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Test 752: International TD-25 (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 752 - INTERNATIONAL TD-25 DIESEL

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean and Acting Director; Lincoln, Nebraska

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of drivers %	Fuel Consumption		Hp-hr per gal	Temperature Degrees F		Barometer inches of mercury		
					Gal per hr	Lb per hp hr		Cooling medium	Air wet bulb		Air drv bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST												
Maximum Available Power—Two Hours—3rd Gear												
186.85	30049	2.33	1486	2.52	13.145	0.493	14.21	170	76	90	28.850	
75% of Pull at Maximum Power—Ten Hours—3rd Gear												
151.87	22749	2.50	1576	1.34	11.310	0.522	13.43	166	68	84	28.820	
50% of Pull at Maximum Power—Two Hours—3rd Gear												
101.52	14771	2.58	1611	0.74	8.969	0.619	11.32	164	66	84	28.995	
MAXIMUM POWER WITH BALLAST												
184.68	47244	1.47	1495	6.53	1st Gear.....			170	71	87	28.725	
187.56	36821	1.91	1501	4.69	2nd Gear.....			165	64	74	29.055	
188.58	30313	2.33	1495	3.18	3rd Gear.....			165	63	70	29.095	
187.68	23205	3.03	1503	1.58	4th Gear.....			165	64	74	29.055	
180.66	16625	4.08	1499	0.80	5th Gear.....			165	64	74	29.055	
180.59	13015	5.20	1501	0.57	6th Gear.....			165	64	74	29.055	
161.69	10037	6.04	1501	0.48	7th Gear.....			170	62	71	29.105	
151.59	7389	7.69	1502	0.44	8th Gear.....			170	62	71	29.105	
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—3rd Gear												
Pounds pull		30300		31050		33450		32300		30100		26750
Horsepower		188.6		173.9		169.5		137.8		112.4		85.6
Miles per hour		2.3		2.1		1.9		1.6		1.4		1.2

Department of Agricultural Engineering

Dates of Test: August 6 to August 17, 1960

Manufacturer: INTERNATIONAL HARVESTER COMPANY, CHICAGO, ILLINOIS

Manufacturer's Power Rating: 185 Drawbar Horsepower

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 50 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8419 Weight per gallon 7.010 lb Oil SAE 30 API service classification DS To motor 7.939 gal Drained from motor 4.960 gal Transmission and final-drive lubricant SAE 30 Type engine oil Total time engine was operated 41½ hours.

ENGINE Make International Harvester Diesel Type 6 cylinder vertical with turbocharger Serial No TD250M977 Crankshaft mounted lengthwise Rated rpm 1500 Bore and stroke 5⅜" x 6" Compression ratio 15.35 to 1 Displacement 817 cu in Cranking system 24 volt electric (four 6 volt batteries) Lubrication pressure Air cleaner dry type, one replaceable paper element Oil filter 3 replaceable paper elements Oil cooler engine coolant heat exchanger for crankcase oil Fuel filter one auxiliary and one final replaceable paper element Muffler was not used Cooling medium temperature control thermostat.

CHASSIS Type tracklayer Serial No TD250 956 Tread width 80" Wheel base 117" Drawbar height 18" Measured length of track 29.75 ft Cleats integral with shoes Cleats per track 42 Size of cleats 24" x 2½" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 58¾" Vertical distance above roadway 30⅝" Horizontal distance from center of rear wheel tread 0" to the right/left Cable control system direct engine drive Transmission synchro-mesh selective gear fixed-ratio transmission with partial range operator controlled power shifting Advertised speeds mph first 1.5 second 2.0 third 2.4 fourth 3.0 fifth 4.1 sixth 5.2 seventh 6.0 eighth 7.7 reverse first 1.5 second 2.0 third 2.4 fourth 3.0 fifth 4.0 sixth 5.1 seventh 5.9 eighth 7.5 Clutch dry double plate operated by hand lever Brakes disc brakes operated independently by steering levers and by foot pedal with equalizer Steering hand levers actuating hydraulic steering control Turning space diameter (with brake applied) right 264" left 264" Power take-off 1500 rpm at 1500 engine rpm.

TOTAL WEIGHT WITH OPERATOR 52,495 lbs including swinging drawbar 417 lbs, front pusher plate 1816 lb, rear cable control unit 2485 lb, track roller guards 420 lb, crankcase guard 425 lb, and transmission guard 182 lb.

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 752.

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

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, $\frac{1}{2}$ the 85% torque; maximum power; $\frac{1}{4}$ and $\frac{3}{4}$ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmissions, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree

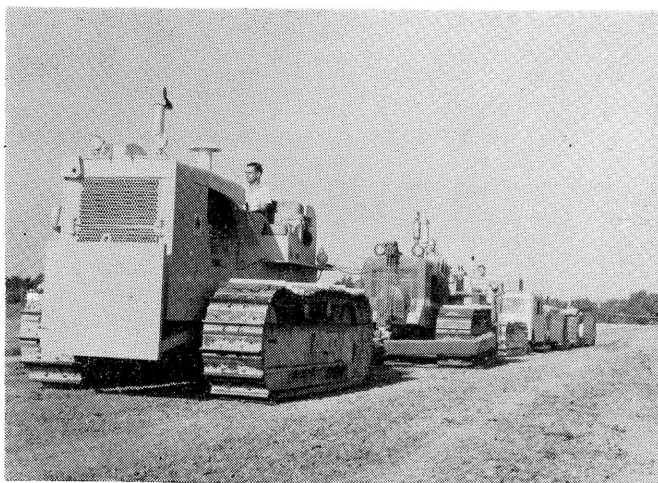
turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions; (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.



International TD-25 Diesel