

THE UNIVERSITY OF NEBRASKA
AGRICULTURAL ENGINEERING DEPARTMENT
COLLEGE OF AGRICULTURE, LINCOLN
Record of Official Tractor Drawbar Horsepower Test

Rated or maximum load. Rated Date Nov. 23, 24, 1927 Test No. 147f
Name, model and rating of tractor. Monarch 6 Ton
Serial No. Engine..... Serial No. Chassis. 60172
Manufacturer Monarch Tractors Corp. Springfield, Ill.
Tractor submitted for test by. " " " "
Tractor equipment. Am Bosch "ZR4Ed26" Mag Zenith "77" carts
Style and dimension of lugs. Angle 31 per track, 2" High, 4 8" wide
Length of track, calculated
Circumference of drive wheels, at face. 20.67 Point of lugs.....
Tractor operated by. Lamb Dynamometer car operated by. Wallace
Dynamometer used. Gullex Load used. Dyn. car & Avery Tr.
Kind of fuel. Gasoline Test No. W.t per gal. 6.19 lbs.
Kind and grade of oil used in engine. Mob B
Kind and grade of oil used in transmission. GOO V
Humidity. 59 per cent. Barometric pressure. 28.97 inches.
Temperature of atmosphere. 41 Temperature of engine. 154
Weather conditions. Fair & cold
Condition of track. Dry & loose on top

Fuel Consumption:

Total for test, gal. 54.995 Gals. per hour 5.4995
Pounds per H. P. hour. 0.839 H. P. hours per gal. 7.38

Water Consumption:

Total used in test, gal. 0.85 Gal. per hour. 0.08

We, the undersigned, certify that this and attached sheets hereto give a true and correct record of the official tractor test No. 147f

F. N. Lamb Operator. Lew Wallace Observer.
Operator. Lew Wallace Observer.
Engineer-in-charge

THE UNIVERSITY OF NEBRASKA
DEPARTMENT OF AGRICULTURAL ENGINEERING
Log of Official Tractor Drawbar Horse Power Test No. 147

Date Nov. 23, 1927

Chart and Reading No.	Time	Stop Watch in 400 ft. minutes	*** Engine Crankshaft R. P. M.	Drive Wheel Slippage								Speed		Average Draft Pounds	Drawbar Horsepower	Temperature Degrees F.		Fuel Used Pounds	Water Used Pounds
				Left Wheel		Right Wheel		Av. Rev. Columns 6 and 8	** Distance Traveled (Feet)	Distance Measured on Ground (Feet)	** Slippage % Columns 10 and 11	Feet per Minute	Miles per Hour			* Cooling Fluid	Atmosphere		
				Counter Reading	Rev. in 400 ft.	Counter Reading	Rev. in 400 ft.												
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
****Observer																			
stop 246			FUEL.																
start 249		3 min.																	
5S 258		1.59		7017								252.9	2.57	5445	41.73	140	39		
5N 304		1.605		5404	1613											140	39		
6S 325		1.61		3785	1619							2483	2.52	5510	41.46	162	39		
6N 330		1.615		2168	1617											162	39		
7S 426		1.6275		0540	1628							249.0	2.53	6350	40.37	140	43		
7N 432		1.620		8925	1615											140	43		
stop 502																			
504			stop engine																
Nov. 24, 1927																			
822			start engine																
827			" test.																
stop 939			To replace broken Dyn. Spring. Put in No 5 - 25016.																
start 941		2 min																	

NOTE: Record all stops by the word "Stop" and "Start" in column 1, record time and give full data.

* Taken in discharge line from engine.

** The first figure in this column is calculated at the rim of the wheel, and the second figure at point of the lugs.

*** Engine R. P. M. = $\frac{\text{Gear Ratio} \times \text{Column (8)}}{\text{Column (9)}}$

**** Each Observer will write his initials at the head of each column in which he records his observations.

THE UNIVERSITY OF NEBRASKA
DEPARTMENT OF AGRICULTURAL ENGINEERING
Log of Official Tractor Drawbar Horse Power Test No. 147f

