Canadian Grain Commission | Commission canadienne des grains

Canada

Sampling Systems Manual

Industry Services

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1. Chapter 1 General provisions

1.1 Purpose

The *Sampling Systems Manual* outlines the Canadian Grain Commission's (CGC) policies and procedures for automatic sampling system equipment including requirements for approval, installation, examination, testing and security. This manual supersedes any previous CGC sampling directions.

1.2 Method

Automatic mechanical sampling systems used to collect official samples for CGC official inspection purposes must meet the requirements stated in this manual.

Automatic mechanical sampling systems are designed to draw official samples of various types of commodities for a variety of applications and in various locations. Sampling systems are generally composed of one or more automatic devices driven pneumatically, hydraulically or electrically. The integrity and acceptability of automatic mechanical sampling systems used for official CGC sampling shall meet basic provisions in the following criteria:

1. CGC approval for samplers and major components of a sampling system

2. CGC approval for official sampling system criteria

3. Maintenance of the sampling system including repairs and alterations in accordance with the manufacturer's specifications and in full view of the CGC

4. CGC examination and testing at periodic intervals and following modifications

5. System operation in accordance with the manufacturer's instructions and CGC specifications while obtaining official samples

1.3 Authority

This manual has been prepared under the authority of section 30 of the Canada Grain Act and section 7 of the Canada Grain Regulations.

30. (1) Subject to the regulations, an inspector

a) shall, on application for inspection and in order of receipt of application for inspection, make an official inspection of grain at any place where provision for inspection has been made; and

b) on making an official inspection of grain shall take an official sample of the grain in the manner prescribed and retain the sample for fifteen days or such longer periods of time as may be prescribed.

Section 30 provides CGC Industry Services access to the operational control of automatic sampling systems when used to obtain official samples. Official samples are those that are drawn under the direct control and continuous supervision of a

designated grain inspector of the CGC. All other samples are considered unofficial and grades or analyses apply only to the sample and not to the grain it is said to represent.

7. (1) Official samples may be taken,

a) subject to subsection (2), by a means of a mechanical sampler; or

b) in a location where the physical structure prohibits the installation of a mechanical sampler, by manual sampling.

(2) No official samples shall be taken by means of a mechanical sampler unless the mechanical sampler is

a) of a type approved by the Commission;

b) installed and maintained by the licensee under the direction of an inspector, and

c) *tested by a CGC inspector. (pending)*

1.4 Official samples

Official samples are defined as those drawn under the direct control or continuous supervision of a designated grain inspector of the CGC.

1.4.1 Terminal or transfer elevator inward carlot or trucklot sample

Sample of approximately one kilogram for grade and dockage assessment; retained on file for 20 days.

1.4.2 Terminal, transfer, process or primary elevator outward carlot or trucklot sample

Sample of approximately one kilogram for grade and dockage assessment; retained on file for 60 days.

1.4.3 Terminal, transfer or process elevator vessel sample

Sample of approximately five kilograms for grade and dockage assessment; retained on file for not less than six months.

1.4.4 Official samples of bulk or bagged grain

Sample of approximately one kilogram representing a container or carlot of bulk or bagged grain for grade and dockage assessment; retained on file for not less than six months.

1.4.5 Terminal, transfer, process or primary elevator weighover samples

Sample of approximately one kilogram representing a bin transfer for grade and dockage assessment; retained on file for 90 days.

1.5 Unofficial samples

Unofficial samples are defined as samples that are not drawn under the direct control or continuous supervision of a designated grain inspector of the CGC and where the inspection results are limited to the sample and not necessarily to the grain the sample is said to represent.

1.5.1 Harvest Survey samples

Samples approximately 200–300 grams, manually drawn by producers or by private grain companies from producer deliveries. The samples are used by the Grain Research Laboratory (GRL) to provide analytical data on the quality of the new crop.

1.5.2 Unofficial submitted samples

Sample of approximately 750 grams, submitted to the CGC as a result of a dispute of grade, dockage or moisture that a producer is offered for his grain at a primary elevator. Samples for *Subject to inspector's grade and dockage* are usually drawn by hand in the presence of the producer and elevator manager, and forwarded to the CGC. Results are binding to the seller and purchaser of that parcel of grain.

1.5.3 Guaranteed representative samples

Sample of no less than 750 grams regardless of the size of the lot being sampled. Samples are guaranteed by person requesting the assessment to be representative of the lot sampled.

1.6 Definitions

1.6.1 Alteration

Modifications or changes made to the sampling system after the system was last tested—These include changes to sampler position, parts, speed, wiring, dust collection etc. It also includes changes to the grain handling system that may effect the sampling system, such as an increase in grain flow, change in belt speed, and use of new shipping bins.

1.6.2 Approval

The written approval to use new mechanical samplers—The approval is obtained by the CGC regional office in consultation with the chief grain inspector. The final CGC approval indicates the sampling system has been proven for integrity and the delivery system for repeatability.

1.6.3 Cancellation

The permanent withdrawal of sampler approval—Reinstatement of sampler approval requires a new approval request including all examinations and tests.

1.6.4 Commodities

Refers to grain, grain products or screenings found in a licensed elevator

1.6.5 Auxiliary controls

A device that duplicates or bypasses the operating controls or interrupts the exclusive CGC use of the sampling device

1.6.6 Operating controls

Controls used by CGC personnel for the normal operation of the sampling system—Operating controls includes on/off control panel switches, timers, indicator lights, sample return, and pneumatic sample delivery.

