



USDA Beef Carcass Grading Instrument Enhanced Grading (IEG) Program

1 Purpose

This document provides the requirements for establishments that wish to utilize the Instrument Enhanced Grading (IEG) Program for applying the *United States Standards for Grades of Carcass Beef* (U.S. Beef Grading Standards).

2 Scope

This document sets forth the requirements for monitoring plant personnel applying the U.S. Beef Grading Standards utilizing an approved instrument. Applicants desiring to participate in this program must submit to the Quality Assessment Division (QAD) a plant program that addresses all aspects and requirements set forth in this document to include documentation and procedures for corrective actions. Grading activities utilizing the grading instrument by a QAD certified plant employee will be in accordance with the U.S. Beef Grading Standards. Application of the U.S. Beef Grading Standards will be monitored and verified by a QAD grader utilizing this document and the applicant's approved plant program.

3 References

USDA QAD Instrument Assessment Systems for Livestock Carcasses and Carcass Products

[*United States Standards for Grades of Carcass Beef*](#)

[*QAD 500 Procedure: Beef, Bullock, and Bull Grading Methods and Procedures*](#)

[*QAD 515 Procedure: Beef Carcass Instrument Grading Procedures*](#)

4 Responsibilities

4.1 Plant Responsibilities

- a. Ensuring proper validation of the instrument.
- b. Daily documentation of validation parameters.
- c. Ensuring that the QAD grader is notified when the instrument does not properly validate.
- d. Ensuring that the instrument is not used until properly validated.
- e. Validation of the instrument at the beginning of the shift.
- f. Ensuring that the instrument operator is properly trained, and training is documented.
- g. Ensuring proper image capture.



- h. Ensuring the proper training of qualified plant employees possessing a combination of education and/or meat related experience commensurate of the role and responsibility of applying the U.S. Beef Grading Standards utilizing the instrument.
- i. Ensuring plant employee applying the U.S. Beef Grading Standards has been certified by QAD to apply the grade standards which includes conducting traditional grading when a usable image is not available under the following circumstances.
 - 1. When the instrument is properly functioning, a certified plant employee may traditionally grade up to 2% of the carcasses presented per shift with the plant remaining subject to the sampling level they were already operating under.
 - 2. When the instrument is not properly functioning, following the QAD grader being made aware, a certified plant employee may traditionally grade all carcasses presented for a period of time not to exceed 1 hour per shift during which the plant will remain subject to the sampling level they were already operating under.
- j. Ensuring that preventative and corrective actions are taken when observations and findings indicate potential noncompliance.
- k. Ensuring that a documented quality control system is in place to monitor and identify issues related to sawing, ribbing, carcass splitting, or other presentation defects, on a continuous basis, throughout each shift. Quality Control documentation will be made available to the QAD grader upon request.
- l. Assuring carcasses are adequately chilled and ribbed a minimum of ten minutes prior to presentation for instrument grading or traditional grading.
- m. Ensuring that instrument technology is operated in accordance with the manufacturer's guidance.
- n. Providing instrument assessment data and ribeye images (color or black and white) to the QAD grader monitoring the system as requested.
- o. Ensure images are sharp and clear (properly focused and not blurred).
- p. Ensure the ribeye surfaces are free of processing debris that would negatively impact instrument prediction.
- q. Ensure camera placement includes the 12th-13th rib cross section.
- r. Ensure control measures are being conducted to verify proper alignment of camera mechanism on carcass surface.
- s. Provide the QAD grader with a copy of the unprocessed images for each carcass selected for the AQL review of image capture.



- t. Ensure that certified plant employee follows Section 7 *Official Grade Determination Phase* of [QAD 515 Procedure: Beef Carcass Instrument Grading Procedures](#).
 - 1. Excluding instrument grade override parameters which should be applied as noted in Section 5.
- u. Obtain and provide the appropriate computer monitor, as approved by the National Meat Supervisor, to use for virtual correlations, to ensure uniformity.

