

JUNIOR AGRICULTURAL MECHANICS

2019 TRACTOR SHOW

NEW: Extensive revisions have been made to the JAM Tractor Show. See below.

23. Tractor Restoration and Reconditioning Classes

- a) Tractor Exhibitor Cards should be on Tractors when they are unloaded Friday morning at show grounds.
- b) No yard tractors or riding lawnmowers
- c) Tractor Serial Number must be included with the Description on Entry Form and Exhibitor Card.
- d) Fuel tanks must not be more than 25% full.
- e) Fuel Shut Off valves, under fuel tanks, must be functional and fuel valves closed when exhibiting.
- f) A full approved ABC fire extinguisher with a minimum of 5lb capacity must be placed next to tractor
- g) Tractors may be started and driven only at the request of show officials
- h) Unloading and Loading will be under direction of show officials.
- i) Exhibitors must provide for each tractor, tools including flash light necessary to check fluid levels. Also, cloth or paper wipes and step ladder for large tractors for judges to check fuel and fluid levels. Tire pressure will also be checked.
- j) Display area. Table or bench size should not exceed 3 ft. by 6 ft. (Should not be so large it blocks access to tractor and other tractors.) If tool box is used it should be sized to fit under the table. Tool Box may serve as the table.
- k) Electrical outlets are not guaranteed.
- l) Caution Tape is not necessary. Do not use tape to prevent access to tractor. Signs may be used to request public to keep off tractor.
- m) Drip pans with absorbent are required at night only.
- n) Additional instructions and safety issues are addressed below.

24. DIVISION 14 - Restoration Classes 1401, 1402, & 1501 - Judging Criteria

Criteria	Points
A) Mechanical - Restoration	40
B) Knowledge & Presentation	20
C) Documentation & Research	15
D) Safety	10
E) Aesthetics	10
F) Authenticity	5
Total	100
Complexity Factor (CF) Bonus Pts	15

25. (NEW) DIVISION 15- Reconditioning Class, 1502 - Judging Criteria

Criteria	Points
A) Mechanical - Repair & Maintenance	30
B) Knowledge & Presentation	20
C) Documentation & Research	15
D) Safety	10
E) Aesthetics	10
F) Diagnosis	15
Total	100
Complexity Factor (CF) Bonus Pts	15

A) Mechanical

I. All tractor classes

- As part of the mechanical evaluations exhibitors will be asked to start and drive tractor, demonstrating all gears along with systems, hydraulics, lights, brakes, PTO etc. Driving and some mechanical evaluation will be conducted outside after off-loading on Friday. Most of the safety criteria will also be evaluated at this time. Exhibitors may be asked to move tractors back outside Saturday for additional evaluation.
- Refer to *Driving, Mechanical & Knowledge Reference Sheet 1* – on the WEB for more specific information.
- NOTE: Sandblasting is discouraged except on large castings such as weights, wheels and rims and components that have no moving parts. Engine Blocks and heads, transmissions, clutch housings, differential and axle housing should not be sandblasted. Also sandblasting can warp or distort sheet metal parts and will impact Aesthetics. Sand remaining from sandblasting can result in major damage to tractor. Evidence of sand will result in deducting points in Mechanical.

2. Restoration Classes 1401, 1402, & 1501

- To include the mechanical restoration of all systems including Engine, Transmission and Final Drive
- Including components – fuel (carburetor or diesel pump), cooling, ignition, exhaust, clutch, brakes, steering, starting, lighting, charging, hydraulics, 3 point and PTO. Some tractors may not have all of these.

3. Reconditioning Class 1502

- Will include only those systems or components that need major repairing or reconditioning. (Those systems that were repaired or maintained should be identified in the Table of contents see below.) Exchanging parts, for example removing a diesel pump and taking to town to put on pump stand is not considered a major repair. It should be identified under Engine in reports but must entail proof of diagnosis in determining pump malfunction to be awarded diagnostic points. Mechanical is worth 30 points in class 1502. Diagnostics is an important part of analyzing the mechanical components. Diagnostic points are awarded in its own Category

- Will include maintenance items. This may be an extensive list such as maintenance required for warranty. Examples of maintenance could include – cooling, fluids, hoses, belts clutch adjustments, air conditioning and tappet adjustments. Some maintenance items may require checking codes on tractor display which may require a special computer to help diagnose error codes. These will require the cooperation of the dealer. Diagnostic skills performed in the performance of major mechanical and maintenance will be awarded points in the Diagnosis criteria, see below.

