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5-19-1952

Test 471 ; Terratrak GT-30

Nebraska Tractor Test Lab

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The Experiment Station
University of Nebraska College of Agriculture
W. V. Lambert, Director, Lincoln, Nebraska

Department of Agricultural Engineering
Dates of test: May 19 to 27, 1952
Manufacturer: AMERICAN TRACTOR CORPORATION,
CHURUBUSCO, INDIANA
Manufacturer's rating: 16.26 hp.

NEBRASKA TRACTOR TEST NO. 471

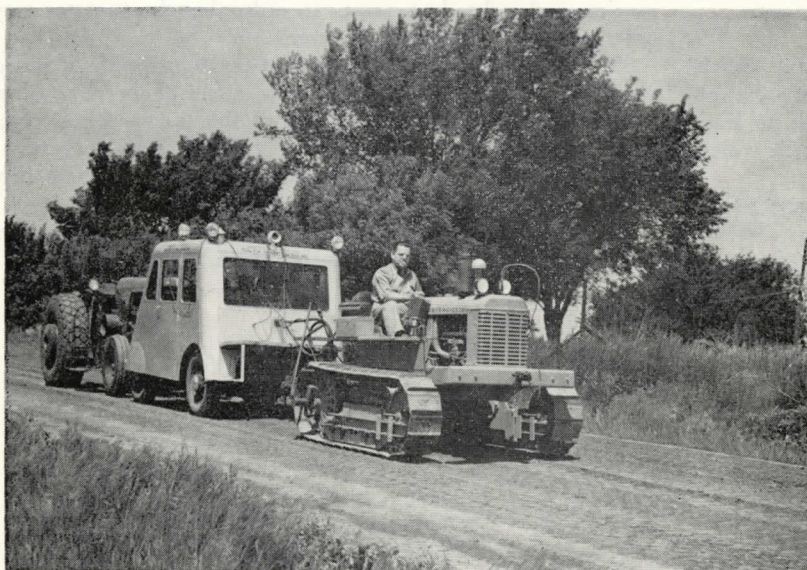
TERRATRAC GT-30

BELT HORSEPOWER TESTS

Hp	Crank shaft speed rpm	Fuel Consumption			Water used gal per hour	Temp Deg F		Barometer inches of mercury		
		Gal per hour	Hp-hr per gal	Lb per hp-hour		Cooling med	Air			
TEST B—100% MAXIMUM LOAD—TWO HOURS										
30.41	1851	2.818	10.79	0.562	0.00	166	57	28.890		
TEST C—OPERATING MAXIMUM LOAD—ONE HOUR										
28.92	1850	2.624	11.02	0.550	0.00	158	53	28.870		
TEST D—RATED LOAD—ONE HOUR										
26.81	1853	2.504	10.71	0.566	0.00	156	52	28.850		
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)										
26.81	1852	2.509	10.69	0.567	...	156	52	.....	
1.64	1982	1.202	1.36	4.445	...	146	52	.....	
13.79	1902	1.786	7.72	0.785	...	153	52	.....	
28.24	1788	2.543	11.10	0.546	...	158	53	.....	
7.20	1981	1.470	4.90	1.238	...	151	53	.....	
20.65	1905	2.212	9.34	0.649	...	155	53	.....	
16.39	1901	1.954	8.39	0.723	0.00	153	53	28.840		
TORQUE (At Dynamometer)										
Eng rpm	1850	1749	1650	1549	1446	1346	1248	1152	1084	946
Lb-ft	210.0	214.2	219.1	223.7	228.4	234.5	240.6	241.5	236.8	229.3

DRAWBAR HORSEPOWER TESTS

Hp	Draw bar pull lb	Speed miles per hr	Crank shaft speed rpm	Slip of drive wheels %	Fuel Consumption			Water used gal per hour	Temp Deg F		Barometer inches of mercury
					Gal per hour	Hp-hr per gal	Lb per hp-hr		Cool- ing med	Air	
TEST F—100% MAXIMUM LOAD—2nd Gear											
25.16	3448	2.74	1853	2.95	.....	Not Recorded	.....	.....	173	68	28.840
TEST G—OPERATING MAXIMUM LOAD											
19.76	4518	1.64	1860	8.33	.....	Not Recorded	.....	.....	161	75	28.840
22.91	3141	2.74	1849	2.82	.....	Not Recorded	.....	.....	164	67	28.840
22.70	1852	4.60	1855	1.01	.....	Not Recorded	.....	.....	165	68	28.840
TEST H—RATED LOAD—TEN HOURS—2nd Gear											
19.85	2727	2.73	1850	3.12	2.322	8.55	0.709	0.00	173	79	28.847



FUEL, OIL and TIME Gasoline octane No. ASTM 76 Research 82 (rating taken from oil company's typical inspection data); weight per gallon 6.063 lb Oil SAE 10; to motor 1.017 gal; drained from motor 0.866 gal Total time motor was operated 41 hours.

CHASSIS Type Tracklayer Serial No. 10671 Tread width 56" Measured length of track 15.09' Cleats integral with shoes Number cleats per track 30 Size of cleats 12" x 6 1/2" Advertised speeds mph first 1.78 second 2.81 third 4.61 reverse 2.05 Belt pulley diam 8 1/2" face 6 1/2" rpm 1192 Belt speed 2652 fpm Clutch single plate dry disc operated by foot pedal Seat upholstered Brakes contracting bands operated by steering levers Steering hand levers controlling brakes.