Date Nov. 23, 1927

Chart and Reading No.	Time	Stop Watch in 400 ft. minutes	*** Engine Crankshaft R. P. M.	Drive Wheel Slippage								Speed		Average Draft Pounds	Drawbar Horsepower	Temperature Degrees F.		Fuel Used Pounds	Water Used Pounds
				Left Wheel		Right Wheel		Av. Rev. Columns 6 and 8	** Distance Traveled (Feet)	Distance Measured on Ground (Feet)	** Slippage % Columns 10 and 11	Feet per Minute	Miles per Hour			* Cooling Fluid	Atmosphere		
				Counter Reading	Rev. in 400 ft.	Counter Reading	Rev. in 400 ft.												
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
****Observer	9 ¹⁰	start engine																	
	9 ²⁶	start test																	
stop	9 ⁴⁶	To put Avery in Gear																	
start	9 ⁴⁷	1 min.																	
1 S	10 ⁴⁶	1.84		6008								2253	2.56	5450	37.21	150	38		
1 N	10 ⁵³	1.82		4388	1620											150	38		
2 S	11 ³⁵	1.625		9530 7913	1617							2465	2.80	5453	40.75	154	38		
2 N	11 ³⁸	1.62		6294	1619											154	38		
3 S	12 ³⁸	1.685		4675	1619							235.6	2.68	5495	39.23	144	40		
3 N	12 ⁴⁵	1.71		3057	1618											144	40		
4 S	2 ¹²	1.69		1053	2004							239.5	2.72	5250	38.10	146	39		
4 N	2 ¹⁸	1.72		9434	1619											146	39		
stop	2 ³⁷	Fuel & to adjust water pump glands.																	
start	2 ⁴³	6 min																	

Norm: Record all stops by the word "Stop" and "Start" in column 1, record time and give full data.

* Taken in discharge line from engine.

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*** Engine R. P. M. = $\frac{\text{Gear Ratio} \times \text{Column (8)}}{\text{Column (9)}}$

**** Each Observer will write his initials at the head of each column in which he records his observations.

THE UNIVERSITY OF NEBRASKA
DEPARTMENT OF AGRICULTURAL ENGINEERING
Log of Official Tractor Drawbar Horse Power Test No. 147 F

Date Nov. 24, 1927

Chart and Reading No.	Time	Stop Watch in 400 ft. minutes	*** Engine Crankshaft R. P. M.	Drive Wheel Slippage								Speed		Average Draft Pounds	Drawbar Horsepower	Temperature Degrees F.		Fuel Used Pounds	Water Used Pounds
				Left Wheel		Right Wheel		Av. Rev. Columns 6 and 8	** Distance Traveled (Feet)	Distance Measured on Ground (Feet)	** Slippage % Columns 10 and 11	Feet per Minute	Miles per Hour			Cooling Fluid	Atmosphere		
				Counter Reading	Rev. in 400 ft.	Counter Reading	Rev. in 400 ft.												
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
****Observer				8925															
8S	946	1.56		7294	1631							261.9	2.95	5265	41.78	160	42		
8N	951	1.61		5677	1617											160	42		
stop	10 ²⁹	To fill Dyn. Cyl. with oil.																	
start	10 ³²	3min																	
9S	10 ²⁵	1.605		4053	1624							248.1	2.82	5717	42.95	168	46		
9N	10 ⁴⁰	1.62		2432	1621											168	46		
10S	10 ⁵⁵	1.615		0810	1622							257.2	2.85	5560	42.32	176	48		
10N	11 ⁰⁰	1.615		9187	1623											176	48		
	11 ⁰⁶	End of test.																	
	11 ¹⁰	stop engine																	
Total	10hrs.																		
Avg		1.650	982	1620				19.43	406	400	1.48	245.8	2.79	5450	40.59	154	41	340.42	7.26

NOTE: Record all stops by the word "Stop" and "Start" in column 1, record time and give full data.

* Taken in discharge line from engine.

