the nutrient results for the feed mixing uniformity test purposes please check this feed uniformity research article!

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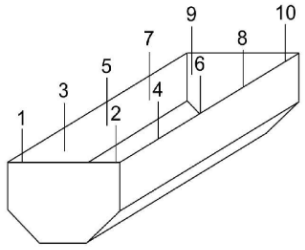

Figure 1. Sampling scheme for a mixer uniformity test in a horizontal paddle mixer. The numbers represent the sampling locations in the mixer. *Photo credit: Herrman (1994).*

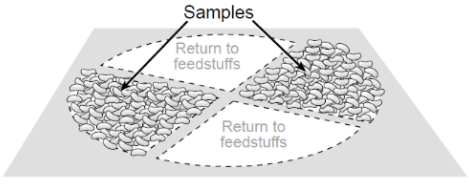

Figure 2. Quartering of samples (splitting the samples into quarters) to reduce the final sample size. *Photo credit: Herrman (2001).*

CHLORIDE TEST STRIPS FOR FEED UNIFORMITY

By Dr. Mohammad Afrouziyeh, July 2023

Name: Chloride Quantab Test Strips

Cost: $103

Available at: Manufacturer's website

Intended use

Chloride Quantab Test Strips have various industrial uses to measure chloride concentration in an aqueous sample. This article introduces the application of the strips in the feed mixture uniformity test. Multiple methods are employed in the feed industry to assess the consistency of mixtures. Among these, the prevalent ones involve chemical tests for minerals, amino acids, and chloride ion content. To accurately evaluate the uniformity of the mixture, it is important that the marker used originates from a single source, is approved for use in feed, and has a precise analysis method. Additionally, the marker should have an adequate number of particles per gram to ensure its detectability when obtaining a sample from the mixer. One of the common markers used in feed mills to assess feed uniformity is salt, which is used in diets from 0.2 to 0.5%. The salt's particle size should be smaller than 400 microns when using a Chloride Quantab Test Strip to test the feed mixture uniformity.

Using the Chloride Quantab Test Strip to test feed uniformity

Take at least ten 100-g feed mixture samples from the different locations of a mixer, considering the sampling protocol explained in the previous article. Then follow the instructions below for each sample separately to measure chloride concentration:

1. Using a 0.1g readability scale, weigh a 10g feed mixture sample into a cup and add 90 grams of hot distilled water to make an aqueous solution.
2. Stir the mixture for 30 seconds, let it sit for 60 seconds, and then stir it again for another 30 seconds.

3. Filter the solution using a funnel and filter paper to eliminate suspended particles and transfer the solution into a test tube/cup.
4. Insert a Chloride Quantab Test Strip into the liquid (Figure 1). Notice that the same lot of Chloride Quantab Test Strip should be used for all ten samples to obtain reliable, accurate results.
5. After the column of the strip becomes fully saturated, an indicating band located horizontally at the top, which is sensitive to moisture, changes its color from yellow to black. This color transformation serves as a signal indicating the completion of the test (Figure 2).

Figure 1. A Chloride Quantab Test Strip in a test solution at the beginning of the test.
All Photos in this article are credited to the Government of Canada, Canadian Conservation Institute

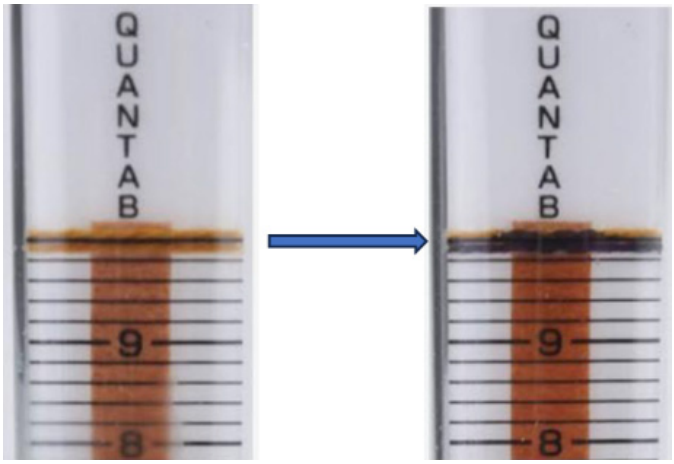

Figure 2. Color change in the top horizontal completion band of the strip from yellow (left picture before exposure to a test solution) to black (right picture after completion of a test for chloride ions)