1.6.7 Lockout control

The device used to disconnect the main power supply and bring the sampler to a zero energy state

1.6.8 Primary sampler

The main sample collector installed at an inward or outward inspection sampling point in a licensed elevator

1.6.9 Secondary sampler

The mechanical or gravitational divider used to reduce the sample obtained by the primary sampler

1.6.10 Suspension

A temporary withdrawal of sampler approval—The suspension is written confirmation by the CGC withdrawing the use of a sampler. A formal suspension may not be required should sampler problems be corrected immediately or before a sampler is used officially.

2 Chapter 2 Approval and authorization

2.1 Responsibilities

To accomplish the intention of section 30 (b) of the Canada Grain Act and section 7 of the Regulations, the CGC must retain operational control or have access to the operational control of mechanical samplers and the authority to accept or reject the use of those devices. As proprietors of the sampling systems, elevator facilities must be aware of their responsibilities to obtain and continue CGC approval of sampling systems.

2.2 Facility management

The operator of the facility that owns, leases, or operates the mechanical sampling systems shall

2.2.1 Provide a written letter of request for the approval of a sampling system

2.2.2 Provide all information needed for approval, including, grain flow, construction, design and manufacturer's specifications (completed ISI-75)

2.2.3 Install all equipment subject to CGC approval in the manner prescribed by the manufacturer

2.2.4 Cooperate with CGC for the examination and testing of sampling systems

2.2.5 Provide all necessary repairs, maintenance and environmental considerations as specified by the CGC and/or manufacturer

2.2.6 Provide written details to the CGC if

1) Alterations to the system are planned

2) Physical changes to equipment or facility that may alter the grain flow to, through or leaving the sampling system are planned

3) The sampling system will no longer be used to obtain official samples.

2.3 CGC inspector in charge or service center operations supervisor

The CGC inspector in charge at a terminal elevator or service center operations supervisor will be responsible to ensure and maintain the integrity of the mechanical samplers within their area of responsibility. The inspector in charge, service center operations supervisor or an employee of the CGC designated by the inspector in charge or service center operations supervisor shall

2.3.1 Conduct or provide supervision and assistance for the initial authorization and approval

2.3.2 Conduct or provide supervision and assistance for supplemental re-verifications

2.3.3 Conduct condition and efficiency checks, and complete and distribute ISI-74a

2.3.4 Initiate and record daily sampler monitoring

2.3.5 In conjunction with the CGC regional office, suspend or reinstate, when warranted, the use of a mechanical sampler for official inspection purposes

2.3.6 Provide periodic information to the regional office regarding the condition and status of mechanical samplers used for official inspection purposes

2.4 CGC regional office

The CGC regional office shall provide a senior inspector to ensure that the mechanical samplers within the region are obtaining representative samples. A CGC regional office senior inspector, conjointly with the elevator management, the CGC inspector in charge, service center operations supervisor and the office of the chief grain inspector, when warranted, shall

2.4.1 Approve mechanical sampler installations or alterations to mechanical sampling systems by

1) Reviewing installation drawings
2) Examining proposed installation sites
3) Providing CGC input on sampler location and design to facility management
4) Performing approval verifications and examinations on new or altered samplers

2.4.2 Initiate or perform periodic or supplemental examinations of official sampling systems, associated equipment and sites

2.4.3 Review condition and efficiency reports (ISI-74a and ISI-74b) submitted by CGC inspector in charge or service center operations supervisor

2.4.4 Periodically review sampler systems monitoring at elevator facilities or CGC service centers

2.4.5 Collaborate with the CGC inspector in charge or service center operations supervisor with suspensions and reinstatements of mechanical samplers for official inspection purposes

2.4.6 Maintain copies and records of

1) Sampler installations and site drawings
2) Correspondence with facility management regarding mechanical samplers
3) Condition and efficiency reports (ISI-74a and ISI-74b)
4) All approval, supplemental and periodic testing data of mechanical samplers

2.5 Office of the chief grain inspector

2.5.1 The chief grain inspector or designate, in conjunction with the CGC regional office shall

- Evaluate and grant or deny approval of mechanical sampling systems
- Provide technical support and/or supervision during initial or supplemental sampler approval verifications, and

2.5.2 The chief grain inspector or designate shall

- Maintain and update the requirements of the CGC sampling handbook
- Maintain an updated national database of all mechanical sampling systems used for collecting official samples, and
- Provide statistical analysis of mechanical sampling systems as warranted.

2.6 Facility request for information

In preparation for the installation or modification of a mechanical sampler used to obtain an official sample, elevator facility management should contact the CGC chief grain inspector or regional office for information and assistance. The chief grain inspector or CGC regional office shall provide information as requested to the elevator facility management and the appropriate CGC affiliates.

2.7 Facility request for approval

Facility management shall request approval in writing from the chief grain inspector or CGC regional office for a proposed mechanical sampling system or modifications to an existing sampling system (completed ISI-75). Included in the request shall be a copy of the manufacturer's installation drawing, a complete description of the model and type of sampling equipment and a representative grain flow drawing or schematic of the intended location. The schematic must show as much detail as possible and as applicable of the proposed sampling system as follows.

1. Scales, scale hoppers and surge bins
2. Dump pits, elevating legs, conveyers, cleaning and shipping bins
3. Loading or receiving spouts and belts
4. Official CGC inspection office or sample collection location

The regional office and the inspector in charge or service center operations supervisor shall maintain communications regarding the status of installation and progress of the sampling system authorization and approval.

2.8 CGC authorization and official approval

On receipt of a request for sampler approval, the CGC shall promptly examine the proposed sampling system and site schematic to determine conformance with basic requirements for the installation and operation of the mechanical sampling system. Any perceived problem areas should be reviewed and addressed with the facility management at this time.

2.8.1 The CGC shall inform the requesting facility or their contractors in writing that the proposed system has been authorized in principle.