** The first figure in this column is calculated at the rim of the wheel, and the second figure at point of the lugs.

*** Engine R. P. M. = $\frac{\text{Gear Ratio} \times \text{Column (8)}}{\text{Column (9)}}$

**** Each Observer will write his initials at the head of each column in which he records his observations.

Log of Official Tractor Drawbar Horse Power Test No. A79

Date Nov. 21, 1927

Chart and No. (1)	Time (2)	Stop Watch in 400 ft. minutes (3)	*** Engine Crankshaft R. P. M. (4)	Drive Wheel Slippage								Speed		Average Draft Pounds (15)	Drawbar Horsepower (16)	Temperature Degrees F.		Fuel Used Pounds (19)	Water Used Pounds (20)
				Left Wheel		Right Wheel		Av. Rev. Columns 6 and 8 (9)	** Distance Traveled (Feet) (10)	Distance Measured on Ground (Feet) (11)	** Slippage % Columns 10 and 11 (12)	Feet per Minute (13)	Miles per Hour (14)			* Cooling Fluid (17)	Atmosphere (18)		
				Counter Reading (5)	Rev. in 400 ft. (6)	Counter Reading (7)	Rev. in 400 ft. (8)												
****Observer																			
				High Gear.															
85	3 ¹⁸	1.11	1006	6700 5583	1117														
9N	3 ²³	1.135	981	4470	1113														
Avg.		1.1225	993		1115			19.33	403.6	400	0.89	356.4	4.05	440.25	47.55	181	60		
				Int. Gear.															
25	4.00	1.615	1007	8977 7351	1626														
35	4.10	1.625	1004	8727 4095	1632														
Avg.		1.620	1006		1629			19.54	408.0	400	1.96	246.1	2.80	658.0	49.07	181	56.5		
				Low Gear.															
25	4.40	2.50	1008	7443 4923	2520														
2N	4.50	2.54	989	2412	2511														
Avg.		2.52	998		2515.5			19.93	416.1	400	3.89	158.3	1.80	1053.7	50.55	190	54		

NOTE: Record all stops by the word "Stop" and "Start" in column 1, record time and give full data.

* Taken in discharge line from engine.

** The first figure in this column is calculated at the rim of the wheel, and the second figure at point of the lugs.

*** Engine R P M = $\frac{\text{Gear Ratio} \times \text{Column (8)}}{\text{Gear Ratio}}$

*** Engine R. P. M. = Column (9)

**** Each Observer will write his initials at the head of each column in which he records his observations.

THE UNIVERSITY OF NEBRASKA
AGRICULTURAL ENGINEERING DEPARTMENT
COLLEGE OF AGRICULTURE, LINCOLN
Record of Official Tractor Drawbar Horsepower Test

Rated or maximum load Maximum Date Nov. 21, 1927 Test No. 1479
Name, model and rating of tractor Monarch 6 Ton
Serial No. Engine..... Serial No. Chassis 60172
Manufacturer Monarch Tractors Corp. Springfield, Ill.
Tractor submitted for test by.....
Tractor equipment Am. Bosch "2R4Ed26" Mag. Zenith, "77" Carb.
Style and dimension of lugs Angle 31 per track, 2" High x 8" wide
Circumference of drive wheels, at face Length of track calculated 20.67' Point of lugs.....
Tractor operated by LAUD Dynamometer car operated by Wallace
Dynamometer used Guiley Load used Dyn. Car & Steamer
Kind of fuel Gasoline Test No. — W.t per gal. 6.19 lbs.
Kind and grade of oil used in engine Mob. B
Kind and grade of oil used in transmission 600W
Humidity 52 per cent. Barometric pressure 28.43 inches.
Temperature of atmosphere H 60 Int 55 Low 53 Temperature of engine H 181 Int 181 Low 170
Weather conditions Fair
Condition of track Dry & loose on top

Fuel Consumption:

Total for test, gal. Gals. per hour

Pounds per H. P. hour..... H. P. hours per gal.....

Water Consumption:

Total used in test, gal. Gal. per hour.....

We, the undersigned, certify that this and attached sheets hereto give a true and correct record of the official tractor test No. 1479

F. N. Lamb Operator. Low Wallace Observer.

..... Operator. Low Wallace Observer.

Engineer-in-charge

UNIVERSITY OF NEBRASKA
AGRICULTURAL ENGINEERING DEPARTMENT
UNIVERSITY FARM, LINCOLN

Report of Official Tractor Test No. 147

Dates of test Nov. 14th to 24th, 1927.

Name, model and rating of tractor Monarch "6 Ton"

Serial No. Engine 60172 Serial No. Chassis 60172

Manufacturer Monarch Tractors Corporation, Springfield, Illinois.