B) Knowledge & Presentation: (All tractor classes)

- NEW knowledge points have been increased. Knowledge is a very important criterion in meeting the JAM educational objectives.
- Judges will ask technical questions to determine the exhibitor(s) knowledge of and involvement in restoration/reconditioning. Judges may present components for exhibitors to identify, describe and discuss.
- Presentation includes showmanship (see showmanship score card on WEB) and encompasses the following: meeting public, making eye contact, introducing self, being confident, articulate, exhibiting enthusiasm and excitement when describing tractor. Display area including area around and under the tractor and additional display items such as Owners Manuals, video equipment including computer display and worn or broken parts replaced in restoration or reconditioning.

C) Documentation and Research: (All Tractor Classes)

- Documentation is a research portfolio and should not be considered a scrapbook. Documentation must be typed (recommend word processor and spreadsheet using computer)
- Many Exhibitors use Documentation to exhibit their knowledge and understanding of Tractors and the skills necessary to Restore and Recondition them. In the photo sections, most exhibitors expand on what they are doing using two or three paragraphs in their descriptions.
- Tractor Judges rely on the Documentation Section to ascertain the knowledge and understanding exhibitors have of the different systems and components and the procedures they used. Many of the knowledge points are determined when judges are inspecting the documents and asking questions over materials they are evaluating.
- See *Tractor Restoration Documentation Template (PDF)* under Presentation on WEB. This template was prepared in 2016 and requires slight modifications for up to date documentation specifications.
- Also *Documentation, Knowledges & Presentation Reference Sheet 2-* found on WEB has more specific information. This document also needs modified slightly See revision for Class 1502 Reconditioning class below
- All documentation should be arranged in a three ring binder, using sequenced labeled dividers with a corresponding table of contents. *Suggested Table of Contents shown below will differ slightly between Restoration and Reconditioning classes.*

Table of Contents - Documentation for all Classes should include a Cover Sheet and a Table of Contents similar to one shown below with page numbers – Refer to Template on WEB

I.	Tractor History – Previous Owners – where obtained etc, (Max 1 page) Could include Picture of tractor as you found it.
II.	Restoration or Reconditioning - Mechanics Summary Report including Complexity Factors- CF (Max 1 page) Could include Picture of Completed Tractor.

III.	<p>Expense Reports – show in spreadsheet format. Similar to BOM in project show.</p> <ol style="list-style-type: none"> a. Parts - Costs of all parts and supplies – invoices included with dates. Show Total Expense including Sub Totals of OC and PE b. Opportunity Cost -OC (identified in Expense Report with OC next to dollar value. These are items which were given (donated) to you – identify their value in dollars, same as if you purchased them. Show sub total for all OC. c. Professional Expenses - PE (Identified in Expense Report with PE notation) These are expenses incurred from taking part to professional technicians. For example, taking a diesel pump to a Diesel Shop so they can put it on pump stand – diagnose and repair it. You are encouraged to be present when the technician is evaluating and/or repairing part so you can learn from this. Have picture taken of you with Professional mechanic to be included in your photos. Professional should be identified in pictures. PE expenses should be presented in a report by itself with Title: <i>Professional Expenses</i>. Should have a sub total for this category.
IV.	<p>Photos – (order of presentation - disassembly – evaluation – repair) All Photos should have a title or description along with identifying names of exhibitors performing the task in the picture. Teacher (AST) or CVEA and others helping you should be in a few of the pictures and identified. Most pictures should be technical in nature - using precision tools – micrometers, torque wrenches, small hole and telescoping gauges, adjusting tappets or clutch, timing engine, diagnosing hydraulic system with pressure gauges etc. Most exhibitors use two or three paragraphs to explain what they are doing in the pictures in different sections. See example Template</p> <ol style="list-style-type: none"> a. No more than 120 with 2 pictures per page. Cover sheets not required on picture pages. b. Photos of high quality – could be on photo paper – excellent contrast and brightness. Judges will also evaluate safety issues in the pictures – gloves, face shields, spray painting, etc. c. Photos shown by sections. Sequence may be different from that depicted below. (Recondition Class will only have pictures in sections – components they diagnosed and repaired.) <ol style="list-style-type: none"> i. Engine ii. Clutch iii. Transmission iv. Final Drive train – Transmission & Final Drive could be combined in a Power Train Section v. Ancillary & External components could include steering, operator comfort, controls, fuel, air filter, turbo, electrical, cooling hydraulics, brakes etc vi. Sheet Metal and finishing – Reconditioning class should include Aesthetic items here also. For example was a cab kit installed? vii. Rims and Tires viii. Eye Appeal item – Decals, Trim, other – Appearance Section could include (vi, vii, and viii)
V.	<p>General Specifications: - Examples, Tractor Fluid Capacity chart, Tractor Horsepower, Hitch Category, Torque chart for fasteners, Valve Tappet adjustments, tractor operator controls, safety items and symbols.</p>

