

UNIVERSITY OF NEBRASKA

LINCOLN

DEPARTMENT OF AGRICULTURAL ENGINEERING

INSTRUCTIONS TO APPLICANT FOR TRACTOR TEST

Three copies are required of each application and all exhibits attached thereto.

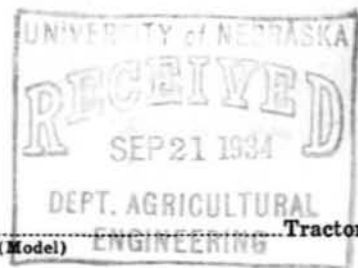
Mail three copies to the Agricultural Engineering Department, College of Agriculture, University of Nebraska, Lincoln, Nebraska, together with draft for \$500.00; priority of test is determined by our date of receipt.

Specifications will include no equipment except that supplied with stock tractors. It may include items (such as extension wheel rims) for which an extra charge is made but such items must be offered for sale by the tractor manufacturer as a part of the tractor and must not be attachments for which the tractor manufacturer is not directly responsible.

If the customer has choice of two or more makes or types of any item of equipment (such as wheel lugs) description will be given of each make or type. All of these makes or types will be sent with the tractor submitted for test.

In filling out specification sheets, if the blanks provided are not suitable for describing some part of the tractor, specifications on that part should be given on a separate sheet.

APPLICATION FOR THE TEST OF THE



Caterpillar
(Name)

R-2

(Model) ENGINEERING Tractor

Peoria, Illinois Sept. 19, 1934
P. O. Date

Department of Agricultural Engineering,
College of Agriculture,
University of Nebraska,
Lincoln, Nebraska.
Gentlemen:

Caterpillar Tractor Company
(Applicant)

hereby applies for test

as provided by Nebraska law, of the Caterpillar

R-2
(Trade Name)

Not Rated

(Model, H. P. Rating)

Tractor. Specifications of this tractor

are given on sheets attached hereto and marked exhibits. A, B, C, D, E, F, H.

(A, B, C, Etc.)

(Each loose sheet and each set of sheets permanently bound together to be marked as an exhibit.)

All of the claims made regarding the construction and performance of this tractor by the applicant either directly or thru his selling agents are covered in sheets and catalogs attached hereto and marked exhibits.

None issued

(Each loose sheet and each catalog to be marked as an exhibit.)

All printed operating instructions furnished to purchasers of this tractor are enclosed herewith and marked exhibits.

None issued

Mr.

L. H. WITT
J. M. Davies
By S. H. W.

(Name)

Chief Experimental Engineer

(Position with Applicant)

will be the official representative of the applicant during the test, and will carry proper credentials.

Caterpillar Tractor Co.

(Applicant)

hereby agrees that no claim for the tractor in excess of

those declared herewith will be made by the applicant either directly or thru his agents; and that no tractor will be offered for sale either by the applicant or his agents under permit based on this test, which does not correspond exactly with description given herewith; excepting such changes in claims made for the tractor or in construction of the tractor as may from time to time be approved in writing by the Board of Tractor Test Engineers and the State Railway Commission.

Respectfully submitted,

(Signature)

(Name typewritten)

C. PARKER HOLT

(Position)

VICE-PRESIDENT

(TO BE SIGNED BY AN OFFICER HAVING POWER TO MAKE CONTRACTS FOR THE APPLICANT)

SPECIFICATIONS OF Caterpillar R-2 TRACTOR
(Name) (Model)

1. Manufacturer: Caterpillar Tractor Co.
Address Peoria, Ill.
Tractor submitted for test by Caterpillar Tractor Co.
Horsepower rating: Drawbar Not rated Belt Not rated Fuel Gasoline Is this tractor to
be advertised or sold for operation on kerosene? No

ENGINE

2. Manufacturer: Caterpillar Tractor Co.
Name Caterpillar Model R-2 4 cycle. bore 4 in.
Stroke 5 in. Crankshaft r. p. m. rated load 1250 Engine weight 1380 lbs. (Specify equipment
included) Fan to Flywheel including Magneto, Carburetor & Air Cleaner
Engine mounted with crankshaft lengthwise Yes crosswise _____ of tractor frame.

