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## Test 731: David Bradley Super 300 (Gasoline)

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA TRACTOR TEST 731 - DAVID BRADLEY SUPER 300 GASOLINE

University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director, Lincoln, Nebraska

## BELT 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									
Rated Engine Speed—Two Hours									
1.77	3600	0.377	1.294	4.69	Air Cooled	72	76	29.047	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
1.58	3770	0.326	1.253	4.85	Air Cooled	72	76	.....	
0.03	4291	0.257	.....	.....	Air Cooled	72	76	.....	
0.86	4012	0.267	1.884	3.22	Air Cooled	72	77	.....	
1.86	3602	0.386	1.258	4.82	Air Cooled	71	75	.....	
0.44	4123	0.262	3.614	1.68	Air Cooled	71	74	.....	
1.21	3839	0.301	1.512	4.02	Air Cooled	71	75	.....	
Av	1.00	3926	0.300	1.820	3.33	Air Cooled	71	75	29.077

## DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	Fuel Consumption		Hp-hr per gal	Temp. Degrees F			Barometer inches of mercury
					Gal per hr	Lb per hp-hr		Cooling med	Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours											
1.65	241	2.57	3598	3.23	0.341	1.255	4.84	Air Cooled	43	54	28.765
75% of Pull at Maximum Power—Ten Hours											
1.38	190	2.72	3737	2.58	0.319	1.404	4.33	Air Cooled	35	42	28.916
50% of Pull at Maximum Power—Two Hours											
0.94	117	3.00	4042	1.25	0.237	1.532	3.97	Air Cooled	48	65	28.685
MAXIMUM POWER WITH BALLAST											
1.75	253	2.59	3604	3.47	.....			Air Cooled	38	43	28.800
MAXIMUM POWER WITHOUT BALLAST											
1.62	237	2.57	3611	5.16	.....			Air Cooled	27	29	29.210
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST											
Pounds pull			255	260	250			260	250	230	
Horsepower			1.8	1.6	1.3			1.2	1.0	0.8	
Miles per hour			2.6	2.3	2.0			1.8	1.5	1.3	

Department of Agricultural Engineering

Dates of Test: November 19 to December 7, 1959

Manufacturer: DAVID BRADLEY MANUFACTURING WORKS, BRADLEY, ILLINOIS

Manufacturer's Power Rating: Engine rated at 3 horsepower by its manufacturer.

**FUEL, OIL and TIME** Fuel regular gasoline Octane No ASTM 84 Research 92 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7292 Weight per gallon 6.070 lb Oil SAE 30 API service classification ML, MM, MS, DG To motor 0.299 gal Drained from motor 0.147 gal Transmission and Final-drive lubricant SAE No 30 Type engine crankcase oil Total time motor was operated 37 hours.

**ENGINE** Make Briggs & Stratton Type 1 cylinder vertical air cooled Serial No 5910190 Crankshaft mounted crosswise Rated rpm 3600 Lubrication splash Bore and stroke 2 3/8" x 1 3/4" Compression ratio 6.2 to 1 Displacement 7.75 cu in Carburetor size 1/2" Ignition system magneto Cranking system recoil rope starter Air cleaner oil washed wire mesh Muffler was used Oil filter none Cooling medium temperature control air cooled.

**CHASSIS** Type 2 wheel Serial No 55126 Tread width 20" to 27" Transmission fixed sheave V-belt drive Advertised speeds mph 2.7 Belt pulley 2.65" pitch diameter B section V-belt rpm 3600 Belt speed 2510 fpm Belt B section V-belt length 70" Clutch single disc, ball lock over center operated by hand lever Brakes none Steering manual.

**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. During the test the recoil starter did not function properly on several occasions.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No 731.

L. F. LARSEN

Engineer-in-Charge

L. W. HURLBUT  
G. W. STEINBRUEGGE  
J. J. SULEK  
Boar of Tractor  
Test Engineers

## TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Drive tires	—No, size, ply & psi	Two 6.70-15;2;6	Two 6.70-15;2;6
Ballast	—Liquid	None	None
	—Cast iron	76 lb each	None
Height of drawbar		12 inches	12 inches
Total weight as tested without operator		486 lb	334 lb

## 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 useage.

### 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.



David Bradley Super 300 Gasoline