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Test 1004: John Deere 1520

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NEBRASKA TRACTOR TEST 1004 - JOHN DEERE 1520 GASOLINE

POWER TAKE-OFF PERFORMANCE												
Fuel Consumption Temperature Degrees F												
H	p	shaft speed rpm	Gal per hr	per per		Hp-hr per Cooling gal medium			Air dry bulb		Barometer inches of Mercury	
MAXIMUM POWER AND FUEL CONSUMPTION												
			Rat	ted Engi	ne Sp	eed-T	wo Hou	rs				
47.86		2500	4.262	0.53		11.23	190	54	7	75	29.437	
		Standa	ard Pow	er Take	off Sp	eed (1	000 rpm)—One	Hour			
43	.95	2066	4.037	0.55	•	10.89	189	54		75 _	29.415	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS												
42	.76	2627	4.035	0.57	1	10.60	190	54	7	75		
	.00	2750	1.874				182	54		75		
	.92	2698 2501	3.143 4.228	0.868		6.97	187 192	54 54	75 75			
	.14	2740	2.518			4.42	184	55	76			
32.51		2665	3.609			9.01	190	54				
Av 25.95		2663	3.234	0.754		8.02	187	54	75		29.400	
DRAWBAR PERFORMANCE												
	D	Connect	Cva-l		iel Co	nsumpti	on	Tem	p Degr	ees F	Param	
Нр	Draw- bar	Speed miles	Crank- shaft	Slip	Gal	Lb	Hp-hr		Air	Air	Barom- eter	
	pull lbs	per hr	speed rpm	drivers %	per hr	per hp-hr	per gal	ing med	wet bulb	bulb dry	inches of Mercury	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST												
Maximum Available Power—Two Hours—10th Gear (5th Hi)												
37.24	2525	5.53	2483	4.73	4.135				47	52	28.810	
			at Max		ower-			0th Ge	ar (5t)	_		
31.35	1939	6.06	2681	3.16	3.851	0.74			52	57	28.578	
	50%	of Pull	at Max	imum P	ower-	-Two	Hours—	10th Ge	ar (5t	h Hi)		
22.51	1349	6.26	2743	2.34	3.534				34	36	29.140	
MAXIMUM POWER WITH BALLAST												
30.27	5467	2.08	2605	14.96	5th	Gear (8	rd Lo)	197	57	67	28.670	
36.07	4854	2.79	2495	11.58	6th	Gear (8	rd Hi)	190	45	51	28.890	
35.95	4596	2.93	2500	10.41	7th	Gear (4	th Lo)	191	43	50	28.890	
37.88	3530	4.02	2501	7.20		Gear (5		191	53	45	28.890	
37.76	3441	4.11	2503	6.81		Gear (4		192	42	54	28.890	
38.41	2592	5.56	2500 2499	4.88		Gear (5		193	43	56	28.890	
38.07	2416 1743	5.91 8.09	2506	3.16		Gear (6 Gear (6		194	48	56 56	28.890	
35.88	1506	8.93	2500	2.74		Gear (7		193	48	55	28.890	
34.31	1061	12.13	2499	1.94		Gear (7		194	48	55	28.890	
33.16	985	12.63	2502	1.76	15th	Gear (8	th Lo)	193	43	55	28.890	
		A	IAXIM	UM PU	LL W	ITHO	UT BA	LLAST				
28.13	4938	2.14	2664	14.73	5th	Gear (3	rd Lo)	189	37	40	29.160	
VA	RYIN	G DRA	WBAR					EED W	ITH I	BALL	AST	
Pounds	null		259		70	2985	3205	344	4 5	3452	3336	
Horsep			38.4		72	35.09	32.53	29.8		4.91	19.26	
Crankshaft speed		eed rpr				2001			1 1243		991	
Miles per hour			5.56 4.97		.97	4.41	3.81 3.				2.16	
Slip of drivers,			% 4.88 5.28			5.74	6.31	6.7	6.76 6.87		6.53	
TIRES, BALLAST and WEIGHT						With Ballast			Without Ballast			
Rear tires Ballast			—No, size, ply & psi —Liquid Cast iron			Two 14.9-28; 6; 14 None 417 lb each			Two 14.9-28; 6; 14 None None			
Front tires Ballast			-No, size, ply & psi -Liquid			Two 6.00-16; 4; 32 None			Two 6.00-16; 4; 32 None			
20 412400		Cast iron				30 lb each			None			
		rawbar					14 inches			141/2 inches		
Stati	c weigh	it with	with operator—Rear Front			4895 lb 1770 lb			4060 lb 1710 lb			
			Total			6665 lb			5770 lb			

Department of Agricultural Engineering

Date of Test: March 28 to April 2, 1969

Manufacturer: JOHN DEERE DUBUQUE TRACTOR WORKS, DUBUQUE, IOWA

FUEL, OIL and TIME Fuel Regular gasoline Octane No Motor 85.2 Research 92.6 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7270 Weight per gallon 6.052 lb Oil SAE 10W 30 API service classification MS, DG, DM To motor 1.673 gal Drained from motor 1.218 gal Transmission and final-drive lubricant John Deere Special 303 Oil Total time engine was operated 44 hours.

ENGINE Make John Deere gasoline Type 3 cylinder vertical Serial No 4MTR119050T Crankshaft mounted lengthwise Rated rpm 2500 Bore and stroke 4.02" x 4.33" Compression ratio 8.0 to 1 Displacement 164.55 cu in Carburetor size 1" Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with replaceable pleated paper element Oil filter full flow replaceable pleated paper cartridge Oil cooler radiator for transmission and hydraulic oil Fuel filter screen in carburetor and fuel pump Muffler was used Cooling medium temperature control Thermostat.

CHASSIS Type standard Serial No T4RMH-077251T Tread width rear 48" to 78" front 48" to 74" Wheel base 80.71" 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 25.2" Vertical distance above roadway 26" 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 1.46 second 2.09 third 3.11 fourth 4.34 fifth 5.75 sixth 8.22 seventh 12.20 eighth 17.05 reverse first 1.70 second 2.43 third 3.61 fourth 5.05 Clutch single plate dry disc in combination with PTO clutch operated by single foot pedal Brakes wet disc operated hydraulically by two foot pedals that can be locked together Steering mechanical with power assist Turning radius (on concrete surface without brake) right 127" left 127" Turning space diameter (on concrete surface without brake) right 255" (on concrete surface without brake) right 255" (on concrete surface without brake) right 261" left 261" Belt pulley 978 rpm at 2100 engine rpm diam 12" face 8.5" Belt speed 3074 fpm Power take-off 1016 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 the SAE and ASAE test code. First, second, third and fourth gears were not run as it was necessary to limit the pull in fifth gear to avoid excessive wheel slippage. Sixteenth gear was not run as it exceeded fifteen miles per hour.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1004.

L. F. LARSEN

Engineer-In-Charge

G. W. STEINBRUEGGE, ChairmanW. E. SPLINTERD. E. LANEBoard of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station E. F. Frolik, Dean; H. W. Ottoson, Director; Lincoln, Nebraska

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, ½ of the 85% torque; maximum power, ¼ and ¾ 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 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 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 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 Pull without Ballast. All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

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.



JOHN DEERE 1520 GASOLINE