4.2 Quality Assessment Division Responsibilities

- a. Provide adequate English and Spanish resources for plants to properly train qualified employees to satisfactorily complete certification testing.
- b. QAD and the National Meat Supervisor or designee will administer the certification test to the plant employee to ascertain knowledge of the grading standards. The scope of the written examination will be limited to the content covered in the available QAD training resources and the validation and operation procedures specific to the instrument(s) utilized by the plant. Correlations for marbling will be conducted in person or utilize ribeye images. Testing will focus on pragmatically evaluating the ability of a plant employee to satisfactorily designate final USDA grades and appropriately assign certified program standards under QAD monitoring.
- c. The QAD grader will review, understand, and verify the applicant's approved plant program.
- d. Utilize the Program Monitoring Procedures noted below in Section 5.
- e. Verify, as applicable, that the instrument(s) is/are on an approved list via serial numbers, etc.
- f. Verify that the camera head and software have the same ID number for camera numbers 300 to 19999.
- g. Daily completion of the QAD 516 Smartform in the Smartforms app.
- h. Conduct traditional grading, temporarily
 - 1. As noted below in Section 5.
 - 2. Upon notification that the grading instrument is not functioning properly.

5 Program Requirements

5.1 Program Monitoring Procedures

The IEG program will be continuously monitored by QAD to ensure the application of the U.S. Beef Grading standards are correct and to identify opportunities to continuously improve the program. The monitoring procedures that QAD follows within a plant are to be developed and submitted by applicants as part of their plant program for QAD approval. These monitoring



procedures must allow methods that provide QAD the ability to conduct continual unbiased evaluation of a plant's IEG program according to the frequencies listed in the appropriate monitoring Tables I, II, and III in addition to the frequencies listed in Post Grading Review Table IV.

For Table IV, Post Grading Review: Methods may include, but are not limited to:

- a. Random selection of carcasses post-grading to be made available for a QAD grader to assess in an appropriately lighted area.
- b. The applicant may provide a means where a QAD grader can view the instrument data and unprocessed images of randomly selected carcasses post grading along with the applied grades of those carcasses.
- c. A combination of both a. and b.

Table IV – Post Grading Review

Slaughter Rate Number of cattle per shift	Sample Size (Number of carcasses)	Accept/Reject Criteria (Review of holding cooler)
Up to 500	20	2/3
501 to 1000	40	3/4
1001 to 1600	60	4/5
1601 to 2200	80	5/6
Over 2200	100	6/7

All defects observed by the QAD grader during the monitoring process will be recorded and shared with the applicant in a timely manner.

TABLE I. MONITORING (Normal)

Slaughter Rate Number of cattle per shift	Sample Size (Number of carcasses)	Accept/Reject Criteria (Normal Level of Review)
Up to 500	40	3/4
501 to 1000	80	5/6
1001 to 1600	120	7/8
1601 to 2200	160	9/10
Over 2200	200	11/12

Factors that may be the cause of an inaccurate grade designation or carcass specification designation include, but not limited to:

- Marbling
- Maturity
- Dark cutting characteristics
- Blood splash



- Callous
- Improperly ribbed carcasses
- Improper sawing
- Bone dust/sawing debris/fat on the ribeye that causes the instrument to provide an invalid marbling score
- Improper placement of the instrument
- Fat thickness
- Ribeye size
- Breed identification
- Humps
- Other items as specified in carcass schedules

Instrument marbling predictions will be overridden by the certified grader if the grader call varies 40 degrees or more from the instrument prediction and it results in a different grade or carcass specification. Additionally, the certified grader will override instrument predictions when other factors listed above are exhibited if they result in a different grade or carcass specification.

Defects shall be classified by the QAD grader as either minor or major. Minor defects are weighted at half and major defects are weighted fully. Defects are defined and classified in the following table.



GRADING DEFECTS			
Metric	Accept	Minor	Major
Marbling Score	10 to 40 degrees above/below the minimum marbling score for Prime, Choice, Select	50 to 60 degrees above/below the minimum marbling score for Prime, Choice, Select	70 or more degrees above/below the minimum marbling score for Prime, Choice, Select
Overall Maturity	40 degrees or less	50 to 90 degrees	100 degrees or more
Dark Cutter	Correct	10 to 50% grade discount	60% - 100% grade discount
Calloused Lean	Correct		Incorrect
Blood Splash	Correct		Incorrect
Stamping Error	Correct		Incorrect
Ribbing, sawing, etc.	Correct/ascertainable		Incorrect/unascertainable
CARCASS SCHEDULE DEFECTS			
Metric	Accept	Minor	Major
Marbling Score	10 to 40 degrees above/below the minimum marbling score as specified in the applicable G-Schedule	50 to 60 degrees above/below the minimum marbling score as specified in the applicable G-Schedule	70 or more degrees above/below the minimum marbling score as specified in the applicable G-Schedule
Breed Identification	As specified		Out of spec
Hump Height	As specified		Out of spec
Overall Maturity	40 degrees or less out of spec	50 to 90 degrees out of spec	100 degrees or more out of spec
*Lean	40 degrees or less out of spec	50 to 190 degrees out of spec	200 degrees or more out of spec
*Skeletal	40 degrees or less out of spec	50 to 90 degrees out of spec	100 degrees or more out of spec
Dark Cutter	As specified	10 to 50% grade discount	60% - 100% grade discount
Calloused Lean	As specified		Out of spec
Blood Splash	As specified		Out of spec
Ribeye Area	Less than 1.0 inch out of spec	1.0 to 1.5 sq. inches out of spec	More than 1.5 sq. inches out of spec
Fat Thickness	Less than 0.2 inch out of spec	0.2 to 0.3 inch out of spec	More than 0.3 inch out of spec
Weight	As specified		Out of spec
* Thresholds when maturity components are evaluated separately (i.e. G-schedule certification).			
NOTE: 2 minor defects = 1 major defect			