6. At the completion of the test, read the number at the top of the white peak (Figure 3)

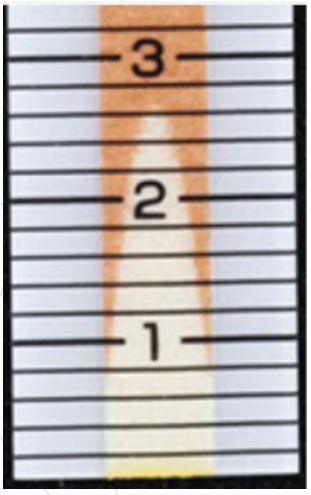

Figure 3. Read the number at the top of the white peak. This picture shows a reading of 2.6 (consider that each gridline between 2 and 3 represents 0.2 increments)

7. Use the conversion charts on the back of the Chloride Quantab Test Strip bottle to convert strip reading to chloride ion percentage. The scales are unique for each batch of strips (Figure 4).

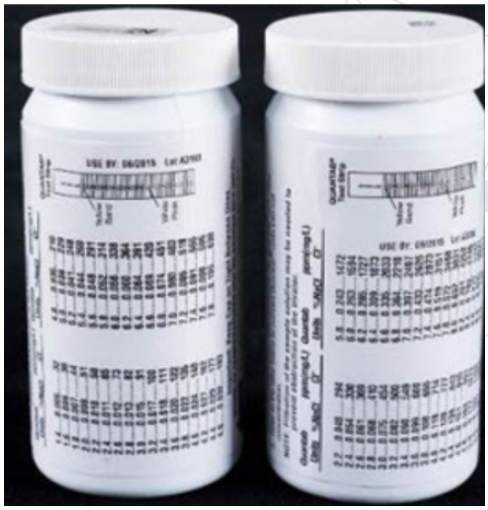

Figure 4. Conversion charts on the back of the Chloride Quantab Test Strip bottle to convert strip reading to chloride ion percentage.

8. Calculating the Coefficient of Variation (CV) from the results of 10 samples within a batch to determine mixing uniformity.

Example: Chloride ion concentration in 10 feed samples as follows: 0.31, 0.30, 0.35, 0.27, 0.31, 0.35, 0.25, 0.22, 0.35, 0.34. To find the tracer's CV follow the following steps:

$$Mean\ value\ of\ tracer\ content = \frac{0.31+0.30+0.35+0.27+0.31+0.35+0.25+0.22+0.35+0.34}{10} = 0.31$$

$$SD = \sqrt{\frac{(0.31-0.31)^2+(0.30-0.31)^2+(0.35-0.31)^2+(0.27-0.31)^2+(0.31-0.31)^2+(0.35-0.31)^2+(0.25-0.31)^2+(0.22-0.31)^2+(0.35-0.31)^2+(0.34-0.31)^2}{10}}$$

$$SD = 0.046$$

$$CV = \frac{0.046}{0.31} \times 100 = 15\%$$

9. The interpretation of CV results was explained in our previous article. Briefly, a CV of less than 10% was considered as excellent uniformity, 10 to 15% as good uniformity, 15 to 20% as fair uniformity, and greater than 20% as poor uniformity by Herrman and Behnke (1994). However, the Guide to Feed Mixing protocol from the University of California, Davis suggests a 5% CV as the industry standard for most ingredients.

How does it work?

A Chloride Quantab Test Strip consists of a thin plastic strip with a capillary column impregnated with brown silver dichromate. After dipping the strip in the solution sample, the liquid enters through a small hole at the bottom of the column and then wicks up the column by capillary action. Chloride ions in the solution react with the silver dichromate, producing a white region of silver chloride on the column. The length of the white region can be converted to a chloride ion concentration using the calibration information supplied with the test strips. The test strips are available in two concentration ranges: 30 to 600 mg/L (30 to 600 parts per million [ppm]) and 300 to 6,000 mg/L (300 to 6,000 ppm).