2.8.2 Following the installation of the sampling system, the CGC regional office, inspector in charge, service center operations supervisor or designate shall examine the system to determine compliance with requirements. Should the sampling system not comply, the facility management shall be notified and non-conformance issues resolved.

The elevator facility, in cooperation with the CGC regional office, inspector in charge, service center operations supervisor or designate, shall provide access to and assistance in conducting any dynamic and visual verifications of the sampling system. When accepted, the CGC regional office shall issue to the facility management and any other persons or firms directly involved, written approval for the use of the sampling system to obtain official samples. The approval shall state that the sampler be installed, serviced, operated and maintained in a manner conforming to the CGC requirements and manufacturer's specifications.

2.9 Suspension of CGC approval

The inspector in charge or service center operations supervisor has the authority to cease accepting official samples from a mechanical sampling system when circumstances warrant such action. A suspension of approval shall be a joint decision taken by the inspector in charge or the service center operations supervisor and the CGC regional office after repeated attempts to correct infractions in a timely manner have failed. In cases where suspension is warranted, written notice shall be forwarded to the facility management and the chief grain inspector. Infractions leading to suspension may include sampling systems that are

1. Out of repair
2. Found with any applied CGC security seals or locks missing without adequate explanations
3. Found with unsatisfactory components or alterations
4. Not maintained according to requirements or specifications
5. Altered without CGC authorization
6. Not examined and re-verified when due
7. Questionable for accuracy or representativeness

It is not the intent of the CGC to restrict the facility from having access to the sampling system. In cases where terminal technicians have accessed a sampler without prior CGC notification, a verbal confirmation by the inspector in charge, service center operations supervisor or designate that the work has been performed shall suffice. In all cases following the removal or destruction of any CGC security seals, the CGC shall examine the sampling system and replace any removed or destroyed seals.

A sampling system suspended by the CGC for official use shall be returned to service upon satisfactory completion of all necessary repairs or alterations. Following an examination by the inspector in charge, service center operations supervisor or designate, confirmation of the reinstatement of a sampling system shall be forwarded to the facility management by the CGC.

3 Chapter 3 CGC sampler examinations

3.1 Initial approval examination

Before being put into service for obtaining official samples, any new or modified sampling units must be examined by CGC Industry Services. The approval examination shall encompass all items listed on the report of condition and efficiency (ISI-74), a drop sample check, and any other items deemed necessary. Sampling systems found not in compliance shall not be approved.

Following an installation, it is recommended that a series of tests be conducted by the facility to prove likeness and quality preservation through the system. Belt samples or spout samples, manually obtained using a standard hand dipping methods or an acceptable alternative, shall be compared with the mechanically obtained sample from the same lot.

Prior to granting approval, comparisons for unconditional approval of the sampling system shall be made using wheat and canola, and conditional approval on the grain of choice in the following manner:

3.1.1 Drop sample check and operational verification

- The sampler delivery drop sample check requires the introduction of three samples of known quality and quantity per grain group into the delivery system as close to the primary sampler as possible, and the collection and analysis of the samples for quantity and quality.

- The operational verification includes a visual and operational confirmation that the sampling systems operates as generally described and delivers a sample conforming to the requirements of this manual. The verification may also include a comparison to hand-obtained samples or to samples obtained by another mechanical sampler for visual sample likeness.

3.2 Periodic drop sample check and operational verification

The Regional CGC Office shall initiate an operational verification and drop sample check in the following circumstances:

3.2.1 CGC Industry Services personnel have sufficient evidence or other information indicating the sampling system to be of questionable accuracy, e.g., noticeable variations between the quality of the grain and the sample, significant differences between samples of the same lot of grain drawn at the same time by different means of sampling, significant variations in quantity of sample for the same lot sizes, or inexplicable variations between the inward and outward quality of the same lot of grain.

3.2.2 Major repairs are made to the sampling or sample delivery systems by the facility. Replacing sampler or divider parts with the equivalent manufacturer components or the addition of non-effectual components may only require the completion of a condition and efficiency check.

3.2.3 A sampling system has been relocated.

3.2.4 A sampling system has not been in operation for reasons such as the elevator being shut down or a particular sampling system has not been in operation for a periods exceeding one year.

3.3 Monthly scheduled condition and efficiency checks

3.3.1 Terminal and transfer facilities

At terminal and transfer elevators the CGC inspector in charge shall conduct and complete or supervise the conducting and completion of a condition and efficiency check on all sampling systems used for official sampling purposes at monthly intervals. For sampling systems in facilities that operate on a seasonal basis, a condition and efficiency check shall be conducted and completed as the systems are brought into official use and at monthly intervals thereafter until the facility closes.

The inspector in charge shall complete or review the monthly condition and efficiency reports, retain a copy onsite, and remit copies to the elevator facility management and the CGC regional office.

The CGC regional office shall review the monthly condition and efficiency reports submitted and make overall recommendations to the CGC inspector in charge and the facility management based on the information provided. A yearly sampler report of all systems in the region shall be forwarded to the chief grain inspector.

3.3.2 Primary facilities

At primary elevators, the service center operations supervisor or designate shall conduct and complete a condition and efficiency check on all sampling systems used for official sampling purposes at minimum of yearly intervals. For sampling systems at facilities that request inspection service intermittently, the condition and efficiency check shall be conducted and completed at the discretion of the service center operations supervisor as service is requested and as warranted.

The service center operations supervisor shall complete or review the condition and efficiency report, retain a copy, and remit a copy to the elevator facility management and the CGC regional office.