The chart below illustrates examples of how marbling defects are determined and weighted.

Marbling Defect Examples

Instrument Marbling Score	IEG Grader Applied Grade	USDA Grader Marbling Score	Minor Defect	Major Defect
400	Choice	360		
400	Choice	350	X	
400	Choice	340	X	
400	Choice	330		X
380	Select	440		
380	Select	450	X	
380	Select	460	X	
380	Select	470		X
700	Prime	660		
700	Prime	650	X	
700	Prime	640	X	
700	Prime	630		X
680	Choice	740		
680	Choice	750	X	
680	Choice	760	X	
680	Choice	770		X
660	Prime	660		
660	Prime	650	X	
660	Prime	640	X	
660	Prime	630		X
360	Choice	360		
360	Choice	350	X	
360	Choice	340	X	
360	Choice	330		X
290	Select	260		
290	Select	250	X	
290	Select	240	X	
290	Select	230		X
300	Ungraded	340		
300	Ungraded	350	X	
300	Ungraded	360	X	
300	Ungraded	370		X
270	Ungraded	340		
270	Ungraded	350	X	
270	Ungraded	360	X	
270	Ungraded	370		X



The chart below illustrates examples of how defects other than marbling are determined and weighted.

Other Defect Examples

Assumed Correct Marbling Score	IEG Grader Applied Grade	Applied G-Schedule Spec.	USDA Lean Maturity Score	USDA Overall Maturity Score (Over 30-Month)	USDA Dark Cutting Percentage	USDA Determined Other	Minor Defect	Major Defect	Explanation
420	Choice			B30					Needs A100 or less. Less than 50 degrees off is no defect.
460	Choice			B50			X		Needs A100 or less. 50 to 90 degrees off is a minor.
440	Choice			B100				X	Needs A100 or less. 100 degrees or more off is a major.
530	Ungraded			B40			X		Needs B100 or less for Choice. 50 to 90 degrees off is a minor.
390	Select			B50			X		Needs A100 or less. 50 to 90 degrees off is a minor.
350	Select			B20					Needs A100 or less. Less than 50 degrees off is no defect.
760	Prime			C0					Needs B60 or less. Less than 50 degrees off is no defect.
720	Prime			B80			X		Needs B20 or less. 50 degrees or more off is a minor defect.
740	Choice			C10					Needs B100 or less. Less than 50 degrees off is no defect.
720	Prime			C20				X	Needs B20 or less. 100 degrees or more off is a major defect.
510	Choice			C50			X		Needs B100. 50 to 90 degrees off is a minor defect.
580	Choice			D0				X	Needs B100. 100 degrees or more off is a major defect.
430	Choice			A	20%		X		10 to 50% discount not taken is minor.
520	Choice			A	50%		X		10 to 50% discount not taken is minor.
420	Choice			A	60%			X	60% or more discount not taken is a major.
610	Select			A	80%				Discount properly applied no defect.
720	Prime			A		BS(Small amount)		X	Ineligible for grade with Small amount or more of Blood Splash.
460	Choice			A		Callous 1/2 square inch (dime size)		X	Ineligible for grade with 1/2 square inch or more of Callous.
		<17.0 sq inch REA				17.9 sq in REA			Less than 1 inch of is no defect
		<17.0 sq inch REA				18.0 sq in REA	X		1.0 to 1.5 inches off is a minor.
		<17.0 sq inch REA				18.7 sq in REA		X	More than 1.5 sq inches off is a major.
		A lean maturity	B30						Needs A100 or less. Less than 50 degrees off is no defect.
		A lean maturity	C70				X		Needs A100 or less. 50 to 190 degrees off is a minor.
		A lean maturity	C90					X	Needs A100 or less. 190 degrees or more off is a major.