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RH/TEMP MONITORING DATA LOGGER

By Dr. Mohammad Afrouziyeh, August 2023

Name: RH/TEMP Monitoring Data Logger

Cost: around CAD$120

Available at the manufacturer's website and on Amazon

How does it work?

Temperature and relative humidity data loggers operate by continuously measuring and recording both temperature and humidity levels within a specified environment. The device typically includes built-in sensors to detect changes in temperature and humidity. These sensors collect data at regular intervals, which is then stored in the device's memory. Some data loggers might have additional features like alarms. These alarms can be programmed to trigger when temperature or humidity readings go beyond set thresholds, notifying users of potential issues in the monitored environment. Once the data logging period is complete or when the device is retrieved, users can connect the data logger to a computer or a compatible device using a USB connection or wireless technology. This allows them to download the recorded data and analyze it using dedicated software provided by compatible applications. The software may provide graphical representations, charts, and reports to help users visualize and interpret the collected data effectively.

Intended use

Temperature and relative humidity data loggers find applications in various fields, including industrial processes, agriculture, healthcare, food storage, environmental monitoring, and research. Designed for both indoor and outdoor applications, they help ensure compliance with regulations, quality control standards, and optimal conditions for various processes and products. The device continuously measures temperature and humidity levels in a given area. By generating detailed data reports, they empower users to analyze trends and make informed decisions regarding intended environmental temperature and humidity.

Examples of temperature regulatory compliance

The effectiveness of a vaccine relies on its storage solution, given that precise temperatures are often necessary. Even a slight deviation can severely compromise its efficacy or, in the worst case, make it ineffective. According to the WHO, over 50 percent of vaccines might be lost annually worldwide due to challenges in temperature control, logistics, and shipping. Some vaccines are required to be stored in a fridge at temperatures between 2°C and 8°C while some require freezer storage to maintain temperature at –20°C.

Start Clean – Stay Clean® is a Canadian egg industry's food safety program that helps ensure that all eggs produced are safe, fresh, and of the highest quality. There are over 100 elements assessed and scored as part of the Start Clean-Stay Clean® program in the egg industry. Farmers are required to meet six critical control elements (biosecurity, egg collection and storage, facility hygiene, pest control, record keeping, and safe, high-quality food for Canadians) and achieve an overall score of at least 90% in order to pass the program audit. Farmers are required to fill out various records on a daily, weekly, and monthly basis. These encompass a variety of aspects such as temperature, water analysis, sanitation, and more. Here are some examples of the items farmers are required to meet to maintain their certification.

1. Barn temperature is maintained between 10°C and 27°C as per animal care guidelines. New codes require recording outdoor temperatures to monitor potential indoor spikes beyond 27°C. Such spikes can induce heat stress in animals, prompting producers to lower indoor temperatures as needed.
2. Eggs must be held at temperatures at or below 7ºC.

In all the situations mentioned, a data logger device can be employed to monitor temperature and humidity levels.

Using the device

To use temperature and relative humidity data loggers follow the following steps:

1. Visit the manufacturer's website to download and install the required software.

2. Connect the device (logger) to the USB port on your PC and open the software.

3. Follow the on-screen wizard to name the logger and select the frequency of data read by the logger. The frequency of data reading can be selected from 15 seconds all the way to one hour. A 15-minute data reading frequency is usually recommended for optimum logger storage time.

4. In the software, you can set high and low alarms for environmental temperature and relative humidity.

5. After completing the software fields, remove the logger from the PC. Try not to leave your data logger in the USB port for extended periods as this will cause some of the battery capacity to be lost.

6. Replace the plastic cap to protect the USB and connect the probe to the jack socket. Your logger is now ready to be placed in its environment.

7. If you are using a data logger to monitor a fridge (for example for vaccine protection) or a freezer, you will need to connect the probe to a glycol liquid container and put the container in the fridge or freezer. You do not need to put the entire log into the fridge or freezer. They have a magnetic clip so they can be fixed to the outside of the fridge or freezer and just the glycol probe can go inside.