Tractor equipment used American Bosch "ZR4Ed26" Mag., Zenith "77" Carb.

Style and dimensions of wheel lugs Angle Casting 31 per Track 2" High x 8" Wide

Brake Horse Power Tests

Horse Power Developed	Crank Shaft Speed R. P. M.	Length of Test Min.	Fuel Consumption			Water Consumption Gallons per Hour			Temperature *Cooling Fluid Deg. F.	Temperature of Atmosphere Deg. F.	Humidity %	Barometric Pressure Inches Mercury
			Kind of Fuel	Amount Used per Hour Gallons	Horse Power Hours per Gallon	In Radiator	In Fuel Mixture	Total				
RATED LOAD TEST												
VARYING LOAD TEST												
		NO BELT TESTS										
MAXIMUM LOAD TEST												
		NO BELT TESTS										
HALF LOAD TEST												
		NO BELT TESTS										

*Taken in discharge line from engine.

Remarks The gasoline used as fuel in these tests weighed 6.19
pounds per gallon.

Report of Official Tractor Test No. 147

Drawbar Horse Power Tests

Horse Power Developed	Draw Bar Pull Pounds	Speed Miles per Hour	Crank Shaft Speed R. P. M.	Slippage of Drive Wheels %	Fuel Consumption			Water Used per Hour Gallons	*Temperature of Cooling Fluid Deg. F.	Temperature of Atmosphere Deg. F.	Average Humidity %	Barometric Pressure Inches Mercury
					Kind of Fuel Used	Amount Used per Hour Gallons	Horse Power Hours per Gallon					
RATED LOAD TEST. TEN HOURS												
40.59	5450	2.79	982	1.48	Gas	5.4995	7.38	0.08	154	41	59	28.97
MAXIMUM LOAD TEST												
49.07	6580	2.80	1006	1.96	Gas	-----Not Recorded-----			181	56.5	52	28.43
50.55	10.537	1.80	998	3.89	"	"	"		190	54	52	28.43
47.55	4402.5	4.05	993	0.89	"	"	"		181	60	52	28.43

Remarks ~~The rated load and first maximum tests were made in intermediate gear, the second maximum test was made in low gear, the third maximum test was made in high gear. The distance advanced by the tractor without load on level ground for several complete revolutions of the tracks was taken as a basis for calculating the slippage.~~

Oil Consumption:

During the complete test consisting of about 24 hours running the following oil was used:

For the engine, 3 gallons of Mobiloil B 3 gallons to fill the crankcase none added during the test.
 For the transmission, & Track 3 gallons of 600W was added during the test.

~~GENERAL REMARKS:~~

REPAIRS AND ADJUSTMENTS.

It was necessary to adjust valves, pump packings and several times during test. It was still working some at end of test.
No repairs or adjustments were necessary during this test. At the end of the test the tractor was in good running order and there were no indications of undue wear nor of any weakness which might require early repair.

BRIEF SPECIFICATIONS.

Motor: Stearns, 4cylinder, vertical, valve-in-head, mounted crankshaft lengthwise. Bore 5 1/8". Stroke 6 1/2". Rated speed 1000 R.P.M.

Magneto: American Bosch "ZR4Ed26"
Carburetor: Zenith "77".
Governor: Pierce fly ball type.
Air Cleaner: United dry centrifugal type.

Chassis: Tracklayer, 2 tracks, partly enclosed final drive, enclosed gear transmission, chain and sprocket final drive. Clutch own make twin disc type. Advertised speeds; Low 1.86 miles per hour, Intermediate 2.82 miles per hour, High 4.07 miles per hour, Reverse 3.26 miles per hour.

Total weight as tested (with operator) 13,755 pounds

REMARKS.

In the advertising literature submitted with the application for test of this tractor, we find some claims and statements which cannot be directly compared with the results of this test as ~~xxx~~ reported above. It is our opinion that none of these are excessive or unreasonable.

We, the undersigned, certify that above is a true and correct report of official tractor test No. 147
In order to conform to the provisions of the tractor rating code of the American Society of Agricultural Engineers and the Society of Automotive Engineers, the drawbar horsepower rating of this tractor should not exceed 38 HORSEPOWER.
Engineer-in-Charge

Board of Tractor Test Engineers.