The CGC regional office shall review the condition and efficiency reports submitted and make overall recommendations to the service center operations supervisor and facility management based on the information provided. A yearly sampler report of all systems in the region shall be forwarded to the chief grain inspector.

3.4 Scheduled drop sample testing

A condition and efficiency check must be completed whenever a drop sample check is required.

3.4.1 Terminal and transfer elevator facilities

At terminal and transfer elevators, a drop sample check on all sampling systems used for official sampling purposes shall be conducted at the lesser interval of the weighover interval for the facility or an interval of 36 months.

3.4.2 Primary and process elevator facilities

At primary or process elevators, a drop sample check on all sampling systems used for official sampling purposes shall be conducted at an interval not exceeding 36 months.

Canadian Grain Commission
Industry Services - Inspection

ISI-74a Sampler condition and efficiency check

Elevator facility name and location	Date
	Period from to

Sampler type CGC ID. Model No. Serial No.

Examine sampler item & check for acceptance (✓) or non-acceptance (×) (Explain non-acceptance in remarks)

Lighting around sampling area		Sampler not modified	
Condition of excess sample return		Sampler security intact	
Lockout and safety switches		Condition of sample divider	
Safe access to sampling area and device		Condition of sample delivery piping	
Cleanliness and condition of sampler		Timer, panel board and indication lights	
Cross-cut diverter type sampler		Pelican dust seals (interior)	
Pelican free and clear		Pelican transverses entire grain stream	
Pelican rhythm of operation		No visible plugs or overflows	
Woodside type sampler		All sample buckets in place	
Condition of sampler buckets		Extension of buckets into grain stream	
Sampler enclosure		Condition of gears, chains and rollers	
Auger type sampler		Auger rotation	
Augur free and clear		Condition of drive, motor and chains	

Condition and operation of delivery system

Mechanical sampling system acceptable for use **Yes** **No**

Remarks:

Inspected and authorized

ISI-74b Drop sample check

Wheat		Sample weight (g)	Riddle	No. 5 Buckwheat	Aspiration	Total dockage
Sample 1	**Control**					
	Result					
	Variance					
	% Variance					
Sample 2	**Control**					
	Result					
	Variance					
	% Variance					
Sample 3	**Control**					
	Result					
	Variance					
	% Variance					

Canola		Sample weight (g)	Round hole	Slotted	Riddle+ Aspiration	Total dockage
Sample 1	**Control**					
	Result					
	Variance					
	% Variance					
Sample 2	**Control**					
	Result					
	Variance					
	% Variance					
Sample 3	**Control**					
	Result					
	Variance					
	% Variance					

ACCEPTANCE BASIS
1. Total sample weight should be within +/-1.5% and sample components within +/-10%
2. A single component of a sample may be outside +/-10% but all other components must be within +/-10% including the total dockage.
3. A minimum of 2 samples is required for limited acceptance for either wheat or canola and acceptance in both wheat and canola provide unlimited acceptance.

SAMPLE PREPARATION
Control wheat samples should contain minimum - maximum levels of 1-2 % (40-80 g) roughage; 2-3 % (80-120 g) seeds and broken grain removable by the No.5 buckwheat; 0.50-1% (20-40 g) aspiration.
Control canola samples should contain minimum - maximum levels of 1-2 % (40-80 g) roughage; 2-3% (80-120 g) fines and weed seeds; 0.50-1% (20-40 g) aspiration.
Control samples must weigh a minimum of 4 kg
Make dockage comparisons on the same equipment.
Introduce samples into the delivery system as close as possible to the sample divider or sampler.
Note any difficulties or sample losses.

3.5 Daily sampler monitoring

Where an automatic sampling system is used to collect and deliver samples for official inspection purposes, the CGC staff on site will visually monitor the sampling system at a minimum of once every eight hours of operational service. Samplers, dividers and delivery systems shall be monitored for leaks, diversions and general operation. At sites where CGC staff is permanently located, this monitoring shall be recorded in the CGC facility sampler log. At all other locations CGC staff shall record the daily monitoring on the official inspection documentation submitted to the service center or regional office.

3.6 Lockout procedures

When testing or monitoring of any sampling system require that a CGC employee access or venture within the close proximity of any moving parts of a sampling system, the facility shall be required to provide industrial lockout procedures (e.g., 29 CFR 1910.147 Control of Hazardous Energy Sources). Lockouts shall be performed in full view of CGC staff and tagged until the inspection procedures are completed.

4 Chapter 4 Sampling systems: requirements

4.1 Sampling systems approval

The CGC approval of sampling systems will be limited, subject to section 4.2, to sampling systems that operate so that a complete cross section (height and width) of the grain stream is extracted, reduced and delivered for official inspection purposes. These sampling systems, commonly referred to as crosscut diverter samplers, shall conform to manufacturer specifications and are to be constructed of the industrial durability required to operate in the environment of the selected installation location.

CGC approval for any new sampling concepts will be based on the ability of the proposed sampling system to extract a two dimensional (height and width) section of the grain stream, reduce the quantity of sample in a representative fashion and deliver the sample to the inspection area.

4.2 Non conforming and previously approved systems

Sampling systems commonly referred to as Woodside samplers or strip auger samplers previously approved by the CGC will continue to be authorized for official CGC use subject to their continued operation. The CGC will continue to test and monitor these sampling systems during their operation in official CGC service. Components of these systems may be replaced in order to maintain the accuracy and operation of the existing sampler.

The CGC will no longer accept any new requests for the approval of Woodside or strip auger samplers for official CGC use. Replacement of these sampling systems must be with a sampling system conforming to section 4.1. of this manual.