8. Depending on the type of logger, collected data can be transferred to a PC using USB, Cloud system, Bluetooth, or Wi-Fi.

9.The collected data can be graphed, printed, and exported to other applications for detailed analysis (figure 1).

10. Ultimately, the compiled temperature and humidity data serves as a valuable resource for conducting comprehensive environmental audits within a designated area. Additionally, this data aids in identifying the underlying causes of any pertinent issues or concerns.

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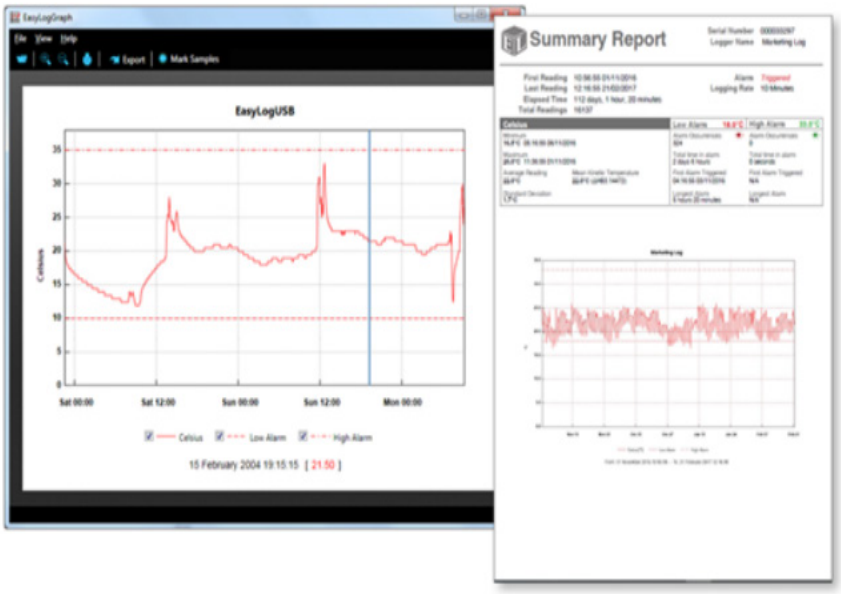


Figure 1. Data report as a graph showing the temperature fluctuation trend over the time period.
Photo source: http://www.easylogusb.com/

PROCESS BEHAVIOUR CHART EXCEL WORKBOOK

By Dr. Mohammad Afrouziyeh, September 2023

	Final BW data	Average BW	Moving Range	Moving Range Bar	Lower Control Limit	Upper Control Limit
Flock 1	2,386.00	2,428.15		31.04	2,345.57	2,510.73
Flock 2	2,421.00	2,428.15	35.00	31.04	2,345.57	2,510.73
Flock 3	2,404.00	2,428.15	17.00	31.04	2,345.57	2,510.73
Flock 4	2,476.00	2,428.15	72.00	31.04	2,345.57	2,510.73
Flock 5	2,400.00	2,428.15	76.00	31.04	2,345.57	2,510.73
Flock 6	2,448.00	2,428.15	48.00	31.04	2,345.57	2,510.73
Flock 7	2,397.00	2,428.15	51.00	31.04	2,345.57	2,510.73
Flock 8	2,470.00	2,428.15	73.00	31.04	2,345.57	2,510.73
Flock 9	2,455.00	2,428.15	15.00	31.04	2,345.57	2,510.73
Flock 10	2,467.00	2,428.15	12.00	31.04	2,345.57	2,510.73
Flock 11	2,437.00	2,428.15	30.00	31.04	2,345.57	2,510.73
Flock 12	2,440.00	2,428.15	3.00	31.04	2,345.57	2,510.73
Flock 13	2,463.00	2,428.15	23.00	31.04	2,345.57	2,510.73
Flock 14	2,446.00	2,428.15	17.00	31.04	2,345.57	2,510.73
Flock 15	2,440.00	2,428.15	6.00	31.04	2,345.57	2,510.73
Flock 16	2,448.00	2,428.15	8.00	31.04	2,345.57	2,510.73
Flock 17	2,410.00	2,428.15	38.00	31.04	2,345.57	2,510.73
Flock 18	2,440.00	2,428.15	30.00	31.04	2,345.57	2,510.73
Flock 19	2,380.00	2,428.15	60.00	31.04	2,345.57	2,510.73
Flock 20	2,444.00	2,428.15	64.00	31.04	2,345.57	2,510.73
Flock 21	2,387.00	2,428.15	57.00	31.04	2,345.57	2,510.73
Flock 22	2,399.00	2,428.15	12.00	31.04	2,345.57	2,510.73
Flock 23	2,407.00	2,428.15	8.00	31.04	2,345.57	2,510.73
Flock 24	2,467.00	2,428.15	60.00	31.04	2,345.57	2,510.73

