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Test 1143: David Brown 885 Gasoline

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1143 – DAVID BROWN 885 GASOLINE

POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Temperature Degrees F Air wet bulb	Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours—(PTO Speed—1100 rpm)								
39.26	2200	3.830	0.591	10.25	207	64	75	29.156
Standard Power Take-off Speed (1000 rpm)—One Hour								
37.26	2000	3.399	0.552	10.96	210	64	75	29.160
Standard Power Take-off Speed (540 rpm)—One Hour								
34.40	1828	3.016	0.531	11.41	209	64	75	29.163
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
34.37	2266	3.637	0.641	9.450	185	64	74	.....
0.00	2371	1.234	.....	.....	181	64	76	.....
17.31	2281	2.244	0.785	7.71	189	63	74	.....
39.23	2200	3.845	0.593	10.20	211	63	74	.....
8.71	2292	1.714	1.192	5.08	188	63	74	.....
25.95	2279	2.740	0.639	9.47	195	63	74	.....
Av 21.04	2281	2.569	0.739	8.19	192	63	75	29.143

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool- ing med	Air wet bulb	Air dry bulb	Barometer inches of Mercury
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VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours—8th Gear (H-1)											
32.09	2148	5.60	2196	4.05	4.253	0.802	7.55	191	60	65	28.800
75% of Pull at Maximum Power—Ten Hours—8th Gear (H-1)											
26.15	1666	5.89	2276	2.81	3.737	0.865	7.00	187	61	65	28.850
50% of Pull at Maximum Power—Two Hours—8th Gear (H-1)											
18.91	1192	5.95	2281	2.00	2.622	0.840	7.21	185	62	67	28.800
50% of Pull at Reduced Engine Speed—Two Hours—10th Gear (L-3)											
18.26	1149	5.96	1603	2.63	2.477	0.821	7.37	186	59	60	28.900

MAXIMUM POWER WITH BALLAST

28.93	5308	2.04	2262	13.76	3rd Gear (HS-1)			185	53	54	28.800
31.33	4459	2.63	2199	10.19	4th Gear (L-1)			189	53	54	28.800
32.92	2680	4.61	2199	5.36	7th Gear (L-2)			194	66	71	28.820
32.65	2184	5.61	2201	4.23	8th Gear (H-1)			191	58	61	28.800
32.03	1887	6.37	2199	3.56	9th Gear (HS-1)			195	66	71	28.820
32.22	1479	8.17	2199	2.82	10th Gear (L-3)			196	66	71	28.820

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 8th Gear (H-1)

Pounds Pull	2184	2279	2390	2517	2564	2525
Horsepower	32.65	30.39	28.40	26.16	22.71	18.74
Crankshaft Speed rpm	2201	1970	1759	1543	1316	1102
Miles Per Hour	5.61	5.00	4.46	3.90	3.32	2.78
Slip of Drivers %	4.23	4.53	4.77	5.13	5.25	5.13

TRACTOR SOUND LEVEL

	dB (A)
Maximum Available Power 2 Hours	96.5
75% of Pull at Max. Power 10 Hours	94.5
50% of Pull at Max. Power 2 Hours	93.0
50% of Pull at Reduced Engine Speed 2 Hours	91.0
Bystander 12th Gear (H-3)	80.5

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires	Two 14.9-28;6;16	Two 14.9-28;6;16
Ballast	794 lb each	None
	Cast Iron	None
Front Tires	Two 6.00-16;6;32	Two 6.00-16;6;32
Ballast	None	None
	Cast Iron	None
Height of drawbar	19 inches	19½ inches
Static weight with operator —rear	4910 lb	2550 lb
front	1640 lb	1470 lb
total	6550 lb	4020 lb

Department of Agricultural Engineering

Dates of Test: September 17 to October 3, 1973

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

FUEL, OIL AND TIME Fuel Lead free gasoline Octane No Motor 82.7 Research 91.6 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7274 Weight per gallon 6.055 lb Oil SAE 20-20W API service classification (Case HDM Oil) To motor 2.115 gal Drained from motor 0.955 gal Transmission and final drive lubricant SAE 140 Total time engine was operated 48 hours.

ENGINE Make David Brown Gasoline Type 3 cylinder vertical Serial No 349101-1740 Crankshaft Mounted lengthwise Rated rpm 2200 Bore and stroke 3.939" to 4.00" Compression ratio 6.75 to 1 Displacement 146.1 cu in Carburetor size 34mm (1.3") Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner oil washed wire mesh with pleated paper precleaner Oil filter full flow replaceable pleated paper element Fuel filter sediment bowl with water trap Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 885/G/1651279 Tread width rear 56" to 76" front 52" to 72" Wheel base 77" 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 26" Vertical distance above roadway 28" 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 1.1 second 1.9 third 2.2 fourth 2.9 fifth 3.2 sixth 3.7 seventh 4.7 eighth 5.7 ninth 6.4 tenth 8.2 eleventh 9.4 twelfth 16.3 reverse 1.9, 3.7, 4.7 and 9.4 Clutch single plate dry disc in combination with PTO clutch operated by foot pedal Brakes internal expanding shoe operated by hand lever or independently by two foot pedals Steering hydrostatic Turning radius (on concrete surface with brake applied) right 113" left 113" (on concrete surface without brake) right 129" left 129" Turning space diameter (on concrete surface with brake applied) right 234" left 234" (on concrete surface without brake) right 266" left 266" Power take-off 1000 rpm at 2000 engine rpm or 540 at 1828 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.

First and second gears were not run as it was necessary to limit the pull in third gear because of the tire tangential pull limitation.

Fifth, sixth, eleventh, and twelfth gears were not run as test procedure requires only six travel speeds.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1143.

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 & Acting Dean; 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. 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.



DAVID BROWN 885 GASOLINE