4.3 Sampling systems not for official use

Sampling systems, commonly referred to as point type samplers, shall not be used for official CGC purposes. This requirement is subject to the direction of the chief grain inspector authorizing the use these systems to sample grain to limited destinations for a period not extending past August 2001. Replacement of these sampling systems must be with a sampling system conforming to section 4.1. of this manual.

5 Chapter 5 Sampling systems: general

5.1 Intended use

The design, composition and construction of a sampling system and associated equipment must suit the environment, the installation location, and the intended official use of the sampling system. The device must withstand normal operation within the facility without loss of reliability or accuracy. Under normal operation, any moving parts shall remain operable and any adjustments remain reasonably constant.

5.2 Marking

The primary sampler and associated divider or pneumatic components shall be permanently marked showing the manufacturer, model and serial numbers. The rated maximum throughput capacity shall be marked on the device or be readily available by reference to the model number.

5.3 Repeatability and proportionality

The overall dimension of the sample entry and pelican must be adequate for the volume and velocity of the grain being sampled allowing for:

1. All grain presented for sampling to be accepted as the collection opening passes through the grain stream, and

2. The sample collection pelican to deliver the entire collected sample to the divider for reduction or to the final sample collection site without backing up.

Under normal operating conditions for vessel shipments, the rate of grain flow past the sampler must, as much as possible, remain consistent within a range of 25 percent of the minimum or maximum rated capacity of the sampling system. Lesser or greater flow rates at the beginning and ending of lots must be for minimum periods of time.

In cases where the flow rate is increased or decreased for extended periods of time, the samples for those portions of grain must be segregated and weighted according to the portions of the lot they represent.

Any sampler installed in a facility used for multiple shipping or receiving purposes, or multiple samplers installed in a facility used for shipping or receiving, must provide a quantity of sample within 10 percent of any other sample taken for the same purposes.

5.4 Speed of transverse

Any non-programmable speed setting shall be set to maximize the efficiency and effectiveness of the sampling system. For cross-cut samplers, the speed that the pelican transverses the grain stream should be at 0.5 metre per second (18-20 in/sec) and at an even rate of acceleration.

5.5 Power sources

Electrical power sources for the operation of a sampler and any associated equipment shall be maintained at a constant voltage to ensure the smooth and unaffected operation of the equipment.

Air or hydraulic sources for the operation of a sampler and any associated equipment shall be maintained at a constant and uniform pressure to ensure the smooth and unaffected operation of the equipment. A separate air or hydraulic supply will be required if the operation of any equipment attached to the same air or hydraulic supply affects the operation of the sampling system.

5.6 Controls

During the operation of a sampling system for official inspection purposes, the control of the timer and resets must be under the direction of the CGC staff on site or readily available to them. Should a grain flow indicator be required to verify grain flow rates it must also be made available. Equipment controls shall be marked conspicuously and be within viewing range of the CGC staff.

5.7 Enclosure and access

All sampling systems must be maintained within a protective enclosure. The sampling system must have strategically located and sealable or lockable access for inspection. The locations must allow for ready and easy examination of the sampler components including the pelican openings, motion activation equipment and dust seals.

5.8 Sample collector openings

The opening of a sampler collector aperture must be at least 1.9 cm (0.75 inch) wide. The opening may be reinforced with narrow support braces to provide structural support and eliminate any distortions to the opening.

A secondary sampler or sample divider, whether it operate gravitationally or mechanically, must be adequately sized to reduce the quantity of sample from the primary sampler without backing up. Mechanical divider openings used to select the final sample must be at least the same width as the primary sampler.

5.9 Sample return

Where the sampler system follows the weighing system in shipping installations or precedes the weighing system in a receiving installation, means must be provided to return the rejected sample portion back to the source grain lot. In cases where miniature bucket elevators, screw conveyers or drag conveyers are used, the sample must not back up into the divider. Where possible, the return should be to a negative pressure location or if necessary, means adopted to restrict any dust from backing up through the divider.

5.10 Sample delivery lines

Sample delivery lines from the sample divider to the inspection area must follow the most direct route with as few bends as possible. Delivery lines should be constructed of metal conduit piping with turns not exceeding 90 degrees. As much as possible, piping should be laid vertically or horizontally. The conduit should be cut squarely and the inside edges honed to remove any roughness and connected in an airtight fashion. An electrical path should be maintained over the entire delivery system with suitable grounding points to discharge any static build up.

The air intake on pneumatic systems must be equipped with a suitable cover to discourage the introduction of unwanted material into the official sample. Any cover shall be removable to accommodate inspection and testing.

5.11 Sample delivery access

A sampler delivery access must have an access point, or an access point must be made available, as close to the primary sampler as possible, but must follow any secondary sampler to allow for the introduction of CGC drop samples.

5.12 Clearing between lots

The entire sampling system must be as self-clearing as possible to prevent contamination from one lot of grain to another.

6 Chapter 6 Sampling systems: installation and use

6.1 Location and installation

The selected location of a proposed sampling system shall be in agreement with the requirements of the CGC. Any nearby equipment shall not adversely affect the operation of the sampler or delay its operation in any manner. Lighting in the area of the sampler should be ample intensity (approx. 1000 lux) and preferably of permanent nature to accommodate a visual inspection of the sampler as required.

6.2 Segregation of samples

Sampling systems must be located or automatic and secure means provided to ensure the representativeness of the sample.

6.2.1 On inward (receiving) sampling systems, the sampler must be located before or immediately following the initial elevation. The sample is considered representative of the entire lot only if the entire lot of grain being sampled has passed the sampler.

6.2.2 On outward (shipping) sampling systems, the sampler must be located following the final elevation and as close as practical to the end of the loading spout. The sample is considered representative of the lot only if the entire lot of grain being sampled has passed the sampler.