A Process Behavior Chart (PBC) is a control chart that can monitor the variation in your process over time. Here is a step-by-step guideline for end users to use the provided Excel file for monitoring broiler market body weight using a Process Behavior Chart.

Step 1: Download and Open the Excel File available at PIP's website

Open the Excel file for monitoring broiler market body weight across your flocks.

Step 2: Enter Data

In the second column, labeled "Final BW Data," enter the body weight data for each flock as they become available. Each row should correspond to a different flock.

Step 3: Calculate Average Body Weight and Moving Range

In the third column, labeled "Average BW," the average body weight of flocks will be automatically calculated as you enter the data in the second column. You do not need to manually enter values in this column.

In the fourth column, labeled "Moving Range," the moving range for each data point will be automatically calculated as the absolute difference between consecutive rows in the "Final BW Data" column. This calculation is usually done automatically using Excel formulas.

The fifth column, labeled "Moving Range Bar," is the average value of the moving range column. The value of the moving range bar is used to calculate the upper and lower control limits.

The sixth and last columns specify the lower control limit (LCL) and upper control limit (UCL).

Step 4: Components of the Chart

The chart should be updated automatically as you enter new data in the "Final BW Data" column. The chart will include the following elements:
* A line representing the average body weight of the flocks.
* Data points for the body weight of each flock.
* Lower and Upper Control Limits

Monitor the chart for trends or points outside the control limits (LCL and UCL). These points are indicators of potential variations in broiler body weight.

Step 5: Interpretation of the Chart

Pay special attention to signals on the chart. A signal is a data point or group of data points that are not likely to occur randomly, indicating that something has changed in the system and should be investigated and addressed.

There are three types of signals to look out for:
Rule 1: A single data point that falls outside the upper or lower control limits. When this occurs, it is appropriate to ask why and figure out what happened. Investigate to understand the cause of this variation.
Rule 2: Eight consecutive data points that are all above or below the baseline average. This is unlikely to happen randomly and signals that something significant has changed in the system. Try to investigate to determine the cause.
Rule 3: A cluster of either three consecutive data points or three out of four data points that are closer to the control limits than they are to the average. This indicates a significant shift in the system. Investigate and identify the underlying reason.

If any of the three signal types mentioned above occur, it is crucial to investigate and take corrective actions. Signals suggest that there have been significant changes or anomalies in broiler body weight data. The following picture shows the three signal types concerning process variation.

Picture source: https://blog.kainexus.com/continuous-improvement/improvement-metrics/using-process-behavior-charts-to-improve

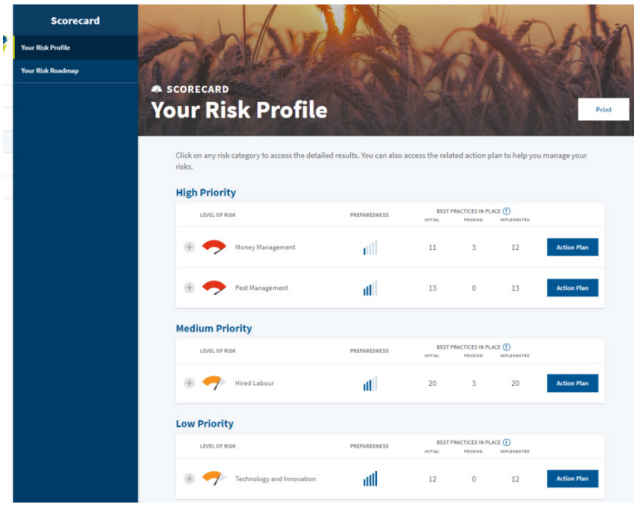
Step 6: Historical Data and Continuous Monitoring

Over time, the chart will accumulate historical data, allowing you to see long-term trends and patterns in broiler body weight. To keep the chart up to date, continue to enter data for new flocks and monitor the process over time. Regularly review the chart to ensure the broiler body weight remains within the desired control limits.