3. Cylinders:
Number 4 Type of cylinder castings In pairs Material Cast Iron Vertical Yes
Horizontal _____ Opposed _____ Clearance Volume 19.67 cu. in. Compression
pressure -- lbs. per sq. in. gage at -- r.p.m. L. I. or T. head I Head detachable Yes
Are cylinders ground to dimension? Yes

4. Valves:
Type Poppet Location In head
Inlet: No. per cyl. 1 O. D. 1 23/32 in. Port. diam. 1 1/2 in. Lift .365 in. Seat angle 45°
Material: Head Chrome Nickel Steel Stem Chrome Nickel Steel
Exhaust: No. per cyl. 1 O. D. 1 23/32 in. Port. diam. 1 5/16 in. Seat angle 45°
Material: Head Chrome Silicon Steel Stem Chrome Silicon Steel
Timing: Inlet opens 10 ° after T. C. Closes 40 ° after L. C. Exhaust opens 35 ° before L. C.
closes 10 ° after T. C.

5. Pistons:
Weight of one with rings and pin 4.8 lbs. -- oz. Length 4 3/4 in. Material Cast Iron
Piston clearance (for diameters). First land .0125 in. Second land .010 in. Third land .0082 in.
Skirt .005 in. Are pistons ground to dimensions? Yes

6. Piston Rings:
Make or type Cast Iron - 4 Plain Compression Rings and 1 Oil Regulating
Number per piston 5 Width 5/32 in.

7. Piston Pin:
Length 3 31/64 in. Diameter 1 7/32 in. Solid or hollow hollow Material SAE 1020 U.D. Sea
less Steel Tubing Heat treatment Carburized & Hardened Ground to dimension Yes
Method of holding piston pin Full floating type -Plugs in Piston Bosses limit
endwise motion.

SPECIFICATIONS OF Caterpillar R-2 TRACTOR
(Name) (Model)

8. Piston Pin Bearings:

a. Bearing in piston bosses: Yes Total length 1 63/64 in. Removable bushing No

Material Cast Iron

b. Bearing in connecting rod end Yes Length 1 3/8 in. Removable bushing Yes

Material SAE #64 Bronze

9. Connecting Rod:

Type "H" Section Length c. to c. 10 1/4 in. Material SAE 1040 Steel Forging

Heat treatment SAE VII

Weight complete with all bolts, nuts and bearings in place 4 lbs. 4 oz.

Bearing cap bolts: No. 2 Length 3 3/16 in. Material SAE 3135 Steel

Crank bearing: Diam. 2 1/4 in. Length 2 1/4 in. Material Babbitt

10. Crankshaft:

Weight 61# Material SAE 1045 Steel Forging Heat Treatment SAE VII

Counter balanced No Main crankshaft bearings. Number 3

Type Four Throw in One Plane - Drop Forged

DIMENSIONS OF EACH BEARING

	Diameter		Length		Material
Front Main	<u>2 3/8</u>	in.	<u>2 9/16</u>	in.	<u>Babbitt Lined-Removable</u>
#1 Crank Pin	<u>2 1/4</u>	in.	<u>2 1/4</u>	in.	<u>" - Forged Steel C</u>
#2 Crank Pin	<u>2 1/4</u>	in.	<u>2 1/4</u>	in.	<u>" - Forged Steel C</u>
Center Main	<u>2 3/8</u>	in.	<u>3 9/16</u>	in.	<u>" - Removable Bron</u>
#3 Crank Pin	<u>2 1/4</u>	in.	<u>2 1/4</u>	in.	<u>" - Forged Steel C</u>
#4 Crank Pin	<u>2 1/4</u>	in.	<u>2 1/4</u>	in.	<u>" - Forged Steel C</u>
* Rear Main	<u>2 3/8</u>	in.	<u>2 1/32</u>	in.	<u>" - Removable Bron</u>
					<u>Shell</u>

* Rear is flywheel end.