5.2 Changing Levels of Monitoring Activities

- a. If during a single shift the QAD grader records inaccurately graded carcasses exceeding the acceptable level noted in Table I, the plant will be moved to Tightened sampling for the next production day for that shift. Tightened sampling levels are in Table II.
- b. Tightened sampling procedures will continue for three (3) consecutive days. If after three (3) consecutive days the plant demonstrates that they have taken corrective action they will move back to normal sampling procedures. Corrective action may include re-evaluation of the plant employee, by QAD by means of a written correlation.
- c. If the QAD grader observes/records more than the acceptable number of inaccurately graded carcasses while on tightened sampling the plant will go to traditional instrument grading by QAD graders, minimum of two (2) per shift, for a 1-week period of time. The applicant will be responsible for all associated travel costs and per diem incurred to travel additional graders to their location.
- d. After one week of traditional instrument grading by QAD graders, the plant may be allowed to return to utilizing certified plant personnel to apply the grades, pending adequate corrective and preventative actions have been taken. The program will resume with three (3) consecutive days of tightened monitoring, with acceptable results, prior to returning to normal sampling.
- e. Reduced Sampling - If monitoring shows that grades and certification are properly applied per Table I under Normal levels for 20 consecutive days, then sampling frequency is reduced per Table III. Monitoring remains at the Reduced levels unless the maximum number of defects is exceeded. If this number is exceeded, monitoring switches to the Normal level.

Table II – Monitoring (Tightened)

Slaughter Rate Number of cattle per shift	Sample Size (Number of carcasses)	Accept/Reject Criteria (Tightened Level of Review)
Up to 500	40	2/3
501 to 1000	80	3/4
1001 to 1600	120	5/6
1601 to 2200	160	7/8
Over 2200	200	9/10



Table III – Monitoring (Reduced)

Slaughter Rate Number of cattle per shift	Sample Size (Number of carcasses)	Accept/Reject Criteria (Tightened Level of Review)
Up to 500	25	2/3
501 to 1000	50	3/4
1001 to 1600	80	5/6
1601 to 2200	120	7/8
Over 2200	160	9/10

- 5.3 Gross Non-Compliance** - QAD management may suspend the approval of the plant's application of carcass grades and identification of Carcass Specifications when significant numbers of obvious mis-gradings occur, beyond those being monitored under reduced, normal or tightened monitoring procedures. Actions to identify and correct the non-conformance by the applicant will be immediately addressed.
- If during a single shift the QAD grader records inaccurately graded carcasses exceeding the acceptable level noted in Table IV, the plant will be moved to Tightened sampling for the next production day for that shift. This will be the same sampling rate.
 - Tightened sampling procedures will continue for three (3) consecutive days. If after three (3) consecutive days the plant demonstrates that they have taken corrective action they will move back to normal sampling procedures. Corrective action may include re-evaluation of the plant employee, by QAD by means of a written correlation.
 - If the QAD grader observes/records more than the acceptable number of inaccurately graded carcasses while on tightened sampling, the plant will go to traditional grading by QAD graders, minimum of two (2) per shift, for a 1-week period of time. The applicant will be responsible for all associated travel costs and per diem incurred to travel additional graders to their location.
 - After one-week of traditional grading by QAD graders, the plant may be allowed to return to utilizing certified plant personnel to apply the grades, pending adequate corrective and preventative actions have been taken. The program will resume with three (3) consecutive days of tightened monitoring, with acceptable results, prior to returning to normal sampling.



5.4 Non-Conformances (NC) - The QAD grader will:

- a. Issue NC's for program deviations and/or deficiencies observed during monitoring activities outside of the designated monitoring/sampling noted in Table I, Table II, or Table III.
- b. Require a written response to each NC within one business day of receipt of the NC. The NC response will include actions taken to correct as well as prevent reoccurrences of the nonconformance.
- c. The QAD grader will retain copies of NC's and applicant's responses in the files. The QAD grader will provide copies of NC's and applicant's responses to the immediate QAD supervisor, QAD Office and the National Meat Supervisor.