By following these guidelines, end users can effectively use the Excel file to monitor broiler market body weight and detect variations in the process, helping maintain product quality and consistency in the poultry industry. The Excel spreadsheet is versatile and can be employed to evaluate various production factors within a poultry farm, including but not limited to egg mass, egg weight, egg production, lighting intensity, and environmental temperature.

INTRODUCING AGRISHIELD: YOUR COMPREHENSIVE RISK ASSESSMENT AND PLANNING TOOL

By Dr. Mohammad Afrouziyeh, October 2023



Name: AgriShield – Risk Assessment and Planning Platform

Cost: $149/year (1-month free trial available)

Available at Farm Management Canada website

Intended use

AgriShield is a valuable risk assessment and mitigation platform designed for Canadian poultry farmers, created with the support of Farm Management Canada. AgriShield aims to assist farmers with the following actions:

Identify, Assess, and Prioritize Risks: AgriShield helps you pinpoint and understand the potential risks on your farm.
Create a Risk Management Plan: It assists you in developing a risk management strategy for your farm and team.
Access Valuable Resources: AgriShield provides access to a wide range of resources and tools to help you effectively manage risks.

How does it functions?

The platform covers six major risk categories, including People, Finance, Market, Business Management, Business Environment, and Production, which further break down into 19 specific risk types. These cover various aspects, such as Occupational Health and Safety Personal Well-being, Hired Labour, Family Relations, Contractors and Advisors, Money Management, Investments Sourcing, Selling and Trade, Business Strategy and Development, Technology and Innovation, Transition Planning Operations, Public Trust and Consumer Advocacy, Politics, Policies and Regulations, Environment and Climate, Animal Health and Welfare, Nutrient Management, Pest Management, and Soil, Water and Biodiversity Management. For each specific risk situation, AgriShield provides guidelines to evaluate your readiness to address risks and discover areas for enhancement.

Whether you want to conduct a risk assessment or access resources for risk management, AgriShield has you covered. It offers an array of resources, from government programs to industry tools, to help you proactively handle risks. By using AgriShield, you can assess the risks on your poultry farm, create a risk profile to identify priorities and develop an action plan for better risk management.

Using the platform

You can gain full access to AgriShield for a yearly license fee of $149, making it an affordable and indispensable tool for your poultry farming operations. The tool comes with a one-month free trial to allow you time to try it out before purchasing. Visit https://www.myagrishield.ca/en/ to start your risk assessment and management journey with AgriShield!

RESPIRATORY PROTECTION AGAINST DUST

By Dr. Mohammad Afrouziyeh, December 2023

Poultry producers are exposed to various health risks due to the presence of dust in poultry houses. Poultry house dust consists of organic matter such as feathers, dander, feed particles, and microorganisms like bacteria and fungi. Continuous exposure to this dust can lead to respiratory issues, eye irritation, and skin problems among poultry workers. To ensure a healthy work environment, employing proper personal protective equipment (PPE) to mitigate potential health hazards associated with poultry house dust is crucial.

Factors involved in selecting appropriate respiratory protection

Implementing a comprehensive respiratory protection program is fundamental to mitigate these risks. Respirators act as a barrier, filtering out dust particles from the air before they are inhaled. When selecting appropriate respiratory protection, consider the following factors:

1. Assessing Dust Levels:
Regularly evaluate the dust levels in different areas of the poultry facility to determine the appropriate level of protection needed. Consider any regular activities within the barn that could elevate dust levels, like vaccination procedures or shipping the birds at the end of a production cycle to choose the right protective respirator.