11. Flywheel:

Diameter 15 1/4 in. Weight 137 lbs. Solid or spokes Solid Method of attaching

(mark x): Flange X Taper Straight

12. Camshaft:

Material SAE 1020 Steel Forging Heat treatment Carburized and Hardened

Cams: Integral X Separate Camshaft bearings. Number 3

SPECIFICATIONS OF Caterpillar R-2 TRACTOR
(Name) (Model)

DIMENSIONS OF EACH BEARING

	Diameter		Length		Material
Front	2 1/4	in.	2 1/8	in.	Cast Iron
		in.		in.	
		in.		in.	
Center	2 1/4	in.	2 3/4	in.	Cast Iron
		in.		in.	
		in.		in.	
Rear	2 1/4	in.	1 15/16	in.	Cast Iron

Camshaft drive: Spur gear..... Helical gear ☒..... Chain..... Crankshaft gear material SAE 104
Steel forging Camshaft gear material SAE 1045 Steel Forging

13. Lubricating System (mark x):

(a) Circulating ☒ (b) Non-circulating..... (c) Pressure feed ☒ (d) Gravity feed.....
(e) Splash..... (f) Drilled crankshaft ☒
(g) Mechanical lubricator..... Make..... Capacity.....gals.

Camshaft lubrication (mark x):

Bearings: Independent lead ☒..... Pressure ☒..... Splash.....
Gears: Independent lead..... Pressure..... Splash ☒
Piston lubrication (mark x): Independent lead..... Pressure..... Splash ☒

14. Lubricating Oil:

Capacity 2 1/2 gals. to fill crank case to proper operating level.

Oils recommended (give trade names and grades for summer and winter operation).

See exhibit Marked "B"

15. Oil-pump Type:

Type Gear Location In sump

16. Governor:

Make Own Type Centrifugal Fly Ball Enclosed Yes

SPECIFICATIONS OF Caterpillar R-2 TRACTOR
(Name) (Model)

Is governor independent of hand throttle? No Regulation: Increase in final speed not over 250 r.p.m.
from rated load speed to no load, with carburetor set for maximum fuel economy.

17. Ignition System: (Give information for all makes or types supplied on stock tractors of this model).

Magneto Yes H. T. Yes L. T. Make Eisemann Model CT4
Impulse coupling Yes Make Eisemann
Magneto H. T. L. T. Make Model
Impulse coupling Make
Magneto H. T. L. T. Make Model
Impulse coupling Make
Battery System Make Model
Battery System Make Model
Battery Make Type Volts Amp. Hours
Battery Make Type Volts Amp. Hours
Firing order 1-2-4-3 Maximum spark advance 30 fixed spark before top center Maximum re-
tard 35° When impulse starter is working Spark plugs: Make or makes Champion Truck Special A
Size and thread 7/8-18 N. Thd. Type
Location Right Side of Cyl. Head Gap .025 in.

18. Starting Device:

Electrical Make Model Volts
Air Pressure: Make Model Pressure

19. Carburetion System:

Carburetor (Give information for all carburetors supplied on stock tractors):

Make Zenith Size 1 1/4 Model Fuels
Make Size Model Fuels
Make Size Model Fuels

20. Exhaust Heat used for:

Air Fuel Mixture in carburetor Mixture in manifold X

21. Hot-water Jacket on:

Carburetor No Manifold No
See exhibits marked C, D, E, F.

22. Enclose Cut or Blue Print (Size 8 1/2"x11" or 11"x17") and explanation showing shape and dimensions of intake manifold and application of exhaust heat to air, fuel, or mixture if so used.

23. Is Water Injected With Fuel? No Describe control valve

SPECIFICATIONS OF Caterpillar (Name) R-2 (Model) TRACTOR

24. Fuel Tanks: Main Tank-20
Number 2 Capacity of each in gals. Aux. " - 2 Location Behind Engine
Front Main Tank serves as Rear Hood Support-Aux. Tank. is a separate compartment of main tank.