VI.	<p>Recondition Class only -<i>Equipment Check in Sheet</i> and <i>Service Preliminary Sheet</i>. These sheets are forms tractor dealers use when tractor or machine brought to them by farmers for repair. There are examples of these two forms are linked below that you may download and print or it is suggested that you use the local dealers sheets.</p> <p>a. <i>Equipment Check In sheet</i>. Customers helps the dealer fill this form out when customer brings in equipment or tractor to be repaired. It includes all the information regarding customer, such as name, address, phone, email etc. It also identifies the machine(s) and or tractor(s) brought in. An important part of this form is asking the farmer to identify or describe the problem (issue) – why machine was brought in. Link Check In Sheet</p> <p>b. <i>Service Preliminary Form</i>. Technician fills out this form after he has inspected the machine and list all items that are needed to repair or fix problem. Form is presented to customer for him to sign authorizing necessary parts and repairs prior to repair. Link Service Preliminary</p>
VII.	<p>Research SDS,and/or PI. ASABE standards including PTO and Hitch Category. See Special rule 19. All relevant Judges Check & Reference sheets. Letters, correspondence with those who advised or helped you with tractor. Owner’s Manual and Parts manuals along with IT manuals are usually too large to show here. They may be books themselves but you could reference those displayed. You may also want to identify those items or parts that you have on display.</p>

D) Safety

Safety is measured in a number of ways. See *Aesthetics, Authenticity & Safety Reference 3* on WEB. All equipment that was original to the tractor should be in place (includes all shields and decals) Tractors must be in a safe operating condition and the following safety procedures must be followed.

- a. Judges will inspect photos to see if tractor was repaired in a safe environment including painting facilities, exhibitors wearing safety glasses and or face shields, gloves, proper and safe clothing. Proper use of hoist and lifting devices, combustible materials stored properly, etc.
- b. Safe procedures must be followed in unloading and loading the tractor. Specific rules and regulations related to the driving, unloading and loading the tractor are posted on the WEB. These will be strictly adhered to and safety points deducted for infractions.
- c. Basic rules for driving, unloading and loading tractors.
 - i. Tractors are unloaded and loaded only under the direction of show officials. No tractor will be offloaded without supervision of show official.
 - ii. Tractor driver must have experience in driving and loading tractor on trailer hauling it to show. This driver must have been approved by the AST or CVEA. Leader certifies that driver meets these criteria. Diver unloading and loading the tractor may or may not be the exhibitor but safety point deductions will be attributed to that tractor based on the procedures used in offloading and loading.
 - iii. Tire pressure and tire coating will be inspected along with controls, including brakes, throttle and clutch prior to offloading. Tires should not have more than recommended tire pressure.
 - iv. All ramps must be fastened to trailer and designed with proper surface to provide traction. This is especially important in wet weather. Trailer must be equipped with middle ramp if hauling tricycle tractor.
 - v. It is the responsibility of the driver to make sure that at least 10 ft of area around the trailer is clear. Only approved personal may be in this area.
 - vi. Truck driver must off load any projects that on the back of the trailer hauling the tractor at the barn where directed. Fork Lifts and other machinery will not come into the tractor unloading area.

- E) Aesthetics: Overall appearance of tractor including workmanship and finish. Aesthetics will be evaluated for all tractor classes. Items to be considered include but are not limited to the following.
- a. Metal preparation prior to painting or waxing.
 - b. Painting a tractor in the Reconditioning class would be done if it increases its value more than the costs of painting. Exhibitor may want to ask a machinery auctioneer to appraise the tractor unpainted and if painted assuming all mechanical repairs are made. Detailing tractor is required even if tractor is not painted.
 - c. Reconditioned tractors that are not painted must have been pressure washed including engine compartment. Those that are not painted may be waxed.
 - d. Painting and finish in Restored Tractors. Clear coating is not recommended. Paint color should be original. See *Aesthetics, Authenticity & Safety Reference 3* on WEB
 - e. Detail and completeness of components – cabs, steering wheels, seats, controls and gages, wiring harness, hoses and belts etc.
- F) Authenticity (Restoration Tractor classes only) Must be as original as possible. See *Aesthetics, Authenticity & Safety Reference 3* on WEB. Items included:
- a. Paint color, fasteners, and other components such as magnetos, carburetors, exhaust systems
 - b. Mechanical systems – fuel, electrical, engine, transmission, final drive, PTO and 3 Point hitch, cooling etc.
 - c. Original Serial plates in place and unaltered serial numbers.