Depending on the severity of the NC, failure to respond to NC's and to take corrective actions, within the specified timeframe may cause suspension of the program.

5.5 Certification of Plant Employees

The National Meat Supervisor or designee will certify qualified plant employees responsible for program integrity and application of the U.S. Beef Grading Standards. This will be accomplished through a process that includes both a written exam, an in-person correlation or a virtual or marbling correlation using images with known expert calls and a cooler correlation for all other grade factors. The qualified plant employee must achieve a passing score on both the written (70% or higher) and correlation (80% or higher) sections of the testing. (**Note:** Carcasses and digital images used in a correlation for the purpose of certifying plant employees must represent a full range of factors that will adequately demonstrate the individual's knowledge, skills, and ability to perform authorized duties.)

Upon satisfactory completion of training and testing, plant employees will be certified to perform authorized grading duties, including identification for Carcass Specifications where applicable. Certification of plant employees will be required to be renewed every two years by the National Meat Supervisor or designee. This will include both a written exam, in-person or digital image correlation(s) for marbling, and a cooler correlation for all other grade factors. After the completion of two license cycles (4 years) for licensed company employees, QAD Management may suspend the written test requirement for those licensed company employees that have shown sustained accurate application of the U.S. Beef Grading Standards and integrity for the program.

In addition, a record designating that each certified plant employee has completed and passed the required tests, signed by the QAD Director, will be issued and must be on file at the applicant's facility as well as the QAD headquarters office. When QAD is requested to assist in the training of the plant's employee, the applicant will incur any additional costs at the unscheduled rate, including travel costs associated with the training of their designated employees.



5.6 Continuing Evaluation of Certified plant employee

The certified plant employee will be evaluated and tested on a continuing basis to ensure adequate knowledge of the U.S. Beef Grading Standards and Carcass Specification requirements.

Evaluations will occur monthly, via written tests and written cooler correlation and/or digital image correlation. At least one of the monthly correlations each quarter will include a digital marbling correlation using images with known expert calls with other grade factors done on a written cooler correlation. The certified plant employee is expected to maintain a high level of knowledge of the requirements for the position, and a high level of integrity in support of QAD programs.

5.7 QAD Equipment

Where applicable, USDA stamps used for identifying carcasses will be provided by the QAD. USDA stamps and roller brands will be secured by USDA employees when not in use. QAD will establish a secure method for certified plant graders to access equipment in the event of an emergency. *For example: secured, locked box with a key secured separately under USDA seal utilizing a seal log maintained by the USDA.* Only trained plant employees or QAD graders are authorized to use this equipment. Misuse of issued equipment may cause suspension of the plants approved program.

5.8 Meetings

The integrity of QAD programs must be maintained at all times. The QAD grader will interact with the company and schedule meetings as needed to discuss issues and/or observations for promoting continuous improvement of the program. The applicant will record minutes detailing the issues discussed during the meetings. Copies of the minutes will be maintained for the files in the grading office.

6 Applications

6.1 Submission of Proposals

Prospective applicants are required to submit a written plant program which must be approved prior to the commencement of activities associated with this program. The plant program must address each required area and outline specific procedures used to ensure that these requirements are met. Each applicant will submit an electronic copy to the National Meat Supervisor and the Quality Assessment Division Director. Applicants may also send a hard copy of their program to:

USDA, AMS, L&P, Quality Assessment Division
Quality Assessment Division Director
1400 Independence Avenue, Stop 0258
Washington, DC 20250

The National Meat Supervisor will notify applicants of their program status within 20 working days of receipt of the plant program.



6.2 Amendments to Programs

Amendments to approved programs will be submitted to the QAD for review and approval prior to implementation. The National Meat Supervisor or designee will notify the applicant of amendment status within 10 working days of receipt and will issue a notice to the applicant indicating amendment approval or denial.

6.3 Charges for Providing Service

The applicable QAD scheduled hourly fee will be charged for the in-house QAD grader performing the monitoring activities. The unscheduled hourly fee and all travel costs incurred for additional graders, if needed, will be borne by the applicant.

7 Change Record

The following changes were made to the August 19, 2024 revision of this document:

- a. Added reference to QAD 516 Smart form
- b. Updated applicable camera instrument numbers
- c. Added clarification of deviations in Certified Meat Programs (G schedules)
- d. Updated Defect chart and split out defects applicable to Certified Meat Programs
- e. Removed Pilot Phase II chart
- f. Added clarification on emergency use of grading equipment

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