25. Air Cleaner:
Make Own-Under Vortex Patents Size (Mark x) (a) Dry centrifugal (b) Strained
thru cloth or screen (c) Water (d) Oil (specify kind)
(e) Other type (describe) Centrifugal and Oil Combination

26. Cooling System:
Cooling fluid water If oil, give specification of oil
Capacity of system 5 gals.
Radiator: Make Own Type Flat tubes & fins Important dimensions Core dimension
24 1/2 x 22 1/4 x 3 1/4
Circulation of cooling fluid: Thermosyphon Pump X Type of pump
Pump delivery gal. per min. at rated speed of engine 13

27. Air Circulation:
By exhaust nozzle By fan X Fan diameter 20 in. Number of blades 6
Speed at rated speed of engine 2000 r.p.m. Type drive Belt

28. Belt Pulley:
Diameter 10 1/2 in. Face 6 1/2 in. Material Hub-Cast Iron Rim-Paper of fibre Is face of pulley lagged?
If so, with what material? Speed (at rated speed of engine) 950 r.p.m.
If gear drive, give gear ratio crank shaft to pulley shaft 1.32 to 1 Belt pulley shaft bearings: (De-
scribe each bearing.)

Type	Make	Size	Material
<u>Roller</u>	<u>Hyatt</u>	<u>RA309</u>	
<u>Ball</u>	<u>Pafnir</u>	<u>308W</u>	

CHASSIS

29. Clutches:
For transmission: Type Single Plate - Dry Make Own Size Friction D size: 12 1/2
On differential (if used) type Make Size O.D. x I.D. x 5/32 thick
For belt pulley (if separate clutch):
Type Make Size

30. Brakes: (Describe each brake.)
(a) Type External contracting band
(Contracting band or shoe)
When gears are in neutral, does brake control belt pulley or traction wheel? Tracks held-not pulley

SPECIFICATIONS OF Caterpillar

(Name)

H-2

(Model)

TRACTOR

By which lever or pedal is brake operated? By two foot pedals on right of Gear Shift Lever(b) Type External Contracting Band When gears are in neutral does brake control belt pulley or traction wheels? (Contracting band or shoe)

(c) Differential brake (if used). Type

How controlled Can both differential brakes be set at once?

31. Transmission:

Manufacturer Own Type Selective Sliding Gear

Enclosed to what extent

Reduction (pairs of gears) engine to drive wheels or tracks.

Speed	Type of gear with number of teeth and in their pairs of contact, from engine, to drive wheel or track						Gear ratio from engine to drive wheels or tracks
Type	Spur	Spur	Bevel	Spur			
1st (ow)	16 with 35	with 13	49 with 13	72 with 13	with		45.8 to 1
2nd low	19 " 32	" " 13	49 " 13	72 " 72	"		35.1 to 1
3rd low	23 " 28	" " 13	49 " 13	72 " 72	"		25.4 to 1
4th low	" " "	" " "	" " "	" " "	"		
Reverse	19 " 20	16 " 32	13 " 49	13 " 72			44.1 to 1

Give following information for each gear wheel:

See exhibit marked "H"

* Location	Type Gear	Pitch Diameter	No. of Teeth	Face Inches	Finish	Material	Heat Treatment
(1)	Spur	3.167	19	1	Machined	2345	SAE VIII
(2)	Spur	3.833	23	7/8	Machined	2345	SAE VIII
(3)	Spur	2.667	16	1	Machined	2345	SAE VIII
(4)	Spur	5.333	32	1	Machined	2345	SAE VIII
(5)	Spur	4.667	28	7/8	Machined	2345	SAE VIII
(6)	Spur	5.833	35	1	Machined	2345	SAE VIII
(7)	Spur	3.333	20	3/4	Machined	2345	SAE VIII
(8)	Spur	2.667	16	3/4	Machined	2345	SAE VIII
(9)	Bevel	2.737	13	1-3/8	Machined	2345	SAE VIII
(10)	Bevel	10.3158	49	1-3/8	Machined	2345	SAE VIII
(11)	Spur	2.3636	13	2-5/8	Machined	2345	SAE VIII
(12)	Spur	13.0909	72	2-1/4	Machined	2345	SAE VIII

Shaft bearings: (Give information for each bearing used in transmission and rear axle.)