UNIVERSITY OF NEBRASKA
AGRICULTURAL ENGINEERING DEPARTMENT
UNIVERSITY FARM, LINCOLN

Report of Official Tractor Test No. 147

Dates of test Nov. 14th to 24th, 1927.
 Name, model and rating of tractor Monarch "6 Ton"
 Serial No. Engine 60172 Serial No. Chassis 60172
 Manufacturer Monarch Tractors Corporation, Springfield, Illinois.
 Tractor equipment used American Bosch "ZR4Ed26" Mag., Zenith "77" Carb.
 Style and dimensions of wheel lugs Angle Casting 31 per Track 2" High x 8" Wide

Brake Horse Power Tests

Horse Power Developed	Crank Shaft Speed R. P. M.	Length of Test Min.	Fuel Consumption			Water Consumption Gallons per Hour			Temperature *Cooling Fluid Deg. F.	Temperature of Atmosphere Deg. F.	Humidity %	Barometric Pressure Inches Mercury
			Kind of Fuel	Amount Used per Hour Gallons	Horse Power Hours per Gallon	In Radiator	In Fuel Mixture	Total				
RATED LOAD TEST												
VARYING LOAD TEST												
	NO BELT TESTS											
MAXIMUM LOAD TEST												
	NO BELT TESTS											
HALF LOAD TEST												

*Taken in discharge line from engine.

Remarks The gasoline used as fuel in these tests weighed 6.19
pounds per gallon.

Report of Official Tractor Test No. ~~133~~ 147

Drawbar Horse Power Tests

Horse Power Developed	Draw Bar Pull Pounds	Speed Miles per Hour	Crank Shaft Speed R. P. M.	Slippage of Drive Wheels %	Fuel Consumption			Water Used per Hour Gallons	*Temperature of Cooling Fluid Deg. F.	Temperature of Atmosphere Deg. F.	Average Humidity %	Barometric Pressure Inches Mercury
					Kind of Fuel Used	Amount Used per Hour Gallons	Horse Power Hours per Gallon					
RATED LOAD TEST. TEN HOURS												
40.59 ✓	5450 ✓	2.79 ✓	982 ✓	1.48 ✓	Gas	5.4995 ✓	7.38 ✓	0.08 ✓	154 ✓	41 ✓	59 ✓	28.97 ✓
MAXIMUM LOAD TEST												
49.07 ✓	6580 ✓	2.80 ✓	1006 ✓	1.96 ✓	Gas	-----Not Recorded-----			181 ✓	56.5 ✓	52 ✓	28.43 ✓
50.55 ✓	10,537 ✓	1.80 ✓	998 ✓	3.89 ✓	"	"	"		190 ✓	54 ✓	52 ✓	28.43 ✓
47.55 ✓	4402.5 ✓	4.05 ✓	993 ✓	0.89 ✓	"	"	"		181 ✓	60 ✓	52 ✓	28.43 ✓

Remarks The rated load and first maximum tests were made in intermediate gear, the second maximum test was made in low gear, the third maximum test was made in high gear. The distance advanced by the tractor without load on level ground for several complete revolutions of the tracks was taken as a basis for calculating the slippage.

Oil Consumption:

During the complete test consisting of about 24 hours running the following oil was used:

For the engine, 3 gallons of Mobiloil B 3 gallons to fill the crancase none added during the test.

For the transmission, & Track 3 gallons of 600W was added during the test.

~~GENERAL REMARKS:~~

REPAIRS AND ADJUSTMENTS.

It was necessary to adjust the water pump packing gland several times during the test. It was still leaking some at end of test.

No ^{other} repairs or adjustments were necessary during this test. At the end of the test the tractor was in good running order and ~~there~~ there were no indications of undue wear nor of any weakness which might require early repair.

BRIEF SPECIFICATIONS.

Motor: Stearns, 4cylinder, vertical, valve-in-head, mounted crankshaft lengthwise. Bore 5 1/8". Stroke 6 1/2". Rated speed 1000 R.P.M.

Magneto: American Bosch "ZR4Ed26"
Carburetor: Zenith "77".
Governor: Pierce fly ball type.
Air Cleaner: United dry centrifugal type.