2. Respirator Types:
Disposable Dust Masks (N95/FFP2) offer effective respiratory protection against moderate dust levels. These masks, designed for single-use applications, efficiently filter airborne particles, safeguarding against inhalation of harmful contaminants. Ideal for various environments, they provide a cost-effective and convenient solution for mitigating respiratory risks in settings with moderate dust concentrations.

Half-Face Respirators are ideal for moderate to high dust environments. These respirators cover the nose and mouth, providing a secure seal with replaceable filters that efficiently trap dust, preventing inhalation and safeguarding respiratory health. Their ergonomic design ensures comfort during extended use, making them an indispensable choice for individuals seeking reliable respiratory protection against airborne dust particles.

Powered Air-Purifying Respirators (PAPRs) offer robust protection against dust particles by actively filtering the air. These systems consist of a facepiece, a battery-powered blower, and high-efficiency filters that create positive airflow, preventing dust infiltration. PAPRs excel in dusty environments, providing continuous clean air to the wearer and reducing breathing resistance, making them a preferred choice for prolonged tasks in highly dusty settings like catching the birds for vaccination or loading.

The table next page provides a basic overview, comparing the mentioned respirators, but it's important to note that the selection of PPE should be based on a thorough risk assessment and compliance with relevant safety regulations and standards. Factors like proper training, individual fit testing, and specific workplace conditions should also influence the choice of respiratory protection.

3. Fit Testing and Training:
Proper fitting is crucial for respiratory protection efficacy. Conduct fit tests to ensure the respirator seals tightly against the face. Train employees on the correct usage, storage, and maintenance of respirators to maximize their effectiveness. Here are the steps to properly put on an N95 respirator and a simple fit test:
1. Grasp the respirator nose clip between your thumb and index finger.
2. Slide your other hand behind the straps and bring the respirator up to your face in one smooth motion.
3. Pull the top strap over your head, followed by the bottom strap, ensuring the bottom strap rests on your neck below the base of your head and the top strap on the crown of your head.
4. Remove any obstructions like long hair, lab coats, shirt collars, or badge holders that might interfere with the straps or the seal of the respirator.
5. Bend the metal nose clip around your nose with both hands to create a tight seal, applying even pressure to both sides of the clip.
6. Perform a positive fit check by covering the respirator with your hands and exhaling forcefully to see if the respirator slightly balloons out and check for air leaks around the edges. Then, conduct a negative fit check by inhaling forcefully to ensure the respirator collapses slightly.
7. If there are air leaks, readjust the mask, nose clip, and straps. Consider using a respirator of a different size if leaks persist.

To remove the respirator, hold it firmly in place with one hand while pulling the straps off over your head. Ensure the respirator is pulled down and away from your face, never above your breathing zone.

Criteria	Disposable Dust Masks (N95/FFP2)	Half-Face Respirators	Powered Air-Purifying Respirators (PAPRs)
Protection Level	Moderate protection	Higher protection	The highest protection
Filtering Efficiency	Filters out at least 95% of particles	Filters higher percentages of particles	Filters highest percentages of particles
Fit and Seal	Generally good but may vary based on fit	Requires a good seal for proper effectiveness	Requires a good seal for proper effectiveness
Reusability	Usually disposable, limited reusability	Reusable with filter changes	Reusable with filter and battery changes
Comfort	Lightweight and less restrictive	Moderate weight, some restriction	Heavier but often has better airflow
Cost	Generally affordable	Moderate cost	Higher initial investment, lower ongoing costs
Environmental Impact	Creates more waste due to disposability	Lesser waste due to reusability	Lesser waste due to reusability
Occupational Health Consideration	Suitable for less hazardous dust environments	Suitable for moderate to higher risk environments	Suitable for high-risk environments

Protecting workers from respiratory hazards is paramount in poultry production. By implementing a well-structured respiratory protection program, including the selection of appropriate PPE, regular training, and maintenance, poultry producers can significantly mitigate the risks associated with airborne dust. Prioritizing the health and safety of workers not only fosters a responsible work environment but also ensures sustained productivity and well-being within the poultry industry.

TOOL OF THE MONTH 2023

ADVANCING KNOWLEDGE

POULTRY INNOVATION PARTNERSHIP

visionary change collaboration opportunity

poultryinnovationpartnership.ca