* Location	Type	Make	Size	Material
A	Ball	Fafnir	307W	
B	Ball	Fafnir	307W	
C	Ball	Fafnir	307W	
D	Ball	Fafnir Gurney	408W or 408R	
E	Plain	Own	1.3735 O.D.	SAE #64 bronze
F	Roller	Timken	438-432	
G	Ball	Fafnir	308W	
H	Roller	Timken	3577-3525B	
J	Roller	Timken	566-563	

* Location may be given by reference to cut or blue print attached hereto if desired.

SPECIFICATIONS OF Caterpillar R-2 TRACTOR
(Name) (Model)

32. Differential:

Make Type.....
Open or enclosed..... Can it be locked?.....
If chain drive is used, give make and description of chain

33. Rate of Travel at Rated Engine Speed:

Also mark by (x) speed normally used for plowing.

Speed	Calculated Speed in Miles per Hour (No slippage allowance)	Advertised Miles per Hour on Rated Load
1st (Low)	1.98	2.0
2nd	2.58 X	2.6
3rd	3.56	3.6
4th		
Reverse	2.06	2.1

34. Drive Wheels:

Number..... Cast solid..... Section of spoke.....sq. in. Shape of
Spoke section..... Spokes cast in or built up..... Diameter.....
.....in. Face.....in. Extension rims width.....in. Lugs: Give descrip-
tions and dimensions of each type of lug furnished on stock tractors in Nebraska.....

How is power transmitted to the rim?.....

Drive wheel axle: Live..... Stationary..... Diameter.....

Material:

35. If Track-laying Type:

No of tracks 2 No. shoes per track 30 Length of track bearing on ground.....
54 1/2 in. Width of each track 13 in. Length of each track shoe c. to c. of pins 6.125 in.

36. Non-driving Wheels:

No..... Cast solid..... Section of spoke.....sq. in.
Shape of spoke section..... Spokes cast in or built up..... Diameter.....in.
Face.....in. Bearings of non-drive wheels (describe each bearing).

Location	Type	Make	Size	Material

SPECIFICATIONS OF Caterpillar (Name) R-2 (Model) TRACTOR

37. Steering Arrangement:

Knuckle type.....Swinging axle..... Other type (describe) Independent Multiple
Disc Dry Clutch and Brake controlling each Track.

38. Static Weight on each wheel or track. (Tanks and radiator full, wheel lugs attached.)

Wheel	Weight, Lbs.
<u>R.H. Track</u>	<u>3850</u>
<u>L.H. Track</u>	<u>3645</u>

Total weight (as above) 7495

39. Frame:

Cast Material.....

Built up..... Material.....

Hot riveted..... Cold riveted..... Bolted.....

Description Frameless Construction - Unit Type

Frame mounting (mark x):

To drive wheels. Spring..... Rigid..... X

To non-drive wheels. Spring..... Rigid.....

40. Drawbar:

Height 10 1/2 in. Verticle adjustment (give limits) None in.

Lateral adjustment 20 1/4 at in

Swiveled Yes Point of swivel how far forward or back of rear axle 8 7/8 forward in.

41. General Dimensions:

Wheel base c. to c. front and rear wheels 54 1/2 in. Tread c. to c.: front wheels..... in.

rear wheels or tracks 50 in. Width over all 67 3/4 in. Length over all 108 in.

Height over all 54 1/4 in. Diameter of circle wholly within which tractor may be turned 140 1/8"

42. The Following Items of Equipment Included in the Above Specifications Are Supplied at an Extra Charge:

Belt Pulley Drive