6.2.3 Samplers located in spouts must not follow a vertical drop of 15 metres or more; or within 0.6 metres of any bends in the spouting.

6.2.4 Outward samplers used for rail car loading must be installed in a manner that provides a clear and definite separation of grain between rail cars.

1) In cases where the sampler is located above the weighing system, there must be means to clearly identify the separation of grain lots with no residual grain being left in the weighing system that was sampled and not delivered to the carrier.

2) In cases where the sampler is located below the scale but prior to shipping or pre-weighed bins, the grain weighed and sampled must be delivered to the carrier with no residual grain being left in the bins.

In cases 6.2.4 (1) and 6.2.4 (2) of this section, if grain is sampled and not delivered to the carrier, the sample representing that lot of grain will be rendered non-representative.

6.3 Divider installation

The divider associated with a sampler must be installed in a reasonably level position within the plumb specifications of the manufacturer and reasonably close to the main sampler. The divider installation site must be free of hazards, with adequate space for inspecting the device and sufficiently clean of dust, spilled grain and refuse. Lighting must be of ample intensity (approx. 1000 lux) in the area and preferably of permanent installation.

6.4 Timer installation and use

6.4.1 Sampler timers may be of the analog or digital type with minimum dial setting of one second. A sampler timer with increments of one second must accurate to within plus or minus one second.

6.4.2 At facilities where the timers reside in the programmable logic controller of the facility, access to the programming must be made available on request. The facility must bring any adjustment to the timing of the sampler to the attention of the CGC inspector onsite.

6.4.3 The timer of crosscut diverter samplers used to sample grain for official CGC purposes shall not be set to exceed a 20-second interval when loading or unloading rail cars or trucks. The divider reduction rate and the sampler timer interval must be set to collect a sample quantity representing between 0.005 percent and 0.01 percent of the lot being sampled.

6.4.4 The timer of a crosscut diverter sampler used to sample grain for official CGC purposes shall not be set to exceed a 45-second interval when loading vessels or barges. The divider reduction rate and the sampler timer interval must be set to collect a sample quantity representing between 0.0005 percent and 0.001 percent of the incremental value of the lot being sampled.

6.4.5 Interlocking the sampler with a scale draft counter is permitted when any of the following conditions are met:

1) Integrating flow sensors that activate the sampler when grain is passing the sampler and the sampler control maintains and brings forward the accrued time lapse to activate and maintain diverter passes from draft to draft conform to items 6.4.3 or 6.4.4, or;
2) The sampler commences each pass during a draft at a randomly selected and non-operator controlled interval and when necessary maintains an interval as set out in items 6.4.3 or 6.4.4 for the duration of the draft, or,
3) The programmed draft weight of a bulk weighing system is set to six metric tonnes or less.

6.5 Blending limitations

Subject to the limitations of the Canada Grain Act and Regulations, the blending of grain must be completed in an evenly and uniform manner before the grain reaches the sampler. The spiking or charging of the grain stream with off-grade grain or commodities will result in the sample being rendered non-representative. When blending, the facility must make locations and quantities of the primary, secondary and alternate grain sources available to the CGC.

Spiking or charging the grain stream is defined as the introduction of large amounts of lesser or greater quality grain into the grain stream for short periods of time.

6.6 Integrity of grain lots

Means must be provided to eliminate the addition of grain or commodities to the grain stream, or the removal of any portion of the sampled grain, after the sampler. Feeder spouts or diversion spouts after the sampler must be sealed with CGC security seals, keyed locks or positive electronic means under the direction of the CGC. If security means are missing or found tampered with during official CGC inspection service, the shipment or lot will be rendered non-representative.

7 Chapter 7 Sampling systems: performance

7.1 Preparation

For any drop sample checks, the facility must assist with arrangements to have the sampling equipment ready for testing.

The CGC shall prepare and re-evaluate any drop samples on equipment tested, approved and maintained by the CGC. Drop samples shall consist of three samples per grain group with a minimum of two acceptable drop sample recoveries.

7.2 Method

7.2.1 Subject to item 7.2.3, the overall loss of a drop sample shall not exceed 1.5 percent.

7.2.2 Subject to items 7.2.4 and 7.2.5, the components of the dockage of the result sample shall correspond to within 10 percent of the components of the original sample in three of the four components, after being dropped or pneumatically conveyed through the sample delivery system.

7.2.3 Samples shall be at least four kilograms in quantity.

7.2.4 Wheat samples shall be prepared and evaluated for:

1) Riddle material—minimum or maximum levels of 1–2% (40–80 g)
2) No. 5 buckwheat material—minimum or maximum levels of 2–3% (80–120 g)
3) Aspiration—minimum or maximum levels of 0.5–1.0 % (20–40 g)
4) Total dockage (140–240 g)

7.2.5 Canola samples shall be prepared and evaluated for:

1) Round hole material—minimum or maximum levels of 1–2% (40–80 g)
5) Slotted material—minimum or maximum levels of 2–3% (80–120 g)
2) Riddle and aspiration material—minimum or maximum levels of 0.5–1.0% (20–40 g)
3) Total dockage (140–240 g)

7.3 Subject to CGC discretion

The CGC shall evaluate and reserve the granting of final approval or certification of an automatic sampling system pending a review of the system in a manner that is consistent with its natural and day to day operation. This evaluation shall be conducted, where possible, in sequence with the provision of official CGC service after a successful drop sample check and in a manner that will be consistent with the prospective operation of the sampling system at the facility.

