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Test 417: Caterpillar Model D-4

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: July 11 to July 26, 1949

Manufacturer: CATERPILLAR TRACTOR COMPANY, PEORIA, ILLINOIS

Manufacturer's rating: 43 Drawbar H. P. in second gear corrected. Belt not rated.

NEBRASKA TRACTOR TEST NO. 417

CATERPILLAR D-4

BELT HORSE POWER TESTS

H. P.	Crank shaft speed R.P.M.	Fuel Consumption			Water used Gal. per hour	Temp. Deg. F.		Barometer Inches of Mercury
		Gal. per hour	H. P. hr. per gal.	Lb. per H. P. hour		Cooling med.	Air	
TEST B and C—100% MAXIMUM LOAD—TWO HOURS								
51.81	1400	3.702	14.00	0.495	0.00	174	82	28.975
*TEST D—ONE HOUR								
46.48	1401	3.207	14.49	0.478	0.00	178	89	28.960

TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)

46.65	1404	3.201	14.57	0.476	---	179	90	---
1.65	1540	1.073	1.54	4.509	---	162	90	---
24.76	1482	2.033	12.18	0.569	---	166	90	---
49.31	1367	3.487	14.14	0.490	---	180	90	---
12.63	1510	1.531	8.25	0.841	---	163	90	---
36.76	1473	2.630	13.98	0.496	---	170	91	---
28.63	1462	2.326	12.31	0.563	0.00	170	90	28.933

DRAWBAR HORSE POWER TESTS

H. P.	Draw bar pull Lbs.	Speed miles per hr.	Crank shaft speed R. P. M.	Slip of drive wheels %	Fuel Consumption			Water used Gal. per hr.	Temp. Deg. F.		Barometer Inches of Mercury
					Gal. per hour	Hp.-hr. per Gal.	Lb. per Hp.-hr.		Cooling med.	Air	
TEST F and G —100% MAXIMUM LOAD—											
39.55	9555	1.55	1404	9.17	Not Recorded				166	82	28.960
41.65	6851	2.28	1399	3.33	" "				170	82	28.910
40.40	5235	2.89	1401	2.49	" "				170	82	28.960
39.52	4059	3.65	1402	1.74	" "				170	85	28.960
37.85	2659	5.34	1399	0.94	" "				168	83	28.960
					" "						
*TEST H—TEN HOURS— 2nd GEAR											
33.01	5392	2.30	1398	2.60	2.902	11.37	0.610	0.00	171	90	28.767

* Formerly called RATED LOAD, see horsepower summary.

FUEL, OIL and TIME Fuel: Diesel fuel, cetane 47 (cetane rating taken from oil company's typical inspection data); weight per gallon 6.935 lbs. Oil: SAE 30; to motor 4.588 gals; drained from motor 2.913 gals. Total time motor was operated 37 hours.

SPECIFICATIONS Type tracklayer; Serial No. 7U5294; Drive enclosed gear; Tread Width: 60"; Measured Length of Track 18.00 ft. Cleats: Type integral with shoes; No. per track 32; Size 1 7/8" x 16". Advertised speeds, mph: First 1.7; Second 2.4; Third 3.0; Fourth 3.7; Fifth 5.4; Reverse: 1.9. Belt Pulley: Diam 14"; Face 8 1/2"; RPM 840; Belt Speed 3079 fpm. Clutch: Make own; Type dry metallic friction disc; Operated by hand lever. Seat upholstered. Brakes: Make own; Type contracting band; Location steering clutch drums; Gear Reduction (brake drum to sprocket) 5.083:1; Operated by foot pedals; Locked by latch on tractor frame. Steering hand levers controlling multiple disc clutches.

ENGINE Make own; Serial No. 7U5294; Type 4 cylinder vertical; Head I; Mounting crankshaft lengthwise; Lubrication pressure; Bore and Stroke 4 1/2" x 5 1/2"; Rated rpm 1400; Compression Ratio 17.3:1. Port Diameter Valves: Inlet 1.813"; Exhaust 1.675". Governor: Make own; Type centrifugal, variable speed. Fuel Injection System own. Air Cleaner: Make Donaldson; Type oil washed wire screen. Oil Filter: Make Purolator; Type permanent metal full flow and replaceable by-pass element. Fuel Filter: Make own; Type four replaceable cotton yarn wound elements. Cooling medium temperature control: Thermostat.

STARTING ENGINE Make own; Type 2 cylinder horizontal opposed; Mounting behind diesel engine; Bore and Stroke 2 3/4" x 3"; Magneto Bosch; Carburetor Zenith; Air Cleaner Donaldson; Mfg. Rating 10 hp at 3000 rpm; Starter hand rope.

TOTAL WEIGHT AS TESTED (with operator) 11,175 lbs.

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data and without allowances, additions or deductions. Test F was made with a fuel pump setting, selected by the manufacturer, to develop approximately 44 (corrected) drawbar horsepower in second gear and data from this test were used in determining the horsepower to be developed in tests D and H, respectively. Tests B, C, D, E, G and H were made with the same setting.

HORSEPOWER SUMMARY

	Draw-bar	Belt
1. Sea level (calculated) maximum horsepower (based on 60° F. and 29.92" Hg.)	44.01	54.61
2. Observed maximum horsepower (tests F & B)	41.65	51.81
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)	33.01	46.42

We, the undersigned, certify that this is a true and correct report of official tractor test No. 417.

L. F. Larsen
Engineer in Charge

C. W. Smith
F. D. Yung
L. W. Hurlbut
Board of Tractor
Test Engineers