ENGINE Make Continental Red Seal Type 4 cylinder vertical Serial No. 22929 Crankshaft mounted lengthwise Head L Lubrication pressure Bore and Stroke 3 3/16" x 4 3/8" Rated rpm 1850 Compression ratio 6.5 to 1 Displacement 140 cu in Port Diameter Valves inlet 1 23/64" exhaust 1 1/16" Governor Novi Carburetor Size 7/8" Ignition System 6 volt battery Starting System 6 volt Air Cleaner oil washed wire screen Muffler was used Oil Filter replaceable element Cooling medium temperature control thermostat.

TOTAL WEIGHT AS TESTED (with operator) 4471 lbs.

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data and without allowances, additions or deductions. Tests B and F were made with carburetor set for 100% maximum belt horsepower and data from these tests were used in determining the horsepower to be developed in tests D and H, respectively. Tests C, D, E, G, and H were made with an operating setting of the carburetor (selected by the manufacturer) of 94.8% of maximum belt horsepower.

HORSEPOWER SUMMARY

	Draw- bar	Belt
1. Sea level (calculated) maximum horsepower (based on 60° F and 29.92" Hg)	26.30	31.40
2. Observed maximum horsepower (tests F & B)	25.16	30.41
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (formerly ASAE and SAE ratings)	19.73	26.69

We, the undersigned, certify that this is a true and correct report of official tractor test No. 471.

L. F. LARSEN
Engineer in Charge

C. W. SMITH
F. D. YUNG
L. W. HURLBUT
Board of Tractor
Test Engineers

EXPLANATION OF TEST REPORT

TEST A: The manufacturer's representative operates the tractor for a minimum of 12 hours using light to heavy drawbar loads in each gear.

This serves as a period for limber up, general observation and adjustments. Adjustments that are permissible include valve tappet clearance, breaker point gap, spark plug gaps, clutch and others of a similar nature. No new parts or accessories can be installed without having mention made of it in the report.

No data are recorded during this preliminary run except the time that the engine is operated.

BELT HORSEPOWER TESTS

TEST B: The throttle valve is held wide open and the belt load on the dynamometer is adjusted so that the engine is at the rated speed recommended by the manufacturer. Carburetor, ignition timing and manifold adjustments are all set for maximum engine power.

This test is designed to determine maximum belt horsepower of the tractor at rated speed and to measure fuel consumption at the maximum power on the belt.

TEST C: For tractors with carburetors the best fuel economy does not always occur when the engine develops maximum power at rated speed. Test C is intended to allow the manufacturer's representative to select a more economical fuel setting even though there is a slight loss of power. *This more practical carburetor setting is used in all later tests except test F.* The throttle valve is held wide open and load adjusted to give rated rpm. Tests B and C are the same for diesel tractors, which have an altogether different fuel system.

TEST D: The throttle control lever is set so that the governor will maintain rated engine speed when rated load is applied. Rated load is 85% of 100% maximum, as obtained in test B, corrected to standard conditions.

This rating is somewhat less than the maximum belt horsepower in order that the operator may have a certain amount of reserve.

TEST E:

Varying load serves to show the range of engine speeds when the engine is controlled by the governor during the following varied loads of 20 minutes each: rated load, no load, $\frac{1}{2}$ rated load, maximum load at wide open throttle valve, $\frac{1}{4}$ and $\frac{3}{4}$ rated load.

The average result of this test shows the average power and fuel consumption. Since the average tractor is subjected to varying loads, these data serve well in predicting fuel con-

sumption and efficiency of a tractor in general use.

Torque, lb-ft at dynamometer, is obtained with wide open throttle and sufficient load is applied to give several readings.

DRAWBAR HORSEPOWER TESTS

In all drawbar tests the pull exerted by the tractor is transmitted by a hydraulic pressure cylinder to a recording instrument in the test car. All tests are made on the same dirt test course which is maintained by grading, sprinkling and rolling so that it remains very nearly the same throughout the season. The same tires, wheels and weights are used for all tests except J and K.

TEST F: A drawbar test, the results of which are used to determine the rated drawbar horsepower in test H. The carburetor is set to develop maximum power as in test B. The rated gear recommended by manufacturer as plow gear is used in this test. The drawbar load is adjusted to give rated engine speed.

TEST G: Maximum drawbar horsepower is determined in each gear when the carburetor is set for fuel economy as in test C. The throttle valve is held wide open and the load is applied so that the engine runs at rated engine speed.

When operating in low gear it is not uncommon for the tractor to develop less drawbar horsepower than in rated gear because of excessive wheel slippage. When excessive wheel slippage occurs the load is reduced until slippage approaches 16%. When the load is reduced it is necessary to operate the tractor engine at part throttle and control engine speed by governor action.

TEST H: Intended to test the ability of the tractor to run continuously for 10 hours at rated drawbar horsepower and to determine the fuel consumption during that time. Rated drawbar horsepower is 75% of 100% maximum drawbar horsepower (Test F), corrected to standard conditions.

When operating at rated load the throttle control lever is set to maintain rated engine speed. This rating is less than maximum drawbar horsepower in order that the operator may have a certain amount of reserve.

TEST J: The tractor is operated in rated gear with all added weight removed. This test shows the effect of the removal of added weight on the performance of the tractor when compared with test G.

Removal of wheel weights generally increases wheel slippage and decreases drawbar horsepower.

TEST K: Similar to test J except that the smallest tires and lightest wheels offered by the manufacturer are used.