Chassis: Tracklayer, 2 tracks, partly enclosed final drive, enclosed gear transmission, chain and sprocket final drive. Clutch own make twin disc type. Advertised speeds; Low 1.86 miles per hour, Intermediate 2.82 miles per hour, High 4.07 miles per hour, Reverse 3.26 miles per hour.

Total weight as tested (with operator) 13,755 pounds.

REMARKS.

In the advertising literature submitted with the application for test of this tractor, we find some claims and statements which cannot be directly compared with the results of this test as ~~report~~ reported above. It is our opinion that none of these are excessive or unreasonable.

We, the undersigned, certify that above is a true and correct report of official tractor test No. 147 of the American Society of Agricultural Engineers and the Society of Automotive Engineers, the drawbar horsepower rating of this tractor should not exceed 38 HORSEPOWER.
Engineer-in-Charge

George H. Jorgensen
E. B. Jorgensen
A. W. Jorgensen

Board of Tractor Test Engineers.

gallon.

147
Report of Official Tractor Test No.

Drawbar Horse Power Tests

Horse Power Developed	Draw Bar Pull Pounds	Speed Miles per Hour	Crank Shaft Speed R. P. M.	Slippage of Drive Wheels %	Fuel Consumption			Water Used per Hour Gallons	*Temperature of Cooling Fluid Deg. F.	Temperature of Atmosphere Deg. F.	Average Humidity %	Barometric Pressure Inches Mercury
					Kind of Fuel Used	Amount Used per Hour Gallons	Horse Power Hours per Gallon					
RATED LOAD TEST. TEN HOURS												
40.59	5450	2.79	982	1.48	Gas.	5.4995	7.38	0.08	154	41	59	28.97
MAXIMUM LOAD TEST												
49.07	5580	2.80	1006	1.96	Gas.	---	NOT RECORDED	---	181	56.5	52	28.43
50.55	10537	1.80	998	3.89	Gas.	---	NOT RECORDED	---	190	54	52	28.43
47.55	4402.5	4.05	993	0.89	Gas.	---	NOT RECORDED	---	181	60	52	28.43

*Taken in discharge line from engine.

Remarks The rated load and first maximum tests were made in intermediate gear; the second maximum test was made in low gear; the third maximum test was made in high gear. The distance advanced by the tractor without load on level ground for several complete revolutions of the tracks was taken as a basis for calculating the slippage.

Oil Consumption:

During the complete test consisting of about ²⁴ hours running the following oil was used:
 For the engine, ³ gallons of Mobiloil "B". 3 gallons to fill the crankcase, none added during test.
 & track ³ 600W were added during the test.
 For the transmission, ³ gallons of

Report of Official Tractor Test No. 147

General remarks

REPAIRS AND ADJUSTMENTS.

It was necessary to adjust the water pump packing gland several times during the test. It was still leaking somewhat at the end of the test.

No other repairs or adjustments were necessary during this test. At the end of the test the tractor was in good running order and there were no indications of undue wear nor of any weakness which might require early repair.

BRIEF SPECIFICATIONS.

Motor: Stearns, 4 cylinder, vertical, valve-in-head, mounted crankshaft lengthwise. Bore 5-1/8"; stroke 6-1/2".
Rated speed 1000 R.P.M.

Magneto: American Bosch "2R4/Ed26".

Carburetor: Zenith "77".

Governor: Pierce fly-ball type.

Air cleaner: United dry centrifugal type.

Chassis: Tracklayer, 2 tracks, partly enclosed final drive, enclosed gear transmission, chain and sprocket final drive. Clutch own make twin disc type. Advertised speeds: Low, 1.86 miles per hour; Intermediate, 2.82 miles per hour; High, 4.07 miles per hour; Reverse, 3.26 miles per hour.

Total weight as tested (with operator) 13,755 pounds.

REMARKS.

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In order to conform to the provisions of the tractor rating code of the American Society of Agricultural Engineers and the Society of Automotive Engineers, the drawbar horsepower rating of this tractor should not exceed 38 horsepower.

We, the undersigned, certify that above is a true and correct report of official tractor

test No. 147

Lew Wallace
Engineer-in-Charge

Oscar W. Sjogren

E. E. Brackett

C. W. Smith

Board of Tractor Test Engineers.