Canadian Grain Commission
Industry Services - Inspection

ISI-75 Sampler request for authorization

Facility name and location			**CGC Office**	
Type of elevator: 0 Terminal	0 Transfer	0 Primary	0 Process	0 Other
Approval requested for: 0 All Grains	0 Restricted to _____			
Sampler type _____ for: 0 Loading trucks	0 Loading railcar	0 Loading barges	0 Loading vessels	
0 Unloading Trucks	0 Unloading Railcars	0 Unloading Barges	0 Unloading Vessels	
Sampler manufacturer	**Model**	**Serial No.**		
Sampler installed in: 0 Spout - cross section dimensions _____x_____ or 0 Belt end - width & height ____x_____				
Sampler location:	Sampler powered: 0 Electrically 0 Pneumatically 0 Hydraulically			
Rate of elevation to sampler _____bph or tph OR Belt speed to sampler _____bph or tph				
Height and width of pelican opening _____x_____ cm	Pelican transverse speed _____ cm/min or in/min			
Timer: 0 Analog 0 Digital 0 Internal	Timer minimum interval ___ seconds	Normal sampler interval _____ seconds		
Inspection access doors sealable				
Divider manufacturer	**Model**	**Serial No.**		
Divider located	Divider reduction ratio			
How and where is excess sample returned?				
Scale draft size _____ tonnes	Weighing systems approved by weights and measures			
Sample delivery system: 0 Gravity drop from divider 0 Pneumatic delivery				
Where is the final sample collected?				
In railcar or truck loading, how is the sample integrity preserved through the system?				
Shipping bins 0 Bin identifications	Bin capacities			
Inspection facility and equipment				
Grading area located	Colour of interior walls bench			
Height of grading bench	Light source from _____ bulb fixture			
Bulbs manufactured by	Lux measured at grading bench			
Dockage tester	Sample divider			
Protein machine 0 Model	Serial No.	Modem		
Pearler				
Facility health and safety				
Fall arrest available	Mandatory hard hat and safety boots			
Muster station	Alarms			
Washrooms locations	Smoking restrictions			
Special instructions:				

Over →

_____ Signed facility manager

_____ Signed CGC

8 Chapter 8 Manual sampling

8.1 Manual probe, hand scoop and bag trier sampling

When a lot of grain cannot be sampled by mechanical sampling means, official samples may be obtained by

8.1.1 Probe—providing it is done in a prescribed manner and sufficient probe samples are taken

8.1.2 Hand scoop—providing it is done in a prescribed manner and that sufficient scoop samples are taken

8.1.3 Bag trier—when sampling bagged lots of grain

8.2 Equipment

8.2.1 Grain probe—a device consisting of an outer sleeve and inner tube, both having perforations incorporated at regular intervals along their length. Probes are available in two lengths: 3.04 metre and 1.60 metre, for sampling bulk grain in railway cars, trucks, containers, bins or holds of ships.

8.2.2 Hand scoop sampler—a device consisting of a metal cone shaped cup attached to the end of a 40–60 centimetre rod

8.2.3 Bag trier—a cone shaped device, 307 millimetres long with a slotted opening along its full length

8.3 Sample identification

Every sample and separate portion as may be required, e.g., moisture testing, must contain proper identification and information concerning the sampling and the grain it represents.

Sample ticket (example)

Date and location:	May 31/00 – Symington Yards WPG
Car initial and number:	CGCG 900303
Shipper:	Sask Pool
Seals:	Record seal numbers and condition where applicable.
Load lines:	193, 210, 200 average 200cm
Probes taken:	11
Good probes:	9
Percent of car represented:	90% (estimate)
Remarks:	Slight musty odour throughout car
Seal applied:	If applicable
Samplers' initials:	_____

8.4 Probe sampling procedure for bulk grain

- **Important:** Take all safety precautions before attempting to secure samples on a rail car or near a moving conveyor. If the facility fails to comply with safety requirements, terminate the sampling.

- **Important:** Never use a sampling probe to open or close a railcar door or hatch cover.

8.4.1 Sampling procedure

1) The surface of the grain is leveled and a sample reception cloth is spread. A sufficiently large area must be leveled to prevent grain from spilling on or off the cloth.
2) The probe is inserted vertically into the grain with the slots closed. When the maximum depth is reached, the slots are opened and the probe is moved up and down slightly to ensure all openings are filled. The slots are closed and the probe is extracted, placed on the sampling cloth and emptied. Care must be taken to avoid overlapping individual probings.
3) Probe samples are examined for uniformity, quality, colour, smut, odours, high moisture, high temperature or heating, insects or any other detectable factors. Unusual conditions or factors must be noted on the sample identification tickets.

8.5 Probe sampling procedure for carlot or container

- **Important:** Take all safety precautions before attempting to secure samples on a rail car or near a moving conveyor. If the facility fails to comply with safety requirements, terminate the sampling.
- **Important:** Never use a sampling probe to open or close a railcar door or hatch cover.

8.5.1 Sampling procedure

1) Prepare the sample ticket as much as possible before entering the car or container.
2) Note any odours such as sour, rancid, musty, heated, chemical etc., before probing.
3) Level the surface of the grain and spread a sample reception cloth. A sufficiently large area must be leveled to prevent grain from spilling on or off the cloth.
4) Take the correct number of samples.
5) Examine the samples for uniformity, including quality and colour, presence of smut, insects, heated kernels, odours or any other noticeable factors. Note any condition detected on the sample identification ticket.
6) If grain samples taken from different portions of the bulk lot show differences, package the different portions separately in a sample bag. Enclose a ticket in each separate sample portion indicating the location and the proportion of the bulk that the sample represents—e.g.,10 percent. If differences in odours or moisture content are noted, place samples in separate moisture containers.

