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Test 628: Eimco 105 Diesel

Tractor Test & Power Museum
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Department of Agricultural Engineering
Dates of test: July 26, 1957 to August 2, 1957
Manufacturer: THE EIMCO CORPORATION,
SALT LAKE CITY, UTAH
Manufacturer's rating: Not Rated

EIMCO 105

DRAWBAR HORSEPOWER TESTS

Hp	Draw bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of drive wheels %	Fuel Consumption			Temp. Deg. F.			Barometer inches of mercury
					Gal per hr	Hp-hr per gal	Lb per hp-hr	Cooling med	Air wet bulb	Air dry bulb	
TEST H—RATED LOAD—TEN HOURS—Low Range											
69.93	12,243	2.14	1917	1.85	8.319	8.41	0.833	195	77	96	28.817
TESTS F & G—100% MAXIMUM LOAD											
54.53	27,141	0.75	1546	10.36	Low Range			180	73	88	28.820
*72.29	12,146	2.23	1977	1.93	Low Range			201	78	99	28.800
46.04	6,995	2.47	2063	0.73	Low Range			168	77	93	28.870
45.73	11,997	1.43	1525	1.36	High Range			192	75	91	28.870
*49.08	8,115	2.27	1528	0.96	High Range			177	77	93	28.870
38.98	3,051	4.79	1730	0.37	High Range			192	75	91	28.870

* Data shown on this line are for maximum horsepower in this gear range. Other data were obtained in the same gear range at loads selected by the manufacturer's representative.

FUEL, OIL, WATER and TIME Fuel Diesel Cetane No. ASTM 50 (rating taken from oil company's typical inspection data) Weight per gallon 7.000 lb Oil SAE 30 To motor 3.465 gal Drainage from motor 2.719 gal Water used 1.407 gal Total time motor was operated 34½ hours.

CHASSIS Type Tracklayer Serial No. 1050500 Tread width 74" Measured length of track 25.20 ft. Cleats integral with shoes Cleats per track 40 Size of cleats 20" x 2½" Advertised speeds mph Low range 0 to 2.27 High range 0 to 5.45 Reverse same as forward speeds Clutch no master clutch Seat upholstered and adjustable Brakes disc operated by two foot pedals Steering hand levers controlling multiple disc clutches hydraulically controlled with independent track reversal.

ENGINE Make General Motors 71 - 2 cycle diesel Type 4 cylinder vertical Serial No. 4A-64401 Crankshaft mounted lengthwise Head 1 Lubrication pressure Bore and stroke 4.25" x 5.0" Rated rpm 2000 Compression ratio 17 to 1 Displacement 283.7 cu. in. Valve port diameter Inlet multiple ports Exhaust 1.35" Governor variable speed centrifugal Starting system 12 volt Air cleaner oil washed wire screen Muffler was used Oil filter replaceable paper element Fuel filter one primary filter with washable yarn element and one secondary filter with replaceable paper element Cooling medium temperature control thermostat.

Total weight as tested (with operator): 29,955 lbs.

REPAIRS AND ADJUSTMENTS: Following Test "A" the generator adjusting bracket broke. During Test "A" the fan shield was removed to provide better cooling. During Test "F" and "G" the generator failed.

REMARKS: All results were determined from observed data and without allowances, additions or deductions. Tests F, G, and H were made with fuel pumps as set by the manufacturer.

This tractor is equipped with a hydraulic torque converter which automatically loads the engine by controlling the forward travel speed according to the load applied. Therefore, rated load and maximum load are approximately the same. No belt pulley is available for this tractor, therefore no belt tests.

HORSEPOWER SUMMARY

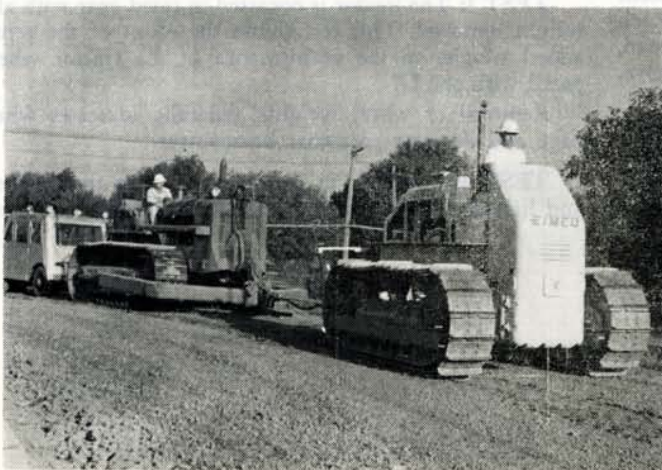
Drawbar

1. Sea level (calculated) maximum horsepower (based on 60° F and 29.92" Hg) 77.86
2. Observed maximum horsepower (tests F and G) 72.29

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 628.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT, Chairman
G. W. STEINBRUEGGE
J. J. SULEK
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 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 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 consumption and efficiency of a tractor in general use.

TEST L: This torque test is run with wide open throttle. Loads are applied to reduce engine speed in approximately ten 5% increments. Rated speed equals 100%. The corresponding dynamometer torque is recorded as a per cent of torque at rated speed.

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. When rubber tires are used, all tests are made on the concrete test course. All crawler type tractors are tested on a 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.