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Test 976: David Brown Selectamatic 1200 (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 976 – DAVID BROWN SELECTAMATIC 1200 DIESEL

POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption		Temperature Degrees F					Barometer inches of Mercury
		Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
65.23	2300	4.098	0.438	15.92	202	56	75	28.967	
Standard Power Take-off Speed (540 rpm)—One Hour									
55.50	1828	3.429	0.431	16.19	205	64	75	28.885	
Standard Power Take-off Speed (1000 rpm)—One Hour									
60.66	2000	3.743	0.430	16.21	204	56	75	28.943	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
58.32	2420	3.542	0.423	16.47	190	56	75	.....
0.00	2469	0.861	.....	.....	182	55	73	.....
29.46	2446	2.019	0.478	14.59	184	55	74	.....
65.42	2300	4.132	0.440	15.83	200	57	75	.....
14.79	2453	1.386	0.653	10.67	183	57	74	.....
43.69	2417	2.664	0.425	16.40	186	57	75	.....
AV 35.28	2417	2.434	0.481	14.49	187	56	74	28.937	

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption		Temp Degrees F				Barometer inches of Mercury
					Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling med	Air wet bulb	Air dry bulb	

VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours—3rd Gear (1st Hi)											
54.76	4246	4.84	2303	5.87	4.086	0.520	13.40	141	57	70	28.685
75% of Pull at Maximum Power—Ten Hours—3rd Gear (1st Hi)											
45.61	3297	5.19	2428	4.17	3.196	0.488	14.27	151	58	68	28.783
50% of Pull at Maximum Power—Two Hours—3rd Gear (1st Hi)											
31.05	2208	5.27	2438	2.96	2.390	0.536	12.99	167	58	65	28.883
MAXIMUM POWER WITH BALLAST											
49.90	8385	2.23	2423	14.80	1st Gear (1st Lo)			160	62	75	28.820
55.67	5490	3.80	2302	7.95	2nd Gear (2nd Lo)			152	57	65	28.790
56.44	4398	4.81	2300	6.10	3rd Gear (1st Hi)			153	57	65	28.790
55.27	3053	6.79	2299	4.30	4th Gear (3rd Lo)			153	57	65	28.790
54.75	2495	8.23	2300	3.27	5th Gear (2nd Hi)			147	57	68	28.790
49.95	1299	14.42	2305	1.58	6th Gear (3rd Hi)			137	57	68	28.790

MAXIMUM PULL WITHOUT BALLAST

47.05	4644	3.80	2431	14.67	2nd Gear (2nd Lo)			170	59	67	28.930
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VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 3rd Gear (1st Hi)

Pounds pull	4398	4623	4736	4860	4924	4827
Horsepower	56.44	53.02	48.06	43.14	37.57	30.61
Crankshaft speed rpm	2300	2062	1829	1604	1381	1146
Miles per hour	4.81	4.30	3.81	3.33	2.86	2.38
Slip of drivers, %	6.10	6.68	6.68	6.94	7.58	6.94

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18.4/15-30; 8; 16	Two 18.4/15-30; 8; 16
	—Liquid	860 lb each	None
	Cast iron	1278 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-16; 6; 28	Two 7.50-16; 6; 28
	—Liquid	None	None
	Cast iron	120 lb each	None
Height of drawbar		20½ inches	21½ inches
Static weight with operator—	Rear	8035 lb	3760 lb
	Front	2520 lb	2280 lb
	Total	10555 lb	6040 lb

Department of Agricultural Engineering

Dates of Test: May 22 to June 1, 1968

Manufacturer: DAVID BROWN TRACTORS LTD., MELTHAM, HUDDERSFIELD, YORKSHIRE, ENGLAND

FUEL, OIL and TIME Fuel No 2 diesel Cetane 52.4 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8371 Weight per gallon 6.970 lb Oil SAE 20-20W API service classification MS, DM To motor 1.704 gal Drained from motor 1.562 gal Transmission lubricant SAE 20W-40 Final drive lubricant SAE 140 Total time engine was operated 46½ hours.

ENGINE Make David Brown Diesel Type 4 cylinder vertical Serial No AD4/55A 6459 Crankshaft mounted lengthwise Rated rpm 2300 Bore and stroke 3.939" x 4.500" Compression ratio 17 to 1 Displacement 219.4 cu in Cranking system 12 volt electric Lubrication pressure Air cleaner oil washed wire mesh with precleaner Oil filter full flow with replaceable paper element Fuel filter primary and secondary filters with replaceable paper elements and sediment bowl Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 1200/A 705548 Tread width rear 56" to 80" front 52" to 72" Wheel base 88½" 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 35.5" Vertical distance above roadway 33.5" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio Advertised speeds mph first 2.43 second 4.04 third 5.02 fourth 6.94 fifth 8.33 sixth 14.30 reverse 4.01 and 8.27 Clutch single plate dry disc operated by foot pedal in combination with PTO clutch operated by hand lever Brakes internal expanding shoe operated by hand lever or independently by two foot pedals Steering no power assist Turning radius (on concrete surface with brake applied) right 138" left 138" (on concrete surface without brake) right 155" left 155" Turning space diameter (on concrete surface with brake applied) right 282" left 282" (on concrete surface without brake) right 316" left 316" Power take-off 540 rpm at 1828 engine rpm and 1000 rpm at 2000 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.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 976.

L. F. LARSEN

Engineer in Charge

G. W. STEINBRUEGGE, Chairman

J. J. SULEK

D. E. LANE

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



DAVID BROWN SELECTAMATIC 1200 DIESEL