Note: Authenticity – does not prevent updating or improving the efficiency and performance of a tractor for field work using manufactures upgrades. This applies especially for the later model tractors. Examples would be replacing the refrigerant R12 and equipment with 134A. Other examples include improved mechanical parts such a hardened valve seats, improved cylinders, rings, pistons, seals, and bearings. Alternators and other external parts should not replace generators etc., on older tractors shown as antiques. Six volt systems should not be converted to twelve volt.

- F) Diagnosis (Recondition Tractor Class) Diagnosis should be documented in the explanations in Documentation & Research book especially when explaining the systems- component analyzed with the Photos. Dealer Forms identified in Documentation above require diagnosis. In later model tractors error codes are generated in the display or computer on tractor to help mechanic determine the problem. Exhibitor may have the dealer's mechanic to help him with this diagnosis in that school will not have the necessary equipment. Student should be involved in the process and should explain and document it in his documentation package. It is hoped that this will help develop a connection with the dealer and maybe eventually turn into an internship or employment. Teacher/leader should go with the student to ask the dealers cooperation. It may be that the dealer can help the students by providing them one of the tractors that has been brought to him for repair. The dealer performs a lot of the required warranty maintenance items on the later model tractor in addition to repair. Some of these maintenance items are technical and will require knowledge and skills to perform the required maintenance. Repair and extensive Maintenance will meet the Mechanical requirements to justify entering a tractor in the Recondition Class because in many of these an analysis will require reading and interpreting technical manuals.
- G) Complexity Factor. Up to 15 points may be added to reward exhibitor(s) for difficulty or sophistication of work conducted on tractor. Examples could be on tractors that have AC units and Cabs, sophisticated transmissions, hydraulic, electrical systems. Work and research shown rebuilding or repairing original parts beyond the normal repair instead of purchasing new ones. Welding cast iron parts where preheating and post heating was necessary, building up a shaft and turning down on lath or hard surfacing or building up teeth on a gear are all examples. Evaluating tractor on a PTO dynamometer could be considered as a Complexity Factor and is also a diagnostic function.

26. Additional Resources

Exhibitors and leaders are encouraged to get on the WEB and using a monthly code to access the ASABE technical library in order to download the Tractor and PTO standards. Although these standards apply to the later model tractors, they are relevant to early model tractors and machinery, for example hitch categories and PTO sizes and number of splines. Standards identify specifications that make different machines compatible with the tractor including early model tractors. It is important for the exhibitor to learn how to search technical libraries such as ASABE print them out and interpret them. Service men working with the later model more sophisticated tractors and machines must rely on technical documents to diagnose and repair them. We also provide on the WEB many additional technical materials to help in our educational objective. Many of these have been identified in other Sections regarding tractors.

2018 ASABE monthly codes to access the library. Link to ASABE is found under Helpful Links on <http://jamshow.org> Web site.

October = flow

November = element

December = process

When prompted for member number –(enter the word next to the appropriate month above. Password – 2018

Note: Codes are not provided for January and February, 2019. It is assumed in research, utilization of these standards is conducted in the beginning of design and construction or restorations and reconditioning phases.

27 Scholarships: Refer to the Junior Livestock Show Scholarship section in the Premium List

28 Premiums: The following premium schedule will apply to all classes.

JUNIOR AGRICULTURAL MECHANICS PLACING & PREMIUMS

1 st	2 nd	3 rd	4 th
\$55	\$45	\$35	\$30

Project and Tractor Shows DIVISIONS & CLASSES

Division 12 & 13 Not used

TRACTOR SHOW

Division 14 Early Model Tractors - Restoration

Class 1401 Tractors 1945 and older

Class 1402 Tractors 1946 – 1963

Division Champion

Reserve Division Champion

Division 15 Later Model Tractors - Restoration & Reconditioning

(The same tractor cannot be shown in both classes)

Class 1501 Tractors 1964 – Present (*Restoration Required*)

NEW

Class 1502 Tractors 1964 – Present (*Repair & Reconditioning Required*)

Division Champion

Reserve Division Champion

Grand Champion Tractor

Reserve Champion Tractor