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Test 1157: John Deere 2630 and 2640 Diesel

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1157 – JOHN DEERE 2630 DIESEL (ALSO JOHN DEERE 2640 DIESEL)

POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	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 dry bulb	
MAXIMUM POWER AND FUEL CONSUMPTION								
70.37	Rated Engine Speed—Two Hours (PTO Speed—651 rpm)							
	2500	4.892	0.481	14.38	200	58	75	28.960
69.02	Standard Power Take-off Speed (540 rpm)—One Hour							
	2075	4.310	0.432	16.01	197	59	75	28.983
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
61.21	2557	4.468	0.505	13.70	194	61	75	.....
0.00	2625	1.941	.....	.....	176	61	77	.....
31.01	2594	3.090	0.690	10.04	186	61	78	.....
70.25	2501	4.888	0.482	14.37	200	69	76	.....
15.62	2613	2.474	1.097	6.31	178	61	76	.....
46.25	2576	3.735	0.559	12.38	191	61	77	.....
Av 37.39	2577	3.433	0.636	10.89	187	62	76	28.977

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption		Hp-hr per gal	Temp Cool- ing med	Degrees F		Barometer inches of Mercury
					Gal per hr	Lb per hp-hr			Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—10th Gear (5-Hi)											
57.88	4027	5.39	2500	6.31	4.785	0.572	12.10	199	69	79	28.760
75% of Pull at Maximum Power—Ten Hours—10th Gear (5-Hi)											
46.20	3042	5.70	2592	4.50	4.207	0.630	10.98	183	48	59	29.130
50% of Pull at Maximum Power—Two Hours—10th Gear (5-Hi)											
31.52	2031	5.82	2618	3.37	3.521	0.773	8.95	178	38	43	29.150
50% of Pull at Reduced Engine Speed—Two Hours—13th Gear (7th-Lo)											
31.41	2031	5.80	1565	3.34	2.456	0.541	12.79	178	49	61	29.140
MAXIMUM POWER WITH BALLAST											
51.96	6470	3.01	2546	14.66	6th Gear (3-Hi)			186	53	60	28.880
56.59	5134	4.13	2501	8.64	8th Gear (5-Lo)			191	60	70	28.860
57.27	4817	4.46	2503	7.94	9th Gear (4-Hi)			194	62	72	28.850
58.15	4055	5.38	2498	6.46	10th Gear (5-Hi)			196	63	74	28.810
56.90	3492	6.11	2499	5.36	11th Gear (6-Lo)			194	64	75	28.800
57.92	2760	7.87	2500	4.11	12th Gear (6-Hi)			196	64	76	28.800

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 10th Gear (5-Hi)

Pounds Pull	4055	4588	5023	5292	5515	5724	5662
Horsepower	58.15	58.61	56.29	51.43	45.56	38.99	30.88
Crankshaft Speed rpm	2498	2247	1990	1738	1487	1235	988
Miles Per Hour	5.38	4.79	4.20	3.64	3.10	2.55	2.05
Slip of Drivers %	6.46	7.41	8.23	8.93	9.49	10.17	9.94

TRACTOR SOUND LEVEL WITHOUT CAB

	dB (A)
Maximum Available Power 2 Hours	97.5
75% of Pull at Max. Power 10 Hours	97.0
50% of Pull at Max. Power 2 Hours	96.5
50% of Pull at Reduced Engine Speed 2 Hours	90.5
Bystander 16th Gear (8-Hi)	87.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	No., size, ply & psi	Two 16.9-28;6;18	Two 16.9-28;6;18
	—Liquid	585 lb each	None
	Cast Iron	240 lb each	None
Front tires	No., size, ply & psi	Two 7.50-16;6;36	Two 7.50-16;6;36
	—Liquid	None	None
	Cast Iron	490 lb each	None
Height of drawbar		19 inches	19½ inches
Static weight with operator—	rear	5350 lb	3700 lb
	front	3080 lb	2100 lb
	total	8430 lb	5800 lb

Department of Agricultural Engineering

Dates of Test: April 16 to April 25, 1974

Manufacturer: JOHN DEERE DUBUQUE
WORKS, DUBUQUE, IOWA

FUEL, OIL AND TIME Fuel No 2 Diesel Cetane No 51.9 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8315 Weight per gallon 6.923 lb Oil SAE 30 API service classification John Deere Torq-Guard or CD, CC and SD To motor 2.134 gal Drained from motor 1.916 gal Transmission and final drive lubricant John Deere Special 303 Oil Total time engine was operated 49 hours.

ENGINE Make John Deere Diesel Type 4 cylinder vertical Serial No 278412T Crankshaft Mounted lengthwise Rated rpm 2500 Bore and stroke 4.19" x 5.0" Compression ratio 16.7 to 1 Displacement 276 cu in Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with replaceable pleated paper element and automatic dust unloader Oil filter full flow replaceable pleated paper screw-on cartridge Oil Cooler engine coolant heat exchanger for crankcase oil and radiator for transmission and hydraulic system Fuel filter sediment bowl and replaceable two-stage paper cartridge Muffler underslung Cooling medium temperature control thermostat.

CHASSIS Type Standard Serial No 2630B 189958T Tread width rear 54" to 78" front 49" to 79" Wheel base 79.4" 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 30.2 Vertical distance above roadway 33.7 Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 1.3 second 1.6 third 1.8 fourth 2.2 fifth 2.6 sixth 3.3 seventh 3.6 eighth 4.3 ninth 4.6 tenth 5.5 eleventh 6.1 twelfth 7.9 thirteenth 9.1 fourteenth 11.6 fifteenth 12.8 sixteenth 16.3 reverse 1.4, 1.8, 2.0, 2.6, 3.0, 3.8, 4.2 and 5.4 Clutch single plate dry disc in combination with PTO clutch operated by a single foot pedal Brakes wet disc operated hydraulically by two foot pedals which can be locked together Steering mechanical with power assist Turning radius (on concrete surface with brake applied) right 115" left 115" (on concrete surface without brake) right 132" left 132" Turning space diameter (on concrete surface with brake applied) right 228" left 228" (on concrete surface without brake) right 260" left 260" Belt pulley 967 at 2100 engine rpm dia 12" face 8½" Belt speed 3038 fpm Power take-off 547 rpm at 2100 engine rpm.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure.

Six gears were chosen between 15% slip and 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1157.

L. F. LARSEN

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

D. E. LANE

Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
H. W. Ottoson, Director and Acting Dean

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. Prior to the maximum power run the tire tread-bar height must be at least 65% of new tread height.

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 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, $\frac{1}{2}$ of 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.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effects of speed-control devices (engine, governor, automatic transmission, 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 4 different runs 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; (3) 50% of the pull at maximum power; and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 6 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 manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. 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.

Varying Drawbar Pull 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.

SOUND MEASUREMENT

Sound is recorded during each of the Varying Power and Fuel Consumption runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet from the line of travel of the tractor.

An increase of 10 dB(A) will approximately double the loudness to the human ear.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska 68503.



JOHN DEERE 2630 DIESEL