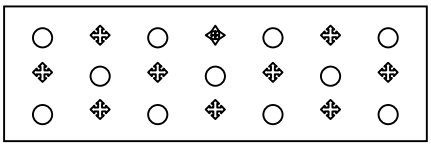
7) If samples are uniform, combine and thoroughly mix the samples—by stirring no less than 20 times by hand.
8) If a moisture test is required, fill a moisture-proof container and enclose a small identification ticket.
9) Place the balance of the sample in a sample bag and enclose an identifying ticket enclosed.

Note: When headroom above bulk grain is restricted, it may be necessary to insert the probe at an angle and raise it to the vertical position when sufficient overhead space is realized. This tends to place considerable stress on the probe and could bend it, making it difficult to open and close. Since probes are usually concave on the slotted side, it is safer to apply pressure against the solid side. This is accomplished by inserting the probe with the closed slots toward the grain surface. When the probe is pushed far enough into the grain to permit straightening to vertical, the probe is pushed to vertical. After filling, the probe is turned on-half revolution so when extracted the solid side is facing the sampler.

8.6 Probe Patterns

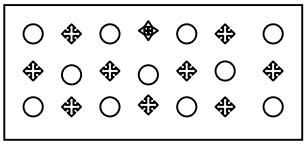
8.6.1 Railway box car

Use: 1.6 metre probe
Take: 11 probe samples
Pattern:



8.6.2 Open top containers

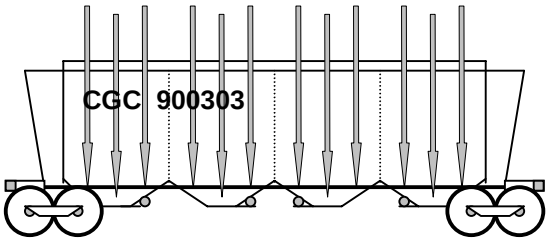
Use: 1.6 metre probe
Take: 11 probe samples
Pattern: ○



♦ **Important:** If 11 probes do not provide adequate sample size, 10 additional probes should be taken in the pattern denoted by ✥

8.6.3 Hopper car

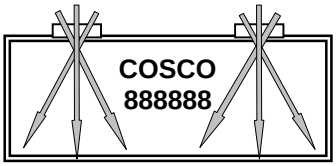
Use: 3.04 metre probe
Take: 12 probe samples
Pattern: see figure



Note: When probing hopper cars, it may not be practical to examine individual probings, as there may not be a suitable location to spread a sampling cloth. However, individual probes form each compartment should be examined for uniformity.

8.6.4 Hatch top container

Use: 3.04 metre probe
Take: minimum of six probe samples
Pattern: as shown for two-hatch container



Note: A 100 percent probe of containers with two hatches may be impossible. In such cases, make at least six good probes with a 3.04 metre probe as shown.

8.7 Probe sampling procedure for bagged grain

♦ **Important:** Take all safety precautions before attempting to secure samples on a rail car or near a moving conveyor. If the facility fails to comply with safety requirements, terminate the sampling.

8.7.1 Number of bags

- Bagged lot sizes of 30 bags or less—sample every bag
- Bagged lot sizes of more than 30 bags—sample not less than 20 percent of the bags

♦ **Important:** Record the total number of bags in the lot and the number of bags sampled on the sample ticket.

8.7.2 Sample Identification

- Show all identification and details of the sampling on the sample ticket.
- Record the number of bags and the weight per bag.
- If stored in a warehouse, show location of the bags.
- If stored in containers or rail cars, record the container or car identification number.

♦ **Important:** Every precaution must be taken to prevent damage to the bags while handling or sampling. Damage claims may be filed if bags are burst or damaged in any way.

8.7.3 Precautions for heavy bags

Bags weighing more than 30 kilograms should not be moved by one individual.

- Request assistance from the facility if working alone.
- Discontinue sampling if no assistance is provided.
- Contact the CGC supervisor immediately for further direction.

8.7.4 Sampling procedure

1) Select bags to be probed in a well distributed pattern to obtain a representative sampling of the entire lot.
2) Be prepared to move bags to obtain a representative sampling. See 8.7.3: *Precautions for bags over 30 kilograms.*
3) Insert the bag trier with a push and turn force to spread the fibers apart. Allow a portion of the product to flow out of the bag.
4) If bags are pilled high, considerable strain may be placed on the lower bags. Strike lower bags with the large end of the trier to relieve the strain and prevent bags from bursting.
5) Examine individual probe samples for uniformity and note variations in foreign material, condition, colour etc. on the sample ticket.
6) If variations are enough to affect the uniformity of the composite sample, package the portion separately. Enclose a ticket in each separate sample, showing the quantity represented by each separate sample and if appropriate, the location of the bags in railcars, containers or warehouse—e.g., 25 bags, top layer.
7) If samples are uniform, combine and thoroughly mix the samples—by stirring no less than 20 times by hand.
8) If a moisture content test is required, fill a moisture proof container and enclose an small identification ticket.

8.8 Hand scoop sampling procedure

♦ **Important:** Take all safety precautions before attempting to secure samples on a rail car or near a moving conveyor. If the facilty fails to comply with safety requirements, terminate the sampling.

8.8.1 Sampling procedure

1) Insert the hand scoop into the grain stream from the left, middle and right of the stream.
2) Collect samples from the stream at random intervals.
3) Capture a full scoop of grain, approximately 80–100 grams per scoop. *See 6.4.3 and 6.4.4 for suggested samples sizes.*
4) Combine and thoroughly mix the scoop samples
5) Divide down to the required sample size.
6) If a moisture test is required, fill a moisture proof container and enclose a small identification ticket.
7) Place the balance of the sample in a sample bag and enclose an identifying ticket enclosed.